No. 687,087. Patented Nov. 19, 1901.

B. H. URSCHEL & E. P. THOMAS.

SWITCH SIGNAL.

(Application filed May 26, 1900.)

(No Model.) 3 Sheets—Sheet 1.

Fig 1

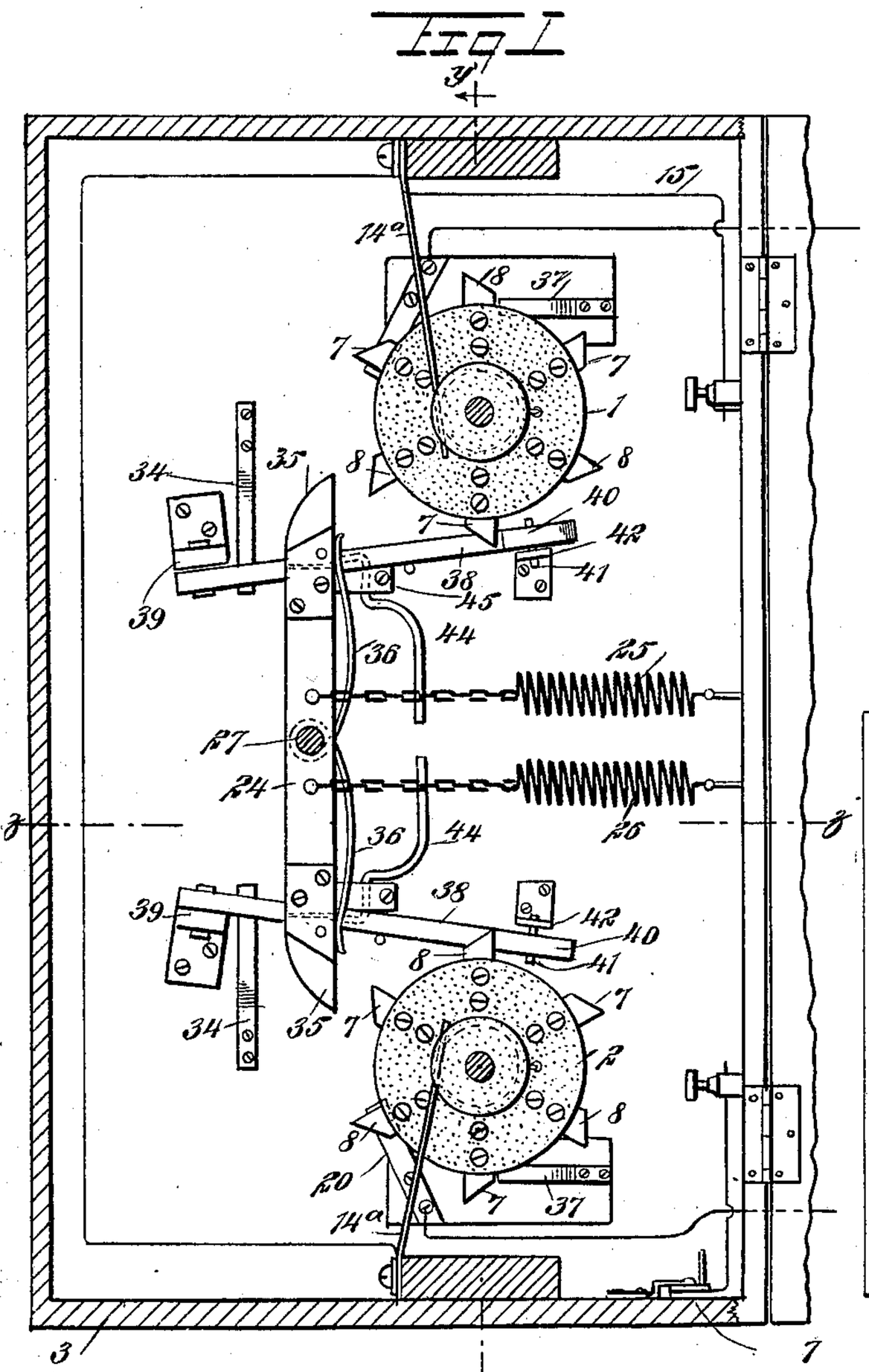

Fig 2

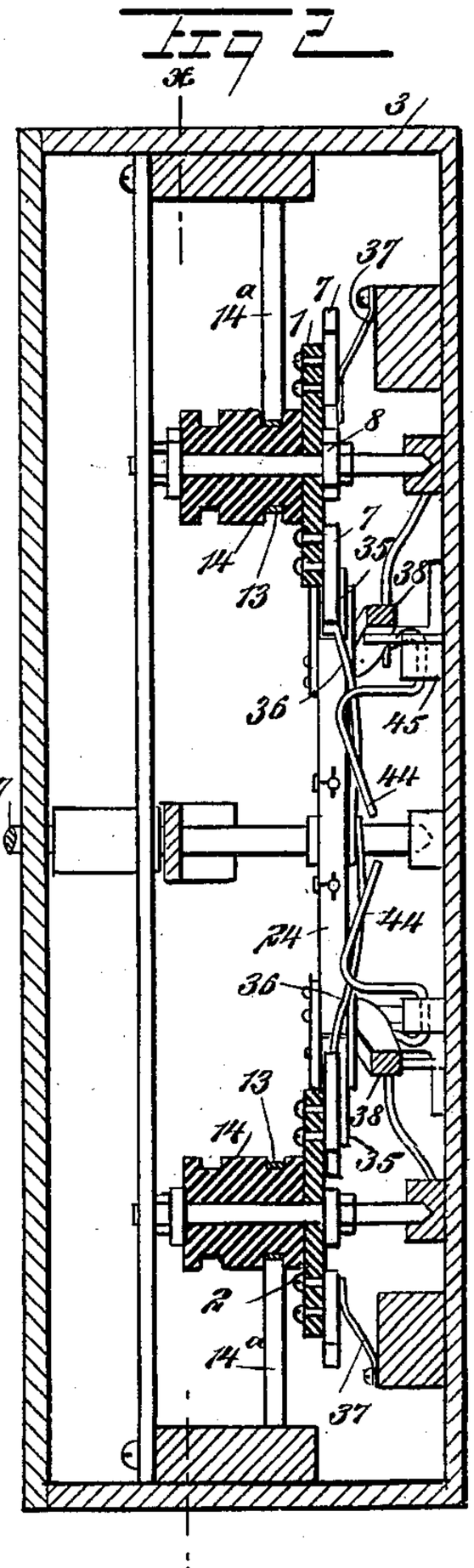

Fig 3

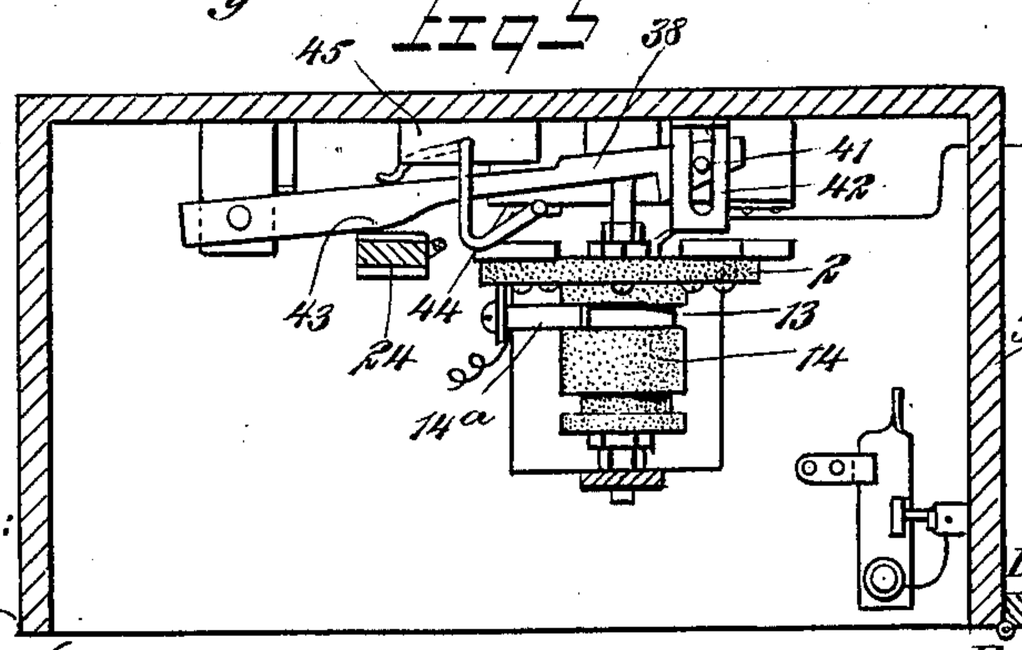

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Fig 4

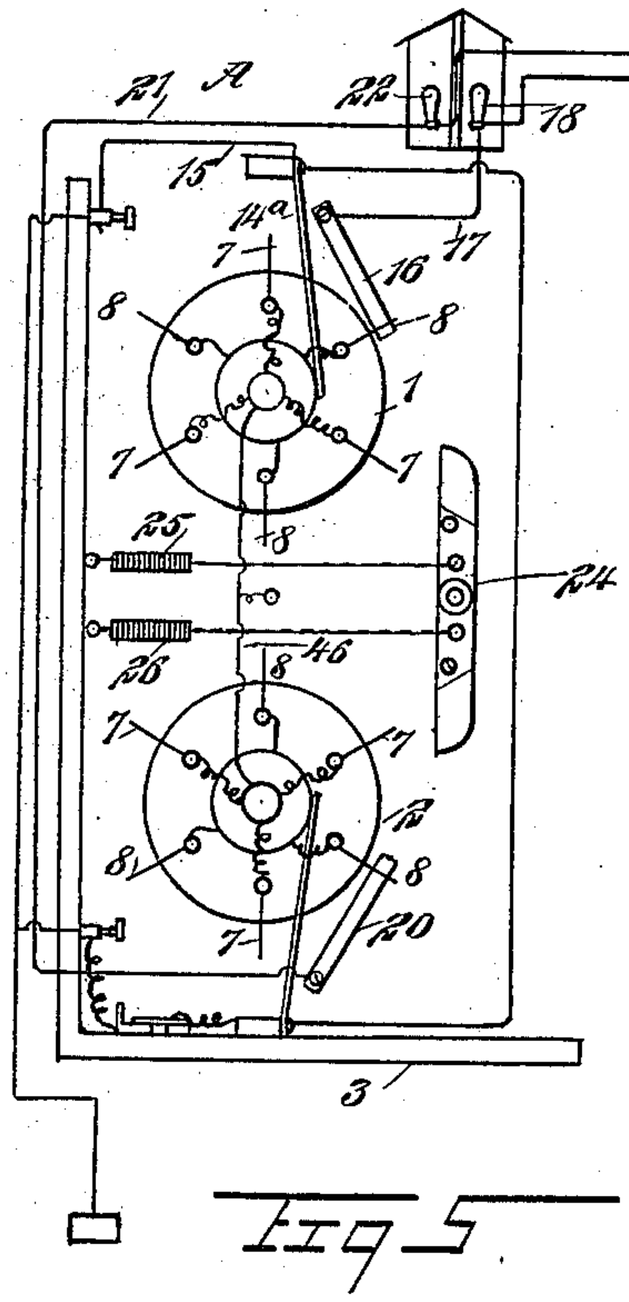


Fig 5

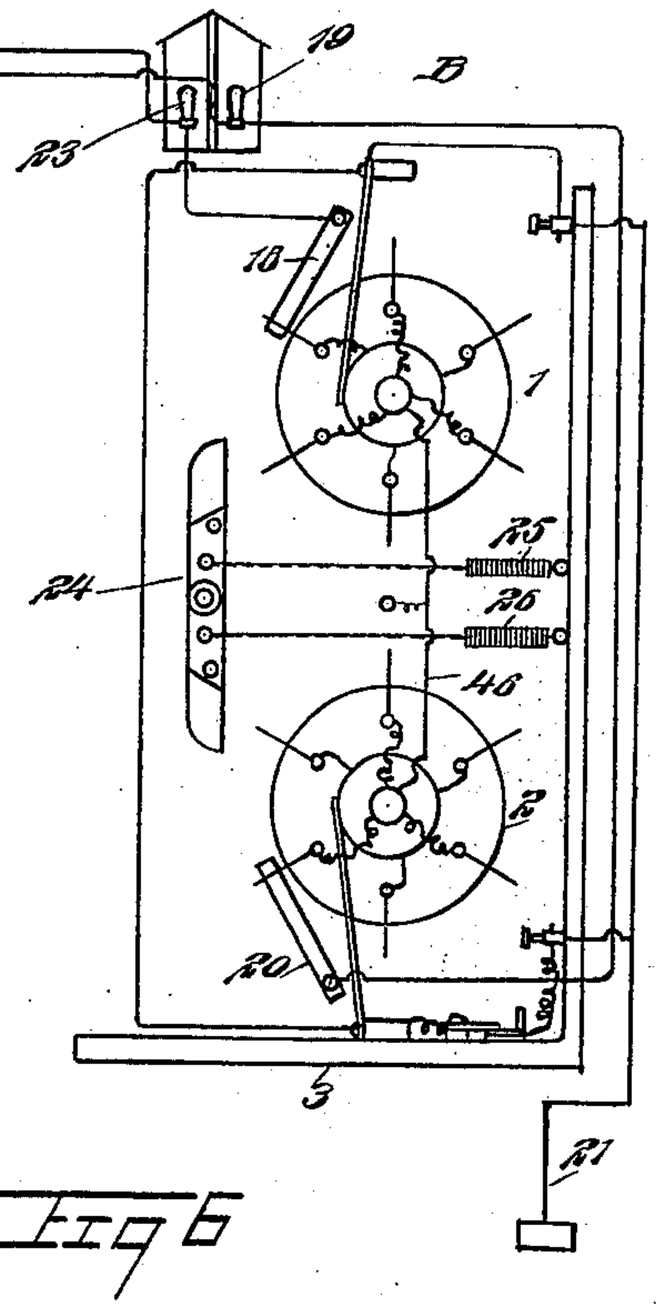
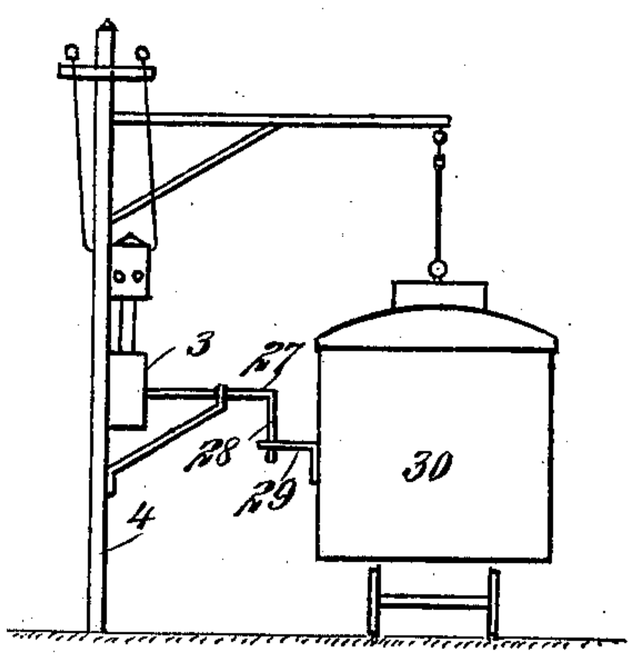


Fig 6



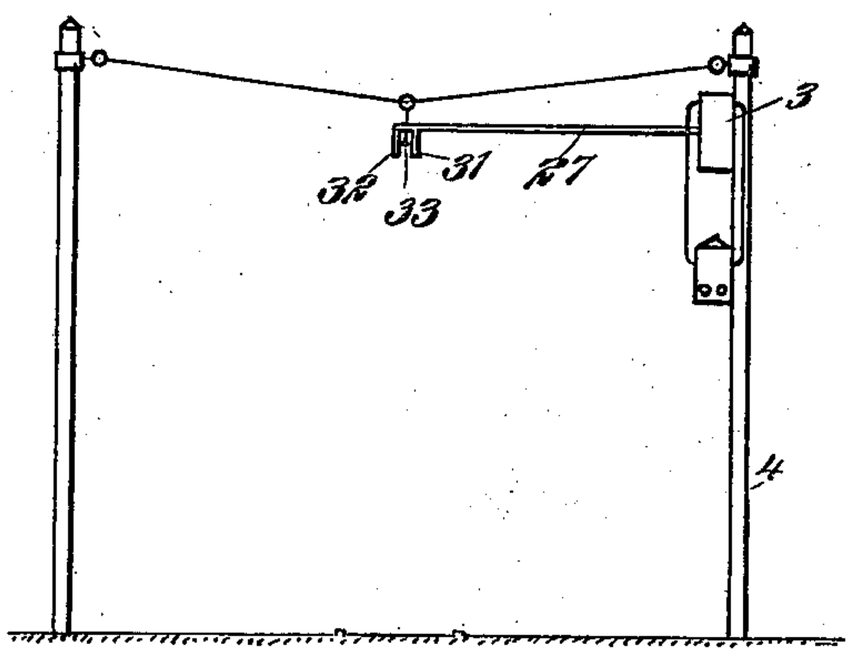
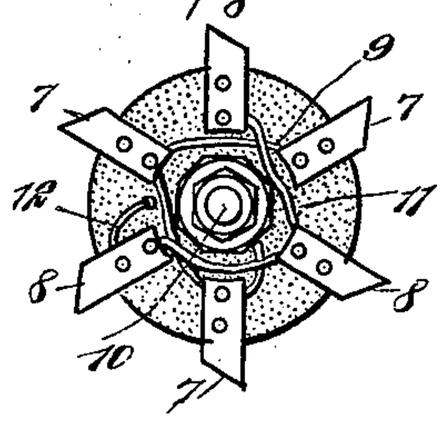


Fig 7



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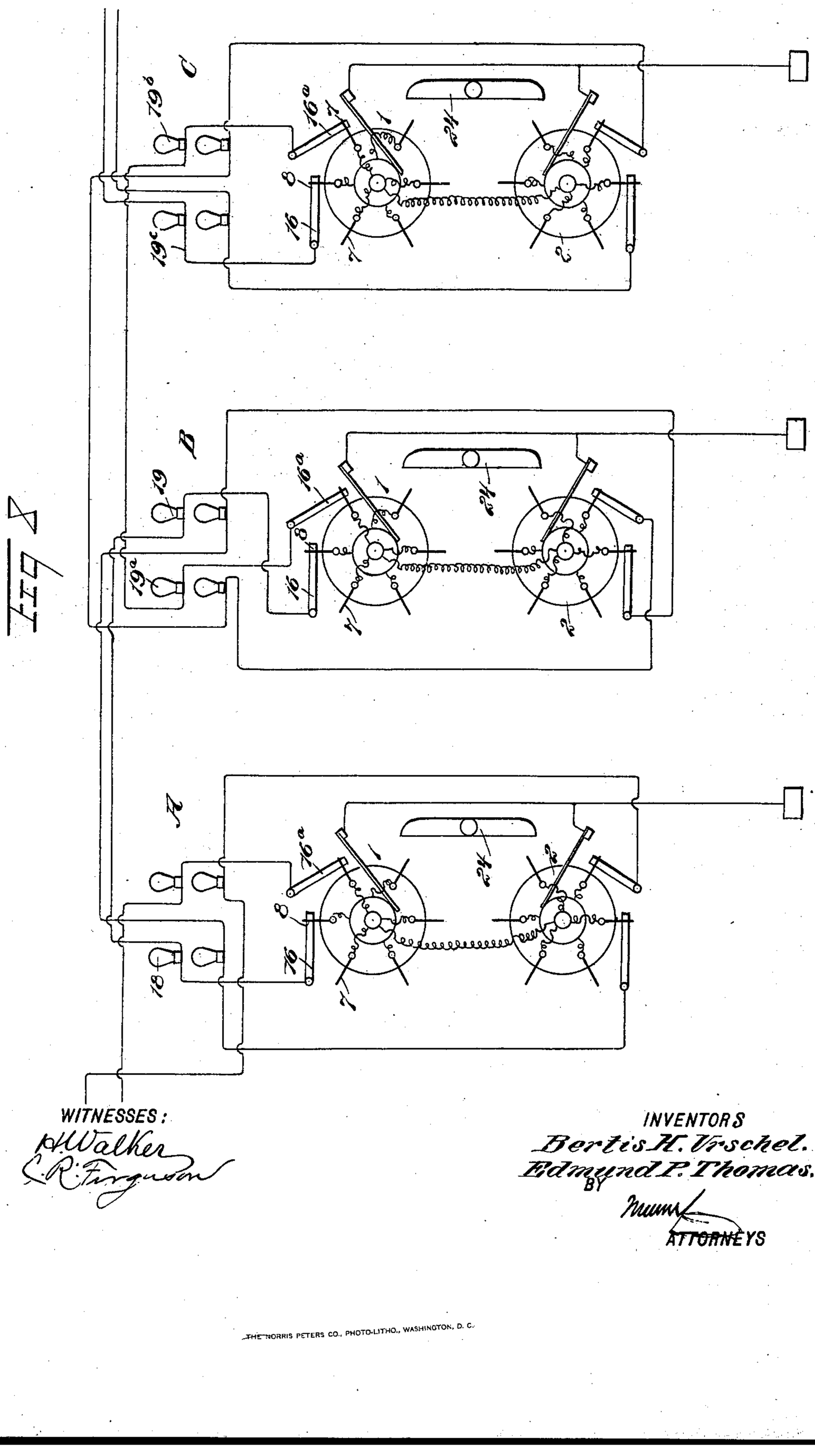

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UNITED STATES PATENT OFFICE.

BERTIS H. URSCHEL AND EDMUND P. THOMAS, OF SUGARRIDGE, OHIO.

SWITCH-SIGNAL.

SPECIFICATION forming part of Letters Patent No. 687,087, dated November 19, 1901.

Application filed May 26, 1900. Serial No. 18,131. (No model.)

To all whom it may concern:

Be it known that we, BERTIS H. URSCHEL and EDMUND P. THOMAS, citizens of the United States, and residents of Sugarridge, in the county of Wood and State of Ohio, have invented a new and Improved Switch-Signal, of which the following is a full, clear, and exact description.

This invention relates particularly to signals for single-track electric railroads as ordinarily used in country districts and in which turnout-switches are placed at suitable distances apart; and the object is to provide a signal mechanism adapted to be operated by a moving car in such a manner as to leave a signal-light at one switch and at the same time turn on a light at the next switch ahead and upon passing the latter switch to turn out both former lamps and turn on another lamp at the second switch and one at the next or third switch, and so on throughout the length of the line, thus preventing possible collisions, between switches, of cars moving in the same or in opposite directions.

We will describe a switch-signal embodying our invention and then point out the novel features in the appended claims.

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

Figure 1 is a section on the line *x x* of Fig. 2 of a signal-controlling mechanism embodying our invention. Fig. 2 is a section on the line *y y* of Fig. 1. Fig. 3 is a section on the line *z z* of Fig. 1. Fig. 4 is a diagrammatic view illustrating the system. Fig. 5 is an elevation showing a device operated by a car for actuating the controlling mechanism. Fig. 6 shows a modification thereof. Fig. 7 is a rear face view of one of the controlling devices. Fig. 8 is a diagrammatic view showing the system extended between three switches.

At each end switch-section of a road lamp or signal controlling devices are placed. In the drawings, Fig. 4, we have shown two of these devices, which may be designated as A and B, and at each switch-section there are two controllers adapted to be operated one independently of the other, depending upon the direction in which a car is moving. The controllers of a section comprise rotary parts or disks 1 2, consisting of insulating material and arranged, as here shown, one above the other in a casing 3, designed to be attached to a pole 4 or other support. Mounted on each rotary part or disk is a series of contact-fingers 7 8, the said contact-fingers 7 and 8 alternating one with the other. The contact-fingers 7 of a series are electrically connected together by a wire 9, and this wire is in electrical connection with the metal spindle 10 of the disk, which has connection, through the wire 46, with a feed-wire for supplying current to the system. The other contact-fingers 8 of the series are electrically connected, by a wire 11 and by means of a wire 12, with a metal ring 13, mounted on the hub portion 14 of the rotary part, the said hub also consisting of insulating material. This ring is meant for the grounding-current, and it is engaged by a brush 14^a, from which a wire 15 extends to ground. It may be here stated that the casing 3 will be provided with suitable binding-posts and switches for the wires.

The several contact-fingers 7 and 8 of the disk 1 are designed to engage one after the other with a spring-contact 16, arranged in the lamp-circuit 17, which contains a lamp 18 at switch A and a lamp 19 at switch B. The several fingers carried by the part 2 are designed to engage one after the other with a spring-contact 20, connecting with the lamp-circuit 21, the said lamp-circuit comprising a lamp 22 at switch A and a lamp 23 at switch B. The two lamps at a switch-section will of course be placed in suitable boxes. One set of lamps is designed to be placed in circuit by a car moving in one direction, while the other set of lamps is designed to be placed in circuit by a car moving in the other direction, and therefore these lamps may be of different colors to clearly indicate the direction in which a car is moving—that is, toward or from a switch occupied by another car.

In the casing 3 and adapted to operate either one of the controllers 1 or 2 is a shifting lever 24, which is held normally out of engagement with the controlling devices by means of springs 25 and 26, connected at one end to the casing and having connection with

the lever at the other end at opposite sides of the shaft for the shifting lever. The lever 24 is mounted on a shaft 27, which extends outward through a wall of the casing 3 and has a depending arm 28, designed to be engaged by an arm 29, carried by a car 30. This construction is clearly illustrated in Fig. 5. In Fig. 6, however, we have shown the shaft 27 as having two downwardly-extending arms 31 and 32, which pass down, respectively, at opposite sides of the trolley-wire 33. These arms 31 and 32 are designed to be engaged by the upper end of the trolley-pole or by a suitable device thereon in order to impart a rotary motion to the shaft 27, giving a rotary motion to the controlling devices through a distance equal to the space between two contact-fingers. The ends of the contact-fingers extend beyond the periphery of the rotary parts, and said ends are beveled on the sides opposite to the direction in which they rotate, and mounted on the ends of the shifting lever 24 are swinging fingers 35, which when the lever is moving in one direction will engage with the ends of a finger, rotating the disk or rotary part one space, and then when the lever is moved back to its normal position by its returning-spring the swinging finger 35 will yield on its pivot against the resistance of a spring 36, permitting the said swinging end or finger to ride over the projected contact-finger. The rotary part or disk is prevented from backward movement by means of a plate-spring 37, which will yield when the contact-finger comes in contact with a surface thereof and will spring upward or outward to engage against the edge of said contact-finger, as plainly indicated in Fig. 1.

To prevent the controller or rotary part from being moved too far by impetus, we employ a stop-lever 38, which is pivoted at one end to a bracket 39, attached to the casing, and at the other end has a hook portion 40 for engaging with a contact-finger. This other end of the stop-lever is guided in its movement by means of a pin 41, projected therefrom into a slot in a bracket 42, attached to the casing. A projected portion 43 of the stop-lever 38 engages normally against the inner surface of the shifting lever 24 by means of a spring 34. As the lever 24 is shifted, however, to rotate the controller through the space of one step the said lever passes off or out of engagement with the projection 43 and engages with a crank-shaped lever 44, pivoted in a block 45, and engaging at one side with the inner edge of the lever 38, as clearly shown in Fig. 3. As the shifting lever passes over the crank-lever it is rocked in such manner as to move the free or hook end of the lever 38 into position by engaging with one of the contact-fingers, then by the reverse movement of the lever 24, as before mentioned, the free end of the lever 38 will be moved in the direction; but out of the line of movement of a projected contact-finger.

In operation and referring particularly to Fig. 4, assuming that a car is passing from the switch A and operating the controller 1 toward the switch B and one of the contact-fingers 8 is in engagement with the spring-contact 16, the current will be from the ground-wire 15, through brush 14ª, ring 13, a contact-finger 8, the spring-contact 16, the wire 17, the lamp 18, and thence through the line-wires to the lamp 19, from which it passes through the wire connection to the spring-contact 20, supported by the lower controller 2 at switch-section B, and thence through the wire 46 to the ground and back to switch A. When the car reaches switch B, the lower controller 2 will be rotated to cut out the lamps 18 and 19 of the sections or switches A and B and close the circuit between a lamp of switch B and the next switch. Of course a car moving in the opposite direction or from B to A will first operate the controller 1 of switch B to put the lamps 23 and 22 in circuit in a similar manner to that above described, and these lamps will be cut out when the car reaches switch A and operates the controller 2. In order to show a complete system of more than two switches, there would have to be two lamps at every switch where one is shown in the drawings. The lamps, however, would have to be in separate circuits and their lines extended in opposite directions. For instance, another lamp in the section of the casing with lamp 23 would be the lamp turned on at switch B when lamp 19 is put out, and of course there would also be one put out at the same time in the same circuit at the switch which may be designated as C, next to the switch B. This lamp is operated by the controller 2 at switch B; but a contact finger or spring similar to 20 would be in contact with a finger next the one that 20 touches. Thus it will be seen that we could operate six separate circuits of lamps from a controller, if desired. In the commencement the controllers in a circuit are both on the positive line or both on the negative line. Then a car passing to the right would turn the controller 1 at switch A, so that a finger 7 would contact with the spring 16, and at this time lamps 18 and 19 are put in circuit. When passing switch B, the controller 2 is turned one notch, and a negative finger will come in contact with the spring 20, and the lamps 18 and 19 will be extinguished; but at the same time a positive finger will come into the circuit for the switch next to switch B, and a lamp both at B and the next switch will be put in circuit. It will therefore be seen that each car shows a complete set of signals clear through the line, and at a point where a car might turn off there would have to be two boxes like those shown at B.

In Fig. 8 we have shown all the necessary connections and circuits for three switches or

more than three switches. It will be noticed we have placed the boxes so that all the levers 24 are to the right, as they could just as well be part to the right and part to the left. A car passing to the right would turn finger 7 of the upper controller into connection with the spring 16, and the circuit would then be from the feeder through finger 7, spring 16, lamp 18, through the line to the lamp 19 at switch B, and, at this switch, through spring 16 and finger 8, to the ground. The car on arriving at switch B will turn on 7, upper controller, to spring 16, and then its feeder and lamps 18 and 19 are cut out, but at the time the finger 8 is turned onto spring 16^a, the circuit is from ground, finger 8, spring 16^a, lamp 19^a, through line to lamp 19^b at switch C, spring 16^a, and finger 7 to the feeder. The car on arriving at switch C moves finger 8 of upper controller on 16^a, and lamps 19^a and 19^b are out, and at the same time finger 7 is brought to spring 16 and lamp is turned on at 19^c. The same takes place when the car passes to the left and the lower set of controllers is brought into action and the lower lamps are operated. We have so connected the lamps that a car may have a block at each end of the section it is in. It is true that if the car were following into a section where a car is it would turn out the lamps; but if the car should do this it would be done knowingly, or if cars should follow close together the second car would not need to operate the lamps.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. A switch-signal, comprising lamps placed at switch-points along a railroad, an electric circuit comprising ground and main-line wires, the lamps being arranged in the main line, rotary controlling devices consisting of disks of insulating material, contact-fingers carried on said disks for closing connection with the ground and main circuits, the ground-connecting fingers alternating with the main-line-connecting fingers, and means for imparting step-by-step rotary movement to the controllers, the said means being operated by a moving car, substantially as specified.

2. In an electric signal system, a signal-controller, comprising a disk mounted to rotate and consisting of insulating material, a series of grounding contact-fingers carried by said disk, a series of main-line-connecting fingers alternating with the first-named fingers, a shifting lever for moving the disk, and a stop for the disk operated by a movement of the shifting lever, substantially as specified.

3. In an electric switch-signal, an electric circuit, lamps arranged in said circuit at switch-points on the railroad, a pair of rotary controlling devices for the electric circuit arranged one above the other at each switch, and a lever for operating either one of said controllers at a switch while the other remains idle, depending upon the direction in which a car is moving to operate the same, substantially as specified.

4. In a signal mechanism, an electric-circuit controller, comprising a rotary part of insulating material, contact-fingers carried by said rotary part, certain of said fingers having ground connections while others alternating with the grounding-fingers have line connections, said fingers being extended outward beyond the periphery of the rotary part, a shifting lever operated by a moving car, a spring-yielding finger on the end of said lever for engaging successively with the contact-fingers, a stop-lever for the rotary part, and a crank-lever operated by the shifting lever for moving the stop-lever into its stopping position, substantially as specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

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EDMUND P. THOMAS.

Witnesses:
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FLORENCE B. RUDULPH.