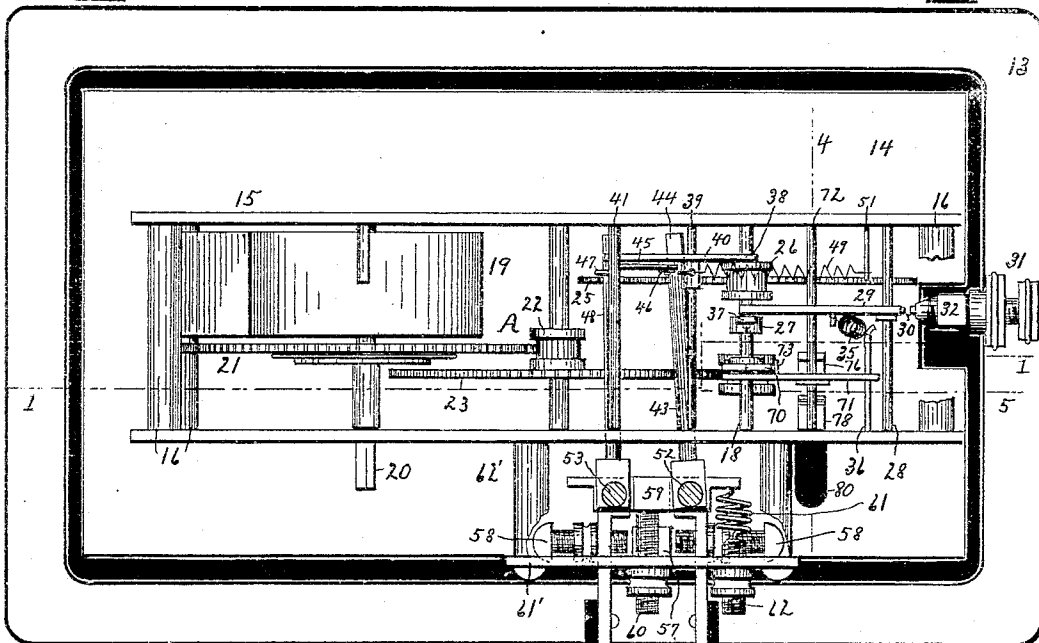
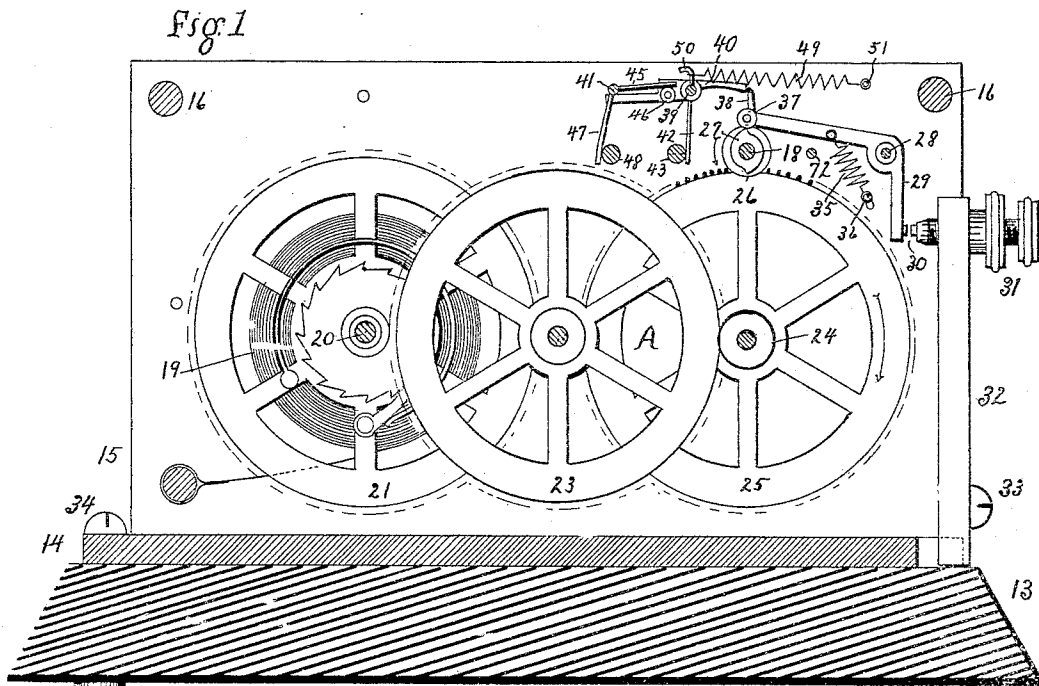


J. A. HULIT.
TELEGRAPH SENDING MACHINE.
APPLICATION FILED SEPT. 3, 1908.

939,507.

Patented Nov. 9, 1909.

2 SHEETS—SHEET 1.



Witnesses

E. Rosen
R. C. Campbell

Fig. 2

C

B

Inventor

John A. Hulit
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att'y

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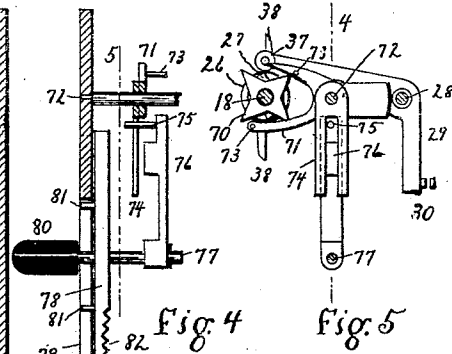
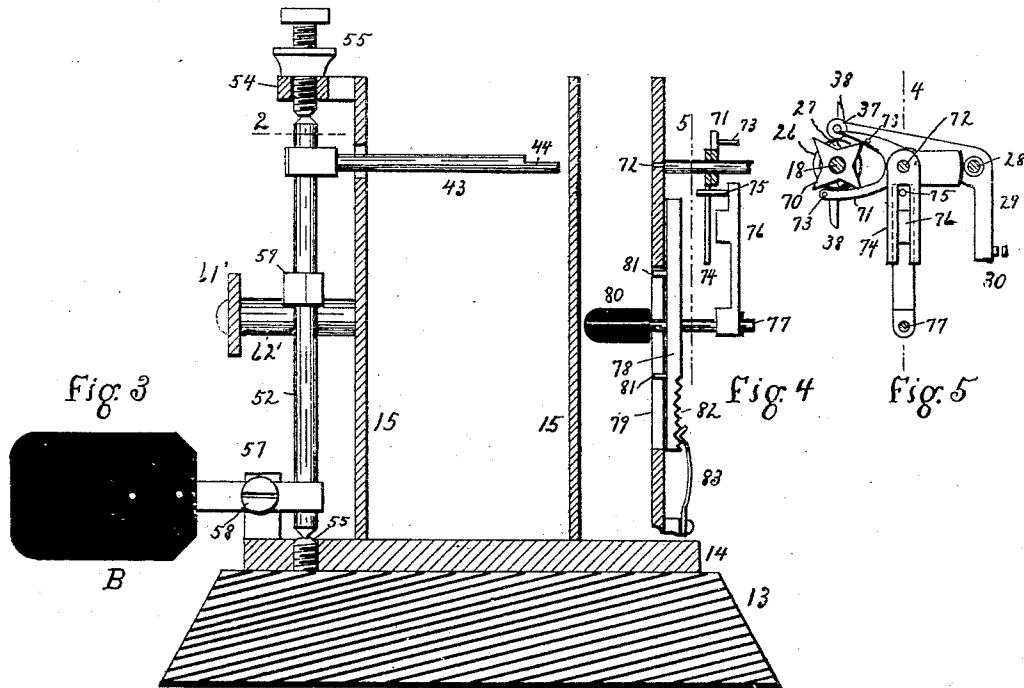


Fig. 5

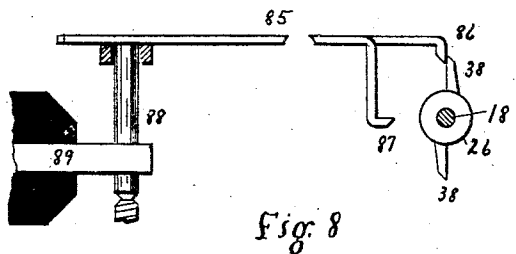


Fig. 8

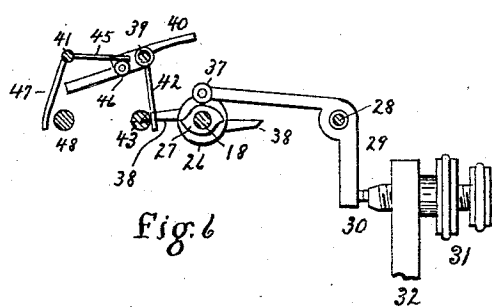


Fig. 6

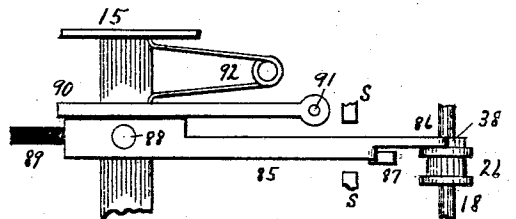


Fig. 9

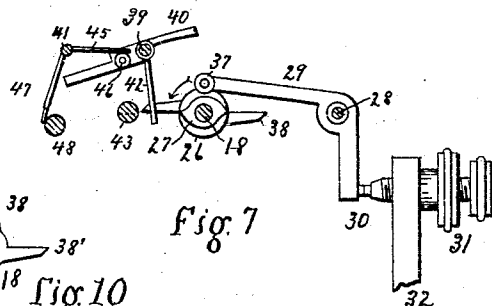


Fig. 7

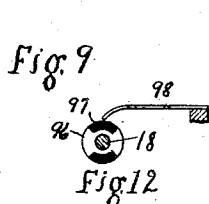


Fig. 12

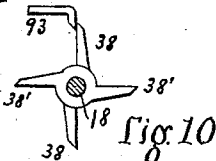


Fig. 10

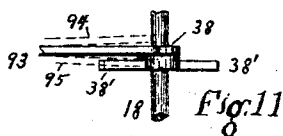


Fig. 11

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN A. HULIT, OF TOPEKA, KANSAS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE
HULIT TRANSMITTER COMPANY, OF TOPEKA, KANSAS, A CORPORATION OF KANSAS.

TELEGRAPH SENDING-MACHINE.

939,507.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed September 3, 1908. Serial No. 451,487.

To all whom it may concern:

Be it known that I, JOHN A. HULIT, a citizen of the United States, residing in Topeka, in the county of Shawnee and State of Kansas, have invented new and useful Improvements in Telegraph Sending-Machines, of which the following is a specification.

My invention relates to automatic or semi-automatic telegraph sending machines, or telegraph keys, of the general type hereinafter illustrated.

The object of my invention is to improve generally upon machines of this kind; to provide a sending machine operated by a motor, and in which the motor runs only during the transmission of a signal, thus saving the motor power; to provide a mechanism thus operated by a motor for sending the dots automatically and to associate therewith a mechanism for making dashes; to provide a motor run sending machine which automatically makes the dots, and to associate therewith a mechanism for making the dashes so that the spaces between the dots and between succeeding dots and dashes may be exactly measured and always the same, so that it is impossible for the operator to make either a "split" dot or a "split" space; to provide a mechanism associated with a single contact for automatically making the dots, for automatically measuring the spaces, and for making the dashes on the same contact, or circuit closer; and to provide the several parts, improvements, and combinations hereinafter described and claimed. And my invention consists of the parts, improvements, and combinations herein set forth and claimed.

In the drawings accompanying and forming part of this specification and in the description of the drawings I illustrate my invention in its preferred form and show the best mode of applying the principles thereof; but it is to be understood that the invention itself is not confined to the exact details of the drawings and the description of the drawings, that parts and combinations thereof as specifically claimed may be used with or without other connecting devices or devices of similar general nature, and that I contemplate changes in form, pro-

portion, and materials, the substitution of equivalent members, and the transposition of parts, within the scope of the appended claims, without departing from the spirit of the invention.

Figure 1 is a longitudinal sectional view of a machine made in accordance with the principles of my invention on a plane approximately through the line 1 of Fig. 2. Fig. 2 is a top or plan view, the controlling levers being shown in section through the line 2 of Fig. 3. Fig. 3 is a cross sectional view of the frame showing one of the controlling or operating levers. Fig. 4 is a sectional view through the line 4 of Figs. 2 and 5 of the speed-regulating device. Fig. 5 is a sectional view through the line 5 of Figs. 2 and 4 showing the escapement or retarding mechanism. Figs. 6 and 7 show the action of the controlling levers and the circuit closer; Fig. 6 showing the action in closing the circuit for making the dashes, and Fig. 7 showing the action for continuously making the dots. Figs. 8 and 9 show modified forms of controlling devices; Fig. 8 being an elevation view, and Fig. 9 being a plan view. Figs. 10 and 11 are respectively, elevation and plan, views of a still further modification of the controlling devices. Fig. 12 is an elevation of a modified form of circuit closer.

Similar reference characters indicate like or corresponding parts throughout the several views.

13 indicates a base of wood or other suitable material, on which is a sur-base, on which are erected the two side-plates, constituting the main part of the frame, the side-plates being rigidly held in position and properly spaced apart by the separators.

A represents a suitable motor of any kind adapted for the purposes hereinafter set forth, its object being to rotate the shaft. Preferably the motor is a spring motor comprising the main spring on the shaft and the train of gears and pinions, the gear meshing with the pinion on said shaft. Secured on said shaft is a double-cam, preferably of about the shape indicated in the drawings. Also extending between the side-

plates is a rod or shaft 28 on which is mounted an L-shaped lever 29, one arm of which carries one member of a contact 30, the other member being carried in a set-screw 31 mounted in a post 32 mounted on the insulated base 13 so as to be insulated from the frame. The two members may be connected with opposite sides of the circuit by means of the screws or binding-posts 33 and 34, respectively, so that the circuit may be controlled by said contact 30. The contact points may be of platinum or other suitable or standard material. The other arm of the L-shaped lever 29 carries an anti-friction roller 37 which rides on the double-cam 27; and a suitable spring 35 is extended between the L-shaped lever and a pin 36 extending out from one of the side-plates, which tends naturally to hold the lever with the contacts closed; but by rotating the shaft 18 and double-cam 27, the contacts will be alternately closed and opened by reason of the high-places of the cam lifting the lever and withdrawing the contact point against the tension of the spring. It may therefore be observed that by holding the shaft in the position shown in Figs. 1, 2, and 5, with the lever or roller on the point of the cam, the circuit will be open; by holding the shaft with the roller on or at the low place on the cam, as shown in Figs. 6 and 7, the circuit will be closed; and that by permitting the motor to rotate the shaft, the circuit will be alternately closed and opened.

Mounted on the shaft 18 are two oppositely set pins or stops 38, 38. Between the side-plates is mounted a rod or shaft 39 which carries a pin or finger 40, one end of which extends in the path of the stops 38 when the other end is stopped up against the rod or shaft 41 which is also mounted between the side-plates. By lifting the stop-pin or finger 40 out of the path of the stop 38, the shaft will be permitted to rotate by the force of the motor; by returning the finger in the path of the stop-pin 38, the shaft and motor will be stopped in the position shown in Fig. 1, with either of the stop-pins 38 against the finger 40. Extending down from shaft 39 is a rod 42 in the path of a rod 43, whose outer end 44 is flattened. Rod 43 is normally out of the path of the stop-pins 38, 38; upon moving said rod 43 to the right, however, the flat portion will extend in the path of said stop-pins 38, 38, and by reason of its action on rod 42, the finger 40 will be lifted, so as to permit the motor to rotate the shaft from its initial position to the position shown in Fig. 6; in which position, the circuit is closed at 30. Upon restoring rod 43 to normal position shown in Figs. 1 and 2, the opposite pin 38 will be stopped by the finger 40 in the position shown in Figs. 1, 2, and 5, with the circuit open at 30. Extending out from the rod or

shaft 41 is a rod 45 which bears on a roller 46 on the tail of the rod or finger 40, and extending down from the rod 41 is another rod 47, which extends in the path of the rod 48; so that by moving said rod 48 to the left (viewed in Figs. 1 and 2), the finger 40 will be lifted, thus permitting the motor to rotate the shaft 18 and associated parts, without interruption from the rod 43, as indicated in Fig. 7, thus alternately opening and closing the circuit as long as the rods 43 and 48 are held in the positions shown in Fig. 7. The normal position of the parts is shown in Figs. 1, 2, and 5, and the controlling finger and the parts immediately associated therewith are held, or returned to this position by the tension of a spring 49 which extends between the pin 50 in shaft 39 and the pin 51 in the side-plate.

The rods 43 and 48 are secured to vertical pivot rods 52 and 53, respectively, extended between the base and a bracket 54 and set in pivot-screws 55, 55. At the lower end of each pivot-rod is secured an arm 56, to which are secured the finger-pieces B and C respectively. Between the arms and finger-pieces is a post or bumper 57 against which the set-screws 58 in said arms strike, to limit the inward or forward movement of said arms or finger-pieces and the parts associated with said pivot-rods. On each pivot-rod is a short rod or lever 59, one arm of which is adapted to strike against a set-screw 60 to limit the backward movement of the pivot-rods and associated parts, and the other arm of which bears against one end of a spring 61, the other end of which bears against the end of a set-screw 62. Set-screws 60 and 62 are held in the plate 61' which is secured by posts 62' to the adjacent side-plate. In Fig. 2 I have shown the set-screws 60 and 62 and the spring 61 for only one of the pivot-rods.

Normally the parts are in the positions shown in Figs. 1 and 2. Now by pressing inwardly (*i. e.*, toward the opposite finger-piece), or toward the left, on finger-piece B, the parts operated thereby will be brought to the position shown in Fig. 6, with the circuit closed, as heretofore explained. Upon releasing said finger-piece, the parts will all be restored to their normal positions, the shaft 18 having made a half rotation. By pressing inwardly, or toward the right, on finger-piece C, the parts operated thereby will be brought to the positions shown in Fig. 7, with the shaft 18 and parts mounted thereon constantly rotating, thus alternately closing and opening the circuit, as heretofore explained. Upon releasing said finger-piece, the parts will be stopped in their normal positions.

In order to adapt my machine for practical telegraphing purposes, I provide in addition to the foregoing a suitable retarding de-

vice to keep down the speed of the motor, and a suitable speed regulating device to adjust the speed of the machine at the will of the operator.

5 Mounted on the shaft 18 is a four-pointed star-wheel 70; and adjacent thereto is a yoke 71 mounted on a rod or shaft 72 mounted between the side-plates. Secured to each arm of the yoke is a pin 73, 73, extending in the
10 path of the star-wheel points, so that as the shaft 18 is rotated the points will strike alternately said pins 73 and cause the yoke to move up and down or back and forth as in any other escapement mechanism. The special location of the points on the shaft with
15 relation to the cam and stop-pins 38, 38, is of special importance, as will hereinafter be more fully explained. Secured to said yoke on said shaft is a slotted rod or plate 74 in the slot of which extends a pin 75 secured to
20 a weight 76 pivoted to a rod 77 secured to a rod 78, said rod 77 also extending through a slot 79 in the side-plate and terminating with a knob 80 on the outside of said plate. Also
25 secured to the rod 78 are two pins 81, 81 extending into said slot 79 to hold the rod 78 in proper movable vertical position. Said rod is notched at 82 and engaged in said notches by a spring 83. By moving the
30 knob down, the weight 76 will also be moved downwardly, bringing the pin 75 farther away from the pivot-shaft 72, thereby lowering the speed of the shaft 18; by which mechanism the speed may be regulated for
35 faster or slower sending, at the will of the operator, by raising or lowering the knob 80, which is conveniently arranged on the outside of the frame.

40 Having understood the operation of the several parts, it will now be readily understood that by pressing the key C the dots are made automatically; a short quick pressure or stroke on that key sending a single dot; while any desired number of dots in suc-
45 cession may be made by holding the key in such pressed-in position for the necessary length of time. A dash may be made by pressing the key B, the length of the dash depending on the length of time the key is
50 held in pressed-in position. It will also be noted that with my machine, not only will the spaces between the dots always be the same, but that also where the dash follows the dot, or the dot follows the dash, the space
55 between either succession of characters will always be exactly the same as the spaces between succeeding dots. In other words my machine automatically measures the spaces as well as the dots, and it automatically
60 measures the spaces between dots and dashes and between dashes, as well as between the dots. Of course, the operator may make a longer space than that made automatically by the machine, but he cannot make a shorter
65 one; he cannot pile up his characters; it is

impossible for him to make an imperfect or "split" dot, or an imperfect or "split" space. The length of the dots and spaces may be regulated by screwing the screw 31 in or out; by screwing it in a heavier dot and shorter
70 space will be made, and by screwing it out a lighter dot and a longer space will be made.

It will be noted that the cam is constructed so there is an abrupt fall following each point, so that the circuit is closed
75 quickly on the operation of either key; and the quickness of the response may be increased or diminished by merely twisting the cam on the shaft with relation to the stops.
80

Inasmuch as it is absolutely essential in a machine of this kind that a quick response be secured from a touch on either key, and as all retarding devices, as usually constructed, include weighty elements, whose
85 inertia of rest prevent such quick response, I have given especial attention to the construction of the escapement device or retarder shown, so that, although it retards the speed of the motor, yet it permits the
90 circuit closer to act quickly in response to a touch on the key. Thus I so locate the pins 73 with reference to the points of the star wheel, that when the shaft 18 and star wheel
95 are in their normal position, the points will not be in contact with either of said pins, but will be permitted to travel a short distance before striking against either one of them. This permits the full force of the
100 motor to operate the shaft initially before encountering the load of the retarder, and I prefer to adjust the parts so that this initial travel is sufficient to close the circuit, thereby insuring a quick response to pressure
105 on the keys. By twisting the star wheel backward or forward on the shaft and with relation to the cam and the stops, this initial travel may be adjusted. As the star-wheel points are opposite each other, they have
110 the same relative position as to the pins 73 when the stop is held by the rod 43 with the circuit closed, so that there will be also a quick response in opening the circuit on releasing the key B at the end of the dash.

The object of the several rods and levers
115 intermediate the motor driven circuit closer and the operating key or keys, is to provide an action whereby the circuit closer and motor may be controlled by a light touch on the key or keys, and whereby the control
120 may be quick and positive, and the mechanism in a form compact and suitable for bringing the keys at the most convenient location for manipulation by the operator. Broadly speaking, however, all these inter-
125 mediate rods and levers are not absolutely essential to my invention, as will be illustrated by reference to Figs. 8, 9, 10, and 11. Thus in Figs. 8 and 9, I provide a single lever 85 secured to a pivot rod 88 and pro-
130

vided with the two stops or steps 86 and 87 corresponding to the finger 40 and the rod 43. To pivot lever 88 is secured a finger-piece or key 89. Along the straight side of lever 85 is a rod 90 pivoted at 91 to the frame, and between the rod and the side plate is a spring 92, by the pressure of which the lever 85 is held in and returned to its normal central position shown in the drawings with stop 86 in the path of stop 38. On pressing the key in one direction to throw the lever against one of the stops (the upper one in Fig. 9, for instance), stops 38 will be released from 86 and will strike against 87, and on releasing the key the lever will be returned to normal position, as in making a dash. On pressing the key in the other direction, the stops 38 will be freed from both stops 86 and 87, and the motor will cause the making of the dots until the key is again released. In the modification shown in Figs. 10 and 11, there are two additional stops 38', 38'' arranged in a plane adjacent to the plane in which the stops 38, 38 are arranged. There is a single lever 93 normally in the path of the stops 38, 38. By shifting the lever to the position indicated in dotted outline by the numeral 95 out of the path of 38, 38, and into the path of 38', 38'', the dashes may be made; and by shifting it to the position 94, the dots may be made.

While I deem the form of circuit closer hereinbefore described the preferable and more efficient one, yet there may be other forms used within the principles of my invention. Thus, in Fig. 12, I illustrate the common form of symbol disk and brush, the disk being mounted on the shaft 18 and divided in its periphery into alternate blocks of insulating 97 and conducting 96 material, the brush 98 bearing against said periphery and resting normally on the insulating material to open the circuit. It should be further understood that by the term "circuit closer" as used in this specification I intend to comprehend circuit-breakers, and all such devices by which the electric circuit is controlled directly or indirectly, and by whatever name known. Also it should be understood that the terms referring to the circuit as open and closed are relative merely, as, for instance, my machine is equally applicable to a normally closed circuit.

By using the preferred form of circuit closer with the anti-friction roller bearing on the cam, I am able to use a comparatively stiff spring 35, thereby insuring a sound and uniform contact at 30. And, except for the very lightest characters, the roller does not ride on the lower places of the cam, but is stopped by reason of the contact at 30, thereby making the contact with the full force of the spring as well as the momentum of the

lever 29. The antifriction roller and the holding of the roller free from the cam when the contacts are closed are also of special advantage in connection with the escapement, because this arrangement relieves the motor of all, or nearly all, friction in its initial movement when the stops are released from either stopping position; both a quick response and a firm contact are secured.

What I claim is:

1. The combination of a frame, a rotary circuit closer mounted therein, a motor for driving said circuit closer, stops for stopping said motor with the circuit closed and for stopping said motor with the circuit open, and a device controlled by the operator for operating one of said stops alone and for operating both of said stops in unison, at the will of the operator.

2. The combination of a frame, a rotary circuit closer mounted therein, a motor for driving said circuit closer, and manually controlled stops for stopping said motor with the circuit closed and for stopping said motor with the circuit open.

3. The combination of a frame, a rotary circuit closer mounted therein, a motor for driving said circuit closer, and spring-pressed manually operable stopping and releasing devices associated therewith, normally stopping said motor with the circuit closer in one position, and adapted by pressure in one way to release said motor and permit it to drive the circuit closer to another position and to stop it with the circuit closer in that other position, and also adapted by pressure in another way to free the motor so as to freely drive the circuit closer, and also adapted on being released from either pressure to stop said motor with the circuit closer in normal position.

4. The combination of a frame, a single circuit closer mounted therein, and a manually controlled mechanism associated therewith, with means whereby a pressure in one way will produce a rapid succession of closings and openings of said circuit closer and a pressure in another way will produce but a single closing of said circuit closer, and a release from either pressure will restore said circuit closer to normal open position.

5. The combination of a frame, a circuit closer mounted therein, a motor for driving said circuit closer, and manually controlled stopping and releasing devices for stopping said motor with the circuit closer in a normal primary position, for releasing said motor and permitting it to drive said circuit closer so as to effect a rapid succession of closings and openings, and for releasing and stopping said motor with the circuit closer in a secondary position.

6. In a machine for transmitting Morse characters over a telegraph circuit, the combination of a frame, a circuit closer mounted

therein, manually controlled devices for making dots and dashes by said circuit closer, said devices being so arranged that the same elements which measure the spaces between succeeding dots also measure the spaces between succeeding dots and dashes.

7. The combination of a frame, a rotary circuit closer mounted therein, a motor mounted therein for driving said circuit closer, a stop for stopping said motor with the circuit closer in a normal primary position, a stop for stopping said motor with the circuit closer in a secondary position, a finger-key and mechanism connecting said key with said stops whereby a pressure on said key in one way will release said motor from said first-mentioned stop and permit said motor to drive said circuit closer to produce a succession of closings and openings and a pressure in another way will bring said second-mentioned stop into stopping position, and a spring for returning said key and connecting mechanism to normal position with said first-mentioned stop in stopping position and said second-mentioned stop in released position.

8. The combination of a frame, a rotary circuit closer mounted therein, a motor mounted in the frame for driving said circuit closer, a retarding device mounted in the frame for said motor, a speed regulator mounted in the frame for said retarding device, stops mounted in the frame for stopping said motor with the circuit closer in a normal primary position and in a secondary position respectively, and keys and springs and connecting mechanism between said keys and the stops normally permitting said stops to stop the circuit closer in normal position, and adapted by pressure in one way to permit the motor to operate the circuit closer successively, and by pressure in another way to permit the motor to operate the circuit closer to its secondary position and there to stop it, and on release of said keys to permit the motor to bring the circuit closer to normal primary position.

9. The combination of a frame, a rotary circuit closer mounted therein, a motor mounted in the frame for driving said circuit closer, a key and connecting mechanism for controlling said motor and circuit closer, and a retarding device having a weight arranged in opposition to said motor when said motor is in operation and freed from said motor when said motor is stopped, whereby the initial travel of said motor may be free from the resistance of said weight.

10. The combination of a frame, a circuit closer mounted therein, devices for operating and controlling the circuit closer, and a retarding device arranged in opposition to the operating device when said device is in operation and freed therefrom when said device is stopped, whereby the initial travel

of said device is free from the resistance of the retarding device.

11. The combination of a frame, a rotary circuit closer mounted therein, a motor for driving the circuit closer, and a retarding device comprising a star-wheel cooperating with said circuit closer and motor and a weighted yoke adapted to engage the points of the star-wheel when the motor is in operation and disengaged therefrom when the motor is stopped; and manually operable devices for controlling said motor and circuit closer.

12. The combination of a frame, a rotary circuit closer mounted therein, a motor for driving the circuit closer, devices for controlling the circuit closer and motor, a star-wheel driven by the motor, a pivoted yoke engaging the points of the star-wheel and forming in connection therewith an escapement the yoke being free from the star wheel when the motor is stopped by said controlling devices, a weight operated by said yoke, and a manually operable device for shifting the weight closer to and farther away from the yoke pivot.

13. The combination of a frame, a motor mounted therein, a cam rotated by the motor, manually operable controlling devices for the motor and the cam, a pair of contacts, a lever controlling said contacts and pivoted in the frame and operated by said cam, and a spring tending naturally to close said contacts, said cam operating said lever in opposition to said spring.

14. The combination of a frame, a motor mounted therein, a shaft mounted therein driven by the motor, a double cam secured on the shaft, a pair of contacts, a lever pivoted in the frame carrying one of said contacts and bearing on said cam, a spring extending between the lever and the cam tending naturally to close said contacts, whereby the operation of the cam and the tension of the spring open and close said contacts, a star-wheel secured on said shaft, a pivoted yoke mounted in the frame and engaging said star-wheel and free from the star-wheel when the motor and circuit closer are stopped by their controlling devices, a pivoted weight operated by the yoke and a means for shifting said weight closer to and farther away from the yoke pivot for regulating the speed, a stop to stop said motor with the circuit open, a stop to stop said motor with the circuit closed, a finger key to release said first-mentioned stop, a finger key to release said first-mentioned stop and bring said second-mentioned stop into stopping position, and springs to return said stops and finger keys to normal position with the first-mentioned stop in stopping position and the second-mentioned stop out of stopping position.

15. The combination of a frame, a motor mounted therein, a pair of contacts operated

by the motor and normally open, and suitable mechanism associated therewith that permits the contacts to be opened and closed by the motor and also holds the motor at
5 rest with the contacts in both closed and open position.

In testimony whereof I have hereunto

signed my name in the presence of the subscribing witnesses.

JOHN A. HULIT.

Witnesses:

HAZEL D. RICHARDSON,
C. J. ROSEN.