

No. 777,164.

PATENTED DEC. 13, 1904.

J. C. WALDO.  
ELECTRIC MAKE AND BREAK MECHANISM.

APPLICATION FILED OCT. 19, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

FIG. 1.

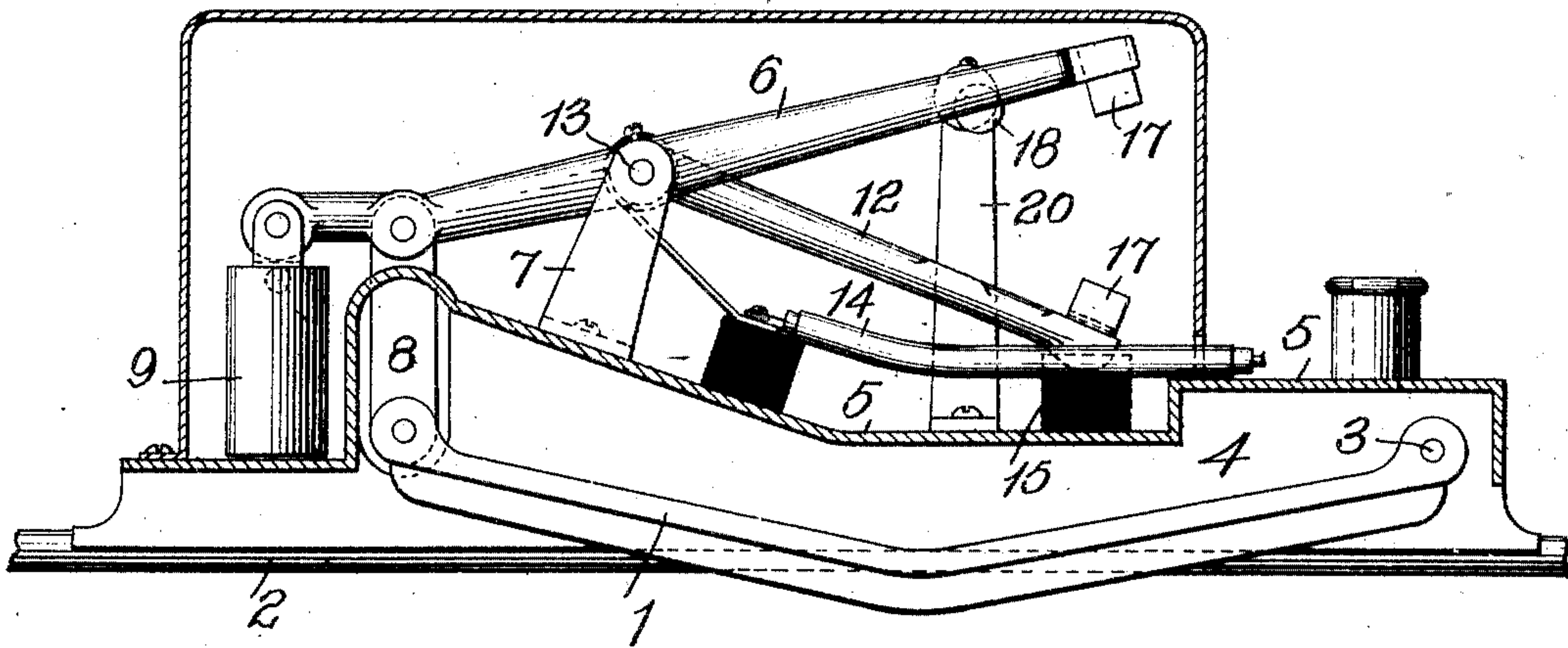


FIG. 2.

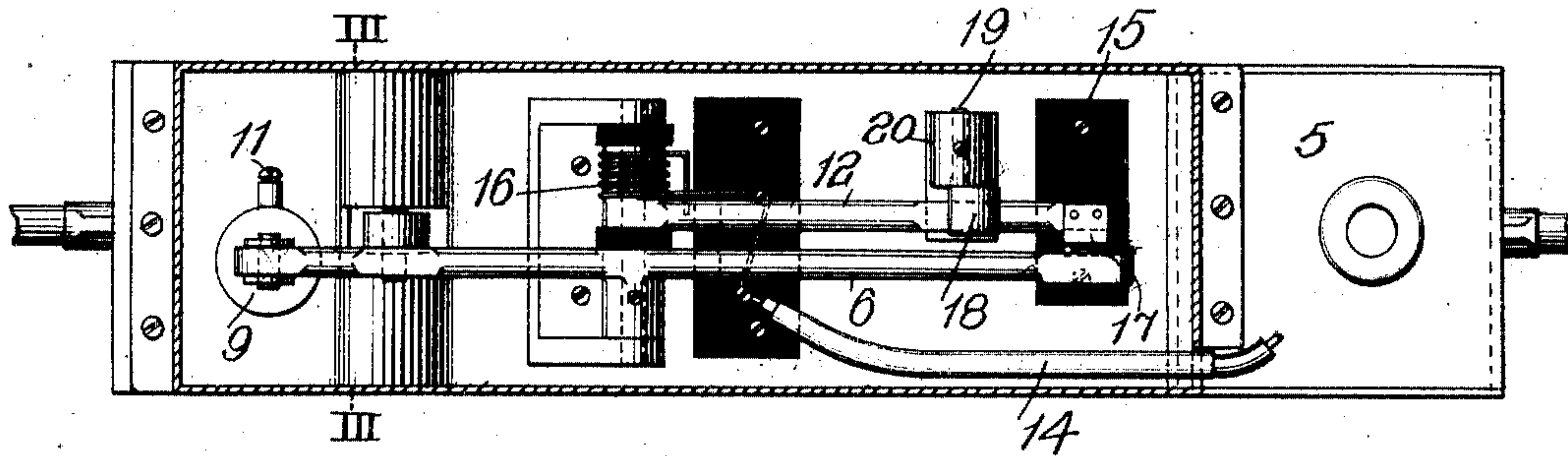
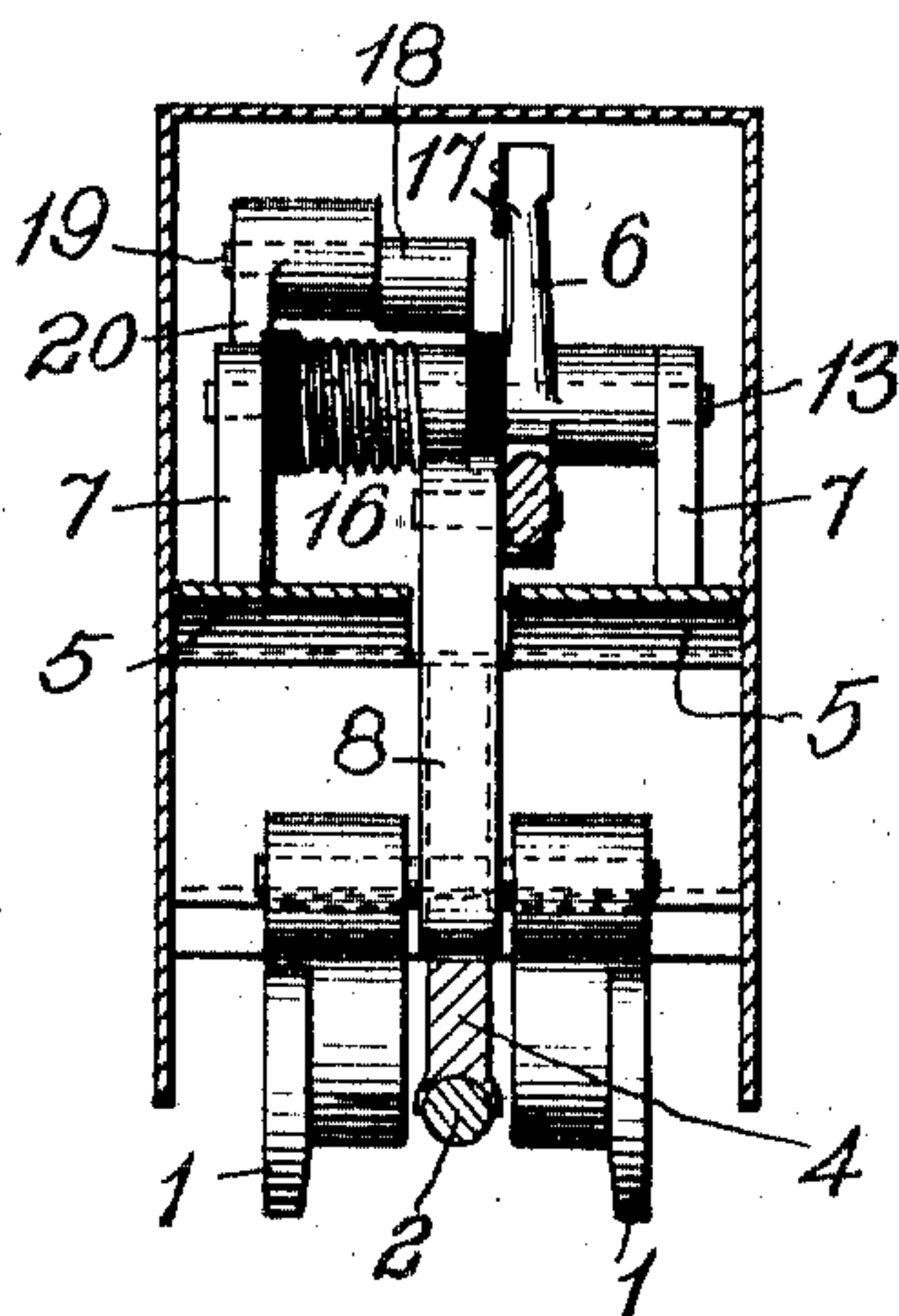


FIG. 3.



WITNESSES:

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2 SHEETS—SHEET 2.

FIG. 4.

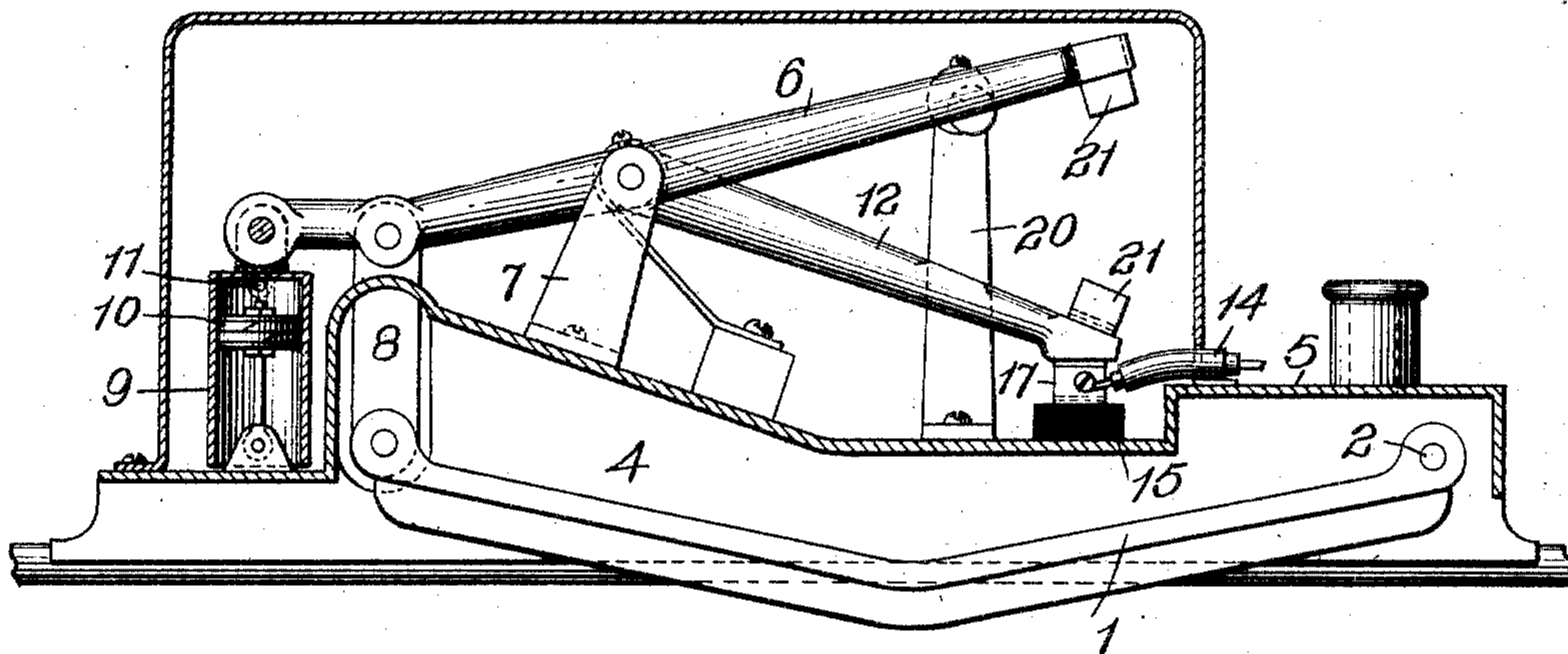
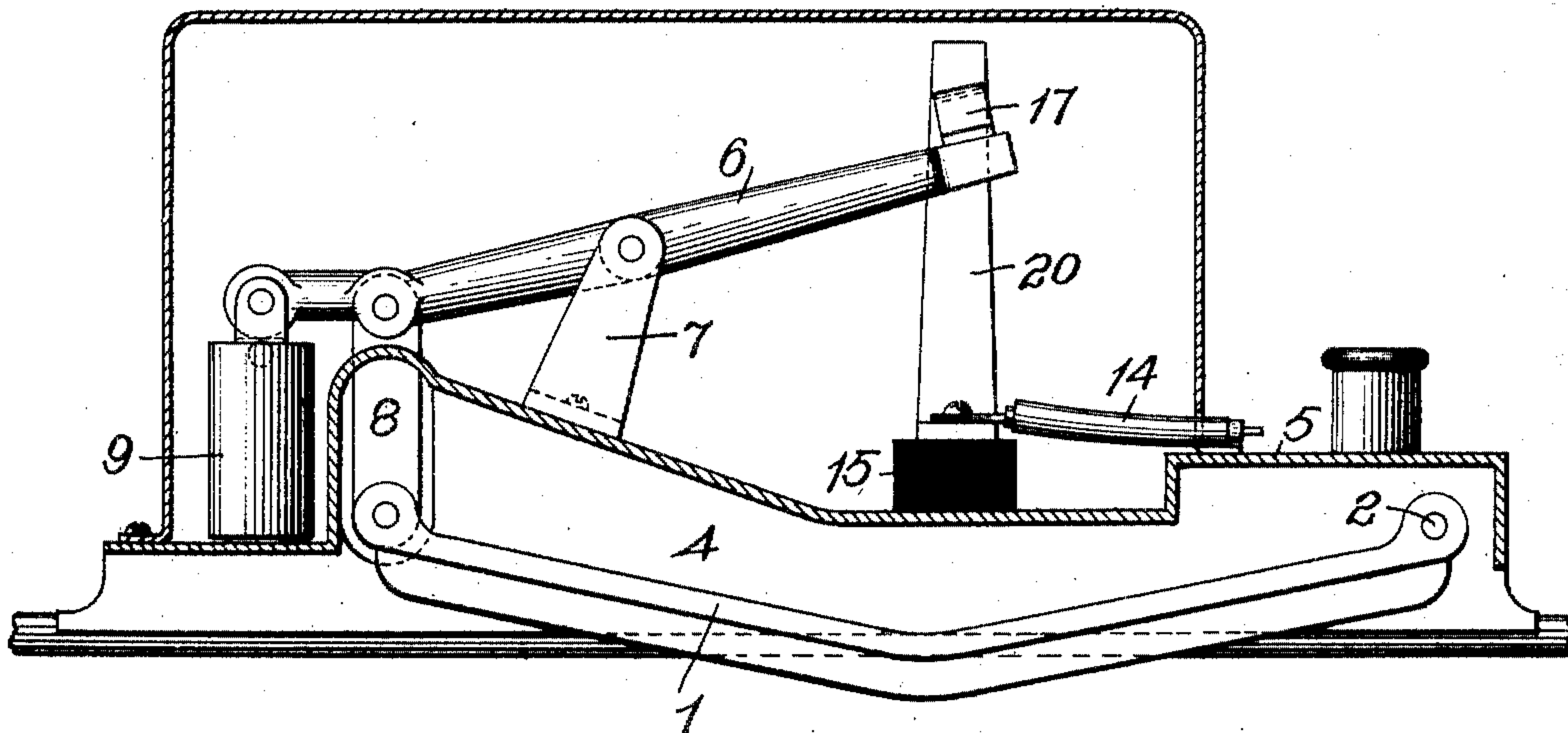


FIG. 5.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JAMES C. WALDO, OF SHARPSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-FOURTH TO JOHN J. FORSTER, OF AVALON, PENNSYLVANIA.

## ELECTRIC MAKE-AND-BREAK MECHANISM.

SPECIFICATION forming part of Letters Patent No. 777,164, dated December 13, 1904.

Application filed October 19, 1903. Serial No. 177,685. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES C. WALDO, a citizen of the United States, residing at Sharpsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Electric Make-and-Break Mechanism, of which improvements the following is a specification.

The invention described herein relates to certain improvements in circuit make-and-break mechanism, said improvements being especially applicable for use in connection with the operation of switches, signals, &c., of electric railways.

In cases where it has been desired to operate switches, signals, &c., of electric roads from the car it has been generally customary to insulate a portion of the trolley-line over which the trolley-wheel would pass to complete the circuit for operating the switch or signal. This construction is objectionable, for the reason that the current is cut off from the car during the operation of the switch or signal, and the insulated section must be made comparatively long or the speed of the car greatly reduced while the car is passing over the section in order to afford sufficient time for the switch or signal mechanism to operate.

It is the object of the present invention to provide for the closing and opening, or vice versa, of the circuit for controlling the switch and signal mechanism and to maintain the circuit in the desired position a sufficient time for the operation of the switch or signal mechanism without cutting the current from the car-motor and without the necessary slowing of the car.

In the accompanying drawings, forming a part of this specification, Figure 1 is a side elevation showing my improvement adapted for use in controlling switch and signal circuits, the supporting frame and case being shown in section. Fig. 2 is a top plan view. Fig. 3 is a sectional view on a plane indicated by the line III III, Fig. 2. Figs. 4 and 5 are views similar to Fig. 2, illustrating modifications of my improvement.

It is characteristic of my improvement that provision is made by the employment of suit-

able mechanism for causing a relative movement of the parts of a make-and-break mechanism, maintaining these parts in such position for a predetermined period, and then causing a reverse movement to bring the parts to the original or normal position.

In applying my improvement to electric railways for controlling switch, signal, or other circuits I provide an actuating part or member, which is preferably by two arms 1 arranged on opposite sides of the trolley-wire 2. One end of these arms is pivotally supported, as by a pin 3 passing through the web 4 of the supporting-frame. The supporting-frame consists of the web 4, resting on and preferably in electrical connection with the trolley-wire, and the platform 5. The opposite ends of the arms 1 are connected to one of the parts or members of the make-and-break mechanism, said part in the construction shown being formed by the lever 6, which is pivoted on the standard 7 and connected by the link 8 to the arms 1. As shown, the arms 1 are bent, so as to have oppositely-inclined portions along which the trolley-wheel moves to lift the free ends of the arms, and thereby shift the lever 6. The arms 1 are so arranged on the supporting-frame that their apices will project below the plane of movement of the portion of the trolley designed to operate the arms that the latter will be shifted sufficiently to produce the desired movement of the lever 6. As the trolley-wheel will strike the arms a sharp blow if the car is moving rapidly, means should be provided for modifying the effects of the blow without interfering with the proper movement of the lever 6. A means convenient to this end consists of a cylinder 9 and plunger 10, fitting in the cylinder, said parts being connected, respectively, to the lever and a stationary part, as the supporting-frame. The inner end of the cylinder is provided with a port controlled by an adjustable valve 11. As the lever is moved in one direction the plunger is drawn outwardly, producing a certain amount of vacuum at the inner end of the cylinder, so that the separating movement of the cylinder and plunger will be resisted by atmospheric pressure, which, how-



ever, will be gradually reduced by the inflow of air past the valve 11. When the lever is returned to normal position, such movement being effected by any suitable means—as, for example, by the weight of the arms 1 in the construction shown—the air in the cylinder will present a resistance to such movement; but as the air is permitted to escape past the valve 11 the lever will move uniformly to its normal position, the valve of such movement being controlled by the rate of flow of the air past the valve 11. When it is desired to complete or close a circuit by the movement of the lever from normal position, an arm 12 is pivotally mounted on but insulated from the supporting-frame in such manner that it will move with the lever 6 for at least a part of its return movement. For convenience of construction the arm 12 is mounted on the pin 13, forming the pivotal support of the lever 6, which is electrically connected to the trolley-wire. The arm 12, which, as stated, is insulated from the other parts of the mechanism, is connected by wire 14 to one terminal of the switch, signal, or other mechanism, the other terminal thereof being connected to the trolley-wire. The arm is normally held against a stop 15, formed of insulating material, by a spring 16. The lever 6 and arm 12 are each provided with contact-plates 17, arranged so as to have good electrical contact when in engagement. Suitable means are provided whereby the arm and lever are detachably secured together when the plates 17 make contact, so that the arm will move with the lever during a portion of the return movement of the latter and for separating the lever and arm at the desired point in the return movement. While separate mechanism may be employed for so connecting the lever and arm, the contact-plates 17 may be employed for that purpose, and to this end the plate or plates on one part, as the lever, are made to grip or engage those on the other part, as the arm. When the arms 1 are struck by a trolley-wheel, the lever 6 will be so shifted that its plates 17 will engage the corresponding plates on the arm 12, completing the switch, signal, or other circuit. As the lever is returned to normal position in the manner described the arm 12 will move with the lever, placing the spring 16 under tension. The rate of simultaneous movement of these parts is controlled by the valve 11, as before stated. The arm 12 will in its return movement strike against a stop 18, which will arrest its further movement, and the continued return movement of the lever combined with the opposite pull of the spring 16 will effect a separation of the contacts 17 on the lever and arm, which will then return to its normal position. It is preferred to make the stop 18 adjustable, and this may be done by providing the block with an eccentric-pin 19, mounted in a standard 20, so

that by rotating the pin the position of the block will be shifted.

It is characteristic of my improvement that provision is made for changing the condition of a circuit by retarding or delaying the return movement of the actuating impulse, so that such return movement does not become finally effective to produce the desired change until after a predetermined interval.

In Figs. 4 and 5 I have a construction whereby a normally closed circuit may be kept open for a predetermined interval and then closed. In the construction shown in Fig. 4 the contacts 17 for the circuit to be controlled are arranged on the arm 12 and the block 15, of insulating material, the contact on the block being connected by the wire 14 to one terminal of the signal or other mechanism, and the arms 12 are electrically connected to the trolley-wire. The lever 6 and arm 12 are detachably connected when the lever is forced down by any gripping mechanism, as intercalating-plates 21. These plate should have such engagement with each other that when the lever 6 rises the arm will be drawn up, separating the plates 17 and opening the circuit. When the arm strikes the stop 18, the gripping-plates 21 will be forced apart and the arm 12 will be returned to normal position by its spring 16. In the construction shown in Fig. 5 the contacts 17 are arranged on the lever 6 and the post 20, so that the circuit will be closed while the lever is up or in normal position. When the lever is shifted by the trolley, as described, the plates 17 will be separated and the circuit broken until the lever is returned to normal position. The post 20 is insulated from the supporting-frame, and the wire 14 is connected to the contact-plates on said post. In this construction the arm 12 is omitted.

I claim herein as my invention—

1. A make-and-break mechanism having in combination two contacts, a part or member movable to engage one of said contacts, means for shifting the engaged part and contact, means for retarding such movement of said part and contact, means for separating said part and contact and means for relieving the contact to normal position, substantially as set forth.

2. Make-and-break mechanism having in combination two contacts, two movable parts or members, means for changing the normal relative position of said parts or members, means for returning the parts or members to normal position, and means for retarding or delaying such return movement, one of the contacts being carried by one of the parts or members, substantially as set forth.

3. A make-and-break mechanism having in combination two contacts, two movable parts or members, means for shifting one part into engagement with the second part, means for returning the first to normal position while in



engagement with the second part, means for  
retarding such return movement, means for  
returning the second part to normal position,  
one of the contacts being carried by one of  
5 said parts or members, substantially as set  
forth.

4. A make-and-break mechanism having in  
combination a movable part or member adapt-  
ed to be shifted by a trolley, two contacts  
10 separable by such part or member, means for  
returning the contacts to normal position and  
fluid-pressure, means for retarding or delay-  
ing such return movement, substantially as  
set forth.

15 5. A make-and-break mechanism having in

combination two arms arranged to be shifted  
by a trolley, a lever connected to said arms  
and carrying one member of a pair of con-  
tacts, a pivotally-mounted arm carrying the  
other contact, a grip for detachably connect- 20  
ing the lever and arm, a stop for arresting  
the movement of the arm, and means for con-  
trolling the joint movement of the lever and  
arm, substantially as set forth.

In testimony whereof I have hereunto set 25  
my hand.

JAMES C. WALDO.

Witnesses:

DARWIN S. WOLCOTT,  
F. E. GAITHER.