No. 888,934. PATENTED MAY 26, 1908.

J. A. RONCHETTI.

TYPE WRITING MACHINE.

APPLICATION FILED FEB. 7, 1907.

4 SHEETS—SHEET 1.

Fig. 1.

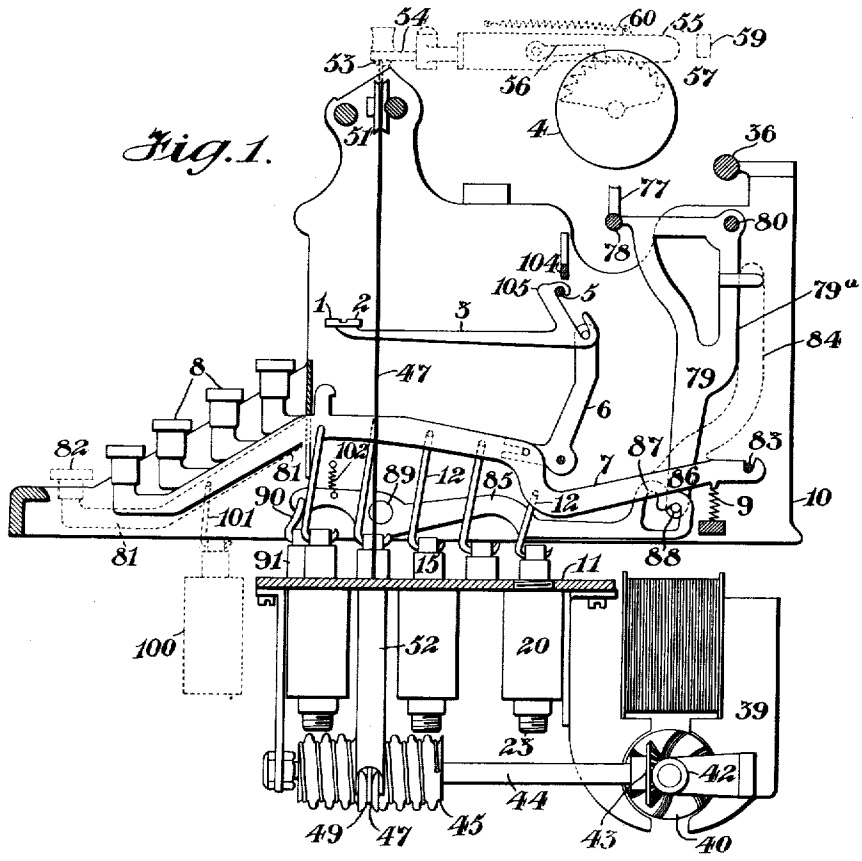
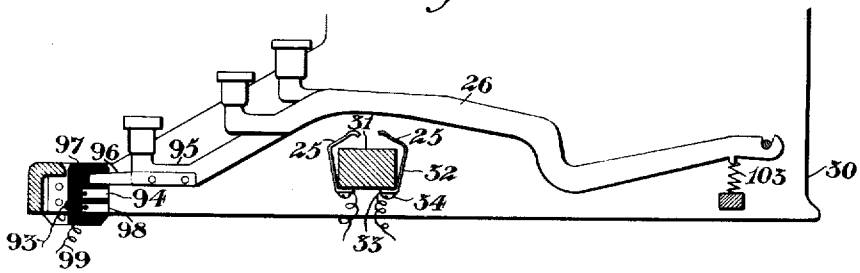


Fig. 2.



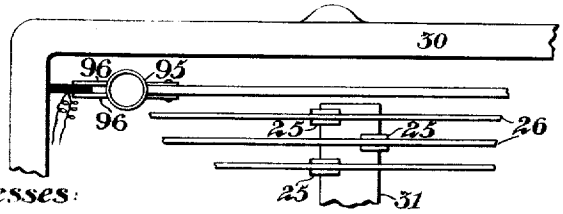


Fig. 3.

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4 SHEETS—SHEET 2.

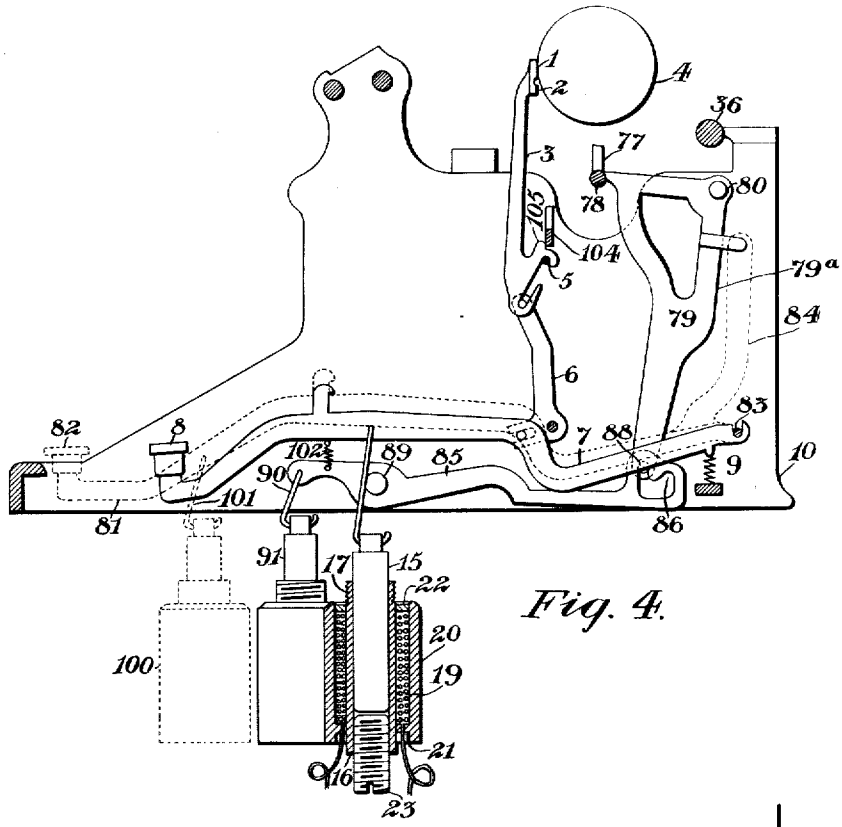

Fig. 4.

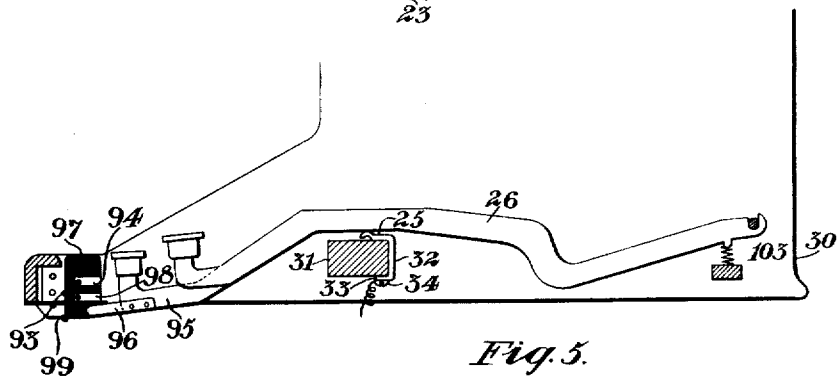

Fig. 5.

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4 SHEETS—SHEET 3.

Fig. 6.

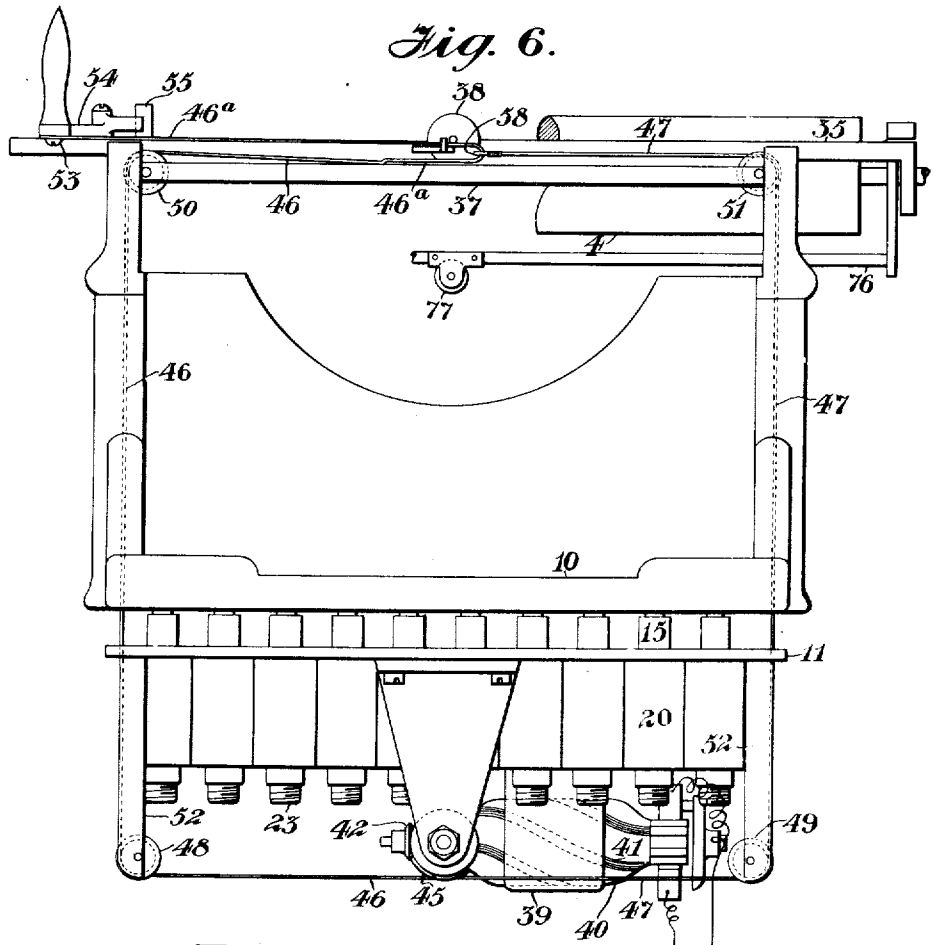
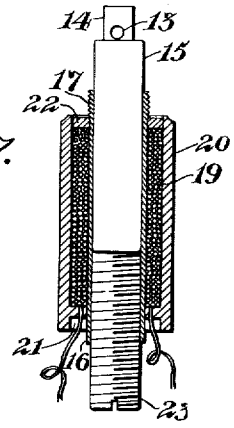
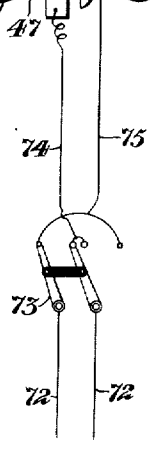


Fig. 7.





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TYPE WRITING MACHINE.

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4 SHEETS—SHEET 4.

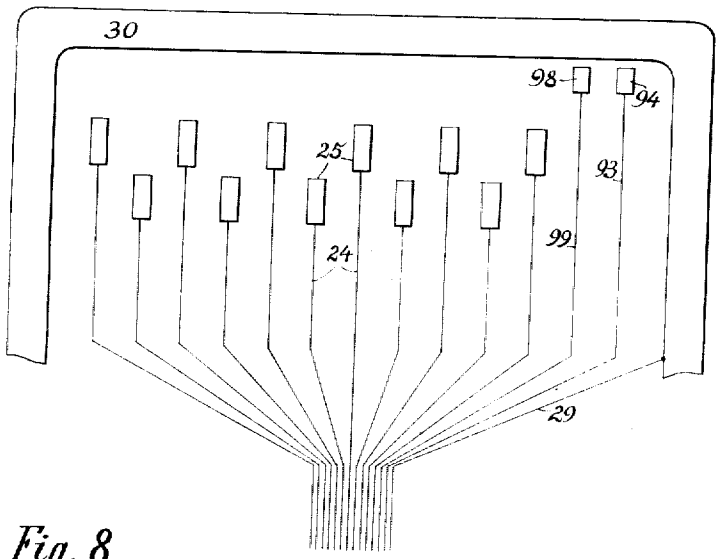
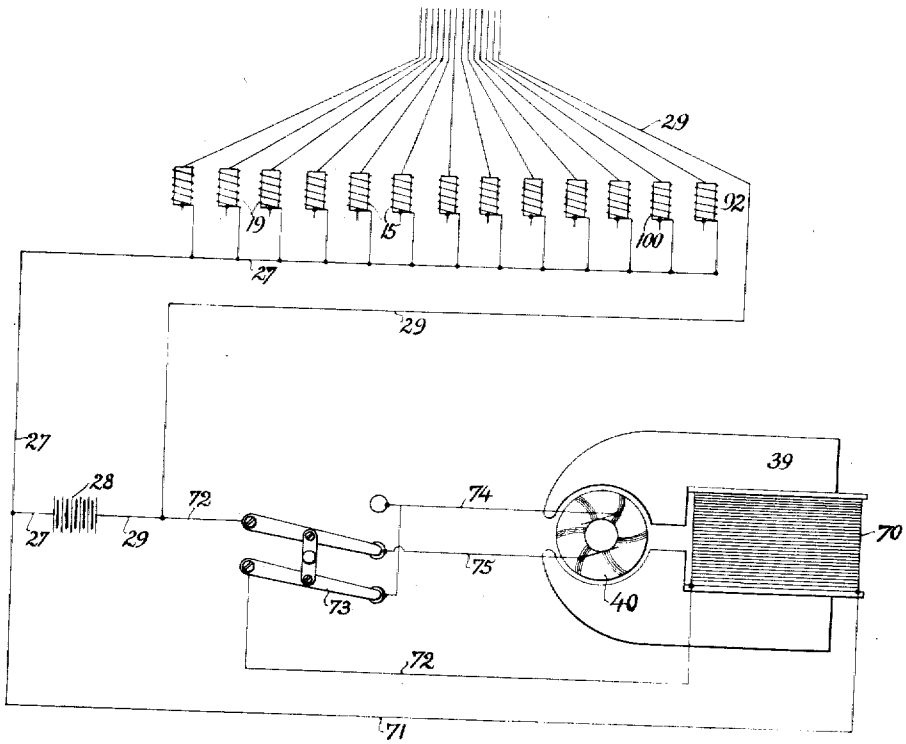


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOSEPH A. RONCHETTI, OF WOONSOCKET, RHODE ISLAND, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

No. 888,934. Specification of Letters Patent. Patented May 26, 1908.

Original application filed March 23, 1906, Serial No. 307,632. Divided and this application filed February 7, 1907. Serial No. 356,260.

To all whom it may concern:

Be it known that I, JOSEPH A. RONCHETTI, a subject of the King of Italy, residing in Woonsocket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to typewriting machines in which electricity is employed for operating certain of the devices, particularly to machines whose type-actions and characters are electrically connected to a distant keyboard from which they are operated.

The invention is designed primarily for enabling a complete typewriting machine, fully equipped with keys etc., to be exhibited in operation in a show window, while the operator is concealed from view. Certain features of the invention however may be otherwise employed, as for instance the electrical carriage operating devices may be employed in ordinary machines in place of the usual driving springs.

For operating the type-actions of the writing machine I employ solenoids, one for each action, and I construct each solenoid so that the core exerts a very much stronger pull upon the type bar at the final portion of the printing stroke, than at other portions thereof, thus conducing to certainty and clearness of imprint; and each solenoid is provided with adjustable means for controlling the power of the stroke. At the operator's keyboard provision is made whereby the depression of any key closes a circuit through the corresponding solenoid.

For the carriage of the writing machine, I provide a motor which is reversible by means of a pole-changer connected to the armature; whereby the motor is enabled to drive the carriage in letter feeding direction during the writing of the line, and then to run the carriage back to begin a new line; suitable connections being made to the line-spacing mechanism, so that the platen is partly rotated at each return of the carriage. The armature of the motor is spirally wound, so that a uniform pull is exerted upon the carriage throughout the run of the latter, this being a desideratum especially when the carriage is being fed along during the printing of the types, since at this time the carriage must start and stop each time a type impression is made, and hence the momentum of the carriage cannot be depended upon for carrying it smoothly in this direction, but the result is obtained by the use of a motor having uniform pull or torque.

I illustrate my invention as applied to an "Underwood" front strike writing machine which belongs to the class having a "shift", the platen being shiftable up and down to enable different types to print. I provide electrical connections for shifting the platen up, and contrive to hold it up without draining the electrical current, so that the whole power of the battery or other source of power may be devoted to operating the type-actions while the platen is so shifted. Thus a single battery may be employed for both shifting the platen and operating the type-actions, and also for driving the carriage in both directions. Other features and advantages will hereinafter appear.

In the accompanying drawings, Figure 1 is sectional elevation taken from front to rear about centrally of an Underwood typewriting machine suitable for exhibition purposes. Fig. 2 is a similar section through a keyboard which is electrically connected to the Fig. 1 machine, so as to control the latter. Usually an entire typewriting machine is employed, of which the devices seen at Fig. 2 form a part. At Figs. 1 and 2 the parts are shown in normal positions. Fig. 3 is a plan of the devices seen at Fig. 2. Fig. 4 is a view similar to Fig. 1 but showing the platen shifted up, and also showing a type-action in printing position. Fig. 5 is a sectional view similar to Fig. 2, but showing a type key and the shift key depressed, whereby the results seen at Fig. 4 were effected. Fig. 6 is a front view of the devices seen at Fig. 1. Fig. 7 is a central longitudinal section through one of the solenoids seen at Fig. 1 for operating the type-actions. Fig. 8 is a diagram of the electrical connections between the machines seen at Figs. 1 and 2.

The type-actions include upper case and lower case types 1 and 2, mounted upon bars 3, so as to strike against the front side of a platen 4. The type bars are hung upon a curved rod 5 and operated by bell cranks 6, connected to levers 7 bearing keys 8 and having returning springs 9.

Beneath the base of the framework 10 of the machine is supported a fixed horizontal brass plate 11, to which are attached the

solenoids for operating the type-actions. From each key lever 7 depends a hook 12, detachably inserted in an eye 13 in a nipple 14 formed upon the upper end of a core 15, part of the latter being above and part below the plate 11. Said core fits loosely in a brass tube 16, which is threaded at its upper end at 17 to screw into tapped holes 18 in the plate 11. Upon this tube I place the windings 19 of the solenoid; and said windings are inclosed in a soft iron or cast iron tubular jacket or case 20, preferably closed at its lower end by an integral interior head 21, and closed at its upper end by a plug 22 in the form of a washer fitting between the tube 16 and the keys 20, said washer being preferably of soft iron, although it may be made of other material. The lower end of the central tube 16 is closed by means of a screw plug 23 made of soft iron, and threaded into said tube, and extending up to about one-third of the height of the windings 19. Preferably the screw plug projects some distance below the tube 16, as illustrated. As seen at Fig. 4, the screw plug 23 is preferably so adjusted in each instance that core 15 almost but not quite contacts with said plug when the type strikes the platen. The downward pull of the core at this time is very great owing largely to the presence of the plug 23 in the solenoid, thus insuring a strong blow and clear imprint of the type. The downward pull of the plug is much greater at the finish than at the beginning of the printing stroke of the type bar; and the movement of the core in the solenoid is relatively short.

As seen at Fig. 8 the solenoids 19 are electrically connected by wires 24 with contacts 25 beneath the key-levers 26 of the Fig. 2 machine. The single wire 27, Fig. 8, connects all of the solenoids to a battery or source of power 28, and a wire 29 connects the latter to the metallic framework 30 of the Fig. 2 typewriting machine. The levers 26 are metal, and have metallic connections to frame 30, so that depression of any key complete an electrical circuit through its associated contact 25, solenoid 19 and battery 28, thus causing core 15 to be pulled down, together with 11 and 7, whereby the type bar is thrown up to print. The contacts 25 overlie a transverse horizontal wooden bar 31 extending alternately forward and backward from the middle portion of said bar (Fig. 3), so as to give ample room; and each contact is bent down at 32, and beneath the bar 33, and secured by a screw 34 passing up into the under side of the bar. These electrical devices for operating the type-actions are useful for telegraphy and other purposes, as well as for exhibition machines, and the same is true of the carriage operating and platen shifting mechanisms.

The usual platen carriage 35 runs upon the rear rail 36 and front rail 37, a roll 38 being provided to run upon the latter. A motor 39 drives the carriage in both directions, said motor having an armature 40, which is spirally wound as at 41, so that it produces a spirally uniform pull or torque, and hence a uniform pull is exerted upon the carriage. Said armature is connected by bevel pinions 42, 43 to a shaft 44, carrying a spool 45 beneath the system of solenoids 19. Oppositely wound cables 46, 47 extend horizontally in opposite directions from said spools and around pulleys 48, 49, to the paper carriage 35. The pulleys 48, 49 are mounted on hangers 52, depending from the platen 11 and the pulleys 50, 51, are mounted opposite the sides of the machine and extend horizontally inward therefrom to operate the carriage. The cable 46 pulls the carriage in letter feeding direction while the cable 47 unwinds from the spool 45. When the rotation of the latter is reversed, the cable 47 returns the carriage to begin a new line while the cable 46 unwinds from the spool. From the pulley 50, cable 46 extends inwardly and terminates in a wire hook or loop 46^a, the latter pivoted at 53 to the usual spacing lever 54, which usually operates a slide 55 having a pawl 56 to engage a ratchet 57 to line-space the platen 4. The end of the other cable 47 has a hook 58 caught in said wire loop 46^a, so that the first pull upon the cable 47 causes a movement of the lever 54 to the right at Fig. 6, thereby partially rotating the platen. This movement of the lever is limited by the usual stop which is indicated diagrammatically at 59, Fig. 1, in the path of the slide 55. Continued pull upon the cable 47 returns the carriage to begin a new line. At the completion of the return movement of the carriage, the pull upon the cable 47 is relaxed, and the line-spacing mechanism is returned to normal position by the usual spring shown diagrammatically at 60, Fig. 1. Moreover the shifting of the pole-changer 72 to reverse the travel of the carriage, produces a pull upon the cable 46, thus drawing the stiff wire hook 46^a to the left and restoring the lever 53 to normal position.

The field windings 70 of the motor are connected by wires 71, 72, 27, 29, to the battery 28. In the branch 72 of the circuit is included a pole-changer 73 to control the flow of current in wires 74, 75 leading to the armature 40. By shifting the pole-changer, the armature is caused to rotate in either one direction or the other, so as to impel the paper carriage 35 either forwardly or backwardly as desired. It will be understood that when the line is being written, the battery 28 operates the motor between operations of the type-actions, so that the entire current is available for each operation.

By screwing in the plug 23 for about one-fourth of the length of the solenoid, and making the core or plunger 15 about equal in

length to the length of the solenoid, a very prompt action of the type-bar is secured. The solenoid may be about two inches in length, and about in the proportion shown, and when made in the described form is very powerful for its size, so that a large number may be assembled in the necessary small space, and a comparatively weak current may be employed. Some of the cores have longer strokes than others, according to the depth of stroke of the key-levers and the points of connection of the cores to the levers; but the core in each instance nearly touches the plug 23 at the completion of the printing stroke, and the shortest-stroke cores, being always near the plugs, exert a strong pull throughout the stroke, so that the effect upon the type-bars is about the same as with the longest-stroke cores. About three-fourths of the length of the core is within the solenoid at the completion of the printing stroke. In said Underwood machine, it is usual to shift the platen up and down. Normally it is in its lower position, Fig. 1, so as to enable the lower case types 2 to print; and it may be shifted up, Fig. 4, to enable the upper case types 1 to print. For this purpose the platen is usually mounted upon a shifting frame 76 connected to the carriage 35 and having a roll 77 to run upon a transverse horizontal rail 78 parallel with the rail 36. Said rail 78 is mounted upon a pair of elbow levers 79 fixed upon a rock shaft 80. A platen shift lever 81 having a key 82 and fulcrumed upon the usual fulcrum rod 83 is provided with an upstanding arm 84 to engage the rear vertical edge 79ª of the elbow lever 79, so that depression of the lever 81 locks the lever 79, and elevates the shift rail 78 together with the platen, Fig. 4. Accidental displacement of the platen frame when shifted either up or down is prevented by a bar or lever 85 having rear and forward notches 86, 87, the former normally engaging a pin 88 projecting laterally from the lower end of the elbow lever 79. The lever 85 is pivoted at 89. At a point forward of said pivot it is connected by a link 90 to the core 91 of a solenoid 92, Fig. 8, connected at one end to the wire 27 and at the other end by a wire 93 to a contact 94, a shift key or lever 95 upon the operators machine, Figs. 2 and 5, has a pair of knives 96 forking an insulation block 97, in which said contact 94 is mounted, said knives 96 being normally above said contact, Fig. 2. At the first part of the depression of the key 95, the knives 96 engage the contact 94 thereby closing circuit through the solenoid 92, and vibrating the rear end of lever 85 up to release the pin 88 and shift lever 79. As said key 95 is pressed farther down, said knives 96 engage a lower contact 98 in said block 97, which is connected through a wire 99 with a solenoid 100, the latter also connected to the wire 27, Fig. 8. The solenoid 100 is connected by a link 101 to the shift lever 81, Fig. 1, so that immediately upon being released from the locking lever 85, the platen frame and platen are shifted up to positions seen in Fig. 4. The operators shift key 95 is depressed still further, so as to become disengaged from the lower contact 98, Fig. 5, so that the entire flow of electricity from the battery 28 may pass through any solenoid 19 for actuating a type bar 3, as at Fig. 4. During the downward movement of the key 95, contact is broken between the knives 96 and the terminal 94, and a spring 102 returns the locking bar 85 to normal position with its forward notch 87 engaging the locking pin 88, so as to hold the platen frame mechanically in its upper shift position, so that the energy of the battery 28 is not drawn upon for this purpose. While the key 95 is held down by the operator, as many type bars may be operated as desired. Upon release of the key 95, it is returned by one of the usual lever springs 103, and on its upward movement first effects an idle closing movement of the circuit through the solenoid 100, and continuing upward closes circuit through a solenoid 92 thereby again releasing the locking pin 88 and releasing the shift arm 79, so that the platen frame gravitates to a normal position.

The paper carriage 35 is of course provided with the usual escapement mechanism, a portion of which is seen at 104 in the form of a universal bar which is operated by a heel 105 formed upon the type bars.

Any number of writing machines may be electrically connected and all operated simultaneously from one operator's machine or keyboard. For this purpose, all of the solenoids for the same type or letter may be connected in series. The motors may also be connected in series so as to be controlled by the same pole-changer. The shifting solenoids may be connected in series, and so may be the magnets which release the shift-lock. If desired, however, the several mechanisms may be electrically connected in parallel.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. A case shifting mechanism having a normally effective lock, an electrical device for releasing said lock, an electrical device for effecting the shift, and a single key having means for operating said electrical devices in succession.

2. A case shifting mechanism having a normally effective lock, an electrical device for releasing said lock, an electrical device for effecting the shift, and a single key having means for operating said electrical devices in succession; said electrical devices

including contacts with which said key connects in succession during the depression, and the key being so mounted that at the final portion of its depression it becomes disconnected from the second contact.

3. A case shifting mechanism having a normally effective lock, an electrical device for releasing said lock, an electrical device for effecting the shift, a single key having means for operating said electrical devices in succession; said electrical devices including contacts with which said key connects in succession during its depression, and the key being so mounted that at the final portion of its depression it becomes disconnected from the second contact, a source of power being provided for said electrical devices, and a system of type-actions provided with electrical operating devices, which are also connected to said source of power; whereby when said shift-key is depressed, said lock is first released, then the shift is effected and the lock restored to normal position, so as to detain the shift mechanism in its shifted position, and while the shift-key is held down the entire energy of said source of power may be devoted to operating the type-actions.

4. A case-shifting mechanism having a normally effective lock, a device for releasing said lock, a key having means for operating said releasing device, and an electrical device operable by said key after its operation of said releasing device, for effecting the shift.

5. A case-shifting mechanism having a normally effective lock, a device for releasing said lock, a key having means for operating said releasing device, and an electrical device operable by said key after its operation of said releasing device, for effecting the shift; said key being so mounted that at the final portion of its depression it becomes disconnected from said electrical device.

6. A case-shifting mechanism having a normally effective lock, a key, a single wire leading from said key, an electrical device controlled by said wire for releasing said lock, and an electrical device also controlled by said wire for effecting the shift.

7. A case-shifting mechanism having a normally effective lock, a key, a single wire leading from said key, an electrical device controlled by said wire for releasing said lock, and an electrical device also controlled by said wire for effecting the shift; the key moving out of connection with said wire at the final portion of its depression.

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