

Pftaps19760106 Wk01

HHHHHT	APS1	ISSUE - 760106
HHHHHT	APS1	ISSUE - 760106
PATN		
WKU	RE0286710	
SRC	5	
APN	500649&	
APT	2	
PBL	E	
ART	315	
APD	19740826	
TTL	Hydrophone damper assembly	
ISD	19760106	
NCL	18	
ECL	13	
EXA	Basinger; Sherman D.	
EXP	Blix; Trygve M.	
NDR	2	
NFG	10	
INVT		
NAM	Widenhofer; James W.	
CTY	Jackson	

Pftaps19760106 Wk01

STA	MI
ASSG	
NAM	Sparton Corporation
CTY	Jackson
STA	MI
COD	2
REIS	
COD	50
APN	151269
APD	19710609
PNO	3701175
ISD	19721031
CLAS	
OCL	9 8R
XCL	340 2
XCL	340 3T
XCL	340 7R
XCL	340 8R
EDF	2
ICL	B63B 2152
ICL	B63B 5102
FSC	9

Pftaps19760106 Wk01

FSS 8 R

FSC 340

FSS 2;3 T;8 S;8 R;7

FSC 114

FSS 206 R

UREF

PNO 2790186

ISD 19570400

NAM Carapellotti

OCL 9 8R

UREF

PNO 3329015

ISD 19670700

NAM Bakeke et al.

OCL 340 2

UREF

PNO 3377615

ISD 19680400

NAM Lutes

OCL 340 2

UREF

Pftaps19760106 Wk01

PNO 3543228

ISD 19701100

NAM Farmer

OCL 340 2

UREF

PNO 3543228

ISD 19701100

NAM Farmer et al.

OCL 9 8R

UREF

PNO 3711821

ISD 19730100

NAM Dale et al.

OCL 9 8R

UREF

PNO 3720909

ISD 19730300

NAM Sikora

OCL 340 2

UREF

PNO 3803540

Pftaps19760106 Wk01

ISD	19740400
NAM	Mar et al.
OCL	340 2
LREP	
FRM	Beaman & Beaman
ABST	
PAL	<p>A damper for use in submerged hydrophone suspension systems including an elongated mass cylinder defined by a tube of flexible synthetic plastic film utilizing a check valve located at each end permitting water to enter the tube and preventing egress. Additionally, each tube end is provided with a disk transversely disposed to the tube length and of a diameter substantially greater than that of the tube to provide drag and hydrodynamic mass damping. The tube and disk are of a configuration to eliminate vortex shedding and the entire damper assembly is capable of being folded and packed within a concise configuration prior to deployment.</p>
BSUM	
PAC	BACKGROUND OF THE INVENTION
PAR	<p>The invention pertains to the field of motion damping devices used with submerged marine instrumentation for damping instrumentation movement and displacement due to wave and water motion.</p>

Pftaps19760106 Wk01

PAR In underwater transducer and hydrophone installations, such as in a sonobuoy system for detecting submarine sounds and the like, the provision of a substantially stable platform for the hydrophone is of prime importance in order to reduce extraneous noises and signals and permit the most accurate sound pressure wave input characteristics.

PAR The purpose of sonobuoy suspension systems is to attenuate the vertical motion imparted by surface wave action to a hydrophone platform as motion of the hydrophone due to surface wave action will result in the generation of spurious low frequency signals. The attenuation system itself must not produce low frequency lateral motion oscillation such as those commonly found in objects suspended in ocean currents resulting from periodic shedding of vortices in the flowing fluid.

PAR In a free floating sonobuoy system it is also important that a high drag concentration in the vicinity of the hydrophone platform be produced to reduce the relative velocity of the flow past the hydrophone to minimize the magnitude of any occurring flow noise as well as reducing the frequency of the noise associated with boundary layer transition on the hydrophone surfaces. Additionally, the magnitude and frequency of any unavoidable motion associated with vortex shedding is simultaneously reduced.

PAR Improved transducer suspension systems have been achieved by the

Pftaps19760106 Wk01

utilization of complaint members such as shown in the assignee's U.S. Pat. No. 3,377,615. Additionally, the utilization of specialized configurations in floating and buoy systems for stabilization purposes are known as shown in U.S. Pat. Nos. 3,191,202, 3,500,783, 3,510,892 and 3,543,228. However, a damper assembly for use with submerged hydrophone assemblies wherein a mass damper of an effective construction capable of being concisely stored has not been previously successfully achieved.

PAC

SUMMARY

PAR

It is an object of the invention to provide a low cost damper for the purpose of stabilizing the position of a hydrophone platform in order to reduce the introduction of spurious noises and signals into the hydrophone. The damper of the invention utilizes both mass, drag and hydrodynamic mass damping characteristics, and while the mass of the damper is significant when deployed, its weight when stored is very small and its unique construction utilizes entrapped water to produce the desired damping mass.

PAR

Additionally, the damper assembly of the invention isolates the hydrophone platform from any direct input of residual strumming produced by the compliant cable spring suspension utilized in conjunction with the hydrophone, and the construction of the damper is such as to minimize the occurrence of vibration due to water current and flow past the damper

Pftaps19760106 Wk01

components.

PAR

The damper assembly in accord with the invention includes a long cylinder of flexible synthetic plastic film closed at each end by a check valve of unique configuration which permits water to enter, but not leave the tube.

Disks having a diameter substantially greater than that of the tube are attached to each tube end at the check valves transversely disposed to the tube length to produce hydrodynamic damping and the disks are canted with respect to each other to minimize adverse effects produced by vortex shedding. An inelastic strip is affixed to the tube extending its length causing the tube to be warped or curved in an arc in the longitudinal direction minimizing rotation of the damper due to waterflow, and elimination of such rotation is important as rotation will aggravate the

PATN

instability of the damper assembly in a shear current.

PAR

The disks located at the tube end are formed of synthetic plastic film and their shape is maintained, when deployed, by a flexible, resilient ring formed of a spring steel material which forms an expanded cylindrical configuration as soon as the damper is deployed and removed from its storage cannister.

PAR

Assembly of the damper is simplified by the utilization of retaining members defined on the check valve wherein a mechanical interconnection

Pftaps19760106 Wk01

between the tube and associated disks is simultaneously achieved by the assembly of the check valve structure. Also, suspension means are defined on the check valve permitting the damper to constitute a component in the hydrophone suspension system.

DRWD

PAC BRIEF DESCRIPTION OF THE DRAWINGS

PAR The aforementioned objects and advantages of the invention will be appreciated from the following description and accompanying drawings wherein:

PAR FIG. 1 is a perspective view of a deployed sonobuoy system utilizing the damper of the invention,

PAR FIG. 2 is an elevational view of the damper in accord with the invention as deployed,

PAR FIG. 3 is a view taken from the right of FIG. 2,

PAR FIG. 4 is a top plan view as taken of FIG. 2,

PAR FIG. 5 is a cross-sectional view taken through the tube along Section V--V of FIG. 2,

PAR FIG. 6 is an enlarged cross-sectional view taken through the disk and check valve along Section VI--VI of FIG. 4,

PAR FIG. 7 is an enlarged cross-sectional view taken through the check valve rim region illustrating the retaining ring construction, and FIGS. 8

Pftaps19760106 Wk01

through 10 illustrate the folding of the disk and tube for packing into the sonobuoy cannister.

DETD

PAC

DESCRIPTION OF THE PREFERRED EMBODIMENT

PAR

FIG. 1 illustrates a deployed sonobuoy system using a damper and improved transducer platform for providing high quality transmission of underwater sound vibrations. The sonobuoy float 10 floats upon the surface of the water and the cannister 12 depends from the float. The cannister is of a hollow cylindrical configuration and prior to deployment houses the sonobuoy components. In those cases where the sonobuoy is dropped from aircraft the cannister serves to protect the transducer, damper and other components upon impact with the water. A cable 14 depends from the cannister and is attached to the upper end of the damper assembly generally indicated at 16. A second cable 18 depends from the lower end of the damper assembly and is attached to the hydrophone assembly generally indicated at 20. The assembly 20 includes instrumentation housing 22,

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housing 23, compliant expansion cables 24 and 26, hydrophone 28, and weight 30. The housing 23 and hydrophone 28 are located within a mesh tube 32 which reduces flow noises and electrical conductors, not shown, interconnect the hydrophone with its transmitter housings 22 and 23 and

Pftaps19760106 Wk01

the transmitter located within the cannister 12. The assembly 20 constitutes no part of the invention and is described in detail in the assignee's copending application, Ser. No. 111,410, filed Feb. 1, 1971. It is to be understood that the purpose of the damper assembly 16 is to provide a stable platform for the hydrophone assembly 20 and does so in the manner described below.

PAR The damper assembly 16 includes a mass cylinder 34 formed by a tube or sleeve of flexible synthetic plastic film of only a few thousandths of an inch thickness whereby the cross-sectional configuration of the tube is cylindrical and the tube may be concisely folded.

PAR The ends of the tube 34 are cut at substantially right angles to the tube length, when deployed, and are connected to check valve structure in a manner later described. The check valve structure 36 is identical at each end of the tube and each check valve includes retaining ring members whereby the tube and disk members associated at each tube end may be mechanically connected simultaneously to the check valve.

PAR The disks 38 are also each formed of synthetic plastic film having an upper layer 40 and a lower layer 42, FIG. 6. When deployed, the annular configuration of the disks is maintained by an annular resilient spring-like ring 44, and the disks are formed by a heat sealing process resulting in a peripheral seam 46.

Pftaps19760106 Wk01

PAR

Stabilizer straps 48 of plastic film are connected to each of the peripheries of the disks 38 at one end, and connected to the central region of the tube 34 at the other end, and the length of the stabilizers is such that the disks 38 are canted with respect to each other as will be apparent in FIGS. 2 and 3.

PAR

The check valve structure 36 will be appreciated from FIGS. 4, 6 and 7. As appreciated from FIG. 4, the check valves are of an annular configuration including a peripheral rim region 50. The body of the valve is formed of a synthetic plastic material and is of a cylindrical configuration including a passage 52. centrally defined therein through which water may flow into the tube 34. Webs 54 diametrically extend across the passage 52 and the inner surface 56 of the rim region serves as a valve seat for the resilient, flexible flap valve 58 riveted to the valve body at 60. Thus, it will be appreciated that water may flow through the passage 52 against the valve element 58 and around the valve element into the tube 34. However, the water may not flow from the tube in that the valve 58 seats against the surface 56, and that portion of the valve disposed over the passage 52 is supported by the webs 54.

PAR

The valves 36 are connected to the tube 34, and serve to interconnect the tube and disks by means of a retaining ring assembly 62 which consists of an outer annular ring 64 and annular inner ring 66. The ring 64 and an L

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cross-sectional configuration including a radial surface 68 for opposed relationship to the peripheral rim region surface 70. Also, the ring 64 is recessed at 72 whereby the ring 66 overlays the ring 64 to maintain the assembly thereof to the valve body.

PAR

The valve body peripheral rim region is provided with a conical "undercut" surface 74 and a radial surface 76 for cooperation with corresponding conical surface 78 and radial surface 80 defined upon the ring 66. The ring 66 is split at 82, FIG. 4, wherein once the ring 64 is positioned as shown in FIG. 7, the ring 66 may be inserted into the recess 72 defined by the ring 64 and the conical surface 74. Due to the presence of the conical surfaces 74 and 78 the ring 66 will be maintained in position, and thereby maintain the assembly of the retaining ring assembly 62 upon the valve body.

PAR

The tube material adjacent the tube end is disposed between the surfaces 68 and 70, the surfaces 76 and 80 and the surfaces 74 and 78 as appreciated from FIG. 7. Likewise, the synthetic plastic film layers constituting the layers 40 and 42 of the disks 38 are disposed between the aforementioned surfaces as illustrated whereby compression upon the material of the tube and disks is maintained between the valve body and the retaining ring assembly to form an effective sealing mechanical connection between the tube, associated disk and check valve structure.

Pftaps19760106 Wk01

PAR The aforementioned check valve structure constitutes the subject matter of the assignee's pending U.S. Pat. application, Ser. No. 145,133, filed May 20, 1971.

PAR An inelastic plastic strip 84 is adhered to the tube 34 throughout its length and electrical conductors 86, FIG. 5, are sandwiched between the tube 34 and the adhesive strip 84 wherein such conductors interconnect the hydrophone assembly 20 below the damper with the cannister 12 located vertically above. The disks 38 may be provided with vent holes 88, and loop anchors 90 formed of a reinforced fabric, FIG. 6, are defined on each of the valve structures 36, and affixed thereto by rivets 92, FIG. 6, to serve as the mounting for the suspension cables 14 and 18.

PAR In that the tube 34 and disks 38 are formed of a highly flexible lightweight synthetic plastic film material it is possible to fold the entire damper assembly 16 in a space only slightly greater than that occupied by the valves 36 when stacked one upon the other. Such concise packaging is illustrated by the folding procedure shown in FIGS. 8 through 10. Each of the disks may be folded as illustrated due to the resilient nature of the annular rings 44 wherein each ring is folded and "wound" to

SRC 5 a diameter substantially equal to that of a check valve body. FIG. 10 illustrates the configuration of the disk once the ring is folded in the

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described manner. Thereupon the tube material may be sandwiched between the folded disks and check valves and the damper assembly is inserted into the cannister 12 intermediate the float 10 and the hydrophone assembly 20.

PAR

When the cannister 12 engages the water surface, the release mechanism permits the assemblies 20 and 16 to deploy from the cannister. The weight of the assembly 20 will pull the damper assembly 16 from the cannister and as the assembly 16 is removed from the confines of the cannister the rings 44 will, due to their resilient nature, "open" to form the disk configuration apparent in FIGS. 2 and 3. Additionally, as the damper assembly is pulled down through the water the water will be forced into the interior of the tube through the lower check valve passage 52. Any air trapped in the tube 34 will soon escape the tube upon wave motion causing an upward movement of the damper assembly wherein the upper check valve 36 will momentarily open and permit entrapped air to be released. The mass of the water entrapped within the tube 34 is significant and thus a mass damping is achieved.

PAR

The inelastic strip 84 causes the tube to form an arc rather than a straight line, and the strip 84 is located at 180.degree. with respect to the stabilizer straps 48.

PAR

The configuration of the damper due to the presence of the inelastic strip 84 and the canting of the disks 38 stabilizes the damper in the presence

Pftaps19760106 Wk01

of a shear current in that the curved configuration employed in conjunction with the offsetting of the points of attachment occurring at the attachment rings 90 located adjacent the check valve edge regions minimizes rotation of the damper, and as such rotation would aggravate the instability of the damper in a shear current such features are of significance.

PAR

Additionally, vortex shedding is greatly reduced due to the presence of the stabilizer straps 48 and the canting of the disks. This combination disrupts the normal waterflow around the tube breaking up the pattern of vortex shedding. Thus, the damper may be used in close proximity to a hydrophone platform without adverse effect.

PAR

Accordingly, it will be appreciated that the damper of the assembly effectively produces mass, drag and hydrodynamic mass damping with the utilization of economically produced structure easily stowable in a restricted volume container. Advantageous waterflow characteristics are achieved wherein the damper does not introduce extraneous vibrations into the hydrophone suspension system, and assembly of the damper components is minimized due to the mechanical interconnection thereof achieved by the check valves 36.

PAR

It is appreciated that various modifications to the inventive concept may be apparent to those skilled in the art without departing from the scope

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and spirit of the invention.

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STM

I claim:

NUM

1

PAR

1. A hydrophone damper assembly comprising, in combination, an elongated tube of flexible material having first and second ends, a check valve attached to each tube end and sealing the associated end, said check valves permitting water to enter the tube and preventing water egress, and attachment means associated with said tube for attaching hydrophone structure thereto.

NUM

2

PAR

2. In a hydrophone damper assembly as in claim 1 wherein said attachment means is mounted upon at least one of said check valves.

NUM

3

PAR

3. In a hydrophone damper assembly as in claim 1 wherein said tube is formed of a synthetic plastic film.

NUM

4

PAR

4. In a hydrophone damper assembly as in claim 1, a disk attached to said tube, said disk having a generally flat planar configuration and transversely related to the length of said tube and having a diameter greater than the diameter of said tube.

Pftaps19760106 Wk01

NUM	5
PAR	5. In a hydrophone damper assembly as in claim 4 wherein said disk is affixed to said tube adjacent one of said ends.
NUM	6
PAR	6. In a hydrophone damper assembly as in claim 5 wherein a disk is attached to each end of said tube.
NUM	7
PAR	7. In a hydrophone damper assembly as in claim 5 wherein said check valves include tube and disk mounting means, said valve at said one tube end attaching said disk to said tube.
NUM	8
PAR	8. A hydrophone damper assembly comprising, in combination, an elongated tube of flexible material having first and second ends, a check valve affixed to each tube end and closing the associated end permitting water to enter the tube and preventing water egress therefrom, a substantially flat disk member affixed to said tube adjacent each end whereby the general plane of said disks is transversely disposed to the tube length, and attachment means mounted upon said tube adjacent said ends for attaching hydrophone structure thereto.
NUM	9
PAR	9. In a hydrophone assembly as in claim 8 wherein said tube and disks are

Pftaps19760106 Wk01

formed of a synthetic plastic film, each of said disks including a

deformable resilient ring forming and maintaining the disk periphery.

NUM

10

PAR

10. In a hydrophone damper assembly as in claim 9 wherein said check valves

include film retaining means, said film retaining means interconnecting

and maintaining the assembly of the associated tube end, disk and check

valve.

NUM

11

PAR

11. In a hydrophone damper assembly as in claim 8, disk orientation means

interposed between said disks and said tube obliquely angularly orienting

the plane of said disks to the length of said tube.

NUM

12

PAR

12. In a hydrophone damper assembly as in claim 11 wherein said tube is of

a curved configuration relative to its length. .ladd. 13. A hydrophone

damper comprising, in combination, an envelope of flexible material, a

check valve defined in said envelope directly communicating with the

environment surrounding said envelope, said check valve permitting water

to directly enter the envelope whereby said envelope confines the water

therein and preventing said water from leaving said envelope, and

attachment means associated with said envelope for attaching hydrophone

structure thereto. .laddend. .ladd. 14. In a hydrophone damper assembly as

Pftaps19760106 Wk01

in claim 13 wherein said envelope comprises a tube having first and second ends, and said check valve is located in one of said ends. .laddend.

.ladd. 15. In a hydrophone damper assembly as in claim 13 wherein said envelope comprises a tube having first and second ends, a disk attached to said tube adjacent at least one of said ends, said disk having a generally flat planar configuration and transversely related to the length of said tube and having a diameter greater than the diameter of said tube.

.laddend. .ladd. 16. In a hydrophone damper assembly as in claim 15 wherein said disk is formed of a flexible synthetic plastic film and has a generally circular periphery, an annular resilient spring element within said disk engaging the periphery thereof and having a normal expanded circular configuration, said element capable of being twisted and folded into a plurality of loops of a dimension less than said elements' normal expanded configuration and expanding into its normal configuration when unrestrained. .laddend. .ladd. 17. In a hydrophone damper as in claim 13,

said envelope having an elongated tubular configuration and an inflated cylindrical transverse cross-sectional configuration, said check valve having a flat configuration having a circular diameter substantially corresponding to the inflated diameter of said envelope. .laddend. .ladd.

18. A hydrophone damper comprising, in combination, an envelope of flexible material having first and second ends, a check valve defined in

Pftaps19760106 Wk01

one of said envelope ends directly communicating with the environment surrounding said envelope, said check valve permitting water to directly enter the envelope whereby said envelope confines the water therein and preventing water from leaving said envelope, and attachment means associated with said envelope for attaching hydrophone structure thereto.

.laddend.

APN	5475732
APT	2
PBL	E
ART	353
APD	19750206
TTL	Pliable tape structure
ISD	19760106
NCL	25
ECL	1
EXP	Larkin; Geo. V.
NDR	5
NFG	34
INVT	
NAM	Wakeman; Alfred W.
STR	Madison Road

Pftaps19760106 Wk01

CTY Durham

STA CT

ZIP 6422

REIS

COD 50

APN 159796

APD 19710706

PNO 3751760

ISD 19730814

CLAS

OCL 16150

XCL 281 375

EDF 2

ICL E05D 700

FSC 16

FSS 150

FSC 220

FSS 30;32

FSC 229

FSS 44

FSC 248

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FSS	205 A
FSC	281
FSS	37.5;40;41;21 R;22
UREF	
PNO	1843170
ISD	19320200
NAM	Meldrim
OCL	16150
UREF	
PNO	2611659
ISD	19520900
NAM	Hadley
OCL	16150
UREF	
PNO	3279473
ISD	19691000
NAM	Toman
OCL	16150
UREF	
PNO	3442415
ISD	19690500

Pftaps19760106 Wk01

NAM	Glass
OCL	16150
UREF	
PNO	3851353
ISD	19741200
NAM	Wakeman
OCL	16150
FREF	
PNO	970,771
ISD	19640900
CNT	UK
OCL	16150X
FREF	
PNO	1,099,154
ISD	19550800
CNT	FR
OCL	16150X
LREP	
FRM	St. Onge Mayers Steward & Reens
ABST	
PAL	A flexible longitudinally continuous tape construction is disclosed for use

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in joining mating edges of juxtaposed members, the tape having an X-like configuration transversely of its length to provide legs adapted to receive and be secured to the edges of the members to be joined. The tape is capable of serving as a pliable hinge to permit articulation of the joined members, or it may also serve simply as a binding for joining members intended to be fixed relative to each other. The tape construction combines longitudinally continuous marginal web portions or carriers, forming the extremities of the legs of the X, with longitudinally spaced strand or equivalent connector means running crosswise of and interconnecting pairs of marginal web portions. The connector means intersect and interlock forming the axis of the X-like configuration.

PARN

PAC

CROSS REFERENCE TO RELATED APPLICATIONS

PAR

This application is a continuation-in-part of my prior copending application Ser. No. 859,619, filed Sept. 22, 1969 [...]. .ladd.now abandoned..laddend.

BSUM

PAC

1. Field of the Invention

PAR

This invention pertains to continuous length, pliable tape structures useful in joining mating edges of adjacent members for making rigid or hinged connection between such members.

Pftaps19760106 Wk01

PAC

2. Prior Art Background

PAR

The limiting strength of conventional hinged or jointed structures utilizing sheet or panel members to form the structure is the ability of such members to carry localized stresses at points of attachment. There has accordingly existed for some time a need for better means of joining the edges of materials having relatively low resistance to localized loading stresses, such as the imposed by rivets screws, spot welding and the like. Sheet or panel materials which are particularly involved include formed plastic sheet, foamed .[.core/stressed.].ladd.core-stressed.laddend.skin laminates, corrugated board, chipboard, felt laminates and similar light weight, low cost but easily rupturable stock which is commonly used in fabricating containers or other vessels, display structures, protective table pads, folio covers, etc. forces in the situation here illustrated.

PAR

Various tape constructions for joining mating edges of such materials have been advanced heretofore. A common arrangement is illustrated in Pats. Nos. 589,504, 1,260,197, 1,833,469 and 3,035,752 where the junction is formed by fabric or paper strips or tabs which are simply glued to the faces of the members to be joined. One particular difficulty with these arrangements is their poor resistance to peeling of the tabs from the

Pftaps19760106 Wk01

faces of the joined members when forces are applied tending to move the members bodily relative to each other. Another form is illustrated in U.S. Pats. Nos. Re. 18,204, 1,998,036, 2,025,926, and 3,442,415. This form of joint-forming tape is characterized generally by the employment of two, coextending tapes which are stitched together along their center lines to form an X-like configuration in cross section. The legs of the X are then glued or otherwise secured to the margins of the members to be joined. This represents an improvement over flat tape but the stitching, falling as it must at the axis of the hinge, weakens the structure at its most critical location. Still another approach used for hingedly joining members is represented by the constructions shown in Pats. Nos. 46,071, 570,365 and 2,219,524. The arrangements there shown are not longitudinally continuous of the joined edges, so that a plurality of separate hinges must be used; and their attachment to the members to be joined presents problems. Molded plastic hinges of the type illustrated in Pats. Nos. 3,202,310 and 3,301,430 are designed to provide a continuous joint along the mating edges, but here again a problem is encountered in providing suitable means for securing such joint-forming constructions to the panel members.

PAC

SUMMARY OF THE INVENTION

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The present invention provides a pliable tape structure which can be

Pftaps19760106 Wk01

manufactured in continuous lengths and easily cut to any desired length for application to the members to be joined, much the same as ordinary pressure-sensitive tape is applied to a surface but which avoids the short-comings of prior tape arrangements discussed above. The novel tape structure is designed to take advantage of the highest tensile strength-to-weight ratio of any material form, namely that of the filament. The invention applies this high strength property to hinges or joint-forming tape without creating localized stress points in the resulting structure, as the tape configuration puts the entire attachment area (glue or other bonding agent) in shear only and eliminates peel forces.

PAR

As mentioned, the novel tape may serve to join both articulated and non-articulated members and one of the principal objectives of the invention is to provide a hinge or joint-forming tape structure which affords uniform distribution of attachment stress over as large an area as

CLMS

practical of the members which it is desired to join, thereby avoiding localized or concentrated stresses at points of attachment, while minimizing susceptibility to peeling. In this way, advantage can be taken of materials of low cost but stress-oriented nature, such as paperboard, expanded or foamed plastic, etc., for use as basic structural members,

Pftaps19760106 Wk01

without the need and attendant expense of special reinforcement or auxiliary construction at the point of attachment. The invention makes possible better application of maximum material properties to achieve great strength-to-weight ratios in joined structures.

PAR Other objectives include greater ease of application of the tape to members to be joined, and provision for specialized engineering applications, such as that involved in rolling hinges or in hingedly joining members whose mating edges are curved.

PAR Use of the novel tapes for purposes other than hinging applications is of advantage where members to be secured together are subjected to loading or other forces tending to shift one member bodily relative to the other. The invention enables loadbearing structures such as display stands, mock-ups of prototype equipment, cartons or containers of various configurations, to be made of relatively low strength sheet stock. By joining members or sections of these devices with tape of the design herein disclosed, the inadequacy in peel strength of conventional pressure-sensitive adhesive or mending tape is largely overcome.

PAR In accordance with the teaching herein, engineering advantage is taken of inherent tensile strength in pliable fabric, strand or sheet materials, when used in the tape configurations disclosed, to form continuous length tape structures which are easily applied to the members to be joined, and

Pftaps19760106 Wk01

which distribute the attachment stresses uniformly over the adjacent edges of joined members, thereby reducing the chance for failure of the materials at such locations.

PAR

Briefly, the tape structures of the invention are comprised generally of two essential sets of elements. One set of elements consists of pliable strands, or equivalent connector means, disposed to run transversely of the joint to be formed. The other set of elements consists of pliable web portions or carriers disposed to run longitudinally of the joint to be formed. Each transverse strand or connector element interconnects two of the longitudinal web portions and serve to support load stresses purely in tension, i.e. the maximum strength property of the strand. At least some of the cross strands alternate with other such strands along the axis of the tape, forming an X-like configuration in cross-section of the tape. Adhesive is applied to the confronting faces of legs in two transversely oriented quadrants of the X for bonding the tape to the margins of the members to be joined, whereby the margins are clamped between adjacent legs in quadrants of the X-like tape on opposite sides of the tape axis.

PAR

Various embodiments of this basic combination and modifications thereof are illustrated in the accompanying drawings and are described hereinafter.

DRWD

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PAC	DESCRIPTION OF DRAWINGS
PAR	FIG. 1 is a perspective view showing a portion of a preferred form of tape structure embodying the invention;
PAR	FIG. 2 is a fragmentary elevational view in perspective showing one method of forming the finished tape of FIG. 1;
PAR	FIG. 3 is a view in cross-section on line 3--3 of FIG. 2;
PAR	FIG. 4 is a cross-sectional view similar to FIG. 3, showing rearrangement of the tape upon removal from the forming mandrels seen in FIG. 2;
PAR	FIG. 5 is a cross-section similar to FIG. 3, showing an arrangement for fabricating a number of tapes simultaneously;
PAR	FIG. 6 is a cross-sectional view of another arrangement for forming multiple tapes;
PAR	FIGS. 7-12 are fragmentary cross-sectional views of different types of hinged members and hinging arrangements using the tape of FIG. 1;
PAR	FIG. 13 is a fragmentary cross-sectional view of hinged members employing a modified type of tape hinge;
PAR	FIG. 14 is a fragmentary view of a jig structure illustrating the formation of a tape hinge of the type shown in FIG. 13;
PAR	FIG. 15 is a fragmentary cross-sectional view of another form of tape hinge construction;
PAR	FIG. 16 is a view similar to that of FIG. 14 illustrating a manner of

Pftaps19760106 Wk01

	forming the tape hinge of FIG. 15;
PAR	FIGS. 17 and 18 are fragmentary views of additional tape hinge constructions;
PAR	FIGS. 19 and 19A are perspective views of tape structures similar to FIG. 1 but employing multiply grouped strands or strips crossing on the bias;
PAR	FIG. 20 is a perspective view of a tape structure similar to FIG. 1 but incorporating pressure-sensitive adhesive and protective release strips;
PAR	FIG. 21 illustrates the manner of applying the tape of FIG. 20 to one member which is to be joined to another;
PAR	FIG. 22 is a fragmentary perspective view of an integrally woven tape structure incorporating the invention;
PAR	FIG. 23 is a cross-sectional view of a woven structure from which tapes of the form shown in FIG. 22 are cut;
PAR	FIG. 24 is a perspective view of another form of tape incorporating the invention, in which the manner of forming the tape is illustrated;
PAR	FIG. 25 is a cross-sectional view of the finished tape seen in FIG. 24;
PAR	FIG. 26 illustrates still another form of tape embodying the invention, and a means of fabricating such tape;
PAR	FIG. 27 is a cross-sectional view of the finished tape of FIG. 26;
STM	What is claimed is:
PAR	FIG. 28 is an enlarged, fragmentary view of the tape structure of FIG. 26;

Pftaps19760106 Wk01

PAR FIG. 29 is a perspective view of another form of tape and a method of making it;

PAR FIGS. 30 and 31 are cross-sectional views of the tape of FIG. 29 in partially completed and fully completed condition;

PAR FIG. 32 is a broken view in perspective elevation of a foamed core/stressed skin panel member having a curved edge with a tape secured along such edge; and

PAR FIG. 33 is a similar view showing a pair of curved-edge members of FIG. 32 joined by the tape.

DETD

PAC DESCRIPTION OF THE PREFERRED EMBODIMENTS

PAR Tape structure 20 illustrated in FIG. 1 is composed of alternating runs of intersecting flexible strands 22 producing an X-configuration, and carrier strips 24 running lengthwise of the tape axis in transversely opposite quadrants of the X. Each of carrier strips 24 is folded lengthwise at 25 and extends continuously between adjacent legs in each of two opposite quadrants of the X. Each of strands 22 is secured at its opposite or cross-axis ends to margins of opposite carrier strips 24 by suitable adhesive. Collectively the strands in each opposite pair of legs of the X form a mat in conjunction with the associated carrier strips. In order to allow free intersection and lateral cross-over of the strands at the tape

Pftaps19760106 Wk01

axis, the carrier strips are positioned to dispose their fold lines 25 slightly outwardly of the tape axis.

PAR

As will be more fully described presently, tape 20 is adapted to be applied along the mating edges of two members to be joined. To this end the edges of the members are received between adjacent tape legs in transversely opposite quadrants of the X-configuration, and adhesive is applied to the confronting faces of such legs to bond them to the margins or edges of the members. It is apparent that the members to be joined may be received in either of the two different sets of opposed quadrants of the tape. Where the members are received in the quadrants in which the carrier strips 24 are located, the carrier strips serve as barriers to prevent glue or other adhesive working into the axis of the tape. That is important where the tape is used as a hinged connection between members, since glue in the axis will impair the freedom of the hinging action of the connecting strands 22. Also the carrier strips serve in such case to prevent wear of the strands on a rough or sharp edge of the hinged member. In cases where the tape is employed simply for joining non-articulated members, these considerations are not so important; in fact it may even be of advantage to use the alternate set of quadrants so that direct glued contact of the strands 22 to the members being joined is obtained.

PAR

In the preferred construction shown in FIG. 1, hinge 20 is intended to be

Pftaps19760106 Wk01

NUM

1

quite flexible so that it may be easily applied in a manner similar to that in which ordinary pressure-sensitive tape is applied to a surface. For that reason both the carrier strip 24 and the transverse strands 22 are of pliable material. Typically useful materials for the carrier strips include paper, more especially craft or crepe paper, woven textile webbing or light plastic film or tape. In fact various types of presently available commercial pressure-sensitive masking tape can conveniently be used for the carrier strip. Strands 22 may be multifilament textile threads or cords, natural or synthetic, as well as monofilament strands of organic or inorganic, e.g. metallic, material.

PAR

In FIGS. 2-4 a method is illustrated for handfabrication of tape of the type shown in FIG. 1. To this end there is provided a pair of elongated flat mandrels 34 suitably supported in edgewise spaced parallel relation. Cord 36 is wound about the mandrels in figure-8 manner to form the mat of strands 22 comprising the connector elements of the completed hinge. Pressure-sensitive tape is then applied over the cord on opposite faces of the mandrels to secure all of the courses or runs of the cord in fixed position relative to each other. A knife or other sharp instrument is then used to sever the terminal bends of each convolution of the cord where it passes around the outer edges of mandrels 34, cutting along plane c--c as

Pftaps19760106 Wk01

shown in FIG. 3. The preliminary tape hinge assembly may then be easily slipped off the mandrels. The legs of the tape hinge are then folded into reverse relationship from that in which they are formed on the mandrels, to the position shown in FIG. 4, so that the margins of each strip 24 are placed in back-to-back relation.

PAR

Methods suitable for commercial production of the tape are shown in FIGS. 5 and 6 in which a plurality of mandrels 34 is employed and cord is woven continuously about these to build up a wide mat of any desired length. In FIG. 5, the opposite faces of this mat are then covered with sheets 36 of paper, cloth, plastic film or the like, which are glued or otherwise bonded to the cord. The finished mat is then cut by suitable slitting knives (not shown) advanced against and along the opposite faces of the mandrels, the knives being spaced on the center lines a--a of mandrels 34 to slit the composite mat lengthwise of the mandrels and form a plurality of separate ribbons or tapes. These are removed from the mandrels, as in FIG. 4. FIG. 6 illustrates a similar method of manufacture but in this case each mandrel 34 is first faced or wound with the material which will serve as the carrier strips, and then the cord is woven about the mandrels in figure-8 manner as before. Alternatively, the tape can be woven without the mandrels, using the carrier strips as the warp elements for the cross strands.

Pftaps19760106 Wk01

PAR

The tape hinge can be applied to the edges of the members to be joined using either set of diametrically opposed hinge quadrants for receiving and securing the members. Also various types of hinge arrangements can be accommodated. This is illustrated in FIGS. 7 through 12 of the drawings. In each of these illustrations the members to be joined are received in the tape quadrants which do not contain carrier strips 24. For some applications, this has an advantage, as can be seen by reference to FIG. 7. Any tendency of strands 22 to peel away from the surface of the hinged member A or B to which they are bonded is resisted by the interpositioning of the carrier strips 24. That is, strands 22 must cut through the interposed carrier strip if forces are applied to members A and B tending to separate them bodily.

PAR

In FIG. 8, hinge 20 connects a relatively thick member C to a flat surface D to permit swinging of member C through an arc of 90.degree.. In FIG. 9, member E is hinged to the flat surface D for swinging movement through an arc of 180.degree.. In this illustration, member E is relatively thin and the legs of hinge 20 are secured to it along opposite margins of the faces rather than along one edge and the adjacent face as is necessary with a thick member.

PAR

FIGS. 10 and 11 also illustrate rolling hinges, the one in FIG. 10 providing for 180.degree. arcuate movement between the hinged members F

Pftaps19760106 Wk01

and G, while FIG. 11 illustrates a hinge permitting 360.degree. arc of movement for member I relative to member H. For this application, a centrally more open type of hinge is necessary. This can be readily provided simply by increasing the distance between the mandrels 34 in forming the hinge.

PAR

Further strengthening of the attachment of the hinge to the hinged members can be provided, as shown in FIG. 12, by applying and bonding overlying tapes 46 on one or both pairs of hinge legs.

PAR

For maximum strength in preventing separation of the hinged members at their limiting position of arcuate movement, a hinge structure such as that shown in FIG. 13 is useful. In this example, hinge 50 is generally similar to previously described hinge 20 except that some of the strands, while extending transversely of the hinge axis, do not cross laterally from one side to another in a given run of such strand; that is, such strands start and end on the same lateral side of the axis in that run. This is illustrated more particularly in FIG. 14 showing a method of constructing hinge 50 of FIG. 13. As before, a jig is used providing spaced mandrels 34, and a length of cord 36 is wrapped about the mandrels to form the strand runs. For clarity of illustration, the runs are shown in spread condition in the drawing but they would normally be closely spaced in actual practice. In this example, cord 36 is wound about the

Pftaps19760106 Wk01

mandrels in alternate courses or runs, first with a figure-8 configuration in which strands 52 laterally cross the hinge axis intermediate the mandrels. In the next course the strands 54 are wound so as to pass completely around the outside of both mandrels without crossing between the mandrels. In other words, while strands 52 in transversely crossing the axis of the hinge move laterally from one side to the other of the mandrels, alternate strands 54 remain on the same lateral side of the mandrels.

PAR

In the resulting hinge construction illustrated in FIG. 13, (after applying carrier strips 24, cutting the terminal bends of the strands to release the hinge from the jig and applying the hinge to members A and B), each strand 54 extends directly across the hinge axis from one member to the other in the limiting position of the hinged members as shown. Such strands are thus in straight tension, providing maximum resistance to separation of the hinged members and to any tendency toward peeling of the intermediate strands 52 from margins of the hinged members. In the alternate limiting position of members A and B, strands 52 extend straight across the hinge axis and provide resistance to separation.

PAR

FIGS. 15 and 16 illustrate a further modification of the preceding example. In this example hinge 60 .[incorporates.] .ladd.incorporates .laddend.an interlocking or overlapping of the strands at the hinge axis.

Pftaps19760106 Wk01

This is accomplished by winding cord 36 about mandrels 34 with a twist at each run, forming a series of interlocking clove hitches as shown in FIG.

16. It will be noted from the drawing however that although each strand 62 or 64 in any given run from one mandrel 34 to the other is positioned on the same lateral side of both mandrels, the strand is laterally displaced intermediate the mandrels by intersection with and overlapping of the strand of the correspondingly opposite run on the other side of the mandrels. The hinge 60 which results thus puts on strand in straight tension, e.g. strand 64 in FIG. 15, in the hinged structure.

PAR

Another method of forming tape hinges of the invention is illustrated in FIGS. 17 and 18 wherein the cord used in forming the transverse strands is not cut or severed as in the previous examples. In both of these illustrations the carrier strips consist of pressure-sensitive tapes 72, 74 and the hinged structure is formed using two pairs of the tape strips in back-to-back relation, one pair on either side transversely of the hinge axis and each pair having the inner edges spaced from the other a distance sufficient to permit passage of the strands between the paired strips in passing from one lateral face to the other.

PAR

In forming this type of hinge structure, two separate lengths of cord 36 are required. In FIG. 17, the two lengths are interwoven or interlocked intermediate the loop portions 76, 78 which are adhered to the faces of

Pftaps19760106 Wk01

the strips. In FIG. 18 the arrangement is essentially the same but does not embody interlocking of the two strands within each loop.

PAR

Multiple cords are used in forming tape 80 also, as seen in FIG. 19. This tape can be formed as described in connection with FIGS. 1-4, except that instead of using a single strand of cord to form the runs, a group 82 of parallel cords is woven about the mandrels. The number of cords in the group will determine the angle or bias of the group in respect to the axis of the X; the greater the number of cords, the greater the bias angle.

PAR

A similar arrangement is shown in FIG. 19A where again a plurality of cords is wound simultaneously as above, but in this case the cords .[.were.].
.ladd.are .laddend.wound about a series of mandrels, as in FIG. 5.

Depending on the width of the composite group of mandrels, each run of grouped cords 92 will cross the tape axis at little or no bias in connecting carriers 24. In place of the grouped cords, webbing or tape of various sorts can be used to provide equivalent connector means.

PAR

Attachment of the finished tape product to the members to be joined is facilitated by incorporating pressure-sensitive adhesive with the tape, as produced, so that it is self-contained ready for application as purchased. FIG. 20 illustrates such an arrangement. The basic tape structure is the same as that shown in FIG. 1, but in this case tape 120 includes bands of pressure-sensitive adhesive 102 extending lengthwise of

Pftaps19760106 Wk01

the tape on confronting faces of the carrier strips 124 in opposite quadrants of the X. In the preferred construction, adhesive 102 does not extend into the center of carriers 124, but is confined to the margins of the tape. Temporary protection in the form of peel or release strips 104 are applied over the adhesive, the strips being made wider than the bands on adhesive so as to overlap at the inner edge and provide a convenient free tab 106 by which to start the peeling off of strips 104 when the tape is to be applied to members to be joined.

PAR

In attaching the tape, one release strip is first completely stripped from one leg and that leg is pressed along an edge of the member to be joined. See FIG. 21. The adjacent leg of the tape is lifted to get access to free tab 106 of its release strip 104 which is then peeled back at 90 degree to the tape axis. As this strip 104 is pulled, it releases next to the X axis first and then diagonally outwardly across the face of tape 120, pulling it firmly against the edge of the member to which it is being attached. This leg of the tape is simultaneously pressed into contact with the face of the member and the process is repeated in securing the other two legs of the tape to the opposite member.

PAR

The arrangement not only facilitates the attachment process, providing a smooth, tight surface contact between the tape and members but aids in getting alignment of the tape axis and the abutting edges of the members,

Pftaps19760106 Wk01

even if there is some initial misalignment due to improper starting placement of the tape. By pulling the release strip in the manner discussed, the tape is made to lie straight and its natural axis is caused to conform closely with the edge of the member to which it is attached so as to produce a rigid axis in the finished structure. In speaking of "natural axis" above, this is intended to mean not so much the axis defined by the crossing strands in the tape as it exists before application to the edges of the members to be formed, but rather to that axis defined by the crossing strands as this is developed upon securing the tape to the members to be joined. The two conditions are identical in the case of a perfectly applied tape to perfectly straight, aligned edges of members to be joined. But such ideal condition seldom exists in practice, and it is one of the virtues of the novel tape that such perfect condition need not exist, because the tape will align itself to accommodate irregularity of the edge and/or inexact application to those edges, without resulting in a loose or wobbly hinged joint. This feature arises inherently from the tape construction wherein the flexible connector strands, in crossing between web portions to which their ends are connected, are free to shift relative to each other, within of course the limits of their points of connection to the longitudinal web portions.

PAR

Still another form of tape is shown in FIG. 22. Tape 220 is woven on a

Pftaps19760106 Wk01

suitable loom to produce an integral structure in which weft threads 222 of the webbing form the cross-connectors for marginal or selvage portions produced by interweaving threads 222 with longitudinal or warp threads 223. Separate carrier members are accordingly not required in this arrangement. Selfsticking adhesive and protective peel strips can of course be incorporated in this form of tape, similar to that, described above. Tape 220 can be produced initially in multiple widths, as shown in FIG. 23, by a process similar to that described in connection with FIG. 5, but without using mandrels and slit on lines b--b to produce separate tapes.

PAR

Yet another form of the invention is illustrated in FIGS. 24 and 25 where a continuous strip 302 of paper or sheet plastic is slit in sinusoidal manner along its longitudinal axis to produce complementary left and right strips or marginal portions 304, 306 having mutually projecting fingers 308. These strips are then pressed laterally together to cause them to intermesh, with the fingers 308 of one overlapping the respective marginal portion 304 or 306 of the other. An imperforate strip 310 is then applied to the intermeshed and overlapped first members 304, 306, and bonded by gluing or welding to the tips of the fingers of those members. Strip 310 is creased longitudinally, causing the free edges of the members to separate and form the X-like tape 320, as seen in FIG. 25.

Pftaps19760106 Wk01

PAR

FIGS. 26 and 27 show another tape structure 420 incorporating the invention. In this case two strips 402, 406 of suitable sheet stock are slit longitudinally along a central sinusoidal line to produce left and right marginal portions 401, 403 and 405, 407, all having teeth 408. Strips 402 and 406 are brought together in such manner that the teeth of one are out of phase, longitudinally of the tape, with those of the other so that the peaks of the teeth overlap. The overlapped peaks are glued or otherwise bonded together at 410, and the marginal portions separated to form the X-like configuration, as seen in cross-section in FIG. 27. Preferably the marginal halves of each strip 402, 406 are first laterally separated, as seen on enlarged scale in FIG. 28, before the overlapping teeth 408 are bonded together. This provides more freedom and reduces binding along the axis of the tape. Again, the marginal web portions may have a band of self-sticking adhesive 412, by which to secure the tape to the edges of the members to be joined, in which case a release or peel strip 414 is provided to protect the adhesion areas until the tape is to be used.

PAR

In FIGS. 29 to 31, a tape 520 is formed by joining two strips 502, 504 by welding or gluing along a central portion or band 506, and then cutting a series of slots 508 across band 506, spaced longitudinally along the tape. Next, each strip 502, 504 is slit at 510, 512, respectively,

Pftaps19760106 Wk01

longitudinally between slots 508 at alternate ends of adjacent slots.

Slits 510, 512 are also alternated in the confronting strips 502, 504 along the tape so as not to coincide at any point. Separating the legs or marginal portions of strips 502, 504 results in an X-shaped tape section, as shown in FIGS. 30 and 31.

PAR

Application of tape to curved edges of members is illustrated in FIGS. 32 and 33. In FIG. 32 a semiflexible member 602 has a curved edge 604 which is to be joined to a similar curved edge of panel member 606 (see FIG. 33). Tape 620 of the construction shown in FIG. 20 is used but to facilitate obtaining a smooth fit of the tape to the curved edge, the carrier strip members 624 of tape 620 are preferably formed of crepe paper to permit some stretching of the tape during application. When the free edges of members 602 are separated, after curved edges 604 are joined, a geodesic structure is obtained as seen in FIG. 33. Any slight longitudinal accommodation necessary along curved edge 604 as the structure is formed is readily permitted by the elasticity of tape 620. FIG. 33 also illustrates the use of light weight, low cost laminated, foamed or honey combed core/stressed skin panels to form geometric structures, where the panels will not resist highly localized loads imposed by the use of rivets or screws as fastening means. Ordinary flat tape if used in such a

Pftaps19760106 Wk01

	construction may overcome the problem of localized attachment stress, but
	is .[.particularly.]. .ladd.pparticularly .laddend.vulnerable to peeling
PAR	1. A flexible tape for joining mating edges of adjacent members,
PA1	said tape having an X-like configuration in cross section and providing a
	longitudinally continuous structure adapted to extend along and be secured
	to the edges of the members to be joined so that the axis of said X-like
	configuration coincides generally with the juncture formed by the members
	to be joined, said tape comprising
PA1	carrier strip means comprising pliable, longitudinally continuous, marginal
	web portions at the extremities of the legs of the X; and
PA1	flexible, spaced, connector means running crosswise of and .[.being
	secured.]. .ladd.bonded .laddend.to and interconnecting pairs of web
	portions, at least some of said connector means intersecting and crossing
	other connector means to form said X-like configuration .[...]. .ladd.,
	said flexible connector means in crossing between said web portions being
	free to shift relative to each other within the limits defined by their
	points of connection to the respective longitudinal web portions..laddend.
NUM	2
PAR	2. A flexible tape as defined in claim 1, wherein at least some of said
	connector means join pairs of transversely opposite web portions.
NUM	3

Pftaps19760106 Wk01

PAR	3. A flexible tape as defined in claim 2, wherein said carrier strip means extends continuously between adjacent legs in each of two opposite quadrants of the X-like configuration.
NUM	4
PAR	4. A flexible tape as defined in claim 3, wherein said adhesive is of the pressure-sensitive type and is confined to the outer margins of confronting faces of said carrier strip means, said tape further including temporary protective release strips covering said adhesive but peelable therefrom to expose said adhesive when said tape is applied to the members to be joined.
NUM	5
PAR	5. A flexible tape as defined in claim 4, wherein the protective release strips overlap the inner margins of the adhesive to provide free tabs along such margins.
NUM	6
PAR	6. A flexible tape as defined in claim 1, wherein said connector means are biased longitudinally of the tape axis.
NUM	7
PAR	7. A flexible tape as defined in claim 1, wherein said connector means comprise alternately crossing flexible strands.
NUM	8

Pftaps19760106 Wk01

PAR	8. A flexible tape as defined in claim 1, wherein said connector means comprise alternately crossing groups of strands.
NUM	9
PAR	9. A flexible, continuous tape hinge for application along adjacent edges of members to be hingedly joined, said hinge have an X-like configuration in cross section and said hinge comprising carrier strip means of pliable sheet material running lengthwise of the hinge on transversely opposite sides of its axis; and flexible strands running crosswise of said axis and carrier strip means, each strand having its cross-axis ends secured to faces of opposed carrier strip portions, at least some of said strands intersecting and crossing over other of said strands to form the hinge axis at their intersection.
NUM	10
PAR	10. A tape hinge as defined in claim 9, wherein the carrier strip portions are disposed in transversely opposed quadrants of the X-like configuration.
NUM	11
PAR	11. A tape hinge as defined in claim 9, wherein the carrier strip portions in each quadrant are integrally joined along the hinge axis.
NUM	12
PAR	12. A tape hinge as defined in claim 10, which further includes

Pftaps19760106 Wk01

	pressure-sensitive adhesive on the confronting faces of the legs of the X-like configuration in transversely related quadrants.
NUM	13
PAR	13. A tape hinge as defined in claim 12, wherein said adhesive coating is located on confronting faces of said carrier strips.
NUM	14
PAR	14. A tape hinge as defined in claim 12, which further includes flexible release strips covering said adhesive coating but peelable therefrom to expose said adhesive upon application of the hinge to members to be hingedly joined.
NUM	15
PAR	15. A tape hinge as defined in claim 9, wherein each of said flexible strands running crosswise of said axis and carrier strip means has its cross-axis ends secured to faces of said carrier strip means over a substantial portion of the width thereof.
NUM	16
PAR	16. A tape hinge as defined in claim 15, which further includes pressure-sensitive adhesive coating on at least one tape face on each side of the hinge axis.
NUM	17
PAR	17. A tape hinge as defined in claim 16, wherein said pressure-sensitive

Pftaps19760106 Wk01

adhesive coating is disposed on confronting faces of the legs of the X-like configuration in transversely related quadrants, said tape further including flexible release strips covering said adhesive coating but peelable therefrom to expose said adhesive upon application of the hinge to members to be hingedly joined.

NUM 18

PAR 18. A tape hinge as defined in claim 9, wherein the carrier strip portions are disposed in diametrically opposed quadrants of the X-like configuration and the strip portions in each quadrant are integrally joined along the hinge axis.

NUM 19

OCL 53 22B

PAR 19. A flexible tape for joining mating edges of adjacent members,

PA1 said tape having an X-like configuration in crosssection and providing a longitudinally continuous structure adapted to extend along and be secured to the edges of members to be joined so that the axis of said X-like configuration coincides generally with the juncture formed by the members to be joined, said tape comprising

PA1 pliable longitudinally continuous carrier .[.strips.]. .ladd.means .laddend.forming the extremities of the legs of the X .[.in transversely opposite quadrants of the X.]; and

Pftaps19760106 Wk01

PA1 flexible, spaced, connector means running crosswise of and interconnecting
[.marginal portions of.] opposite carrier [.strips.] .ladd.means, all
of .laddend.said connector means intersecting and crossing [.each
other.] alternately to .ladd.join diagonally opposite carrier means and
.laddend.form said X-like configuration.

NUM 20

PAR 20. A flexible tape as defined in claim 19, wherein said carrier
[.strips.] .ladd.means .laddend.are formed of stretchable sheet
material.

NUM 21

PAR 21. A flexible tape as defined in claim 20 wherein said carrier
[.strips.] .ladd.means .laddend.are formed of crepe paper.

NUM 22

PAR 22. A flexible tape as defined in claim 1, wherein said carrier strip means
are formed of stretchable sheet material.

NUM 23

PAR 23. A flexible tape as defined in claim 1, which further includes adhesive
disposed on confronting faces of said web portions in transversely opposed
quadrants of the X, for securing said faces to edges of the members to be
joined. [.24. A flexible tape as defined in claim 1, wherein said
flexible connector means, in crossing between said web portions to which

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they are connected to form said X-like configuration, are free to shift relative to each other within the limits defined by their points of connection to the respective longitudinal web portions..].ladd. 25. A

flexible tape for joining mating edges of adjacent members,

PA1 said tape having an X-like configuration in cross-section and providing a longitudinally continuous structure adapted to extend along and be secured to the edges of members to be joined so that the axis of said X-like configuration coincides generally with the juncture formed by the members to be joined, said tape comprising

PA1 carrier strip means comprising pliable, longitudinally continuous, marginal web portions at the extremities of the legs of the X;

PA1 flexible, spaced, connector means running crosswise of and being secured to and interconnecting pairs of web portions, at least some of said connector means intersecting and crossing other connector means to form said X-like configuration; and

PA1 adhesive means disposed on confronting faces of said web portions in transversely opposite quadrants of the X for securing said faces to edges of the members to be joined..laddend. .ladd. 26. A flexible tape for joining mating edges of adjacent members,

PA1 said tape having an X-like configuration in cross-section and providing a longitudinally continuous structure adapted to extend along and be secured

Pftaps19760106 Wk01

	to the edges of the members to be joined so that the axis of said X-like configuration coincides generally with the juncture formed by the members to be joined, said tape comprising
PA1	pliable, longitudinally continuous, film forming the extremities of the legs of the X; and
PA1	flexible, spaced, connector means running cross-wise of and being joined to said film on both sides of the X axis, said connector means intersecting and crossing each other alternately to form said X-like configuration..laddend.
PATN	
WKU	RE0286737
SRC	5
APN	5479657
APT	2
PBL	E
ART	324
APD	19750207
TTL	Method of preserving perishable products
ISD	19760106
NCL	2
ECL	1

Pftaps19760106 Wk01

EXP McGehee; Travis S.

NDR 2

NFG 5

INVT

NAM Esty; Joseph J.

CTY San Diego

STA CA

ASSG

NAM U. C. San Diego Foundation

CTY La Jolla

STA CA

COD 2

REIS

COD 50

APN 165398

APD 19710723

PNO 3715860

ISD 19730213

RLAP

COD 71

APN 58266

Pftaps19760106 Wk01

APD 19700727

PSC 3

RLAP

COD 84

APN 645968

APD 19670614

PSC 1

PNO 3521806

ISD 19670614

CLAS

XCL 53 7

EDF 2

ICL B65B 3104

FSC 53

FSS 7;22 B

UREF

PNO 2242686

ISD 19410500

NAM Tirrell

XCL 53 7

UREF

Pftaps19760106 Wk01

PNO	2814382
ISD	19571100
NAM	Lassiter
XCL	53 22B
UREF	
PNO	3313084
ISD	19670400
NAM	Forman
OCL	53 22B
LREP	
FRM	Harris, Kern, Wallen & Tinsley
ABST	
PAL	The method of packaging perishable products in a container and insuring preservation of the products while in the container, which method consists in permanently sealing the opening of the container after the product is packaged thereafter forcing an inert fluid to expel the air from the container through a port entry and exhaust, then sealing the port entry and exhaust while in the process of purging, thus trapping the inert fluid in the container.
PARN	
PAC	CROSS REFERENCE TO RELATED APPLICATION

Pftaps19760106 Wk01

PAR The present application is a continuation of S.N. 58,266 filed July 7, 1970 and now abandoned and which in turn is a division of the inventor's copending application Ser. No. 645,968, now Pat. No. 3,521,806, filed June 14, 1967.

BSUM

PAC BACKGROUND OF THE INVENTION

PAR (1) Field of the invention

PAR The invention is directed to the method of packaging and preserving perishable products after being packaged by purging the package of air after the perishable product is packaged and substituting an inert fluid for the air.

PAR (2) Description of the prior art

PAR Applicant is not aware of prior art directed to the method herein disclosed.

PAC SUMMARY OF THE INVENTION

PAR The method comprises the placing of the perishable product through product inlet opening. Then that opening is sealed closed. Thereafter the air is purged from the package by forcing inert fluid through the package, the package having fluid inlet and outlet openings. During the purging, the fluid inlet and outlet openings are sealed to entrap the purging fluid.

PAR Other features and the advantages of the present invention will be apparent

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from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the invention are illustrated.

DRWD

PAC BRIEF DESCRIPTION OF THE DRAWINGS

PAR FIG. 1 is a perspective view of one embodiment of the package of this invention;

PAR FIG. 2 is a perspective view of the package shown in FIG. 1, the stable carton being shown with the top open;

PAR FIG. 3 is a sectional view of the package shown in FIG. 1, the view being taken along the line 3--3 of FIG. 1;

PAR FIG. 4 is a fragmentary, sectional view of the package shown in FIG. 1, the view being taken along the line 4--4 of FIG. 1; and

PAR FIG. 5 is a perspective view of another embodiment of the package.

DETD

PAC DESCRIPTION OF THE PREFERRED EMBODIMENTS

PAR Referring more in detail to the drawings, and particularly to FIG. 1, the package includes an inherently stable carton 11. The carton 11 is preferably of the conventional cardboard crating type and includes closing flaps 12 extending upwardly from the sides thereof. The carton 11 includes an inlet opening 13 juxtaposed one side and the top and an outlet opening 15 juxtaposed the opposite side and the bottom on the same side of the

Pftaps19760106 Wk01

carton.

PAR

A flexible, plastic .[, i.e. impermeable.]. container 17 is disposed in the carton 11. The container 17 includes one side unsealed 18 forming an opening 19 for accepting perishable products such as fruits, vegetables, meats and flowers, apples 21, being illustrative. Plastic tubes 23 and 25 are affixed to the flexible plastic and extend from the container. The tubes 23 and 25 are alignable with and extend through the inlet and outlet openings, 13 and 14, respectively, and are supported by the walls forming the openings of the container.

PAR

Referring now to the embodiment shown in FIG. 5, the carton 11 is of the same general configuration as that shown in FIG. 1, except there are no flaps 12. Rather, a cover 29 is provided for covering the container 17 receiving opening formed by the walls of the carton 11. The cover 29 is shown in broken lines, removed from the carton 11. The cover 29 includes walls 33 that surround the walls of the carton 11 and is adapted to be slidably extended thereover. One wall of the cover 29 includes slots 35 and 37 for accepting the tubes 23 and 25, respectively. Thus, the cover 29 can be slipped over the carton 11 and secured into covering position with the tubes 23 and 25 extending therethrough and accessible to be connected and sealed.

PAR

Shipping cartons 11 of the type depicted in FIG. 1, are generally supplied

Pftaps19760106 Wk01

to the packager in a collapsed form. Thus, when it is desirable to package the products 21 for shipping or storage, the carton 11 is erected as shown

ART 335

in FIG. 2. The container 17 is then placed in the carton through the top opening and the tubes 23 and 25 are extended through the inlet and outlet openings 13 and 15, respectively. The produce, herein shown at 21, is then inserted through the opening 19 in the container and the opening is sealed. In the embodiment shown in FIG. 1, the envelope 17 is plastic and the opening 19 is sealed by pressing the film 18, forming the opening 19, together with conventional heat sealing mechanism. The flaps of carton 12 are then closed and taped in a conventional manner.

PAR Any suitable method can be employed for removing the air from the container and substituting an inert gas. I prefer to connect a hose (not shown) to a supply of inert gas, such as argon or nitrogen, and to the tube 23. The inert gas is then released into the container 17 through the tube 23 and the inert gas expels the air through the outlet tube 25.

PAR It is noted that the inlet tube 23-outlet tube 25 arrangement depicted, effects a very effective flow pattern. The flow pattern is depicted in FIG. 2 by arrows. The incoming gas enters the container 17 from the front and is propelled generally along and parallel to the side nearest the inlet tube 23. When the gas reaches the back wall of the container 17, it

Pftaps19760106 Wk01

is deflected inwardly from the side and passes generally along the back wall until it reaches the side nearest the outlet tube 25. The gas is again deflected and is directed back toward the front of the container 17 and will be forced downwardly to pass out the outlet tube 25. Thus, flow is assured throughout the container 17 and no air pockets will be left uncirculated when the purge is completed.

PAR

The inert gas purge is continued for a time sufficient to drive essentially all of the air out of the container 17. When the desired level of inert atmosphere is reached, approximately 99.8% the purge is discontinued and while the container 17 is still pressurized, the tubes 23 and 25 are sealed. Sealing is preferably effected by cutting of the plastic tubes 23 and 25 with hot scissors, thereby severing and sealing the tube simultaneously. Since both tubes 23 and 25 extend from the same side of the container 11, they are readily accessible to the worker during the packaging.

PAR

The remaining portions of the tubes 23 and 25 are then preferably tucked back into the carton 11. If desirable, the openings 13 and 15 may then be covered in any conventional manner. The packaged produce 21 is then ready for shipment and is maintained in an inert atmosphere. Spoilage and decaying of the produce is obviated since essentially all the oxygen has been purged from the container 17 and photosynthesis is suspended.

Pftaps19760106 Wk01

Pressurization of the envelope 17 is preferred since if the oxygen were expelled and a vacuum left in the container, there would be greater danger of oxygen seepage into the container. The lack of oxygen will cause any animal life included in the container 17 to quickly suffocate and the produce 21 will be protected from insect damage.

PAR

The above described method is preferred since it is generally much more economical to force a purge through the container 17 to purge the air therefrom, rather than to evacuate the air by vacuum. However, if it were desirable to evacuate the air by pulling a vacuum, only one tube, as for instance 23, would be necessary. The air could be evacuated from the container 17 through the tube 23 and the container 17 could then be pressurized by pumping the inert gas in through the tube 23. The tube 23 would then be sealed in the manner described above.

PAR

Referring now to packaging the produce 21, in the package embodiment shown in FIG. 5, the same general procedure, as that first described, is followed, except that, rather than closing the flaps 12, the cover 29 is slid into position and secured, as by taping. The container 17 is then purged and the tubes 23 and 25 sealed as described above.

PAR

From the foregoing it will be apparent that the method herein described, provides simple, effective and economical means of packaging perishable produce, meats and flowers.

Pftaps19760106 Wk01

CLMS

STM Having described my invention, I now claim:

NUM 1

PAR 1. Those steps in the method of preserving a perishable product in a container .[.formed of impermeable material.]. having a product opening, an inlet tube for conveying a purging fluid to the container, and an outlet tube for withdrawing air from the container, the steps in the method comprising:

PA1 (A) inserting the product into the container through the product opening;

PA1 (B) thereafter permanently sealing the product opening;

PA1 (C) thereafter purging the interior of the container by forcing an inert fluid into the container through said inlet tube and forcing air from the container through said outlet tube;

PA1 (D) placing the container in a carton having more stability than the container;

PA1 (E) extending the tubes to the exterior of the carton;

PA1 (F) thereafter, and while the container is still pressurized with inert fluid, permanently sealing the tubes closed.

NUM 2

PAR 2. The steps in the method as defined in claim 1, characterized in that the tubes are formed of plastic that, when cut with a hot scissor, is sealed

Pftaps19760106 Wk01

closed; and further characterized in that the step of sealing the tubes closed is by severing the tubes with a hot scissor.

PATN	
WKU	RE0286745
SRC	5
APN	405766&
APT	2
PBL	E
APD	19731012
TTL	Catamenial device
ISD	19760106
NCL	17
ECL	1
EXP	Medbery; Aldrich F.
NDR	1
NFG	2
INVT	
NAM	Guyette; Linda S.
STR	35 Summer St.
CTY	Rutland
STA	VT

Pftaps19760106 Wk01

ZIP 5701

REIS

COD 50

APN 116531

APD 19710218

PNO 3732866

ISD 19730515

CLAS

OCL 128285

XCL 128270

ICL A61f 1320

FSC 128

FSS 270;285;296;263

UREF

PNO 1222825

ISD 19170400

NAM Walter

XCL 128285

UREF

PNO 1401358

ISD 19211200

Pftaps19760106 Wk01

NAM	Peterkin
OCL	128270
UREF	
PNO	1887526
ISD	19321100
NAM	Spielberg et al.
OCL	128270
UREF	
PNO	3085574
ISD	19630400
NAM	Penska
OCL	128263
FREF	
PNO	1,007,643
ISD	19520200
CNT	FR
OCL	128285
LREP	
FRM	Kenway & Jenney
ABST	
PAL	An improvement in a tampon for absorbing menstrual fluids in which a

Pftaps19760106 Wk01

capillary wick of non-absorbing material extends into the interior body of the tampon. The wick acts as a capillary transport to carry fluids to the core of the tampon body, thus using the absorptive capacity of the unexposed cotton.

BSUM

PAR My invention relates to intravaginal catamenial devices and relates more

ICL B60k 500

particularly to an improvement in such devices whereby they are made much more effective as absorbing mediums for menstrual fluids.

PAR Devices in common use today come in a number of variants. However, they all essentially comprise a compressed cylinder of cotton. The cotton is preferably highly absorbent, but must be densely packed for efficient use.

The cotton cylinder is usually contained in a rigid plastic applicator tube, although the structural integrity of the cylindrical shape is dependent on the compressing process, and not upon said tube.

PAR When inserted in the vaginal cavity, a cord (stitched to the cotton) extends therefrom, and provides the means for removal after use.

Appearance of menstrual blood on the cord is an indication to the user that no further effective absorption can be expected from the device. The need for its removal and replacement is thus indicated.

PAR I have found that a significant portion of the absorptive capacity of the

Pftaps19760106 Wk01

cotton is never used. After the top end of the dense cotton cylinder has been wetted, the fluids run down along the outside surface of the cylinder. The cotton, of course, absorbs the fluids, but it is only the surface cotton (and then only to a limited depth) that is actually effective. A significant portion of the cotton at the core of the cylinder (as much as 40 percent to 60 percent) remains dry. This is for two basic reasons: the cotton is densely packed; also once the surface is wet, the cotton is a poor conducting medium for any further transfer of fluid to the center. At this point, the indication for removal appears and the device, only partially used, must be discarded.

PAR I solve this problem by adding a transporting element to carry menstrual fluids to the interior of the cotton cylinder whereby 90 percent or more of the cotton is effectively used, thus significantly extending the life of each replacement.

DRWD

PAR For a complete understanding of my invention, refer to the accompanying drawing in which

PAR FIG. 1 is an exploded view of the tampon as it appears before compression, with the element of the invention added; and

PAR FIG. 2 is the tampon after compression and ready for use.

DETD

Pftaps19760106 Wk01

PAR Referring now more particularly to the drawing, a block of cotton is provided in accordance with present practice. A removal cord 6 is stitched to the cotton mass on the back side (as shown). The front side may be called the thread side. The thread side is the surface which becomes the interior portion of the cylinder of FIG. 2.

PAR To the thread side of the cotton I affix by stitching a capillary wick 7. It will be appreciated that this device is mass produced; the thread stitching, the cord 6 and the wick 7 are all affixed to the cotton mass by suitable machinery in one pass. The wick 7 is preferably made of a non-absorbing synthetic material which is porous; the interstices form capillary avenues through which fluids are transported. The wick 7 is flexible (as a fabric) and I have found a wide variety of substances in the nylon or rayon class to be effective. Certain fiber glass woven materials may also be used. The important point is that the wick itself does not become saturated by absorption, but continues to act as a capillary transport delivering fluid to the interior cotton, where it is absorbed and retained.

PAR The wick 7 is positioned to extend beyond what will be the top end of the tampon, while the bottom end stops before the lower edge of the cotton block as shown.

PAR When compressed, the completed tampon 8 is shown in FIG. 2. The wick 7

Pftaps19760106 Wk01

extends in the order of one-fourth of an inch or so from the top end of the tampon 8 and leads into the interior of the cotton cylinder.

PAR

In use, the menstrual fluids are not only absorbed by the surface cotton as is now the case, but they migrate from the top by capillary action through the wick 7 into those interior portions of the cotton that heretofore have remained dry. Thus the effective capacity of the tampons now in general use is greatly increased.

PAR

While I have shown a particular embodiment of my invention for purposes of illustration, it will be appreciated that the inventive concept can easily be applied to any of a variety of tampons now on the market. For example, the cotton block 5 may be in a wide range of dimensions. In some cases the mass is rolled to form the final cylindrical shape, in which case alternate layers of wick and cotton are formed along a radial line of the cylinder. I have shown a method of construction easily adapted to present production techniques. However, the wick material could be introduced between two layers of cotton, to make a "sandwich" which could then be either rolled or crushed into final form. The particular method of assembly may be chosen to suit the machinery which it is desired to use. I therefore include all variations as will occur to persons skilled in the art which are within the spirit and scope of the following claims:

CLMS

Pftaps19760106 Wk01

STM	I claim:
NUM	1
PAR	1. A rolled cylindrical tampon .ladd.having means for conducting body fluid to the interior thereof, said tampon .laddend.comprising a first sheet of absorbent material, .ladd.and .laddend.a second sheet of .laddend.[.non-absorbent.]. .laddend.relatively non-absorbent wick-like .laddend.synthetic woven material superimposed on one face of said first sheet and extending beyond at least one edge of said first sheet.laddend., said first and second sheets being rolled into a cylinder having its outer cylindrical surface formed by a portion of said first sheet and having the
FSC	180 non-extending portion of said second sheet disposed entirely within said outer surface, .laddend. [.whereby.]. .laddend.so that .laddend.upon rolling said [.sheet.]. .laddend.sheets .laddend.into a cylinder said second sheet .laddend.[.will act as.]. .laddend.forms .laddend.a spiral wick to the interior of said cylinder. .ladd. 2. In an intravaginal tampon, the combination of first means for absorbing menstrual fluid and having an outer body of material absorbent to such fluid and with top and bottom ends, and second means for transporting menstrual fluid from said top end of said tampon body directly into the interior of said body, said second means comprising a relatively non-absorbent wick element disposed within and in contact

Pftaps19760106 Wk01

with the interior of said outer body and extending from said top end thereof. .laddend..ladd. 3. In a tampon as defined in claim 2, the further improvement wherein said wick element is constructed of a material substantially nonabsorbent to such menstrual fluid. .laddend..ladd. 4. In a tampon as defined in claim 3, the further improvement wherein said wick element is structured to pass menstrual fluid therethrough by capillary action. .laddend..ladd. 5. In a tampon as defined in claim 4, the further improvement in which said wick element is a woven synthetic material having interstices which form capillary avenues for transportation of such menstrual fluid. .laddend. .ladd. 6. In a tampon as defined in claim 2, the further improvement wherein said wick element protrudes beyond said body of absorbent material at said top end thereof. .laddend..ladd. 7. In a tampon as defined in claim 6, the further improvement wherein said wick element is constructed of a material substantially nonabsorbent to such menstrual fluid. .laddend..ladd. 8. In a tampon as defined in claim 7, the further improvement wherein said wick element is structured to pass menstrual fluid therethrough by capillary action. .laddend..ladd. 9. In a tampon as defined in claim 8, the further improvement in which said wick element is a woven synthetic material having interstices which form capillary avenues for transportation of such menstrual fluid. .laddend..ladd. 10. In a tampon as defined in claim 2, the further

Pftaps19760106 Wk01

improvement wherein said wick element extends within the interior of said body from the top end thereof in the direction toward, but only part of the distance to, the bottom end thereof. .laddend. .ladd. 11. An

intravaginal catamenial tampon comprising

PA1 A. an outer member including a body of material absorbent to menstrual fluids, and having opposed top and bottom ends and outside surfaces therebetween, and

PA1 B. an inner member including a relatively nonabsorbent fluid-transporting element for carrying menstrual fluids to the interior of said body from said top end thereof, said transporting element being in contact with said body and disposed within the interior of said body from said outside surfaces and extending from only the top end thereof. .laddend..ladd. 12.

A tampon as defined in claim 11 further characterized in that said transporting element is of a material substantially nonabsorbent to such menstrual fluids and is structured for transporting such fluid therethrough by capillary action. .laddend..ladd. 13. A tampon according

to claim 12 further characterized in that said transporting element is woven of synthetic material and has interstices which form capillary menstrual fluid-transporting avenues. .laddend. .ladd. 14. A tampon

according to claim 11 further characterized in that said transporting element protrudes beyond said body of absorbent material at said top end

Pftaps19760106 Wk01

thereof. .laddend..ladd. 15. A tampon as defined in claim 14, further

characterized in that said transporting element is of a material

substantially nonabsorbent to such menstrual fluids and is structured for

transporting such fluid therethrough by capillary action. .laddend..ladd.

16. A tampon according to claim 15 further characterized in that said

transporting element is woven of synthetic material and has interstices

which form capillary menstrual fluid-transporting avenues. .laddend..ladd.

17. A tampon according to claim 11 further characterized in that said

transporting element extends within the interior of said body from the top

end thereof in the direction toward, but only part of the distance to, the

bottom thereof. .laddend.

PATN

WKU

RE0286753

SRC

5

APN

491922&

APT

2

PBL

E

ART

316

APD

19740725

TTL

Removable vehicle chassis sub-frame with engine

ISD

19760106

Pftaps19760106 Wk01

NCL	10
ECL	9
EXA	Siemens; Terrance L.
EXP	Schonberg; David
NDR	6
NFG	15
INVT	
NAM	Hobbensiefken; Dean
STR	Rte. 1, Box 241
CTY	Lyons
STA	OR
ZIP	97358
REIS	
COD	50
APN	98625
APD	19701216
PNO	3732942
ISD	19730515
CLAS	
OCL	180 11
XCL	180 56

Pftaps19760106 Wk01

XCL	180 64L
FSS	11;55;56;64 M;64 L
FSC	280
FSS	124 F
UREF	
PNO	696397
ISD	19020400
NAM	Ball
OCL	180 56
UREF	
PNO	725394
ISD	19030400
NAM	Ball
OCL	180 56
UREF	
PNO	781990
ISD	19050200
NAM	Ball
OCL	180 56
UREF	
PNO	783599

Pftaps19760106 Wk01

ISD 19050200

NAM Warrington

OCL 180 55

UREF

PNO 810379

ISD 19060100

NAM Pope

OCL 180 56

UREF

PNO 1727721

ISD 19290900

NAM Langlands

OCL 180 64L

UREF

PNO 1770279

ISD 19300700

NAM Morrison

XCL 180 11

UREF

PNO 2013599

ISD 19350900

Pftaps19760106 Wk01

NAM Butler

XCL 180 64M

UREF

PNO 2047336

ISD 19360700

NAM Stout

XCL 180 11

UREF

PNO 2383611

ISD 19450800

NAM Marcy

OCL 180 11

UREF

PNO 3062309

ISD 19621100

NAM Schwartz

OCL 180 11

FREF

PNO 147,949

ISD 19040200

CNT DT

Pftaps19760106 Wk01

OCL 180 55

FREF

PNO 1,941

ISD 19140100

CNT UK

OCL 180 56

LREP

FRM Watson, Cole, Grindle & Watson

ABST

PAL A heavy duty motor vehicle has a main frame with a forward axle and steerable ground wheels. A power unit sub-frame carrying a rear axle is releasably secured to the main frame, and includes an engine assembly which is located at an intermediate position between the axles. The unit may also include a fifth wheel assembly whereby it becomes a towing vehicle for a further trailer unit or units.

BSUM

PAC BACKGROUND OF THE INVENTION

PAR 1. Field of the Invention

PAR This invention pertains to new and novel improvements in motor vehicles, and more particularly to a heavy duty vehicle such as a tractor-trailer truck combination.

Pftaps19760106 Wk01

PAR 2. Statement of the Prior Art

PAR It has heretofore been proposed to provide removable sub-chassis assemblies for motor vehicles. Examples of prior patented arrangements in the field include the following U.S. patents:

TBL	Patent No.	Patentee	Issued
	1,198,388	Winslow	Sept. 12, 1916
	1,484,474	Cross	Feb. 19, 1924
	1,855,642	Masury	Apr. 26, 1932
	1,948,744	Curtiss	Feb. 27, 1934
	1,962,937	Richman	June 12, 1934
	1,975,366	Linderman	Oct. 2, 1934
	2,260,804	Dunham	Oct. 28, 1941
	2,480,047	Reinhard	Aug. 23, 1949
	2,531,268	Herrington	Nov. 21, 1950
	2,751,992	Nallinger	June 26, 1956

PAR The foregoing illustrative patents show that prior attempts to provide a removable vehicle chassis sub-frame have been concerned principally with engines mounted either at the forward or rear end of the chassis, thereby imposing the weight of the engine and transmission principally on either a

Pftaps19760106 Wk01

forward or a rear axle.

PAC

SUMMARY OF THE INVENTION

PAR

The present invention provides a vehicle construction which is particularly suited to heavy duty equipment, and is characterized by mid-length mounting of the engine assembly. This central mounting of the engine and related components has been found to substantially increase payload capacity by improved weight distribution. A co-related principal structural innovation of this invention resides in the detachability of the entire vehicle power train, thereby facilitating servicing and maintenance.

PAR

In this construction, the entire vehicle power train, including the engine, transmission, drive shaft and drive axle is secured to the main vehicle frame by a non-complex hitch means. In the event of need for major service or repair, the power train unit is detached and a substitute placed in service thereby freeing the chassis unit from unnecessary deployment from use. The mid-length location of the engine assembly, together with the detachable sub-frame on which this component is mounted, further makes feasible the use of an effective air suspension means for the vehicle. In respect to the latter, the fact that the engine is not front mounted provides sufficient space for the correct location of such air suspension means.

Pftaps19760106 Wk01

PAR The midship engine location herein provided moreover, makes it possible to locate a fifth wheel hook-up assembly for a trailer at a location which permits load sharing between the axles of the two axle tractor. Thus, the need for a third tractor axle in order to correctly balance the load factor between the axles is eliminated. This location of the engine further provides ample engine space, and permits the use of types of engines other than the conventional internal combustion piston types when desired, such as turbine or other styles.

PAR A further objective of this invention resides in providing a detachable, engine carrying sub-frame which is readily attached and detached, and one wherein the rear suspension comprises a simple combination of air bags and a stabilizer arm. The unit further employs an array of electric, fuel and air quick disconnect plugs which make possible rapid disengagement of the sub-frame from the chassis.

PAR The absence of an engine in the forward frame area of the vehicle results in the provision of ample space for mounting of a forward air suspension means. Further, the necessity for a tilt assembly for the vehicle cab is obviated.

PAR Additional objects and advantages of the invention will become apparent to those skilled in the art from a consideration of the following specification when read in conjunction with the annexed drawings.

Pftaps19760106 Wk01

DRWD

PAC BRIEF DESCRIPTION OF THE DRAWINGS

PAR FIG. 1 is a side elevational view of a vehicle constructed and assembled in accordance with the teachings of this invention, showing the main frame and cab in a tilted position in phantom lines for assembly or disassembly;

PAR FIG. 2 is a diagrammatic side elevational view of an assembled unit as used for a prime mover and single trailer;

PAR FIG. 3 is a diagrammatic view similar to FIG. 2, showing the unit as embodied in a tandem trailer unit;

PAR FIG. 4 is a top plan view of the vehicle of FIG. 1, the cab and superstructure being removed for clarity of illustration;

PAR FIG. 5 is an enlarged sectional view taken substantially on the line 5--5 of FIG. 4, showing the forward axle and wheel assembly and the front suspension;

PAR FIG. 6 is a plan view from the plane of the line 6--6 of FIG. 5, looking in the direction of the arrows, showing the hitch means hereof;

PAR FIG. 7 is a detail sectional view on line 7--7 of FIG. 6;

PAR FIG. 8 is a front view of the sub-frame;

PAR FIG. 9 is a sectional view taken on the approximate plane of line 9--9 of FIG. 4, showing the rear axle unit;

PAR FIG. 10 is a rear elevational view of the rear axle unit from the plane of

Pftaps19760106 Wk01

line 10--10 of FIG. 4;

PAR FIG. 11 is a view similar to FIG. 5 showing an alternate front suspension construction;

PAR FIG. 12 is a cross section showing details, taken on line 12--12 of FIG. 11, looking in the direction of the arrows;

PAR FIG. 13 is a side elevational view of an assembled unit;

PAR FIG. 14 shows the unit of FIG. 13 in the process of being disassembled; and

PAR FIG. 15 discloses transport of a detached unit.

DETD

PAC DESCRIPTION OF THE PREFERRED EMBODIMENT

PAR Referring to the drawings in more detail, in FIGS. 1 and 4, a representative embodiment of the invention is shown and is generally designated by reference character 20. The particular design of the cab 22 and other elements of superstructure is without significance to the invention and that illustrated is offered by way of example only. The unit 20 however, comprises a main frame 24 including elongated side frame elements 26 and 28 of conventional channel form. For purposes of reference herein, the frame includes a forward end 30, and a rear end 32.

PAR Frame cross elements are provided at convenient locations, and include a forward cross element 34, and a similar rear cross element 36. Each cross element is formed of channel stock and each is reinforced at its ends by a

Pftaps19760106 Wk01

gusset plate 38.

PAR

In FIGS. 5 and 6, a forward axle mounting and assembly is shown. The axle 40 includes an integral top member 42, and has end portions 44, 46, connected, by conventional means not shown, to steerable front ground wheels 48, 50. Plates 52, 54 are fixedly secured by bolts 56 or other fastening means to the member 42, and each plate has a forwardly projecting portion 58. The wheels are each provided with a conventional knuckle 60 for steering purposes. The plate 52 has a rearward extension 62 for mounting of power steering apparatus, indicated generally at 64 in FIG. 1.

PAR

An important feature of this invention concerns the provision of a pair of frame pivot arms 64 and 66. The arms have leading upwardly curved ends 68, 70, and trailing ends 72, 74, and are each of tubular construction. The trailing ends 72 and 74 are clamped between the plates 52 and 54, respectively, and bottom clamp plates 76, 78 (FIG. 5), by changeable fasteners 80 of suitable type. If desired, protective split sheaths 82, 84 with rubber bushings are employed in the clamp arrangement. A pair of brackets 86, 88 reinforced by a lateral span 89 depend from the frame sides 26 and 28, and a cross member 90 spans the frame thereat. The brackets support hinges 92 with rubber bushings which serve as pivots for the leading ends 68 and 70 of the arms.

Pftaps19760106 Wk01

PAR Immediately above the axle 40 the frame side members 26 and 28 are connected by an upper channel 94, reinforced at its ends by gusset plates 96. The bottom flanges of the side frames are similarly spanned by a larger inverted channel 98, the two last named channels being connected by a vertical reinforcing web 100. Forward suspension for the vehicle comprises an air bag suspension system heretofore employed exclusively in rear suspension systems due to bulk. The system hereof comprises conventional air bags 102, 104 of enlarged size, secured by their upper flanges 106 to bear against the channel member 98. The base 110, 112 of the bags are suitably secured to the plates 52 and 54 by appropriate fasteners 114.

PAR Rearwardly by the axle and front suspension, the side frames are connected by a further cross member 116. Enlarged reinforcing members 118 are secured to the member 116, and longitudinal braces 120, 122 extend therefrom to the member 90. A bracket 124 is secured to member 116, and a pneumatic or other fluid operated cylinder 128 controls extension and retraction of a hitch 130 with a connector 132.

PAR This invention has, as a major feature thereof, a totally independent power unit 134, a main component of which is a power unit sub-frame 136 including a bight portion or transverse rod 138, and elongated side rods 140, 142. Each of the side rods has a distal end 144, 145 angularly

Pftaps19760106 Wk01

related to the main extent thereof, and a pair of brackets 146, 148 are centrally fixed in an upright position on the bight or transverse rod 138.

These are connected by a top brace 150 having a portion 152 which embraces the connector 132 of the hitch. The eye member may be further embraced by a bottom plate 154 and 154A.

PAR

The side rods 140, 142 are spanned at various locations by apparatus for mounting of an engine and related accessories. For example, two mounts 158A and 158B for a radiator assembly 158. A front mount 156 and a spanning engine mount 160 for an engine 162 and transmission 164 are provided. Fuel tanks 166 for the engine are mounted outboard on the frame sides, as shown in FIG. 4.

PAR

The power unit 134 further includes a rear axle assembly 168 having a differential housing 170 and shaft housings 172, 174. The latter are clamped about the distal ends 144, 145 of the sub-frame side rods by clamps which include split sleeves 176, 178, upper and lower housing engagement blocks 180, 182, and 184, 186, and inverted U-bolts 188 with locking nuts 190. The axle housing terminates at brake assemblies 192, 194, for rear ground wheels 196 and 198.

PAR

The rear axle mount is stabilized by a stabilizer bar 200 having a connector 202 releasably secured to the frame side 26 for pivotal movement thereat. A second stabilizer connector 204 is releasably and pivotally

Pftaps19760106 Wk01

engaged to an upstanding lug 206 on the differential housing 170. The housing is operatively associated with the transmission 164 through a drive shaft 208.

PAR

At a location forward of the rear axle assembly, rear suspension means is provided between the sub-frame and the main frame. In FIGS. 1, 4 and 9, it will be observed that mounting plates 210, 212 with depending supports 214, 216 are fixedly secured to the rod distal ends. The lower portions 218, 220 of air bag suspension members 222, 224 are secured to these plates by changeable fasteners 226. At their respective upper ends, the air bags are supplied with mounting brackets which include vertical members 228, 230 which are fixed, as by riveting, to the frame sides. The frame is reinforced laterally at the location of the suspension means by a lower channel 232, an upper channel 234, and a vertical web member 236.

PAR

The forward suspension means may be modified in the case of extremely heavy vehicles in the manner shown in FIGS. 11 and 12. There, air bags 102a and 104a are again mounted between a channel 98a and an upper member 42a of an axle 40a. In addition, a forward stabilizer bar 300 has a first connector 302 engaged on a bracket 304 depending from the frame side 26a, and a second connector 306 pivotally mounted in an upstanding bracket 308 secured on the plate 52a.

PAR

In FIGS. 2 and 3, diagrammatic sketches show the adaptability of the

Pftaps19760106 Wk01

vehicle hereof to load distribution. In FIG. 2, a single trailer is shown, and the trailer hitch or fifth wheel 400 has been located at a midship location on the tractor frame. The tandem trailer arrangement of FIG. 3 however, provides improved efficiency and handling characteristics by shifting of the trailer hook-up 402 to an aft position.

PAR FIGS. 13 through 15 best illustrate the principal advantages and manner of use of the construction provided hereby. In FIG. 13 an assembled unit as heretofore described is shown. In FIG. 14, the main frame has been tilted forwardly following disengagement of the rear air bags from their lower mounting sections and disconnect of the electrical and fluid controls for the power unit. These controls are located, as indicated above, in an array adjacent the hitch (not shown). The tilted frame and cab, previously raised by any suitable jack means to the position shown, is supported on a standard 500, and the drive unit is placed on a dolly 502 for movement to a repair or replacement location. FIG. 15 shows the unit as being towed to another location by a truck 504.

CLMS

STM I claim:

NUM 1

PAR 1. In a motor vehicle:

PA1 a frame having frame side elements and cross elements, including at least

Pftaps19760106 Wk01

	one fixed intermediate cross element, connecting the side elements;
PA1	a cab mounted to the frame;
PA1	a fifth wheel mounted to the frame rearwardly of the cab for connection to a trailer that overhangs the frame rearwardly of the cab;
PA1	a front axle having steerable ground wheels thereon;
PA1	front suspension air bag means for the front axle interposed between the front axle and the side elements;
PA1	a power unit comprising a power unit sub-frame including a transverse forward rod and side rods fixed to and extending rearwardly of the forward rod below the side elements, the side rods having rearward distal ends;
PA1	a single hitch means, located rearwardly of the front axle, releasably connecting the center of the forward rod to the center of the intermediate cross element;
PA1	a rear axle assembly, having ground wheels and having a differential assembly, secured to the distal ends of the side rods;
PA1	rear suspension means interposed between the side rods and the side elements proximate to the rear axle assembly;
PA1	means securing the rear suspension means to the side rods and the side elements including releasable securing means securing the rear suspension means to at least one of the side rods and the side elements;
PA1	engine mounting means extending between the side rods between the hitch

Pftaps19760106 Wk01

	means and the rear axle assembly; and
PA1	an engine assembly, including an engine, secured on said mounting means and located between the hitch means and the rear axle assembly.
NUM	2
PAR	2. The invention of claim 1, wherein:
PA1	the rear suspension means comprises a series of air bags.
NUM	3
PAR	3. The invention of claim 1, and:
PA1	a stabilizer rod releasably secured between the differential assembly and the frame.
NUM	4
PAR	4. The invention of claim 1, and:
PA1	a stabilizer rod secured between the frame and the front suspension means.
NUM	5
PAR	5. In a vehicle:
PA1	a frame having side elements;
PA1	a front axle, having steerable ground wheels thereon, secured to forwardly projecting frame pivot arms, the frame pivot arms being pivotally secured at their front ends to the frame side elements;
PA1	yieldable suspension means mounted between the pivot arms and the frame side elements;

Pftaps19760106 Wk01

PA1	hitch means spanning the frame side elements rearwardly of the front axle;
PA1	a power unit, including a sub-frame having hitch connection means, releasably engaged with and extending rearwardly of the hitch means;
PA1	a rear axle, having ground wheels, secured to the sub-frame rearwardly of the hitch means;
PA1	yieldable suspension means releasably interposed between the sub-frame and the main frame; and
PA1	an engine assembly mounted to the sub-frame between the hitch means and the rear axle.
NUM	6
PAR	6. The invention of claim 5, wherein:
PA1	the yieldable suspension means comprise air bags.
NUM	7
PAR	7. The invention of claim 5, and:
PA1	a power train assembly operatively mounted on the sub-frame.
NUM	8
PAR	8. The invention of claim 5, and:
PA1	a longitudinally movable fifth wheel assembly on the main frame. .ladd. 9. In a motor vehicle:
PA1	a frame having side frame elements and cross elements connecting the side elements;

Pftaps19760106 Wk01

PA1	a cab mounted to the frame;
PA1	a fifth wheel mounted to the frame rearwardly of the cab for connection to a trailer that overhangs the frame rearwardly of the cab;
PA1	a front axle having steerable ground wheels thereon;
PA1	yieldable front suspension means for the front axle disposed between the front axle and the side elements;
PA1	a rear axle assembly, having ground wheels thereon and having a differential assembly;
PA1	hitch means located between the front and rear axles;
PA1	a power unit comprising a power unit sub-frame including side rods extending rearwardly of the hitch means below the side elements, the side rods having forward ends and rearward distal ends, and the rear axle assembly being secured to the distal ends of the side rods;
PA1	the side rods being releasably connected by the hitch means with the side frame elements;
PA1	rear suspension means disposed between the side rods and the side elements proximate to the rear axle assembly;
PA1	means securing the rear suspension means to the side rods and the side elements including releasable securing means securing the rear suspension means to at least one of the side rods and the side elements;
PA1	engine mounting means extending between the side rods between the hitch

Pftaps19760106 Wk01

	means and the rear axle assembly; and
PA1	an engine assembly, including an engine, secured to the engine mounting means and located between the hitch means and the rear axle assembly.
PAR	.laddend..ladd. 10. In a vehicle:
PA1	a frame having side elements;
FRM	Baker & McKenzie
PA1	a front axle, having steerable ground wheels thereon, secured to forwardly projecting frame pivot arms, the frame pivot arms being pivotally secured at their front ends to the frame side elements;
PA1	yieldable suspension means mounted between the pivot arms and the frame side elements;
PA1	a rear axle having ground wheels thereon;
PA1	hitch means on the frame side elements located between the front and rear axles;
PA1	a power unit, including a sub-frame having hitch connection means, releasably engaged with and extending rearwardly of the hitch means, the rear axle being secured to the sub-frame rearwardly of the hitch means;
PA1	yieldable suspension means releasably disposed between the sub-frame and the main frame; and
PA1	an engine assembly mounted to the sub-frame between the hitch means and the rear axle. .laddend.

Pftaps19760106 Wk01

PATN

WKU 39302717

SRC 5

APN 5328756

APT 1

ART 353

APD 19741216

TTL Golf glove

ISD 19760106

NCL 4

ECL 1

EXP Larkin; Geo. V.

NDR 1

NFG 6

INVT

NAM Kahng; He Chung

CTY Glenview

STA IL

ASSG

NAM Hi-Kahng Trading Co.

CTY Chicago

Pftaps19760106 Wk01

STA	IL
COD	2
CLAS	
OCL	2161A
XCL	2 21
EDF	2
ICL	A41D 1900
FSC	2
FSS	16;20;21;159;161 R;161 A;163
FSC	294
FSS	25
UREF	
PNO	2379430
ISD	19450700
NAM	Frost
OCL	2161A
UREF	
PNO	2782422
ISD	19570200
NAM	Bencriscutto
OCL	2161A

Pftaps19760106 Wk01

LREP

ABST

PAL

A golf glove is disclosed having an extra finger pocket between the index and middle finger pockets for securing one finger of one hand of a golf player between the fingers of the player's other hand.

BSUM

PAC

BACKGROUND OF THE INVENTION

PAR

1. Field of the Invention

PAR

This invention relates to a device designed to improve a golfer's grip on a golf club, and more particularly, to a device to assist a golfer in maintaining the proper position of the fingers of one hand with respect to the other hand on the club during the entire swing of the golf club.

PAR

2. Description of the Prior Art

PAR

From the prior art, a number of glove configurations and other devices are known for improving a player's grip on a golf club or to assure the proper positioning of the player's hands on the golf club. Such include gloves with special attachments for holding a player's fingers in position with respect to the palm of the hand, and gloves having straps adapted to fit around a golf club or to fit around the thumb of a player's opposite hand. One prior art device comprises a two-handed glove to force the two hands of a player to remain in a fixed position relative to each other.

Pftaps19760106 Wk01

PAR

As is well-known, a golfer adjusts his grip on the golf club and aligns the head of the golf club with the ball, while holding the club in front of himself. In aligning the head of the club with the ball, the player turns the club such that the face of the club's head is at the proper angle relative to the ball. It has become apparent, however, that during the swing, a player has a tendency to twist the club somewhat changing the carefully adjusted angle of the head relative to the ball. While a player may have a firm grip on the club while starting the back swing, as for example in an overlapping grip, there is a tendency for the fingers of the right hand of a right-handed player to move away from the fingers of the left and just prior to beginning the down swing in preparation for hitting the ball. Such loosening of the grip has a tendency to cause the club to twist, causing a change in the angle of the face of the club's head when it comes in contact with the ball.

PAR

Prior art gloves which are directed to maintaining a strong grip by means of the left hand do not aid in maintaining a proper position of the fingers of the right hand on the club. Certain prior art devices such as the two-handed glove mentioned above, or another known device consisting of a relatively thin sheet of flexible material which fits around the glove and having holes through which fingers of both hands are extended, are intended to fix the position of the fingers of both hands. They are,

Pftaps19760106 Wk01

at best, awkward to use or difficult to manufacture, or both.

PAC	SUMMARY OF THE INVENTION
NAM	Patterson
PAR	In accordance with this invention, a modified golfing glove is provided for improving a golfer's grip on a club, having a receptacle or restraining surface for holding one or more digits of one hand in a secured position relative to the digits of the other hand. In one illustrative embodiment of this invention, a standard golf glove is modified by the addition of a finger receptacle or finger pocket extending in a direction opposite the direction of the normal finger receptacles or pockets of the glove, and attached adjacent to the middle finger and index finger pockets of the glove. In a so-called overlapping grip, the little finger of the right hand of a right-handed golfer, may fit into the extra pocket. When so positioned, the little finger of the right hand will tend to remain securely nestled between the middle and index fingers of the left hand during the entire swing, avoiding an unwanted twisting of the club during the swing. In an alternative embodiment of the invention, several straps are extended between the middle and index finger pockets of a golf glove of one hand to provide a pocket for the little finger of the other hand.
PAR	In yet another embodiment of my invention, a loop resembling a section of a finger pocket is attached to the outer edge of the index finger pocket of

Pftaps19760106 Wk01

the glove of one hand to accommodate the ring finger of the player's other hand.

DRWD

PAC BRIEF DESCRIPTION OF THE DRAWING

PAR FIG. 1 is a perspective view of a portion of a golf club handle being gripped in an overlapping grip.

PAR FIG. 2 is a plan view of a left-handed golf glove having a finger pocket for accommodating one of the fingers of the right hand.

PAR FIGS. 3 and 4 are perspective views taken substantially along the sectional lines 3--3 and 4--4, respectively, of FIG. 1.

PAR FIG. 5 is a plan view of a left-handed glove having straps extending between two finger pockets thereof to accommodate a finger of the right hand.

PAR FIG. 6 is a plan view of a left-handed glove having a section of a finger pocket attached to the outer edge of the index finger pocket to accommodate a finger from the right hand.

DETD

DETAILED DESCRIPTION

PAR The figures as outlined above, refer to a left-handed golf glove to be worn by a right-handed player. The invention is clearly adaptable to use by left-handed players using a right-handed glove having the features of this

Pftaps19760106 Wk01

invention as shown in the drawing and described herein.

PAR

FIG. 1 shows the two hands of a player gripping the handle 10 of a club in the so-called overlapping grip. The player's left hand is in a glove 12 having an extra pocket 14 attached to the glove between the middle and index fingers. The pocket 14 points in the direction opposite of the other finger pockets of the glove, and as shown in FIG. 1, the little finger 16 of the player's left hand is extended into the pocket 14.

PAR

FIG. 2 is a plan view of a left-handed glove such as shown in FIG. 1. The extra finger pocket 14 is shown to be positioned partially between and extending partially over the middle and index finger pockets 22 and 24. The upper edge 26 of the pocket 14 preferably terminates in the vicinity of the position of the outer-most knuckle of the left index finger when the same is inserted in the index finger pocket 24. The fingertip end 28 of the pocket 14, preferably extends a distance beyond the common termination point 21 of middle and index finger pockets 22 and 24. The length of the finger pockets 14 will preferably be approximately equal to the distance from the middle knuckle to the tip of the little finger of the right hand of a player. As shown in the perspective representation of FIG. 3 and FIG. 4, the open end 26 of the extra pocket 14 is positioned partially between the middle and index finger pockets 22 and 24. The end portion 28 extends beyond the common termination point 21 of the finger

Pftaps19760106 Wk01

pockets 22 and 24 and is fastened to the back section 23 of the glove. The extra finger pocket may be attached to the back of the glove and its adjoining finger pockets by stitching or another known method.

PAR

It will be understood that when a right-handed player grips the golf club in an overlapping grip, as represented in FIG. 1, the little finger 16 will extend into the extra pocket 14. Thus, the end of the little finger of the right hand, when inserted in the pocket in this manner, will rest on the area on the back of the left hand between the knuckles of the middle and index fingers. When the little finger is inserted in the extra pocket and positioned in the manner described, the player's hands are interlocked in such a manner as to keep the left hand in position relative to the right hand. Particularly, the right hand does not have the tendency to open during any part of the swing, and loss of the correct grip is avoided.

PAR

As is apparent from the above description and the drawing, the finger pocket 14 overlays the back panel 23 of the glove. When this finger pocket 14 is attached to the glove by means of peripheral stitching as indicated in the drawing, it is possible for a player to place the little finger of the right hand underneath the pocket 14. In this manner, the lower surface of the finger pocket acts as a restraining surface and the end portion of the little finger of the right hand fits snugly underneath the end portion

Pftaps19760106 Wk01

28 of the finger pocket 14. When the little finger is so positioned, the player has a sense of interlocking of hands in the same manner as when the little finger is inserted in the pocket. The function of restraining the little finger of the right hand in the desired position between the middle and index fingers and overlapping the back of the left hand, may also be accomplished by means of a plurality of straps extending between the middle and index finger pockets and one or more straps attached to the back of the glove. Such an arrangement is shown in FIG. 5. The straps 52, 53 and 54 extend between the middle finger pocket 22 and the index finger pocket 24 and are attached thereto. The strap 55 is attached to the back panel 23 of the glove 12. It will be understood that when the glove of FIG. 5 is worn by a player and a golf club is gripped in the manner depicted in FIG. 1, the little finger 16 of the player's right hand will fit underneath and be restrained by, the straps 52 through 55. When used in this manner, a glove having such straps aids the player to maintain a secure grip on the golf club.

PAR

As stated earlier herein, there is a tendency for the overlapping hand, for example the right hand shown in FIG. 1, to open slightly when the club is raised in preparation for the swing, which may result in an inadvertent turning of the club. This tendency of a player's hand to open is reduced substantially by interlocking the little finger of that hand between the

Pftaps19760106 Wk01

middle and index fingers of the other hand in the manner described in the previous paragraphs. The same effect may be obtained by securing one of the other fingers of the overlapping hand, for example the ring finger.

FIG. 6 shows a finger receptacle 62 attached to the outer edge 25 of the index finger pocket 24 of a left-handed glove. The receptacle 62 may be attached to the pocket by means of stitching or any other known means.

When a golf club 10 is gripped by means of the overlapping grip as depicted in FIG. 1, the ring finger 18 of the right hand may be inserted into the receptacle 62. When the ring finger of the right hand is inserted in the receptacle 62 in the manner described, the tendency of the right hand to open during the swing is reduced substantially, aiding the golfer in maintaining the correct alignment of the club. When using a grip other than the overlapping grip depicted in FIG. 1, a golfer may insert another digit, for example, the little finger of the left hand, in the receptacle

62

PAR

While the invention has been illustrated by means of the examples described above and shown in the drawing, it will be apparent to those skilled in the art that other embodiments may be produced without departing from the scope of the present invention.

CLMS

STM

What I claim is:

Pftaps19760106 Wk01

NUM	1
PAR	1. A golf glove comprising at least an index finger receptacle, a middle finger receptacle and a back surface extending from said receptacles in the direction of the wrist, and further comprising another finger receptacle disposed adjacent said index finger receptacle and said middle finger receptacle and overlapping a portion of said back section.
NUM	2
PAR	2. A golf glove in accordance with claim 1 wherein said other finger receptacle is attached along its periphery to said index finger receptacle, said middle finger receptacle and said back surface.
NUM	3
PAR	3. A glove comprising an index finger receptacle, a middle finger receptacle, a back surface extending in the direction of the wrist, a finger restraining strap extending between said receptacles, and a finger restraining strap attached to said back surface adjacent said index finger receptacle and said middle finger receptacle and aligned in a direction substantially parallel to said finger restraining strap extending between said finger receptacles.
NUM	4
PAR	4. A golf glove adapted for use on one hand of a golf player comprising at least an index finger receptacle and further comprising a finger

Pftaps19760106 Wk01

receptacle attached to the side of said index finger receptacle most
nearly adjacent to the thumb and adapted to receive a finger of the golf
player's other hand.

PATN	
WKU	39302725
SRC	5
APN	5015332
APT	1
ART	355
APD	19740910
TTL	Crib leg lock
ISD	19760106
NCL	3
ECL	1
EXA	Holko; Thomas J.
EXP	Frazier; Roy D.
NDR	1
NFG	3
INVT	
NAM	Boudreau; Robert J.
CTY	Bedford

Pftaps19760106 Wk01

STA	PA
ASSG	
NAM	Hedstrom Co.
CTY	Bedford
STA	PA
COD	2
CLAS	
OCL	5 11
XCL	5100
XCL	248423
XCL	403107
EDF	2
ICL	A47D 701
FSC	5
FSS	11;99 B;100
FSC	248
FSS	188.2;188.5;157;407;408;409;423
FSC	403
FSS	107;108
UREF	
PNO	933921

Pftaps19760106 Wk01

ISD 19090900

XCL 5 11

UREF

PNO 1549144

ISD 19250800

NAM Messegee

OCL 248188.2

UREF

PNO 1609246

ISD 19261100

NAM Hamburger

XCL 248407

UREF

PNO 1667080

ISD 19280400

NAM Ramsey

OCL 5 11

UREF

PNO 1834468

ISD 19311200

NAM Mayette

Pftaps19760106 Wk01

XCL 5 99B

UREF

PNO 2545289

ISD 19510300

NAM Lang

OCL 5 11

UREF

PNO 2560109

ISD 19510700

NAM Hines

XCL 248407

UREF

PNO 2574559

ISD 19511100

NAM Graf et al.

OCL 5 11

UREF

PNO 2711301

ISD 19550600

NAM Jaspersen

XCL 403107

Pftaps19760106 Wk01

UREF

PNO 2734200

ISD 19560200

NAM Kedrowski

OCL 5 11

UREF

PNO 3670344

ISD 19720600

NAM Boudreau

OCL 5 11

LREP

FRM Cesari and McKenna

ABST

PAL A lock for a height-adjustable crib or playpen requires two distinct manual operations in order to release the lock on each crib leg. Each lock includes a rigid metal bracket which engages around the extensible part of the leg and is pivotally connected to a crib corner post. The bracket has a nose which projects into one of a series of openings in the extensible part of the leg then the bracket is swung against the leg part to prevent movement of the leg part relative to the post. The upper edge of the bracket is slotted to receive a latch pivotally connected to the corner

Pftaps19760106 Wk01

post just above the bracket. The latch drops into the slot when the nose is engaged in one of the openings so that the bracket cannot be moved.

BSUM

PAC

BACKGROUND OF THE INVENTION

PAR

This invention relates to juvenile furniture hardware. It relates more particularly to an improved leg lock for a crib, playpen or other height adjustable enclosure.

PAR

There is a growing awareness of the need to make juvenile furniture even safer for children. In the specific case of height-adjustable cribs and pens, considerable attention is being paid to making the crib less subject to being collapsed accidentally.

PAR

Some prior crib leg locks comprise a spring loaded pin mounted on a strap connected to the crib corner post and arranged to engage in openings in the extensible leg. When the pin is retracted the leg is free to move.

These spring loaded locks are disadvantageous because they can be released by the child in the crib. Other cribs avoid this problem by securing the extensible leg to the corner post by passing a bolt through the corner post and leg and turning down a wingnut or threaded knob on the bolt to prevent the two from moving.

PAR

In some cases, the bolt opening through the extensible leg is an elongated slot so that it is only necessary to loosen the nut in order to move the

Pftaps19760106 Wk01

leg. In other instances, the bolt has to be completely removed in order to reposition the leg. These prior constructions are not entirely satisfactory because in the former instance the crib is subject to accidental collapse if the nut should loosen, while in the latter case it takes a considerable amount of time and trouble to readjust the height of the crib.

PAC

SUMMARY OF THE INVENTION

PAR

Accordingly, the invention aims to provide a leg lock for a height-adjustable crib or playpen which cannot release accidentally, yet which can easily be released intentionally by the parent when it is desired to change the height of the crib.

PAR

Another object of the invention is to provide a leg lock of this general type which is relatively inexpensive to make.

PAR

Still another object of the invention is to provide a crib leg lock which will pass current government safety regulations on juvenile furniture.

PAR

A further object of the invention is to provide a crib leg lock which is less prone to accidental release by the child in the crib.

PAR

A further object of the invention is to provide a crib leg lock which is latched securely when it locks the leg at a selected height.

PAR

Other objects will in part be obvious and will in part appear hereinafter.

PAR

The invention accordingly comprises the features of construction,

Pftaps19760106 Wk01

combination of elements and arrangement of parts which will be exemplified in the following detailed description, and the scope of the invention will be indicated in the claims.

PAR

Briefly, the subject leg lock is installed on each of the four corner posts of a conventional crib. It comprises a generally C-shaped stamped metal strap which is pivotally connected to opposite sides of the corner post and engages around the usual extensible leg slidably connected to that corner post. The strap is provided with a relatively sharp nose which projects into one of the usual positioning holes in the leg when the strap is swung against the leg so that the leg is locked at a selected lengthwise position relative to the corner post.

PAR

When the bracket is thus swung against the leg, a latch drops into a slot formed in the upper edge of the bracket so that the bracket itself is locked in that position. Thus, even though the crib is lifted from the floor so that there is no upward force on the corner supports, the bracket remains locked with its nose in the positioning hole in the leg.

PAR

When it is desired to release the lock, two separate and distinct manual procedures must be followed. First, the latch key must be lifted up out of the slot in the bracket. At the same time the bracket must be swung away from the leg, thereby withdrawing its nose from the positioning hole in the leg. The leg can then be moved to a new height after which the bracket

Pftaps19760106 Wk01

can be repositioned against the leg with its nose in another hole therein.

Whereupon the latch will again drop in the slot in the bracket thereby locking the bracket in place.

PAR The chances of the average child being able to manipulate both the latch and the bracket so as to release the leg are quite small. Thus there is little likelihood of accidental collapse of the crib. Since the bracket and latch are simple stamped metal parts, the cost of incorporating the subject lock into a crib of otherwise conventional construction is relatively small.

PAC DESCRIPTION OF THE PREFERRED EMBODIMENT

DRWD

PAR FIG. 1 is a perspective view of a crib including the improved crib leg lock.

PAR FIG. 2 is a fragmentary enlarged view of the crib leg lock in an unlocked position.

PAR FIG. 3 is a fragmentary enlarged view of the crib leg lock in a locked position.

DETD

PAR Referring to FIG. 1 of the drawing, a crib shown generally at 10 has the usual corner supports indicated generally at 12. Since all these supports are identical, we will describe only one in detail. Each such support

Pftaps19760106 Wk01

	comprises a corner post 12a of the crib, and an extensible leg 12b. Leg 12b is slidably connected to the corner post by the usual C-shaped metal strap 14, which engages around leg 12b and whose ends are connected to
NAM	Higgins
	opposite sides of the corner post by wood screws 13 (FIG. 2).
PAR	The leg 12b has the usual series of spaced openings 15, which cooperate with the subject leg lock shown generally at 16 to allow one to position crib 10 at a number of different elevations above the floor. Thus when the lock 16 is engaged in the uppermost hole 15, the leg 12b can extend down a considerable distance below the bottom of the crib. On the other hand, engagement of the lock 16 in the lowermost hole 15 positions the leg 12b so that its lower end is flush with the floor of the crib, thus enabling the crib to rest directly on the floor. Intermediate height adjustments of the crib are accomplished by engaging the lock 16 in the intermediate holes 15.
PAR	Referring now to FIGS. 2 and 3, lock 16 comprises a bracket 18 having a flat front face 18a, a pair of sides 18b extending at right angles to face 18a and considerably below that face. The bracket is arranged to engage around leg 12b and the lower edges of the bracket sides 18b are pivotally connected to corner post 12a by wood screws 22. These extend through suitable openings in the bracket sides and are turned down into opposite

Pftaps19760106 Wk01

sides of the corner post, with the bracket being positioned almost midway up on the corner post.

PAR

The bracket 18 is formed with a relatively sharp nose 18c at the top of the front face 18a, which projects at right angles from that face toward leg 12b. Nose 18c is slightly narrower than the openings 15 in leg 12b, so that when the bracket 18 is swung upwardly with its front face 12a flush against leg 12b, the nose 18c can project into one of the openings 15, assuming of course that the leg 12b is at one of its selected positions of adjustment.

PAR

Lock 16 also includes an elongated L-shaped latch 26, which is recessed into a horizontal slot 28 in the outer face of corner post 12a just above bracket 18. The latch is pivotally connected to the corner post by a wood screw 32 extending through a suitable opening in the latch and turned down into the corner post. The latch extends beyond corner post 12a and terminates in a short leg 26a, bent at a right angle relative to the rest of the latch. The width of the slot 28 is somewhat greater than the width of the latch 26 so that the latch is free to pivot to a degree about screw 32. Further, the screw 32 is positioned toward the straight end of the latch so that the force of gravity causes the latch to swing downward about its pivot so that its end adjacent leg 26a rests against the lower wall of slot 28.

Pftaps19760106 Wk01

PAR Latch 26 is arranged to engage in a slot 34 formed in the top edge of bracket side 18b, adjacent latch leg 26a, when nose 18c engages in one of the openings 15. As soon as the bracket is swung against the leg 12b, the latch drops into the slot 34, thereby locking the bracket in place, thus providing a double lock for the corner support 12. Also the upward force exerted on leg 12b tends to maintain the bracket 18 against the leg.

PAR In order to change the height adjustment of each support, 12, it is necessary to lift latch 26 out of slot 34, using the latch leg 12a for this purpose. Then while the latch is raised, the bracket 18 must be swung away from leg 12b, thereby retracting nose 18c from opening 15. At this point the leg 12b can be slid up or down relative to its corner post and the lock repositioned in one of the other openings 15, whereupon the bracket will again be locked in place by latch 26.

PAR It is apparent then that two distinctly different manual operations must be performed in order to release each support 12. Accordingly, the chances are minimal of a corner support being released accidentally as the crib is being moved by a child in the crib. Further, since the present lock is made of simple stamped metal parts, its cost is minimal.

PAR It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and since certain changes may be made in the above construction without

Pftaps19760106 Wk01

departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not a limiting sense.

PAR It is also to be understood that the following claims are intended to cover all of the generic and specific features of the invention herein described

CLMS

STM I claim:

NUM 1

PAR 1. In combination with a height adjustable crib or the like of the type having a corner post and an extensible leg slidably connected to the corner post and having a series of holes along its length, a lock comprising

PA1 A. a rigid bracket extending around the extensible leg and having sides lying flush against opposite sides of the corner post;

PA1 B. means for pivotally connecting the bracket sides to the corner post so that the bracket can be swung toward and away from the leg;

PA1 C. a rigid nose projecting from the bracket and extending toward the leg, said nose being arranged to engage in one of the leg holes when the bracket is swung against the leg so as to lock the leg at a selected position of lengthwise adjustment relative to the corner post, and

Pftaps19760106 Wk01

PA1 D. means mounted on the corner post and cooperating with the bracket for
removably retaining the bracket with its nose in said hole said retaining
means comprising

PAR 1. a latch pivotally connected to the corner post adjacent to the bracket,
and a slot formed in a side of the bracket, the sides of the slot being
engaged by the latch when the bracket is positioned with its nose in said
hole.

NUM 2

PAR 2. The lock defined in claim 1 wherein the bracket comprises a single rigid
metal stamping.

NUM 3

PAR 3. The lock defined in claim 1 wherein the pivotal connection of the latch
to the corner post is off center so that the force of gravity tends to
maintain the latch in the slot when the bracket is positioned with its
nose in said hole.

PATN

WKU 39302733

SRC 5

APN 5402409

APT 1

ART 351

Pftaps19760106 Wk01

APD	19750110
TTL	Bed safety side rail arrangement
ISD	19760106
NCL	24
ECL	1
EXA	Calvert; Andrew M.
EXP	Gilliam; Paul R.
NDR	7
NFG	14
INVT	
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STA	MO
COD	2
RLAP	
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Pftaps19760106 Wk01

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PSC 4

RLAP

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PSC 3

CLAS

OCL 5331

XCL 5100

EDF 2

ICL A47D 702

ICL A47C 2100

FSC 5

FSS 331;332;100

UREF

PNO 1240201

ISD 19170900

NAM Haskes

OCL 5331

UREF

Pftaps19760106 Wk01

PNO 2817855

ISD 19571200

NAM Pratt

OCL 5331

UREF

PNO 3093839

ISD 19630600

OCL 5331

UREF

PNO 3125769

ISD 19640300

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OCL 5331

UREF

PNO 3175453

ISD 19650300

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OCL 85 8.3

UREF

PNO 3233930

ISD 19660200

Pftaps19760106 Wk01

NAM Becker

OCL 85 8.8

UREF

PNO 3419922

ISD 19690100

NAM Malherbe

OCL 5331

UREF

PNO 3585659

ISD 19710600

NAM Burst et al.

OCL 5331

LREP

FR2 Pippin, Jr.; Reginald F.

ABST

PAL A bed safety side rail arrangement which includes two opposite articulated side rail assemblies selectively pivotally movable from an upper safety position to a lowered position, as for patient transfer and handling and/or bedmaking tasks. The opposite side rail assemblies are readily removably secured to opposite sides of a bed, and desired structural rigidity is provided through the medium of tubular cross members or cross

Pftaps19760106 Wk01

member assemblies which engage the side rail assemblies at their respective pivot connections.

PARN

PAR

This is a continuation of application Ser. No. 393,191, filed Aug. 30, 1973, which in turn is a continuation of Ser. No. 177,390, filed Sept. 2, 1971, now abandoned.

BSUM

PAR

This invention relates to bed safety side rail arrangements and to beds incorporating such arrangements, and more particularly to self-rigidified articulated bed side rail and support assemblies which may be easily installed and removed.

PAR

Various safety side rail arrangements have been made in the past, including various articulated arrangements; however, such side rail arrangements have had various shortcomings. Included in these shortcomings are the utilization of additional supporting or rigidifying members which are welded or bolted to the bed frame. Such welded or bolted members on the bed frame usually provide pivot points for the rail assembly, as well as a means for fastening the rail assembly to the bed, and serve to transfer connection with hole 17 therefor. undesirable bending loads to the bed frame, as well as sometimes providing less side rail lateral stability than is desirable. In addition, in

Pftaps19760106 Wk01

various ones of the prior art constructions a latch is located in the upper portion of the rail, which is generally undesirable inasmuch as it allows the patient to purposely or inadvertently to disengage the latch and lower the side rail from its safety position.

PAR It is an object and feature of the present invention to provide a safety side rail arrangement which enables the provision of side rails on a bed without requiring additional reinforcing members or mechanisms permanently or otherwise rigidly secured to the bed frame in order to support and rigidify the side rail.

PAR It is a further feature of the invention to provide a detachable side rail assembly which does not require the utilization of ancillary securing hardware such as nuts, bolts, cotter pins, or the like for installation on a bed.

PAR Still a further feature of the invention is to provide a bed safety side rail arrangement which may be installed and removed manually and without tools, and which may be easily installed and removed by a novice without any assistance from a second party.

PAR A further feature of the invention is the provision of a side rail arrangement having a latch which engages automatically when the side rail is raised, and which may be easily released by authorized personnel standing to the side of the bed, while according substantial difficulty

Pftaps19760106 Wk01

and impediment to release by a person, such as a bedridden patient, lying on the bed.

PAR

Still a further feature of the invention is to provide a side rail arrangement which may be utilized on a variety of bed models, including beds of older construction, and with a minimum of adaptation required.

PAR

Still other objects, features and attendant advantages will become apparent to one skilled in the art from a reading of the following detailed description on several physical embodiments constructed in accordance with the invention, taken in conjunction with the accompanying drawings wherein

:

DRWD

PAR

FIG. 1 is a perspective view of a bed arrangement incorporating the invention.

PAR

FIG. 2 is a schematic representation illustrating the side rail arrangement of FIG. 1, with the bed frame and mattress schematically illustrated in phantom for clarity of illustration.

PAR

FIG. 3 is a fragmentary view of the zone of connection of one of the side rail assemblies with the bed frame, with the side rail assembly in the upper safety position.

PAR

FIG. 4 is a fragmentary view similar to FIG. 3, with the side rail assembly in a pivotally lowered stop position.

Pftaps19760106 Wk01

said riser.

PAR FIG. 5 is a fragmentary view of the bed attachment end of the foot end or latch-connected riser of one of the side rail assemblies.

PAR FIG. 6 is a fragmentary view of the bed attachment end of the head-end riser of one of the side rail assemblies.

PAR FIG. 7 is a fragmentary view taken on the line 7--7 of FIG. 2.

PAR FIG. 8 is a fragmentary view taken on the line 8--8 of FIG. 2.

PAR FIG. 9 is a side elevation view of one of the side rail assemblies, illustrating the position of the side rail in full lines in the safety position, and showing the lowered position of the side rail risers in phantom line, the bed frame connecting member being illustrated in phantom for clarity of illustration.

PAR FIGS. 10 and 11 are schematic representations of the bed arrangement of FIG. 1, showing respectively the relationship of the side rail assembly with the major bed parts, in respectively the raised safety position and the lowered position.

PAR FIG. 12 is a schematic representation illustrating the inverted reversal of the side rail and riser arrangement to provide a different effective side rail height, this different height position being illustrated in full lines, and the position of the side rail, riser and latch as in FIG. 1 being shown in phantom line.

Pftaps19760106 Wk01

PAR

FIG. 13 is a fragmentary perspective view of a modification, illustrating an adapter arrangement for enabling ready attachment of the side rail assembly to a bed frame not otherwise particularly adapted for the illustrated side rail assembly of FIG. 1.

PAR

FIG. 14 is a sectional view taken on the line 14--14 of FIG. 2.

DETD

PAR

Referring now in detail to the Figures of the drawing, in the illustrative embodiment of FIG. 1, a bed generally indicated at 11 has provided thereon two side rail assemblies 31, 31', the side rail assemblies being shown in the raised safety position, with their respective side rails 33, 33' extending above the mattress 29, which may be supported in any conventional and suitable fashion, as by a spring frame 27 which may be in turn supported on a suitable support assembly which may be either rigid or provided for conventional articulated movement of the spring frame 27. In the illustrated assembly, a conventional central support assembly 21 is schematically illustrated, which is secured to longitudinal side frame members 13, 13', and additional or other spring frame supporting members may be suitably provided as may be desired or necessary, as well as articulation effecting mechanism or mechanisms, as is conventional in the bed art, and particularly the hospital patient care bed art. The side frame members 13, 13' are conventionally secured to support legs 15, with

Pftaps19760106 Wk01

	a headboard 19 and footboard 19a provided thereon. A typical articulated position of the mattress 29 is illustrated in phantom in FIG. 1, to
NUM	7
	illustrate the utility of the side rail assemblies for various positions of the spring frame and mattress in this or various other bed assemblies on which the side rail arrangement may be suitably employed.
PAR	The side rail assemblies 31, 31' are preferentially mirror images of one another, and the various corresponding parts of the side rail assembly 31' are accordingly designated by the same numbers as used for the side rail assembly 31, with the addition of a prime (') reference mark thereto. The invention will therefore be described in detail with respect to only one side rail assembly 31, it being understood that the opposite side rail assembly 31' is preferably identical mirror image.
PAR	The two side rail assemblies 31 and 31' include risers 41, 43 and 41', 43' respectively, which are releasably pivotally secured to the side frame members 13 and 13' of bed 11. The securement of the risers 41, 43 and 41', 43' is facilely effected by a single operator without the necessity for the use of tools. The mode of interconnection and mounting of the risers is best illustrated in FIGS. 2-9.
PAR	Referring now to the side rail assembly 31, the risers 41 and 43 are each provided with pivot pins or shafts 41a, 43a, which engage within

Pftaps19760106 Wk01

corresponding slightly oversize openings 16 and 17 formed in the relatively thin vertical wall of the longitudinal side frame member 13, which member may suitably be a rigid angle iron member such as is provided in conventional bed construction. Side rail assembly 31' is likewise provided with corresponding riser pivot pins which extend into similarly spaced corresponding mounting holes in the longitudinal side frame member 13'. The risers rely for vertical support upon the bed side frame members 13, 13', but do not utilize these bed side frame members for rigidity against lateral bending moments which may be exerted on the side rail assemblies, as by a patient moving against the side rail. The two side rail assemblies are rigidified and bending moments are taken by two cross tube arrangements, 81, 83, the head end cross tube arrangement being a simple open tube which engages at its opposite ends with the inwardly extending pivot pin 41a on the riser 41 and the pivot pin, not shown, on the riser 41'. The foot end cross tube assembly 83 may in various bed arrangements be a simple tube such as 81, but for more universal use, as where bed operating mechanisms pass along the bed frame in this zone, an offset cross tube assembly is provided, including an offset cross tube 85 which is secured at its opposite ends to two end tubes 87 through the medium of a spacer web 89, the end of the cross tubes being in complementary pivot-engaging relation with the riser pivot pin 43a of

Pftaps19760106 Wk01

riser 43 and the corresponding opposing riser pivot pin, not shown, of riser 43'.

PAR

The cross tube 81 and cross tube assembly 83 provide the side rail assemblies with a suitable rigidifying support structure without necessitating transfer of bending moments into the bed frame, which transfer of bending moments to the bed frame is typical of cross members which are welded or otherwise rigidly fastened to the bed frame. It will be appreciated that the cross tubes act on the riser pivot pins in this respect, so as to substantially minimize lateral bending movement of the side rail assemblies.

PAR

Referring in particular to FIGS. 3 and 5-8, each of the risers 41 and 43 is provided with a retainer spring 49, 59, respectively, which serves to removably secure the risers 41 and 43 to the side frame member 13. The retainer spring 49 takes the form of a dual leg torsion-acting spring arrangement having a torsion coil 49t with extending spring mounting leg 49b and spring retention leg 49a. Formed on the end of the spring mounting leg 49b is a mounting wrap 49w which engages in rotatably slidable wrapsecuring relation about the riser pivot pin 49a at a position adjacent the riser 41. As will be seen in FIG. 6, spring 49 is held in place adjacent the zone of interconnection of the riser pivot pin or shaft 41a with the riser lower end 41-1, through the medium of washer 67 and snap

Pftaps19760106 Wk01

retainer ring 65, the retainer ring 65 being of conventional construction and engaging within a narrow annular retaining groove 41af in the riser pivot pin. Thus, washer 67 and spring mounting wrap 49w are for sliding rotational or arcuate movement on the riser pivot pin 41a, retained between snap ring 65 and the inner face of riser 41. The spring retention leg 49a engages in an annular retaining groove 49ag formed in the riser pivot pin at a position spaced axially from the zone of engagement of the mounting wrap 49w, and the end of the spring retention leg 49a is provided with a finger grip loop 49c which enables the release of the spring retention leg 49a from the groove 49ag in order to effect assembly and removal of the riser 41 with respect to side frame member 13. Thus, in mounting the riser 41 on the bed, the riser pivot pin 41a is inserted into the hole 16 in the frame member 13, and the finger grip loop 49c is pulled downwardly into a position beneath the lower edge of the side frame member 13 and is then released on the inner face side of the side frame member 13 and replaced into the retaining groove 41ag, thereby securely positioning the riser 41 and pivot pin 41a in pivotal position on the side frame member 13. Removal of the riser 41 may be readily accomplished by reversal of this operation.

PAR

Mounting of the riser 43 on the frame side member 13 is accomplished in a generally similar but slightly modified fashion, the riser 43 having a

Pftaps19760106 Wk01

differently constructed retainer spring 59 which is associated with a latch 51 which serves to releasably lock the riser 43 in the raised safety position for the side rail assembly 31. It will be appreciated that locking of the riser 43 in this position will likewise lock riser 41 in position in view of the parallelogram arrangement of these risers 41, 43, in conjunction with side frame member 13 and side rail 33.

PAR

The latch 51 and its assembly with foot end riser 43 is best seen in FIGS. 5 and 7. Latch 51 has a vertically extending slot 51s to accommodate relative vertical movement between the latch and riser pivot pin 43a, to enable locking and release action of the latch with respect to lock stop pin 43b, which is suitably secured on the lower end portion of the riser lower end 43-l. Riser pivot pin or shaft 43a extends through slot 51s, and the latch 51 is secured to the riser 43 through the medium of a snap retainer ring groove 43af formed in the periphery of the riser pivot pin 43a. A flat washer 63 is slidably mounted on the pivot shaft or pin 43a between the outer face of latch 51 and the inner face of riser 43.

PAR

Latch 51 has a lock slot 51-la formed thereon for engagement with the lock/stop pin 43b, to afford locking of the riser 43 in the raised safety position for the side rail assembly 31. The latch is provided with a latch pivot pin 57 which is suitably secured, as by welding, at the opposite end zone of a bent-in section 53, and in the engaged position of the pivot pin

Pftaps19760106 Wk01

57 with the side frame member 13 the latch 51 is enabled to pivot about the axis of pivot pin 57 and thereby afford vertical motion of the latch relative to the riser 43 and riser pivot pin 43a, within the limits of restriction of the slot 51s, thus enabling engagement and disengagement of the lock/stop pin 43b with the lock slot 51-ls, as may be desired. As an aid to the engagement of the lock stop pin 43b with the lock slot 51-ls, a latch cam surface 51a is formed on the latch 51 adjacent the lock slot 51-ls, whereby the latch 51 is cammed upwardly by the engagement of the lock stop pin in the course of raising the foot end riser 43, with the lock stop 43b thereupon reaching the lock slot 51-ls, at which time the latch 51 will pivot downwardly and engage the lock stop pin 43b in the lock slot 51-ls under the influence of gravity and the resilient spring action of spring 59 which serves the dual purpose affording this resilient biasing action and retaining the riser 43 and latch 51 in engagement with the bed frame, namely the side frame member 13.

PAR

Retainer spring 59 is a cantilever spring having an anchor end loop 59a anchored to a flange 54 on the latch 51, as through the medium of a headed anchor pin 58 riveted or otherwise suitably secured in place, the spring 59 having an upwardly curved cantilever medial 59b, with a finger grip loop 59c at its free end, the medial and/or end zone adjoining loop 59c engaging with an annular retaining groove 43ag formed in the riser pivot

Pftaps19760106 Wk01

pin 43a at an axial position spaced from snap-retainer ring 61 by a distance sufficient to accommodate the vertical side web of the side frame member 13 through which the riser pivot pin 43 extends at the zone of Flange 54 serves the dual function of serving as a cantilever mount for retainer spring 59 and also providing an advantageously disposed and formed hand-engaging surface for exerting an upward latch release force F.sub.r, as indicated generally by the dual arrows in FIGS. 1 and 5.

PAR In securing the riser 43 and associated latch 51 to the frame side member 13, the riser pivot pin or shaft 43a is inserted into slightly oversized complementary mounting hole 17 formed in the relatively thin-walled vertical web position of side frame member 13, and a latch pivot pin 57 is inserted into slightly oversized complementary hole 18, likewise formed in side frame member 13. Finger grip loop 59c is utilized to bend the spring 59 downwardly to a position beneath the lower surface of side frame member 13, permitting the riser pivot pin to be fully inserted into the mounting hole 17, whereupon the spring 59 is replaced in the annular retaining groove 43ag on the inner face side of the side frame member 13 through which the pin 43a extends. Sufficient clearance is provided between the flange 54 and the lower edge side frame member 13 to enable upward pivot release action of the latch 51 about the axis of pivot pin 57 in its respective frame mounting hole 18. As noted above, the foot end 53 of the

Pftaps19760106 Wk01

latch 51 is bent laterally inwardly at a small angle relative to the head end section of the latch, the bend being suitably effected in the zone adjacent the anchor pin end of flange 54. This inward bending of the section 53 of latch 51 enables self-retention of the latch pivot pin in mounting hole 18 without the necessity of a keeper on the latch pivot pin, it being appreciated that the riser pivot pin 43a is held against an undesirable degree of canting motion through its engagement with its associated cross tube assembly 83, as shown particularly in FIGS. 2-4 and 7

PAR

Removal of the foot end riser 43 and associated latch 51 carried thereby is readily accomplished by reversal of the assembly operations discussed above, such essentially only requiring manual downward bending of the spring 59 while the foot and riser 43 is pulled outwardly to thereby remove the riser pivot pin 43a and latch pivot pin 57 from engagement with the side frame member 13.

PAR

As shown particularly in FIGS. 1, 2 and 14, the side rails 33 take the form of a length of tubing, preferably steel, formed in a loop 35 with both ends secured together through the medium of a short tubular coupling 37, as by sweat soldering or other suitable connecting medium. Two spreader bars 38 are suitably secured between the upper and lower parallel runs of loop 35, as by soldering, in order to provide a desired rigidity to the

Pftaps19760106 Wk01

side rail tube assembly, and also serve to facilitate pivotal mounting of the risers 41 and 43 to the side rail 33. To this end, as shown in FIG. 14, a tube spacer 39 is suitably secured, as by soldering, to each comprising spreader bar 38, preferably in a vertically off-center position, and a pivot pin 45 is suitably secured, as by welding, in the top end of the risers 41 and 43, the pivot pin 45 extending in pivotal relation within the tube spacer 39 and being pivotally secured in place as through the medium of a headed screw 45a which engages within a threaded bore in the pivot pin 45, and the head of screw 45a extending beyond the inner diameter of tube spacer 39 to effect suitable retaining action. A spring washer 39a is disposed between the tube spacer 39 and the adjacent face of riser 41 to aid in prevention of looseness or vibration between these parts. The length of tube spacer 39 is sufficient to provide lateral stability for the side rail 33 and also to minimize the pinching hazard for fingers and electrical cords which may be created by the scissor action of the risers and side rail 33 during raising and lowering.

PAR

It will be noted that the risers 41, 43 are constructed of substantially rigid flat material, preferably from a flat steel bar. An offset 41f, 43f, is formed in the risers 41, 43, as illustrated in FIGS. 7 and 8, and provides sufficient clearance between the various moving parts, such also

Pftaps19760106 Wk01

aiding in reducing the pinching hazard which is inherent in articulated side rail assemblies. Although the riser bars are relatively rigid, there is enough springiness available to absorb a large portion of the lateral loads without making the assembly flimsy and noisy in operation.

PAR

In mounting of the side rail assembly, 31, 31' and associated cross members 81, 83, onto bed 11, one of the side rail assemblies is first removably secured to its respective side frame member, as has been described above, with the riser 41, riser 43 and associated latch 51, retained in their respective mounting holes 16, 17, 18 through the medium of retainer springs 49, 59. Thereupon, the cross tubes 81, 83 are brought into end engagement with their respective riser pivot pins or stub shafts, and the opposite side rail assembly is then positioned with its pivot mounting pins or stub shafts in the corresponding respective three holes in the other side frame member, the corresponding open ends of the cross tube members 81, 83 being held in alignment with the pivot pin holes for the respective riser pivot pins during mounting of this opposite side rail assembly with its respective risers onto the respective opposite side frame member. The second side rail assembly is then similarly releasably retained in place by manual manipulation of the retention springs 49, 59 associated with the respective riser pivot pins, whereupon the bed and side rail assembly is in condition for utilization.

Pftaps19760106 Wk01

PAR

Lowering of either or both of the side rails 33 or 33' may be selectively effected by manually exerting a small upward hand or foot force $F_{sub.r}$ on the underside of the in-turned release flange on the respective latch 51 or 51', to thereby release the lock/stop pin 43b or 43b' (not shown) from the respective lock slot in latch 51, while exerting a force on the respective side rail toward the foot end of the bed, to thereby move the lock/stop pin out of the lock slot on the latch, and permit the side rail assembly to be articulated in a scissors parallelogram motion to its lowered position, at which position the respective riser stop pins 41b and 43b, or 41b', 43b' (not shown) engage the undersurface of the respective side frame member 13 or 13', to effect a lowered stop position for the side rail. Raising of the side rail assembly merely requires the operator to grasp the side rail 33 or 33' and exert an upward pull thereon, which will result in the reverse scissors parallelogram motion of the risers and associated side rail, to bring the respective lock/stop pin 43b or 43b' (not shown) into engagement with its respective latch cam surface 51a or 51a' (not shown) and latch lock slot 51-ls or 51-ls' (not shown).

PAR

FIGS. 10 and 11 illustrate the relative positions of the side rail assemblies, in the raised safety and lowered position respectively, with respect to the major bed components. It will be noted that when the side rail is in the lowered position almost all of the mattress is exposed in

Pftaps19760106 Wk01

the illustrative embodiment, and the side rail does not materially interfere in the bed making task. Also, this positioning of the side rail assembly in the lowered position is of importance in preventing interference with the patient being placed onto or removed from, or personally getting in or out of, the bed.

PAR

The side rail assembly according to the illustrated and preferred embodiment of the invention enables the side rail 33 or 33' to be located in its upper safety position at either of two heights relative to the mounting position of the risers on the bed frame member, as illustrated in FIG. 12. The location of the side rail 33 and latch 51 corresponding to the location in FIGS. 1-11 is illustrated in phantom lines, while the second location of the side rail and latch is illustrated in full lines.

PAR

As has been noted heretofore, the risers are preferably connected to the spreader bars 38 in a vertically offset position with respect to the vertical center of the spreader bars, as shown in FIG. 14, and it is only necessary to rotate the risers about their respective pivot pin connections with the side rail spreader bars through a 180.degree. arc, and to thereupon rotationally translate the entire side rail assembly through a further 180.degree. arc, to effect the desired effective vertical change of position of the side rail 33 or 33' relative to the riser pivot pins which connect with the frame. This reversal brings the

Pftaps19760106 Wk01

respective latch 51, 51' from the foot end riser position to the head end riser position, likewise reversing the risers themselves. Thus, by providing an extra hole for mounting the latch pin therein adjacent the head end hole 16, the two risers and latch may be suitably mounted on the bed frame with the respective side rail 33, 33' at a different vertical height position in the raised safety position thereof. This positioning of the latch 51, 51' in the head end riser position is not normally as desirable as its illustrated position at the foot end riser location, particularly in view of the ease of operation of the latch by an operator at the foot end riser position.

PAR

The foregoing described dual height capability for the side rail assembly in the raised safety position enables the side rail assembly to be utilized on beds having the upper mattress surface at different heights relative to the bed frame mounting members 13, 13', while providing generally similar relative side rail positioning with respect to the mattress upper and lower surfaces. It will be apparent that greater or less height difference may be accommodated by greater or less offset of the connection point for the risers to their respective side rail spreader bars.

PAR

If desired, the side rail assemblies may be mounted on a bed having no mounting hole positions formed therein corresponding to the required riser

Pftaps19760106 Wk01

and latch pivot pins, either by forming such holes in the bed frame members, or by attaching an auxiliary adapter bar 111, to the desired bed frame member, as illustrated in FIG. 13. The adapter bar 111 takes the form of a longitudinal bar having a vertical offset between its upper and lower section 114, 115, the intermediate offset section 113 being of approximately the same effective width as the effective width of the vertical web portion of the side frame member 13a to which the adapter bar 111 is to be attached. Thus, the lower longitudinal section 115 is in generally vertical alignment with the vertical web portion of the angle bar side member 13a when attached thereto, while the upper longitudinal section 114 of the adapter bar 111 is positioned flush along the external face of the side frame member. The adapter bar may be suitably secured to the side frame member 13a as through the utilization of securing screws or bolts, as indicated at 119. This will require the presence or forming of relatively small holes in the side frame member 13a to accommodate the screws or bolts 119, which holes are present in various existing bed frames. However, even if such holes must be subsequently formed in the bed frame, they may be more readily, and possibly more acceptably, formed than the more precisely and differently sized holes required for mounting of the riser pivot pins and latch pins of the two side rail assemblies. The auxiliary mounting adapter 111 has formed in its lower longitudinal extent

Pftaps19760106 Wk01

mounting holes 116, 117 and 118 corresponding respectively to the positioning of holes 16, 17 and 18 for respective riser pivot pins 41a, 43a and latch pivot pin 57. An extra latch pivot pin hole 120 may be provided adjacent the hole 116 to accommodate the latch pivot pin 57 in the side rail reversal position as illustrated in FIG. 12. The adapter bar 111 also has a keeper 121 secured to its lower longitudinal section 115, as by welding, and extending in upwardly spaced relation above the center lateral offset section 113, to aid in longitudinal stiffening of the adapter by engagement with the inner face of the vertical web portion of the side frame member 13a. A mirror image auxiliary mounting adapter bar may be provided for the opposite side rail assembly.

PAR

While the invention has been described with respect to various illustrative embodiments thereof, it will be apparent to those skilled in the art that various modifications and improvements may be made without departing from the scope and spirit of the invention. For instance, while the side rail assemblies according to the invention are most advantageously utilized in combination with independently suspended rigidifying cross bar assemblies as shown and described, and such is clearly an important inventive aspect, the side rail assemblies according to the invention may, though less advantageously, be utilized on bed frames having rigid pivot mounting elements such as tubes, or the like rigidly secured to the bed frame, it

Pftaps19760106 Wk01

being appreciated that such arrangements will sacrifice the important feature of the preferred overall combination arrangement as shown and described, in which the rigidifying cross members do not form a rigid part of the supporting frame of the bed. Accordingly, it will be understood that the invention is not to be limited by the illustrated embodiments, but only by the scope of the appended claims.

CLMS

STM

I claim:

NUM

1

PAR

1. A bed arrangement comprising

PA1

a bed frame,

PA1

a side rail assembly for said bed frame, said side rail assembly comprising

PA2

a pair of separately detachable side rails each with spaced risers

pivotally secured thereto, and one riser having a releasable

pivot-prevention lock thereon,

PA2

said risers being removably pivotally mounted on said bed frame,

PA2

and a pair of nonpermanent and detachable cross members extending

transversely across said bed frame and releasably engageable in pivotal

interconnecting relation each with respective opposite pairs of said side

rails risers,

PA1

said side rail risers each having pivot pins thereon,

Pftaps19760106 Wk01

PA1 and said cross members each having end openings for receiving said pivot pins,

PA1 said cross members being relatively pivotally engaged at their end openings with said riser pivot pins, and being supported in suspended relation between and by said pivot pins,

PA1 said bed frame including spaced generally parallel longitudinal side frame members with spaced holes effectively formed thereon,

PA1 said cross members extending between said side frame members and having their said end openings in effective alignment with respective opposite pairs of said holes,

PA1 said riser pivot pins extending through said holes and into said cross member end openings,

PA1 and releasable securing means releasably securing said pins within said side frame member holes.

NUM 2

PAR 2. A bed arrangement according to claim 1,

PA1 each of said releasable pivot-prevention locks on said risers including a latch removably pivotally engaged with a respective adjacent one of said longitudinal side frame members,

PA1 said latches each having a slot therein larger in one direction than the cross section of the respective said riser pivot pin, and through which

Pftaps19760106 Wk01

	slot a respective said riser pivot pin extends to enable pivoted
	lock/release movement of said latch about the zone of pivotal engagement
	of said latch with a respective said longitudinal side frame member,
PA1	and a lock pin on each of said risers which have a latch thereon and
	latchably engageable in riser-locking relation with said latch at one
	pivoted position of said latch and releasable from its riser locked
	relation at a second pivoted position of said latch.
NUM	3
PAR	3. A bed arrangement according to claim 2,
PA1	the pivotal engagement of said latches with said longitudinal side frame
	members being about a generally horizontal pivot axis, said one pivoted
	position of said latch being an upward pivoted position as compared to
	said second pivoted position of said latch, whereby said latch is gravity
	biased toward said one pivoted position.
NUM	4
PAR	4. A bed arrangement according to claim 3,
PA1	said releasable securing means comprising finger actuatable spring
	retainers carried by each of said risers and releasably engageable in
	resilient relation with said riser pivot pins.
NUM	5
PAR	5. A bed arrangement according to claim 4,

Pftaps19760106 Wk01

PA1 said finger actuatable spring retainers carried by said risers which have
said latch attached thereto being anchored to the respective said latch
and releasably engageable in spring biased locking relation with the
respective adjacent said riser pivot pin.

NUM 6

PAR 6. A bed arrangement according to claim 5,

PA1 said finger actuatable spring retainers which are anchored to said latches
being anchored each to its respective said latch in spaced relation from
the respective said riser pivot pin and engaging the respective said riser
pivot pin in cantilevered spring biasing relation toward a locked position
with respect to said latchably engageable further pin on the respective

PAR 7. A bed arrangement according to claim 6,

PA1 a pivotal engagement of each of said latches with said longitudinal side
frame members being about a respective generally horizontal pivot axis,
said one pivoted position of each said latch being an upward pivoted
position as compared to said second pivoted position of said latch,
whereby said latch is gravity biased toward said one pivoted position.

NUM 8

PAR 8. A bed arrangement according to claim 6,

PA1 said riser pivot pins each having a groove therein for releasable retentive
engagement by said spring retainers on the inner side of the respective

Pftaps19760106 Wk01

said longitudinal side frame member.

NUM

9

PAR

9. A bed arrangement according to claim 8,

PA1

two of said spring retainers being each secured in latch-engaging relation to a respective one of said riser pivot pins and being also releasably engageable with a said groove in the respective said pivot pin at a position spaced along the length of said pin from said wrap-engaging relation position of said spring retainer on the respective said pin.

NUM

10

PAR

10. A bed arrangement according to claim 9,

PA1

each of said spring retainers having a finger engageable loop thereon for finger actuated locking or release thereof relative to its said riser pivot pin and the respective said longitudinal side frame member.

NUM

11

PAR

11. A bed arrangement according to claim 4,

PA1

two of said spring retainers being each secured in latch-engaging relation to a respective one of said riser pivot pins and being also releasably engageable with a said groove in the respective said pivot pin at a position spaced along the length of said pin from said wrap-engaging relation position of said spring retainer on the respective said pin.

NUM

12

Pftaps19760106 Wk01

PAR	12. A bed arrangement according to claim 11,
PA1	each of said spring retainers having a finger engageable loop thereon for finger actuated locking or release thereof relative to its said riser pivot pin and the respective said longitudinal side frame member.
NUM	13
PAR	13. A bed arrangement according to claim 1,
PA1	said releasable securing means comprising finger actuatable spring retainers carried by each of said risers and releasably engageable in resilient relation with said riser pivot pins.
NUM	14
PAR	14. A bed arrangement according to claim 13,
PA1	each of said spring retainers having a finger engageable loop thereon for finger actuated locking or release thereof relative to its said riser pivot pin and the respective said longitudinal side frame member.
NUM	15
DETD	
PAR	15. A bed arrangement according to claim 13,
PA1	said riser pivot pins each having a retention groove therein for releasable retentive engagement by said spring retainers on the inner side of the respective said longitudinal side frame member.
NUM	16

Pftaps19760106 Wk01

PAR 16. A bed arrangement according to claim 13,
PA1 two of said spring retainers being each secured in latch-engaging relation
to a respective one of said riser pivot pins and being also releasably
engageable with a said retention groove in the respective said pivot pin
at a position spaced along the length of said pin from said warp-engaging
relation position of said spring retainer on the respective said pin.

NUM 17

PAR 17. A side rail assembly for a bed, for selective detachable connection to
a bed, comprising
PA1 a pair of separately detachable side rails each with spaced risers
pivotally secured thereto, and one said riser having a releasable
pivot-prevention lock thereon for selectively locking said riser in a
given position about a pivot axis therefor,
PA1 and a pair of nonpermanent and detachable cross members, extendable
transversely across a bed frame and releasably separably engageable in
pivotal interconnecting relation each with respective opposite ones of
each of the two risers associated with each of said side rails,
PA1 each of said releasable pivot prevention locks including a selectively
movable latch,
PA1 said latches each having a slot therein of larger vertical extent than the
respective said riser pivot pin, and through which slot a respective said

Pftaps19760106 Wk01

	riser pivot pin extends, to enable support of said latch by said pivot pin
	when said side rail assembly is not connected to a bed and to enable up
	and down lock/release movement of said latch when said latch is engaged
	with a bed,
PA1	and a pivot-stop on each said riser which has a latch thereon and latchably
	engageable in locking relation with said latch at one pivoted position of
	said latch and releasable from its riser-locked relation at a second
	pivotal position of said latch.
NUM	18
PAR	18. A side rail assembly according to claim 17,
PAR	each of said movable latches including a cam surface engageable in latch
	moving relation by the respective said riser stop pin as the respective
	said riser approaches one extent of its pivoted travel, and a slot
	adjacent to said cam surface and engageable in releasable locking
	engagement with said stop pin at said one extent to pivoted travel of the
	respective said one riser.
NUM	19
PAR	19. A bed arrangement comprising
PA1	a bed frame,
PA1	a side rail assembly for said bed frame, said side rail assembly comprising
PA2	a pair of separately detachable side rails each with spaced risers

Pftaps19760106 Wk01

pivotaly secured thereto,

PA2 said risers being removably pivotaly mounted on an effective portion of said bed frame,

PA2 and a pair of nonpermanent and detachable cross members extending transversely across said bed frame and releasably engageable in pivotal interconnecting relation each with respective opposite pairs of said side rail risers,

PA2 said cross members and said side rail risers having a respective pin and socket interconnection formed therebetween at opposite end zones of said cross members,

PA2 said cross members and said risers being relatively pivotaly interconnectable through their respective said pin and socket interconnections,

PA1 said bed frame including spaced generally parallel longitudinal side frame members with spaced holes effectively formed thereon,

PA1 said cross members extending between said side frame members and said cross members and said risers being removably disposed with their respective pin and socket connections aligned with and having a portion thereof extending through spaced holes and supported on said side frame members,

PA1 and releasable securing means releasably securing said pin and socket interconnections with a portion of said interconnections extending through

Pftaps19760106 Wk01

said spaced side frame member holes.

NUM	20
PAR	20. A bed arrangement comprising
PA1	a bed frame,
PA1	a side rail assembly for said bed frame, said side rail assembly comprising
PA2	a pair of separately detachable side rails each with spaced risers pivotally secured thereto,
PA2	said risers being removably pivotally mounted on an effective portion of said bed frame,
PA2	and a pair of nonpermanent and detachable cross members extending transversely across said bed frame and releasably engageable in pivotal interconnecting relation each with respective opposite pairs of said side rail risers,
PA1	said side rail risers each having pivot pins thereon,
PA1	and said cross members each having end openings for receiving said pivot pins,
PA1	said cross members being relatively pivotally engaged at their end openings with said riser pivot pins, and being supported in suspended relation between and by said pivot pins,
PA1	said bed frame including spaced generally parallel longitudinal side frame members with spaced holes effectively formed thereon,

Pftaps19760106 Wk01

PA1	said cross members extending between said side frame members and having their said end openings in effective alignment with respective opposite pairs of said holes,
ECL	1
PA1	said riser pivot pins extending through said holes and into said cross member end openings,
PA1	and releasable securing means releasably securing said pins within said side frame member holes.
NUM	21
PAR	21. A bed arrangement comprising
PA1	a bed frame,
PA1	a side rail assembly for said bed frame, said side rail assembly comprising
PA2	a pair of separately detachable side rails each with spaced risers pivotally secured thereto, and one riser having a releasable pivot-prevention lock thereon,
PA2	said risers being removably pivotally mounted on said bed frame,
PA2	and a pair of nonpermanent and manually releasably detachable lateral rigidifying stabilizers cross members extending transversely across said bed frame and releasably engageable in pivotal and lateral rigidifying interconnecting relation each with respective opposite pairs of said side rail risers,

Pftaps19760106 Wk01

PA1 said side rail risers each having pivot pins thereon,
PA1 and said detachable stabilizer cross members each having end openings for receiving said pivot pins,
PA1 said cross members being relatively pivotally engaged at their end openings with said riser pivot pins, and being supported in suspended relation between and by said pivot pins,
PA1 and releasable securing means releasably securing said pivot pins to said bed frame with said cross members extending therebetween,
PA1 said releasable securing means comprising finger-actuatable spring retainers for each of said risers and releasably engageable in resilient relation with said riser pins,
PA1 said releasable pivot-prevention lock on said riser including a latch removably pivotally engaged with a respective adjacent effective portion of one of said longitudinal side frame members,
PA1 two of said spring retainers being each secured in latch-engaging relation to a respective one of said riser pivot pins and being also releasably engageable with a said groove in the respective said pivot pin at a position spaced along the length of said pin from said wrap-engaging relation position of said spring retainer on the respective said pin.

NUM 22

PAR 22. A bed arrangement according to claim 21,

Pftaps19760106 Wk01

PA1	each of said spring retainers having a finger engageable loop thereon for finger actuated locking or release thereof relative to its said riser pivot pin and the respective said longitudinal side frame member.
NUM	23
PAR	23. A side rail assembly for selective detachable connection to a bed, having a bed frame including spaced generally parallel longitudinal side frame members with spaced holes effectively formed thereon, comprising
PA1	a side rail assembly for a said bed frame, said side rail assembly
PA2	a pair of separately detachable side rails each with spaced risers pivotally secured thereto,
PA2	said risers being removably pivotally mountable on an effective portion of a bed frame,
PA2	and a pair of nonpermanent and detachable cross members extendable transversely across a said bed frame and releasably engageable in pivotal interconnecting relation each with respective opposite pairs of said side rail risers,
PA1	said cross members and said side rail risers having a respective pin and socket interconnection formed therebetween at opposite end zones of said cross members,
PA1	said cross members and said risers being relatively pivotally interconnectable through their respective said pin and socket

Pftaps19760106 Wk01

interconnections,

PA1 said cross members extending between said side frame members and said cross members and said risers being removably disposed with their respective pin and socket connections alignable with and having a portion thereof extendable through said spaced holes and supportable on said side frame members.

PA1 and releasable securing means for releasably securing said pin and socket interconnections with a portion of said interconnections extending through said spaced side frame member holes.

NUM 24

PAR 24. A side rail assembly for selective detachable connection to a bed, having a bed frame including spaced generally parallel longitudinal side frame members with spaced holes effectively formed thereon, comprising

PA1 a side rail assembly for a said bed frame, said side rail assembly comprising

PA2 a pair of separately detachable side rails each with spaced risers pivotally secured thereto,

PA2 said risers removably pivotally mountable on an effective portion of a said bed frame,

PA2 and a pair of nonpermanent and detachable cross members extendable transversely across a said bed frame and releasably engageable in pivotal

Pftaps19760106 Wk01

	interconnecting relation each with respective opposite pairs of said side
	rail risers,
PA1	said side rail risers each having pivot pins thereon,
PA1	and said cross members each having end openings for receiving said pivot
	pins,
PA1	said cross members being relatively pivotally engaged at their end openings
	with said riser pivot pins, and being supportable in suspended relation
	between and by said pivot pins,
PA1	said cross members extendable transversely between said side frame members
	and having their said end openings in effective alignment with respective
	opposite pairs of said holes,
PA1	said riser pivot pins extendable through said holes and into said cross
	member end openings,
PA1	and releasable securing means for releasably securing said pins within said
	side frame member holes.
PATN	
WKU	39302741
SRC	5
APN	5139813
APT	1
ART	315

Pftaps19760106 Wk01

APD	19741011
TTL	Assembly for use in recreational activities
ISD	19760106
NCL	7
ECL	1
EXA	Basinger; Sherman D.
EXP	Reger; Duane A.
NDR	4
NFG	12
INVT	
NAM	Syfritt; Harold A.
STR	2221 Vista Drive
CTY	Manhattan Beach
STA	CA
ZIP	90266
RLAP	
COD	74
APN	229096
APD	19720218
PSC	1
PNO	3846858

Pftaps19760106 Wk01

CLAS

OCL	9 2A
XCL	150 51
XCL	220 12
EDF	2
ICL	B63B 708
FSC	9
FSS	2 A;2 C;2 S;11 A
FSC	114
FSS	61;66.5 F;121;123
FSC	220
FSS	12
FSC	150
FSS	51
UREF	
PNO	2546396
ISD	19510300
NAM	Jenkins
OCL	9 2A
UREF	
PNO	3064370

Pftaps19760106 Wk01

ISD 19621100

NAM Fleur

OCL 114123

UREF

PNO 3601076

ISD 19710800

NAM Meeks

OCL 9 2A

LREP

FR2 Markva; Neil F.

ABST

PAL The assembly includes a longitudinal axis and opposite end surfaces transverse to the longitudinal axis. The container has a structure effective to receive both liquids and gas mediums therein and has valves for introducing and exhausting both liquid and gas mediums. An elongated frame structure has a plurality of parallel linear support members wherein each support member is laterally spaced with respect to any other lateral support member, and a separate end frame portion connected at each end of the support members to form an open structural configuration for receiving the collapsible container. The elongated container is fastened to the frame structure with the longitudinal axis thereof disposed substantially

Pftaps19760106 Wk01

parallel to the linear support members and each of the end surfaces of the container being disposed adjacent an end frame portion to support the container within the frame structure during use. The container is attached to the frame structure with one of the linear support members extending longitudinally along one side of the container with the opposing side of the container being free of a support member. The assembly may be used as a pontoon when the container is inflated with a gas fluid medium and is employable in other uses such as a fresh water reservoir, a ballast, a sea anchor, a pitch and roll stabilizer and the like when the container is not inflated or holds a liquid fluid medium.

PARN

PAC STATUS OF THE APPLICATION

PAR This application is a divisional application of my parent application Ser. No. 229,096 filed Feb. 18, 1972 and now U.S. Pat. No. 3,846,858.

BSUM

PAC BACKGROUND OF THE INVENTION

PAR This invention relates to an assembly usable as a boat or as an accessory with sailboats and powerboats and may be employed for many purposes to add to the comfort, convenience and safety of the boating public. The assembly may also be used as a vehicle on land or ice.

PAR It is known in the prior art to use the weight of water as a counterbalance

Pftaps19760106 Wk01

or ballast in a sailboat. Furthermore, there are many different types of accessories which may be employed for different uses. For example, liquid storage tanks, portable showers, pontoons, lifting mechanisms, sea anchors and pitch and roll stabilizers are all available in the prior art. A boatsman who wishes to have the benefits of all these accessories must necessarily have the storage room available on board his boat. The presence of all these different types of accessories creates an obvious problem aboard whether the boat is at dock or underway. Therefore, it is likely that some of these items would not be placed on board by the boatsman. Consequently, it is very likely that safety risks would not be mitigated in any way and that some inconveniences would be suffered by the boatsman.

PAR

Where a boat is anchored offshore, it is necessary to have some sort of

NDR

3

dinghy so that the boatsman may get back and forth between the shore and his boat. Until now, it was necessary for the boatsman to purchase an additional small boat which must be either placed on board or left anchored at the offshore location. When left at the offshore location, there is obviously no further use that may be attributed to such an accessory.

PAR

Finally, there is a marked increase in the number of people who are water

Pftaps19760106 Wk01

sport enthusiasts. Consequently, there are many unskilled people participating in activities in this area. They are demanding equipment which will provide them both with fun and relaxation without their being exposed to a high safety risk. In addition, it is human nature to tire quickly of performing the same kind of activity again and again. In other words, people maintain their interest in certain activities when there is a variety of experiences opened to them. For example, the prior art now provides inflatable boats on which a motor or a sail may be placed for movement. Collapsible catamaran assemblies are available. Collapsible pontoon structures which may be inflated on location are also available in the prior art. These prior art structures provide a means for the consumer to have a fairly small investment and provide him with a highly transportable device for enjoying his water sports. However, each of these prior art assemblies provides only one type of activity. Until now, no construction has been available wherein the recreational enthusiast may also perform several different functions by effecting a simple mechanical manipulation thereto.

PAC

PURPOSE OF THE INVENTION

PAR

The primary object of this invention is to provide a convertible assembly which may provide a variety of experiences to the water enthusiast along with enhancing the convenience and safety of the boating public and also

Pftaps19760106 Wk01

provide a vehicle for land and ice.

PAR Another object of this invention is to provide a convertible assembly which may be used to effectuate desired results requiring the use of a large number of individual devices now available on the commercial market.

PAR Another object of this invention is to provide a boat construction which may be used separately for water sports as well as for transportation between shore and a boat anchored offshore.

PAR A still further object of this invention is to provide a convertible boat construction which may be used for transportation, as a life raft, has a size and shape suitable for storage on board a larger boat and may be broken down into its component parts whereby the component parts may be used to serve useful functions on board a larger boat in place of a multiple number of accessories.

PAR Another object of this invention is to provide a convertible assembly which may be used as a pontoon when filled with a gas fluid medium or as a stabilization unit when containing a liquid fluid medium.

PAC SUMMARY OF THE INVENTION

PAR The assembly of this invention includes at least two elongated units mounted on a rigid support means. One feature of this invention is directed to the specific structure of at least one of the units. This unit is a combination of a collapsible, elongated container adapted to receive

Pftaps19760106 Wk01

a fluid medium therein and an elongated frame structure having an open configuration for receiving the collapsible container. Fastening means are provided for attaching the container within the frame structure during use. The container being attached to the frame structure forms a combination that may be used as a pontoon when the container is inflated with a gas fluid medium and may be employed in other uses when the container holds a liquid fluid medium.

PAR When the two elongated units are mounted on a rigid support means, the assembly may be used as a dinghy or boat on the water surface. Because the assembly may be broken down into its component parts, it may be easily stored on board a larger boat. Once broken down, the separated unit or units may be used for various other functions. Wheels or runners may also be placed on the support means to provide a vehicle for land or ice.

PAR Other features of the invention are directed to the manner in which the separated units may be attached to the mast of a sailboat for providing additional support thereto and effecting the hiking-out of additional weight from the side of a sailboat that is underway.

DRWD

PAC BRIEF DESCRIPTION OF DRAWINGS

PAR Other objects of this invention will appear in the following description and appended claims, reference being made to the accompanying drawings

Pftaps19760106 Wk01

forming a part of the specification wherein like reference characters designate corresponding parts in the several views.

PAR FIG. 1 is a perspective view of an assembly made in accordance with this invention;

PAR FIG. 2 is a perspective view of the assembly of FIG. 2;

PAR FIG. 3 is a top plan view of the assembly of FIG. 2;

PAR FIG. 4 is a sectional view along line 4--4 of FIG. 2;

PAR FIG. 5 is a sectional view along line 5--5 of FIG. 2;

PAR FIG. 6 is an exploded view of the connection as shown in FIG. 2;

PAR FIG. 7 is a sectional view showing detail of an assembly made in accordance with this invention;

PAR FIG. 8 is a perspective view of another embodiment of this invention;

PAR FIG. 9 is a perspective view of a module made in accordance with this invention;

PAR FIG. 10 is a top plan view of the module of FIG. 9;

PAR FIG. 11 is a side elevational view of the module as shown in FIG. 9, and

PAR FIG. 12 is an end view of another embodiment of a module made in accordance with this invention.

PAC DESCRIPTION OF SPECIFIC EMBODIMENTS

PAR More specifically, a boat assembly, generally designated 10, incorporates the structure made in accordance with this invention. The boat assembly 10

Pftaps19760106 Wk01

includes a hull 11, a bow portion 21, a deck portion 22 and a mast 23. A pontoon construction extends along both sides of the assembly 10 and includes a plurality of flexible containers 12 filled with a fluid medium. In this particular embodiment, the fluid medium is air and the containers 12 provide buoyancy to the assembly 10. Cones 20 are disposed at the front and rear ends of the pontoon assembly in a manner that is known in the prior art. The mast 23 may be connected to the support members of the assembly 10 in any known manner. The construction as shown in FIG. 1 may be elongated or shortened by simply adding or eliminating more pontoon modules and support members as desired. The width or beam may also be modified when lengthening the boat by either using a different length of transverse support member between the parallel pontoons, or by having telescoping cross members.

PAR

The hull 11 as shown in the assembly 10 is a single hull construction known in the prior art as a cathedral hull. The single hull assembly as shown in FIG. 1 may be converted to a multi-hulled assembly as shown in FIG. 8. This convertibility characteristic is accomplished through the unique superstructure as described hereinbelow. A hull covering 45 is used to complete the deep hull configuration. The hull covering may also be inflatable. The boat assembly of this invention is also capable of achieving all known forms of single hull designs, e.g., the deep V;

Pftaps19760106 Wk01

semi-V; modified V; cathedral (also known as the tri-hull); tunnel hull; round bottom boat; flat bottom boat; as well as all of the multi-hulled configurations of a trimaran and a catamaran.

PAR

The superstructure of assembly 10 is shown in perspective in FIG. 2 and includes a simple fastening together of pontoon modules in any desired configuration. The basic module of the instant invention includes linear longitudinal support members 17 and short transverse support members 18 which are interconnected at their ends through the joint fastening mechanism 35. As is evident in the drawings, the elongated frame structure has a plurality of parallel linear support members 17 that are laterally spaced with respect to each-other and an end frame portion including transverse support members 18. An end frame portion is shown located at each end of the support members 17. The flexible containers 12 have a structure effective to receive both liquid and gas mediums and include longitudinal fabric tunnels 13 through which the longitudinal support members 17 extend. As shown, the collapsible, elongated containers 12 have a longitudinal axis and opposite end surfaces 12a transverse to the longitudinal axis. The outer end tunnel 16 encases a short transverse support member 18. The sectional view as shown in FIG. 7 shows the relationship existing between the longitudinal support member 17 and the outer longitudinal tunnels 13 which are connected to the flexible

Pftaps19760106 Wk01

container 12.

PAR

As is evident in the drawings, the fastening means in assembly 10 include tunnels 13 and 16 for attaching the longitudinal containers 12 to the frame structure with the longitudinal axis of each container 12 being disposed substantially parallel to the linear support member 17.

Additionally, each of the end surfaces 12a are disposed adjacent an end frame portion. Consequently, the frame structure provides support along both the longitudinal surface and end surfaces 12a when the containers 12 are within the frame structure during use. A horizontal web 14 and a vertical web 15 are connected to the inside of the flexible container 12 to provide support therein. The container 12 will retain its shape much more effectively through the use of the webs 14 and 15. If desired, it is possible to form either one of these webs as a single solid piece to compartmentalize the inside of the container.

PAR

As shown, container 12 is attached to the frame structure with one of the linear support members 17 extending longitudinally along one side of the container with the side opposing said one side of the container being free of a support member 17. See particularly FIG. 7 where this arrangement is used as a pontoon and FIGS. 9, 10 and 11 where the container 12 is used to hold a liquid medium providing ballast.

PAR

The pontoon modules are connected by the cross members 30 and curved

Pftaps19760106 Wk01

support members 34. In the embodiment as shown in FIG. 1 and FIG. 2, the single hull configuration includes longitudinal keel members 31, side support members 32 and keel braces 33. In addition, the bow portion 21 includes a front bow support member 25, top side support members 26 and 27 and bow braces 28 and 29. When it is desired to have a multi-hulled configuration as shown in FIG. 8, it is simply necessary to remove the bow portion 21 which includes braces 28 and 29 and support members 25, 26 and 27 together with the longitudinal keel support members 31, side support members 32 and keel brace members 33. When these braces and support members are removed, the resultant structure will be a through-passage configuration which is commonly referred to as a catamaran. Alternatively, it is simply necessary to remove the bow member 25, brace 28, and keel braces 33 then swing upwardly longitudinal keel support members 31 and side support members 32, to awaiting fasteners in the center of members 34. The boat will move about on the surface on the water through the buoyancy provided by the flexible containers 12 that have been filled by air.

PAR

The convertibility of the assembly made in accordance with this invention

EXP

Lawson; Patrick D.

has been facilitated through the use of a fastening mechanism 35 as shown in FIG. 6. The flattened end portions 36 on each one of the support brace

Pftaps19760106 Wk01

members may be placed in juxtaposed relationship with a bolt 37 extending therethrough into a plug 38. A grommet 40 and washer 41 are used to separate each of the flattened ends 36. A lock washer 39 will maintain the bolt 37 in place while the assembly is in use. When it is desired to remove a pontoon module from the assembly or to convert from between a single hull and double hull construction, it is simply a matter of making the simple manipulation of the fastening means to effectuate the desired results. Other types of fasteners such as set screws, bolts, snap-out pins placed into pre-drilled holes might also be used for strength and rigidity as alternatives to the fastening mechanism of this embodiment.

PAR

The deck covering 22 may include any snap-on fastening mechanism available in the prior art. That is, it is simply a matter of manipulating a simple fastening mechanism to remove the covering from the assembly of this invention for its other uses, e.g., when it is to be used for a shower curtain; for a cockpit tent which converts the cockpit into additional cabin and sleeping facilities; for an air ventilator covering, etc.

PAR

It is within the contemplation of this invention to provide a set of wheels or a set of runners onto the support structure so as to enable the assembly to be used for travel over land or over the surface of ice or snow. Any conventional mechanism might be used to attach wheels or runners to the basic frame construction to effectuate the desired results.

Pftaps19760106 Wk01

PAR

The assembly 10 may be dismantled into its component parts such as shown in the construction of the module of FIG. 9. In this specific embodiment, the module is being used as a ballast on board a sailboat. That is, the container 12 is filled with liquid medium and the additional weight is used to offset the tilting of the sailboat when underway. Connecting lines 19 extend from the module and attach to the shroud line 24. The shroud line 24 is attached over a pulley 50 located toward the top of the mast 51 on the sailboat in a manner known in the prior art. The line 24 would extend through pulley 50 and back downwardly to a winch, block and tackle or a cleat 52. The amount of displacement of the module may be controlled with respect to the gunwales of the sailboat in this manner. The module may be used as a ballast by having the module disposed along the deck of the sailboat itself. It need not be connected to the shroud 24 for this use. It may also be pushed or carried outwardly from the side of the boat to effectuate the same result as a man hiking outwardly from the gunwales as is well known in the sport of sailing.

PAR

The cross members 30, 34, can be the extendible support of the module used as a stabilizer. The cross members 30, 34, used in conjunction with a cable and winch, give the option of utilizing at least two methods or principles to extend the ballast outwardly from the gunwales of the boat; first, the simple principle of a crane, and second, the principle of

Pftaps19760106 Wk01

scissors wherein one end of the two cross members is allowed to run smoothly along the angles of connecting lines 19. The other end of the two cross members 30 and 34 can be attached to the gunwales of the sailboat, being allowed to pivot horizontally like the center of a pair of scissors.

PAR

When filled with water, the module may very well be used as a sea anchor by simply dropping the same over the side and maintaining a connecting line to the boat itself. Once the boat is anchored, it is possible to utilize the same ballast or trim stabilizer as an underwater stabilizer and reduce the boat's pitch and roll. In this instance, the module is detached and partially emptied so that the top has a flat or concave configuration. At least one of the modules is submerged into the water using the same cross members, or any pole, to extend the shroud away from the gunwales. In other words, it is possible to use the module made in accordance with this invention to stabilize any type of boat while it is either at anchor or while it is underway. This is a capability that is shared by no other structure available in the prior art.

PAR

The flexible container module may be made any desired length, width, height and shape, depending upon the desired size and weight when filled with a medium such as air or liquid. Such a module as described hereinabove has been constructed in accordance with this invention with length L of 4 feet, and overall width W of 15 inches and an overall height H of 18

Pftaps19760106 Wk01

inches. Straps (not shown) may be used to support the container 12 along its length. Such straps would extend underneath the container 12 and between parallel support members 17.

PAR

It is seen that the container of the module as shown in FIG. 9 may be used to provide additional water storage. The frame structure may be used in conjunction with a block and tackle for lifting material on board the ship. The flexible container 12 would be deflated in such an instance. It would also be possible to mount a module with water located in the flexible container 12 in such a way as to provide a shower facility on board ship. It would simply be necessary to place a curtain structure such as the deck portion 22 to form a shower stall underneath the upraised module and place a shower head onto a valve allowing the water to run out of the flexible container 12 as desired. It is clear that the structure of the module of FIG. 9 might also be used as a boatswain's chair. Many other uses may be made of such a module structure as may be deemed appropriate by the user.

PAR

It is clear that the use of a frame structure in combination with an inflatable capacity for the assembly as disclosed herein has many advantages over a purely inflatable boat as is available in the prior art. Such purely inflatable boats may not be used to effectuate the desired conversion between single hull and multi-hulled boats nor are they readily

Pftaps19760106 Wk01

adaptable to use on land or ice. Furthermore, the completely inflatable boats of the prior art may not be dismantled in such a way as to provide the additional accessory items as are provided by the module that is disclosed herein and shown specifically in FIG. 9. At the same time, the disclosed assembly retains the advantages of an inflatable boat when compared to one made out of less flexible material such as fiberglass or wood.

PAR The container 12 includes a standard air valve 42 a scoop structure 43 and a one-way valve 44. With this structural configuration, the container 12 may be placed over the side of a boat while underway to scoop water into the one-way valve 44. As shown, the container 12 includes valve means for introducing and exhausting both liquid and gas mediums.

PAR In the embodiment of FIG. 12, a longitudinal member 17 and four transverse support members 18 are taken from another pontoon cylinder and attached as shown. It is also possible to secure a member 17 to the center of member 18, making a flat or concave top configuration, thereby providing a further strengthening effect. In this embodiment, members 32 could be extended and attached to the very bottom of the container, thereby allowing the formation of a very deep V-hull configuration.

PAR While an assembly for use in recreational activities has been shown and described in detail, it is obvious that this invention is not to be

Pftaps19760106 Wk01

considered as being limited to the exact form disclosed, and that changes in detail and construction may be made therein within the scope of the invention, without departing from the spirit thereof.

CLMS

STM

Having thus set forth and disclosed the nature of this invention, what is claimed is:

NUM

1

PAR

1. An assembly for use in recreational activities comprising:

PA1

a. a collapsible, elongated container having a longitudinal axis and opposite end surfaces transverse to the longitudinal axis,

PA1

b. said container having a structure effective to receive both liquid and gas mediums therein and including valve means for introducing and exhausting both liquid and gas mediums,

PA1

c. an elongated frame structure having a plurality of parallel linear support members wherein each support member is laterally spaced with respect to any other lateral support member and a separate end frame portion connected at each end of said support members to form an open structural configuration for receiving the collapsible container, and

PA1

d. fastening means for attaching the elongated container to the frame structure with said longitudinal axis disposed substantially parallel to the linear support members and each said end surface being crossed by an

Pftaps19760106 Wk01

	adjacent end frame portion to support the container within the frame structure during use,
PA1	e. the container being attached to the frame structure with one of said linear support members extending longitudinally along one side of the container with the side opposing said one side of the container being free of a support member whereby the assembly may be used as a pontoon when the container is inflated with a gas fluid medium and is employable in other uses when the container is not inflated or holds a liquid fluid medium.
NUM	2
PAR	2. An assembly as defined in claim 1 wherein
PA1	the collapsible container includes first and second valve means disposed at different locations on the surface of said container,
PA1	said first valve means being effective to introduce a fluid medium while the second valve means is effective to exhaust a fluid medium.
NUM	3
PAR	3. An assembly as defined in claim 1 wherein
PA1	the collapsible container includes valve means for introducing and exhausting a liquid medium and valve means for introducing and exhausting a gas medium.
NUM	4
PAR	4. An assembly as defined in claim 1 wherein

Pftaps19760106 Wk01

PA1	the collapsible container includes a first valve means for introducing and exhausting a fluid medium disposed on one side of the container and a second valve means for introducing and exhausting fluid medium on an opposing side of said container.
NUM	5
PAR	5. An assembly as defined in claim 4 wherein
PA1	one of the valve means is disposed on the side of the container having a linear support means,
PA1	said valve means includes a scoop means disposed around the valve opening for directing flow of a liquid medium.
NUM	6
PAR	6. An assembly as defined in claim 1 wherein
PA1	the frame structure includes means for attaching the assembly to a shroud line that is connected to the mast of a sailboat.
NUM	7
PAR	7. An assembly as defined in claim 1 wherein
PA1	the collapsible container includes a flexible support means located inside the container so that the shape of the container will be maintained in a desired configuration when filled with a fluid medium.
PATN	
WKU	39302750

Pftaps19760106 Wk01

SRC	5
APN	5639999
APT	1
ART	353
APD	19750331
TTL	Method of fabricating a slipper
ISD	19760106
NCL	9
NFG	11
INVT	
NAM	Bailin; Richard
STR	46 Johnson Ave.
CTY	Englewood Cliffs
STA	NJ
ZIP	7631
CLAS	
OCL	12142S
EDF	2
ICL	A43D 900
FSC	36
FSS	11.5

Pftaps19760106 Wk01

FSC 12

FSS 142 S

UREF

PNO 914377

ISD 19090300

NAM Baker

OCL 12142S

UREF

PNO 2971278

ISD 19610200

NAM Scholl

OCL 36 11.5

UREF

PNO 3311937

ISD 19670400

NAM Conroy

OCL 36 11.5

FREF

PNO 563,158

ISD 19570500

CNT IT

Pftaps19760106 Wk01

OCL 12142S

ABST

PAL A novel slipper and its method of fabrication is described. The slipper comprises a substantially flat sole member with die-cut bounding edges onto which is heat-sealed an overlying arc-shaped vamp. The novel method is characterized by pre-tacking vamps at predetermined locations to a sole web, and substantially simultaneously heat-sealing each vamp to a sole and die-cutting the bonded sole and vamp from the sole web.

BSUM

PAR This invention relates to novel slippers and their method of fabrication on a mass-production scale at extremely low cost.

PAR Methods have been used in the past to manufacture slippers for household, bath or other uses out of plastic materials by electronic heat-sealing in order to reduce costs. For slippers constructed in the form of a relatively flat sole member provided with an overlying arc-shaped vamp or other curved strap-like structure by which the slipper is retained on the user's foot, it is accomplished by pre-cutting the soles from continuous sheets and then heat-sealing a pre-cut vamp to opposite edges of each pre-cut sole. Separate handling and orientation of the pre-cut soles and pre-cut vamps increases considerably the production cost of each unit. In addition, such known process does not lend itself to the fabrication of

Pftaps19760106 Wk01

slippers from non-electronically heat-sealable materials, such as rubber or fabric.

PAR A main object of the invention is a slipper fabrication process which substantially reduces manufacturing costs.

PAR Another important object of the invention is a low-cost fabrication process for slippers containing materials which cannot normally be electronically heat-sealed together.

PAR Still a further object of the invention is an improved process for making a slipper having a substantially flat sole with die-cut bounding edges to which is electronically heat-sealed an overlying arc-shaped vamp with die-cut bounding edges, and the resulting slipper product.

PAR The invention achieves the foregoing objects by a novel process characterized by the supply of the sole and possibly the vamp and other elements making up the slipper from continuous webs of flexible sheet material of sufficient lateral extent such that a number of soles and vamps as the case may be can be obtained. The continuous webs are introduced into apparatus for pre-attaching or pretacking the vamps or sections of the vamp web at predetermined locations of the sole web, following which the sole web with attached vamps is fed into electronic heat-sealing apparatus between electrodes which incorporate a die cutter configured to die-cut complete soles from the sole web while the pretacked

Pftaps19760106 Wk01

vamps are substantially simultaneously die-cut and heat-sealed to each sole. The process of the invention thus allows the use of electrodes affording multiple dies thereby enabling the fabrication in one final sealing step of plural slippers with convex vamps from the continuous webs.

PAR A feature of the process of the invention is construction of the die or electrode for each slipper into a complete annulus for die-cutting the completed slipper from the continuous webs. In a preferred embodiment, the closing pressure for the sealing die part is less than that applied during the cutting operation, which ensures proper sealing and die-cutting of the completed slipper.

DRWD

PAR These and further features and advantages of the invention as will be hereinafter described will be better understood from the following detailed description of several exemplary preferred embodiments of the invention, taken in conjunction with the accompanying drawings wherein:

PAR FIGS. 1a, 1b and 1c are, respectively, a plan view, a cross-sectional view along the line 1b--1b, and a cross-sectional view along the line 1c--1c of one form of completed slipper made in accordance with this invention;

PAR FIG. 2 is a schematic view of one form of apparatus for carrying out the process of this invention;

Pftaps19760106 Wk01

PAR FIG. 3 is a schematic plan view of the sole and vamp webs while in the pretacking station illustrating how vamp webs can be pretacked to the sole web for a process wherein labor costs predominate over material costs;

PAR FIG. 4 is a schematic plan view of sole webs with pretacked vamp webs after leaving the pretacking station of FIG. 3;

PAR FIG. 5 is a cross-sectional view of the sole web with pretacked vamps after leaving the pretacking station of FIG. 3;

PAR FIG. 6a is a cross-sectional view of one form of cutting and sealing die;

PAR FIG. 6b is a cross-sectional view of another form of sealing and cutting die;

PAR FIG. 7a is a schematic plan view similar to FIG. 3 for a process wherein material costs predominate over labor costs;

PAR FIG. 7b is a plan view of the sole web with pretacked vamps after leaving the pretacking station of FIG. 7a.

DETD

PAR When used in this description, the term "electronic heat-sealing" shall mean a dielectric material heating process resulting from the application of radio-frequency electromagnetic energy by way of mating electrodes to the material. Equipment for accomplishing this is well-known and commercially available. Unless mention of specific details is made, it is to be understood that conventional frequencies, powers, and electrode

Pftaps19760106 Wk01

configurations can be used, as will be clear to those skilled in this art.

The term "electronically heat-sealable material" when used herein shall mean those well known synthetic resin or plastic materials that have a sufficiently high loss factor that their temperature can be raised by electronic heat-sealing alone to a sealing or bonding temperature sufficient upon the application of conventional pressures to cause fusion-bonding of two such materials. Examples, as are well known, include thermoplastic materials such as polyvinylchloride (PVC), polyamide and the like. "Non-electronically heat-sealable" materials are those that cannot by electronic heat-sealing alone be bonded together, usually because their loss factor is not high enough or they don't melt. Examples are fabrics, rubber, paperboard, and plastics such as polyurethane foam.

PAR

FIGS. 1a, 1b and 1c illustrate one form of slipper 10 in accordance with this invention. The slipper 10 comprises a sole 11 and a bowed or arched vamp 12. The sole 11 has a substantially flat form and has a boundary edge configuration generally corresponding to the shape of a human foot. The boundary edges 13 are die-cut, i.e., the sole has been cut cleanly through by a die along its entire boundary. The sole 11 may be constructed of a single layer of sheet material, or of multiple layers of sheet material, or may be of a laminated construction, examples of which will be given later. The curved or contoured vamp 12 is of a generally rectangular form

Pftaps19760106 Wk01

which overlies the sole and is bonded to the sole at its periphery along opposite side edges 14 as shown. The bonded side edges 14 are die-cut similarly to that of the sole. The front and rear edges of the vamp are designated 15. The vamp 12 may also be constructed of a single layer of sheet material, or of multiple layers of sheet material, or may be of a laminated construction, examples of which will be given later.

PAR

FIG. 2 illustrates one form of manufacturing process in accordance with the invention for the simplest case of a sole and vamp each constituted of a single sheet of electronically heat-sealable material, such as PVC. The sole is supplied from a continuous web 20 of sheet material. The material which is quite thin, for example, 10-180 mils thick, is readily supplied from wide rolls 21, typically 24-54 inches wide, which are commercially available. For the embodiment illustrated in FIG. 2, the vamp material is supplied in the form of two narrow strips 22 each having a width equal to the front-to-rear length of the vamp indicated in FIG. 1 by the numeral 24. The supply rolls for the vamp webs 22 is shown at 25. As a first step in the process, the webs 20, 22 are pulled through a tacking press of conventional construction at a pretacking station shown schematically at 27

PAR

The web feed mechanism must be constructed so that the slipper sections are maintained in preset positions so that a succession of operations at

Pftaps19760106 Wk01

different stations can be performed on the slipper sections. This can be accomplished manually by providing locating marks or depressions in the webs at the first station, and using these marks for manually positioning the webs at succeeding stations in order to accurately locate the already operated on slipper sections for subsequent operations. For high speed production, this is best accomplished automatically. One form of apparatus suitable for this purpose is depicted in FIG. 2 and comprises a conveyor system 30 wherein a movable belt 31 is caused stepwise to index along a horizontal path between two work stations 27 and 28. The conveyor belt comprises a series of spaced, thin, flat, metal trays 32, for example, one-eighth inch thick aluminum, linked together to form a complete belt 31. The belt 31 is driven by suitable rollers 33 in an indexing manner so as to move the trays 32 stepwise through the station at an appropriate speed to enable each station operation to be carried out in full.

PAR

As will be observed, the sole and vamp webs 20, 22 are fed onto each tray 32 in succession as it passes underneath with the sole web 20 located under the vamp webs. The sole web is then manually pinned or otherwise temporarily affixed to the tray before or at the first station 27 in order to orient the sole web with respect to the tray. The tray 32 is indexed to the first station 27 where the vamps are pretacked to the sole web.

PAR

The apparatus at the first station 27 comprises a conventional C-frame

Pftaps19760106 Wk01

low-pressure press, shown schematically, comprising a fixed lower-bed platen 35, a fixed C-frame 36 on which is vertically movable an upper die 37 by means of a conventional fluid cylinder 38'. A conventional radio-frequency generator 38 capable of performing electronic heat-sealing is housed within the press and is connected between the upper die 37 and lower platen 35, which are both of metal. The upper die plate is provided with suitable locating pins 39 which engage matching holes (not shown) in the lower platen 35 when the press closes. Mounted on the die plate are a series of spot-sealing electrodes in the form of pins 40 arranged in a suitable pattern for spot-sealing or tacking the vamp webs to the sole web at preselected areas. This requires that the vamp sections be first appropriately shaped into the arch shape they will assume in the finished slipper, which is accomplished by means of a conventional vamp-forming die or looping jig illustrated schematically at 42 in FIG. 2. This known device comprises a plurality of retractable arched molds 43 mounted on the press by a suitable mechanism 44 whereby the molds 43 can be located above each slipper section of the sole web 20. When the upper press die closes, the vamp strips are arch shaped over the dies 43 and in that shape the strips 22 are then spot-sealed or tacked down to the sole web 20. In this way, in accordance with the invention, the contoured vamps are accurately located and affixed to the sole webs at positions where they will be

Pftaps19760106 Wk01

properly centered under the final sealing and cutting dies in a subsequent station to prevent the latter from contacting the vamps except at the desired sealing zones.

PAR

The vamp-tacking operation is illustrated in FIGS. 3 and 4. FIG. 3 shows a conveyor tray 32 located on the press lower platen. The tray is provided with tapered or countersunk locating openings 45 at each corner which when the conveyor is indexed are located over the die pin holes in the lower platen, such that when the die 37 is lowered, the pins 39 engage and pass through the tray openings 45 and into the underlying aligned platen holes to locate the tray with pinned sole web 20 with respect to the spot-sealing electrodes 40. The ultimate slipper outlines to be formed are shown in dashed lines at 46. As will be observed, two rows of slippers 46 will be fashioned from the pinned section of the sole web. The slippers are arranged such that the broader areas, for the user's toe portion, are laterally aligned, and thus the vamp strips 22 are located in the proper position to form vamps on all the slipper sections. The vamp-forming dies 43 are shown in dashed outline. The actuating mechanism, for example, a known spring extender 44, is shown at the left. As the press closes, the vamp-forming dies are automatically moved laterally forward as shown by the arrows into positions under the vamp webs over each slipper section to be formed. In that position, the tacking die closes and the R.F. generator

Pftaps19760106 Wk01

is activated causing a spot seal to be formed wherever the pin electrodes 40 are located alongside each vamp-forming die 43 tacking the curved vamp sections to the underlying sole web.

PAR

FIG. 4 illustrates the configuration as the tray indexes from the spot-sealing station to an intermediate position before entering the final sealing station. The spot seals are illustrated by dots 47 in FIG. 4. As will be noted, each vamp section is spot sealed to the web at two points at either side just outside of the slipper outline. More sealing spots or a different spot pattern can be employed if needed. FIG. 5 is a cross-section through the configuration along the vamp strip just after the spot-sealing operation of FIG. 3. The vamp-forming dies 43 cause the vamp strips to assume their final bowed shape before spot-sealing. When the press opens causing the vamp-forming dies to retract, which is conventionally accomplished by an air cylinder return, the stiffness of the vamp material causes the tacked vamps to retain their bowed position during subsequent processing. In this form, as illustrated at the center of FIG. 2, still pinned to the tray 32, the assembly enters a seal and cutting press designated 28.

PAR

The seal and cutting press 28 is again of conventional construction similar to the press 27 but of the high-pressure type, having a lower platen 50 with locator holes in the corners, an upper die plate 51 with locator pins

Pftaps19760106 Wk01

52, a hydraulic cylinder 53 for moving the die up and down, and an R.F. generator 54. On the upper die plate 51 are mounted multiple sealing and cutting dies 55. One form of suitable die is illustrated in cross-section in FIG. 6a, and comprises a fixed inner sealing annulus 56 in the shape of the final slipper and a fixed surrounding outer cutter annulus 57. Both can be conveniently formed of any well-conducting metal, though the cutter should be a hard metal such as steel for long life. The inner sealing die 56 has a flat bottom, below which protrudes the knife edge of the cutter 57. The shape of the sealing die 56 conforms to the seal outline designated 58 in FIGS. 1a and 1b. When the press closes, the hollow die sections 56 close down on the vamps pretacked to the sole web. The trays 32 are located on platen 50 by the same locator holes 45 used during the tacking operation to ensure proper location of the dies 55 with respect to the pre-tacked vamps. The sealing die 56 closes on the vamp inside of the spot seals 47, with only moderate pressure applied. The pressure is sufficient to compress the vamp and sole webs, but is insufficient to cause the cutter 57 to cut through the material. Then the R.F. generator is activated causing heat sealing of the compressed edges at the sealing zones 14 (FIG. 1), and permanent deformation along the entire boundary of the slipper outline indicated at 58 (FIG. 1). Substantially simultaneously, or immediately afterwards, the die pressure is increased

Pftaps19760106 Wk01

to the level at which the cutter 57 cuts cleanly through the web materials at the deformed boundary die-cutting the completed slipper from the webs.

The completed slippers can be removed as the tray indexes to the right of FIG. 2 out of the final sealing station.

PAR

With the die configuration of FIG. 6a, a deformed zone 58 is formed completely around the slipper edge or border. By appropriate shaping of the sealing edge, a stitch-type appearance can be embossed onto the deformed edge for ornamental purposes. If no border edge is desired, the electrode configuration of FIG. 6b can be employed essentially comprising just the knife edge 57 alone serving also as the sealer. In this case, the seal is formed by the knife edge when the moderate die pressure is applied, and then when the pressure is raised to the higher level the same knife edge cuts through the sealed region to sever the completed slipper from the webs effectively eliminating the border. Spring-loaded electrodes are also suitable.

PAR

FIGS. 3 and 4 illustrated the process of the invention for the case wherein labor costs predominate over material costs, and thus the slipper outlines can be oriented on the sole web such that the vamp sections are in-line thereby enabling the use of vamp strips. However, the slipper outlines, with the broader parts aligned, does not maximize slipper yield per square unit of the sole web. In order to minimize scrap, the slipper outlines

Pftaps19760106 Wk01

should be oriented so that each slipper toe portion adjoins an adjacent slipper heel portion, in which case the vamps are no longer in-line, and a modified process is necessary for tacking the vamps in position. This is illustrated in FIGS. 7a and 7b.

PAR

FIG. 7a illustrates the vamp tacking process at the first station. The sole web, as before, is designated 20, and is shown on a tray 32 at the tacking station. The slipper outlines are shown at 46 in phantom. Note in comparison with FIG. 3 that alternate columns are reversed for closer nesting of the slippers to reduce scrap. As a result, the vamps are no longer aligned, and vamp strips cannot be used. It thus becomes necessary to use precut vamp straps which will involve more individual handling and increased labor costs, but will save material. The vamp strips may be precut on any standard die-cutting machine so as to have the desired vamp width (dimension 24 in FIG. 1a), but an overall length that exceeds the length the vamp will have in the finished slipper, leaving excess vamp portions at opposite ends by which the vamp section can be supported for tacking to the sole web. The vamp sections are suitably located with respect to the slipper by use of known shuttle type locators, one form of which is illustrated in FIG. 7a. This comprises a frame 60 suspended from the side of the press so as to be laterally movable between the die sections when open. The frame 60 includes extended finger sections 61

Pftaps19760106 Wk01

which are configured to fit between the slipper outlines 46 of the finished slippers, and have openings or cut-outs 62 at the positions where the vamps are to be tacked to the sole web. The precut vamp sections, indicated by 63, are manually suspended on the fingered extensions 61 so as to bridge the cut-outs 62 as shown. Suspension may be readily accomplished by pinning of the vamp sections as shown at 64, or by the use of springs or any other appropriate holders. Where pinning is used, the pin holes can be placed in the vamp sections when they are precut from larger webs. Now, when the tacking press closes, each of the vamp sections 63 can be tacked to the underlying sole web 20 by the spot-sealing electrodes 40 illustrated in FIG. 2 passing through the frame openings 62 in the space between the frame inner edge and the slipper outline. After the tacking operation, the vamp sections are unpinned from the frame, and the sole web 20 with tacked vamps 63 on the tray 32 indexed to the next position, illustrated in FIG. 7b. FIG. 7b shows the vamps 63 tacked to the sole web 20 at spots 47. When the indexed tray enters the final sealing station, the tacked vamps will be properly located with respect to the cutting and sealing dies which are now oriented according to the pattern 46 illustrated in FIG. 7a. An advantage of this modified process is that the vamps need not be simple rectangles as they would be when formed from strips, but could be given more complicated, more asymmetrical, or more

Pftaps19760106 Wk01

ornamental configurations. Moreover, during the pre-cutting operation, the edges can also be pre-sealed if desired, or the surface embossed to enhance its appearance. In addition, polyester goring or other embroidery can be added to the vamp to enhance its appearance before or during tacking to the sole web.

PAR

In the examples so far described, both the sole and vamp were each constructed of a single sheet of electronically heat-sealable material, such as of PVC. In place of the thin flexible PVC sheet can be substituted so-called PVC semi-rigid foam as a sole material, which is also electronically heat-sealable but thicker and less flexible than the PVC sheet.

PAR

The process of the invention also lends itself to the manufacture of slippers which are more attractive or durable or comfortable at little additional labor expense. For instance, the sole can be constituted of plural layers of electronically heat-sealable material. For instance, a two layer construction can be constituted of a PVC foam or sheet bottom layer and a top layer or sock lining of a differently colored PVC sheet. A preferred three layer construction includes a cushion layer in the sole between the bottom and top sole layers. Examples of electronically heat-sealable cushion layers include PVC foam, polyurethane vinyl-impregnated foam, reticulated polyether vinyl impregnated foam, PVC

Pftaps19760106 Wk01

fiberbond, and wadding with PVC binder. Similarly to the process used for the single layer sole, all sole layers are preferably supplied from rolls as continuous webs fed in the proper order onto the conveyor tray on the lower press platen of the sealing apparatus. All of the webs are then temporarily affixed to the tray and processed jointly in the same manner as the single web 20 of FIGS. 2 and 7. While supply of continuous webs offers the least labor expense, in some cases intermediate sole layers can be pre-cut to size and manually located in the presses over each sole to be made. An example of such use is the provision of cardboard sole stiffeners to be located between the sole top and bottom sheets to increase the rigidity of the sole. The cardboard lies inside of the border seam and remains unbonded in the completed article.

PAR

The invention is not limited to three-layer sole constructions, but four or five layer sole constructions are also possible. A particularly attractive sole configuration is a PVC bottom layer, a PVC foam cushion, a PVC striated colored sheet, and a translucent PVC top layer.

PAR

The vamp can also be made up of one or more layers of electronically heat-sealable material, supplied from rolls as continuous webs as in the process depicted in FIG. 2, or pre-die-cut in unison in the same manner as described in connection with the modified process depicted in FIG. 7.

PAR

In accordance with a further feature of the invention, non-electronically

Pftaps19760106 Wk01

heat-sealable materials can also be used in the slipper in accordance with this invention. Examples are sponge rubber for the sole bottom layer and fabric for the sock lining of the sole. When such non-electronically heat-sealable materials are present, then some means must be provided to enable them to be sealed to the other sole layers and to the vamp. For this purpose, it is preferred to provide an intermediate layer of heat-activated adhesive that when activated will bond to the non-electronically heat-sealable materials or other materials present. It is preferred to use for this purpose a thin polyamide fiber net, available commercially as "Pellon," which melts when subjected to electronic heat-sealing. The Pellon is available in the form of rolls as a continuous web and can be processed in the same manner as the other webs used in the sole and vamp. Thus, when the top sole layer is fabric, and a PVC foam is used as the cushion layer, then a film of Pellon would be provided between the fabric sock liner and the cushion, bonding the latter layers together along the border sealing zone during the final heat-sealing step. To seal the vamp to the sole sock lining when of fabric, an additional layer of Pellon is provided between the vamp side edges and the sole sock lining at the border sealing zone. It is preferred to provide the Pellon strip to the vamp before the latter is spot-sealed to the web.

PAR

The heat-activated adhesive layer can be omitted between the fabric and

Pftaps19760106 Wk01

cushion layer by precoating or laminating the sock liner on the side facing the cushion with PVC. Then, the PVC coating or lamination will bond to the cushion during the final sealing step, requiring the adhesive layer only between the vamp and the fabric top layer of the sole.

PAR Additional ornamentation or styling can be provided for the vamp by pre-stitching or pre-sealing to the vamp across its top a decorative material, such as embroidered elastic or polyester goring. Ornamentation can also be provided by embossing of the vamp before sealing to the sole.

PAR The weld of the vamp to the soles can be reinforced by means of a gusset or enlargement of the fused area at the vamp corners, or if desired by manually adding adhesive by means of a spot glue applicator to the locations under the tacked vamps where the corners will become located during the subsequent final sealing operation.

PAR While electronic heat-sealing is preferred when using at least one electronically heat-sealable material, the process of the invention is also applicable to slippers formed entirely of materials that cannot be electronically heat-sealed, but require the use of known hot die sealing methods. Examples of such materials include polyurethane foam. Such materials would be processed in the same manner as described above, except that sealing would be effected by means of a hot die instead of by R.F. energy.

Pftaps19760106 Wk01

PAR

As will be evident from the foregoing description, the process of the invention enables the mass-production from continuous webs of flat-soled slippers having an arc-shaped, foot-retaining vamp in a remarkably small number of steps requiring minimum handling by low-skilled personnel and thus at remarkably low cost. The process is applicable not only to electronically heat-sealable materials, but also through the use of a fusible bonding sheet or hot die sealing or other techniques as described to more elaborate or more attractive slipper constructions employing non-electronically heat-sealable materials. The resulting slippers are durable, attractive, and can be made of such low cost as to be disposable if desired. The die-cut edges offer improved results over tear seals, in that no raggedness results, and no extra labor is needed to remove the scrap.

PAR

In the embodiments illustrated, the individual vamp sections or strips were attached to the sole web after properly locating same by spot welding or sealing. While this is the preferred method, any suitable means can be utilized for temporarily attaching the pre-located vamp sections to the sole web so that they are properly centered under the sealing and cutting dies at the sealing and cutting station. For instance, instead of spot-sealing, the vamp sections can be pinned to the sole web at the same places indicated by reference numeral 47 in FIGS. 4 and 7b. For this

Pftaps19760106 Wk01

purpose, it would be preferred to use a wire tray for supporting the sole web for receiving the temporary pin attachments.

PAR While my invention has been described in connection with specific embodiments thereof, those skilled in the art will recognize that various modifications are possible within the principles enunciated herein and thus the present invention is not to be limited to the specific embodiments disclosed.

CLMS

STM What is claimed is:

NUM 1

PAR 1. A method of manufacturing slippers each having a flat sole member and an arc-shaped vamp disposed over the sole member to retain the slipper on the foot of a user, comprising the steps:

PA1 a. providing a continuous sole web of sufficient lateral extent to enable plural sole members to be made therefrom,

PA1 b. locating plural vamp sections over the sole web at predetermined locations,

PA1 c. attaching the plural vamps in their final arc-shape to the sole web at the predetermined locations,

PA1 d. positioning the sole web with preattached vamps under a sealing and cutting die, and

Pftaps19760106 Wk01

PA1 e. heat-sealing the preattached vamps at opposite sealing zones to the sole web by the sealing die and substantially simultaneously die-cutting entire slippers with heat-sealed vamps from the sole web.

NUM 2

PAR 2. The method of claim 1 wherein the heat-sealing of step (e) is carried out with moderate die pressure, and the die-cutting is carried out with increased die pressure.

NUM 3

PAR 3. The method of claim 1 wherein the sole web is composed of plural material layers.

NUM 4

PAR 4. The method of claim 1 wherein the vamp is supplied in the form of a continuous strip, and adjacent sections of the vamp strip are tacked to the sole web while a curved vamp-forming die is temporarily positioned between the vamp strip and sole web at the predetermined locations.

NUM 5

PAR 5. The method of claim 1 wherein plural vamp sections are pre-formed before the attaching step, and temporarily suspended over the predetermined locations of the sole web before the attaching step is executed.

NUM 6

PAR 6. The method of claim 1 wherein the attaching and sealing-cutting steps

Pftaps19760106 Wk01

are carried out at preceding and subsequent stations, and the sole web is conveyed between the stations while temporarily affixed to a locating tray provided with means for locating same with respect to the attaching and sealing-cutting dies.

NUM	7
PAR	7. The method of claim 1 wherein the attaching step is executed by means of a spot-sealing die having pin sealers.
NUM	8
PAR	8. The method of claim 1 wherein the sealing-cutting die forms a continuous annulus.
NUM	9
PAR	9. The method of claim 1 wherein the sole and vamp comprise electronically heat-sealable materials.
PATN	
WKU	39302768
SRC	5
APN	2782588
APT	1
ART	242
APD	19720807
TTL	Wheel spinning and vehicle conveying apparatus for automatic wheel

Pftaps19760106 Wk01

washers

ISD	19760106
NCL	12
ECL	1
EXP	Roberts; Edward L.
NDR	2
NFG	7
INVT	
NAM	Van Brakel; Russell A.
CTY	Harshaw
STA	WI
ASSG	
NAM	Haverberg Auto Laundry Equipment Co.
CTY	Chicago
STA	IL
COD	2
CLAS	
OCL	15 53B
XCL	15DIG2
XCL	104172B
EDF	2

Pftaps19760106 Wk01

ICL	B60S 304
FSC	15
FSS	DIG. 2;21 R;21 B;21 C;21 D;21 E;97 R;53 B
FSC	104
FSS	172 R;172 B;172 CT
UREF	
PNO	3037223
ISD	19620600
NAM	Lovsey
OCL	15DIG.2
UREF	
PNO	3554132
ISD	19710100
NAM	Hanna
OCL	104172B
LREP	
FRM	Seed, Berry, Vernon & Baynham
ABST	
PAL	An automobile conveyor for use in conjunction with a wheel spinning device for an automatic wheel washer including an endless chain having a plurality of selectively engageable dogs pivotally secured thereto. The

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dogs normally travel in a position to urge an auto through the washer whereat the outboard end is in close association with the chain and beneath the automobile first supporting surface. Operating means are included whereby when an automobile is in position at least one of the dogs will be automatically moved to a position where the dog extends above the automobile supporting surface, contacts a wheel, and urges the car through the washer apparatus. At the wheel spinning and washing station the chain is forced downwardly to a position whereat it passes beneath the mechanism necessary to perform the wheel spinning operation while still retaining the outboard end of the dog above the automobile supporting surface. The continual contact by the dog assures that the automobile moves through the washer apparatus in a continuous motion.

BSUM

PAC

BACKGROUND OF THE INVENTION

PAR

This invention relates to automobile washing apparatuses and in particular to the means for automatically conveying an automobile through the apparatus.

PAR

One of the problem areas with automatic washing of automobiles is the thorough cleaning of the wheels and it has become the practice to spin the wheels at a rate more rapid than that related to the travel of the automobile to assure that there is a full circumferential washing of the

Pftaps19760106 Wk01

wheel. As the wheel is spinning, a brush is placed into contact with the wheel and appropriate solvent is introduced at the scrubbing area and thus the entire wheel is washed. When the wheel is being washed and rotated at a rapid rate, the apparatus which is used to urge a car through the washing mechanism is temporarily disengaged or the chain carrying the auto contacting mechanism must be momentarily halted.

PAR It becomes obvious that to halt the chain or to disengage the driving mechanism for any reason causes the overall washing operation to move at a slower pace, thus greatly decreasing the potential profit by lowering the per hour capacity of the washing mechanism.

PAR With the above noted problems in mind, it is desirable to have a conveyor system wherein the automobile is continuously engaged by the conveyor mechanism throughout the entire washing operation and the automobile passes through all of the various stations at the washer apparatus at a constant rate.

PAR It is an object, therefore, of the present invention to provide a conveyor mechanism which is adapted to continuously urge an automobile through automatic washing apparatus.

PAR It is another object of the present invention to provide an automobile conveyor in conjunction with a wheel spinner whereby the conveyor continuously urges the automobile through the wheel spinning apparatus and

Pftaps19760106 Wk01

is adapted to flex passing beneath and providing sufficient clearance for the driving mechanism for the wheel spinning apparatus.

PAR It is yet another object of the present invention to provide a dog or pusher means for use on a conveyor chain incorporated in an automobile washing apparatus, the dog means normally rides in a position adjacent its carrying chains, below the automobile supporting surface but is selectively moved to a position whereat it extends above the automobile and urges the automobile through the washing apparatus.

PAR A further object of the present invention is to provide a wheel washing apparatus for use in conjunction with an automatic automobile washing mechanism wherein the wheel washing apparatus is adapted to automatically accommodate automobiles having different wheel widths.

DRWD

PAC BRIEF DESCRIPTION OF THE DRAWINGS

PAR FIG. 1 is a schematic plan view of the wheel washing and spinning apparatus which may be utilized by the hereinafter described conveyor chain;

PAR FIG. 2 is a vertical section through the inventive conveyor chain apparatus as seen along lines 2--2 of FIG. 3;

PAR FIG. 3 is a side elevational view of the inventive conveyor chain detailing the means for tensioning the chain and the means for moving the automobile contacting dogs from their lower inactive position to their upper tire

Pftaps19760106 Wk01

engaging position;

PAR FIG. 4 is a sectional view further detailing the elements shown in FIG. 3 and further illustrating the means for moving a dog from its lower position to its upper position;

PAR FIG. 5 is a plan view of the wheel spinning and washing apparatus showing the location of the conveyor chain mechanism;

PAR FIG. 6 is a sectional view taken along lines 6--6 of FIG. 5 showing the relative location of the necessary elements of the wheel washing operation and the configuration of the conveyor chain and attached dogs as they pass this apparatus;

PAR FIG. 7 is an elevational view taken along lines 7--7 of FIG. 6 and detailing the means whereby the conveyor chain and its attached dogs accommodate a wheel spinning and washing apparatus.

DETD

PAC DETAILED DESCRIPTION OF THE DRAWINGS

PAR As seen in FIG. 1, a wheel washer assembly which may well be used in conjunction with the inventive conveyor mechanism comprises a series of powered rollers 2 adjacent a scrubbing brush 4. The rollers are powered to impart a high velocity spin to the wheel of the automobile which is resting upon the rollers. The rollers do not impart a forward motion to the automobile and thus a primary moving means is necessary to transport

Pftaps19760106 Wk01

the automobile through the wheel washer assembly. The scrubbing brush 4, which is a commercially available item and thus not described in detail, comprises bristles mounted to a suitable backing. Normally included with the scrubbing brush is a nozzle for supplying the necessary detergent for an adequate scrub job. The wheel 6 of the automobile passes onto the rollers 2 whereat it is rotated at a rapid rate while being on contact with the brush 4. It is to be understood that the wheel rotation may well be opposite to the direction normally associated with the travel of the vehicle.

two purposes.

PAR

The opposite side of the wheel washing apparatus, i.e., that portion necessary to wash the wheels on the opposite side of the automobile, comprises elongated powered rollers 8 which cause the wheel to spin. Since the automobiles in use on the highways today have a variety of widths, the brush 10 which is used in conjunction with the rollers 8, is hydraulically controlled such that when an automobile is in position upon the rollers the piston rods 12 are forced outwardly of the piston causing the brush to push against the wheels and thus move the entire automobile toward brush 4. When the automobile has reached this position, its wheels contact the brush 4 and the sideward movement of the automobile is stopped. At this point the wheels and tires on both sides of the automobile will be in

Pftaps19760106 Wk01

contact with their respective brushes and thus be completely scrubbed as the wheel is rapidly rotated by the respective powered rollers 2 and 8.

PAR

Referring now to FIGS. 2, 3 and 4 taken together, it can be seen that the vehicle conveyor apparatus basically comprises a framework having elongated generally horizontal elements 14 which extend substantially the entire length of the conveyor. The horizontal elements 14 are held in vertical spaced position by means of vertical frame elements 16 which are in turn held in a proper spaced condition by lateral horizontal joining frame members 18. Taken together, the three frame elements 14, 16 and 18 provide a rigid frame structure for the mechanism which will be hereinafter described.

PAR

Intermediate the top and bottom horizontal frame members 14 is a chain 20 which is trained around a sprocket 22 which is mounted for relative linear movement relative to the framework. The position of the sprocket 22 is controlled by the combined action of the sprocket supporting bracket 24, the threaded rod 26 which is secured between the frame member 16 and the bracket 24. A compression spring 29 is mounted between the frame member 16 and the bracket 24, continuously urging the sprocket wheel 22 to its outer-most position, thus assuring a constant and proper tension upon the chain 20 for proper functioning of the mechanism. Mounted to the chain 20 are a plurality of dog or pusher elements having an inner wheel 28, an arm

Pftaps19760106 Wk01

member 30, and an outer wheel assembly 32. As can be seen in FIG. 4, the linking member 30 has one concave surface 34. Since the dogs or pusher members normally travel in a collapsed or folded condition with the outermost end trailing, when the dog or pusher passes around the sprocket it is necessary to either provide greater clearance or alternatively provide an open portion in the arm 30 to allow the dog or pusher to lie closer to the sprocket as it passes around said sprocket. The preferred embodiment, as illustrated, includes the concave surface 34 so the guide may be placed closer to the sprocket and thus conserving upon space.

PAR

The apparatus is designed such that the outer wheel assembly 32 of the dog or pusher will rise above the automobile supporting surface only when there is an automobile in position. To selectively control the time when a dog is moved upwardly through the supporting surface, there is provided an automatically controlled ramp means 38 which is mounted upon a shaft 40. Shaft 40 extends through the side wall of the framework of the conveyor. Mounted exteriorly of the main mechanism is a lever means comprising an arm 42, keyed to the shaft 40 such that movement of the lever will cause movement of the shaft. The arm 42 has one end restricted in movement by a pair of stops 44, 46 and the other end secured to the piston rod of a ram 48. There is provided, in a portion of the automobile conveyor which extends above the automobile supporting surface, a sensing means 50 which

Pftaps19760106 Wk01

could be a limit switch or alternatively an electric eye, such that it senses the presence of a wheel. Response of the sensing mechanism 50 to the wheel of an automobile will cause the ram to operate, lifting the ramp 52 to the position shown in phantom in FIG. 4. The ramp causes the dog to travel upwardly with its outer wheel assembly 32 pushing open the trap door 52, allowing passage of the outer wheel assembly therethrough.

PAR

As seen in FIG. 2, the outer wheel assembly 32 comprises a pair of wheel contacting rollers 54 mounted upon a shaft secured to the link member 30. Outboard of the wheel contacting rollers 54 are a pair of surface contacting rollers 56 adapted to ride upon the vehicle supporting surface when above the wheel supporting surface and to ride on an appropriate lower level when the device is in its normal position below the vehicle supporting surface.

PAR

Referring now to FIGS. 5, 6, and 7, it can be seen that the conveyor system hereinabove described is fully capable of operating in conjunction with a wheel spinning and washing apparatus. Since, with the exception of those details described with respect to FIG. 1, the apparatus is identical for both sides of the car only one side is shown and will be described in detail.

PAR

As seen in the figures, there is provided a pathway 60 to support the wheels of the vehicle. It is to be noted that the supporting surface 60 is

Pftaps19760106 Wk01

in two essentially identical segments with a slot therebetween. The slot between these segments is to accommodate the bar 30 of the automobile pusher assembly as described hereinabove.

PAR

The wheel spinner and washer apparatus itself comprises a plurality of parallel powered rollers 70 which cause the wheel to spin. Balancing the powered wheels 70 are a plurality of coaxial idler wheels 72 on the opposite side of the slot, whereby the wheel when being washed will be fully supported and not subjected to a torque.

PAR

The construction details of the spinning device are thus seen in FIG. 6 wherein it can also be seen that the wheel pusher mechanism is adapted to

NAM

Bryant ride above the wheel spinning mechanism when pushing the automobile through said mechanism and is adapted to ride below said mechanism in both the directions of travel when not pushing an automobile through the mechanism. Further to be seen in this Figure is the wheel washing brush 4 which is mounted upon a channel member 74; channel member 74 is in turn mounted upon a channel member 76; channel member 76 is secured to a ram which thus controls the position of the brush 4 assuring that it will be in contact with the tire T. The drive for the spinner rollers 70 is provided via shaft 78 and can be from any well known source, such as hydraulic motor, electric motor or the like.

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PAR

Further to be seen in this view is the fact that the idler rollers 72 are mounted upon a shaft 80 which is held in a rigid position by means of a pair of spaced bearings 82 which permit rotation of the members 72 without permitting downward deflection thereon.

PAR

Referring now to FIG. 7, it can be seen that the spinner mechanism is contained within a compartment which has an upper, substantially level planer element 84 which is substantially in alignment with the automobile supporting member 60 such that when the wheel is going through the wheel spinning mechanism it will roll freely from the element 60 to the element 84. Further, the element 84 provides a supporting surface for the wheels 54, 56 of the automobile pushing apparatus. When the automobile pushing apparatus is in its upper position forcing an automobile through the wheel washer, the chain 20 will be forced downwardly by means hereinafter described, but the pushing apparatus being on the end of link member 30, stays above the wheel supporting level and continues to force the automobile through the wheel washing apparatus. The lower portion of the spinning mechanism is closed by a pair of angled ramps 86 and a substantially horizontal joining member 88 such that the combination of 86 and 88 provide a surface which is easily followed by the roller 28 at the bottom of the connector rod 30 whether the pusher mechanism is in its upper position as shown in solid or is in its lower position as shown in

Pftaps19760106 Wk01

phantom in FIG. 7. The roller 28 following the contours 86, 88 causes the chain to go to a lower position, thus permitting continuous movement of the chain through what normally has been an impeding area. The spinning mechanism is normally mounted below the floor of the wheel washer apparatus in the path of the chain. Further to be seen in this view, is the fact that the conveyor 20 and the attached dogs are substantially supported by tracks or ramps 90 such as shown in FIG. 7 throughout most of its pathway to assure that it is in proper location. Tracks or ramps 90 serve to guide the chain and contain the conveyor chain such that it will not interfere with other mechanisms necessary for complete operation. As seen, the ramp or track 90 will serve as a part of the framework serving

PAR Thus, as can be seen hereinabove the present invention provides a unique automobile conveyor mechanism whereby the pusher members or means for forcing the automobile through the washing apparatus is only selectively engaged when an automobile is in position to be moved through the apparatus. Further, the conveyor mechanism itself is constructed in a unique fashion that it may pass beneath a wheel spinning and washing apparatus without interfering therewith, the construction details being such that the accommodation of both the conveying and the spinning mechanisms are easily accomplished.

CLMS

Pftaps19760106 Wk01

STM	The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:
NUM	1
PAR	1. In a vehicle wheel washing device for wheels of a given minimum tread width, a frame, opposed projecting sets of parallel horizontal rollers journal-mounted in said frame and having their projecting ends spaced apart to define a slot between said sets for the travel of a wheel pushing arm on an endless conveyor, said slot being narrower than said minimum tread width, drive means in the frame for rotating the rollers in one of said sets in a common direction, guide means in the frame beneath said sets of rollers for guiding the endless conveyor.
NUM	2
PAR	2. In a vehicle washing device, a passageway for a vehicle wheel having a slot therealong, an endless conveyor beneath the passageway having a pusher arm adapted to project upwardly through said slot and engage a vehicle wheel occupying the passageway to roll it along the passageway responsive to operation of the conveyor, transverse rollers in the passageway on opposite sides of said slot, means for rotating some of said rollers such that a vehicle wheel pushed by said arm will be rotated faster by such rollers than the rolling speed induced by the pusher arm, wheel scrubbing means on one side of said passageway arranged and adapted

Pftaps19760106 Wk01

to engage the respective side of a wheel while it is rotated by the rollers.

NUM

3

PAR

3. In a vehicle wheel washing device for use with an endless vehicle conveyor of the type having an upper forwardly moving conveying run and a lower return run and having spaced pusher arms arranged and adapted to project upwardly, while in the upper run, through a slot extending along a wheel passageway located above the upper run for engaging the back of vehicle wheels occupying the passageway to forwardly propel such wheels, a support frame, two opposed projecting sets of parallel horizontal rollers journal mounted on said frame and having their projecting ends spaced apart to define a travel path between said sets for passage of such pusher arms, drive means on the frame for rotating the rollers in one of said sets in a given rotational direction opposite to that of a wheel when pushed over the rollers by such a pusher arm, guide means in the frame beneath said sets of rollers for guiding such an endless conveyor and wheel scrubbing means on the frame arranged and adapted to engage the side of a wheel moving over said sets of rollers.

NUM

4

PAR

4. In a vehicle washing device, a travel path for the wheels on one side of a wheeled vehicle, said path being partly defined by wheel-spinning means

Pftaps19760106 Wk01

and having a slot along its length including the portion thereof defined by said wheel-spinning means, endless conveyor means beneath said travel path having an upper conveying run and including wheel pushing means having an active position projecting upwardly through said slot while moving along said upper run, and wheel scrubbing means in the region of said wheel-spinning means movable into and out of wheel scrubbing position.

NUM

5

PAR

5. In a device according to claim 4, a deflecting means beneath said wheel spinning means for deflecting said upper run downwardly in the region of said wheel spinning means.

NUM

6

PAR

6. A device according to claim 4 in which said travel path has guide rails defining the portions of said slot endwise of said wheel-spinning means, first guide roller means on said wheel pushing means always engaging the underside of said guide rails while the wheel pushing means travels through said portions of the slot, and deflecting guide means in the region of said wheel-spinning means deflecting said upper run downwardly in said region by engagement therewith by said first guide roller means.

NUM

7

PAR

7. A device according to claim 6 in which said wheel pushing means has

Pftaps19760106 Wk01

second roller means arranged to engage the back of the vehicle wheels when the wheel pushing means is active while traveling said upper run.

NUM

8

PAR

8. A device according to claim 4 in which said wheel pushing means has optimal active and inactive positions while in said upper run, said wheel pushing means being entirely located beneath said slot while in inactive position moving along said upper run.

NUM

9

PAR

9. A device according to claim 4 in which deflecting means in the region of said wheel-spinning means constantly downwardly deflects said upper run.

NUM

10

PAR

10. A device according to claim 4 in which said wheel pushing means has rollers arranged to engage the vehicle wheel when in active position and to engage said deflecting means when in inactive position.

NUM

11

PAR

11. A device according to claim 4 in which said wheel pushing means has

OCL

15 83

first rollers adjoining the conveyor arranged to engage said deflecting means and be downwardly deflected when said wheel pushing means is in either active or inactive position and has second rollers arranged to engage the vehicle wheel when in active position and arranged to engage

Pftaps19760106 Wk01

said deflecting means and be downwardly deflected when said wheel pushing means is in inactive position.

NUM

12

PAR

12. A vehicle wheel washing device comprising,

PA1

means forming a passageway along which wheels of one side of a car may be rolled, a slot located in said passageway, conveyor means beneath the passageway having a pusher means adapted to project upwardly through said slot and engage a vehicle wheel occupying the passageway to roll it along said passageway responsive to operation of the conveyor, wheel spinning means located in the passageway on opposite sides of said slot adapted to engage and rotate said vehicle wheel so that said wheel is moved faster by said spinning means than by said conveyor means, wheel scrubbing means on one side of said passageway arranged and adapted to engage the respective side of said wheel when it is rotated by the wheel spinning means.

PATN

WKU

39302776

SRC

5

APN

4991435

APT

1

ART

242

APD

19740821

Pftaps19760106 Wk01

TTL Mobile floor sweeper

ISD 19760106

NCL 7

ECL 1

EXP Roberts; Edward L.

NDR 3

NFG 4

INVT

NAM Wulff; Richard F.

CTY Long Lake

STA MN

ASSG

NAM Advance Machine Company

CTY Spring Park

STA MN

COD 2

CLAS

OCL 15 83

EDF 2

ICL E01F 104

FSC 15

Pftaps19760106 Wk01

FSS 49 C;50 C;83-86;340

UREF

PNO 1042860

ISD 19121000

NAM Whittome

OCL 15 83

UREF

PNO 1537003

ISD 19250500

UREF

PNO 2913744

ISD 19591100

NAM Gregersen

OCL 15 83

LREP

FRM Wicks & Nemer

ABST

PAL A Mobile Floor Sweeper including a rotatable cylindrical brush mounted on a mobile chassis, lever means for raising and lowering said brush relative to the chassis with plate means pivotally mounted on the chassis adjacent the brush together with lever means connecting the plate means with the

Pftaps19760106 Wk01

means for raising and lowering the brush whereby the plate means follows the brush as it is raised and lowered and means for adjustably positioning one end of the brush relative to the chassis.

BSUM

PAC

SUMMARY

PAR

The invention relates to mobile floor sweepers having a cylindrical brush for picking up debris. Certain of such types of sweepers have a plate adjacent the brush to aid in directing the flow of debris over the brush and into a collector bin. However, when the brush is used the diameter of the brush reduces and the same must be replaced or lowered to maintain brushing contact with the floor. When the reduced diameter brush is lowered the space between the plate is increased and the effectiveness of the plate is diminished.

PAR

It is an object of the present invention to provide a mechanism which causes the plate to automatically follow the brush as it is lowered and a further mechanism for adjusting an end of the brush to maintain contact of the entire length of the brush with the floor.

DRWD

PAR

With reference to the drawings forming part of this application:

PAR

FIG. 1 is a side elevational view of a floor sweeper partially in section with portions broken away and embodying the invention.

Pftaps19760106 Wk01

PAR FIG. 2 is a top plan view of the sweeper partially in section with portions broken away.

PAR FIG. 3 is a perspective view of the central portion of the sweeper showing in particular the follower deflector plate for the brush and the mechanism therefore embodying the invention.

PAR FIG. 4 is a perspective view of the handle and its mounting for raising and lowering the brush.

DETD

PAR Referring to the drawings in detail, the sweeper A includes the conventional cylindrical brush 8 with the bristles 9 mounted on the core 10. Having a trunnion shaft 12 at one end. Further provided is a motor housing 13 connected to a first side bar 16 with the trunnion shaft 12 rotatably mounted on the second side bar 18. Mounted within the housing 13 is the hydraulic motor 14, the shaft 15 of which is connected to the plate 15a which in turn is connected to the core 10 whereby the brush is rotatable. Rigidly connected to the rear end of the first side bar 16 is the extension 20 to which is pivotally connected at one end the link 22 by means of the pin 24. The other end of the link 22 is pivotally connected by means of the pin 23 to the link 26 with the other end of the link 26 fixedly secured to the rod 27. The numeral 28 designates a follower plate which includes the main flat body 30 secured to the rod 27 at the rear

Pftaps19760106 Wk01

longitudinal edge and from which the side flange 32 extends. The rod 27 extends beyond the side flange 32 and the other end of the plate to form trunnions 33 and 34 respectively, which are journaled in the side wall portions 40 and 42, respectively of the housing H for pivotal movement of the plate 28.

PAR

The sidewall portions 40 and 42 are connected to the top 44 of the housing H. The housing H is connected to the longitudinal frame 46 by means of the brackets 48 and 50 connected to the braces 49 and 51 carried by the top 44 of the housing. The numeral 56 designates a plate, FIGS. 1 and 3 secured to the side wall portions 40 and 42 which leaves an opening as at "X" between the upper edge of the plate 56 and the housing H through which debris is thrown by means of the brush into the collector bin B as indicated by the arrows in FIG. 1.

PAR

The forward end of the first side bar 16 is rigidly secured to the outer end of the first transverse rod 58 which is pivotally mounted in the brackets 60 secured to the top 44 of the housing H. The numeral 62 designates a second transverse rod pivotally mounted in the brackets 63 secured to the top of the housing H and substantially in axial alignment with the first transverse rod 58. The outer end of the rod 62 is fixedly secured to the second side bar 18, and the inner end of rod 62 is fixedly secured to the lower end of the first control arm 64. Secured to and

Pftaps19760106 Wk01

extending from the arm 64 is the extension bar 66. A second control arm 68 is fixedly secured at its lower end to the inner end of the first transverse rod 58, and on the upper end of the arm 68 is the small plate 70 having a threaded hole 72 in which is mounted the threaded adjustment bolt 74. The bolt 74 is of such a length that it adjustably bears against the extension bar 66, the screw movement of the bolt changing the relative position of the bars 64 and 68 and therefore the position of the brush relative to the floor. As the adjustment screw 74 is changed the end of the brush mounted on the bar 16 is raised or lowered relative to the other end of the brush so that there is full lengthwise contact and even pressure of the brush with a surface to be swept. In essence, if the end of the brush at bar 16 is too low or too high relative to the other end, the brush end may be adjusted to level the brush with the floor and give an even sweeping path. This guarantees more even brush wear and complete sweeping. As a result the entire brush may be kept parallel to the floor on which the sweeper is used.

PAR

Further provided is the rod 76 which has mounted on the inner end thereof the bifurcated member 78 pivotally connected to the upper end of the arm 64 by means of the pin 80. Mounted on the rod 76 for lengthwise adjustment thereof is the turnbuckle 82. The rod 76 is pivotally connected at its front end to the lower end of arm 84 by means of the pin 86 in the

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bifurcated end 87. The upper end of the arm 84 is fixedly secured to the short shaft 88 rotatably mounted in the brackets 90 and 92 mounted on the transverse support plate 94 connected to the walls 96 and 98 of the sweeper A.

PAR Further provided is an enlarged portion 100 of shaft 88 to which is secured the spaced ears 102 and 104 and pivotally mounted on the ears 102 and 104 is the collar 106 to which is secured the handle 108. When the handle 108 is moved rearwardly of the sweeper, the shaft 88 is rotated and as a result the arm 84 is moved in the direction of the arrow in FIG. 1 which through the mechanism described raises the brush, and if the handle 108 is moved in the opposite direction the brush is lowered through the mechanism described. To hold the handle in a given position to thereby hold the brush in a given position, there is provided the locking slots 110, 110a and 110b formed in the support plate 94 which receive the handle for adjustably positioning the brush.

PAC OPERATION

PAR In using the sweeper A, the brush 10 wears and the diameter of the same is thereby reduced. With the diameter of the brush reduced, it is necessary to lower the same for maintaining contact with the surface to be swept. To remedy this the handle 108 is moved forward which moves the arm 84 rearwardly which in turn moves the arm 64 rearwardly in the direction of

Pftaps19760106 Wk01

the arrow through the rod 76 as in FIGS. 1 and 3. As the arm 64 moves rearwardly the rods 58 and 62 are allowed to rotate due to the weight of the brush in a clockwise direction looking particularly at FIG. 1. As the shafts 58 and 62 rotate the bars 16 and 18 are lowered about the axis of rotation of the rods 58 and 62, and as the bars are lowered the plate 28 is pivotally lowered and follows the brush through the links 22 and 26 and the trunnions 27 and 34. As a result the plate 28, particularly the forward edge, is positioned in close proximity to the brush whereby debris picked up by the brush does not travel around with the brush but exits into the bin B through the opening as at "X." With the forward edge of the plate 28 in close proximity to the brush a flow pattern of air and debris is created above the plate 28 and out of the opening as at X. As a result air and debris does not follow around the brush but as above described. As the brush wears further and the same is lowered the plate 28 is automatically and pivotally lowered to maintain its proximity to the brush. Even pressure contact of the brush is maintained by means of the adjustment bolt 74 and the parts connected therewith as hereinbefore set forth.

CLMS

STM

I claim:

NUM

1

Pftaps19760106 Wk01

- PAR 1. In a floor sweeper having a rotatable cylindrical brush mounted on a mobile chassis, a receiver for receiving debris delivered from said brush, means for raising and lowering said brush, a plate adjacent said brush for the direction of debris, the improvement in said plate said improvement including
- PA1 a. plate means carried by said sweeper and adjacent said brush, and
- PA1 b. means for moving said plate means relative to said brush as said brush is moved relative to said chassis whereby the plate means maintains the same position relative to the brush,
- PA1 said means for moving said plate means including link means connected to said plate means and said means for raising and lowering said brush whereby the plate means automatically moves relative to the brush when the brush is raised and lowered.
- NUM 2
- PAR 2. The device of claim 1 in which said plate means includes a flat plate.
- NUM 3
- PAR 3. The device of claim 2 in which said plate is pivotally mounted on the edge on the chassis.
- NUM 4
- PAR 4. In a floor sweeper having a rotatable cylindrical brush mounted on a mobile chassis comprising in combination:

Pftaps19760106 Wk01

PA1	a. means for raising and lowering said brush relative to the chassis,
PA1	b. plate means,
PA1	c. means pivotally mounting said plate means on said chassis, adjacent said brush,
PA1	d. lever means connecting said plate means with said means for raising and lowering said brush whereby the plate means follows the brush as it is raised and lowered, and
PA1	f. means for adjustably positioning one end of said brush relative to the chassis.
NUM	5
PAR	5. The device of claim 4 in which said plate means includes a single flat plate.
NUM	6
PAR	6. In a floor sweeper having a rotatable cylindrical brush mounted on a mobile chassis, lever and rod means for raising and lowering said brush, means associated with said lever and rod means for adjustably moving one end portion of said brush relative to the other end, the improvement in said associated means, said improvement including
PA1	a. said means associated with said lever and rod means including first and second rod members in axial alignment and carried by said mobile chassis,
PA1	b. a second arm rigidly secured to said second rod means at the inner end,

Pftaps19760106 Wk01

PA1	c. said second rod rigidly secured at the outer end to
PA1	d. a second bar connected to said brush,
PA1	e. a first arm rigidly secured to said first rod means at the inner end,
PA1	f. said first rod rigidly secured at the outer end to,
PA1	g. a first bar connected to said brush,
PA1	h. means for changing the relative positions of said second and first arms to cause the end portion of said brush connected to said first bar to move relative to the chassis.
NUM	7
PAR	7. The device of claim 6 in which said means for changing the relative positions of said second and first arms includes
PA1	a. a screw member mounted on said first arm in engagement with
PA1	b. an extension bar on said second arm.
PATN	
WKU	39302784
SRC	5
APN	459696&
APT	1
ART	242
APD	19740410
TTL	Paintbrush and guard attachment for edging

Pftaps19760106 Wk01

ISD	19760106
NCL	5
ECL	1
EXP	Blum; Daniel
NDR	1
NFG	5
INVT	
NAM	Nasca; Richard A.
STR	350 Bank St.
CTY	Painesville
STA	OH
ZIP	44047
CLAS	
OCL	15166
XCL	15248R
EDF	2
ICL	A46B 1700
ICL	B44D 322
FSC	15
FSS	166;248 R;248 A;246;437
FSC	33

Pftaps19760106 Wk01

FSS 39 B;41 F

FSC 273

FSS 19 R;19 A;19 B

FSC 294

FSS 19 A

FSC 401

FSS 48;193

UREF

PNO 922074

ISD 19090500

NAM Bangert

OCL 401 48

UREF

PNO 1915893

ISD 19330600

NAM Kinpoitner

OCL 15166

UREF

PNO 2078193

ISD 19370400

NAM Campbell

Pftaps19760106 Wk01

OCL 15166

UREF

PNO 2116406

ISD 19380500

NAM Nancarrow

OCL 15166

UREF

PNO 2807041

ISD 19570900

NAM Watro

OCL 15248R

UREF

PNO 2820237

ISD 19580100

NAM Maslaney

OCL 15248R

UREF

PNO 3401418

ISD 19680900

NAM Deck et al.

OCL 15166

Pftaps19760106 Wk01

UREF

PNO 3824647

ISD 19740700

NAM Deck et al.

OCL 15248R

FREF

PNO 1,033,626

ISD 19660600

CNT UK

OCL 15248R

LREP

FR2 Hogg; William N.

ABST

PAL A device for removable attachment to a paintbrush to assist in cutting-in one flat surface to another is disclosed. It is formed of flat metal sheet cut to a configuration having a central portion with a foot depending from one end thereof and a pair of bendable arms extending laterally therefrom. The arms can be bent to a plane normal to the plane of the central portion to engage the opposite sides of the handle of a paintbrush, and the foot portion acts as a guide and shield against unintentional smearing.

BSUM

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BACKGROUND OF THE INVENTION

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This invention relates generally to removable attachments for paintbrushes, and more particularly to an attachment device for use on a paintbrush to assist in forming straight uniform edges at the interface of intersecting surfaces and allow application of paint to the intended surface while preventing unintentional smearing of paint of the other surface, commonly referred to as "cutting-in."

PAR

This operation of "cutting-in," i.e., painting up to the edge of one surface where it intersects with the edge of another surface without smearing paint and still obtaining a straight even edge is one of the more difficult techniques, especially for amateur, or do-it-yourself painters. Good smooth mating surfaces which are straight and which are free of smeared paint present a very pleasing appearance and add greatly to the attractiveness of any paint job. These surfaces often are where a ceiling meets the walls with the ceiling and walls being painted a different color, thus requiring a good straight even interface.

PAR

There have been many different prior art proposals for devices which are adapted to be applied to or used in conjunction with paintbrushes to assist in "cutting-in." However, each of these devices have suffered certain serious drawbacks which have prevented any of them from gaining widespread acceptance or use. For example, many of them are difficult to

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apply to the paintbrush or can be adapted only to one size paintbrush or require special fittings to be applied to the paintbrush. Also, many of them do not allow for easy dipping of the brush into the paint can without smearing on the device and therefore detracting from its usefulness. Also, many of these devices are awkward to use and in some cases must be separated from the paintbrush thereby requiring two hands to do the operation.

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SUMMARY OF THE INVENTION

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According to the present invention a device for use on a paintbrush to assist in forming straight uniform edges at the interface of intersecting surfaces and allow application of paint to the intended surface while preventing unintentional smearing of the paint of the other surface is provided which device easily can be attached to and removed from various sizes and configurations of paintbrushes, which is easy to use, which will allow straight work up close to or at the interface without unintentional smearing, and which can be easily manipulated to allow the paintbrush to be dipped into the paint without smearing, and which device can be economically and easily manufactured.

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DESCRIPTION OF THE DRAWING

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FIG. 1 is a plan view of a device according to this invention as it is

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