

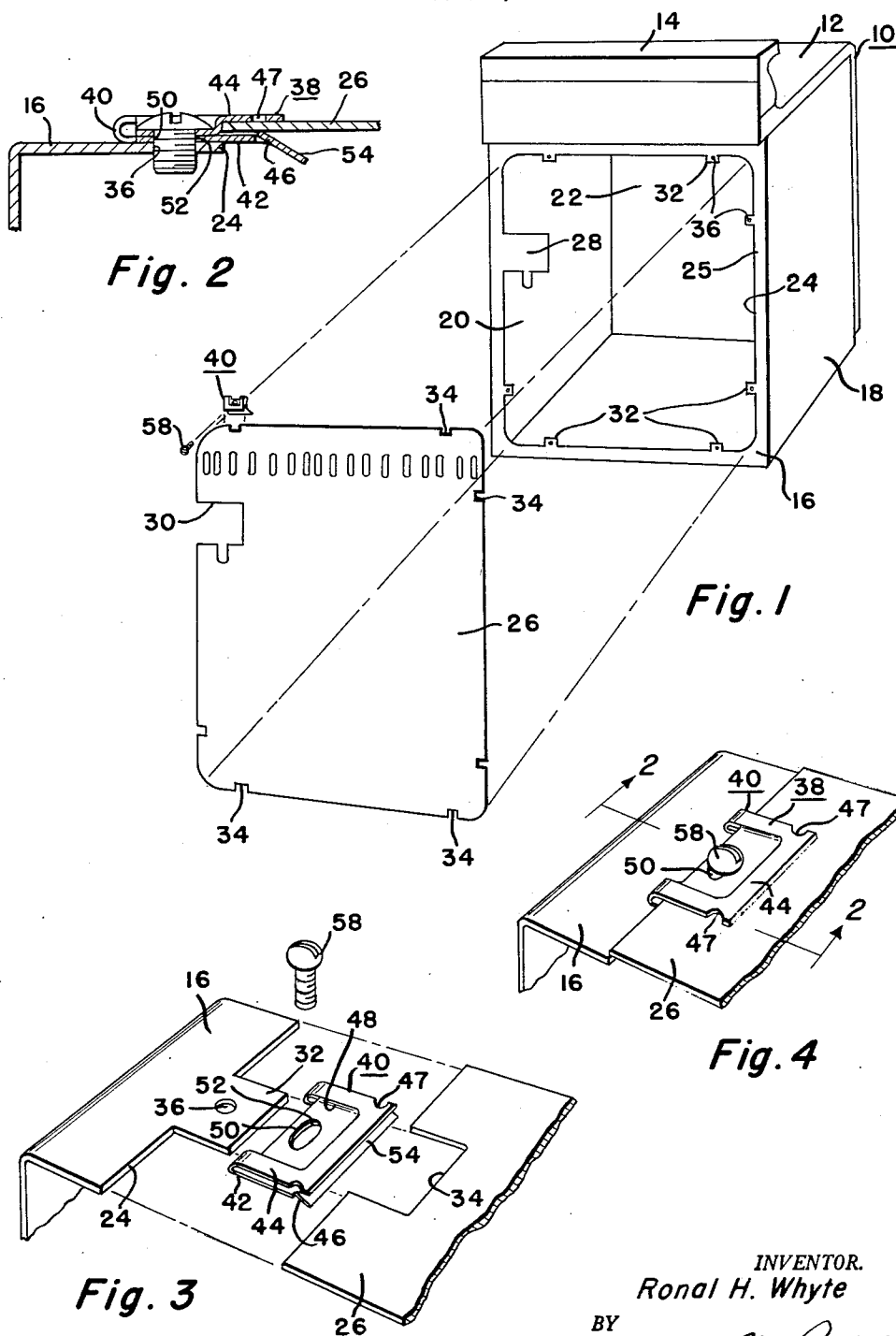
May 22, 1962

R. H. WHYTE

3,035,670

PANEL JOINT

Filed Oct. 5, 1959



INVENTOR.  
Ronald H. Whyte  
BY  
Frederick M. Ritchie  
His Attorney

1

3,035,670

## PANEL JOINT

Ronal H. Whyte, Dayton, Ohio, assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Filed Oct. 5, 1959, Ser. No. 844,244  
5 Claims. (Cl. 189—36)

This invention relates to a domestic appliance and more particularly to an improved forming and attachment method for a service panel on a cabinet type appliance.

In the appliance art many devices such as laundry products are constructed so that a panel thereof may be removed to service the mechanism enclosed within the cabinet. In recent years the box-like cabinets have been formed by a wrap-around method wherein a single sheet of metal forms three or more sides of the appliance cabinet. Prior to bending or forming the sheet of metal into a box-like shape, a panel is generally punched out to define an access opening for subsequent exposure of the mechanism housed within the cabinet. Heretofore the punched out panel has been discarded and another larger panel supplied to cover the access opening. In brief, prior art devices have used an access panel which is slightly larger than the access opening—conventional fastening means being utilized to attach the panel to the cabinet. Such an arrangement creates a considerable amount of waste in that the punched out portion is discarded and another manufacturing operation is required to form an oversized access panel. It is to the solution of this problem that the present invention is directed.

It is an object of this invention to provide a cabinet wall having an access opening formed by the removal therefrom of a panel which subsequently serves as the access cover for said opening.

A further object of this invention is the provision of a punching operation for a cabinet access opening which simultaneously preforms the access opening and the access panel.

A more specific object of this invention is the provision of a fastening assembly wherein a panel having a notch may be joined to a panel having a complementary tab—a clip snugly interfitting said notch and adapted to overlie said tab for facilitating attachment of said panel.

A still more specific object of this invention is to provide a clip assembly for attaching complementary notched and tabbed panels, including a clip having a recess for positioning the clip on the notched panel, and means for resisting the removal of said clip from said notched panel, and means for connecting said clip to said tabbed panel.

It is also an object of this invention to utilize a punched out panel as the access cover for the punch-formed access opening, complementary tabs and notches being formed on the access opening and the access cover, respectively, for cooperation with a clip in securing the cover to the opening.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings wherein preferred embodiments of the present invention are clearly shown.

In the drawings:

FIGURE 1 is an exploded perspective view of an appliance cabinet having a punched out access panel connected in accordance with the concepts of this invention;

FIGURE 2 is a sectional view taken along line 2—2 in FIGURE 4;

FIGURE 3 is an exploded perspective view showing the components of the fastening assembly of this invention; and

FIGURE 4 is a perspective view of the fastening assembly with the adjacent panels in fastened relationship.

2

In accordance with this invention and with reference to FIGURE 1, an appliance cabinet 10 is illustrated having a top portion 12 on which a control panel 14 may be mounted. The rear wall 16 and sidewalls 18 and 20 are formed from a single sheet of metal in a wrap-around type of construction to form a three-sided box or receptacle.

Within the cabinet or box 10 any type of appliance actuating mechanism may be installed. For instance, if the cabinet 10 is to enclose a dryer, the tumbling drum and its prime moving system are included within the cabinet. Additionally, if the cabinet 10 is to house a washing machine, the agitating and spinning mechanism, as well as the spin tub, are all installed within the cabinet 10. These components of washers and dryers require periodic servicing and, for this reason, it is desirable to have an access opening in some portion of the cabinet 10 to permit such servicing of the enclosed mechanism. In the cabinet shown in FIGURE 1 an access opening is formed in the rear wall thereof. Prior to the forming of the three-sided wrap-around shape, the sheet of metal forming the rear wall 16 and sidewalls 18 and 20 has punched therein an opening 24 defined by a peripheral flange 25. In the prior art devices the piece of metal punched from the metal sheet has been discarded or utilized in other manufacturing operations to form smaller work pieces. In any event, it was necessary to close the opening 24 with a somewhat larger panel which could be fastened to the flange 25 in any conventional manner, as by screws. It is the object of this invention to utilize the same piece of metal which is punched from the rear wall portion of the wall or sheet portion 16 as the removable access panel, lid or cover.

This invention also solves another problem which has been encountered in the mass production of appliance cabinets with access openings. Due to the odd configuration of many mechanisms to be placed within an appliance cabinet, the access openings are frequently irregular. Such odd sized access openings or apertures make it more difficult to form access panels which will match or be completely complementary to the access opening. Manufacturing tolerances between access opening and covering access panel sometimes vary to the point that the access panel doesn't fit. Reworking of the parts in such instances adds greatly to the cost of manufacture. This invention sets forth an arrangement whereby the access panel must necessarily match the access opening—the blank punched from the cabinet serving as the access panel.

In view of the foregoing problems, this invention teaches a design for a cabinet 10 wherein the access opening 24 is punched from an unformed sheet prior to forming the sheet into a box with sides 16, 18 and 20. For the purpose of this invention, however, it is immaterial what form is given to the sheet after the access opening is cut. The blank cut from the sheet to form the access opening 24 subsequently becomes the access panel or cover 26, thereby eliminating the scrap which normally occurs from such a punching operation.

Many appliances have components which mount on the same wall as the access opening and which require external connection. Where it is desirable to have an access opening which covers substantially the entire wall, arrangements must be made to support such components on the wall and to shape the access panel to avoid covering such components. Note that the access opening 24 has an irregular protruding extension or component support portion 28 thereon to accommodate such items as a water valve assembly for a washing machine. Since the water inlet connectors must be exposed for hose attachment, the access panel must not hinder access to the connectors. In prior art devices two or more operations were required to

3

accommodate the formation of an access opening and an access panel for covering the opening. These operations are accompanied by waste or scrap due to the odd configurations frequently punched. However, the panel 26 and the irregular opening 24 with the extension 28 are formed by the same stamping operation. Of basic importance to the fastening arrangement of this invention is the fact that the single punching operation forms tabs or protrusions 32 which are complementary to notches 34 from which the tabs were punched. Then, too, the protrusion 28 results from the forming of the cutout 30. Simultaneously in the single punching operation, apertures 36 are formed in the tabs 32 for a fastening purpose to be described more fully hereinafter. Thus, we have a single piece of metal punched from an access wall of a cabinet which is exactly complementary in every detail to the various protrusions and tabs surrounding the peripheral flange 25 of the access opening 24. After the punching or forming operation, the panel 26 may be laid aside until the assembly of the appliance is completed. As a last operation in the manufacturing process, the panel 26 will be fastened by a clip arrangement shown generally at 38 (FIGURES 2 and 4). Note that tolerance problems have been mitigated since the panel 26 of necessity matches the access opening 24 from which it was punched.

The fastening arrangement 38 is thus comprised of a tab 32 on a cabinet opening 24, a clip 40, a notch 34 in a removable panel 26 and a screw or bolt 58. The clip 40 is formed with a base portion 42 and an upper or top portion 44 reverse bent to the base portion 42. A sharply pointed tang 46 is struck out at each side of the base portion 42 and extends upwardly into digging engagement with the panel 26 when the clip 40 is installed within the notch 34. Prior to mounting the clip on a notched panel the points of the tangs 46 may extend into a clearance slot 47 on the top of the clip. Centrally located in the top portion 44 is a recessed or depressed area 48 which is exactly the same size as the notch 34. Thus, when the clip 40 is slipped within the notch 34 of panel 26, the outer limits of the recess 48 snugly fit adjacent the sides of the notch 34 and prevent the clip 40 from pivoting or shifting. Within the recess 48 is an aperture 50 which just overlies an aperture 52 in the base portion 42. The apertures 50 and 52 are elongated to allow for a slight tolerance. However, it should be recognized that the complementary nature of the access opening 24 and the removable access panel 26 should eliminate for all intents and purposes any misalignment problems. The gripping tangs 46 may be formed by turning downwardly a flange 54 on the base portion 42 after slicing or lancing the base portion adjacent the tab 46.

In assembling the fastening arrangement to the access panel 26, the clip 40 is inserted so that the recess 48 snugly fits into the notch 34 of the access panel. This clip attachment may be done in a subassembly operation prior to the final mounting of the access panel on the appliance cabinet 10. The lanced-out tangs 46 at each side of the clip 40 will serve as gripping members tending to resist the removal of the clip 40 from the panel. As a final assembly operation in the construction of the appliance, the access panel 26 will be held adjacent the access opening 24 and a fastening means, such as a screw 58, inserted through apertures 50 and 52 in the upper and lower portions of the clip 40 to threadedly engage the port or aperture 36 in the tab 32. The assembly will be the same, of course, at each tab and notch combination about the peripheral flange 25 of the appliance cabinet opening. Note also that the access panel 26 will be spaced slightly from the rear wall 16 of the cabinet 10 a distance determined by the thickness of the base portion 42 of the clip. As aforesaid, this arrangement of forming and fastening an access panel will easily accommodate any irregular protrusions in the access opening without the problems

4

of mismatching which can arise when the access panel and opening are formed separately.

It should now be seen that an improved fastening arrangement has been provided for a punched-out cover replacement. Scrap and waste are held to a minimum in view of the fact that punched-out portions to form openings may be used themselves as the cover for such openings. The fact that complementary parts are formed in a single punching operation will effect a complete and exact fit for all access panels in a mass produced cabinet item. Further, the complementary nature of the arrangement permits the use of a single clip to facilitate the attachment of adjacent parts so formed.

While the embodiments of the present invention as herein disclosed, constitute preferred forms, it is to be understood that other forms might be adopted.

What is claimed is as follows:

1. In combination, a first panel, a second panel punched from said first panel to form a complementary, similarly configured ported tab and notch respectively on said first and second panels, a clip having a base portion below said notched second panel, a top portion above said notched second panel, and a depressed portion within said notch, said depressed portion snugly fitting said notch to position said clip, said depressed portion having an aperture overlying the port in said ported tab, said base portion having a struckout tang for engaging said notched second panel, and means insertable through said aperture and said ported tab to connect said first panel in juxtaposition to said second panel.

2. In combination a first panel having a ported tab, a second panel having a notch complementary with and similarly configured to said ported tab, a clip having a base portion below said notched second panel and a top portion above said notched panel, said top portion having a recessed portion within said notch, said recessed portion snugly fitting said notch to position said clip, and having an aperture overlying the port in said ported tab, said base portion having a struck-out tang for engaging said notched second panel to resist the removal of said clip from said second panel, and means insertable through said aperture and said ported tab to connect said first panel in juxtaposition to said second panel.

3. In combination, a first panel, a second panel, a tab on one of said panels having a port, means defining a notch on the other of said panels configured to mate with the shape of said tab, a clip having a base portion below said notched panel and a top portion above said notched panel, said top portion having a recessed portion within said notch, said recessed portion snugly fitting said notch to position said clip, and having an aperture overlying the port in said ported tab, said base portion having a struck-out tang for engaging said notched second panel to resist the removal of said clip from said notched panel, and means insertable through said aperture and said ported tab to connect said first panel in juxtaposition to said second panel.

4. In combination, a first panel, a second panel, a tab on one of said panels having a port, means defining a notch on the other of said panels configured to mate with the shape of said tab, a clip having a first portion on one side of said notched panel and a second portion on the other side of said notched panel, one of said portions having a recessed portion within said notch, said recessed portion snugly fitting said notch to position said clip, and having an aperture overlying the port in said ported tab, one of said portions having a struck-out tang for engaging said notched second panel to resist the removal of said clip from said notched panel, and means insertible through said aperture and said ported tab to connect said first panel in juxtaposition to said second panel.

5. In combination, a first panel, a second panel, a tab on one of said panels, means defining a notch on the other of said panels configured to mate with the shape of said tab, a clip having a first portion on one side of said

**5**

notched panel and a second portion on the other side of said notched panel, one of said portions having a recessed portion within said notch, said recessed portion snugly fitting said notch to position said clip, means on one of said portions for engaging said notched second panel to resist the removal of said clip from said notched panel, and means cooperating with said tab and said clip to connect said first panel in juxtaposition to said second panel.

**5**

1,822,558  
2,654,411  
2,689,027  
2,829,742  
2,883,011

**6****References Cited in the file of this patent****UNITED STATES PATENTS**

|         |       |                |
|---------|-------|----------------|
| Belding | ----- | Sept. 8, 1931  |
| Bedford | ----- | Oct. 6, 1953   |
| Flora   | ----- | Sept. 14, 1954 |
| Wallace | ----- | Apr. 8, 1958   |
| Flora   | ----- | Apr. 21, 1959  |