

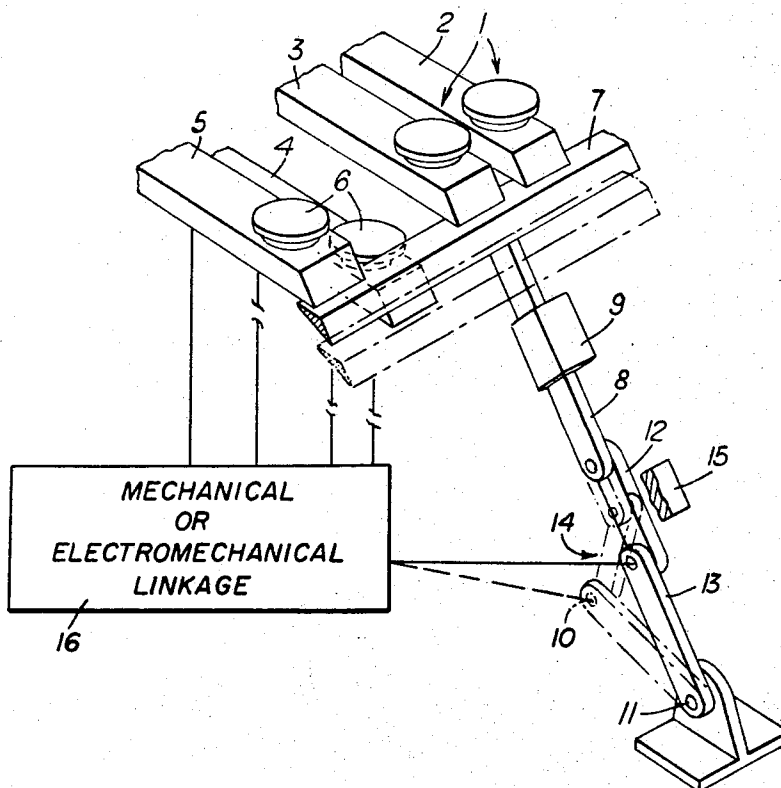
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KEYBOARD BLOCKING ARRANGEMENT

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KEYBOARD BLOCKING ARRANGEMENT

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ABSTRACT OF THE DISCLOSURE

A common bail is interposed on the depression of a first key by erection of a toggle, and a mutual arrangement between the surfaces of the bail against the keybars and the direction of the movement of the bail, is such that the major component of force between the bail and the undepressed keys is along the direction of movement of the bail and in alignment with the limbs of the erected toggle.

The invention relates to keyboard apparatus such as teleprinters and electric typewriters and is concerned with the provision of means for blocking other keys of a keyboard when one has been depressed.

In one known type of key-blocking device, the keys are mounted on individual keybars which are parallel to one another and a bail, extending longitudinally of the keybars, is coupled to the keys in such manner that, on depression of one of the keys, the bail moves over the end of the depressed keybar and under the keybars of the remaining keys. In this type of device, as commonly arranged, if an attempt be made to depress a second key when one has already been depressed, sufficient force may be exerted on the bail by the keybar of the second key to hinder retraction of the bail when the first key is released.

According to the present invention there is provided a keyboard locking device including a blocking member movable in a straight line, a toggle coupled between the blocking member and a fixed pivot, and means when one of the keys of the keyboard is depressed for erecting the toggle so that its two limbs are in alignment with one another and thereby interpose the blocking member in the path of other keys of the keyboard, the arrangement being such that a major component of the reaction between a depressed key and the blocking means lies in the direction of movement of the blocking means.

An embodiment of the invention will be described with reference to the accompanying diagrammatic drawing which represents a perspective view of a fragmentary portion of a keyboard and locking device according to the invention.

In the drawing four keys 1 are depicted, each incorporating a keybar 2, 3, 4 and 5, respectively. The keybars 2, 3 and 5 are represented in their normal positions and keybar 4 is shown depressed. The keybars lie parallel to one another in a row and, when one is depressed, it moves downward in substantially a straight line. Deviation from a straight line might arise on account of play in the guides (not shown) if a parallel motion is used, or on account of motion through a small arc if a pivot is used, but such deviation can be ignored. Key buttons 6 are mounted on each keybar, but in general, the key buttons of adjacent keybars are not in the same row or at the same level but, rather are staggered, as on an ordinary typewriter keyboard. In the drawing, for the sake of simplicity, they are however shown in one row. The keybars project to the front, as viewed in the drawing, beneath their key buttons.

For blocking of the remainder of the keybars when one of the keys has been depressed, a common bail 7 is

provided. This is shown integral with an actuating rod 8 capable of movement in a direction oblique to the lower surface of the keybars, which in the illustrated embodiment are shown as flat and parallel, though this need not necessarily be so. The connecting rod 8 slides in a guide 9 which is fixed by means not shown to the framework of the machine and, at its lower end, is coupled by means of a toggle 10 to a fixed pivot 11. The pivot points on the two limbs 12 and 13 of the toggle, where they are joined to the connecting rod 8 and the fixed pivot 11, are in line with the direction of movement of the rod 8.

When the keys are in their normal undepressed positions the bail 7 is withdrawn from under the keybars and the limbs of the toggle 10 are inclined to one another as represented by the dotted lines. When the toggle links 12 and 13 are moved into alignment with one another by a force represented by the arrow 14, the connecting rod 8 is moved upwards. The force represented by the arrow 14 may be applied from any one of the keybars through a known mechanical or electromechanical linkage 16 which retains the toggle against a stop 15. When, therefore, the keybar 4 is depressed the linkage responds and the toggle is erected and brings the bail 7 over the forward end of the keybar 4, as viewed in the drawing, and beneath the remaining keys.

A known mechanical arrangement which could be used to erect and withdraw the toggle is shown on page 63 of "Mechanisms, Linkages, and Mechanical Controls," published by McGraw-Hill, Inc., 1965. The typewriter drive mechanism illustrated in that arrangement is used to erect a type bar, but could be adapted by one skilled in the art to erect the toggle, and the spring shown being used to return the toggle once the key is released. An example of a known electromechanical arrangement is shown in the R. V. Reppert Patent #2,621,772, issued December 16, 1952, wherein the depression of a key closes electrical contacts and complete the circuits which energize the electromagnets. The electromagnets are coupled to various linkages which perform the various movements and are returned upon the release of the key to their original position by the springs. This arrangement also could be applied to the present locking device by having the depression of a key energize a spring loaded electromagnet to erect the toggle.

Due to the fact that when the bail 7 is in its blocking position in the path of the keybars 2, 3 and 5, the limbs 12 and 13 of toggle 10 are in alignment with one another and with the connecting rod 8, an effectively infinite mechanical advantage is presented against the depression of these keybars, and, due to the stop 15, the blocking device is effectively locked. On the other hand, if pressure be applied to one of the undepressed keys, since a major component of the reaction between the keybar concerned and the bail is parallel to the direction of motion of the bail, friction between the keybar and the bail is of minor account and only a very small force in the direction opposite to the arrow 14 need be applied to the toggle 10 to release the bail. The small unlocking force is provided in the linkage 16 as indicated in the known arrangements heretofore mentioned when the keybar 4 is released.

It is to be understood that the foregoing description of specific examples is made by way of description only and is not to be considered as a limitation on its scope.

I claim:

1. A keyboard blocking arrangement for preventing depression of further keys when one is already depressed, the keyboard including a row of parallel keys and the arrangement comprising:
a blocking member including a bail and a connecting rod;

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a toggle having two limb members, one limb being pivoted to said connecting rod and the other to a fixed pivot;
linkage means responsive when one of the keys of the keyboard is depressed for erecting said toggle, so that its two members are in alignment with one another and said bail is interposed in the path of the other keys of the keyboard; and
a stop member against which said toggle is maintained in alignment, the arrangement being such that the major component of force between the bail and an undepressed key, is along the direction of movement of said bail and in alignment with the limbs of the erected toggle.
2. An arrangement according to claim 1, further including a fixed guide in which said connecting rod slides, such that said bail is moveable at right angles to its length over one end of any depressed keybar of the row and under the remaining keybars of the row, the pivot on said connecting rod and the fixed pivot are in alignment with

the movement of the bail, and the bail remains interposed beneath the other keys of the row until the depressed key is released.

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