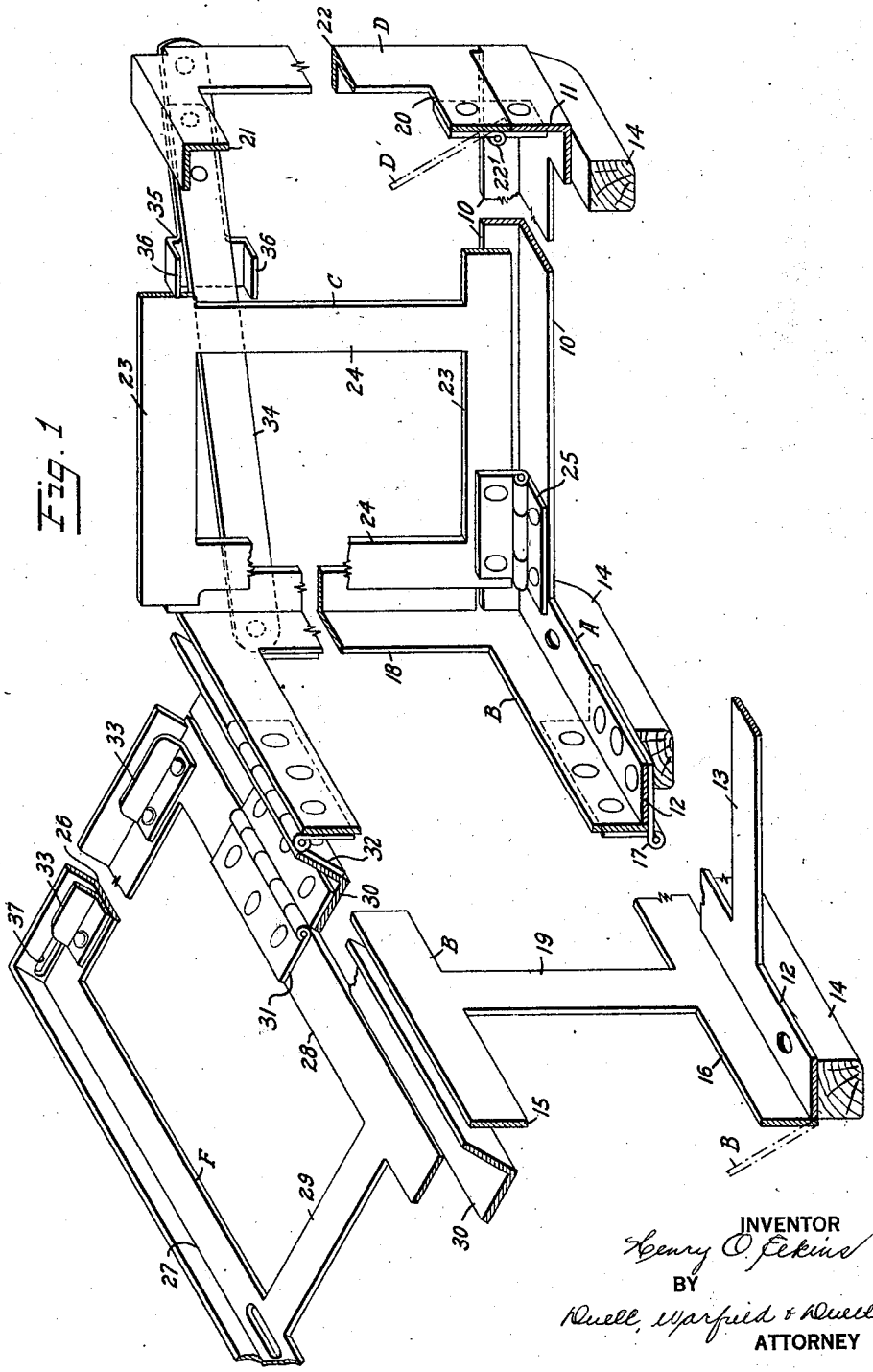
March 27, 1928. 1,663,649

H. O. ELKINS

COLLAPSIBLE CONTAINER

Original Filed Oct. 12, 1923 3 Sheets-Sheet 1

Fig. 1



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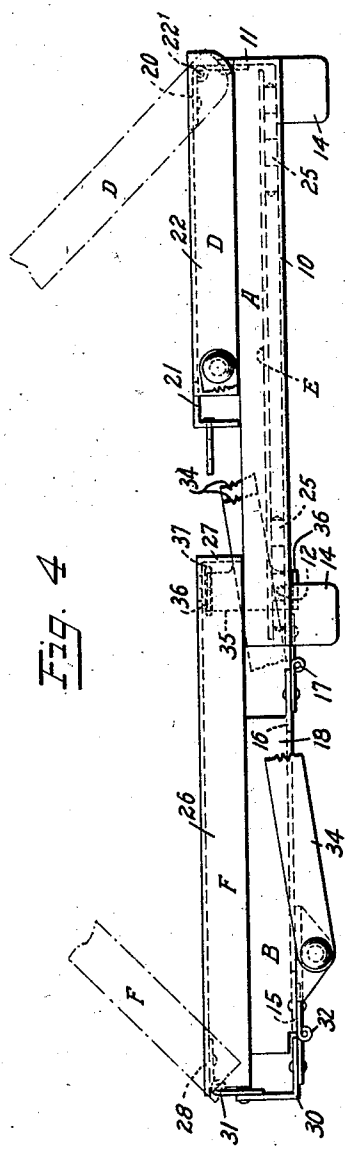

Fig. 4

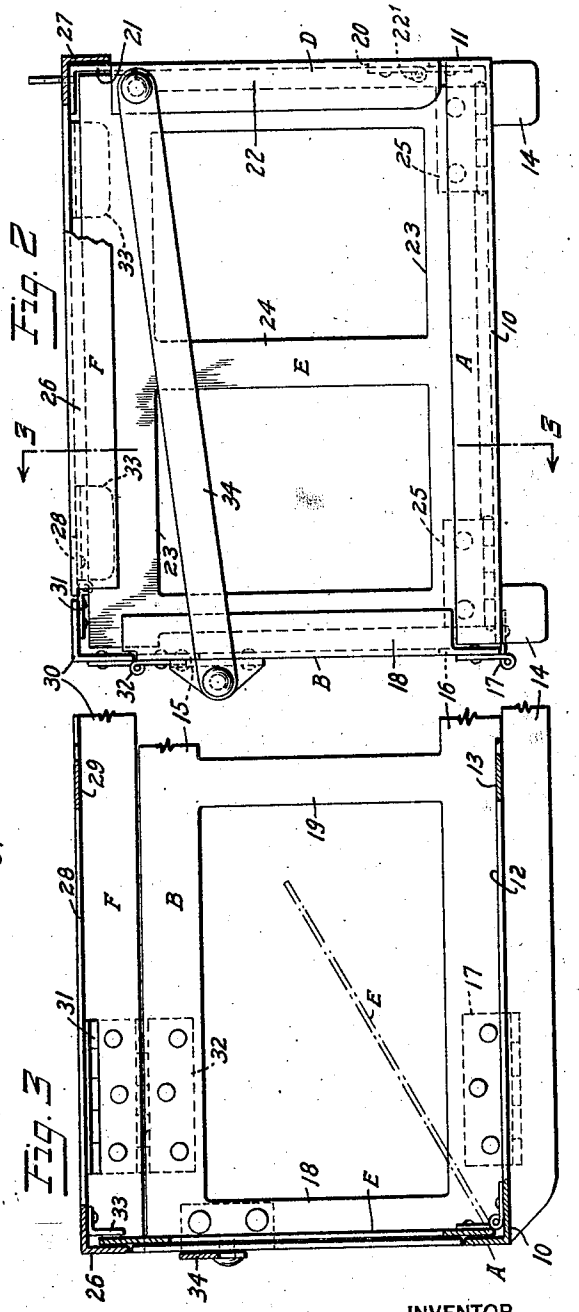

Fig. 2

Fig. 3

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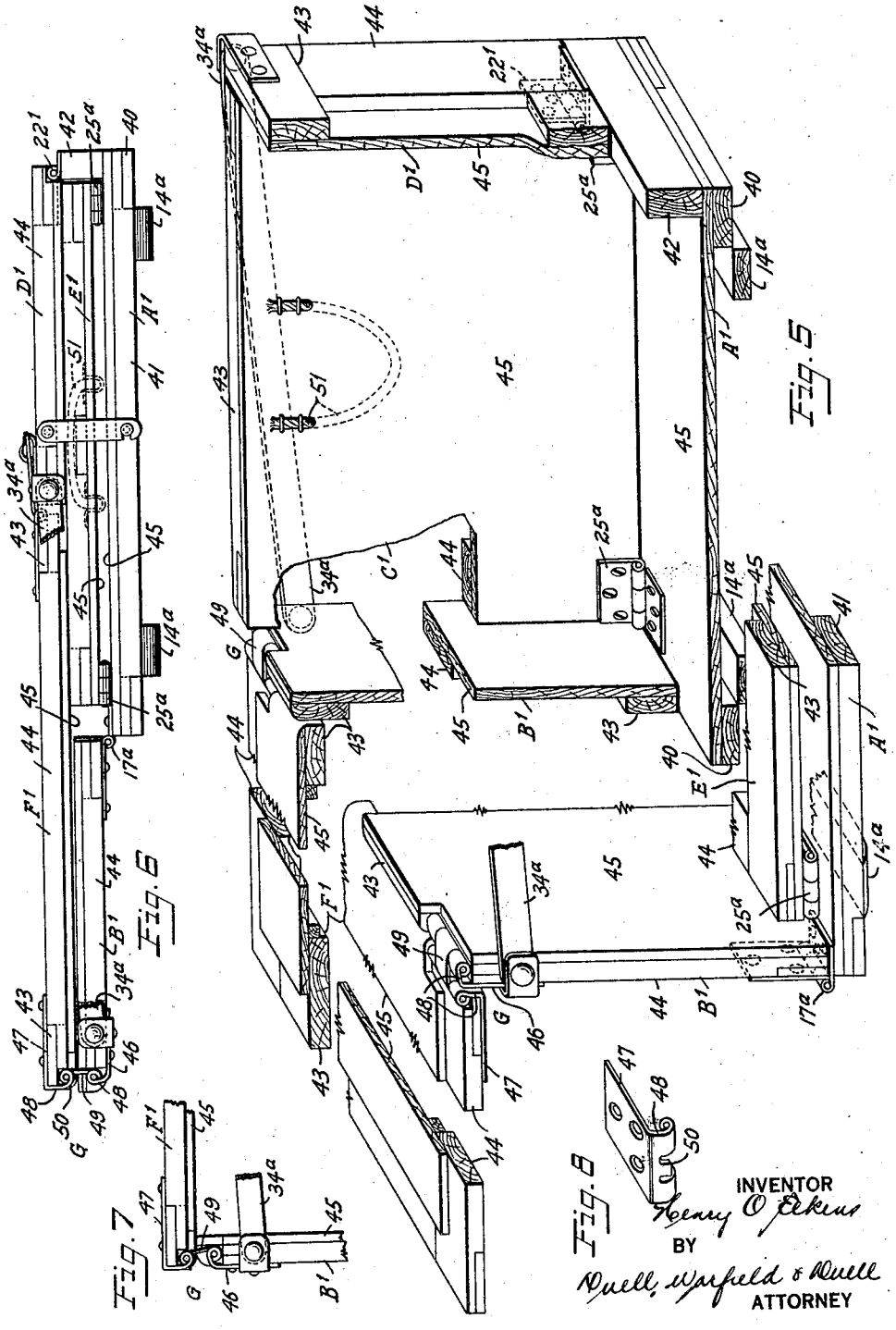

Fig. 5

Fig. 6

Fig. 7

Fig. 8

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UNITED STATES PATENT OFFICE.

HENRY O. ELKINS, OF BATH, NEW YORK.

COLLAPSIBLE CONTAINER.

Application filed October 12, 1923, Serial No. 668,070. Renewed February 1, 1928.

This invention relates to containers and more particularly in some of its details to improvements in collapsible containers, for receiving merchandise or the like and adapted to be expanded into operative or merchandise-receiving condition or to be collapsed into a self-contained unit of relatively very small dimensions.

It is a general object of the invention to improve and perfect the construction of containers of the class mentioned so as to provide a product which is light as well as strong, capable of easy and instantaneous extension to form a satisfactory container for the shipping or storing of articles of merchandise or the like, while being capable of effectually sustaining stresses due to superposed loads or lateral thrusts, and being furthermore capable of being collapsed into a compact, self-contained unit of relatively small volume.

A more particular object of the invention is the provision of a container of the class mentioned, with an improved arrangement and articulation of the enclosing elements or sections, facilitating the collapsing and expanding operations and furnishing a construction especially strong and rigid when expanded and of especially small relative volume when collapsed.

A further object is the provision of an improved container of the class mentioned, of simple and durable construction, yielding economies both in production and in use.

Other objects will be in part pointed out in connection with the following detailed description of illustrative embodiments of the invention, and will be in part obvious in connection therewith.

The invention accordingly comprises the features of construction, combinations of elements, and arrangement of parts, which will be exemplified in the construction hereinafter set forth and the scope of the application of which will be indicated in the claims.

For a complete understanding of the nature and objects of the invention reference should be had to the following detailed description taken in connection with the accompanying drawings, in which,

Figure 1 is a fragmentary perspective view of a container embodying the invention, the parts being in expanded or extended position and the cover section swung to open position;

Fig. 2 is an end elevation of the container in extended position, parts being broken away for clearness of disclosure;

Fig. 3 is a longitudinal section taken approximately on the line 3—3 of Fig. 2;

Fig. 4 is an end elevation of the container in collapsed condition, parts being broken away for clearness of disclosure;

Fig. 5 is a fragmentary perspective view corresponding to Fig. 1, but illustrating a modified form of the invention;

Fig. 6 is an end elevation showing the structure of Fig. 5 in collapsed condition;

Fig. 7 is a detail showing the hinged connection for the cover section; and

Fig. 8 is a detail view of one of the hinge elements.

Referring to the drawing for a complete detailed description of certain preferred embodiments of the invention, and first, to the embodiment disclosed in Figs. 1 to 4 inclusive, the container is formed by a plurality of enclosing walls or sections, including the bottom section A, side and end sections, B, C, D, and E, the cover section F, all articulated and connected together by joints enabling the device to be expanded to container-forming or operative condition, or to be collapsed to form a self-contained unit. In the expanded condition it will be understood that the container may be employed for receiving and shipping or storing merchandise or the like, and in the collapsed condition the container may be returned without merchandise, or it may be conveniently stored when in such condition.

As shown in Figs. 1 to 3 the several enclosing sections are preferably of metallic construction which is well adapted to form a light and rigid structure. The sections are preferably of skeleton construction including structural members of preferred commercial cross-section which are advantageous for permitting the container to collapse into a relatively very small volume, while also lending strength and rigidity to the container when in extended condition.

As shown, the bottom section A includes structural end members 10 and a front longitudinal member 11, both of angle section having horizontal and vertical flanges lying respectively in the planes of the bottom and front side sections of the container. The rear longitudinal member 12, is preferably a flat or rectangular plate, cooperating, as seen in Fig. 1, with a similar member of the rear side frame section to form a longitudinal

marginal angle member corresponding to the front angle 11. Intermediate transverse flat frame members 13, as many as desired, may extend between the longitudinal members of the bottom section for imparting additional strength and rigidity. Supports 14 of wood or other suitable material are preferably secured to the exterior surface of the bottom section, providing shoes for the container for supporting the same and by means of which it may be easily slid about.

The rear side section B has upper and lower longitudinal structural members 15 and 16, preferably flat or rectangular in section, the lower member lying adjacent to longitudinal member 12 of the bottom section and disposed at an angle thereto to form in effect a marginal structural member of angle section. Hinges 17 are secured to the frame members 12 and 16 whereby the rear side or body section and the bottom section may swing relatively to each other. The terminal members 18 are preferably angular in section providing upright corner posts for the container when extended, and transverse frame members as indicated at 19 may also extend between the longitudinal frame members 15 and 16 intermediate the ends thereof.

The front side or body section D has upper and lower frame members, the lower member 20 being preferably flat and the upper member 21 being angular in section and forming the upper margin of the container body. The terminal angles 22 extend between the longitudinal members 20 and 21 providing additional corner posts for the container opposed to the posts 18. It will also be understood that transverse frame members corresponding to the frame members 19 of the rear section may be employed in the front section to provide additional strength. The front side section is hinged to the bottom section by means of hinges 22′ so as to swing inwardly from the position shown in Fig. 1, these hinges being secured preferably to the upstanding flange of the longitudinal member 11 and the structural member 20 of the front section. When the container is in extended position it will therefore be seen that the member 20 will be superposed edge to edge with reference to the upstanding flange of the angle member 11 whereby load stresses may be transmitted between these members through the contacting edges thereof.

The opposed end or body sections C and E are of similar construction, being preferably of flat metal and of skeleton formation, including longitudinal members 23 and transverse connected members 24. Each end frame member is connected at one edge to one of the marginal angles 10 of the bottom section within the angle thereof by means of hinges 25. It will thus be seen that the end frames are disposed in position to be housed and protected by the marginal angles of the bottom and side sections when extended as shown in Fig. 1, or by the marginal angles of the bottom section when collapsed, as will be obvious upon reference to Fig. 4. Furthermore, the end frame sections are enclosed and protected by the end angle members of the cover section of the container, as will be more fully pointed out.

The cover section F is also preferably of metallic construction having transverse end angle members 26, a longitudinal front or marginal angle member 27, and a flat longitudinal rear marginal member 28. Transverse intermediate frame members 29 may also be employed. An angle bar 30, is disposed intermediate the cover section and the rear body section B, being hinged to the cover section through hinges 31 attached to one flange of the angle bar and to the rear body section B by hinges 32 secured to the other flange of the angle bar. Clips or retaining members 33 are secured to the cover in position to engage with the upper margins of the end frame sections when the cover is closed, thereby retaining said sections in extended positions. The front and back body or side sections B and D, in addition to the hinged connections above described, are connected together at their opposite ends by means of links 34 pivoted thereto, whereby the sections are constrained for movement together. The enclosing sections are preferably all of integral metallic construction, being pressed or stamped from metallic plates, or otherwise formed. A spring catch 35 may be secured to one or more of the links 34, having detents 36 for engaging in appropriate openings as 37 formed in the cover section for holding the container in collapsed position as shown in Fig. 4.

When the container is collapsed, as indicated in Fig. 4, the side section B is swung on its hinges 17 so as to lie approximately in the same plane as the bottom section. At the same time the front side section D assumes a position parallel to the bottom section but lies face to face in abutting position therewith due to the fact that the hinges 22′ are connected to the upstanding flange of the marginal angle member 11, at points removed from the plane of the bottom of the container. In this position the end or retaining sections C and E are folded down on their hinges so as to lie close down to the container bottom, being enclosed in the marginal flanges of the bottom section substantially in the plane thereof. The cover section then assumes a position substantially in the plane of the side section D. The cover section is enabled to assume this position by virtue of the double hinge connection formed by the angle bar 30 and hinges 31 and 32 permitting the cover section to swing about different centers spaced apart,

one (32) to completely uncover the container, and one (31) to fold to collapsed position as shown in Fig. 4. It will therefore be seen that the enclosing sections of the container when collapsed occupy two parallel planes and lie face to face in a compact relatively very small self-contained unit effectually supported in this condition by means of the spring latch 35.

To expand the container into operative condition for the reception of merchandise for storage or transportation, the latch 35 is released, the cover section swung outwardly as indicated in dot and dash lines, Fig. 4, and the front and rear connected sections B and D swung to upright position. The end body sections C and E are then swung into an upright position (see Fig. 1) within the enclosing angles of the side and bottom sections so as to be housed and protected thereby. The end frames cooperate with the side and bottom sections to brace and retain the container in expanded condition so as to form a comparatively rigid self-sustaining structure. The end frames will be effectually held in extended position by means of the clips 33 attached to the under side of the cover section when the cover section is swung to closed position, the floating angle bar 30 swings over the upper margin of the side frame B. The top margins of the container are thus entirely protected by angle bars, not only presenting a finished appearance to the expanded container, but also rigidifying the construction and forming a substantial seat through which stresses from superposed loads may be effectually transmitted to the container frame. In this connection it will be observed that the vertically disposed flange of the floating angle bar 30 may abut with the upper edge of the frame member 15 when the cover is in closed position relieving the hinges of undue stress. This arrangement provides an advantageous structure inasmuch as the container finds an important use where large numbers of containers are superposed as in tiers, especially in the parcel post service in transportation and handling of the mails. The corner posts and other framing members, as set forth, provide ample load-sustaining struts adapting the container to this class of service, and the longitudinal and transverse angle members of the container sections are well adapted to stand stresses incident to lateral or longitudinal thrusts.

The embodiment of the invention disclosed in Figs. 5 to 8, inclusive, is similar to that in Figs. 1 to 4, inclusive, but embodies some distinguishing features of construction advantageous for special purposes. As shown, this embodiment, as in that previously described, is made up of enclosing sections, being in this case preferably of wood, and designated in the drawing respectively by corresponding reference letters with the distinguishing primes applied. Other corresponding parts are designated by corresponding reference numerals with the index "a".

The bottom section A' includes longitudinal and transverse frame members 40 and 41 appropriately secured together. At the front edge of the bottom section is secured an upstanding longitudinal frame member 42 forming a support to which is hinged the front side section D' of the container. The side and end frame sections and the top or cover section are of similar construction including longitudinal and transverse marginal frame members 43 and 44 respectively. Each enclosing section, including the bottom section, is preferably covered on the inner surface with a surfacing material or sheathing, such, for example, as the sheathing boards 45 as shown in the drawing, presenting a smooth interior surface for the container. As will be seen, the articulation of the bottom, side and end sections is similar to that in the modification previously described.

The articulation of the cover section to the container body is modified to provide a simple and effective hinge G adapted to this type of construction and enabling the cover to assume correct position both when the container is collapsed or extended. Each hinge includes a butt 46 for attachment to the side section B' and a butt 47 for attachment to the cover section. Both butts are preferably secured to the outer surfaces of the sections and are provided with angularly disposed sections 48, lying adjacent the respective edges of the cover and side sections and pivoted to a connecting link 49. Butt 47 is provided with a stop or limiting lug 50 adapted to contact with a connecting link 49 to limit the opening movement of the cover. This lug also contacts with the link 49 to stop downward movement of the hinged edge of the cover section F' in case this section is slid forwardly from supporting position on the upper edge of the side section B' as indicated in Fig. 7. It will thus be seen that the hinge G permits the counter section to swing freely to open or closed position when the container is extended and to assume a position in parallelism with the other enclosing sections when the container is collapsed.

Handles 51 of rope or similar flexible material may be secured by appropriate clamping means to the end sections C' and E', having outwardly extending loops for convenient access. These handles may be employed both for swinging the end sections to or from collapsible position or for moving the container about when in extended position. When the container is extended the handles 51 are disposed in position to engage with the transverse connecting links

34ª so as to distribute stress incident to lifting the container.

The method of collapsing or expanding the sections is similar to that described above in connection with the first modification and will be clearly understood. In this case, as in the former, it will be noted that the cover section F′ when in closed position overlies the upper edges of the side and end sections so as to transmit load stress through to said sections. This form, therefore, as well as the first, is adapted for carrying heavy superimposed loads as when a number of the containers are piled one upon another. Also, it will be noted that the ends of the cover sheathing 45 provide abutments for engaging with the upper edges of the end sections C′ and E′ for retaining them in extended position when the cover is closed.

Since certain changes may be made in the above construction and different embodiments of the invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

It is also to be understood that the following claims are intended to cover all of the generic and specifics features of the invention herein described. and all statements of the scope of the invention which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A collapsible container including, in combination, body sections including bottom, end and side sections articulated for extension to form enclosing walls or to be collapsed, bracing links connected to opposed body sections and other opposed body sections being adapted to brace the container to sustain it in extended position, a cover section having hinged connection to said body and adapted to swing into a position to overlie the upper edges of said body sections so as to transmit loads thereto and to entirely uncover the space within the container, said hinged connection also permitting the cover section when collapsed to assume a position substantially parallel with the body sections and face to face with certain of the said sections, and retaining members on said cover section adapted when the cover is closed to cooperate with said sustaining sections to retain them in sustaining position.

2. A collapsible container including, in combination, body sections including bottom, end and side sections articulated for extension to form enclosing walls or to be collapsed, bracing links connected to opposed body sections and opposed other body sections being adapted to brace the container to sustain it in extended position, and a cover section having hinged connection to said body and adapted to swing into a position to overlie the upper edges of said body sections so as to transmit loads thereto and to entirely uncover the space within the container, said hinged connection also permitting the cover section, when collapsed, to assume a position substantially parallel with the body sections and face to face with certain of the said sections, one of said body sections being hinged to the bottom section at points spaced above the container bottom.

3. A collapsible container including, in combination, metallic body sections including bottom and side sections having structural corner members of angle section and a metallic section having marginal angles with flanges surrounding the margins of the container when extended, one of said marginal angles being hinged at one flange to a side section and at another flange to said cover section to provide separate articulations for said cover section in collapsed and extended positions, and flat metallic end sections hinged to the end angles of said bottom sections and adapted to retain said side sections in extended position.

4. A collapsible container including, in combination, metallic body sections including bottom and side sections having structural corner members of angle section and a metallic cover section having marginal angles with flanges surrounding the margins of the container when extended, one of said marginal angles being hinged at one flange to a side section and at another flange to said cover section to provide separate articulations for said cover section in collapsed and extended positions, flat metallic end sections hinged to the end angles of said bottom sections and adapted to retain said side sections in extended position, and members secured on said cover section for engagement with said end sections to retain the latter in extended position.

5. A collapsible container including, in combination, articulated side, bottom and cover sections having metallic structural members cooperating to form marginal angle members for the container when extended, one of said angle members being formed by a flat marginal member of the bottom section and a flat marginal member of a side section hinged to the first mentioned marginal member.

6. A collapsible container including a plurality of body sections arranged for movement between collapsed and extended positions, and a cover section hingedly attached to one of said body portions, and formed with a pair of inwardly extending flanges positioned to receive therebetween upon the closure of said cover section a body section

adjacent the last-mentioned body section when in extended position, and arranged to retain the same in the latter position.

7. A collapsible container including a plurality of body sections, a cover section and means to connect said cover section to one of said body sections, said means being arranged to permit when said container is extended, the movement of said cover section between a covering position and open position substantially parallel thereto, and to prevent movement of the cover section beyond the latter position, and being arranged to permit the movement of said cover section to a position parallel to said body portion as the container is collapsed.

In testimony whereof I affix my signature.

HENRY O. ELKINS.