Feb. 18, 1958 H. D. SQUIRE 2,823,940

REFRIGERATOR DOOR SAFETY RELEASE

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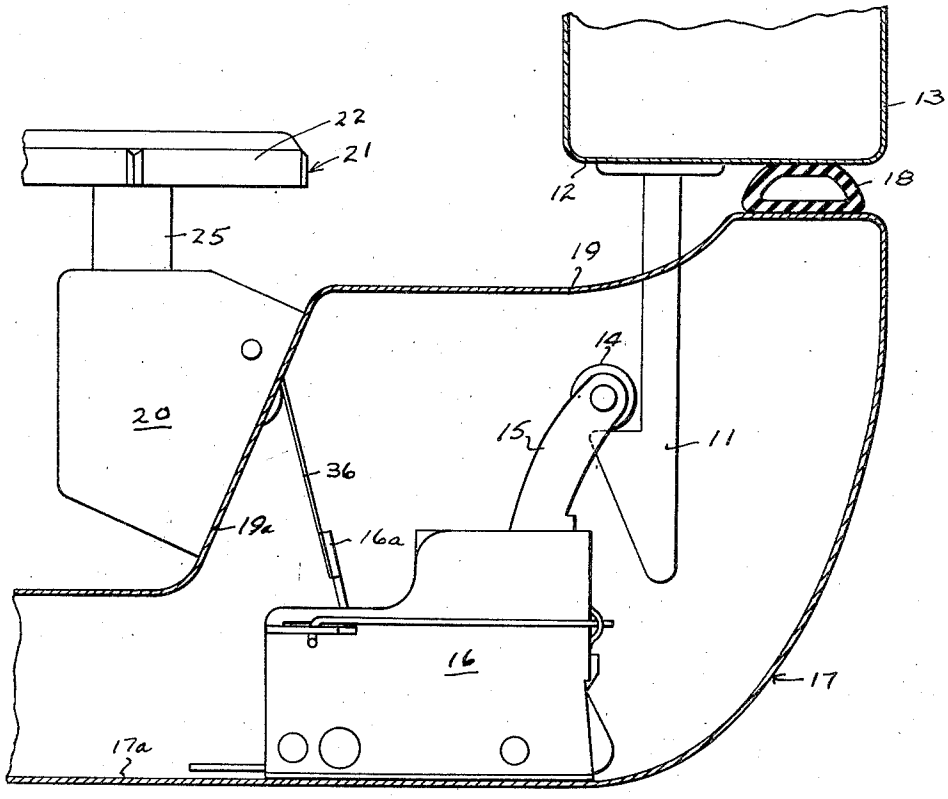



FIG. 1

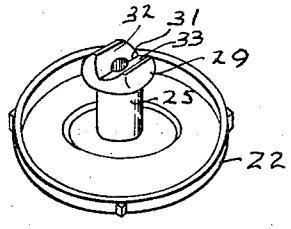



FIG. 3

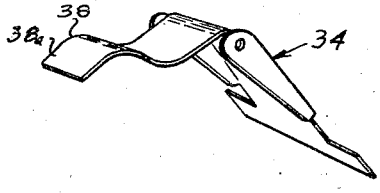



FIG. 4

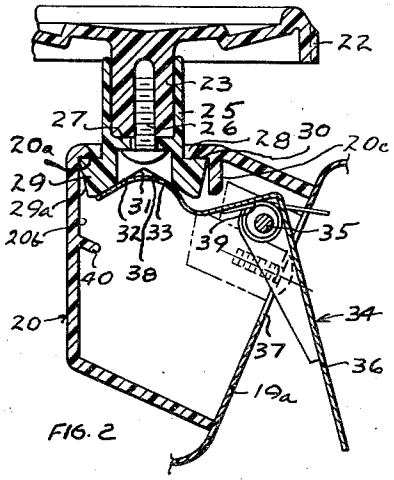



FIG. 2

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# REFRIGERATOR DOOR SAFETY RELEASE

Herbert D. Squire, Galesburg, Ill., assignor to Midwest Manufacturing Corporation

Application October 31, 1956, Serial No. 619,445

12 Claims. (Cl. 292—92)

This invention relates to a safety release for a domestic refrigerator door which enables the door to be opened from the inside.

In a number of instances in recent years children have died after climbing into refrigerators and then having the door closed on them. This has pointed up the desirability of providing for the opening of the refrigerator door from the inside, so that a child trapped inside may escape. The present invention is directed to such a safety release for a refrigerator door.

The present invention takes account of the likelihood that a child locked inside a refrigerator, because of fright or extreme youth, might be unable to manipulate the door release in a particular manner required to open the door. For example, if the door release could be operated only by pushing it the child might mistakenly try to turn it, or vice versa. In the present invention the chance of the child's being unable to operate the safety release is minimized by providing an operating handle which may be pushed, turned or tilted to open the door.

Accordingly, it is an object of the present invention to provide a novel and improved safety release for a domestic refrigerator door which enables the door to be opened from the inside.

It is also an object of this invention to provide such a safety release which may be operated by pushing, turning, or tilting, thus minimizing the likelihood that a child trapped in the refrigerator would be unable to operate the safety release properly.

Another object of this invention is to provide such a safety release which is rugged and economical in construction, dependable in operation, and which may be readily applied to a refrigerator to operate the door latch without requiring substantial modification of the same.

Further objects and advantages of the present invention will be apparent from the following detailed description of a preferred embodiment thereof, which is illustrated in the accompanying drawing.

In the drawing:

Figure 1 is a sectional view showing a refrigerator door latch arrangement with the present safety release applied thereto;

Figure 2 is a section through the present safety release assembled on the door;

Figure 3 is a perspective view of the operating handle in the present safety release; and

Figure 4 is a perspective view of the actuator in the present safety release which couples the operating handle to the door latch.

Referring to Fig. 1, the refrigerator has a door latch which is operated by the usual handle (not shown) on the front of the refrigerator door. This latch includes a generally L-shaped keeper 11 which projects forward from the front panel 12 of the side 13 of the refrigerator. Cooperating with this keeper is a roller 14 mounted on a pivotal arm 15, which forms part of the latch mechanism indicated generally at 16. The details of this latch mechanism form no part of the present invention and hence are not described in detail here. The latch mechanism itself is described and claimed in the co-pending application of Herbert D. Squire, Serial No. 619,517, filed October 31, 1956, which is assigned to the same assignee as the present invention.



The latch mechanism 16 is mounted on the inside of the front panel 17*a* of a hollow refrigerator door 17. The door carries a gasket 18 of rubber or the like which cooperates with the main refrigerator housing to provide a seal when the door is closed. The door is hinged to the side of the refrigerator housing opposite the side 13.

The hollow door 17 includes a rear panel 19 which presents a forwardly inclined segment 19*a* spaced from the sealing gasket 18. A hollow casing 20 is rigidly attached to segment 19*a* as shown in Fig. 1. Casing 20 provides a mounting for the present safety release.

This safety release includes a handle 21 with a manually operable knob 22 and a stem (Fig. 2) integral therewith and extending forward therefrom. The stem 23 is snugly received in a sleeve member 25. A screw 26, threadedly received in stem 23 and having its head engaging a transverse internal annular shoulder 27 on sleeve member 25, connects the stem 23 rigidly to the sleeve member 25.

The sleeve member 25 extends into an opening 28 in the rearwardly disposed outer wall 20*a* of casing 20. As shown in Fig. 2, the opening 28 is substantially wider than sleeve member 25 and is outwardly beveled rearwardly so as to permit tilting of the sleeve member. The sleeve member carries an enlarged head 29 which presents a transverse annular outer shoulder 30 for engagement with the inner face of casing wall 20*a* around the opening 28 therein, as best seen in Fig. 4. The outer side 29*a* of head 29 away from shoulder 30 is beveled inwardly. At its inner end the head is formed with a transverse V-shaped groove 31 (Figs. 2 and 3) which extends completely across the head from one side to the other and presents a pair of oppositely inclined cam surfaces 32 and 33.

The enlarged head 29 of the operating handle is confined between a forwardly extending side wall 20*b* of the casing 20 and an internal protrusion 20*c* which extends forward from the casing back wall 20*a*. This arrangement permits head 29 to be displaced axially, turned or tilted, however.

The present safety release mechanism also includes an actuator 34 which couples the operating handle 21 to the latch mechanism 16. This actuator is pivotally supported by a cross pin 35 mounted in the opposite side walls of casing 20 near the panel segment 19*a* on the door. The actuator 34 at one side of its pivot presents a flat, generally T-shaped leg 36 which extends forward through an opening 37 in the panel segment 19*a* of the door for engagement with the operator 16*a* of the latch mechanism 16 (Fig. 1). At the other side of pivot 35 the actuator presents a curved segment 38 which is received in the groove 31 at the forward end of operating handle 21. As best seen in Fig. 4, the curved segment 38 of the actuator terminates in a flat portion 38*a* which makes substantially planar contact with the inclined cam face 32 on the operating handle, while a convexly curved portion of the actuator segment engages the opposite cam face 33 on the operating handle.

A torsion spring 39 acts between the door panel segment 19*a* and the actuator 34 to bias the curved end 38 of the actuator into engagement with the inclined surfaces 32, 33 on operating handle 21, as shown in Fig. 2. Also, the spring biases the operating handle rearward in

Fig. 2, normally positioning the transverse shoulder 30 abutting against the casing wall 20*a*.

The knob 22 of the operating handle preferably is provided with an insert made of material which glows in the dark so as to be readily noticeable from inside the refrigerator. If desired, this material may spell out instructions, such as "Push," to indicate how the handle may be manipulated to open the door.

In operation, if the knob 22 is pushed forward, this action will cause the actuator 34 to pivot counter-clockwise in Figs. 1 and 2, and such movement of the actuator causes the operator 16*a* for the latch mechanism 16 to release the door. Forward movement of the operating handle is limited by an inner protrusion 40 on the casing 20 (Fig. 2).

If the knob 22 is turned in either direction, the cam surface 33 on the inner end of the operating handle will ride across the curved segment 38 of actuator 34, pivoting the actuator counter-clockwise to release the door.

If the knob 22 is tilted in any direction the outer edge of the shoulder 30 on the enlarged head 29 of the operating handle will serve as a pivot point for the handle, with the result that a similar camming action will take place, causing the actuator 34 to pivot counter-clockwise and operate the latch mechanism 16 to open the door. The beveled outer side wall 29*a* of head 29 permits sufficient tilting of the handle to operate the door release.

Also, any combination of the actions of pushing, turning and tilting the operating handle will cause the door to be opened.

From the foregoing it will be apparent that the present safety release is particularly advantageous in that almost any type of manipulation which the child might try will be effective to open the door.

It is to be understood that, while there has been described in detail herein and illustrated in the accompanying drawing a particular preferred embodiment of this invention, various modifications, omissions and refinements which depart from the disclosed embodiment may be adopted without departing from the spirit and scope of the present invention.

I claim:

1. In combination, a casing having an opening in one wall thereof, an actuator pivotally mounted on the casing, an operator extending freely through said opening in the casing and terminating within the casing in a head which is larger than said opening and which at its inner end presents a recess facing away from said opening in the casing and defined by oppositely inclined surfaces which converge in a direction toward said opening in the casing, said actuator presenting a segment within the casing in confronting relation to the inner end of said head which is seated in said recess bearing against said inclined surfaces, and spring means biasing the actuator to position said enlarged head on the operator in engagement with the inner side of said casing wall around said opening therein.

2. In combination, a casing having an opening in one wall thereof, an actuator pivotally mounted on the casing and at one side of its pivotal mounting presenting a curved segment within the casing, said actuator at the other side of its pivotal mounting extending outside the casing, an operating handle having a knob disposed outside of the casing and a stem extending from the knob freely through said opening into the casing, said operating handle within the casing presenting a circular head larger than said opening which at its inner end is formed with a V-shaped recess extending completely across the head and defined by intersecting oppositely inclined surfaces which converge toward each other in a direction toward said knob, and a spring acting against said actuator to bias said curved segment of the actuator into engagement with said inclined surfaces on the head and to position said head abutting against said casing wall around said opening therein, said operating handle being operative to pivot the actuator against the bias exerted by said spring means in response to displacement of the operating handle into the casing or turning of the operating handle or tilting of the operating handle.

3. The combination of claim 2, wherein said casing has a protrusion limiting the displacement of the operating handle into the casing.

4. In combination, a refrigerator having a hollow door with spaced outer and inner panels, a latch for holding the door closed including a latch mechanism mounted on the door and disposed between said outer and inner panels of the door, a hollow casing mounted on the inner door panel, an actuator pivotally mounted on said casing, said actuator at one side of its pivotal mounting presenting a first leg extending into the space between the inner and outer door panels and positioned to operate said latch mechanism, said actuator at the opposite side of its pivotal mounting presenting a curved segment disposed within said hollow casing, spring means biasing the actuator to position said curved segment rearward from the door, said casing having a rear wall with an opening therein, an operating handle having a portion disposed behind said casing rear wall and accessible thereat from inside the refrigerator, said handle having a stem which extends freely into said casing through said opening in the casing rear wall and a head which is larger than said opening and which is disposed within said casing, and said head at its forward end presenting a substantially V-shaped recess defined by oppositely inclined surfaces which converge toward each other in a direction rearward from the door and which engage said curved segment of the actuator.

5. In combination, a support having a wall with an opening therein, an operator having a portion positioned at the outer side of said wall, a stem connected to said portion and extending freely through said opening and a head connected to the inner end of the stem at the inner side of said wall, said head being larger than said opening and at its inner end terminating in oppositely inclined end faces which converge toward each other in a direction toward said wall to form a seat which is open across the head from one edge portion of the head to the opposite edge portion thereof, each of said inclined end faces extending continuously across the head from said one edge portion to said opposite edge portion and throughout their respective extents being oppositely inclined to one another, an actuator pivotally mounted on the support at one side of the axis of said stem, said actuator at one side of its pivotal mounting presenting a curved segment having portions which engage the respective inclined inner end faces on said head, and spring means biasing said actuator to position its curved segment bearing against the inner end of said head to bias the head into engagement with the inner side of said wall around said opening therein.

6. The combination of claim 5, wherein said head has a flat circular outer end which engages the inner side of said wall around said opening therein and presents a circular marginal edge about which the operator may be tilted in any direction, and wherein said inclined inner end faces on the head intersect one another and define a substantially V-shaped seat which is open completely across the inner end of the head between diametrically opposite marginal edge portions.

7. The combination of claim 6, wherein said support carries a protrusion spaced inward from said wall and interposed in the path of movement of the inner end of said head to limit the extent to which the operator may be pushed inward.

8. The combination of claim 6, wherein said support presents wall portions extending from the inner side of said wall in closely spaced relation to opposite sides of said head, and said head is inwardly tapered toward its inner end to permit the head to be tilted between said wall portions about its marginal edge at its outer end.

9. The combination of claim 5, wherein said support comprises a casing upon which the actuator is pivotally mounted, and the actuator at the opposite side of its pivotal mounting extends outside the casing.

10. In a refrigerator having a hollow door with spaced outer and inner panels, and a latch for holding the door closed including a latch mechanism mounted on the door and disposed between the outer and inner panels of the door, the improvement which comprises: a hollow casing mounted on the inner door panel, an actuator pivotally mounted on said casing, said actuator at one side of its pivotal mounting presenting a first leg which extends into the space between the outer and inner door panels and positioned to operate said latch mechanism for opening the door, said casing having a wall with an opening therein, an operator having a handle portion disposed outside said casing and accessible from inside the refrigerator, a stem connected to said handle portion and extending freely through said opening into said casing, and a head connected to the inner end of the stem within the casing, said head being larger than said opening and at its inner end terminating in oppositely inclined end faces which converge toward each other in a direction toward said wall of the casing to form a seat which faces away from said casing wall and which is open completely across the head from one marginal edge portion of the head to the opposite marginal edge portion thereof, each of said inclined end faces extending continuously across the head from said one edge portion to said opposite edge portion



and throughout their respective extents being oppositely inclined to one another, said actuator at the opposite side of its pivotal mounting presenting a curved segment disposed within said casing and having portions which engage the respective inclined inner end faces on said head, and spring means biasing said actuator to position its curved segment bearing against the inner end of said head to bias the head into engagement with said casing wall around said opening therein.

11. The combination of claim 10, wherein said head has a flat circular outer end which engages said casing wall around said opening therein and presents a circular marginal edge about which the operator may be tilted in any direction.

12. The combination of claim 11, wherein said inclined inner end faces on the head intersect one another and define a substantially V-shaped seat which is open completely across the inner end of the head between said diametrically opposite edge portions thereon.

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