

Dec. 27, 1927.

1,653,683

J. WHITAKER

KEYBOARD

Filed Feb. 5, 1925

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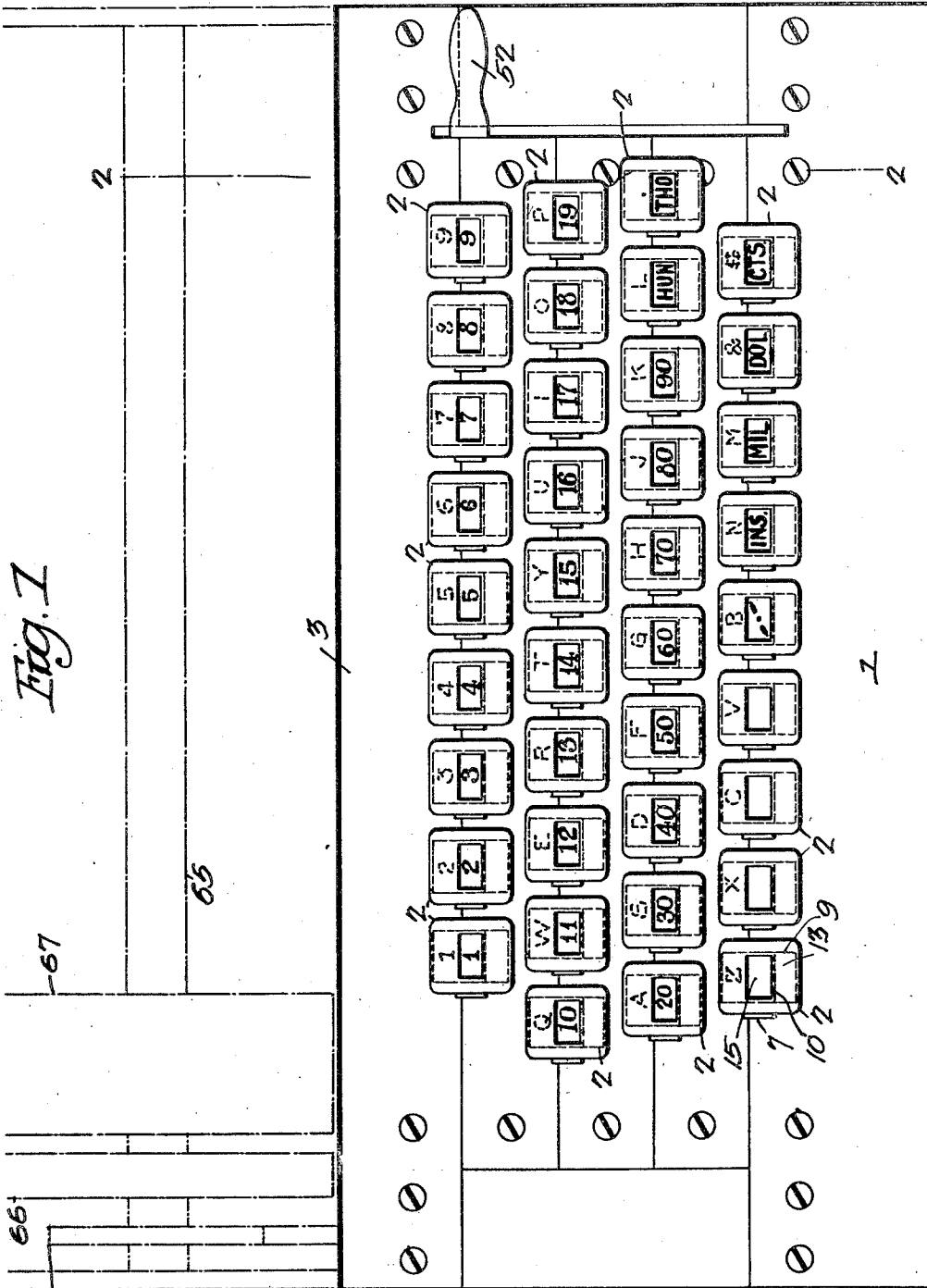


Fig. 1

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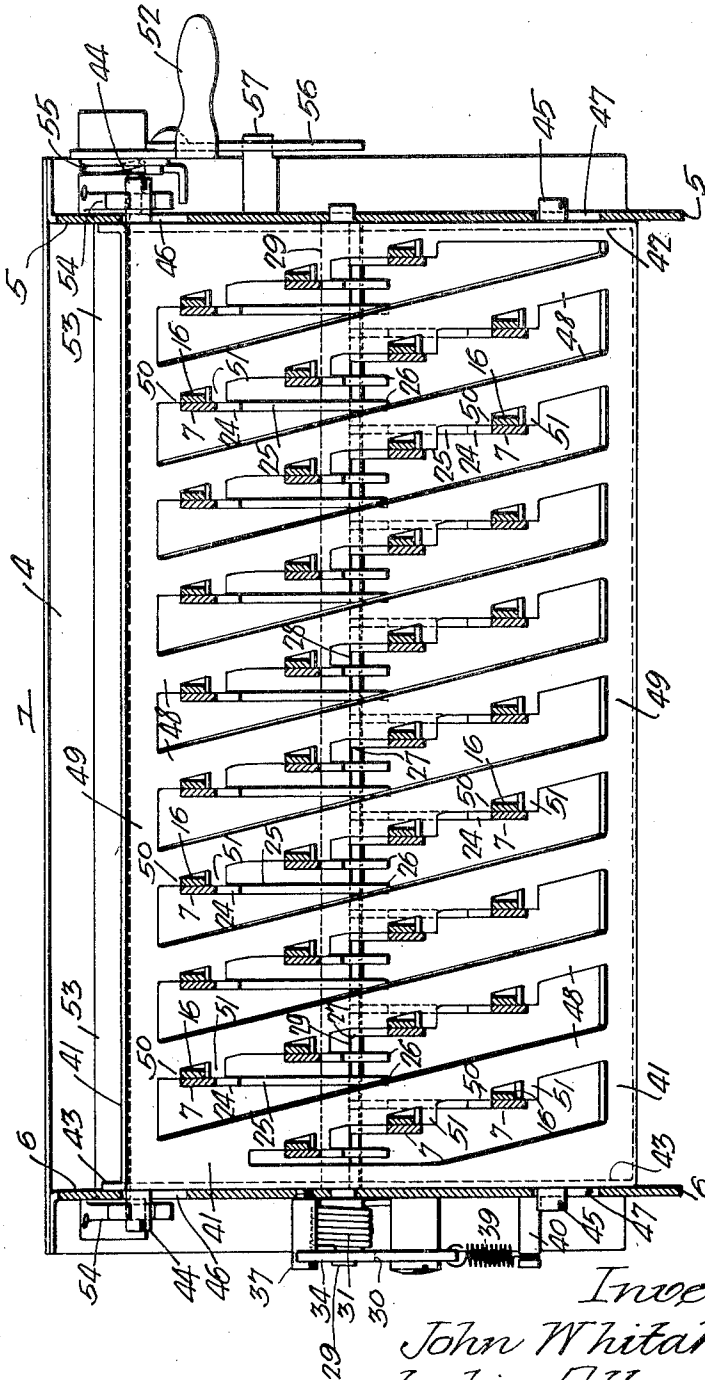
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Fig. 5.



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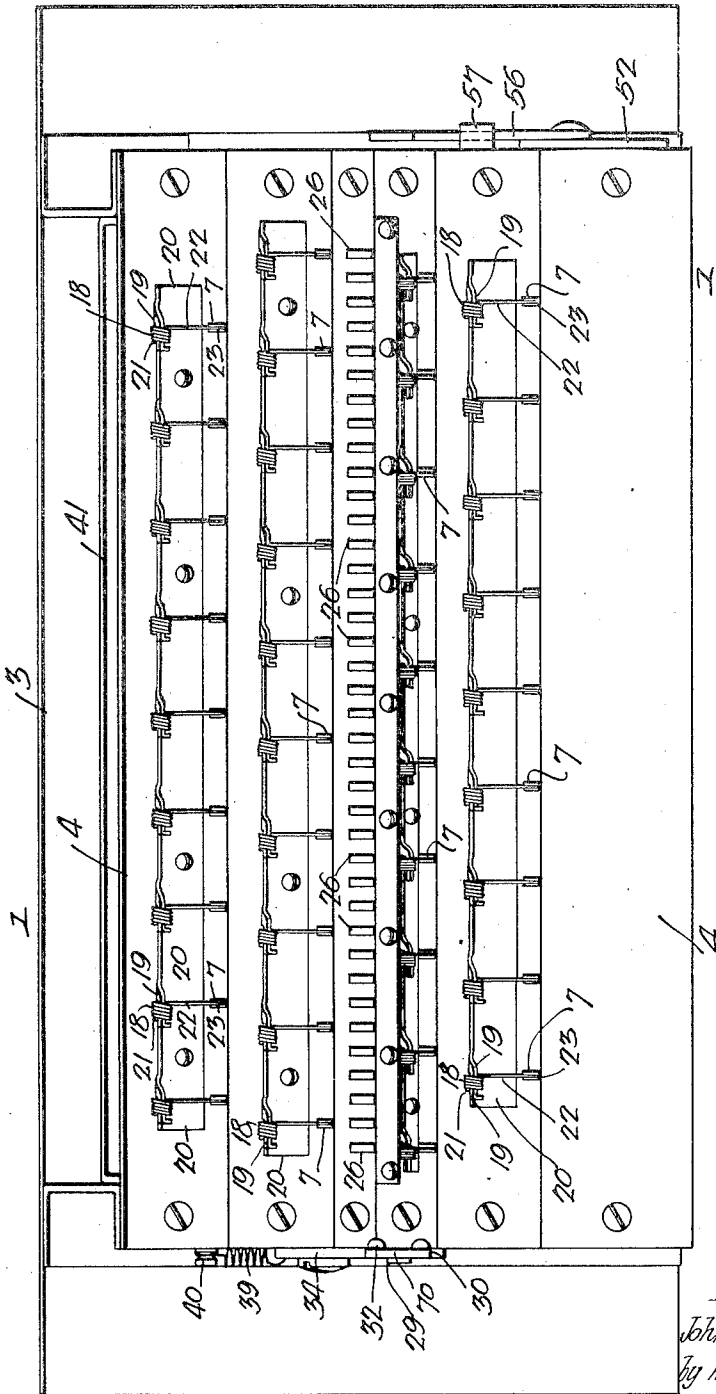
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Fig. 4.



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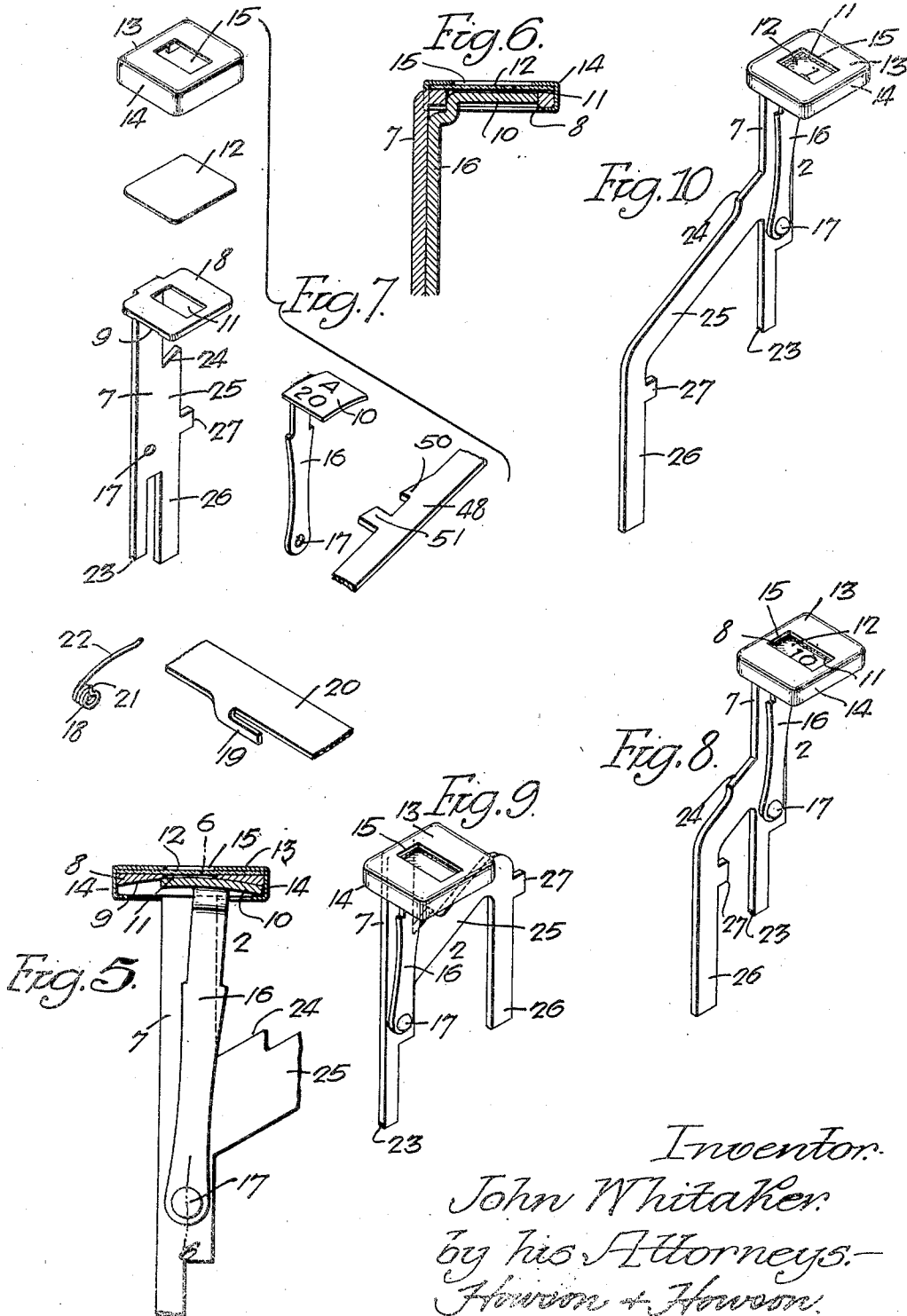
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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE.

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KEYBOARD.

Application filed February 5, 1925. Serial No. 6,985.

One object of my invention is to provide a key board, wherein the individual keys thereof are each provided with a series of different characters, one character of each series only being visible at any one time, and wherein all the characters visible on the key board at any one time will be of the same general class.

Another object of my invention is to provide the key board with mechanism whereby the characters visible on the keys thereof can be changed from one general class to another, simultaneously.

Still another object of the invention is to so construct the key board that when one key thereof has been pressed it is locked in such depressed position until the machine, to which the key board is attached, has performed the function assigned thereto by the pressing of that particular key and by virtue of such mechanism no other key of said key board can possibly be pressed into an operative position until the cycle of operations, controlled by the pressing of the first key has been completed, and the said first key released and returned to its normal position.

A key board embodying the above-mentioned features can be applied to and used advantageously in connection with a large and divergent variety of mechanical appliances, including check writing machines, typewriting machines, calculating machines, adding machines, cash registers, change making machines, money counting machines, mechanical registers, bookkeeping machines, key board printing devices, linotype and similar machines, or in fact any key board operated device, wherein a multiplicity of classes of characters are to be employed, by the use of a number of keys not exceeding the number of characters embodied in the largest single class to be so employed.

As an example of the above-mentioned applications of my invention and considering the device as applied to a check writing machine, the key board may embody in a single class of characters visible at one time, the letters of the alphabet and the numerical characters from one to nine, also the necessary marks of punctuation, whereby through

the mechanical elements of such machine and controlled by the keys of said key board, an operator can write the name, address and other devices of identification of the recipient of a check being written. By merely operating a single lever the class of characters visible may be changed from that above noted to one wherein words, written in full and representing the numerical characters in units from one to twenty and in tens from twenty to ninety and such abbreviations as (Hun.) for hundred, (Tho.) for thousand, (Mil.) for million, (Dol.) for dollars, (Cts.) for cents and (Ins.) for insured, or any other words or abbreviations as may be deemed necessary, will appear on the keys of the key board, whereby the amount to be paid the said recipient can be written on the check, by the mechanical elements controlled by the key board, when such characters appear on the keys of said key board by the operation of the above-mentioned single lever.

When applied to a typewriting machine the alphabet may be installed on the keys of my improved key board in two or more languages, only the characters of the alphabet of one language being visible at any one time, and by moving the above-mentioned lever to different positions the change from one to another language can be made.

The mechanical elements necessary to make a change in the operating conditions of a machine corresponding to the above described keyboard change of a machine to which my improved key board is attached, can be operatively attached to the aforesaid single lever and in the case of typewriting machines may consist in changing the different type rolls from an inoperative to an operative position, or vice versa, with respect to the platen of said machine. The effecting of the above mentioned change in mechanical operation of the particular form of machine to which my improved key board may be attached forms no part of the present invention and will henceforth be considered in a general and unrestrictive manner only.

In the accompanying drawings:
Fig. 1, is a plan view of my improved key board;

Fig. 2, is a transverse sectional view taken on the line 2—2, Fig. 1;

Fig. 3 is a sectional plan view taken on the line 3—3, Fig. 2;

5 Fig. 4, is an inverted plan view;

Fig. 5, is an enlarged sectional elevation of one of the keys;

Fig. 6, is a sectional elevation taken on the line 6—6, Fig. 5;

10 Fig. 7, is a detached perspective view of one of the keys of my improved key board and its immediate co-operative elements;

Figs. 8, 9 and 10 are perspective views of the different forms of keys employed, and

15 Figs. 11, 12, 13, 14, 15 and 16 are views of various modified forms of keys which are applicable to my improved key board.

My invention consists of a framework 1, arranged at a convenient angle to facilitate the operation of keys 2 mounted therein and adapted to receive vertical movement with respect thereto.

The framework 1 comprises upper and lower plates 3 and 4, respectively, and end plates 5 and 6.

Each of the keys 2 comprise a shank 7 slidably mounted in the upper and lower plates 3 and 4. Integral with and extending laterally from each shank 7 is a finger plate 8, concaved at its lower side, as indicated at 9, for the reception of a movable indicating plate 10.

The finger plate 8 is provided with a rectangular opening or window 11, through which one of a series of characters on the upper surface of the indicating plate 10 will be visible to the operator. Overlying the upper surface of the finger plate 8 is a transparent element 12 which is secured in place thereon by a retaining cap 13, which is provided with downwardly projecting flanges 14. The flanges 14 are turned inwardly at their lower edges and serve to retain the elements of the key as a unit, also acting in the capacity of limit stops for the movable indicating plate 10. The retaining cap 13 is provided with a rectangular aperture 15 aligned with the aperture 11 of the finger plate 8.

Each of the indicating plates is provided with a downwardly projecting arm 16 pivotally secured to the shank 7 at 17.

As shown in Fig. 2, in the present instance, the keys 2 are arranged in four longitudinally aligned series forming a so-called "bank" of keys.

The movable indicating plate of each key has inscribed thereon in the present instance, two distinct and separate characters composing two separate and distinct classes of inscriptions to be used in the operation of the machine to which my key board is attached.

Each of the keys 2 is maintained in its normal position by a spring 18 coiled around a projecting arm 19 of a plate 20, secured

to the under side of the lower plate 4 of the framework 1. Each spring 18 has one of its ends 21 lying in engagement with the plate 20 and its opposite end 22, which forms a sort of arm, engaging a groove 23 in the lower end of the shank 7. Upward movement of the shank 7 is limited by a stop 24, integral with said shank 7 and engaging the underside of the upper plate 3.

Each of the shanks 7 is provided with an extension 25 on the outer end of which is a depending leg 26 parallel to the lower portion of the shank 7.

The lower ends of the depending legs 26, of the entire bank of keys 2 are longitudinally aligned in a single row with respect to the framework 1 and project downwardly through apertures in the lower plate 4 thereof, as clearly shown in Fig. 2.

Each of the legs 26 is provided with a lug 27 designed to enter a groove 28, in a longitudinally extending bar 29 which lies parallel to the complete series of aligned depending legs 26, when a key 2 is pressed into an operative position.

The bar 29 is rotatably mounted in the end plates 5 and 6 of the framework 1 and has secured to its end, adjacent the end plate 6, a lever 30. Intermediate the lever 30 and the said plate 6, and coiled around the said bar 29 is a spring 31, having one of its ends secured to the lever 30 and having its opposite end engaging the plate 4. This arrangement of elements tends to turn the bar 29 in such a direction that its groove 28 will normally lie in the position shown in Fig. 2, a lug 32 on the lever 30 engages the under side of the plate 4 and limits the rotative movement of the bar 29, to the above extent.

When any one of the keys 2 is pressed its lug 27 enters the groove 28 and turns the bar 29, which turns the lever 30 until a projection 33 thereon engages a resiliently mounted catch 34, on the end plate 6. The above-mentioned engagement retains the bar 29 in its turned position and the said key in its depressed position. With the bar 29 in the above described position any other key being pressed its lug would strike the plain portion of the bar 29 without effect and when the pressure thereon is released the said key will return to its normal position, under the influence of its spring 18. The first pressed key will be retained in its depressed position until the cycle of operations, assigned to the machine have been completed, release of said key being perfected by mechanism hereinafter described.

The catch 34 is slotted at 35 for the reception of a retaining stud 36, the opposite inclined end 37 of said catch resting on a projecting pin 38 on the end plate 6. A spring 39, having one of its ends secured to a pin 40 on the end plate 6 and its opposite

end secured to the catch 34, serves to retain the said catch 34 in its normal position.

Shifting of the movable indicating plate 10 of each of the keys 2 is accomplished simultaneously by a grid-like plate 41 slidably mounted in the end plates 5 and 6 and immediately adjacent the under side of the top plate 3. The grid 41 has depending flanges 42 and 43 immediately adjacent the end plates 5 and 6 respectively. Secured in the said flanges 42 and 43 are studs 44, 44 and 45, 45 which project through slots 46, 46 and 47, 47 respectively in the end plates 5 and 6, such construction permitting a movement of said grid 41 parallel to the plane of the plate 3.

The grid 41 is provided with a series of bars 48 disposed at an angle to the longitudinal side bars 49 thereof. The bars 48 lie adjacent the shanks 7 of the keys 2 parallel to the line of angular transverse alignment of said shanks. Each bar 48 adjacent each of the shanks 7, is provided with an abutment 50, lying in engagement with one side of each of the arms 16 of the indicating plates 10, which lie immediately adjacent and parallel to each of the shanks 7. The opposite side of each of the arms 16 is engaged by a lug 51 projecting from the bars 48, as shown in Fig. 3.

Movement of the grid 41, as will be apparent from the drawings, will move each of the arms 16, simultaneously with respect to the shanks 7, causing a corresponding relative movement of the indicating plates 10 with respect to the windows 15, in the caps 13 of the keys 2; such movement obliterating the entire class of characters formerly visible through said windows and presenting an entirely new class for observation there-through.

Movement of the grid 41 is obtained through a lever 52 secured to one end, adjacent the end plate 5, of a longitudinally extending shaft 53 rotatably mounted in the end plates 5 and 6. Forked levers 54, 54 secured to the shaft 53, adjacent the end plates 5 and 6, engage the supporting studs 44—44 of the grid 41. A coiled spring 55, having one of its ends secured to the lever 52 and its opposite end resting on the bottom plate 4, tends to retain the grid 41 in the position shown in the drawings; retention in the position above described relative to the movement of the indicating plates 10, is obtained by the engagement of a hook 56, pivoted to the lever 52, with a projecting pin 57, on the end plate 5. Release of the hook 56 may be accomplished in any desired manner.

For the purpose of illustration only and forming no part of the present invention certain of the elements of a machine, to which my improved key board may be operatively applied, are shown in the drawings

and include a spiral formed selector wheel 58, rotatably mounted in the side frames 59 of the machine. Secured to one end of the selector wheel 58 is a gear wheel 60 which meshes with a gear wheel 61 suitably mounted on a continuously rotating shaft 62. The gear 61 meshes with an idler gear 63 which in turn meshes with a gear 64 secured to a shaft 65 splined to which is a pair of character wheels 66 and 67. The shaft 62 as aforementioned rotates continuously and through a clutch mechanism 68 rotates the described train of gears and therewith the selector wheel 58 and character wheels 66 and 67.

Through mechanism not shown and forming no part of the present invention, the character wheel provided with a class of characters corresponding with the class of characters visibly displayed through the windows of the keys 2, is automatically selected for relative co-operation with the platen of the machine, when said visible class of characters is moved to its position of visibility in said keys.

When it is desired to change the class of characters, visible in the windows of the keys, by operating the lever 52 to its other position the character wheel corresponding in characters to the class to be displayed on the keys will automatically be operatively connected to the mechanism of the machine, and will be selectively controlled by the keys of the key board.

In operation of the machine the selector wheel 58 and character wheels 66 and 67 are driven continuously through the shaft 62 and the train of gears 60, 61, 63 and 64. When any one of the keys 2 is pressed the lower end of the leg 26 of such key is projected into the path of rotation of the spiral selector wheel 58, which will stop said wheel, the said train of gears and the operating character wheel in such a position that a character on said character wheel, corresponding with the character displayed on the pressed key will be operatively aligned with the platen of the machine.

As above mentioned the pressing of one of the keys 2 turns the bar 29 until the projecting end 33 of the lever 30, attached to said bar is engaged and retained by the latch 34, thereby retaining the key 2 in its depressed position.

The shaft 62, after the stopping of the selector wheel 58, the said train of gears and the operating character wheel, continues to rotate, in order that the cycle of operations of the machine may be executed by said shaft; such continued rotation being permitted by virtue of the mechanism of the clutch element 68 (which forms no part of the present invention). When said cycle of operations is completed a projecting pin 69 on the shaft 62 engages an end 70 of the

lever 30, opposite the end 33 thereof, and returns the said lever 30 and its associated bar 29 to their normal positions, wherein the pressed key 2 is released and returns to its normal position through the action of its spring 18.

Release of the point 33 of the lever 30 is effected by sliding the catch 34 longitudinally on the pins 36 and 38, the inclined end 37 thereof riding up on said pin 38 until the hook portion of said catch 34 disengages the said point 33 of the lever 30, whereafter the catch 34 is returned to its normal position under influence of the spring 39.

It will be understood that my improved key board may be built into the machine to which its principles are to be applied or it may be built as a separate unit and detachably secured to the machine at the discretion of the designer of such machine.

It is quite obvious that many modifications may be made in the construction of my invention as applied to various classes of mechanisms to be controlled thereby, without departing from the spirit and essential features of the invention.

In Figs. 11 and 12, I have illustrated a key employing a circular indicating plate having three different characters thereon, it being understood, however, that I may place any desired number of characters on the indicating plate without departing from the spirit of the invention. The circular indicating plate 10^a is secured to a vertically mounted rotatable spindle 16^a and may be moved to a position wherein any desired one of the characters may be exposed to view, as shown in Fig. 12, by a rack 48^a and pinion 50^a as shown in Fig. 11.

In Figs. 13 and 14, another form of key is illustrated having a combined finger and indicating plate 8^b adapted to be rotated with respect to said key a distance of one hundred and eighty degrees (180°), to display either side of said plate, on which is inscribed a different character, operation thereof being accomplished by a crank 50^b and lever 16^b as shown.

In Figs. 15 and 16, still another form of key is illustrated having a triangular combined finger and indicating plate 8^c which is operated in substantially the same manner as the structure shown in Figs. 13 and 14, except, in this case, the plate is capable of movement in three steps of 120° each to display any one of the inscribed faces of the key uppermost.

I do not intend to limit the use of the device to the application set forth in the drawings and description thereof, as it will be understood that such illustration was made merely to clarify the operation of my device as applied to one of the many forms of mechanism to which my invention is applicable, therefore only such limitations should

be placed upon the scope of my invention as are set forth in the appended claims, or required by the prior art of record.

I claim—

1. A key board selector key comprising a shank, a finger plate rigidly mounted on said shank; a movable indicating plate mounted adjacent said finger plate; a depending arm rigidly secured to said indicating plate and pivoted to said shank; and means for moving said indicating plate with respect to said finger plate.

2. A key board selector key comprising a shank; a finger plate rigidly mounted on said shank; a movable indicating plate mounted adjacent said finger plate; a depending arm rigidly secured to said indicating plate and pivoted to said shank; an opening in said finger plate; a plurality of characters on said indicating plate; and means engaging said depending arm for moving said indicating plate with respect to said finger plate to cause the different characters of the indicating plate to register individually with the opening in the finger plate.

3. A key board comprising a frame; a series of selector keys operatively mounted in said frame; movable indicating plates on said keys; a grid slidably mounted in said frame for operating the said indicating plates; and means for operating said grid.

4. A key board comprising a frame; a series of selector keys operatively mounted in said frame; indicating plates operatively mounted on said keys; a grid slidably mounted in said frame for controlling said indicating plates; means for operating said grid; and means for retaining said grid in any one of the positions to which it may be moved.

5. A key board comprising a frame; a series of selector keys mounted in said frame, each key comprising a finger plate and a shank; a movable indicating plate adjacent said finger plate and having an arm pivoted to said shank; a grid slidably mounted in said frame and having projections engaging said arms, and adapted to move said indicating plates simultaneously, with respect to said finger plates; means for operating said grid; and means for retaining said grid in its adjusted position.

6. A key board comprising a frame; a series of selector keys mounted in said frame, each key comprising a finger plate and a movable indicating plate adjacent thereto; a plurality of characters on each of said indicating plates; an opening in each of said finger plates immediately above one of said characters; a shank on each finger plate; an arm on each indicating plate pivoted to said shank; a grid slidably mounted in said frame; projections on said grid engaging said indicating plate arms; means for oper-

ating said grid whereby all the said indicating plates may be moved relatively to the finger plates, simultaneously, bringing a different set of the individual characters thereon into registry with the openings in the finger plates.

7. A key board comprising a frame; a series of selector keys mounted in said frame and adapted to be depressed with respect thereto, each key comprising a finger plate and a movable indicating plate adjacent thereto; a plurality of characters on each of said indicating plates; an opening in each of the finger plates immediately above one of said characters; a shank on each finger plate; an arm on each indicating plate pivoted to said shank; a grid slidably mounted on said frame; projections on said grid engaging said indicating plate arms and adapted to move all the indicating plates relative to the finger plates, simultaneously, to bring a different set of individual characters thereon into registry with the openings in the finger plates, and to maintain the indicating plates in their adjusted positions with respect to the finger plates when the keys are depressed; means for retaining a depressed key in its depressed position; and means for returning said key to its normal position.

8. A key board comprising a frame; a series of selector keys mounted in said frame adapted to be depressed with respect thereto, each key comprising a finger plate and a movable indicating plate adjacent thereto; a plurality of characters on each of said indicating plates; an opening in each finger plate immediately above one of said characters; a shank on each finger plate; an arm on each indicating plate pivoted to said shank; a projecting lug on each shank; a grid slidably mounted in said frame; projections on said grid engaging said indicating plate arms and adapted to move all the said indicating plates relative to the finger plates, simultaneously, bringing a different set of the individual characters thereon into registry with the openings in the finger

plates, and to maintain the indicating plates in their adjusted positions with respect to the finger plates when the keys are depressed; a bar pivoted in said frame; a groove in said bar adapted to engage the shank lug of a depressed key, said bar being turned on its pivots by the depressed key and thereby presenting a rigid abutment to the keys occupying their normal positions to prevent their being depressed; means for releasing the depressed key; and means for moving the keys to their normal positions.

9. A key board comprising a frame; a series of selector keys mounted in said frame and adapted to be depressed with respect thereto; a shank on each key; a lug on each key shank, the said shanks and said lugs of the entire series of selector keys being laterally aligned respectively one with the other; a bar pivoted in said frame parallel to said aligned shanks and having a groove adapted to be engaged by the lug of a key when it is depressed, said engagement causing the pivoted bar to turn and thereby present a rigid abutment to the remainder of the series of key shank lugs, preventing their depression.

10. A key board comprising a frame; a series of selector keys mounted in said frame and adapted to be depressed with respect thereto; a shank on each key; a lug on each key shank, the said shanks and said lugs of the entire series of selector keys being laterally aligned respectively one with the other; a bar pivoted in said frame parallel to said aligned shanks; a groove in said bar adapted to be engaged by the lug of a key when it is depressed, said engagement causing the pivoted bar to turn and thereby present a rigid abutment to the remainder of the series of key shank lugs, preventing their depression; means for retaining the bar in its turned position; means for returning said bar to its normal position; and means for returning each key to, and maintaining it in, its normal raised position.

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