

No. 803,214.

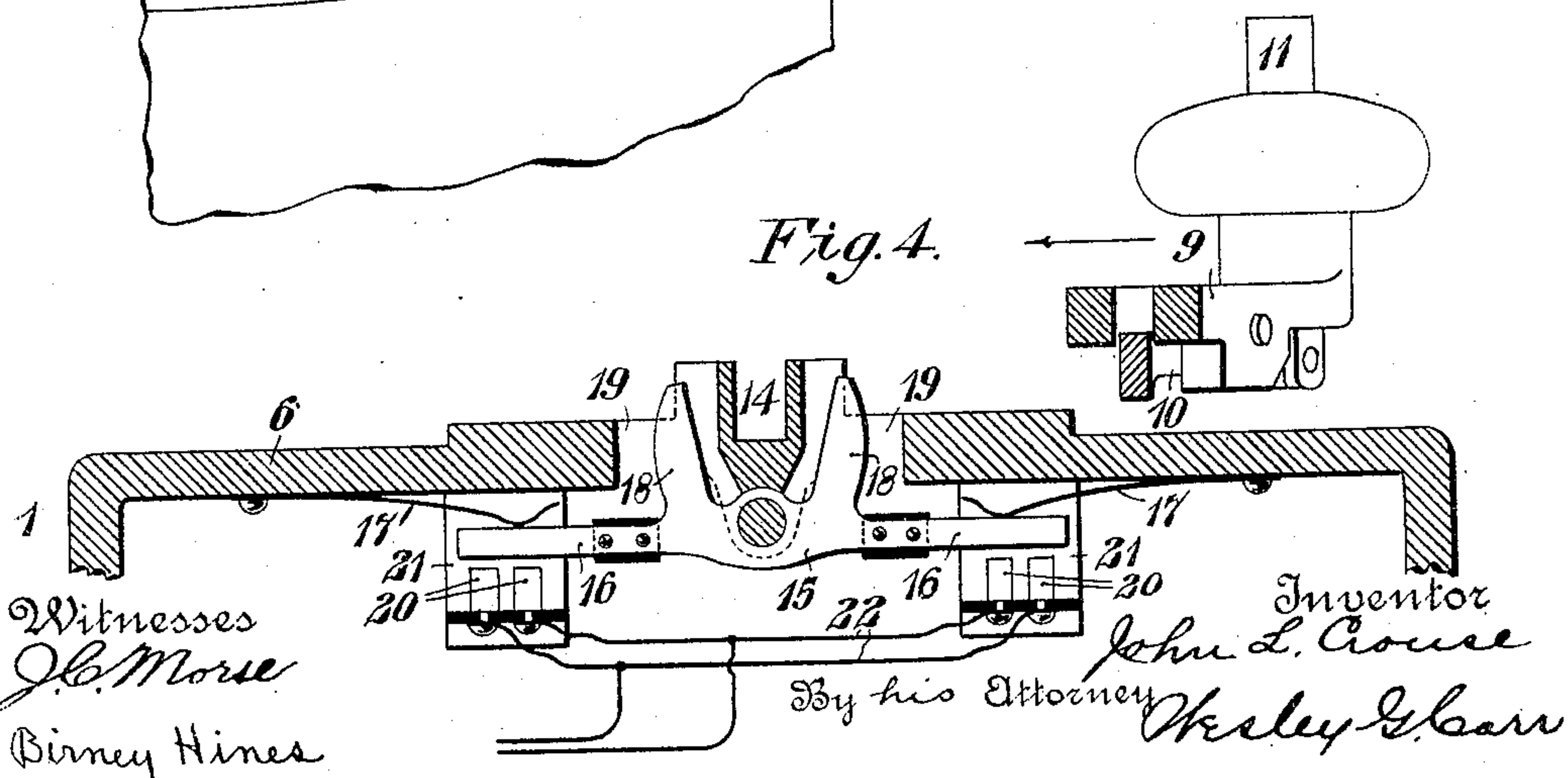
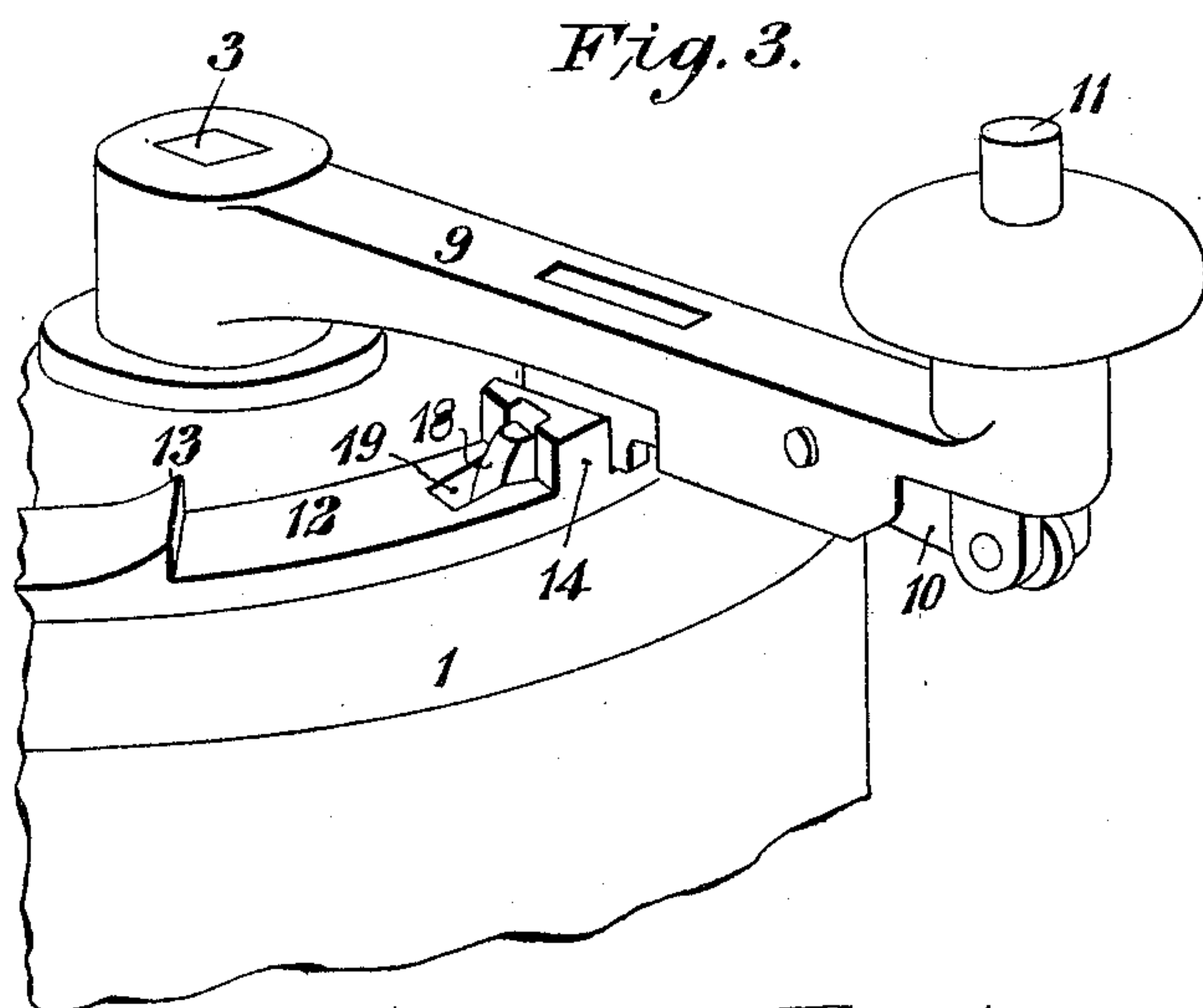
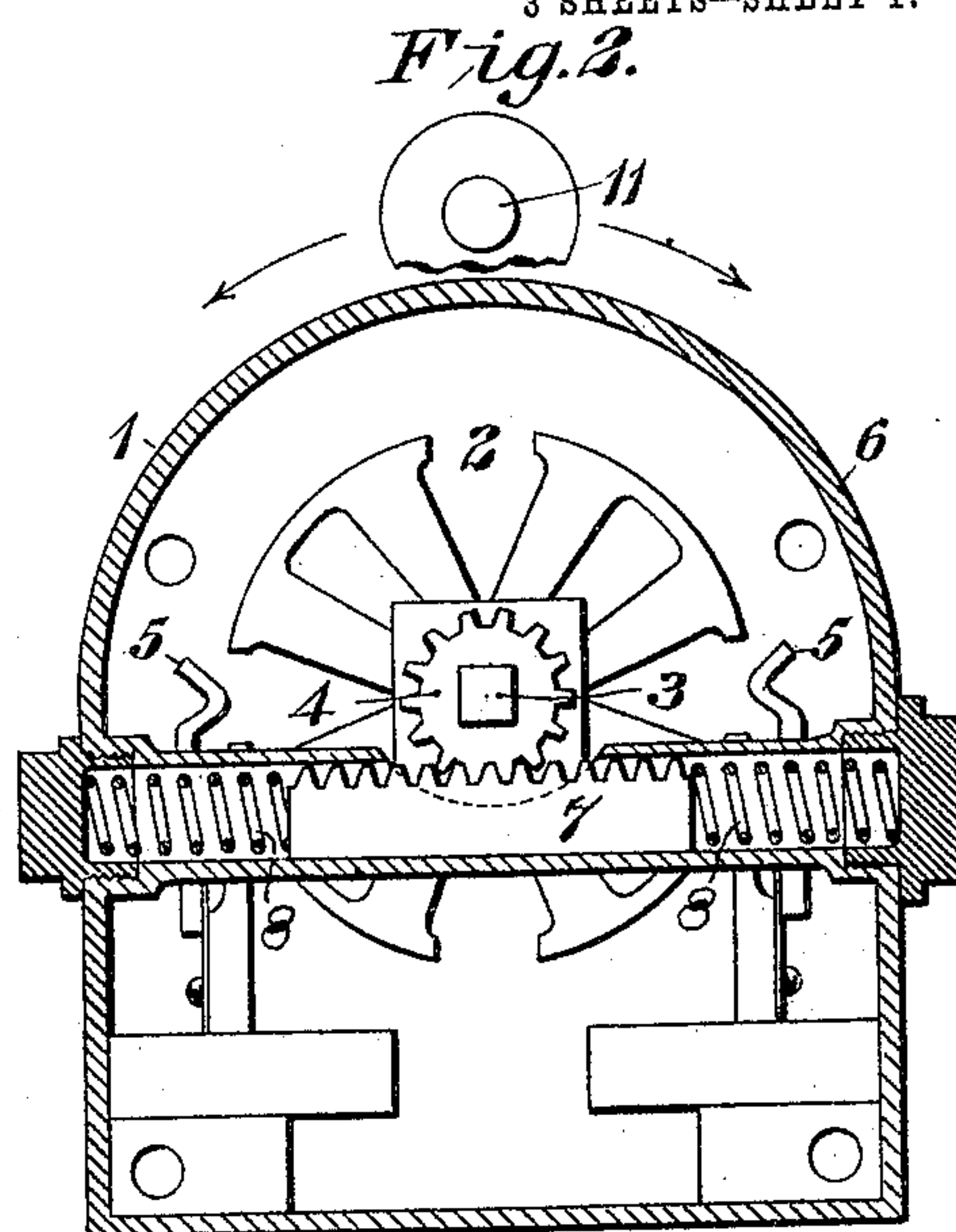
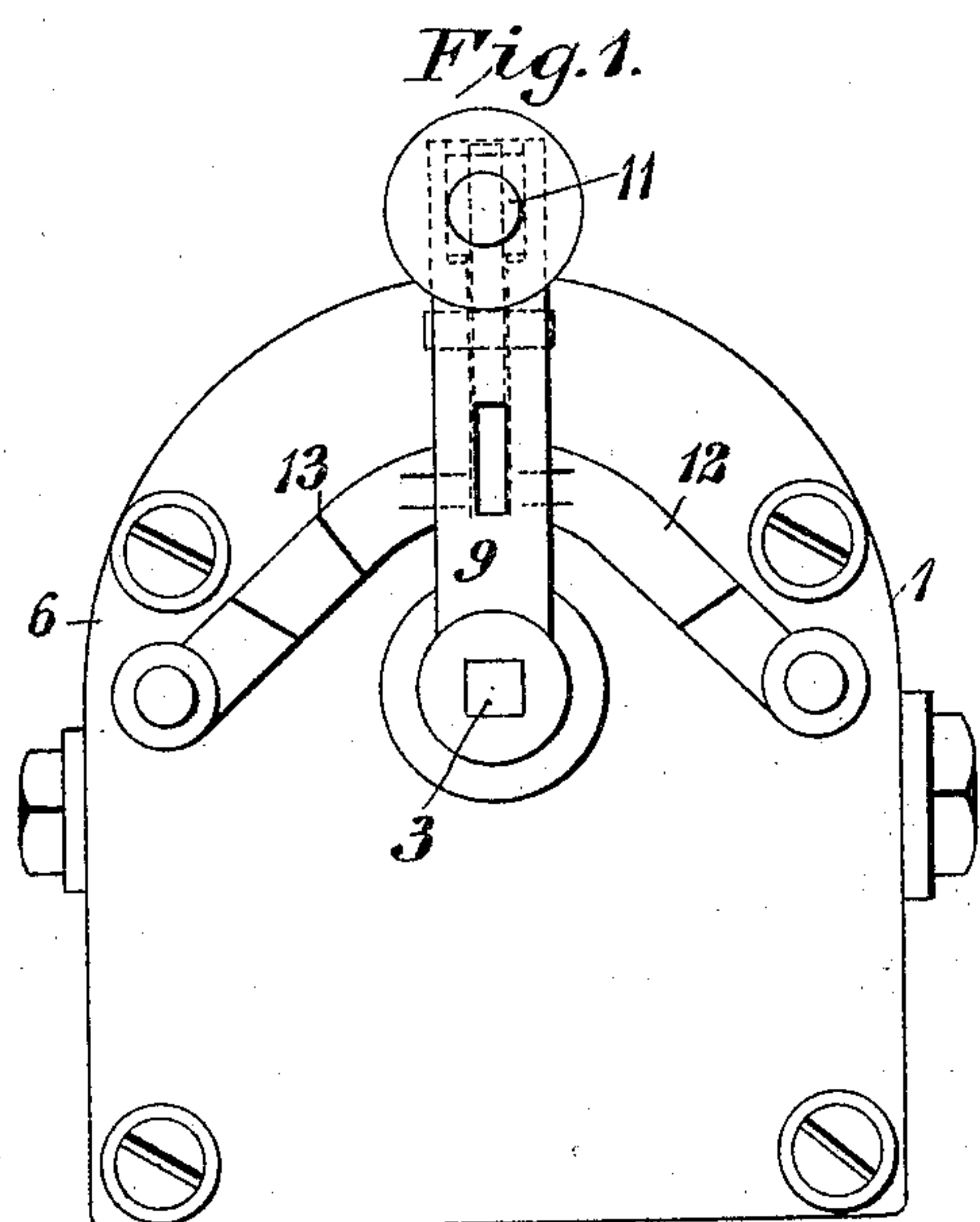
PATENTED OCT. 31, 1905.

J. L. CROUSE.

CONTROLLING SYSTEM FOR RAILWAY VEHICLES AND TRAINS.

APPLICATION FILED JAN. 22, 1903.

3 SHEETS—SHEET 1.



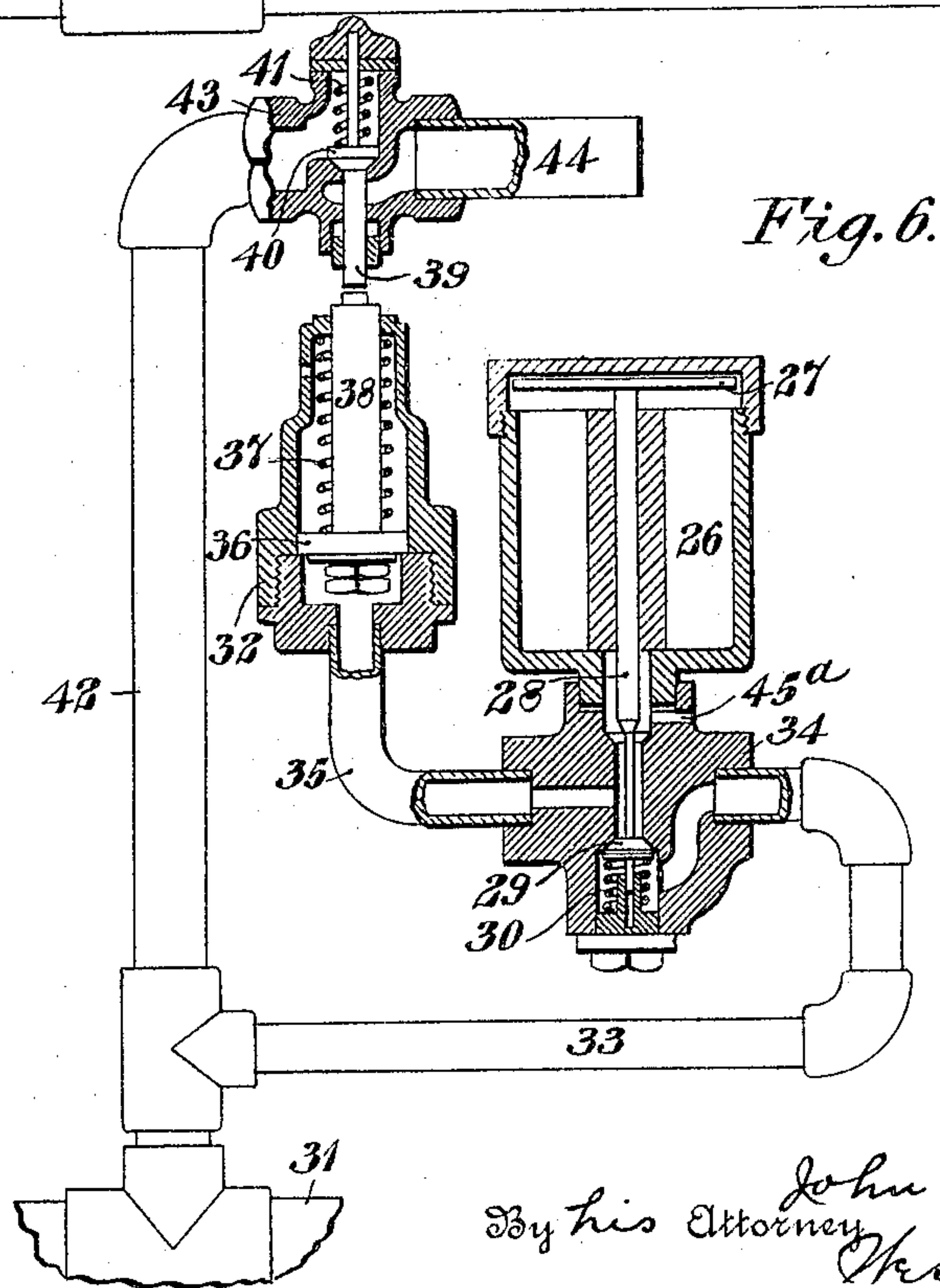
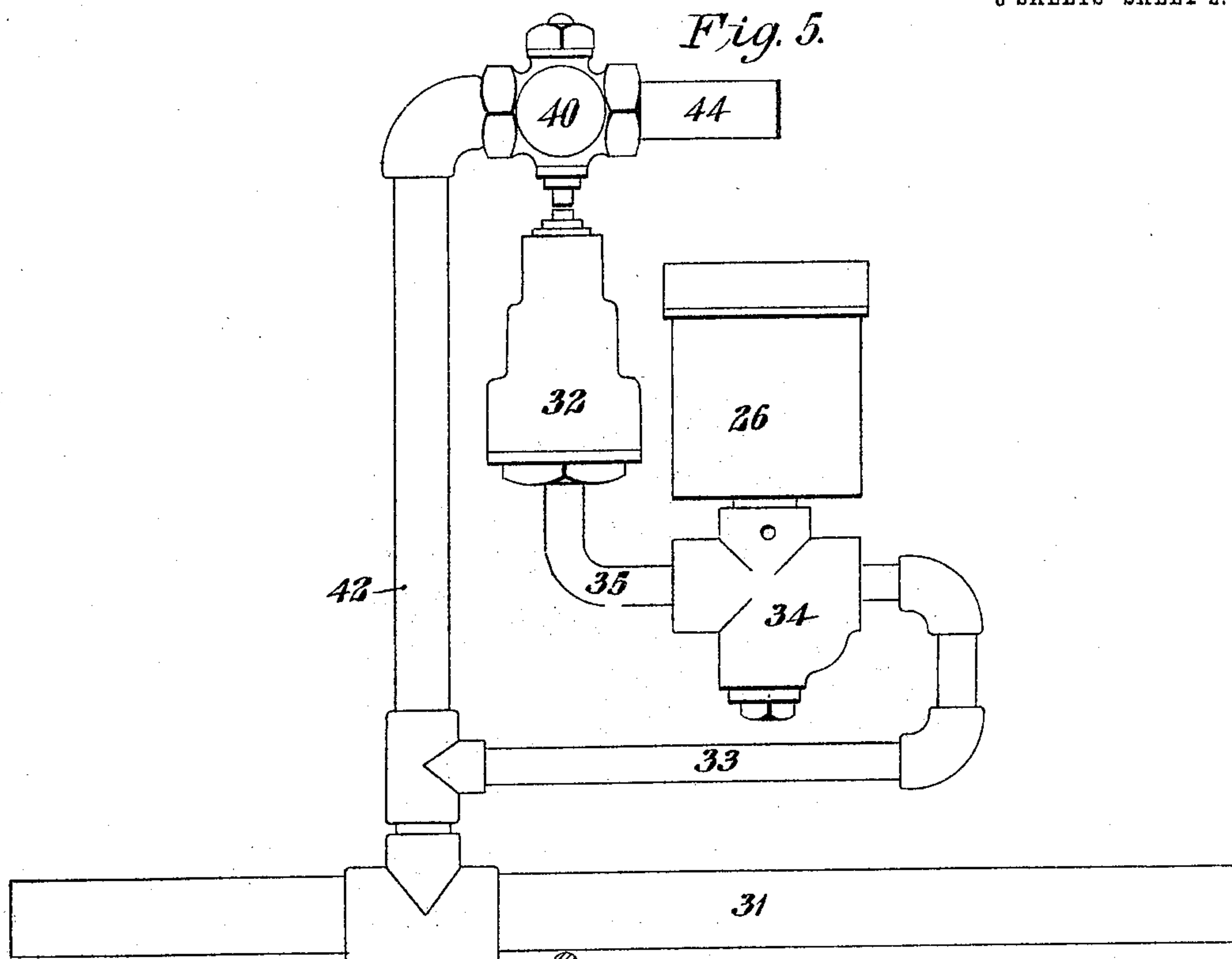
Witnesses
J. B. Morse
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 7.

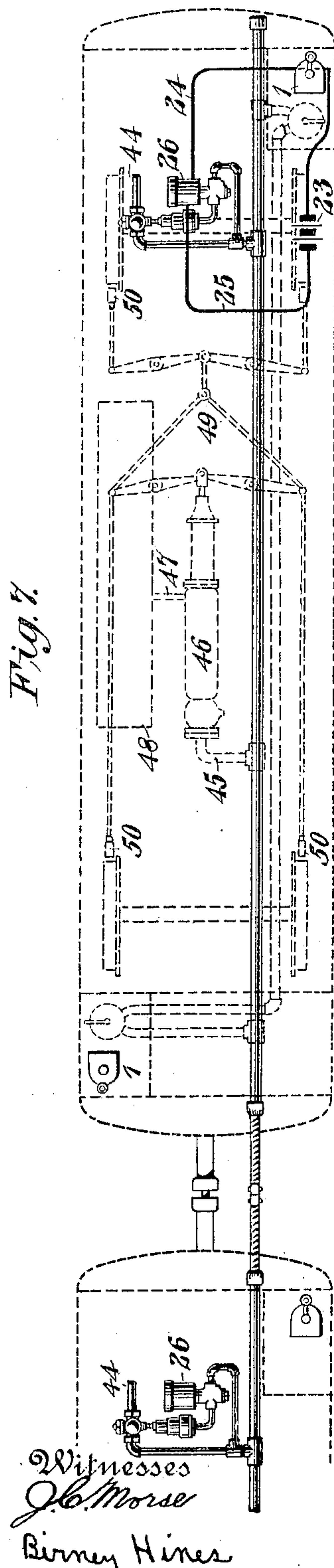
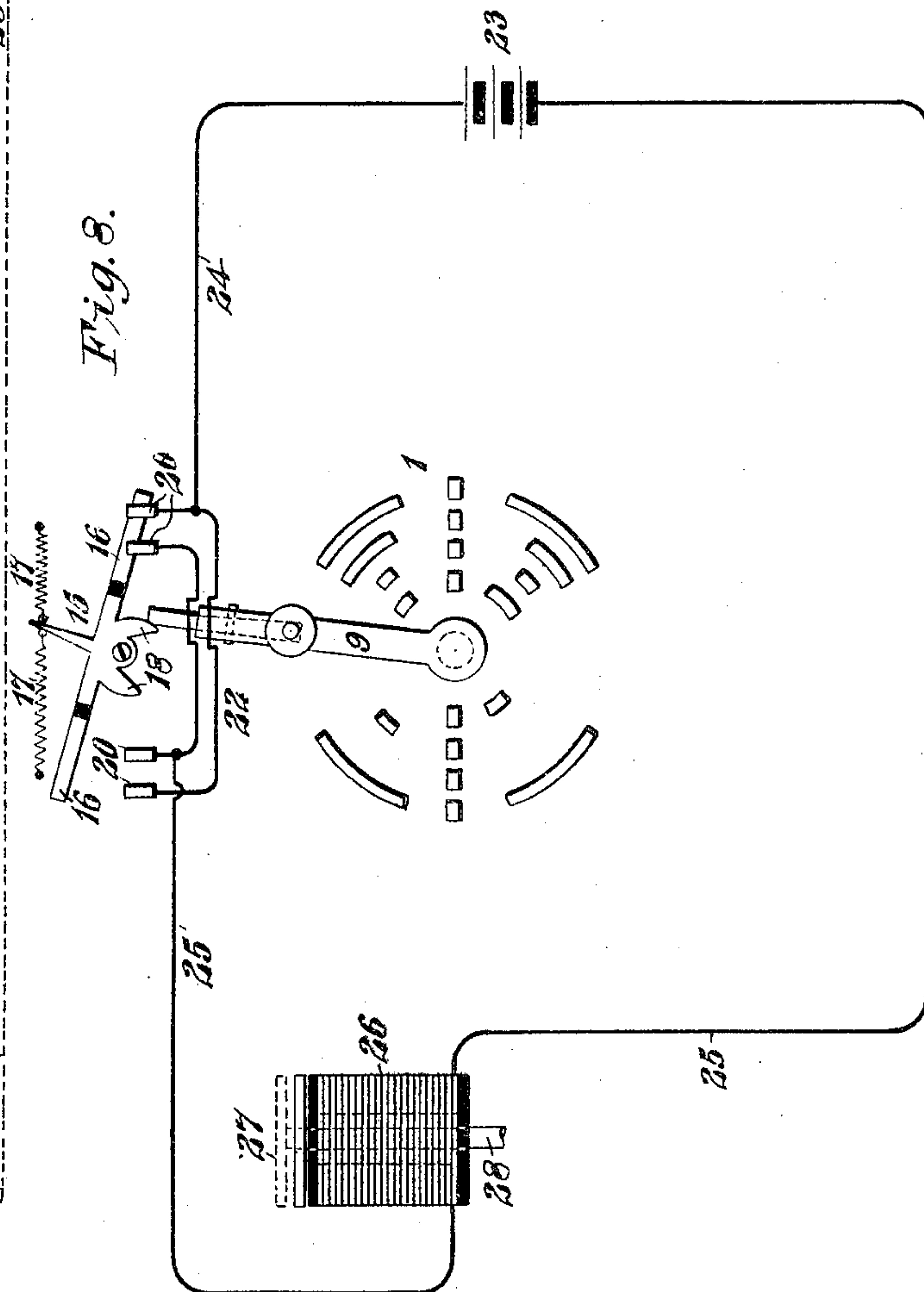


Fig. 8.



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UNITED STATES PATENT OFFICE.

JOHN L. CROUSE, OF NEW YORK, N. Y., ASSIGNOR, BY MESNE ASSIGNMENTS, TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

CONTROLLING SYSTEM FOR RAILWAY VEHICLES AND TRAINS.

No. 803,214.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed January 22, 1903. Serial No. 140,067.

To all whom it may concern:

Be it known that I, JOHN L. CROUSE, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a new and useful Improvement in Controlling Systems for Railway Vehicles and Trains, of which the following is a specification.

My invention relates to systems and apparatus for controlling the operation of motors which are employed for propelling railway vehicles and trains; and it has for its object to provide safety devices whereby the power-circuit will be automatically opened and the brakes applied in case the handle of the manually-operated governing-switch is released, thus insuring an effective safeguard against accidents by reason of carelessness or disability of the motorman.

My invention is illustrated and for convenience will be described as applied to an electropneumatic system substantially such as is set forth in Patent No. 624,277, granted to George Westinghouse May 2, 1899, and the modifications thereof set forth in Patents Nos. 682,828 and 684,609, granted to E. R. Hill September 17, 1901, and October 15, 1901, respectively. I desire it to be understood, however, that such illustration and description is not intended to restrict the invention to any specific type of controlling system, nor is it to be considered as necessarily limited to systems in which the brakes are pneumatically operated.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of a manually-operated governing-switch. Fig. 2 is a sectional view of the switch shown in Fig. 1, and Fig. 3 is a perspective view of the operating-handle of the governing-switch and some of the parts which directly cooperate therewith. Fig. 4 is a sectional view of the handle and a portion of the casing of the governing-switch, the safety-switch being shown in elevation. Fig. 5 is a side elevation of the principal electropneumatic devices utilized in my invention. Fig. 6 is a view, mainly in section, of the parts shown in Fig. 5. Fig. 7 is a diagrammatic view of a portion of a train equipped with my invention, and Fig. 8 is a diagram of the switches and electric circuits employed by me.

The following description will be limited to substantially the features constituting my invention, and therefore reference may be had to the patents hereinbefore mentioned for such further illustration and description of the entire system as may be needed to secure a more comprehensive knowledge thereof.

In general it may be stated that the system to which my invention pertains provides for the synchronous operation of two or more controllers located either upon one car or upon a plurality of cars, the latter arrangement being that usually employed in order that the desired power for propelling a train may be applied to a plurality of cars which may either constitute the entire train or, as is usually the case, be coupled with one or more cars which are unprovided with propelling-motors. In order that all of the motors may be operated in synchronism, it is obviously necessary that the controllers be so operated and that their operation be governed from a single point, this point being at any desired place on any one of the cars, but preferably on the forward end of the forward car of the train. In the system set forth in the patents hereinbefore mentioned the several motor-controllers are actuated simultaneously step by step by means of compressed air derived from suitable reservoirs through a train-pipe, and the air from the same source is also utilized for braking purposes. The application of fluid-pressure to the controller-operating devices is effected by means of electromagnetically-actuated valves, the governing-magnets being energized from a battery-circuit which is opened and closed in accordance with the movements of a manually-operated governing-switch, except that when the said governing-switch is moved to circuit-closing position the step-by-step movement of the controllers will be continued automatically until a certain predetermined position is reached, when the movement will cease and will be resumed only when the handle of the governing-switch is moved to another "on" position.

The governing-switch 1 (here shown in Figs. 1 and 2 and partly in some of the other figures) comprises a drum 2, mounted upon a shaft 3, having a pinion 4, stationary contact-terminals 5, with which the contacts on

the drum 2 engage in order to make the desired circuit connections, a casing 6, a rack 7, which engages with the pinion 4, springs 8 for automatically returning the drum 2 to zero or "off" position from any position to which it may be manually moved in either direction, an operating-handle 9, having a stop-latch 10 and a pin 11 for raising the free end of the same, and a toothed segment 12, the teeth 13 of which serve by engagement of the free end of the latch 10 therewith to indicate to the motorman the running positions corresponding to which the handle must be stopped, and having also a lug or projection 14, which indicates the zero or off position of the switch.

The parts of the governing-switch thus far described pertain to my invention only in the sense and to the extent that they cooperate with the means which will be now described for effecting the new result.

Pivotally mounted on the inner face of the front plate of the casing 6 and just beneath the stop-piece or lug 14 is a switch member 15, having oppositely-projecting arms 16, which are normally held substantially parallel to said plate by means of suitable springs 17. The switch member 15 is also provided with two arms 18, that project laterally therefrom through openings 19 upon the two sides of the lug 14 and sufficiently beyond the outer face of the casing to be engaged by the latch 10 when the arm 9 is returned from any point in either its forward or reverse direction to its zero or off position by means of the springs 8 and the rack and pinion operated thereby. When the member 15 is rocked in the one direction or the other by the means above specified, it forces the one or the other of the arms 16 into contact with the corresponding stationary contact-terminals 20, which are supported from the casing 6 by means of suitable brackets 21. The corresponding contact-terminals 20 of the two pairs are connected together by means of conductors 22, and these conductors 22 are respectively connected to the terminals of a battery 23 by means of conductors 24 and 25, and in the conductor 25 is included the coil of an electromagnet 26, the armature 27 of which has a stem 28, that is provided with a valve 29, a coiled spring 30 being provided for normally holding the same to its seat, whereby it closes a passage leading from the train-pipe 31 to the end of a cylinder 32, this passage comprising a branch pipe 33, passages through the valve-casing 34, and a pipe 35, leading from the said valve-casing to the cylinder 32. The cylinder 32 contains a piston 36, that is normally held in one end of the cylinder by means of a spring 37, and its stem 38 projects through the other end of the cylinder in position to engage the stem 39 of a valve 40, that is normally held to its seat by a coiled spring 41.

This valve 40 when lifted from its seat vents the train-pipe to the atmosphere through a branch pipe 42, the valve-casing 43, and a pipe 44. The connection 45 between the auxiliary reservoir 46 and the train-pipe 31 and the connection 47 between the auxiliary reservoir and a main or supplemental reservoir 48 are such that the venting of the train-pipe serves to effect such movement of the brake-lever and rod mechanism 49 as to set the brake-shoes 50 in the usual manner.

It will be seen from the foregoing description, in connection with the drawings, that the handle 9 of the governing-switch when released will return instantly to the zero or off position and the latch 10 will engage one or the other of the switch-arms 18 and close the circuit of the battery 23, which battery may be the one employed for energizing all of the magnets of the controlling system. The battery-circuit being thus closed, the magnet 26 will serve to unseat the valve 29, thus admitting compressed air from the train-pipe to the cylinder 32, and this air will lift the piston 36 against the action of the spring 37, and this piston will serve to unseat the valve 40, thus venting the train-pipe to the atmosphere and effecting the setting of the brakes in the usual manner, as above set forth. When the handle of the governing-switch is again moved away from stop 14 in either direction, the spring 17, which is under compression, will serve to open the safety-switch, and thus deenergize the magnet 26, whereupon the spring 30 will close the valve 29, the air in the cylinder 32 will exhaust through the small exhaust-port 45^a above the valve 29, the valve 40 will be seated by the spring 41, and the brakes will be released in the usual manner.

As has already been stated, my invention is not necessarily restricted to electropneumatic controlling systems or, in its broadest aspect, to employment in connection with air-brakes, since the closing of the safety-circuit might be utilized to effect the application of other types of brakes. It is to be understood also that the invention may be embodied in apparatus the details of construction of which vary largely from what is here shown, and I therefore do not intend to limit my invention, except as limitations may be imposed by the prior art.

I claim as my invention—

1. In a controlling system for electrically-propelled vehicles or trains, the combination with a brake-setting means and a governing-circuit therefor, of a governing-switch having a manually-operated handle and a spring for causing said handle to close said governing-circuit when released by the motorman.

2. In a controlling system for electrically-propelled vehicles or trains, the combination with a brake-setting means, of a governing-circuit, a manually-operated switch for

said circuit, a brake-controlling circuit, a normally open switch therefor having means engaged by the handle of the governing-switch, when released, to effect the setting of the
5 brakes.

3. In a vehicle or train controlling system, the combination with a governing-switch having a spring-restrained, manually-operated handle, of pneumatically - operated
10 brake-setting means, an electric controlling circuit therefor and a normally open switch for said circuit which is closed by the governing-switch handle when released by the operator.

15 4. In a vehicle or train controlling system, the combination-with a governing-switch having a spring-restrained, manually-operated handle, of a pipe for compressed air the venting of which serves to set the brakes of
20 the vehicle or train, a valve for venting said pipe, an electromagnet for unseating said valve, and a normally open switch for the circuit of said electromagnet the movable member of which projects into the path of movement of the governing-switch handle so as to
25 be moved to circuit-closing position when said handle is automatically returned to open-circuit position.

5. In a controlling system for electrically-
30 propelled vehicles or trains, the combination with a spring-restrained, manually-operated governing-switch, of brake-setting mech-

anism, a control-circuit for said mechanism and a governing device therefor so located as to be actuated by the movable member of the
35 governing-switch when released.

6. In an electropneumatic controlling system for vehicles or trains, the combination with air-brake mechanism and an electric governing-circuit therefor having a normally
40 open switch, of a manually-operated governing-switch for the vehicle or train propelling mechanism and a spring or springs for causing the handle of said switch to close the brake-governing switch when said handle is
45 released.

7. In an electropneumatic controlling system for electrically - propelled vehicles or trains, the combination with brake-setting mechanism and a normally open controlling-
50 circuit therefor, of a governing-switch for the vehicle or train propelling mechanism having a spring-restrained, manually-operated handle and means engaged by said handle, when released, to close the brake-controlling circuit
55 and thereby effect application of the brakes.

In testimony whereof I have hereunto subscribed my name this 21st day of January, 1903.

JOHN L. CROUSE.

Witnesses:

WM. H. CAPEL,

THOS. H. BROWN, Jr.