Feb. 23, 1960 J. R. NEWCOMER, JR., ET AL 2,926,056

LATCH

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FIG. 1

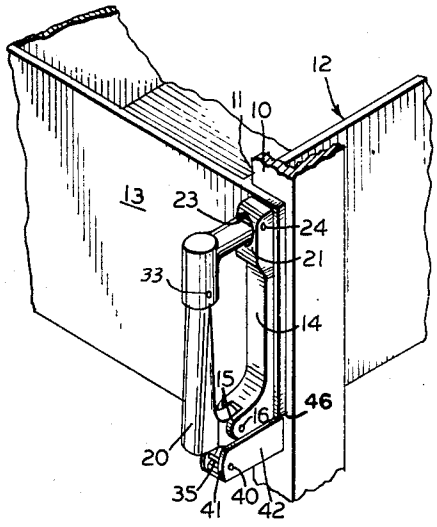
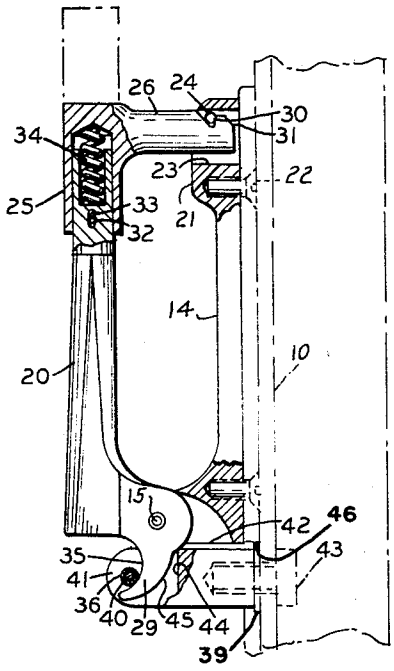


FIG. 2



INVENTORS.
JACOB R. NEWCOMER JR.
ALBERT J. RASKA.
BY John P. Chandler
THEIR ATTORNEY.

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FIG. 3

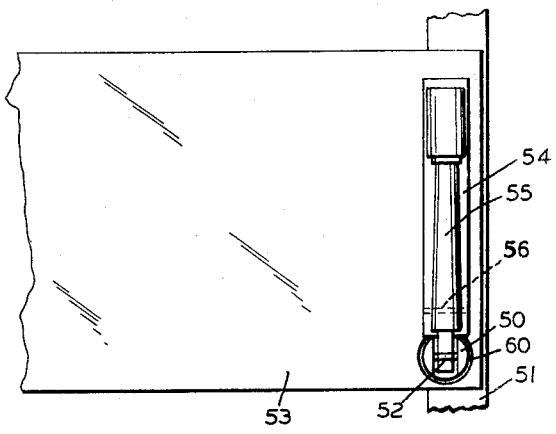
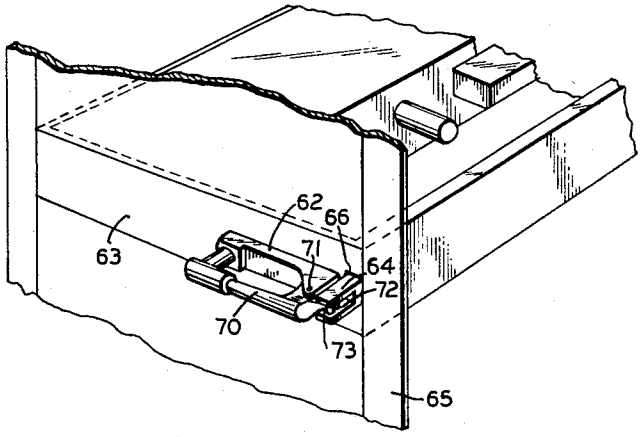


FIG. 4



INVENTOR.
JACOB R. NEWCOMER JR.
BY ALBERT J. RASKA
John P. Chandler
THEIR ATTORNEY.

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LATCH

Jacob R. Newcomer, Jr., Westwood, and Albert J. Raska, Emerson, N.J., assignors to Camloc Fastener Corporation, Paramus, N.J., a corporation of New York

Application January 20, 1958, Serial No. 710,836

1 Claim. (Cl. 312—320)

This invention relates to latching elements and relates more particularly to a novel combination of latch and keeper therefor which secures two members which are movable relative to each other in locked relation and also serves as a carrying handle for one of the memebrs if it is to be bodily transported.

An important object of the invention is to provide a latch for a slidable drawer-like member forming a housing for an electronic chassis which is conveniently made completely removable from a frame or cabinet for purposes of inspection or repair. In instalaltions of this character the chassis will be electrically connected with the electronic unit by means of complemental male and female connectors, one of which is positioned at the rear of the drawer and the other at the rear of the recess receiving the drawer and the two components become connected when the drawer is moved fully in to the supporting frame. Since these connectors have a number of individual frictional elements considerable force is required to engage or disengage the connectors.

It is an object of the present invention to provide a latch with a hinged handle having two camming elements, one for moving the drawer outwardly a sufficient distance to disengage the connectors and the other for fully re-engaging them. These camming elements provide a multiplication of force which renders this initial travel in either direction easy to accomplish.

Another object of the invention is to provide a novel latch and keeper therefor which are mounted on the front faces of the drawer and frame, respectively, and wherein no parts of the fastener extend to the rear of said faces so the entire inner area of the chassis is made available for the components to be installed therein. Drawers and frames of this character almost invariably have equally spaced, pre-drilled holes which receive ordinary machine screws heretofore used for securing the drawers or other slidable members in the supporting frame. A separate handle was installed for pulling the drawer out of the frame and for carrying the drawer. The latch and keeper of the present invention utilize these holes in their present location and enable the latch assembly to be quickly installed and this installation can be effected without any destruction or modification of the frame and drawers beyond forming a square opening at or adjacent the edge of the front wall of the drawers through which the keeper, secured to the frame, projects forwardly. In the event that the keeper is round, a round hole may be drilled. Another important advantage of the latch and keeper is in the extreme flexibility of location of installation. In most instances a latch is secured with the handle in a vertical position along each vertical edge of said front wall with the keeper below the handle. This leaves substantially the entire face of the front available for the installation of control members. In other instances the handle may be in a horizontal position with the keeper located at the side. In other words, the latch assembly can be mounted in any position and location so long as there is a frame member behind the camming portion of the handle on which the keeper can be mounted.

A still further object of the invention is to provide a combination of cam latch and keeper therefor wherein the drawer, in addition to being prevented from moving outwardly of the frame, is also prevented from up, down or sidewise movement in either direction. Considering the handle being mounted in a vertical position, this novel locking relationship is achieved first, by a novel C-shaped cam on the handle, which, when the parts are in engaged position prevents upward movement of the drawer, second, by a close positioning between the handle mounting bracket and the keeper, preventing downward travel of the drawer and finally, by forming the cam which enters a slot in the keeper almost as wide as the slot, thus preventing all but slight sidewise travel. Thus the security of the drawer against unwanted movement does not require a close fit between the drawer and the frame opening to receive the drawer.

In the drawings:

Fig. 1 is a broken perspective view of the combined handle and latch of the present invention in a typical installation.

Fig. 2 is a side elevation of the latch and keeper, partially in section.

Fig. 3 is a broken front elevation showing a modified keeper and installation arrangement.

Fig. 4 is a perspective view showing a horizontal installation of the latch.

The latch handle is shown in Figs. 1 and 2 as being mounted in a vertical position on a horizontal pivot and in these views **10** indicates a fixed frame which may comprise the front wall of a cabinet having an opening **11** to receive a drawer **12** having a front panel **13**, the drawer being slidable outwardly of the cabinet.

The latch of the present invention comprises a vertical base plate or bracket **14** having a bifurcated forward extension at its lower end forming spaced ears **15** through which a pivot pin **16** passes for mounting a latch handle **20**. At its upper end the bracket may have a thickened portion **21** and the bracket is secured to the front face of the drawer or other member by means of screws **22**.

A generally oval shaped horizontal opening **23** is formed at the upper end of the bracket and a steel pin **24** passes through the upper section of this opening. The latch handle **20** has an inverted L-shaped sliding lock comprising a tubular vertical portion **25** carried telescopically at the upper end of the latch handle and a rearwardly extending horizontal portion **26** having a recess **30** to form a hook and a tapered nose **31**. The upper end of the latch handle has an elongated slot **32** and a pin **33** carried by tubular portion **25** limits vertical movement of the lock. A spring **34** urges the lock upwardly.

At its lower end below pivot **16** the latch handle **20** has an arcuate extension **29** forming a cam having a forwardly facing, substantially C-shaped camming surface **35** which engages a sleeve **36** carried on a pin **40** passing between two ears **41** of a bifurcated or fork-shaped keeper **42** secured by a screw **43** to frame **10**. Shims of varying thickness, one of which is shown at **39**, may be positioned between the keeper and the frame to properly locate the keeper so as to secure a tight lock. The only modification in the frame which is of conventional construction is to form a suitable opening **46** in the lower corner of the front panel **13** of the drawer to receive the keeper as the drawer is moved to closed position. If desired sleeve **36** may be omitted and the camming surface will directly engage the pin. The recess formed by the spaced ears in the keeper is defined at its rear by an interconnecting wall **44** which is engaged during initial outward travel of the drawer by convex rear surface **45** of extension **29**. Thus the spaced ears form, with the pin, a vertical opening to receive the C extension **29**. The width of the recess is only slightly more than the width

of the cam so as to prevent lateral movement of the cam and hence the drawer.

Fig. 2 shows the parts in locked position and the hook 30 of sliding lock 26 has received fixed pin 24 in aperture 23. Cam surface 35 engages the under side of sleeve or roller 36 in the keeper slot and it will also be noted that a portion of the arcuate rear face of the handle engages the upper corner of the keeper, thus preventing both downward and upward movement of the drawer. When it is desired to disengage the latch, lock 25—26 is depressed, which permits hook 30 to be freed from engagement with pin 24. Forward movement of the upper end of the latch handle causes convex cam surface 45 to move against wall 44 of the keeper, thereby exerting a lever action to move the drawer outwardly. As soon as the curved extension 29 clears sleeve 36 on outward travel of the sliding member the latch handle is moved forwardly to the locked position wherein it serves as a carrying handle if the drawer is removed and transported. The lever also may function as a supporting leg for the drawer in the event that it becomes necessary to work on the contacts at the inner end of the drawer. This arrangement protects any dials or knobs on the front wall of the drawer.

To replace the drawer and engage the latch the upper lock is disengaged and drawn forwardly to permit extension 29 to clear the roller, after which the handle is moved rearwardly, thus causing cam surface 35 to move the drawer fully home, after which the upper lock is engaged.

When the latch of the present invention is used on a drawer forming a housing for an electronic chassis, and the separable connectors having a considerable number of contacts are employed, the initial resistance to movement of the drawer is at its maximum and cam 29 is illustrated as being formed to give the greatest multiplication of force at this time. As the male contacts are being withdrawn from the female contacts the resistance to travel progressively decreases and accordingly the multiplication of force decreases as shoulder 44 is progressively engaged by cam surface 45 towards its high point, i.e., at its lower end. The invention is not, of course, limited to any particular shape of cam surface or degree of multiplication of force.

In a typical installation one of the latches may be positioned on each side of the drawer so as to balance the pulling or pushing forces necessary to withdraw the drawer or to return it to closed position. This arrangement also permits substantially the entire front face of the drawer to be free for the installation of control elements if the latch is used on an electronics installation. In other applications a single latch may be used which will preferably be centered relative to the drawer.

Arrangements for mounting such a single latch both vertically and horizontally are illustrated in Figs. 3 and 4 respectively. In Fig. 3 the keeper 50 mounted on frame 51 is shown as being round instead of square as shown in Fig. 1 and a pin 52 without the sleeve or roller is employed. The front panel 53 of the drawer supports bracket 54 and the handle 55 is pivotally mounted thereon at 56. Instead of the square cut-out of Fig. 1 a circular opening 60 is formed in the panel to receive the keeper.

In Fig. 4 the bracket 62 is mounted horizontally on panel 63 forming the front of the drawer. A square keeper 64 is mounted on the front of the supporting framework 65 and the panel has an opening 66 to receive the keeper. The handle 70 is pivoted at 71 in a horizontal position and the cam 72 extends laterally into the slot 73 of the keeper.

This view illustrates the flexibility of application of the latch where the front panel has a height less than the length of bracket 62 so the vertical mounting would not be possible.

The latch assembly of the present invention is shown in the drawings in two of the positions that it customarily occupies when assembled. It may also be applied to the upper or to the lower faces of a frame having a vertically movable drawer-like member. Because of its extreme flexibility of application the two installation positions shown are suggestive only, although it has been found that the preferred method of application is that shown in Fig. 1 and it is for that reason, and also for the sake of clarity, that some of the claims define the structure in the position it occupies in Fig. 1 with the keeper and the elongated bracket in superimposed relation. This definition of the structure is not, however, to be taken in any limiting sense.

The present application is a continuation-in-part of our co-pending application Serial No. 526,046, filed August 2, 1955, now abandoned.

While there have been described herein what are at present considered preferred embodiments of the invention, it will be obvious to those skilled in the art that many modifications and changes may be made therein without departing from the essence of the invention. It is therefore to be understood that the exemplary embodiments are illustrative and not restrictive of the invention, the scope of which is defined in the appended claims, and that all modifications that come within the meaning and range of equivalency of the claims are intended to be included therein.

What we claim is:

The combination with a frame having an opening and a member supported in slidable relation within the opening, of a latch and keeper therefor for securing said member within the frame, a bracket, and a latch handle pivotally mounted at one end thereof at one end of the bracket and provided with an extension forming a lever beyond the pivot, said keeper having an opening therein receiving the lever, said bracket and keeper being provided with substantially flat rear faces which engage the front faces of the slidable member and frame, respectively, and to which they are secured in aligned, juxtaposed relation, said lever having a front camming surface which engages a front wall of the keeper opening when the handle is rotated in one direction to urge the member into the frame and a rear camming surface which reacts against a rear wall of the keeper opening when the handle is rotated oppositely to urge the member out of the frame.

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