June 10, 1930. L. G. KRUSELL 1,762,823

TUBE DEFLATING VALVE

Filed May 16, 1927

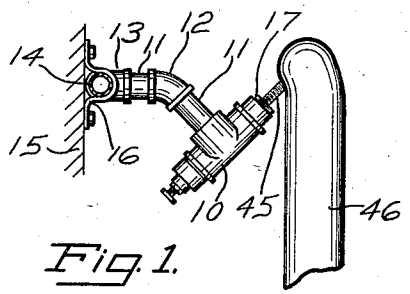


Fig. 1.

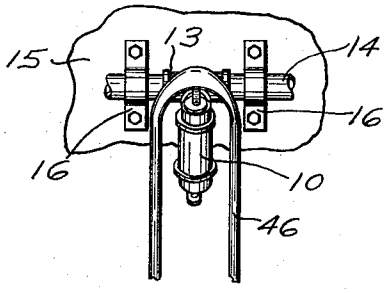


Fig. 2.

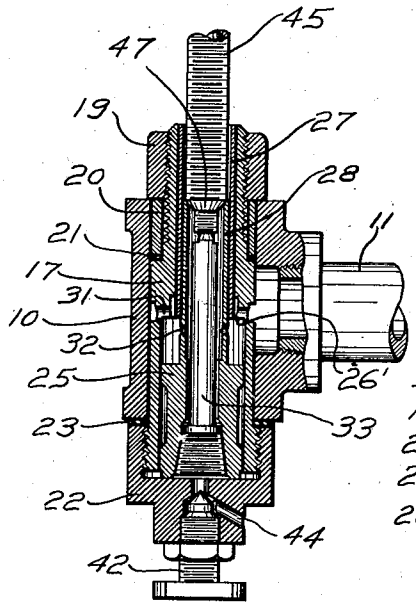


Fig. 3.

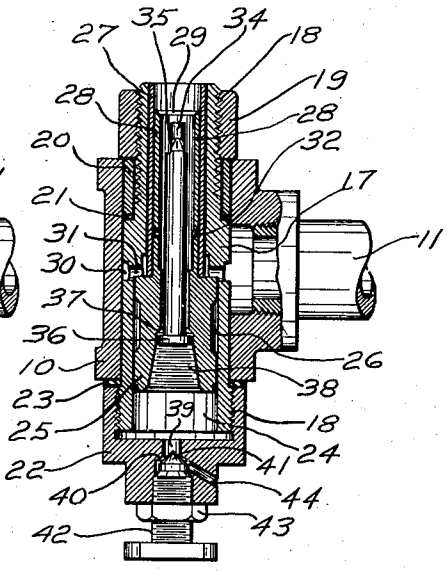


Fig. 4.

INVENTOR.
Lars G. Krusell
BY
Edward C. Taylor
ATTORNEY.

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UNITED STATES PATENT OFFICE

LARS G. KRUSELL, OF CHICOPEE FALLS, MASSACHUSETTS, ASSIGNOR TO THE FISK RUBBER COMPANY, OF CHICOPEE FALLS, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS

TUBE-DEFLATING VALVE

Application filed May 16, 1927. Serial No. 191,690.

This invention relates to improvements in devices for deflating inner tubes for pneumatic tires. After these tubes are made and inspected it is necessary to deflate them in order to reduce their bulk for packing. Several types of deflating devices have heretofore been proposed some of them operating to connect the valve stem of the tube to a source of suction when the stem is inserted in the device and to shut off the supply of suction automatically when the tube valve is removed. My invention relates particularly to improvements in the latter type of deflating device. Among the improvements which I have sought to accomplish by my device is the prevention of clogging due to accumulation of dust within the deflating device, the provision of a single apparatus which will take all types of valve stems, the provision of a simple, rugged and at the same time fine adjustment and the construction of the valve in such a manner that it may be taken apart for cleaning without disturbing the adjustment.

Referring to the drawings:

Fig. 1 is a side elevation of my improved deflating device with a tube in place;

Fig. 2 is a front elevation thereof;

Fig. 3 is a view on a larger scale taken in median section, the parts being shown in the position they occupy during the operation of deflating a tube;

Fig. 4 is a view similar to Fig. 3 showing the parts in the positions they occupy after the deflating device has automatically shut off upon removal of the tube valve.

The deflating device is mounted upon a suction T 10 joined by nipples 11 and a 45° L 12 to a T 13. This latter T is a portion of a suction main 14 shown as held to a wall or other support 15 by brackets 16. Into the suction T 10 is fitted a barrel 17 having threads 18 at each end. At one end the barrel is held in the suction T by a nut 19 bearing upon a spacing collar 20 which compresses a packing 21 located between the spacing collar and a shoulder on the barrel. At the other end of the barrel is threaded a cap 22 bearing upon the packing 23. By this means the barrel is rigidly held in the suction T with an air tight joint.

The barrel is formed with a central bore enlarged at one end to form a cylinder 24. In this cylinder runs a piston 25 preferably cut away as at 26 in order to reduce its friction. Into the main portion of the central bore is fitted a bushing 27, the bushing and the barrel wall being cut away so as to separate the main portion of the bore from the cylinder 24 by a shoulder 26′. Within the bushing 27 runs the hollow stem 28 of the piston 25, this hollow stem having a beveled valve receiving seat 29 at its end.

A groove 30 is formed around the barrel at the point of separation between the cylinder and the main portion of the bore, and holes 31 connect this groove with the interior of the cylinder 24 as perhaps best shown in Fig. 3. These holes are preferably positioned so as to be divided by the shoulder 26′ and the top of the piston 25 when the latter is in the raised position of Fig. 4. Any dust which may have collected on the top of the piston will therefore be carried off into the suction main and will not collect so as to cause clogging of the valve.

In the stem 28 are formed holes 32 which with the piston in the operative position of Fig. 3 connect the interior of the stem with the chamber formed by the cylinder 24 but which when the valve is closed lie within the bushing 27 and are thereby cut off from the source of suction. Within the hollow stem 28 is positioned a deflating pin 33 of smaller diameter than the hole in the end of the tube valve in order to provide a suction passage around it and having at its upper end a tip 34 flattened at its sides as indicated at 35. The tip extends within the tube valve stem 45 as indicated in Fig. 3 and depresses the valve plunger therein so as to open the connection between the interior of the tube and the space within the stem 28. The flat sides 35 form an air passage inside the end of the valve stem 45. The other end of the deflating pin 33 is formed with a head 36 fitting loosely within an enlargement 37 within the piston 25 and is held in place by a taper screwed plug 38. The fitting of the deflat-

ing pin in the piston is kept loose so that it may accommodate itself to slight variations in the dimensions of the tube valves presented to it and will not bend or injure the parts of these valves as has sometimes been the case in former devices.

The cap 22 is formed with a hole 39 having a beveled seat 40 receiving the tapered end 41 of a needle valve screw 42. This screw is held in adjusted position by a lock nut 43 and serves to regulate the passage of air into the hole 39 from a vent 44 leading into the atmosphere. A very fine adjustment can be made by this means and yet the cap 22 can be removed to afford access to the piston 25 without in any way disturbing the adjustment.

In operation a tube valve 45 is inserted in the bushing 27 as shown in Fig. 3, being pressed down upon the deflating pin so that the tip of the latter depresses the valve plunger. The tapered shoulder 47 upon the valve stem fits upon the beveled seat 29 to give an air tight joint. With the parts in the condition of Fig. 3 deflation is continued to the desired extent. The operator then removes the tube valve from the bushing 27 and the piston 25 thereupon rises closing the holes 32 by moving them within the bushing and giving an additional seal by the contact of the upper end of the piston with the lower end of the bushing. The reason for the rising of the piston is the difference in the pressure on its upper surface due to the suction and the substantial atmospheric pressure at its lower end. It is to control this automatic closing of the valve that the needle valve 42 is provided. During the normal operation of the deflating device it is necessary that the piston remain down. If the connection to the atmosphere left by the valve 42 is too large the pressure on the lower end of the piston will be sufficient to cause the valve to rise. The needle valve is therefore set so as to compensate for the normal leakage past the piston 25 so that the pressure below the piston never gets high enough to cause the latter to rise. When the tube is removed from the deflating device, however, the passage of air through the vent 44 permits the piston to seek a new position of equilibrium and the latter then rises to the position shown in Fig. 4.

Having thus described my invention, I claim:

1. A tire tube deflating device comprising a barrel having a central bore with an enlargement at one end separated from the main part of the bore by a shoulder, a piston having a hollow stem sliding in the bore and a body portion sliding in the enlargement thereof, the piston being limited in its motion in one direction by the shoulder, a passage in the barrel permitting air to be exhausted from the chamber between the piston stem and the enlargement in the bore, and opening into the barrel so as to be divided by the shoulder, a hole in the hollow stem communicating in one position of the piston with the chamber and cut off from such communication by motion of the stem into the bore, and a deflating pin loosely and movably mounted in the stem.

2. A tire tube deflating device comprising a barrel having a central bore with an enlargement at one end separated from the main part of the bore by a shoulder, a piston having a hollow stem sliding in the bore and a body portion sliding in the enlargement thereof, the piston being limited in its motion in one direction by the shoulder, a passage in the barrel permitting air to be exhausted from the chamber between the piston stem and the enlargement in the bore and opening into the barrel so as to be divided by the shoulder, and a hole in the hollow stem communicating in one position of the piston with the chamber and cut off from such communication by motion of the stem into the bore.

3. A tire tube deflating device comprising a barrel having a central bore with an enlargement at one end, a piston having a hollow stem sliding in the bore and a body portion sliding in the enlargement, a connection permitting the exhaustion of air from the chamber between the piston stem and the enlargement in the bore, a hole in the stem communicating with the chamber or cut off therefrom by the bore depending upon the position of the piston, a removable cap closing the enlarged end of the bore, and an adjustable vented needle valve attached to and removable with the cap.

4. A tire tube deflating device comprising a barrel having a suction chamber into which a tube valve may be inserted, a shut off valve adapted to shut off the chamber from a suction source, said valve being exposed on one side to the reduced pressure of said chamber, a removable cap separating the other side of the valve from the atmosphere, and a vented needle valve attached to and removable with the cap whereby the access of air from the atmosphere to the valve may be regulated.

LARS G. KRUSELL.