

No. 828,235.

PATENTED AUG. 7, 1906.

W. J. McCOLLOM.
CALL SYSTEM.

APPLICATION FILED FEB. 24, 1906.

2 SHEETS—SHEET 1.

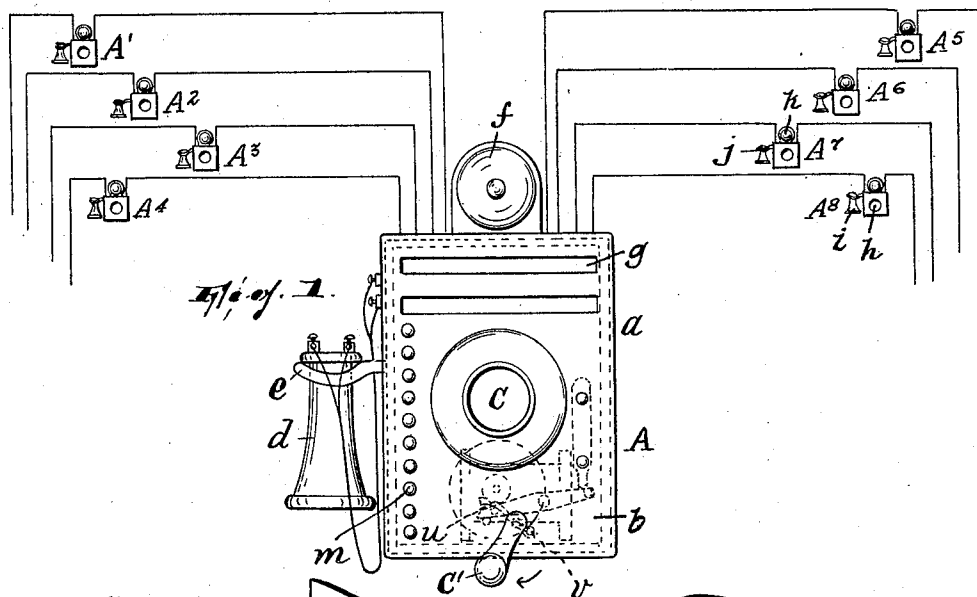
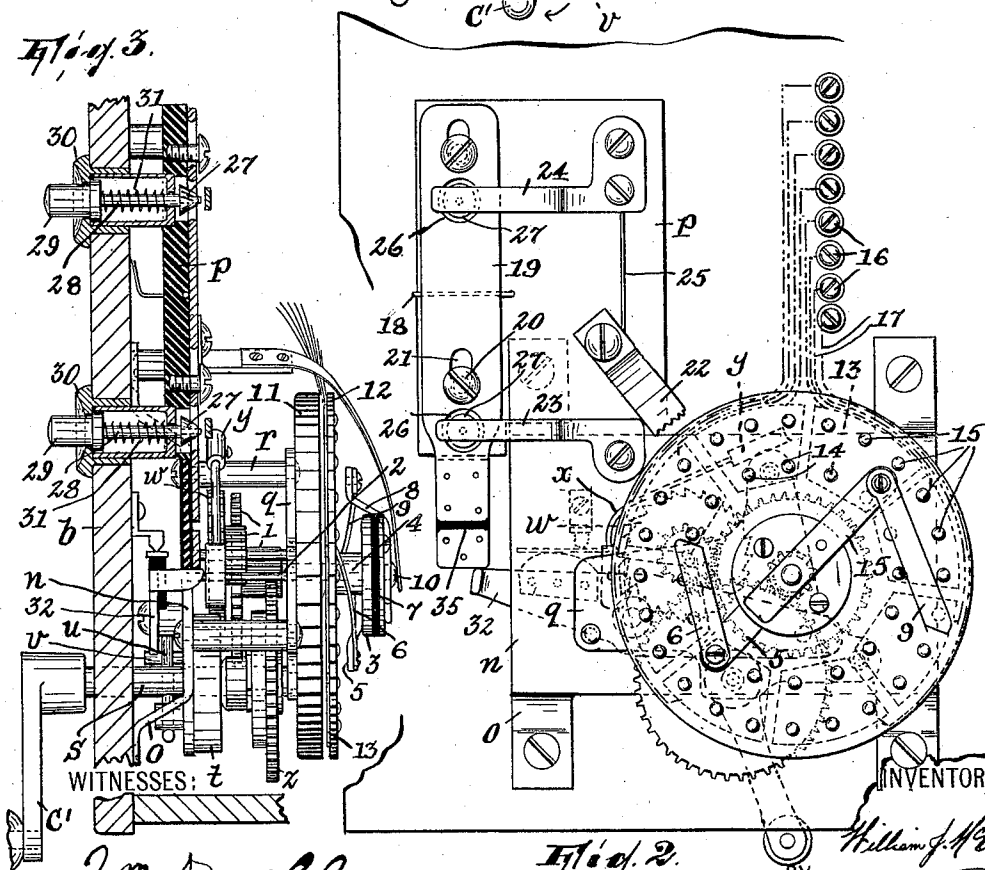


Fig. 3.



Wm. Drell
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Fig. 2.

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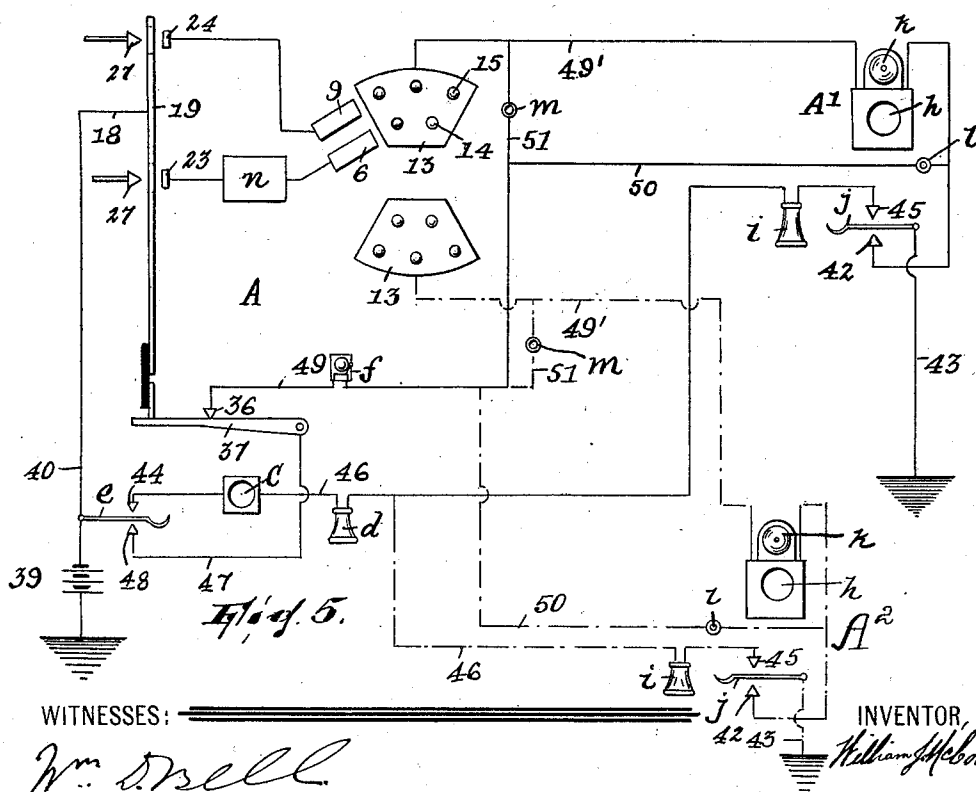
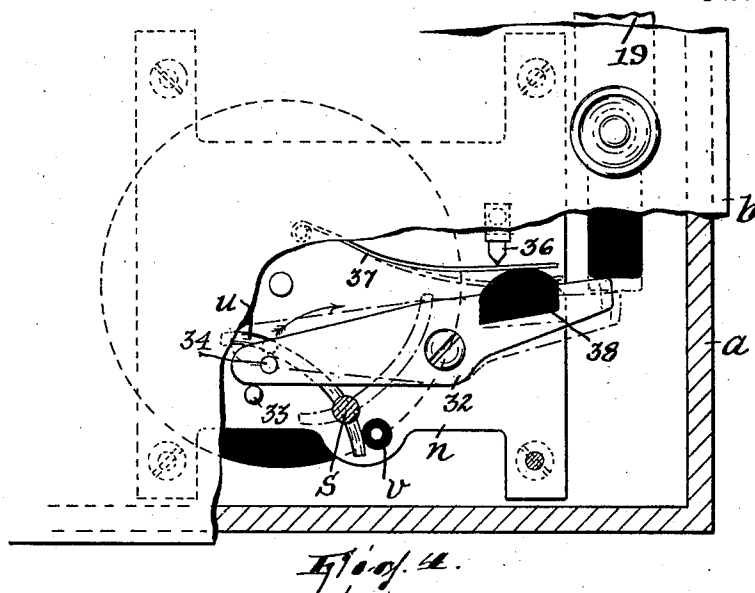
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2 SHEETS—SHEET 2.



WITNESSES:

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A. Glatt.

INVENTOR

William J. Collins,

BY _____

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UNITED STATES PATENT OFFICE.

WILLIAM J. MCCOLLOM, OF PATERSON, NEW JERSEY, ASSIGNOR OF ONE-THIRD TO F. ELIOT LOW, OF PATERSON, NEW JERSEY.

CALL SYSTEM.

No. 828,235.

Specification of Letters Patent.

Patented Aug. 7, 1906.

Application filed February 24, 1906. Serial No. 302,820.

To all whom it may concern:

Be it known that I, WILLIAM J. MCCOLLOM, a citizen of the United States, residing in Paterson, county of Passaic, State of New Jersey, have invented certain new and useful Improvements in Call Systems; and I do hereby 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, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

My invention is an improvement in telephone call systems for use particularly in mills and the like in which the calling-signal from the central station operates at all the others. Systems of this nature are sometimes designed primarily for simply the use of only a comparatively few individuals—such as the superintendent, foreman, and others who have cause to move about the establishment more or less from place to place—and as at present used they comprise no means for indicating simply by the signal and without resorting to the talking system which individual is wanted. Thus it becomes necessary for some one to answer all the substations every time they are wanted.

My invention therefore has in mind to so construct and arrange the operating parts of a system of this nature that the person calling may give a signal which while it operates at all the substations is appropriated to any particular individual who alone need answer the call.

My invention contemplates employing a suitably-actuated circuit maker and breaker at the central station so constructed as to make and break the circuit any one of a series of number of times whereby to cause a bell to ring or other signal to operate a corresponding number of times in all the substations, which maker and breaker has means for determining at the will of the person at central which signal shall be given.

My invention also has in mind to so construct the system that each substation may call up the central station, and to this end, since the simplest and most direct circuit arrangement for both signaling and talking is preferably utilized, I provide for automatically cutting out signaling toward central by

any substation while the signaling from central to the several substations is in operation.

My invention will be found fully illustrated in the accompanying drawings, wherein—

Figure 1 shows the instrument for the central station in front elevation and attached thereto diagrammatically the instruments for the several substations. Fig. 2 is an inside plan view of the main mechanism of the instrument for the central station, the same being shown as attached to the front hinged plate or door of said instrument. Fig. 3 is a view, partly in side elevation and partly in section, of what is shown in Fig. 2. Fig. 4 is a front view of a fragment of the instrument for the central station, the door being broken away to show the reverse side of certain parts seen in Fig. 2; and Fig. 5 is a diagrammatic view illustrating the circuit arrangement.

In the drawings, A designates the central or office station, and A' A² A³ A⁴ A⁵ A⁶ A⁷ A⁸ designate the substations. The instrument at the central station comprises a case *a*, having a door *b*, a transmitter *c*, a receiver *d*, receiver-hook *e*, a bell or other signal *f*, and an indicator *g*. Each substation comprises a transmitter *h*, receiver *i*, receiver-hook *j*, signal *k*, and a button or other circuit-closer *l*.

As already stated and as hereinafter more particularly described, a given signal—such as one, two, three, or four rings at the several substations—may be produced from the central station at the will of the operator, whereupon the party wanted and to whom such signal is appropriated answers at that substation to which he is nearest. It is not intended that communication between one substation and another can be effected at any time. By closing the circuit at any one substation by the use of the button there located that substation may call up the central office, and in that type of system to which my invention particularly relates the person at the said substation closes the circuit and leaves it closed, whereby the bell *f* or other signal at central continues sounding until the call is answered, whereupon the person at central, noting from the indicator what substation is calling, employs one of a series of buttons *m* to reset the indicator, sound the signal at the substation calling, (so notifying the person at said substation that the call is answered,) and opening the line between the central and

that substation for talking. So much being already known and in common use, it is unnecessary for me to more particularly describe the same herein.

5 *n* is a metal plate having legs *o*, by which it is secured to the door *b* of the case *a* on the inside thereof.

p is an insulating-plate secured to the door in spaced relation thereto directly above the
10 plate *n*.

q is another plate arranged parallel to and in front of the plate *n* and secured thereto by posts *r*, whereby to form a frame for certain mechanism to be described. In said frame
15 is journaled the main arbor *s*, which projects through the door *b* and carries a crank *c'*. A coiled spring *t*, secured at one end to the arbor and at the other end to a fixed point on the frame, normally pulls the arbor in the direction the reverse of that indicated by the
20 arrow in Fig. 1, thereby pressing one end of an arm *u*, carried by the arbor, against a stop *v*.

Journaled in the frame is an escapement-wheel *w*, with which coöperates the usual vibratory part *x*, carrying a weight *y* at its free end. The escapement-wheel is connected with a gear-wheel *z*, revoluble on the arbor *s* by a train of gearing 1. There is the usual
30 pawl-and-ratchet connection between the arbor and the gear-wheel *z*, so that when the arbor is turned in the direction of the arrow in Fig. 1 the spring *t* is put under tension and the pawl advanced one or more teeth on the
35 ratchet. When the crank of the arbor is freed, the spring returns it; but owing to the gearing and the action of the escapement mechanism the rotation is relatively slow. This mechanism is in common use in messenger calls, as well also in telephone-call systems of the kind to which my invention particularly relates, it affording a convenient means whereby a certain part or parts can be
40 set for rotation and left to rotate of themselves during a given period of time.

2 is an arbor on which one or more of the elements of the gearing 1, above referred to, may be arranged, and 3 is a metal disk having a collar 4, by which it is secured near the
50 end of said arbor 2 which is the farther from the plate *n*.

5 is an arm secured to the disk 3, and 6 a blade or spring contact-piece carried by said arm.

7 is a disk of insulation secured on the front of the disk 3, 8 an arm carried by said disk 7, and 9 a blade or spring contact-piece carried by the arm 8.

10 is a metal stud axially alined with the
60 arbor 2, but insulated therefrom by the disk 7.

To the front of the plate *q* are secured circular plates of insulation 11 and 12, between which are metal segments 13, arranged concentrically. Each segment 13 carries spaced

contacts 14 15, which protrude through the plate 12. In the adaptation shown there are two contacts 14 and three contacts 15 to each segment, and the series of contacts 14 and 15 are arranged in circles concentric with the
70 arbor 2. The blade 6 wipes over the contacts 14, while the blade 9 wipes over the contacts 15 when the mechanism has been set by the operator to cause the arbor 2 to rotate. Each segment 13 is connected to a
75 corresponding binding-post 16 on the inside of the case *a* by a wire 17, each binding-post corresponding to one of the stations *A*, *A*², &c. On the insulating-plate *p* is arranged a wire or other contact-piece 18, which forms
80 part of the circuit. Against this bears a metal slide 19, which is guided for movement in a vertical direction by screws 20, penetrating vertical slots 21 in said slide.

22 is a metal spring-arm secured to the
85 plate *p* and bearing against the stud 10.

23 is a similar metallic spring-arm secured to the metal plate *n* and electrically connected with the arbor 2 by way of said plate.

24 is a metallic spring-arm connected with
90 the arm 22 by a wire 25, said arm 24 being secured to the plate *p*.

The arms 23 and 24 are secured to the plate *p*. The arms 23 and 24 overlap the slide 19, which latter has openings 26 directly
95 back of the arms 23 and 24. These openings are occupied by metallic cones 27 on stems 28 of push-buttons 29, set in sockets 30 in the door *b* and normally pressed upwardly by springs 31.

32 is a lever fulcrumed at about its center in the back of the plate *n*, being normally held by the arm *u* on arbor *s* against a stop
33, said arm engaging a stud 34 on the lever to effect this. The slide 19 rests on the other
105 arm of the lever 32, and in order to prevent a short circuit from the contact through the slide and the lever to the frame *n* the lower end of the slide may be insulated from the remainder thereof by insulation 35.

In view of the foregoing and further description of the circuit arrangements to follow if the arbor 2 is set in motion by setting the crank *c'* back and then releasing it and thereupon immediately one of the buttons 29
115 is pressed in the following operation will result: Setting the crank back will cause arm *u* to release lever 32, so that the weight of the slide 19 is free to move the latter downwardly. Upon the operator now immediately pressing
120 in one of the buttons 29 its cone 27 will slightly raise the slide until the cone passes, whereupon the slide will fall again, locking the button in the impressed position. In this position the cone engages the arm 24 23
125 and completes the circuit from the slide to said arm. If the lower button is pressed, the circuit is through 18, 19, 27, 23, *n*, 2, 5, 6, 14, 17 to 16. If the upper button is pressed, the circuit is through 18, 19, 27, 24, 25, 22, 10, 8, 130

9, 15, 17 to 16. During this time the blades are of course rotating, and as they pass over the contacts 14 whichever one is in circuit makes and breaks the circuit. It moreover
 5 closes the circuit successively with respect to each substation which successively receives the signal, being two or three rings, according to the blade which is in circuit. When the rotating parts come to a stop on the arm *u*
 10 engaging stud 34 and forcing lever 32 against the stop 33, said lever has pressed up the slide, releasing the button held impressed thereby and breaking the circuit between 27 and the arm 23 24.

15 It might occur that while the mechanism was thus successively calling the substations some one at one of the substations might short-circuit in such manner as to interfere with the calling of some or all of the stations
 20 relatively following his station. To this end 36 is a contact-point to which a wire may be secured, as hereinafter described, and against which a circuit maker and breaker in the form of a lever 37, fulcrumed on the frame *n*, is
 25 normally held by the lever 32, which carries an insulating-piece 38, engaging the lever 37.

Referring to Fig. 5, the parts 13, 6, 9, *n*, 23, 24, 19, 27, 37, *c*, *d*, *e*, and *f* all belong to station A. Two substations only, A' and A²,
 30 are indicated in this figure, each having the parts *h*, *i*, *j*, *k*, and *l*.

39 is a source of energy located in a wire 40, running from contact-piece 18 to ground and including the receiver-hook *e*.

35 49' designates wires running each from a segment 13 to the rest contact-point 42 for the receiver-hook of each of the stations A' A², said wire including the transmitter and bell for that station.

40 43 is a wire leading from each hook *j* to ground.

44 designates the upper contact-point for the hook *e*, and 45 the corresponding contact-points for the hooks *j*.

45 46 is a branched wire connecting the contact-point 44 with the contact-points 45 and including receivers *d* and *i* and transmitters *c*, and 47 is a wire connecting the rest contact-point 48 for the hook *e* with the lever 37,
 50 which is mounted on and electrically connected with the frame *n* in the actual construction, as above described.

49 is a wire including signal *f* and connected with the contact-point 36.

55 50 denotes wires including the buttons *l*, the same connecting each wire 49' beyond the signal *k* with the wire 49, and 51 denotes wires connecting the wire 49 with wires 50 and each including a button *m*.

60 The conditions for signaling from central being established by turning the crank *c* and pushing in one of the buttons 29, the current flows from ground through 39 40 18 19 27, 23 or 24, 6 or 9 13 49' 42, the hook *j* of the first
 65 station electrically reached, and 43 to ground,

sounding the signal at that station. In turn the circuit is similarly established for the station corresponding to the next segment electrically connected with the parts 6 and 9. The person called answers at that substation
 70 to which he is nearest and, removing the receiver from the hook, breaks the signal-circuit, establishing the talking-circuit, which, the person at central having now removed the receiver from the hook *e*, is completed thus:
 75 from ground through 39, *e*, 44, *c*, *d*, 46, *i*, *h*, 45, *j*, 43 to ground.

If a button *l* at one of the substations should be closed while the several substations are being successively signaled, the circuit,
 80 which would otherwise be completed through 39, 40, *e*, 48, 47, 37, 36, 49, 50, 49', 42, *j*, 43 to ground, would be broken between 36 and 37, because slide 19 has dropped and moved lever 37 to form a break in the circuit. Of course
 85 the interference from the closing of the circuit by the button at the time when the talking-line is working is prevented by the circuit being opened between *e* and 48.

The circuit may, in view of the foregoing,
 90 be said to be branched at the central station, the signal for each substation being located in a branch. Correspondingly, since the circuit is closed during signaling at the receiver-hook *e* between the same and con-
 95 tact-point 48, the parts *e*, 48, 47, 37, 36, 49, and 50 form a branched shunt which is closed to make a short-circuit when either of buttons *l* is pressed in and signaling from central is not occurring. Again, the circuit is,
 100 in effect, formed with a break having as its terminals, on the one hand, the segments 13 and, on the other hand, the wire 18, which break is intermittently electrically bridged or
 105 closed by the rotating arm 6 or 9 (according as the one or the other of said arms is first made to be electrically connected with wire 18 by impressing one of the buttons 29) as the latter passes over the spaced contacts 15 of the seg-
 110 ments.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with an electric circuit having a break therein, of a signal arranged
 115 in said circuit, and a make-and-break mechanism comprising parts movable the one with reference to and in contact with the other, one of said parts comprising spaced contact-points connected with one terminal at said
 120 break and arranged in a plurality of sets of different numbers of contact-points, and the other being adapted to engage said contact-points, and being connectible, at will, as to its contacting portions, alternately, with the
 125 other terminal, substantially as described.

2. The combination, with an electric circuit having a break therein, of a signal arranged in said circuit, a make-and-break mechanism comprising parts movable the one with refer-
 130

ence to the other, one of said parts comprising spaced contact-points connected with one terminal at said break and arranged in a plurality of sets of different numbers of contact-points, and the other comprising devices contactible each with a set of said contact-points, and means for connecting, at will, either of said devices with the other terminal, substantially as described.

3. The combination, with an electric circuit having a break therein, of a signal arranged in said circuit, a make-and-break mechanism comprising parts one of which has spaced contact-points connected with one terminal at said break and arranged in concentric sets of different numbers of contact-points and the other of which comprises devices contactible each with a set of said contact-points, means for rotating said other part to cause said devices to successively engage said contact-points, and means for connecting, at will, either of said devices with the other terminal, substantially as described.

4. The combination, with an electric circuit having a break therein, of a signal arranged in said circuit, a make-and-break mechanism comprising portions one of which has spaced contact-points connected with one terminal at said break and arranged in sets of different numbers of contact-points and the other of which comprises devices each having a movable part contactible with a set of said contact-points, a movable slide electrically connected with the other terminal, and devices each interposable between one of said first-named devices and the slide to produce electrical connection, said slide, when moved, being adapted to break said connection between said devices, substantially as described.

5. The combination, with an electric circuit having a break therein, of a signal arranged in said circuit, a make-and-break mechanism comprising portions one of which has spaced contact-points connected with one terminal at said break and arranged in sets of different numbers of contact-points and the other of which comprises devices each having a movable part contactible with a set of said contact-points, a movable slide electrically connected with the other terminal, devices each interposable between one of said first-named devices and the slide to produce electrical connection, said slide, when moved, being adapted to break said connection between said devices, and means for moving said movable parts, said means being adapted to actuate said slide, substantially as described.

6. The combination, with an electric circuit having a break therein, of a signal arranged in said circuit, a make-and-break mechanism comprising portions one of which has spaced contact-points connected with one terminal at said break and arranged in concentric sets of different numbers of contact-points and the other of which comprises devices each

having a rotary part contactible with a set of said contact-points, a gravity-actuated slide electrically connected with the other terminal at said break, devices interposable between said first-named devices and the slide to produce electrical connection, a lever engaged with said slide, and a spring-actuated mechanism for rotating said rotary parts, said mechanism normally holding said lever in a position to maintain the slide against the action of gravity, substantially as described.

7. The combination, with a branched electric circuit, of a signal located in each branch of said circuit, a circuit making and breaking means adapted to close the circuit with respect to the branches thereof, successively, whereby to successively actuate the signals, a shunt connected with the unbranched portion of the circuit and with one of the branches of the circuit at a point relatively beyond the signal therein, a signal and a circuit-closer in said shunt, and means for breaking the shunt during the operation of successively closing the circuit with respect to the branches thereof, substantially as described.

8. The combination, with a branched electric circuit, of a signal located in each branch of said circuit, an automatic circuit making and breaking means adapted to close the circuit with respect to the branches thereof, successively, whereby to successively actuate the signals, a shunt connected with the unbranched portion of said circuit and with one of the branches of the circuit at a point relatively beyond the signal therein, a signal and a circuit-closer in said shunt, and means, actuative from said circuit making and breaking means, for automatically breaking the shunt during the operation of successively closing the circuit with respect to the branches thereof, substantially as described.

9. The combination, with a branched electric circuit, of a signal located in each branch of said circuit, an automatic circuit making and breaking means adapted to close the circuit with respect to the branches thereof, successively, whereby to successively actuate the signals, a shunt connected with the unbranched portion of said circuit and with one of the branches of the circuit at a point relatively beyond the signal therein, a signal and a circuit-closer in said shunt, a normally-closed self-closing circuit-closer arranged in said shunt, and means, actuative from said circuit making and breaking means, for moving said last-named circuit-closer during the operation of successively closing the circuit with respect to the branches thereof, substantially as described.

10. The combination, with a branched electric circuit, of a signal located in each branch of said circuit, a circuit making and breaking means adapted to close the circuit with respect to the branches thereof, success-

sively, whereby to successively actuate the signals, a shunt connected with the unbranched portion of said circuit and having branches appropriated to and each connected with one of the branches of the circuit at a point relatively beyond the signal therein, a signal arranged in the unbranched portion of said shunt, a circuit-closer arranged in each branch of the shunt, and a means for automatically breaking the shunt during the operation of successively closing the circuit with respect to the branches thereof, substantially as described.

11. The combination, with a branched electric circuit, of a signal located in each branch of said circuit, a circuit making and breaking means adapted to close the circuit with respect to the branches thereof, successively, whereby to successively actuate the

signals, a shunt connected with the unbranched portion of said circuit and having branches appropriated to and each connected with one of the branches of the circuit at a point relatively beyond the signal therein, signaling means arranged in said shunt, a circuit-closer arranged in each branch of the shunt, and a means for automatically breaking the shunt during the operation of successively closing the circuit with respect to the branches thereof, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 10th day of February, 1906.

WILLIAM J. McCOLLOM.

Witnesses:

JOHN W. STEWARD,
F. ELIOT LOW.