Feb. 23, 1932. J. C. CROWLEY 1,846,315

VALVE MECHANISM

Filed May 16, 1928

Fig. 1.

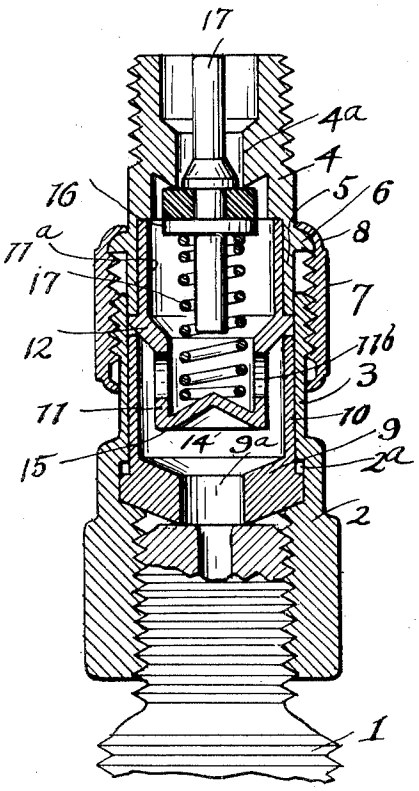
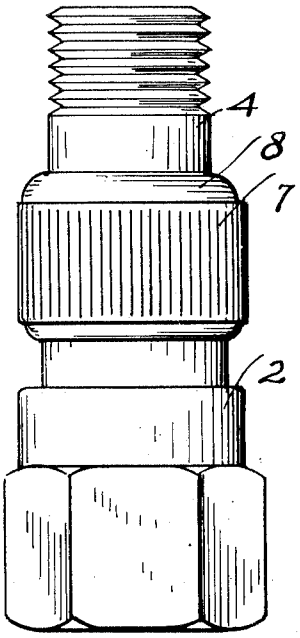


Fig. 2.



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VALVE MECHANISM

Application filed May 16, 1928. Serial No. 278,072.

The present invention relates to a valve mechanism adapted to be used in connection with the stem or tube of pneumatic devices to control the inflation and deflation thereof. More particularly the valve mechanism is intended to be used in connection with a valve stem for inner tubes of pneumatic tires, and in this connection it is intended to replace the usual valve insides, which, as is well known, are inserted within the bore of a standard valve stem.

The valve mechanism of the present invention, being adapted for mounting upon the end of a valve stem, may be so proportioned with respect to the air passages through the same, that it may be made much larger than is possible to obtain with the use of the usual valve insides where the size of the air passages is necessarily restricted and limited, due to the limitation of the space within a valve stem which may be occupied by the usual valve insides. The result is that the valve mechanism of the present invention permits a much more rapid inflation than is possible to obtain when using a valve insides with the usual valve stem.

A further advantage in the present valve mechanism lies in the fact that it may be much more ruggedly constructed than is possible to accomplish with valve insides, which is of considerable advantage in that it gives a longer life and usefulness to the valve mechanism.

A further and important result achieved by the present valve mechanism is that it completely seals the end of the valve stem, so as to insure against the leakage of air, and in addition to this provides a construction wherein the valve mechanism may be placed in condition to receive air without the removal of a dust cap or a valve cap or both, as is customary with present forms of constructions.

Reference should be had to the accompanying drawings forming a part of the specification, in which

Figure 1 is a sectional elevation of the valve mechanism of this invention, mounted on a valve stem.

Figure 2 is an elevation of the construction shown in Figure 1.

Referring to the drawings, 1 indicates the usual form of valve stem, and it may here be stated that while the valve mechanism of this invention is herein shown and described as connected with the usual valve stem, it will be understood that the use of this valve mechanism is not restricted to the particular type or form of valve stem, such as represented by the valve stem 1.

The valve stem is equipped with an internal bore, such as indicated in the part of the valve stem broken away, through which air is conducted to the pneumatic device with which the stem is associated.

Mounted upon the end of the valve stem is a casing 2, and this casing has, in the form shown, internal threads which cooperate with threads upon the valve stem. The casing 2 has a circular wall 3 upon the outer surface of which threads are provided.

A movable member 4 which has a hollow interior, is provided with a depending flange 5, the outer diameter being such that it may fit within the upstanding flange 3 of the member 2. The member 4 has an outwardly extending rib or ridge 6. Cooperating with the member 4 and the flange 3 of the member 2, is an external annular member 7 which, upon the outer surface thereof, is knurled so as to provide a convenient finger grip. This member, upon the interior surface, is provided with threads which are adapted to engage with the threads formed upon the flange 3.

The member 7 is adapted to cooperate with the external annular rib 6. The rib 6 extends upon the interior portion of the member 7, and the member 7 has a part 8 which is bent or otherwise formed around the rib 6, so as to retain the members 4 and 7 against separation, at the same time forming a swivel connection. It should be noted that the extension 6 on the member 4 is located above the threads which are formed on the interior surface of the member 7, so that the member 4 is definitely secured with respect to the member 7, so that longitudinal movement of the member will effect longitudinal movement of

the member 4. However, the connection is such that the member 7 may swivel upon the member 4.

It will be obvious from the foregoing description that as the member 7 is turned, it will move longitudinally upon the flange 3 of the member 2 and the rotary movement of the member 7 will cause longitudinal movement of the member 4.

Within the casing 2 is a cup-shaped packing member made of suitable resilient material, which has a heavy base portion 9, which forms the packing proper and an upstanding flange 10 which lies against the upstanding flange 3 of the member 2. The packing member 9 is somewhat dish shaped in form, and is provided with a central opening 9*a*. The periphery of the packing 9 engages within a groove 2*a* formed in the inner surface of the member 2.

When the member 2 is turned upon the valve stem 1 and the inner end of the valve stem engages with the packing 9, the packing 9 is deformed from its initial dish shape and is moved to a more nearly flat shape, this action, however, being resisted by the compression of the packing member 9 against the walls of the member 2. The result of the continued movement of the end of the valve stem 1 into the casing 2, results in securing a very efficient sealing action between the packing member 9 and the end of the valve stem 1, so that the leakage of air around the end of the valve stem is obviated.

Within the member 4 there is secured a plunger, generally indicated at 11. This plunger is provided with a flange 11*a* which fits within the flange 5 of the member 4 and is secured therein, so that the plunger 11 will move with the member 4. The plunger 11 also has a slanting face 12, a part of which lies directly above the upstanding flange 10 of the packing member.

The lower part of the plunger 11 is provided with air openings 13, and has a reentrant conical portion 14 which provides an annular bottom portion as at 15, which is adapted to engage with the packing member 9 so as to provide an air seal when the valve mechanism is in closed position.

The plunger 11 is hollow and within the same is a check valve 16 having a stem 17. Within the member 4 there is an inwardly extending annular portion 4*a*, which forms a seat that cooperates with the check valve 16. The check valve is normally held to its seat by means of a spring 17, one end of which bears against the spring and the other end of which seats around the conical reentrant portion 14. The valve stem 17 extends outwardly to adjacent the end of the member 4, and is in position to be displaced when an inflating chuck or pump connection is attached to the end of the member 4. As will be noted, the end of the member 4 is provided with threads which are adapted for connection with a pump coupling and also may receive a closing cap.

In Figure 1 the valve mechanism is shown in open position, and in this condition when an air chuck or pinch connection is applied at the end of the member 4, air may pass the check valve 16, through the openings 13, and through the central opening 9*a* in the packing 9, through the valve stem 1 and to the pneumatic device to be inflated.

Under the condition mentioned the path of air will be as indicated, and there will be no leakage of air because even in open position the upstanding flange 10 of the packing member 9 is in sealed relationship with respect to the plunger 11, and furthermore, the packing member 9 is in sealed relationship with respect to the end of the valve stem.

After inflation the inflating chuck or pump connection will be removed, whereupon the check valve 16 will be moved to its seat and thus prevent the escape of air. The member 7 is then turned in the proper direction, moving the plunger into engagement with the packing member 9. This engagement serves not only to prevent the escape of air around the plunger 11, but also more pronouncedly folds the packing member 9 into closer engagement with the end of the valve stem, thus positively sealing the end of the valve stem and preventing any escape of air.

From the foregoing it will be seen that there are really three air seals, the first is the normal air seal existing by virtue of the crowding action of the packing 9 against the end of the valve stem 1, the second sealing is the engagement of the plunger 11 with the packing member 9 and the third seal is through the instrumentality of the check valve.

Although a preferred embodiment of the invention has been illustrated and described herein, it should be understood that the same is susceptible of various modifications and adaptations within the scope of the appended claims.

Having thus described my invention what I claim is:

1. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within said casing which is adapted to engage with the end of the valve stem and with the inside of said casing in an air sealing relationship, a movable member associated with the casing, a plunger associated with the movable member, which plunger is adapted to be moved into and out of engagement with the gasket to compress the same against the valve stem and the inside of said casing to control the passage of air through the casing, and an operating member having an operative connection with the casing and with the movable

member, whereby the plunger is moved into and out of engagement with the gasket.

2. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within the casing which is adapted to engage with the end of the valve stem and with the inside of the casing in an air sealing relationship, a movable member associated with the said casing, a plunger associated with the said movable member and adapted for movement into and out of engagement with the said gasket to compress the same against the valve stem and the inside of said casing to control the passage of air through the casing, a rotary member mounted outside of the casing and the movable member and having a connection with the casing and with the movable member whereby rotation of the same will move the plunger into or out of engagement with the gasket.

3. A valve mechanism comprising a casing adapted to be mounted on the end of a tubular member such as a standard valve stem or the like, a gasket within said casing having a portion which is adapted to engage the end of said valve stem in an air sealing relation and another portion adapted to engage the inside of said casing in a similar relation, a movable member cooperating with the said casing and adapted to be moved with respect to said casing, an operating member associated with the said movable member and having a threaded relationship with the said casing, a plunger adapted to control the passage of air, which plunger is associated with the movable member, the plunger being adapted to be moved into and out of engagement with the said gasket upon the operation of the said operating member to compress said gasket against the end of the valve stem and the inside of said casing.

4. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within said casing which engages the end of the valve stem with an inherent pressure to provide an air sealed relationship between the end of the valve stem and the gasket, a movable member associated with the casing, an operating member associated with the movable member, said operating member having a threaded connection with the casing whereby the movable member may be moved with respect to the casing, a plunger within the said casing, said plunger being adapted to control the passage of air through the casing and said plunger being adapted to be moved into and out of engagement with the said gasket upon the operation of the operating member.

5. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within the said casing which bears upon the end of the valve stem and upon the inside of said casing to provide an air sealing engagement therewith, a movable member associated with the casing, an annular operating member mounted upon the movable member but being capable of rotation with respect thereto, the said rotatable member having a threaded engagement with the said casing, a plunger associated with the movable member, said plunger being adapted to control the passage of air through the said casing, and said plunger being adapted to be moved into and out of engagement with the said gasket upon the operation of the rotatable member to compress the same against the end of the valve stem and the inside of said casing.

6. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within said casing which is adapted to engage with the end of a valve stem and the inside of said casing in an air sealing relation, a movable member mounted to have a sliding relationship with respect to a portion of the casing, a rotatable member mounted upon the said movable member but capable of rotation with respect thereto, said rotatable member having a threaded engagement with the casing, a hollow plunger associated with the movable member, said plunger being adapted to control the passage of air through the said casing, said plunger being movable into and out of engagement with the said gasket to compress the same against the end of the valve stem and the inside of said casing, a check valve within the said movable member, and a passageway in the movable member which is controlled by the said check valve.

7. A valve mechansm comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within the said casing which gasket is provided with an upstanding cylindrical wall engaging the inside of the casing and with a base portion engaging the end of the said valve stem in an air sealing relationship, a movable member associated with the said casing, a plunger carried by the movable member, said plunger being provided with a slanting wall and with a portion adapted to engage with the base portion of said gasket, the said slanting wall of the plunger being adapted to engage with the upstanding wall of the gasket with an air sealing relationship, and means associated with the movable member and the casing for causing reciprocation of the plunger.

8. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within the casing which is provided with an upstanding annu-

lar flange engaging the inside of the casing and with a base portion engaging the end of the valve stem in an air sealing relationship, a movable member associated with the casing, a plunger associated with the movable member and adapted to be moved toward and from the said gasket to control the passage of air through the said casing, the said plunger being positioned to engage with the upstanding flange of the gasket to normally provide an air sealing relationship therewith and upon inward movement to compress the same, and means associated with the movable member and the casing to cause the movement of the plunger toward or from the said gasket.

9. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within said casing which is adapted to engage with the end of said tubular member in an air sealing relationship, said gasket being provided with an upstanding flange engaging the inside of said casing, a movable member associated with the casing, a plunger associated with the movable member and always having an air sealing engagement with the upstanding flange of the gasket, said plunger being hollow and provided with air openings, a check valve within the said plunger, an air passageway in the movable member which is normally closed by the said check valve, and means cooperating with the said movable member and with the casing whereby the plunger may be moved into or out of engagement with the said gasket to compress the same against the end of the valve stem and the inside of the casing.

10. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within said casing which is adapted to engage with the end of said tubular member and with the inside of said casing in air sealed relationship, a movable member having a wall portion which slidably engages with the wall portion of the casing, an external annular member having a swivel connection with the movable member and having a threaded engagement with the casing, a plunger associated with the movable member and adapted for movement into or out of engagement with the gasket to compress the same against the end of said tubular member and the inside of said casing to control the passage of air through the casing.

11. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within the casing and adapted to engage with the end of the valve stem in an air sealing relationship, said gasket being provided with an upstanding annular flange engaging the inside of said casing, a movable member having a telescoping engagement with a portion of the said casing, a rotatable member having a swivel connection with said movable member and a threaded engagement with a portion of the said casing, whereby the movable member may be moved with respect to the casing, a hollow plunger associated with the said casing, a portion of the said plunger always engaging with the upstanding flange of the gasket in an air sealing relationship, the said plunger being provided with air openings adjacent the end thereof, and said plunger being adapted to be moved into or out of engagement with the said gasket, a check valve within the said hollow plunger, the said movable member having an air passageway which is adapted to be controlled by the said check valve.

12. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within the casing having a relatively heavy base portion engaging the end of the valve stem and always in air sealing relationship therewith, and an upstanding tubular flange portion engaging the inside of said casing, a movable member associated with said casing, a plunger associated with the movable member, and movable toward and from the said gasket to control the passage of air through the said casing, the said plunger always engaging the upstanding flange of the gasket in air sealing relationship therewith, and means associated with the movable member and the casing for moving the plunger toward or from the gasket.

13. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, a gasket within the casing having a relatively heavy dished base portion engaging the end of the valve stem and always in air sealing relationship therewith, and an upstanding tubular flange portion engaging the inside of the casing, a movable member associated with the casing, a plunger associated with the movable member and always engaging said flange portion of the gasket in air sealing relationship therewith, and means associated with the movable member and the casing for moving the plunger toward the said gasket to compress the base portion against the end of the valve stem and the flange portion against the inside of the casing.

14. A valve mechanism comprising a casing adapted to be mounted upon the end of a tubular member such as a standard valve stem or the like, and having an internal annular groove, a gasket in said casing having a relatively heavy dished base portion provided with an outwardly extending annular flange engaging in said annular groove of the

casing, said base portion of the gasket always engaging the end of the valve stem with an inherent pressure to provide an air seal relationship therewith, said gasket also having an upstanding tubular flange portion engaging the inside of said casing, a plunger movably mounted in said casing and having a portion always in engagement with said upstanding flange of the gasket to provide an air seal relationship therewith, and means for moving said plunger relative to said casing and toward said gasket to compress the base portion thereof against the end of the valve stem and the flange portion against the inside of said casing.

In testimony whereof, I hereunto affix my signature.

JOHN C. CROWLEY.