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O. W. SWANSON  
CALCULATING MACHINE KEYBOARD

2,204,239

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Fig. 1.

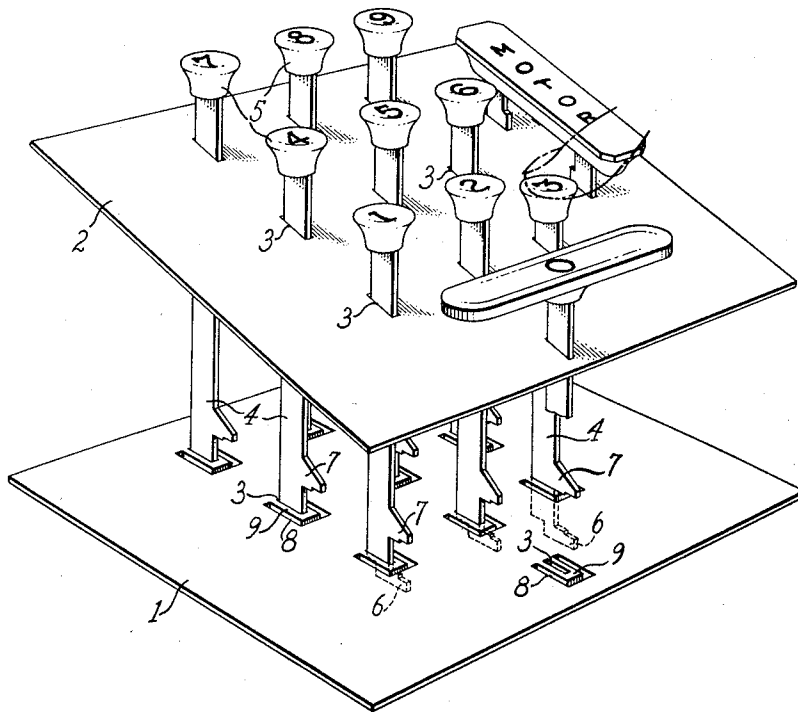


Fig. 2.

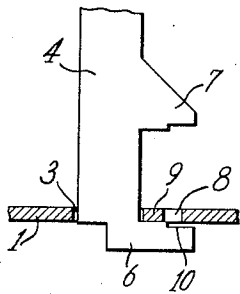


Fig. 3.

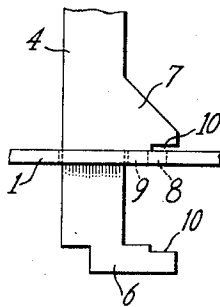
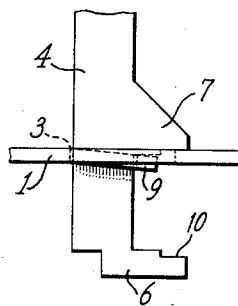


Fig. 4.



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## CALCULATING MACHINE KEYBOARD

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Application December 24, 1938, Serial No. 247,713

4 Claims. (Cl. 235—145)

This invention relates to business machines, and more particularly to a means for silencing the operation of the keys thereof.

Usually, each key stem is provided with a pair of stops for limiting movement of the key. In operation, one of the stops strikes the top of a base plate to limit the depression of the key, and, when the key is released, the other stop strikes the bottom of the plate to limit the rise of the key, suitable spring tension being provided to cause such restoring action.

In normal operation, the keys are operated quite rapidly, causing an objectionable "clicking" noise when they reach each extremity of their movement.

It is accordingly an object of the present invention to provide a simple and effective means for reducing the noise incident to operation of the keys, and to accomplish this in an efficient and inexpensive manner.

With this and incidental objects in view, the invention consists in certain novel features of construction and combinations of parts, the essential elements of which are set forth in appended claims, and a preferred embodiment of which is hereinafter described with reference to the drawing which accompanies and forms part of the specification.

In said drawing:

Figure 1 is a perspective view of a keyboard embodying the invention,

Figure 2 is a fragmental detail left side elevation of a key stem and a portion of the base plate showing the key in normal or underpressed position,

Figure 3 is a view similar to Figure 2, but with the key stem shown in its normally depressed position, and

Figure 4 is a view similar to Figure 3, but showing the key stem in an abnormally depressed position, i. e., with excessive pressure being exerted upon the key.

The invention is shown in connection with amount indexing keys and mechanism of the character disclosed in the United States Patent No. 1,965,611, issued to Oscar J. Sundstrand on July 10, 1934, and the application of Oscar J. Sundstrand, Serial No. 581,800, filed December 18, 1931.

Referring to Figure 1, the keyboard includes a base plate 1 and an inclined top plate 2. These plates are mounted in the relative positions shown, and are suitably secured in the machine frame (not shown). Each plate is provided with corresponding guide slots 3 through which pass

stems 4 of keys 5. Suitable spring tension, such as that disclosed in the aforementioned patents, is arranged to normally maintain the keys in their elevated positions. Lower stops 6, preferably formed integral with key stems 4, are arranged to bear against the underside of base plate 1 to limit the upward movement of the keys. Upper stops 7, likewise preferably formed integral with key stems 4, are provided to limit downward movement, as illustrated by the "3" key in Figure 1. The impact of stops 6 and 7 as they strike the base plate in the machines now in use creates a noise that is sufficiently amplified by the base plate to be objectionable. To absorb the shock of the impact, and to lessen the amplifying effect of the base plate, narrow U-shaped slots 8 are provided in plate 1 about three of the sides of each aperture 3 in plate 1. These slots form a series of narrow flexible tongues 9, which are sufficiently yielding to cushion the impact, and greatly diminish the transmission of the shock to the base plate.

When a key is normally depressed from the position shown in Figure 2 to that shown in Figure 3, its stop 7 contacts tongue 9 only, that portion of the stop that extends beyond slot 8 being recessed slightly as at 10, to prevent its contacting base plate 1. Likewise, when a key is released to restore under action of its spring, its stop 6 contacts tongue 9 only, that portion of the stop that extends beyond slot 8 being similarly provided with a slight recess 10 to prevent its contacting plate 1.

The purpose of forming the stops 6 and 7 with these extending portions is to prevent tongues 9 from being bent out of alignment if excessive pressure is applied upon its corresponding key. This feature is illustrated clearly in Figure 4 where the key is shown depressed to such an extent that the slight clearance provided by the recess 10 has been completely taken up, causing the extending portion of the stop to abut the base plate proper to prevent tongue 9 from being bent beyond its elastic limit.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form of embodiment herein disclosed, for it is susceptible of embodiment in various forms, all coming within the scope of the claims which follow.

What is claimed is:

1. In a machine of the class described, a keyboard including a plate having an aperture, and

being cut away around the greater portion of said aperture to form a tongue through which said aperture extends, a depressible key having a stem extending through the aperture, and a stop on said stem for limiting movement of the key by striking said tongue.

2. In a machine of the class described, a keyboard having a key provided with a stop, a top plate provided with an aperture for guiding the key, and a bottom plate provided with an aperture for guiding the key and also provided with an opening surrounding a portion of the aperture to form a tongue to cooperate with said stop.

3. In a machine of the class described, a keyboard including a plate having an aperture and being cut away around the greater portion of said aperture to form a tongue through which said

aperture extends, a depressible key having a stem extending through the aperture, a stop on said stem for limiting movement of the key by striking said tongue, and an additional stop on said stem for limiting movement of the key by striking a portion of the plate other than said tongue.

4. In a machine of the class described, a keyboard including a plate having an aperture and being cut away around the greater portion of said aperture to form a tongue through which said aperture extends, a depressible key having a stem extending through the aperture, and a plurality of stops on said stem for limiting movement of the key by striking said tongue, one of the stops being situated above the tongue and the other stop below the tongue.

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