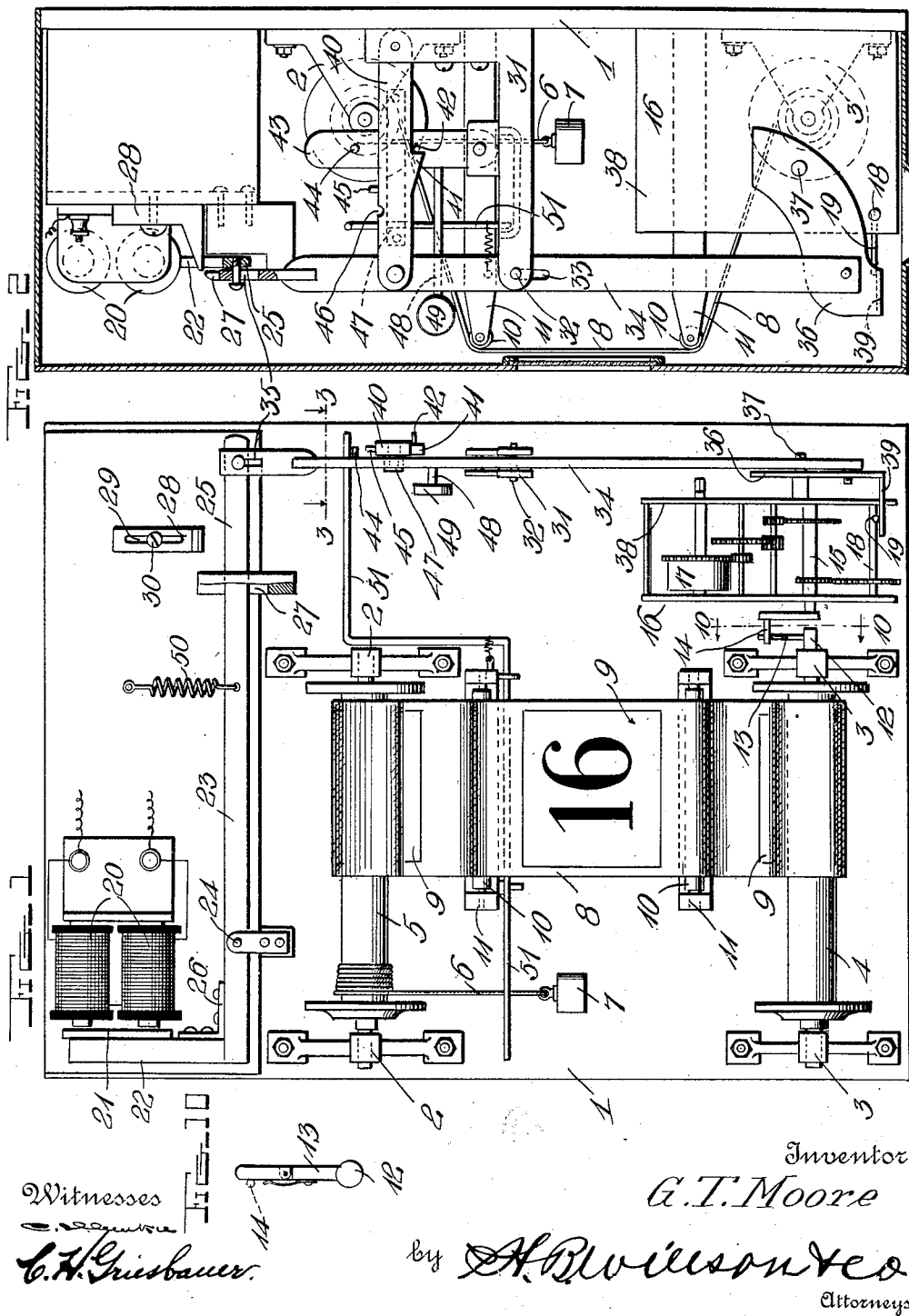
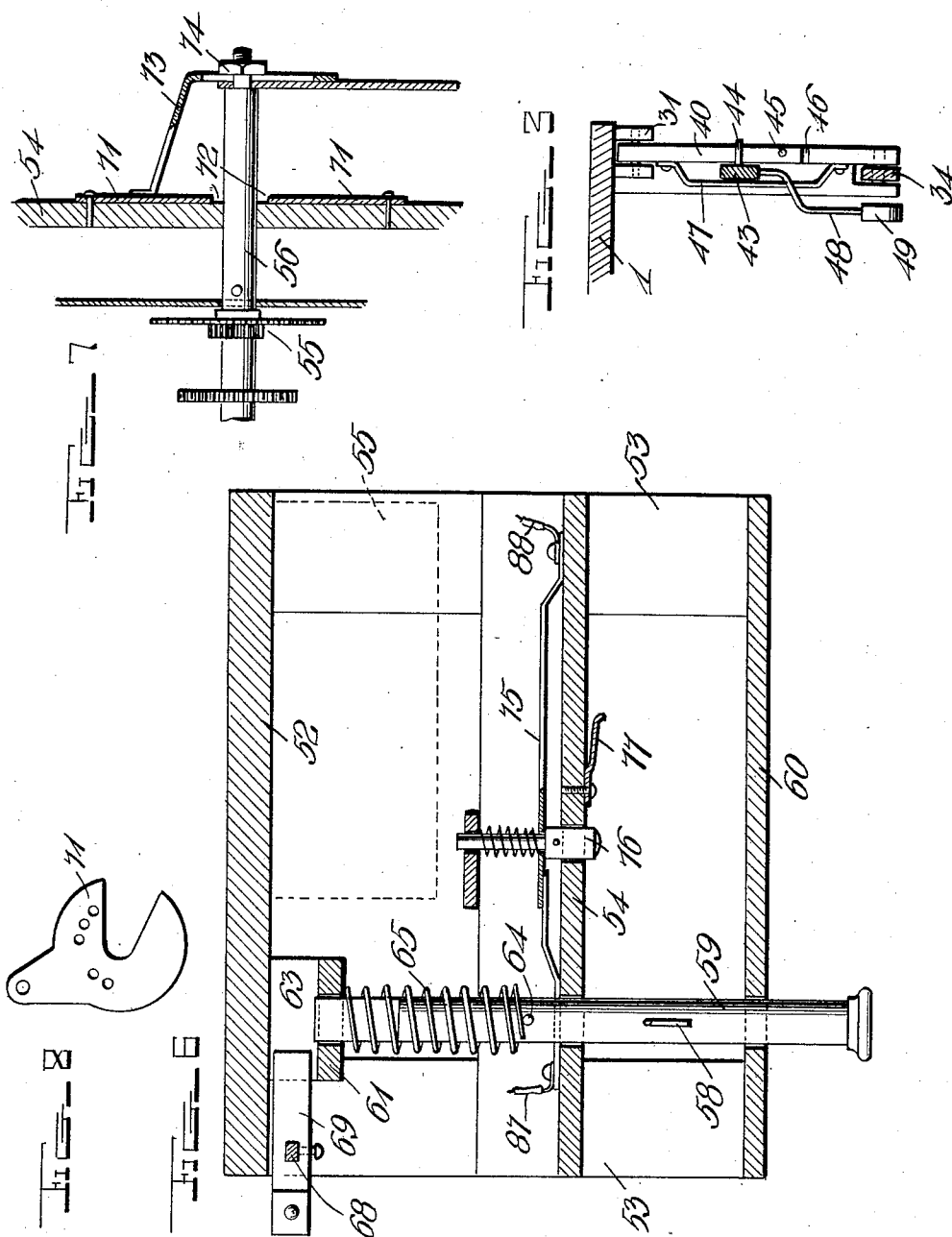




G. T. MOORE.
 FIRE ALARM APPARATUS.
 APPLICATION FILED JUNE 11, 1909.
 998,197.
 Patented July 18, 1911.
 4 SHEETS—SHEET 2.



Witnesses
 C. H. Grieshaber

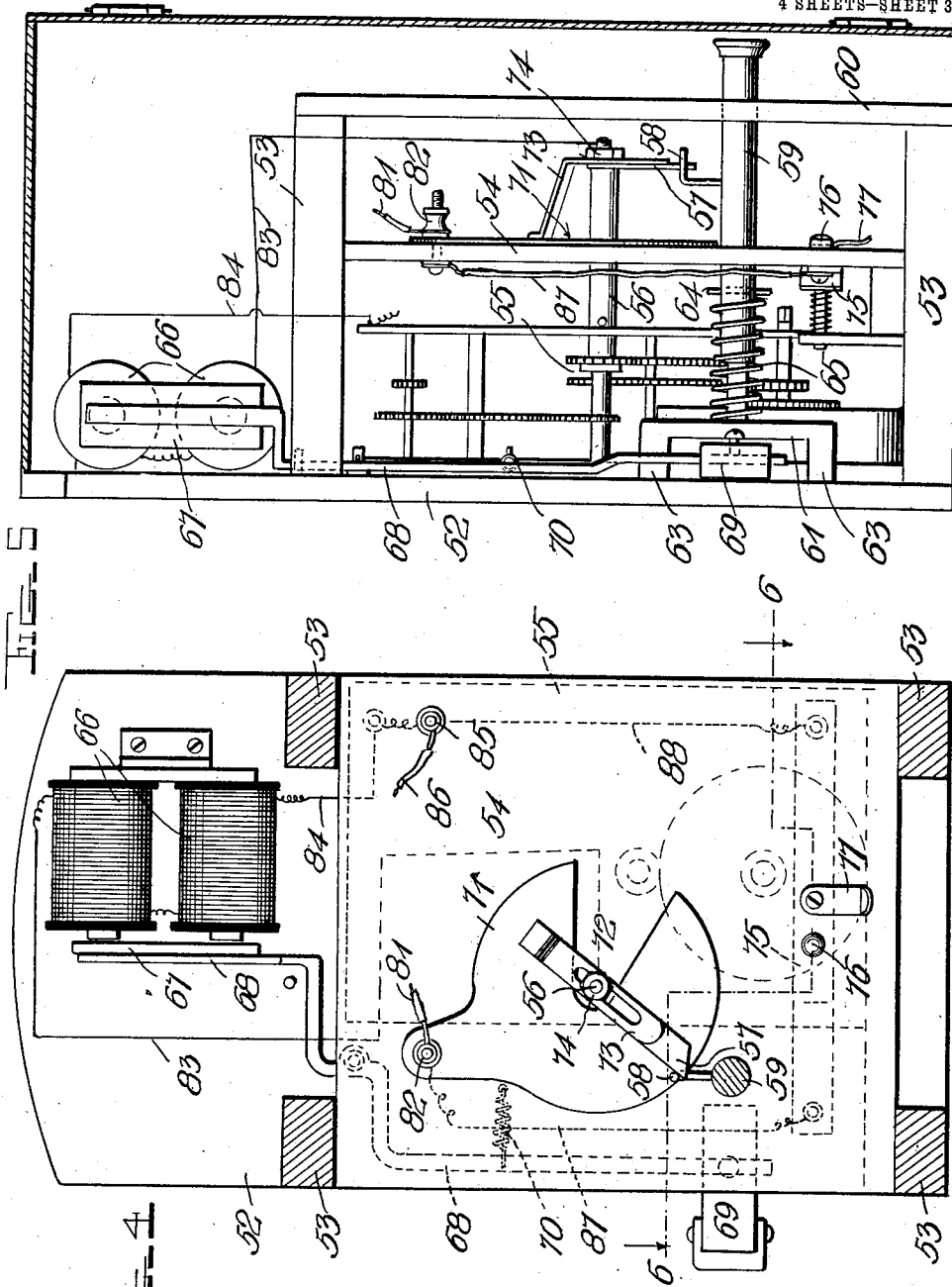
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Inventor

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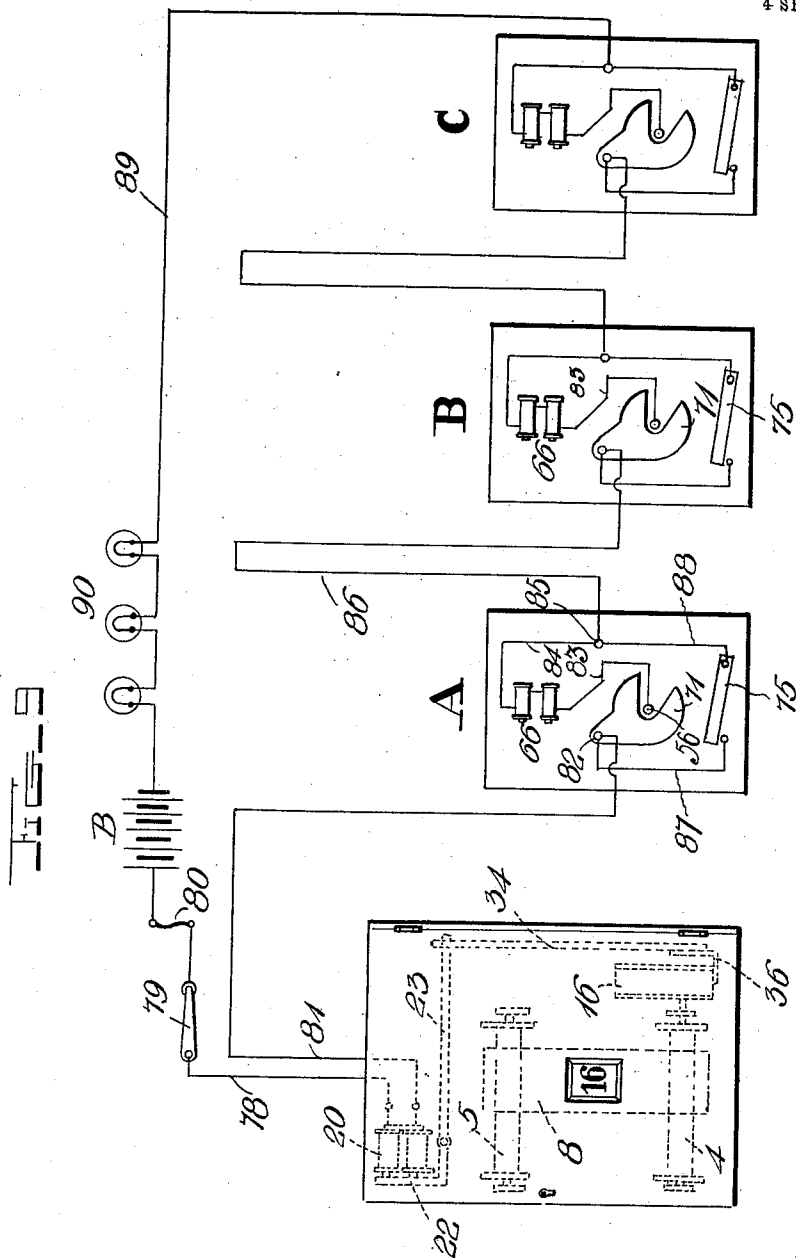
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Witnesses

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UNITED STATES PATENT OFFICE.

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FIRE-ALARM APPARATUS.

998,197.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed June 11, 1909. Serial No. 501,599.

To all whom it may concern:

Be it known that I, GUY T. MOORE, a citizen of the United States, residing at Marlboro, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in a Fire-Alarm Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The primary object of this invention is to provide a simple and efficient system, the initial cost of installation of which will be slight and the cost of maintenance of which will be negligible.

A further object of the invention is the provision of a register which is adapted for use in the system disclosed and which will operate to positively give the number of the station being sent in without confusing central.

A further object is to provide a sending mechanism which will prevent interference at other stations in a simple and effectual manner.

A further object of the invention is the provision of a novel central register which, when operated, will be locked against further operation until its return to its initial position manually by the operator.

A further object of the invention is the provision of a novel tripping mechanism for controlling the tape of the register and a novel contact plate at each sending station which may be adjusted to maintain the circuit open for any predetermined length of time thus insuring the proper operation of the tape of the register and preventing interference from subsequent operations at other stations or by induction from outside sources of current.

These several objects, and such other incidental objects as will hereinafter appear, are attained in the use of the mechanism illustrated in the accompanying drawings and the invention consists in certain novel features of the same which will be hereinafter first fully described and then more particularly pointed out in the appended claims.

In the drawings which illustrate the typical embodiment of the invention, Figure 1 is a front elevation of the register with the front plate removed. Fig. 2 is a side elevation of the same with the casing

broken away. Fig. 3 is a detail horizontal section taken on the line 3—3 of Fig. 1. Fig. 4 is a front elevation of one of the sending boxes, with the front of the casing removed. Fig. 5 is a side elevation of the same with the casing broken away. Fig. 6 is a detail horizontal section on the line 6—6 of Fig. 4, parts being broken away and the driving mechanism being shown only in diagram. Fig. 7 is a detail sectional view through the contact finger shown in Fig. 4, showing its connection with the main arbor of the driving mechanism and its association with the limiting finger. Fig. 8 is a detail elevation of a contact plate with holes therein. Fig. 9 is a diagrammatic view showing the circuits employed. Fig. 10 is a detail elevation of the operating arm for driving the indicator tape looking in the direction of the arrows on the line 10—10, Fig. 1.

The register is more particularly shown in Figs. 1, 2 and 3. This register comprises a casing of any suitable sort which is connected up and supported upon the base or back board 1 and is omitted from the drawings for the sake of clearness in illustration. Spaced apart upon the back board or base are two pairs of brackets 2 and 3 in which are journaled the tape rollers 4 and 5, the latter also acting as a weight drum and having wound thereupon the weight cord or chain 6 which is provided with an operating weight 7. Wound upon these rollers is the register tape 8, which is provided with suitably spaced numerals preferably running consecutively and arranged in separate sections 9. This tape preferably runs over antifriction rollers 10 which are carried upon suitable uprights 11 and are arranged intermediate the tape rollers and are slightly raised therefrom so as to bring the tape close to a suitable glass front carried upon the casing. The roller 4 has a projecting stub shaft 10 upon which is keyed an arm 13 adapted to be freely engaged by a crank arm 14 carried upon the driving arbor 15 of the clock work mechanism 16. This mechanism has its winding drum shown at 17 and a controlling shaft 18 which is driven thereby is shown as provided with a trip arm 19. By referring to Fig. 10 it will be noticed that the contact or operating arm 13 is hinged in its center and is provided with a spring to hold it in normal position. When traveling in one

direction the shoulder formed on the outer hinge member prevents the parts from doubling and thereby turns the shaft 15 while in the reverse movement of the shaft 12 the spring yields or permits the outer end of the arm to drop over the rigid end of the crank arm 14.

Mounted upon the upper portion of the base 1 is an electromagnet 20 whose armature 21 is rigidly connected to the other arm 22 of a bell crank lever 23. This bell crank lever is pivoted at 24 to the base and has its longer arm 25 extending transversely of the base and braced to the short arm by a strap 26. The long arm of the lever is limited in its downward movement by a slotted stop 27, in which the arm is adapted to play and is limited in its upward movement by a stop 28 having a slot 29 through which a set screw 30 is inserted to adjustably secure the stop to the base.

Extending outwardly from the base 1 below the lever 23, is a bracket 31 carrying a pin 32 at its outer end adapted to pass through a longitudinal slot 33 in a vertical rod 34, said rod 34 having its upper end connected with the arm 25 of the bell crank lever by a pin and slot connection 35. A tripping lever 36 is pivoted to the lower end of this rod and is journaled upon a stub shaft 37 projecting laterally from the frame 38 of the clock work mechanism 16. The lower end of this trip lever has a lateral projection 39 so that, when in depressed position, it will be engaged by the trip arm 19 of said mechanism to prevent the operation thereof.

The upper end of the bracket 31 is bifurcated to receive a retaining arm 40 which is pivotally connected at its outer end to the rod 34 and is provided on its under edge, intermediate its length, with a cam faced stop 41 adapted to be engaged by a pin 42 upon the locking lever 43. A similar pin 44 on the lever 43 above the frame 40 is adapted to engage a pin 45 upon the upper edge of the frame 40, and a notch 46, adjacent the pin 45 for a purpose which will be hereinafter described. The lever 43 travels in a guide 47 carried upon the arm 40, and is provided with a laterally extending arm 48 having a weight 49 on its end which normally holds the pin 42 in engagement with the squared rear side of the cam stop 41.

As the circuit used in the system is normally closed it will be readily seen that the outer end of the arm 25 is normally depressed carrying with it the rod 34 and the arm 40. In this position, the pin 42 rests against the squared rear face of the cam 41 and the pin 44 is held free of the pin 45. The trip arm 19 is in engagement with the lateral extension 39 on the trip lever 36 and the clock work mechanism is stationary.

When the circuit is broken as hereinafter described, the lever 25 is raised by a spring 50 against the stop 28, thus lifting the rod 34 and the trip lever 36 and disengaging the lateral extension 39 from the trip arm 19, thereby permitting the clock work mechanism to start. The crank arm 14 which is in engagement with the arm 13 on the roller 4 now acts to wind the tape upon the said roller and bring the required number into view. This action also winds the weight cord 6 upon the roller 5 and raises the weight 7 so that, when the parts are again stopped, this weight will return them to normal position automatically, it being understood that the arm 13 is free of the crank arm 14. At this time, it will be seen, the pin 42 is held free of the arm 41, thus allowing the weight 49 to carry the lever 43 forwardly so that the pin 44 will engage the pin 45. The pin 42 at this time, is considerably forward of the squared rear face of the stop 41 and when the circuit is again completed and the outer end of the bell crank 23 thrown downwardly, the pin 45 will be withdrawn from the path of the pin 44, thus allowing the lever 43 to move farther forward, whereupon the pin 44 will engage the notch 46. In this position, the spring 50 will be prevented from acting should the circuit through the magnet 20 be again broken. When the parts are thus arranged and the current is restored to the line, both pins 42 and 44 being free of the lever 40, any attempt to raise the lever will result in the pin 44 catching in the notch 46 and thus locking the device against operation. In order to restore the parts of the register to their normal positions, I pivot to the under side of the upper bracket 10 a transverse lever 51, the inner end of which is adapted to engage the upper end of the lever 43 and force it back to normal position. In this movement, the pin 44 passes over the pin 45 while the pin 42 rides upon the inclined face of the cam 41 and raises the arm 40 until the pin 42 passes completely under the cam after which the arm 40 will drop to its normal position.

The sending boxes are identical in their construction and arrangement except in the position of the contacts which will be hereinafter described in connection with the operation of the apparatus and with the system employed. As the boxes are similar I shall describe only one of them.

Projecting outwardly from the base plate 52 are front supporting arms 53 to which is secured a disk supporting plate 54. The clock work mechanism 55 is supported upon the back plate and has its main drive arbor 56 projecting through the plate 54 and provided on its end with an adjustable contact device to be hereinafter described. Connected to the arbor, adjacent the contact de-

vice, is a retaining arm 57 which is adapted to engage an off-set arm 58 carried upon the operating plunger 59, the outer end of which projects through the front plate 60 secured upon the arms 53. The inner end of the plunger is squared as shown in Fig. 5 and passes through a supplemental plate 61 spaced from the base plate 52 by means of blocks 63. Intermediate the plate 61 and a transverse pin 64 which extends through the plunger 59, there is arranged a spiral spring 65 which normally holds the plunger in projected position with the arm 58 in the path of the retaining arm 57. In this manner the clock work mechanism is prevented from operating until the plunger is manipulated to carry the arm 58 out of the path of the retaining arm 57.

In order to prevent the operation of the clock work mechanism at the stations other than the one in the act of sending, I provide an electromagnet 66 which is wired as will hereinafter be described, and has its armature 67 connected to an operating rod 68 pivoted upon the base plate 52 and provided at its lower end with a plug 69 adapted to be projected when the armature 67 is released by the magnet into the path of the plunger 59 by the spring 70. It will thus be seen that as the circuit is a closed one, when it is broken the magnets of all of the boxes upon this particular line will be released allowing the spring 70 to throw the plug 69 into the path of the operating plunger 59 so as to prevent the release of the clock work mechanism, thus preventing the sending of signals from other boxes and the consequent confusion of signals at central.

Secured to the plate 54 is a contact plate 71 which has the V-shaped slot 72 formed therein, the said slot straddling the driving arbor 56 of the clock work mechanism, that is to say, its sides do not coincide with radii of the shaft but in the form shown, extend past the shaft out of contact therewith. The entire length of the movable arm or finger, therefore, does not leave nor meet the side of the notch at the same instant but the lines of the arm and the side of the notch intersect and the point of intersection moves outwardly as the arm or finger leaves one side of the notch and moves inward as the arm meets and passes over the opposite side of the notch.

This plate is connected to the electromagnet 20 of the central register by a suitable conductor 81 and therefore forms one terminal of the line circuit. The contact device before mentioned comprises a slotted finger 73 having its slot engaged over the reduced end of the arbor 56 so as to be adjustable radially of the arbor. A suitable clamping nut 74 holds the finger in its adjusted position upon the arbor and one end of said finger is bent inwardly as shown

in Figs. 5 and 7 so as to normally contact with the plate 71. By adjusting the fingers upon the boxes to the proper degree, it will be seen that each box, when operated will have its circuit maintained open for a greater or longer period. For instance, the box at station A may have its contact finger arranged so that the end of the same will operate upon the outside edge of the plate 71 whereby an extremely short break in the circuit is assured. The contact arm at station B may be arranged at an intermediate position while the contact finger at station C will have its finger arranged at the innermost point of adjustment so that a relatively long break in the circuit is made as the end of the finger travels across the slot or gap 72 it being understood that only the end of the finger touches the plate.

Each sending box is provided with a separate controlling switch 75 which is adapted to control the circuit when any repairs are necessary. This switch is operated by a spring-pressed button 76 which may be held in depressed position so as to open the switch by a plate 77 which is pivoted to the plate 54 and is adapted to swing over the button. If it be desired to repair any of the mechanism in the box, the switch 75 is closed. The entire circuit is then shunted around the plate 71 and the clock work mechanism so that the proper repairs may be made. It will be obvious that the shunting of the magnet at one station does not affect the condition of the other stations.

At the central office, the magnet 20 of the register has one of its coils connected by a conductor 78, to a switch 79 and through a protective device 80 to the battery B. The opposite side of the magnet 20 is connected by a conductor 81 to the binding post 82 on the plate 71 at the first station A. The binding post 82 is connected directly to the contact plate 71 and also to the shunt wire 87 which is connected through the normally open switch 75 to a conductor 88 which is connected to the opposite binding post 85 and to the line. The arbor 56 of the clock works 55 is connected by a wire 83 to one terminal of the electromagnet 66, whose other terminal is connected to the binding post 85 by a conductor 84, contact between the arbor and the conductor 83 being effected by a brush or other well-known form of moving contact. When the contact arm 73, which is in electrical connection with the mechanism through the shaft 56, is moved over the notch or slot in the plate 71, the line circuit is broken and the magnet 20 de-energized so that the tape 8 will be actuated as before described to display the number of the box at which the break in the circuit is made. Inasmuch as the tape at the central station will move as long as the circuit is broken, the number displayed when the tape

comes to rest will correspond to the number of the station sending the alarm. When the finger has traveled across the slot and again touches the plate, the circuit will be closed and the magnet 20 again energized so that the parts controlled thereby will be restored to their normal positions as before described. The succeeding stations along the line are connected in a similar manner by a conductor 86 extending from the post 85 of one station to the post 82 of the next station and the return wire may be connected to the ground or may be a direct metallic return by way of conductor 89 to the resistance device 90. In the present instance the resistance device is shown as a plurality of lamps connected in series in the circuit and it will be understood of course, that if the return wire from the last station on the line is grounded, one side of the resistance device will also be grounded. I prefer to use a full metallic circuit although the grounded circuit will give satisfactory results.

Having thus described my invention, what I claim is:—

1. A sending device comprising a contact plate, a shaft, driving mechanism for the shaft, a contact arm connected to the shaft and adapted to ride over said plate, retaining means carried by the shaft, means to release said retaining means whereby the shaft mechanism may rotate the contact arm over the plate, and means to determine the length of engagement of the contact arm with the plate.

2. A sending device comprising a contact plate having a V-shaped slot therein, a shaft driven at a predetermined speed, a contact arm carried by the shaft, and means to adjust the contact arm to determine the time of passage of said contact arm over the slot.

3. A sending device comprising a contact plate having a V-shaped slot therein, a controlling arm adjustable to and from the edge of the plate and having one end in contact therewith and normally crossing one side of the slot, and means to rotate said arm over the plate and across the slot.

4. A sending device comprising a contact plate having a V-shaped slot therein, a driven shaft extending through the slot with its radii out of coincidence with the walls of the slot, and a contact arm held by said shaft and adapted to rotate over the plate and across the slot, the contact arm and plate being relatively adjustable to vary the time of passage of the arm across the slot.

5. A sending device comprising a flat circular plate having a V-shaped notch extend-

ing inwardly from its rim, a shaft arranged in the center of said contact plate, and a radially adjustable contact arm held by and rotatable with the shaft, and adapted to engage the contact plate and pass over said notch.

6. A sending device comprising a contact plate, a motor driven shaft, a contact arm carried by the shaft and adapted to rotate over the plate, said plate being out of contact with the contact arm during a predetermined portion of its rotation, an electromagnet, a source of current connected thereto, a tripping device for controlling the rotation of the shaft, and means controlled by the magnet for controlling the operation of the tripping device.

7. The combination with a source of current, of a pair of sending stations, notched contact plates at each station, motor driven contact arms adapted to wipe over said plates and notches, retaining members to control the operation of said arms, an electromagnet at each station in circuit with said source of current, means for controlling the said retaining members, said contact arms, when operated, controlling the circuit of said electromagnets, and members controlled by the magnet of the inactive station for preventing the operation of said retaining means.

8. The combination of a contact plate, a contact arm movable over said plate and adapted to close a circuit through the same, a plunger arranged below the plate and adapted to retain said contact arm normally at rest, an electromagnet normally energized by the circuit through the contact arm and contact plate, a pivoted arm secured to the armature of said magnet, and a plug on the lower end of said arm adapted to swing into the path of the plunger when the magnet is deenergized and thereby prevent the operation of the plunger to release the contact arm.

9. A sending device comprising a driven shaft, a plate having a portion cut away eccentrically to said shaft, and a contact arm carried by said shaft to wipe over the plate and across the cut-away portion thereof, the plate and the arm being relatively adjustable to vary the time of passage of the arm across the cut-away portion.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

GUY T. MOORE.

Witnesses:

WILLIAM I. GOLBERT,
NELSON H. RICE.