

Feb. 20, 1940.

P. T. CAREW ET AL

2,190,649

SOLENOID CRYPTOGRAPHIC TYPEWRITER

Filed May 18, 1936

4 Sheets-Sheet 1

Fig. 1

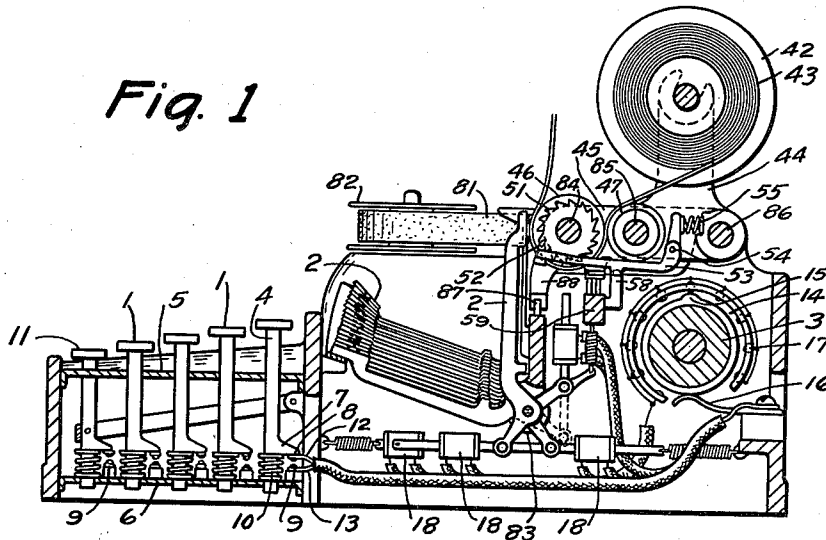
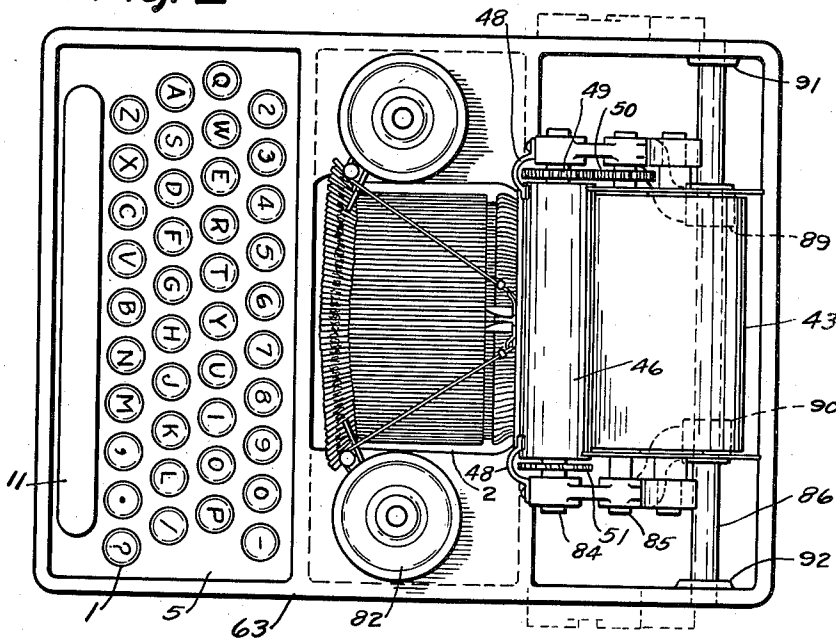


Fig. 2



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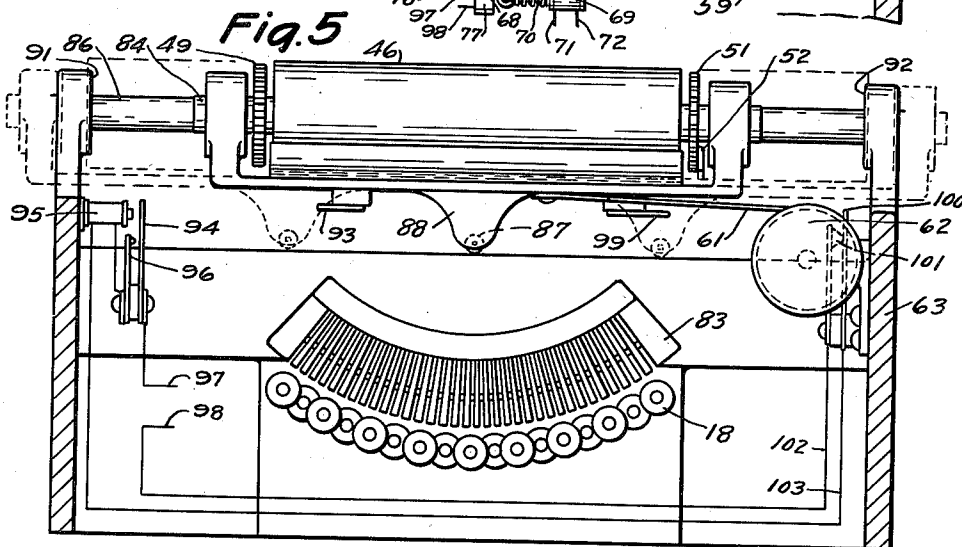
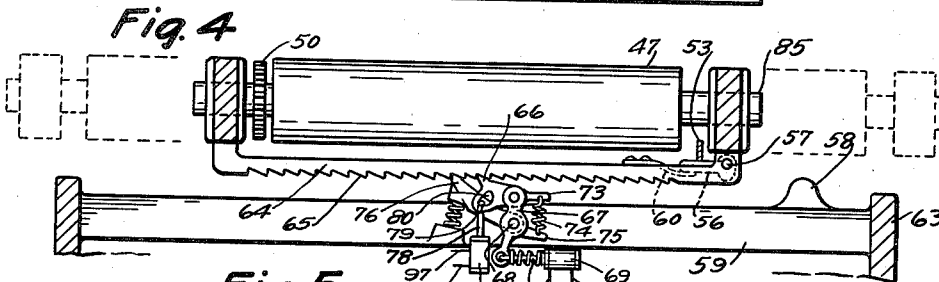
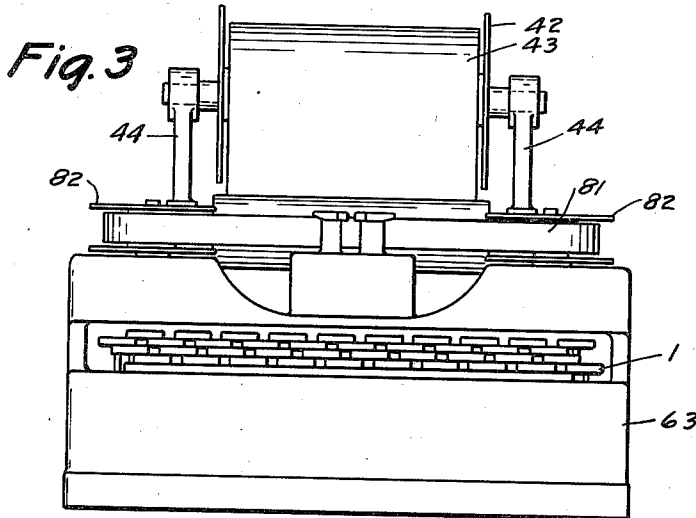
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Fig. 6

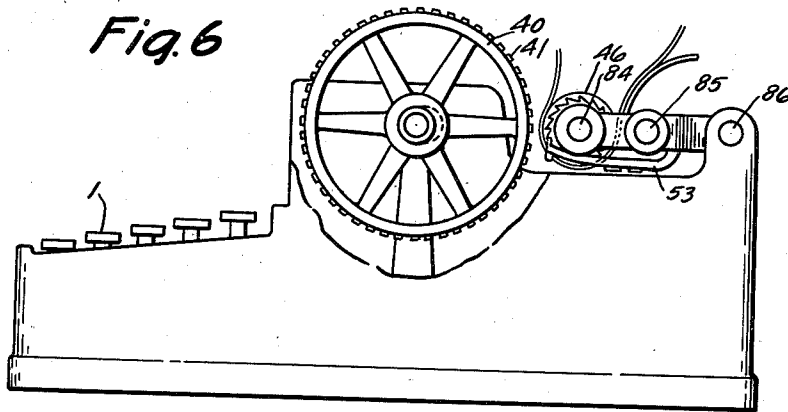


Fig. 7 Fig. 8

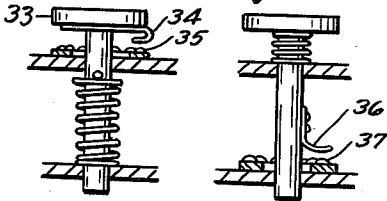


Fig. 9

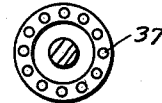


Fig. 10

Fig. 11

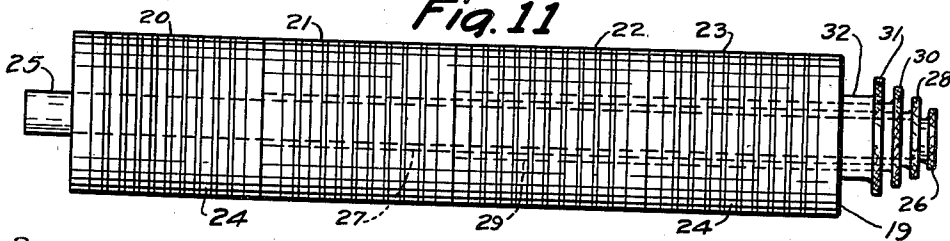
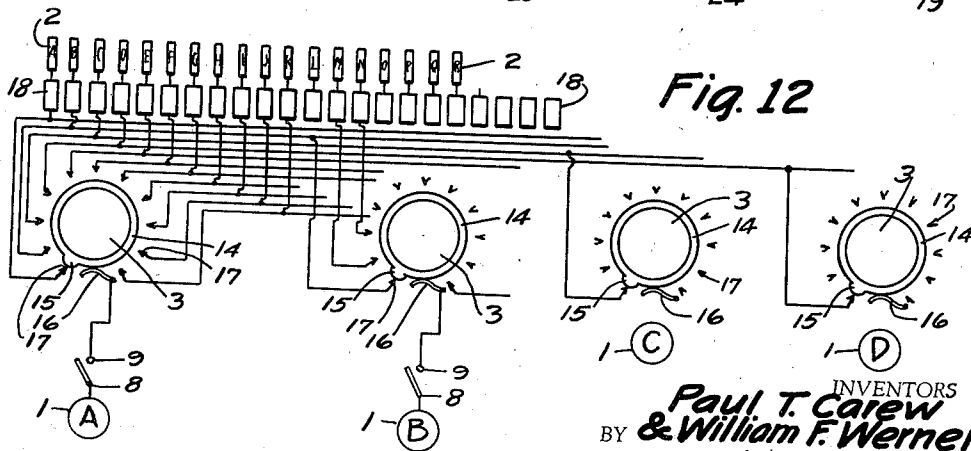


Fig. 12



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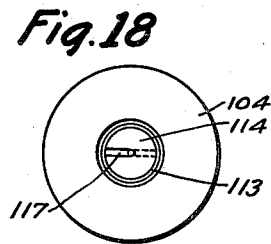
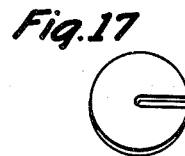
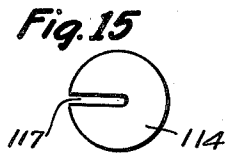
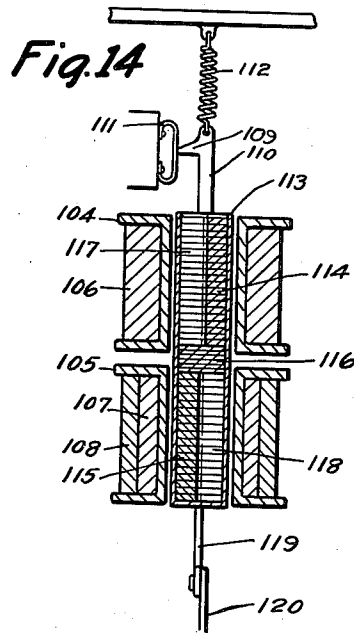
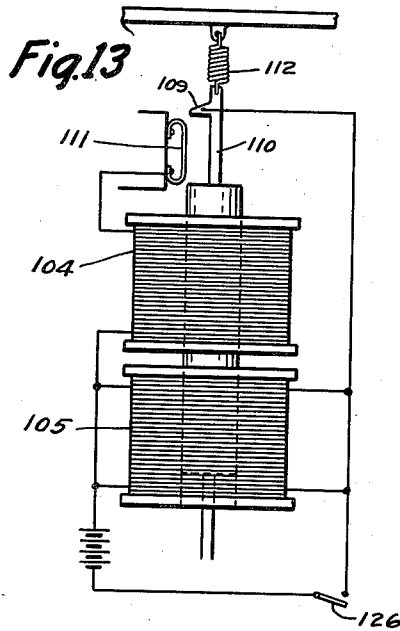
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2,190,649

SOLENOID CRYPTOGRAPHIC TYPEWRITER

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Application May 18, 1936, Serial No. 80,389

3 Claims. (Cl. 197—4)

The purpose of this invention is to provide a machine similar to a typewriter for transcribing messages in code which will write the message in code, although it is typed in ordinary language; and which may also be set to write the message back into the original language, although it may be typed in code, so that a secret message may be typed by one machine and then forwarded to another machine at a distant point where it may be retyped so that the message as originally written will be reproduced. The machine is also formed so that the code may readily be changed at will.

The invention is a machine having keys substantially the same as a typewriter keyboard, in which each key closes a circuit by which the type are operated and in the circuit between the key and type is means for changing from one circuit to another so that each key may operate any letter or figure. The machine is formed with a roller or platen and may be provided with a spool from which paper may be fed in a continuous strip over the platen; however, the spool may be omitted and sheets of paper used if desired. The machine may be of the type using type bars or may have a wheel or roller with the type on the surface thereof, and the keys may be rotatably mounted with a plurality of contact points at each key so that the change in the circuits between the keys and type may be made directly at the keys.

Other machines have been provided for writing in code, but these machines require separate attachments and do not use means incorporated in the machine for changing the circuits so that you can make the different keys operate different type, and so that the relation between the type and keys may readily be changed.

The object of the invention is, therefore, to provide a machine which operates in the normal manner in which means is provided between the keys and type by which any key may be made to operate any letter or figure.

Another object is to provide a typewriter with interchanging means between the keys and type in which the relation between the two may readily be changed.

A further object is to provide an electric typewriter in which each key is independently operated.

A further object is to provide a typewriter in which the carriage is electrically fed.

A further object is to provide a typewriter in which the platen is automatically returned when the end of a line is reached.

And a still further object is to provide an electrically operated typewriter in which the keys are operated by the completion of electric circuits and in which the different keys may operate different type, which is of a simple and economical construction.

With these ends in view the invention embodies a typewriter having a keyboard, a platen, a ribbon, and type, in which the keys are electrically connected to the type and adapted to operate the type as they are pressed downward, means interrupting the electric circuits between the keys and type, and means changing the circuits so that the keys may operate different type.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein:

Figure 1 is a view showing a longitudinal section through the machine with parts shown in full and parts omitted.

Figure 2 is a plan view of the machine.

Figure 3 is a front elevation of the machine.

Figure 4 is a detail showing a cross-section through the upper part of the machine showing the roller behind the platen, and the trip which advances the platen for each line.

Figure 5 is a longitudinal section through the machine taken just in front of the platen with parts omitted and parts broken away.

Figure 6 is a view showing a side elevation of the machine with parts broken away showing an alternate design in which the type bars are replaced by a wheel with type on the surface thereof.

Figure 7 is a detail showing an alternate arrangement in which the type keys are provided with a contact point and a plurality of points are positioned around each key so that the different circuits may be obtained by turning the keys.

Figure 8 is a similar view showing an alternate design in which the contact points are located inside of the machine instead of on the surface.

Figure 9 is a plan view of one of the keys shown in Figure 7.

Figure 10 is a plan view showing the contact points.

Figure 11 is a view showing the contact roller used in the design shown in Figure 1, in which the roller is provided in four independently operated sections.

Figure 12 is a diagrammatic view showing one arrangement of the circuits from the keys through the contact roller.

Figure 13 is a view showing an elevation of one of the solenoids.

Figure 14 is a longitudinal section through one of the solenoids showing the construction thereof.

Figure 15 is a detail showing one of the discs of which the core of the lower portion of the solenoid is formed.

Figure 16 is a similar view showing one of the discs of the upper portion of the solenoid, showing that the position of the slot therein is reversed.

Figure 17 is a detail showing a perspective view of one of the discs.

Figure 18 is a view showing a plan of the upper end of the solenoid with the connecting rod omitted.

In the drawings the typewriter is shown as it may be made, wherein numeral 1 indicates the keys, numeral 2 the type bars, and numeral 3 the contact roller.

In the general operation of the machine it can be set to operate in the normal manner so that when you strike an A the letter A will print, however, it can also be set so that when you strike the letter A the letter H will print, and by turning the contact roller it may be set so that any letter will print and, therefore, so that you can write in code and the code may be changed at will.

In the design shown the keys 1 are mounted on stems 4 which are held in openings in plates 5 and 6, and each stem is provided with a projection 7 which has a contact point 8 thereon that is adapted to engage a similar contact point 9 which is insulated from the plate 6. Springs 10 are placed around the stems which rest upon the plate 6 and bear against the under side of the projections 7 so that as soon as the key is released it is returned by the spring to the normal position. It will be understood, therefore, that the keys may be operated in the normal manner and with a slight touch they will close a circuit and as soon as they are released they will be instantly returned to the upper position. A space bar 11 is provided at the lower end of the key board and this is also provided with a switch so that it may operate a ratchet which is shown in Figure 4. The contact points are connected by wires 12 and 13 to the roller 3 and it will be noted that the roller is provided with a plurality of rings 14, with one ring for each key and each ring is provided with a projection or cam surface 15. One of the wires from each key contacts the roller through a brush 16 and the cam 15 engages one of the contact points 17 and it will be noted in Figure 12 that the roller 3 may be set so that when the letter A is struck a circuit will be completed through the wires to one of the solenoids which are indicated by the numeral 18, and this will operate the type bar 2 having the letter A thereon, whereas if the roller 3 is turned so that the cam 15 engages the next contact point, a different type bar will operate when the letter A is struck, thereby printing a different letter and the cam 15 may be set so that any letter desired may be printed when the letter A is struck. It will be appreciated that it will require considerable wiring to connect the letter A to every letter of the alphabet, however, as this arrangement would make it possible to produce an unlimited number of combinations or different codes this is not necessary, as if the letter A should be connected to 4, 8, or 10 of the type bars through their respective circuits, this would produce all of the combinations that would be necessary.

It will also be noted that if the letter H prints when you strike the letter A the roller may also be set so that the letter A prints when you strike

the letter H, and therefore if a message is type-written in code and transmitted to a remote point, a receiving machine at the remote point may be used to type the code message so that it will return to the original English message or the original message may be in any language.

The device may therefore be used to transcribe a message from English into code and then from the code back into English, and as the operation of the machine is very simple it will be understood that the message may be changed back and forth with absolute accuracy so that any mistakes are positively eliminated.

In the design shown in Figure 11 the roller, which is indicated by the numeral 19, is divided into four sections 20, 21, 22 and 23 and each of these sections is provided with a plurality of rings 24 similar to the rings 14. The first section 20 is mounted directly upon a shaft 25 and this extends continuously through the device and on the end of the shaft is a knob 26 by which the section 20 may be turned. The section 21 is mounted upon a sleeve 27 which extends through the device and on the outer end of the sleeve is a knob 28 by which this section may be turned. The section 22 is also mounted upon a sleeve 29 having a knob 30 on the outer end so that this may also be turned independently and the section 23 is provided with a knob 31 which is connected by a sleeve 32 and it will, therefore, be noted that each section of the roller may be turned independently or in combination and with a code formula or character given at the beginning of a message these knobs may be set so that any code may be written and also so that the person receiving the message may readily transcribe it back into the original language. It will be noted that with this combination of sections of the contact roller it will be possible to obtain any number of combinations and, therefore, vary the code as many times as may be desired. It will also be possible to change the code in one message so that it will be substantially impossible to decipher it without the given letter or character.

In the design shown in Figures 7 and 8 the keys are indicated by the numeral 33 and in Figure 7 each key is provided with a contact point 34 that may engage one of a plurality of points 35 and these points may be connected to the wires 12 and 13 instead of the points 8 and 9 and with a plurality of contact points around each key it will also be possible to set the keys so that the machine will write a code and the code may be varied also as desired. In Figure 8 the key stems are provided with contact points 36 that engage a plurality of points 37 and these may also be connected to the wires 12 and 13 so that any contact desired may be obtained and in this design the keys may be provided with a pointer 38 and the upper plate 5 with a plurality of points 39 corresponding with the contact points 37 so that the keys may be set from the upper surface.

In the design shown in Figure 6 the machine is provided with a cylinder or wheel 40 having type 41 on the surface thereof, and this wheel is operated similar to the wheel of the news ticker in which a plurality of contacts are provided so that as the letter A is struck the wheel will rotate until the letter A is in printing position and will then move toward the platen to print the letter A upon the paper. The details of this machine are not included because this is a patented machine and this part would be supplied by the manufacturer or owner of the present patents or

made by license thereunder. It will be noted that with the contact points from the casing passing through the contact roller 3 or with the contacts around each key it will also be possible to change the circuits to the wheel 40 so that any letter desired will print when you strike the A or any letter on the key board.

The general operation of this machine is substantially the same as that of any typewriter except that it is preferred to supply the paper upon which the message is printed in a roll and a spool 42 with a roll of paper 43 thereon is mounted in bearings 44 on the carriage 45 as shown in Figure 1 and the paper passes downward from the spool between the platen 46 and a feed roller 47 so that it is fed by the rollers around the platen 46 and up out of the opposite side where it is exposed to the type and then as the message is printed thereon it passes upward. It may be held upon the platen by spring clips 48 at the ends of the roller, however, it will also be understood that any of the parts of a typewriter may be used to mount and feed the paper. In this design the rollers 46 and 47 are geared together by gears 49 and 50 to insure positive operation and the roller 46 is provided with a ratchet wheel 51 at one end which is engaged by a pawl 52 on a lever 53 which is pivotally mounted in the carriage 45 on a pin 54 and resiliently held downward by a spring 55 as shown. This lever 53 rests upon an L shaped lever 56, shown in Figure 4, which is mounted upon a pin 57 and the lower leg of this lever engages a projection 58 on a cross bar 59 and it will be noted that as the carriage moves back to the starting position this leg will engage the projection 58 and raise the opposite leg so that it will move the lever 53 upward, thereby causing the pawl 52 to turn the ratchet 51, thereby rotating the platen and feed roller. The lever 56 is held upward by a spring 60 and it will be noted that as it passes back over the projection 58 it will move downward and then return to its normal position without moving the lever 53.

The carriage 45 is resiliently held backward or in the starting position by a spring tape 61 in a cylindrical casing 62 on the side of the frame 63 of the typewriter, and on the lower side of the carriage is a bar 64 which has ratchet teeth 65 at the lower edge which are engaged by another pawl 66 pivotally mounted in the upper end of a lever 67 which is pivotally mounted on a pin 68 and connected to a solenoid 69 through a rod 70. This solenoid is connected by wires 71 and 72 to each of the typewriter keys and also to the space bar so that as each key is operated it will energize the solenoid 69 and this will draw the rod 70 inward and force the pawl 66 over so that it will move the carriage the distance of one tooth which corresponds to the width of a letter or the space provided for a letter. The pawl 66 is provided with a projection 73 at the opposite end which is connected by a spring 74, the opposite end of which is connected to a projection 75 and, therefore, it will be noted that the spring will hold the pawl upward in engagement with the ratchet teeth.

Another pawl 76 is also provided which engages the teeth 65 and this pawl is connected to a solenoid 77 by a rod 78 which has a pin 79 in the upper end which also extends through a slot 80 in the pawl 66, thereby permitting the pawl 66 to operate in the normal manner, however, when the solenoid 77 is energized it will pull both of the pawls 66 and 76 downward, thereby releasing

the bar 64 and permitting the spring 61 to draw the carriage back to the normal starting position, whereas in the normal operation of the machine the pawl 76 will hold the carriage as the pawl 66 moves it forward and returns to its normal position. It will, therefore, be noted that the carriage will move forward the distance of one letter each time a key is struck and when the carriage arrives at the end of a line it will automatically move back to a starting position. It will be understood, however, that for ordinary use this return movement may be eliminated, and the carriage may be moved back by hand similar to the movement of a typewriter.

In the design shown the machine is provided with an ink ribbon 81 which is mounted on spools 82, and this ribbon may also be mounted and operated similar to that of a typewriter. The type bars 2 are pivotally mounted in a segment 83 similar to the segment of a typewriter, and the solenoids 18 are shown installed in different positions around the segment, as it will be noted that the width of each solenoid is greater than that of the space between the type bar, so that it will not be possible to mount the solenoids in one continuous row. It will be understood, however, that the arrangement of the solenoids is immaterial and they may be placed in any position.

The platen and feed roller are mounted in the carriage 45 on shafts 84 and 85 and the platen is supported on a straight rod 86 at the back and upon a roller 87 in a projection 88 at the front. The roller 87 travels upon the cross bar and this thereby supports the forward end of the carriage, and at the same time permits the forward end to be raised. It will be noted that the back of the carriage is provided with bearings 89 and 90 that are positioned inside of the ends of the carriage in order to permit the bearings of the feed roller and platen to extend over the sides of the machine when the platen moves from side to side. The sides of the bearings 89 and 90 may engage the inner surfaces of bearings 91 and 92 in which the straight rod 86 is rigidly mounted. It will be noted that the bearings 44 in which the spool 42 is mounted extend upward from the side bars of the carriage so that the spool travels with the platen.

As the carriage approaches the end of the frame, a plate 93 engages a contact 94 forcing it against a solenoid 95 and against another contact 96, thereby closing a circuit through the solenoid 95, and holding the contact 94 against the contact 96, and holding the circuit closed. This circuit is connected by wires 97 and 98 to the solenoid 77, and as this is energized it draws the pawls 66 and 76 downward, thereby releasing the carriage 45, so that the spring 61 may draw the carriage backward, and as the carriage reaches the opposite side a plate 99 will engage a contact 100 and move it away from the contact 101, thereby opening the circuit through wires 102 and 103, and deenergizing solenoid 95 and releasing contact 94.

The solenoid which has been indicated by the numeral 18 is preferably formed as shown in Figures 13 and 14 with a double coil, and with the lower section of the coil compound wound. The coil is formed of an upper section 104 and a lower section 105 with wiring 106 on the upper section and with the wiring provided in an inner section 107 and an outer section 108 on the lower coil, and the coils are connected so that when the circuit is completed the lower coil 105 only is

energized and this draws the core downward until a point 109 on a rod 110 engages a contact 111 and completes a circuit through the coil 104 and as soon as this coil is energized it exerts
 5 added force on the core, and this double movement insures a quicker movement and greater force so that it is possible to reduce the size of the solenoids to a minimum and at the same time obtain sufficient force to operate the typewriter
 10 type bars and other mechanism.

In the design shown the core is formed with an upper rod 110 held upward by a spring 112 and the core is formed with an outer tubular shell 113 and in the shell are a plurality of discs, preferably made of iron or substance having magnetic attraction, and these discs are arranged in different series with an upper series formed of discs 114, a lower series formed of discs 115, both of the former being of material having magnetic attraction, and these two series are separated by a plurality of discs 116 of non-magnetic material. The upper discs 114 are provided with slots 117 and the lower discs 115 are provided with slots 118 and the slots 118 are oppositely positioned
 25 from the slots 117. The outer shell 113 is made of brass or any non-magnetic material.

With the solenoid formed in this manner it may be used for either a push or pull and may be operated by either A. C. or D. C. current, and
 30 the lower end of the core may be connected by a rod 119 to one of the type bars which is indicated by the numeral 120.

The solenoids may be connected by wiring to any suitable switches or operating means, and
 35 it will be noted in Figure 13 that the lower section of the solenoid is directly connected to a switch 126 which may be of any type and located at any point and the upper section is connected through the contact points 109 and 111, so that
 40 after the core has started downward the upper section is energized to quicken the movement.

It will be understood that other changes may be made in the construction without departing from the spirit of the invention.

45 The construction will be readily understood from the foregoing description. In use the machine may be provided as shown and described and it will be noted that with a spool of paper

mounted upon the carriage the end of the paper may be fed through the rollers as shown in Figure 1 and the typewriter may be used in the normal manner. When it is desired to write in code the contact roller 3 may be turned and by indications on the end thereof this roller may be set at any position desired or so that A or any letter will strike substantially any letter desired and, as hereinbefore described, a message may be typed in English and this machine will transcribe it into code and the code may then be typed upon another machine which will transcribe it back into the original English or the language in which it was first supplied. This machine may be considered as particularly designed for police work so that a message may be sent in code to radio cars who may use a similar machine to transcribe it back into the original message; however, it may also be used for sending secret messages between the different offices of a company or for sending Government secret messages that may be desired to be transmitted in code or secret.

Having thus fully described the invention, what we claim as new and desire to secure by Letters Patent, is:

1. Means for causing the keys of a typewriter to operate a plurality of type bars consisting of a plurality of rings on a roller, means electrically connecting the keys to the rings and a plurality of contact points positioned about said rings and adapted to be engaged by a cam surface thereon, said plurality of contact points connected to operating means for the respective type bars.

2. In a device as described in claim 1, mounting means for the rings, comprising sleeves for separate groups of rings, and knobs rotating each sleeve independently from the end of the roller, said knobs extending through a side wall of the machine casing.

3. In combination with a device as described in claim 1, a plurality of solenoids directly connected to the said type bars and positioned to operate the type bars independently, comprising the operating means therefor, and adapted to be instantly operated by the said keys to which they are connected.

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