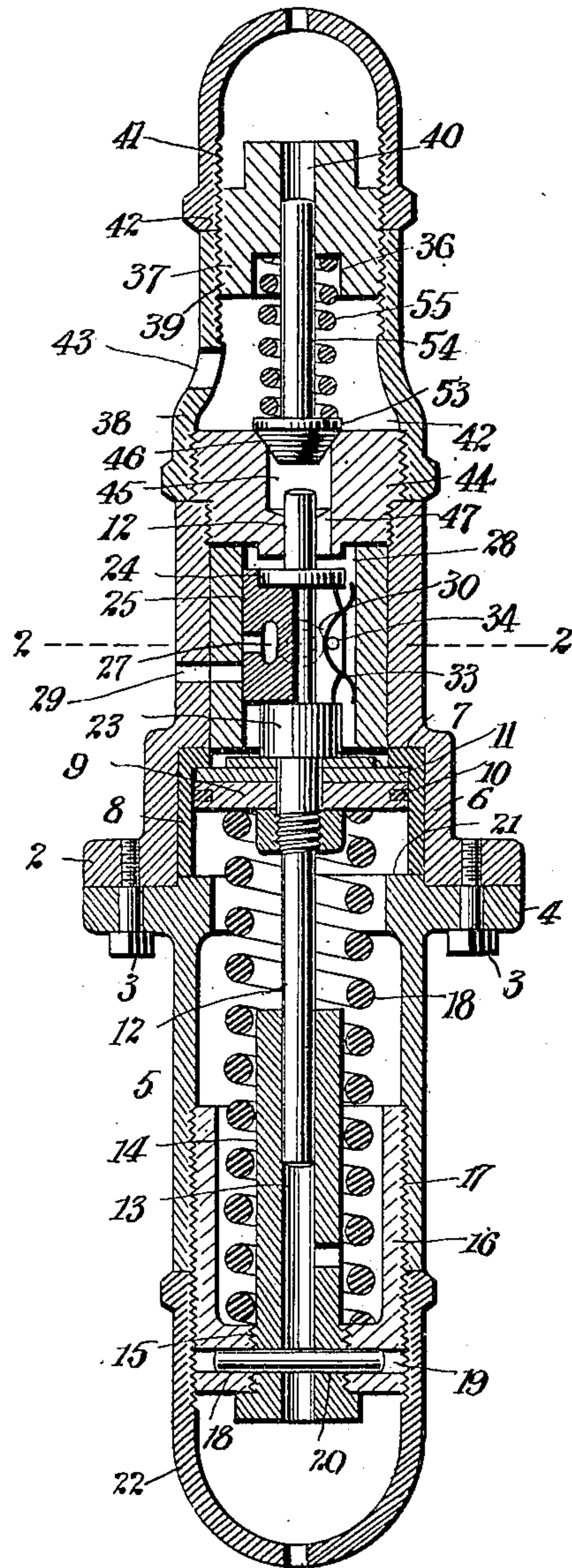


No. 825,786.

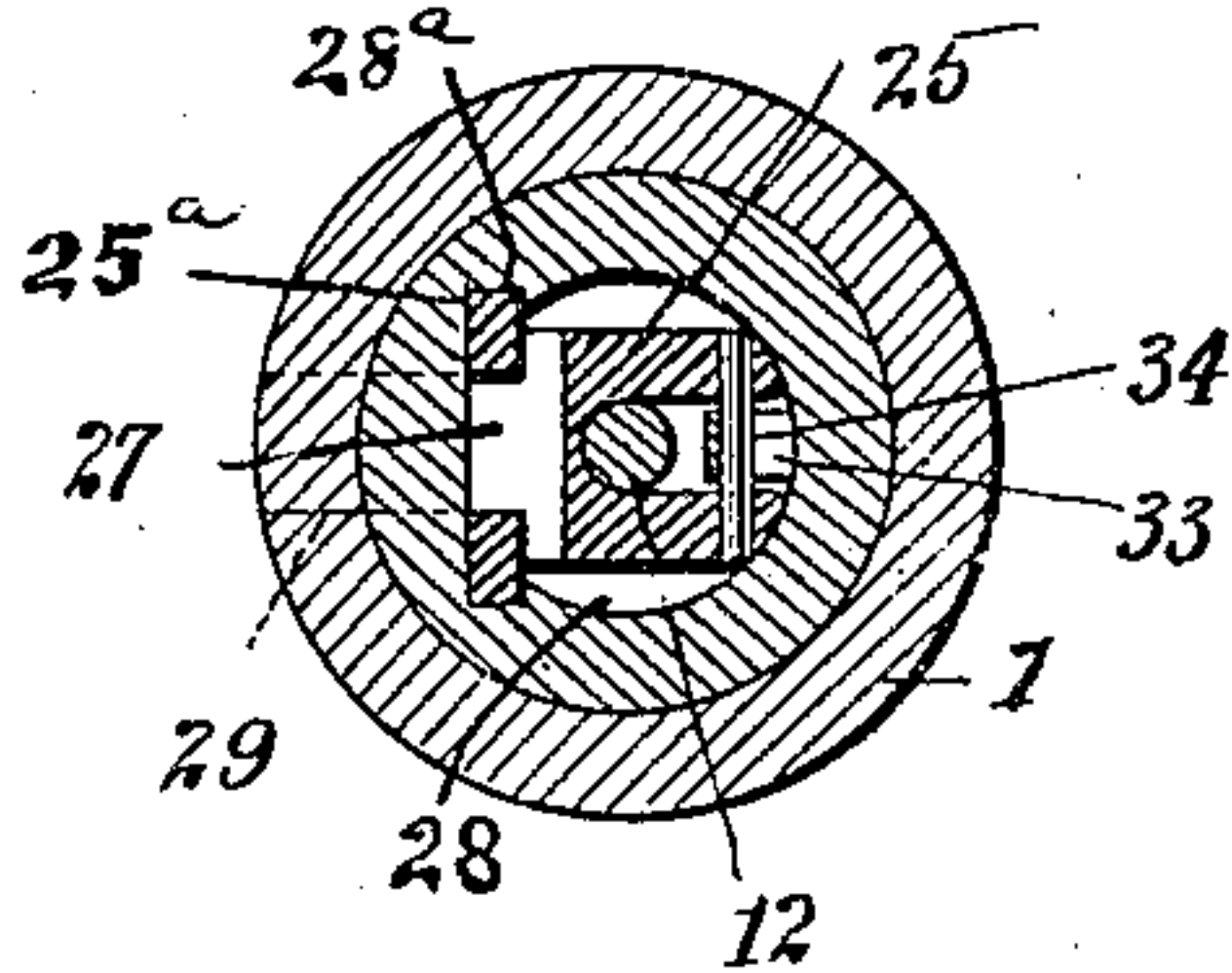
PATENTED JULY 10, 1906.

L. F. WILLIAMS.  
AIR BRAKE GOVERNOR.  
APPLICATION FILED AUG. 28, 1903.

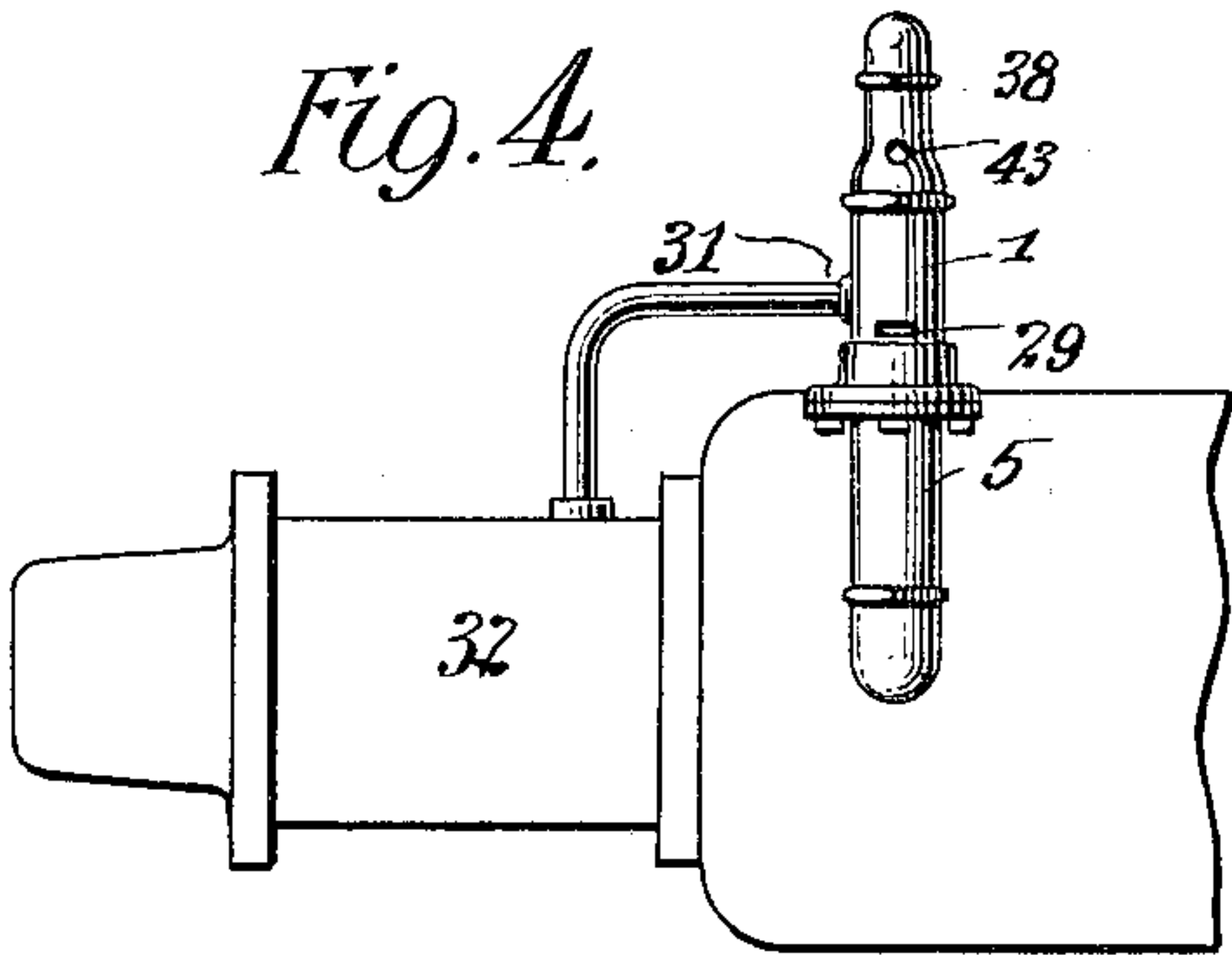
*Fig. 1.*



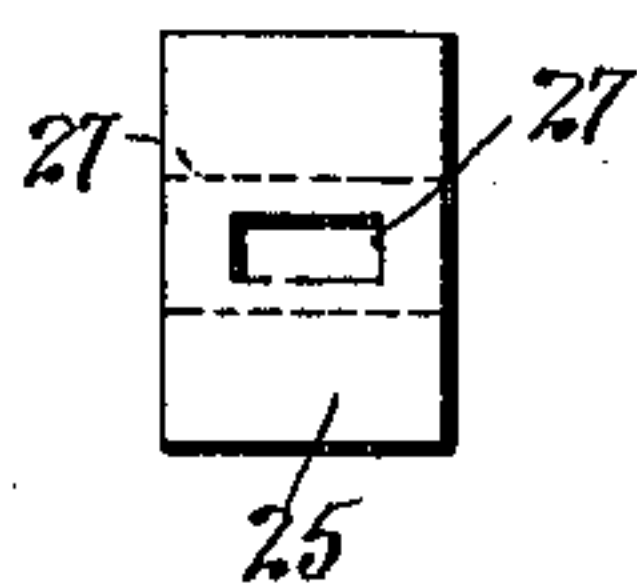
*Fig. 2.*



*Fig. 4.*



*Fig. 3.*



Witnesses  
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# UNITED STATES PATENT OFFICE.

LEONARD F. WILLIAMS, OF THURBER, TEXAS.

## AIR-BRAKE GOVERNOR.

No. 825,786.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed August 26, 1903. Serial No. 170,849.

*To all whom it may concern:*

Be it known that I, LEONARD F. WILLIAMS, a citizen of the United States, residing in Thurber, Erath county, Texas, have invented certain new and useful Improvements in Air-Brake Governors, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to what is known as "fluid-pressure" brakes, a well-known type of which is in use on railway cars and trains in the form of an air-brake which is operated by the pressure of compressed air which, by means of a well-known system of engineer's valve, train-pipe, auxiliary reservoir, triple valve, &c, is caused to act upon a piston in the brake-cylinder so that the piston-rod operates the brakes by putting them on and releasing them in a manner well known.

The present invention has for its object the prevention of the brakes being set with such pressure or force as to lock the wheels and cause them to skid, which defect results in a serious injury to the wheels by causing the same to become flattened at the points where they slide on the tracks.

Briefly stated, the present invention, in its broad feature, consists in an automatic governor for regulating the pressure of the fluid or air in the system in such a manner as to prevent the brake being applied with force greater than a predetermined degree, the governor being previously adjusted to such predetermined degree or pressure either for service or running application or for emergency application, or both.

In the accompanying drawings I have illustrated a type of my invention in which the automatic governor is constructed to automatically operate for service and likewise emergency applications of the brakes, and the illustration shows the governor as applied directly to the brake-cylinder, which is the only part of the brake system which it is deemed necessary to show, the same being sufficient for the proper understanding of this invention.

Figure 1 is a sectional view of the governor, the plane of the section being longitudinally and centrally thereof. Fig. 2 is a view in cross-section on the plane indicated by the line 2 2, Fig. 1. Fig. 3 is a view in elevation

of the slide-valve shown as detached. Fig. 4 is a view, on a reduced scale, of the governor shown as applied to a brake-cylinder.

Referring to the drawings, in which like numbers of reference designate like parts throughout, 1 is a tubular shell or casing having at one end a flange 2, which is secured, by means of bolts or screws 3, to a flange 4 on the abutting end of a similar cylindrical casing or tubular part 5, so that the parts 1 and 5 together constitute a tubular or cylindrical body. The tubular casing 1 is preferably formed with two internal diameters of different size, the diameter 6 at the inner end thereof being larger than the remaining portion at the other end, so that a shoulder 7 is formed between the two. Within the larger diameter 6 is fitted a bushing 8, within which slides the piston 9, having a suitable packing-ring 10 and with one face covered with a washer 11 of suitable soft material for taking against the shoulder between the two diameters of the interior of the casing. The piston 9 is provided with a fixed rod or stem 12, extending through it and projecting to each side thereof. One end of this rod is guided in a longitudinal opening 13, formed in the member 14, which is mounted, by means of a screw-threaded joint 15, in the end of a cup-shaped piece 16, which latter is itself screwed within the end of the tubular casing 5 by means of screw-joint 17. A spiral spring 18 of comparatively large size and considerable strength is interposed between the side of the piston 9 and the cup-shaped piece 16, and the main part of the spring surrounds the guide member 14, so that the tension of the spring may be adjusted and regulated by moving the part 16 inwardly or outwardly, according to whether the tension is to be increased or decreased. The guide part 14 after being screwed into the cup-shaped member 16 is secured thereto by a cross-pin 18, which is passed through a perforation 19 in the part 16 and a perforation 20 in the guide member 14, as indicated in the drawings. The parts so far described may be assembled before the two casings 1 and 5 are bolted together by inserting the piston 9 with its rod 12 in the larger end or diameter 6 of the casing 1, then bolting together the two casings end to end, so that the shoulder 21 on the abutting end of the casing 5 may, if required, limit the movement of the piston in that direction. The spring 18 may then be put in



place and the cup-shaped member 16 screwed into position over the spring, and then the guide part 14 may be placed in position and locked to the member 16 by the pin 18. Of course these parts may be assembled differently; but this is one way of putting them together. Upon the end of the cup-shaped part 16 which projects beyond the casing 5 and which is screw-threaded upon its exterior is screwed a check-nut or cap 22, which will serve to prevent the loosening of member 16. This check-nut is preferably made in the form of a cap for inclosing and housing the end of the parts over which it is placed. The other end of the piston-rod 12 is provided with two suitably-spaced fixed pieces or collars 23 and 24, which are shown in the form of disks, and between these two fixed points is arranged the slide-valve or service regulating-valve 25, the exterior face of which is made flat and provided with lateral guides 25<sup>a</sup>, which work in corresponding grooves 28<sup>a</sup> in the walls of the valve-chamber 28. This slide-valve 25, which is actuated by the movement of the piston through means of its stem, is provided with a three-way port 27, which opens upon opposite sides of the valve, so as to be in constant communication with the interior of the body-casing 1, or rather the interior of the valve-chamber 28, which is formed within the cylindrical bushing 26. The third opening of the three-way port 27 is upon the exterior face of the valve, so that this opening will register with the service-exhaust 29, formed through the side wall of the body-piece 1 and communicating with the outer air. The inner end of the regulating-valve chamber 28 is in communication with the adjacent end of the piston 9 by means of the space around the circular shoulder or collar 23, and an induction-port 30 opens into the side of the chamber 28, and this port through a short pipe 31 is in constant communication with the interior of the brake-cylinder 32, the construction and purpose of which are well known.

The regulating-valve 25 is held in its proper position by means of a spring 33, the ends of which bear against the face of the interior chamber 28 while the spring is passed around the bar or pin 34, which is fixed across the space between two rearwardly-extending projections 35 on the back of the valve.

The parts of the device thus far described comprise the necessary elements of a governor which will automatically act to regulate the pressure of the ordinary running or service application when such pressure exceeds the predetermined point—say, for instance, of fifty pounds. In Fig. 1 the various parts thus far described are shown as in relative positions which they occupy while the pressure does not exceed a predetermined degree, whatever it may be. The spring 18

and the parts which control the tension thereon are adjusted beforehand in such a manner that the piston 9 normally stands at the point indicated in Fig. 1, and thus keeps the regulating-valve 25 closed on the education-port or service-exhaust 29, and under this condition the pressure will be maintained at the required degree in the brake-cylinder. If, however, the pressure should exceed the predetermined point of, say, fifty pounds to the square inch, the spring 18 will yield under this excessive pressure on the piston 9, which moving downwardly will carry with it the regulating-valve 25 until its port 27 registers with the service-exhaust 29, whereupon the excessive pressure will now have a path to the outer air and will accordingly be so regulated as to permit the spring 18 to force the piston back again and move the valve 25 to close it, thereby regulating the pressure and preventing the locking of the brake-shoes on the wheels, and hence preventing the skidding or sliding of the wheels on the track.

In addition to the functions hereinabove described the governor also is constructed to automatically govern an excessive pressure in the system during an emergency application of the brakes, which is of course at a much higher pressure than the ordinary service or running application. This is accomplished by means of another valve 53, having a stem 54 and provided with a spiral spring 55, one end of which rests against the valve, while the other end takes into a socket 36, formed in the inner end of a piece 37, which is set into the end of a tubular part 38 by means of a screw-joint 39, the stem of the valve sliding in a central perforation 40, formed in the part 37, so that by adjusting the nut up and down the tension of the spring on the valve will be regulated, and the part 37 thus serves as an adjusting-nut for the spring and also a guide for the valve-stem 54. Upon the outer end of the nut 37 is placed a check-nut 41 by means of a screw-thread 42, and this is made in the form of an inclosing cap the same as the check-nut 22 at the other end of the device. The valve-chamber 42 is provided with the emergency-exhaust 43, communicating with the exterior air. This emergency-valve chamber 42 is separated from the valve-chamber 28 of the regulating-valve 25 by means of a partition 44, which also serves as a coupling-piece between the abutting ends of the body-casing 1 and the tubular part 38, in which the so-called "emergency-valve" 53 is mounted, each of said tubular casings being united to the dividing-piece 44 by means of screw-threaded joints, as shown. The partition 44 is provided with a central passage-way 45, the upper end of which has a valve-seat 46, on which the so-called "emergency" regulating-valve 53 closes, while the other end of the passage-way 45 is in commu-



nication with the upper end of the valve-chamber 28 through a set of grooves 47, formed in the side of the interior of the passage-way and around the part thereof through which the upper end of the piston-stem 12 projects and works. The emergency-valve 53 thus controls communication between the regulating-chamber 28 on the one hand and the emergency-exhaust 43, communicating with the atmosphere, upon the other hand. In an emergency application of the brakes the compressed fluid or air enters the brake-cylinder 32 at a very high pressure and much greater than the service application, and the air enters the valve-chamber 28 in such a great volume that while it succeeds in operating the piston 9 to open the regulating-valve 25 through the service exhaust or port 29 nevertheless it cannot escape quickly enough through the exhaust 29, and at this time the excessive pressure continues to move the piston, and so carries the pressure-regulating valve 25 downwardly to its lower limit of movement and closes it on the exhaust 29. Thereupon the excessive pressure is directed against the emergency-valve 53, which is adjusted to open only at a high pressure—say sixty pounds pressure—and as soon as this occurs any excess of pressure, so far as it enters the brake-cylinder, passes direct to the atmosphere through the emergency-exhaust 43. The regulation of the pressure by the emergency-valve 53 will cause the same to close; but the service part does not move back until the brakes are released. Thus the operation of the emergency-valve 53 will serve to prevent the locking of the brake-shoes on the wheels during an emergency application of the brakes.

Any defect in the braking system that would cause a brake-cylinder to retain the pressure after the brakes had been released or any leak in the brake-cylinder while the triples are in release position when the brakes were applied again the pressure would not rise high enough to slide the wheels when this governor is used, as described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination of a fluid-pressure brake having a brake-cylinder, an automatic governor connected with said brake-cylinder for regulating the pressure therein, the said governor having a service pressure-exhaust and an emergency pressure-exhaust each of which has a valve controlling it and each valve being adjusted to open its exhaust upon a certain increase in pressure in said brake-cylinder above a predetermined point, the said valve controlling the service-exhaust being opened under a less increase in pressure than the emergency exhaust-valve and being closed by such emergency-pressure when the same acts upon and opens the said

emergency exhaust-valve, substantially as and for the purpose set forth.

2. The combination of a fluid-pressure brake having a brake-cylinder, an automatic governor connected with said brake-cylinder for regulating the pressure therein, the said governor having an emergency pressure-exhaust provided with a valve controlling the same and normally keeping it closed and adapted to open upon a certain predetermined increase in pressure in said brake-cylinder, said governor also having a service pressure-exhaust provided with a slide-valve normally closing said exhaust and adapted upon a certain increase in pressure in said brake-cylinder above a predetermined point to move into its intermediate position and open said service-exhaust and also adapted to move beyond said intermediate position and close said service-exhaust when acted upon by the said emergency-pressure, the said slide-valve being restored to its normally closed position when the brakes are released, substantially as and for the purpose set forth.

3. The combination of a fluid-pressure brake and an automatic governor connected therewith and having pressure-regulated valves each adjusted to a different pressure, one of said valves being opened to govern the pressure when the same exceeds the pressure of the ordinary service or running application, and another of said valves opening to govern the pressure when an emergency application is made, the first-mentioned valve being closed by the pressure during an emergency application, substantially as and for the purpose set forth.

4. The combination of a suitable casing provided with a valve-chamber having an induction and eduction port, a piston mounted in said casing and having one face thereof in communication with said valve-chamber, a stem mounted on said piston, a sliding valve mounted on said piston-stem and provided with a passage-way adapted at times to register with the eduction-port in the valve-chamber and place the same in communication with the interior of such chamber, and means for normally acting upon the piston with a predetermined degree of pressure to keep said valve closed, a second valve controlling a passage-way which communicates with said valve-chamber and the outer air, and adjustable means for normally keeping a pressure on the second valve greater than that on the first-mentioned valve for maintaining the valve closed under such pressure, substantially as and for the purpose set forth.

5. A high-speed-valve device for air-brakes, comprising a low-pressure blow-off-valve mechanism normally subject to the brake-cylinder pressure for limiting the same, a high-pressure blow-off valve, and means operating in emergency applications



for cutting out of action said low-pressure-valve mechanism.

6. A high-speed-valve device for air-brakes, comprising a low-pressure blow-off-  
5 valve mechanism normally subject to the brake-cylinder pressure for limiting the same, a high-pressure blow-off valve, and means operated by the rapid rise in brake-cylinder pressure in emergency applications

for cutting out of action said low-pressure- 10 valve mechanism.

In testimony whereof I have hereunto set my hand in the presence of the two subscribing witnesses.

LEONARD F. WILLIAMS.

Witnesses:

M. A. WILLIAMS,  
WM. SCHROEDER.