J. G. SCHREUDER & V. K. SPICER.

APPARATUS FOR AUTOMATICALLY CONTROLLING THE SPEED OF TRAINS.

APPLICATION FILED AUG. 3, 1907.

903,411. **Patented Nov. 10, 1908.**

3 SHEETS—SHEET 1.

Fig. 2.

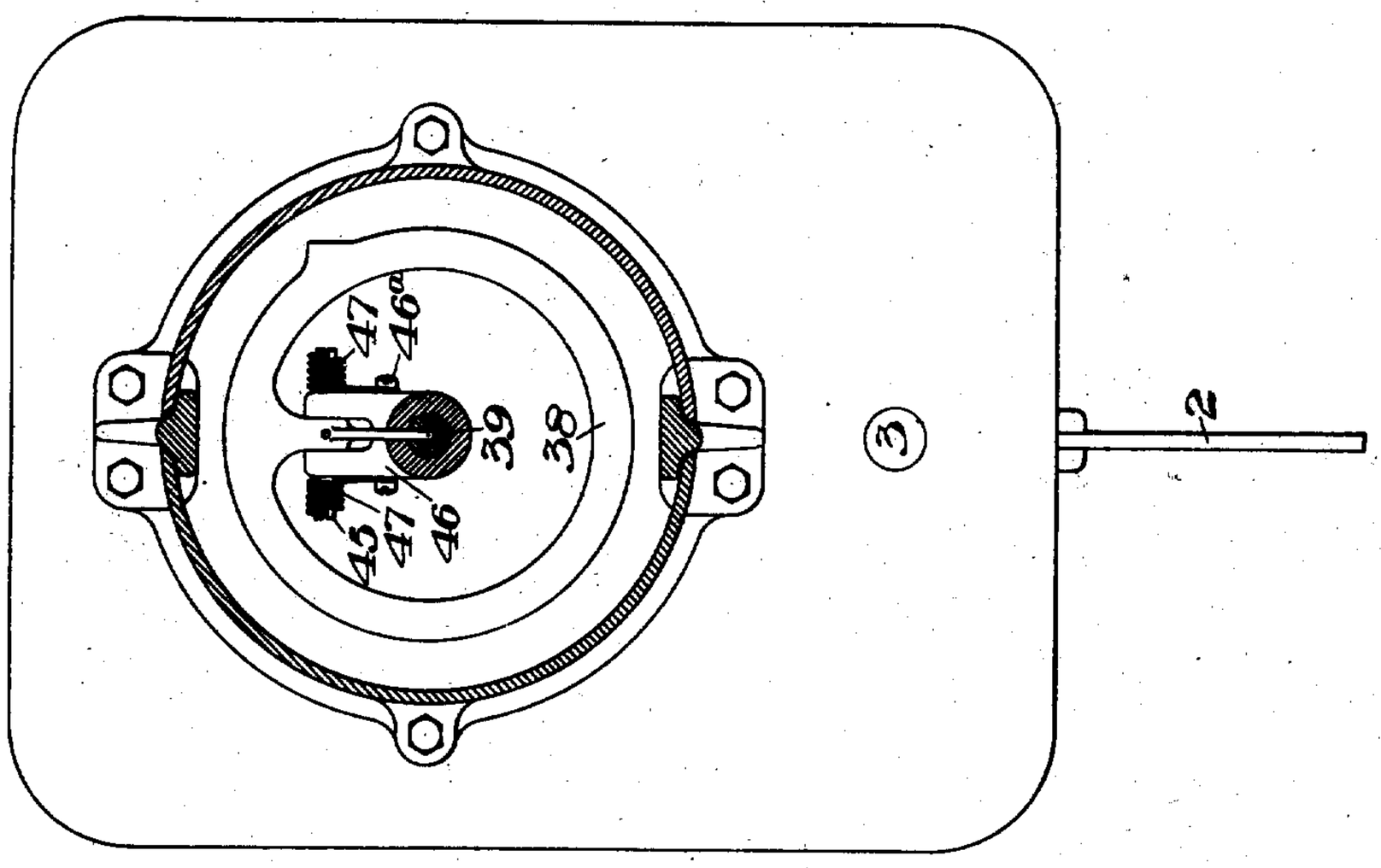
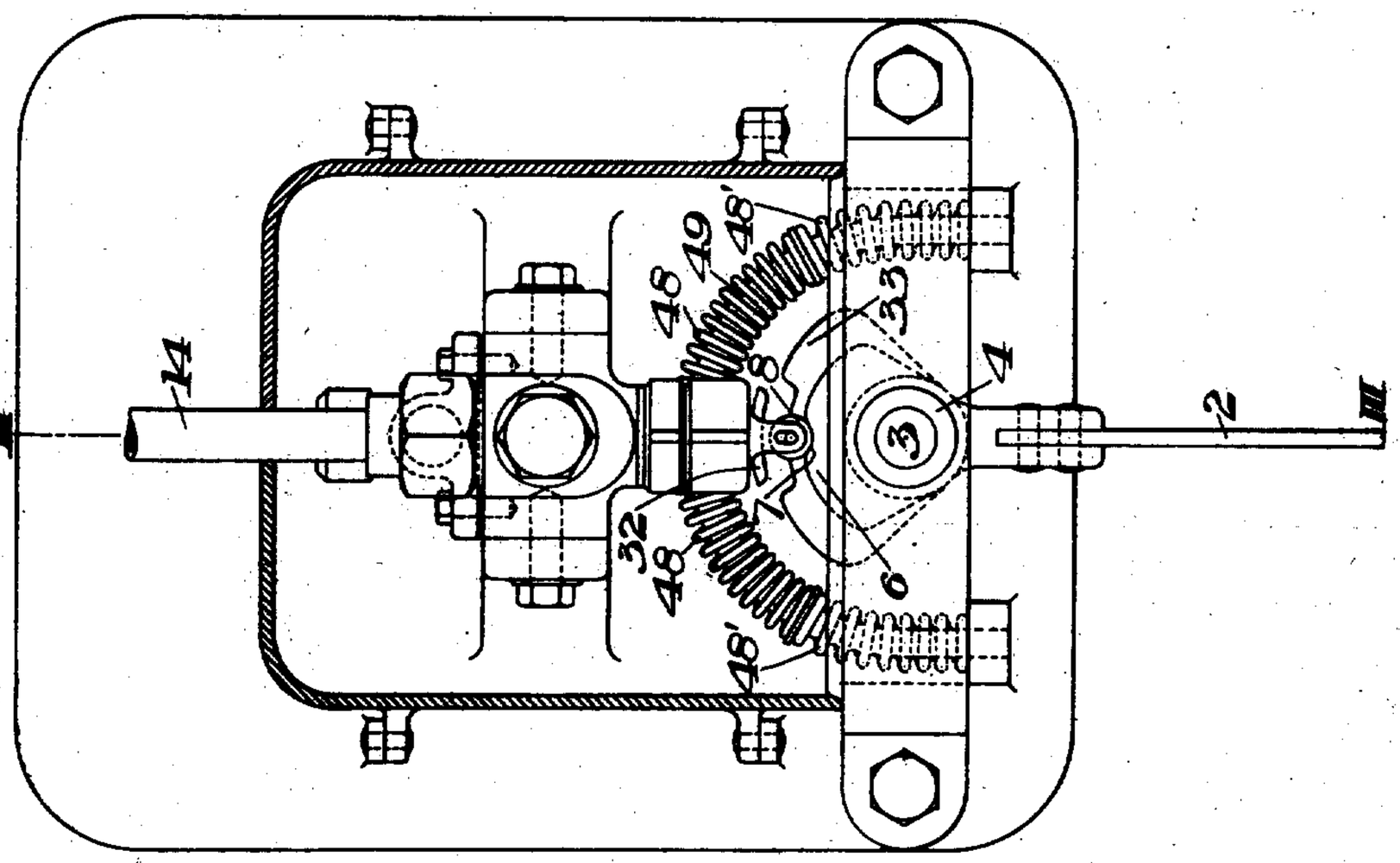


Fig. 1.



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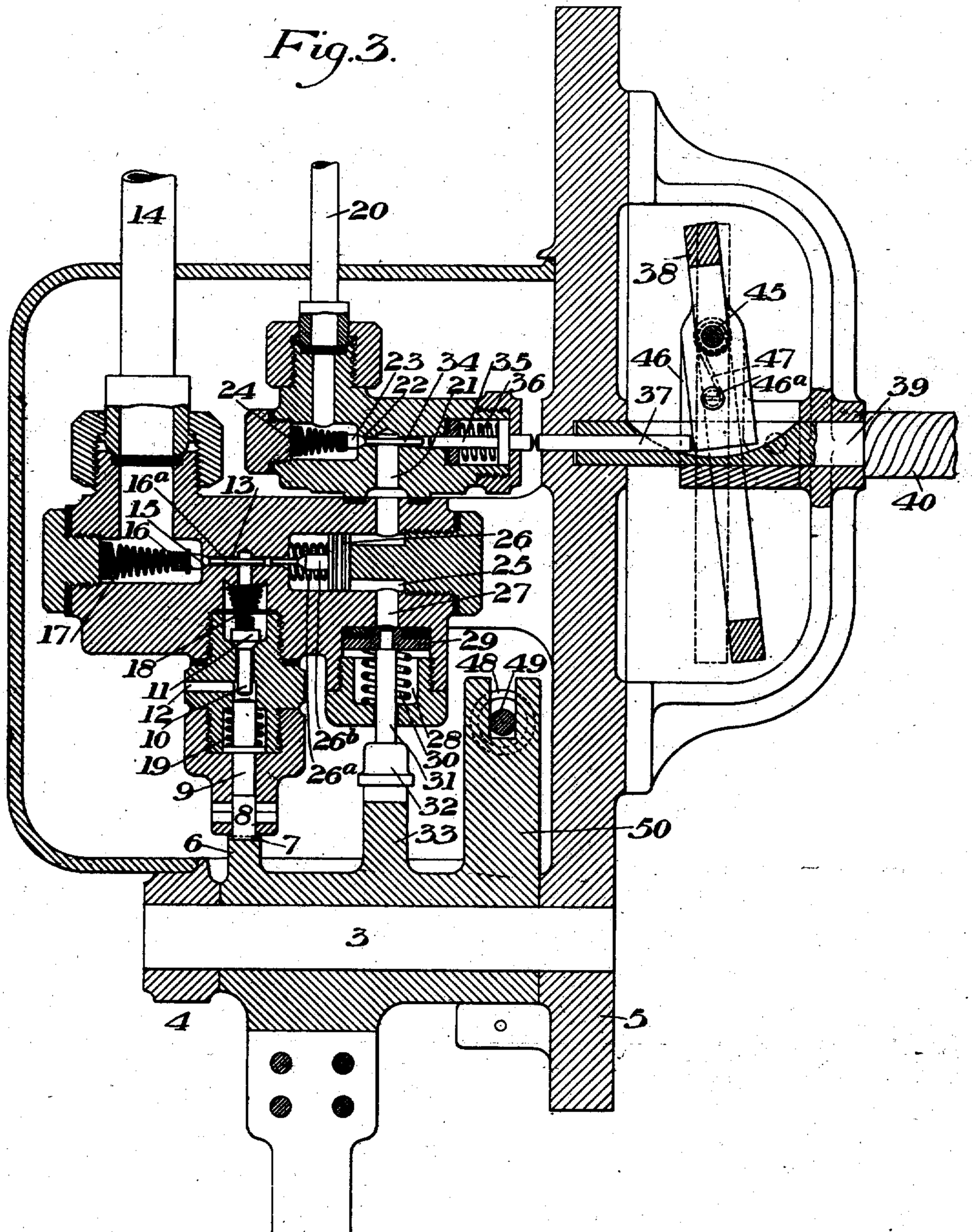
3 SHEETS—SHEET 2.

Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 6.

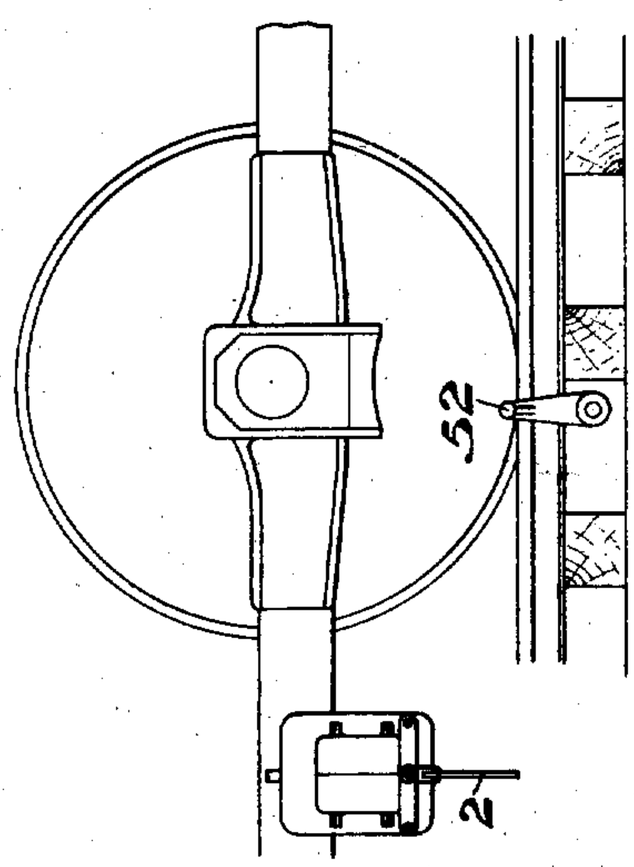


Fig. 4.

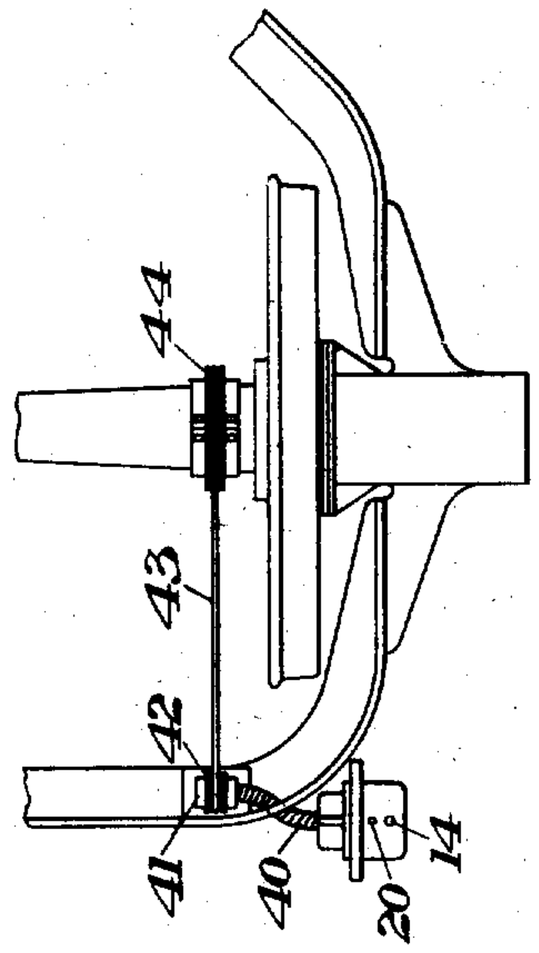
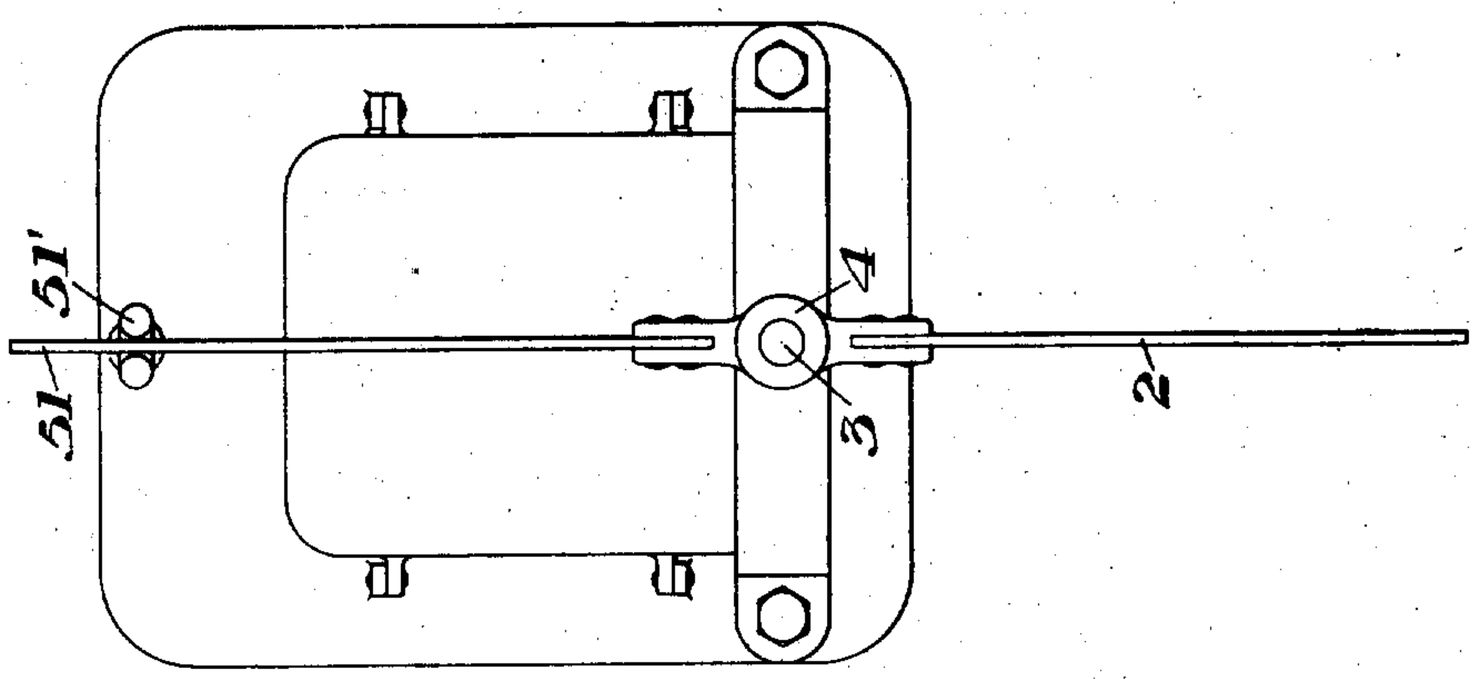


Fig. 5.



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UNITED STATES PATENT OFFICE.

JENS G. SCHREUDER, OF EDGEWOOD PARK, PENNSYLVANIA, AND VIBE K. SPICER, OF CHICAGO, ILLINOIS, ASSIGNORS TO THE UNION SWITCH & SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

APPARATUS FOR AUTOMATICALLY CONTROLLING THE SPEED OF TRAINS.

No. 903,411. Specification of Letters Patent. Patented Nov. 10, 1908.

Application filed August 3, 1907. Serial No. 386,933.

To all whom it may concern:

Be it known that we, JENS G. SCHREUDER, of Edgewood Park, Allegheny county, Pennsylvania, and VIBE K. SPICER, of Chicago, Cook county, Illinois, have invented a new and useful Apparatus for Automatically Controlling the Speed of Trains, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a front view of apparatus embodying our invention, with the casing shown in section; Fig. 2 is a detail sectional view showing the centrifugal speed governor; Fig. 3 is a section on the line III—III of Fig. 1; Fig. 4 is a plan view showing one method of driving the speed governor from the axle of the locomotive or car; Fig. 5 is a detail view showing another way of holding the trip arm in central position; and Fig. 6 is a side view showing an application to an engine frame.

The object of our invention is to provide means for automatically controlling the speed of railway trains, (and by the term "train" as used herein, and in the claims, we include all forms of railway engines and vehicles whether single or attached), in passing distant signals, at curves, or at any other point along the right of way where it is desirable to limit the speed.

In accordance with our invention, we provide trip mechanism carried by the train, preferably on an engine, and which is arranged to affect the operation of valve mechanism whereby the speed of the train is controlled, either by causing the application of the brakes or by operating the throttle or both. This trip mechanism is designed to operate the valves, by means on the track at the desired points, provided the speed of the train exceeds a predetermined limit; otherwise, the operation of the trip does not effect the operation of the valves.

Referring to the accompanying drawings, the numeral 2 designates a depending trip arm, which is attached to a rotary shaft 3 supported in suitable bearings 4 and 5 attached to the engine or train at any convenient point.

On the hub of the arm 2 is a cam 6 having a central depression 7 in which normally rests a roller 8 on the lower end of a plunger 9, which is arranged to engage the stem 10 of a valve 11 which controls a fluid-exhaust opening or passage 12, which leads through the said valve to a passage 13. This passage 13 is connected to the brake pipe 14, through a valve seat 15 which is normally closed by a valve 16. The valve 16 is normally held closed by a spring 17. The valve 11 has a similar closing spring 18, and the plunger 9 is provided with a spring 19 which normally holds the roller 8 in engagement with the cam.

20 designates a fluid-supply pipe, which communicates with an air passage 21 through port 22 controlled by a valve 23 having a closing spring 24. The port 21 opens into a cylinder 25, having therein a piston valve 26, and from which leads a passage 27 to a chamber 28 having therein a piston 29. The piston 29 has a depending stem 31 provided with a brake shoe 32 at its lower end which is arranged to be moved into engagement with a brake flange 33 on the hub of the trip arm 2 and normally held clear thereof by the spring 30. The valve 23 has a stem 34, which extends across the upper portion of the port or passage 21 into position to be engaged by a rod or plunger 35 which is normally held out of engagement therewith by a spring 36. The outer end of the plunger 35 extends into position to be engaged by the endwise movable shaft 37 actuated by a centrifugal device 38. This device is secured to a shaft 39, which may be driven in any suitable manner from an axle or other rotating part of the train or engine. We preferably drive it by means of a flexible shaft 40 extending to a shaft 41, which is driven by pulley 42 connected by belt 43 with a pulley 44 on one of the axles.

The device 38 may be any form of a centrifugal device, such as a ball governor; in the form shown, it consists of an annular ring, pivoted at 45 to a lug 46 which projects from the shaft 39, and is normally held in the oblique position shown in full lines by the action of the coil springs 47 coiled on the trunnion bearings or pivots and held stationary relative to the lug 46 by the clamp 46^a.

The piston valve 26 which is normally held in the position shown in Fig. 3 by a spring 26^a has a stem 26^b which abuts the stem 16^a of the valve 16.

The trip arm 2 is normally held in the cen-

tral position shown in Fig. 1, by means of the two sets of springs 48 and 48′, which are coiled about and seated on the curved guide rods 49, and bear against opposite sides of an arm 50, Fig. 3, on the hub of the trip arm 2. These springs not only serve to hold the trip arm in a central position, but they also take up the impact when the arm 2 is operated, the springs 48 receiving the first impact which they transmit to the heavier springs 48′. Instead of these springs, we may, however, employ the spring arm 51 shown in Fig. 5, which is connected to the arm 2, and whose upper portion is normally confined between the stops 51′; or any other suitable structure.

52 (Fig. 6) designates a track trip, which is secured to the track in position to be engaged by the trip arm 2. This trip 52 may either be controlled by a connection with a signal, or it may be permanently, or temporarily, fastened to the track at any point where it is desired to limit the speed of or stop the train.

The operation is as follows:—With the speed below a predetermined limit, the contact of the trip arm 2 with the trip 52 will simply affect the opening of the valve 11 without any other effect, since the exhaust passage 12 is still closed by the valve 16. When, however, the speed of the train exceeds the predetermined limit, (as determined by the set of the centrifugal device 38), the said device will tend to move into the position shown in dotted lines in Fig. 3, and will thereby actuate the shaft 37 and the rod 35 to open the valve 23. Fluid pressure now passes from the supply pipe 20 into the port 22 and passage 21, to the cylinder 25. This actuates the piston 26 and causes its stem 26^b to engage the stem 16^a of the valve 16 and open that valve. Fluid pressure now escapes from the brake pipe 11 through the port 13 and the escape port 12, valves 11 and 16 both being open. Fluid pressure simultaneously passes around the piston 26 into the port 27 and actuates the piston 29 to throw the brake shoe 32 into engagement with the brake flange 33 as the trip arm rotates. This brake shoe will hold the trip lever in the position to which it has been moved by the trip, thereby keeping the valve 11 opened until the speed of the train has been reduced to the proper limit. This reduction of speed will cause the centrifugal device 38 to withdraw the stem 37, and the return springs of the several valves will automatically close them, and the spring 30 will raise the brake shoe 32 to permit the trip arm to resume its normal position. It will thus be apparent that unless the speed of the train exceeds the predetermined limit, the operation of the trip arm 2 will have no effect in applying the brakes. The brakes may be directly applied by the escape of air from the brake pipe 14, or said pipe may be connected to any other suitable valve mechanism which controls the application of the brakes, or it may effect the operation of the throttle valve of the engine, or both.

We do not wish to limit ourselves to the exact form of valve mechanism which we have herein shown and described, it being obvious that the desired result can be effected with various arrangements of valves; neither do we limit ourselves to the particular character and arrangement of the trip mechanism shown; nor to the use of the particular centrifugal speed governor, since any suitable device driven by connection with a rotating part of the engine may be employed.

What we claim is:—

1. In apparatus for controlling the speed of trains, a control valve, fluidal actuated means for controlling the opening of said valve, and combined trip and governor means for causing the operation of the fluidal device; substantially as described.

2. In apparatus for controlling the speed of trains, a normally closed controlling valve, a trip device arranged to open said valve, a supplementary control valve, a fluidal means for opening the supplementary valve, and means controlled by the speed of the train for controlling the operation of the fluidal means; substantially as described.

3. In apparatus for controlling the speed of trains, a controlling valve, a trip device arranged to open said valve, supplementary valve mechanism, fluidal means for controlling the operation of the supplementary valve means, and a centrifugal device operated by the speed of the train and controlling the operation of the fluidal mechanism; substantially as described.

4. In apparatus for controlling the speed of trains, a main controlling valve, a trip device for opening the same, a supplementary valve, a fluidal piston for operating the same, valve means for controlling the admission of pressure to said piston, and means controlled by the speed of the train for controlling the operation of the last named valve means; substantially as described.

5. In apparatus for controlling the speed of trains, a main control valve, a trip device for actuating the same, a supplementary control valve, a fluidal piston for opening the supplementary valve, means governed by the speed of the train controlling the operation of said piston, and means arranged to return the valves to their normal positions; substantially as described.

6. In apparatus for controlling the speed of trains, controlling valves, a trip mechanism, a device operated by the speed of the train, said trip mechanism and device conjointly controlling the operation of said valve to reduce or check the speed of the train, and means for automatically return-

valve to normal position; substantially as described.

7. In apparatus for controlling the speed of trains, a control valve, a trip mechanism for opening the same and means controlled by the speed of the train whereby the opening of said valve is not effected unless the speed exceeds a predetermined limit; substantially as described.

8. In apparatus for controlling the speed of trains, a control valve, trip mechanism for opening said valve, a supplemental control valve, means for opening the supplemental valve controlled by the speed of the train, and means for automatically holding the main and supplemental valves open until the speed has been reduced to the predetermined limit; substantially as described.

9. In apparatus for controlling the speed of trains, a movable trip device, a brake therefor, and means controlled by the speed of the train for controlling the operation of the brake; substantially as described.

10. In apparatus for controlling the speed of trains, a pivoted trip device, a brake therefor, and fluidal means for controlling the operation of the brake and controlled by the speed of the train; substantially as described.

11. In apparatus for controlling the speed of trains, a pivoted trip arm, and compound springs arranged to bear against opposite sides of said arm for holding it normally in a central position and for taking up the impact of operation together with curved guides for said springs; substantially as described.

12. In apparatus for controlling railway trains, a shiftable speed controlling member, a fluidal actuated device for controlling the shifting of said member, and combined trip and speed actuated means for causing the operation of the fluidal actuated device; substantially as described.

In testimony whereof, we have hereunto set our hands.

JENS G. SCHREUDER.
VIBE K. SPICER.

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