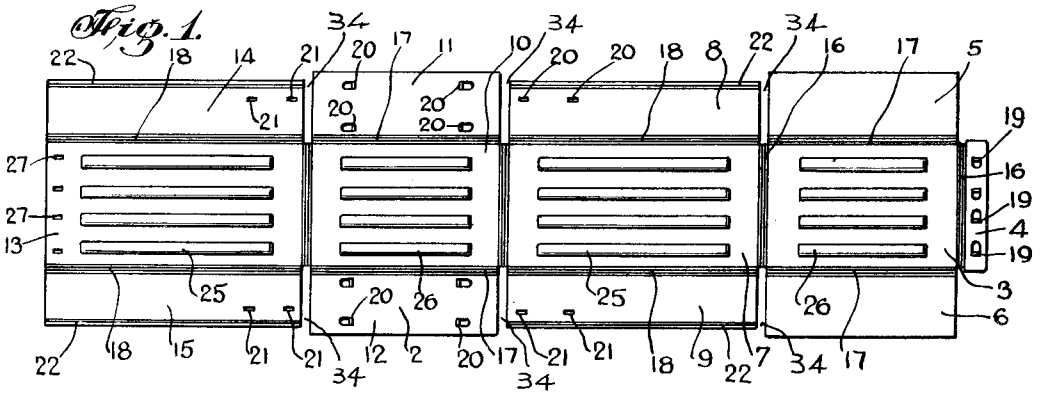
Sept. 1, 1931. O. A. ROSS 1,821,668

FOLDING METAL BOX

Filed Oct. 26, 1927

Fig. 1.



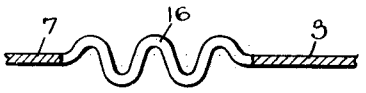


Fig. 3.

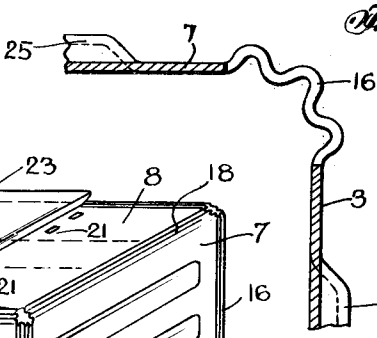


Fig. 4.

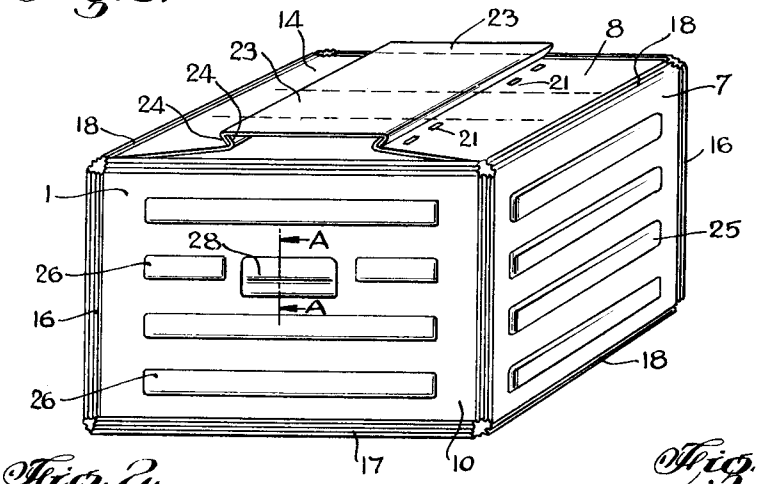


Fig. 2.

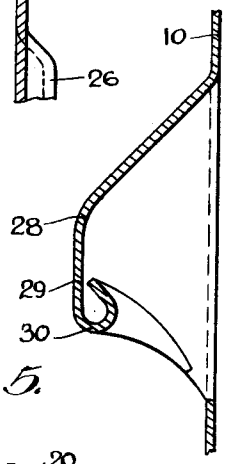


Fig. 5.

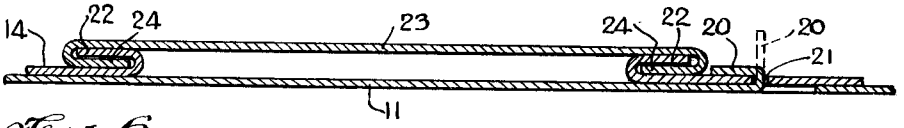


Fig. 6.

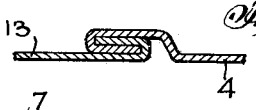


Fig. 8.

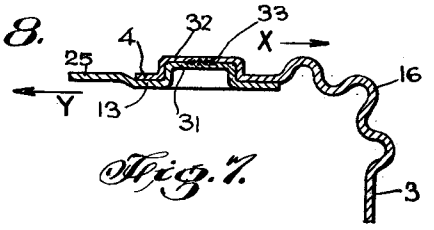


Fig. 7.

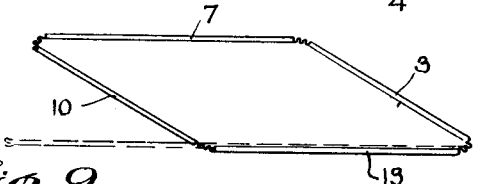


Fig. 9.

INVENTOR

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Patented Sept. 1, 1931 1,821,668

UNITED STATES PATENT OFFICE

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FOLDING METAL BOX

Application filed October 26, 1927. Serial No. 228,861.

This invention refers to folding or collapsible boxes, cartons, or containers and more particularly to a container of this type made from metal.

One object of this invention is to furnish a collapsible metal box which may be made up from strip sheet metal with a minimum of waste.

Another object is to furnish a collapsible metal box which may be formed from sheet metal and partially assembled in collapsed form whereby the empty boxes may be stored or shipped in a minimum of space.

Another object is to furnish a novel means for finally sealing the container after its contents have been packed therein.

Another object is to furnish novel flexible edges for the box whereby the various panels may be readily bent into place without distorting panels of the box.

Another object is to furnish a novel form of reenforced weld whereby two sheets of metal may be welded together in such a manner that any torsional stress between the sheets will not cause a shearing action on the weld.

Other objects and advantages will appear as the description of the invention progresses, and the novel features of the invention will be pointed out in the appended claims.

This invention consists in the novel construction and arrangement of parts hereinafter described, delineated in the accompanying drawings, and particularly pointed out in that portion of the instrument wherein patentable novelty is claimed for certain and peculiar features of the invention, it being understood that, within the scope of what hereinafter thus is claimed, divers changes in the form, proportions, size and minor details of the device may be made without departing from the spirit of, or sacrificing any of the details of the invention.

In describing the invention in detail, reference is had to the accompanying drawings wherein I have illustrated embodiments of my invention, and wherein like characters of reference designate corresponding parts through the several views, and in which:—

Figure 1, is a development of one form of sheet metal stamping employed for forming a folding metal box, and, Fig. 2 is an enlarged perspective view of a folded metal box made up from the formed sheet shown in Fig. 1, and, Fig. 3 is a detailed sectional view of one of the edges of the box before bending, and Fig. 4 is a similar view after bending, and, Fig. 5 is a sectional view of a handle formed in the box ends and is taken on line A—A, of Fig. 2, and, Fig. 6 is an enlarged sectional view of the cover seal after locking, and Fig. 7 is an enlarged sectional view of a modified form of locking a side and end together as a partial assembly of the box, and, Fig. 8 is a similar modified sectional view, and Fig. 9 is an elevated view of a partially assembled box in the state of being collapsed.

Referring to Figs. 1, 2, 3, 4 and 5, the box 1, is formed from the stamped sheet 2 comprising the open end panel 3, having locking tongue 4, top flap 5 and bottom flap 6; also side panel 7, having top cover 8 and bottom cover 9; also end panel 10, having top flap 11 and bottom flap 10; also open side panel 13 having top cover 14 and bottom cover 15.

The tongue 4, is joined to open end panel 3 by a corrugated section 16, and a similar section joins said panel to side panel 7.

The flaps 5 and 6 are joined to end panel 3 by corrugated sections 17—17, and similar sections join flaps 11 and 12 to end panel 10.

The flaps 8 and 9 are joined to side panel 7 by the corrugated sections 18—18 and similar sections join flaps 14 and 15 to side panel 13.

Stamped out of tongue 4 are locking projections 19—19 (see Fig. 6) and stamped from flaps 5, 6, 11 and 12 are locking projections 20—20 (those in flaps 5 and 6 not being shown) adapted to enter slots 21—21 of covers 8, 9, 14 and 15.

The outer edges of covers 8, 9, 14 and 15 are formed upwardly into locking sections 22—22 adapted to interlock with locking sections 24—24 of top and bottom covers 23—23.

The side panels 7 and 13 are formed to provide reinforcing ribs 25—25 and the end panels 3 and 10 are also formed to provide similar ribs 26—26.

The side panel 13 is provided with perforations 27—27 to receive locking members 19—19 of tongue 4.

Suitable handles as 28—28 are formed in the end panels 3 and 10, the carrying edge 29 being bent over to form a roll edge 30.

Referring to Fig. 7, showing a modified form of securing tongue 4 to side panel 13, said panel is stamped to form a cylindrical cup shaped boss 31 adapted to enter into a similar but larger diameter boss 32 and whereafter the weld 33 is formed to lock said tongue and panel together. It will be noted that strain of the tongue 4 in direction of arrow X and an opposite strain of panel 13 in direction of arrow Y will merely serve to impinge the cylindrical section of boss 32 against the similar section of boss 31 in this manner relieving the weld 33 from any shearing action, the weld only being required to hold said tongue and panel against separation transversely.

The process of forming applicant's improved box is as follows:—The sheet metal from which the boxes are formed is preferably supplied in sheets, the plane dimensions of which are substantially the length and width of the developed stamping as shown by Fig. 1. The first operation comprises notching out openings 34—34, piercing perforations 27—27 and shearing locking members 19—19 and 20—20 and also shearing handles 28—28 preparatory to forming.

The second operation comprises forming the corrugations 16—16, 17—17 and 18—18, also the reinforcing ribs 25—25 and 26—26, also forming the locking sections 22—22 and the handles 28—28.

If desired, and if locking projections as 19—19 and slots 27—27 are employed, the formed sheet 2 may be stocked or shipped without further assembly. However, if the modified forms of securing tongue 4 and panel 13 together as shown by Figs. 7 or 8, are employed, it is preferable to join said tongue and panel whereafter the partially formed box is collapsed as shown by Fig. 9, whereafter it is stocked or shipped for further use.

When the box is to be finally filled with material, the collapsed carton shown in Fig. 9, is re-opened to form a rectangle whereafter the bottom flaps 6 and 12 are folded inwardly. Thereafter the bottom cover panels 9 and 15 are also folded inwardly and on top of the flaps 6 and 12, the locking projectors 20—20 partially entering the slots 21—21. Thereafter a cover as 23 is restrained to engage the locking sections 22—22, said cover being first engaged at one end of the box locking sections 22—22 and thereafter slid to place whereafter the cover 23 is restrained downwardly until the cover 23 is interlocked with cover panels 9 and 15 as shown by Fig. 6, and whereafter the locking projections 19 are bent to also lock flaps 6 and 12 onto cover panels 9 and 15. The box 1 is now ready to receive the contents to be placed therein and after being filled therewith the top flaps 5 and 11 are folded inwardly whereafter the top cover panels 8 and 14 are also folded inwardly until the locking projections 20—20 enter the slots 21—21. Thereafter another cover as 23 is restrained to engage the locking section 22—22 of top cover panels 8 and 14 whereafter said cover is restrained downwardly until it is securely locked with said cover panels as shown by Fig. 6. Thereafter the locking projections 20—20 are also bent over to lock top flaps 5 and 11 onto cover panels 8 and 14.

On boxes of certain dimensions it may be preferable to omit covers 23—23 and form locking section 22—22 to engage each other and finally be formed into a lock seam as shown by Fig. 8.

It is to be noted that by employing applicant's improved method of forming folding metal boxes, said boxes may be varied in height and/or width without varying the width of the flat stock from which said boxes are formed. To compensate for the changes in width and height of said boxes, the width of the top and bottom detached covers, as 23, is varied proportionately to the change in width of the cover portions, as 8—9 and 14—15, depending upon whether the box is increased or decreased in width and/or height.

What I claim is:—

1. A developed metal sheet for knock down metal boxes, the sheet having uniformly spaced parallel edges, comprising, a plurality of rigid side and end wall panels formed alternately longitudinally of the center portion of the sheet, the panes being integrally joined by corrugated flexible portions formed transversely of the center portion of the sheet, rigid cover panels formed co-extensively of each edge portion of the sheet positioned transversely oppositely each side and end wall panel, the inner longitudinal edge of each cover panel being integrally joined to each longitudinal edge of the side and end wall panels by a corrugated flexible portion formed longitudinally of the sheet, the parallel edges of the sheet solely forming the outer longitudinal edges of the cover panels.

2. A developed metal sheet for knock down metal boxes, the sheet having uniformly spaced parallel edges, comprising, a plurality of rigid side and end wall panels formed alternately longitudinally of the center portion of the sheet, the panels being integrally joined by corrugated flexible portions formed transversely of the center portion of the sheet, rigid cover panels formed co-extensively of each edge portion of the sheet positioned transversely oppositely each side and end wall panel, the inner longitudinal edges of each cover panel being integrally

joined to each longitudinal edge of the side and end wall panels by a corrugated flexible portion formed longitudinally of the sheet, the parallel edges of the sheet solely forming the outer longitudinal edges of the cover panels and the dimensions of the end wall panel between the transverse edges thereof being determined independently of the dimension of the cover panels between the inner and outer edges thereof.

3. A knock-down metal box comprising, a plurality of rigid panels joined together at their edges by integral flexible portions, certain panels forming cover panels for the box, semi-formed locking portions formed on the cover panels, a detached cover arranged to be secured to the cover panels, and semi-formed locking portions formed thereon arranged to engage and be interlocked with the locking portions of the cover panels as the locking portions are completely formed to secure the detached cover to the cover panels to form the cover for the box.

4. A knock-down metal box comprising, a plurality of rigid panels joined together at their edges by integral flexible portions, certain panels forming cover panels arranged to partially enclose a face of the box, locking portions formed thereon, a detached cover arranged to be secured to the cover panels for completing the closure, locking portions formed thereon arranged to engage and be interlocked with the locking portions of the cover panels as the locking portions are completely formed to secure the detached cover to the cover panels to complete the closure of the box.

5. A knock-down metal box comprising, a plurality of plane rigid panels joined together at their edges by integral flexible portions, and re-enforcing ribs formed in the plane surfaces of the panels, the re-enforcing ribs being formed as integral portions of the panels.

6. A knock-down metal box comprising, a plurality of rigid plane panels joined together at their edges by integral flexible portions, and handles formed in the panels, the handles being formed from the panels as an integral portion thereof.

7. A knock-down metal box comprising, a plurality of rigid panels joined together at their edges by integral flexible portions, certain panels forming cover panels arranged to be folded one over the other, locking projections formed on certain of the cover panels, and orifices formed on other cover panels arranged to receive the locking projections as the cover panels are folded together for sealing the box, the locking projections being arranged to bendably lock the cover panels together.

8. A developed metal sheet for knock down metal boxes, the sheet having uniformly spaced parallel edges formed thereon, comprising, a plurality of rigid side and end wall panels formed longitudinally of the center portion of the sheet, flexible portions formed transversely of the sheet integrally joining the transverse edges of the side and end wall panels, cover panels formed co-extensively of each edge portion of the sheet, each cover panel being positioned transversely oppositely the side and end wall panels, flexible portions formed longitudinally of the sheet integrally joining the inner longitudinal edge of the cover panels and the longitudinal edge of the side and end wall panels, the parallel edges of the sheet forming the cutter edge of the cover panels independently of the dimensions of the side and end wall panels between the transverse and/or longitudinal edges thereof.

9. A developed metal sheet for knock down metal boxes comprising, rigid side and end wall panels formed alternately co-extensively of the center portion of the sheet, flexible portions formed transversely of the sheet integrally joining the transverse edges of the side and end wall panels, rigid cover panels formed co-extensively of the edge portions of the sheet, the cover panels being positioned transversely oppositely the side and end wall panels, flexible portions formed longitudinally of the sheet integrally joining the inner edge of the cover panels and the longitudinal edges of the side and end wall panels, and notches formed transversely of the sheet between each cover panel extending between the inner and outer edges thereof, the inner ends of the notches communicating with the inner ends of the transverse flexible portions.

10. A knock down metal box comprising, a plurality of rigid metal panels forming the walls of the box, certain edges of the panels being arranged spacedly parallel to each other, flexible portions integrally joining the spacedly parallel edges of the panels, and a plurality of continuously connected corrugations formed in the flexible portions between the edges of the panels, the corrugations extending longitudinally of the flexible portions whereby the panels may be readily positioned relatively to one another to form the box for receiving the contents to be placed therein.

11. A knock down metal box comprising, a plurality of rigid metal panels forming the walls of the box, certain edges of the panels being arranged spacedly parallel to each other, flexible portions integrally joining the spacedly parallel edges of the panels, and reversed curve grooves formed in the flexible portions between the edges of the panels, the grooves extending longitudinally of the flexible portions whereby the panels may be readily positioned relatively one to another for forming the box for receiving the contents to be placed therein.

12. A knock down metal box comprising, a

plurality of rigid metal panels forming the walls of the box, certain edges of the panels being arranged spacedly parallel to each other, flexible portions integrally joining the spacedly parallel edges of the panels, and inwardly facing and outwardly facing grooves formed alternately longitudinally of the flexible portions between the edges of the panels whereby the panels may be readily positioned relatively one to another for forming the box in preparation to receiving the contents to be placed therein.

Signed at New York city in the county of New York, and State of New York, this 21st day of October, A. D. 1927.

OSCAR A. ROSS.