March 11, 1958 A. H. GERHARDT 2,826,327

HINGE MECHANISM

Filed Nov. 14, 1955 2 Sheets-Sheet 1

Fig. 1

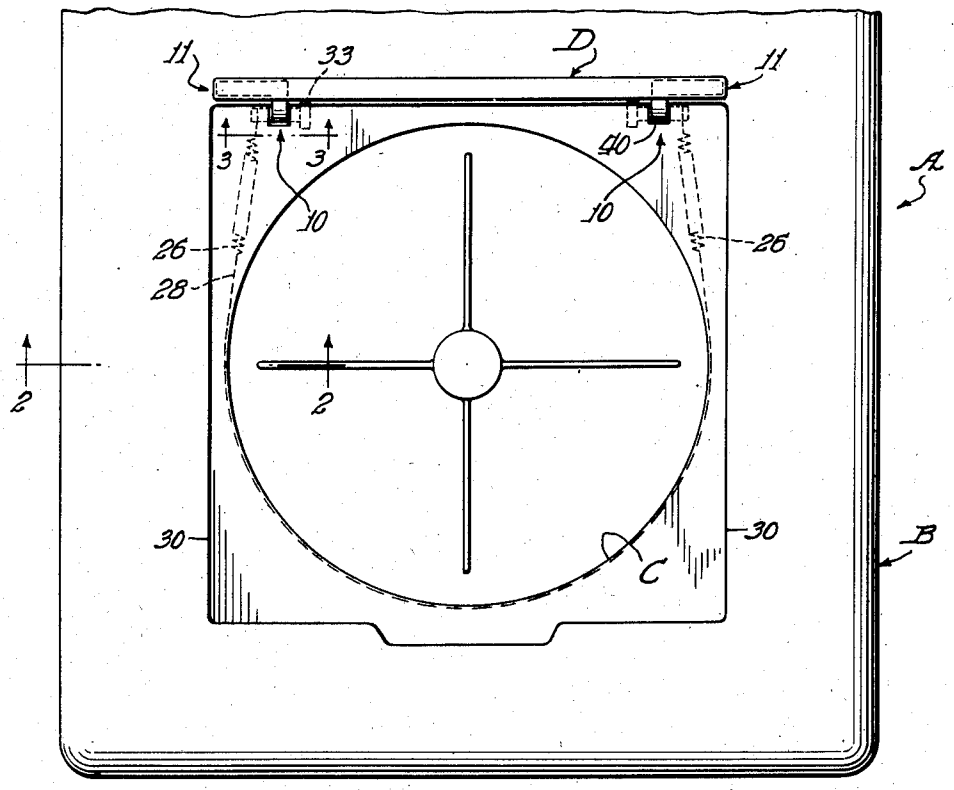
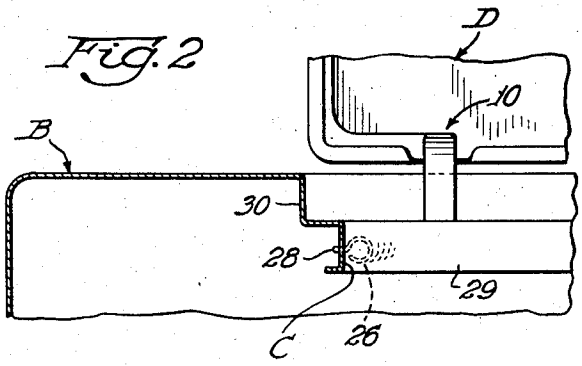


Fig. 2



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HINGE MECHANISM

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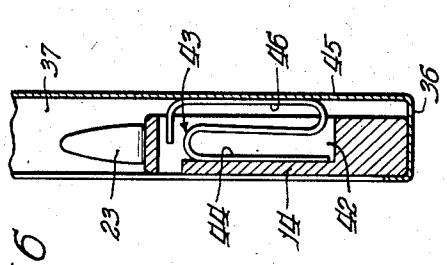


Fig. 6

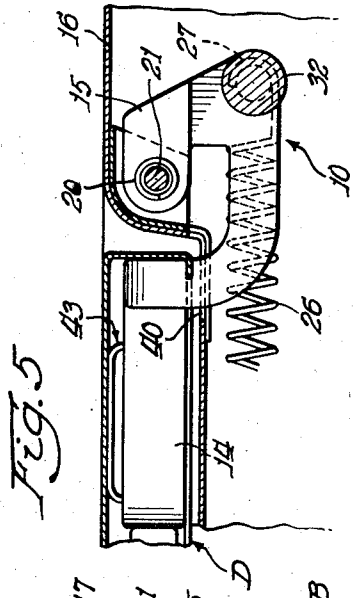


Fig. 5

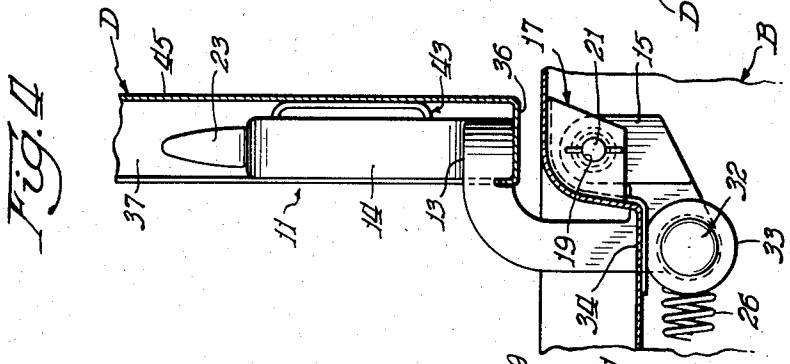


Fig. 4

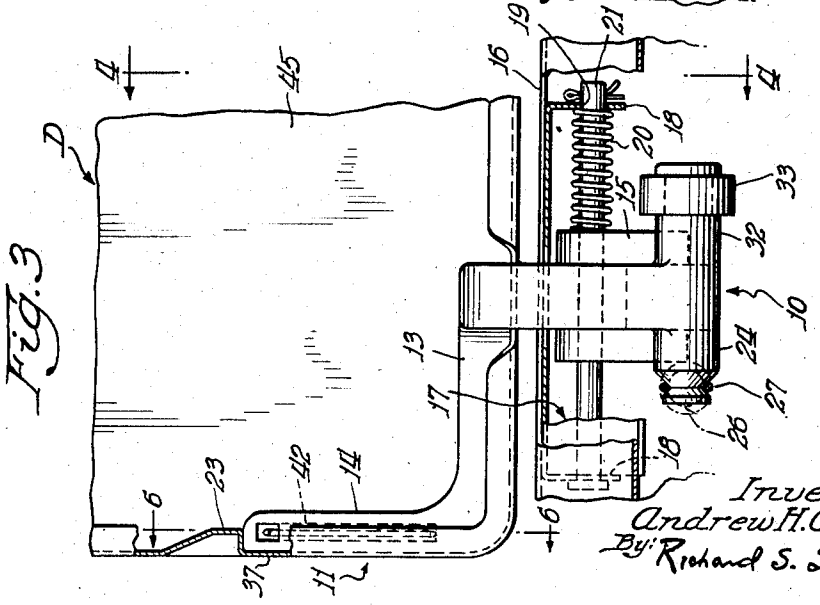


Fig. 3

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2,826,327

HINGE MECHANISM

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Application November 14, 1955, Serial No. 546,320

10 Claims. (Cl. 220—35)

This invention relates to household appliances and more particularly to a novel means for hinging an access door to household appliances such as laundry machines, ovens, and the like.

As is well known, it is common practice in the appliance industry to apply hard finishes to the outer surface of the appliance. This finish frequently takes the form of porcelain enamel or the like. Inherently, such materials have very little elasticity and tend to chip.

The various household appliances are usually housed in a sheet metal structure, and because of the hard character of the finish, the industry has been constantly plagued with the tendency for a coating of porcelain enamel or the like, applied to a sheet metal structure to chip, check or cleave whenever localized stresses are developed in the sheet metal.

The chipping problem has been particularly bothersome in connection with mounting access doors to appliances wherein it is necessary to rivet, or screw hinges to the appliance casing. In mounting the hinges to the casing in the above manner, localized stresses are developed in the casing immediately surrounding the heads of the screws or rivets with the result that after varying intervals of time, checks or chips occur in the casing finish.

It is a particular object of the present invention to provide a means for mounting the access door of a laundry appliance which precludes the use of screws and nuts or rivets.

Another object of the present invention is the provision of a counterbalanced access door for a laundry machine.

Another object of the present invention is the provision of an access door for a laundry machine having a hinge mechanism which operates to center the door automatically with respect to the access opening.

A still further object of the present invention is the provision of a novel means for mounting the access door to a hinge.

Another object of the present invention is the provision of simple yet novel hinge structure which lends itself to quick removal or replacement of the access door.

A still further object of the present invention is the provision of a hinged access door provided with resilient bumpers so as to preclude damage to the casing of an appliance, the door, or the hinges.

A further object of the present invention is the provision of an access door structure for a household appliance which may be readily cleaned.

A further object of the present invention is the provision of a hinge mounting which does not develop localized stress in the supporting structure but which distributes the hinge load over a wide area.

A hinged access door embodying the principles of the present invention may comprise a pair of brackets spot-welded to the underside of a household appliance casing, a pintle pin supported in each bracket, arms rotatably mounted upon the pintle pins and movable along the longitudinal axis of the pins, an access door, said access door

having tracks formed therein for accepting the arms, and spring means for urging the arm into engagement with the tracks of the access door.

Other features and advantages of the present invention will become more apparent when considered in conjunction with the appended specification and drawings wherein:

Figure 1 is a plan view of the upper portion of a laundry machine with which the present invention may be associated;

Fig. 2 is a sectional view of a portion of Fig. 1 as viewed in the plane of line 2—2;

Fig. 3 is a sectional view of a portion of Fig. 1 as viewed in the plane of line 3—3;

Fig. 4 is a view of the right side of Fig. 3 as viewed in the plane of the line 4—4 and showing the access door in the open position;

Fig. 5 is a view similar to the showing of Fig. 4, with the access door in the closed position; and

Fig. 6 is a sectional view of a portion of Fig. 3 as viewed in the plane of line 6—6.

Referring now to Fig. 1, there is shown a laundry machine indicated generally by the letter A, having a casing B, formed with an access opening C. The margin surrounding the access opening C is recessed with respect to the plane of the top surface of the casing B, to accommodate an access door D.

Since the present invention is not directed to the specific construction of the laundry machine shown, but may in fact be associated with any household appliance, it is not deemed necessary to describe the laundry apparatus in detail except as is necessary to show the adaptation of the present invention thereto.

In an exemplary embodiment of the present invention illustrated in Fig. 1, the access door D is shown receiving two hinges **10**. The hinges **10** engage pockets or tracks **11** formed in the underside of the access door D, in a manner which will become more apparent as the specification proceeds. A body portion of the hinges **10**, is adapted to engage hinge or pintle pins secured to the under side of the casing B. The hinges are biased by springs **26** shown in dotted lines, and are effective to maintain the access door in an open position. The tension of the springs is so adjusted that upon manually moving the door through a predetermined arc toward a closed position, the force of gravity exerted upon the door, by virtue of its mass, is sufficient to carry the door to a closed position.

Having shown a particular application of the present invention, and having established an environment therefor, a detailed description thereof will now be undertaken. Referring to Fig. 3, there is shown a top wall **16**, of a laundry machine casing whose underside supports a bracket **17**. The bracket is spot-welded to the wall **16**, and is formed with two depending ears **18**, each having through apertures **19** formed therein for accepting a hinge or pintle pin **21**. A body portion **15** of the hinge **10** is rotatably mounted upon the pin **21**. The hinge is formed with an L-shaped portion composed of a horizontal arm **13** and a vertical arm **14** adapted to engage the track or pockets **11**, formed in the underside of the access door D. Coil springs **20**, mounted on the pins **21**, are provided to urge vertical arms **14** into engagement with the track **11** (or to the left as viewed in Fig. 3).

A stop **23** formed in the vertical portion of the track **11** serves to hold the horizontal arm **13** snugly against the horizontal portion of the track **11**.

It is, of course, understood that the hinge of Fig. 3 is one of a pair of hinges and that the second hinge is identical to the hinge of Fig. 3 but of opposite hand.

Referring now to Figs. 1, 2 and 3, it is apparent that

the springs 26 engage a cross arm 24 of each hinge 10 as at 27 and are held under tension by a strap or wire 28, encircling a depending flange 29, bounding the access opening C. The function of the springs 26 is to carry the access door D to a full open position after it has been raised through a predetermined angle, such as 45° from a horizontal position, and to partially counterbalance the weight of the door before it has been raised through such an angle.

It is to be understood that the hinges 10, by virtue of their cooperation with coil springs 20 and 26, may be urged to and fro along the longitudinal axis of the pins 21, with the result that the access door supported by the hinges will readily center itself with respect to the recess formed in the top panel of the casing.

With the two brackets 17 equally spaced from corresponding sides 30 of the top panel recess, and with the two springs 20 of equal tension, the door will automatically center in the recess.

As is more apparent in Figs. 3 and 4, a projection 32, integral with the cross arm 24 supported by the hinge 10 carries a resilient bumper 33, operable to engage the underside of the marginal areas surrounding the access opening C (as at 34) when the door is opened. It is the function of the bumper 33, to absorb shock and preclude the creation of localized stresses that would otherwise develop if the projection 32 were permitted to engage the casing directly.

As is also apparent in Figs. 3 and 4, the horizontal arm 13 of each hinge engages a sidewall 36 of the track 11, while the vertical arm 14 engages a corresponding vertical sidewall 37 of the track. The stop 23 and the wall 36 limit the movement of the door with respect to the hinge in an upward or downward direction as viewed in Figs. 3 and 4. The wall 36 and the stop 23 may be spaced to permit upward and downward motion of the door with respect to the hinge, or the fit may be snug as shown in Fig. 4.

In order to avoid the impracticability of making a snug fit between the L-shaped portion of the hinge 10, and the track 11, the vertical arm 14 (or the horizontal arm 13) of the hinge is formed with a slot 42 (Fig. 6) for accepting a generally Z-shaped spring 43. A snug fit between the arm 14, the track 11 and thus the door and the hinge, is accomplished by the engagement of the leaves 44, and 46, with the bottom of the slot 42, and the inner side of the door panel 45, respectively. The friction developed between the door D and the spring 43 precludes relative motion between the hinge 10 and the access door.

From the above description of the present invention, it is apparent that the access door D may be readily removed by moving either or both of the hinges 10 inwardly toward one another against the coil springs 20. By so doing, the vertical arms 14 are moved out of engagement with the track 11, thus freeing the door. Note that the casing is provided with elongated openings 40 to permit lateral movement of the hinges.

It is to be noted that the impracticability of maintaining close tolerances necessary to mount the door to the hinges is overcome by the cooperattion of the generally Z-shaped springs 43, the vertical arms 14 and the track 11.

While I have illustrated preferred embodiments of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth but wish to avail myself of all changes within the scope of the appended claims.

I claim:

1. A door and hinge assembly for a laundry machine comprising a support, a hinge element having arms mounted on the support and movable relative thereto, a door having a pocket formed therein and adapted to receive the arms of said hinge element, and resilient means mounted on the support for moving the hinge element in a direction axially of the hinge element and relative to the support whereby the said arms are received and retained in said pocket thus hinging the door to the support.

2. In a laundry machine, a casing for enclosing the machine, said casing having an access opening therein, the combination therewith of a self-centering access door for closing the access opening, a pair of hinges including portions connected to the the door and the casing whereby the door may be rotated relative to the casing about a predetermined axis, said door-connected hinge portions being movable with said door linearly along said axis of rotation, and resilient means mounted on said hinge means effective to position said access door by urging said door-connected hinge portions in opposite directions along said axis whereby the door is centered with respect to said opening.

3. A door hinge assembly comprising a plurality of hinge pins adapted to be fastened to a casing, a hinge element mounted upon each hinge pin and movable relative thereto, each said hinge element having arms engageable with a door, and resilient means associated with each mounted hinge element for moving the element relative to its pin and in a direction axially of the hinge element to forcibly urge the arms in engagement with the door, whereby the door is hinged to the casing.

4. A hinged door for closing an access opening in a casing comprising a plurality of hinge pins supported by the casing, a corresponding number of hinge arms mounted upon the hinge pins and movable axially relative to the pins, a track formed integral with said door for engaging the arms, resilient means mounted upon each hinge pin for moving said arms axially of the pins and in a direction to cause said arms to engage the track whereby the door may be rotated upon the hinge pins to close the casing.

5. A self-centering access door for closing an access opening in a laundry machine casing comprising a plurality of hinge pins supported by the casing, hinge elements mounted upon the hinge pins and movable relative to the pins, means for mounting the door to the hinge elements, resilient means forcibly urging said hinge elements along the longitudinal axis of their respective hinge pins into engagement with the door thereby positioning the hinge elements at predetermined locations along the longitudinal axis of their respective hinge pins, whereby the door is substantially self-centered with respect to the access opening, the assembled access door and hinge elements being movable along the longitudinal axis of the hinge pins.

6. A removable access door for closing an access opening in a casing comprising: a door having pockets formed thereon, hinge elements movably mounted upon the casing having arms engageable with the pockets whereby the door may be moved relative to the casing about a predetermined axis, resilient means for urging the arms into engagement with the pockets whereby said door is hinged to the casing, said hinge elements being manually movable along said axis against the action of said resilient means to disengage said arms from the pockets thus removing the door from the casing.

7. An access door for closing an access opening in a casing comprising a plurality of hinge pins adapted to be fastened to the casing, a hinge element mounted upon each hinge pin and movable relative thereto, each said hinge element having arms engageable with pockets formed in the door, and resilient means associated with each mounted hinge element moving the element axially of its pin and in a direction to cause the arms to forcibly engage and to have further axial movement prevented by the pockets, whereby the door is mounted to the casing.

8. An access door closing an access opening in a casing

comprising a plurality of hinge pins adapted to be fastened to the casing, a hinge element mounted upon each hinge pin and movable relative thereto, each of said hinge elements having arms engageable with a track formed in the door, and resilient means associated with each mounted hinge element for moving the element axially of its pin and in a direction to cause the arms to engage the track, each of said resilient means moving its associated hinge element independently of the other resilient means, and a second resilient means connected to each hinge element and adapted to engage the casing, said second resilient means being effective to urge the door towards an open position.

9. An access door for closing an access opening in a casing comprising the plurality of hinge pins adapted to be fastened to the casing, a hinge element mounted upon each hinge pin and movable relative thereto, each of said hinge elements having arms engageable with a track formed in a door, and resilient means associated with each mounted hinge element said resilient means urging the elements relative to the longitudinal axis of their pins and in opposite directions to cause the arms to engage the track, and a second resilient means connected to each hinge element and adapted to engage the casing, said second resilient means being effective to maintain the door in an open position and to partially counterbalance the effect of gravity upon the door in closed and near closed positions.

10. A door and hinge assembly for the casing of a

laundry appliance and operable to close a recessed opening in the top of the casing comprising: a pair of brackets welded to the underside of the casing, a hinge pin supported in each bracket, a hinge element rotatably mounted upon each hinge pin and movable along the longitudinal axis of the pin, said hinge elements having L-shaped arms, a generally rectangular door having pockets formed in the corners thereof, said arms being engageable with said pockets, spring means mounted upon each hinge pin for urging the arms along said axis and into engagement with the pockets whereby said door is mounted to the casing, a second spring means engaging each hinge element and the casing for holding said door in an open position, said second spring being so selected that when said door is rotated through a predetermined angle from an open position towards a closed position, the pull of gravity upon the door overcomes said second spring means to allow the door to close.

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