

July 29, 1969

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3,457,744

LATCH FASTENER

Filed Dec. 4, 1967

2 Sheets-Sheet 2

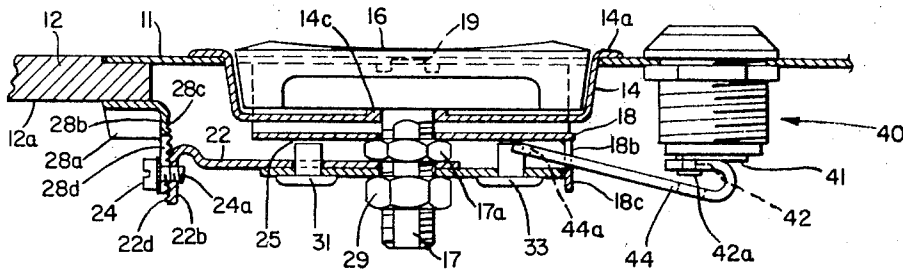


Fig. 4

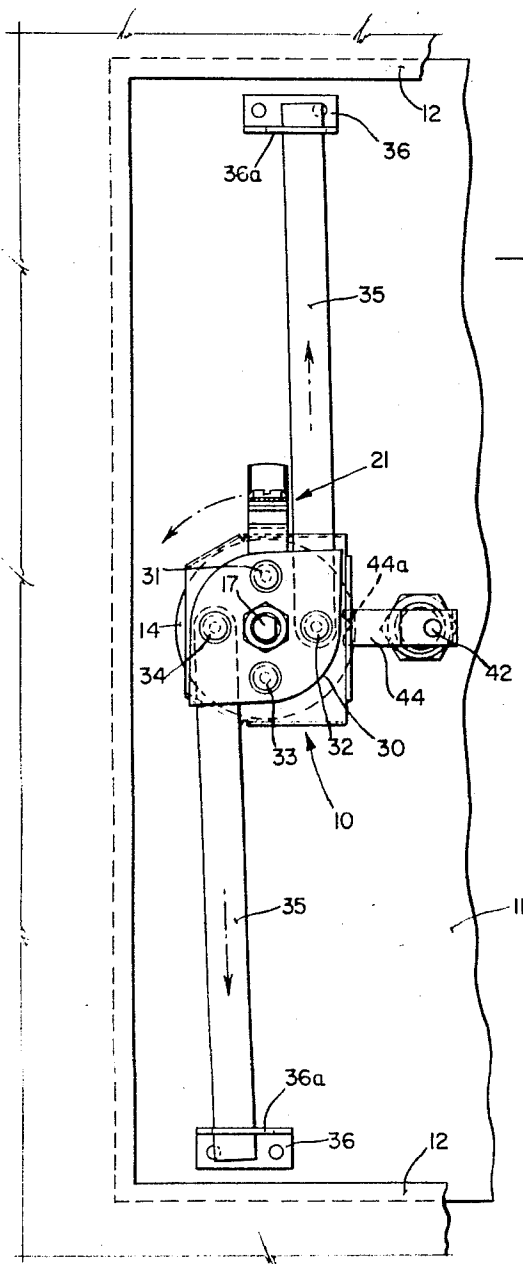


Fig. 5

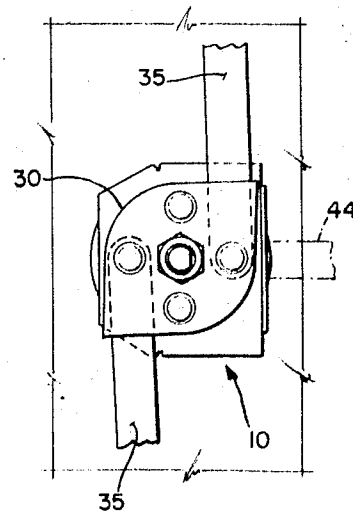


Fig. 6

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2 Sheets-Sheet 1

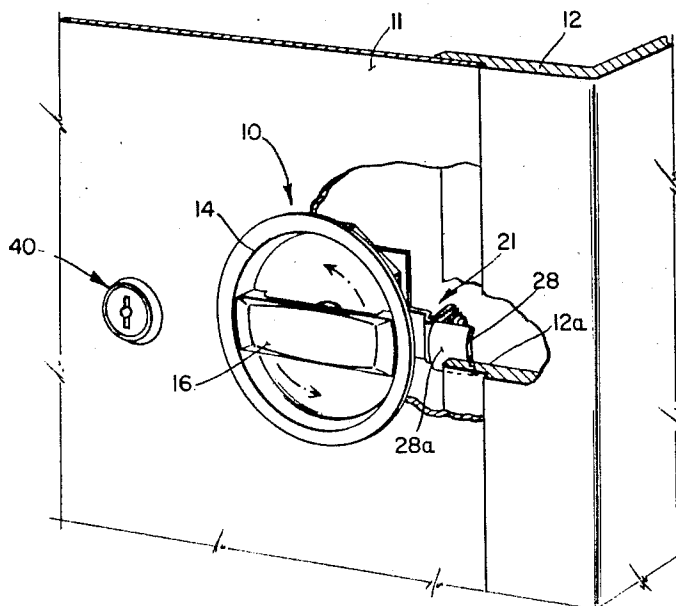


Fig. 1

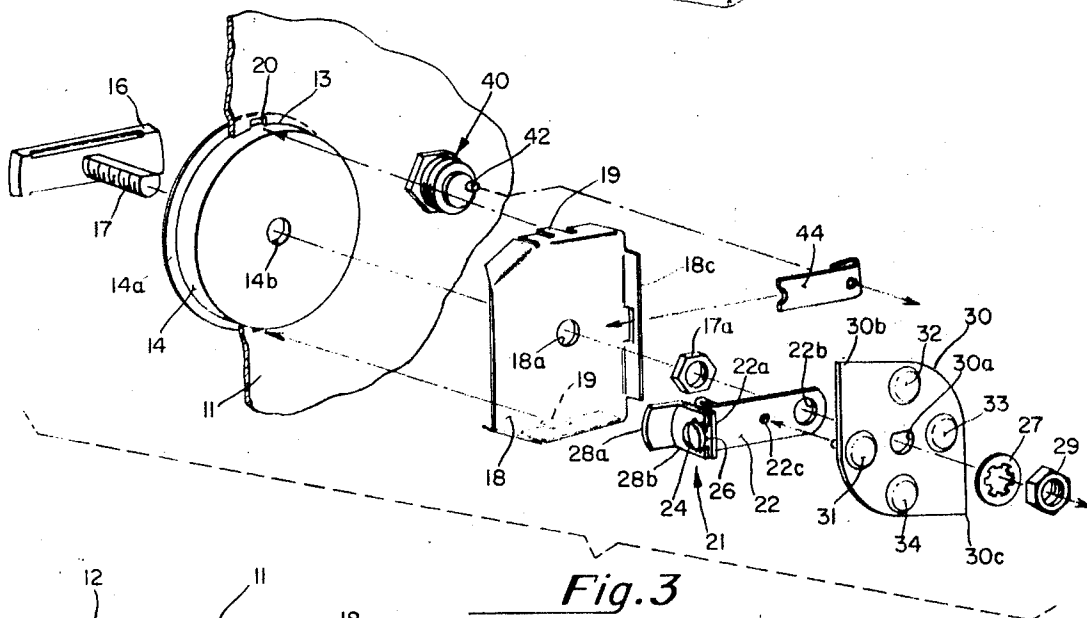


Fig. 3

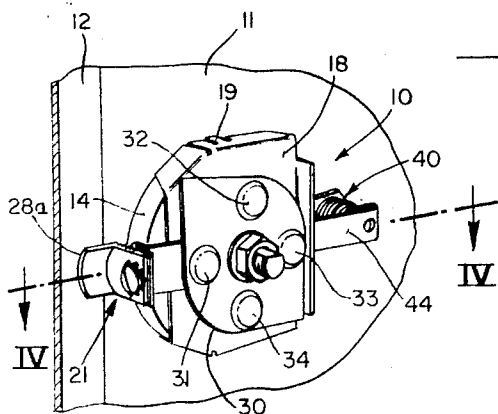


Fig. 2

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3,457,744

LATCH FASTENER

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U.S. Cl. 70—82

10 Claims

ABSTRACT OF THE DISCLOSURE

A latch fastener consists of a latch which is mounted for rotation to a shaft which passes through a panel and has affixed to the end thereof a handle for rotating the shaft and the latch. The handle is disposed in a cup which is mounted through a hole in the panel; the cup having a lip which engages the panel surface. A housing fits over the cup on the inside of the panel, and projecting tabs on the housing engage notches in the panel. The cup and housing are held in position by means of a nut which is tightened onto the threaded shaft sufficiently to prevent relative motion of the cup and housing but not so tight as to prevent rotation of the threaded shaft. An actuator sub-assembly is held in position by means of a second nut on the threaded shaft. The sub-assembly has a plurality of pins, one of which engages the latch so that as the handle is rotated, the shaft and actuator assembly are rotated and so is the latch. In alternative embodiments, the pins are used with extension rods in addition to or instead of the latch, so that the latch fastener may be used in the alternative as a three point latch or a two point latch. The latch has an adjustable pawl assembly to accommodate differences in thickness of the panel or panel frame. A lock sub-assembly is mounted separately from the cup and includes a key-operated, eccentrically-mounted lock pawl which engages one of the pins in the actuator sub-assembly to provide a means for locking the latch fastener.

BACKGROUND OF THE INVENTION

This invention relates to a latch fastener for fastening two members or panels together. More specifically, this invention relates to a latch fastener having an adjustable pawl and a novel mounting means including a recessed handle. Additionally, a separately mounted locking mechanism is provided to engage the latch fastener and lock it.

The prior art in the general field of latches for storage cabinets of the type used in offices, schools, and other business establishments is rather highly developed. Prior art fasteners have required the use of secondary mounting means such as rivets, welds, or screws to hold the housing in place on the panel or door of the cabinet. Besides being difficult to install, the secondary mounting means sometimes spoil the appearance of the panel or door as viewed from the outside. In addition, the variety of panels and frames used in cabinets requires numerous variations in the latch fasteners.

SUMMARY OF THE INVENTION

This invention provides a latch fastener which is mounted in a single hole in a panel. The latch is adjustable to accommodate various thicknesses encountered in both the panel and its mating frame member. Alternative fastening means are provided within the scope of this invention for use with or in lieu of the single latch. In addition, a simple and effective locking means is provided for engaging the latch fastener and retaining it in a lock position.

Accordingly, an object of this invention is to provide an improved latch fastener for storage cabinets and the like. Another object is to provide a fastener which is re-

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cessed mounted and requires no additional or secondary mounting means.

Another object is to provide a fastener which is adaptable to various thicknesses in the panel and frame members with which it is to function.

A still further object is to provide a fastener which is adaptable for use with a variety of latch means.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other objects of the invention will become apparent from the following disclosure with reference to the drawings.

FIG. 1 is a perspective view showing a locking means, and one form of a latch fastener in accordance with this invention shown mounted in a panel in engagement with the adjacent frame; the panel and frame being partially broken away;

FIG. 2 is a perspective view of the reverse side of the latch fastener shown in FIG. 1;

FIG. 3 is an exploded view of the latch fastener, locking means, and panel shown in FIGS. 1 and 2;

FIG. 4 is a section taken as indicated by the lines and arrows IV—IV in FIG. 2;

FIG. 5 is a rear view of an alternate embodiment of my invention showing alternate latch means in the open position; and

FIG. 6 is a partial rear view of a further alternate embodiment of my invention showing a portion of the latch means of FIG. 5 removed.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Although specific forms of the invention have been selected for illustration in the drawings, and the following description is drawn in specific terms for the purpose of describing these forms of the invention, this description is not intended to limit the scope of the invention which is defined in the appended claims.

Referring to FIG. 1, the latch fastener designated generally 10 is shown mounted in a panel 11 which for illustrative purposes is considered to be a door of a utility cabinet; a portion of the frame of the utility cabinet being shown at 12. As seen when viewed from the front face of the utility cabinet, only the cup 14 and the handle 16 of the latch fastener 10 are visible. The pawl foot 28 of the latch sub-assembly designated 21, as can be seen through the broken away portion of the panel 11 and frame 12 and is engaged with the face 12a of the frame 12 to fasten the panel 11 against the frame 12 in a closed position. A portion of the lock 40 is also visible on the panel at a short distance removed from the cup.

Referring now as needed to FIGS. 1 through 4, I shall describe the parts and their disposition with respect to one another, which comprise the preferred embodiment of my latch fastener in combination with the lock 40. The cup 14 is placed in a hole 13 in the panel member 11 with the flange 14a of the cup resting on the outside surface of the panel member 11. The housing 18 is formed to fit over the cup 14 on the inside of the panel member 11 and has projecting tabs 19 which engage notches 20 in panel member 11. The cup 14 and housing 18 are held in position by means of a screw sub-assembly consisting of a handle 16 affixed to a threaded shaft 17, and a nut 17a. The shaft 17 passes through a clearance hole 14b in cup 14 and a clearance hole 18a in the housing 18 and the nut 17a is tightened on the shaft 17 sufficiently to prevent relative motion of the cup 14 and the housing 18, but not so tight as to prevent rotation of the threaded shaft 17 and handle 16. To aid in this coaction, the cup 14 has an annular lip 14c thereon disposed about the hole 14b which provides a bearing surface for the handle 16.

The latch sub-assembly 21 consists of a pawl 22, a screw 24, and lock washer 26 and a pawl foot 28. The pawl 22 is a substantially flat member with a U-shaped flange 22a at one end and several clearance holes 22b and 22c. The pawl 22 is placed over the threaded shaft 17, after the nut 17a has been tightened; the shaft 17 passing through the hole 22b. The outer face of the shaped flange 22a has a plurality of transverse serrations therein 22d. The pawl foot 28 is an angled member consisting of a substantially flat leg 28b and a curved leg 28a. The outer surface of the flat leg 28b is transversely serrated as at 28c to mate with similar serrations 22d on the pawl 22. The flat leg 28b has a longitudinal slot 28d therein which embraces the shank 24a of the screw 24. The screw 24 is in suitable threaded engagement with the flange 22b of the pawl 22. Lock washer 26 is disposed between the head of the screw 24 and the inner surface of the flat leg 28b. The pawl foot 28 can be adjusted for variations in the thickness of the panel 11 and frame 12 by loosening the screw 24 and moving the pawl foot 28 toward or away from the frame 12 as desired, then tightening the screw 24 against the lock washer 26 and leg 28b thereby retaining the pawl foot 28 against the flange 22b of the pawl 22 as clearly shown in FIG. 4.

An actuator sub-assembly consisting of an actuator 30 and studs 31, 32, 33, and 34, which are fixedly mounted to the actuator 30, is retained on shaft 17 behind the latch sub-assembly 21 by lock washer 27 and nut 29. Relative motion between the actuator sub-assembly and the threaded shaft 17 is prevented by the D-shaped hole 30a in the actuator 30 which mates with the corresponding D-shaped threaded shaft 17. Relative motion of either nut 17a or 29 with respect to the threaded shaft 17 is prevented by a jamming action of the pawl 22 and actuator 30 between the two nuts assisted by the lock washer 27. That is, the nut 29 is tightened vigorously against these parts and the nut 17a.

Relative motion of the latch sub-assembly 21, which has a round hole 22b therein with respect to the D-shaped threaded shaft 17, is prevented by the stud 31 which passes through hole 22c in the pawl 22. The thickness of the nut 17a when combined with the thickness of the pawl 22 is such that there is a slight clearance 25 (FIG. 4) between the ends of the studs and the adjacent face of the housing 18.

Rotation of the handle 16 in the direction of the arrows shown in FIG. 1 causes rotation of the nuts 17a and 29 and the parts 22 and 30 held between them. To limit this rotation, a flange 18c is provided on the housing 18 which engages the edges of the actuator 30 near the points 30b and 30c upon approximately 90 degrees of rotation from the closed position shown in FIG. 2 to the open position shown in FIG. 5 or vice-versa. Relative motion of the housing with respect to the panel member is prevented by means of the tabs 19 engaging the notches 20. Thus, the rotatable components may be rotated as a unit within fixed limits with respect to the panel 11, and the cup 14 and housing 18 remain stationary during this rotation.

The means just described for attaching the latch fastener 10 to the panel 11 eliminates the need for secondary mounting means such as screws or rivets, while at the same time providing an effective means for latching, which includes adjustable means to compensate for various panel thicknesses.

In the alternative embodiment shown in FIG. 5, extension or latch rods 35 are used so that the latch fastener 10 may be used as a three point latch. The rods 35 extend behind the frame 12 at the top and bottom of the panel 11 when the latch fastener 10 is closed (as in FIGS. 1 through 4) to latch behind the frame or through a slot in the turned back edge of the frame. The rods are suitably constrained in brackets 36 attached to the back of the panel member by any suitable means as by spot welding; the brackets 36 each having an elongated slot

36a therein to accommodate the movement of the rod. Each rod is pivotally connected to a stud on the actuator 30 by means of a clearance hole which fits around the stud as at studs 32, 34, FIG. 5. The rods are held on the studs by virtue of the fact that only a small clearance is provided between the end of the studs and the adjacent face of the housing 18. Rotation of the handle 16 to the closed position rotates the latch sub-assembly 21 in the direction of the arrow shown in FIG. 5 and rods 35 are moved upwardly and downwardly as indicated by the arrows in FIG. 5 to latch the panel in the closed position.

In the alternative embodiment shown in FIG. 6, the latch sub-assembly 21 has been removed and the latch fastener combined with the rods 35 becomes a two point latch for securing the panel 11 only at the top and bottom as previously described. In this embodiment, the nut 17a is made of such a thickness as to maintain the clearance 25.

Referring to FIGS. 1 through 5, I will now describe the operation of the lock 40 which co-acts with the latch fastener 10 to maintain the latch fastener in the locked or unlocked position as desired. The lock 40 is a standard panel lock as is well-known in the prior art and consists of a cylinder 41 and suitable means to affix the cylinder to a panel. The lock is key operated and the cylinder 41 is rotated when the key (not shown) is inserted into the lock and turned. A pin 42 is eccentrically mounted on the rear face of the cylinder 41. The pin 42 passes through a clearance hole in the end of the inverted pawl member 44 and suitably retains the inverted pawl member as by means of the flared top 42a which is similar to a rivet head. The pawl member 44 passes through the slot 18b in the flange 18c of the housing 18 to engage the stud 33 with the U-shaped end 44a thereof (shown in FIG. 5) when the latch fastener 10 is in the closed position (FIG. 4).

Upon rotation of the cylinder 41, the pin 42 is rotated to the position shown in FIG. 5 thereby withdrawing the pawl member 44 and removing the end 44a from engagement with the stud 33. The actuator 30 is then free to rotate and can be moved to the open position (as shown in FIG. 5).

It will be understood that various changes in the details, materials, and arrangement of parts which have been herein described and illustrated in order to explain the nature of this invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the following claims.

What is claimed is:

1. A latch fastener comprising: a cup having an outwardly extending flange about the open end thereof and a hole in the bottom thereof; a housing disposed about the bottom and sides of said cup and having tabs extending therefrom toward said flange and having a hole in the bottom thereof; a shaft passing through the holes in said cup and said housing so as to be free to rotate therein, said shaft being threaded along a portion of its length; a handle disposed in said cup and connected to said shaft to rotate said shaft upon rotation of said handle; a nut in threaded engagement with said shaft for retaining said cup and said housing in axial position between said handle and said nut; and a latch disposed on said shaft for rotation therewith in response to the rotation of said handle wherein the latch has an adjustable pawl on the end thereof remote from said shaft.

2. A latch fastener comprising: a cup having an outwardly extending flange about the open end thereof and a hole in the bottom thereof; a housing disposed about the bottom and sides of said cup and having tabs extending therefrom toward said flange and having a hole in the bottom thereof; a shaft passing through the holes in said cup and said housing so as to be free to rotate therein, said shaft being threaded along a portion of its length; a handle disposed in said cup and connected to

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said shaft to rotate said shaft upon rotation of said handle; a nut in threaded engagement with said shaft for retaining said cup and said housing in axial position between said handle and said nut; and a latch disposed on said shaft for rotation therewith in response to the rotation of said handle wherein an actuator is disposed on said shaft to rotate therewith, said actuator having mating means thereon to engage said latch to cause said latch to rotate with said actuator.

3. The invention of claim 2 wherein said actuator mating means includes a plurality of pins, at least one of which engages said latch.

4. The invention of claim 2 wherein the latch has an adjustable pawl at the end thereof remote from said shaft.

5. The invention of claim 4 wherein said latch has a flange at the end thereof remote from said shaft, said flange having an outer serrated surface, and said pawl comprises a pawl foot and a flange a portion having a serrated surface thereon for engagement with said latch surface, and fastening means are provided in engagement with said flange portion of said pawl foot and said flange of said latch to hold said serrated surfaces together and to provide for said adjustment of one surface with respect to the other.

6. The invention of claim 1 wherein the pawl has a pawl foot thereon which is convex when viewed from the handle end of the shaft.

7. The invention of claim 4 wherein said housing has a flange extending rearwardly away from said cup, and the actuator is disposed to engage the flange of the housing upon rotation of the actuator through a predetermined distance and thereby prevent further rotation in that direction.

8. The invention of claim 3 wherein at least one latch rod is provided in engagement with one of said pins which is not engaged with said latch.

9. A latch fastener and locking mechanism for a panel and mating frame comprising:

- (a) a cup having an outwardly extending flange about the open end thereof and a hole in the bottom thereof;
- (b) a housing disposed about the bottom and sides of said cup and having tabs extending therefrom toward said flange and having a hole in the bottom thereof;
- (c) a shaft passing through the holes in said cup and said housing so as to be free to rotate therein, said shaft being threaded along a portion of its length;
- (d) a handle disposed in said cup and connected to said shaft to rotate said shaft upon rotation of said handle;

(e) a nut in threaded engagement with said shaft for retaining said cup and said housing in axial position between said handle and said nut;

(f) a latch disposed on said shaft;

(g) an actuator disposed on said shaft to rotate therewith, said actuator having a plurality of pins thereon at least one of which engages said latch to rotate said latch in response to rotation of said shaft;

(h) a lock mounted in said panel remote from said cup, said lock including a cylinder having provision for a key in one end and having a pin eccentrically mounted on the rear face thereof and extending axially therefrom;

(i) a pawl member suitably retained by said pin so as to rotate thereabout while being maintained in axial position on said pin;

(j) said housing having a flange extending rearwardly from said cup, said flange having a slot therein, said pawl member being disposed in said slot for free sliding engagement therein and having an end thereof shaped for engagement with one of said pins on said actuator, whereby upon appropriate rotation of said lock cylinder, said pawl member is engaged or disengaged with one of the pins on said actuator.

10. The invention of claim 9 wherein at least one latch rod is provided mounted for sliding movement with respect to said panel and said mating frame and connected to one of the pins of said actuator to move in response to rotation of said shaft, and thereby fasten or unfasten said panel to or from said frame.

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