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LATCH MECHANISM FOR COLD STORAGE DOORS AND THE LIKE

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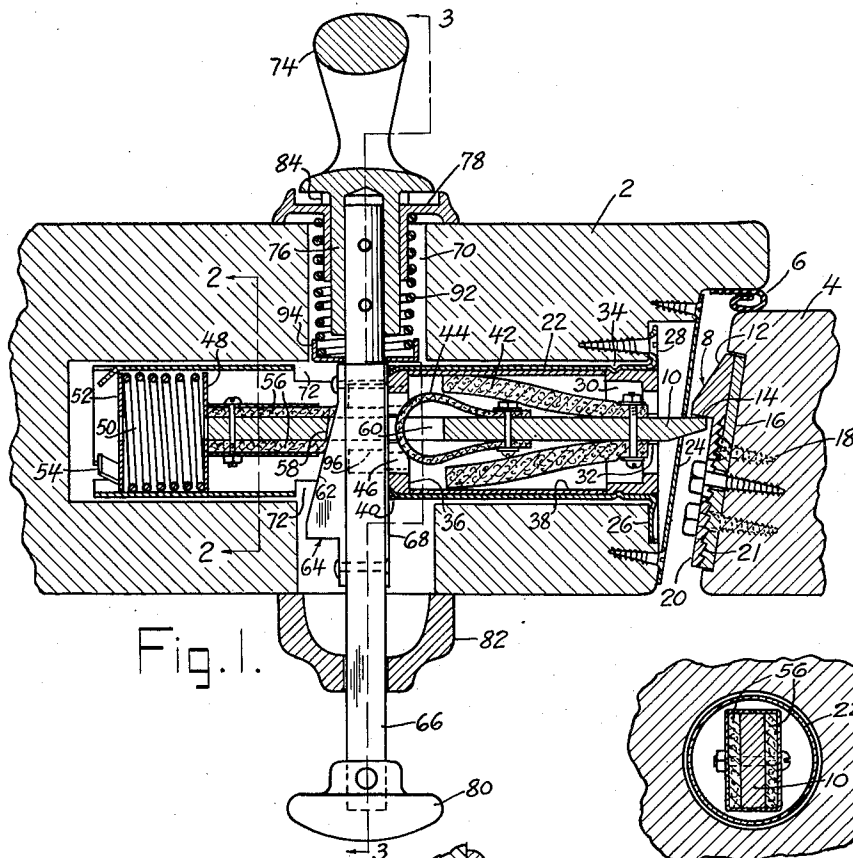


Fig. 1.

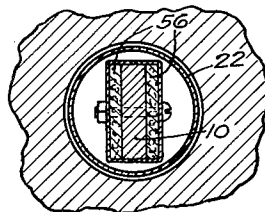


Fig. 2.

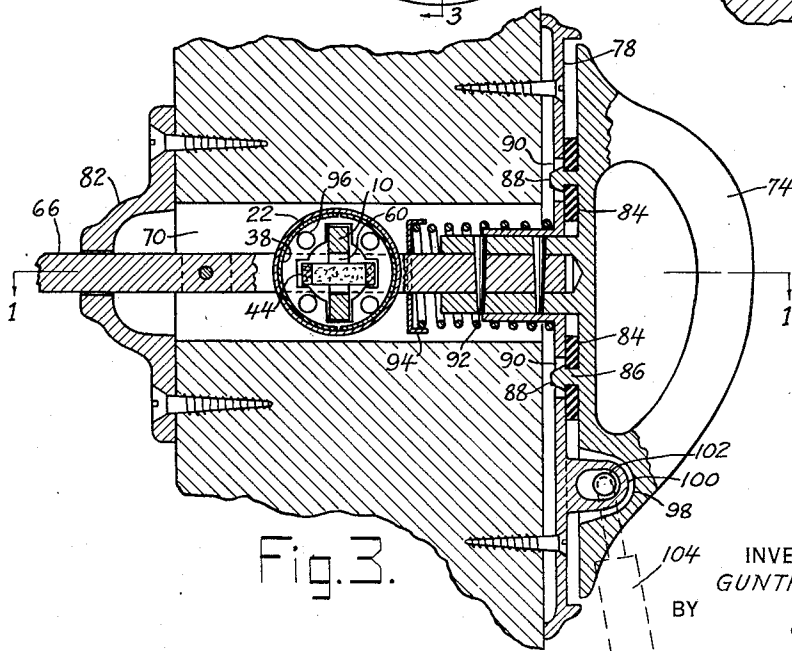


Fig. 3.

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LATCH MECHANISM FOR COLD STORAGE  
DOORS AND THE LIKEGunther Philip Wild, Philadelphia, Pa., assignor  
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7 Claims. (Cl. 292—170)

This invention relates to cold storage cham-  
bers, refrigerators and like constructions having  
a door for closing the entrance thereto and par-  
ticularly to latch mechanism for retaining such  
doors in closed position and operating means for  
the latch mechanism.

The doors employed on cold storage chambers,  
"walk-in" refrigerators and similar structures  
are made thick enough to carry the necessary in-  
sulation and therefore generally are very heavy.  
It also is customary to provide sealing means in  
the form of a gasket between the door and frame  
to seal the space therebetween when the door is  
closed.

Formerly the sealing means employed for this  
purpose were formed of relatively stiff or dense  
material so that considerable force was required  
to compress the sealing means sufficiently to in-  
sure proper sealing of the space between the  
door and frame. It was therefore necessary to  
use relatively heavy and powerful latch mecha-  
nism or cam elements to urge and hold the door  
closed and in sealing relation with the frame.  
Complicated and powerful actuating means were  
required for operating such latch mechanism and  
therefore the hardware necessary for use on cold  
storage doors was expensive to construct and in-  
stall, bulky and unsightly in appearance and  
difficult to operate.

The relatively soft and resilient sealing means  
now available for use render it unnecessary to  
urge the door so forceably toward the frame to  
insure the desired sealing thereof. However, but  
little if any change has been made in the type  
of latch mechanism employed on cold storage  
doors. As a result the sealing means, although  
functioning satisfactorily when not tightly com-  
pressed, are subjected to heavy pressure and are  
so tightly compressed that the resiliency and life  
of the material is destroyed very quickly, decreas-  
ing its effectiveness and requiring frequent re-  
placement thereof. Moreover, the force applied  
to the latch mechanism and operating means  
tend to loosen the bolts or other securing means  
by which the latch mechanism is attached to the  
door or frame particularly when the door is ac-  
tuated frequently and over a long period of time.

In accordance with the present invention, these  
objections to constructions of the prior art are  
overcome by employing soft and resilient sealing  
means of the type now available for such pur-  
poses and providing latch means which serve  
simply to retain the door in closed position with  
the sealing means under little or no greater

compression than is necessary to insure proper  
sealing of the space between the door and frame.  
The latch mechanism preferably is wholly con-  
cealed and may be small and comparatively light  
in construction. Only the handle of the latch  
operating means need be visible and but very  
little force is required to actuate the latch. Thus  
a construction is provided which is attractive in  
appearance, inexpensive to construct and install  
and the life of the mechanism as well as the life  
of the sealing means employed is greatly in-  
creased.

While the elements employed in accordance  
with the present invention may take various  
forms it is preferred that the frame of the door be  
provided with a keeper, which may be adjustable  
to allow for wear or compression of the sealing  
means, and a latch bolt is carried by the door  
and slidably movable into and out of engagement  
with the keeper. The keeper may be located on  
the inner face of the frame and the bolt may be  
embedded in the door so that none of the latch  
mechanism is visible and the moving parts there-  
of are protected from injury and dirt.

The operating means, only the handle of which  
need be visible, preferably includes a wedge mov-  
able to retract the bolt against the action of a  
spring. Because of the frictional resistance to  
retraction of the bolt when in engagement with  
the keeper, it is generally desirable to form the  
wedge on the operating means with a relatively  
low pitch so that the force required to move the  
wedge in retracting the latch bolt is small. Means  
independent of the latch bolt such as a spring  
serves to return the operating means to its inac-  
tive position on release thereof.

Further since the mechanism is wholly enclosed  
and the doors to which it is applied are so thick  
that the mechanism is not accessible for lubrica-  
tion it is also preferable to employ automatic  
lubricating means therefor which are operable  
over a period of years to apply a limited amount of  
lubricant to the movable parts of the con-  
struction as required to insure smooth and ready  
operation thereof.

One of the objects of the invention is to pro-  
vide cold storage doors, refrigerator doors and  
similar constructions with latch mechanism  
which is relatively small and inexpensive to build  
and install and which requires but little force  
for operation.

Another object of the invention is to de-  
crease the cost and increase the life of the latch  
mechanism and operating means as well as the

sealing means employed on cold storage doors and the like.

A further object of the invention is to provide cold storage doors with latch mechanism which is concealed from view and yet continuously lubricated.

These and other objects and features of the invention will appear from the following description thereof in which reference is made to the accompanying figures of the drawing.

In the drawing:

Fig. 1 is a horizontal sectional view of a typical form of latch mechanism and operating means therefor embodying the present invention, the section being taken on the line 1—1 of Fig. 3.

Fig. 2 is a vertical sectional view of the construction shown in Fig. 1 taken on the line 2—2 thereof, and

Fig. 3 is a vertical sectional view of the construction of Fig. 1 taken on the line 3—3 thereof.

That form of the invention chosen for purposes of illustration in the figures of the drawing is applied to a cold storage chamber having a door 2 and a frame 4 with a resilient and yieldable sealed strip or gasket 6 extending about the marginal portion of the door and engageable with the door frame to seal the space between the door and frame. The frame 4 carries a keeper 8 engageable by a latch bolt 10 slidably carried by the door. The keeper is formed with an inclined face 12 engageable by the latch bolt to retract the same on closing the door and a vertical face 14 behind which the bolt is projected to retain the door in closed position. The keeper 8 is adjustably mounted on the door frame, so that it may be moved readily inward from the position shown to hold the door closer to the frame and insure proper sealing of the space between the door and frame when the sealing means 6 is worn or compressed. For this purpose the keeper is provided with a base plate 16 secured to the frame by a screw 18 or other suitable means, whereas the keeper carrying plate 20 is adjustably secured in position on the base plate by means of screws or the like. The adjacent faces of the base plate 16 and keeper carrying plate 20 are formed with cooperating ratchet teeth 21 as shown for holding the keeper carrying plate in any adjusted position to which it may be moved.

The latch bolt 10 is slidably movable within a tubular housing member 22 located within a recess in the door concealed by a cover plate 24 through which the bolt projects. The housing is formed on its outer end with a projecting flange 26 which extends outward over the adjacent portion of the door and is held in place by screws 28 or the like.

The housing is provided with an end member 30 having a slot 32 therein through which the bolt 10 is slidably movable. The member 30 is held in place by the portion 34 of the housing which is rolled into an annular groove in the end member. A similarly slotted member 36 is located within the housing and spaced from the member 30 by a split sleeve 38. Tongues 40 of the housing extend inwardly into recesses in the edges of the member 36 to prevent dislocation thereof. The members 30 and 36 serve to guide the latch bolt in its movement and provide an enclosure for lubricant carrying wicks 42 and 44 secured to the latch bolt and movable therewith. The wick 44 is positioned to project through transversely extending portions of the slot 46 in the member 36 when the bolt is retracted whereas the wicks 42 are heavier and serve to supply

the wick 44 with a continuous supply of lubricant especially when deformed by movement of the bolt.

The rear end of latch bolt 10 bears against a washer 48 behind which a spring 50 is located. The spring is maintained under compression by a washer 52 held in place by tongues 54 struck inward from the housing member 22 at the inner end thereof. Lubricant carrying wicks 56 are secured to the bolt 10 adjacent the rear edge 58 of a slot 60 in the bolt to lubricate the surface 62 of a wedge 64 carried by a transversely movable operating rod 66.

The spring 50 normally tends to urge the latch bolt 10 outward into engagement with the keeper 8 on the frame so that when the door is closed the end of the latch bolt is in position to engage the inclined face 12 of the keeper and be cammed inward against the action of the spring 50 but when the sealing means 6 is suitably compressed the bolt is again projected outward behind the vertical face 14 of the keeper 8 to hold the door closed and the sealing means under the desired compression. When the door is opened outward movement of the bolt 10 is limited by engagement of the rear edge 58 of the slot 60 in the bolt 10 with the surface 62 of the wedge 64 on the operating rod.

Upon inward movement of the latch bolt the wick 44 carried thereby is moved into position to engage and lubricate the surface 68 of the operating rod which engages the rear face of member 36 whereas the surface 62 of the wedge 64 is continuously lubricated by the wicks 56. In this way the mechanism although located in an inaccessible position and concealed from view is provided with a limited but prolonged supply of lubricant which serves to prevent waste of the lubricant and retention thereof for long periods of time. Furthermore, on actuation of the bolt the lubricant carrying wicks are deformed so that they express lubricant therefrom onto elements of the mechanism. In this way the supply of lubricant to the mechanism is varied in response to the need therefor, the application of lubricant being increased on frequent use of the latch mechanism and reserved for later use when the mechanism remains idle.

The operating means shown for actuating the latch mechanism are located in a transversely extending opening 70 in the door and include an operating rod 66 which passes through openings 72 in the tubular housing 22 and through the slot 60 in the latch bolt 10. The rod 66 is provided on one end with a handle 74 which is formed with a shank 76 secured to the rod and slidably movable through an opening in an escutcheon plate 78. A knob 80 is secured to the opposite end of the operating rod so that the rod may be actuated from either side of the door. The rod is guided in movement by the shank 76 on the handle 74 and by the plate 82 which closes the inner end of opening 70 in the door. The knob 80 carried by the rod 66 is engageable with the plate 82 to limit outward movement of the rod whereas inward movement thereof is limited by engagement of the resilient bumpers 84 carried by the handle with the outer face of the escutcheon plate 78. The bumpers 84 are held in place by pins 86 formed with heads 88 which project into recesses 90 in the escutcheon plate. The bumpers may be easily applied and removed from the handle by simply forcing them over the enlarged heads 88 on the pins 86 so that they may

be replaced readily without removing the handle from the operating rod.

A spring 92 for urging rod 66 inward encircles the shank 76 of the handle and bears against the escutcheon plate 78 at one end while the other end thereof bears against a recessed washer 94 abutting the end of wedge 64.

The latch operating rod is provided with a wedge 64 located within the slot 60 in the latch bolt and engaged by the portion 58 of the bolt at the rear edge of the slot 60. The wedge is positioned with the low portion of the surface 62 thereof engageable by the portion 58 of the latch bolt, when the rod 66 is in its innermost position and the latch bolt is fully projected whereas on outward movement of the rod 66 the portion 58 of the bolt rides up to a high point on the wedge to retract the bolt. Thus outward movement of the operating rod and wedge serves to retract the latch bolt 10 whereas on inward movement of the rod 66 the latch bolt is projected by spring 50.

By forming the wedge 64 with the surface 62 thereof inclined at a relatively small angle to the operating rod the force required to retract the latch bolt is greatly decreased since the movement of the operating rod is considerably greater than the movement of the latch bolt. Thus the latch bolt may be retracted readily even when subjected to considerable frictional resistance. Moreover, the outward movement of the latch bolt takes place freely due to the action of spring 92 in urging the operating rod inward as soon as the handle is released. In this way the spring 50 is relieved of the burden of returning the operating rod to its inactive position and all danger of the latch bolt sticking or failing to be projected when the door is closed is eliminated. Pins 96 carried by the member 36 project inward therefrom and serve as lateral bearing members for the rod 66.

The distance that the handle 74 and operating rod 66 is moved in retracting the bolt may be varied as desired and will depend upon the inclination of the surface 62 with respect to the rod 66. However, the force required to actuate the rod is decreased by the use of a wedge having a low pitch and therefore the pitch preferably is less than 45° and may be very much lower or about 20° or less as shown.

The handle employed preferably is formed with a recess 98 therein and the escutcheon plate is formed with a projecting lug 100 extending into the recess. The handle and lug 100 are formed with aligned openings 102 there-through to receive a padlock 104 or other locking means so that even the usual hasp and staple are eliminated and no hardware is visible on the door except the handle itself. At the same time a construction is provided which is easy to operate, simple in construction and much more economical to produce and install than are the constructions of the prior art.

In assembling the device the parts are caused to assume aligned positions automatically by inserting the rod 66 into the slot 60 in the latch bolt and moving it inward until the edge 58 of the slot engages the surface 62 on the wedge. The spring 50 then urges the opposite flat surface 68 of the operating rod against the adjacent flat surface of member 36 holding the rod 66 in position while the pins 96 prevent the rod from being displaced laterally. The plate 82 is then passed over the end of the operating rod and secured in position and the handle 74 and the

escutcheon plate 78 are secured in place at the opposite end of the rod assuring perfect alignment of the parts without the use of templates or other means for locating the elements.

The operation of the mechanism described probably will be apparent from the foregoing description thereof.

When it is desired to retract the latch bolt to open the door the operator grasps the handle 74 and pulls it outward or pushes against the knob 80 on the inner side of the door to move the operating rod 66 outward. The wedge 64 carried by the rod is thus moved upward as seen in Fig. 1 or to the right as seen in Fig. 3, forcing the latch bolt 10 inward by engagement of the surface 62 on the wedge with the rear edge 58 of the slot 60 in the latch bolt. The latch bolt is thus retracted against the action of spring 50 and remains in retracted position as long as the operator pulls on the handle 74 or pushes on the knob 80. On release of the handle 74 or knob 80 the spring 92 moves the operating rod 66 to the position shown in Fig. 1 allowing the latch bolt to be projected under the action of the spring 50 and without resistance from the operating rod. When the door is closed and the latch bolt moves into engagement with the inclined surface 12 of the keeper 8 it is cammed inward by the keeper against the action of spring 50 until the latch bolt has passed the vertical edge 14 of the keeper and the sealing means 6 is suitably compressed. The spring 50 then projects the bolt to the position shown in Fig. 1 to hold the door in closed position and retain the sealing means 6 under substantially no more than sufficient compression to insure proper sealing of the space between the door and the frame.

It will be apparent from the foregoing description of the form of the invention illustrated in the drawing that numerous changes in the construction and arrangement of the element employed may be made without departing from the spirit and scope of the invention. It should therefore be understood that the form of the invention shown in the drawing and herein described is intended to be illustrative of the invention and is not intended to limit the scope thereof.

I claim:

1. In latch mechanism for a cold storage door or the like having a slidable latch bolt the combination of a housing within which said latch bolt is movable and lubricant carrying means within said housing for furnishing a limited but prolonged supply of lubricant to an element of said mechanism.

2. In latch mechanism for a cold storage door or the like having a slidable latch bolt and means movable to actuate said latch bolt the combination of a housing within which said latch bolt and means are movable and lubricant carrying means within said housing and engaging said means and bolt for furnishing a limited but prolonged supply of lubricant thereto.

3. In latch mechanism for a cold storage door or the like having a slidable latch bolt and means movable to actuate said latch bolt the combination of a housing within which said latch bolt and means are movable and lubricant carrying means actuated by an element of said mechanism to apply lubricant onto said movable means.

4. In latch mechanism for a cold storage door or the like having a slidable latch bolt and means movable to actuate said latch bolt the combination of a housing within which said latch

bolt and means are movable and deformable lubricant carrying means movable by an element of said mechanism to express lubricant therefrom and furnish a limited but prolonged supply of lubricant to said movable means.

5. In latch mechanism for a cold storage door or the like having a slidable latch bolt and means movable to actuate said latch bolt the combination of a housing within which said latch bolt and means are movable and a lubricant carrying wick located in said housing and deformable upon movement of an element of said mechanism to discharge lubricant onto said movable means.

6. In latch mechanism for a cold storage door

or the like having a latch bolt and a wedge movable to actuate said latch bolt the combination of lubricant carrying means engaging said wedge to furnish a limited but prolonged supply of lubricant to a surface of said wedge.

7. In latch mechanism for a cold storage door or the like having a latch bolt and a wedge movable to actuate said latch bolt the combination of a lubricant carrying wick and means for deforming said wick upon movement of said latch bolt to express lubricant therefrom onto an element of said mechanism.

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