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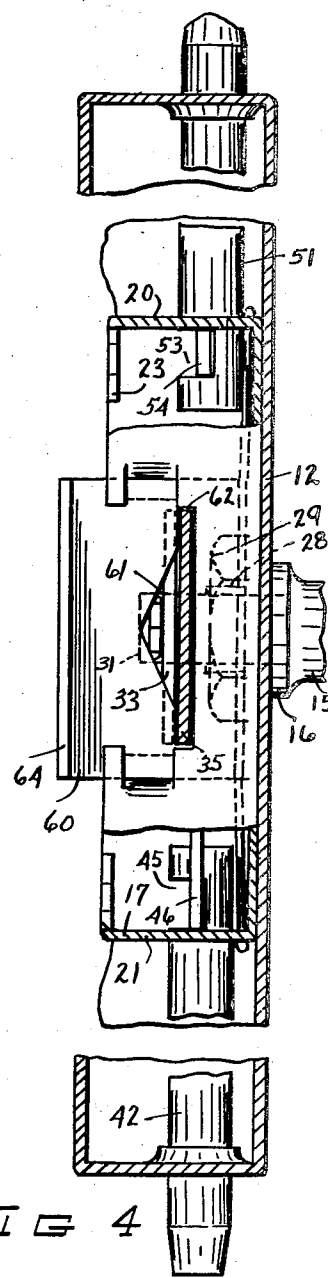
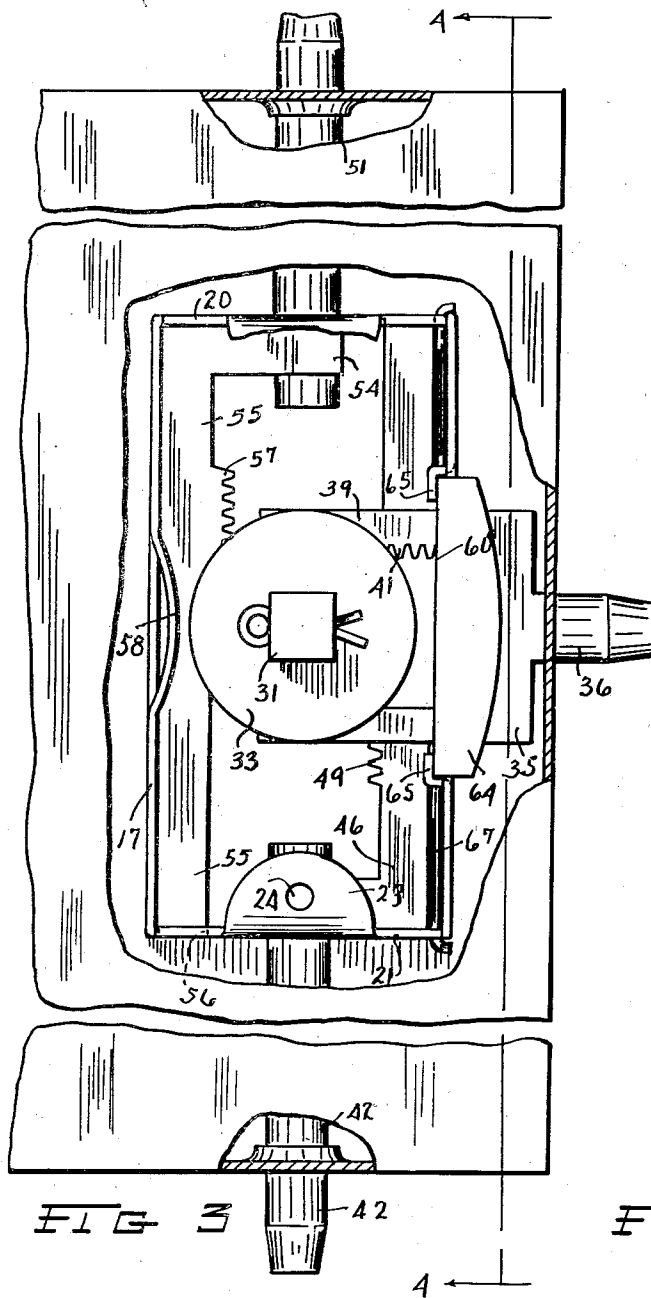
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LATCHING MECHANISM

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2 Sheets-Sheet 2



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LATCHING MECHANISM

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2 Claims. (Cl. 292—39)

This invention relates to an improvement in latching mechanisms.

The preferred embodiment of the invention discloses a latch mechanism adapted to fasten doors or drawers of cabinets, safes, lockers, entrance doors, etc. The purpose and provision of a latch mechanism of this type is to securely latch a door, drawer, or other closure at several points to the casement or frame in which it is mounted.

One of the objects of the invention lies in the provision of a latch mechanism of this class which, by reason of the simplicity in design, is extremely economical to manufacture and lends itself readily to almost any desired installation.

Another object of the invention lies in the provision of a device of this class which is reversible in its manipulative action and adaptable for use with either right or left hand doors.

A further object of the invention lies in the provision of a device of this class in which all of the draw bolts are directly geared to the operating handle for simultaneous movement.

A still further object of the invention lies in the provision of a device of this class the bolts of which, when withdrawn to unlatch the door, are prevented from being again extended to latched position until the door is in fully closed position.

Other and further objects of the invention will be more fully understood from a consideration of the following specification which is taken in conjunction with the accompanying drawings and in which,

Figure 1 is a fragmentary perspective view of a door embodying one modification of the invention, parts being broken away in both door and latch cover to disclose certain details of the device;

Figure 2 is a vertical sectional view taken through the door and latch mechanism substantially on the line 2—2 of Figure 1;

Figure 3 is a rear-elevation of the latch mechanism with the cover plate removed, showing the location of the various elements of the latch when the bolts are extended; and

Figure 4 is a vertical sectional view taken substantially on the line 4—4 of Figure 3.

The hereinafter described invention is of the class preferably used for latching the doors of steel safes, cabinets, lockers, etc. French doors and windows have long been provided with latching means of this same class. The present invention is, therefore, particularly directed to an improved means by which multi-directional

latching may be had through the use of a simple, easily installed, economical device.

Referring to the drawings, and particularly to Figures 1 and 3 thereof, the invention, for convenience of disclosure, is shown mounted in a door generally indicated by the reference numeral 10. The door 10 is the type commonly known as the hollow metal door and is provided with the usual inner and outer faces 11 and 12 which are connected by ends 13. A suitable handle or operating knob 14, mounted on the shaft 15, is located on the outer face 12 of the door.

The latching mechanism is contained within a supporting structure or housing 17, having opposite walls 18, 19, and 20, 21. The walls 20 and 21 are provided with inwardly directed tabs 23 through which threaded openings 24 are made. A cover plate 25, when required, encloses the latching mechanism, being secured to the structure 17 by screws 26, which engage the threads of the openings 24. The shaft 15 projects through a collar 16, into the door 10. The collar 16, by which the shaft 15 is supported, is formed with a threaded portion 28 which projects through the rear wall of the structure 17. A fixed or removable nut 29 is engaged with the threaded portion of the collar and constitutes the means by which both the collar and structure 17 are held in place. A square shank 31 forms a continuation of the shaft 15 and is fitted with a gear 32. A washer 33 is mounted on the shank 31 and secured in position against the face of the gear 32 by means of a cotter pin. The washer 33 and nut 29 define a space surrounding the gear 32 in which are located bolt connections and having teeth engageable with said gear.

A U-shaped connector plate or yoke 35 is connected with a center bolt 36 and projects through a slot 37 in one side wall of structure 17. One of the prongs 39 of the plate 35 is formed with a plurality of inwardly directed teeth 41 which engage the teeth of the gear 32. The other prong of the plate 35 is slightly removed from the teeth of the gear 32 and constitutes a guide for reciprocation of plate 35 and bolt 36. It is pointed out that the thickness of the plate 35 is approximately half the thickness of the gear 32 or the space between the nut 29 and washer 33.

A fastening bolt 42 projects into the structure 17 through a suitable opening 43. The inner end of this bolt is formed with a transverse slot 45 into which is fitted the finger portion of a connector plate 46. The plate 46 lies adjacent one face of the plate 35 and projects through a rectangular opening 47 in the wall 20 of the struc-

ture 17. That part of the plate 46 adjacent the gear 32 is formed with teeth 49 which engage the teeth of said gear. The plate 46 is prevented disengagement from the slot 45 in the bolt 42 by reason of its engagement with the rectangular opening 47 in the structure 17. A second bolt 51 projects into the supporting structure 17 through a suitable opening 52 and is provided with a transverse slot 53 into which the finger portion 54 of a connector plate 55 projects. The plate 55 lies against the side wall 18 and projects through a rectangular opening 56 in the wall 21 of the supporting structure. That portion of the plate 55 lying adjacent the gear 32 is formed with teeth 57. It will be noted that the plate 35 lies adjacent the washer 33, and that plates 46 and 55 lie within the space between the plate 35 and the nut 29. When the bolts 36, 42, and 51 are extended, plate 35 is moved from in front of the plate 55 and it is necessary to provide a blister 58 or other suitable guide means in the side wall 18 to prevent said plate from moving into the path of the plate 35 during the operation of retracting the bolts.

During the use of a door, the draw bolts of which are similarly arranged to that described above, it frequently occurs that persons manipulating the door extend the bolts while the door is in open position and fail to retract them sufficiently to permit closing. Consequently the extended bolts are frequently jammed into the casing, becoming somewhat bent and misaligned, as well as causing undesired defacing of the frame in which the door is supported. To prevent such defacement, and the subsequent wear and breakage of the latching mechanism, the present invention includes a lock which forms part of the latching mechanism and prevents extending the bolts through manipulation of the knob until the door is in fully closed position. This lock consists of a plate 60 having a suitable slot 61. The ends of the slot terminate in rectangular openings 62. The outer end of the plate is provided with an angularly disposed strike portion 64. The plate 60 abuts the inner face of the side wall 19 of the supporting structure, being held in place by flanges or guides 65 which may be attached to or formed from the side wall 19 of the structure. The slot 61 of the plate normally registers only partially with the slot 37 in the side wall 19, a spring 67 being provided for this purpose. The openings 62, which connect with the slot 61 constitute, when the plate 60 is moved inwardly into the structure, a passageway through which a portion of the plate 35 may move when the mechanism is manipulated to extend the bolts. When the bolts have been withdrawn and the outer end of the plate 35 has been withdrawn from the openings 62 and slots 61, the spring 67 acts automatically to move the plate 60 to the position shown in Figure 1 of the drawings. With the lock plate in this position, shoulders 68 lie in the path of the plate 35 and prevent said plate and the attached bolt 36 from being extended. Inasmuch as the plate 35 and plates 46 and 55 are all connected through the gear 32, the locking plate also prevents extending the bolts 42 and 51.

The operation of extending and retracting the bolts as well as the automatic operation of the locking plate 60 may be briefly described as follows. It is assumed the door 10 is in closed posi-

tion and bolts 36, 42, and 51, are extended. Rotation of the knob 14 ninety degrees rotates the gear 32, moving plates 35, 46, and 55 to withdraw bolts 36, 42, and 51 into the door. As above stated, when the plate 35 moves out of registry with the slot 61, and openings 62 of the plate 60, said plate assumes a new position, by reason of the pressure of spring 67, and prevents extending the bolts while the door is open. In closing the door, it is only necessary to move it to closed position in the usual manner. The strike portion 64 of the plate 60 being in the lead during the closing operation, first abuts the frame or case-ment and as the door is moved into fully closed position, the plate 60 is depressed against the tension of the spring 67 and so held while the door is in this position. As soon as the plate 60 has been depressed, the operating knob 14 may be rotated in the opposite direction to extend the bolts since the plate 35 is now free to move through the slot 61 in the plate 60.

It is pointed out that the walls 20 and 21 of the structure 17 are arranged with diagonally opposite unused rectangular slots 69 and 70. These slots are perforated during the operation of forming the supporting structure and with the perforating of the other slots, and makes possible the reversal of connector plates 46 and 55. In this manner, all latching mechanism made in accordance with this invention can be made actuable in clockwise or counter-clockwise direction as may be desired for both right and left hand, inwardly or outwardly swinging doors.

Although applicant has shown and described only one modification of the invention, it will be understood by those skilled in the art that other modifications and adaptations of the invention are contemplated, and it is not intended that applicant be limited in the spirit and scope of the invention other than as defined by the hereunto annexed claims.

Having thus set forth my invention what I claim as new and for which I desire protection by Letters Patent is:

1. In a latching mechanism, insertable as a unit into a door, including a housing, an operator projecting into said housing, a gear on said operator, a yoke in said housing having a latch bolt projecting beyond the limits of said housing, said bolt being centered with respect to said yoke and said operator, teeth on one inner wall of said yoke engaged with said gear, said yoke being invertible in said housing whereby to facilitate use of said mechanism with either a right or left hand door.

2. A latching mechanism, insertable as a unit into a door, including a housing, an operator projecting into said housing, a gear mounted on said operator, a pair of opposed plates in said housing, teeth on said plates engaged with said gear, latch bolts projecting into said housing joined to said plates, said latch bolts being on center with said operator, a yoke in said housing, a latch bolt joined to the central portion of said yoke and projecting beyond the limits of said housing, teeth on one inner wall of said yoke engaged with said gear, said yoke and said plates being invertible in said housing whereby to facilitate use of said mechanism with either a right or left hand door.