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H. E. SMITH

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INFLATING HAND PIECE

Original Filed Aug. 27, 1927

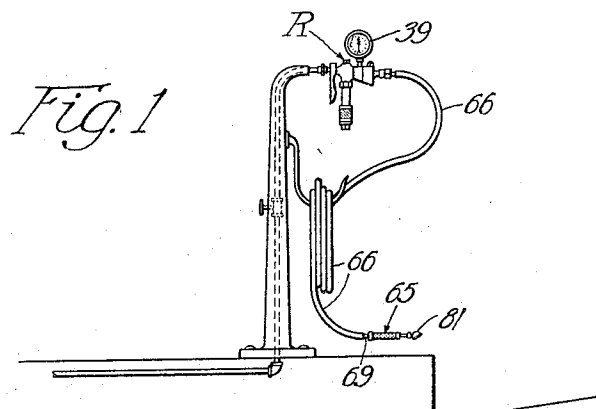
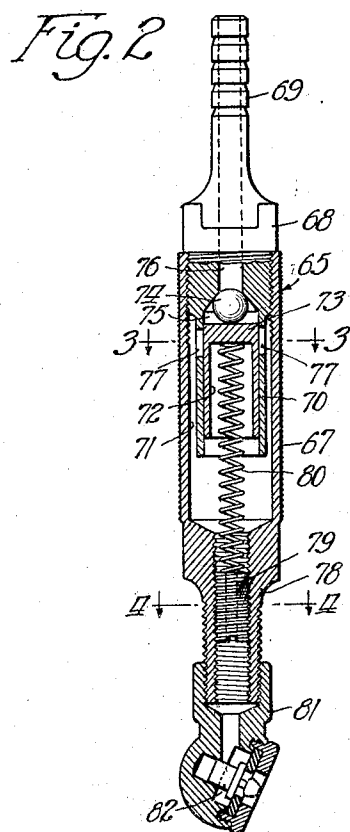


Fig. 4

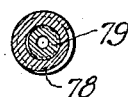
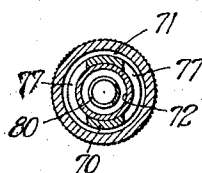


Fig. 3



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UNITED STATES PATENT OFFICE

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INFLATING HAND PIECE

Original application filed August 27, 1927, Serial No. 215,987. Divided and this application filed July 22, 1929. Serial No. 379,930.

This invention relates to a hand piece for use in inflating automobile tires, and for similar purposes.

The hand piece of my invention is particularly adapted for use with an inflating apparatus such as that disclosed in my copending application, Serial No. 215,987, filed August 27, 1927, which has matured into Patent No. 1,769,240, dated July 1, 1930 of which the instant application is a division.

One of the main objects of my invention is to provide a hand piece having means for creating a back pressure and thus imparting a desirable velocity to the air flowing there-through to the tire. A further object is to provide a hand piece of comparatively simple and efficient construction having signaling means for indicating when the tire is completely inflated. Further objects and advantages of my invention will appear from the detail description.

In the drawing:—

Fig. 1 is an elevation of a hand piece in accordance with my invention, as applied;

Fig. 2 is a central longitudinal sectional view through the hand piece, parts being shown in elevation;

Fig. 3 is a section taken substantially on line 3—3 of Fig. 2;

Fig. 4 is a section taken substantially on line 4—4 of Fig. 2.

My hand piece 65 is shown, in Fig. 1, as connected to a pressure regulating device R by a suitable length of hose 66. The regulating device R is preferably similar to that of my above identified patent, and has associated therewith a suitable pressure gauge 39.

The hand piece includes a hollow cylindrical body 67 into one end of which is screwed a member 68 provided at its outer end with a corrugated nipple 69 for reception of the hose end. This member 68 is provided with a hollow cylindrical extension 70 which projects into the body 67 of the hand piece in concentric spaced relation thereto leaving a space

71 between the extension 70 and the surrounding wall of the body. This extension is open at its outer end and receives a piston 72 operating therein, this piston being also open at its outer end and closed at its inner end by a head 73. A ball valve 74 is confined between the inner end or head 73 of the piston and the inner end of bore 75 of extension 70, the inner portion of this bore being shaped to provide a seat for the valve 74.

The inlet passage or bore 76 of the nipple member 68 opens directly into bore 75 of extension 70 and this passage is normally closed by the ball valve 74. The piston 72, when in its inner or normal position, closes two openings or slots 77 provided in the extension 70 adjacent the inner end thereof, these slots being disposed radially of the extension and establishing communication between the bore 75 and the space 71 when the piston is depressed or moved outwardly sufficiently to uncover these openings.

At its other end the hand piece is provided with a neck 78 which is axially bored and threaded for reception of a tubular screw plug 79 threaded therein and open at both ends. An expansion coil spring 80 is confined between this plug and head 73 of piston 72, this spring acting to normally hold the piston in its inner position. By adjusting the screw plug 79 in neck 78 the compression of the spring can be varied to adjust the expansive force exerted thereby on the piston. An inflating chuck 81 of known construction is threaded upon neck 78 and can be removed therefrom, when desired, for adjusting the plug 79. In using the hand piece, this chuck is applied to the end of the tire valve tube flat against the outer end thereof so as to unseat the valve 82 of the chuck permitting air to flow from the body 67 through the neck 78 and screw plug 79 into the tire.

In practice, the hollow screw plug 79 is adjusted so that the ball valve 75 is urged to-

ward its seat with a pressure of approximately 30 pounds per square inch.

I have found this additional pressure to be of value in that it insures proper operation of the piston 72 and it also insures that the air delivered from the passage 76 will enter the body 67 of the hand piece at a pressure appreciably higher than the pressure in the tire as it approaches complete inflation. This imparts a desirable velocity to the air entering the tire at such time and avoids the objectionable slowing down in inflation which takes place where means is not provided for producing this increased air velocity.

In the use of the device, the regulator is adjusted to give the desired pressure as indicated on the gauge 39. In this connection attention is called to the fact that the pressure indicated by the gauge will not be the true pressure obtaining in the regulator R, due to the fact that the spring 80 of the hand piece exerts a pressure of 30 pounds opposed to the pressure of the air entering the hand piece. The gauge is, therefore, properly adjusted to allow for this difference in pressure and when the gauge indicates 50 pounds pressure per square inch, the actual pressure in the regulator R is 80 pounds per square inch. The gauge reading is correct, however, as to the maximum pressure which will be delivered to the tire. Assuming that the regulator has been set for 50 pounds pressure, when the chuck 81 is applied to the valve stem, valve 82 is opened, permitting flow of air through the hand piece. The air flows into passage 76 and unseats the ball valve 74, and then acts upon the head 73 of piston 72 to move the piston outwardly in the extension 70 exposing the openings 77. This permits the air to escape into the space 71 and thence through the neck 78 and chuck into the tire. This sudden escape of the air from above the head 73 of the piston reduces the pressure to such an extent as to permit upward movement of the piston so as to again seat the ball valve and the pressure in passage 76 then immediately builds up so as to unseat the ball valve and again moves the piston outwardly so as to uncover the openings 77. In this manner the piston is reciprocated during inflating of the tire and the vibration caused by this reciprocation of the piston can readily be felt when holding the hand piece and, in fact, is very noticeable.

As soon as the tire is fully inflated and the flow of air through the regulator is stopped in the manner above described, the piston will stop reciprocating so that the cessation of the vibration caused by the reciprocating piston is a signal which indicates that the tire is fully inflated. In addition to serving as a signal, this piston also serves, in conjunction with the spring 80, to insure that sufficient velocity will be imparted to the air entering the tire, as it approaches full infla-

tion, to prevent slowing down of the inflating operation due to back pressure exerted by the air in the tire.

What I claim is:—

1. In an inflating hand piece, a body, a nipple secured to one end of the body and having a portion extending into the body and provided with radial openings, said body having an outlet at its other end, an inwardly opening valve normally closing the inner end of the nipple, a piston operating in the extension of the nipple and bearing against said valve, and yielding means urging the piston toward the valve, the piston normally closing said openings and having a snug fit with the nipple extension.

2. In an inflating hand piece, a body, a nipple secured to one end of the body and having a portion extending into the body and provided with radial openings, said body having an outlet at its other end, an inwardly opening valve normally closing the inner end of the nipple, a piston operating in the extension of the nipple and bearing against said valve, and yielding means urging the piston toward the valve, said means being adjustable and the piston normally closing said openings and having a snug fit with the nipple extension.

3. In an inflating hand piece, a hollow cylindrical body, a nipple secured in one end of the body and having a hollow cylindrical portion extending into the body in spaced relation to the surrounding wall thereof, said body having an outlet at its other end, said extension having a valve seat at the inner end of the nipple and being provided with radial openings, a ball valve cooperating with said seat for closing the inner end of the nipple, a piston operating in said extension, a coil spring bearing on the piston and urging it toward the valve, said piston normally holding the valve seated and closing said openings, and means for adjusting the compression of the spring to vary the expansive force exerted thereby.

4. In an inflating hand piece, a hollow cylindrical body, a nipple secured in one end of the body and having a hollow cylindrical portion extending into the body in spaced relation to the surrounding wall thereof, said extension having a valve seat at the inner end of the nipple and being provided with radial openings, a ball valve cooperating with said seat for closing the inner end of the nipple, a piston operating in said extension, the body having a tubular neck at its other end defining an outlet, a hollow screw plug threaded in said neck for adjustment therein, and a coil spring confined between the piston and the plug and extending into the neck, the piston normally holding the valve closed and covering the openings in said nipple extension.

5. In an inflating handpiece, a hollow

body having two passages one of less diameter than the other, a nipple secured in the passage of larger diameter and having a hollow portion spaced from and extending
5 into said larger passage, said portion of the nipple being provided with a valve seat and with radial openings, a ball valve seating in said valve seat, a piston slidably mounted in the extending portion of the nipple and normally closing the valve and said openings, and
10 spring means mounted in the smaller passage and yieldingly holding the piston in position to hold the valve seated and to close said openings.

15 In witness whereof, I hereunto subscribe my name this 15 day July, A. D. 1929.

HARVEY E. SMITH.

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