

- [54] **SHIFT LOCK MECHANISM**
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- [73] Assignee: **The Singer Company**, New York, N.Y.
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- [51] Int. Cl. .... **B41j 5/22**
- [58] Field of Search ..... 197/71, 73, 74, 78-81, 197/98, 100, 107, 16, 183; 235/145 R, 26, 27

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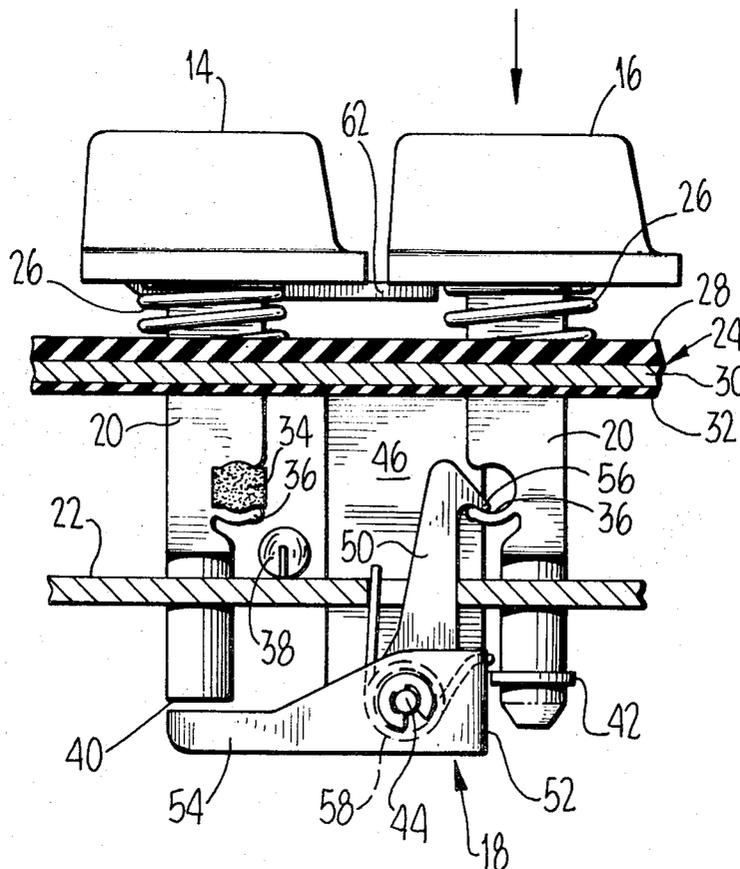
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[57] **ABSTRACT**

A shift lock key mechanism for locking the shift key in depressed or actuated position on a keyboard comprising a shift key and a lock key and a spring-biased bellcrank having a latch arm engageable with the lock key when depressed to lock the shift key in depressed position and a release arm engageable by the shift key when further depressed to release the lock key and allow a return of the shift key to its rest or non-actuated position; said shift key being operable independent of the lock key.

**4 Claims, 4 Drawing Figures**



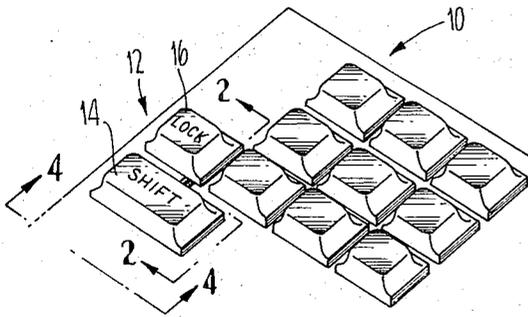


Fig. 1

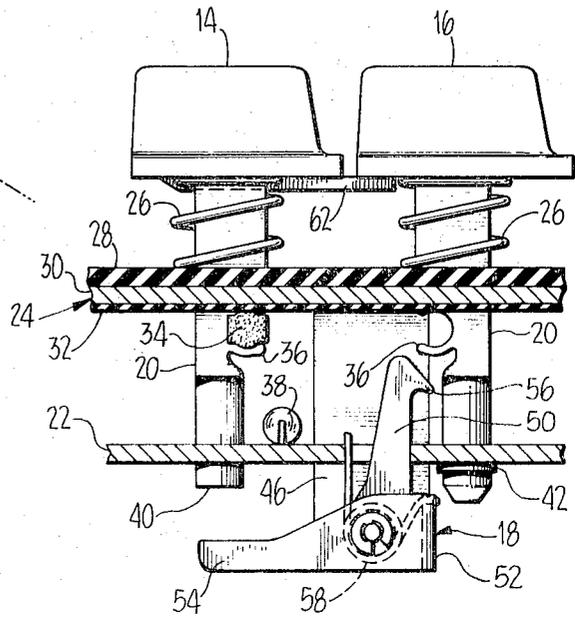


Fig. 2

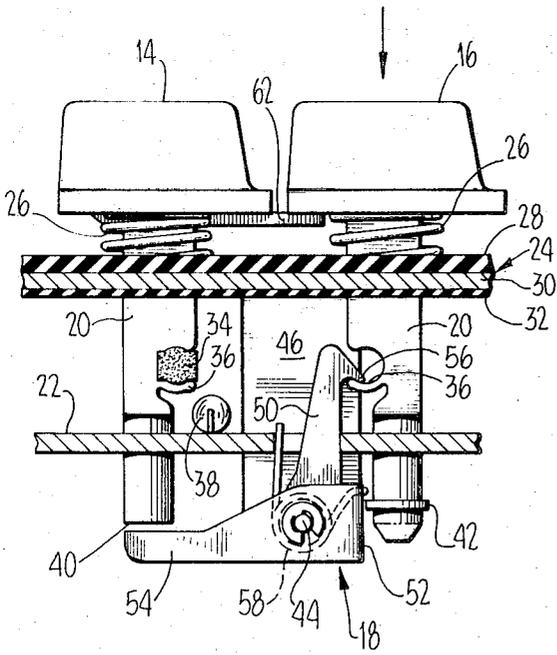


Fig. 3

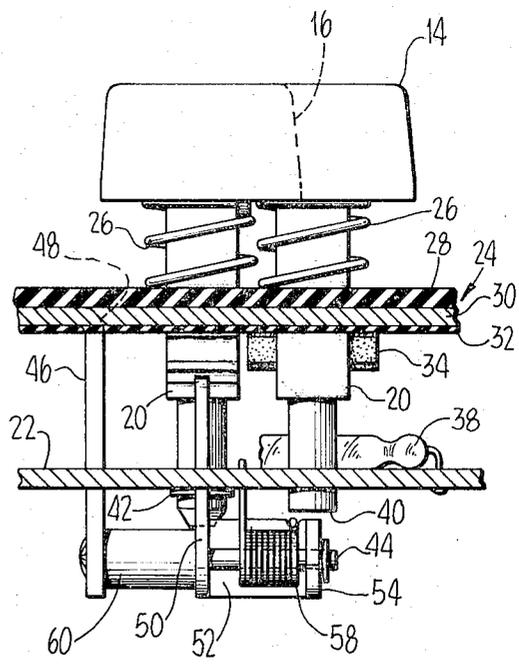


Fig. 4

## SHIFT LOCK MECHANISM

## BACKGROUND OF THE INVENTION

This invention may be utilized with a keyboard of the type disclosed and claimed in the U.S. Pat. to Egon Pedersen, No. 3,693,123 dated Sept. 19, 1972.

With the therein disclosed keyboard, it has been found desirable to provide a shift lock key mechanism including a shift key and a lock key and a means for holding the shift key in locked position to facilitate typing of, for example, lower case, upper case letters, and numerals/symbols on a dual function keyboard system. However, in order to incorporate such a shift lock key mechanism in a keyboard of the type utilizing reed switches, a desirable objective is to use as many common parts as possible with a minimum of modifications to the existing keys and keyboard system and, with this invention, such an objective is accomplished.

This invention comprises a shift key and a lock key with a bellcrank mounted therebetween. The shift key is free to be depressed independently of the lock key but the lock key, when depressed, will be engaged by the bellcrank so as to hold both the lock key and the shift key depressed. Release of the lock key is accomplished by a further depression of the shift key to engage the bellcrank and release it from engagement with the lock key.

With this arrangement the bellcrank engages a portion of a notch in the stem of the lock key which notch has already been formed in the stem to hold the magnet used in this arrangement but which is omitted in this invention and utilized as a hook engaging means for the bellcrank. With this arrangement, only minor modifications are required of the stems of the keys and the bellcrank requires only an aperture in the lower base plate without further modification of the keyboard assembly.

## BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective drawing illustrating a section of a typical keyboard containing the shift lock key mechanism;

FIG. 2 is an elevational view taken along line 2—2 of FIG. 1 and illustrates the bellcrank and the associated keyboard keys;

FIG. 3 is another side elevational view showing the actuation of the latch arm engaging the lock key when depressed; and

FIG. 4 is an elevational view taken along line 4—4 of FIG. 1.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

In FIG. 1 a portion of a keyboard 10 is illustrated and which may, for example, be part of an input terminal to a computer. The keys illustrated may comprise a portion of the alphanumeric key section of a keyboard with a dual function assigned to the keys as, for example, small and capital letters, or numerals and symbols, such as in a typewriter keyboard, operable by a shift lock key mechanism constructed in accordance with the teachings of this invention and illustrated in its entirety as 12, and illustrated in more detail in FIGS. 2, 3 and 4.

In FIGS. 2, 3 and 4, it can be seen that the shift lock key mechanism 12 comprises shift key 14 and lock key 16 with a dual arm bellcrank 18 operable therebetween. Keys 14 and 16 are keyboard components, such

as described in U.S. Pat. No. 3,693,123, supra, and each comprises a key stem 20 of DELRIN or CELCON acetal compound operable between a lower base member 22 and a mounting plate 24 and normally maintained in a non-actuated or rest position by a return spring 26. As explained in detail in the referenced patent, mounting plate 24 comprises a resilient cushioning layer 28 supported by a carbon steel core 30 under which is a resilient spacing layer 32 provided to reduce key noise and to improve the touch of the key by decreasing breakaway force.

Affixed to the key stem 20 and normally abutted against spacing layer 32 when the key is inactive is a small bar magnet 34 in a slot formed in part by a resilient land 36. Bar magnet 36 will actuate a reed switch 38 when key 14 is depressed which is coupled to the appropriate circuitry to perform the necessary function directed by the actuation of the key 14. FIGS. 2 and 3 show the keys in these non-actuated or rest positions, while FIG. 3 shows key 14 in its depressed position with the bar magnet 34 actuating the reed switch 38.

An important feature of this invention is the fact that the lock key and the shift key utilize the same stem as the other keys on the keyboard with only minor changes. Stem 20 of key 14 is only cut off or flattened at its lower extremity, as at 40, so as to engage the bellcrank 18 and the lower extremity of lock key 16 is provided with a lock washer 42 which engages the lower plate 22 as a stop to arrest the upward movement of the key by the return spring 26, the stop function of the washer is accomplished by the bar magnet 34 engaging the resilient spacing layer 32 on the other keys.

Bellcrank 18 is mounted for rotating about a shaft 44 affixed to tab or plate 46 which, in the embodiment shown, is formed from part of the carbon steel core 26 and bent normal to the core 26 as at 48 (FIG. 4) to form the plate but obviously the plate 46 could be formed as a separate piece and affixed to the keyboard in any suitable manner.

Bellcrank 18 comprises a latch arm 50 formed integral with a web 52 and a release arm 54; the latter being formed so as to be approximately 90° to the latch arm 50. Latch arm 50 is, of course, located in close proximity to the stem 20 of the lock key 16 and provided with a hook 56 which is spring-biased by coil spring 58 toward the key stem so as to engage the resilient land 36 of the key stem of the lock key 16. The resilient land 36 on lock key 16 faces the similar land on shift key 14 to accommodate the latch arm and is sufficiently stiff so as to overcome the bias of the spring as it is lowered past the hook and becomes latched to the arm. Biasing spring 58 is, of course, coiled around the shaft 44, one end of which engages the base member 22 and the other engages the web 52. Also, the bellcrank 18 is spaced on the shaft 44 by a sleeve 60 so that there is proper alignment between the key stems and the arms 50 and 54.

As shown in FIGS. 2 and 4, shift key 14 may be depressed independently of lock key 16 so as to also function independently of the lock key 16 in the conventional manner to cause a shift in the print mechanism similar to that in the typical typewriter keyboard, but when it is desired to lock the shift key for continuous operation, a depression of the lock key 16 causes the shift key 14 to be depressed also by reason of a bar of plate 62 suitably affixed as by pressing into the plastic material to the underside of the head of the key 14 and

extending beneath the head or key top 16. Depression of the locking key 16 causes the latch 56 to engage the resilient land, holding the shift key in its depressed position as shown in FIG. 3. Release of the shift lock is accomplished by depressing the shift key 14 further so that the end 40 of the stem 20 engages the release arm 54, rotating the bellcrank 18 and disengaging the hook 56 from the resilient land 34. Obviously, the biasing springs 26 return the two keys to their inactivate or at rest positions.

While the foregoing description is in connection with a reed switch mechanism, the invention could be utilized with other types of switch mechanisms where the keys have similar stems.

What is claimed is:

1. In combination with a manual keyboard with manual keys depressible relative to a keyboard mounting plate, a shift lock key mechanism comprising:
  - a manually actuatable shift key positioned in the keyboard;
  - a manually actuatable lock key positioned adjacent to the shift key;
  - a stem on said shift key being substantially identical with a stem on the locking key;
  - means mounted between said keys and engageable by said shift key stem and said lock key stem so as to hold said shift key depressed when said lock key is depressed, said means comprising a bellcrank having a latch arm and a release arm, said release arm being engageable by said shift key and said latch arm being engageable by said lock key, said lock arm further being positioned to engage said lock key stem when the latter is depressed, and means engaging said shift key so as to depress said shift key upon depression of said lock key.
2. The combination claimed in claim 1 wherein said

bellcrank is spring-biased toward said latch key stem which bias is overcome when said shift key engages said release arm.

3. The combination claimed in claim 1 wherein said lock key stem has a resilient land, said latch arm is positioned to engage said land when said lock key is depressed, and spring means biasing said latch arm towards said land which is overcome by the depression of said shift key so as to move said release arm.
4. In combination with a manual keyboard with manual keys depressible relative to a keyboard mounting plate, a shift lock key mechanism comprising:
  - a manually actuatable shift key positioned in the keyboard and having a key head;
  - a manually actuatable lock key positioned adjacent to the shift key and having a key head;
  - a stem on said shift key being substantially identical with a stem on the locking key;
  - means mounted between said keys and engageable by said shift key stem and said lock key stem so as to hold said shift key depressed when said lock key is depressed, said means comprising a bellcrank having a latch arm and a release arm, said release arm being engageable by said shift key and said latch arm being engageable by said lock key, said lock arm further being positioned to engage said lock key stem when the latter is depressed, said bellcrank being spring-biased toward said latch key stem, which bias is overcome when said shift key engages said release arm; and
  - means comprising a plate attached to said shift key and engageable by the head of said lock key so as to depress said shift key upon depression of said lock key.

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