

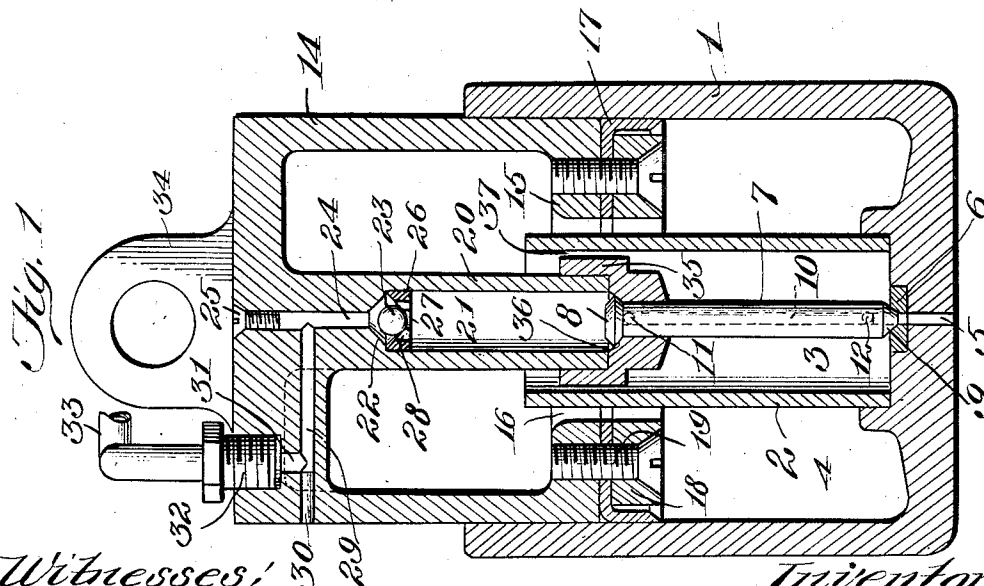
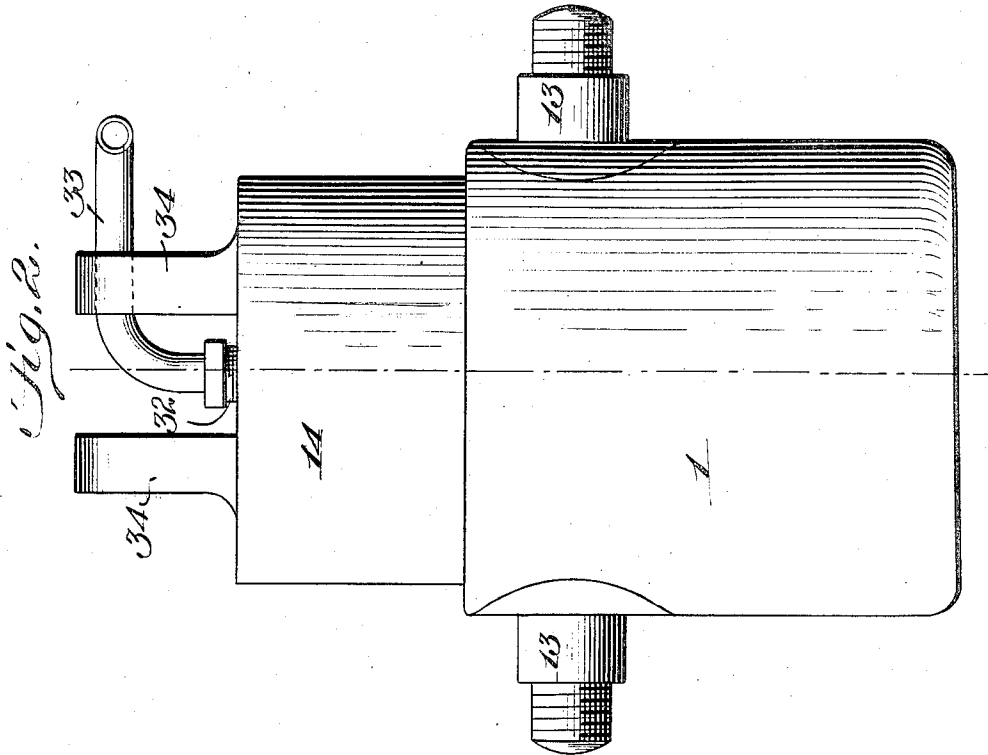
No. 770,128.

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B. F. TEAL.
PNEUMATIC VEHICLE SPRING.

APPLICATION FILED MAY 28, 1904.

NO MODEL.



Witnesses:
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UNITED STATES PATENT OFFICE.

BENJAMIN FRANKLIN TEAL, OF PHILADELPHIA, PENNSYLVANIA.

PNEUMATIC VEHICLE-SPRING.

SPECIFICATION forming part of Letters Patent No. 770,128, dated September 13, 1904.

Application filed May 28, 1904. Serial No. 210,260. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN FRANKLIN TEAL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented new and useful Improvements in Pneumatic Vehicle-Springs, of which the following is a specification.

This invention relates to certain new and useful improvements in pneumatic vehicle-springs, and aims to construct a spring in such a manner as to automatically regulate the amount of pressure necessary to carry the load uniformly without regard to the variations thereof.

Primarily the invention resides in providing a pneumatic vehicle-spring with an integrally-arranged regulating means to compensate for variations in a load, said regulating means forming an essential part of the spring and being arranged as an integral part of the construction to overcome the subjecting of said means to derangement from exposure, as would be the case with an externally-arranged supplemental regulating means for the spring.

The invention further aims to construct a pneumatic regulating-spring which shall be simple in its construction, strong, durable, efficient in its use, automatically regulated, and comparatively inexpensive to set up.

With the foregoing and other objects in view the invention consists of the novel combination and arrangement of parts hereinafter more specifically described, illustrated in the accompanying drawings, and particularly pointed out in the claim hereunto appended.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like reference characters denote corresponding parts throughout the views thereof, and in which—

Figure 1 is a section of a spring constructed in accordance with this invention on line 2 2 of Fig. 2, and Fig. 2 is a front elevation.

Referring to the drawings by reference characters, 1 denotes a cylinder, open at its top and having connected to the upper face of its bottom in any suitable manner an upwardly-extending sleeve 2, thereby providing said

cylinder with a combined valve and air-inlet chamber 3 and a pressure-chamber 4. The bottom of the cylinder 1, approximately centrally thereof, is formed with an outlet-port 5, and at the inner end of said outlet-port 5 a valve-seat 6 is arranged. Arranged within the chamber 3 is a vertically-extending valve-body 7, having its upper end formed with a valve-face 8 and its lower end formed with a valve-face 9, the latter adapted when occasion requires to engage the seat 6. The valve-body 7 is formed with a vertically-extending bore 10, which communicates at its upper end with an air-inlet port 11 and at its lower end with an air-outlet port 12, said latter port communicating with the chamber 3. The valve-face 8 is termed an "inlet-valve," and the valve-face 9 an "outlet-valve." The cylinder 1 is formed with a pair of trunnions 13, to which is attached any suitable means (not shown) for connecting the cylinder with the vehicle or a suitable part of the vehicle.

Extending within the cylinder 1 is a plunger 14, having its lower end formed with an internal flange 15, through which extends the sleeve 2, the diameter of the latter with respect to the flange 15 being such as to form an air-passage 16. Arranged against the bottom of the plunger 14 is a packing-cup 17, which is retained in position through the medium of a follower 18 and the follower-screws 19. The packing-cup 17 has that portion which engages the lower face of the plunger conform in contour to the flange 15. The packing-cup 17 also engages the inner face of the cylinder 1. Formed integral with the inner face of the top of the plunger 14 is a depending tubular extension 20, having a chamber 21, which is open at its bottom to permit of the entrance of the valve-body 7 when the cylinder 1 is elevated, said cylinder carrying the valve-body therewith, and the top wall of said chamber 21 is constructed to form a valve-seat 22 for the check-valve 23. The chamber 21 at its top communicates with a channel 24, which is closed at its upper end through the medium of a screw-plug 25. The channel 24 forms a continuation of what may be termed the "air-inlet" channel and also permits access being had to the valve 23 to

enable the adjustment thereof when occasion requires. The valve 23 is retained at the upper end of the chamber 21 through the medium of a support 26, said support being provided with a centrally-arranged opening 27, having branches 28. When the valve 23 is away from its seat, it extends in the opening 27; but said valve is not of such size as to close the branches 28, the incoming air passing around the valve and through the branches 28 into the chamber 21. When the valve 23 is against the seat 22, the back pressure of air passes through the opening 27 and branches 28 and retains said valve against its seat.

Communicating with the channel 24 is a branch channel 29, closed at its outer end by means of a plug 30 and communicating at a point removed from its outer end with an air-inlet 31, which communicates, through the medium of a coupling device 32, with an air-supply pipe 33. The plunger 14 at its top is provided with a pair of ears 34 to permit of connecting said plunger to the body of the vehicle. Secured in any suitable manner to the lower end of the tubular extension 20 is a collar 35, which forms a valve-seat 36 for the valve-face 8 and also forms a guide for the valve-body 7. The diameter of the collar 35 at its upper portion is not as great as the inner diameter of the sleeve 2, in which said collar 35 is arranged, thereby forming an air-passage 37 for the passage of air from the chamber 3 into the chamber 4.

The valve-body 7, with its two valve-faces, forms what is termed a "regulating" means for the spring, and in this connection it will be stated that the valve-face 8 regulates the supply of air to the cylinder and the valve-face 9 regulates the discharge of air from the cylinder.

It will be assumed that the cylinder 1 has been elevated, carrying the valve-body 7 therewith and opening the inlet-port 11, and that the plunger 14 is in communication, through the medium of the pipe 33, with a continuous air-supply reservoir, (not shown,) and air entering through the inlet 31, branch channel 29, and channel 24 will pass around the valve 23, through the branches 28, into the chamber 21, thence into the port 11, through the bore 10, and out through the port 12 into the chamber 3, thence up into the plunger 14, and then into the chamber 4 until equilibrium is established. When the equilibrium is established, the valve-face 8 will engage the valve-seat 36. Consequently the inlet-port 11 will be closed, as well

the outlet-port 5. To compensate for the variations of the load, so as to automatically regulate the pressure necessary to carry the load uniformly, the valve 27 will be caused to vibrate, so as to open and close the inlet-port 11 or to open and close the outlet-port 5, thereby supplying and exhausting the air to and from the spring. If the pressure is too great in the spring, it is evident that the valve-body will be elevated, so that the surplus pressure can exhaust through the outlet-port 5, and if the pressure is not sufficient or if equilibrium is not established the cylinder 1 will be elevated, so as to open the inlet-port 11 to permit of a further supply of air to the interior of the plunger 14 and chambers 3 and 4. Such operation is an automatic one, as will be evident from the structure set forth, or, in other words, opening of the inlet-port 11 and the closing of the outlet-port 5 is done automatically owing to the moving automatically of the cylinder 1, which when moved in one direction will open the port 11 and when moved in the other direction will open the outlet-port 5. The movement of the cylinder 1 is caused by the relative variations of pressure and load.

It is thought the many advantages of my improved pneumatic spring for vehicles can be readily understood from the foregoing description, taken in connection with the accompanying drawings, and it will furthermore be evident that changes, variations, and modifications can be resorted to without departing from the spirit of my invention or sacrificing any of its advantages, and I therefore do not wish to restrict myself to the details of construction hereinbefore described, and set forth in the annexed drawings, but reserve the right to make such changes, variations, and modifications as come properly within the scope of the protection prayed.

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

A pneumatic spring having as the essential element thereof a self-contained means for automatically regulating the pressure to compensate for variations in the load.

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

BENJAMIN FRANKLIN TEAL.

Witnesses:

N. L. BOGAN,
GEO. W. REA.