G. C. READ.

MACHINE TELEGRAPH.

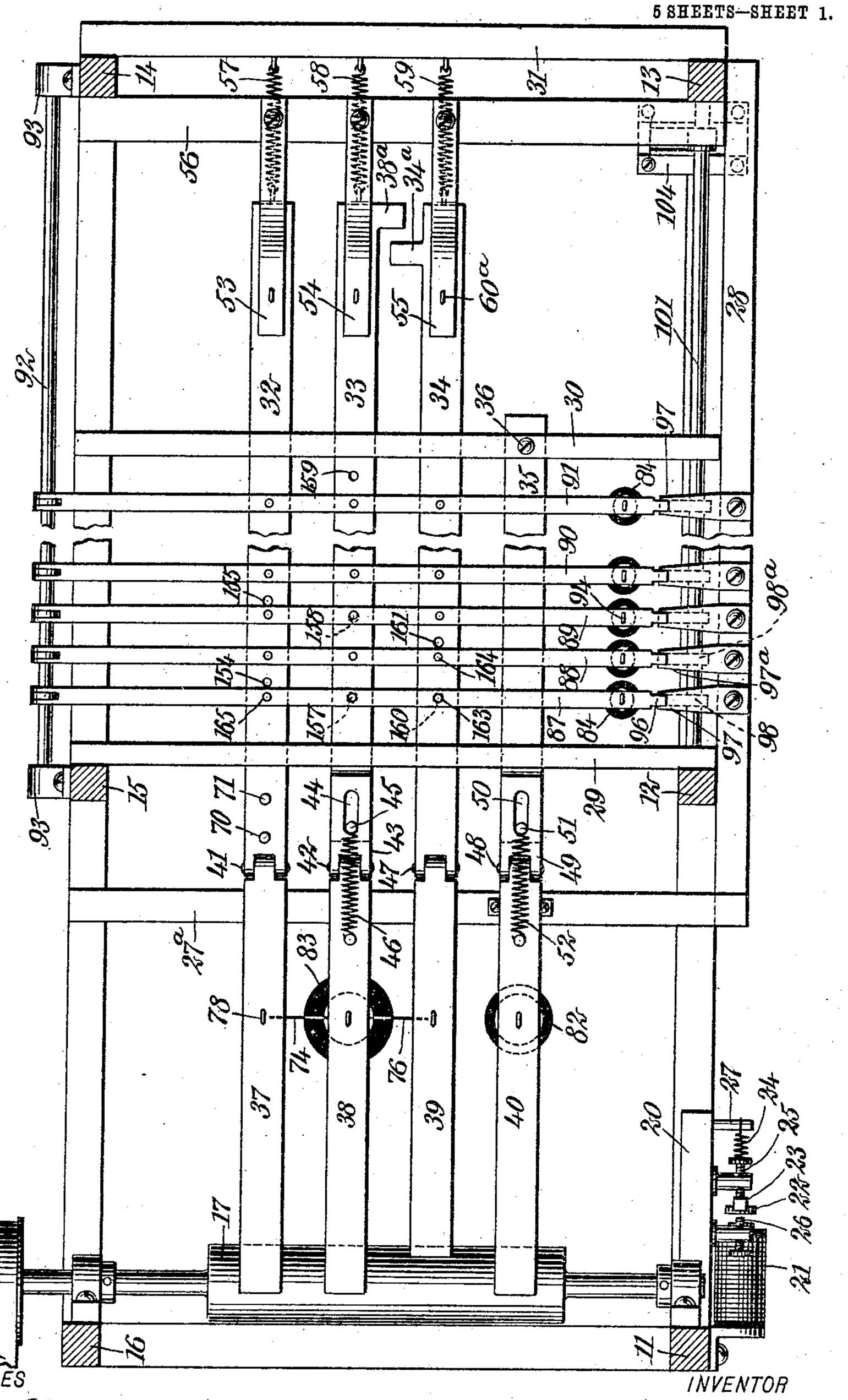
APPLICATION FILED MAR. 21, 1908.

929,984.

Patented Aug. 3, 1909.

5 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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ATTORNEYS

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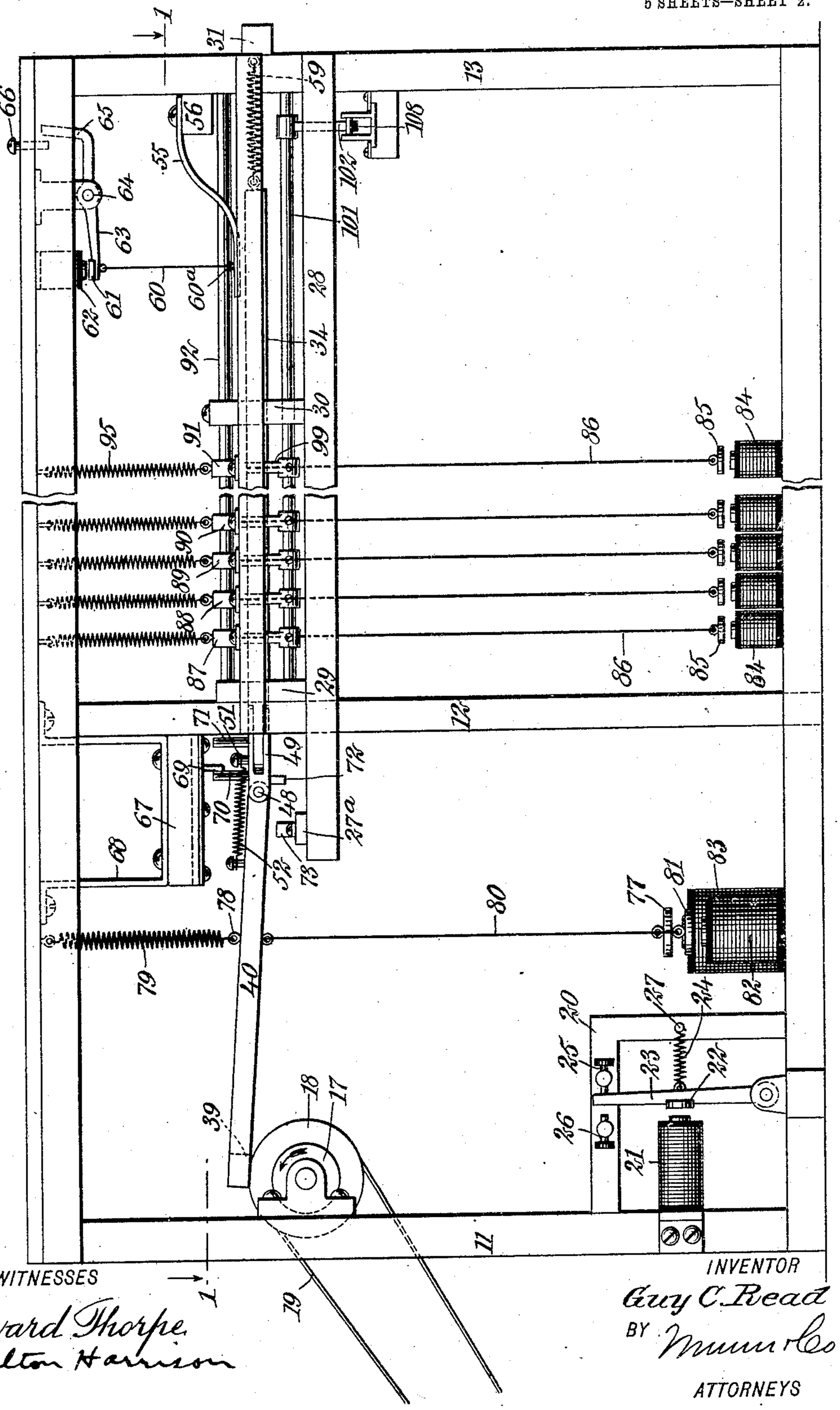

Fig. 2.

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5 SHEETS—SHEET 3.

Fig. 4.

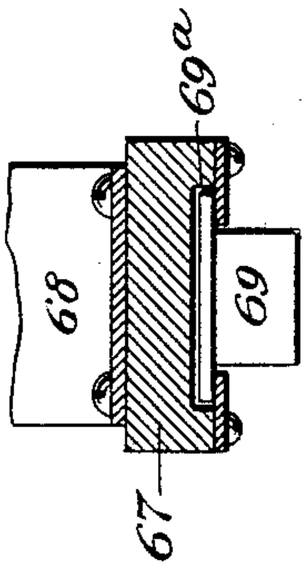

Fig. 5.

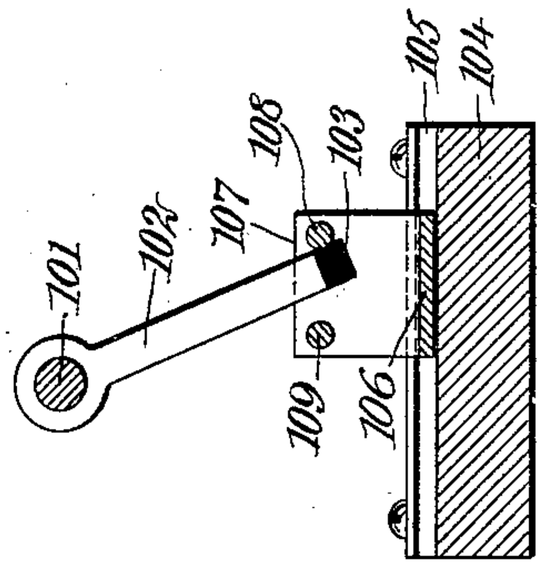

Fig. 6.

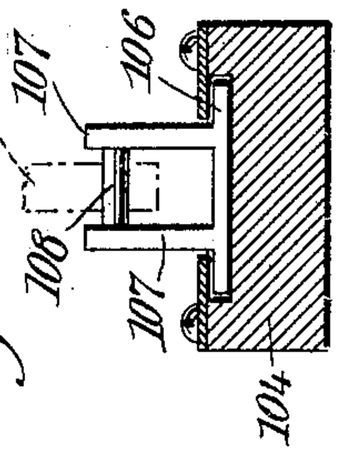

Fig. 3.

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5 SHEETS—SHEET 4.

Fig. 7,

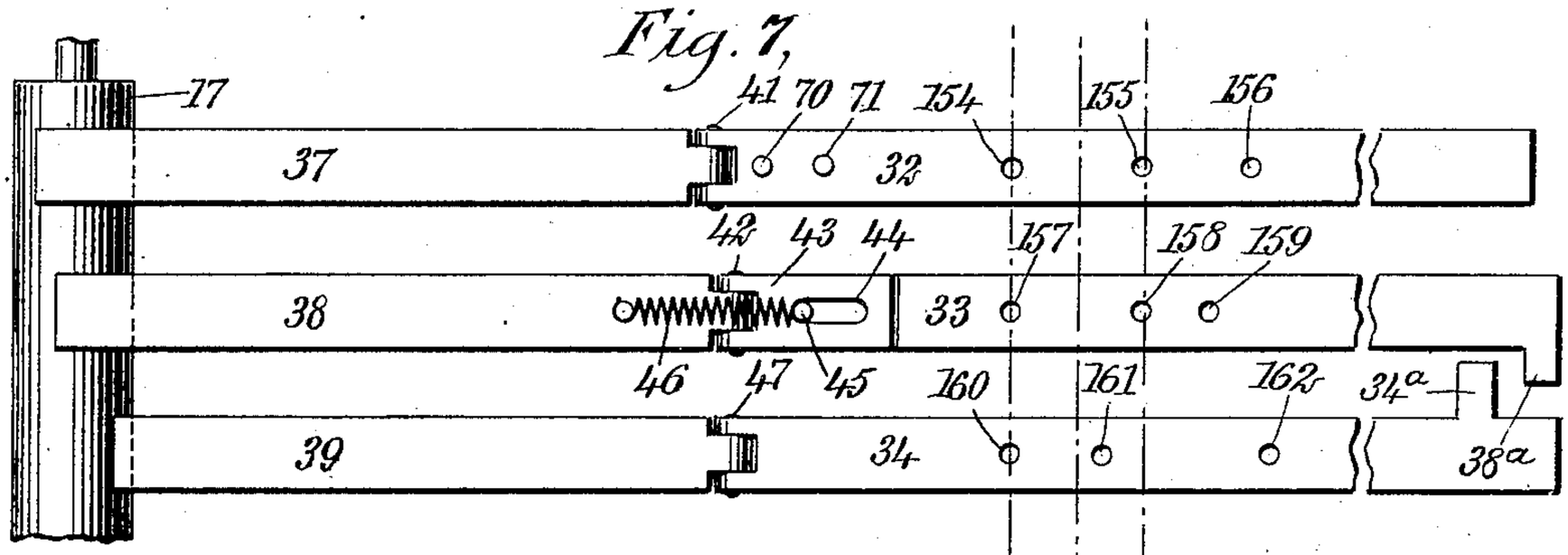


Fig. 8,

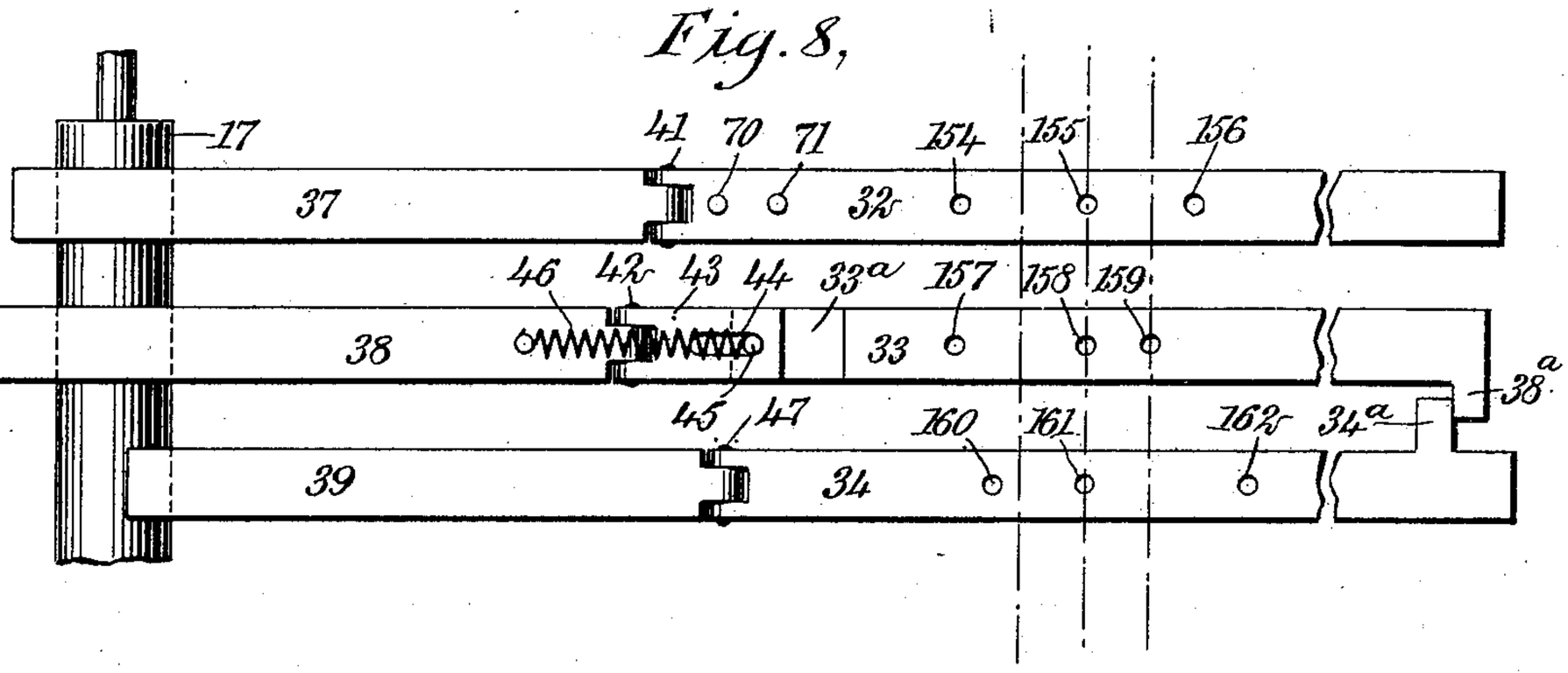
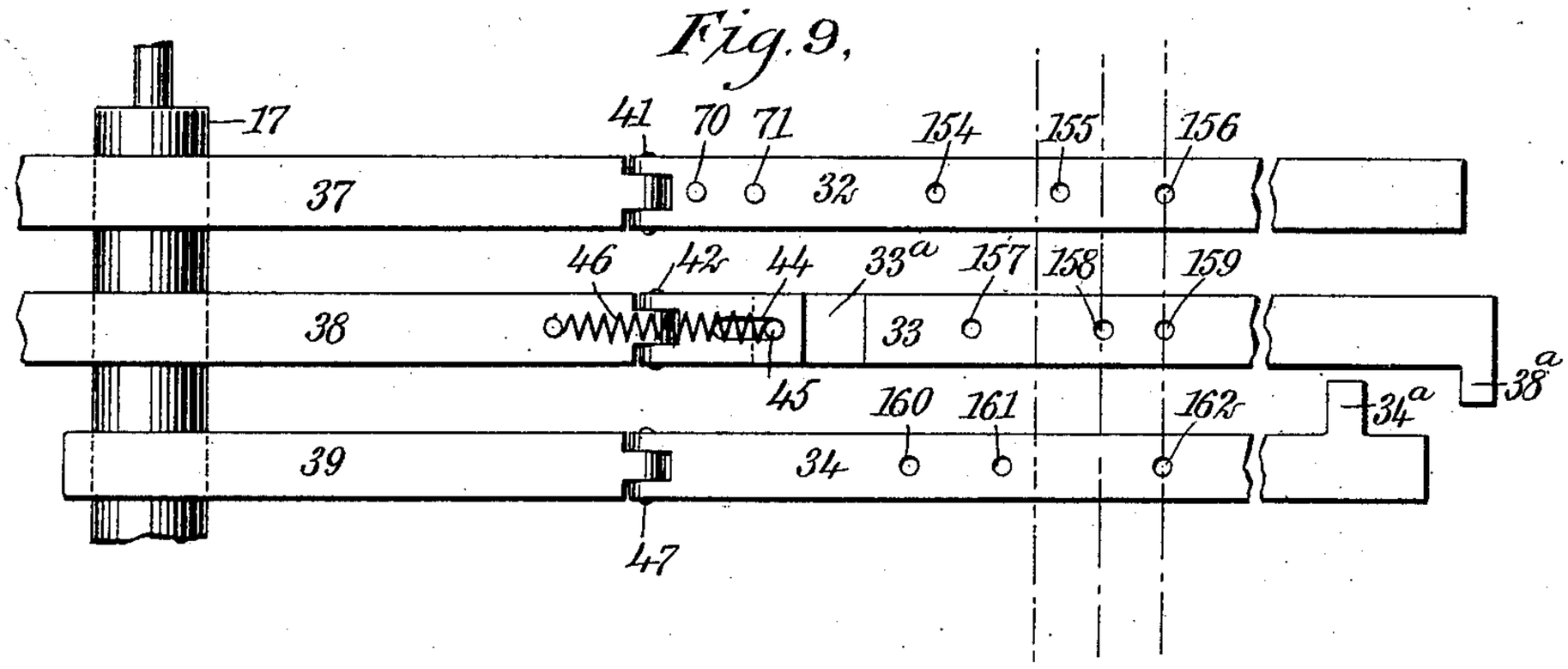


Fig. 9,



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5 SHEETS—SHEET 5.

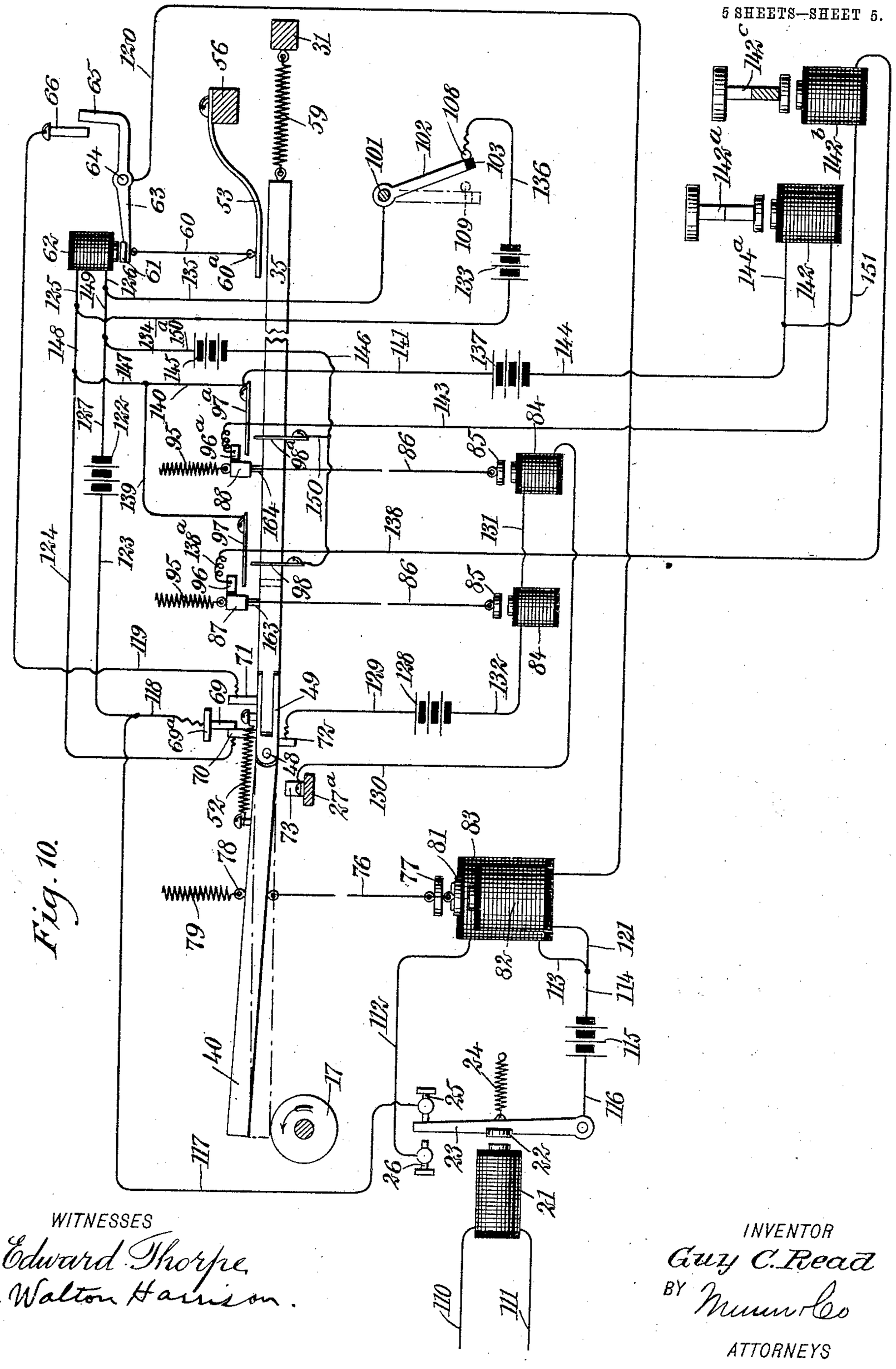

Fig. 10.

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UNITED STATES PATENT OFFICE.

GUY CARLETON READ, OF DAVENPORT STATION, TORONTO, ONTARIO, CANADA.

MACHINE-TELEGRAPH.

No. 929,984. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed March 21, 1908. Serial No. 422,409.

To all whom it may concern:

Be it known that I, GUY CARLETON READ, a subject of the King of Great Britain, and a resident of Davenport Station, Toronto, in the Province of Ontario and Dominion of Canada, have invented a new and Improved Machine-Telegraph, of which the following is a full, clear, and exact description.

My invention relates to machine telegraphs, my more particular object being to provide a receiver system including mechanism whereby currents sent over an electric line and made up of dots and dashes, are caused to operate the keys and analogous parts of a typewriter, so as to print the letters corresponding to the telegraphic characters.

In pursuance of this object, my invention further relates to means whereby a number of separate circuits, each controlling one of the keys of the typewriter, are energized in succession by selective mechanism operated electrically from a distance, and energized by currents, the duration of which corresponds to dots and dashes.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a horizontal section upon the line 1—1 of Fig. 2, looking in the direction of the arrows and showing a number of contact bars journaled upon appropriate supports and adapted to be moved downwardly one at a time, so as to close different electric circuits controllable thereby and leading to the typewriter keys, this view further showing four jointed rods and mechanism for actuating the same, for the purpose of enabling the current impulse representing dots and dashes to act selectively as between the various contact bars; Fig. 2 is a side elevation of the mechanism appearing in Fig. 1, and shows how various of the jointed rods are pulled endwise one at a time for the purpose of controlling the down-strokes; Fig. 3 is an end elevation showing the mechanism as seen from the right of Fig. 2, this view further showing the relative arrangement of certain magnets employed and mechanism operated and controllable by these magnets; Fig. 4 is a fragmentary section through a sliding contact employed for the purpose of opening and closing one of the circuits; Fig. 5 is a fragmentary section through another sliding contact, and a rocking contact arm for engaging the same; Fig. 6 is a fragmentary section through the sliding contact shown in Fig. 5, the section being taken upon a plane at right angles to the section through Fig. 5; Fig. 7 is a fragmentary plan view of three of the jointed rods and the cylinder for moving the same endwise, this view showing the position of the parts when the letter E is being recorded by the machine; Fig. 8 is a view similar to Fig. 7, but showing the condition of the jointed rods while the letter A is being made; Fig. 9 is a view somewhat similar to Fig. 7 but showing the relative positions occupied by the jointed rods when the letter B is being made; Fig. 10 is a diagram showing the general wiring of the system, the various contacts and batteries and many of the movable mechanical parts associated with or controllable by the various electric circuits.

A supporting framework contains posts 11, 12, 13, 14, 15, 16, and is used for housing and sustaining many of the movable parts. Journaled upon the posts 11, 16 is a roller 17 driven by a pulley 18, the latter being engaged by a belt 19 and driven continuously thereby in the direction indicated by the arrow in Fig. 2. A subframe 20 (see Fig. 2) contains a magnet 21 provided with an armature 22, the latter being supported by an armature lever 23. Connected with this lever is a retracting spring 24. Contact screws 25, 26 are mounted upon opposite sides of the armature lever 23. An adjusting screw 27 is connected with the spring 24 for the purpose of regulating at will the tension of the same. The contact lever 23 normally rests against the contact screw 25, this taking place when the line is open and inactive. The contact lever 23 is also brought into frequent engagement with the contact screw 25 during the formation of the letters and this contact controls a circuit having a very peculiar purpose, as hereinafter described. The framework further comprises various bars 27^a, 28, 29, 30, 31, all mounted rigidly in position. Four flat rods 32, 33, 34, 35 (see Fig. 1) of slightly different shape are provided. The bar 35 is connected by a screw 36 with the cross rod 30. Four other bars 37, 38, 39, 40, shorter than the bars 32, 33, 34, 35, are disposed in alinement with the bars just mentioned. A pivot pin 41 connects together the bars 37, 32, making a composite member which I desig-

nate as a jointed rod. The bar 38 is connected by a pivot pin 42 with a head 43, the latter being slidable in relation to the bar 33 and provided with a slot 44. A pin 45 rigidly mounted upon the bar 33 extends through the slot 44. By this arrangement the bar 38 may be moved in the general direction of its length a little distance without disturbing the bar 33. This is because the head 43, owing to the slot 44, may be moved a little distance before the end of the slot lodges against the pin 45.

A spring 46 connects together the bar 38 and the pin 45, and serves to keep the head 43 and bar 38 normally in the position indicated in Fig. 1. The bar 39 is connected by a pivot pin 47 with the bar 34. The bar 33 is provided with a boss 38ª (see Fig. 1) projecting laterally therefrom, and the bar 34 is provided with a boss 34ª likewise projecting laterally from it, the boss 34ª lying within the path of travel of the boss 38ª, and so arranged that when the bar 33 is drawn endwise a sufficient distance, its boss engages the boss 34ª and causes the rod 34 to move endwise, carrying with it, of course, the bar 39.

The bar 40 is connected by a pivot pin 48 with a head 49, which head is provided with a slot 50 through which extends a pin 51 mounted rigidly upon the bar 35, and a spring 52 connects together the bar 40 and the pin 51. The bar 35 being stationary, owing to the screw 36, the tension of the spring 52 normally holds the bars 40, 35 in the relative position indicated in Fig. 1.

Mounted upon a cross bar 56 are three leaf springs 53, 54, 55, which normally tend to press downwardly upon the bars 32, 33, 34, so as to hold the same in fixed position. Spiral springs 57, 58, 59 are connected respectively with the bars 32, 33, 34, and tend to retract these bars when displaced endwise, as will be understood from Figs. 1, 2 and 10. Connected with the leaf springs at 60ª are wires 60 (see Fig. 3), which are secured to an armature 61. A magnet 62 is disposed just above this armature, and is adapted to lift the same so as to disengage the springs 53, 54 and 55 from the rods upon which they normally press. The armature 61 is mounted upon an armature-lever 63, the latter being supported by a pivot-pin 64. This armature lever is provided with a contact-plate 65, which is adapted to engage a contact-screw 66, the engagement occurring whenever the magnet 62 is deënergized.

A slideway 67 (see Fig. 2) is mounted upon a bracket 68 supported by the framework. Mounted within this slide-way 67 is a contact-slide 69, having an enlarged portion 69ª disposed within the slideway (see Figs. 2 and 4). Contact-pins 70, 71, insulated from each other, are mounted upon the bar 32, and normally the pin 70 is in engagement with the contact-slide 69. Whenever the bar 32 is drawn forward, however, contact is broken between the contact-slide 69 and pin 70, and the pin 71 moves into engagement with the contact-slide 69.

Mounted upon the head 49 and projecting downwardly therefrom is a contact-pin 72. A contact-boss 73 is mounted upon the cross-rod 27ª, and so disposed as to be engaged by the contact-pin 72 whenever the head 49 and rod 40 are carried endwise to the left, according to Fig. 2. Wires 74, 75, 76 are connected with the bars 37, 38, 39, and are adapted to draw the same downwardly so as to bring them to the level of the upper surface of the roller 17. The wires 74, 75, 76 are secured at their upper ends to links 78 (see Fig. 1) for the purpose of preventing their withdrawal from the rods 37, 38, 39 and 40. Spiral springs 79 (see Fig. 2) tend to maintain the rods 37, 38, 39 and 40 in their uppermost positions, thus serving as retracting springs. A wire 80 is connected with the rod 40 and is provided at its lower end with an armature 81, and below this armature is a magnet 82. A magnet 83 is disposed below the armature 77 and is adapted, when energized, to draw the same downwardly.

A number of magnets 84 are connected in series and are each provided with an armature 85, each armature being mounted upon a wire 86. The various wires 86 hang from bars 87, 88, 89, 90, 91, and are adapted to be drawn downwardly one at a time. A rod 92 is mounted in brackets 93, and the various bars 87, 88, 89, 90, 91 are journaled upon it. Mounted upon each of the bars 87, 88, 89, 90, 91 is a link 94, and connected with these links are springs 95, shown in Figs. 2, 3 and 10. The purpose of the springs 95 is to normally maintain in uppermost position the bars to which they are attached. Each bar 87, 88, 89, 90, 91 is provided at its free end with a contact-plate 96 or 96ª, which is rigid upon the bar. The number of these bars is commensurate with the number of typewriter keys to be actuated. Disposed below each plate 96 or 96ª is a contact-spring 97 or 97ª, and below this spring is a contact-plate 98 or 98ª. Normally the contacts just mentioned are all separate.

Disposed below each bar 87, 88, 89, 90, 91 is a rocker-arm 99, and connected with the latter is a spiral spring 100 for retracting the same, each rocker-arm 99 being mounted upon a rod 101. Extending downwardly from this rod is an arm 102, the lower end of which is provided with a block 103 of insulating material, and disposed below the arm 102 is a slideway 104, provided with a groove 105. Movably mounted within this groove are plates 106, provided with a portion 107 projecting therefrom, this plate and its projecting portion together constituting

a contact-slide. Contact-pins 108, 109 are mounted within the plates 106 and disposed one upon each side of the arm 102.

The arrangement is such that when the rod 101 turns, the lower end of the arm 102 moves the contact-slide and makes or breaks communication with the contact-pin 108, according to the direction in which the rod 101 is turned. Because of the rocking movement peculiar to the rod 101, I designate the latter as a rocking shaft. The pin 109 being insulated, no circuit is completed when it is engaged by the contact slide.

Wires are shown at 110, 111. These may be considered either as line wires or as the wires of a local circuit. Either of these wires may be grounded, if desired. A wire 112 (see left of Fig. 10) connects the contact screw 26 with the magnet 83, connected by wires 113, 114, with a stationary battery 115, and from the latter a wire 116 extends to the armature lever 23. Connected with the contact screw 25 is a wire 117, and this wire is connected by a wire 118 with the plate 69ª of the contact slide 69. The contact pin 71 is connected by a wire 119 with the contact screw 66, and a wire 120 is connected with the armature lever 63 and also with the magnet 82. A wire 121 connects the magnet 82 with the wires 113, 114.

A battery 122 (see upper portion of Fig. 10) is connected by a wire 123 with the wires 117, 118, and a wire 124 is connected with the contact pin 70. Connected with the magnet 62 are wires 125, 126, and a wire 127 is connected with the battery 122.

A battery 128 (see middle portion of Fig. 10) is connected by a wire 129 with the contact pin 72. A wire 130 leads from the contact point 73 to all of the magnets 84, which are connected in series with each other by wires 131. A wire 132 leads from the last of these magnets to the battery 128.

A battery 133 (right hand of Fig. 10) is connected by a wire 134 with the wire 125. A wire 135 joins the wire 126 and leads downwardly to the rocking shaft 101, and a wire 136 leads from the contact pin 108 to the battery 133.

A wire 138 leads from the contact plate 96 to the magnet 142ᵇ, and this wire is provided with a coiled or flexible portion 138ª, to permit movement of the rod 87. From the contact springs 97, 97ª, wires 139, 140 lead upwardly and are joined together and with a wire 147. From the contact spring 97ª a wire 141 leads to a battery 137, and thence wires 144, 144ª lead to a magnet 142, which controls a typewriter key 142ª. I do not wish to be understood, in using the expression "typewriter-key", to imply merely the kind of key which necessarily makes a letter or figure. The key in question may be considered as the shifting key or as the key operating the space-bar, and the construction and use of such parts being old, I do not deem it necessary to describe them in detail. Suffice it to say that it is common in the art to operate almost any movable part of a typewriter by aid of a key, and that the two keys shown are representative of any and all keys with which a typewriter may be provided for any purpose whatsoever.

From the magnet 142 a wire 143 leads to the contact plate 96ª. From a battery 145 (see upper right-hand corner of Fig. 10) a wire 146 leads to the contact-plate 98.

Connected with the wires 139, 140, is a wire 147 which joins with the wire 124. Connected with these wires is a wire 148 which joins with the wires 125, 134. A wire 149 connects the wires 126, 135 with the wires 127 and 150ª. A wire 150 connects together the contact-plate 98ª and the wire 146. A wire 150ª connects the battery 145 with the wire 127. A magnet 142ᵇ is connected by a wire 151 with wires 144, 144ª. The magnet 142ᵇ controls a typewriter key 142ᶜ. The rod 32 (see Figs. 7, 8, 9) is provided with holes 154, 155, 156. Similarly the rod 33 is provided with holes 157, 158, 159, and the rod 34 likewise provided with holes 160, 161, 162. There may be any number of these holes in each of the rods mentioned and the distribution of the holes is somewhat arbitrary.

Each rod 87, 88, 89, 90, 91 is provided upon its under surface with pins 163, 164, as indicated in Fig. 10. The number and arrangement of these pins, like that of the holes in bars 32, 33, 34, is somewhat arbitrary. I purpose having the holes in the bars 32, 33 and 34 and the pins in the bars 87, 88, 89, 90 and 91, so arranged that, by bringing about predetermined movements of the bars 32, 33 and 34, certain pins are brought into register with certain holes, so that when all of the bars 87, 88, 89, 90 and 91 are drawn downwardly by the action of the magnets 84, only one bar will be in proper position to make its descent, the others being held up by the pins. I propose further to control the positions of the bars 32, 33, 34, from moment to moment, by electric signals flashed over the wire as above indicated.

It will be noted that the bar 39 is shorter than the other bars 37, 38, 40, and consequently is not so easily brought into engagement with the roller 17. When the magnet 83 is energized, all three of the bars 37, 38, 39, descend, the bars 37, 38 engaging the upper surface of the roller, but the bar 39 being shorter than the others failing to engage the roller immediately. If, now, it should happen that the bar 33 is advanced, that is moved to the left according to Fig. 1, the lug 38ª engages the boss 34ª and the bars 34 and 39 are thus advanced to such a point

that the roller 17 may be engaged by the bar 39. The bar 40, when it descends, is brought into engagement with the roller 17, but this bar never descends except when the magnet 82 is energized. Hence, there is a certain interdependency between the bars 37, 38, 39, the bar 40 being comparatively independent.

The operation of my device is as follows: We will suppose that the various springs have been adjusted, and that the roller 17 is in motion. The apparatus above described being located at the receiving station, is ready for the reception of messages. Suppose, now, that the line wires 110, 111 (see left-hand portion of Fig. 10) are energized for an instant only, so as to represent the sending of a dot of the Morse or Continental alphabet. This dot, we will say, would mean the letter E. The magnet 21 is energized for an instant only, and attracts the armature 22 and causes the armature lever 23 to move out of engagement with the contact screw 25 and into engagement with the contact screw 26. The energizing of the magnet 21, as above described, causes a circuit to be completed, as follows: battery 115, wire 116, armature lever 23, contact screw 26, wire 112, magnet 83, wire 113, wire 114, back to battery 115. The circuit last traced energizes, for an instant only, the magnet 83 and causes the bars 37, 38, 39 to be drawn downwardly, the bars 37, 38 alone being brought into engagement with the roller 17. Now, as the duration of the circuit through the magnet 83 is very short, owing to the fact that only a single dot is made, the bars 37, 38 press, for a very short instant only, upon the roller 17. Both of the bars last mentioned are therefore drawn forward, the bar 39 not moving. Since the pivot pin 41, connecting together the bar 37 and the bar 32, admits of no play between these parts, the bar 32 is advanced a little distance representing the duration of the current representing the dot. The bar 33 does not move forward, however, because of its connection with the bar 38 through the medium of the slot 44, the pin 45 and the head 43. The instant the current stops flowing (or in other words, as soon as the dot is finished) the spring 46 retracts the bar 38 and head 43 to their normal position. Now, since the bar 32 alone is provided with contact pins 70, 71, and since this bar moves forward a distance representing one dot, the following circuit normally closed is opened: battery 122, wire 123, wire 118, contact plates 69ª, 69, contact pin 70, wires 124, 148, 125, magnet 62, wires 126, 149 and 127, back to battery 122. This circuit being thus broken deënergizes the magnet 62. The armature 61 now drops and the three springs 53, 54, 55, being thus released, grip tightly upon the bars 32, 33 and 34. The movement of the bar 32 to the left, according to Fig. 1, as above described, brings the contact pin 71 into engagement with the contact plate 69. This happens at the same instant when, owing to the dropping of the armature 61, the armature lever 63 is moved and the contact plate 65 brought into engagement with the contact screw 66. The following circuit is thus completed: battery 115, wire 116, contact lever 23 (now retracted to normal position, see Fig. 10), contact screw 25, wire 117, wire 118, contact plates 69ª, 69, contact pin 71, wire 119, contact screw 66, contact plate 65, wire 120, magnet 82, wire 121, wire 114, back to battery 115.

Let us suppose, now, that the bars 87, 88 and 89 represent respectively the letters E, A and B. Such being the case, it is necessary that after the electric impulse representing the dot is sent over the line, the apparatus shall be brought into such condition that the bar 87 alone is free to move downward. This is done by so arranging the hole 154 in the bar 32 that, when the bar 32 moves the distance representing one dot, the hole 154 is brought into registry with the pin 165, and as the other bars 33, 34 have not moved, and the bar 35 is always stationary, it necessarily follows that the bar 87 is the only one capable of descending. Now, it will be noted that one of the circuits above traced is closed by the retraction of the armature lever 23 against the contact screw 25. The duration of the closure of this circuit is a matter of some importance for the reason that it determines whether the machine is to make the letter E or some other letter, say one beginning with a dot. If, after the first dot is made, there is a pause sufficient to represent the interval between telegraphic letters, the circuit through magnet 82 and contact screw 25 remains completed for a corresponding period, and consequently the armature 81 and wire 80 cause the bar 40 to not only engage the roller 17, but to remain in contact with it for an appreciable period. This being done, the contact pin 72 (see Fig. 10) moves into engagement with the contact point 73. It should be noted, however, that in order to close the contact just mentioned, it is necessary for the bar 40 to have time to travel a proper distance. Hence, if after making the dot there is not a sufficient pause before the next dot or other character, the contact-pin 72 is not brought into engagement with the contact point 73. The contact-pin 72 may start toward the contact-point 73, but unless the interval after the formation of the dot or other character be sufficient to bring it into engagement with the contact-point 73, the spring 52 restores the bar 40 and head 49 to their normal positions, as soon as the magnet 82 is deënergized. If, however, the period elapsing after the making of the dot or other charac-

ter be sufficient, or in other words, if the operator has completed the letter and purposely paused, so that the contact-pin 72 is brought into engagement with the contact-point 73, the following circuit is completed: battery 128, wire 129, contact-pin 72, contact-point 73, wire 130, magnets 84 connected by wires 131, 132, back to battery 128. This energizes all of the magnets 84 and pulls upon all of the armatures 85. Since, however, the bar 87 is the only one capable of making a descent, as above explained, this bar alone moves downward. The other bars 88, 89, 90, 91 are held up by the pins under them which do not register with the holes in the bars 33, 34. The bar 87, being brought downward, the following circuit is completed: battery 137, wires 141, 140 and 139, contact spring 97, contact plate 96, wires 138[a] and 138, magnet 142[b], wires 151 and 144 back to battery 137. This energizes the magnet 142[b] and pulls down the typewriter key 142[c]. The bar 87 has sufficient movement, however, after making engagement between the contact plate 96 and the contact spring 97, to carry the spring last mentioned into engagement with the contact point 98. This closes another circuit as follows: battery 145, wire 146, contact point 98, contact spring 97, wire 139, wires 147, 148, 125, magnet 62, wires 126, 149 and 150, back to battery 145. This energizes the magnet 62 and causes it to attract the armature 61, thus raising the three leaf springs 53, 54, 55 from the bars 32, 33, 34, and thereby enabling the bar 32 (which happens to be the only one displaced) to return to its normal position. If, in making some other letter, it should happen that either or all of the bars 32, 33, 34 are displaced, the raising of the springs 53, 54, 55 will necessarily liberate them and enable them to return to normal position. The descent of the bar 87, however, does more that has already been described. It depresses the arm 99 (see Fig. 3) and in so doing turns the rocking shaft 101 a slight distance. In doing this, the arm 102 (see Figs. 5 and 6) is turned slightly so as to engage the pin 109 which is insulated, and thus move the slide 106 (see Fig. 5) to the left.

Now, when the bar 87 rises, after the completion of its stroke, the rocking shaft 101 turns slightly in a contraclockwise direction, according to Fig. 5, the arm 102 being thus brought into direct metallic engagement with the contact pin 108, and moving the slide 106 to the right, according to Fig. 5, until the block 103 of insulating material engages the pin 108. It will thus be seen that for a moment, while this is taking place, the arm 102 is in direct metallic contact with the pin 108, and that immediately afterward it is insulated from this pin. Such being the case, a circuit is made and immediately thereafter broken. This circuit is as follows: battery 133, wire 134, wire 125, magnet 62, wire 126, wire 135, rocking shaft 101, arm 102, contact pin 108 and wire 136, back to battery 133. This energizes the magnet 62, thus raising the armature 61 and springs 53 so as to allow the bar 32 (or if other bars 33 are displaced, to retract them all) to normal position. This last movement might seem to be superfluous because ordinarily the bar 32, or any other bar which happens to be displaced, will be restored to normal position, as above described. If, however, it should happen that the bar 32 should be displaced considerably, for instance after transmission of the letter P or the figure 6, consisting entirely of dots, a little time interval is required for the bar to get back to its normal position, and the circuit last traced is for the purpose of insuring that the springs 53, 54, 55 will be raised for an adequate length of time to enable the bar 32, or any of the other bars, to get back to normal position.

The ascent of the bar 87 opens the circuits which were closed by its descent, and the several magnets affected thereby are deënergized. This leaves the apparatus in position for making another letter.

Suppose, now, that the letter A is made. This letter consists of a dot and a dash. The line being energized accordingly, the magnet 21 gives one pull of proper duration and another pull of longer duration. As above explained, so long as nothing but dots be made, the bar 32 is the only one which can move. A dash being made, however, the bar 33 moves the full length of a dash and in so doing, the lug 38[a] engages the lug 34[a] and pulls up the bar 34 so that the bar 39 is brought into engagement with the roller. After this takes place, either dots or dashes will move the bar 34. The magnet 21 being energized, as stated, the circuit through magnet 83 is closed, quickly opened, and closed again for a little longer period. The bars 37, 38, 39 are drawn down accordingly. The bar 32 moves forward a distance representing a dot and a dash. The bar 38 moves forward a distance representing a dash. This being done, it follows that the bars 32 and 33 present, relatively to the pins projecting downwardly from the bars 87, 88, a different group of holes in alinement with these pins. The arrangement of the mechanism is such that when the bars are brought into the position just described, the holes and pins will so register that the bar 88 alone is free to descend. The other bars 87, 89, 90, 91, all being supported by the pins projecting downwardly from them. The bar 88, therefore, instead of the bar 87, now descends. This completes a circuit through the magnet 142 and draws down the typewriter key 142[a]. All of the circuits affected are analogous to those above traced in relation

to the descent of the bar 87 in making the letter E. Since the typewriter key 142ª represents the letter A, that is the letter now made by the typewriter.

Suppose, next, that the letter B comes over the line. This letter consists of a dash followed quickly by three dots. In this instance (see Fig. 1) the bar 37 moves forward the distance represented by a dash and three dots. The bar 38 moves a distance represented by one dash only. Since, however, the lug 38ª engages the lug 34ª and pulls on the bar 34, this bar moves a distance represented by three dots. Here, then, we have still a third combination of holes and pins, and owing to the prearrangement of the same, the bar 89 alone is capable of making its descent. This bar, in its descent and subsequent ascent, completes a number of other circuits analogous to those above described with reference to the magnets 142, 142ᵇ, and thus causes a third letter to be made upon the typewriter, the letter in this instance being B.

As above indicated, the spacing, shifting and other movements peculiar to the typewriter, being capable of execution by means of keys, are performed through the action of magnets analogous to 142 and 142ᵇ, so that the entire work of the typewriter is controlled by the distant telegraph operator.

An important function is performed by the bars 40, 35, and the magnet 82 and its armature. It is true that these parts do not directly control the formation of letters by selecting which bar 87, 88, 89, 90, 91 shall make its descent. The office of the bar 40 and magnet 82 controlling it, is to enable the machine to distinguish between letters, or parts of letters, in which the time interval between the dots or other characters may have a significance. For instance, if two dots be made quickly, they indicate the letter I according to the Morse code. If, however, they be made of equal duration but spaced farther apart, they mean two E's.

The magnet 82, unlike the magnet 83, is controlled by the space during which the line is not energized. In other words, the time intervals between dots or other characters are given a positive effect owing to the fact that they cause the magnet 82 to be energized and the bar 40 to be put in motion.

It is largely by means of the bar 40 and magnet 82 that the machine is able to allow the time interval between successive characters to determine what significance shall be given to the characters as affected by the time interval, and consequently to determine automatically and selectively which one of the bars 87, 88, 89, 90, 91, if any of them, shall be depressed.

From the above description it will be noted that signals, such as are made by the Continental code or by the Morse code, when sent over a line, will cause the receiving apparatus at the opposite end of the line to register the characters upon an ordinary typewriter, and that this is accomplished by the selectivity of different bars which are depressed one at a time, each bar representing either a letter, or a movement of the spacing key or shifting key of the typewriter.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In a machine telegraph, the combination of a plurality of typewriter keys, a single line wire, contact bars mounted to move up and down, mechanism controlled by said contact bars for operating said typewriter keys, and mechanism comprising jointed rods having endwise movement and controlled in their movement by electric dots and dashes passing over said line, the said last mentioned mechanism controlling the movement of said contact bars to cause the typewriter keys to print the letters corresponding to the telegraphic characters.

2. The combination of a plurality of keys for printing intelligible characters, a separate magnet for each key, contact bars controlling said magnets, a telegraph line, and mechanism comprising a plurality of jointed rods having endwise movement and controllable by electric dots and dashes passing over said line, the said mechanism controlling said contact bars for energizing said magnets in a predetermined order of succession.

3. The combination of a revoluble roller adapted to turn continuously, a plurality of bars provided with portions for engaging said roller so as to enable said roller to move said bars endwise, magnets for bringing said bars into engagement with said roller, means for breaking engagement between said bars and said roller, mechanism controllable by the relative position of said bars for printing intelligible characters, a telegraphic line, and mechanism energized by currents therefrom for controlling the engagement of said bars with said roller.

4. In a machine telegraph, the combination with the keys of a typewriter, of a plurality of electric circuits each controlling one of the keys of the typewriter, selective mechanism for energizing said circuits in succession, and comprising contact bars each controlling one of said circuits, and sliding bars, the position of which controls the movement of the contact bars, and a telegraph line connected with said selective mechanism for operating the same from a distance, to control the position of the sliding bars, the said selective mechanism being energized by currents, the duration of which corresponds to dots and dashes.

5. In a machine telegraph, the combina-

tion of a plurality of movable bars, mechanism connected with each of said bars for printing a separate intelligible character, a plurality of sliding bars crossing said first mentioned bars, the relative position of said sliding bars normally preventing the descent of any of said first mentioned bars, a revoluble roller adapted to be engaged by the sliding bars to move said bars endwise, means for normally holding said bars out of engagement with the roller, and means controlled from an electric line for bringing said sliding bars into engagement with said roller, whereby the sliding bars are positioned to permit selective movements, one at a time, of said first mentioned bars.

6. In a machine telegraph, the combination of a revoluble roller, a plurality of bars disposed adjacent thereto, means controllable from a telegraphic line for bringing certain of said bars into engagement with said roller for the purpose of actuating said bars, a second bar normally disconnected from said roller, means for enabling one of said first-mentioned bars to move said second-mentioned bar, and mechanism controllable by the relative positions of said bars for printing intelligible characters.

7. In a machine telegraph, the combination of a plurality of circuits for controlling the printing of intelligible characters, a plurality of contacts for opening and closing said circuits, a plurality of pivoted bars for actuating said contacts, a telegraphic line, a revoluble roller, a plurality of bars adapted to be moved endwise by said roller, the position of said bars controlling the movements of said pivoted bars, and mechanism energized by currents from the line for controlling the engagement of said endwise movable bars with said roller.

8. The combination of a plurality of typewriter keys, a separate magnet for each key, a telegraph line, a device adapted to be moved continuously, mechanism movable by the said device, the said mechanism being normally held out of engagement with said device and having movable parts adapted to be brought into engagement with said device, the mechanism being controlled by electric dots and dashes passing over said line for energizing said magnets in a predetermined order of succession.

9. In a machine telegraph, the combination with a plurality of hinged contact bars adapted to be moved downwardly one at a time, a series of electric circuits, each controlled by one of said contact bars, a plurality of typewriter keys each operated by one of said circuits, a telegraph line, a revoluble roller adapted to turn continuously, and a plurality of jointed bars adapted to be actuated from the said roller and controllable from the line to enable the current impulse representing dots and dashes to act selectively between the various contact bars.

10. In a machine telegraph, the combination of a plurality of bars mounted to move up and down, mechanism connected with each of said bars for operating a typewriter key when the bar is depressed, a plurality of sliding bars extending at right angles to said first mentioned bars, a telegraph line, means controllable from the telegraph line for moving said bars endwise to position the same, to permit selective movements one at a time, of said first mentioned bars, mechanism for enabling the relative position of said sliding bars to normally prevent the descent of all of said first mentioned bars, springs adapted to press on the sliding bars for holding said bars in fixed position when moved endwise, means for moving said springs to release said sliding bars, and means for returning said bars to normal position when released.

11. The combination of a revoluble roller, a plurality of jointed bars adapted to engage said roller so as to be moved endwise thereby, springs for holding said bars normally out of engagement with said roller, magnets for bringing said bars into engagement with said roller, a telegraph line, mechanism energized by currents from the line for controlling the engagement of said bars with said roller, bars mounted to swing, and mechanism connected with said swinging bars for actuating typewriter keys, the said swinging bars being controlled in their movements by the relative position of said first mentioned bars.

12. The combination of a plurality of typewriter keys, a series of electric circuits each controlling one of said keys, a telegraphic line, a series of contact bars adapted when moved downwardly, one at a time, to close each a different electric circuit, each contact bar being provided with pins on its under surface, a series of bars mounted to move endwise and each provided with a plurality of holes, and mechanism controllable from the line for moving said bars to bring certain of said holes into registry with certain of said pins to permit the current impulse to act selectively between the said contact bars.

13. In a machine telegraph, the combination of a plurality of circuits for controlling the printing of intelligible characters, a plurality of contacts for opening and closing said circuits, a plurality of pivoted bars for actuating said contacts, each bar being provided with pins on its under surface, a plurality of sliding bars arranged at right angles to the first mentioned bars and adapted to move endwise, each bar being provided with holes adapted to be engaged by the said pins, the position of said holes relative to the pins controlling the movements of said

pivoted bars, a telegraph line, and mechanism energized by currents from the line for controlling the movement of said sliding bars.

14. In a machine telegraph, the combination of a plurality of keys, a series of electric circuits each controlling one of said keys, a plurality of contacts for opening and closing said circuits, a plurality of movable bars for actuating said contacts when the bars are depressed, a telegraph line, mechanism movable relative to said bars and controllable by said line for permitting selective movements, one at a time, of said bars, means for holding said mechanism when positioned, means for returning said mechanism to normal position when released from said holding means, and an electric circuit controlling the said holding means, the said circuit being closed by the downward movement of said bars.

15. In a machine telegraph, the combination of a revoluble roller adapted to turn continuously, a plurality of bars mounted to slide and each having a hinged member adapted to be brought into engagement with said roller so that the bars may be moved endwise by the roller, means for bringing said hinged members of the bars into engagement with the roller, mechanism controllable by the relative position of said bars for operating typewriter keys, a telegraph line, and mechanism energized by currents therefrom for controlling the engagement of said bars with said roller.

16. In a machine telegraph, the combination of a revoluble roller, a plurality of jointed bars mounted to slide and each having one member arranged to move up and down, the said members being disposed adjacent to the roller and sundry of said members having their free ends arranged to engage the roller when said members are moved downward, one of said bars having its vertically movable member shorter than the members of the other bars, whereby the said member may move downward without engaging the roller, means controllable from a telegraph line for moving said members downward, means for moving the last mentioned bar endwise from one of the other bars to cause said bar to engage the roller, a plurality of typewriter keys, and mechanism controllable by the relative position of said bars for actuating the typewriter keys.

17. The combination of a plurality of typewriter keys, magnets for actuating said keys, a single line wire, a rotatable device, mechanism comprising endwise movable bars having pivoted members adapted to engage said rotatable device, whereby the bars are moved endwise, the said mechanism being controlled by electric dots and dashes passing over said line, and means controlled by the position of said mechanism for energizing said magnets in a predetermined order of succession.

18. The combination of a plurality of typewriter keys, a series of electric circuits each controlling one of said keys, a telegraph line, a series of pivoted contact bars adapted when moved downwardly one at a time, to close each a different electric circuit, a series of bars mounted to move endwise, the position of said bars controlling the movement of the contact bars, each of said endwise movable bars having a pivoted member, means adapted to be engaged by the pivoted members of the bars to move the bars endwise, and mechanism actuated from the line for controlling the engagement of the said pivoted members of the bars with said means to permit the current impulses to act selectively between the said contact bars.

19. In a machine telegraph, the combination of a plurality of bars mounted to slide and each having a hinged member, a movable device adapted to be engaged by the hinged members to move said bars endwise, a telegraph line, mechanism energized by currents therefrom for controlling the engagement of said bars with said device, and mechanism controllable by the relative position of said bars for operating typewriter keys.

20. The combination of a revoluble roller, a plurality of jointed rods having members adapted to engage said roller so that the rods may be moved endwise, means controlled by the relative position of said rods for actuating typewriter keys, a telegraph line, and mechanism energized by currents from the line for controlling the engagement of said jointed rods with said roller.

21. In a machine telegraph, the combination with a plurality of typewriter keys, of a series of electric circuits each controlling one of the keys of the typewriter, selective mechanism comprising contact bars each controlling one of said circuits, sliding bars the position of which controls the movement of the contact bars, and means for moving said sliding bars, and a telegraph line connected with said selective mechanism for operating the same from a distance to control the position of the sliding bars, the said selective mechanism being energized by currents the duration of which corresponds to dots and dashes.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUY CARLETON READ.

Witnesses:
W. MERSEREAU,
H. A. PHILLIPS.