

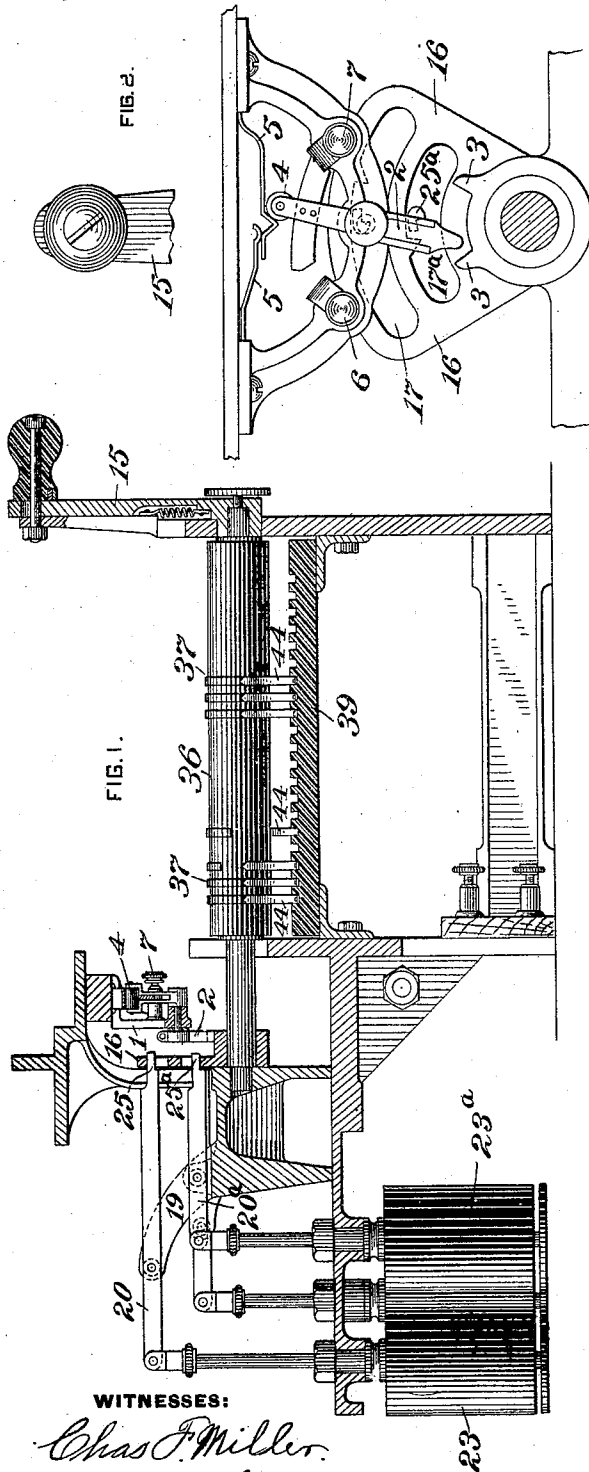
(No Model.)

5 Sheets—Sheet 1.

J. P. COLEMAN.
SWITCH OPERATING MECHANISM.

No. 551,755.

Patented Dec. 24, 1895.



WITNESSES:

Chas. F. Miller.
A. E. Gaither

INVENTOR,

John Prepley Coleman
by Darwin B. Wolcott
Att'y.

(No Model.)

5 Sheets—Sheet 2.

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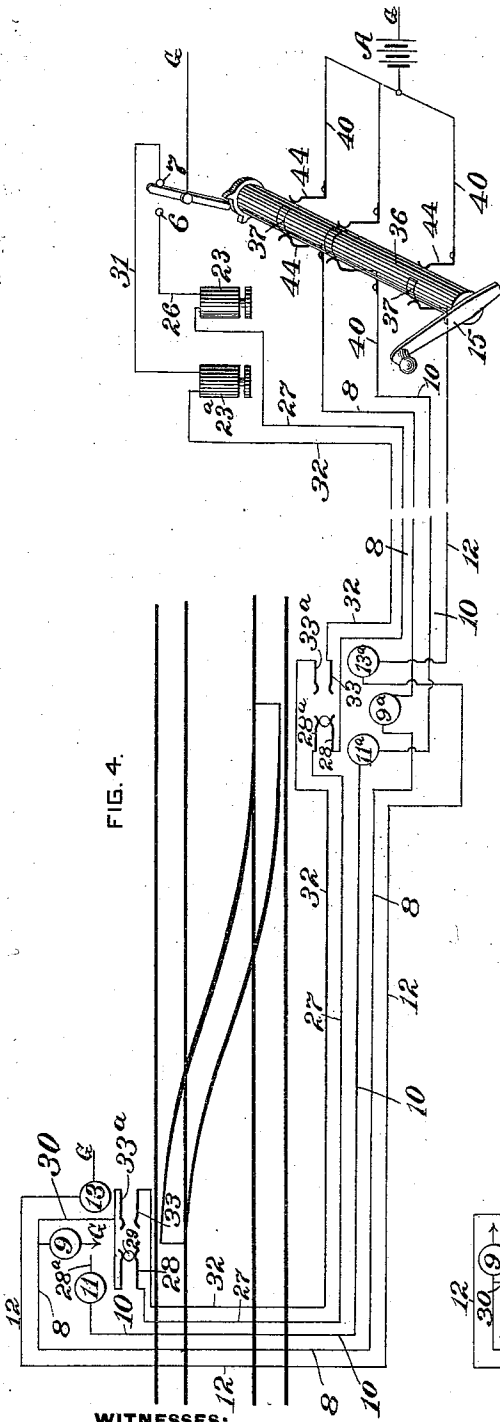


FIG. 4.

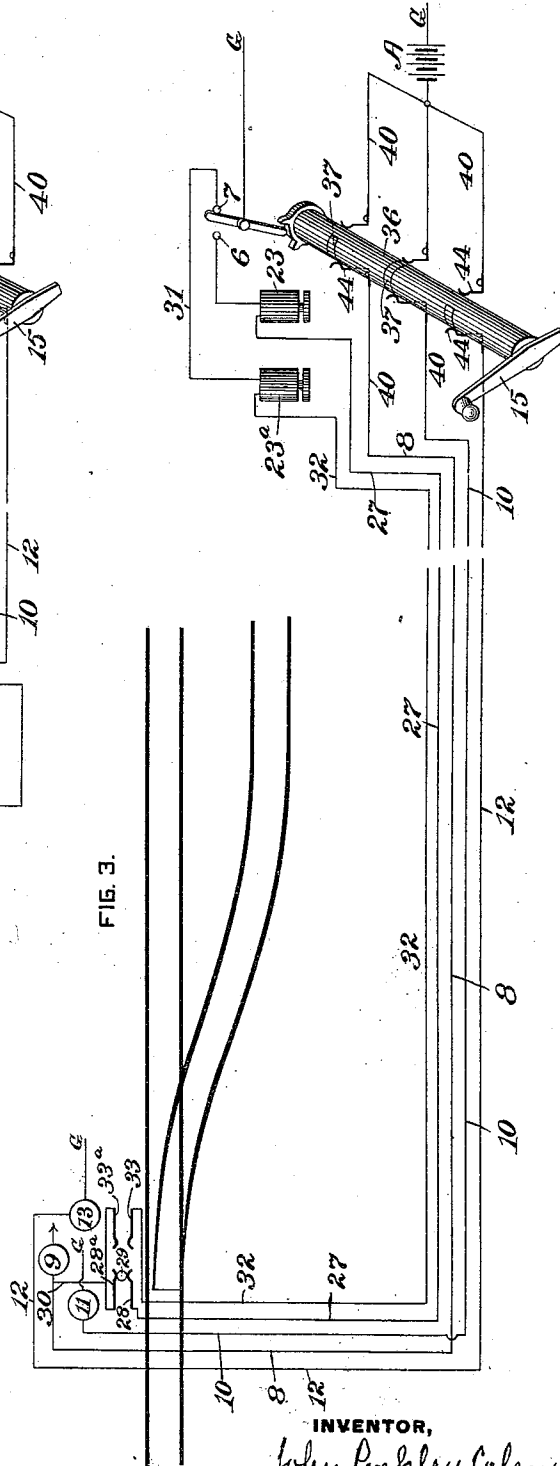


FIG. 3.

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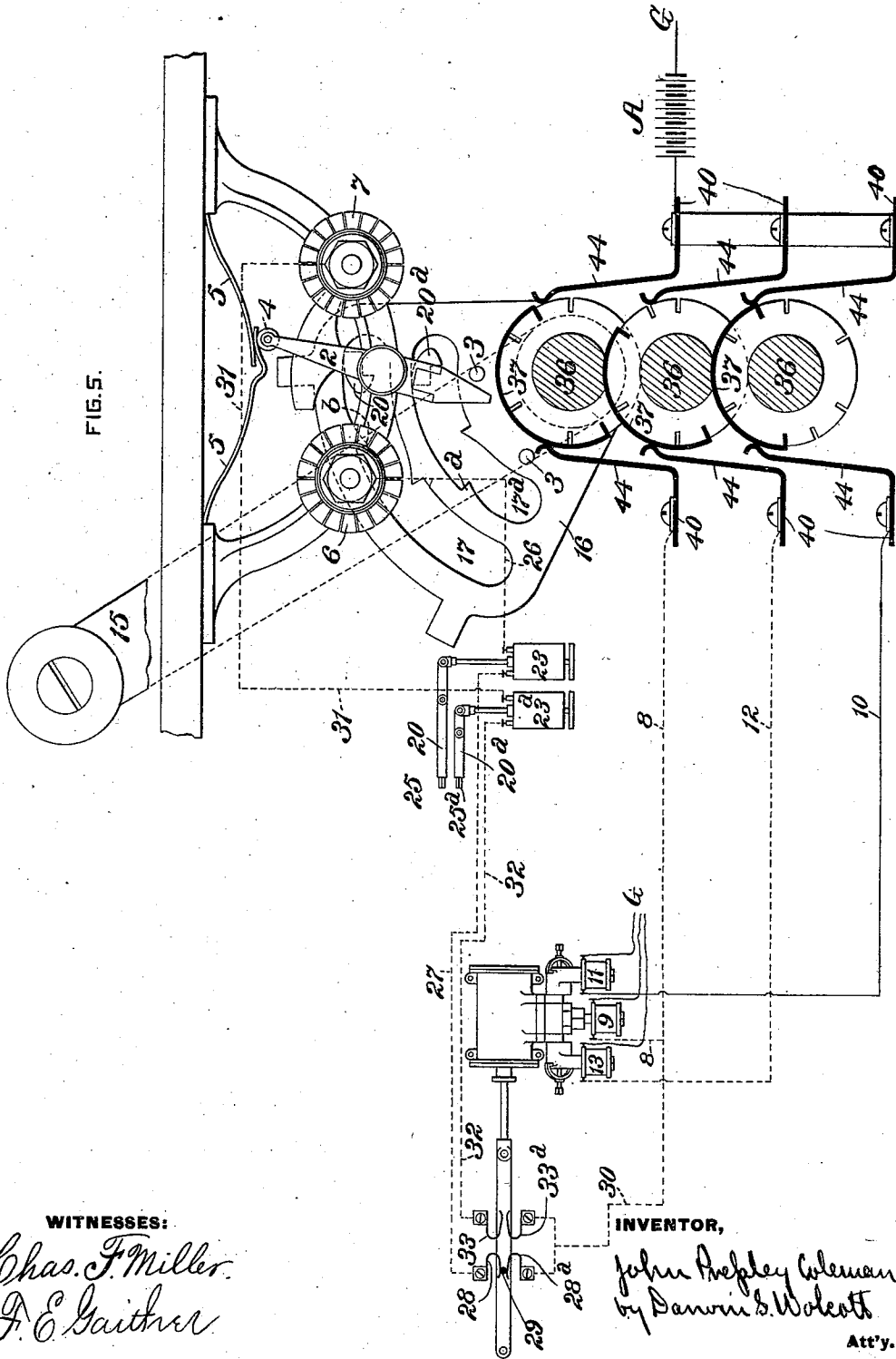
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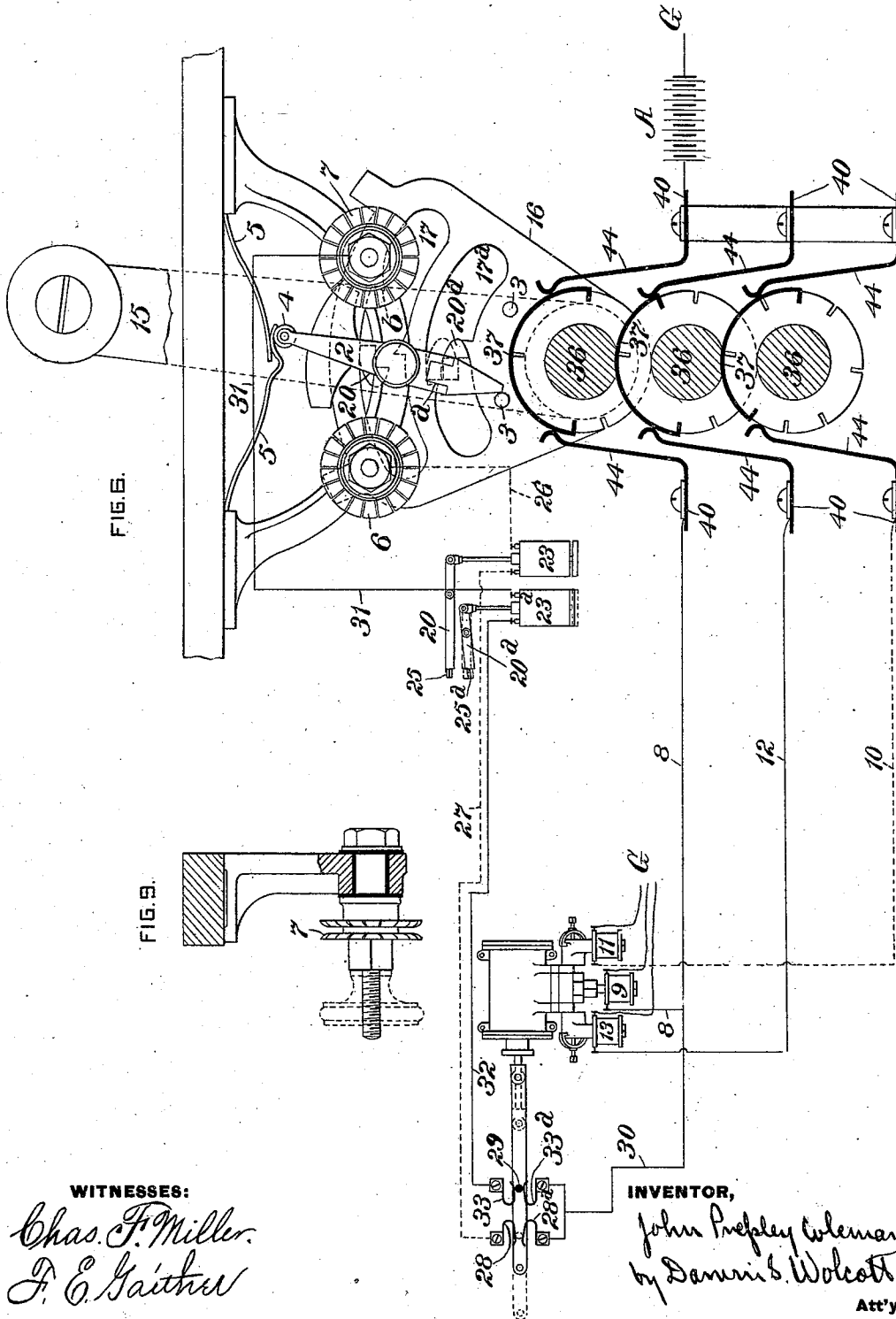
(No Model.)

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WITNESSES:

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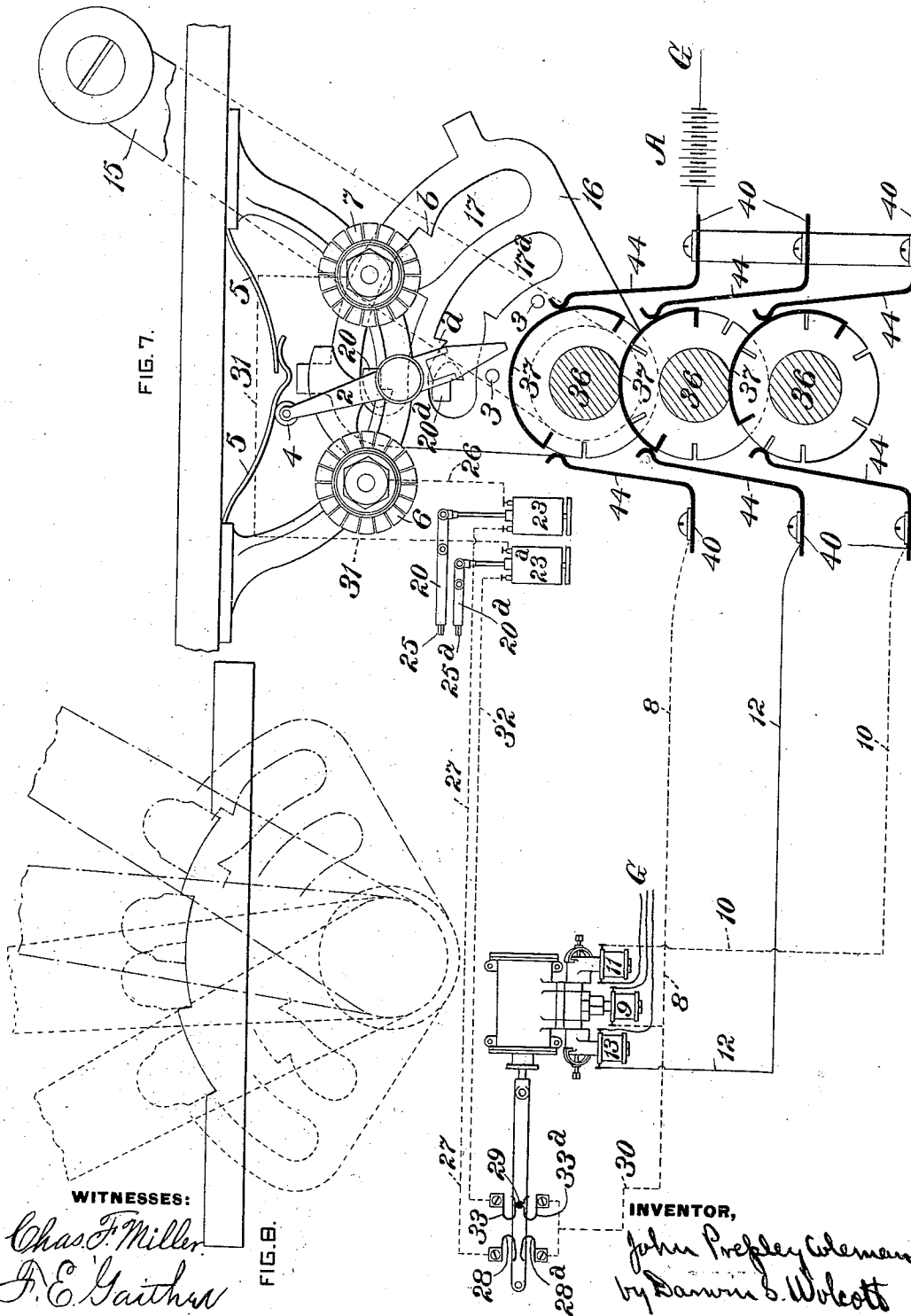
(No Model.)

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SWITCH OPERATING MECHANISM.

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WITNESSES:

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FIG. 8.

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UNITED STATES PATENT OFFICE.

JOHN PRESSLEY COLEMAN, OF SWISSVALE, PENNSYLVANIA, ASSIGNOR TO
THE UNION SWITCH AND SIGNAL COMPANY, OF SAME PLACE.

SWITCH-OPERATING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 551,755, dated December 24, 1895.

Application filed February 21, 1895. Serial No. 539,180. (No model.)

To all whom it may concern:

Be it known that I, JOHN PRESSLEY COLEMAN, a citizen of the United States, residing at Swissvale, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Switch-Operating Mechanism, of which improvements the following is a specification.

The invention described herein relates to certain improvements in switch-and-signal apparatus, being more especially applicable to the apparatus described and shown in Letters Patent No. 446,159, dated February 10, 1891, and has for its object the conjoint operation of two make-and-break mechanisms preliminary to obtaining an indication from the switch. It is a further object of the invention to employ the wire forming the circuit of the locking-magnet of the switch mechanism as the battery-wire of the indication-circuit.

In general terms the invention consists in the construction and arrangement as herein-after described and particularly claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 is a sectional elevation of a switch-and-signal machine having my improvements applied thereto. Fig. 2 is a detail view of the machine, on an enlarged scale, showing the circuit-breaker applied to the switch-lever. Figs. 3 and 4 are diagrammatic views illustrating the switch controlling and operating circuits for single and crossover switches, respectively. Figs. 5, 6, and 7 are diagrammatic views illustrating the successive positions of the parts of the apparatus when the switch-lever is being shifted from normal to reverse, the circuits which are successively closed by the movement of such lever being shown in solid lines and the open circuits in broken lines. Fig. 8 is a diagrammatic view illustrating the several positions of the switch-lever while being shifted from normal to reverse and return, and Fig. 9 is a sectional detail view of one of the contact points or plates on the machine.

In the practice of my invention the controlling-machine, except in the particulars hereinafter set forth, is constructed and operated as shown and described in said Letters

Patent No. 446,159, and the switch-operating mechanism, which is shown diagrammatically, is preferably constructed as shown and described in Letters Patent No. 393,596, dated November 27, 1888..

Upon a suitable portion of the frame are attached a series of brackets 1, corresponding in number to the switch-controlling rollers 36 of the machine. These brackets are so arranged with reference to the rollers 36 that levers 2, pivotally mounted on the brackets, can be shifted by radial projections 3, preferably formed on the hubs of the quadrants 16, which are secured on the shafts of the rollers 36, so as to be shifted therewith. As shown in Fig. 2, the radial projections 3 engage the lower end of the lever 2, which is provided at its upper end with a roller 4, pressed upon by spring 5. This spring is preferably formed in two sections, one of which is provided with a V-shaped projection adapted to resist the movement of the lever beyond it; but when the lever has been pushed beyond the projection the latter will impart a sudden push or thrust to the lever, so as to cause it to engage one or the other of the contact-springs 6 or 7.

The latches 20 and 20^a, pivotally mounted on brackets 19, are provided with spring-tongues 25 25^a, projecting into slots 17 17^a in the quadrant 16, and have their rear ends connected to the armatures of magnets 23 23^a, respectively. These tongues are so constructed that the tongue 25^a will engage projections on the walls of the slot 17^a of the quadrant 16 when the roller 36 is being shifted from normal to reverse, thereby controlling such movement, but will not affect the movement of the roller in the opposite direction, while the tongue 25 will engage projections on the walls of the slot 17 when the roller is being shifted reverse to normal, but will not interfere with the movement from normal to reverse.

As described and shown in said Patent No. 446,159, a series of metallic bands 37 are so arranged transversely of the rollers 36 as to form electric connections in certain predetermined positions of the roller between contact-springs 44, forming parts of metallic strips 40 on the insulating-bed 39. As shown in Fig. 3, these strips are connected at one

end to a common battery A. One strip has its opposite end connected by a wire 8 to the locking-magnet 9 of the switch-operating mechanism. Another one of the strips is connected by a wire 10 to the magnet 11, controlling one of the valves of the switch-operating mechanism, while the magnet 13, controlling the other valve of said mechanism, is connected by a wire 12 with the third strip 40. With two switches, which are to be operated by one lever—as, for example, those at the ends of a crossover, as shown in Fig. 4—the locking and valve magnets 9^a, 11^a, and 13^a of the mechanism for operating the second switch are placed in series in the circuits of the corresponding magnets of the first switch.

The circuit from the contact 6 is formed by wire 26, latch-magnet 23, wire 27, spring 28, locking-pin 29 of switch mechanism spring 28^a, wires 30 and 8 to metallic strip 40 on the machine. The circuit from contact 7 is formed by wire 31, magnet 23^a, wire 32, spring 33, locking-pin 29, spring 33^a, wires 30 and 8 to metallic strip 40 on the machine. The springs 28 28^a and 33 33^a are electrically connected by the pin 29, employed in locking the switch-rails in their open and closed positions. It will be observed that the springs 28^a and 33^a are electrically connected and have a common return to the battery, such return being formed by the wire 8 connecting the locking-magnet 9 with the make-and-break mechanism in the machine.

As shown in Fig. 4, the corresponding springs of the second switch are connected in series with the springs 28 28^a and 33 33^a of the first switch, thereby requiring corresponding movements in both switches to close the circuits.

In describing the operation of my improvements it will be supposed that the switch and its operating mechanism are in normal position, as indicated in Figs. 3, 4 and 5. By the first movement of the lever 15 to the right or reverse position the circuit through magnet 11 is closed; but the closing of this circuit does not produce any effect, as the magnet 11 is employed for so operating the valve mechanism of the switch-operating mechanism that the latter will shift the switch-rails to normal position—*i. e.*, for clear main line. The continued movement of the lever closes the circuit through the locking-magnet 9, as shown in Fig. 6, thereby unlocking the valves of the switch-operating mechanism, and just after the lever 15 has passed the center position the circuit through the magnet 13 is closed, whereby the valves are so shifted that the switch-operating mechanism will move the switch-rails for open siding, as shown in Fig. 7. It will be observed that during the foregoing movements of the lever 15 the circuit through the magnet 23^a, operating the latch 20^a, which controls the movements of the lever 15 from normal to reverse, is completed at 7, but broken at springs 33 33^a, so that the

tongue of said latch will rest against the upper wall of the slot 17^a and in the path of the shoulder *a* on said wall. The first movement of the switch-operating mechanism, due to the closing of the circuit through magnet 13, shifts the pin 29, connected to the switch-rail-locking device, into position between springs 33 33^a, as shown in Fig. 7, completing the circuit through latch-magnet 23^a, and thereby shifts the latch 20^a so as to permit of a completion of the movement of the lever 15 to reverse position. The completion of this movement of the lever and its roller 36 breaks the circuit of the locking-magnet, and also effects the shifting of the lever 2 to the opposite position into contact with the contact-spring 6, in readiness for the opposite movement of the lever 15 from reverse to normal. During the movement of the lever from normal to reverse the circuit of magnet 23 is broken, as shown, so that the latch 20 will rest yielding against the upper wall of slot 17 in quadrant 16. As the lever and quadrant move from normal to reverse, the shoulder *b*, projecting into slot 17, will pass over the latch 20, which will drop behind the shoulder as the quadrant approaches middle position, as shown in Fig. 5, and thereby prevent any return of the lever and quadrant to normal position until the latch 20 is depressed by the action of the magnet 23. The circuit of this magnet cannot, however, be closed until the lever 2 is shifted into engagement with contact 6, said lever and contact forming parts of circuit of magnet 23. Such shifting of lever 2 cannot be effected except by a complete movement of lever 15 and quadrant 16 to reverse position, as hereinbefore stated. The lever and quadrant are locked as against return to normal position in the manner stated before the circuit through magnet 13 is completed, and as the shoulders *a* and *b* are so arranged in the slots 17^a and 17 as to permit of sufficient movement of the lever 15 to complete the circuit of magnet 13 before shoulder *a* engages latch 20^a it is possible for the operator to shift his lever back and forth between shoulders *a* and *b*, alternately making and breaking the circuit through magnet 13; but these operations will not effect the switch-rails, if they have been shifted, as it is necessary to close circuit through magnet 11 in order to change the position given to the switch-rails by the closing of circuit through magnet 13.

It will be readily understood from the foregoing that the unlocking of the lever 15 for a complete movement in either direction is dependent upon the completion of the circuit through the latch-magnets at the switch and at the machine, so that the positions of the switch-rails and the lever 15 must correspond—that is to say, when the switch-rails are in normal position (*i. e.*, for clear main line) the lever 15 must also be in normal position—and when the lever has been shifted far enough to effect a shifting of the switch-rails such movement must be entirely com-

pleted before the lever can be returned to its original position, whether normal or reverse.

When operating two or more switches, as at the ends of a crossover, the circuits of the latch-magnets are controlled at three or more points—*i. e.*, at the several switches and at the machine—as shown in Fig. 4.

My improvement is readily applicable to other forms of apparatus for operating switches—as, for example, such as have mechanical connections between the operating-levers and the switch-rails.

While preferring to employ the wire forming the circuit of the locking-magnet 9 as the battery-wire of the indication-circuits, independent wires may be employed for such circuits, if desired.

I claim herein as my invention—

1. The combination of a fluid pressure switch operating mechanism, having magnets controlling the normal and reverse valves and magnet controlling a lock for said valves, make and break mechanisms in the circuits of said magnets, electrically controlled latches controlling said make and break mechanisms in accordance with the positions of the switch rails, the circuits of the magnets operating said latches being formed in part by the circuit of the magnet controlling the lock of the switch operating mechanisms; substantially as set forth.

2. The combination of a switch operating mechanism having magnets controlling the movements of such mechanism in shifting the switch rails to normal and reverse, a magnet for locking the switch operating mechanism at normal and reverse, make and break mechanisms in the circuits of said magnets, and two electrically controlled latches controlling the make and break mechanisms, the circuits of the latches being controlled by the switch rail locking mechanism, substantially as set forth.

3. The combination of a switch operating mechanism having magnets controlling the movements of such mechanism in shifting the switch rails to normal and reverse, a magnet for locking the switch operating mechanism at normal and reverse, make and break mechanisms in the circuits of said magnets, an electrically controlled latch controlling the make and break mechanisms, the circuit of the latches being controlled by the switch rail locking mechanism, and the make and break mechanisms in the circuits of the switch operating mechanism, substantially as set forth.

4. The combination of a switch operating mechanism having magnets controlling the

movements thereof, make and break mechanisms in the circuits of said magnets, an electrically controlled mechanism for controlling the make and break mechanisms, two electric switches in the circuit of the mechanism controlling make and break mechanism, one of said switches being shifted in accordance with changes in position of the switch rails, and the other in accordance with changes in position of the make and break mechanisms, substantially as set forth.

5. The combination of switch shifting mechanism, means for operating such mechanisms, electrically controlled mechanism for controlling the operating means, two electric switches in the circuits of the controlling mechanism, one of said switches being shifted in accordance with changes in position of the switch rails, and the other in accordance with changes in position of the operating means, substantially as set forth.

6. The combination of two switch operating mechanisms, each mechanism having magnets controlling the movements of such mechanism in shifting the switch rails to normal and reverse, and a magnet for locking the switch operating mechanism at normal or reverse circuits having the magnets of said mechanisms arranged in series, make and break mechanisms in said circuits, an electrically controlled mechanism for controlling the make and break mechanisms, the circuits of the electrically controlled mechanism having switches arranged therein in series and controlled by the movements of the switch rails and the make and break mechanisms in the circuits of the switch operating mechanisms, substantially as set forth.

7. The combination of a switch operating mechanism having magnets controlling the movements thereof and a magnet for locking the switch operating mechanism at normal or reverse, make and break mechanisms in the circuits of said magnets, an electrically controlled latch for controlling the movements of the make and break mechanisms, electric switches arranged in the circuits of the electrically controlled latch and controlled by the switch operating mechanism, contact pieces in said latch circuits, and a lever operated by the make and break mechanisms, substantially as set forth.

In testimony whereof I have hereunto set my hand.

JOHN PRESSLEY COLEMAN.

Witnesses:

DARWIN S. WOLCOTT,
F. E. GAITHER.