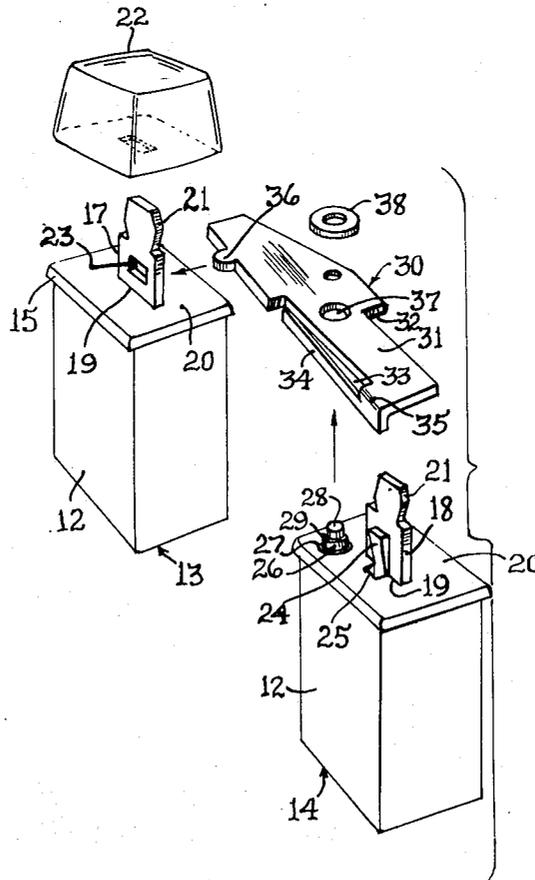


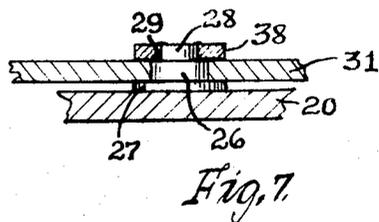
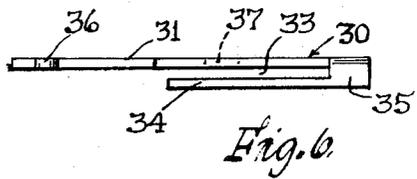
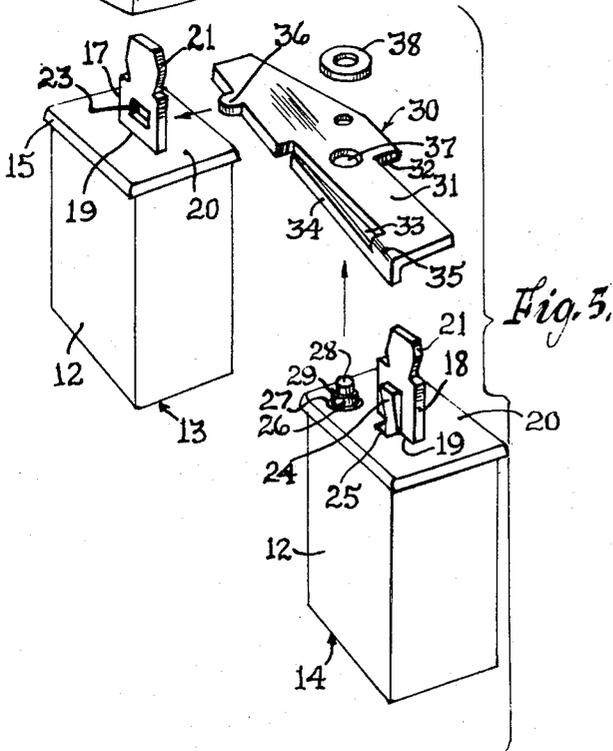
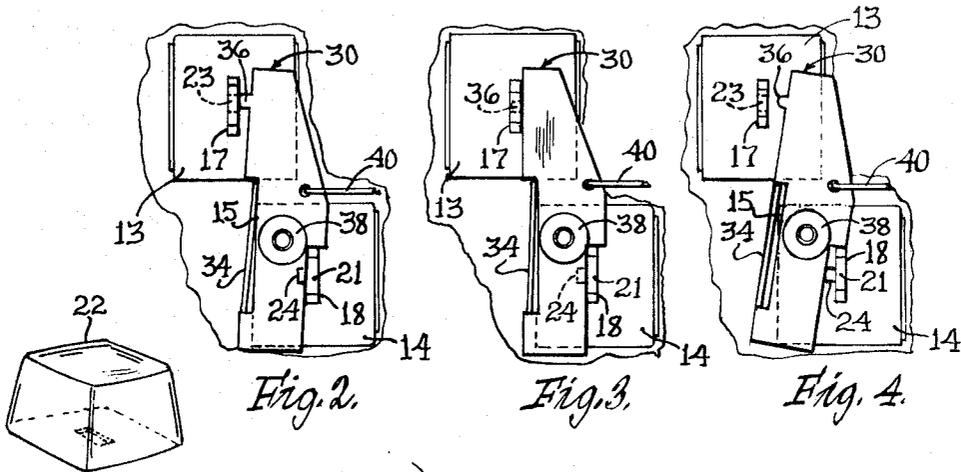
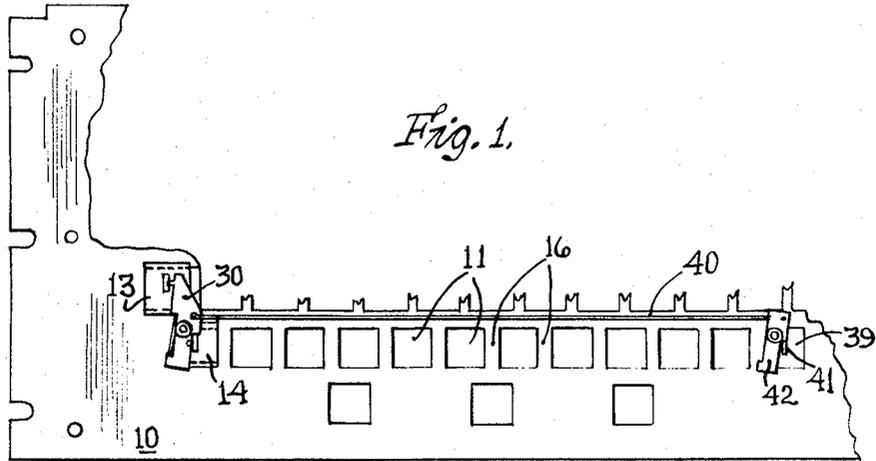
[54] **MECHANICAL KEY LOCK-IN**
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 [73] Assignee: **Cherry Electrical Products Corporation, Waukegan, Ill.**
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 [51] Int. Cl.**G06c 7/04**
 [58] Field of Search.....**235/26, 27, 145, 607 K, 130 R; 197/107**

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 Primary Examiner—**Stephen J. Tomsky**
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[57] **ABSTRACT**
 A mechanical lock-in for a depressed key of a keyboard including an automatic release of the locked depressed key through successive actuation of associated key members.

6 Claims, 7 Drawing Figures





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MECHANICAL KEY LOCK-IN

SUMMARY OF THE INVENTION

A lock-in structure for a key of a keyboard for retaining a selected key in a depressed condition, comprising a self-biased locking lever pivotally urged into an aperture formed in the stem of the key to be locked, with the locking lever pivoted out of the aperture by the depression of an associated key member which is provided with a cam surface and connecting means for pivoting the locking lever in one direction out of its operative position with respect to the depressed locked key.

GENERAL DESCRIPTION

The invention will be best understood by reference to the enclosed drawings which illustrate the preferred embodiment of the invention, and in which:

FIG. 1 is a fragmentary top plan view of the keyboard showing the placement of the keys and associated locking structure of this invention;

FIG. 2 is a fragmentary top plan view of two associated keys and the locking mechanism of this invention in its normal or unactuated condition;

FIG. 3 is a fragmentary top plan view similar to FIG. 2, but showing the locking lever in its actuated or locking position;

FIG. 4 is a top plan view similar to FIGS. 2 and 3 but showing the locking lever in its released position;

FIG. 5 is a perspective view of the associated switch structures and locking mechanism in an exploded relation with respect to each other;

FIG. 6 is a side elevational view of the locking lever of this invention;

FIG. 7 is a fragmentary detailed sectional view showing the pivotal mounting of the locking lever to one of the key structures.

In the present embodiment of the invention as illustrated, the keyboard 10 accommodates a plurality of electrical switch keys. However, it should be understood that the physical structure of the lock-in means hereinafter to be described, can be utilized in a non-electrical keyboard.

As fragmentarily shown, the keyboard 10 is provided with an arrangement of spaced openings 11 that are of a size to frictionally receive the body enclosures 12 of the electric switch keys, two of which are shown at 13 and 14. Each of the body enclosures 12 of the switch keys provides a top edge peripheral flange 15 which rests upon the keyboard surface 16 surrounding each of the openings 11.

The switch keys 13 and 14 in addition to their body enclosures 12 each provide a stem 17 and 18 movable through a suitable opening 19 formed in the top wall 20 of each body enclosure 12. It is to be noted that the free ends of the stems 17 and 18 are preformed as at 21 to frictionally receive a cap or button 22.

As shown in FIG. 5, the stem 17 of the switch key 13 has formed therein an aperture 23, while the stem 18 of the switch key 14 is provided on one side wall thereof with a cam surface 24. The opening 19 formed in the top wall 20 of the body enclosure 12 of the switch key 14 is provided with an enlargement 25 through which the cam surface 24 may be moved when the stem 18 is depressed as hereinafter described.

Also provided on the top wall 20 of the body enclosure 12 of the key switch 14 is a circular stud 26 which extends vertically therefrom in a spaced parallel relation to the stem 18. This stud provides an enlarged base flange 27 and a reduced free end 28, such that a shoulder 29 is provided for a purpose hereinafter made apparent.

The lock-in mechanism of this invention includes a lever 30 which is formed from a single blank of metal stamping in such a manner as to provide an elongated body 31, one edge of which is notched as at 32. The edge opposite the notch 32 has a portion removed as at 33, so as to provide a spring finger 34 which is connected to the body 31 by a lip 35 that is bent out of the normal plane of the body 31 so as to dispose the spring finger 34 in a longitudinal plane beneath the normal plane of

the body 31. The spring finger 34 is biased in a direction so as to be slightly disposed beneath the body 31 for a purpose hereinafter described.

The lever 30 also provides a locking pin 36 which is of a size to be readily projected into the aperture 23 formed in the stem 17 of the key 13. The body 31 of the lever 30 has formed therein a circular opening 37 which is of a size to receive the circular stud 26 and yet rest upon the base flange 27 provided thereby, as clearly shown in FIG. 7.

A retaining washer 38 is adapted to be projected upon the reduced free end 28 of the stud 26 and rests against the shoulder 29 provided thereby, with the free end 28 of the stud 26 swaged over the washer 38 so as to retain the lever 30 on the stud 26 for free pivotal movement.

When the lever 30 is mounted upon the stud 26 provided by the key switch 14, the spring finger 34 will engage one edge of the peripheral flange 15 thereof and by reason of its canted relation to the body 31, will bias the lever 30 in a counterclockwise direction as shown in FIG. 2. In such position, the lever 30 tends to pivot in a clockwise direction as shown in FIG. 2, about the stud 26. However, such movement is resisted by the fact that the pin 36 is in contact with a portion of the stem 17 of the associated key switch 13 adjacent to but not in alignment with the aperture 23 formed therein.

It should be noted that the keyboard openings 11 are so related, one to another, that the key switches 13 and 14 will be in a specific offset relation one to another, as shown.

When the stem 17 of the key switch 13 is manually depressed, such movement will cause the aperture 23 formed therein to be moved into alignment with the locking pin 36, and the continuing self-biasing action of the lever 30 will force the pin 36 into the aperture 23 and lock the stem 17 in a depressed condition as shown in FIG. 3.

The key switch 13 will remain in its depressed locked condition until the stem 18 of the key switch 14 is manually depressed. By this action, the cam surface 24 will bear against the notched edge 32 of the body 31 of the lever 30 and physically pivot the lever 30 in a clockwise direction about the stud 26 so as to withdraw the locking pin 36 from the aperture 23 formed in the stem 17 of the key switch 13, permitting the same to be mechanically self-restored to its original position, such as shown in FIG. 4.

In some installations of the locking mechanism it is desirable to have more than one key switch capable of effecting release of the locking lever 30 from the stem 17 of the key switch 13. Such an arrangement is shown in FIG. 1, where another key switch 39 having the same construction and components as the key switch 14, is carried in one of the openings 11 formed in the keyboard 10. The locking lever 42 associated with the key switch 39 does not provide a locking pin 36, but is connected to the locking lever 30 of the key switch 14 by a connecting means 40, such as an extremely thin but durable rod or wire strand. Thus, when the stem 41 of the key switch 39 is depressed, its cam surface will pivot its associated locking lever 42 in a clockwise direction, which through the connecting means 40 will also effect pivotal movement of the locking lever 30 of the key switch 14 in a like direction. Thus, if the locking lever 30 had been self-biased into a locking position with respect to the stem 17 of the key switch 13, such locking position would be changed by the actuation of either of the key switches 14 or 39.

I have provided a simple locking lever which contains as an integral part thereof a canted spring finger which biases the locking lever into operative position, or which maintains the locking lever in a ready position with respect to an associated switch for automatic pivotal movement when desired.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A mechanical lock-in for a selected key of a keyboard including first and second juxtaposed keys having stemlike supporting members, the first key being the selected key to be locked in and the second key effecting its release, wherein the improvement comprises

- a. an apertured stem provided by the first key,
- b. latch means carried by the second key and extending laterally therefrom so as to have a free end positioned in close proximity to said stem of the first key,
- c. means for pivotally supporting said latch means on the second key whereby it may be pivoted through a plane extending transversely to the normal plane of said stem of the first key,
- d. means on said latch means for biasing the free end thereof in one direction about said pivotal connection to the second key and into contact with the stem of the first key,
- e. means provided by the free end of said latch means adjacent said stem of the first key and normally out of alignment with said aperture formed therein and adapted to be projected therein when the first key is moved into an operative position for latching the same,
- f. and means on the stem of the second key for pivoting said latch means in an opposite direction about said pivotal connection to the second key and against said biasing means so as to withdraw said projecting means out of said aperture in said stem of the first key to permit it to return to its inoperative position.

2. A mechanical lock-in for a selected key of a keyboard as defined by claim 1, wherein said means on said latch means for biasing the free end thereof in one direction comprises a spring finger adapted to bear against the second key when said latch means is pivotally mounted thereto, so as to bias said latch means in one direction relative thereto.

3. A mechanical lock-in for a selected key of a keyboard as defined by claim 1, wherein said latch means comprises an elongated substantially flat lever of a length to extend between the stems of the first and second keys and which is pivotally connected to the second key and provides a free end adjacent to the stem of the first key.

4. A mechanical lock-in for a selected key of a keyboard as defined by claim 3, wherein said means for biasing said lever in one direction about its connection to the second key comprises a spring finger bent out of the substantially flat plane of said lever and adapted to bear against the second key so as to bias said lever in one direction and in the direction of the stem of the first key.

5. A mechanical lock-in for a selected key of a keyboard as defined by claim 1, wherein said means provided by the free end of said latch means which is normally out of alignment with said aperture formed in said stem of the first key, is a locking pin extending transversely of the normal plane of said latch means and having contact with said stem of the first key as said latch means is biased in one direction about its pivotal connection to the second key, with said locking pin adapted to be forcibly projected by said biasing means into said aperture of said stem of the first key when the first key is moved into an operative position.

6. A mechanical lock-in for a selected key of a keyboard as defined by claim 5, wherein said means for biasing said latch means in one direction about its pivotal connection to the second key includes a spring finger provided by said latch means and adapted to bear against the second key so as to bias said latch means and said locking pin in one direction into contact with said stem provided by the first key and to further bias said locking pin into said aperture formed in said stem of the first key when the first key is moved into an operative position.

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