July 15, 1941. L. L. ANDERSON 2,249,644

REFRIGERATOR LATCH

Filed Dec. 30, 1940 2 Sheets-Sheet 1

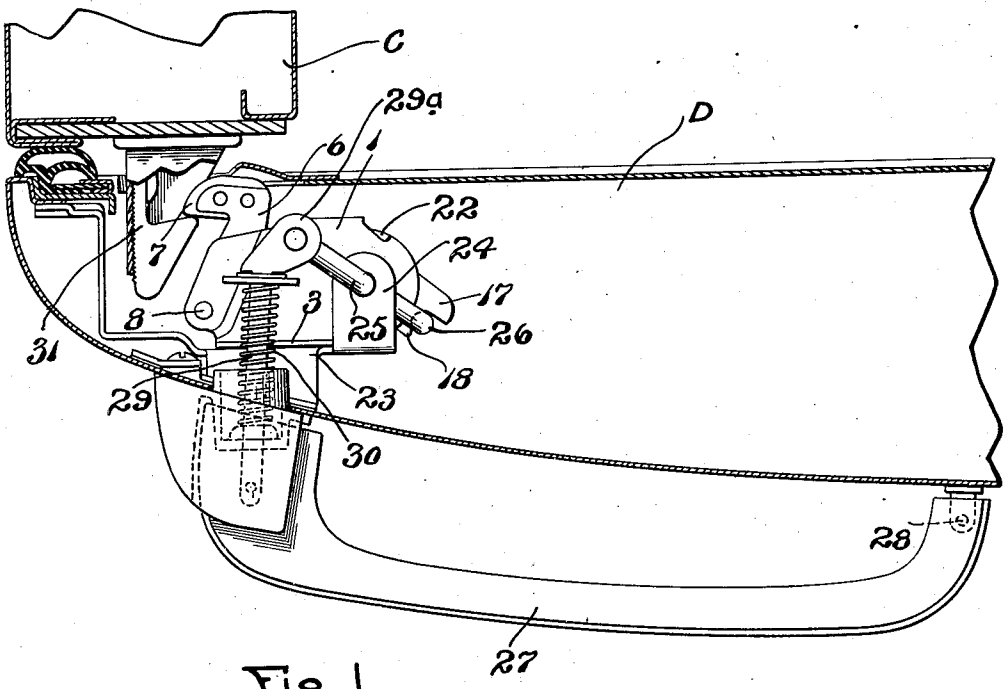

Fig. 1.

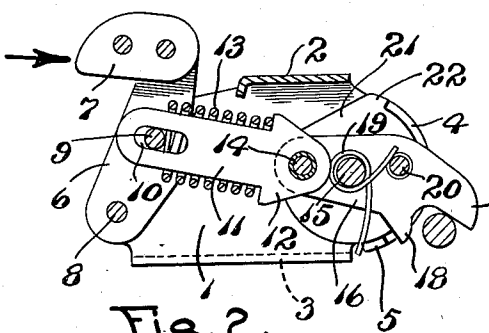

Fig. 2.

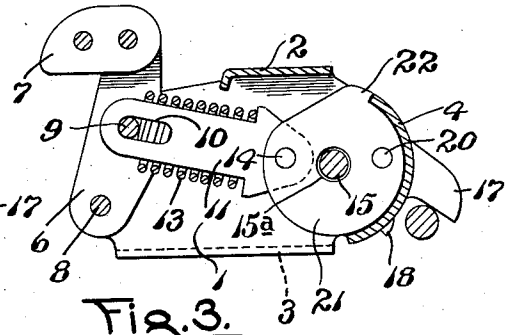

Fig. 3.

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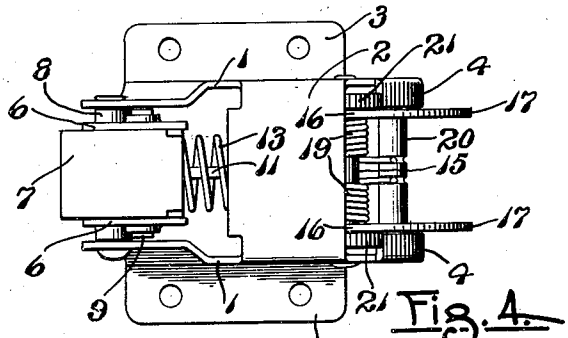

Fig. 4.

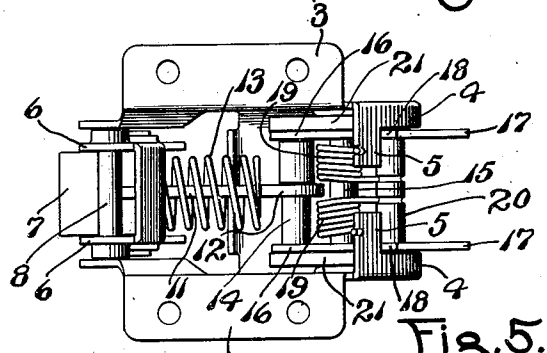

Fig. 5.

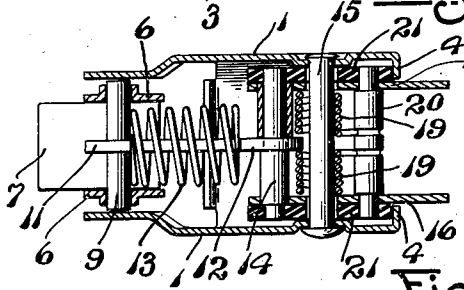

Fig. 6.

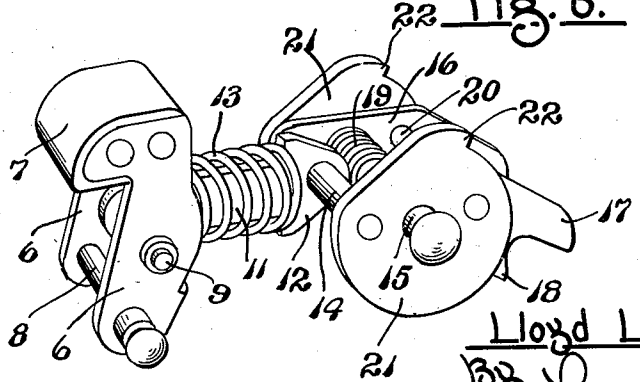

Fig. 7.

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REFRIGERATOR LATCH

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Application December 30, 1940, Serial No. 372,222

12 Claims. (Cl. 292—122)

This invention relates to latches of particular utility for releasably holding refrigerator doors in closed position.

Refrigerator latches in which a latch bolt is connected with a toggle lever structure are well-known. Such toggle lever structures are subject to the defect that in operation from one position to another a noise is produced. This is particularly detrimental in refrigerators which are made almost entirely of metal, as is becoming very common practice. When the refrigerators and particularly the doors thereof included wood framework the noise produced by the latch in its operations was to some extent deadened by the sound deadening properties of the wood used. But in refrigerators in which the doors are made substantially all of metal including steel framework, the undesirable sound is very pronounced and is accentuated rather than deadened.

The present invention is directed to a novel improvement in refrigerator latches whereby the movement of the latch bolt is slowed up and braked thereby eliminating the quick action of the spring actuated lever construction which has been productive of the undesirable noise which has been described. With my invention the noise is greatly reduced or completely eliminated and is not noticeable.

An understanding of the invention may be had from the following description of one preferred form of structure which I have devised, taken in connection with the accompanying drawings disclosing the same, in which,

Fig. 1 is a fragmentary horizontal section through a door with the latch of my invention mounted thereon and shown in plan.

Fig. 2 is a horizontal section through the latch substantially midway between its upper and lower sides and showing the latch bolt partially retracted.

Fig. 3 is a similar horizontal section with the latch bolt in its farthest outer position and with the inner portion of the toggle lever construction shown in plan.

Fig. 4 is an elevation of the latch looking against its inner side.

Fig. 5 is an opposite side elevation of the latch.

Fig. 6 is a vertical section through the latch shown in Fig. 1 between its opposite inner and outer sides, and

Fig. 7 is a perspective view of the latch bolt and attached toggle lever and brake construction.

Like reference characters refer to like parts in the different figures of the drawing.

The structural embodiment of the latch includes a sheet metal supporting casing or housing made preferably from a single piece of metal and formed with two spaced apart sides 1 connected at their inner end portions by an integral cross plate 2, the opposite edge portions of the sides 1 being bent laterally at right angles to provide attaching flanges 3. Each of the sides 1 at its inner end portion is formed with a curved flange 4, which flanges extend toward each other and against which brakes hereafter described are adapted to bear under certain conditions of the latch operation. Integral fingers 5, one on each of the flanges 4 extend toward each other as shown.

The latch bolt is mounted for pivotal movement between the two sides 1 at the ends thereof opposite the brake flanges 4. A lever made from a single piece of sheet metal is formed with two spaced arms 6 parallel to each other between the free ends of which the keeper engaging bolt member 7 is permanently secured. The opposite ends of the arms are mounted to turn about a pivot pin 8 which extends between and is mounted upon the sides 1 of the latch casing.

A rod or pin 9 extends between the spaced arms 6 substantially midway between the ends thereof and passes through a slot 10 formed in the outer end portion of a flat bar 11 of metal which at its opposite end portion is formed with a triangular like head 12. A coiled compression spring 13 surrounds the bar 11 bearing at one end against the shoulders provided by the head 12 as shown, and at the other end against the pin 9. It is apparent that with the bar 11 held against longitudinal or pivotal movement the latch bolt may be turned in clockwise direction (Figs. 2 and 3) about the pivot pin 8 by forcing it in a direction to compress the spring 13 with the pin 9 traversing the slot 10. The arm 11 forms one member of a toggle lever which at its head 12 is pivotally connected with a knuckle pin 14. The other parts of the toggle lever construction comprise two spaced apart lever members 16 of flat metal which are connected each at one end to the pin 14 and are mounted to turn about a rod 15 securely fixed at its ends in the sides 1 of the housing and extending between said sides. Each of the lever members 16 projects inwardly beyond the rod 15 and terminates in two spaced apart projections 17 and 18 with a concave socket between them. Coiled torsion springs 19 are mounted upon and located around

the rod 15 and have their end portions bearing against the fingers 5 and a pin 20 which extends between the two lever members 16, as shown. These springs are under stress, and bearing against the fixed abutment fingers 5 have a tendency to turn the lever members 16 in a clockwise direction.

At the outer sides of each of the lever members 16 a disk 21, in practice made of suitable fiber, is permanently secured, the ends of the pins or rod 14 and 20 having secure connection with said disks. Each of the disks is provided with a projection 22 as shown, which normally engages against one end of its adjacent brake flange 4. These disks at portions of their curved edges lie within the inner curved sides of the brake flanges 4. The normal position of the latch parts is that shown in Fig. 3, the projections 22 against the brake flanges 4 providing stops as is evident. The openings through the lever members 16 and the braking disk members 21 are slightly larger in diameter than the exterior diameter of the rod 15 as shown at 15a in Fig. 3.

The latch construction which has been described in practice is mounted between the inner and outer sides of a steel door D (Fig. 1) on a bracket fixture 23 of metal which is permanently secured within the body of the door, the attaching flanges 3 being secured to the bracket. The bracket includes in its structure spaced integral arms 24 passing one above and the other below the latch casing which at its inner end portion is located between said arms. A crank 25 is formed from a suitable length of rod-like material and is provided with a U-shaped portion 26 seated in the sockets between the projections 17 and 18 on the lever members 16. A handle 27 is shown as disposed at the outer side of the door D and is pivotally mounted at one end at 28 on a stud secured to the door. The opposite end of the handle is connected with a rod 29 which extends through the front side of the door and has a flattened portion 29a connected with one end of the crank 25. A coiled spring 30 is located around the rod 29 and is compressed when a pull is exerted upon the handle 27 to swing the crank 25 in a counter-clockwise direction (Fig. 1).

The associated side C of the refrigerator casing is provided with a suitable keeper 31 of a conventional construction in the recess of which the keeper engaging member 7 of the latch bolt is designed to be received. This keeper has the usual head with an inclined surface and the part 7 of the bolt is provided with a rounded or cam surface to ride against the inclined surface of the keeper, whereby in closing the door the latch bolt is swung clockwise from the position shown in Fig. 3 so as to compress the spring 13 until the nose of the keeper is reached whereupon the part 7 will be forced by the compressed spring 13 into the recess of the keeper as shown in Fig. 1.

The latch bolt is retracted by pulling upon the handle 27 thereby turning the disks 21 counter-clockwise and withdrawing the latch bolt so as to disengage from the keeper 31. In closing the door the toggle lever members 11 and 16 being located in a position so that the center lines of pins 9, 14 and 15 are substantially in alinement they are held against any turning movement and the latch bolt 6 with its keeper engaging head 7 only has movement accompanied by movement of the spring 13. With the door closed, as in Fig. 1, the head 7 bears snugly against the inner side of the keeper head and occasionally is not out to the full position as shown in Fig. 2 with the spring 13 partly compressed. This provides a force which moves the inner portion of the toggle lever structure to the right (Fig. 3) and brings the curved edges of the disk 21 against the inner curved sides of the flanges 4. This produces a friction bearing of the edges of the disk against the flanges 4 whereby when the handle is pulled to retract the latch a brake is put on the retracting movement, slowing up such movement and eliminating the quick striking of the movable parts of the latch bolt structure against the supporting casing or housing therefor and obviating noises which would be accentuated or increased when transmitted from the metal housing to the metal door.

The construction has been built and fully tested under service conditions to a degree in excess of the service which the latch will have in actual use. It has proven particularly effective for the noise eliminating purposes for which it was designed.

The manual operation of the latch for opening the door may be made in many ways, and the one disclosure made is not to be considered in any way limiting the use of the invention thereto. This invention is directed to the latch structure and is not concerned with any particularly manually operated mechanism for operating it.

The claims are directed to the latch structure itself and not to the operating means. The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. A latch structure comprising, a housing having spaced apart sides, each side at one end thereof being inwardly turned to provide a curved braking flange, a latch bolt movably mounted on the housing, latch operating means connected with the bolt at one end and mounted for rotation at its opposite end including disks having edges thereof located within said curved braking flanges, said rotatable disks being mounted for a limited bodily movement toward said flanges upon the application of pressure against the latch bolt, thereby bringing the edges of said disks into retarding frictional engagement against said braking flanges.

2. In a latch structure, a supporting casing having spaced parallel sides and including a fixed braking flange, a latch bolt movably mounted on said casing, a rod extending through the casing, a bar forming one member of a toggle lever connected with the latch bolt at one end, a second member of the toggle lever structure mounted upon said rod for rotative movement thereabout, said members of the toggle lever having a pivotal connection at adjacent ends, and a disk mounted on the second toggle lever member having a curved edge located within the braking flange, said second toggle lever member and disk through which said rod passes having openings for the passage of the rod slightly greater in diameter than the exterior diameter of the rod.

3. A latch comprising a casing having spaced parallel sides, each of which at one end is turned inwardly to provide curved braking flanges extending toward each other, a rod mounted on and extending between the sides of the casing having an axis substantially coincident with the centers of curvature of said flanges, a pair of spaced apart flat metal members rotatably mounted on said rod, a pin connecting said mem-

bers at one end, a disk secured at the outer side of each of said members and through which said rod passes, said disks having curved edge portions lying within said braking flanges, a bar pivotally mounted at one end on said pin, a latch bolt movably mounted on said casing and connected with said bar, the openings through said members and attached disks being slightly greater in diameter than the exterior diameter of the rod passing through.

4. A construction containing the elements in combination defined in claim 3, combined with spring means acting upon said members and attached disks to turn them in one direction, and a projection extending from a disk to come against one end of a braking flange to stop said turning movement at a predetermined position.

5. A construction containing the elements in combination defined in claim 3, combined with means for pivotally mounting said latch bolt between the sides of the casing, said bar having a slot in its end portion nearest said latch bolt, a pin connected with the latch bolt passing through said slot, and a coiled spring bearing at one end against the latch bolt and at its opposite end against said bar.

6. A construction containing the elements in combination defined in claim 3, each of said members at the opposite end thereof being formed with a socket for the reception of a means for manually turning said members and attached disks about the rod on which they are mounted.

7. A latch comprising, a casing having spaced apart connected sides, each of said sides at one end thereof being turned inwardly and formed as a curved braking flange, a rod extending between and mounted at its ends on said sides with the axis of the rod substantially coincident with the centers of curvature of said flanges, two spaced apart flat members pivotally mounted on said rod, a disk secured at the outer side of each of said members, each of said disks having a projection thereon, two spaced apart pins on opposite sides of said rod connecting the members and disks in firm relation to each other, torsion spring means mounted on said rod engaging at one end with one of said pins and at the other end with the casing adapted to turn said members and connected disks in a direction to bring the projections on the disk each against one end of its associated brake flange, said members and disks having openings therethrough for passage of the rod slightly greater in diameter than the exterior diameter of the rod, a bar pivotally connected at one end on the other of said pins, said bar adjacent its other end having a longitudinal slot therein, a latch bolt located between the sides of the casing adjacent the ends thereof opposite the ends on which the braking flanges are positioned, means for pivotally mounting said latch bolt at one end thereof on said casing, a pin extending through said latch bolt between its ends and passing through the slot in said bar, and a coiled spring surrounding said bar bearing at one end against the bolt, said bar being provided with a head at its opposite end having shoulders against which the opposite end of the spring bears.

8. A latch comprising, a housing, a latch bolt movably mounted on said housing, a pair of toggle levers connected to said latch bolt and said housing, a spring acting to extend said latch bolt, means for manually moving the toggle levers to retract the latch bolt and a brake connected with one of said toggle levers to retard movement of the latch bolt.

9. The elements in combination defined in claim 8, in which said spring acting to extend said latch bolt also acts to exert pressure on said brake.

10. A latch comprising, a housing, a latch bolt movably mounted on the housing, a pair of toggle levers pivotally connected to said latch bolt and to said housing, manual means for moving said toggle levers in out of line position for retracting said latch bolt and a brake connected with one of said toggle levers and bearing against said housing acting to retard movement of the latch bolt.

11. The elements in combination defined in claim 10, combined with a spring acting to extend said latch bolt said spring also exerting braking pressure between said brake and said housing.

12. A latch comprising, a housing, a latch bolt movably mounted on the housing, a pair of toggle levers, one having a loose pivotal connection with said housing and the other having a sliding connection with the latch bolt, a brake connected to and rotatable with said first named toggle lever and having frictional engagement with said housing and a compression spring having one end bearing against said latch bolt and the other end bearing against said second named toggle lever, said spring acting to extend said latch bolt and to exert frictional pressure on said brake against said housing.

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