July 29, 1924. 1,503,393

J. TWARDOWSKY

DOOR LATCH

Filed May 31, 1923

Fig. 1

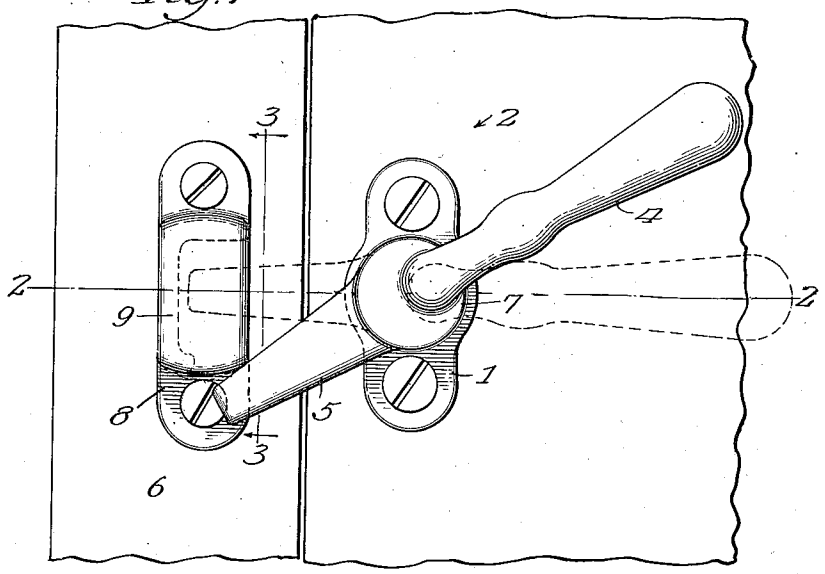


Fig. 3

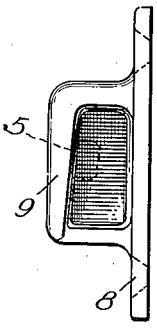


Fig. 2

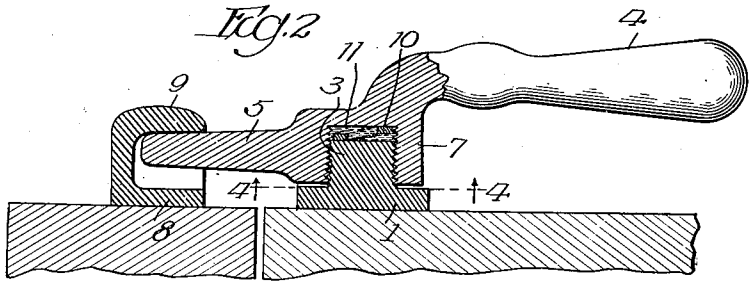


Fig. 4

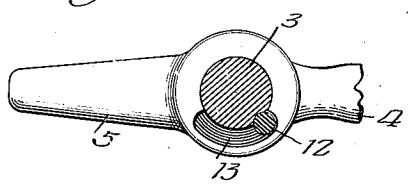


Fig. 5

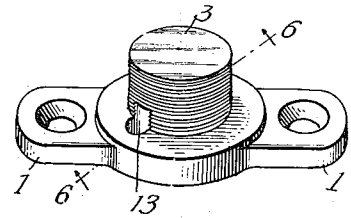
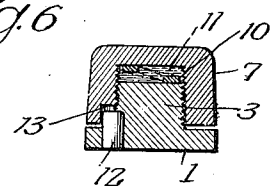


Fig. 6



Inventor:

John Twardowsky

by Albert Scheible

Attorney

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UNITED STATES PATENT OFFICE.

JOHN TWARDOWSKY, OF CHICAGO, ILLINOIS, ASSIGNOR TO UNIVERSE CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DOOR LATCH.

Application filed May 31, 1923. Serial No. 642,513.

To all whom it may concern:

Be it known that I, JOHN TWARDOWSKY, a citizen of Russia, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Door Latch; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to door latches of the general class employed for uses where a substantially air-tight closing of the door is essential, as for example in connection with the doors of refrigerators. While latches employing a cam principle have heretofore been used for this purpose, they have commonly been objectionable on account of the liability of having them jarred out of their effective locking positions, on account of their marring the finish when striking exposed stop portions, on account of their rusting or corroding and sticking, and on account of their complexity and difficulty of adjustment.

My present invention aims to overcome all of these objections in a simple, inexpensive and handsome latch construction, aims to provide this with movement-limiting means and movement-resisting means securely inclosed to guard against tampering, and aims to provide simple and positive means for preventing the heretofore objectionable corrosion and sticking.

More particularly, my invention aims to provide a latch in which a manually movable cam lever is permanently pivoted on the supporting plate associated with it, in which the said plate and lever have friction means interposed between them for retarding movement of the lever and preventing it from being jarred out of any position to which it may have been moved, in which positive means for limiting the movement of the lever in both directions are housed between these parts, and in which these parts also house between them a supply of lubricant for effectively preventing any corrosion at the pivot and a resulting sticking of the lever. Furthermore, my invention aims to provide a latch of this kind in which the partial rotation of the lever during the latching or unlatching also moves the lever either away from its support or towards the latter, thereby cooperating with a cam ledge in affording the desired wedging action with quite gradual slope on the cam ledge.

Still further and also more detailed objects will appear from the following specification and from the accompanying drawings in which—

Fig. 1 is an elevation of my latch, showing the same as used for latching a refrigerator door, this figure showing the opened position of the latching lever in full lines and showing a closure position in dotted lines.

Fig. 2 is a section through the same latch, taken when the lever is in its latching position, or along the line 2—2 of that figure.

Fig. 3 is a side elevation of the latch plate of Fig. 1 taken from the right hand side of the same.

Fig. 4 is a section taken through the stem of the pivot member and the stop pin, along the line 4—4 of Fig. 2.

Fig. 5 is a perspective view of the stationary pivot member.

Fig. 6 is a section taken centrally of the stem of the stationary pivot member through this member as well as the lever and the stop pin, or along the line corresponding to the line 6—6 in Fig. 5.

In the embodiment of the drawings, I employ a pivot plate 1 screwed flatwise to the outer face 2 of the door, and having a threaded stem 3 projecting forwardly from it. This stem serves as the pivot for a latching lever which has its longer end 4 formed to afford a handle and which has a shorter end 5 reaching across the edge of the door and partly across the door frame 6. The latching finger 5 is connected to the handle 4 of the latching lever through a cup or boss 7 which is threaded on its interior to match the thread on the stem 3 of the pivot plate, so that the resulting threaded engagement affords the desired pivotal movement for the lever.

The latching finger 5 swings during the movement of the lever above the base 8 of a latching plate which is screwed or bolted to the door frame 6 and which has a ledge 9 spaced from the said base 8 so as to permit the finger 5 to swing behind it after the manner shown in dotted lines in Fig. 3 and shown in full lines in Fig. 2. This ledge has its rear face sloping in one direction

towards the base 8, so that if the lever is moved in that direction, namely a clockwise direction in Fig. 1 or a direction which would move the latching finger upwards in Fig. 3, this ledge will exert a cam action tending to force the latching lever flatwise towards the door frame. Since this lever is restricted in movement rearwardly of the stem 3 by its threaded connection to the latter, the resulting pressure will force both the lever and the pivot plate 1 bodily in a direction transverse of the face of the door and inwardly of the refrigerator, thereby firmly closing the door.

In practice, the handle end 4 of the lever is desirably considerably longer and heavier than the arm of the lever which affords the latching tip, being preferably so proportioned both for insuring a good leverage and for affording a good handhold. Thus arranged, the excessive weight of the handle end of the lever will tend to swing the lever out of the released position in which it is shown in Fig. 1 and would be apt to interfere with the ready opening and closing of the door. To avoid this, I desirably interpose a friction member between the tip of the stem 3 and the bottom of the threaded cup or boss 7, this friction member being preferably in the form of a spring washer. By using a washer of an ample size and spreading action, I can readily cause this washer to hold the lever frictionally in any position to which it may have been moved about its pivotal mounting, thereby also preventing any jarring of the refrigerator from tending to loosen the latch. At the same time, the space in which the spring washer is housed also affords room for a considerable supply of a lubricant 10, from which supply the lubricant feeds along the thread during the to and fro movement of the lever, thereby preventing the threadedly interconnected parts from corroding and sticking to one another.

To limit the movement of the lever about its pivotal mounting, I provide cooperating stop formations on the pivot plate and the lever. For this purpose, I desirably form a bore extending from the back of a pivot plate through the latter and forwardly beyond this plate, into which bore I drive a stop pin 11. Then I enlarge the said boss or cup 7 on the lever along one side for a portion of its circumference so as to form an arcuate recess 13 into which the stop pin 12 projects. To reduce the required diameter of the boss 7, the bore which houses the pin 12 may extend through the periphery of the threaded stem 3 as shown in Fig. 5, and in any case the end walls of the recess 13 engage the stationary stop pin 12 so as to limit the movement of the lever in both directions.

With the parts thus arranged, the stop pin can be driven firmly into its normal position during the manufacture of the latch after the lever has been threadedly attached to the stem of the pivot plate, and as the stop pin is entirely concealed when the latch is attached, no one can tamper with it, so that my latch is fool proof. Moreover, since the pivoting is effected by the interengaging of threaded portions, any pivotal movement of the lever also effects a corresponding movement of the lever axially of the stem 3. By employing left-hand threads on the parts when arranged as in Fig. 1, I cause the latching movement of the lever to move this toward the tip of the stem or in a direction which would afford a cam action even if the rear face of the ledge 9 were parallel to the door frame. The cam action as thus due to the thread cooperates with the slope of the said rear ledge face, so that I can secure a highly effective cam action with my latch while employing a ledge with a quite slight slope.

However, I do not wish to be limited to the use of a thread which will cause a given movement of the lever to move the latching finger in the opposite direction with respect to the door from that in which the cam surface of the ledge tends to move this finger. Neither do I wish to be limited to other details of the construction and arrangement above described, it being obvious that these might be modified in many ways without departing from either the spirit of my invention or from the appended claims.

I claim as my invention:

1. A door latch comprising a stationary pivot plate having a threaded stem, a lever threaded upon and rotatable on the stem, friction means interposed between the stem and the lever to retard movement of the lever, a stationary latch plate having a cam ledge adapted to be engaged by one end of the lever, and stop means carried conjointly by the pivot plate and the lever for positively limiting the movement of the lever.

2. A door latch as per claim 1, in which the lever has an arcuate recess open towards the pivot plate and in which the stop means include a pin fast on the pivot plate and extending into the recess and adapted to engage opposite ends of the recess.

3. A door latch comprising a stationary pivot plate having a threaded stem thereon, a lever having intermediate of its ends a cup formation threaded upon the stem, a friction washer interposed between the tip of the stem and the bottom of the cup formation, and a latch plate having a cam ledge adapted to be engaged by one end of the lever, the cup formation also serving as a lubricant reservoir for lubricating the threaded portions of the stem and lever.

4. A door latch as per claim 1, in which the direction of the thread on the stem and lever moves the lever during the latching movement thereof in the opposite direction

with respect to the pivot plate from that in which the cam ledge tends to move the lever.

5. A door latch comprising a stationary pivot plate having a stem, a lever pivoted on the stem and mounted for enforced movement axially of the stem during a rotational movement of the lever on the stem, and a latch plate having a ledge overhanging one end of the lever during part of the rotational movement of the lever, the said ledge having a slope cooperating with the aforesaid movement of the lever axially of the stem in moving the pivot plate in a direction transverse to the lever-engaging face of the ledge.

Signed at Chicago, Illinois, May 15th, 1923.

JOHN TWARDOWSKY.