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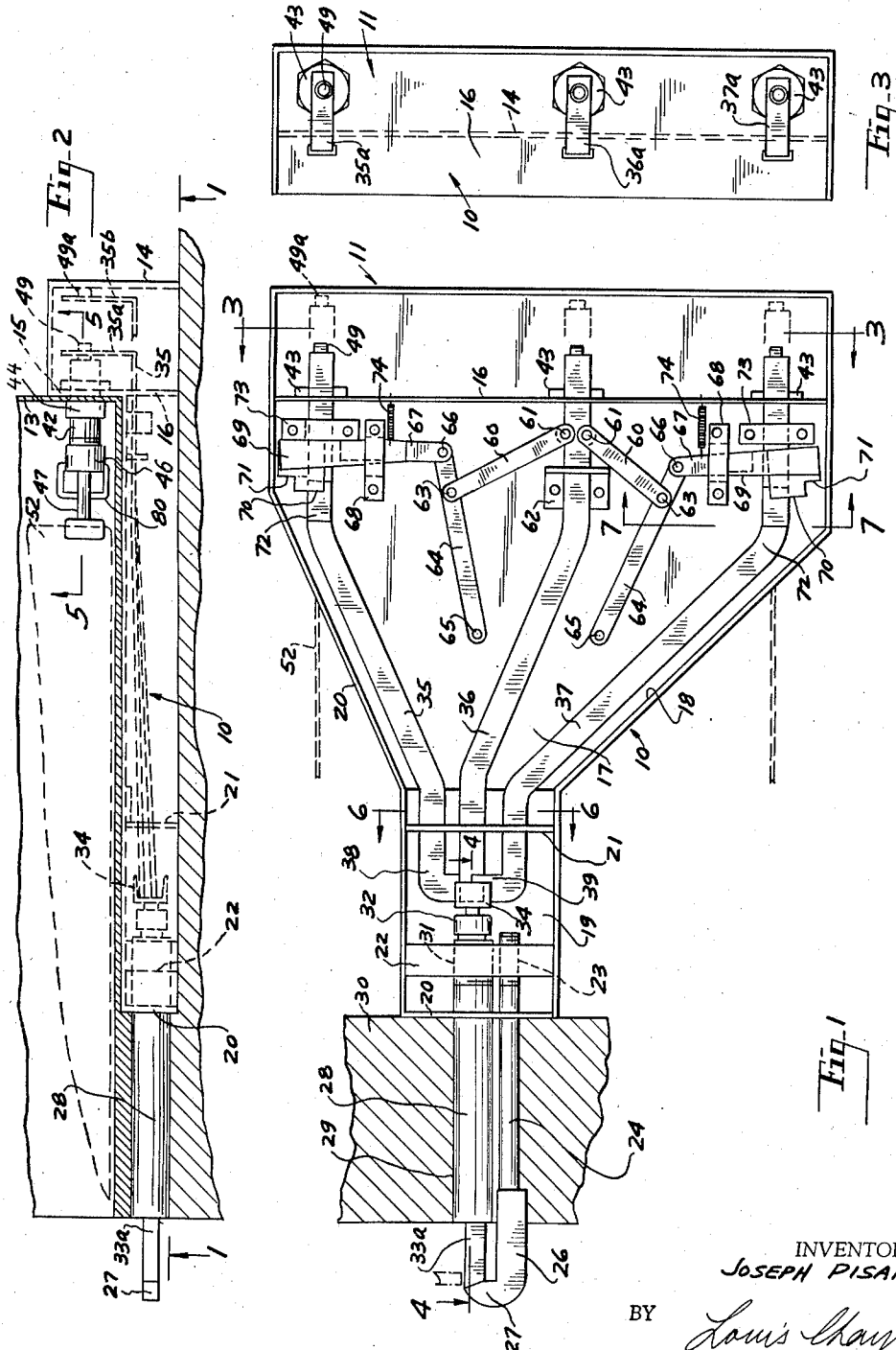
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2,829,609

DEVICE TO PREVENT DOOR LOCKING IN REFRIGERATORS

Original Filed March 3, 1954

3 Sheets-Sheet 1



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Fig. 4

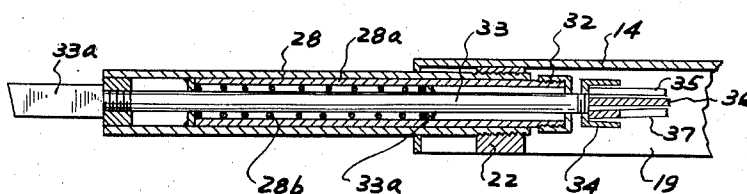


Fig. 5

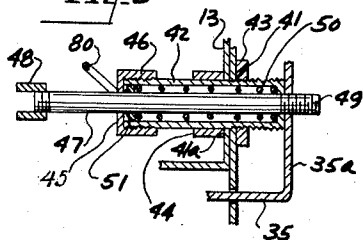


Fig. 6

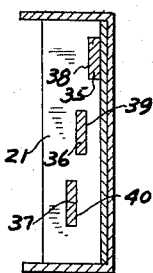


Fig. 7

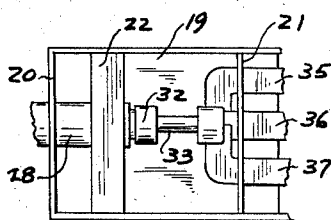
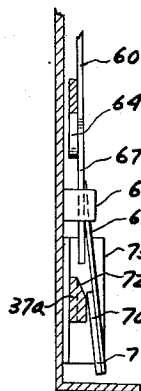


Fig. 8

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2,829,609

DEVICE TO PREVENT DOOR LOCKING IN REFRIGERATORS

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Original application March 3, 1954, Serial No. 413,802, now Patent No. 2,726,113, dated December 6, 1955. Divided and this application November 14, 1955, Serial No. 546,409

4 Claims. (Cl. 109—63.5)

The present application is directed to a combination of elements including a keeper of different construction and capable of a different function, which construction was shown in the parent application but was not claimed therein.

The device pertains to household refrigerators and ice boxes of the type which include a cabinet provided with a plurality of horizontally-disposed shelves therein. The locking means in this type of refrigerator and ice box, which both types from here on will be generally referred to as ice boxes, are mounted on the outside only and cannot be controlled or unlocked from within the respective ice box. It is because of this last-named feature that each year a number of children have perished by suffocation when trapped in abandoned and unguarded ice boxes of this type. Once locked within the ice box, a child has no way of opening the locked door from inside.

Since the ice boxes of the type mentioned are small, a child cannot enter a particular ice box as long as there are any shelves therein. To permit entry into the box, the shelves, or at least some of them, have to be removed therefrom. Taking advantage of this situation, I have provided means which will prevent the locking of the door of the ice box automatically upon removal of one or more shelves therefrom. Thus, an accident will be prevented even before circumstances favoring it, such as an open door ice box, are created.

I shall now describe my improvement with reference to the accompanying drawings in which:

Fig. 1 is a side elevational view of my device as it is installed in a side wall of an ice box;

Fig. 2 is a top elevational view of said device;

Fig. 3 is a sectional view on line 3—3 of Fig. 1;

Fig. 4 is a sectional view on line 4—4 of Fig. 1;

Fig. 5 is a sectional view on line 5—5 of Fig. 2;

Fig. 6 is a sectional view on line 6—6 of Fig. 2;

Fig. 7 is a sectional view on line 7—7 of Fig. 1;

Fig. 8 is a side elevational view of a detail of a mechanism included in my device, the view disclosing said detail in one of its two alternate operative positions;

Fig. 9 is a side elevational view, partly in section, of a modified species of my device.

Figs. 10 and 11 show each an enlarged side elevational view of structural details of said modified keeper;

Figs. 12 and 13 show each the front elevational view of a cap forming a part of the keeper assembly shown in Fig. 9;

Figs. 14 and 15 are front elevational views of two alternate positions of the modified keeper element with respect to the parts co-operating therewith.

Similar numerals refer to similar parts throughout the several views.

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To start my description, I wish to refer to the fact that a conventional ice box is provided with a two-element lock, including a keeper which is provided with an upright shoulder or spur and which is mounted upon the

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body of the ice box, specifically, on a portion which will be here identified as a door frame. The complementary part of the lock is a latch which is mounted on the door in such a manner that upon closing the door the latch will come into engagement with the keeper, ordinarily falling into place between the shoulder and the door frame of the box.

As the working of my device is directed to said keeper, the mechanism of said device is located in the wall of the box on the side on which the keeper is installed. Most elements of the mechanism are installed in a flat casing which is composed of a shallow pan, generally indicated by numeral 10, and a chamber, generally marked by numeral 11. The pan, which is provided with a flange 20 all about its sides, is disposed vertically in the wall of the box, the open side of the pan being turned away from the interior of the ice box, as shown in Fig. 2 where the side wall of the ice box is marked 12.

The pan 10 and the chamber 11 are in a right-angle relation to each other, the chamber 11 being disposed behind the inside lining 13 within the rear portion of the ice box. At the rear, the chamber is defined by a vertical wall 14. The front wall 15 of said chamber extends into the pan, forming therein a partition 16. The mid-portion 17 of the pan is substantially triangular in shape, being defined at the top and at the bottom by two converging lines 18 leading to a rectangular area 19.

A flange 20 which fringes the sides of the pan defines here one side of the rectangular area and bears against the rear surface of the door frame 30 of the ice box. Disposed transversely within the rectangular area 19 of the pan is another vertical partition 21, and forwardly therefrom, that is, in the direction to the front of the ice box, is a vertical bar 22 which is in a spaced relation to the door frame of the box. Threaded into a transverse aperture 23 in said bar 22 is a bolt 24 which passes through the door frame 30 and terminates outside of said door frame with the keeper constituting one element of the door-locking assembly. The keeper includes a horizontally-disposed shank 26 and an upwardly-extending spur or shoulder 27.

Located directly above said bolt 24, and extending parallel thereto, is a tubular member 28 which is disposed within a bore 29 in said door frame 30. The inner end of the member is threaded into an aperture 31 in said bar 24, while the outer end of said member 28 terminates at the outer face of said door frame, as shown in Fig. 1. Axially disposed within said member 28 is a tube 28a containing therein an axially-disposed shaft 33 which at its front end 33a is adapted to project forwardly into engagement with the inner face of the spur 27, as shown in Fig. 1.

At the inner end, the tubular member 28 is provided with a cap 32 having an axial opening therein for passage of said shaft 33. A spring 28b, contained in said tube 28a, bears against an annular flange 33b on said shaft 33, urging said shaft inwardly, that is, towards the rear portion of the ice box. The inner end of the shaft 33 carries a U-shaped, horizontally-disposed fork 34 opening towards the rear portion of the ice box.

Located within the pan are three oblong levers marked 35, 36, and 37, respectively, the levers having the shape of flat bars, each being adapted to be moved horizontally, and each lever passing at its front end through a separate slot in the partition 21 and at its rear end in a corresponding separate slot in said partition 16. The levers are all disposed in substantially the same vertical plane while passing through the rear partition 16, but are in slightly divergent positions when passing through partition 21, as shown in Fig. 6 where said slots are marked, from top to bottom, 38, 39, and 40, respectively.

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The front ends of all the levers fit into the U-shaped fork 34 from the open end thereof, the end portion of the lever 35 being turned downwardly into said fork, the front end of the lever 37 being turned upwardly into said fork, and the end portion of the lever 36 reaching said fork in its straight line extension.

At the rear, each lever turns laterally into chamber 11. This is shown in Fig. 2 with respect to lever 35, the laterally-turned portion thereof being marked 35a, while similar lateral extensions of the other levers are marked 36a and 37a, respectively.

It will be understood that the mechanism is not limited to three shelves, but that a separate lever has to be provided to co-act with each shelf.

Secured within an aperture 41 in the front wall 15 of the chamber 11, and in the aligned aperture 41a in the lining 13 of the ice box, is a cylindrical member 42 threaded, at one end, for reception of a nut 43. The latter is disposed in an opposed relation to a collar 44 axially mounted upon the body of said cylindrical member 42. The nut and the collar clamp the lining 13 and the wall 15 of the chamber 11 from opposite directions to hold the cylindrical member in place. This is best shown in Fig. 5.

At one end, that is, the rear end, said cylindrical member is provided with an inwardly-turned annular flange 45. At the opposite end a cap 46 is threaded upon said member, but contains an axial opening for passage of a rod 47. At what is its front end, the rod 47 carries a fork 48, while the rear end of the rod is threaded into one of the laterally-extending end portions of the levers 35a, 36a, or 37a, as the case may be.

Coiled about the rod in the cylindrical member 42 is a spring 50 which, bearing against an annular flange 51, drives the rod outwardly towards the front of the ice box. The fork 48 is in a position to the rear of a shelf 52 in the ice box, the rear edge of the shelf fitting into the opening or slot between the plates or tines of the fork. When the shelf is put down in its place, it will push the rod 47 rearwardly towards the rear wall 14 of the chamber 11, and as the rod is connected to the lever 35, said lever will be also moved rearwardly till the lateral extension of said lever will occupy position 35b.

An identical arrangement of elements, including a cylindrical member 42, a rod 47, and a coiled spring 50, is in a co-operative engagement with each of the two other levers of the ice box.

Returning to the levers as shown in Fig. 1, it will be noted that lever 36 is in a co-operative relation with the lever 35 disposed thereabove, and with the lever 37 which is disposed below said lever 36. As the means to effect the relation are the same for lever 35 as they are for said lever 37, I will restrict my description to the means pertaining to said lever 35 alone.

As shown in Fig. 1, a link 60 is at one end pivotally connected, by means of a bolt 61, to said lever 36 at a point between the partition 16 and a bracket 62 supporting said link. The outer end of the link 60 is connected by a pin 63 to a link 64, one end of which is pivotally secured to the bottom of pan 10 by a bolt 65. The opposite end of said link 64 is, in turn, joined by a bolt 66 to a vertically-disposed bar 67 adapted to slide vertically within a retaining bracket 68. Secured to the upright bar 67, and extending downwardly therefrom, is a flat spring 69 which carries on its inner surface a plate 70. The plate, which is recessed at one corner to form a vertical shoulder 71, is in abutment, face to face, with an inverted, vertically-disposed wedge 72 welded to the outer surface of said lever 37, as shown in Figs. 1 and 7. Located between the sliding vertical bar 67 and the partition 16 of the pan is a bracket 73 to guide the horizontal portion of the lever in its sliding movement at that point.

A coiled spring 74 anchored to the partition 16 pulls the upper portion of said vertical member 67 towards said partition.

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To conclude the description of my device, I wish to add that the cap 46 of the cylindrical member 42 which is in a co-operative relation to the top shelf, and the cap of a smaller cylinder in co-operation with the lowest shelf, are each provided with a pivoted U-shaped clamp 80 which fits into the slot of the fork 48. The reason for this arrangement is as follows: At times it may be desirable to remove the upper shelf without affecting the locking means of the ice box. This can be done by pushing the fork 48 manually towards the rear wall 14 of the chamber 11, causing the clamp to enter into the slot of the fork 48. This done, the lever 35 would be permanently held back in its inoperative position. However, there is no such arrangement for the intermediate lever 36. Here, once the shelf controlling said lever has been removed, the lever will always block the locking means. The clamp is marked 80.

I shall now describe the operation of my device:

When the ice box is in its normal use, all the shelves are in place, and, because of that, all the levers are in their withdrawn positions, their lateral extensions 35a, 36a, and 37a, respectively, being disposed close to the rear wall 14 of the chamber 11, as shown in dotted lines 35b with respect to the position of lever 35. With all these levers withdrawn, as above stated, the device is inoperative. This means that the ice box may be locked or unlocked in the customary manner.

It will be now assumed that one of the shelves, say the top one, has been removed. As there is no shelf to push back the fork 48 towards the rear of chamber 11, the coiled spring 50 acting upon rod 47 within the cylinder 42 will move said rod forwardly towards the front of the ice box, and as the rod is connected by intermediate means to said lever 35, it will cause the lever to move forwardly, bearing against the fork 34 which is located rearwardly of the door frame 30 of the ice box. As the fork is mounted on shaft 33, it will push said shaft outwardly against the tension of spring 28b so that the outer portion or bar 33a of shaft 33 will come in contact with the face 27 of the keeper 26. With the bar 33a in said position, the latch of the lock cannot be applied to the keeper 26 and the door cannot be locked.

Exactly the same thing would happen if any other, all or any two shelves had been removed, as the mechanism applicable to the other shelves is identical with that already described with reference to the top shelf and to the lever 35.

It will be obvious that a child cannot enter the ice box as long as the shelves therein are in place. Assuming that the shelves have been removed and that a child has entered the ice box, it might be possible for said child to push back the fork 48 which controls the intermediate lever 36. Now, restricting my description to the elements shown in Fig. 1, below said lever 36, this is what would take place. Lever 36 would be shifted rearwardly towards the rear wall of chamber 11. Link 60, pulled by the lever, would act upon link 64 and cause it to pull up the vertical bar 67. The wedge 72 would then engage the shoulder 71 in plate 70 to prevent the withdrawal of lever 37 rearwardly. In other words, even if the child were to push in the middle lever 36 out of engagement with fork 34 which controls the bar 33a, the other levers would still remain in place so that said keeper 26 would be blocked by said bar 33a, as shown in Fig. 1.

The mechanism shown in Figs. 9 to 13 is a modification of the locking mechanism employed by me. The modification is restricted to the keeper, generally indicated by numeral 81, and to the means to operate the same. The keeper itself includes a shank 82 terminating at its front end with an upright spur 83. The shank is axially connected to a shaft 100 which fits axially into

a tubular member 84. At the rear the member 84 is

closed by a cap 85 which is provided with an axial aperture 86 to permit a sliding movement of said shaft there-through. The end portion of the shaft extending from the member 84 through said aperture 86 fits into a cup 32a connected to the fork 34, said shaft being adapted to be turned about its axis. At the front, the member 84 is provided with a cylindrical collar 87. The front face 88 of the collar contains two bayonet slots 89, these being in a diametrically-opposed relation to each other, and with two notches also in diametrically-opposed relation to each other but on a line disposed at right angle to the diameter joining the slots. The notches are marked 90.

The shank is equipped with a pin 91 passing diametrically through said shank at the front end thereof, the ends of the pin being adapted to come into engagement alternately with said slots and said notches. A spring 92 coiled about the shank, is at one end 93 anchored in an aperture in the tubular member at the front end thereof, while the other end 94 of said spring is anchored in a slot 95 at the end of the shank remote from the keeper 81. The object to be attained by the use of the spring is two-fold. First, the spring is to urge the shank in the rearward direction to keep the pin 91 in engagement with the slots or the notches; the other object is to impart to the shank a partial turn about its axis.

The device operates as follows: Normally, the keeper 81 is in such a position that the spur 83 is turned upwardly, as shown in Fig. 9. At this stage, should the fork 34 be pushed forwardly by one of the levers 35, 36, or 37, in the direction of the arrow shown in Fig. 9, said shaft 100 with the keeper 81 would be thrust forwardly, causing the pin 91 to be disengaged from the slots 89 whereupon the shaft 100 actuated by the spring 92, would turn the keeper approximately 90 degrees about its axis. As a result thereof the pin 91 would come into engagement with the notches 90 so that the spur 83 would be in a horizontal position, rendering the keeper inoperative. This is shown in Figs. 10 to 15.

What is claimed is:

1. In an ice box having a plurality of removable shelves and having a door provided with a latch, in combination with each shelf a horizontal rod disposed rearwardly of the respective shelf parallel to the side wall of the ice box, each rod bearing, at its front end, against the rear portion of its shelf, spring means urging each rod against its shelf, an oblong lever within the body of the ice box, the rear end of the lever being secured to the rod, a horizontally-disposed collar mounted within the front wall of the ice box along its door, the front end of the collar being provided with radially-disposed slots, a shaft disposed within the collar for a longitudinal sliding movement therein, the rear end of the shaft being provided with a fork for reception of the front end of the lever, a keeper on the front end of the shaft, the keeper having an upwardly-projecting spur in a spaced relation to the front of the ice box for engagement with the latch, radial pins on the shaft rearwardly of the keeper, the pins being adapted to fit into the slots, spring means acting upon said shaft to hold the pins in said slots, the spring means being adapted to impart to the shaft a turn about its axis, the above rod being adapted, on removal of the shelf, to push the lever forwardly into the fork to impart a longitudinal forward movement to the shaft to cause disengagement of the pins from the slots and to cause the keeper to turn about its axis to prevent engagement of the spur of the keeper with said latch.

2. In an ice box having a plurality of removable

shelves and having a door provided with a latch, a cylindrical collar disposed horizontally within the wall of the ice box along its door, the collar being provided, on its front face, with a pair of diametrically-disposed slots and a pair of diametrically-disposed notches on a line at right angle to a line joining the slots, a shaft disposed slidably within the collar and terminating at its front end with a keeper including a vertically-rising spur in a spaced relation to the front wall of the ice box, radial pins on the shaft, spring means acting upon the shaft to urge it rearwardly for engagement of the pins with the slots, said spring means being adapted to turn the shaft about its axis, the opposite end of the shaft terminating with a fork, a rod actuated by spring means and bearing against a shelf from the rear of the ice box, a lever at one end fitting into the fork and connected at the other end to said rod, the above rod being adapted, on removal of the shelf, to push the shaft, by means of said lever, forwardly to disengage the pins on the shaft from the slots in the collar to cause the keeper to turn about its axis for engagement of the pins with notches to prevent engagement of the spur with the latch.

3. In an ice box having a plurality of removable shelves, a cylindrical collar disposed in the front wall thereof along one side of its door, the collar having in its front face radially-disposed slot means, a shaft disposed slidably in said collar and terminating with a keeper including a radially-projecting spur in a spaced relation to the front wall of the ice box, radial pin means on the shaft, spring means acting upon the shaft to urge it rearwardly towards the rear of the ice box to keep the pin means in engagement with the slot means and exerting upon the shaft a torque for a turn about its axis, the opposite end of the shaft terminating with a fork, a rod actuated by separate spring means and bearing from the rear against a shelf, a lever at one end fitting into the fork and connected at the other end to said rod, the rod being adapted, on removal of the shelf, to move forwardly under the action of said last-named spring means to push the shaft forwardly out of engagement by means of said pins with the slot means to cause the shaft to turn about its axis under the action of the first-named spring means to prevent engagement of the spur with the latch.

4. In an ice box having a plurality of removable shelves, a cylindrical collar disposed in the front wall thereof along one side of its door, the collar having in its front face radially-disposed slot means, a shaft disposed slidably in said collar and terminating with a keeper including a radially-projecting spur in a spaced relation to the front wall of the ice box, radial pin means on the shaft, spring means acting upon the shaft to urge it rearwardly towards the rear of the ice box to keep the pin means in engagement with the slot means and exerting upon the shaft a torque for a turn about its axis, means adapted to bear against the shaft from the rear but kept inoperative by a shelf in the ice box, said means serving, on removal of the shelf, to push the shaft forwardly to disengage the pins from the slots and to cause the shaft to turn about its axis.

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