Jan. 28, 1964 R. D. KRAUSS 3,119,124

PLAY PEN

Filed May 31, 1962 2 Sheets-Sheet 1

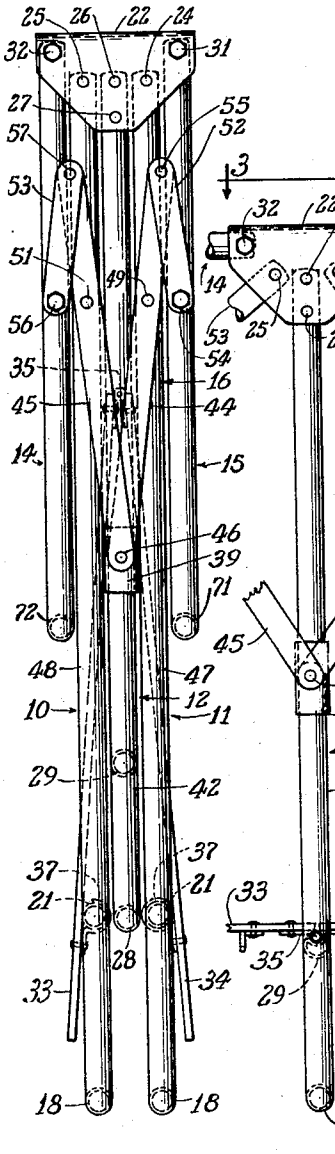


Fig. 1

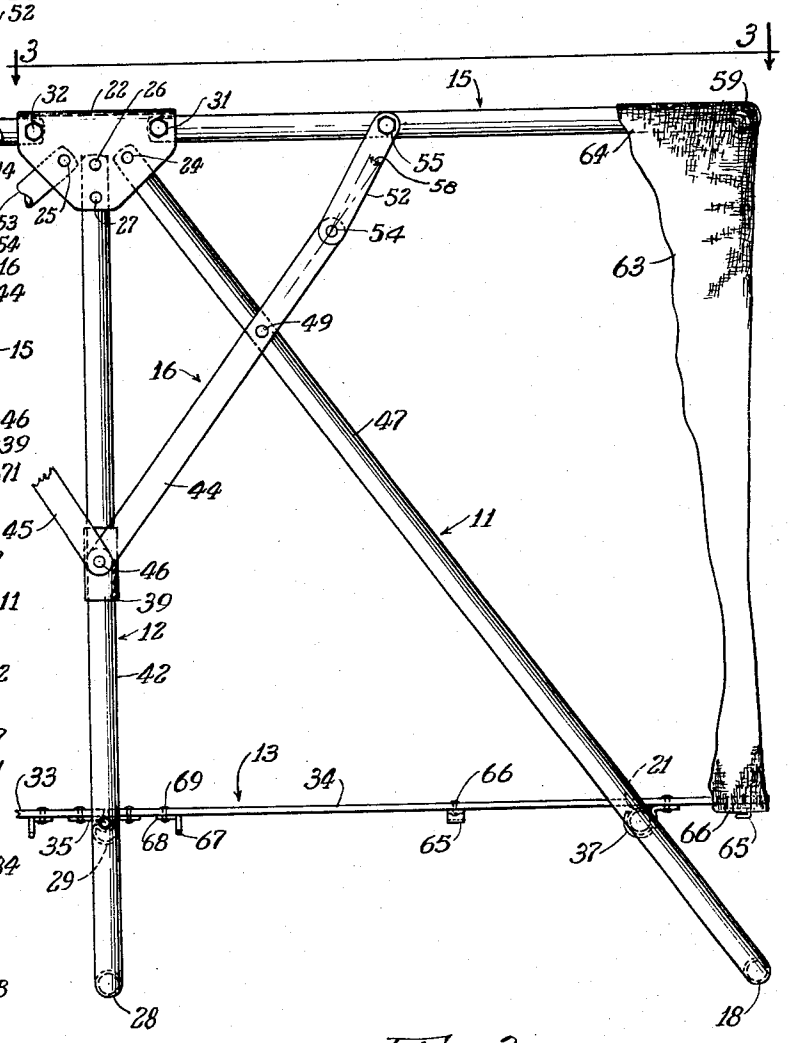


Fig. 2

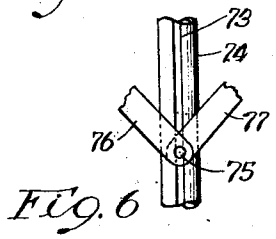


Fig. 6

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PLAY PEN

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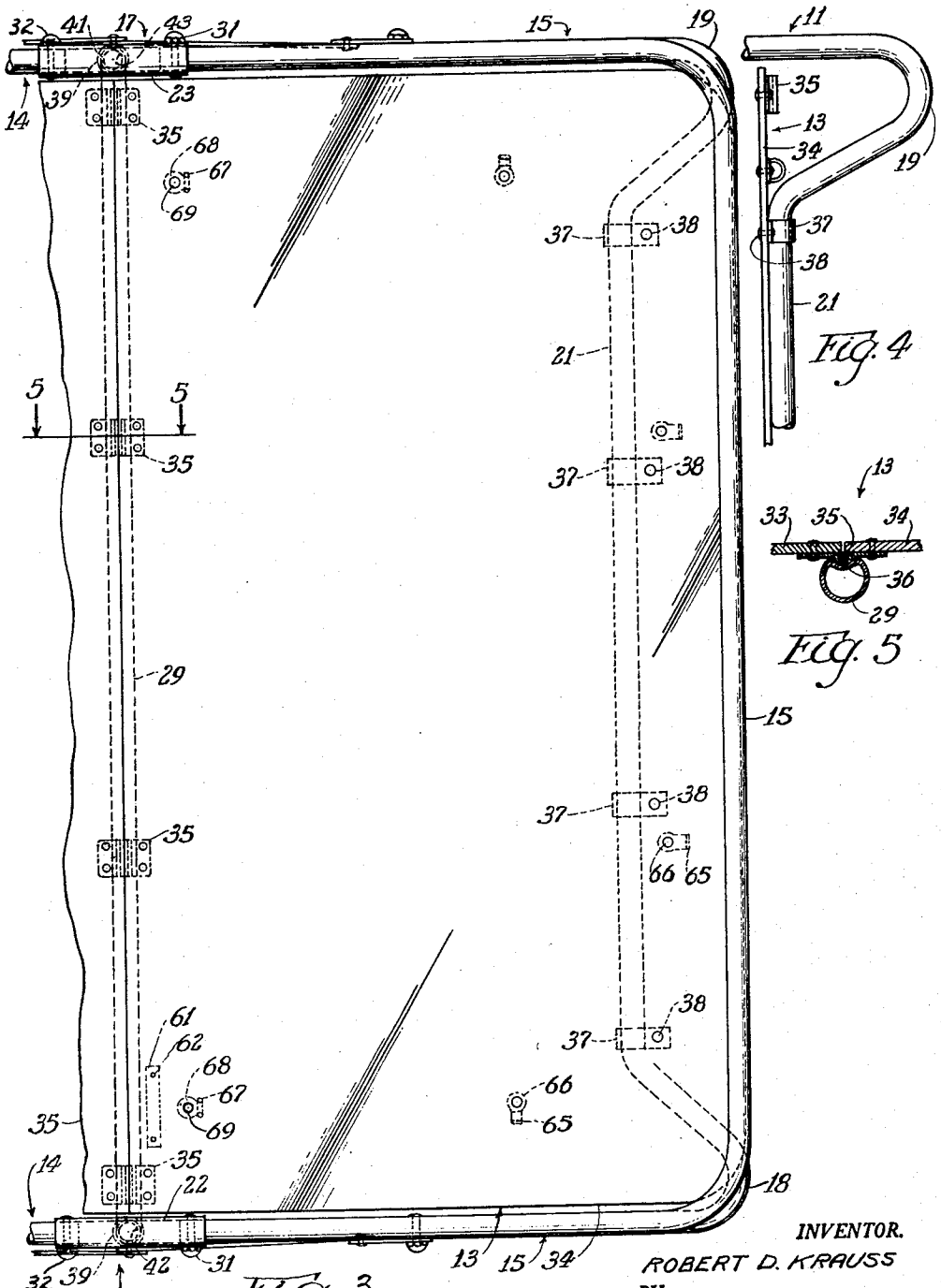


FIG. 3

FIG. 4

FIG. 5

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PLAY PEN

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This invention relates generally to a child's play pen and more particularly to a novel foldable play pen foldable and unfoldable in only one manual motion, and automatically lockable.

The purpose of this invention is to eliminate the plurality of movements required to manipulate the play pens presently in use; to simplify the operation of folding and unfolding a play pen to one step and movement by the operator; and to provide a foldable play pen structure automatically lockable and safe for children.

An object of this invention is the provision of an improved play pen structure which can be quickly and readily folded or unfolded.

Another object is to provide a play pen structure which can be folded or unfolded with only one manual motion.

Still another object of this invention is the provision of a foldable play pen that is not accidentally collapsible.

Yet another object of this invention is the provision of a foldable play pen that is not collapsible, as by the inquisitive hands of small children, or of an adult, resultive in injury to such hands due to the jackknife action of members comprising a foldable play pen.

A further object is to provide a foldable play pen whose upper U-frames, constituting the play yard enclosure, are automatically locked in an unfolded operative position, when the unfolding movement is completed.

Other specific objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings in which like reference numerals designate like parts throughout the figures thereof and wherein:

FIG. 1 is a side elevation view of a play pen constructed according to one embodiment of this invention, with the play pen in folded position, and with the fabric sidewalls omitted for clarity of illustration;

FIG. 2 is a fragmentary side elevation view of the play pen unfolded and open for occupancy;

FIG. 3 is a plan view taken along line 3—3 of FIG. 2;

FIG. 4 is a fragmentary front elevation view of the lower end portions of one of the legs comprising the play pen, and the floor pivotally attached to such portions;

FIG. 5 is a fragmentary cross-section view taken on line 5—5 of FIG. 3, showing the floor hinged along its centerline and showing a cross-member or support beam thereat; and

FIG. 6 is a fragmentary elevation view showing a modification wherein a slot is provided in the central legs to provide a guideway for the pin connecting the two levers.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown a play pen comprising a pair of foldably mounted leg-forming frames generally indicated at 10 and 11, a central fixed leg-forming frame generally indicated at 12, a foldable floor generally indicated at 13 pivotally supported on said foldable leg members 10 and 11, a pair of foldable top rails 14 and 15, and companion foldable braces generally indicated at 16 and 17.

The foldable leg-forming frames 10 and 11 are U-shaped tubular members having bights at the corner portions thereof forming recurved ground-engaging feet such as indicated at 18 and 19, see FIG. 4, and integral interconnecting cross-members or support beams such as indicated at 21, said cross members being elevated above the ground engaging feet.

The two free upper ends of each foldable leg frame are pivotally mounted within the sides of the inverted U-shaped connecter plates such as indicated at 22 and 23, interconnecting the plates, by pin means such as indicated at 24 and 25, respectively, see FIG. 2.

Said two free upper ends of each leg-forming frame pivot on a common horizontal axis, and such companion axes are spaced laterally from each other to allow the disposition therebetween of a third tubular fixed leg-forming frame generally indicated at 12. Said fixed leg frame is disposed vertically and is secured to the connecter plates 22 and 23 by means of rivets such as indicated at 26 and 27. The length of the fixed leg frame is shorter than the length of the adjacent foldable leg frames, and extends to the ground support of the pair of U-shaped leg-forming frames when the pair of leg-forming frames are normally equally extended. Said fixed leg frame is provided with bights forming ground-engaging feet 28, and an interconnecting cross-member or support beam 29, similar to the corresponding bights and support beams on the foldable leg frames, hereinbefore described. When folded, the foldable leg frames assume a position adjacent and parallel to the vertical fixed leg frame 12, and on opposite sides theroef. The middle fixed leg frame is retractable from its ground engaging position when the foldable leg-forming frames are in a folded position.

The foldable top rails generally indicated at 14 and 15 constitute a pair of U-shaped members, disposed in a horizontal plane adjacent opposite ends of said connecter plates, the ends of one of said rails confronting the ends of the other and being pivotally connected to said connecter plates, to form a rectangular framework in which each rail is foldable downwardly to a substantially vertical parallel arrangement. The two leg ends of each such U-shaped top rails are pivotally mounted within the sides of the inverted connecter plates by pin means such as indicated at 31 and 32, respectively. When extended outwardly, the top rails are stopped, by the connecting body portions of the U-shaped connecter plates, in a common horizontal plane. When folded, the top rails assume a vertical position adjacent and parallel to the folded leg frames, respectively.

The foldable floor 13 comprises two equal length panels 33 and 34 centrally hinged, along an axis parallel to the support beams 21 and 29 of the leg frames, by means of hinge means 35. Said floor panels are foldable by lifting upwardly at the hinge means, as hereinafter described. The middle support beam 29 is slightly recessed, as at 36, to receive the hinges to bear therein. When the play pen is unfolded said beam 29 supports the floor panels along said hinge line, and in a substantially horizontal position.

The floor sections are pivotally mounted on cross members 21 by means of clip bearings such as indicated at 37 which are riveted to the underside of the floor panels by means of rivets such as indicated at 38.

Sleeves such as indicated at 39 and 41 are slidably engaged on leg elements 42 and 43, respectively, of the central leg forming frame 12, to be guided thereon as crossheads.

Systems of foldable braces such as indicated generally at 16 and 17 are pivotally connected to the slidable sleeves 39 and 41, respectively, to communicate extensible and retractible motions to the top rail members of the foldable play pen.

In view of the fact that both such foldable brace systems are identical, only one of such systems, namely brace system 16, see FIGS. 1 and 2, will be described, it

being understood that the companion brace system **17** is identically constructed.

The foldable brace system **16** comprises a pair of levers **44** and **45** pivotally connected, at their lower ends, to slidable sleeve **39**, by a common pin **46**. Said levers **44** and **45** are further pivotally connected, intermediate their ends, to the leg members **47** and **48** of the foldable leg frames **11** and **10** by means of pins **49** and **51**, respectively. The upper free ends of said levers **44** and **45** are link-connected to the corresponding top rails **15** and **14** by means of links **52** and **53**, and pins **54** and **55**, and pins **56** and **57**, respectively.

It is to be noted that when the play pen is operatively extended, opened, or unfolded the links **52** and **53**, and the associated levers **44** and **45**, respectively, are not in alignment. During the extending or unfolding operation the links **52** and **53**, and the associated levers **44** and **45**, respectively, pass through and beyond an axially aligned relation and take a final fully operative extended position wherein such links and their associated levers are non-aligned, such as indicated by the angle at **58**. Such "over-the-centerline" arrangement causes the top rails **14** and **15** to be locked in extended position so as to resist a "collapsible" force applied to the top rails, such as indicated at **59**, as might be generated by a child hanging on the rail at **59**.

Nevertheless, the play pen is easily collapsed and folded when one pulls upwardly on the hinged floor or on strap handle **61** riveted to the floor sections by means of rivets such as indicated at **62**, see FIG. 3.

In the alternative, should one position himself at the side of the play pen and grasp the adjacent feet **18** thereof, and lift upwardly to tilt the play pen, the play pen can be easily collapsed and folded by pulling said feet toward each other.

The play pen framework above described is enclosed with a flexible netting such as denoted at **63**. This netting is shown only fragmentarily in FIG. 2 for clarity of illustration. The netting extends around the play pen inside the legs thereof, and is suspended at its upper end from the top rails **14** and **15** by means of a hem **64** or sleeve sewed to the netting, the top rails being received in said hems or sleeves. The sleeve may be cut away adjacent the U-plates **22** and **23**, and at the link pivots such as indicated at **55**, to permit free movement and ready folding of the adjacent members. The lower end of the netting is hookedly engaged to the hooks, such as indicated at **65**, which are secured to the underside of the floor by means of rivets such as indicated at **66**.

Rings such as indicated at **67** are pivotally mounted in clip bearings **68** which are in turn secured to the underside of the floor by means of rivets **69**. Said rings are provided to secure the tie-cords, of the netting, thereto.

Operation.—Assuming that the play pen is folded as indicated in FIG. 1, an operator merely grasps the top rails **14** and **15** at the corner portions thereof, as at **71** and **72**, respectively, and pulls outwardly and upwardly thereon until the top rails are substantially horizontally disposed and locked by the lever systems and the play pen fully unfolded, as indicated in FIG. 2. During the unfolding operation, the leg-forming frames **10** and **11** are actuated pivotally outwardly, through means of the lever system connected therewith, to a fully unfolded position. Furthermore, during such unfolding operation, the relatively shorter central leg-forming frame **12** moves downwardly in sleeve **39** and finally bears on the ground or floor that supports the leg-forming frames **10** and **11** when the unfolding operation is complete; and sleeve **39** also moves independently upwardly on frame **12** to an "unfolded" position somewhat higher than it assumed when the play pen was in a folded state. In addition, during such unfolding operation, the two sections of the floor **33** and **34** unfold and spread outwardly until they lie in substantially the same horizontal plane and are supported on cross member **29** when the play pen

is fully unfolded. The pivotally secured floor functions to act as a tie-rod limiting the spread of the leg-forming frames **10** and **11**. In the absence of such tie-rod construction, the central leg-forming frame prevents a collapse of the play pen.

To fold the play pen one merely grasps the strap handle **61** and pulls upwardly thereon until the hinged floor sections are substantially vertically disposed and the play pen folded as shown in FIG. 1. In the folding operation, the leg-forming frames **10** and **11** are drawn and folded substantially together. Also during the folding operation, the relatively shorter central leg-forming frame **12** is raised and disposed upwardly, off the ground support; and the sleeve **39** also moves independently downwardly on frame **12** to a "folded" position. As the leg-forming frames **10** and **11** are drawn together, the levers **44** and **45**, pivotally connected to such frames, are actuated scissorwise to a folded position adjacent each other. During such scissorwise action of the levers **44** and **45**, the end portions thereof draw the respective links **52** and **53** from the extended "over-the-centerline" position, back through an axially aligned relation, and thence finally to the folded position shown in FIG. 1. The links **52** and **53** in turn, responsive to the closing action of the levers **44** and **45**, actuate and draw the top rails **15** and **14**, respectively, downwardly and inwardly to a folded position.

In the alternative, the play pen can be folded, as hereinbefore disclosed, by lifting one side of the play pen to a tilted position, and grasping the adjacent feet **18** with both hands, respectively, and pulling and forcing the leg-forming frames **10** and **11** toward each other, thereby generating a motion that is communicated to the top rails **14** and **15** through the connecting lever system **16**, resulting in the top rails being folded downwardly and inwardly.

FIG. 6 shows a modification wherein a vertical slot **73** is provided in central fixed leg-forming frame **74** to provide guideway means for pin **75** slidably received therein. Said pin is fixed on lever **76**; and lever **77** is pivotally mounted on said pin **75**. The pin functions as a crosshead in said slot, much as sleeve **39** is slidably guided on fixed leg **42**.

Some characteristic features of this invention are the provision of a play pen extensible and retractible by only one step or movement of an operator; a play pen having a foldable brace system automatically lockable against the curious and prying fingers of children; a play pen having a foldable brace system that supports the foldable top rails thereof, which top rails cannot be collapsed by a force applied to said top rails, including a force as might be generated by a child hanging from said top rails; a play pen that is not accidentally foldable and likely to injure fingers caught between the foldable parts thereof; and a foldable pen that is safely positively lockable in extended position, yet easily retractible to a folded position.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood, that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

What is claimed and desired to be protected by Letters Patent of the United States is:

1. A foldable play pen, comprising: a pair of spaced connecter plates; a pair of U-shaped top rails normally disposed unfolded in a horizontal plane and disposed adjacent opposite ends of said connecter plates, the ends of one of said rails confronting the ends of the other and pivotally connected to said connecter plates to form a foldable rectangular framework in which each rail is foldable downwardly to a mutual substantially parallel arrangement; a pair of foldable U-shaped leg-forming frames pivotally connected at their upper ends to said connecter plates interconnecting said plates, for supporting said framework, said leg frames being movable from a normally equally extended unfolded position to a folded sub-

stantially vertical and parallel arrangement; a vertical U-shaped leg-forming frame fixed at its upper ends to said connecter plates interconnecting them and disposed between said foldable leg forming frames, said vertical leg-forming frame extending to the planar ground support of said foldable leg-forming frames when said foldable leg-forming frames are normally unfolded, and said vertical leg forming frame being retractible from its ground engageable position when the foldable leg-forming frames are folded, each of said leg-forming frames having upstanding leg members and a cross member adjacent the lower ends thereof; a floor comprising a pair of equal length floor panels hingedly connected at their adjacent ends, and said floor being pivotally supported at its remote ends on the cross members of the normally unfolded foldable leg-forming frames, respectively, said hinge axis and pivotal axes being mutually parallel, whereby to fold said floor panels upwardly when the foldable leg-forming frames are moved toward one another, and whereby said floor is supported on the cross member of said vertical leg-forming frame when the foldable leg-forming frames are normally unfolded; and means for cross-bracing said top rails and said leg-forming frames, comprising a sleeve slidably engaged on each of the leg members of the vertical leg-forming frames, a pair of levers pivotally connected at their lower ends to each of said sleeves, respectively, and each lever of said pair being also pivotally connected intermediate its ends to an adjacent leg member of a foldable leg-forming frame, respectively, and links pivotally interconnecting the free ends of said levers and the corresponding adjacent top rails, respectively, said links being non-aligned with their associated levers in an over-the-center relation whereby to lock the top rails in their normally unfolded position, and whereby said cross-bracing means is adapted to permit the foldable leg-forming frames and top rails to fold adjacent the vertical leg-forming frame into a substantially parallel arrangement.

2. A foldable play pen, comprising: a pair of spaced connecter plates; a pair of U-shaped top rails having their ends pivotally connected to opposite ends of said connecter plates interconnecting said plates, and disposed normally unfolded in a horizontal plane, each top rail being foldable downwardly to a mutual substantially parallel arrangement; a pair of foldable U-shaped leg-forming frames having their upper ends pivotally connected to said connecter plates and interconnecting said plates for supporting said top rails, said leg frames being movable from a normally equally extended unfolded position to a folded substantially parallel arrangement, each of said leg-forming frames having upstanding leg members and a cross member adjacent the lower ends thereof; means for cross-bracing the leg-members and the top rails on at least one side of the play pen comprising a pair of levers pivotally connected at their lower ends and each lever being also pivotally connected intermediate its ends to an adjacent leg member, respectively; links pivotally interconnecting the free upper ends of said levers and the corresponding adjacent top rails, respectively, said links being substantially aligned with their associated levers to maintain said top rails in their normally unfolded position, and whereby said cross-bracing means is adapted to permit the foldable leg-forming frames and top rails to fold adjacently downwardly; and a floor comprising a pair of centrally hinged panels pivotally supported at their remote ends on the corresponding cross members of the leg-forming frames, respectively, said hinge axis and pivotal axes being mutually parallel, whereby to fold said floor upwardly when a lifting force is applied to said floor and said leg-forming frames and associated top rails are consequently folded downwardly.

3. The play pen set forth in claim 2 wherein said links are substantially aligned with their associated levers in an over-the-center relation to maintain said associated top rails in an unfolded position.

4. A foldable play pen, comprising: a pair of spaced connecter plates; a pair of U-shaped top rails having their ends pivotally connected to opposite ends of said connecter plates interconnecting said plates, and disposed normally unfolded in a horizontal plane, each top rail being foldable downwardly to a mutual substantially parallel arrangement; a pair of foldable U-shaped leg-forming frames having their upper ends pivotally connected to said connecter plates interconnecting said plates, for supporting said top rails, said leg frames being movable from a normally equally extended unfolded position to a folded substantially parallel arrangement, each of said leg-forming frames having upstanding leg members and a cross member adjacent the lower ends thereof; a lever pivotally connected to each of said leg-forming frames intermediate its ends; guide means depending from at least one of said connecter plates and connected to the lower end of each of said levers to guide the same during pivotal movement of said leg-forming frames in folding and unfolding; and a link pivotally interconnecting the upper end of each lever and the corresponding associated top rail, said link being substantially aligned with said lever to maintain said associated top rail in its normally unfolded position, and whereby said cross-bracing means is adapted to permit said adjacent leg member and associated top rail to fold adjacent said guide means into a substantially parallel arrangement.

5. The play pen set forth in claim 4 wherein said guide means is fixed to said connecter plate.

6. The play pen set forth in claim 4 wherein each said link is substantially aligned with the corresponding lever in an over-the-center relation to maintain said associated top rail in unfolded position.

7. The play pen set forth in claim 4 and a floor comprising floor panels hinged together along a parting line extending substantially centrally thereof and pivotally mounted on corresponding cross members of said leg-forming frames at the remote ends of said floor, said hinge and pivot axes being mutually parallel, whereby to fold said floor panels upwardly when a lifting force is applied centrally of said floor and said leg-forming frames are consequently moved toward one another.

8. The play pen set forth in claim 7 wherein the guide means extend downwardly from each of said connecter plates and has a cross member extending beneath and supporting said floor substantially at the said hinged parting line thereof.

9. In a foldable play pen having a foldable upper frame means comprising a pair of foldable portions normally disposed unfolded in a horizontal position, and a pair of foldable leg-forming frames each having a pair of leg members connected by a cross member adjacent their lower ends, said leg frames being pivotally connected at their upper ends to the sides of said upper frame means, interconnecting said sides, to support said upper frame means for folding, said leg frames being movable from a normally unfolded position to a folded position, the improvement comprising means for cross-bracing said foldable upper frame means and said leg frames including a pair of levers pivotally connected at their lower ends and each of said levers being also pivotally connected intermediate its ends to an adjacent leg member, respectively, at one side of said upper frame means, links pivotally interconnecting the free ends of said levers and the adjacent foldable portions, respectively, of said upper frame means, said links being substantially aligned with their associated levers in an over-the-center relation, whereby to lock the foldable portions of said upper frame means in a normally unfolded position.

10. In a folding play pen, the combination comprising an encircling upper frame composed of two generally U-shaped members disposed normally in a common horizontal plane and pivotally linked together substantially at a central fold line for the pen to provide for relative downward folding of said members, a pair of substantially U-shaped leg members having their upper free ends pivotally interconnected with said upper frame adjacent said

fold line for folding therewith and normally extending downwardly therefrom in a diverging angular relation from said fold line to support said upper frame on a floor, foldable brace means between said leg members and the corresponding members of said upper frame, and means pivotally interconnecting said brace means in substantially the vertical plane of said fold line to secure said brace means against folding when said upper frame members and said leg-forming members are in extended position.

11. The play pen of claim 10 in which spaced connecter plates pivotally interconnect with the corresponding free ends of said upper frame members and said leg-forming members.

12. The play pen of claim 11 in which guide means carried by said connecter plates and carrying said pivotal interconnecting means control the folding of said brace means during folding of said upper frame members and said leg-forming members.

13. The play pen of claim 12 in which said guide means comprises a centrally depending member rigidly secured to each connecter plate, said pivotal interconnecting means for said brace means pivotally interconnect said depending member and said brace means, and means are associated with said pivotal interconnecting means providing a vertical lost motion between said fixed depending member and said brace means.

14. The play pen of claim 13 in which said pivotal interconnecting means comprises a pivot pin joining said brace means and means to provide relative sliding movement between said pin and said depending guide member.

15. The play pen of claim 10 and a floor comprising two panel sections hinged together along a parting line generally in the vertical plane of said fold line to fold upwardly as the pen is folded, and a pivotal support for each floor panel section on the corresponding leg members whereby folding of said leg members inwardly toward each other effects a corresponding similar folding of said floor panel sections together and a downward and inward folding of said upper frame members, and said floor panel sections constituting a tie rod holding said leg members against spreading beyond the unfolded position thereof.

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