A tyre inflation pistol comprises a high pressure supply side (22), a passageway (28) leading to a pressure gauge, a passageway (26) leading to the tyre and a valve assembly. The valve assembly is arranged to close off the gauge passageway (28) when the tyre is being inflated to prevent damage to the gauge. The valve assembly comprises: a first valving element (14, 32) which controls air flow from the high pressure supply (22) to the tyre side (26); a second valving element (40, 42, 44, 46, 48) which slides in an axial hole (26) in the first valving element and acts to close off an aperture (54) leading to the pressure gauge; and an operating lever (18). Initially, the tyre side (26) of the valve is connected to the pressure gauge side (28) via an aperture (54). Operating the lever (18) moves the second valving element (42, 46) to close off the aperture (54). Further movement of the lever (18) pushes the head (48) of the second valving element against the first valving element (14) and opens the high pressure supply side (22) to the tyre side (26).
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TYRE INFLATION GUN

This invention relates to a tyre inflation gun.

Tyre inflation guns are known. They generally comprise a gun structure connected by a pipe to a compressed air receiver and extending into a tube provided with an element for its connection to the tyre nozzle. A pressure gauge is connected to the gun structure for checking the tyre pressure.

The inflation gun is used by connecting the gun to the tyre, the pressure gauge then indicating the tyre pressure. If the internal pressure is less than the correct value, the user operates the gun trigger to connect the compressed air receiver to the tyre and hence inflate it. If the internal pressure is too high, the user causes air to escape from the tyre by again operating the trigger, but moving it only a short distance.

This known inflation gun has however the drawback that during inflation the pressure gauge is connected to the compressed air receiver, with consequent damage to the sensor element and to the pointer of the pressure gauge graduated scale, which has an end-of-scale value which is distinctly less than the pressure in the receiver.

An object of the invention is to eliminate this drawback by providing an inflation gun which during tyre inflation closes the connection between the pressure gauge and the compressed air receiver.

Such object and further ones are attained according to the invention through a tyre inflation gun as described in claim 1.
A preferred embodiment of the invention is described in detail hereinafter by way of non-limitating embodiment with reference to the accompanying drawings, in which:

Figure 1 is a longitudinal section through a gun according to the invention;

Figure 2 is an enlarged detailed view of the operating valve when checking the tyre pressure;

Figure 3 shows it in the same view as Figure 3 during tyre inflation; and

Figure 4 shows it during deflation.

As can be seen from the figures the inflation gun according to the invention comprises a gun structure 2 provided with a threaded insert 4 for connection to the pipe 5 of the compressed air receiver and a tube 6 provided with an element 8 for connection to the tyre nozzle.

A pressure gauge 10 is also mounted on the gun structure.

Within the gun structure there is provided a cylindrical seat 12 for a valving element indicated overall by 14.

The cylindrical seat 12 for the valving element 14 comprises a first aperture 16 provided at one end in a position facing a trigger 18 hinged to the gun structure.

In a substantially central position in said seat there is a second aperture 20 which connects said seat to a chamber 22 connected to the compressed air pipe 5.

Said seat comprises a third aperture 24 for connecting said seat to a chamber 26 communicating with the tube 6 and to a chamber 28
communicating with the pressure gauge 10.

Coaxially with said valving element 14 there is provided a coil spring 30 which, in the absence of external stresses, maintains the head 32 of the valving element 16 in contact with seal gaskets provided in correspondance with the aperture 24.

The valving element 16 comprises a central longitudinal hole 36 in which a second valving element 38 is axially movable, its stem 40 being substantially of cross-shaped cross-section and being provided with two heads 42, 44 with which 0-rings 46 are associated.

The other end of the stem 40 is provided with a prismatic shaped head 48.

The prismatic head 48 has that portion facing the valving element substantially of conical shape with its lateral surface complementary to a corresponding annular recess 50 provided in the valving element 14.

Coaxially with said stem 40 there is provided a coil spring 52 having its rigidity constant less than that of the spring 30 and which, in the absence of external stresses, maintains said prismatic head 48 spaced from the recess 50 and in contact with the trigger 18.

The valving element 38 is movable between two end positions, in one of which the head 44 closes the upper aperture of the hole 36 and in the other of which the head 42 closes the aperture 52 which communicates with the duct 28 of the pressure gauge 10.

The gun according to the invention operates as follows.
Under normal conditions the coil spring 30 maintains the head 32 in a position in which it closes the aperture 24, the coil spring 52 maintaining the stem 40 with its head 44 in a position in which it closes the hole 36 and its head 42 spaced from the aperture 54, so that the chamber 26 communicates with the chamber 28 connected to the pressure gauge. In this configuration the end 48 of the stem 40 is substantially in contact with the trigger 18 (see Figure 2).

At the moment in which the user applies the end 8 of the tube 6 to the wheel nozzle, the internal tyre pressure is indicated by the pressure gauge by virtue of the direct connection between the chamber 26 and the chamber 28.

If the indicated pressure is less than the correct pressure, the user operates the trigger 18 to initially cause the stem 40 to move within the hole 36 in the valving element 30 and then, when the conical surface makes contact with the corresponding facing surface 50 of the valving element 14, to raise this latter.

As a result of the movement of these two valving elements, on the one hand the chamber 28 is closed by the head 42 of the stem 40 and on the other hand the hole 36 in the valving element 14 is opened with consequent air flow from the chamber 22 to the seat 12, then through the chamber 26 and hence to the tyre (see Figure 3).

If the internal tyre pressure is greater than the correct value, the user operates the trigger 18 lightly so as to axially thrust the stem 40 but without the prismatic head 48 coming into contact with the valving element 14.
This movement of the rod causes the head 44 to separate from the valving element 14 with consequent escape of air from the tyre via the chamber 26, the hole 36 and the bottom end of the valving element 14.

In this configuration the upper head 42 of the rod 40 does not close the aperture 54, with the result that via the chamber 26 the pressure gauge communicates with the tyre, to indicate the pressure within this latter (see Figure 4).
CLAIMS

1. A tyre inflation gun characterised by comprising:
   - a first valving element (14) comprising a through axial hole (36) within which
     there axially moves a second valving element (38) which also causes said
     first valving element to undergo its travel stroke;
   - for said first valving element (14), a seat (12) provided at one end with a
     first aperture (16) faced by a member (18) for axially operating said first
     valving element (14) in the sense of causing it to open against first elastic
     means (30), and provided with a second aperture (22) for the introduction of
     air originating form the compressed air receiver and, at the opposite end to
     that comprising the first aperture, a third aperture (24) communicating with
     the duct (28) of the pressure gauge (10) and with the duct (26) connected to
     the tyre;
   - said second valving element (38) being provided at one end with a first and
     second head (42, 44) which are superposed, and being provided at the other
     end with a third head operable against second elastic means (52) by the
     member (18) which axially operates the first valving element (14), said second
     elastic means (52) having a rigidity constant less than that of the first elastic
     means (30);
   - said second valving element (38) being movable between an initial position in
     which said first head (44) closes the hole (36) through said valving element
     (14) which in its turn closes said third aperture (24) of said seat (12), an
     intermediate position in which said first head (44) opens the hole (36) through
said valving element (14) which still closes said third aperture (24) of said seat (12), and a final position in which said third head (48) rests against the valving element (14) so that said second head (42) closes the aperture (54) of communication with the pressure gauge but said valving element (14) opens the aperture (24) of said seat (12) to allow the fluid to be fed to the tyre.

2. A gun as claimed in claim 1, characterised in that the seat (12) for the first valving element (14) is of cylindrical cross-section.

3. A gun as claimed in claim 1, characterised in that the stem (40) of the second valving element (38) has a substantially cross-shaped cross-section.

4. A gun as claimed in claim 1, characterised in that the first elastic means (30) and the second elastic means (52) are coil springs.

5. A gun as claimed in claim 1, characterised in that the operating members are a trigger (18).

6. A gun as claimed in claim 1, characterised in that said third head (48) of said second valving element (36) is substantially of cone shape and cooperates with a corresponding flared portion (50) provided in correspondence with said first valving element (14).
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC 6 B60S5/04 F16K11/16

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B60S F16K B60C

Documented searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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Patent family members are listed in annex.

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Date of the actual completion of the international search

3 February 1997

Name and mailing address of the ISA

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Date of mailing of the international search report

17.02.97

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