W. M. FOLBERTH.

PRESSURE GAGE.

APPLICATION FILED MAY 24, 1915.

1,197,196. Patented Sept. 5, 1916.

Fig. 1.

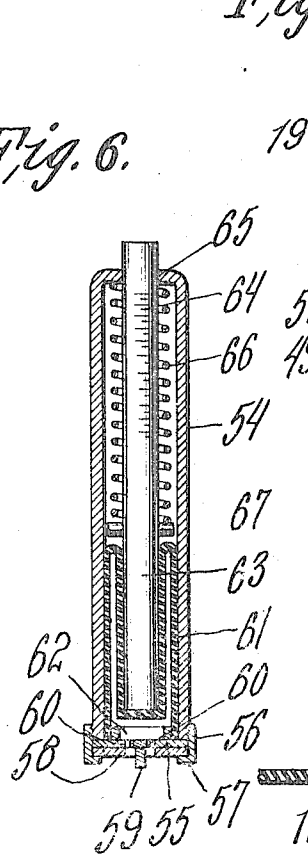


Fig. 6.

Fig. 2.

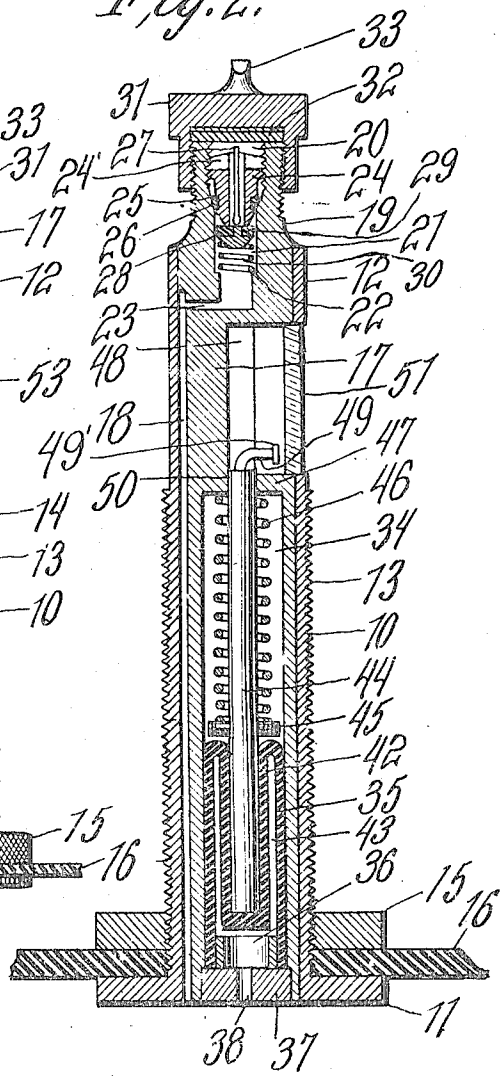


Fig. 3.

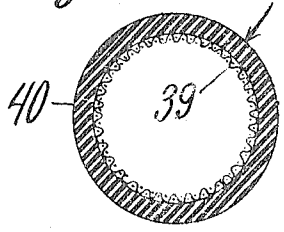
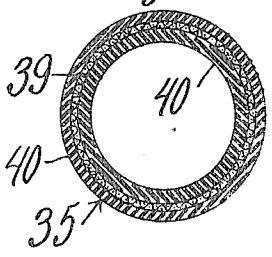


Fig. 4.



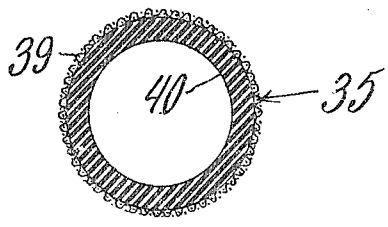


Fig. 5.

Witness

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PRESSURE-GAGE.

1,197,196. Specification of Letters Patent. Patented Sept. 5, 1916.

Application filed May 24, 1915. Serial No. 30,196.

To all whom it may concern:

Be it known that I, WILLIAM M. FOLBERTH, a subject of the Emperor of Austria-Hungary, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Pressure-Gages, of which the following is a specification.

The present invention relates to improvements in pressure gages for use in connection with pneumatic tires, for vehicles, while not necessarily restricted to such use.

An important object of the invention is to provide means of the above mentioned character, which are simple in construction, inexpensive to manufacture, compact, convenient in use, and reliable in operation.

A further object of the invention is to provide novel and simple means whereby the air pressure may properly move the indicator member, without liability of leakage.

A further object of the invention is to provide a gage of the above mentioned character, embodying a tube adapted to be permanently connected with the inner tube of a pneumatic tire, such tube being adapted to be manufactured in standard sizes.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification and in which like numerals are employed to designate like parts throughout the same, Figure 1 is a side elevation of apparatus embodying the invention, Fig. 2 is an enlarged central longitudinal sectional view through the same, Fig. 3 is a transverse sectional view through a tubular pressure operated member, Fig. 4 is a similar view through a slightly different form of tubular pressure operated member, Fig. 5 is a similar view through a still different form of tubular pressure operated member, and, Fig. 6 is a central longitudinal sectional view through a slightly different form of gage embodying the invention.

Attention being called first to Figs. 1 to 5 inclusive, the numeral 10 designates an outer preferably metallic tube or casing, provided at its inner end with an annular flange 11. The tube 10 has an inner smooth reduced portion 12, and its outer portion is exteriorly screw-threaded, as shown at 13, with flattened portion or portions 14, whereby the same may be readily held by a wrench or other suitable tool. Having screw-threaded engagement with the outer portion of the tube 10, is a clamping ring or nut 15, adapted to bind the apertured portion of an inner tube 16 to the flange 11, as shown.

The numeral 17 designates an inner preferably cylindrical main plug or core, preferably formed of metal, and adapted to fit snugly within the tube 10, these parts being preferably held together by solder or other suitable means. The plug or core 17 is preferably provided upon one side of its periphery with a longitudinal groove or port 18, which extends through the outer end thereof, to lead into the interior of the inner tube, as is obvious. It is also to be understood that instead of employing the single groove or port 18, two or more may be employed, as may be found advantageous. The core or plug 17 has its inner end reduced, as shown at 19, and is provided with an axially extending opening or bore 20, the outer portion of which is preferably slightly enlarged and internally screw-threaded. The inner end of the bore or opening 20 leads into a smaller opening or bore 21, forming therewith a shoulder 22. The opening or bore 21 communicates with the groove or port 18 by an opening or port 23, as shown.

Arranged within the bore 20 and having screw-threaded engagement therewith is a tubular plug 24, the lower portion of which is provided with an annular groove 25, receiving a packing ring 26, contacting with the inner wall of the opening or bore 20, for forming an air tight connection therewith. Extending longitudinally through and beyond the tubular plug 24 is a valve stem or needle 27, the inner end of which is attached to a check valve 28. This check valve carries a packing 29, which engages with the lower end of the plug 24, which serves as a valve seat. The valve 28 is moved toward its seat by a compressible coil spring 30, engaging it and the shoulder 22, as shown. The plug 24 is provided at its end with a transverse groove 24′, for a purpose to be described.

The reduced extension 19 is exteriorly screw-threaded for engagement with the interior screw-threads of a removable cap 31, provided with an interior plate or washer 32, formed of any suitable material. The cap 31 is provided with an outwardly ex-

tending tool-extension 33, adapted to contact with the valve stem or needle 27, to unseat the valve 28, and to fit within the transverse slot 24′ formed in the upper end of the plug 24, for adjusting it.

The inner plug or core 17 is provided in its outer portion with a main axially extending opening or bore 34, which is preferably cylindrical. Arranged within the outer portion of the main bore or opening 34 is a tubular flexible pressure operated member 35, to be more fully described. The outer end of this tubular member is clamped or secured to the inner wall of the opening or bore 34 by a clamping ring 36, which is placed therein and subsequently expanded by a suitable tool, to securely lock these parts together. A ring 37 provided with a contracted opening or bore 38, is inserted in the outer end of the bore or opening 34, to prevent dirt or the like entering the tubular pressure operated member 35, and this ring may be held in place by frictional contact with the wall of the opening 34, or may have screw-threaded engagement therewith.

The pressure operated tubular member 35, as shown in Fig. 3, may be formed with an inner flexible lining or casing of fabric 39, having an exterior covering or coating of rubber 40, or other suitable material to render it air tight, such coating being vulcanized thereto. The fabric 39 is longitudinally nonextensible but circumferentially extensible and contractible. The fabric may consist wholly of longitudinal threads, or longitudinal and transverse threads, the term "fabric" being intended to cover either form. In Fig. 4, the fabric 39 is shown completely embedded within the rubber 40, which is vulcanized thereto. In Fig. 5, the fabric 39 is shown arranged exteriorly of the rubber casing 40, with the rubber 40 vulcanized thereto. In the constructions shown in Figs. 3 and 5, instead of having the casing 40 vulcanized to the fabric casing 39, this may be dispensed with and they may be made separate. The tubular pressure operated member 35 is rendered, by the fabric casing 39, longitudinally non-extensible but circumferentially extensible and contractible. The member 35 is folded transversely, providing an inner portion 42, telescoping the outer portion thereof, and providing an annular air space 43.

Mounted to reciprocate within the opening 34 is an indicator member or rod 44, the inner end of which fits into the folded inner portion 42 of the tubular member 35, the end of the folded portion 42 being closed, as shown. At this point it might be well to state that air pressure passing through the opening 38 and entering the tubular member 35, passes into the annular space 43, forcing the outer portion of the tubular member 35 into firm contact with the wall of the opening 34, and the inner portion 42 in firm contact with the rod 44, and at the same time separating these portions and providing an air cushion between them so that the tubular member may readily fold and unfold, during operation.

The rod 44 is provided near the tubular member 35 with a pin 45, passing through a transverse aperture therein and engaging a suitably graduated coil spring 46, which surrounds the rod 44, with its upper end engaging the end wall 47 of the opening 34.

Formed through the side of the outer tube 10 and the inner core or plug 17, preferably near their inner ends is a chamber 48, receiving therein a preferably laterally extending indicator or pointer 49, attached to the upper end of the rod 44, such upper end operating through a contracted opening 50, as shown. The pointer 49 is preferably provided with a head 49′ which is preferably painted white so that it may be more easily seen. The outer side of this chamber 48 is preferably covered by a section of transparent material 51, such as glass or the like. The smooth reduced portion 12 of the outer tube 10 is provided near one side of the section of transparent material 51, with a scale or graduations 53, coöperating with the pointer for indicating the degree of pressure in the tire. It is obvious instead of arranging the scale or graduations upon the tubular member 10, the same could be advantageously applied to the outer end of the rod or member 44, and read as they move from within the opening 50.

In the use of this form of the invention, the device is permanently attached to the inner tube of the tire. When it is desired to inflate the tire, the cap 31 is removed and the pipe or hose of the air pump coupled to the extension 19, as is well known. When operating the pump, the pressure therefrom will unseat the valve 28, and the air will pass thereabout, through the opening 20, opening 23, and through port 18 into the inner tube 16. When the pump is stopped, the check valve 28 automatically seats, thus preventing the escape of the air. The pump is now disconnected from the extension 17 and the cap returned thereon. When the compressed air passes into the inner tube 16, the same passes through opening 38 into the tubular pressure operated member 35, causing the rod or member 44 to move inwardly, the inner and outer portions of this tubular member unfolding, to permit of such movement. The pointer 49 coöperating with the scale or graduations, indicates the degree of pressure in the tire. It is obvious that the device will indicate the degree of pressure while the tire is being pumped and also the degree of pressure therein when disconnected from the pump,

thus informing the attendant when it is necessary or desirable to inflate the tire.

In Fig. 6, I have shown a different form of the pressure gage. This pressure gage comprises an outer tube or casing 54, having a head or end 55, secured to its outer end by a coupling or sleeve 56, provided with a flange 57, serving to hold a packing ring or washer 58, to the side of the head 55. The head 55 is provided with an outwardly extending pin 59, projecting outwardly therebeyond for a substantial distance and adapted to contact with the valve stem or needle of the ordinary valve tube with apertures or openings 60 upon opposite sides thereof to permit of the free passage of the air. Arranged within the inner portion of the tube 54 is a flexible tubular pressure operated member 61, preferably identical with the tubular pressure operated member 35. The inner end of the member 61 is clamped to the tube 54 by an expansible ring 62, identical with the ring 36. Extending into the folded inner portion of the tubular member 61 is an indicator rod or member 63, provided upon its inner portion with a scale or graduations 64, as shown. The rod 63 operates through an opening 65 in the upper end of the tube 54. A coil spring 66, which is suitably graduated, is arranged within the tube 54, surrounds the rod 63, and engages a transverse pin 67, carried by the rod 63, to oppose its inward movement. In the operation of this form of the invention, the usual cap is removed from the valve tube, and the device is applied thereto with the ring or washer 58 firmly contacting with the outer end of the tube. The pin 59 contacts with the valve stem or needle, and unseats the check valve, whereby the air pressure enters the tubular pressure operated member 61, causing the rod 63 to move inwardly, whereby the graduations may be read as they pass out of the opening 65.

It is to be understood that the forms of the invention herewith shown and described are to be taken as preferred examples of the same, and that various changes in the shape, size, and arrangements of parts may be resorted to without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described the invention, I claim:

1. A pressure gage of the character described, comprising a body portion provided with a main longitudinal bore and a longitudinal air port, a check valve for preventing the passage of air in one direction through the air port, a flexible tube arranged within the longitudinal bore of the body portion and folded transversely upon itself to provide telescoping inner and outer portions having an air space therebetween, a longitudinally movable indicating rod held within the inner portion of the tube, yielding means to oppose the movement of the indicating rod in one direction, and means for permanently securing the body portion of the gage to an inner tube.

2. In a pressure gage of the character described, a body portion provided with a longitudinal bore and a longitudinally extending air port, a check valve arranged within the air port, a flexible tube arranged within the longitudinal bore of the body portion and being longitudinally non-extensible and circumferentially extensible and contractible and folded transversely upon itself it provide inner and outer telescoping portions having an air space therebetween, a longitudinally movable indicating rod having a scale associated therewith and projecting into the inner portion of the tube to be held therein, a spring surrounding the indicating rod to oppose its movement in one direction, and means for permanently securing the gage to an inner tube.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM M. FOLBERTH.

Witnesses:
RALPH S. SHERLINE,
B. P. FISHBURNE.