July 1, 1930. A. J. HALL 1,769,341

LATCH

Filed July 18, 1928

Fig. 1.

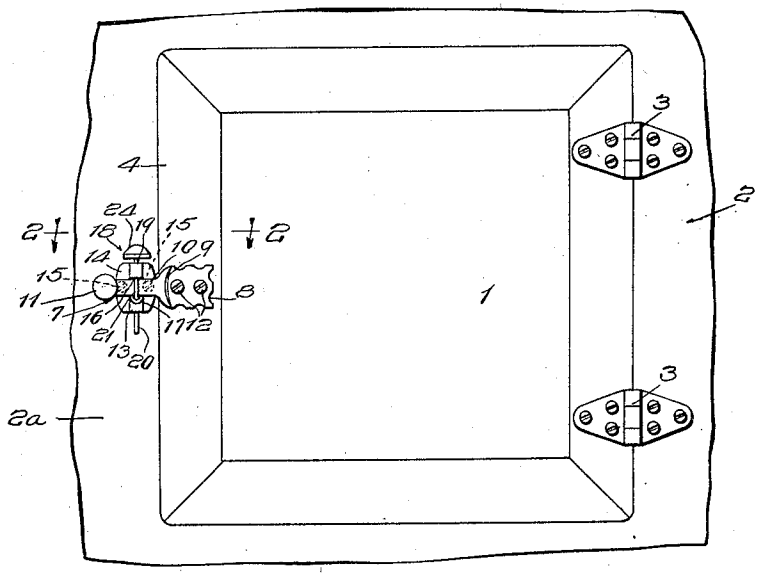


Fig. 2.

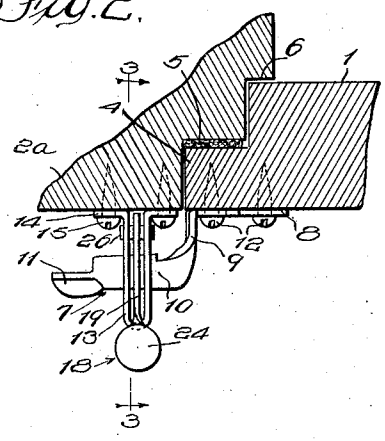
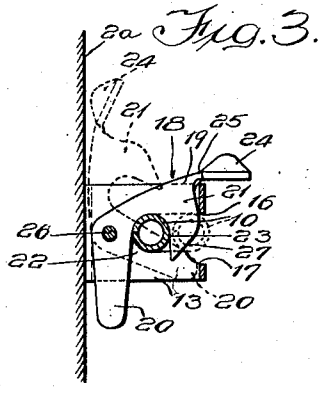


Fig. 3.



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UNITED STATES PATENT OFFICE

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LATCH

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This invention relates to latches, and more particularly to a latch and associated means for securing doors, particularly doors of refrigerators and like structures.

Latches of the type which are commonly used for refrigerator doors are open to the objection of being rather complicated and of expensive construction and usually occupy considerable space. One of the main objects of my invention is to provide a latch and associated means for securing a door closed, the latch being of simple and inexpensive but highly efficient construction. A further object is to provide securing means in which the door is urged into tightly closed position by a camming action and is held tightly closed under pressure.

A further object is to provide a latch and an associated securing member cooperating therewith so constructed that the latch member and the securing member may be readily formed each from a single piece of material and at small cost. Another object is to provide a latch member so constructed and arranged as to exert a camming action on the cooperating securing member carried by the door for closing the door, this latch member also exerting a camming action as it is moved into inoperative or releasing position for opening the door. A further object is to provide a latch member having elements thereof so disposed that, when such member is in lowered or securing position, it will be raised by contact therewith of the securing member carried by the door, as the door is moved into closed position, so as to permit entry of the securing member into the receiving slot of the latch member. Further objects and advantages will appear from the detailed description.

In the drawings:

Fig. 1 is a front view of a latch and associated securing member constructed in accordance with my invention as applied to a door of a refrigerator or similar structure;

Fig. 2 is a section taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a section taken substantially on line 3—3 of Fig. 2.

I have illustrated my invention as applied to a door 1 of a structure 2 such as a refrigerator, this door being hinged to the refrigerator at 3. Door 1 is of known construction and is provided with a peripheral flange 4 which fits into a suitable rabbet provided in the door frame, the inner face of this flange contacting with the packing strip 5 secured to the shoulder of the rabbet. The body portion of the door fits into a rabbet 6 of the door frame. This construction of the door and its associated frame is well known in the art and need not be illustrated nor described in detail.

A securing member 7 is carried by the door 1. This member is formed from a single piece of sheet material which is bent and rolled to provide a flat base plate 8, a neck 9 projecting outwardly from the base plate substantially at right angles thereto, and a tubular portion or pin 10 disposed at right angles to the neck and projecting outwardly beyond the adjacent edge of the door, the material of the blank from which the member 7 is formed being shaped, at the outer end of pin 10, to provide a rounded element or knob 11. The neck 9 provides a resilient connection between pin 10 and plate 8 which is secured to the door by screws 12 or in any other suitable or preferred manner. This securing member can be readily produced at small cost by a simple rolling and bending process from a blank of suitable shape and, therefore, can be produced at small cost.

A bracket 13 is secured to door frame 2a adjacent the edge of the door opening. This bracket is of elongated U shape in plan view and the inner end portion of each arm of the bracket is bent outwardly at right angles to provide a securing flange 14. These flanges receive screws 15 by means of which the bracket is effectively secured to the door frame. This bracket is provided with a horizontally disposed slot 16 extending from its outer end and disposed for reception of pin 10 when the door 1 is closed. Preferably, though not necessarily, the bracket is provided with inclined surfaces 17 at the outer lower portion of slot 16 for contact by the pin 10 so as to elevate this pin and

raise it sufficiently for proper engagement into slot 16 in the event of sagging of door 1 on its hinges. The bracket 13 can be readily formed by a simple bending operation from a blank cut or punched from sheet material and can, therefore, be produced at small cost.

A latch member 18 is mounted in bracket 13 between the arms thereof. This latch member is in the form of an angle lever and comprises an upper arm 19 and a lower arm 20. A finger 21 extends from arm 19 above arm 20, this finger extending in the same direction as arm 20 and being disposed substantially parallel therewith. The finger 21 defines, with arm 20, a slot 22 adapted for reception of the securing pin 10 of member 7. The inner edge of finger 21 is inclined outwarly slightly to provide a surface or edge 23 which contacts with pin 10 and exerts a camming action on the outer portion thereof for forcing the pin toward the door frame 2^a as the latch member 18 is swung downwardly in full operative or securing position.

This latch member is formed from a single piece of sheet metal of suitable gauge and temper and is provided, at the upper end of arm 19, with a rounded element or knob 24 for convenience in manipulating the latch member. This knob is initially formed in the plane of the arm 19 and is connected to this arm by a restricted element or neck 25. This neck is then turned through an arc of 90 degrees so as to dispose the knob 24 at right angles to arm 19, as illustrated. The latch member, produced in this manner, can be readily manufactured at very small cost. It will thus be seen that the entire securing device, including the securing member 7, the bracket 13 and the latch member 18, is of very simple and inexpensive construction and can be manufactured at small cost.

The latch member 18 is pivotally mounted in the bracket 13 by means of a pivot pin 26 secured through the arms of the bracket and passing through arm 20 of latch member 18. As will be noted more clearly from Fig. 3, this pin is disposed adjacent the angle of member 18 and is above the lower edge or wall of opening or slot 16 of the bracket but below the lower wall or edge of slot 22 of latch member 18. It will also be noted that the outer end of finger 23 is inclined at 27, this inclination being such that, when the latch member is in its lowered position, the outer end of the finger is inclined downwardly and inwardly of slot 16 of bracket 13 and forms, with the lower outer portion thereof, a substantially V-shaped entrance opening for the pin 10. Upon closing of door 1, in the event that the latch member is in its lowered position, the pin 10 strikes the inclined edge 27 of finger 21 thus raising the latch member so that the pin passes into slot 22 thereof.

In order that pin 10 may pass into slot 22, it is necessary that finger 21 be raised until the tip thereof is at the upper edge of slot 16. The angle between the arms 19 and 20 of the latch member 18 is such that, at this time, the upper inner portion of arm 20 extends across the lower inner portion of slot 16 of the bracket. Continued closing movement of door 1 causes the pin 10 to contact with the inner upper portion of arm 20 swinging the latch member 18 downwardly about the pivot pin 26 and thus causing the finger 21 to engage over the pin 20 securing the door in closed position. If the door is closed quickly, the pin 10 will contact with arm 20 with sufficient force to throw the latch member downwardly violently causing finger 21 to exert a camming action upon pin 10 for forcing the door tightly into closed position. If the door is closed slowly, the latch member may be rocked downwardly by means of knob 24 so as to cause the camming action to be exerted by finger 20 upon pin 10. In either case, the pin is forced toward the door frame and the neck 9 is placed under tension and, due to its inherent resiliency, exerts constant pressure against the door for holding it tightly closed.

To open the door, upward pressure is exerted on knob 24 and the latch member 18 is swung upwardly about pin 26. As the latch member is moved into its raised or inoperative position, the arm 20 is moved across the lower portion of slot 16 and contacts with the inner lower portion of pin 10 so as to exert a camming action thereon and open the door.

By swinging the latch member quickly into unsecuring or releasing position, the door 1 may be thrown into full open position by the action of arm 20 upon pin 10. When the latch member is in its full releasing position indicated by the dotted lines in Figure 3, the upper edge of arm 20 is disposed well above the lower edge or wall of slot 16 and forms, with the upper edge or wall of this slot, a substantially V-shaped opening for entry of the securing pin 10. With the latch member in this position, as the door 1 is swung closed, pin 10 enters between the top wall of slot 16 and the upper edge of arm 20 and swings the latch member downwardly about the pin 26 into operative or securing position. If the door is swung shut quickly, the pin 10 will strike the edge of arm 20 with sufficient force to swing the latch member 18 into full operative or securing position. Under such conditions, it is not necessary to exert downward pressure upon the knob 24 for the purpose of tightly closing the door. In the event that the door is swung closed slowly,

the desired camming effect between edge 23 of finger 21 and the pin 10 is obtained by pressing downwardly upon knob 24.

While I have illustrated and described my invention as applied to a refrigerator or similar structure, is is equally well adapted for use in any structure where it is desired to secure a door or similar member tightly closed. I do not, therefore, intend to in any way limit myself to this one particular use which is set forth merely as illustrative of my invention.

What I claim is:

1. In combination, a hingedly mounted door, a locking pin projecting from the door at one edge thereof, a fixed bracket having a slot extending from its outer end and disposed for reception of the pin in the closing movement of the door, and a latch member pivoted in the bracket and comprising an upper element and a lower element defining a slot opening into the bracket slot for reception of the pin when the latch member is in inoperative position, the pivot of the latch member being below the upper element thereof when said member is in inoperative position, said lower member having its upper edge straight and inclined downwardly and outwardly of the bracket slot when the latch is in inoperative position and the upper member exerting a camming action on the pin for forcing the door closed as the latch member is moved into operative position.

2. In combination, a hingedly mounted door, a locking pin projecting from the door at one edge thereof, a bracket fixedly mounted adjacent the door and having a slot for reception of the pin, and a latch member having a slot for reception of the pin and pivoted on the bracket for movement transversely of the slot thereof, the pivotal connection between said member and the bracket being above the lower wall of the slot in the bracket and below the lower wall of the slot in the latch member.

3. In combination, a hingedly mounted door, a locking pin projecting from the door at one edge thereof, a bracket fixedly mounted adjacent the door and having a slot for reception of the pin, and a latch member having upper and lower elements defining a slot for reception of the pin, the lower one of said elements being pivotally secured to the bracket above the lower wall of the slot thereof and the outer edge of the upper element being inclined downwardly and inwardly of the bracket slot when said latch member is in securing position.

4. In combination, a hingedly mounted door, a locking pin projecting from the door at one edge thereof, a base plate secured to the door, a resilient neck connecting the pin and said plate, and latch means cooperating with the pin for securing the door closed and exerting a cam action on the pin for forcing the door into full closed position.

In witness whereof, I hereunto subscribe my name this 12th day of July, 1928.

ANDREW J. HALL.