June 28, 1966 M. CALTHORPE 3,257,760

EXPANSIBLE ROOM STRUCTURES

Filed May 3, 1963 4 Sheets-Sheet 1

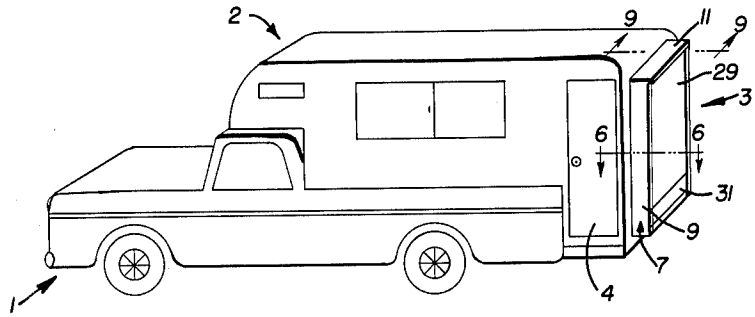


Fig. 1

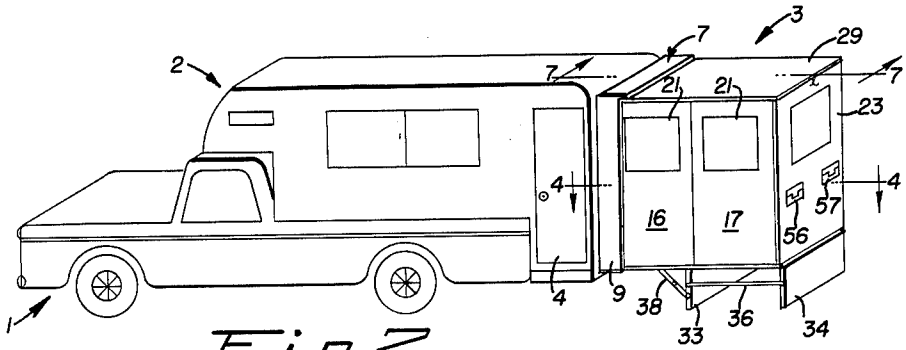


Fig. 2

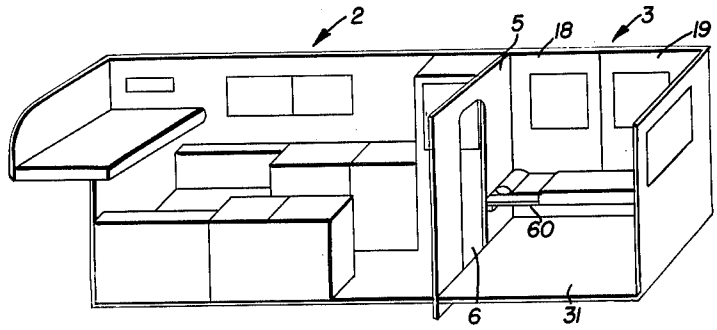


Fig. 3

INVENTOR.
MAURICE CALTHORPE

BY

Leon F. Herbert

ATTORNEY

June 28, 1966 M. CALTHORPE 3,257,760

EXPANSIBLE ROOM STRUCTURES

Filed May 2, 1963 4 Sheets-Sheet 2

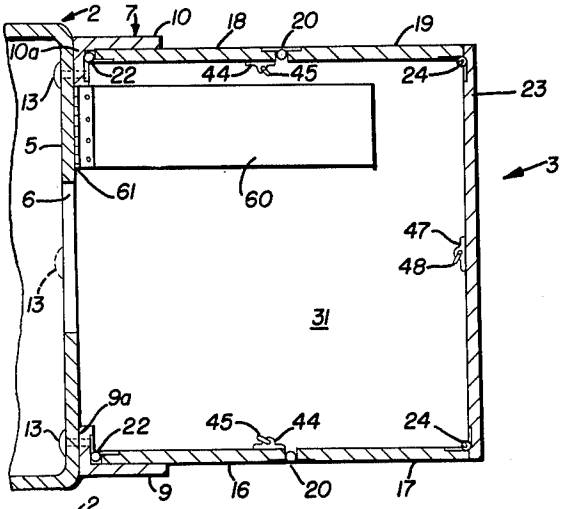


Fig. 4

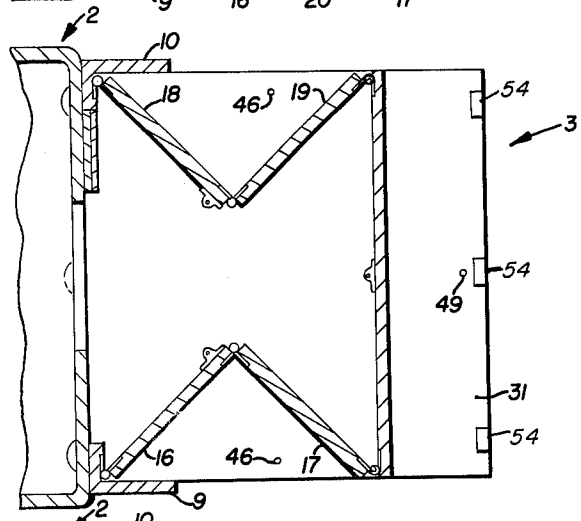


Fig. 5

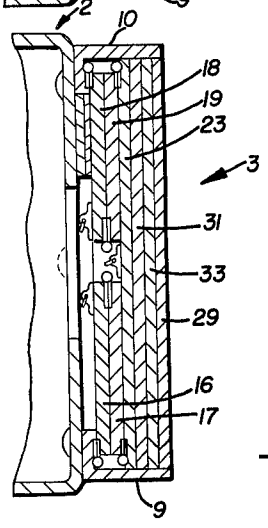


Fig. 6

INVENTOR.
MAURICE CALTHORPE

BY

Leon F. Herbert
ATTORNEY

June 28, 1966 M. CALTHORPE 3,257,760

EXPANSIBLE ROOM STRUCTURES

Filed May 2, 1963 4 Sheets-Sheet 3

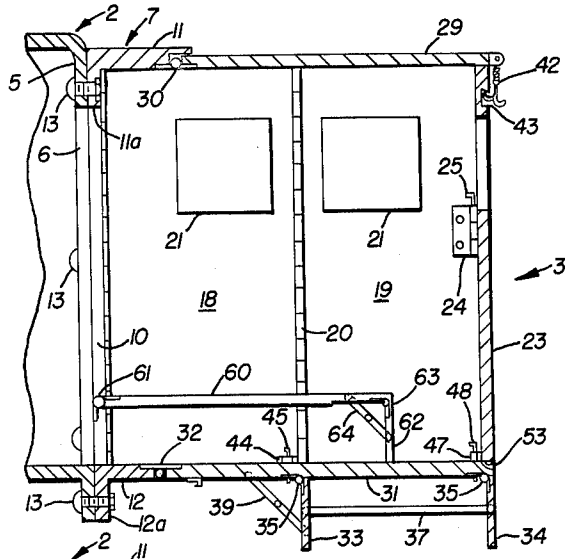


Fig. 7

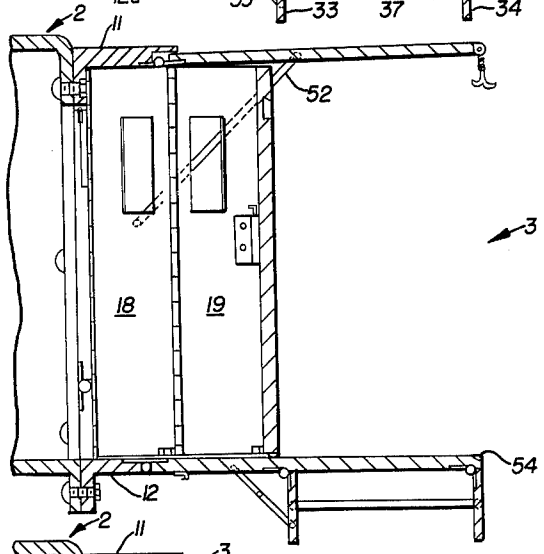


Fig. 8

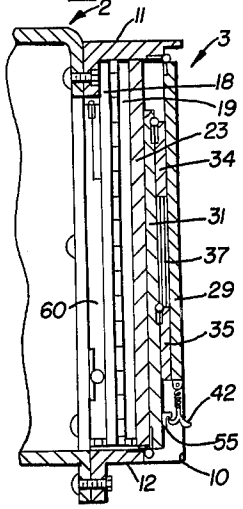


Fig. 9

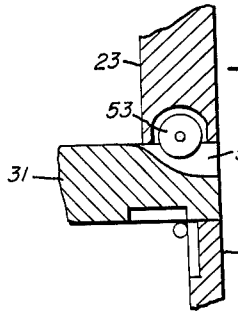


Fig. 13

INVENTOR.
MAURICE CALTHORPE

BY

Leon F. Herbert

ATTORNEY

June 28, 1966 M. CALTHORPE 3,257,760

EXPANSIBLE ROOM STRUCTURES

Filed May 2, 1963 4 Sheets-Sheet 4

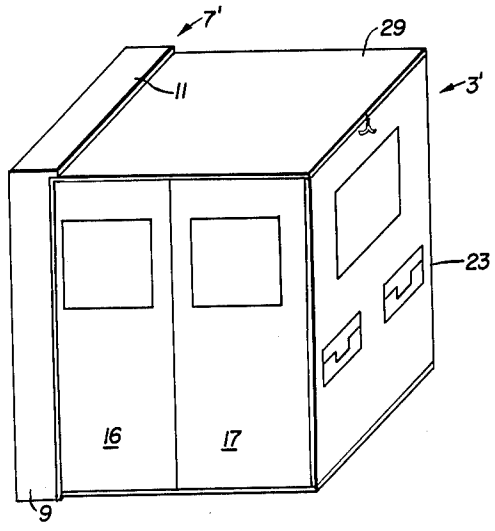


Fig. 10

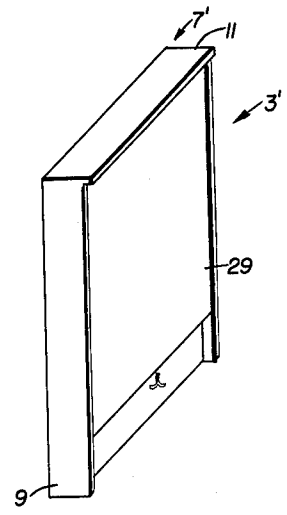


Fig. 11

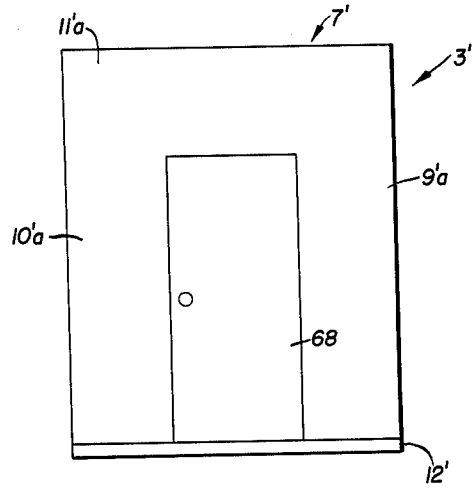


Fig. 12

INVENTOR.
MAURICE CALTHORPE

BY

Leon F. Herbert

ATTORNEY

United States Patent Office 3,257,760 Patented June 28, 1966

3,257,760

EXPANSIBLE ROOM STRUCTURES

Maurice Calthorpe, 14848 Manuella Ave., Los Altos Hills, Calif.

Filed May 2, 1963, Ser. No. 277,602
4 Claims. (Cl. 52—68)

This invention relates to expansible room structures, and more particularly to expansible room structures associated with mobile housing units such as pick-up campers, travel trailers, mobile homes and the like.

Mobile housing units have become widely accepted and are now in use for a variety of purposes. However, it has been realized that mobile housing units would enjoy even greater popularity if they could be adjusted to provide extra housing space when needed and then collapsed to reduce the overall size during travel or storage.

A variety of proposals have been made in the past for designing mobile housing units having the feature of adjustability. It is an object of this invention to provide a greatly improved expansible room structure.

More specifically an object of this invention is to provide a pick-up camper or the like having an expansible room structure wherein the expansible room structure is combined with a standard pick-up camper or the like without requiring extensive modification of the standard construction.

A further object of the invention is to provide an expansible room structure which is simple and inexpensive to manufacture.

Another object of the invention is to provide an expansible room structure which is so simple to adjust that it can be easily expanded and collapsed by one person.

An additional object of the invention is to provide an expansible room structure which does not require the prior art use of telescoping beam supports for movable panels.

Another object of the invention is to provide an expansible room structure which in collapsed condition adds only slightly to the dimensions of a conventional pick-up camper or the like and yet does not occupy any of the internal space of the conventional structure.

A further object of the invention is to provide an expansible room structure which can be used with stationary as well as mobile units and can even be used per se to provide a detached room structure in any location for a wide variety of uses such as cabanas, portable camping units, storage rooms and workshops.

Other and further objects and features of advantage will become apparent to those skilled in the art from a reading of the following detailed description which refers to the accompanying drawings, in which:

FIGURE 1 is a perspective outside view of the expansible room structure embodied in a pick-up camper combination and showing the structure in collapsed condition;

FIGURE 2 is a view similar to FIGURE 1 but showing the structure in expanded condition;

FIGURE 3 is a schematic perspective view of the interior of the structure shown in expanded condition;

FIGURE 4 is a cross sectional view on line 4—4 of FIGURE 2;

FIGURE 5 is a view similar to FIGURE 4 but showing the structure partially collapsed;

FIGURE 6 is a cross sectional view on line 6—6 of FIGURE 1, showing the structure fully collapsed;

FIGURE 7 is a cross sectional view on line 7—7 of FIGURE 2;

FIGURE 8 is a view similar to FIGURE 7 but showing the structure partially collapsed;

FIGURE 9 is a cross-sectional view on line 9—9 of FIGURE 1 showing the structure fully collapsed;

FIGURE 10 is a perspective view similar to FIGURE 2 but showing a detached design for the expansible room;

FIGURE 11 is a view similar to FIGURE 10 but showing the detached structure in collapsed condition;

FIGURE 12 is a front view of the detached structure; and

FIGURE 13 is an enlarged fragmentary view of the lower rear portion of FIGURE 7.

Referring in more detail to the drawings, FIGURES 1 and 2 show a pick-up camper comprising a vehicle body 1 having a conventional camper body 2 mounted thereon and embodying an expansible room structure 3. The camper body has the usual side door 4. As shown in FIGURE 3 the camper also has the usual unnumbered appointments and the usual rear wall 5. The only modification normally required in the conventional camper is to add a side door 4 if the camper is provided originally with the usual rear door opening 6, or cut a rear doorway 6 if the camper is originally provided with a side door.

The expansible room 3 has a front wall structure 7 comprising a rectangular frame made of right angle sections. The frame has side portions 9 and 10 (FIGURES 1, 2 and 4–6), and top and bottom portions 11 and 12 (FIGURES 1, 2 and 7–9). The side and top portions have projections 9*a*, 10*a*, and 12*a* thereon which form a front portion. The bottom portion has a downwardly projecting portion 12*a*. The frame is attached to the rear wall 5 of the camper by a plurality of bolts 13 as designated in FIGURES 4 and 7.

The expansible room structure has two side walls each formed in two equal sections 16, 17 and 18, 19. Each pair of sections is joined together by a piano hinge 20, and each of the sections is preferably provided with a window 21. The forward side sections 16 and 18 are attached to the frame side portions 9*a* and 10*a*, respectively, by piano hinges 22. The rearward side sections 17 and 19 are attached to a rear or end wall 23 by hinges 24. Hinges 24 are preferably short hinges having easily removable pins 25 shown partly removed (FIGURE 7), all for reasons to be hereinafter explained. The unit consisting of the side wall sections 16–19 and the rear wall 23 is a very important portion of the structure because it provides the basis for many of the advantages of the overall structure, as will be hereinafter explained in more detail.

The expansible room structure has a top wall or roof 29 attached to the frame top portion 11 by a piano hinge 30. A bottom wall or floor 31 is attached to the frame bottom portion 12 by a piano hinge 32. Support members 33 and 34 are attached to the bottom of floor 31 by piano hinges 35 and are interconnected by tie bars 36 and 37 which are pivotally connected to the support members. The support members are held in extended position by standard collapsible elbow braces 38 and 39, which are pivotally connected to the floor and the forward support members.

In order to hold the roof 29 tightly down against the side and rear walls, the roof has pivotally attached thereto a spring type or other conventional latch 42 which engages a recess 43 in the rear wall, as shown best in FIGURE 7. In order to hold the side and rear walls firmly in place, the side wall sections 16 and 18 are provided with apertured brackets 44, and easily removable pins 45 pass through the brackets and through matching holes 46 in the floor. Similarly, the rear wall 23 is provided with an apertured bracket 47, and a pin 48 which extends through a hole 49 in the floor.

The operation of the described structure will now be explained. Starting with the structure in the expanded

condition of FIGURES 4 and 7, latch 42 is released, and pins 45 and 48 are removed. Then the roof is raised slightly so that it does not bear downwardly on the side and rear walls, as shown in FIGURE 8. Preferably, the roof is held in raised position by a releasable brace, for example a brace bar 52 (FIGURE 8) having inturned ends received in sockets in the roof and the frame side portion 10. After this simple preparation, the rear wall is pushed forward to collapse in one motion the unit consisting of the side and rear walls. The travel of the side and rear walls from expanded to collapsed condition will be easily understood by reference in sequence to FIGURE 4 through FIGURE 6 and to FIGURE 7 through FIGURE 9.

In order to facilitate the collapsing movement of the side and rear walls, a plurality of rollers 53 are recessed in the bottom of the rear wall 23, one such roller being shown in FIGURES 7–9. The rollers protrude just enough to raise the bottom edges of the side and rear walls out of contact with the floor 31. The overlapping sections of the hinges 22 are given sufficient spacing to provide for the required slight vertical movement. The end of floor 31 is recessed at 54 (FIGURE 8) for each of the rollers, so that when the rear wall is fully expanded, the rollers 53 are out of engagement with the floor, and the bottom edges of the side and rear walls rest firmly on the surface of the floor. If desired, the rollers can run in a track attached to the floor.

Once the side and rear walls have been collapsed into the position shown in FIGURES 6 and 9, the floor 31 is folded upwardly into the position shown in FIGURES 9 and 6. When the floor is folded into collapsed position, the elbow braces 38 and 39 are released, and the support members 33 and 34 are folded flush against the floor. Next the brace bar 52 is removed, and the roof 29 is folded downwardly into the position shown in FIGURES 9 and 6. As shown in FIGURE 9, the floor is provided with a bracket 55 so that the unit can be locked in collapsed position by the latch 42.

In order to expand the structure, one simply repeats the collapsing sequence in reverse order. It will be noted in FIGURE 2 that the rear wall is provided with recessed brackets 56 having hinged handles 57 which are grasped to pull the side and rear wall unit into expanded position.

As shown in FIGURES 6 and 9 the collapsed structure occupies a thickness consisting of five walls, the support members, and the front frame, to make a total of seven thicknesses. Since each of these thicknesses can easily be under one inch, the total structure can add less than seven inches to the length of the camper. For example, the front frame can be made of one-quarter inch metal, the walls can each be made of plywood having a thin aluminum outer sheeting with a combined thickness of about one-half inch, and the supports 33 and 34 can be one-half inch plywood. Thus, the total thickness can be as little as about three and one-quarter inches, or even less depending on the wall strength desired and types of materials employed. It should be understood that suitable weather stripping material may be attached to the top and bottom edges of the side and rear walls to seal their contact with the top and bottom walls. Similarly, weather stripping material can be attached to the rear edges of the side wall sections 17 and 19 to seal their abutment with the rear wall. Also, waterproof material, such as rubberized fabric, may be sealed across the piano hinges 20 and 30. It should also be understood that the hinges 30 and 32 are preferably of the spring biased type to facilitate upward pivotal movement of the roof and floor.

As previously stated, the hinges 24 are only long enough to provide the necessary pivotal connection between the side and rear walls, and are provided with the easily removable pins 25. Thus, by simply removing pins 25, the side wall sections 17 and 19 can be used as doors, and the hinges 24 and pins 25 can serve as the door latches; in which case it would be desirable for some purposes to provide a slot in the side wall sections to permit access to the pins from the outside of the room. The floor pins 45 and 48, and the roof latch 42 hold the walls 16, 18 and 23 in place when one or both of the walls 17 and 19 are used as doors. Another feature of the invention is that the construction makes it possible to attach a bed frame 60 to the rear wall 5 of the camper on one or both sides of the opening 6 without adding appreciable thickness to the construction. The bed frame 60 is connectced to wall 5 by a piano hinge 61 and carries its own support member 62 pivotally attached by a hinge 63 and reinforced by an elbow brace 64.

When the expansible room structure of the invention is designed as a detached unit, only minor differences are required. FIGURES 10–12 show the invention designed as a detached expansible room. In FIGURES 10–12 the same reference numbers are used to identify parts which are identical to FIGURES 1–9 and primed numbers are used to identify slightly modified parts.

The detached room structure 3′ is exactly the same as the attached room structure 3, except that there is no need for the support members 33 and 34, and the front wall structure 7 is fully closed. Thus, it will be noted in FIGURE 12 that the front portion of the modified wall structure 7′ has the top portion 11*a*′ and the side portions 9*a*′ and 10*a*′ extended to form a completely closed front wall. Preferably the front wall is provided with a door 68. The bottom portion 12 of the attached version is revised to remove the downward projection shown in FIGURE 9 and is thus designated 12′ in FIGURE 12. If it is desired to raise the detached structure off the ground, the downward projection on the bottom portion 12 and the support members 33 and 34 can be retained, revised of course to all be the same length.

Although preferred embodiments of the present invention are shown and described herein, it is to be understood that modifications may be made therein without departing from the spirit and scope of the invention as set forth in the appended claims.

Having thus described the invention, what is claimed as new and desired to be secured by the Letters Patent is as follows:

1. An expansible housing structure comprising top, bottom, and rear walls, two side walls, and a front wall structure, first hinge means forming first pivot axes and connecting one end of each of said top and bottom walls to said front wall structure, said first hinge means being positioned so that said first pivot axes are spaced rearward from the front of said front wall structure, second hinge means forming second pivot axes connecting one end of each of said side walls to said front wall structure, said second hinge means being positioned so that said second pivot axes are forward of the hinge axes of said top and bottom walls, third hinge means connecting the other ends of said side walls to the sides of said rear wall, each of said side walls being made of two sections, fourth hinge means connecting each pair of said side wall sections together, rollers attached to the bottom of said rear wall, said rollers being engageable with said bottom wall when said bottom wall is folded down to a position substantially normal to the axis of said hinge means connecting one end of said side walls to said front wall structure, said bottom wall having recesses therein adjacent the end of the bottom wall remote from said hinge means for the bottom wall, and said rollers being receivable in said recesses when said rear wall is positioned adjacent said remote end of the folded down bottom wall.

2. An expansible housing structure as claimed in claim 1 further comprising releasable brace means attached to said top wall and front wall structure for holding said top wall pivoted away from said front wall structure an

amount sufficient to prevent said top wall from interfering with movement of said side and rear walls about their respective hinge means.

3. An expansible housing structure as claimed in claim 1 in which the hinge means at one end of one of said side wall sections is releasable, and releasable latch means attached to the adjacent side wall section and to the bottom wall, said latch means holding said adjacent side wall fixed in a plane substantially normal to said rear wall, whereby when said releasable hinge means is released said one side wall section is usable as a door.

4. An expansible housing structure comprising top, bottom and rear walls, two side walls, and a front wall structure, hinge means connecting one end of each of said top and bottom walls to said front wall structure, hinge means connecting one end of each of said side walls to said front wall structure, hinge means connecting the other end of each of said side walls to said rear wall, each of said side walls being made of two sections, hinge means connecting each pair of said side wall sections together, each of said hinge means forming a pivot axis, the pivot axes of the hinge means for said side walls being substantially parallel to each other, the pivot axes of the hinge means for said top and bottom walls being substantially parallel to each other and substantially normal to the pivot axes of the hinge means for said side walls, said front wall structure having a front portion and rearwardly projecting top and side portions on said front portion, the distance between said side portions being greater than the width of said rear wall and said side portions extending rearwardly far enough that said rear wall is received between said side portions when said side and rear walls are fully collapsed toward said front wall, said hinge means for said top wall being positioned adjacent the rearward edge of said rearwardly projecting top portion, the distance between the pivot axis for said bottom wall and the rear surface of said front portion being

substantially equal to the combined thickness of two of said two sections of one of the side walls plus the thickness of said rear wall, the pivot axis for said top wall being positioned rearwardly of the pivot axis for said bottom wall, releasable latch means attached to said top wall and front wall structure for holding said top wall pivoted away from said front wall structure an amount sufficient to prevent said top wall from interfering with movement of said side and rear walls about their respective hinge means, rollers attached to the bottom of said rear wall, said rollers being engageable with said bottom wall when said bottom wall is folded down to a position substantially normal to the axis of said hinge means connecting one end of said side walls to said front wall structure, said bottom wall having recesses therein adjacent the end of the bottom wall remote from said hinge means for the bottom wall, and said rollers being receivable in said recesses when said rear wall is positioned adjacent said remote end of the folded down bottom wall.

References Cited by the Examiner

UNITED STATES PATENTS

1,305,162	5/1919	Puff	296—26
1,375,212	4/1921	Crone	296—26
2,604,671	7/1952	Sherman et al.	52—63
2,813,747	11/1957	Rice	52—67
2,886,856	5/1959	Sun Kun Che	52—69
2,907,077	10/1959	Pugsley	52—32

FOREIGN PATENTS

637,543	3/1962	Canada.
699,753	1953	Great Britain.
6,560	3/1911	Great Britain.

FRANK L. ABBOTT, *Primary Examiner.*

E. J. WITMER, *Examiner.*

R. A. STENZEL, *Assistant Examiner.*