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2,863,178

COLLAPSIBLE ROOF-TOP STRUCTURE

Filed Oct. 26, 1953

2 Sheets-Sheet 1

FIG. 1.

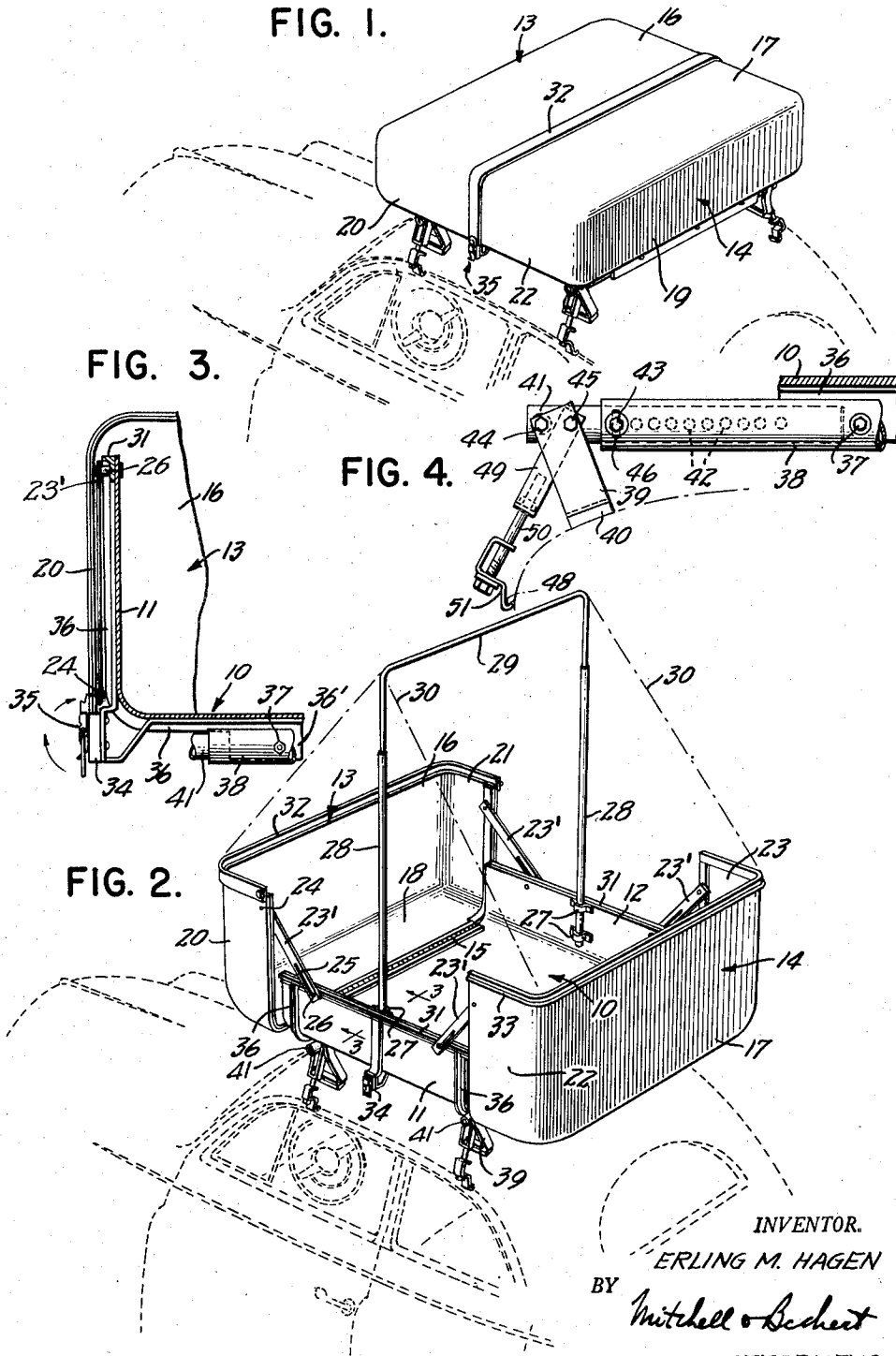


FIG. 3.

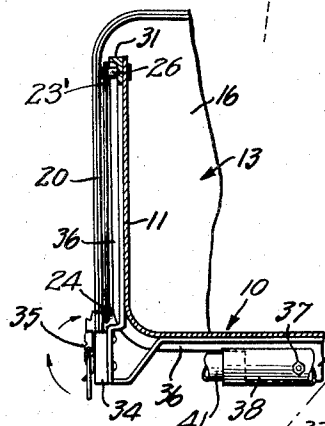
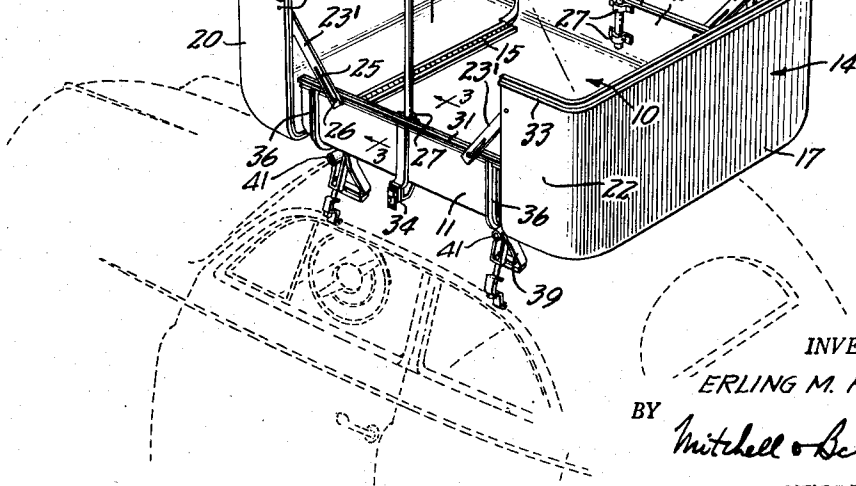


FIG. 4.



FIG. 2.



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2 Sheets-Sheet 2

FIG. 5.

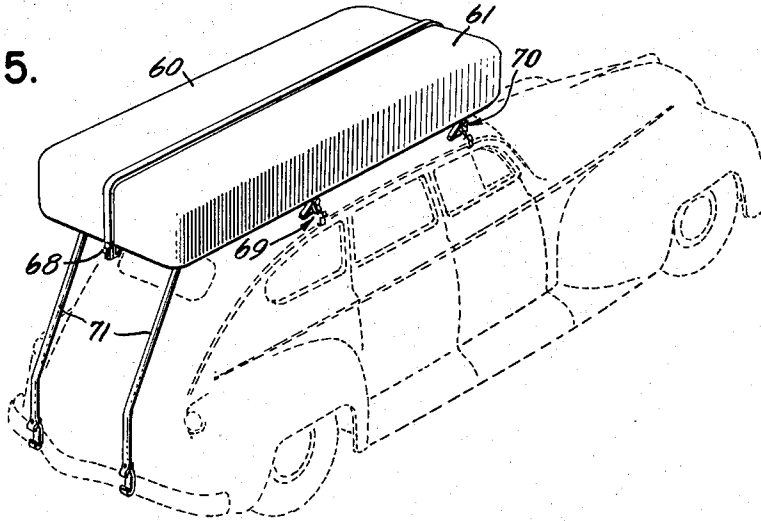
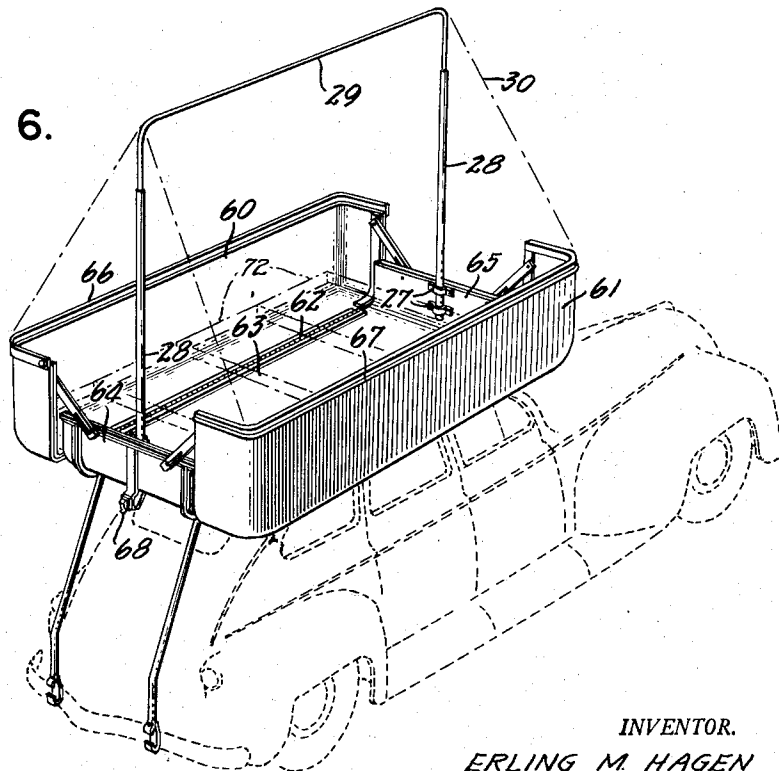


FIG. 6.



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## COLLAPSIBLE ROOF-TOP STRUCTURE

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13 Claims. (Cl. 20—2)

My invention relates to a collapsible structure suitable for mounting on the roof of an automobile, and openable to provide sleeping space for one or more persons.

It is an object of the invention to provide an improved device of the character indicated.

It is a specific object to provide an improved collapsible tent platform which, when in open position, may provide rigid upstanding walls defining the lateral confines of the tent platform and which, when in closed position, may be fully secured against tampering and may be sealed against the weather.

It is a general object to meet the above objects with a light-weight construction providing the greatest floor-space utilization, compatible with relatively small volume and weight when closed.

Other objects and various further features of the invention will be pointed out or will occur to those skilled in the art from a reading of the following specification in conjunction with the accompanying drawings. In said drawings, which show, for illustrative purposes only, preferred forms of the invention:

Fig. 1 is a view in perspective, illustrating a collapsible structure incorporating features of the invention, and shown in closed position;

Fig. 2 is a view similar to Fig. 1, with the parts shown in open relation;

Fig. 3 is an enlarged sectional view in the plane 3—3 of Fig. 2, but with the parts closed as in Fig. 1;

Fig. 4 is a fragmentary view in elevation of a supporting adapter, suitable for anchoring the structure of Figs. 1 and 2 to the roof of an automobile; and

Figs. 5 and 6 are perspective views generally similar to Figs. 1 and 2, respectively, but illustrating a modified construction having greater capacity.

Briefly stated, my invention contemplates a collapsible tent platform, comprising essentially a rectangular base or floor with open longitudinal ends, and with two generally similar cover members hinged at said ends, and so formed that when in the open position, substantial parts of said covers form, in effect, extended areas of said base, so that the useful floor area includes not only the base area, but also substantial areas of both cover members. Both the cover members and the base may include contiguous or overlapping side panels and top-closure faces, so that when the structure is in open position, rigid upstanding walls completely surround the usable floor space. The upstanding longitudinal ends of the structure, when in open position, are thus defined by top parts of the covers; these cover parts may be of sufficient extent to meet (and, if desired, to overlap and seal, against the weather and against tampering) when the structure is in closed position. In one form to be described, the proportions are such that the two covers hinge forwardly and rearwardly of the car on which the structure is mounted, and in the other form these covers hinge to the respective sides of the vehicle.

Referring to Figs. 1 and 2 of the drawings, my invention is shown in application to a collapsible tent-platform

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structure comprising a base having an extensive rectangular floor area defined between two opposed upstanding side or wall panels 11—12, contiguous with the transverse limits of said base or floor 10. The wall panels 11—12 thus define open longitudinal ends of the base, and two cover members 13—14 may be hinged, as by piano-hinge means 15, at these longitudinal ends of the base. The base or floor 10 may be rigidly mounted on the roof of an automobile (suggested by light dashed outlines) by means to be later described.

The cover members 13—14 may each include an upper face or top-closure panel 16—17 of substantially half the longitudinal extent of the base 10 and of substantially the full transverse extent thereof, so that when in closed position (Fig. 1) the exposed central edges of the covers may meet and, if desired, overlap (as shown). The cover members 13—14 may also include end-closure faces or panels 18—19, spacing the longitudinal ends of each upper face 16—17 from the respective hinge connections to the base 10; when in open position, the panels 18—19 become extensions of the floor area and, because of my method of hinging, the extended floor area may be substantially flush and in the same plane, permitting comfortable accommodation of sleeping gear. The cover members may further include side panels, as at 20—21 for the cover 13, and at 22—23 for the cover 14. The side panels (20—21) are preferably each contiguous with, and fastened to, the upper and end-closure panels (16—18), and in the form shown, the side panels and the upper and end-closure panels for each cover member are formed of unitary, essentially single-piece, pressed-metal construction.

To retain the covers in open position, I show stay arms 23', connecting spaced parts of the covers 13—14 and of the base 10 at locations off the hinge axes. Each stay arm may be a bar, pivoted as at 24 to a cover (13), and connected by means of an elongated slot 25 to a pin 26, carried by the corresponding wall (11) of the base 10. A short transverse lobe at the lower end of the slot may serve to lock the stay arm in the position shown in Fig. 2, so as positively to locate the cover member associated therewith in the open position.

For the purpose of supporting a tent or other cover over the described platform and wall, I may provide tent-support means, such as brackets 27, carried by parts of the side walls 11—12 of the base. In the form shown, the brackets 27 are oriented to receive spaced uprights or poles 28, which I have shown as open pipes, into the ends of which a generally "U-shaped" ridge pole 29 may be inserted. The members 28—29 are, of course, preferably dimensioned so that when separated and disengaged, they may be stacked within the confines of the collapsed structure shown in Fig. 1. Phantom outlines 30 suggest the limits of a tent supported on the ridge pole 29, and extending into any desired overlapping relation with the panels 16—17 (constituting a first pair of opposed walls) and with the panels 20—11—22 and 21—12—23 (constituting a second pair of opposed walls).

In order to render the described structure secure against the weather and against tampering, I prefer that the adjacent edges and surfaces of the principal members 10—13—14 shall closely overlap each other when in closed position. Thus, the upper edges of the side walls 11—12 may be reinforced with a flange member 31 for structural reasons, and also to more closely confine the clearance which would otherwise be defined between the side panel 20 of cover 13, and the side wall 11 of the base 10 (see Fig. 3). Also, one of the cover members, say the member 13, may be formed along the outer exposed closure edge thereof, with a raised projection, shown in the form of a strip 32, continuously spanning the full length of the upper panel 16 and the full effective height

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of both side panels 20—21. This seal strip 32 may overlap the corresponding exposed edges of the cover member 14 when in closed position, as shown in Fig. 1. If desired, to permit further sealing effectiveness, one of the cover members 13—14 may carry a sealing strip 33 of sponge rubber or the like; in the form shown, the sealing strip 33 is carried by the cover member 14. It will be understood that when the cover member 13 is closed over the sealing strip 33 of cover member 14, the structure may be completely weather-proof because the cover member 13 overlaps the cover member 14. Thus, when in closed position, the cover member 13 may be termed the upper cover member, and the cover member 14 may be termed the lower cover member.

In order to secure the structure in closed position, I have shown that it is merely necessary to clamp the upper cover member 13 directly to the base 10. This may be achieved by securing an anchorage or bracket 34 to the central part of each side wall 11—12 of the base; each of the brackets 34 may project downwardly and outwardly and may support a hasp or clamping means 35, poised for engagement with a suitable abutment or lug on the skirt of the upper cover member 13. The clamp 35 shown is of the familiar toggle-action variety, and when secured against the resilient compression of strip 33, a secure weather-tight seal is presented, and the structure will not rattle loose.

As with the cover members 13—14, the base or floor member 10 may be formed from sheet metal, so that the ends 11—12 are merely bent upwardly from a single sheet. The sheet may be sufficiently stiff so that reinforcement is not necessary, but in the form shown I show reinforcement ribs or flanges 36, extending continuously up the outer surfaces of the walls 11—12, and along the bottom of the floor. For most effective bracing, the web of the flange means 36 underneath the floor 10 may project more extensively than along the walls 11—12, as illustrated at 36' (see Fig. 3). This more extensive flange 36' may serve the further function of providing a means for removably securing the entire collapsible structure to a suitable support or mounting means carried by the car.

In the form shown, the mounting means on the car comprises essentially two spaced transversely-extending tubes or pipes 38 (Figs. 3 and 4), supported by suitable adapters at the extreme transverse ends thereof. The adapters are each shown to comprise a generally triangularly shaped standard 39, the base of which may be cushioned, as by a rubber lining 40, for direct contact with the car roof. The upper ends of the standard 39 may be clamped directly to the pipe 38, or as in the form shown, to an extension 41 thereof. The extension 41 may be of a size to fit slidably within the tube 38, and may be provided with a plurality of holes 42 for adjustable securing, by means of a bolt 43, to the tube 38. Two bolts 44—45 are shown rigidly securing the standard 39 to the extension 41, and a limited circumferential slot 46 in tube 38 at the point of securing to extension 41 may permit such freedom of angular adjustment of the standard 39 with respect to the tube 38 as may be necessary to seat the cushion or pad 40 squarely against the local contour of the car roof.

To secure the described assembly against lateral displacement, the outer end of the extension 41 may be guyed to some ridge or ledge on the side of the car, as for example, the usual rain gutter, suggested at 48. I have shown the guying means to comprise a clevis 49, pivoted at bolt 45 to the extension 41, and connected by bolt 50 to an anchoring strip 51, hooked to the rain gutter 48.

In Figs. 5 and 6, I show a modified arrangement of my collapsible structure in which substantially the same organization of parts is adapted for greater capacity of sleeping space. Because the greater capacity entails a change in proportions from those shown in Figs. 1 and 2,

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I find it more convenient so to orient the larger structure of Figs. 5 and 6 that the cover members 60—61 open laterally, that is, on hinge axes (as at 62) aligned with the front-to-back axis of the automobile. In spite of this reorientation, the larger structure of Figs. 5 and 6 may still be said to comprise a base member 63 with upstanding side panels or walls 64—65 at opposed transverse ends, so as to define open longitudinal ends along which the hinge connections to the covers 60—61 are made. One of the members, say the member 60, may be provided with the raised sealing strip 66, so that cover 60 becomes the upper cover which may fit down over the lower cover 61 to compress the resilient seal strip or gasket 67 when the device is secured in the closed position. As previously described, quick-release clamps or other locking means 68 may secure the upper cover 60 to the base 63.

Because of the greater length of the organization of Figs. 5 and 6, and depending upon the vehicle to which this structure is applied, two spaced supporting means, designated generally 69—70 and of the type described in Fig. 4, may not be completely adequate to support the structure, and in that event, I may provide rear supporting bars 71, detachably anchored to the rear bumper or bumper-bracket of the vehicle, and for connection to a rear transverse floor reinforcement flange, it being understood that reinforcing flanges (corresponding to 36' in Figs. 3 and 4) may run transversely of the vehicle at three or more longitudinally spaced locations, rather than at the two locations shown in Figs. 1 and 2. The tent-supporting means for Figs. 5 and 6 may be completely analogous to that described in connection with Fig. 2; therefore, the same reference characters identify the corresponding parts.

In use it is no more difficult to apply my structure to any standard closed automobile than it is to apply a familiar ski rack. The basic supporting structure, best shown in Fig. 4, is first accommodated to the width of the particular vehicle top by loose adjustment of the bolt 43 in the appropriate adjustment hole 42 in bar 41, and the stay or guy 49—50 may be loosely clamped in place. Because of its relatively light construction, the collapsible assembly complete with floor girders 36' may be simply laid over the supporting frame bars 38, and bolts 37 may be set in order to secure the collapsible structure to the supporting framework. Next, the bolts 43 may be tightened in order to secure the desired angular setting of bars 41 with respect to standard 39. Finally, the guy bolts 50 may be taken up to the desired tightness.

Whichever of the desired forms of the invention is used, it is a simple matter to set up the tent for occupancy. It is merely necessary to release clamp 35 or 68, as the case may be, and to pull out the cover members to the open positions shown in Figs. 2 and 6. The uprights and ridge poles for the tent frame may be instantly available because they can be contained within the collapsible structure, and the tent may merely be laid over the erected supporting frame-work 28—29, with the sides of the tent overlapping the upstanding outer walls of the open structure; convenient access to the opened structure may be had by means of a lightweight collapsible ladder (not shown), hooked over or resting against one of the side walls 11—12 or 64—65, and contained within the collapsed structure when not in use. The volume within the collapsible structure of either Figs. 1 or 5 may be sufficient to accommodate not only the tent, tent poles, and ladder, but also all mattresses, blankets, and other gear necessary for sleeping. In a typical design for the form of Figs. 1 and 2, the outside dimensions for the closed structure may be about four feet by four feet, by fifteen inches high; this opens, as in Fig. 2, to provide a walled-in smooth floor area, six and a half feet by four feet—ample for two mattresses or sleeping bags, side by side. In a typical design for the form of Figs. 5 and 6, the collapsed structure is about four by eight feet, and it

opens to provide a smooth floor area, six and a half feet by eight feet—ample for four mattresses or sleeping bags, side by side, as suggested by dotted outlines 72. I have found in my own experience that it is no job at all to set up a large size collapsible structure (as in Fig. 6) with all mattresses in place and ready for occupancy within three minutes of releasing latches 68.

While I have described the invention in detail for the preferred forms shown, it will be understood that modifications may be made within the scope of the invention as defined in the claims which follow.

I claim:

1. In a device of the character indicated, a rectangular base with opposed open longitudinal ends, first and second covers hinged to said base along said respective longitudinal ends, each cover including an upper face of substantially half the longitudinal extent of said base and of substantially the full transverse extent of said base, each cover also including a closure face spacing the longitudinal end of each cover from the hinge axis thereof, said closure faces being substantially flush with said base when in open position, and side panels for the transverse ends of each cover and rigidly secured to the closure face and to the upper face thereof; whereby when said covers are in closed position with both upper faces contiguous, said side panels may effectively close the transverse ends of said device.

2. A device according to claim 1, and holding means for holding said covers in open position, said holding means including stays connecting said base to each of said covers at points spaced from the respective hinge axes.

3. A device according to claim 1, in which one of said covers is provided with sealing means extending the full transverse width along the exposed edge of the upper face and of each of the side panels of one cover, said sealing means overlapping the corresponding edges of said other cover when in closed position.

4. A device according to claim 3, in which said sealing means comprises a continuous strip raised out of the predominant surface of the upper face and of the side panels of said one cover.

5. A device according to claim 3, in which said sealing means includes a strip of resiliently yieldable material carried by one of said covers at the region of overlap of said covers.

6. The combination of claim 1, in which said base comprises a substantially flat panel with flanged reinforcement means secured to the lower face thereof.

7. The combination of claim 6, in which said reinforcement means comprises a plurality of spaced substantially parallel flanges extending between one pair of opposed edges of said base.

8. The combination of claim 6, in which said flanged reinforcement means includes means for detachably securing said base to a supporting structure.

9. The combination of claim 8, and including roof-top-adapting supporting structure comprising spaced parallel bars spaced in accordance with the spacing of said flanges.

10. In a device of the character indicated, a rectangular base with upstanding opposed side panels at the transverse ends of said base defining open longitudinal ends for said base, first and second covers hinged to said base

along the respective longitudinal ends thereof, each cover having an upper face of substantially half the longitudinal extent of said base and of substantially the full transverse extent between said side panels, each cover also having a closure face spacing the longitudinal end of each upper face from the hinge axis by an extent at least no less than the height of said side panels above said base, said closure faces being substantially flush with said base when in open position, means for holding said covers in open position, and tent-supporting means carried by the central portions of each of said side panels.

11. A device according to claim 10, in which said last-defined means comprises bracket means permanently secured to said side panels and oriented for reception of tent poles upon vertical insertion.

12. In a device of the character indicated, a rectangular base with opposed open longitudinal ends, first and second covers hinged to said base along said respective longitudinal ends, each cover including an upper face of substantially half the longitudinal extent of said base and of substantially the full transverse extent of said base, each cover also including a closure face spacing the longitudinal end of each cover from the hinge axis thereof, said closure faces being substantially flush with said base when in open position, side panels for the transverse ends of each cover and rigidly secured to the closure face and to the upper face thereof; whereby when said covers are in closed position with both upper faces contiguous, said side panels may effectively close the transverse ends of said device, and means for detachably securing the side panels of one of said covers directly to adjacent parts of said base.

13. In a device of the character indicated, a rectangular base including opposed upstanding sides and with open longitudinal ends, first and second covers hinged to said base along said longitudinal ends, each cover having an upper face of substantially half the longitudinal extent of said base and of substantially the full transverse extent of said base, each cover further including a closure face spacing the longitudinal end of each cover from the hinge axis thereof to an extent exceeding the height of the sides of said base above said base, said closure faces being substantially in the plane of said base when in open position, each of said covers further including side panels forming the transverse ends of each cover and rigidly secured to the closure face and to the upper face thereof, said side panels being transversely spaced from each other by an amount exceeding the transverse spacing of the upstanding sides of said base, whereby said side panels may overlap the sides of said base and may effectively close the ends of said device.

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