Jan. 21, 1958 J. P. DAHL 2,820,256

COLLAPSIBLE ENCLOSURE

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Fig. 1.

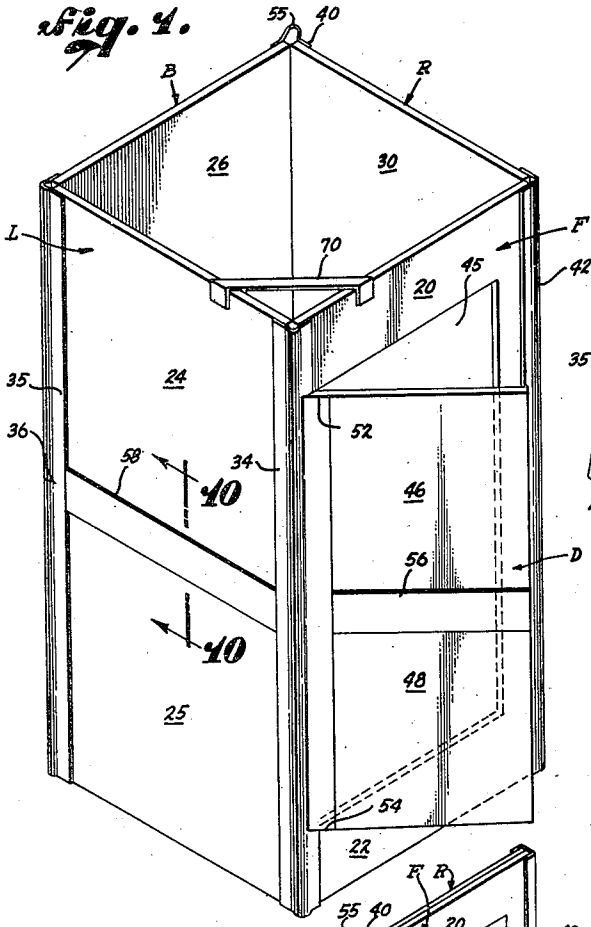


Fig. 3.

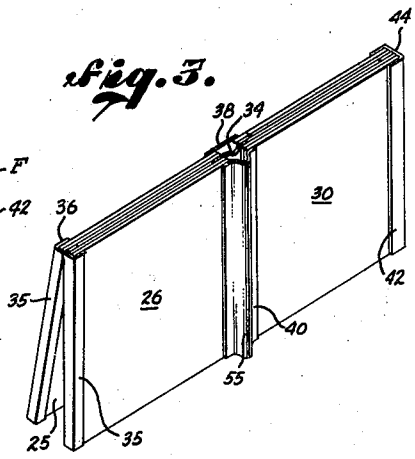


Fig. 2.

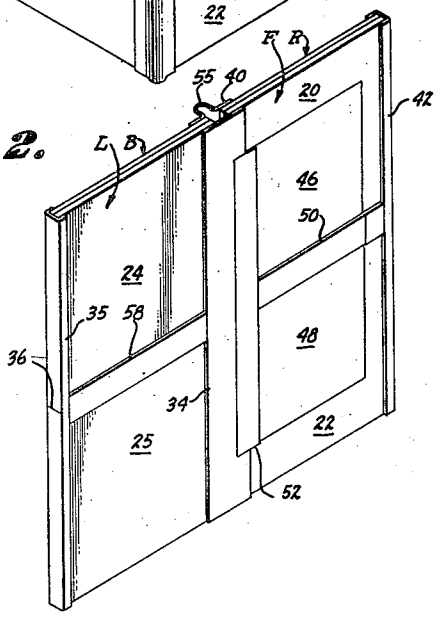
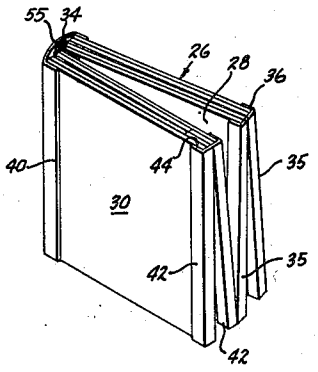


Fig. 4.



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COLLAPSIBLE ENCLOSURE

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fig. 5.

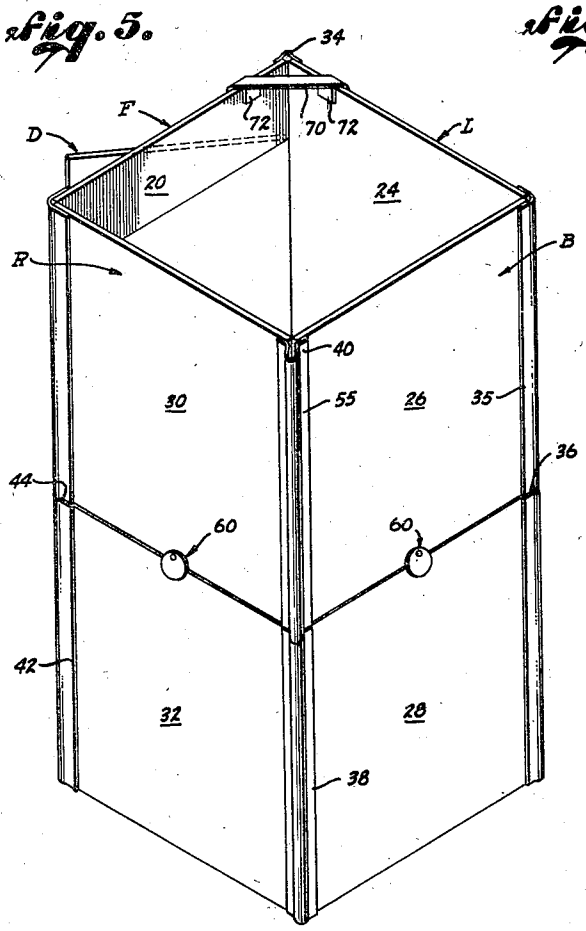
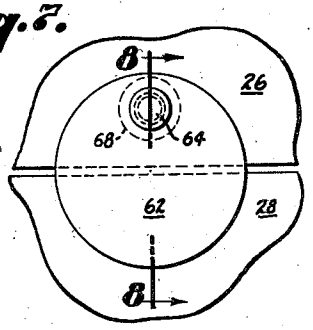


fig. 7.



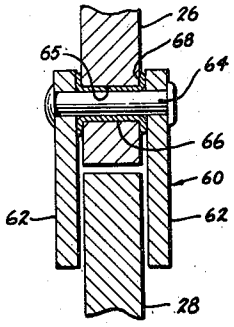
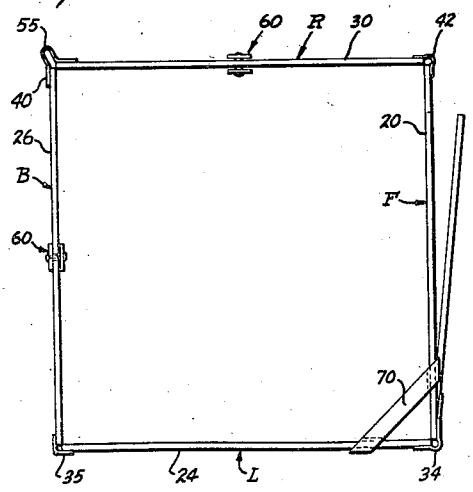


fig. 8.

fig. 6.



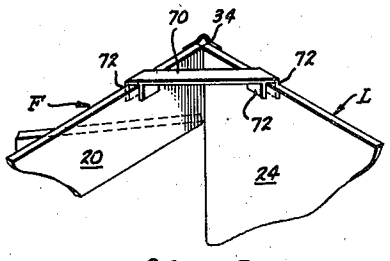


fig. 9.

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Fig. 12.

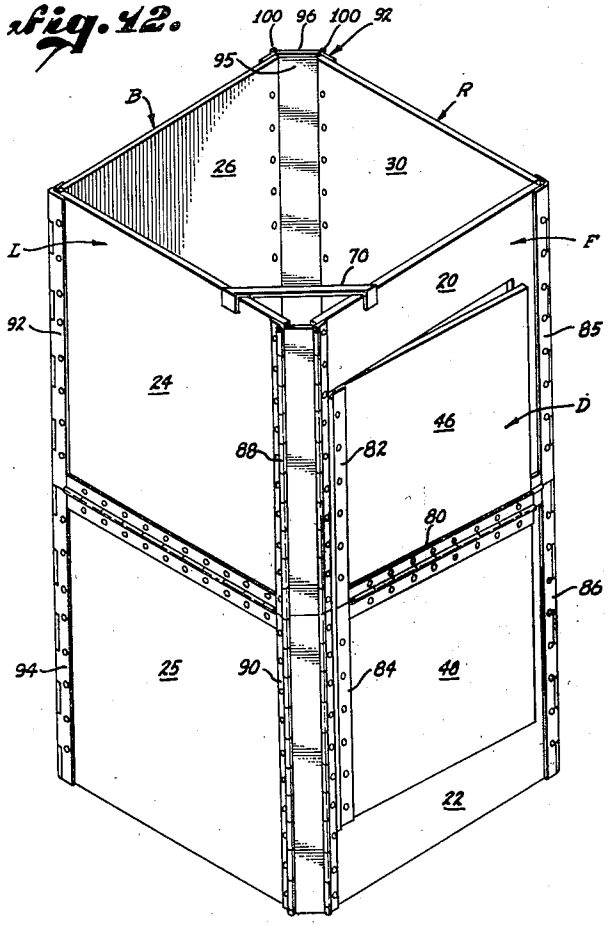


Fig. 10.

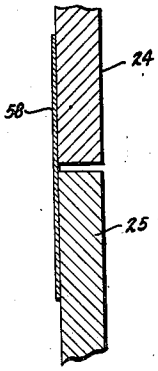


Fig. 13.

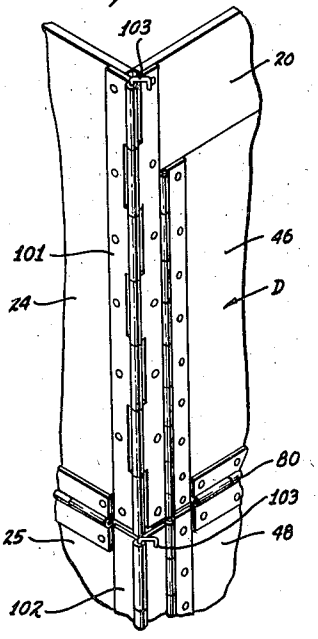
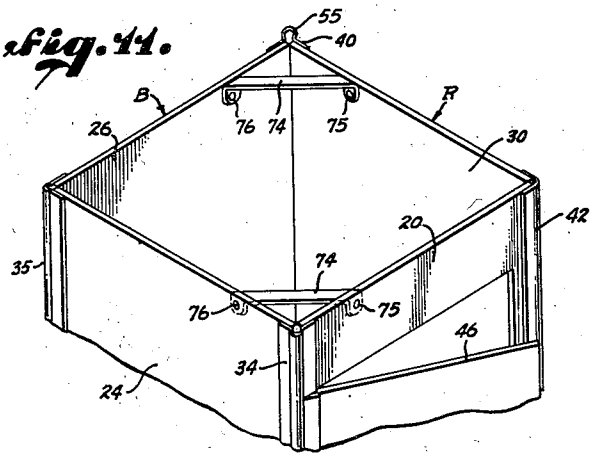


Fig. 11.



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United States Patent Office 2,820,256 Patented Jan. 21, 1958

2,820,256

COLLAPSIBLE ENCLOSURE

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Application February 4, 1955, Serial No. 486,048

2 Claims. (Cl. 20—2)

This invention relates to a portable enclosure of a dimension to serve, for example, as a temporary privy, on a construction job or at a camping spot, or to serve as a portable dressing room for bathers.

The general problem to which the invention is directed is to provide a light-weight enclosure of this type of simple, rugged construction that may be readily erected and also may be readily collapsed into compact portable form for transportation from one site to another. The invention meets this problem by providing a structure having four side walls, each of which comprises two wall sections lying on opposite sides of a dividing line that extends transversely around the erected enclosure. The structure is foldable along the vertical lines of juncture of the four side walls and is also foldable along the transverse dividing line, thereby to collapse into a single stack of the eight wall sections. Such a stack is light enough and of small enough dimension to be carried by a passenger automobile and, therefore, may serve for family use as well as for industrial use.

In the preferred practice of the invention the enclosure has a doorway on one of its four sides and a permanently hinged door for the doorway. This door is made in two sections lying on opposite sides of the transverse dividing line to permit the desired collapse of the structure into the eight-layer stack.

It is highly desirable to have all eight of the wall sections interconnected to provide insurance against any section becoming separated and misplaced or lost. Such interconnection is also desirable to maintain the desired relationships among the various sections to prevent confusion that may be caused by one section being inadvertently moved out of its normal place in the eight-section assembly.

The preferred practice of the invention is characterized by the fact that all of the eight sections are permanently connected together in such manner as to permit the sections either to be stacked for transportation or to be unfolded for erection of the enclosure.

The various features and advantages of the invention will be apparent from the following detailed description considered with the accompanying drawings.

In the drawings, which are to be regarded as merely illustrative:

Figure 1 is a perspective front view of the erected enclosure;

Figure 2 is a perspective view of the enclosure in flat state after the first folding step;

Figure 3 is a perspective view of the structure after the second folding step;

Figure 4 is a perspective view of the structure after the third or last folding step;

Figure 5 is a perspective view from the rear of the erected enclosure;

Figure 6 is a plan view of the erected enclosure;

Figure 7 is an enlarged detail showing a latch means for releasably interconnecting the two wall sections of the structure;

Figure 8 is a section taken as indicated by the line 8—8 of Figure 7;

Figure 9 is an enlarged portion of Figure 5 showing the construction of a rigid brace means that may be used to increase the rigidity of the erected structure;

Figure 10 is an enlarged fragmentary section taken as indicated by the line 10—10 of Figure 1;

Figure 11 is a fragmentary perspective view showing how flexible straps may be used instead of rigid brace means to increase the rigidity of the erected structure;

Figure 12 is a perspective view similar to Figure 1 showing a second embodiment of the invention; and

Figure 13 is a fragmentary perspective view of another embodiment of the invention.

The first embodiment of the invention shown in Figures 1 to 10 comprises an upright box-like enclosure made of suitable material such as water proofed fibre-board or like panels, the enclosure being open at the top and bottom. The enclosure has four side walls, each of which comprises two wall sections lying on opposite sides of a dividing line that extends horizontally around the erected structure. Thus the front wall F comprises an upper wall section **20** and a lower wall section **22**; the left side wall L comprises an upper wall section **24** and a lower wall section **25**; the back wall B comprises an upper wall section **26** and a lower wall section **28**; and the right side wall R comprises an upper wall section **30** and a lower wall section **32**.

It is contemplated that the four side walls of the enclosure will be hingedly interconnected for folding movement relative to each other and any suitable hinge arrangement may be used for this purpose that will not interfere with the folding of the pairs of wall sections along the horizontal dividing line. In this first embodiment of the invention a hinge arrangement is employed that comprises strips of flexible sheet material such as heavy fabric. In the construction shown, the front wall F is connected with the left wall L by a flexible hinge strip **34**; the left wall L is connected with the back wall B by a flexible hinge strip **35** which is partially severed by a transverse slit **36**; the back wall B is connected to the right side wall R by two hinge strips, namely, a lower hinge strip **38** that interconnects the two wall sections **28** and **32** and separate upper hinge strip **40** that interconnects the two wall sections **26** and **30**; and the right side wall R is connected to the front wall F by a hinge strip **42** which is partially severed by a slit **44** (Figures 3 and 4) which serves the same purpose as the previously mentioned slit **36**.

In the construction shown in the drawings, the two wall sections **20** and **22** of the front wall F are cut away to form a doorway opening **45**, as best shown in Figure 1, and a suitable door D is hingedly mounted on the structure to close this doorway. The door D is made in two sections **46** and **48** which are foldable relative to each other along the transverse dividing line. The door sections **46** and **48** may be considered as parts of the corresponding wall sections **20** and **22**. While the door D may be hingedly mounted in any suitable manner, in this instance the previously mentioned hinge strip **34** is of sufficient width to serve this additional purpose, the hinge strip having slits **52** and **54** at the upper and lower edges, respectively, of the door as indicated in Figure 1.

All of the above mentioned hinge strips, except hinge strips **34** and **40**, may be of the simple construction shown to serve as what may be termed single hinges. The hinge strip **40**, however, serves as what may be aptly termed a double hinge since the strip is relatively wide to provide a web **55** of substantial width between the

two corresponding wall sections **26** and **30**. In the final folded state of the enclosure forming a stack of eight of the wall sections, the two wall sections **26** and **30** are the outermost sections at opposite ends of the stack, as indicated in Figure 4, and the web **55** is of sufficient width to extend across the edges of the remaining six wall sections that are sandwiched between the two wall sections **26** and **30**.

The hinge strip **34** is also formed with an enlarged web to permit folding of the sections from the partially collapsed position of Figure 3 to the completely folded position of Figure 4. The web of the hinge strip **34** is not as large as the web **55** for the hinge strip **34** extends across but four of the wall sections, as clearly shown in Figure 4, when the enclosure is in its collapsed or folded position.

The two wall sections of each of the four side walls of the structure are foldable relative to each other along the transverse dividing line, as heretofore stated, and for this purpose may be interconnected by hinge means of either single or double type or may be free of any direct interconnections whatsoever. Preferably the two wall sections of at least one of the four walls are hingedly interconnected since at least one such interconnection across the transverse dividing line is necessary for all of the wall sections to be connected with each other directly and indirectly. As heretofore stated, interconnecting the series of wall sections makes a unitary structure that keeps any one wall section from being inadvertently separated and misplaced, and such interconnection also provides desirable guidance for the correct positioning of the wall sections relative to each other in the procedure of erecting the enclosure.

In the present preferred practice of the invention the two wall sections **20** and **22** of the front wall F are interconnected by the previously mentioned hinge strips **34** and **42** as well as by a horizontal or transverse hinge strip **56** that directly interconnects the two door sections **46** and **48**. In like manner the two wall sections **24** and **25** of the left side wall L are interconnected not only by the previously mentioned hinge strips **34** and **35**, but also by a transverse flexible hinge strip **58**.

The two sections of each of the remaining pairs of wall sections need not be interconnected directly by any hinge means whatsoever. Thus the wall sections **30** and **32** of the right side wall R are not directly interconnected by hinge means and the two wall sections **26** and **28** of the back wall B are not directly interconnected by any hinge means.

In these instances in which the two wall sections of a wall of the enclosure are not directly hinged together, it is desirable to provide suitable latch means for releasably interconnecting the wall sections in such manner as to maintain them in co-planar alignment. Thus, as shown in Figure 5, a suitable latch means **60** releasably connects the wall section **30** with the wall section **32** and a second similar latch means **60** releasably connects the wall section **26** with the wall section **28**.

As best shown in Figures 7 and 8, each latch means **60** may comprise a pair of latch arms **62** fixedly mounted on the opposite ends of a pin **64** that is journalled in the upper of the two wall sections. The upper wall section has a bore **65** therethrough in which is mounted a suitable sleeve **66** to journal the pin **64**, the sleeve being formed with suitable end flanges **68**. In this instance the two latch arms **62** are in the form of suitable discs, the pin **64** being fixedly attached to the two discs eccentrically thereof to cause the two discs to gravitate to their effective latching positions shown in Figures 5, 7 and 8.

If desired, the rigidity of the erected enclosure may be increased by the addition of suitable brace means. For example, as best shown in Figures 5 and 9, a single rigid diagonal brace member **70** may be provided for releasable engagement with the upper edges of two of the side walls, the brace member being shown in engagement with the front wall F and the left side wall L. The diagonal brace member is a metal bar formed with a pair of diagonal tongues **72** at each end, as shown.

The manner in which the described structure serves its purpose may be readily understood from the foregoing description. In the erected state of the enclosure shown in Figures 1 and 5, the two latch means **60** interconnect the two sections of the right wall R and also of back wall B, and the diagonal brace member **70** interconnects the front wall F and the left side wall L.

The first step in folding the erected structure for transportation from one site to another is to remove the diagonal brace member **70** and to fold the left wall L against the back wall B and the front wall F against the right side wall R thereby collapsing the closure to the flat state shown in Figure 2. This flat state may be described as comprising two interconnected stacks of two each of the four side walls of the enclosure.

The next step is to fold the arrangement shown in Figure 2 downward back on itself to form the arrangement shown in Figure 3 which comprises two interconnected stacks of four each of the eight wall sections of the enclosure. The final step is to fold the arrangement shown in Figure 3 on itself with the hinge strip **40** outermost, thereby forming a stack of eight of the wall sections. The two wall sections **26** and **30** are at opposite ends of the stack and these two sections are interconnected by the web **55** of the double hinge strip **40**. It is apparent that in this final folded state of the structure the double hinge strip **40** unifies the stack since it cooperates with the wall sections **26** and **30** to enclose the remaining six wall sections. It is to be noted that all of the wall sections of the eight-section stack are interconnected directly and indirectly in a manner that tends to keep each of the wall sections in place in the stack.

To erect the enclosure from the eight-section stack shown in Figure 4, the stack is first unfolded to the state shown in Figure 3 and again is unfolded to the state shown in Figure 2. The structure shown in Figure 2 is then opened up to the state shown in Figure 1. The two latches **60** are then manipulated into their respective latching positions and the diagonal brace member **70** is placed in its effective position.

If desired, flexible brace means may be employed instead of the rigid diagonal brace member **70** to prevent inadvertent collapsing or folding of the wall. For example, as shown in Figure 11, a pair of flexible straps **74** may be used for this purpose, each strap being made of leather, woven webbing or the like. The two straps **74** are positioned diagonally as shown with the one end of each strap connected to the outer surface of the wall sections **20** and **30**, respectively by suitable rivets **75** and removably fixed to the inner surfaces of wall sections **24** and **26** by separable fasteners **76**.

Figure 12 shows how piano type metal hinges may be substituted for hinges of flexible sheet material for interconnecting the various members of the enclosure. In the construction shown the two door sections **46** and **48** are interconnected by a hinge **80**, the door being hingedly mounted by an upper hinge **82** connecting the door section **46** with the wall section **20** and a lower hinge **84** connecting the door section **48** with the lower wall section **22**. The front wall F is connected to the right wall R by an upper hinge **85** that interconnects wall sections **20** and **30** and by a lower hinge **86** that interconnects wall sections **22** and **32**. In like manner the front wall F is connected to the left side wall L by an upper hinge **88** interconnecting wall sections **20** and **24** and a lower hinge **90** interconnecting wall sections **22** and **25**. The left side wall L is connected to the back wall B by an upper hinge **92** interconnecting wall sections **24** and **26** and a lower hinge **94** interconnecting wall sections **25** and **28**. The right side wall R is connected to the back wall B by a similar lower

hinge (not shown) interconnecting wall sections **28** and **32** and by an upper hinge **95** interconnecting wall sections **26** and **30**.

The upper hinge **95** is a double hinge corresponding in function to the previously described double hinge **40**. Thus the upper hinge **95** has a central web **96** with two hinge pins or pintles **100** at the opposite longitudinal edges thereof. The web **96** is of a width sufficient to permit the hinge **95** to replace the complete stack of wall sections in the final folded position of the enclosure.

Hinges **88** and **90**, as in the earlier described embodiment of the invention, must be, in effect, double hinges to permit folding of the enclosure. These hinges are therefore like hinge strip **34** and are of a size sufficient to embrace the thickness of four wall sections when the enclosure is completely collapsed or folded.

It is apparent that the embodiment of the invention shown in Figure 12 may be erected from folded state in the manner heretofore described and, for transportation from one site to another, may be collapsed and folded into an eight-section stack. As heretofore described the two wall sections **26** and **30** will be at opposite ends of the stack with the hinge web **96** extending across the edges of the intervening six wall sections.

If desired, the enclosure may be formed with single hinge elements substituted for the hinges **88** and **90**. Hinges **101** and **102** replace hinges **88** and **90** of the form of the invention shown in Figure 13 of the drawing. Hinges **101** and **102** are single hinges and the hinge pin **103** of each is removable to permit separation of the wall sections joined by the hinges. For this purpose, each hinge pin at the one end thereof is reversely bent back on itself to form an actuator **103** to be grasped by the fingers of the user in the operation of removing the pins from the hinges.

The removal of the hinge pins will separate the wall sections joined by the hinges **101** and **102**, but this does not complicate the final folding operation as these pins can be removed just prior to the final folding step. The enclosure in the completely folded position is held in this position in exactly the same way as are the earlier described embodiments of the invention.

Although in all embodiments of the invention herein shown and described, the enclosure has been shown as comprising four upright wall elements but it should be understood an efficient closure can be had where three or more than four side walls are used. The invention is therefore not to be limited solely to an enclosure having four upright side walls.

Although the now preferred embodiments of the present invention have been shown and described herein, it is to be understood that the invention is not to be limited thereto, for it is susceptible to changes in form and detail within the scope of the appended claims.

I claim:

1. A collapsible enclosure of the type described having four upright side walls, each comprising a pair of wall sections on opposite sides of a central dividing line extending transversely around the enclosure, said four side walls being foldable relative to each other along their vertical edges and said wall sections being foldable along said transverse dividing line to form a compact stack of eight wall sections, two adjacent sections of two adjacent side walls respectively being at opposite sides of the stack and being interconnected by a double hinge of a width to extend across the thickness of the six intermediate wall sections of the stack, the two wall sections of the pair of wall sections of each of said two adjacent side walls being detached from each other, the remaining wall sections of each of the other two side walls of the enclosure being interconnected by transverse hinge means, said other two side walls being hingedly interconnected by vertical hinge means.

2. A collapsible enclosure of the type described having four upright side walls, each comprising a pair of wall sections on opposite sides of a central dividing line extending transversely around the enclosure, said four side walls being foldable relative to each other along their vertical edges and said wall sections being foldable along said transverse dividing line to form a compact stack of eight wall sections, two adjacent sections of two adjacent side walls respectively being at opposite sides of the stack and being interconnected by a double hinge of a width to extend across the thickness of the six intermediate wall sections of the stack, the two wall sections of the pair of wall sections of each of said two adjacent side walls being detached from each other to enable the enclosure to be folded along said central dividing line; and first and second releasable means for interconnecting the pair of wall sections of each of said adjacent side walls when the enclosure is erected.

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