No. 747,485. PATENTED DEC. 22, 1903.

W. E. ROBERTS.

ELECTRICAL TYPE WRITING MACHINE.

APPLICATION FILED FEB. 27, 1902.

NO MODEL. 5 SHEETS—SHEET 1.

*Fig. 1.*

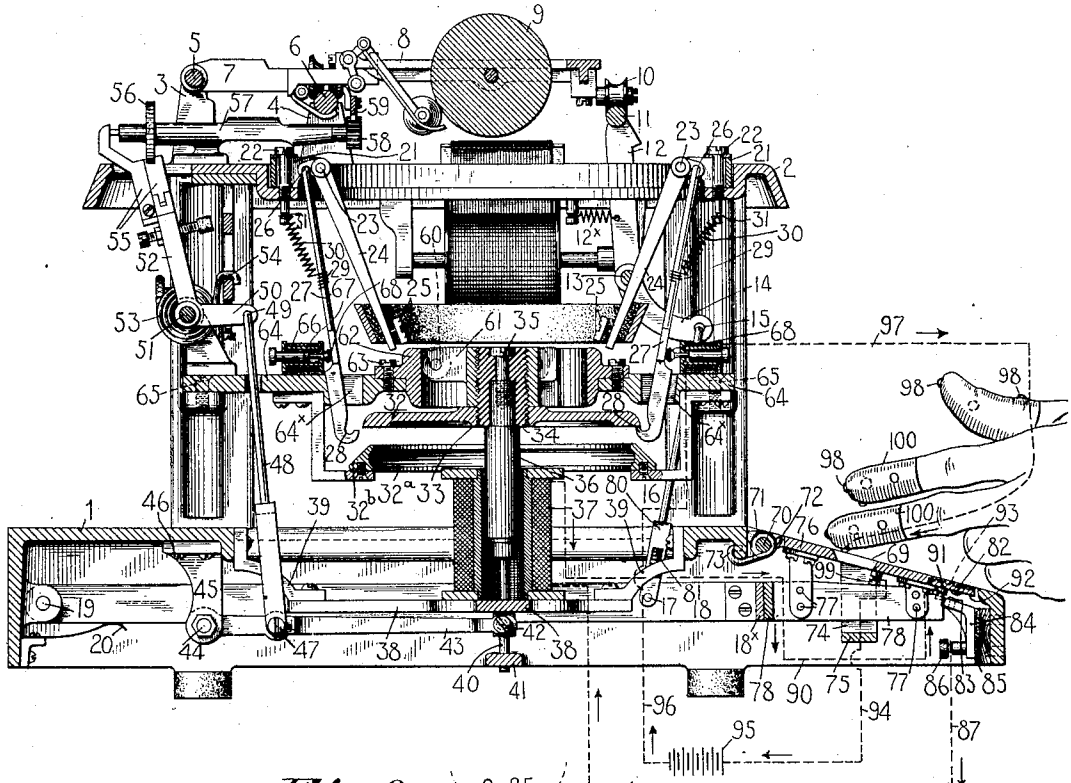


*Fig. 2.*

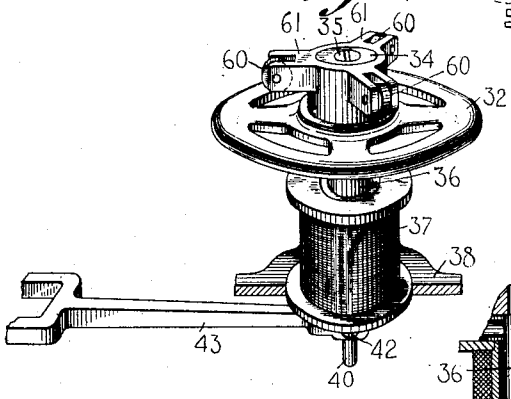
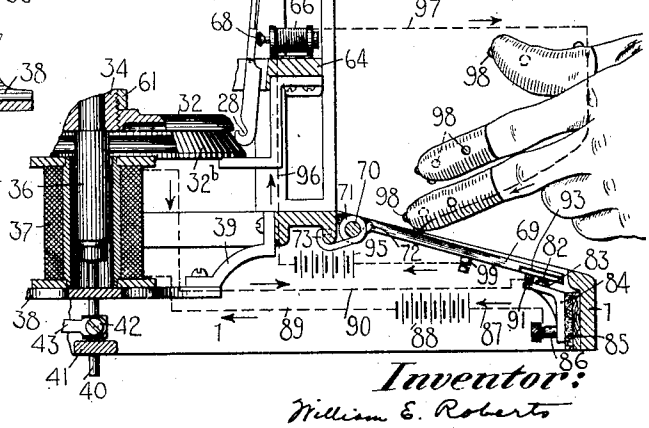


*Fig. 3.*



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NO MODEL. 5 SHEETS—SHEET 2.

*Fig. 4.*

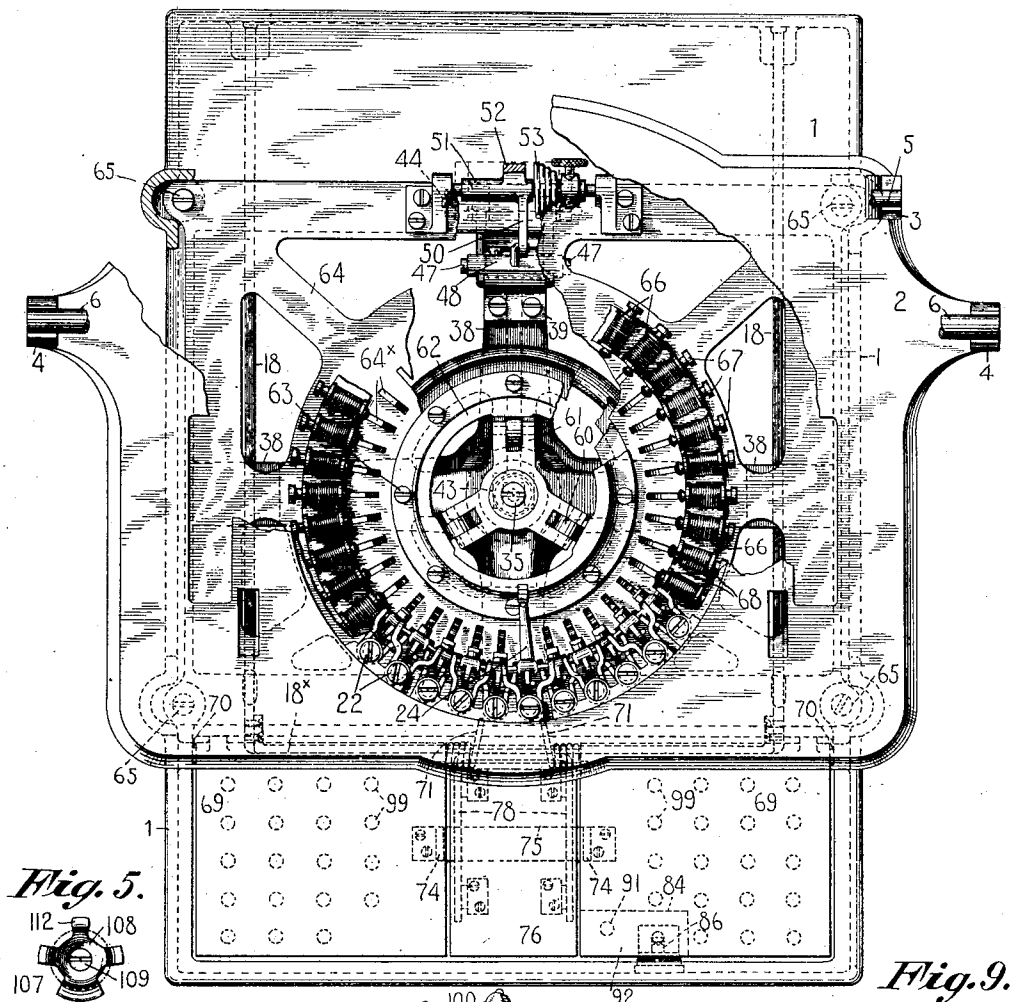



*Fig. 5.*




*Fig. 6.*

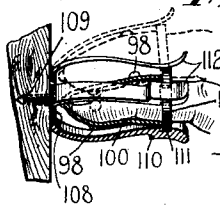
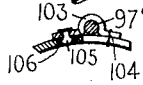



*Fig. 7.*



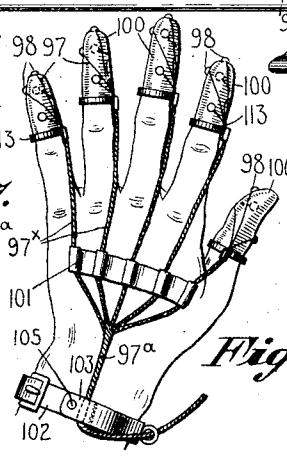
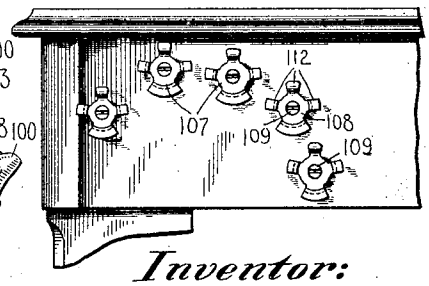




*Fig. 8*

*Fig. 9.*




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NO MODEL. 5 SHEETS—SHEET 3.

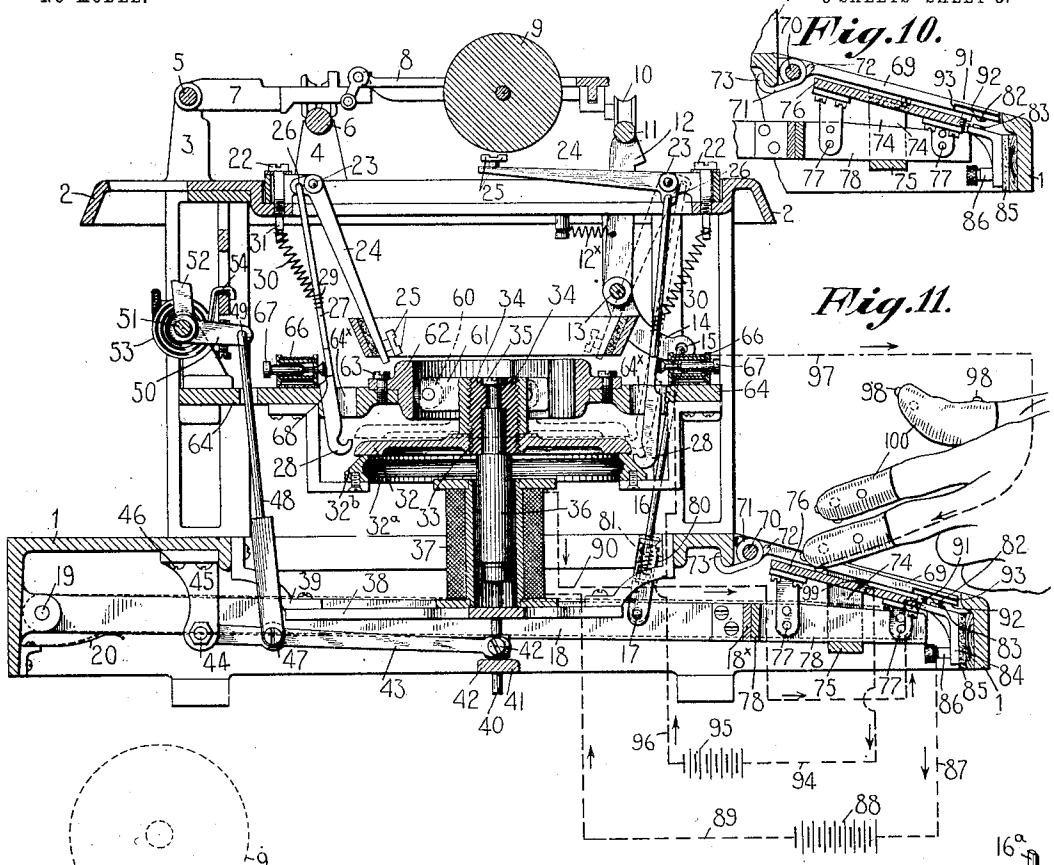


Fig. 11.



Fig. 10.

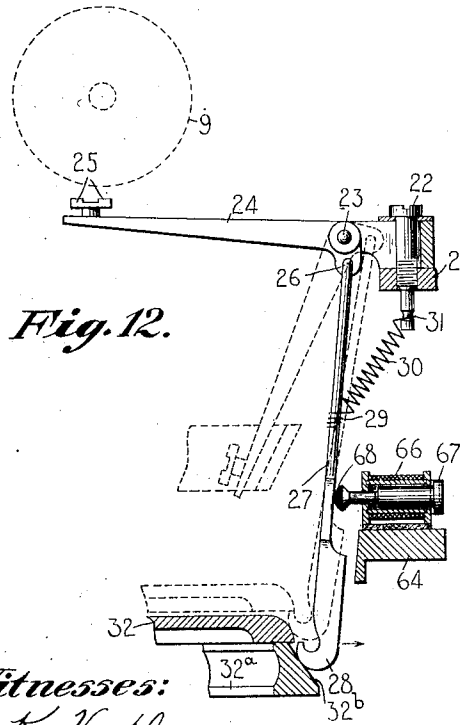


Fig. 12.

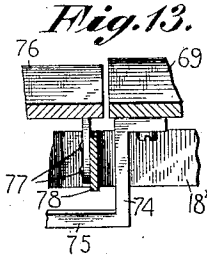


Fig. 13.

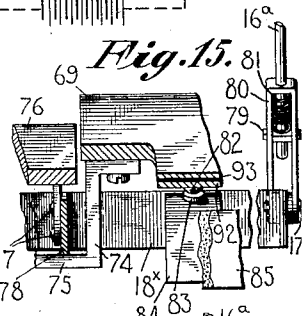


Fig. 15.

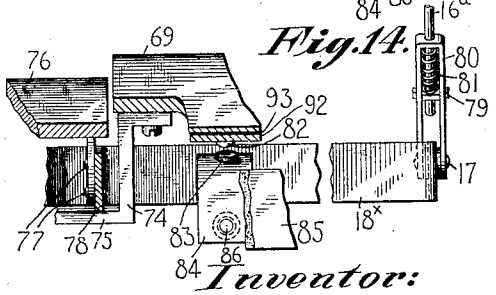


Fig. 14.

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No. 747,485. PATENTED DEC. 22, 1903.

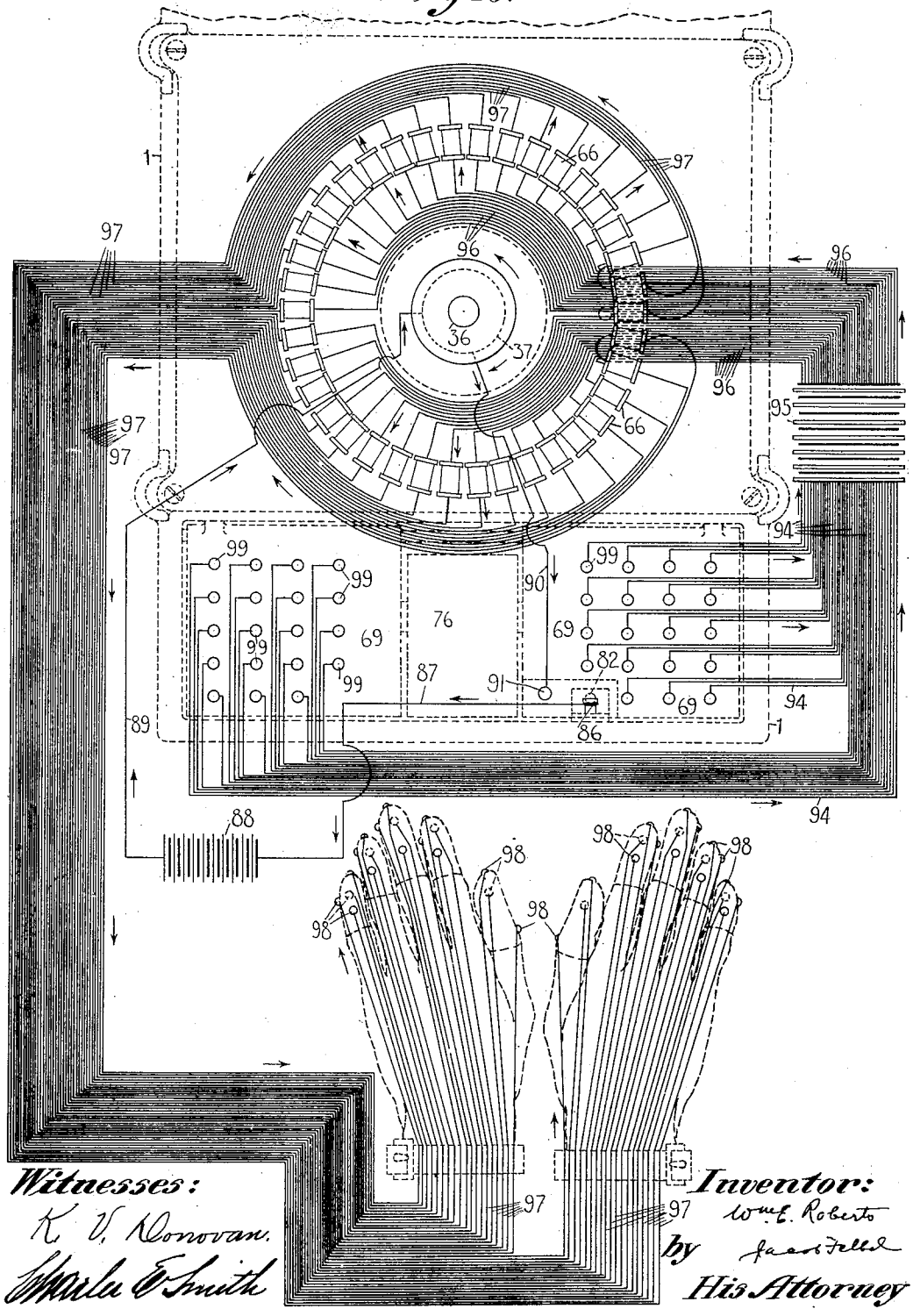
W. E. ROBERTS.

ELECTRICAL TYPE WRITING MACHINE.

APPLICATION FILED FEB. 27, 1902.

NO MODEL. 5 SHEETS—SHEET 4.

*Fig. 16.*




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

No. 747,485. PATENTED DEC. 22, 1903.

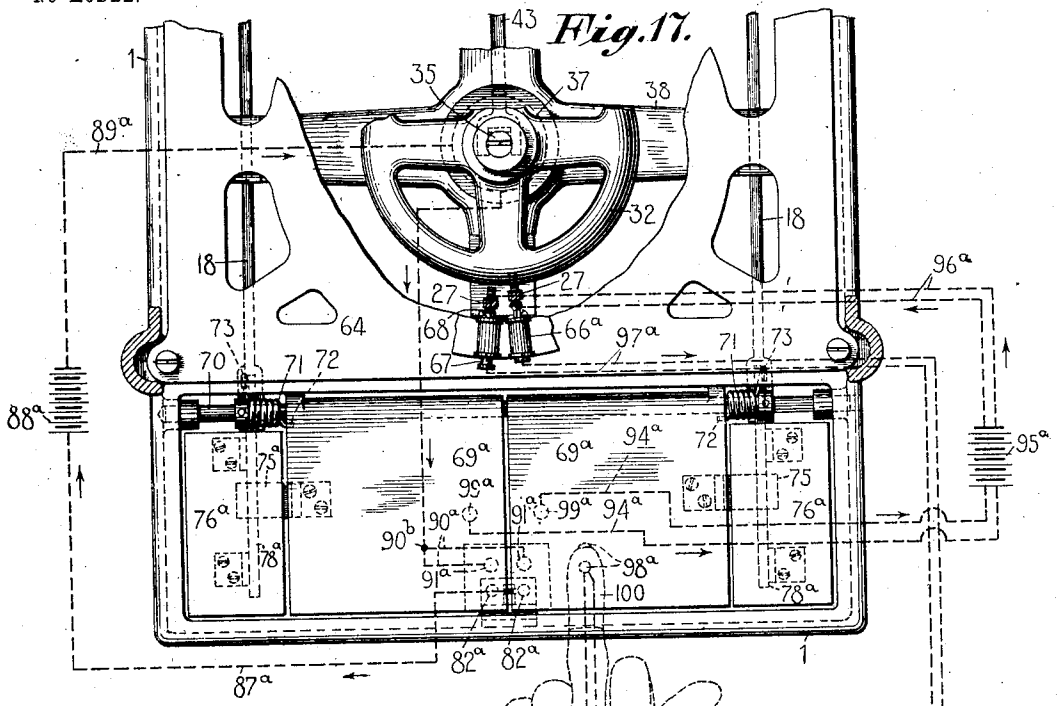
W. E. ROBERTS.

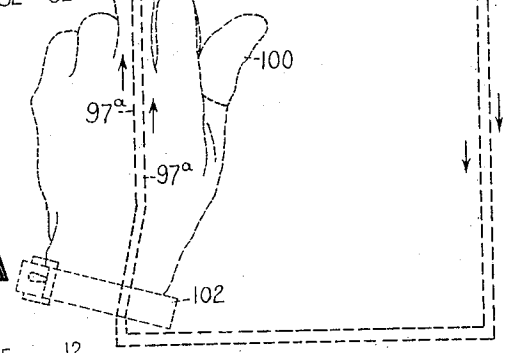
ELECTRICAL TYPE WRITING MACHINE.

APPLICATION FILED FEB. 27, 1902.

NO MODEL. 5 SHEETS—SHEET 5.

Fig. 17.



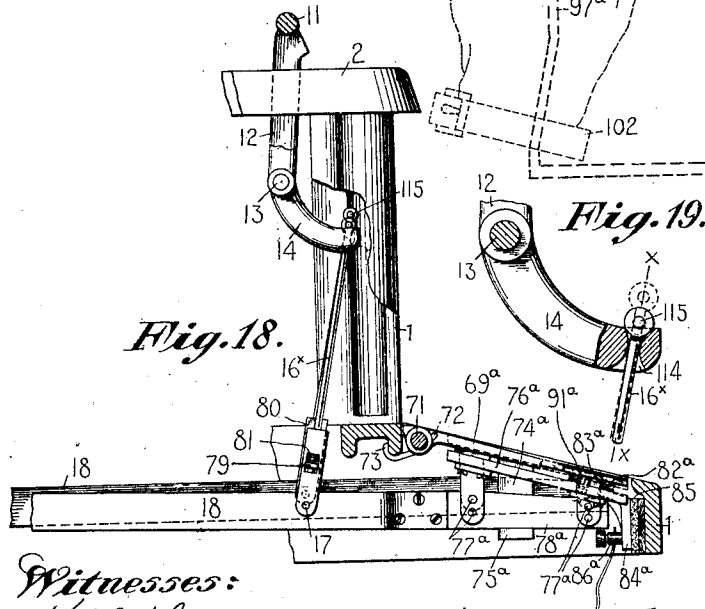




Fig. 18.




Fig. 19.

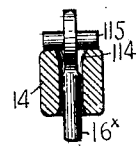



Fig. 20.

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No. 747,485. Patented December 22, 1903.

# UNITED STATES PATENT OFFICE.

WILLIAM EVANS ROBERTS, OF NEWARK, NEW JERSEY, ASSIGNOR TO WYCKOFF, SEAMANS & BENEDICT, OF ILION, NEW YORK, A CORPORATION OF NEW YORK.

## ELECTRICAL TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 747,485, dated December 22, 1903.

Application filed February 27, 1902. Serial No. 95,876. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM EVANS ROBERTS, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Electrical Type-Writing Machines, of which the following is a specification.

My invention relates to type-writing machines; and the object of said invention is to provide a simple, rapid, and efficient type-writing machine which requires but little manual labor to operate and wherein electrically-controlled means are employed to bring about an actuation of various of the parts.

To these and other ends which will hereinafter appear my invention consists in the construction, arrangement, and combination of parts hereinafter described, and particularly pointed out in the appended claims.

In the accompanying drawings, wherein like reference characters indicate corresponding parts in the various views, Figure 1 is a vertical central front to rear sectional view of one form of type-writing machine embodying my invention. Fig. 2 is a detail perspective view of the type-carrier-actuating device, together with the solenoid which actuates it and the connection to the escapement mechanism. Fig. 3 is a fragmentary vertical sectional view of a portion of the machine, the view illustrating the type-carrier just before it arrives at the printing position. Fig. 4 is a top view of the machine with the parts broken away. Fig. 5 is a detail face view of one of the finger-stall clamps. Fig. 6 is a side view of the same. Fig. 7 is an enlarged detail fragmentary sectional view of the wire-holding bracelet. Fig. 8 is a rear view of the hand, showing the application of the finger-stalls and cable-bracelet thereto. Fig. 9 is a fragmentary front elevation of the type-writer support or table, showing the clamps applied thereto. Fig. 10 is a fragmentary vertical sectional view taken through the spacing contact-plate. Fig. 11 is a front to rear vertical sectional view of the machine, illustrating the spacing contact-plate depressed and a type-bar just before it arrives at the printing position. Fig. 12 is an enlarged detail fragmentary sectional view showing a type-bar and its actuating and selecting mechanism. Figs. 13, 14, and 15 are fragmentary detail front views, with portions broken away, of the spacing and selecting contact-plates, the view illustrating the various steps during the actuation of a type-carrier through the depression of the spacing-plate. Fig. 16 is a diagrammatic plan view of the circuits. Fig. 17 is a fragmentary plan view of a modified form of machine embodying my invention. Fig. 18 is a fragmentary vertical sectional view of the same, taken through the front portion of the machine. Fig. 19 is a fragmentary detail side view, with parts broken away, of a portion of the means for shifting the platen. Fig. 20 is an enlarged detail transverse sectional view of the same, taken on the line $x\,x$ of Fig. 19.

In the drawings parts have been omitted and broken away to better illustrate other features of the construction.

I have illustrated my invention in its application to a machine which is essentially the same in many of its features as the No. 6 Remington type-writing machine, though it should be understood that the invention is applicable to various other characters of writing-machines, and to this end various changes in the construction and operation of the machine may be made without departing from the spirit of my invention.

Referring first to Figs. 1 to 16, inclusive, of the drawings, 1 indicates the frame of the machine, which is provided with a top plate 2, that supports upwardly-projecting studs 3 4, which carry traverse-rods 5 and 6, respectively, on which a truck 7 of the carriage moves from end to end of the machine. The truck has operatively connected thereto a platen-frame 8, which travels with the truck and is provided with a revoluble platen 9. The platen-frame has a traverse grooved roller 10 pivoted thereto and which is adapted to bear upon a shift rod or rail 11 and to move the platen-frame in the usual manner in a direction transverse to the length of the platen for upper and lower case printing. The shift-rail is supported upon arms 12,

which are pivoted to a fixed portion of the machine at 13 and are provided with depending arms 14, that are each connected at 15 to a depending link 16, which is pivoted at its lower end 17 to a lever 18. The shift-rail is restored to the normal position by a spring $12^{\times}$, connected at one end to one of the arms 12 and at its opposite end to a fixed portion of the machine. The levers 18 are united at their forward ends by a cross-bar $18^{\times}$, and thus form with the cross-bar a yoke, and the rear ends of these levers are pivoted at 19 to the frame of the machine, and the yoke as a whole is restored to the normal position by springs 20 and $12^{\times}$.

The top plate may have the usual hangers 21, secured thereto by screws 22, and pivoted in each hanger at 23 is a type bar or carrier 24, which is provided with a plurality of types 25 thereon. The heel of each type-bar is connected at 26 to an actuating-link 27, that has a hook or abutment 28 at its lower end, and each actuating-link 27 has one end 29 of a contractile spring 30 secured thereto. The opposite end 31 of each spring may be secured to a depending stem of the screw 22, which secures the associated type-bar hanger in place, and the tension of each spring 30 is exerted to draw the lower end of the actuating-link away from its associated type-bar. The actuating-links 27 may be arranged in a circle, with their lower hook-like ends extending below the plane of the lower face of the actuating device or disk 32, and the relation of the parts is such that the hook-like ends 28 of the links are normally out of the path of movement of the disk. When, however, any of the actuating-links are moved inwardly around the connection 26 as a pivotal center, the lower hook-like end thereof will be brought beneath the lower face of the actuating-disk, as represented at the right-hand side of Fig. 1 of the drawings. Should the disk be depressed at this time, it will be understood that the type-bar of the associated link will be moved to the printing-point, the downward movement of the disk being limited by a fixed ring $32^{a}$. This ring has a cam-face $32^{b}$, which is effective to move the hooked ends of the links outwardly during the downward movement of the disk, so that they are automatically released just before the type-bar reaches the printing position, as represented in Fig. 12, and the momentum of the type-bar will bring the type thereon to the printing-point, and the rebound of the bar and its spring 30 will immediately restore the link and type-bar to the normal position. The actuating-disk 32 is preferally connected by threaded connections 33 to an insulating-piece 34, which is in turn connected by a screw 35 to the core or armature 36 of the solenoid or electromagnet 37. This solenoid is supported upon and insulated from a plate 38, which is secured to the frame of the machine by brackets 39. The core or armature 36 is likewise provided with a downwardly-extending stem 40, which is guided in a suitable bracket or cross-bar 41. This stem 40 is pivoted at 42 and insulated from one end of a lever 43, which has its opposite end pivoted at 44 to a downwardly-extending bracket 45, that is secured at 46 to the frame of the machine. Pivoted to this lever at 47 intermediate of its ends is a link 48, which has its upper end connected at 49 to a crank-arm 50, which projects from a rock-shaft 51 of the dog-carrier 52. The solenoid core or armature, with the parts connected thereto, and the dog-carrier are restored to the normal position by a spring 53, which is connected at one end 54 to the frame of the machine and at its opposite end to the rock-shaft 51. If desired, a separate spring may be employed to aid in the restoration of the parts to the normal position. The dog-rocker 52 may be provided with the usual feed-dogs 55, that coöperate with an escapement-wheel 56, that is operatively connected with a shaft that rotates in a bearing 57, secured to the top plate of the machine. The forward end of this shaft is provided with a feed-pinion 58, which meshes with a feed-rack 59, carried by the carriage-truck 7. The solenoid core or armature and the actuating disk or device 32 may be guided in their vertical movement by antifriction-rollers 60, carried in brackets 61, that extend from said device, and the antifriction-rollers are adapted to bear on the side walls of the guide 62, which is secured at 63 to a supporting and guide plate 64, which in turn is secured to the frame of the machine by screws 65. The plate 64 has guiding-slots $64^{\times}$ therein, through which the actuating-links 27 extend, the side walls of the slots limiting the lateral movement of the links.

Surrounding the actuating-links 27 and circularly arranged on the supporting-plate 64 is a series of solenoids or electromagnets 66, one of such solenoids being employed for each actuating-link. Each solenoid is provided with a core or armature 67, that has an insulating-head 68, which is adapted to bear upon the associated actuating-link 27, and when a solenoid 66 is energized the core 67 thereof will force its link inwardly against the tension of its spring 30, so that the hook-like end of the link will be forced beneath the actuating device 32, and upon the downward movement of said device the connected type-bar will be moved to the printing-point. During these movements of the parts the hooked end of the selected link will be carried off the edge of the disk or ring 32, so that the hook is released just before the type-bar reaches the printing position, and when the circuit which energized the solenoid 66 of said link is broken the tension of the spring 30 of the associated link will become effective to restore the core 67 of said solenoid to the normal position.

The so-called "selecting contact-plates" 69 are pivoted upon a rod 70 and are suitably

insulated from the frame of the machine, and each of these plates is normally maintained in the elevated position by a spring 71, which is secured at one end 72 to one of the plates 69 and at its opposite end 73 to the frame of the machine. Secured to and depending from the plates 69 are bracket-arms 74, which are united at their lower ends by a cross-bar 75, which extends beneath a centrally-disposed vibratory shifting contact-plate 76, that is pivoted upon the rod 70. This contact-plate 76 is secured by angle-irons at 77 to the forwardly-projecting arms of angle-irons 78, which are secured to the cross-bar $18^{\times}$, that unites levers 18. It will be understood that a depression of the contact-plate 76 will cause the arms 12 to be vibrated against the tension of the spring $12^{\times}$, thus moving the platen in a direction transverse to its length to bring about a shift of the platen for upper and lower case writing. Upon reference to Figs. 14 and 15 it will be observed that lost motion may be provided in the link 16 by the arrangement therein shown. Thus, for instance, the lower end of the rod $16^{a}$ is provided with a cross-head 79, which works within guide-slots in a yoke 80, that is pivoted at 17 to the levers 18, and an expansion-spring 81 is interposed between the yoke and the cross-head. The tension of this spring is sufficient to cause a transmission of movement through the rod $16^{a}$ to the arms 12 when the shift-plate is depressed, and thus effect a shifting movement of the platen. After the full-shift movement has taken place and the transverse movement of the platen-frame is arrested a further downward movement of the shift-plate will cause a compression of the spring 81, so as to permit the angle-iron 78 to contact with the cross-bar 75, thus causing the contact-plates 69, to which said cross-bar is secured, to be electrically connected to the plate 76 and to be forced down or to follow the shift-plate 76 during a still further depression of said plate. One of the contact-plates 69 is provided with a contact 82, that is adapted to bear upon the contact 83, which is supported by a bracket 84, that is insulated at 85 from the machine. This bracket 84 is provided with a binding-post 86, to which a wire 87 is connected, and this wire extends to a battery 88, and a wire 89 leads from this battery to the solenoid 37. The return-wire 90 leads from the solenoid to a binding-post 91, which is carried by a plate 92, to which the contact 82 is secured, and this plate 92 is insulated at 93 from the contact-plate 69, which carries it.

Each plate 69 has secured thereto a plurality of terminals 99 of the wires 94, (see Fig. 16,) which extend to a battery 95. Corresponding wires 96, extending from this battery to various of the selecting-solenoids 66 and return-wires 97, extend from the solenoids to selecting-contacts 98, carried by the fingers of the operator—that is to say, each selecting-solenoid 66 has a corresponding selecting-contact 98 on a finger of the operator and constitutes a portion of a separate and distinct circuit, which is formed by the battery 95, a wire 96, a solenoid 66, a wire 97, a contact 98 on the finger of the operator, one of the contact-plates 69, and the return-wire 94. In the diagrammatic view shown in Fig. 16 these various circuits are illustrated, each circuit being shown with a separate connection 99 on a contact-plate 69. It should be understood, however, that these various wires 94 may be bunched in two groups and the terminals for each group connected to a single binding-post on one of the contact-plates 69. Thus it will be seen that one half of the circuits may be made through one of the contact-plates 69 and the other half made through the other contact-plate 68, or, in other words, that the wires of one half of the selecting-solenoids 66 are connected to one of the plates 69 and the other half of the solenoids 66 are connected to the other contact-plate 69. It is merely necessary for the operator to place one of the contacts 98 upon a contact-plate 69 when a current will be established to energize the particular selecting-solenoid 66 for which said contact 98 is provided. The energizing of the solenoid 66 will force the core or armature 67 thereof inwardly, thus moving the hook-like end 28 of the associated actuating-link 27 beneath the actuating device or disk 32. It will be seen that little labor is required, and no manual movement of the parts is necessary to bring about this selection of the type-carrier to be actuated. A slight depression upon the selecting contact-plate 69 at this time will cause the contact 82 thereon to bear upon the associated contact 83. This will result in energizing the solenoid 37, which will cause the core or armature 36 to be drawn down, together with the actuating device 32 secured thereto, and the selected type-bar will be moved to the printing position. This same movement of the solenoid-core 36 is effective to actuate the escapement mechanism and to permit the carriage to be moved by the usual spring-drum, (not shown,) when the core moves back to the normal position.

It is of course immaterial at what point on a contact-plate 69, or either or them, (because they are electrically connected by the cross-bar 75 and, in effect, constitute one plate,) a contact 98 bears, so that the operator has no need of fixing attention upon a keyboard, as is ordinarily the case. There may be any suitable number of contacts 98 secured to each finger-stall or carrier 100, which is adapted to fit the fingers of the operator, and each contact is connected in the construction thus far described with a single selecting-solenoid 66. In the present construction the machine is shown provided with seventy-six characters, and these seventy-six characters may be selected and printed by the contacts carried by the fingers of the operator and the coöperation of the selecting contact-plates 69 and the shift-plate 76.

Should the operator press upon the shift-plate 76 with one of the contacts 98 so as to move said plate from the position shown in Fig. 13 to that represented in Fig. 14, the platen will first be shifted transversely by the mechanical connection, and when the angle-irons 78 reach contact with the bar 75, as shown in Fig. 14, an electrical connection between the plate 76 and the plates 69 will be established and a current will pass through a selecting-solenoid to move the particular actuating-link which corresponds to the selecting-contact 98 on the plate 76 into the path of the actuating device 32. A further depression of the plate 76, which is allowed by the spring connection in the link 16, will cause the plates 69 to be forced down with the plate 76, thereby bringing the contact 82 on one of the plates 69 to bear upon its associated contact 83, when the circuit will be closed which energizes the actuating-solenoid 37. The core 36 will then be drawn down and the particular type-bar selected by the contact 98 which bears upon the plate 76 will be moved to the printing position. It will therefore be seen that the shift-plate 76 is not alone effective to bring about a shift of the platen, but that a movement of this plate will select and operate the particular type-carrier which corresponds to the contact 98 that is brought to bear upon the plate, so that a single depression of the shift-plate 76 accomplishes a threefold result—that of shifting the platen, selecting the type-carrier to be operated, and actuating the type-carrier. When the operator desires to feed the carriage without actuating a selecting device and without therefore operating a type-bar, it is merely necessary to depress the vibratory selecting-plate without bringing a selecting-contact 98 to bear thereon. This will result in the contact 82 bearing upon the contact 83, and a current will be established through the solenoid 37 and the escapement mechanism will be actuated. While the actuating device 32 is moved, at this time no printing will take place, for the reason that a selecting-solenoid has not been energized and all of the hooked ends of the actuating-links 27 will therefore be out of the path of the disk or ring 32.

From the foregoing description it will be understood that the solenoid-magnets 66, their cores 67, and the links 27 constitute selecting means or devices. These are first operated to select the type-bar to be actuated, and the subsequent operation of the actuating device or disk 32 will effect an operation of the selected type-bar.

Upon reference to Fig. 8 it will be observed that the various wires 97, which extend from the contacts carried by each finger-stall 100, are united to form a cable $97^{\times}$, which passes through a guide 101, and that these various cables from the fingers of the operator are united into a single cable $97^{a}$, which passes through a guide in a bracelet or support 102. This guide may be formed by a strap 103, which is secured at one end 104 to the body of the bracelet and may be provided with a clasp member 105 at its opposite end that cooperates with a clasp member 106, carried by the bracelet. The cable $97^{a}$ is placed in position and the clasp-carrying end of the strap 103 is secured in place and the cable may extend as a single cable until it arrives at the machine, where connection is made between the respective solenoids and the wires 97, which make up the cable.

In order that the finger-stalls may be maintained in their proper order, so that each finger-stall may be attached to the particular finger for which it is intended, it is deemed desirable to provide finger-stall clamps 107 for supporting the finger-stalls when they are not in use. Upon reference to Fig. 9 it will be observed that these clamps may be secured to the table or support for the machine and that the arrangement thereof is such that the fingers with the finger-stalls thereon may be inserted in the clamps, as represented in full lines in Fig. 6. The clamps 107 are each constructed with a base portion 108, through which the screw 109 may be projected to secure the clamp in place to a suitable support. Each clamp is provided with a rigid arm 110, that has a groove 111 therein, and extending from the base 108 are resilient clamping-arms 112, which are smooth on their inner face and are spaced apart throughout their lengths and adapted with the rigid arm 110 to surround a finger-stall, as well as to allow an endwise insertion of a finger-stall in a clamp, as illustrated in Fig. 6. In order to remove the finger-stalls, it is merely necessary to insert the fingers with the stalls thereon into their respective places in the clamps, when the collar or lug 113 on each finger-stall will seat itself within the groove 111. The fingers may then be withdrawn and the stalls maintained in the clamps. When the operator desires to place the stalls upon the fingers, it is merely necessary to insert the fingers therein in the same order in which they were withdrawn and to slightly raise the fingers with the stalls thereon, as indicated in dotted lines in Fig. 6, thus removing the lugs 113 from their respective recesses 111 and the fingers may be drawn out of the clamps with the stalls in place thereon.

In the modification shown in Figs. 17 to 20 of the drawings the same reference characters are employed to indicate the parts which are the same as those shown in the other figures. In this modification each selecting-contact $98^{a}$ on a finger of the operator is connected to two wires $97^{a}$, which extend to separate solenoids or electromagnets $66^{a}$. There are likewise two selecting contact-plates $69^{a}$ employed in this construction, and each of said plates is provided with a contact $82^{a}$, that coöperates with a contact $83^{a}$, and each of said contact-plates is likewise provided with a binding-post $91^{a}$, to which the wires $90^{a}$ are connected, and these wires are joined

at $90^b$, and the single branch thereof extends to the solenoid 37. A single fixed bracket $84^a$, which carries the two contacts $83^a$, is provided with a binding-post $86^a$, to which is secured a wire $87^a$, that passes to a battery $88^a$, and the wire $89^a$ extends from this battery to the solenoid 37. The terminals $99^a$ of the wires $94^a$ are connected to the contact-plates and extend to a battery $95^a$, and the wires $96^a$ extend from this battery to the solenoids $66^a$. There are likewise provided two shifting contact-plates $76^a$, both of which are constructed in a similar manner, each being electrically connected at $77^a$ to a metallic plate $78^a$, which is adapted to cooperate with the lateral extension $75^a$ of a bracket-iron $74^a$, which is secured to one of the contact-plates $69^a$. It will be understood that the operation of this modified construction is the same as the construction formerly described, except that each selecting-contact $98^a$ is adapted to select a plurality of type-carriers by reason of its connection with the plurality of the selecting-solenoids $66^a$, the particular type-bar selected depending upon which of the contact-plates $69^a$ the selecting-contact is brought to bear upon. Thus, for instance, if a selecting-contact, as indicated in Fig. 17, is brought to bear upon the right-hand selecting-plate then the solenoid $66^a$ (shown to the right in Fig. 17) will be energized. On the contrary, if the same selecting-contact $98^a$ is brought to bear upon the left-hand selecting-plate $69^a$ then the left-hand solenoid $66^a$ (shown in Fig. 17) will be energized and the associated actuating-link 27 will have its hooked end forced beneath the actuating device 32. After the selection has been thus made a depression of the contact-plate $69^a$ will cause the contact $82^a$ thereon to be brought to bear upon its coöperating contact $83^a$, thus closing the circuit through the actuating-solenoid 37 and causing the actuating device 32 to operate the type-bar through the selected link. The upper end of each connecting-link $16^\times$ passes through an aperture 114 in the depending arm 14, which is connected to each of the arms 12, that carry the shift-rod 11. The rod $16^\times$ is provided at its upper end with a pin 115, which extends to opposite sides thereof and constitutes a stop, which causes the arms 12 14 to be moved therewith during the downward movement of a link $16^\times$, but permits the arms 14 to move downwardly independently of said links. This is in order to permit an independent movement of the shift-plates $76^a$ at opposite sides of the machine. Thus, for instance, when the shift-plate upon one side of the machine is depressed it will cause the shift-rail 11 to be moved through the intermediate connections, but will permit the shift-plate at the opposite side of the machine to remain in the normal position, the upper end of the link $16^\times$ of said fixed plate riding freely through the aperture 114 in its coöperating arm 14.

It should be understood that any desired number of contact-plates $69^a$ may be employed and that the greater the number of shift-plates the greater will be the reduction of selecting-contacts carried upon the fingers of the operator. If three selecting-contacts be employed, then each selecting-contact upon a finger of the operator will be connected with three selecting-solenoids and each selecting-contact will be available to energize any one of the three selecting-solenoids in accordance with the contact-plate upon which it is brought to bear.

While I have shown and described with considerable detail two forms or embodiments of my invention, it should be understood that various changes in construction and operation may be made without departing from the spirit of my invention.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a type-writing machine, the combination of a series of printing instrumentalities, and means for selecting and operating said printing instrumentalities, said selecting means comprising selecting devices, a plurality of electrical contacts carried by a hand of the operator and each corresponding to one or more particular printing instrumentalities of the series, a coöperating contact on the machine and electrical connections between said contacts and the selecting devices.

2. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said printing instrumentalities, said operating means comprising a vibratory selecting contact-plate that is moved by the fingers of the operator bearing thereon, and means for establishing an electrical connection to actuate a printing instrumentality when the selecting-plate is moved and after an electrical current is sent through it to operate the selecting means.

3. In a type-writing machine, the combination of printing instrumentalities, and means for selecting said printing instrumentalities, said selecting means comprising an electrical contact carried by the hand of the operator, a movable coöperating selecting-contact on the machine, and electrical connections between said contacts and the selecting means, and means for operating said printing instrumentalities, said operating means comprising an electrical connection to actuate a printing instrumentality when the selecting-contact is moved and after an electric current is sent through it to actuate the selecting means.

4. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said printing instrumentalities, said selecting means comprising selecting devices, a plurality of electrical contacts carried by a hand of the operator, each contact being effective to select at least one character to be printed, a contact carried by the machine and with which various contacts on a hand of the operator are

adapted to coöperate to establish electric currents, and electrical connections between the various contacts and the selecting devices.

5. In a type-writing machine, the combination of printing instrumentalities, and means for selecting said printing instrumentalities, said selecting means comprising selecting devices, a plurality of electrical contacts carried by a hand of the operator, each contact being effective to select at least one character to be printed, a contact carried by the machine and with which various contacts on a hand of the operator are adapted to coöperate to establish electric currents, electrical connections between the various contacts and the selecting devices, and means for automatically actuating a printing instrumentality after it is selected.

6. In a type-writing machine, the combination of printing instrumentalities, and means for selecting said printing instrumentalities, said selecting means comprising a plurality of electrical contacts carried by a hand of the operator, each contact being effective to select at least one character to be printed, a movable contact-plate carried by the machine and with which various contacts on a hand of the operator are adapted to coöperate to establish electric currents, electrical connections between the various contacts and the selecting means, and means controlled by the movement of said contact-plate for automatically actuating a printing instrumentality after it is selected.

7. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said printing instrumentalities, said selecting means comprising a plurality of electrical selecting-contacts carried by a hand of the operator, each contact being effective to select a plurality of characters to be printed, a plurality of contacts carried by the machine and with which various selecting-contacts on a hand of the operator are adapted to coöperate to establish electric currents, and electrical connections between the various contacts and the selecting means.

8. In a type-writing machine, the combination of printing instrumentalities, and means for selecting said printing instrumentalities, said selecting means comprising a plurality of electrical selecting-contacts carried by a hand of the operator, each contact being effective to select a plurality of characters to be printed, a plurality of contacts carried by the machine and with which various selecting-contacts on a hand of the operator are adapted to coöperate to establish electric currents, electrical connections between the various contacts and the selecting means, and means for automatically actuating a printing instrumentality after it is selected.

9. In a type-writing machine, the combination of printing instrumentalities, and means for selecting said printing instrumentalities, said selecting means comprising a plurality of electrical selecting-contacts carried by a hand of the operator, each contact being effective to select a plurality of characters to be printed, a plurality of movable contact-plates carried by the machine and with which various selecting-contacts on a hand of the operator are adapted to coöperate to establish electric currents, electrical connections between the various contacts and the selecting means, and means controlled by the movement of said contact-plates for automatically actuating a printing instrumentality after it is selected.

10. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said instrumentalities, said selecting means comprising a plurality of selecting devices, a plurality of electrical selecting-contacts which are carried by the fingers of the operator, wires that extend from said contacts to the selecting devices, a contact on the machine with which various contacts on the fingers of the operator are adapted to coöperate to establish electrical currents, and electrical connections between said contact on the machine, and the selecting devices.

11. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said instrumentalities, said selecting means comprising selecting devices, electrical selecting-contacts which are carried by the fingers of the operator, a plurality of wires that extend from each of said contacts to the selecting devices of different printing instrumentalities, a plurality of contacts on the machine, and electrical connections between each of said contacts on the machine and a plurality of selecting devices.

12. In a type-writing machine, the combination of printing instrumentalities, and selecting means for said printing instrumentalities, said selecting means comprising selecting devices, electrical selecting-contacts which are carried by the fingers of the operator, wires that extend from said contacts to the selecting devices, a movable contact on the machine, a plurality of electrical connections between said contact on the machine and the selecting devices, and means for automatically actuating a printing instrumentality after it has been selected by the selecting means, the said automatic movement of the printing instrumentalities being controlled by the movement of said movable contact.

13. In a type-writing machine, the combination of printing instrumentalities, and selecting means for said printing instrumentalities, said selecting means comprising selecting devices, electrical selecting-contacts which are carried by the fingers of the operator, a plurality of wires that extend from each of said contacts to the selecting devices of different printing instrumentalities, a plurality of contacts on the machine, electrical connections between said contacts on the ma-

chine and a plurality of selecting devices, and means for automatically actuating a printing instrumentality after it has been selected by the selecting means.

14. In a type-writing machine, the combination of printing instrumentalities, devices for selecting and operating said printing instrumentalities, a movable contact which is electrically connected to a plurality of selecting devices, contacts carried by the hands of the operator and which coöperate with said movable contact to establish an electrical current to actuate the selecting devices, and means for automatically actuating the operating device when the said movable contact is moved and after a printing instrumentality has been selected with the aid thereof.

15. In a type-writing machine, the combination of printing instrumentalities, devices for selecting and operating said printing instrumentalities, a movable contact-plate that is in the nature of a keyboard with which the fingers of the operator are adapted to contact and which is electrically connected to a plurality of selecting devices, means for automatically actuating the operating device when the said contact-plate is moved and after a printing instrumentality has been selected with the aid thereof, feeding mechanism for the feeding paper letter-space distances, and means for automatically actuating said feeding devices.

16. In a type-writing machine, the combination of a series of printing instrumentalities, means for selecting and operating said printing instrumentalities, said selecting means comprising a plurality of electrical contacts carried by a hand of the operator and each corresponding to one or more particular printing instrumentalities of the series, a coöperating contact on the machine, electrical connections between said contacts and the selecting means, a paper-carriage, and means for automatically moving said carriage in the direction of its feed.

17. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said printing instrumentalities, said operating means comprising a vibratory selecting contact-plate that is in the nature of a keyboard and with which the fingers of the operator are adapted to coöperate, means for establishing an electrical connection to actuate a printing instrumentality when the selecting-plate is moved and after an electrical current is sent through it to operate the selecting means, a paper-carriage, and electrically-controlled means for feeding said carriage.

18. In a type-writing machine, the combination of printing instrumentalities, and means for selecting said printing instrumentalities, said selecting means comprising an electrical contact carried by the hand of the operator, a movable coöperating selecting-contact on the machine, and electrical connections between said contacts and the selecting means, means for operating said printing instrumentalities, said operating means comprising an electrical connection to actuate a printing instrumentality when the selecting-contact is moved and after an electric current is sent through it to actuate the selecting means, a carriage, and electrically-controlled means for moving said carriage in the direction of its feed.

19. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said printing instrumentalities, said selecting means comprising selecting devices, a plurality of electrical contacts carried by a hand of the operator, each contact being effective to select at least one character to be printed, a contact carried by the machine and with which various contacts on a hand of the operator are adapted to coöperate to establish electric currents, electrical connections between the various contacts and the selecting devices, a power-driven carriage, escapement mechanism therefor, and electrically-controlled means for automatically actuating said escapement mechanism.

20. In a type-writing machine, the combination of printing instrumentalities, and means for selecting said printing instrumentalities, said selecting means comprising a plurality of electrical contacts carried by a hand of the operator, each contact being effective to select at least one character to be printed, a movable contact-plate carried by the machine and with which various contacts on a hand of the operator are adapted to coöperate to establish electric currents, electrical connections between the various contacts and the selecting means, and means controlled by the movement of said contact-plate for automatically actuating a printing instrumentality after it is selected, a power-driven carriage, escapement mechanism therefor, and means controlled by the movement of said contact-plate for actuating said escapement mechanism.

21. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said printing instrumentalities, said selecting means comprising a plurality of electrical selecting-contacts carried by a hand of the operator, each contact being effective to select a plurality of characters to be printed, a plurality of contacts carried by the machine, and with which various selecting-contacts on a hand of the operator are adapted to coöperate to establish electric currents, electrical connections between the various contacts and the selecting means, a carriage, and means controlled by the movement of any of said movable contacts for moving the carriage in the direction of its feed.

22. In a type-writing machine, the combination of printing instrumentalities, and means for selecting said printing instrumentalities, said selecting means comprising a plurality of electrical selecting-contacts carried by a

hand of the operator, each contact being effective to select a plurality of characters to be printed, a plurality of movable contact-plates carried by the machine and with which various selecting-contacts on a hand of the operator are adapted to coöperate to establish electric currents, electrical connections between the various contacts and the selecting means, means controlled by the movement of said contact-plates for automatically actuating a printing instrumentality after it is selected, a power-driven carriage, and electrical means controlled by the movement of said movable contact-plates.

23. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said instrumentalities, said selecting means comprising selecting devices, electrical selecting-contacts which are carried by the fingers of the operator, wires that extend from said contacts to the selecting devices, a contact on the machine, electrical connections between said contact on the machine and a plurality of selecting devices, a carriage, and electrically-controlled means for moving the carriage in the direction of its feed at each operation of a printing instrumentality.

24. In a type-writing machine, the combination of printing instrumentalities, and means for selecting and operating said instrumentalities, said selecting means comprising selecting devices, electrical selecting-contacts which are carried by the fingers of the operator and are merely effective to select the printing instrumentality to be actuated, a plurality of wires that extend from each of said contacts to certain of the selecting devices of different printing instrumentalities, a plurality of contacts on the machine, electrical connections between each of said contacts on the machine and a plurality of selecting devices, a power-driven carriage, and means controlled by contacts on the machine for automatically feeding the carriage a letter-space distance at each operation of a printing instrumentality.

25. In a type-writing machine, the combination of printing instrumentalities, and selecting means for said instrumentalities, said selecting means comprising electrical selecting-contacts which are carried by the fingers of the operator, a plurality of wires that extend from each of said contacts to the selecting means of different printing instrumentalities, a plurality of contacts on the machine, electrical connections between said contacts on the machine and the selecting means, means for automatically actuating a printing instrumentality after it has been selected by the selecting means, a carriage, escapement mechanism therefor, and means controlled by the movement of the actuating means of printing instrumentalities for operating the escapement mechanism.

26. In a type-writing machine, the combination of printing instrumentalities, selecting devices therefor, a vibratory contact-plate that is moved by the fingers of the operator bearing thereon and which constitutes one terminal for the circuits of a plurality of said selecting devices, an operating device for the printing instrumentalities, and electrical connections for actuating the operating device when said contact-plate is moved by the fingers of the operator.

27. In a type-writing machine, the combination of printing instrumentalities, selecting devices therefor, a vibratory contact-plate which constitutes one terminal for the circuits of a plurality of said selecting devices, a single operating device for all of the printing instrumentalities, electrical connections for actuating the operating device when said contact-plate is moved, a carriage, and means controlled by the movement of the contact-plate and operable independently of the selecting devices for affording a movement of the carriage in the direction of its feed.

28. In a type-writing machine, the combination of printing instrumentalities, selecting devices therefor, a vibratory contact-plate which constitutes one terminal for the circuits, of a plurality of said selecting devices, the other terminal of each of said circuits being carried by the hands of the operator, an operating device for the printing instrumentalities, and electrical connections for actuating the operating device when said contact-plate is moved.

29. In a type-writing machine, the combination of printing instrumentalities, selecting devices therefor, a vibratory contact-plate which constitutes one terminal for the circuits of a plurality of said selecting devices, the other terminal of each of said circuits being carried by the hands of the operator, an operating device for the printing instrumentalities, and electrical connections for actuating the operating device when said contact-plate is moved, said connections comprising a contact carried by the contact-plate, a relatively fixed contact with which the contact on the plate coöperates, and electrical connections between the two contacts and the operating device.

30. In a type-writing machine, the combination of means for feeding the paper letter-space distances, printing instrumentalities, selecting devices therefor, operating means for the printing instrumentalities, a movable selecting contact-plate which is electrically connected to a plurality of the selecting devices, and a movable shifting contact-plate which is adapted to move said selecting contact-plate and which is adapted to be electrically connected with the said selecting devices.

31. In a type-writing machine, the combination of means for feeding the paper letter-space distances, printing instrumentalities, selecting devices therefor, operating means for the printing instrumentalities, a movable selecting contact-plate which is electrically

connected to a plurality of the selecting devices, contacts which are carried by a hand of the operator, and which are electrically connected with the selecting devices, and a movable shifting contact-plate which is adapted to move the selecting-plate and to afford an independent movement thereof and which is adapted to be electrically connected with the said selecting devices and the operating means for the printing instrumentalities.

32. In a type-writing machine, the combination of means for feeding the paper letter-space distances, printing instrumentalities, selecting devices therefor, operating means for the printing instrumentalities, movable selecting contact-plates, each of which is electrically connected to a plurality of the selecting devices, contacts which are carried by the hands of the operator and each of which is electrically connected with a plurality of selecting devices, and a movable shifting contact-plate which is adapted to move the selecting-plates and to afford an independent movement thereof, and which is adapted to be electrically connected with the said selecting devices, and with the operating means for the printing instrumentalities and with the feeding means.

33. In a type-writing machine, the combination of means for feeding the paper letter-space distances, printing instrumentalities, selecting devices therefor, operating means for the printing instrumentalities, a spring-pressed pivoted selecting contact-plate which constitutes a keyboard and is electrically connected to a plurality of said selecting devices, a contact on said plate that is adapted to be forced into contact with a relatively fixed contact, electrical connections between said contacts and said operating means, and contacts which are carried by the hands of the operator and which are electrically connected with the selecting devices.

34. In a type-writing machine, the combination of means for feeding the paper letter-space distances, printing instrumentalities, selecting devices therefor, operating means for the printing instrumentalities, a spring-pressed pivoted selecting contact-plate which constitutes a keyboard and is electrically connected to a plurality of said selecting devices, a contact on said plate that is adapted to be brought to bear upon a relatively fixed contact, electrical connections between said contacts and the said operating means, contacts which are carried by the hands of the operator and which are electrically connected with the selecting means, a spring-pressed pivoted shifting contact-plate which is adapted to move the selecting-plate and to afford an independent movement thereof, and electrical connections between said shifting plate and the selecting devices, the operating means for the printing instrumentalities and said paper-feeding means.

35. In a type-writing machine, the combination with printing instrumentalities, an electric contact-plate which constitutes the keyboard of the machine, and coöperating contacts carried by the fingers of the operator and which with said contact-plate control the operation of the machine.

36. In a type-writing machine, the combination of type-bars, an actuating-hook for each type-bar, a single actuating device which cooperates with all of said hooks, an electromagnet for operating said actuating device, a selecting device for each type-bar, a single contact-plate which is electrically connected with a plurality of the selecting devices, contacts which are carried by the fingers of the operator and which are electrically connected to said selecting devices, and means for energizing the electromagnet of the actuating device when a selecting device has been operated.

37. In a type-writing machine, the combination of type-bars, an actuating-hook for each type-bar, a single actuating device which cooperates with all of said hooks, an electromagnet for operating said actuating device, an electrically-controlled selecting device which coöperates with each actuating-hook to move it into the path of the actuating device, a single contact-plate which is electrically connected with a plurality of the selecting devices, a plurality of contacts which are carried by the fingers of the operator and which are electrically connected to said selecting devices, means for energizing the electromagnet of the actuating device after a selecting device has been operated, and means for effecting a letter-space feed of the paper.

38. In a type-writing machine, the combination of a carriage, escapement mechanism therefor, type-bars, an actuating-hook for each type-bar, a single actuating device which coöperates with all of said hooks, a solenoid for operating said actuating device, an electrically-controlled selecting device which cooperates with each actuating-hook to move it into the path of an actuating device, a movable contact-plate which is electrically connected with the selecting devices and to the actuating device, a contact which is fixed relatively to the movement of the contact-plate and which coöperates with a contact thereon, electrical connections between said contacts and the solenoid, contacts which are carried by the fingers of the operator and which are electrically connected to said selecting devices, and means for operating the escapement mechanism from said solenoid.

39. In a type-writing machine, the combination of a carriage, escapement mechanism therefor, type-bars, an actuating-hook for each type-bar, a single actuating device which coöperates with all of said hooks, an electromagnet for operating said actuating device, a selecting-electromagnet for moving each of said hooks into the path of the actuating device, a movable spring-restored contact-plate which is electrically connected with the selecting-magnets, contacts which are carried

by the fingers of the operator and which are electrically connected with the selecting-magnets, and means for energizing the magnet of the actuating device after a selecting-magnet has been energized.

40. In a type-writing machine, the combination of a carriage, escapement mechanism therefor, type-bars, an actuating-hook for each type-bar, a single actuating device which coöperates with all of said hooks, an electromagnet for operating said actuating device, a selecting-electromagnet for moving each of said hooks into the path of the actuating device, a movable spring-restored contact-plate which is electrically connected with the selecting-magnets, contacts which are carried by the fingers of the operator, and which are electrically connected with the selecting-magnets, means for energizing the magnet of the actuating device after a selecting-magnet has been energized and operative connections between the armature of the magnet for the actuating device and the escapement mechanism.

41. In a type-writing machine, the combination of a carriage, escapement mechanism therefor, type-bars, an actuating-hook for each type-bar, a single actuating device which coöperates with all of said hooks, a solenoid for operating said actuating device, a selecting-solenoid for moving each of said hooks into the path of the actuating device, a movable spring-restored contact-plate which is electrically connected with the selecting-solenoids, a contact on said plate, a contact which is fixed with relation to the movement of said plate, electrical connections between said contacts and the solenoid for the actuating device, contacts which are carried by the fingers of the operator and which are electrically connected with the selecting-solenoids, whereby the solenoid of the actuating device is energized after a selecting-solenoid has been energized, and operative connections between the core of the solenoid for the actuating device and the escapement mechanism.

42. In a type-writing machine, the combination of a carriage, escapement mechanism therefor, type-bars, an actuating-hook for each type-bar, a single actuating device which coöperates with all of said hooks, a solenoid for operating said actuating device, a selecting-solenoid for moving each of said hooks into the path of the actuating device, a plurality of movable spring-restored contact-plates, each of which is electrically connected with a plurality of the selecting-solenoids, contacts which are carried by the fingers of the operator, and each of which is electrically connected with a plurality of the selecting-solenoids, and means for energizing the solenoid of the actuating device after a selecting-solenoid has been energized.

43. In a type-writing machine, the combination of a carriage, escapement mechanism therefor, type-bars, an actuating-hook for each type-bar, a single actuating device which coöperates with all of said hooks, a solenoid for operating said actuating device, a selecting-solenoid for moving each of said hooks into the path of the actuating device, a plurality of movable spring-restored contact-plates, each of which is electrically connected with a plurality of the selecting-solenoids, contacts which are carried by the fingers of the operator and each of which is electrically connected with a plurality of the selecting-solenoids, means for energizing the solenoid of the actuating device after a selecting-solenoid has been energized, and operative connections between the core of the solenoid for the actuating device and the escapement mechanism.

44. In a type-writing machine, the combination of a carriage, escapement mechanism therefor, type-bars, an actuating-hook for each type-bar, a single actuating device which coöperates with all of said hooks, a solenoid for operating said actuating device, a selecting-solenoid for moving each of said hooks into the path of the actuating device, a plurality of movable spring-restored contact-plates, each of which is electrically connected with a plurality of the selecting-solenoids, a contact on each of said plates, a contact which is fixed with relation to the movement of said plates, electrical connections between said contacts and the solenoid for the actuating device, contacts which are carried by the fingers of the operator, and each of which is electrically connected with a plurality of the selecting-solenoids, whereby the solenoid of the actuating device is energized after a selecting-solenoid has been energized, and operative connections between the core of the solenoid for the actuating device and the escapement mechanism.

45. In a type-writing machine, the combination of a platen, printing instrumentalities, means for actuating said printing instrumentalities, a contact shift-plate for shifting the platen and printing instrumentalities relatively one to another for upper and lower case writing, and means for automatically operating said printing instrumentalities when the shift-plate is actuated.

46. In a type-writing machine, the combination of a platen, printing instrumentalities, electrically-controlled means for actuating said printing instrumentalities, a contact shift-plate for shifting the platen and printing instrumentalities relatively one to another for upper and lower case writing, and means for automatically rendering said electrically-controlled actuating means effective to operate the printing instrumentalities when the shift-plate is actuated.

47. In a type-writing machine, the combination of a platen, printing instrumentalities, electrically-controlled selecting means therefor, electrically-controlled means for actuating said printing instrumentalities, a contact shift-plate for shifting the platen and printing instrumentalities relatively one to another

for upper and lower case writing, and means for automatically rendering said electrically-controlled selecting and actuating means effective to select and operate said printing instrumentalities when the shift-plate is actuated.

48. In a type-writing machine, the combination of a platen, a carriage, feed mechanism for said carriage, printing instrumentalities, electrically-controlled selecting means, electrically-controlled means for actuating said printing instrumentalities, a contact shift-plate for shifting the platen and printing instrumentalities relatively one to another for upper and lower case writing, and means for automatically rendering said electrically-controlled selecting and actuating means effective to select and operate said printing instrumentalities and to feed the carriage when the shift-plate is actuated.

49. A holder or clamp for a contact-carrier, said holder comprising a base or body portion, spring-arms carried thereby and between which the carrier is adapted to be inserted and held in place, said arms being spaced apart throughout their lengths, and means for securing the holder in place.

50. A holder or clamp for a contact-carrier, said holder comprising a base or body portion, spring-arms carried thereby and between which the carrier is adapted to be inserted and held in place, means for securing the holder in place, and positive engaging means carried by the holder and adapted to positively engage the contact-carrier.

51. A holder or clamp for a contact-carrier, said holder comprising a base or body portion, a rigid arm carried thereby, coöperating spring-arms that are carried by the body portion and are adapted to clamp and support the carrier between them and the rigid arm, and means on the rigid arm for positively engaging the carrier.

52. A contact-carrying finger-stall clamp which comprises a perforated base portion by which it may be secured to its support, a grooved rigid arm extending from said base portion, resilient arms that project from said base and coöperate with the rigid arm to surround and support the finger-stall in place, and by means of which the finger-stall can be withdrawn from the finger.

Signed in the borough of Manhattan, city of New York, in the county of New York and State of New York, this 20th day of February, A. D. 1902.

WILLIAM EVANS ROBERTS.

Witnesses:
K. V. DONOVAN,
E. M. WELLS.