

Dec. 23, 1958

N. LEVENBERG
RADIATOR ENCLOSURE

2,865,569

Filed Dec. 1, 1953

3 Sheets-Sheet 1

FIG. 1.

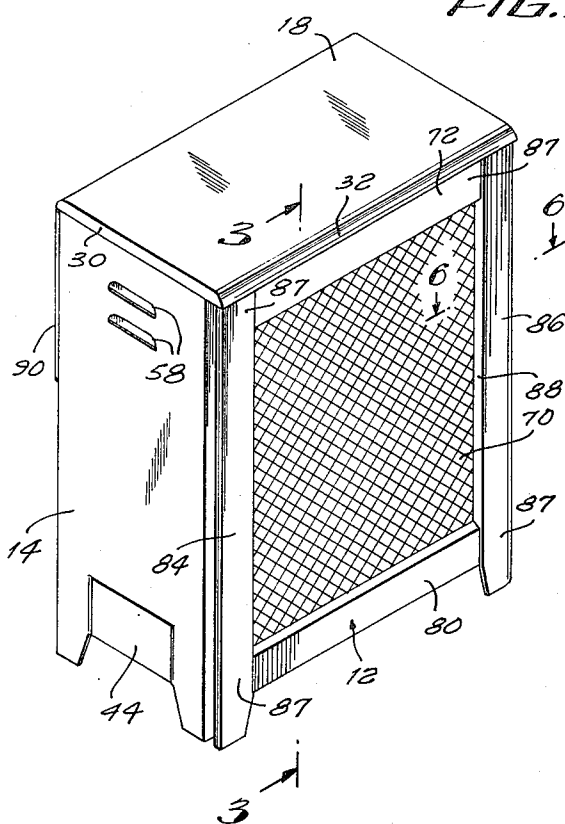


FIG. 3.

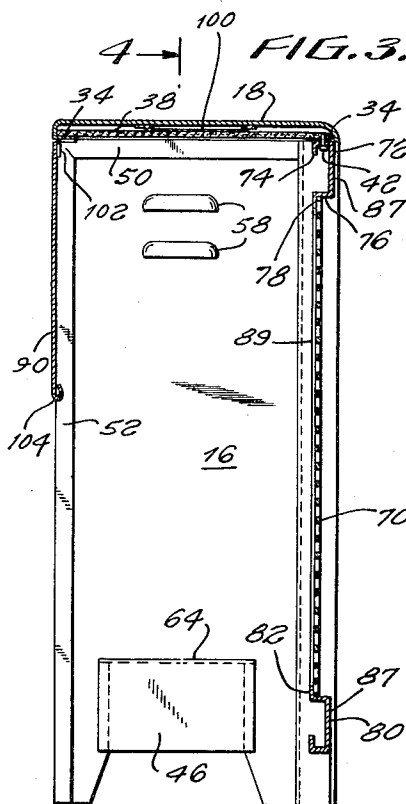
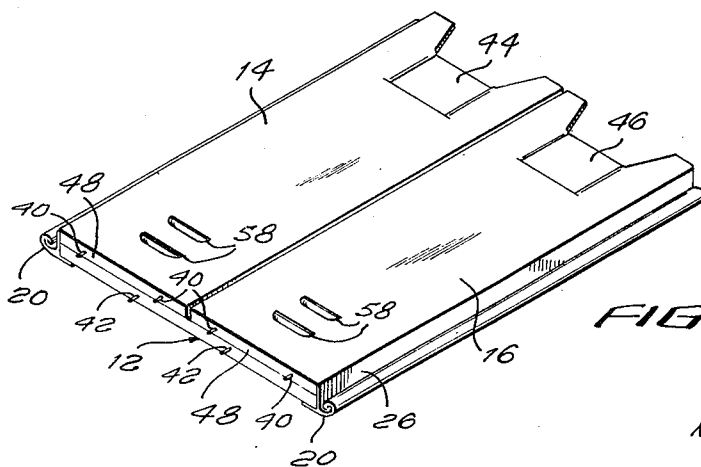


FIG. 2.



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3 Sheets-Sheet 2

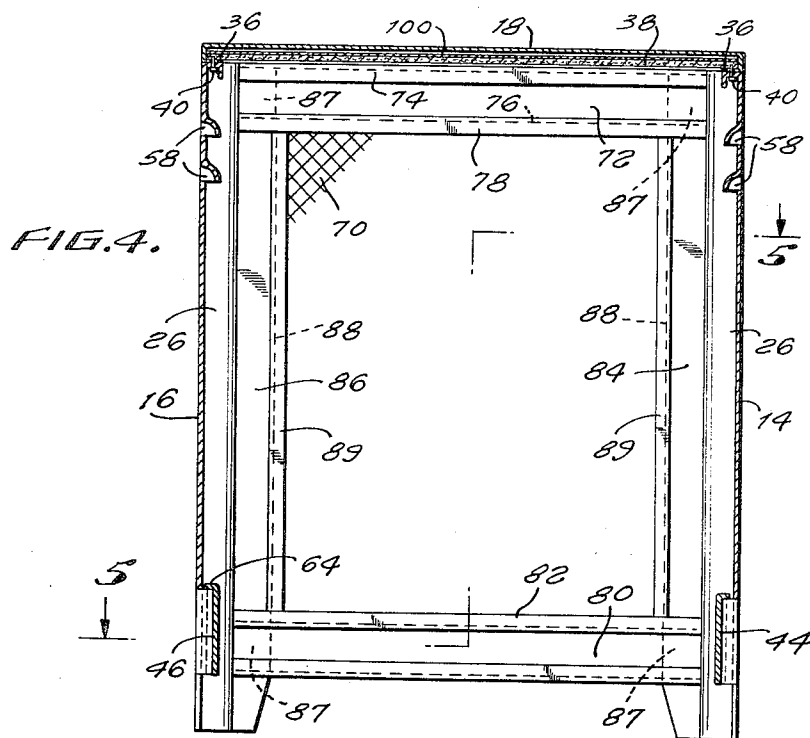


FIG. 8.

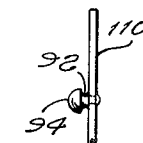


FIG. 9.

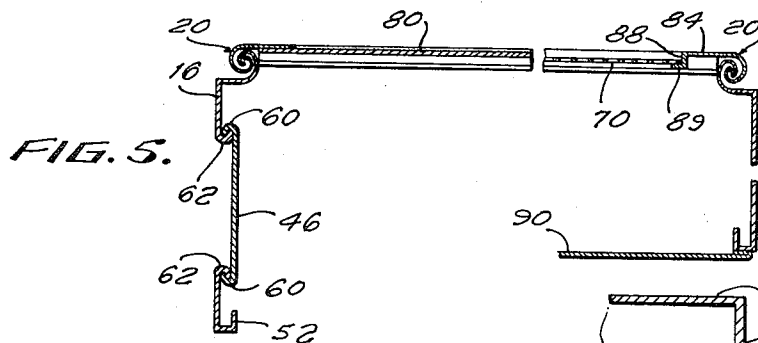
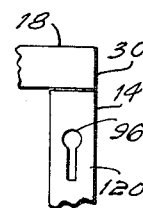
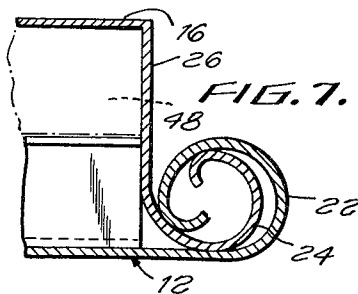
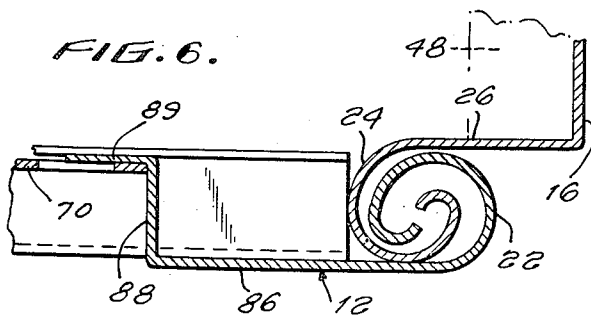


FIG. 10.



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3 Sheets-Sheet 3

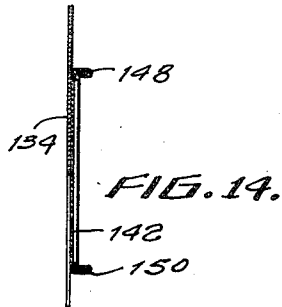
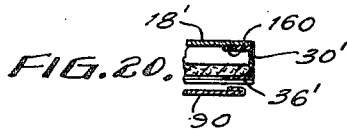
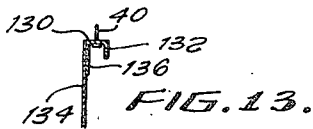
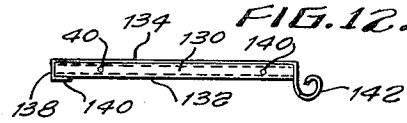
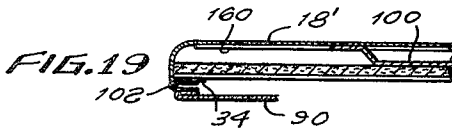
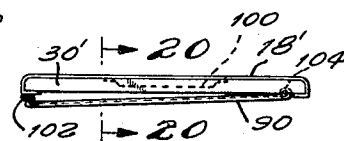
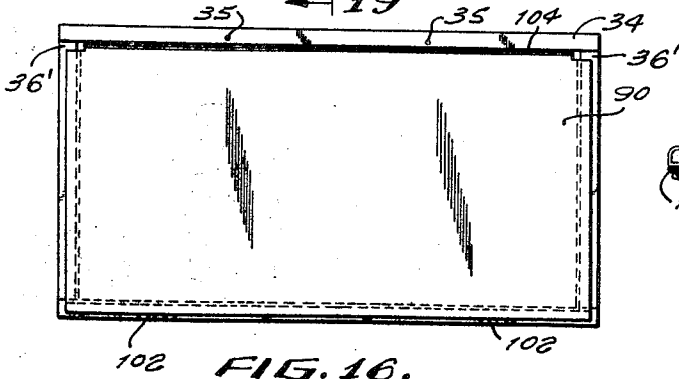
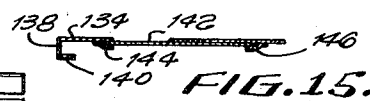
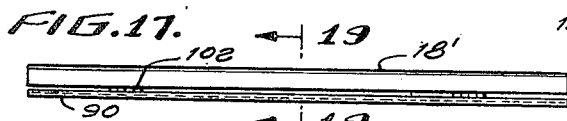
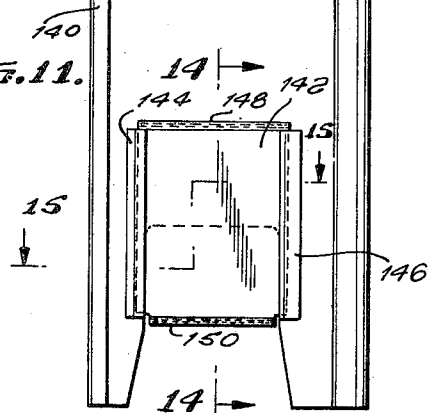


FIG. 11.



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RADIATOR ENCLOSURE

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4 Claims. (Cl. 237—79)

This invention relates to radiator enclosures, and more particularly to a foldable or knock-down radiator enclosure.

Most radiator enclosures are custom-made, and even though the more important sizes might be standardized for quantity manufacture, the resulting product still would be too bulky for easy merchandising. One object of the present invention is to provide a radiator enclosure which may be knocked down or folded, for compact packaging in a carton which is only a fraction of the size of the enclosure when set up, and which is well adapted for storage in warehouses, stores and the like, so that it may be merchandised by department stores and mail order houses as well as local stores.

Another object of the invention is to provide such a radiator enclosure which does not require the use of bolts, nuts, screws or the like, nor the use of tools of any kind to assemble or dis-assemble the same.

A further object is to provide such a radiator enclosure which has sliding gates or doors at the ends for access to a radiator valve, the said doors preferably being so designed as to provide a safe edge although made of sheet metal.

To accomplish the foregoing general objects, and other more specific objects which will hereinafter appear, my invention resides in the radiator enclosure elements, and their relation one to another, as are hereinafter more particularly described in the following specification. The specification is accompanied by drawings, in which:

Fig. 1 is a perspective view of a radiator enclosure embodying features of my invention;

Fig. 2 is a perspective view showing the side panels folded against the back of the front panel;

Fig. 3 is a vertical section taken approximately in the plane of the line 3—3 of Fig. 1;

Fig. 4 is a vertical section taken approximately in the plane of the line 4—4 of Fig. 3;

Fig. 5 is a horizontal view taken approximately in the plane of the stepped line 5—5 of Fig. 4;

Fig. 6 is a fragmentary section drawn to enlarged scale and taken approximately in the plane of the line 6—6 of Fig. 1;

Fig. 7 is a fragmentary section similar to Fig. 6, but showing the relation of the parts when the side panel is folded against the back of the front panel;

Fig. 8 is a fragmentary view showing how a back plate may be provided with studs for detachably mounting the same;

Fig. 9 is a fragmentary view showing how the rear edges of the side panels may be provided with bayonet slots to receive the studs of the back plate shown in Fig. 8;

Fig. 10 is a fragmentary view of one pattern of perforation which may be used for the front panel;

Fig. 11 is an inside elevation of a modified form of side panel;

Fig. 12 is a plan view of the same;

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Fig. 13 is a fragmentary section taken approximately in the plane of the line 13—13 of Fig. 11;

Fig. 14 is a vertical section taken approximately in the plane of the line 14—14 of Fig. 11;

Fig. 15 is a horizontal section taken approximately in the plane of the stepped line 15—15 of Fig. 11;

Fig. 16 is a bottom plan view of a slightly modified top for the radiator enclosure, with the back plate folded thereagainst as it is during packaging and shipment;

Fig. 17 is an edge view of the top looking toward the hinged edge, with the back plate folded against the top;

Fig. 18 is an end elevation of the modified top with the back plate in folded position;

Fig. 19 is a fragmentary section taken approximately in the plane of the line 19—19 of Fig. 17; and

Fig. 20 is a fragmentary section taken approximately in the plane of the line 20—20 of Fig. 18.

Referring to the drawing, and more particularly to Fig. 1, the radiator enclosure comprises a front panel 12, side panels one of which is visible at 14, and a top 18. The other side panel 16 is shown in Figs. 2 and 3, and in Fig. 2 it will be seen that the side panels 14 and 16 may be folded flat against the back of the front panel 12. For this purpose the side panels have a width less than half the width of the front panel, and the side and front panels are preferably joined by hinge means generally designated 20.

The panels and the top are all made of sheet metal, but the sheet metal is folded at the side edges to give the same a desired rigidity and an apparent thickness, as will be seen in the drawing. The hinge means 20 is so designed as to permit the side panels to fold flat against the back of the front panel despite this apparent thickness.

Referring to Fig. 6, the sheet metal of the front panel 12 is curled as shown at 22 along its side or vertical edges. The side panel 16 is matingly curled as shown at 24, and the curls 22 and 24 are readily inter-engaged by sliding one axially of the other to provide the desired hinge action. However, at least one of the curls, in this case the curl 24, is offset from its panel, as shown by the inward bend 26. When the side panel 16 is folded against the front panel 12, as is shown by the change from Fig. 6 to Fig. 7 of the drawing, the offset at 26 permits the parts to come flat together despite their thickness. Differently expressed, the total dimension of the offset 26 is preferably adequate to compensate for the sum of the thicknesses of the front panel and the side panel.

The top 18 is preferably made of sheet metal, and its side edges are turned downward as shown at 30 and 32 in Fig. 1, and then inward as shown at 34 in Figs. 3 and 19, and at 36 in Fig. 4. This forms a comparatively rigid top of seeming substantial thickness. The top is additionally strengthened by welding thereto a channel-shaped stiffening piece. This is shown in section at 100 in Fig. 3 and in Fig. 4. It is also shown in broken lines in Fig. 18. It will be evident that the flat outwardly turned edges may be welded against the top of the radiator cover, which is the preferred method of assembly. The depth of the channel is made less than the apparent thickness of the top, thereby leaving room for a layer of heat insulation.

The hollow interior of the top preferably receives such a lining of heat insulation, as shown at 38 (Fig. 3). This heat insulation may be asbestos, glass wool, or other known equivalent materials, and it prevents the top from becoming too hot, so that it may be usefully employed as a shelf. The heat insulation may be purchased in sheet form, and is cut to size and cemented at the center against the bottom of the channel 100. The edges of the heat insulation are received within the inwardly fold-

ed bottom edges 34 and 36 of the top, thus supporting the same against sagging downward. The cementing or attachment to the channel 100 supports the sheet against sagging downward at the center.

The top might be foldably related to one of the other walls, but is preferably and most simply made completely detachable. The top, and the front and side panels, are provided with mating means to detachably secure them together. In the specific case here shown the top has a series of holes formed through the inwardly turned bottom edges 34 and 36. These holes receive pins or metal dowels which project upwardly from the top edges of the front and side panels. Two of the holes are shown at 35 in Fig. 16. In the present case each side panel has two such pins, some of which may be seen at 40 in Figs. 4, 11, 12, and 13, and the front panel has two such pins, one of which is shown at 42 in Fig. 3. These pins preferably have large flat heads (Fig. 13) which are preferably welded in position, and to assemble the top with the panels it is merely necessary to push the top down until the pins are received in the holes.

The side panels 14 and 16 may be made mainly of a single piece of heavy gauge sheet metal. This sheet metal is bent inwardly at the top and side edges to a desired simulated thickness, as indicated at 48 in Fig. 2. At the top and rear edges the metal is then bent parallel to the outside wall, as shown at 50 and 52 in Fig. 3. The forward edge is extended and curled as was previously explained in connection with Figs. 6 and 7, the extension or offset 26 making it possible for the panel to fold flat.

The louvers 58 are desirable in order to improve air circulation. They are preferably struck inward, as is best shown in Fig. 4.

Referring now to Fig. 5, the outer edges of the door 46 are reversely folded, as shown at 60. The side edges of the door opening are reversely folded in opposite direction, as shown at 62. The parts fit together, thus affording a sliding movement of the door 46 in vertical direction, while at the same time providing safe edges. The downward movement of the door may be limited by folding the top edge of the door outward, as is indicated at 64 in Fig. 4. To gain access to a radiator valve it is merely necessary to push the door upward. Except at its ends, the lower edge of the door may be reversely folded to give the same a safe edge, although such a fold is not shown in Fig. 4, but is in Fig. 14.

It will be understood that the two side panels 14 and 16 are alike in construction, although reversed in the sense that the hinge curl is at the righthand edge when looking at the panel 14, and is at the lefthand edge when looking at the panel 16.

The front panel is highly perforate, and for this purpose is essentially a rigid frame which carries a flat sheet 70 of perforate metal. The perforations may form an ornamental appearance, as is already common with radiator enclosures. One such perforation is shown in Fig. 10, but other patterns are available and usable.

The frame is made up of four pieces each made of sheet metal, and referring to Figs. 3 and 4 it will be seen that the top member 72 has its top edge bent rearwardly to a desired thickness, and then downwardly as shown at 74. The bottom edge of top member 72 is folded rearwardly to a desired thickness as shown at 76, and then downwardly as shown at 78, thus forming a flange against which the perforate sheet 70 is secured.

The bottom member 80 is substantially the same as the top member 72, except that it is inverted so that its flange 82 is at the top.

Referring now to Figs. 1, 4, and 5, the side members 84 and 86 are made of sheet metal, with the inner edges bent rearwardly as shown at 88, and then inwardly to form flanges 89 against which the perforated sheet 70 is received. It is preferably spot welded to the flanges

78, 82, and 89. The rearwardly bent part 88 and flange 89 terminate at the lower edge of the top member 72, and at the upper edge of bottom member 80, thus permitting the latter members to be welded flat against the back of the front walls of the upright members 84 and 86 in the upper and lower or end regions of said upright members as shown at 87. At their outer edges the upright members 84 and 86 are bent to form hinge curls, as was already described in connection with Figs. 6 and 7.

The radiator enclosure as so far described is complete enough for use. When the top 18 is applied over its holding pins it holds the front and side panels in proper relation. However, I prefer to additionally provide a back plate which closes the back of the radiator. One important advantage is to prevent soiling of the wall of the room immediately above the radiator, which otherwise may be caused by the rising current of hot air escaping behind the back edge of the top 18.

The back plate is shown at 90 in Figs. 1 and 3. For convenience it is preferably hinged to the top, as is indicated at 102, and the vertical dimension of the back plate is preferably made small enough so that it may fold against the top during packaging and shipment. This is clearly shown in Figs. 16, 17, 18, and 19, referring to which it will be seen how the back plate 90 folds flat against the bottom of the top 18'. The top and side edges of the back plate are reversely folded to provide the same with a safe edge and also to stiffen the same. The bottom edge of the back plate is curled inward on a relatively large radius as shown at 104 (Figs. 3 and 18), thereby stiffening the same. However, in order to insure flat folding, this rolled edge 104 is cut short at its ends, as will be seen in the upper left and right corners of Fig. 16, so that the rolled edge 104 fits within the inwardly turned edges 36' of the top. This is also shown in dotted lines at 104 in Fig. 18.

The main purpose of the back plate is to prevent circulation of air upward along the wall of the room immediately behind the radiator where it may darken or discolor the wall. Instead the circulation is guided forward through the perforated front panel, and through the louvers of the side panels.

It is not essential that the back plate be hinged to the top. A flat sheet metal back plate may be employed which is detachably secured to the rear edges of the side panels by suitable means, for example, bayonet or keyhole slots. Thus referring to Figs. 8 and 9, the back plate 110 has a stud 92 riveted thereto, the said stud having a head 94. The rear edge 120 of the side panel 14 has a keyhole slot 96, the upper part of which is dimensioned to receive the head 94 and the lower part of which is dimensioned to receive the stud 92. There are four studs, two at each side edge of the back plate near the upper and lower corners thereof. The keyhole slots are similarly located, and are cut through the rear edges of the side panels. It will be understood that the top edge of the back plate reaches or overlaps the rear edge of the top 18 after the studs have been slid down to the bottom of the keyhole slots. In other words, there should be no open space between the top of the back plate and the top of the enclosure. It may be mentioned that the back plate of this construction may be of substantially the same height as the enclosure if desired, instead of being shortened in vertical direction as was the case with the back plate 90.

Referring now to Figs. 11-15, I there show a modified form of side panel. This side panel is generally the same as that previously described but differs in several minor respects.

One is that the top edge 130 (Fig. 13) and the downwardly turned inside edge 132 are not integral with the main side wall 134 of the panel. Instead they form a part of a channel which is completed by a third wall 136, the latter being welded against the main side wall 134.

The rear edge wall 138 and its intumed edge 140, as well as the hinge curl 142, are integral with the main side wall 134, as previously described, but the top of the panel is finished by an inverted channel member which is welded in position. This inverted channel member carries the pins 40 previously referred to.

Another difference in the side panel shown in Fig. 11 centers about the upwardly slidable door 142. In this case the side edges of the door are flat, and are received within guide tracks formed by strips 144 and 146 which are welded against the inside face of the main wall 134. The top edge of the door is folded inwardly and reversely as shown at 148 in Fig. 14, and similarly the bottom edge is folded inwardly and reversely as shown at 150. However, the fold at the bottom is shortened or cut away at its ends in order to clear the guide tracks 144, 146, whereas the fold 148 at the top is intentionally left full in length so that it will act as a stop to limit downward movement of the door. The door is shown in its normal or closed position in Fig. 11, and it will be understood that for access to a radiator valve the door is simply pushed upward by bearing against its bottom edge 150.

The top 18' shown in Figs. 18-20 also differs in one detail from the top 18 previously described. The end edges 30' and inwardly folded flanges 36' are not integral with the top 18', and instead form part of a channel which is completed by the part 160 (Figs. 19 and 20). The part 160 is welded to top 18'. The front and back edges are made integral, as in Figs. 1-4.

The changes in Figs. 12-20 make for manufacture in simpler and less expensive dies.

It is believed that the construction and method of assembling my improved radiator enclosure, as well as the many advantages thereof, will be apparent from the foregoing detailed description. The enclosure may be folded or knocked down to small dimension for packaging, storage and shipment, thus making it feasible to merchandise the same in stores and by mail order. No bolts, nuts or screws are employed, and no tools of any kind are needed to assemble the enclosure. The perforate front is supplemented by louvered sides. The back plate aids in proper distribution of warm air, and prevents soiling of the wall behind the radiator. The sliding doors at the sides provide ready access to the radiator valve, yet conceal the same when not in use.

It will be understood that while I have shown and described my invention in preferred forms, changes may be made in the structures shown, without departing from the scope of the invention, as sought to be defined in the following claims.

I claim:

1. A foldable knock-down radiator enclosure comprising a front panel, side panels, a back plate, and a top, said top being made of sheet metal and having edges which extend downward and inward to provide a comparatively rigid top of substantial apparent thickness, said back plate being hinged at its top edge to the rear edge of the top, the height of the back plate being approximately equal to but no greater than the width of the top, to afford folding for packaging and storage, said

back plate having a height only a fraction of the height of the panels.

2. A foldable knock-down radiator enclosure comprising a front panel, side panels, a back plate, and a top, said top being made of sheet metal and having edges which extend downward and inward to provide a comparatively rigid top of substantial apparent thickness, said back plate being hinged at its top edge to the rear edge of the top, the height of the back plate being approximately equal to but no greater than the width of the top, to afford folding for packaging and storage, said back plate having a height only a fraction of the height of the panels, the bottom edge of the back plate being curled to stiffen the same, and the ends of said curl being cut away to permit the curl to be received within the hollow interior of the top.

3. A radiator enclosure comprising a front panel, side panels, and a top, said top being made of sheet metal and having edges which extend downward and inward to provide a comparatively rigid top of substantial apparent thickness, the inwardly turned bottom edge of said top lying in a plane parallel to the top and having a plurality of holes, and the top edges of said front and side panels having mating upwardly projecting pins to fit in said holes, said pins being shorter than the apparent thickness of the top, the inside of said top having a lining of heat insulation, with the edges resting on the intumed edges of the top.

4. A radiator enclosure comprising a front panel, side panels, and a top, said top being made of sheet metal and having edges which extend downward and inward to provide a comparatively rigid top of substantial apparent thickness, said inward bent edges of said top lying over the top of said front and side panels and said top being stiffened by a flat channel-shaped piece welded thereto, said piece having a channel height less than that of the top, and a lining of heat insulation secured beneath the bottom of the channel, with its edges resting on the intumed edges of the top.

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