

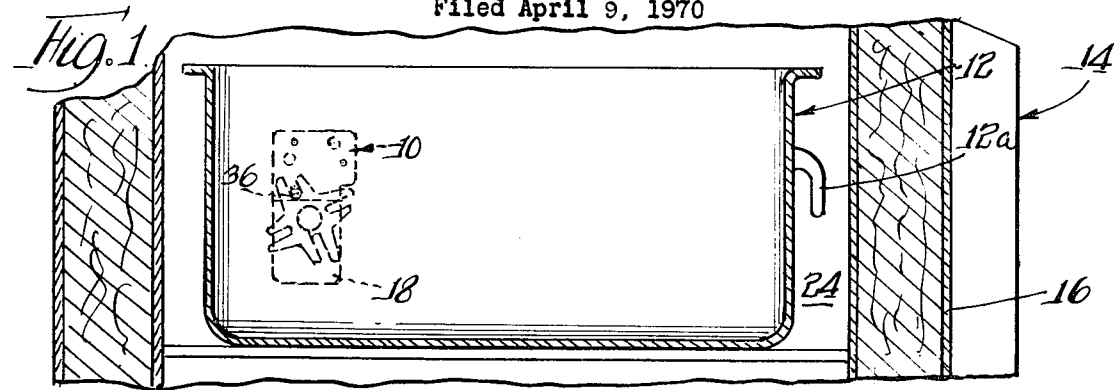
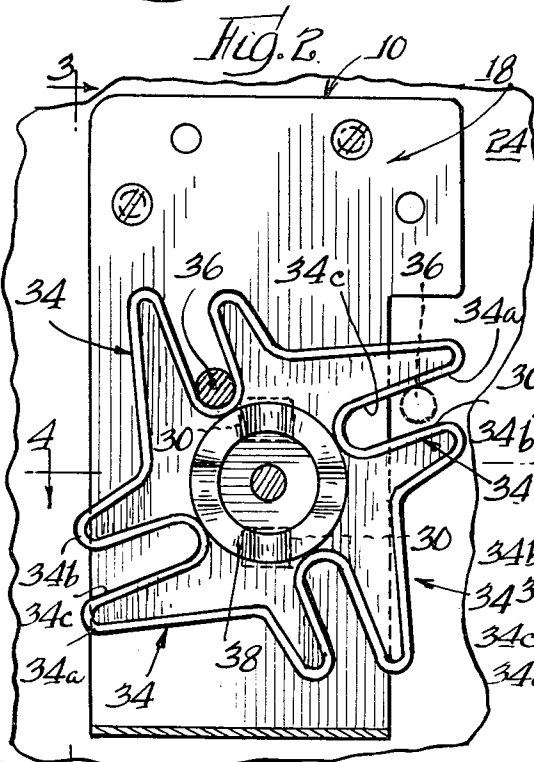
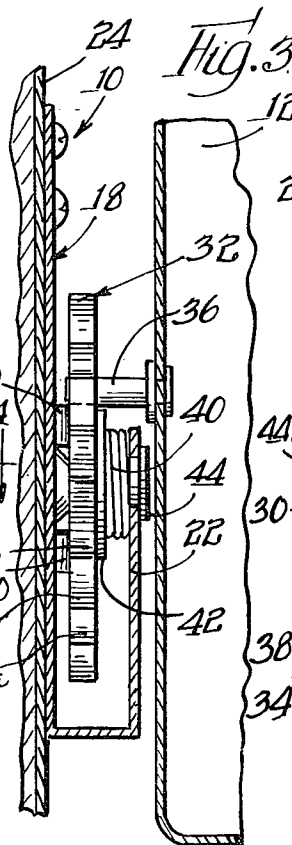
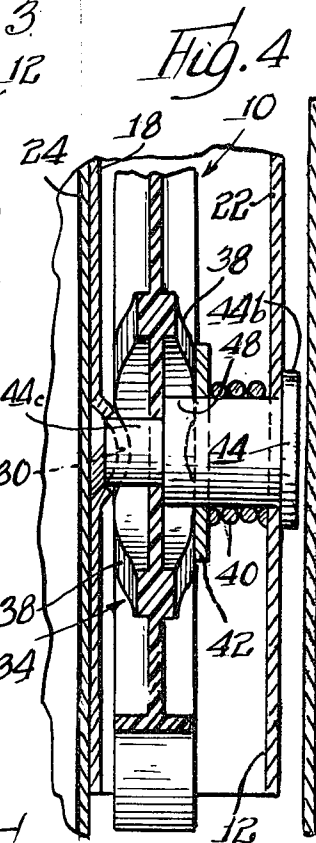
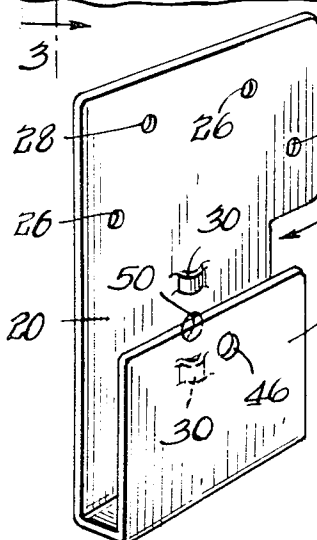
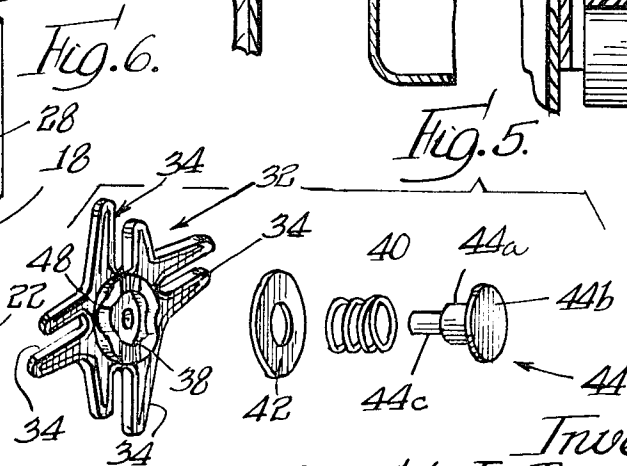
May 30, 1972

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3,666,342

OVER-CENTER LOCKING DEVICE

Filed April 9, 1970



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3,666,342

OVER-CENTER LOCKING DEVICE

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Filed Apr. 9, 1970, Ser. No. 27,063

Int. Cl. E05c 19/06

U.S. Cl. 312—333

5 Claims

ABSTRACT OF THE DISCLOSURE

The present invention relates generally to a restraining device for preventing the unauthorized or inadvertent shifting of a horizontally slidable member and more particularly to a restraining device for use with slidable structures such as the baskets or drawers in refrigerators and the like. One embodiment of the present invention as disclosed herein comprises a support attachable to the vertical panel of a refrigerator and a rotary latch member mounted on the support. The rotary latch member includes a plurality of peripheral, equally spaced cams each of which comprise a pair of spaced cam surfaces defining a recess opening radially outwardly for accommodating a complementary shiftable cam actuating member such as a pin mounted on the side wall of a slidable drawer. Means is also provided to prevent unauthorized rotation of the latch means when the cams occupy a predetermined position.

SUMMARY OF INVENTION

Household appliances such as refrigerators often include horizontally shiftable food storage drawers or baskets. It has been found essential to provide means for preventing or restraining unauthorized or inadvertent outward shifting of such structures from their innermost position within the refrigerator. The present invention contemplates the provision of an improved, novel, and extremely practical latch mechanism of very simple design for securing a drawer structure or the like against unauthorized outward shifting.

It has been found that some of the latching devices, heretofore available, may be rendered inoperative after the drawer has been moved outwardly. It is one of the important objects of the present invention to avoid this difficulty by providing a latching device which is so constructed that it will constantly and automatically be maintained in operative condition.

More specifically, the present invention contemplates a solution of the above problem by the provision of a unique latching device which is rotatable and is constantly retained in a predetermined position whereby to accommodate an actuating member such as a pin carried on the side of a horizontally shiftable structure such as a drawer or basket.

BRIEF DESCRIPTION OF DRAWING

The foregoing and other objects and advantages will be more apparent from the following detailed description when considered in connection with the accompanying drawing wherein:

FIG. 1 is a fragmentary vertical sectional view of a refrigerator equipped with a conventional horizontally shiftable refrigerator drawer or basket in association with

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a drawer restraining device which is representative of one embodiment of the present invention;

FIG. 2 is an enlarged detailed view of the rotary latching member and support comprising the restraining device shown in association with a fragmentary portion of a vertical refrigerator panel or partition;

FIG. 3 is a view of applicant's improved latching device as seen along the line 3—3 of FIG. 2;

FIG. 4 is an enlarged horizontal sectional view of the rotary latching means and support therefore, taken substantially along the line 4—4 of FIG. 2;

FIG. 5 is a perspective exploded view showing the rotary latching member and parts for securing said member to the support; and,

FIG. 6 is a perspective view of the support with the rotary latching member detached therefrom.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to the drawing wherein like numerals have been employed to designate similar parts throughout the various figures, it will be seen that one embodiment of the drawer restraining device contemplated by the present invention is designated generally by the numeral 10. In FIG. 1 the device 10 is disclosed in association with a horizontally shiftable basket or drawer 12 of a conventional refrigerator designated generally by the numeral 14 in FIG. 1. The door of the refrigerator is shown at the right of FIG. 1 and is designated by the numeral 16. In refrigerators of this type it is important that means be provided for securing the food retaining drawer or basket 12 in its innermost position as shown in FIG. 1. Obviously, any device employed to restrain the drawer 12 against outward shifting, namely: to the right of FIG. 1 must be impositive in nature. That is to say, such restraint must be sufficient to prevent inadvertent, or unauthorized shifting of the drawer and at the same time permit manual shifting of the drawer to permit access when the refrigerator door is opened.

The restraining device 10 includes a J-shaped support member 18 as clearly illustrated in FIG. 6. The support 18 includes a plate section 20 and a laterally spaced integral smaller plate section 22. The plate 20 is adapted to be secured to a vertical panel or partition 24 within the refrigerator 14. A pair of screw accommodating apertures 26 are arranged to facilitate attachment of the mounting plate 18 to a panel on one side of the drawer 12 and a similar pair of screw accommodating apertures 28 are arranged to permit attachment of the plate 18 to a panel position on the opposite side of the drawer 12. Thus the J-shaped support member 18 is adapted to be secured with equal facility to the refrigerator panel on either side of the drawer. Attention is also directed to a pair of vertically spaced protuberances 30 struck out from the plate 20. The cooperation of these detents 30 with a rotary latch member 32 will be more apparent from the description which follows.

The rotary member 32 is formed with four equally spaced peripheral cam sections 34. As clearly shown in FIG. 2, each of the cam sections 34 include a pair of spaced cam surfaces 34a and 34b which define a substantially radial recess or slot 34c. These slots open radially outwardly for accommodating a complementary actuating member or pin 36 secured to and extending outwardly

from a sidewall of the horizontally slidable drawer 12. The latch member 32 is rotatably mounted between the plate sections 20 and 22 of the support member 18. Opposite sides of the rotary latch member 32 are provided with undulated surfaces 38 adapted to coact with the struckout protuberances 30. It has been found practical to produce the rotary latch member 32 as a unitary plastic molded part. Hence in producing the latch member, the undulated surfaces 38 on opposite sides thereof as well as the cam sections 34 are molded as a single unit.

The previously mentioned struckout members 30 cooperate with the adjacent undulated surfaces 38 in resisting rotation of the latch member 32. The latch member 32 is constantly urged toward the plate section 20, and consequently the protuberances 30 by means of a coil spring interposed between the plate section 22 and a washer 42. The spring 40 and washer 42 are supported by a rivet member 44, and a shank 44a of which extends through a complementary aperture 46 in the plate section 22 and also into the central aperture 48 of the rotary latch member 32. The head 44b of rivet 44 engages the outer surface of the plate section 22 and the opposite reduced extremity 44c of the rivet extends through an aperture 50 and is peened over the plate member 20. Thus it will be apparent that the coil spring 40 constantly biases one of the undulated surfaces 38 toward the plate 20, thereby maintaining diametrically opposed valleys of said undulated surface into meshing relation with the protuberances 30.

In the disclosed embodiment, the rotary latch member 32 is provided with four equally spaced peripheral cam sections 34. Likewise the undulated surfaces 38 are also provided with four equally spaced valleys and peaks. When the latch member 34 occupies the position shown in FIG. 2, the protuberances 30 will be nested within complementary diametrically opposed valleys of the adjacent undulated surfaces 38. Hence any tendency to cause rotation of the member 32 will be resisted by the nesting of protuberance 30 nested in undulated surface 38 held by the resilient action of the spring 40. Hence the force necessary to impart rotation to the latch member 32 from the position shown in FIG. 2, must be sufficient to overcome the force exerted by the coil spring 40. The undulations of the surfaces 38 function as a cylindrical cam. Thus should the member 32 be rotated in response to the engagement of the actuating pin 36 with the cam surface 34a as said pin moves from the dotted line position to the solid line position illustrated in FIG. 2, the latch member will have been rotated counterclockwise through 90 degrees. At each 90 degree position the coaction between the protuberances 30 and the adjacent undulated or cylindrical cam surface is such as to resist forces tending to rotate the member 32 in either clockwise or counterclockwise direction.

As was previously mentioned, the J-shaped support member 18 is provided with two sets of apertures 26 and 28 which permit the member 18 to be usable on either one of the opposite side walls 24 of a refrigerator. The rotary latch member 32 is also capable of multiple usage on opposite sides of the refrigerator 14 since symmetrical undulated surfaces 38 are provided on opposite faces of member 32.

Assume that the drawer 12 is in the position shown in FIG. 1, and that the refrigerator door 16 is open so as to expose the right extremity of the drawer. By manually exerting a pull on the drawer handle 12a the cam actuating pin 36 will initially move from the solid line position to the dotted line position shown in FIG. 2, thereby imparting 90 degree clockwise rotation to the latch member 32. As the pin 36 moves to the right from the dotted line position illustrated in FIG. 2, the rotary latch member 32 remains in the position shown and is held in this position due to the coaction between the struckout members 30 and the undulated surfaces 38 as previously described. As the drawer 12 is again shifted toward its innermost position the pin 36 engages the cam surface 34a and shifts the latch member through 90 degrees in a counterclock-

wise direction. However, the cam sections 34 and the latch member 32 always maintain the same relative positions with respect to the actuating pin 36.

A distinct advantage of the present device resides in the fact that should the latch member 32 be inadvertently rotated, when the drawer 12 is in its withdrawn position, the pin 36 will readily strike the cam sections and particularly the tangentially positioned longer cam surface 34a. This will result in rotation of latch member 32, regardless of initial orientation and present the throat formed by slot 34c to accept pin 36. While such inadvertent rotation is infrequent the latch member 32 is capable of handling same without causing frustration on the part of the user. Additionally, should the latch member 32 become worn from engaging pin 36 and protuberances 30 after protracted use, it can be rotated 90° to present relatively fresh surfaces for use.

From the foregoing it will be apparent that the present invention contemplates the provision of a very simple yet highly practical restraining device for preventing unauthorized or inadvertent shifting of a horizontally slidable member such as a drawer structure. By employing the simple expedient in the form of a rotary latch member having peripheral equally spaced cam sections of the type described, inadvertent misalignment of the cam slots with respect to the cam actuating pin is completely avoided. This results from the fact that the rotary cam, or undulated surface section of the latch member is so disposed with respect to the struckout protuberances that the latch member will automatically seek a position in which a cam slot is in alignment with the actuating pin. By having the undulated surface or cylindrical cam structure on opposite sides of the latch member, it is possible with equal facility to use the latch member on either side of a drawer. Likewise the J-shaped support for the latch member is so arranged as to adapt itself for mounting upon a panel positioned on either side of the associated drawer structure. By using suitable plastic material in the manufacture of the rotary latch member, operational noises are reduced to a minimum. Also the latch member under such circumstances may be self lubricating, thereby facilitating the slidable engagement of the pin with the cam surfaces which define the peripheral slots.

I claim:

1. A restraining device for preventing unauthorized shifting of a horizontally slidable member such as a drawer structure, including a support attachable to a supporting structure, rotary latch means mounted on said support, said rotary latch means including a plurality of peripheral cam sections, each of which comprises a pair of spaced cam surfaces defining a recess opened radially outwardly for accommodating a complementary shiftable cam actuating member, one of said spaced cam surfaces in each cam section extending radially outwardly beyond its adjacent spaced cam surface to form an obstruction for contacting said shiftable cam actuating member, and means for restraining said latch means against unauthorized rotation including cylindrical axially facing cam means rotatable with said latch means, fixed protuberant means axially cooperative with said cylindrical cam means, and resilient means for yieldably urging said cylindrical cam means and said protuberant means toward each other.

2. A restraining device as set forth in claim 1 wherein each of said peripheral cam sections is defined by a pair of unequal arm members extending laterally from said rotary latch means in circumferentially spaced relation defining between each pair of arms a substantially radial slot for accommodating a complementary shiftable cam actuating member, each of the longer arms in each of the cam sections being disposed on the same side of the hand of travel as the next adjacent pair of arms.

3. A restraining device as set forth in claim 1 wherein a cylindrical cam is provided on opposite sides of said rotary latch means to permit the usage of said rotary latch means on opposite sides of a drawer with a common sup-

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port means usable on either side of the drawer to thereby permit orientation of said latch means to insure presentation of the longer cam surface to said actuating member.

4. A restraining device as set forth in claim 1 wherein the rotary latch means comprises a one piece molded plastic element.

5. A restraining device as set forth in claim 1 wherein the rotary latch means includes four equally spaced pairs of arms, each of which provides a pair of spaced cam surfaces defining a recess opening radially outwardly with the longer arm of each pair being oriented in the same position circumferentially about said rotary latch means as all of the other pairs.

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U.S. Cl. X.R.

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