

June 23, 1970

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3,516,604

SEQUENTIAL KEYBOARD INTERLOCK

Filed Jan. 10, 1968

2 Sheets-Sheet 1

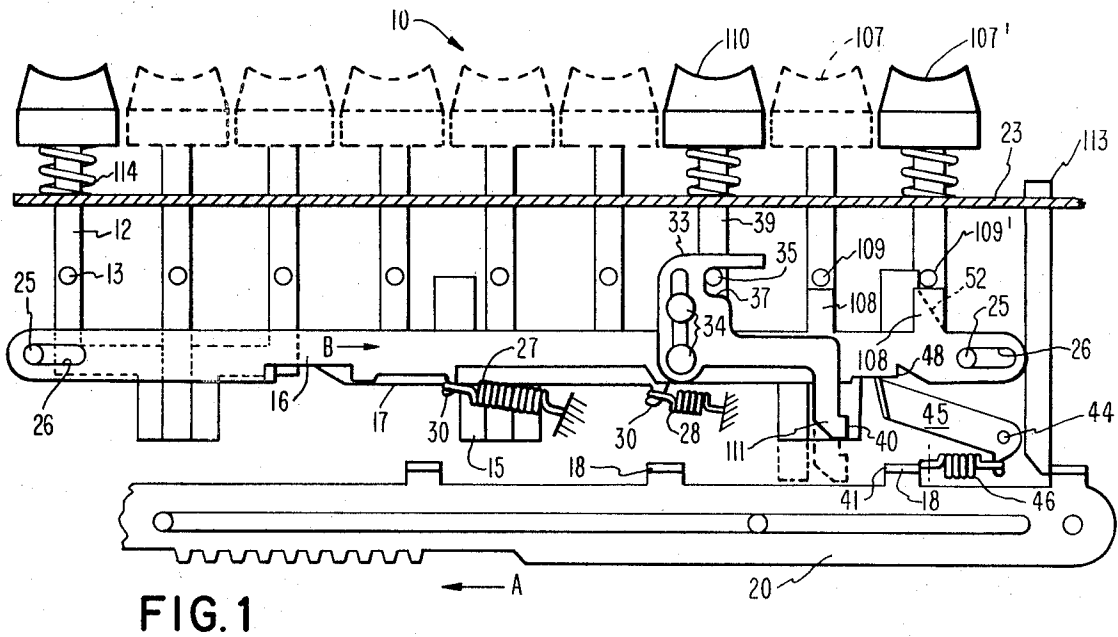


FIG. 1

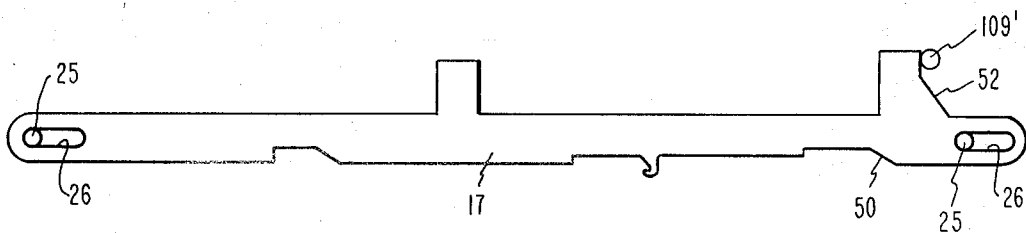


FIG. 2

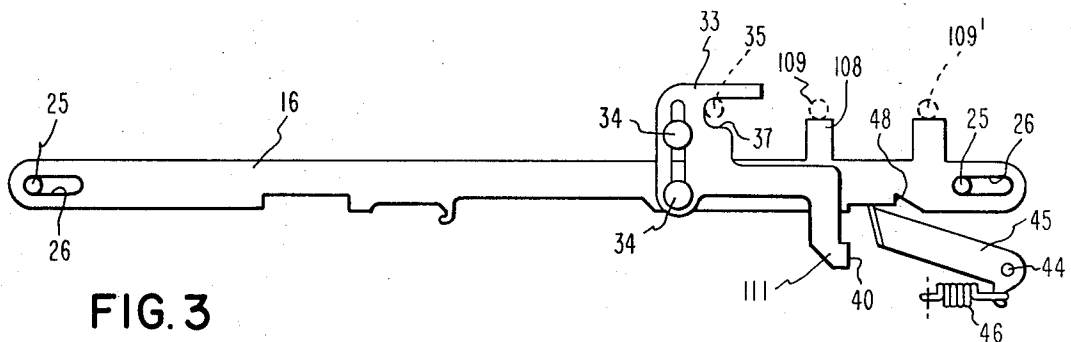


FIG. 3

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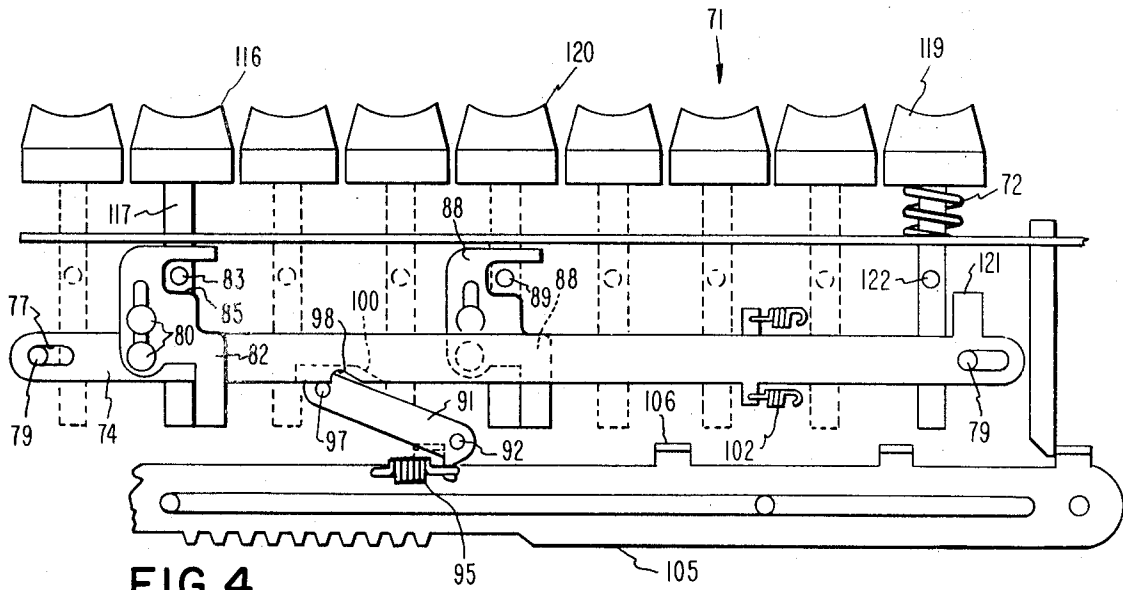


FIG. 4

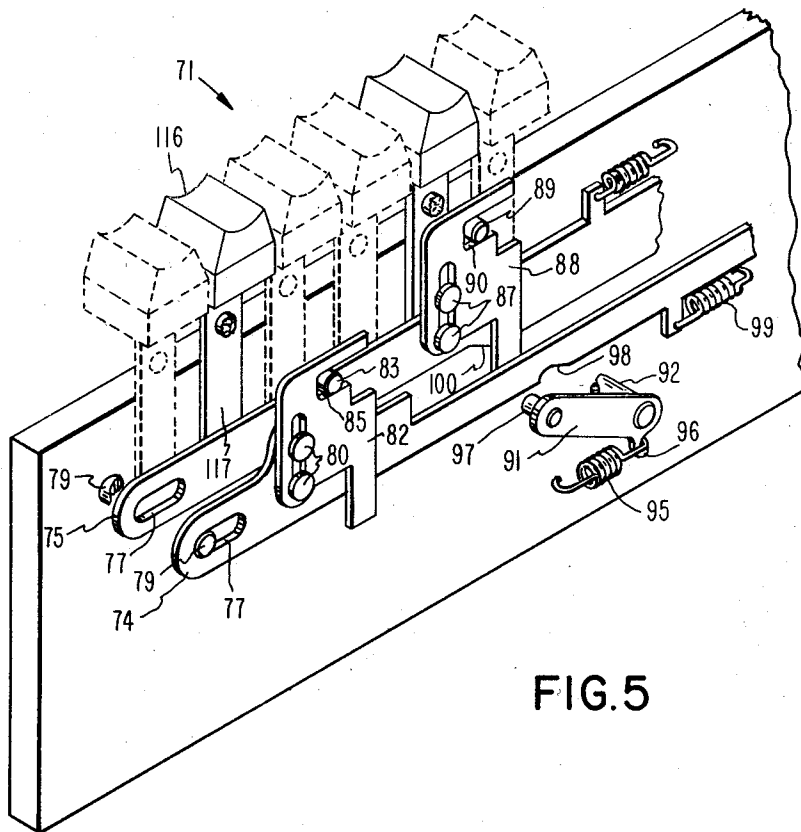


FIG. 5

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SEQUENTIAL KEYBOARD INTERLOCK

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Filed Jan. 10, 1968, Ser. No. 696,919

Int. Cl. G06c 7/04; G07g 1/00

U.S. Cl. 235—145

10 Claims

ABSTRACT OF THE DISCLOSURE

Keyboard interlocks are utilized to enforce a sequence of operation of keys within a keybank of control keys. Two slides cooperate to cause an interlock to be set or removed to respectively prevent or permit operation of another key or keys within the keybank in accordance with the sequence of operation it is desired to enforce. One of the cooperating slides carries keystem stops which are positionable to interfere with a selected key assembly, preventing operation. Such slide is biased toward one position and selectively positionable in a second position from which it is released by actuation of the other of the slides.

BACKGROUND OF THE INVENTION

This invention pertains to devices for recording manually keyed information and more particularly, to such devices employing a series of keybanks.

In a transaction recording machine or an accounting machine there are numerous occasions requiring interlocks which function to disable further operation of the device if an attempt is made to enter incorrect information, if there is failure to perform a step of the operation or it is attempted to operate the machine other than in the predetermined sequence. A common method of entry in the recording portion of the machine is through the use of keybanks. It is usually necessary to enforce a sequence of operation involving the preclusion of the use of a key or keys within a keybank until another operation is performed or limit a subsequent operation to the use of a specific operating key.

SUMMARY

The present invention utilizes a sequential interlock shown in a keybank of machine operation control keys to enforce a desired or necessary sequence of the operations determined by the control keys. Operation of a predetermined key moves an interposer into position to actuate a first slide when a differential actuator is cycled. When the differential actuator is cycled, the slide is moved to a position where it is latched. In either the initial or latched position the slide blocks operation of one or a plurality of the keys of the keybank. A second slide member has a camming surface which functions to release the latch and permit return of the first slide and the keystem blocking elements carried thereby to the initial position.

Use of an interposer prevents the change of position of the first slide until the differential actuator is cycled and permits rekeying if necessary. As will be observed by an examination of the two embodiments illustrated, almost any desired sequence of operation can be enforced by variations in the positioning of keystem blocks on the first slide member, such as the number of keys that can be blocked or the choice of sequence by having actuation of the first slide move keystem blocking elements into or out of blocking relation with respect to the various keystems of the bank.

It is an object of this invention to provide an improved sequential interlock for a key operated mechanism.

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It is a further object of this invention to provide a simplified interlock for sequentially permitting or preventing operations of specified keys within a bank or system.

It is a further object of this invention to provide a sequential interlock that is key actuated but not effected until actuation of the mechanism for entering keyed information.

While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood that the foregoing and other changes in form and details may be made therein without departing from the spirit and scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic side elevation of a keybank and differential actuator partly broken away and partly in section showing the sequential interlock mechanism of this invention.

FIG. 2 is a side elevation of the slidable member of FIG. 1 which carries the cam release surfaces.

FIG. 3 is a side elevation of the slidable member latching mechanism and keystem blocking means of FIG. 1.

FIG. 4 is a schematic side elevation similar to FIG. 1 showing an alternative form of the invention.

FIG. 5 is an exploded isometric view of a portion of the keybank of FIG. 4.

DETAILED DESCRIPTION

Referring to FIGS. 1 through 3, a keybank 10 includes a series of depressible keys each having a keystem 12 with a projecting stud 13 mounted thereon. Each key is mounted for vertical reciprocating motion between an upper non-actuated position and a lower actuated position. The keys are each biased to the upper position by a spring 14 and are retained in a lowered position by a keylock slide (not shown) from which it is released automatically upon rekeying the keybank or completion of a machine cycle. The lower terminal end 15 of each keystem depends downwardly below the slide members 16 and 17 and when a key is depressed, the corresponding keystem end is disposed farther downward in a position to interfere with one of the lugs 18 on the differential actuator 20 when the latter is released and moves in the direction of arrow A. Each keystem upon depression is positioned to intercept one of the lugs 18 of the differential actuator 20 after a given distance of travel from the initial position illustrated.

Mounted on the keybank frame 23 are a pair of stationary horizontal pins 25 that project through elongated apertures 26 in slide members 16 and 17 to permit the slide members to move in a confined longitudinal path defined by the length of the apertures 26. The slide members 16 and 17 are biased in the direction of arrow B respectively by tension springs 27 and 28 which are connected between the keybank frame 23 and depending projections 30. An interposer 33 is mounted about a pair of pins 34 connected to slide member 16 to permit vertical relative movement therebetween while limiting longitudinal movement of interposer 33 to motion in unison with slide member 16. The keystem stud 35 projects into the interposer recess 37 to cause depression of interposer 33 as the associated keystem 39 is depressed. Depression of interposer 33 causes the surface 40 to be placed in the path of travel of the lug 18 on the differential actuator projection 41. Restoration of the keystem 39 to the raised position at the termination of the machine cycle also restores the interposer 33 to its raised full line position as shown in FIG. 1. Also mounted about a stationary axis on the frame 23 is a pin 44 about which is pivotally mounted a latch lever 45 that is biased in one direction toward engagement with the slide member 16 by a ten-

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sion spring 46. A slide member recess surface 48 provides a cooperating latch portion for receiving the latch lever 45 and retaining the slide member 16 in a second position against the biasing force of the spring 27.

A second slide member 17, best seen in FIG. 2, has a camming surface 50, which is engageable with the latching portion of lever 45 when disposed in position to retain the slide member 16 against the biasing force of the spring 27, to pivot latch lever 45 out of engagement with slide member 16, upon movement to the left as viewed in FIG. 2. Slide member 17 also has an inclined camming surface 52 which is engageable with a keystem stud 109' to effect leftward motion of the slide as viewed in FIG. 2.

FIGS. 4 and 5 illustrate a second embodiment utilizing the sequential interlocks of this invention. A series of depressible keys 71 are mounted for vertical reciprocating movement in a keybank and urged toward their upward position by springs 72. A first slidable member 74 and a second slidable member 75 have horizontally spaced elongated apertures 77 through which are received a pair of stationary pins 79 to permit the slide members 74 and 75 limited horizontal travel. The slide member 74 carries a pair of pins 80 which are received through an inner elongated opening in a vertically movable interposer member 82 which is reciprocated vertically by engagement between a keystem stud 83 and the upper and lower surfaces presented by interposer recess 85. In a similar manner slide 75 carries a pair of pins 87 which extend through a vertically elongated opening in an interposer 88, the vertical reciprocating motion of which is controlled by engagement with the keystem stud 89 received in interposer recess 90.

A latch lever 91 is pivotally mounted about a pin 92 carried by the keybank frame with a tension spring 95 connected at one end to a depending portion 96 which urges the projecting pin 97 toward engagement with the lower surface of the slide 74. Slide 74 has a recess 98 in the lower surface portion that is engageable with the latch lever pin 97 to restrain slide 74 against the force of the biasing tension spring 99 when the slide has been reciprocated to its opposite extreme position. The slide 75 has a camming surface 100 formed in its lower surface which is engageable with the latch lever pin 97 in its latched position when slide 75 is reciprocated against the biasing force of the tension spring 102 to effect termination of the latched engagement between the latch lever 91 and slide 74. Underlying the keybank is a horizontally reciprocable differential actuator 105 which presents keystem engaging lugs 106 engageable with the lower terminal end of a keystem when the latter is in a depressed actuated condition.

OPERATION

In the embodiment of FIG. 1, operation of the keys 107 and 107' is blocked by the keystem stops 108 on the slide member 16 which underlie the keystem studs 109 and 109'. As shown, key 110 represents a "total" key, 107 is an "amount tendered" key and 107' is the "change" key. The interrelation of these keys requires that the amount tendered and change keys not be operable until a total operation has been effected and that the interlocked condition be restored following the cycle initiated by the change key. Stops 108 prevent operation of amount tendered or change keys until removed from a blocking position by actuation of key 110. Finally key 107' causes slide 16 to be restored to the original blocking position. Actuation of the key 110 depresses both the lower terminal portion of keystem 39 and interposer 33 lower projection 111 to the dotted line positions and also through means not shown retracts the zero stop 113 to an elevated position thereby releasing differential actuator 20. Differential actuator 20 moves in the direction of the arrow A until motion is arrested by engagement be-

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tween a lug 18 and the downward terminal end portion 15 of a depressed keystem. During a terminal portion of the cycle the depressed keystem is restored and differential actuator 20 restored in the opposite direction to the position shown in FIG. 1.

During the initial portion of the machine cycle the differential actuator lug 18 first engages interposer surface 40 and drives interposer 33 and slide 16 in unison until motion is terminated by engagement between lug 18 and keystem 39. Latch lever 45 pivots into engagement with the slide recess 48 to retain the slide 16 in the shifted position against the biasing force of spring 27 as differential actuator 20 is driven back to the position illustrated to complete the cycle of operation. With slide 16 retained by latch lever 45 the projecting stops 108 are respectively removed from interference with the keystem studs 109 and 109'. In this condition key 107 may be depressed for one or more cycles of operation and key 107' may be depressed. However, depression of key 107' causes keystem stud 109' to engage the camming surface 52 of slide 17 causing lateral movement of the slide 17 against the biasing force of tension spring 28 and causing the camming surface 50 to engage the latch lever 45 and release slide 16 to return to its initial position whereat the slide projections 108 are restored to the keystem stud blocking position shown.

The structure of FIGS. 4 and 5 as in the previous embodiment depression of key 116 disposes both the keystem 117 and interposer 82 in the path of a differential actuator lug 106 whereby machine operation moves slide 74 to a position where it is retained by latch lever 91. Thereafter operations involving depression of key 116 may be repeated but key 119 may not be operated until key 120 and interposer 121 are depressed and the machine is cycled to cause a differential actuator lug 106 to move interposer 88 and slide 75 to effect release of latch lever 91 by engagement of camming surface 100 with pin 97. At this time restoration of slide 74 by action of spring 99 to a condition whereat slide tab 121 no longer interferes with keystem stud 122 frees key 119 for operation.

In the structures of FIGS. 4 and 5 operation of key 116 causes key 119 to be blocked requiring key 120 to be operated before operation of key 119 is permitted. Use of interposer 82 permits rekeying following depression of key 116 without disturbing the interlock mechanism and interposer 88 enforces the requirement that not only key 120 be depressed but the machine be cycled before the interlocked condition is removed. The embodiment of FIGS. 4 and 5 illustrates a condition where operation of a selected key is precluded by operation of another key within the key bank while the embodiment of FIGS. 1 through 3 shows a condition wherein operation of one key within a bank of keys frees another key or keys for operation.

While the invention has been particularly shown and described with reference to preferred embodiments thereof, it will be understood that the foregoing and other changes in form and details may be made therein without departing from the spirit and scope of the invention.

What is claimed is:

1. In a device for receiving manually keyed information, a keybank comprising:
 - a frame;
 - a plurality of keys mounted on said frame;
 - a first slide member carried by said frame, said first slide member being biased toward a first position and movable to a second position;
 - selectively operable latch means for retaining said first slidable member in said second position;
 - a second slide member carried by said frame;
 - cam means carried by said second slide for selectively engaging said latch means to release said first slide from said second position; and
 - stop means carried by said first slide operable to prevent operation of a first key of said plurality of keys

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when said first slide is disposed in one of said first and second positions.

2. The device of claim 1 wherein said latch means comprises a latch lever pivotably mounted on said frame and biased toward a position of engagement with said first slide member and a cooperating latch portion carried by said first slide member and engageable with said latch lever when said first slide member is in said second position.

3. The device of claim 2 further comprising first key actuated means operated by a second key of said plurality of keys for controlling movement of said first slide from said first to said second position.

4. The device of claim 3 further comprising second key actuated means operated by a third key of said plurality of keys for controlling movement of said second slide member to cam said latch lever away from engagement with said cooperating latch portion.

5. The device of claim 4 further comprising a differential actuator selectively engageable with said first key actuated means to move said first slide member from said first position to said second position and wherein said first key actuated means comprises an interposer mounted on said first slide for reciprocating motion in a direction normal to the direction of movement of said first slide into and out of a position in the path of travel of a portion of said differential actuator whereby cycling said differential actuator causes said first rack to be moved from said first position to said second position.

6. In a machine for recording transactions, a frame;

a plurality of depressible keys;

a differential actuator operable to enter keyed information into the recording mechanism of said machine; a first slidable member supported on said frame and movable between a first position and a second position;

biasing means urging said slidable member toward said first position;

selectively operable latch means for retaining said first slidable member in said second position;

an interposer carried by said first slidable member and controlled by one of said plurality of keys for selective reciprocal movement generally normal to the path of travel of said first slidable member;

said interposer being movable by depression of said one of said keys into the path of travel of said differential actuator for movement of said first slide member to said second position upon operation of said differential actuator;

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means carried by said first slidable member for preventing operation of a second key of said plurality of keys when said first slidable member is disposed in one of said first and second positions;

an operating means controlled by depression of one of said plurality of keys other than said one of said keys for disengaging said latch means.

7. The machine of claim 6 further comprising a second slidable member and wherein said latch means comprises a lever pivotably mounted on said frame and biasing means urging said lever toward latching engagement with said first slidable member and said operating means comprises a camming surface formed as a portion of said second slidable member.

8. The machine of claim 7 wherein said interposer is mounted on said first slidable member for movement in unison with said first slide member in the direction of travel of said first slidable member and for movement relative to said first slidable member in a direction normal to the direction of travel of said first slidable member and said first and second slidable members are mounted on said frame for movement along parallel paths.

9. The machine of claim 8 wherein said operating means further comprises a second interposer member carried by said second slidable member and movable by said key other than said one key to a position in the path of said differential actuator whereat operation of said differential actuator will cause said second slidable member to cam said latch lever away from a position of latching engagement with said first slidable member.

10. The machine of claim 8 wherein said second slidable member has a second camming surface engageable with said key other than said one key upon depression thereof to move said second slidable member to a latch lever releasing position.

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U.S. Cl. X.R.

235—27

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