Oct. 4, 1932. A. EKMAN 1,880,928

REFRIGERATOR LATCH

Filed Jan. 13, 1930 2 Sheets-Sheet 1

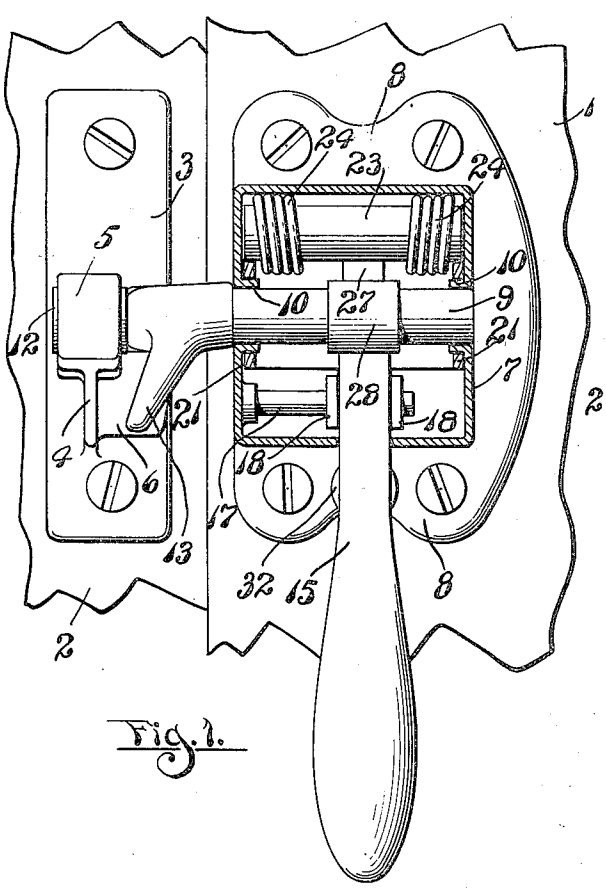


Fig. 1.

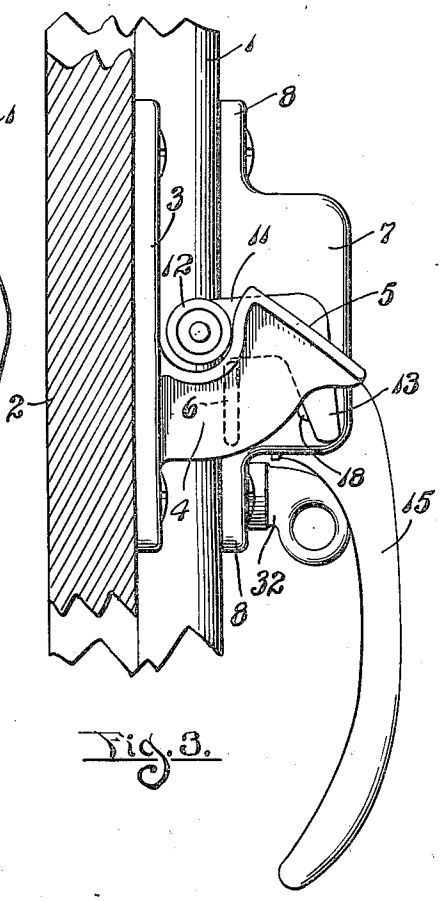


Fig. 3.

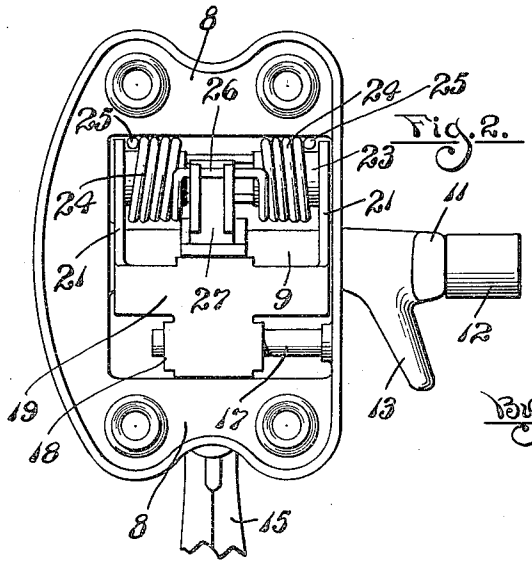


Fig. 2.

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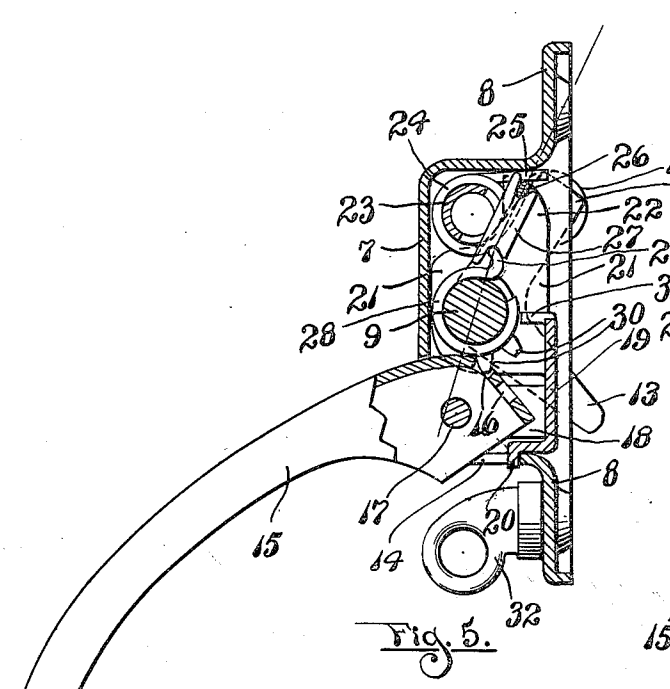


Fig. 5.

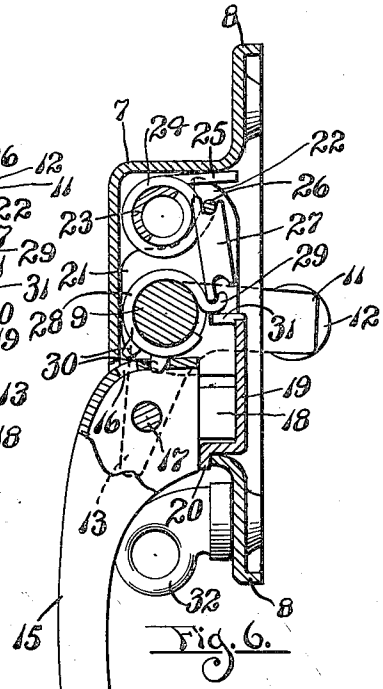


Fig. 6.

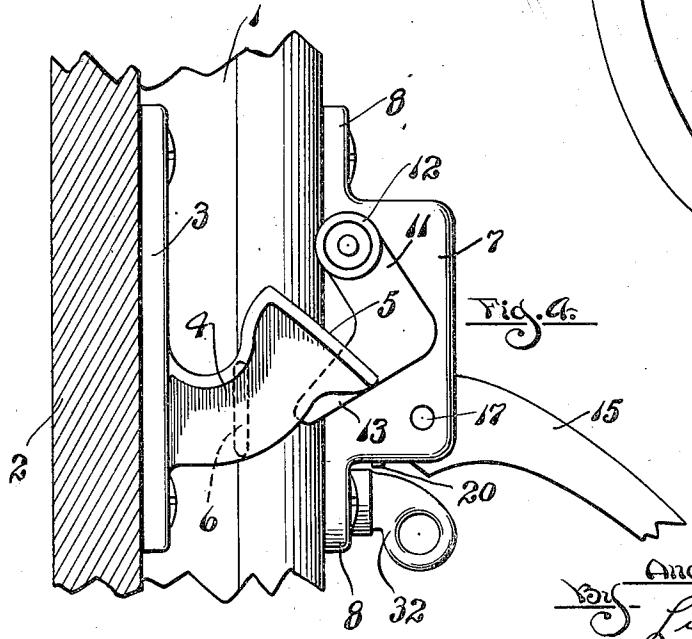


Fig. 4.

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UNITED STATES PATENT OFFICE

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REFRIGERATOR LATCH

Application filed January 13, 1930. Serial No. 420,387.

This invention relates to latches, and more particularly to latches which are to be applied to swinging doors such as those used on refrigerators, kitchen cabinets or the like.

In opening and closing refrigerator doors it is desirable that the latch used may be easily operated for opening the same and that the latch shall be held in a position such that when the door is closed it does not have to ride over any cam surface with an overcoming of the spring action of the latch, but that it may move freely over the keeper and after it has passed by the keeper hook, be tripped so as to snugly engage with the keeper hook and thereby hold the door in tightly closed position. The strength of spring properly required for maintaining a relatively heavy refrigerator door in tightly closed position so as to preclude the escape of refrigerated air from the refrigerator is great and as normally an overcoming of the spring is required every time the door is closed, there is a very strong tendency that parts of the latch and keeper may be damaged, especially as the door is many times slammed with heavy force; and the fastenings which secure the latch to the door may become loosened and in addition a heavy strain is put upon the refrigerator hinges. By eliminating any necessity to overcome the spring when the door is closed all of such detrimental tendencies are overcome and there is no damage to the latch parts, their fastenings or to the door hinges.

It is a primary object and purpose of the present invention to provide a very economically manufactured refrigerator latch and have an effective trip operation thereof when the door is closed to permit sure and easy closing of the door. The present invention is concerned with much the same character and type of latch as that shown in my Patent No. 1,778,148, issued October 14, 1930. An understanding of the invention and its various advantages in the matter of operation and economy of manufacture may be had from the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a front elevation of the latch and keeper attached to a door and door jamb, which are shown fragmentarily, the outer side of the latch housing being removed and the housing shown in section.

Fig. 2 is an inner side elevation of the latch which is applied to the door.

Fig. 3 is a side elevation of the latch and keeper applied, respectively, to the door and door jamb, the door being in closed position.

Fig. 4 is a view similar to that shown in Fig. 3, the door being partly opened and shown approaching closed position.

Fig. 5 is a central vertical section through the latch which is to be attached to a door and with the latch occupying the position which it has when the door is opened, and

Fig. 6 is a similar section with the latch parts in the position they occupy when the door is closed.

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

On a door, indicated at 1, and on a door jamb shown at 2, the latch and the keeper therefor, respectively, are mounted. The latch is located near the free vertical edge of the door which is mounted for swinging movement on hinges. The keeper comprises a flat base plate 3 attached by screws to the door jamb 2 from which a keeper hook 4 extends outwardly. The hook at its outer side has a curved cam face 5. A vertical tripping ledge 6 extends laterally from the hook toward the door as best shown in Fig. 1.

The latch mechanism which is to be secured to the door 1 includes a stamped housing 7, preferably, from which attaching ears 8 integral therewith extend upwardly and downwardly. Screws may pass through these ears to secure the housing and the mechanism carried thereby to the door.

A latch bolt 9 in the form of a rod is mounted for rocking movement on and between the vertical sides of the housing 7; and to make bearings for the bolt the metal of the sides of the housing is pressed inwardly, as indicated at 10, providing wider bearings for the bolt than the mere thickness of the metal used in the housing would afford.

One end of the bolt at the side of the hous-

ing adjacent the keeper has a bell crank head permanently secured thereto (see Fig. 4). One arm 11 of the bell crank is equipped with a laterally extending roller 12 at its free end, and the other arm 13 extends at right angles substantially from the arm 11 so as to engage against the tripping ledge 6 when the door is closed.

The lower part of the latch housing 7 is cut away to make an opening 14 through which the upper end of an operating handle 15 for the latch is to pass. The latch handle 15 is formed from flat or sheet metal and at its upper end has a plurality of spaced openings 16, best shown in Fig. 5, the purpose of which will later appear. The latch handle is pivotally mounted on a pivot pin 17 which extends through the inner side of the housing 7 to and through two spaced apart ears 18 which extend outwardly at right angles from a plate 19 located within and at the inner part of the housing 7. One end of the plate 19 is turned outwardly and then downwardly providing a lip 20 which extends into the opening 14 in the latch housing. Two sides 21 are bent at right angles from the base 19 and extend outwardly parallel to and closely adjacent the inner sides of the sides 7 of the latch housing, and the latch bolt 9 passes through said sides 21. These sides 21 terminate in upper extremities 22 spaced a distance from the outer side of the housing 7 to serve to hold a tubular member 23 in place at the upper outer portion of the housing as fully shown in Figs. 5 and 6.

The tubular member 23 serves as a support for spaced apart coils 24 of a coiled spring the free ends of the coil being extended, as indicated at 25, to bear against the inner side of the upper end of the housing 7. The spring is made from a single length of spring wire and an intermediate loop 26 between the coils 24 extends inwardly and upwardly therefrom and seats in suitable notches at the upper ends of the sides of a channel shaped arm or link 27 the lower end of which is engaged with the hooked end 29 of a metal band 28 located around and permanently secured to the latch bolt 9 substantially midway between its ends.

Two spaced apart teeth 30 project from the member 28 and are adapted to engage in the openings 16 in the upper end of the handle 15, similar in action to gear teeth and a rack. A stop lug 31 is bent in an outward direction from the upper end of the plate 19 and is in the path of movement of the hooked end 29 of the member 28 as illustrated in Fig. 6.

In the operation of the latch structure as described, with the door closed, as shown in Fig. 3, the drop handle 15 is grasped and swung outwardly. The link 27 and the member 28 with which it engages having been in the position shown in Fig. 6 when the handle 15 is swung outwardly to the position shown in Fig. 5, the bolt 9 is turned about its longitudinal axis, lifting the roller 12 out of the recess of the keeper hook and above the nose of the hook. The structure described with reference to the link 27, bolt 9 and the member 28 around it is in effect a toggle arm structure. In the movement of the parts from the position shown in Fig. 6 to that shown in Fig. 5 the line of force of the spring with which the upper end of the link 27 is engaged is carried across from one side to the other of the dead center line of the toggle construction whereby the spring maintains the latch parts in either position to which operated, namely, that shown in Fig. 5 or that shown in Fig. 6. Accordingly, when the handle 15 is grasped and pulled outwardly the roller 12, carried on the arm 11, which has been seated in the recess of the keeper hook is disengaged from the keeper and remains in its upper position all of the time that the door is open.

On closing the door the end of the arm 13 comes against the trip ledge 6 and automatically rotates the latch bolt so as to cause the roller 12 to be forced into the recess back of the hook of the keeper, the toggle construction described being automatically moved from the position shown in Fig. 4 to that shown in Fig. 6. The roller 12, when the door is being closed, moves freely over the nose of the keeper hook without engaging therewith in any respect, and the tripping action effects a movement of the roller 12 downwardly into the recess of the keeper hook, the roller engaging with the inner side of the hook and wedging the door to tightly closed position.

Attached to the lower ear 8 of the latch housing is an eye 32 which, when the door is in closed position, with the handle 15 at its inward location it is directly over said eye permitting the handle to be embraced by the bolt of a padlock thereby serving to hold the handle against outward movement; and therefore locks the latch against operation with the lock bolt engaged with the keeper.

The construction described is one of a very economical manufacture. It is durable and efficient in all respects and has proved exceptionally practical in service. 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, a shaft mounted therein for rocking movement, said shaft at one end having a crank portion adapted to engage with a keeper, a metal band located around and secured to the rock shaft having spaced apart teeth extending radially therefrom, a handle pivotally mounted on the housing having spaced openings at its inner end in which said

teeth are received on pivotal movement of the handle thereby rocking the rock shaft, said band at one end being formed into a curved section projecting away from the rock shaft, a link seated at one end in the socket made by said curved portion of the band, and spring means bearing against the opposite end of the link and with which said opposite end of the link has a pivotal connection, substantially as and for the purposes described.

2. A construction containing the elements in combination defined in claim 1, combined with a fixed stop interposed in the path of movement of said projecting end of the band on the rock shaft to limit the rocking movement of said shaft in one direction.

3. A latch structure comprising a housing, a rock shaft mounted therein having keeper engaging means secured thereto at one end, a handle pivotally mounted with respect to the housing, interengaging means between the handle and rock shaft for rocking the shaft by said handle, a cylindrical support held within said housing a distance from said rock shaft, spring means comprising a central U-shaped loop, coils formed in the legs of said loop located around said support and having free ends bearing against the housing, and a link interposed between said loop of the spring means and the rock shaft, said link at one end having pivotal connection with said loop and at the opposite end having a pivotal connection with the rock shaft, for the purposes described.

4. A latch structure comprising, a housing, a rock shaft mounted therein, keeper engaging means at one end of the rock shaft, a plate located within and at the inner part of the housing having outwardly turned sides lying within the sides of the housing through which said rock shaft passes, and also having outwardly turned ears a short distance from said sides turned from the plate, a handle located between and pivotally carried on said ears, operative means connecting the handle and rock shaft for rocking said shaft by movement of the handle, said sides turned outwardly from the plate having portions cut away therefrom a distance from the rock shaft forming recesses, a cylindrical supporting member held in said housing between the outer side thereof and the said sides of the plate in said recesses, spring means comprising a U-shaped loop with the legs thereof formed into spring coils, said coils being located around said support and terminating in free ends bearing against the housing, and a link having one end pivotally engaging against said U-shaped loop and the other end pivotally connected with said rock shaft.

5. In a device of the character described, a housing, a shaft mounted therein for rocking movement, said shaft at one end having a crank portion and an arm extending at an angle to said crank portion, a handle movably mounted on the housing, interengaging means on the handle and rock shaft for rocking the shaft on movement of the handle, spring actuated means cooperatively associated with said rock shaft for maintaining it in either of its two extreme positions of movement and a keeper adapted to receive the crank portion of said shaft when said shaft is in one of its extreme positions, said keeper having means thereon adapted to contact with the arm on said shaft to initiate the movement of said crank portion into said keeper.

In testimony whereof I affix my signature.

ANDREW EKMAN.