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CYLINDER RELIEF AND DRAINAGE DEVICE.
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911,603.

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Fig. 1

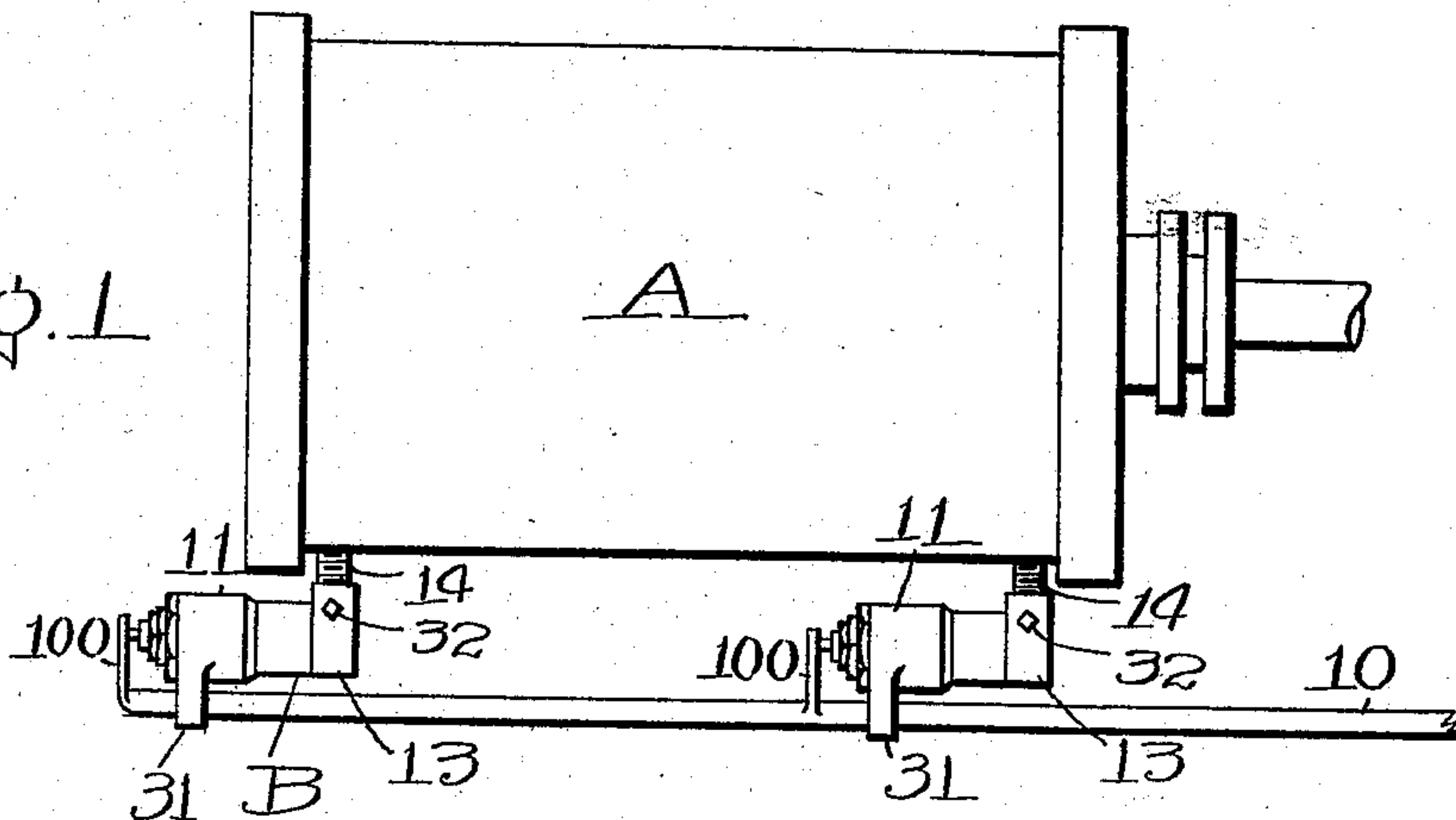


Fig. 2

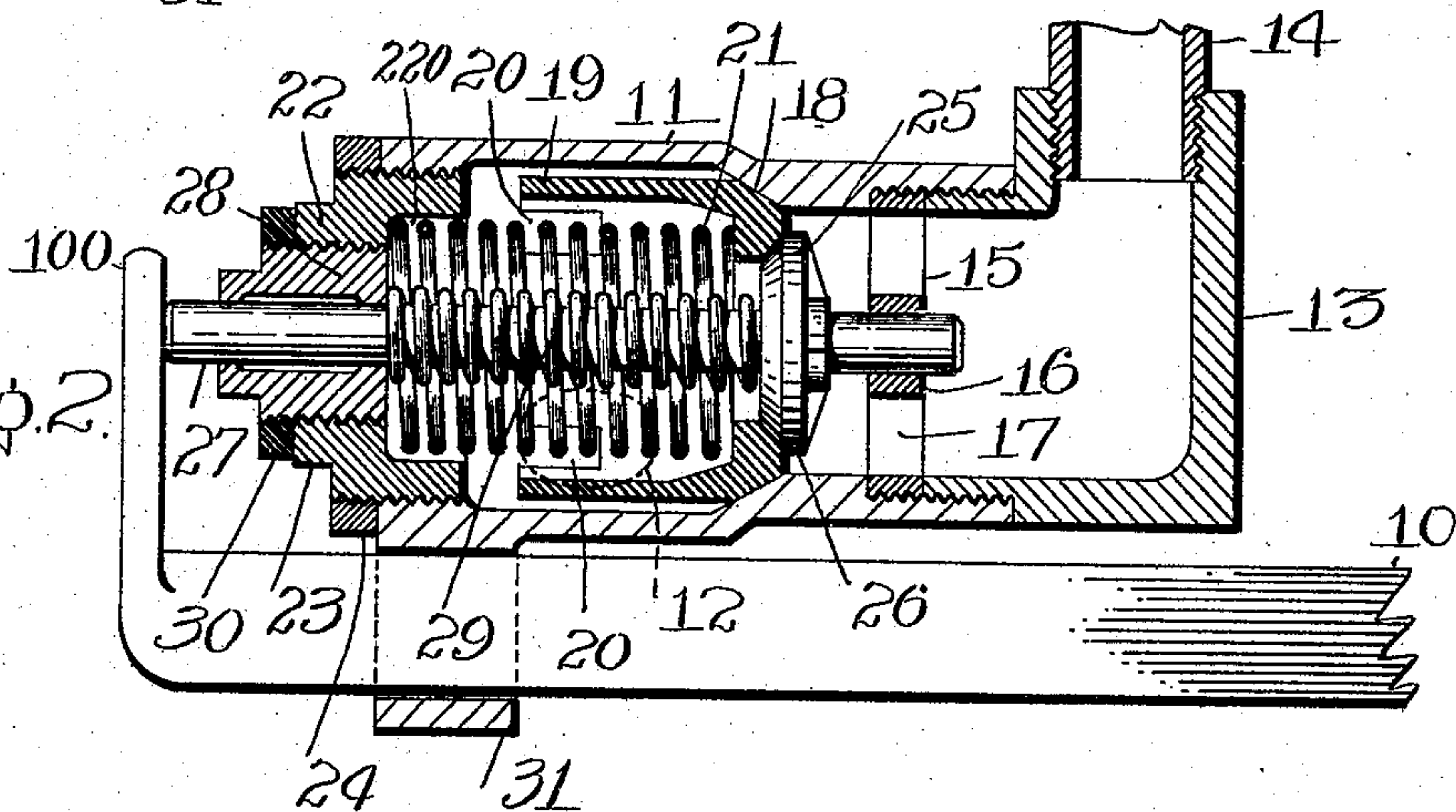
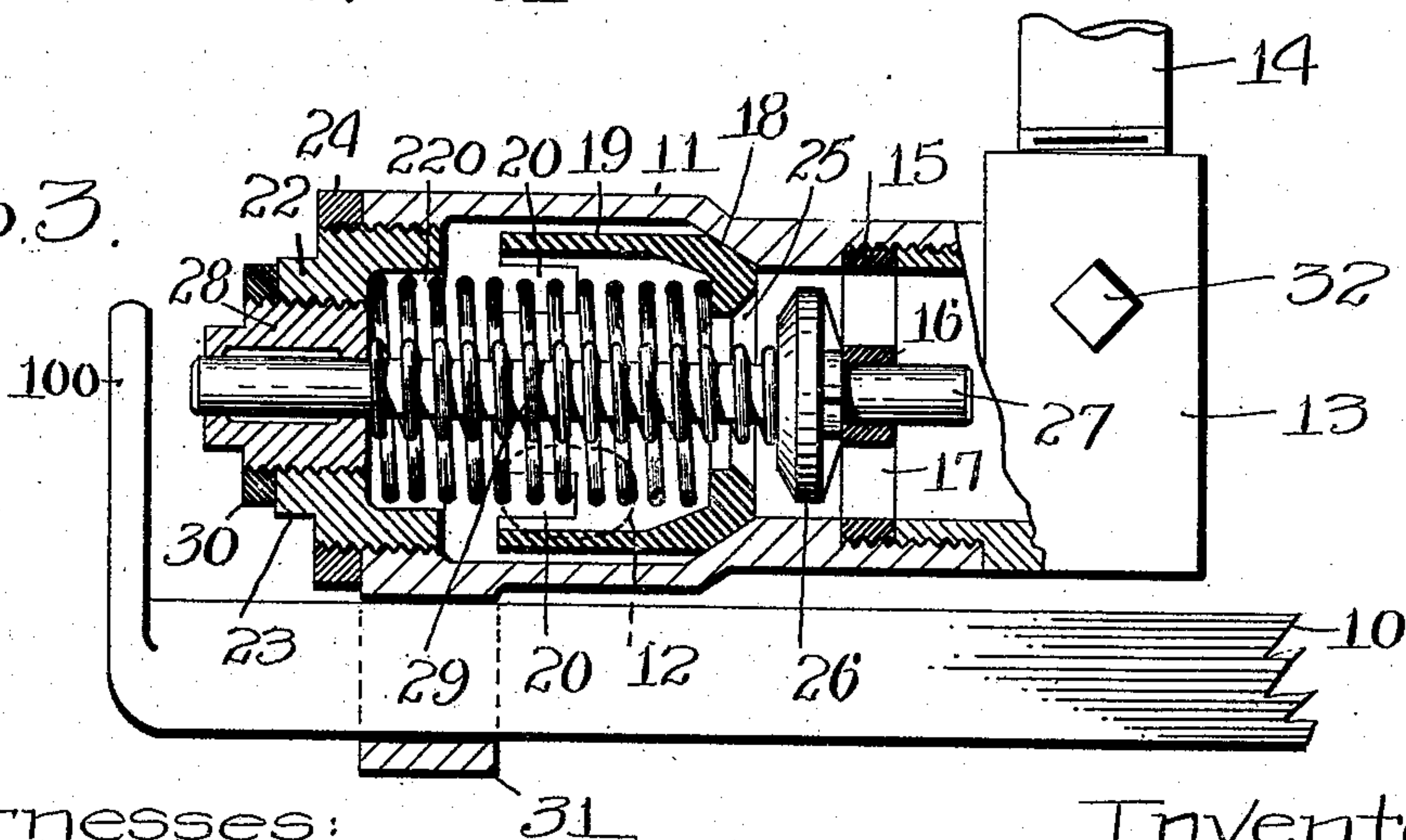


Fig. 3



Witnesses:

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CYLINDER RELIEF AND DRAINAGE DEVICE.

No. 911,603.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed February 13, 1908. Serial No. 415,659.

To all whom it may concern:

Be it known that I, FRANKLYN C. MILLER, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Cylinder Relief and Drainage Device, of which the following is a specification.

The object of this invention is to provide a new and improved cylinder relief and drainage device which shall be simple to manufacture and efficient in operation under all conditions and which may be readily applied to the cylinders of locomotives.

To this end the invention consists of the device described and claimed in this specification and illustrated in the accompanying sheet of drawings; referring to which,

Figure 1 is a side elevation of a locomotive cylinder with a pair of my improved relief and drainage devices applied thereto. Fig. 2 is a sectional view on an enlarged scale illustrating the parts in the position they assume in normal operation, and Fig. 3 is a similar view showing the position the parts assume when the engine is at rest.

Referring to the drawing and in detail A designates a locomotive cylinder and B my improved relief and drainage device. A pair of these relief and drainage devices is applied to the cylinder one near each end thereof and the same are turned to stand in the same direction so that a pull on the usual operating rod 10 which extends and is connected to operating means in the cab will operate both devices in a manner hereinafter described.

The device is arranged as follows. 11 designates a casing which has a single port or passage-way 12 leading to the atmosphere. Screwed in the end of the casing is a cap 13 which has an opening extending at right angles to the casing by which the device is connected to the cylinder by means of coupling 14. A bridge 15 is screwed into the casing so as to seat against the end of the screw-threads and the same is held in place by the cap 13. This bridge has a central hub 16 which is supported by arms 17 so that there is a free passage through the same. The casing 11 is provided with a valve seat which may be a ground conical surface 18, engaging which is a cylindrical valve 19. The barrel of said valve is provided with notches or slots 20 for a purpose hereinafter referred to. A spring 21 is arranged in said valve 19 and the tension of this spring is adjusted by a nut

22 which is threaded into the left-hand end of the casing, as shown. This nut 22 is counter-bored or turned out as at 220 so that the same will hold the spring 21 in proper central position. This nut is provided with a wrench-head 23 by which the same may be turned. A check-nut 24 is threaded on this nut to screw up against the casing to hold the nut in its adjusted position. By this means the tension with which the valve 19 is pushed to its seat can be adjusted. The right-hand end of the cylindrical valve 19 is cut out so as to form a valve seat 25, engaging which is a valve 26 formed or secured on a stem 27 which is fitted to slide in said hub 16 and in a nut 28 which is threaded into the nut 22. A light spring 29 is arranged between the nut 28 and the valve 26 and by adjusting the nut 28 in the nut 22, the tension of this spring can be regulated. A check-nut 30 is threaded on the end of the nut 28 to secure the same in adjusted position. The casing 11 is provided with depending projections 31 which have holes through the same in which the operating rod 10 works, the operating rod being provided with suitable fingers 100—100 for engagement with the stems 27—27 of the two devices. The casings are also provided with small openings which are closed by small bolts or screws 32 for a purpose hereafter described.

It will be noticed that the valve 19 is positively held to its seat by its spring 21 and that the valve 26 is normally held away from its seat by its spring 29. By this arrangement, the valve 19 will form a relief valve and the valve 26 will form a drainage valve, which valves will operate as hereinafter described. It will be noticed that the valve 19 and its seat are arranged so that the valve 19 closes toward the cylinder and it will be noticed that the valve seat 25 and valve 26 are arranged so that the valve 26 closes away from the cylinder. As both devices operate the same, a description of one will be sufficient.

When the engineer or operator desires to blow out the cylinders, he pulls on the rod 10 so that the valve 26 will be held positively from its seat in the valve 19. Then as steam is let into the cylinder, the same will blow out freely through the device and will pass out through the port or passage-way 12. In normal running, the rod 10 is moved to the position shown in the figures. As the spring 29 is only a light spring, the valve 26

will be only normally lightly pushed away from its seat so that as the heavy pressure used in locomotive practice is admitted to the cylinder, the valve 26 will remain closed 5 or will remain closed during the time the steam is pressing on the piston. Thus in normal running with steam being admitted to the cylinder, there is no escape of steam through the device. When the engine is 10 coasting or running under its own momentum, the normally open valve 26 will allow the piston to draw in air, which air will be trapped and compressed on the other stroke of the piston which is a desirable operation as 15 it cushions the stroke of the piston and prevents the reciprocating parts from jarring loose.

In case water of condensation forms in the cylinder or in case of an abnormal pressure in 20 the cylinder, the valve 19 will open against its spring 21 and will thus form a relief valve to relieve this abnormal pressure through the single port or passage-way 12. When the engine is left standing, the valve 26 normally 25 moves away from its seat, as shown in Fig. 3, and forms a drainage and safety valve.

In the ordinary construction, it is necessary to move the rod 10 or its equivalent to open the drainage valves when the engine is 30 left for a considerable time, as over night. Sometimes the engineer forgets to do this and if there is a leaking throttle, the engine will creep over night and will become derailed or do damage, or the cylinder will fill with 35 water and the parts will be broken when it is attempted to start the engine.

It will be noticed that the valve 26 in my device is always open where there is no pressure or only a light pressure in the cylinder and that it is impossible to close the 40 same by manipulation of the rod 10. This is a very important point, as by this construction, the cylinder is always open to drainage when the engine is at rest.

45 It will be noticed that the springs which control the valves are easily adjusted. The parts also are so designed as to meet cases of derangement or breakage. If the large spring 21 which holds the relief valve 19 to 50 its seat breaks, the nut 22 can be unscrewed and the broken spring removed. The nut 22 can then be screwed back into the casing and brought down on the end of the relief valve 19 to hold the same to its seat. This will 55 permit a careful operation of the engine, as the valve 19 still can operate and as communication is still open through the device to the single port or passage-way 12 by reason of the slots 20 formed in the valve. If the 60 spring 29 should break, the engine can be operated carefully by manipulating the rod 10. It also will be noticed that all the parts can be put into the casing from the end thereof, whereby the device is very accessible 65 for repair and inspection. It also will be

noticed that the device can be used to supply oil to the cylinder which is sometimes necessary in case the valve gear becomes deranged so that oil cannot be taken into the cylinder with the steam. When it is necessary to dis- 70 connect the valve gear of the cylinder, the screws 32 are taken out and each casing 11 is filled with oil which can be done up to the level of the outlet 20 and the hole through the relief valve 19. Then the screws 32 are 75 replaced and as the piston is reciprocated, the oil will be sucked into the cylinder. It also will be noticed that but a single port or passage-way is used to allow the steam or water to escape from the cylinder, which is 80 an advantageous point in construction, as the blow-out will only take place in one direction which can be regulated to clear all the parts of the frame or machine, and discharge under the engine. 85

The details and arrangements herein shown and described may be greatly varied by a skilled mechanic without departing from the scope of my invention as expressed in the claims. 90

Having thus fully described my invention, what I claim and desire to secure by Letter-Patent is:—

1. In a device of the class described, the combination of a casing having a single out- 95 let or passage therefrom and a valve-seat, a normally closed relief valve engaging said valve-seat and having a valve-seat, a normally open drainage valve engaging the valve-seat in the relief valve, said drainage 100 valve having a stem, a spring holding the relief valve normally to its seat, a nut threaded into the casing and cut out to engage said spring, a spring on the stem of the drainage valve, and a nut threaded into 105 the first named nut and bearing on the spring of the drainage valve for adjusting the tension thereof.

2. In a device of the class described, the combination of a casing having a single out- 110 let or passage through the side thereof, and having a valve-seat, a cylindrical relief valve engaging said valve seat and having a valve-seat, a drainage valve engaging the valve-seat in the relief valve, a stem on which the 115 drainage valve is arranged, a nut having a turned out end threaded into the casing, a spring held thereby and adjusted against the relief valve, a spring on the stem of the drainage valve, and a nut threaded into the 120 first named nut for adjusting the tension of the spring on the drainage valve.

3. In a device of the class described, the combination of a casing having an outlet or passage therefrom and a valve-seat therein, 125 a cylindrical relief valve engaging said casing, the end of the relief valve being slotted, a nut threaded into the casing and adapted to engage said slotted end, and a spring arranged between the nut and the relief 130

valve whereby the tension of the relief valve can be adjusted, and whereby in case of breakage of the spring, the nut can be turned into contact with the end of the relief valve to hold it positively against its seat.

4. In a device of the class described, the combination of a casing having a valve-seat therein, a nut threaded into the opposite end of the casing, a valve for said valve-seat, a spring bearing on the nut and valve for holding the valve to its seat, said valve projecting into position to be engaged and operated by the nut when the spring is removed, and having a valve seat, and a relief valve for the last named seat.

5. In a device of the class described, the combination of a casing having a valve-seat therein, a nut threaded into the opposite end of the casing, a valve for said valve-seat, a spring bearing on the nut and valve for holding the valve to its seat, said valve having a valve-seat, a relief valve for the last named seat, a stem to which the relief valve is fixed, a nut threaded into the first named nut and having a bearing for said stem, and a spring bearing on the rear of the second valve and on said second nut, and removable independently of the stem and other spring.

6. In a device of the class described, the combination of a casing having a valve-seat therein, a nut threaded into the opposite end of the casing, a valve for said valve-seat, a spring bearing on the nut and valve for holding the valve to its seat, said valve

having a valve-seat, a relief valve for the last named seat, a stem to which the relief valve is fixed, a nut threaded into the first named nut and having a bearing for said stem, a spring bearing on the rear of the second valve and on said second nut, and removable independently of the stem and other spring, and a bearing for the other end of the stem removably mounted at the other end of the casing and forming a stop against which the second valve is adapted to engage.

7. In a device of the class described, the combination of a casing having an outlet and a valve-seat, a cap threaded into one end thereof, a bridge held in fixed position by said cap, a relief valve engaging the valve-seat and having a valve-seat formed therein, a drainage valve engaging the valve-seat in the relief valve, springs for holding the relief valve normally closed and the drainage valve normally open, a nut threaded into the other end of the casing for adjusting the spring of the relief valve, a nut threaded into the first named nut for adjusting the tension of the spring of the drainage valve, and means for positively holding the drainage valve open.

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

FRANKLYN C. MILLER.

Witnesses:

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C. FORREST WESSON.