Aug. 19, 1930. H. TASTENHOYE ET AL 1,773,505

TIRE SIGNAL

Filed Dec. 15, 1927

Fig: 1.

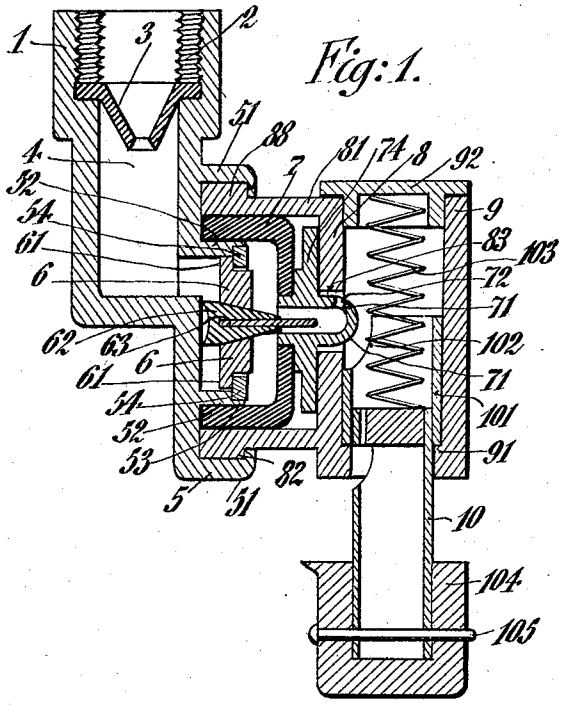


Fig: 3.

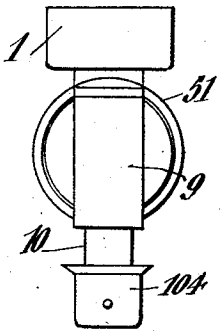


Fig: 2.

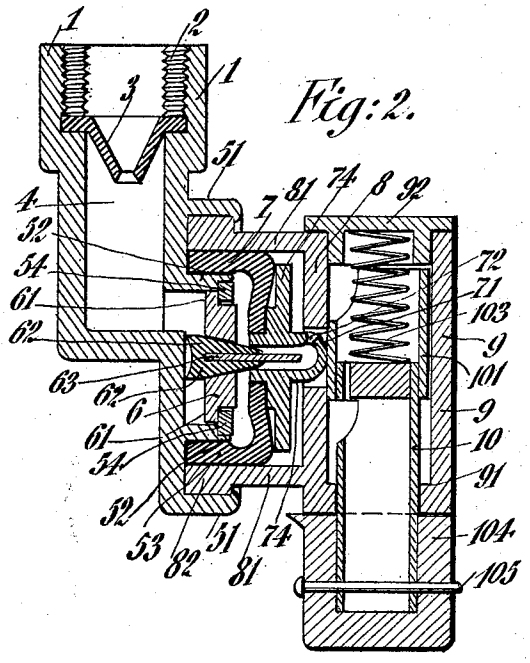
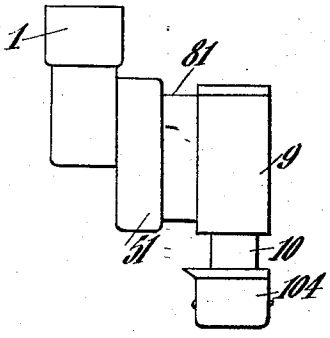


Fig: 4.



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UNITED STATES PATENT OFFICE

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TIRE SIGNAL

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This invention relates to a small device which, located on the valve of a closed vessel containing a gas under pressure, emits a continuous whistling as soon as the internal pressure in the vessel, owing to any cause whatever, no longer reaches the predetermined minimum of pressure. The same is especially suitable as deflation signaller for vehicle pneumatic tires.

This device consists substantially of a box screwed on the valve of the vessel, which must not be completely closed. Said box encloses a set of valves and diaphragms under influence of the internal pressure which by pressing the same, holds fast against the action of a spring, a whistle forced home in a socket. So long as the internal gas pressure is higher than the strength of the spring, such pressure presses on the whistle,—which latter is thus held in its socket,—the boss of the outer diaphragm, driven out by the air under pressure; but as soon as the internal pressure ceases balancing the strength of the spring the whistle is forced out of its socket, the boss on the diaphragm then projects into the thus opened space and the canal in said boss allows the gas to flow out and pass through the whistle which then emits a sharp sound so long as gas escapes from the vessel.

In order to have the invention more clearly understood, the accompanying drawing illustrates, as mere example, a form of construction of the device in its application as deflation signaller for a motor car pneumatic tire.

Figs. 1 and 2 illustrate, in double natural size, an axial vertical section of the device, open (alarm position) in Fig. 1, and closed (inoperative position) in Fig. 2.

Figs. 3 and 4 are front and side views respectively, of the device in natural size.

In said drawings:

1 indicates a hollow cap screwed at 2 on the valve of the air-tube (not shown) and enclosing in its upper part, a sleeve 3, preferably of rubber, for ensuring tightness and so shaped as to force somewhat back the plunger rod of the valve (which should not be locked) for allowing the internal pressure entering the device. Said cap is in communication through a bore 4 with the bottom of a box or casing 5 having an external flange 51 and a concentrical internal projection 52 forming a shoulder 53, in which tightly fits a ring 54. In said box is arranged a first, nontight valve consisting of a disc 6, the diameter of which is somewhat smaller than the diameter of the opening in the ring 54, but provided wtih a base flange 61, of somewhat larger diameter, to abut against the under face of the ring; through said disc 6 passes a soft rubber cone 62, the base of which serves as resilient stop guard for disc 6, whilst its upper part, ended with a reinforcing and guiding pin 63, serves as obturator for the canal in the diaphragm to be described later on. The disc 6 thus slightly moves in ring 54 in two directions: in one direction, until pressing the base of cone 62 against the bottom of the box 5, in the other direction until its flange 61 contacts with ring 54 and its cone closes the canal of the diaphragm.

In any position, however, it allows the air passing under pressure between its flange 61 and the ring 54.

The diaphragm 7 consists of a thick cap of soft rubber, hermetically fitting on the annular internal projection 52 in box 5. In the center-bore of said cap, is forced the bottom of a tubular piece 71, with dome shaped top, in the upper part of the body of which is bored a side opening 72; on the body of said piece 71 is fastened a disc 73 of a diameter somewhat smaller than the diameter of the diaphragm 7 and having in its center a comparatively thick flat boss 74 which bears against the central top part of the diaphragm 7.

Over the whole is placed a lid or closure 8 having high walls 81, the bevelled bottom of which engages the bead of diaphragm 7 and presses same against the internal projection 62 of box 5, whilst its reinforced external flange 82 tightly fits into the external flange 51 of said box 5, which is then locked over it by folding, hammering or any other suitable manner.

Said lid 8 is bored in its center with a hole 83 in which loosely engages the upper portion of the tubular part 72 which projects

over its level in a diametral socket or bearing 9 made in one piece with same.

The lower part of said socket 9 has an internal contraction forming a circular shoulder 91. In said socket is arranged a whistle alarm element 10, of ordinary construction, the bottom of which is closed by a removable cap 104 fastened by a pin 105; the body of said whistle 10 is guided and slides loose in the contracted part 91 against which abuts and stops a sleeve 101, fastened in the whistle of somewhat larger diameter, and the front face of which is undercut, as shown in 102 to admit, when at the end of its downwards stroke, the head of the tubular piece 71 of diaphragm 7. In said sleeve is provided a coil spring 103, held in the socket 9 by a cap 92 forced or otherwise secured in said socket.

The mounting and working of this device are as follows: The nut of the valve spindle of the suitably inflated tire, is slightly loosened (for instance of half a revolution) so that a pressure on same will allow air to escape from the tire. The neck 1 is then screwed on said valve, by this screwing down, the conical rubber sleeve forces down the valve spindle and the small quantity of compressed air escaping, passes through the hole 4 in the bottom of box 5, between disc 6 and ring 54, and collects under the diaphragm 7. When forcing then the whistle 10 up in socket 9, the contact of its sleeve 101 with the head of the tubular piece 71, forces back into the box said part 71, the disc 73 of which presses down through its boss 74, the diaphragm 7; the bottom of the tubular piece then strongly engages the upper part of the rubber member or cone 62 which obturates it tightly, whilst the resilient base of said cone spreads more or less against the bottom of box 5. Simultaneously, the disc 6 lifts somewhat more from ring 54; the pressure in the air tube and in the interior of diaphragm 7 is now in balance and pressure cannot escape from said diaphragm, the passage 71—72 being obturated by the cone 62. This results in the head of the tubular piece 71 being pressed against the whistle with a force equal to the normal pressure in the tire.

The spring 103 which tends to project the whistle out, being calculated or adjusted to a strength less than said normal pressure (preferably to a strength corresponding to the minimal pressure permissible in the tire, for instance 4 kgs. for a tire the normal pressure of which ought to be 5 kgs.), said spring 103 is held inoperative by the said antagonist pressure and the whistle 10 remains locked in the socket 9 (see position shown in Fig. 2).

But when owing to some accidental cause, (such as a nail puncture in the tire) the pressure sinks under the permissible limit, the stress of the diaphragm 7 on the head 71 ceases to be sufficient for opposing the spring 103, which then forces the whistle out. The head of the tubular piece 71 then facing the empty space formed by the bevelled edge or notch 102 of sleeve 101, enters same under action of the pressure in diaphragm 7, which straightens (see positions shown in Fig. 2). As a result, the base of part 71 no longer bears on the rubber cone 62 and the passage 71—72 opens. The air forced out of the tire, passing through canal 5, escapes between ring 54 and disc 6 and flows through passage 71—72 and sleeve 101 to take its way through the mouth-piece of whistle 10, which is then blown.

The whistle continues signalling to the driver so long as air escapes from the tire.

When the driver wishes to stop the whistling, he grips the whistle by its head 104 and rotates it half an axial revolution which, by bringing the solid part of sleeve 101 against the head of piece 61, forces said piece back against the rubber cone 62 which obturates it and closes the passage 71—72.

It should be well understood that the above described form of construction is merely given as example and that a great number of modifications or alterations can be resorted to, without leaving the scope of this invention.

Moreover, although the invention being described in its special application to pneumatic tires, it must be well understood that same can be employed in and applied to any case when it is found necessary to notice and signal any loss or decrease of pressure of air or other gas compressed in a closed vessel.

In short, the invention consists in an hermetically closed device, connecting the vessel containing gas under pressure with a whistle, and enclosing a set of valves and diaphragms arranged in such manner that the pressure of the internal gas produces the obturation of the passages leading to the whistle, so long as such pressure is higher than the strength of a spring especially calculated or adjusted to force said whistle out, in its operative position, as soon as said internal pressure falls under a predetermined level, this opening the passage for the gas to the mouth-piece of the whistle and blowing the same.

We claim:

1. A casing to be put into communication with an enclosure containing fluid under pressure, a whistle movably mounted on the casing, pneumatically-actuated means in the casing to engage the whistle and normally hold it in inoperative position, said means on a reduction in the pressure of said fluid releasing the whistle, and means for projecting the whistle to sound an alarm when released.

2. A casing for connecting with an enclosure containing fluid under pressure, the casing having a bearing, a movable tubular whistle in the bearing, the casing having an open-

ing to communicate with the inside of said bearing, pneumatically-actuated means in the casing and comprising a part to pass through said opening to engage the whistle and normally hold it in the bearing, said means acting on a reduction of pressure of said fluid to release the whistle, and means for causing the whistle to move when released into position to sound an alarm indicating said reduction of pressure.

3. A casing for connection with an enclosure containing fluid under pressure, the casing having an opening, a tubular part having an outlet aperture in said opening, a flexible cap in the casing to which said part is connected, a valve in the casing carrying a resilient member with a stem to project into the adjacent end of the part to close same, an alarm element held by said tubular part out of operative position, and means for causing movement of said element when released by said tubular part, the pressure of said fluid normally causing the cap to hold the tubular part in engagement with the alarm element to prevent movement thereof and the resilient member closing one end of said tubular part, a reduction of said pressure enabling the means for moving said element to actuate same and causing relative movement of said member and said part to permit said fluid to be discharged from said part to actuate said alarm element.

4. A casing for connection with an enclosure containing fluid under pressure, the casing having a bearing thereon and an opening leading from the inside of the casing into said bearing, a tubular whistle in said bearing, a spring to project said whistle into operative position, a flexible cap in the casing, a tubular part having an outlet connected to the cap and disposed in said opening, a valve carrying a resilient member in the casing having a stem to project into the tubular part, the pressure of said fluid normally acting upon the tubular part to cause said part to hold the whistle against the force of said spring, reduction of said pressure enabling the spring to project the whistle into operative position and the cap then moving the tubular part to project the end thereof into said bearing and permit fluid to pass through the outlet of said tubular part to the whistle to operate the latter, said whistle having a bevelled edge to enable it to be pushed back in the bearing, the end of said tubular part being then engaged by said edge to move said part backward into said casing.

In testimony that we claim the foregoing as our invention, we have signed our names hereto.

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