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Hyde

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[54] BRACE ASSEMBLY

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[52] **U.S. Cl.**.....**248/351,** 248/440
[51] **Int. Cl.**.....**F16m 11/32**
[58] **Field of Search**.....248/351, 440; 5/99 C

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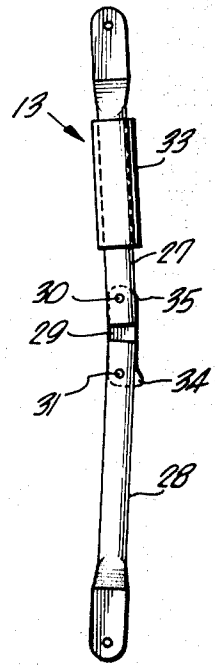
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[57] **ABSTRACT**

Described herein are collapsible brace assemblies which require a plurality of motions to revert from a bracing to a collapsed configuration. By reason of their construction, the brace assemblies of the invention can be safely and advantageously employed to support rails about collapsible enclosures, such as play pens. The brace assemblies comprise, in the most general sense, first and second brace bar members joined together by a linking member pivotally mounted in recesses formed in the joined ends of the brace bars. A sleeve, preferably of non-metallic material such as plastic, is coaxially and slidably positioned about one of the joined bars and can be slid into locking position about the joint at the joined ends of the brace bars to prevent pivotal motion of the connecting link therebetween. The sleeve is prevented from sliding past the joint by a stop, preferably constituted by an integral extension from the lower end of the linking member. Sidewise buckling of the brace is prevented by the sleeve and preferably also by the projection from and a lateral edge of the linking member.

9 Claims, 6 Drawing Figures



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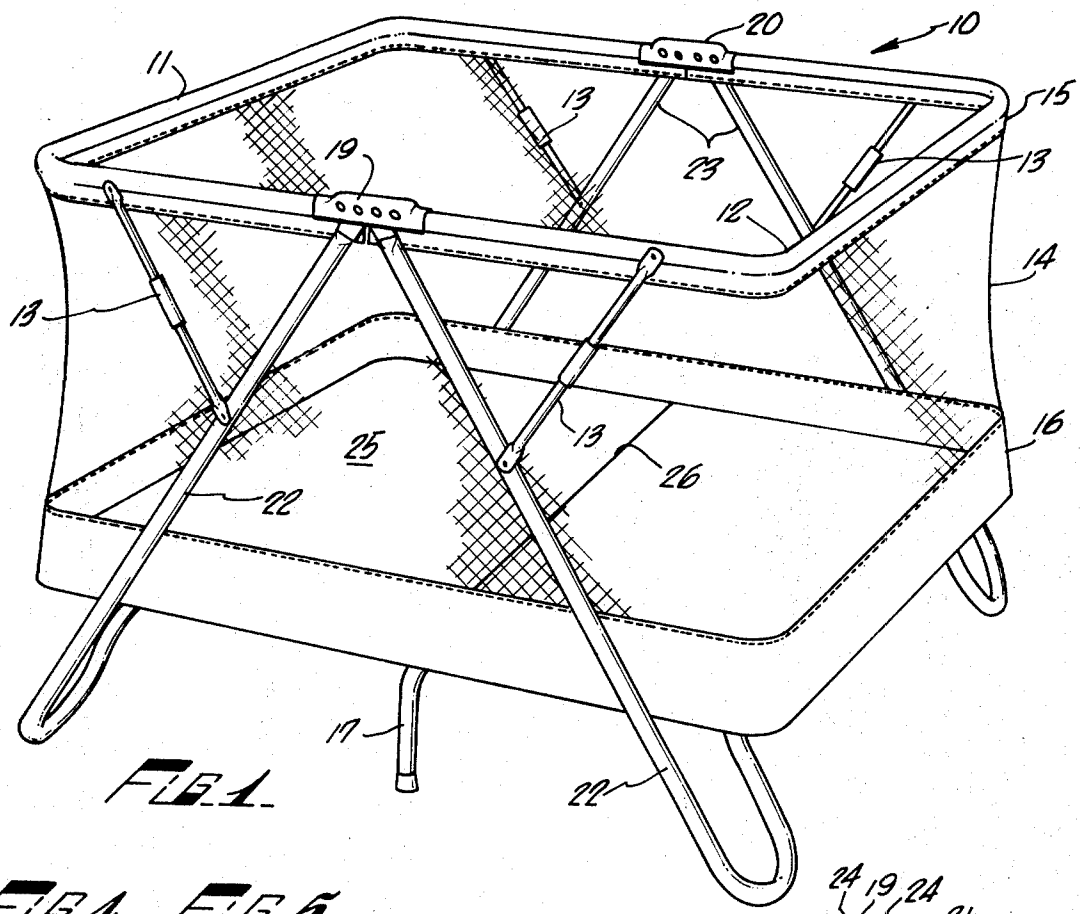


FIG. 1

FIG. 4

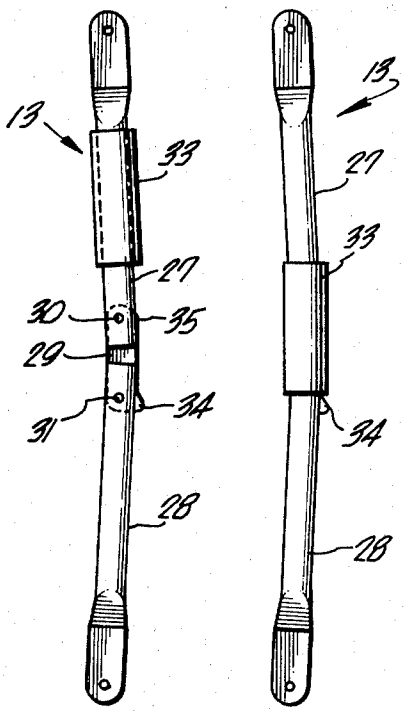


FIG. 5

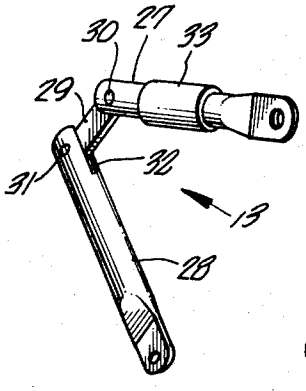
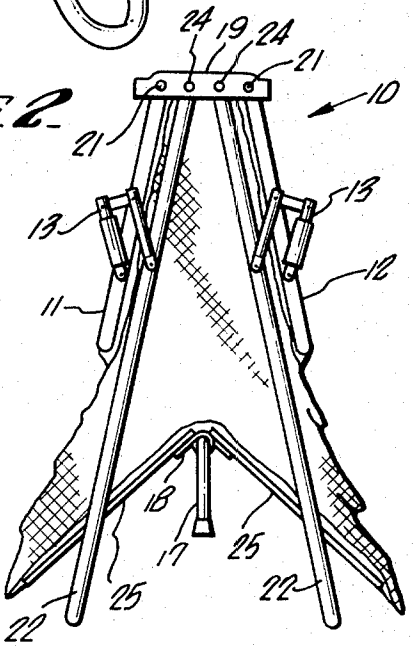


FIG. 3

FIG. 2



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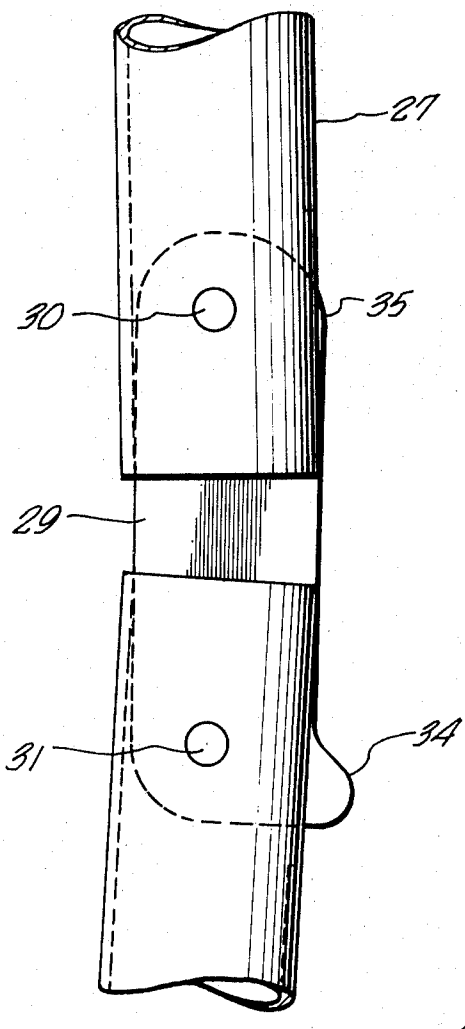


FIG. 6

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BRACE ASSEMBLY

FIELD OF THE INVENTION

This invention relates to collapsible brace assemblies and, more specifically, to collapsible enclosures such as play pens in which such brace bar assemblies are employed.

BACKGROUND OF THE INVENTION

Of recent years, play pens and related enclosures of the sort whose floor and rails fold by rotation about two parallel axes have gained widespread popularity by reason of, inter alia, the convenience with which they can be unfolded for use or collapsed for storage. Typically, when in enclosing configuration, the rails of such assemblies are supported by a collapsible brace acting against a load-bearing leg or other member. Generally, such braces are comprised of two principal brace bars pivotally connected one to the other by, e.g., a saddle bracket of the sort which restrains pivotal motion in one direction, but permits the brace to be "broken" or unlocked simply upon imposition of force in a direction opposite that from which pivotal movement is restrained. While such saddle brackets admit of convenient folding of the enclosing configurations in which they are employed, the fact that such enclosures are primarily employed in production of play pens and related equipment for children demands that considerations of safety be accorded at least equal if not greater weight than those of convenience. While the saddle bracket-type collapsible brace has found wide public acceptance and has proved generally reliable in preventing inadvertent folding of play pen enclosures, a need has existed for a collapsible brace which, without sacrificing convenience in folding or unfolding, requires more than a single motion for unlocking.

BRIEF SUMMARY OF THE INVENTION

According to this invention there is provided a collapsible brace assembly suitable for use in play pen enclosures and which, while requiring more than a single unlocking motion, admits of convenient folding and unfolding of the play pen and related enclosures with which it is employed. The brace assembly is comprised of first and second brace bars, one end of each of the bars being recessed to receive a linking member whose first and second ends are pivotally affixed to the first and second brace bars respectively, means adjacent to the said second end to engage an edge of a sleeve coaxially, slidably positioned about the first brace bar to stop the slidable movement thereof when the sleeve is slid into locking position preventing pivotal movement of the first and second linking member ends with relation to the said ends of the first and second brace bars. Preferably, the sleeve is formed of non-metallic material, e.g., of a tough plastic, so that children are not encouraged to tamper with the locked brace assembly for reasons hereinafter described.

Unlocking of the brace requires first that the locking sleeve be lifted to expose the brace joint, followed by an imposition of force against the joint to cause pivotal breaking of the same. The sleeve in locking position prevents sidewise buckling of the brace, as does the projection which engages an edge of the sleeve and, in a preferred embodiment, as does a lateral edge of the linking member which is exposed when the brace bars are in substantially longitudinal alignment, one with the other.

One object of the present invention is to provide a collapsible brace suitable for use in folding play pens and related enclosures.

Another object of this present invention is to provide a collapsible brace which requires a plurality of unlocking movements.

Yet another object of the invention is to provide a pivotally collapsible brace which resists sidewise buckling in a direction perpendicular to the plane of pivotal movement.

A still further object of the invention is to discourage tampering with the brace when in locked position, by the combined use of metallic and non-metallic materials.

These and other objects and advantages of the invention will become apparent from the detailed description which follows and from the accompanying drawings (not to scale) in which like numerals refer to like elements and wherein:

FIG. **1** is a pictorial view of a collapsible play pen enclosure incorporating the brace assembly of the invention;

FIG. **2** depicts the play pen of FIG. **1** in a partially folded configuration; and

FIGS. **3**, **4**, and **5** illustrate various of the positions which may be assumed by one brace bar assembly embodiment of the present invention;

FIG. **6** is an enlarged view of the central portion of the brace bar assembly depicted in FIG. **4**.

DETAILED DESCRIPTION OF THE INVENTION

With reference now to FIG. **1**, a playpen **10** whose rails **11** and **12** are supported by brace bar assemblies **13** is shown in enclosing configuration. The walls of the enclosure are formed by netting **14** which is secured respectively, to the rails **11** and **12** and to the floor of the play pen by upper hemming **15** and lower hemming **16**. The floor is centrally supported by center leg **17** which is mounted to the floor with hinge brackets shown at **18** in the FIG. **2** illustration of the play pen in partially folded configuration. Rails **11** and **12** are pivotally mounted in saddle brackets **19** and **20** by means of pins **21**. Similarly, inclined leg members **22** and **23** are pivotally mounted in respectively, saddle brackets **19** and **20** by means of pins such as those shown in FIG. **2** at **24**. Preferably, although not here shown, the portions of inclined legs **22** and **23** adjacent the netting **14** are padded for greater safety.

To unfold or collapse the playpen enclosure, the brace assemblies **13** are broken and the rails rotated together with the inclined leg members about an axis generally passing through the two saddle brackets **19** and **20**. Thereafter, the floor halves **25** are pivoted about an axis generally passing along the line of floor seam **26**. As pivotal movement of the floor halves, rails and inclined leg members is continued the play pen assembly assumes a relatively flat, space-saving configuration, as suggested by FIG. **2**. As before noted, of course, FIG. **2** depicts the play pen short of completed folding. It will be apparent from the foregoing that the folding operation is initiated by unlocking the brace bar assemblies **13**, which assemblies are more clearly de-

picted in FIGS. 3, 4 and 5, and to which reference is now had.

The brace bar assemblies of the invention comprise first and second brace bars 27 and 28, respectively pivotally affixed to first and second ends of brace bar linking member 29, as by pivot pins 30 and 31. Preferably, the brace bars are dimpled or otherwise indented so as to minimize exterior profile of the pivot pins 30 and 31. Each end of linking member 29 is received in a recess formed in the ends of the respective brace bars, like that shown at 32.

The locking sleeve 33 is coaxially and slidably positioned about first brace bar 27 and is sized to be slidably positioned in locking relation to the joint formed by linking member 29 while engaging with its lower edge a projection adjacent the second end of the linking member 29 which serves to stop further downward slidable movement of locking sleeve 33. Preferably, linking member 29 is generally boot-shaped and provided with an integral toe 34 which serves as the said projection stopping slidable movement of the locking sleeve as shown in FIG. 5. The toe projection 34 emerges from recess 32 when the brace bars are longitudinally aligned, one to the other, as will be apparent from FIGS. 4 and 5, and serves to resist sidewise buckling of the brace assembly in a direction perpendicular to the plane in which collapsible brace assembly 13 pivots. That buckling is also resisted by the locking sleeve 33 when in locking position, as appears from FIG. 5. With reference to FIG. 4, and to the enlarged view in FIG. 6 such buckling can be further resisted by positioning the linking member 29 such that a lateral edge 35 thereof projects through at least one of the brace bar recesses and, most preferably, through both such recesses when the brace bars 27 and 28 are longitudinally aligned. In such case, as most clearly appears from FIG. 6, a body portion of the linking member adjacent the projecting lateral edge resists buckling of the brace assembly sidewise to the plane in which pivotal movement is had.

The brace bars can be formed of welded or extruded steel, chrome steel, aluminum, etc., and may be of solid bar stock with the recesses milled. Preferably, however, for lightweight construction and economy the brace bars are formed from hollow metal tubing and the recesses provided simply by slotting the walls thereof. Preferably, the recesses communicate with the exterior through but one wall of the tubing, and the interior wall of the tubing opposite the recesses stops pivotal movement of the linking member away from the recesses.

The ends of brace bars 27 and 28 opposite linking member 29 are preferably flattened and pierced or otherwise adapted for pivotal attachment of first and second brace bars 27 and 28 to, respectively, supported and load-bearing members, e.g., the rail 11 and inclined leg member 22 of FIG. 1. Preferably, first and second brace bars 27 and 28 are respectively attached to rail 11 and leg 22 at points approximately equidistant from saddle bracket 19. Appropriate points of attachment are readily arrived at, the primary consideration being positioning such that the folded brace bar assembly not unduly project from the playpen in folded configuration. Packaging and storage is thereby facilitated.

Linking member 29 is preferably formed of flat metal stock and the projection serving as a stop to the lower edge of locking sleeve 33 integrally formed thereon. Alternatively, of course, the projection which stops downward travel of the locking sleeve 33 can be provided by, for example, increasing the diameter of the lower portion of brace bar 28 to greater than the internal diameter of locking sleeve. Again, that projection can be provided by increasing the exterior profile of pivot pin 31 to engage the edge of locking sleeve 33. While each of these "projections" serve the intended purpose of preventing travel of locking sleeve 33 below the brace assembly joint, it is preferred that an integral toe of the linking member be employed so that in addition to the stop action there is secured the resistance to sidewise buckling hereinabove discussed.

The locking sleeve 33 can be formed of metal or any tough, flex-resistant material such as, in the preferred case, a tough plastic (e.g., vinyl). The locking sleeve is preferably formed of a non-metallic material such as plastic since it has been found that children are attracted by "tinkling" sounds like those which result from manipulation of metal parts against one another. By use of a plastic or other non-metallic locking sleeve 33 such attractive sounds are largely diminished, and the occupant of a play pen is discouraged thereby from tampering with the locking mechanism of the brace bar assembly. Accordingly, the possibility of inadvertent collapse and injury to or egress by the occupant of the play pen is greatly reduced.

It will be apparent from the foregoing that the nature of the locking mechanism itself greatly reduces the possibility of egress or injury. Thus, in order to break or collapse the brace bar invention, not one but two motions are required. First, the locking sleeve 33 must be lifted to clear the joint formed by pivotal attachment of brace bars 27 and 28 to linking member 29; the brace assembly then assumes the configuration illustrated in FIG. 4 and, to be collapsed to a configuration like that of FIG. 3 then requires the imposition of force against that side of the joint adjacent the recesses formed in the brace bars.

It will also be apparent from the drawings that while the safety factor has been increased by requiring a plurality of motions to break the brace assembly, the process of unfolding the collapsible play pen to an enclosing configuration has in nowise been rendered less convenient. Thus, for example, if the rail 12 of FIG. 2 is raised to the position shown in FIG. 1, it is apparent that the brace bar assembly 13 will assume the configuration of FIG. 4. Thereupon, locking sleeve 33 can fall of its own weight into locking position as shown in FIG. 5.

In sum, there has been provided by this invention a brace bar assembly which is simple of construction, yet safe in operation and convenient in employment. Accordingly, it is intended that the scope of this invention be limited only to that lawfully accorded the claims appended hereto.

I claim:

1. A collapsible brace assembly comprising first and second brace bars, one end of each bar being recessed to receive a brace bar linking member whose first and second ends are pivotally affixed to said first and second bars respectively, a projection from said linking

member adjacent the second end thereof extending outwardly through the recess in said second bar when the brace bars are longitudinally aligned, said projection serving to engage an edge of a sleeve coaxially slidably positioned about the first bar to stop the slidable movement of said sleeve when it is slid into locking position preventing pivotal movement of said first and second ends with relation to said ends of the first and second bars, said projection additionally serving to resist buckling of said assembly in a sidewise direction perpendicular to the plane in which said pivotal movement occurs.

2. An assembly according to claim 1 wherein said brace bars are tubular members whose recesses are positioned so that the interior walls of the brace bars opposite the recesses stop pivotal movement of the linking member away from said recesses.

3. An assembly according to claim 1 wherein the ends of the first and second brace bars opposite those affixed to said linking member are provided with means for pivotal affixation to, respectively, supported and load-bearing members.

4. A collapsible brace assembly comprising first and second brace bars, one end of each bar being recessed to receive a brace bar linking member whose first and second ends are pivotally affixed to said first and second bars respectively, means adjacent the second end to engage an edge of a sleeve coaxially slidably positioned about the first bar to stop the slidable movement of said sleeve when it is slid into locking position preventing pivotal movement of said first and second ends with relation to said ends of the first and second brace bars, a lateral edge of said linking member projecting from at least one of the respective recesses in said brace bars when the brace bars are longitudinally aligned such that a body portion of said linking member adjacent said lateral edge resists buckling of said assembly in a sidewise direction perpendicular to the plane in which said pivotal movement occurs.

5. An assembly according to claim 4 wherein said edge so projects from each of the respective recesses in said brace bars.

6. An assembly according to claim 4 wherein said brace bars are tubular members whose recesses are positioned so that the interior walls of the brace bars opposite the recesses stop pivotal movement of the linking member away from said recesses.

7. An assembly according to claim 4 wherein said sleeve is formed of non-metallic material.

8. An assembly according to claim 4 wherein said sleeve is formed of non-metallic material.

9. An assembly according to claim 4 wherein the ends of the first and second brace bars opposite those affixed to said linking member are adapted for pivotal affixation to, respectively, supported and load-bearing members.

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