Feb. 16, 1971 L. R. POE 3,563,628

LIMITED LOAD DRAWER LATCH

Filed Dec. 5, 1968

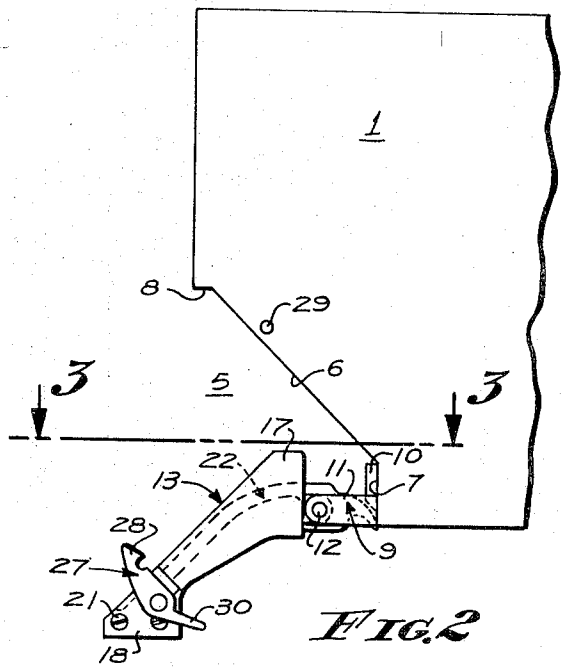


FIG. 2

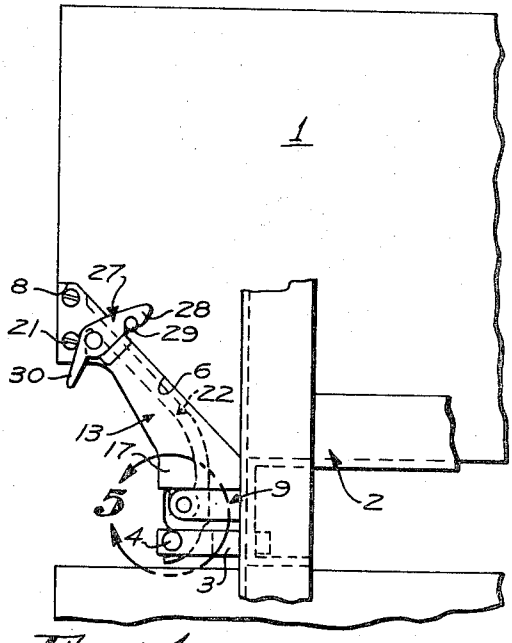


FIG. 1

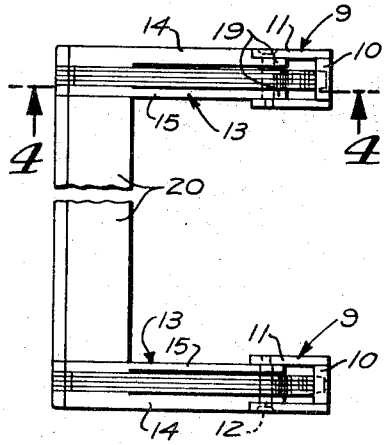


FIG. 3

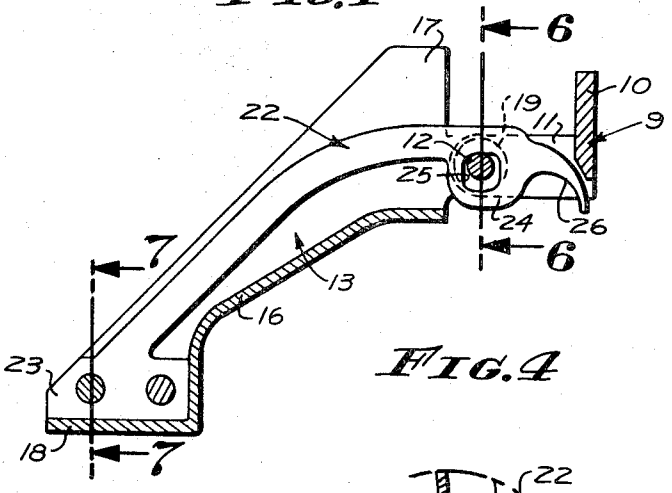


FIG. 4

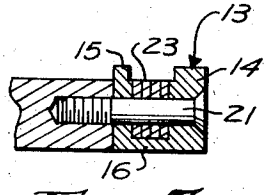


FIG. 7

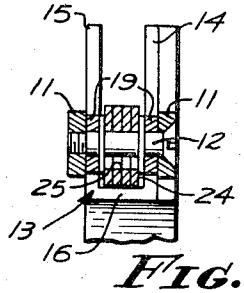


FIG. 6

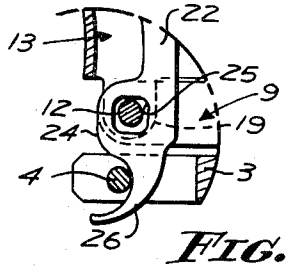


FIG. 5

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LIMITED LOAD DRAWER LATCH

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Int. Cl. A47b 58/00, 95/02
U.S. Cl. 312—320 5 Claims

ABSTRACT OF THE DISCLOSURE

A limited load latch intended primarily for a drawer designed to carry electronic equipment and provided with separable connectors at its inner ends which are joined during the final closing movement of the drawer; the latch being incorporated in a handle pivotally connected to the outer, underside of the drawer and having a pair of elongated, laminated latch springs terminating in latch hooks capable of limited displacement on engagement with latch pins carried by the rack structure in which the drawer slides.

BACKGROUND OF THE INVENTION

It is customary to divide the more complex electronic equipment into units, each of which is mounted in a drawer which slides in a rack structure and is electrically connected to other units through separable connectors, when the drawer is pressed fully into place. The space available for such electronic equipment is often at a premium to the extent that the space between conventional drawer handles needs to be utilized as much as possible. One solution, which has been proposed, is to mount the handle in the lower outer corner of the drawer.

A problem, which is inherent, is to provide a means for compensating for manufacturing tolerances. One solution is disclosed in the copending application, Ser. No. 781,927, filed Dec. 6, 1968. The present application is directed to another solution which is particularly suited for latches installed in the lower outer corners of electronic equipment drawers.

SUMMARY OF THE INVENTION

Included in the objects of the invention are:

First, to provide a limited load latch particularly adapted for installation at the lower, outer portions of darwers designed to slide into racks: the latch incorporating novelly arranged spring arms terminating in yieldable catches engageable with keeper pins to secure the drawer in its closed position.

Second, to provide a latch of this type wherein the spring arms are formed of laminated flat plates which are constrained to yield edgewise or in their respective planes and thereby may be relatively stiff yet occupy a minimum of space.

DESCRIPTION OF THE FIGURES

FIG. 1 is a side view of the limited load drawer latch, shown in its closed position, and indicating fragmentarily, the drawer on which it is mounted and the adjacent portions of the rack in which the drawer slides.

FIG. 2 is a similar side view of the limited load drawer latch, with the latch and the drawer shown in their open position.

FIG. 3 is an enlarged fragmentary plan view of the limited load latch removed from the drawer, taken from 3—3 of FIG. 2.

FIG. 4 is a further enlarged sectional view of the latch, taken through 4—4 of FIG. 3.

FIG. 5 is an enlarged fragmentary sectional view, taken within circle 5 of FIG. 1, showing the latch in its closed position.

FIG. 6 is a fragmentary sectional view, taken through 6—6 of FIG. 4.

FIG. 7 is a fragmentary sectional view, taken through 7—7 of FIG. 4.

The limited load latch is mounted on a drawer 1; a set of the drawers is mounted in a rack structure 2. The limited load latch is intended primarily, but not limited to, drawers which contain electronic components, not shown, which when the drawers are closed are connected to the components of other drawers through separable connectors, not shown, carried by the drawers and the rack structure.

At appropriate locations, the rack structure 2 is provided with pairs of brackets 3 and keeper pins 4 for each drawer which form mating keepers for the latches. The lower, forward portion of each drawer is provided with a latch handle recess 5, which is essentially triangular in side aspect with the lower forward wall 6 of the drawer forming the hypotenuse. Near the bottom of the drawer, the sloping wall 6 joins a vertical wall 7. The upper extremity of the wall 6 is joined to a downwardly facing shoulder 8.

Secured to the lateral margins of the vertical wall 7 is a pair of mounting brackets 9, each of which includes an attachment plate 10 and a pair of horizontally extending arms 11, joined by a pivot pin 12. Pivotally associated with each mounting bracket 9 is a housing arm 13, which is channel shaped in cross section, and includes a laterally outer flange 14, a laterally inner flange 15, joined by a connecting web 16.

Each housing arm conforms to the angular or sloping wall 6, and includes a base end 17, conforming to the vertical wall 7, and an extended end 18 fitting under the shoulder 8. The base end and the extended end are therefore in right angular relation. A pair of pivot lugs 19 project from the base end 17 and fit between the arms 11 to receive the corresponding pivot pin 12.

A connecting or handle bar 20 joins the extended ends 18 of a pair of housing arms by means of a pair of screws 21 extending from each housing arm into the end of the handle bar.

Each housing arm receives a laminated spring arm 22. Each spring arm comprises a set of laminations which have identical configuration. The spring arms have enlarged secured ends 23 that fit within the extended end 18 of the corresponding housing arm and are perforated to receive the screws 21. Each spring arm extends from its secured end in a generally curving path to the corresponding pivot pin 12. In the region of the pivot pin the spring arm forms an enlarged portion 24, having an aperture 25 dimensioned to clear the pivot pin 12 and permit limited displacement of the extended end of the spring arm. Each spring arm terminates in a hook 26, which is engageable with a corresponding keeper pin 4.

Operation of the limited load drawer latch is as follows:

When the drawer 1 is open and the handle formed by the housing arms 13 and connecting bar 20 is pivoted to the position shown in FIG. 2, the hook 26 is in an upper position at a level above the corresponding keeper pin 4. When the drawer is moved toward its closed position, and shortly before reaching its fully closed position, interengagement of the components of the separable connectors provides increased resistance. When this occurs, the handle is rotated clockwise, as viewed in FIG. 2, toward the position shown in FIG. 1, causing the hook 26 to engage the corresponding keeper pin 4 so that the leverage provided by the housing arms 13 may force the drawer to its fully closed position. In the course of this movement, the spring arms 22 yield, as indicated in

FIG. 5, to compensate for any tolerance discrepancies. However, should the spring arms yield to the extent permitted by the apertures **25**, the increased load serves as a warning that a separable connector is malfunctioning. This condition is noticeable immediately after initial engagement of the separable connector components, and after the handle has moved only a short distance toward its closed position.

In order to hold the handle of the limited load latch in its closed position, various secondary latch devices may be employed. For purposes of illustration, a secondary latch **27** is shown in FIGS. 1 and 2 as pivotally connected to a housing arm **13**, near its extended end **18**. The secondary latch **27** includes a hook arm **28**, engageable with a pin **29** extending laterally from the drawer, and a manually engageable release arm **30** can move the hook arm **28** free of the pin **29**. A spring, not shown, holds the secondary latch in position for automatic engagement with the pin **29**, as the housing arm moves to the position shown in FIG. 1.

It will be noted that by providing a laminated spring arm, the spring arm may be formed of spring metal stampings, and that the force exerted by the spring arm can be altered by changing the number of laminations.

While particular embodiments of this invention have been shown and described, it is not intended to limit the same to the details of the constructions set forth, but instead, the invention embraces such changes, modifications and equivalents of the various parts and their relationships as come within the purview of the appended claims.

I claim:

1. A limited load latch for engagement with a mating keeper, said latch comprising:

(a) a mounting member;

(b) a handle structure;

(c) means pivotally connecting said mounting member and handle structure;

(d) a spring arm secured in said handle at a point remote from said pivot means, said spring arm being provided with an aperture to receive said pivot means and dimensioned to permit limited deflection of said spring arm determined by said aperture, and terminating in a catch element engageable with said keeper.

2. A latch, as defined in claim **1**, wherein:

(a) said handle structure includes a pair of spaced arm members dimensioned to receive a spring arm therebetween and a cross bar connecting said arm members.

3. A limited load latch for a drawer slidable in a rack structure and encountering resistance to its closing movement in order to join electrical connectors, the drawer having a latch accommodation recess at its lower outer corner, said latch comprising:

(a) a pair of keeper members extending from said rack structure;

(b) a pair of brackets secured to said drawer at the underside of said recess;

(c) a handle having parallel housing arms and a connecting handle bar dimensioned to fit said recess;

(d) a pivot pin connecting each housing arm to a corresponding bracket for pivotal movement of said handle bar between a closed position adjacent the lower front side of said drawer and an open position outwardly and downwardly therefrom;

(e) and a spring arm secured in each housing arm remote from said pivot pin, each housing arm having an opening loosely receiving a pivot pin and terminating in a catch adjacent thereto, engageable with a corresponding keeper member as said handle is moved to its closed position, said spring arms being yieldable within the limits permitted by said openings.

4. A latch, as defined in claim **3**, wherein:

(a) each of said spring arms includes a multiple lamination of flat spring plates constrained for deflection in the planes of said plates.

5. A latch, as defined in claim **3**, which further comprises:

(a) a secondary latch for securing said handle in its closed position.

References Cited

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U.S. Cl. X.R.

312—333; 74—527