H. B. ASHELMAN & J. S. JOHNSON.

SAFETY VALVE.

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1,216,919.

Patented Feb. 20, 1917.

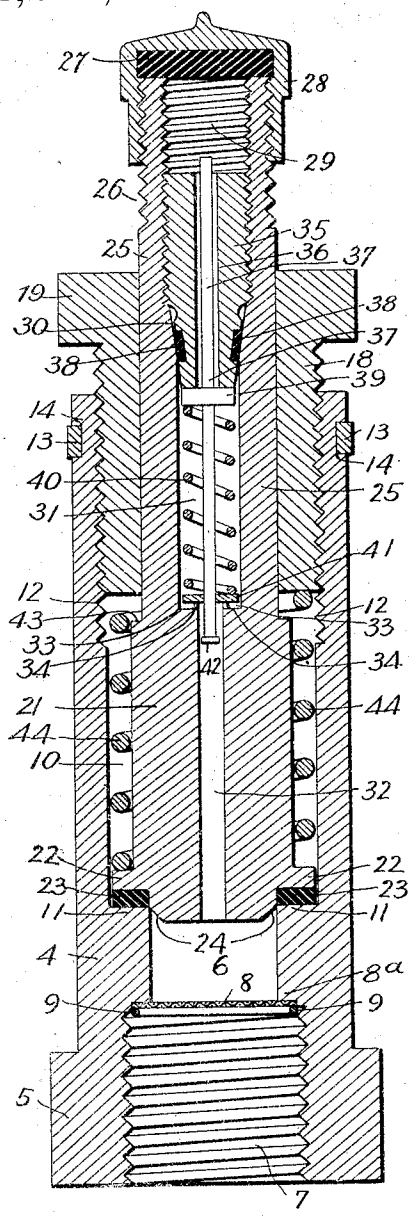


FIG. 1.

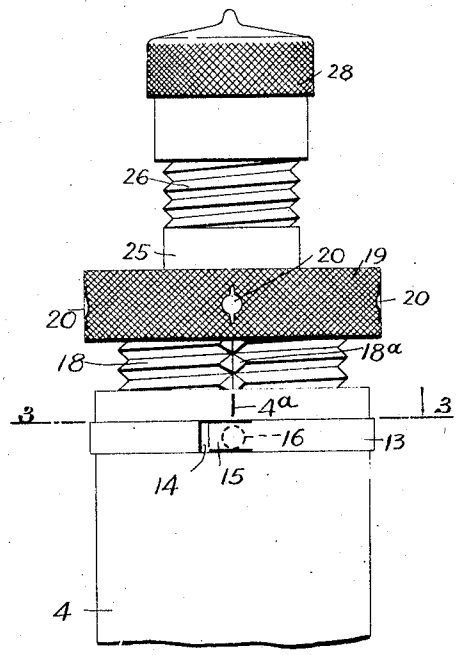


FIG. 2.

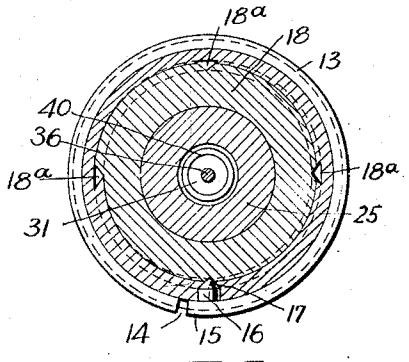


FIG. 3.

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SAFETY-VALVE.

1,216,919. Specification of Letters Patent. Patented Feb. 20, 1917.

Application filed January 23, 1914, Serial No. 813,890. Renewed January 13, 1917. Serial No. 142,322.

To all whom it may concern:

Be it known that we, HERVEY BOWES ASHELMAN and JOHN SANDFORD JOHNSON, citizens of the United States, residing at Fargo, in the county of Cass and State of North Dakota, have invented new and useful Improvements in Safety-Valves, of which the following is a specification.

Our invention relates to safety valves for general use, and more particularly to safety valves of a type suitable for service in connection with vehicle tires.

Among the various objects sought to be accomplished by our improvements are the following:

I. To enable the valve to automatically give relief in the event that the pneumatic pressure within the tire exceeds a predetermined normal limit, so as to avoid excessive or dangerous pressure of air within the tire, no matter whether such pressure be due to the act of inflating the tire, or accumulated by other means, for instance by expansion of air within the tire due to the application of heat.

II. To provide various parts and so combine the same as to increase the general efficiency of safety valves.

Reference is made to the accompanying drawing, forming a part of this specification, and in which like numerals indicate like parts.

Figure 1 is a substantially central vertical section through our safety valve.

Fig. 2 is a fragmentary side elevation of the upper portion thereof.

Fig. 3 is a cross section on the line 3—3 of Fig. 2, looking in the direction of the arrow.

A barrel 4, having the proximate general form of a cylinder, is provided with an enlarged portion 5, and with a passage 6. This passage merges into a threaded passage 7 of somewhat greater diameter than the passage 6. A screen 8 is located within the passage 7 and is held in position by a metallic ring 9 or other fastening suitable for the purpose. The screen 8 rests against an annular shoulder 8^a with which the barrel 4 is provided.

The barrel 4 is further provided with a compartment 10 merging into the passage 6, this compartment being bounded partially by an annular shoulder 11. The upper inner surface of the barrel 4 is provided with a thread 12.

Encircling the barrel 4 and located in an annular groove 14 near the upper end thereof is a spring ring 13, made preferably of steel, and employed, as hereinafter described, as a locking ring. This locking ring carries a locking pin 16, provided with a conical point 17, as indicated more particularly in Fig. 3.

A revoluble bushing 18, of substantially cylindrical form, is threaded externally to mate the thread 12, and is fitted within the upper end of the barrel 4. The bushing 18 is provided with grooves 18^a, in this instance four in number, which are located parallel with each other and with the geometrical axis of the bushing. These grooves cross the threads carried by the bushing 18, as will be understood from Fig. 2. The bushing 18 is provided with a milled head 19 of annular form, integral with it, and used for turning it. This milled head is provided with openings 20, extending radially into it, and having a form suitable for the purpose of facilitating the application of a pin or wrench to the head 19 in order to turn the same, and also serving as a gage. Another gage mark 4^a is placed upon the upper portion of the barrel 4. When the gage mark 20 is in registry with the gage mark 4^a, the locking pin 16 fits into the adjacent groove 18^a, as will be understood from Fig. 3. There are as many openings 20, or gage marks carried by the head 19, as there are grooves 18^a. By turning the head 19, and with it the bushing 18, the bushing is brought into such position that the locking pin 16 fits into some one of the vertical grooves 18^a, and when this takes place the gage mark 4^a is in registry with one of the openings or gage marks 20.

Located within the barrel 4 and concentric thereto is a sleeve 21, provided with an annular bead 22, serving as a shoulder. An annular packing 23 of rubber is carried by the sleeve 21 and secured to the shoulder just mentioned. This packing rests upon the annular shoulder 11 when the movable parts are in normal position, as indicated in Fig. 1. The sleeve 21 is further provided with a substantially frusto-conical end portion 24, which is encircled by the annular packing 23, and serves to some extent for centering and guiding the sleeve 21.

This sleeve is provided with a neck portion 25, the latter adjacent its upper end being provided externally with a thread 26.

A cap 28 is threaded internally, and revolubly fitted upon the upper end of the neck portion 25, and carries a rubber packing 27 having the form of a disk, and adapted, under pressure of the cap 28, to close the upper end of the neck 25 so as to render the same air tight. The neck portion 25 is provided internally with a thread 29, and is further provided with a substantially frusto-conical portion 30, and with a cylindrical passage 31 of the same diameter as the lower end of the portion 30. The passage 31 communicates with a passage 32 of a still smaller diameter, and extending to the bottom of the sleeve 21. The sleeve 21, adjacent the upper end of the passage 32, is provided with a number of lugs 34, and encircling these lugs is an annular space 33, forming practically a continuation of the passage 31.

Revolubly mounted within the neck portion 25, and threaded externally, is a sleeve 35, provided externally with a thread mating the thread 29. The sleeve 35 is further provided with an axially disposed passage 36, which is in alinement with the passage 32. A valve stem 37 extends through the passage 31, and into the passage 32, as well as into or through the passage 36. The sleeve 35 is provided with a substantially frusto-conical portion 35^c, and with a substantially frusto-conical gasket 38, adapted to fit against the portion 30 of the neck 25.

A valve 39, having the form of a disk, is mounted upon the valve stem 37. A spiral spring 40 engages the valve 39, and encircles a portion of the valve stem 37. An annular guide plate 41 encircles the valve stem 37, and is engaged by the spring 40. The valve stem 37 carries a head 42, serving the purpose of a limiting stop, in order to prevent the plate 41 from becoming detached from the valve stem 37.

The sleeve 21 is provided with an annular shoulder 43, which is adapted to lodge against the lower end of the bushing 18 whenever the sleeve 21 is lifted or raised upwardly, according to Fig. 1.

A spiral spring 44 encircles the lower portion of the sleeve 21, and constantly engages the annular bead 22 thereof. The spiral spring in question also constantly engages the lower end of the bushing 18, so that the tension of the spring in question may be controlled, at the will of the operator, by rotation of the milled head 19.

The sleeve 35, the valve 39, the valve stem 37, the spiral spring 40 and the cap 28, all carried by the sleeve 21, are for purposes of adjustment, entirely independent of the spring 44, and movements of the sleeve 21 take place independently of the parts just enumerated as inclosed within and carried by this sleeve.

The lower end of the sleeve 21 is essentially a valve, and the shoulder 11 is a valve seat against which this valve is adapted to lodge, and which it engages under pressure of the spring 44.

The operation of our device is as follows: The parts being assembled as shown and described, and the spiral springs being adjusted as to tension, the safety valve is mounted in position ready for use, for instance upon a vehicle tire. For this purpose the threaded passage 7 is brought into engagement with a threaded sleeve carried by the vehicle wheel and communicating with the tire.

In order to inflate the tire, the cap 28 is removed, and the upper end of the sleeve 21 is connected with an air pump. Air is forced downwardly through the passages 36, 31 and 32, through the screen 8 and into the tire. The air while passing through the passage 36, disengages the valve 39 from its seat—that is, from the lower end of the frusto-conical portion 37 of the sleeve 35, and in so doing slightly compresses the spiral spring 40. The closure of the valve 39 prevents the retrogression of the air. The tire being inflated to a predetermined tension, no more air can be forced into the tire. This is because the air pressure in the lower end of the barrel 4, being the same as the air pressure in the tire, lifts the sleeve 21 slightly, and in so doing compresses the spring 44. Air now makes its escape, passing between the packing 23 and the annular shoulder 11, and flowing upwardly through the passage 10 and out through the grooves 18^a into the atmosphere.

The operator by turning the milled head 19 and with it the threaded bushing 18, as above described, can confer upon the spring 44, such tension as will permit the air pressure within the tire to reach a predetermined desired maximum, and no more.

The operator by turning the sleeve 35 can, within limits permitted by the elasticity of the gasket 38, adjust the position of this sleeve relatively to the sleeve 21, and by so doing can control the tension of the spring 40. By adjusting the tension of this spring, the operator can adjust the sensitiveness of the valve 39, relatively to the air pressure required to open this valve and inflate the tire.

We do not limit ourselves to the precise construction shown, as variations may be made therein without departing from the spirit of our invention.

Neither do we limit ourselves to any particular use to which our invention can be applied.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

1. In a safety valve, the combination of a barrel having one end internally threaded, valve mechanism carried thereby, a spring

for normally maintaining said valve mechanism in a predetermined position, a bushing exteriorly threaded and screwing into the barrel, said bushing engaging said spring for the purpose of conferring different degrees of tension upon said spring, said bushing being provided with grooves extending across the threads thereof, a spring ring carried by said barrel, and a locking pin carried by said spring ring for fitting into some one of said grooves, in order to lock said bushing relatively to said barrel.

2. In a safety valve, the combination of a barrel having one end internally threaded and provided with a valve seat, a sleeve extending into said barrel and provided with a valve for engaging said valve seat, means for admitting air through said sleeve and for preventing retrogression of said air through said sleeve, a spring for normally holding said valve against said seat, a bushing exteriorly threaded and screwing into the barrel, said bushing engaging said spring for placing said spring under different degrees of tension in order to control the sensitiveness of said valve relatively to said valve seat, said bushing being provided with grooves extending across the threads thereof, a spring ring carried by said barrel and provided with a locking pin extending through the wall of said barrel and formed to fit into any of said grooves, and indicating mechanism for disclosing when any one of said grooves is in registry with said locking pin.

3. In a safety valve, a barrel having its upper end internally threaded and provided with a valve seat adjacent its lower end, a bushing exteriorly threaded and screwing into the barrel, said bushing having longitudinal grooves extending across its threads, a spring ring surrounding the barrel and having a pin projecting through the barrel into one of the grooves of the bushing, a sleeve in the barrel and having its lower end forming a valve normally engaging the valve seat of the barrel, said sleeve having an exterior bead at its lower end and having its upper end reduced and extending through the bushing, a spring surrounding the sleeve between the bead and the inner end of the bushing, a second sleeve adjustably secured in the upper reduced end of the first sleeve and having its inner end forming a valve seat, and a spring pressed valve in the reduced end of the first sleeve and seating on the valve seat at the inner end of the second sleeve.

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