May 15, 1956 I. E. McWETHY 2,745,133

HINGE

Filed Jan. 15, 1953

Fig. 1

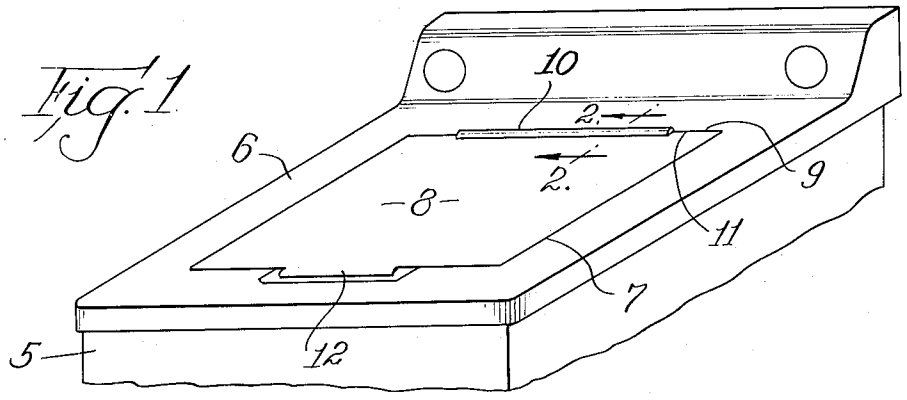


Fig. 2

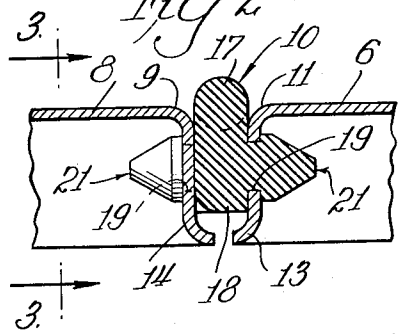
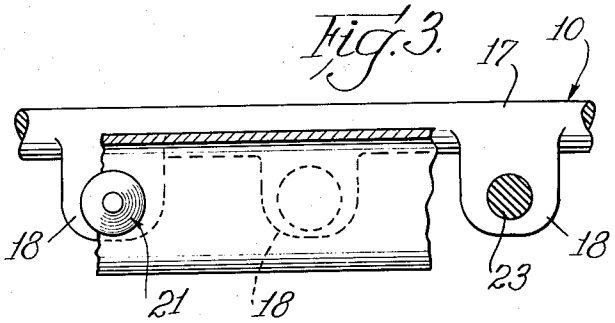


Fig. 3.



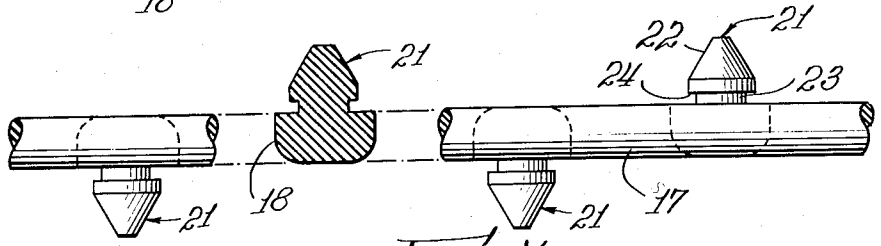


Fig. 4

Fig. 5.

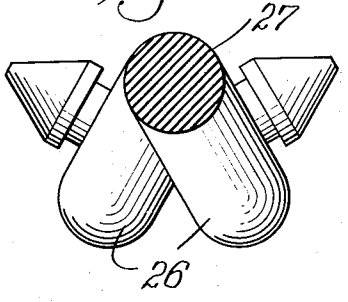
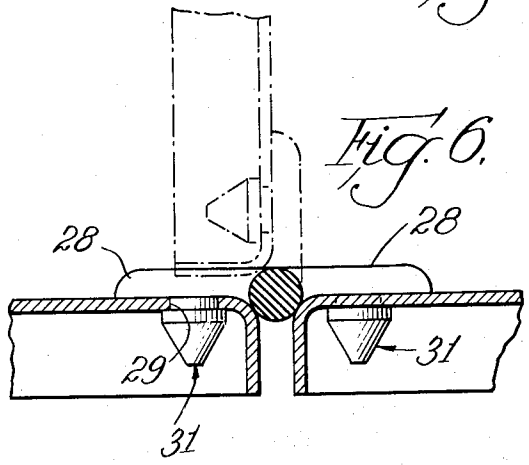


Fig. 6.



INVENTOR.

Irvin E. McWethy

BY

J. D. Douglas

His Atty.

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HINGE

Irvin E. McWethy, Galesburg, Ill., assignor to Admiral Corporation, Chicago, Ill., a corporation of Delaware

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7 Claims. (Cl. 16—150)

This invention relates to an improved hinge structure by which two members may be hinged together. More especially, the invention relates to a resilient element for connecting a door to its support, both the door and support being of relatively rigid material such as sheet metal or plastic and formed to cooperate with anchoring portions on the element.

While it is not new to hinge doors to their support by means of rubber hinges, the structure of the hinges has been such that the hinging operation involved permanently deflecting the hinge members transversely thereof. The rubber hinges were frequently large in cross-section and often called for considerable time for their installation and were consequently expensive of use.

By the present invention, a non-metallic hinge has been provided which may be readily installed and replaced, involves use of a minimum of material and is inexpensive of manufacture.

The invention is particularly applicable to sheet metal cabinets having in the upper wall thereof, an opening closable by a door also of sheet metal. The invention aims to supply inexpensive hinge support for the door and to this end provides a strip of rubber or vulcanized rubber compound either of predetermined length to accord with the length of complementary edges of a door and its support, or a strip of indeterminate length from which strips of determined length may be clipped as required. Extending laterally of the main portion of the strips, alternately in two planes angularly-spaced about said portion, and preferably spaced uniformly from each other throughout the length of the strip are branches having anchor portions thereon for cooperation with series of holes in both the door and the casing adjacent the door so that when said door is swung about its axis sections of the rubber between the branches are torsionally stressed.

For an explanation, in detail, of a specific example of the invention, reference will be made to the accompanying drawing wherein:

Fig. 1 is a fragmentary perspective view showing the top of a domestic washing machine in conjunction with which the invention is incorporated;

Fig. 2 is a fragmentary section taken on line 2—2 of Fig. 1;

Fig. 3 is a fragmentary section taken on line 3—3 of Fig. 2;

Fig. 4 is a top plan view of the hinge medium shown in Fig. 2, a portion thereof being shown in section;

Fig. 5 is a section of a second embodiment of the invention; and

Fig. 6 is a third embodiment of the invention in section.

In Fig. 1 is shown a domestic washing machine. It includes a cabinet 5 in a top wall 6 of which is an opening 7 closable by a door 8 having a hinge edge 9. The cabinet 5 has a hinge edge 11, complementary to the edge 9 to which it is coupled by a novel hinge strip 10, later to be described in detail. As a convenience for moving the door about its hinge, another edge thereof bears

a handle 12. Furthermore, the edge of the door 8 and edges defining the opening 7 are both reinforced by depending flanges 13 and 14 respectively.

As already indicated, the door 8 is hingedly coupled to the casing 6 by non-metallic means. It comprises a hinge strip 10 of thermo-plastic compound such as rubber, vulcanized rubber compound or synthetic rubber having suitable elasticity. It may be provided in lengths or units, each of which is adequate for the hinge of a single cabinet, or hinge stripping may be supplied in rolls or coils of great length by its manufacturers, from which suitable short lengths may be clipped. Preferably, the hinge strip 10 may take the form of a cylindrical rod 17 of uniform cross-section. The axis of rod 17 may be sustained at the level of the outside of the cabinet 6 and door 8 partly by arms or lugs 18 extending, in a single plane, downward between the flanges 13 and 14 from the rod 17.

Each of the lugs 18 also overlies one of a series of regularly spaced-apart holes 19 alternately on opposite sides of adjacent lugs in the flanges 13 and 14. The hinge strip 10 is further secured to the flanges 13 and 14 by anchor portions 21 extending laterally of the lugs 18 and through the holes 19, each of the anchor portions including a head 22 joined to the lug 18 by a neck 23. Although the diameter of the holes 19 is approximately equal to or greater than the diameter of the necks 23, they are smaller, diametrically, than the heads 22 where they are joined to the necks, shoulders 24 being thereby provided for engagement with the inside of the flanges 13 and 14.

Provision is made to facilitate threading of the heads through the holes. To this end, the heads are formed with peripheral surfaces tapering from adjacent the shoulders 24 to their free ends where the heads are of diameters less than the diameter of the holes 19.

In arranging the hinge strips 10 in assembly with the cabinet 6 and door 8, the heads 22 are forced into the apertures in which operation the walls of the apertures progressively compress the heads transversely of their axes until the shoulders 24 reach the inside of the sheet metal. Thereupon the respective flanges 13 and 14 are confined between the lugs 18 and the shoulders 24. In this embodiment the sections of rod 17 between the lugs 18 are in a state of relaxation when the door 8 closes the cabinet. The sections of rod 17 between the lugs 18 are increasingly deflected, torsionally, from this position as the lid 8 is moved toward its extreme open position, not shown.

In Fig. 5 is shown an embodiment wherein alternate lugs 26, corresponding to the lugs 18 of Figs. 2 and 3, are in different planes angularly spaced about the axis of a rod 27, when said rod is in a state of relaxation. After the hinge mechanism of this construction is in assembly with the door 8 and cabinet 6 the rod 27 is torsionally deflected in one direction when the door is closed and under deflection in the opposite direction when the door is in its extreme open position. By the last embodiment (Fig. 5) there is less likelihood of a poor grade of rubber being flexed beyond its limit of elasticity than in the first described embodiment.

Although in the two examples of the inventive feature, already described, the lugs extend between two edges of the door and casing about the door; a further construction is also contemplated as shown in Fig. 6 wherein lugs or arms 28 extend over the top of the door and cabinet in which holes 29 receive anchor portions 31, on the sides of the lugs.

While I have shown my invention in three embodiments thereof, I am aware that extensive other departures may be made therefrom without departing from the spirit or scope of the invention.

I claim:

1. A hinge structure for attachment of a closure to an opening in a cabinet wall wherein the closure and opening are provided with flanges arranged to be juxtaposed in the closed position and wherein said juxtaposed flanges are provided with apertures therein, the apertures in the closure flange being offset relative to the apertures in the other flange, comprising a body of resilient material extending substantially the length of the said flanges, said body being provided with a plurality of spaced arms extending from the body in alignment with each other and opposite to said apertures, each alternate arm being provided with a head portion for engagement in apertures of one of said flanges extending normal to the arms, the other arm portions being provided with heads for engagement in the other apertures in the other of said flanges.

2. A hinge structure for attachment of a closure to an opening in a cabinet wall wherein the closure and opening are provided with flanges arranged to be juxtaposed in the closed position and wherein said juxtaposed flanges are provided with apertures therein, the apertures in the closure flange being offset relative to the apertures in the other flange, comprising a body of resilient material extending substantially the length of the said flanges, said body being provided with a plurality of spaced arms extending from the body in alignment with each other and opposite to said apertures, each alternate arm being provided with a head portion for engagement in apertures of one of said flanges extending normal to the arms, the other arm portions being provided with heads for engagement in the other apertures in the other of said flanges, said body intermediate said arms being arranged to be deflected torsionally and resisting said torsion.

3. In a hinge structure for connection of a pair of sheet metal members each of which has a depending flange in complementary relation to each other wherein each of the flanges has a series of apertures therein, the apertures of one series being in alternate staggered relation to the apertures of the other series, means for hinging the members together at their flanged edges comprising a resilient rod of substantially uniform diameter capable of torsional deflection within its elastic limits between adjacent apertures when one of the members is swung throughout its course with respect to the other member, two series of fingers integral with the rod, the fingers of one series being arranged to extend through the apertures of one flange and the fingers of the other series being arranged to extend through the apertures of the other flange when forced through said apertures, and a shoulder adjacent the ends of each of the fingers capable of engaging the inside of the flanges and resisting removal of the fingers from the apertures thereby to secure the members together.

4. A hinge structure as defined in claim 3, wherein each of said fingers comprises a head and a lug, said lugs of one of said series of fingers being formed integrally with the rod in lateral extension therewith, lugs of the second series of fingers formed integrally with said rod in lateral extension therewith in a plane radially spaced about said rod from said one series of lugs, said head of each finger

of said one series of fingers being formed integrally with said lugs of said one series and extending outward therefrom to extend through the apertures of one flange, said head of each finger of said second series of fingers being formed integrally with said lugs of said second series and extending outward therefrom to extend through the apertures of the other flange when forced through said apertures, and said shoulders being formed adjacent the end of each head.

5. A hinge structure as defined in claim 4, wherein each of said heads is of greater cross-section relative to the diameter of the apertures in said flanges and displaceable to allow their insertion into and through said apertures.

6. A hinge structure as defined in claim 3, wherein each of said fingers comprises a head and a lug, said lugs of one of said series of fingers being formed integrally with the rod and the lugs of the second series being integrally formed on the diametrically opposite side of said rod, a head extending from each of said lugs normal to the plane of said lugs, and said shoulders being formed adjacent the end of each head.

7. In a hinge structure for connection of a pair of sheet metal members each of which has a depending flange in complementary relation to each other wherein each of the flanges has a series of apertures therein, the apertures of one series being in alternate relation to the apertures of the other series, means for hinging the members together at their flanged edges comprising a resilient rod of substantially uniform diameter capable of torsional deflection within its elastic limits between adjacent apertures when one of the members is swung throughout its course with respect to the other member, two series of fingers integral with the rod, the fingers of one series being arranged to extend through the apertures of one flange and the fingers of the other series being arranged to extend through the apertures of the other flange when forced through said apertures, said fingers being normally angularly spaced from each other for biasing one of said sheet metal members intermediate one position wherein said members are in the same plane and a second position wherein one of said members is in an overlying relationship to the other of said members, and a shoulder adjacent the end of each of the fingers capable of engaging the inside of the flanges and resisting removal of the fingers from the apertures thereby to secure the members together.

References Cited in the file of this patent

UNITED STATES PATENTS

1,682,993	Short	Sept. 4, 1928
1,694,291	Swyert	Dec. 4, 1928
1,723,306	Sipe	Aug. 6, 1929
1,862,285	Terry et al.	June 7, 1932
2,458,537	Skelly	Jan. 11, 1949
2,507,965	Eichner	May 16, 1950
2,576,996	Castedello	Dec. 4, 1951
2,607,411	Van Vliet	Aug. 19, 1952