No. 682,758. Patented Sept. 17, 1901.

C. SEARS.

TYPE WRITER ESCAPEMENT.

(Application filed Mar. 6, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

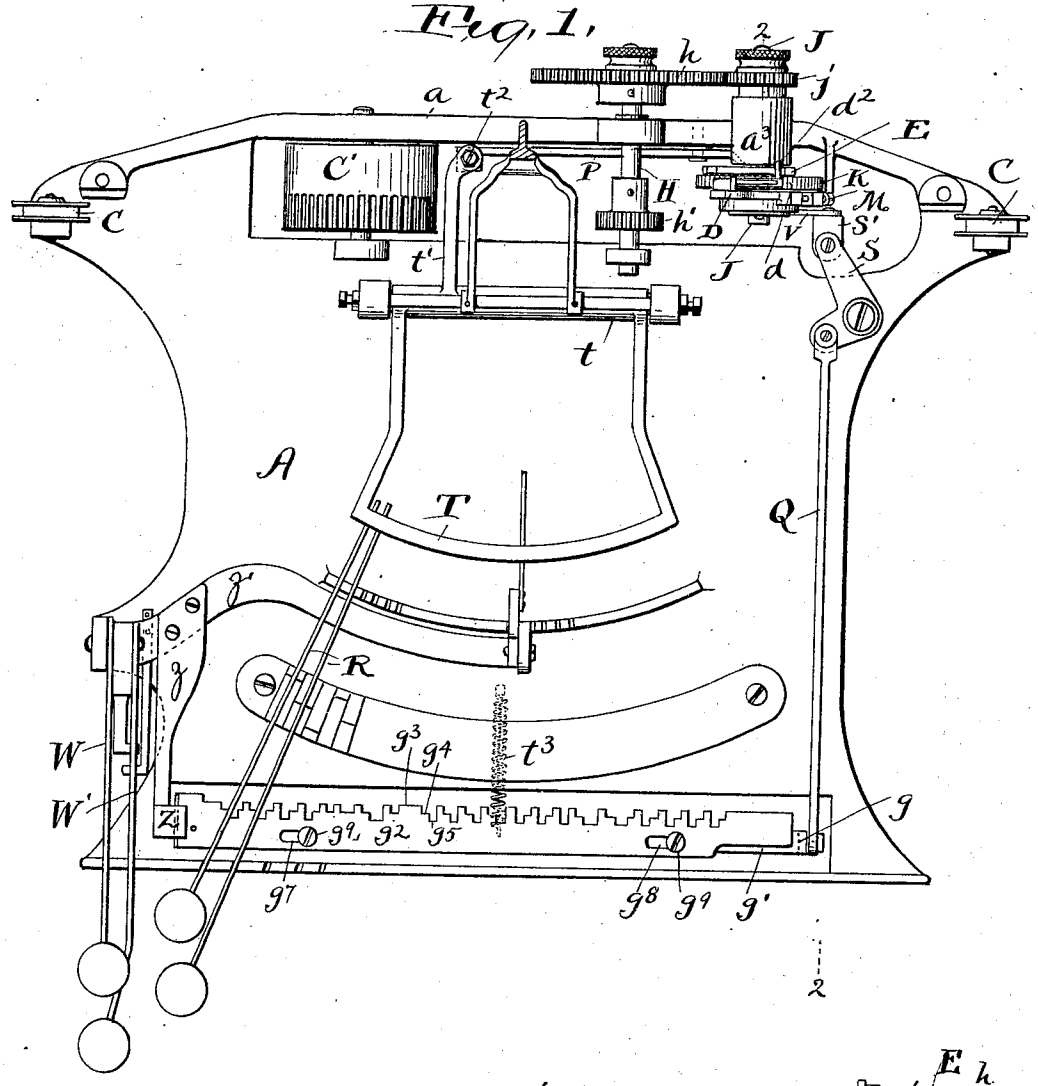
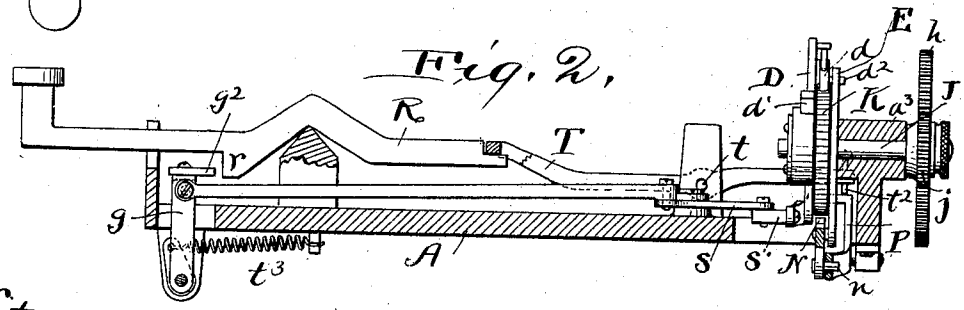


Fig. 2.



Witnesses,
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(No Model.) 2 Sheets—Sheet 2.

Fig. 3.

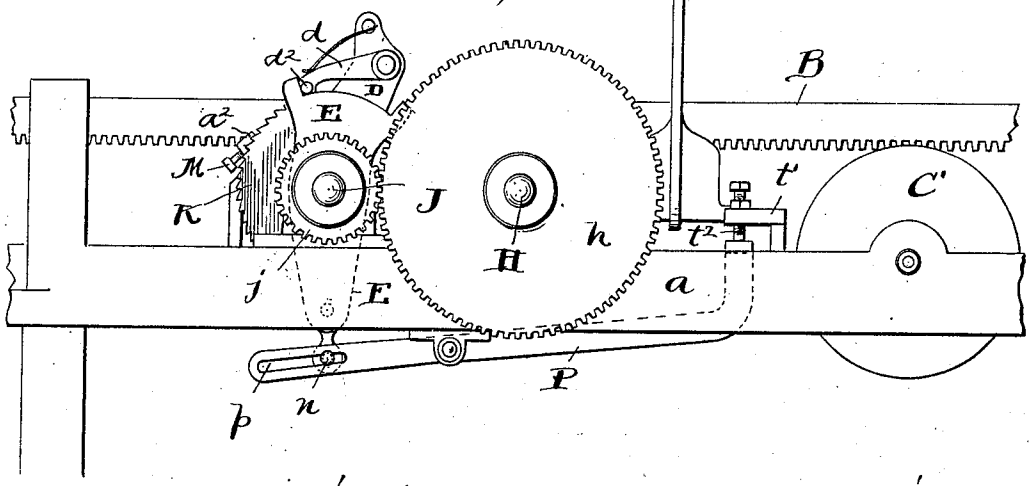


Fig. 4.

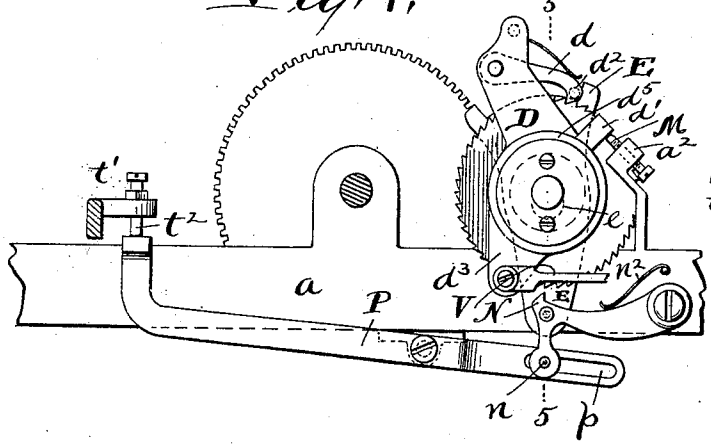


Fig. 5.

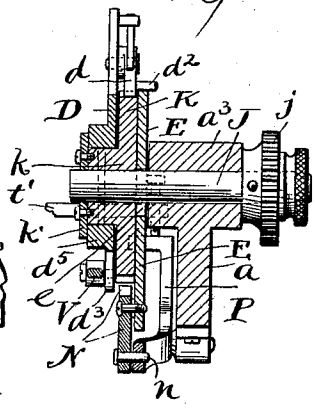
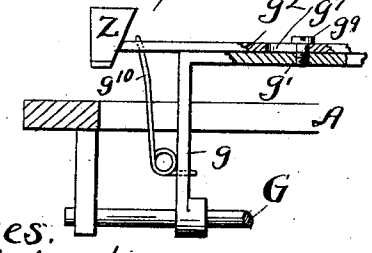
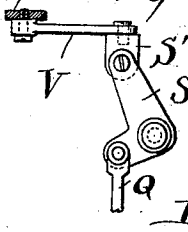


Fig. 6.



d³ Fig. 7.



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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

CHARLES SEARS, OF CLEVELAND, OHIO.

TYPE-WRITER ESCAPEMENT.

SPECIFICATION forming part of Letters Patent No. 682,758, dated September 17, 1901.

Application filed March 6, 1899. Serial No. 707,866. (No model.)

To all whom it may concern:

Be it known that I, CHARLES SEARS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Type-Writer Escapements, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The invention relates to the mechanism for controlling the feeding movements of the carriage of a type-writing machine, to the end that said carriage shall move different but definite distances proportional to the width of the several characters printed.

The invention consists in the construction and combination of parts shown in the drawings and hereinafter described, and pointed out in the claims.

In the drawings, Figure 1 is a plan view of so much of a type-writing machine as includes my invention and is necessary to the understanding thereof. Fig. 2 is a vertical sectional view on line 2 2 of Fig. 1. Fig. 3 is a rear view of the invention and of a part of the rear frame member. Fig. 4 is a front view of much of the same mechanism. Fig. 5 is a vertical sectional view on line 5 5 of Fig. 4. Fig. 6 is a front view, partly in section, of certain mechanism at the front left corner of Fig. 1; and Fig. 7 is a plan view of the mechanism connecting the swinging frame at the front of the machine with the oscillating pawl-carrier.

Certain parts of the invention are applicable for use with any form of type-writing machine, whether or not it contains "shift-keys" and mechanism operated by them for the well-understood purpose of adapting a single key-lever for printing several different characters. I have chosen to illustrate the invention as applied to a Hammond machine containing two shift-keys.

Referring to the parts by letters, A represents the bed-plate, and *a* represents a bar which is a part of the frame of the machine and extends across the rear end of the machine. The rack-bar B is fixed to and forms a part of the carriage. I have not thought it necessary to show any part of the carriage except this rack-bar nor to show all of the means for supporting and guiding the carriage. Any suitable carriage may be employed and any suitable means for supporting and guiding it may be provided—as, for example, the carriage and guides therefor found in the Hammond machine. The grooved wheels C C are, however, a part of the supporting and guiding mechanism for the carriage, the rack-bar being adapted to ride upon them. The carriage is under continuous tension to move it in the feeding direction. It matters not in what manner or by what mechanism this tension is applied. I have shown a commonly-used spring-barrel, having external gear-teeth which engage with the rack-bar. The movement of the carriage is prevented or definite movements thereof are permitted by certain escapement mechanism, in which and the mechanism which it operates and by which it is operated my invention is found. A shaft H, which is suitably mounted, carries a pinion h', which meshes with the rack. A gear h on its end meshes with a gear j on the escapement-shaft J. These gears h and j are removable, and other gears of different relative sizes may be substituted, whereby the actual movements of the carriage due to a given movement of the escapement may be varied. A ratchet K is secured to the shaft J. An oscillating pawl-carrier D is mounted on the same axis adjacent to the ratchet. As shown, its hub d^5 is mounted on the hub k of the ratchet, whereon it is held by the plate k'. A spring-pawl d is pivoted to one arm of this pawl-carrier, and it is normally held by its spring in engagement with the ratchet. An arm d', which is rigid with the pawl-carrier, engages with a stop M, which, as shown, is an adjustable screw which screws through a fixed bracket a^2. The force acting upon the carriage is transmitted through the described mechanism to the pawl-carrier when pawl d is engaging with the ratchet and said arm d' is moved against the stop M, whereby the movement of all of said parts is stopped. When the pawl d is lifted out of engagement with the ratchet, whereby the pawl-carrier may move backward independently of the ratchet, a detent N is moved into engagement with the ratchet, whereby the movement of the ratchet is temporarily prevented. A plate E, which is movable radially, or nearly so,

across the axis of the escapement-shaft, is the device for moving both of the pawls, as stated. This plate has a slot *e*, which embraces the shaft, and the plate lies between the ratchet and the shaft-bearing a^3. A pin d^2, which is secured to the pawl *d*, extends over the arc-shaped top edge of the plate E, whereby the lifting of the plate moves the pawl out of engagement with the ratchet. The part of said parts below the shaft is pivotally connected with the detent N, which is pivoted to the bar *a*. A lever P is also pivoted to bar *a*. One end has a slot *p*, which receives a pin *n*, which projects from detent N. This lever is rocked whenever a key-lever R is depressed. The mechanism for transmitting motion from each key-lever to the lever P consists of a frame T, which extends over the rear ends of all of the key-levers and is in contact with them. This frame is fast to rock-shaft *t*, and an arm *t'*, projecting rearwardly from the rock-shaft, engages one end of the lever P. Preferably an adjustable screw t^2, which screws through the arm *t'*, engages the lever P. The upward movement of the detent N, induced by lever P, carries it into engagement with the ratchet. It likewise lifts the plate E, and this lifts pawl *d* out of engagement with the ratchet. The depression of a key-lever also causes the pawl-carrier to be moved backward a greater or less distance through the following mechanism. Underneath the front ends of all of the key-levers is a swinging frame, which, as shown, includes a rock-shaft G, two arms *g*, and a horizontal bar *g'*. On each key-lever is a stub *r*, which when the lever is depressed is moved into the path of a bar g^2, which is movably mounted on the top of bar *g*, and these stubs serve as stops to limit the movement of said bar, and consequently of the swinging frame, to which it is movably secured. This bar g^2 is notched at the points where it will engage with the stubs when it swings rearward, and these notches are of various depth. The distance between the stubs on the key-levers and the parts of the bar which will engage with them are proportionate to the widths of the characters which will be printed by the depression of said levers. The stubs might be placed at different points on the levers, and the bar might be unnotched if each key was associated with one character only. The swinging frame is swung rearward after the pawl *e* has been drawn out of engagement with the ratchet by a spring t^3. This rearward movement of the frame is transmitted to the pawl-carrier through a link Q, the bell-crank lever S, a block S', which is pivoted to one arm of the bell-crank lever, and the link V, which is pivoted to block S', and to an arm d^3 of the pawl-carrier. The depression of any key causes the pawl *d* to be lifted out of engagement with the ratchet, and thereupon the spring t^3 moves the swinging frame backward until the top bar g^2 strikes the stub on said key-lever. This movement is proportionate to the width of the character which is printed by the depression of said lever. This movement of the frame is transmitted, through the described mechanism, to the pawl-carrier D, which is moved backward a distance proportionate to the width of said character. When the key-lever is released, the spring n^2, which engages with the detent N, moves it down, and with it the plate E, whereby the pawl *d* is again allowed to engage with this ratchet. At the same time the detent N is moved out of engagement with said ratchet. The force (in the spring-barrel) acting to move the carriage being stronger than the spring t^3, the carriage is moved, whereby the pawl-carrier is moved back to its home position, in which it is stopped by the engagement of the arm *d'* with the stop-pin M. The permitted feed movements of the carriage are therefore always proportionate to the distance which the pawl-carrier is moved from its home position, and this distance is always proportionate to the width of the character.

In many machines each key-lever is associated with two or more characters, which are commonly of different widths—as, for example, a capital letter and a lower-case letter. Shift-keys are provided for determining which letter shall be printed. If the shift-key is not operated, lower-case characters are commonly printed; but when capitals are required the shift-key is depressed before the character-key is struck. In the machine, as shown, two shift-keys W W' are employed, and therefore each character-key is associated with three characters, this being one of the characteristics of the Hammond machine, to which I have chosen to apply my invention. Each of these three characters associated with each key belong to what may be called "different-type systems," the capital letters constituting one system, the lower-case letters another system, and the figures and punctuation-marks a third system. The three characters in these different systems which are associated with the same key-lever may be of different widths, and in most cases they are. Moreover, it is obvious that there is no uniform relationship between the widths of the characters in different systems associated with the same key-lever. For example, there might be associated with one key-lever a capital "L," a lower-case "l," and an interrogation-point. The "L" would be, say, five units wide, the "l" two units wide, and the "?" three units wide. The three characters associated with another key-lever might be a capital "M," a lower-case "m," which are of substantially the same width, and a comma, which is not more than one-sixth as wide. From the foregoing one will understand what is meant by the statement that the widths of the characters in one system do not bear any uniform

relationship to the width of the characters in another system, which are associated with the same key-levers. To adapt the invention for use with such a machine, the notched bar g^2 is constructed so as to have three parts of its edge associated with each key-lever, and means are provided for moving said bar crosswise of the machine, so as to bring any one of these surfaces into line with the stubs on the key-levers. For example, the three parts g^3 g^4 g^5 of the rear edge of the bar are associated with the key-lever R, these three parts being different distances in front of said stub r. This bar is movable endwise across the machine, so as to bring any one of these three engaging surfaces or stops into line with the stub or stop on the key-lever with which it is designed to engage. The bar g^2 is provided with two longitudinal slots g^7 g^8, through which the screws g^9 pass, whereby said bar is secured upon the bar and guided in its endwise movements. A spring acts to move the bar to the left as far as possible, which is its normal or home position. The left end of this bar is beveled and an oppositely-beveled wedge-block Z engages with it. This wedge is on the end of an arm z, which is rigidly secured to a rocking frame z', to which both of the shift-keys are secured. One of the shift-keys is adapted to rock the frame z' twice as far as the other. As the frame rocks, this wedge-block acting upon the bar moves it to the right, so as to bring one or the other of the bearing-surfaces or stops into line with and consequently into operative relationship with the stub or stop on the key-lever with which it is intended to engage.

Having described my invention, I claim—

1. In a type-writing machine having a plurality of systems of printing characters of various widths whereof the widths of the characters in one system have no uniform relation to the widths of the corresponding characters in the other system, the combination of escapement mechanism, a plurality of key-levers, a shift-key, and mechanism whereby the depression of any key-lever will cause the printing of the associated character in either system and a concurrent movement of the escapement mechanism a distance proportionate to the width of the character so printed, substantially as specified.

2. In a type-writing machine having a plurality of systems of printing characters of various widths whereof the widths of the characters in one system have no uniform relation to the widths of the corresponding characters in the other system, the combination of the key-levers, escapement mechanism held in restraint, a stop-bar connected with said escapement mechanism and carrying a plurality of series of stop-surfaces, and movable in two directions, means for moving said stop-bar to bring any series of stop-surfaces thereon into operative position, means operated by the key-levers to release said escapement mechanism whereby it and the stop-bar move concurrently, a plurality of stops severally associated with said key-levers and adapted to be moved thereby into the path of the stop-surface on the stop-bar which corresponds with the character which is printed by the operation of said key-lever, substantially as specified.

3. In a type-writing machine having a plurality of systems of printing characters of various widths whereof the widths of the characters in one system have no uniform relation to the widths of the corresponding characters in the other system, the combination of a swinging frame, a plurality of series of stops severally secured to said frame, and means for moving any desired stop of either series into operative relation to its coöperating stop, with a plurality of coöperating stops, one associated with and operable by each key-lever, escapement mechanism connected with the same swinging frame, a plurality of key-levers, and mechanism operated thereby for releasing said swinging frame, substantially as specified.

4. In a type-writing machine having a plurality of systems of printing characters of various widths whereof the widths of the characters in one system have no uniform relation to the widths of the corresponding characters in the other system, the combination of a plurality of key-levers, escapement mechanism held in restraint, mechanism whereby it is released by the operation of any key-lever, a plurality of movable stops associated one with each key-lever and movable thereby, other movable stops of which a plurality are associated with each of the stops first named, connections between the stops last named and the escapement mechanism, a shift-key and mechanism whereby it moves the stops last named to bring any of them into operative relationship with that one of the first-named stops with which it is associated, substantially as specified.

5. In a type-writing machine, the combination of a key-lever, a stop operated thereby, a plurality of stops movable in two paths and adapted for engagement with said stops, mechanism for moving said movable stops in one path to bring either of them into operative relationship with the said stop which is operated by the key-lever, escapement mechanism connected with said movable stops, and mechanism adapted to move said escapement mechanism until it is brought to a standstill by the engagement of the stop which the key-lever operates and that movable stop which is in operative relationship to it, substantially as specified.

6. In a type-writing machine, the combination of a swinging frame, a notched bar movably secured to said frame, and mechanism for moving the bar on said frame, with a plu-

rality of movable stops adapted to be moved severally into the path of said notched bar, means whereby to move said stops, and movable mechanism which is connected with said frame and whose movements are governed by the movement of said frame, substantially as specified.

7. In a type-writing machine, the combination of a plurality of stops, keys for severally operating said stops, and a notched bar which is movable laterally toward and from said stops and is movable longitudinally to bring different surfaces on its edge into line with the several stops, and movable mechanism connected with said bar and adapted to have its movements controlled by the movements of said bar, substantially as specified.

8. In a type-writing machine, the combination of the escapement mechanism, a spring-actuated swinging frame connected therewith and adapted to control its movements, a notched bar movably secured to said frame, and means for moving the bar upon said frame, with a plurality of movable keys having stubs projecting into the path of said notched bar, and mechanism whereby the depression of each key releases the escapement mechanism, substantially as specified.

9. In a type-writing machine, an escapement consisting of a shaft, a ratchet-wheel rigid thereon, a movable plate having a circumferential recess, a detent-pawl connected to said plate, an oscillating pawl-carrier, a pawl carried thereby, said pawl having a projection lying in said recess, combined with a plurality of finger-keys, and intermediate mechanism whereby the actuation of said keys moves the said plate, and also moves the pawl-carrier backward, substantially as described.

10. In a type-writing machine, the combination of a carriage under tension to move it in the feeding direction, a detent-shaft, and mechanism connecting said shaft and carriage, a ratchet secured to said shaft, an oscillating pawl-carrier, a pawl mounted thereon for engagement with the ratchet, a detent-pawl, a plate movable transversely to the axis of the shaft and adapted to simultaneously move the pawl out of engagement with the ratchet and the detent into engagement with the ratchet, a plurality of finger-keys having projecting stubs, a spring-actuated swinging frame adapted to engage with the stub on a depressed key-lever, mechanism connecting said frame and pawl-carrier, and mechanism operated by the finger-keys for moving said plate, substantially as specified.

11. In a type-writing machine, the combination of a carriage under tension to draw it in the feeding direction, a rack forming a part thereof, a pinion engaging with said rack, an escapement-shaft adapted to be turned by said pinion, a ratchet secured to the shaft, an oscillating pawl-carrier, a pawl mounted thereon, a plate movable in a path transverse to the axis of the shaft and adapted to engage with and lift said pawl out of engagement with the ratchet; a detent pivoted to a fixed support, and pivotally connected with said plate, a stop for the pawl-carrier, a plurality of finger-keys, and intermediate mechanisms, whereby the actuation of said keys moves the said plate, and also moves the pawl-carrier backward, substantially as specified.

12. In a type-writing machine, the combination of a carriage under tension to draw it in the feeding direction, a rack forming a part thereof, a pinion engaging with said rack, an escapement-shaft adapted to be turned by said pinion, a ratchet secured to the shaft, an oscillating pawl-carrier, a pawl mounted thereon, a plate movable in a path transverse to the axis of the shaft and adapted to engage with and lift said pawl out of engagement with the ratchet, a detent pivoted to a fixed support and pivotally connected with said plate, a stop for the pawl-carrier, a plurality of finger-keys, and intermediate mechanisms, whereby the actuation of said keys moves the said plate, and also moves the pawl-carrier backward a distance proportionate to the width of the corresponding characters, substantially as specified.

13. In a type-writing machine, the combination of a carriage under tension to draw it in the feeding direction, a rack forming a part thereof, a pinion engaging with said rack, an escapement-shaft adapted to be turned by said pinion, a ratchet secured to the shaft, an oscillating pawl-carrier, a pawl mounted thereon, a plate movable in a path transverse to the axis of the shaft and adapted to engage with and lift said pawl out of engagement with the ratchet, a detent pivoted to a fixed support, and pivotally connected with said plate, a stop for the pawl-carrier, a spring-actuated swinging frame, having a notched top bar, mechanism connecting said frame to the pawl-carrier, a plurality of key-levers having stubs which will be moved into the path of said notched bar when the key-levers are depressed, and mechanism actuated by said key-levers for moving said plate, substantially as specified.

14. In a type-writing machine, the combination of a plurality of key-levers each having a stub, a spring-actuated swinging frame, a bar movably secured on said frame, said bar having notches in its edge facing said stubs whereby to form two or more surfaces for engagement with each stub, which surfaces are different distances from the stub, a shift-key, mechanism whereby the shift-key moves the bar upon said frame, and mechanism connecting said swinging frame with the escapement mechanism, substantially as specified.

15. In a type-writing machine, the combination of a plurality of key-levers each having a stub, a spring-actuated swinging frame, a

bar movably secured on said frame, said bar having two or more surfaces for engagement with each stub, which surfaces are different distances from the stub, a spring for moving said bar in one direction, a shift-key, a wedge-block operated thereby and engaging with said bar, whereby it is moved in the contrary direction, and mechanism connecting said swinging frame with the escapement mechanism, substantially as specified.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CHARLES SEARS.

Witnesses:
THOS. C. BRINKLEY,
PHILIP E. KNOWLTON.