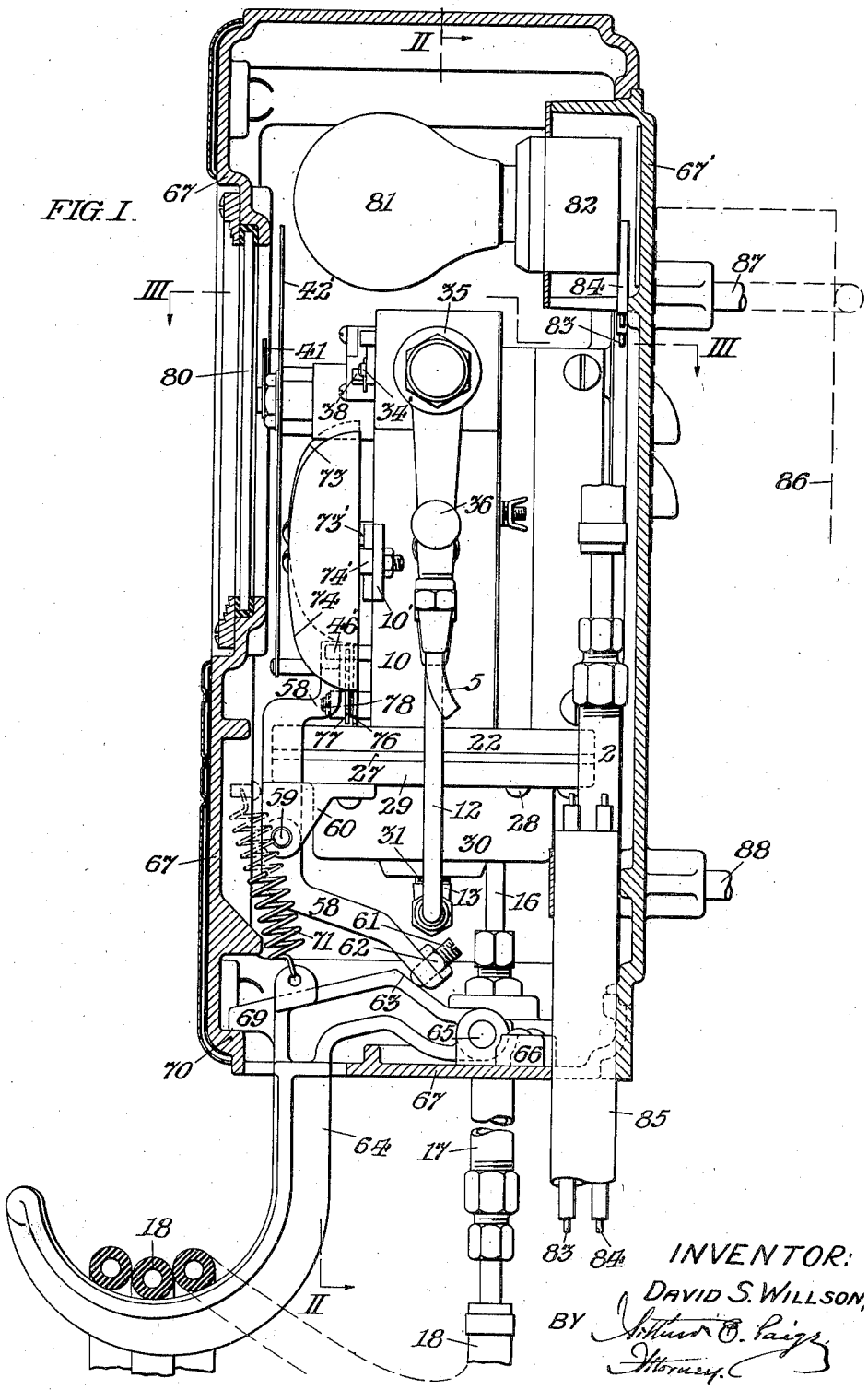
Aug. 9, 1938. D. S. WILLSON 2,126,693

FLUID DISPENSING APPARATUS

Filed July 6, 1936 4 Sheets-Sheet 1

FIG. I.



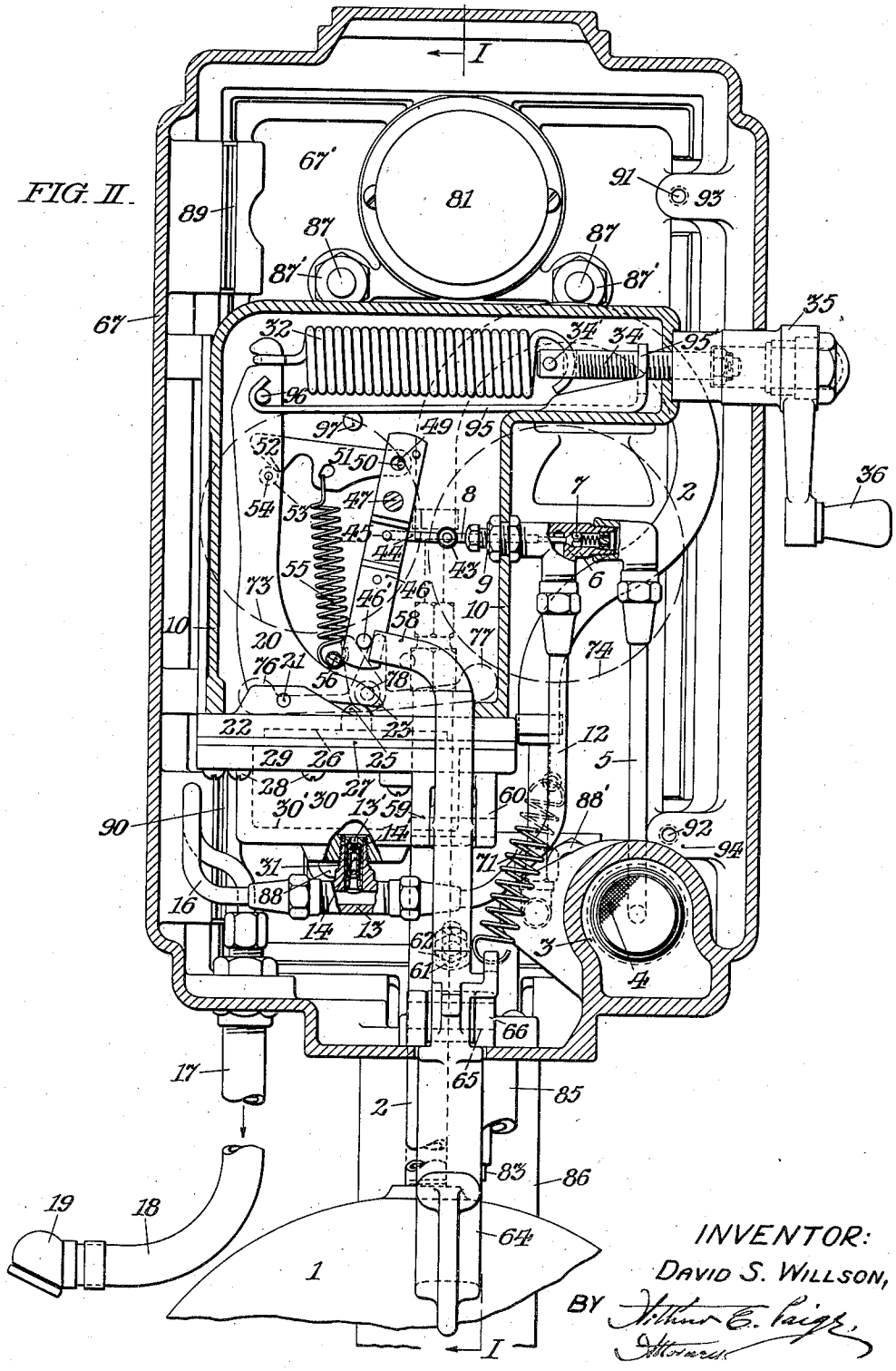
INVENTOR:
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FLUID DISPENSING APPARATUS

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FIG. II.



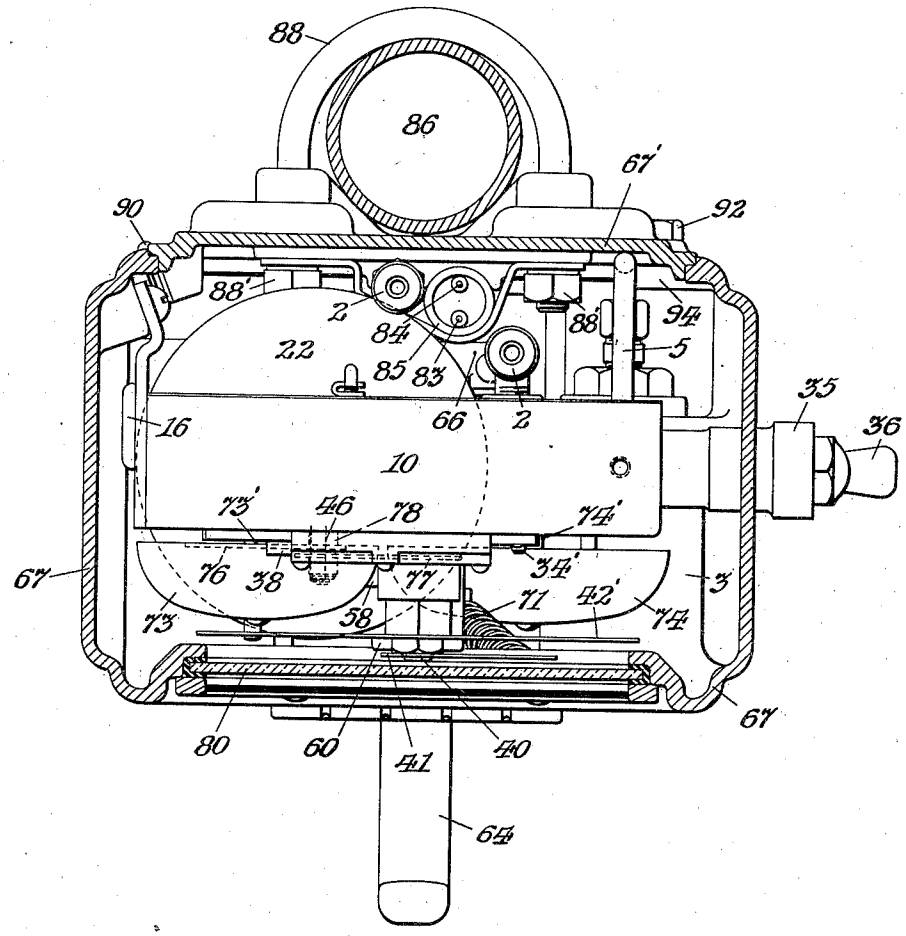
INVENTOR:
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FLUID DISPENSING APPARATUS

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FIG. III.



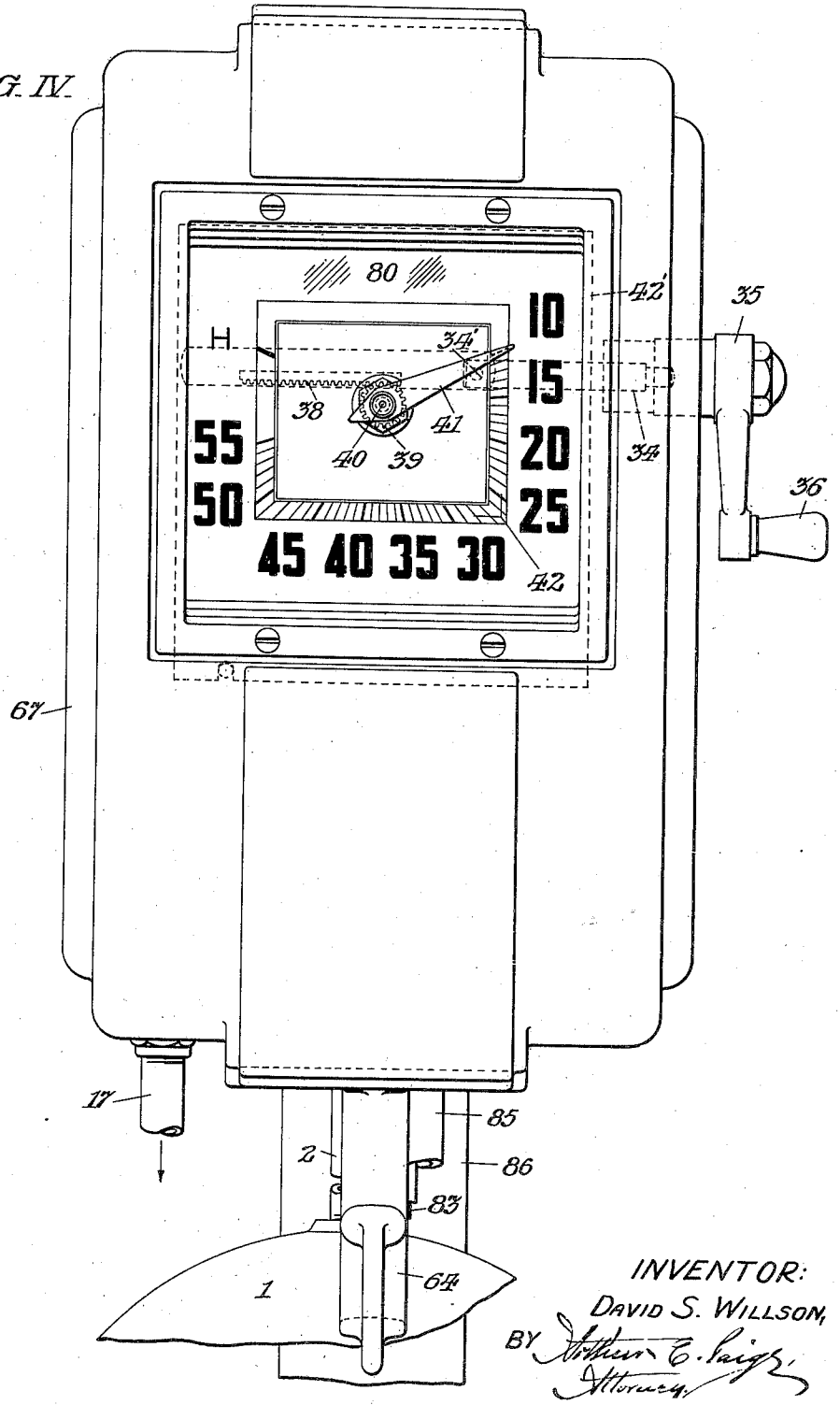
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Aug. 9, 1938. D. S. WILLSON 2,126,693

FLUID DISPENSING APPARATUS

Filed July 6, 1936 4 Sheets-Sheet 4

FIG. IV.



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Patented Aug. 9, 1938

2,126,693

UNITED STATES PATENT OFFICE

2,126,693

FLUID DISPENSING APPARATUS

David S. Willson, Conshohocken, Pa., assignor to John Wood Manufacturing Company, Inc., Conshohocken, Pa., a corporation of Delaware

Application July 6, 1936, Serial No. 89,098

7 Claims. (Cl. 221—73.5)

My invention relates to devices for controlling the pulsatory delivery of air, from any source of compressed air, into a receiver, for instance, a vehicle tire, to charge such receiver to any pressure less than that of the source and variably predeterminable by manual adjustment of an element of said device.

Such a device includes means to audibly indicate to the operator and the customer, the beginning, continuance, and termination of such delivery when the predetermined pressure has been delivered, preferably including a bell which is sounded by each pulsation of air through said device.

My invention is particularly applicable to such air dispensing apparatus wherein a valve is controlled by a diaphragm subjected to the pressure of the air dispensed, which valve is closed when the back pressure from the receiver reaches the predetermined pressure for which the device has been set.

Although such apparatus is designed to be automatically operative as aforesaid; it has been found in practice that the wear to which the stem of said valve is subjected will permit a small leakage of air unless the valve packing is frequently adjusted. Such leakage is negligible, as far as loss of compressed air is concerned, but incidentally causes the device to continue to pulsate after the termination of an inflating operation and to consequently continue to sound the signal when the device should be idle and silent.

Letters Patent of the United States 1,980,148 granted November 6, 1934, to Joseph C. Woodford for improvement in Fluid dispensing apparatus sought to remedy the objection aforesaid by the interposition of a safety valve which would prevent the leakage of air through the apparatus which would cause the idle operation aforesaid.

The object and effect of my present invention is to prevent such abnormal operation and signalling of such a device by providing means to automatically engage and restrain the mechanism controlled by the diaphragm aforesaid, when the predetermined pressure has been reached in the receiver as the consequence of an air dispensing operation, until the normal operation of the device is again initiated, by the operator.

As hereinafter described such restraining means is brought into effect at the completion of each dispensing operation by the weight of the hose through which the air is dispensed, which the operator then hangs upon a movable hose support, and is only released when the operator removes the hose from said support. Consequently, the present invention is operative to overcome the objection above stated regardless of whether the apparatus leaks or not.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In said drawings: Fig. I is a vertical sectional view of a casing containing the controlling mechanism of such dispensing apparatus, conveniently embodying my invention, with the hose hanging on the support to render the signalling device inoperative. Fig. II is a vertical sectional view, taken on the line II, II, in Fig. I, in the direction of the arrows on said line. Fig. III is a transverse plan sectional view taken on the line III, III, in Fig. I. Fig. IV is an elevation of said casing as seen from the left hand side of Fig. I.

Tire inflating apparatus embodying my invention may include a container 1 in which air is held under high pressure, say 150 pounds per square inch which may be conveniently maintained by an electrically operative air compressing pump local to said container. Air is dispensed from said container through conduit 2 which leads to the filter chamber 3 containing foraminous screen 4 or other suitable filtering material for eliminating dust from the air passed there through. The air passes from said chamber 3 through conduit 5 to the valve casing 6 which contains the reciprocatory valve 7 which closes in the direction of the passage of air through said casing 6 in which it is automatically reciprocated between its opened and closed positions by means of its stem 8 which is connected with controlling mechanism hereinafter described. Said stem 8 extends through the packing box 9 in the wall of the casing 10, and it is the packing in that box which must be frequently adjusted if leakage is to be prevented. When said valve 7 is opened the compressed air from the tank 1 passes downwardly from the casing 6 of said valve through the conduit 12 and T fitting 13 which is a casing for the timer valve 14. The air passes from said casing 13 through the conduits 16 and 17 to the flexible dispensing hose 18 which is provided at its free end with the check valve coupling 19 for engagement with the tubular valve stem of a vehicle tire, or any other receiver which is to be charged with compressed air.

The controlling mechanism for said valve 7 includes the main lever 20 which is fulcrumed at 21 in said casing 10 upon its base plate 22. The short arm 23 of said lever 20 is in contact with the axial stud 25 projecting upwardly from the

plate 26 which rests upon the flexible diaphragm 27. Said diaphragm is clamped to said base plate 22 by the screws 28 extending through the flange 29 of the cup shaped casing member 30 which contains the air chamber 30' beneath said diaphragm 27, with which said T fitting 13 is connected by its branch 31.

The effect of the arrangement above described is that whenever said valve 7 is opened the conduit leading to the check valve 19 is charged with compressed air at substantially the pressure in the supply tank 1, say, 150 pounds per square inch, and the diaphragm 27 is uplifted to turn said lever 20 counterclockwise against the stress of the spring 32 which extends from its upper end to the spring adjusting screw 34 which extends through the side wall of said casing 10, in engagement with the nut 35, which is provided with a handle 36 by which it may be turned to vary the stress upon said spring and in consequence upon said lever 20. Such adjustment is effected by axial movement of said screw without rotation of the latter when said handle is manually turned.

Said valve 14 gravitates to opened position when not uplifted by the pressure of air beneath its head 14', greater than the pressure of air in said chamber 30' and when opened permits free communication through the passage 13' for the escape of air from said chamber 30' back into the T fitting 13 and conduits 18 etc. connected therewith. When thus uplifted valve 14 does not entirely close said passage 13', and its effect is to retard the passage of air from the source 1 into said chamber 30' and thus retard the closing movement of the valve 7, which is effected only when the air pressure in chamber 30' is sufficient to stress the lever 20 and spring 32 to the position shown in Fig. II.

Said screw 34 carries the pin 34' to actuate an indicating device by which the operator can determine the air pressure to be delivered to the tire or other receiver by the aforesaid adjustment of said screw 34 by the handle 36. Such indicating device includes the rack 38 which is engaged with said pin 34' by which it is reciprocated. Said rack is in mesh with the pinion 39 on the shaft 40 which carries the indicating hand 41 which, by the movement of said rack, is caused to traverse a circular series of graduations 42 on the dial 42'. The effect of that arrangement is that when the spring 32 is stressed to such an extent as to cause the indicating hand 41 to register with any numbered graduation on said dial; that number represents the pressure of pounds per square inch to which the tire will be inflated by the operation of the mechanism above described.

In order to effect the pulsatory operation of said mechanism, by the automatic reciprocation of said valve 7; the stem 8 of that valve is connected by the pivot 43 with the link 44 pivoted at 45 on the trip lever 46 which is fulcrumed on the stud 47 projecting from said casing 10, and the upper end of said lever 46 has the opening 49 for loose engagement with the pin 50 projecting from the cam link 51. Said link 51 has at the free end thereof the pendent cam point 52 which, in the closed position of said valve 7 shown in Fig. II, has its lower point on the right hand side of the roller 53 which is journaled to turn freely on the stud 54 carried by said lever 20. Said link 51 is continuously stressed downward by the spring 55 which extends from it to the stud 56 which is stationary on said casing 10. The purpose of said link 51 and spring 55 is to impart a snap action to said lever 46 and to the valve 7 when said lever 46 is free to oscillate.

Such action is effected by the descent of the cam point 52 under stress of the spring 55 alternately upon opposite sides of said roller 53 on the lever 20; said point being prevented from resting on the upper dead center of said roller 53 by the loose connection of the link pin 50 in the hole 49 in said lever 46, which permits the spring 55 to freely slide the link 51 in either direction across dead center when the latter is presented to the cam point 52 by relative movement of said lever 20.

In order to engage and hold the mechanism above described idle and noiseless, at the termination of each operation of charging a tire, and with the valve 7 in its normal idle closed position indicated in Fig. II; I provide said trip lever 46 with a detent stud 46' which, as shown in Fig. I, extends through the front of the casing 10 into engagement with the detent lever 58, as shown in Figs. I and II. Said lever 58 is fulcrumed on the shaft 59 in the bracket 60 which is fixed upon the flange 29 of said casing member 30. As shown in Fig. I, said lever 58 carries at the lower end thereof the adjustable abutment screw 61 which is held in properly adjusted position by the nut 62 so as to cooperate with the incline 63 on the hose supporting lever 64. Said lever is fulcrumed on the shaft 65 in the bracket 66 fixed upon the bottom wall of the outer casing 67 which forms a housing for the casing 10 and other elements above described. The adjustment of the screw 61 is such as to leave the upper end of the lever 58 in the path of said detent stud 46', when said hose lever 64 is depressed to the limit of its downward movement by the weight of the hose 18 hung thereon as indicated in Fig. I; which movement is limited by the lug 69 on said lever 64 encountering the ledge 70 on the front wall of said casing, shown in Fig. I. When said hose 18 is lifted from said supporting lever 64 the latter is uplifted by the spring 71 which extends from it to the front wall of said casing 70 with the effect that the surface of the incline 63 is thrust against the end of said screw 61, far enough to thrust the upper end of said lever 58 out of the path of said detent pin 46'.

The mechanism above described being in the normally idle position shown in Fig. II, and with the hose 18 holding the hose supporting lever 64 down as in Fig. I; the operation of charging a tire or other receiver with compressed air is initiated by removing said hose 18 from said lever 64 and thus freeing the trip lever 46 for oscillation. The check valve 19 at the end of the flexible hose 18, which valve is known to the trade as a "chuck" is then applied to the valve tube of a tire or other inlet to a receiver with the effect of opening said valve 19 and permitting the air under its initial pressure of 150 pounds per square inch to escape from said source 1 and the conduits connected therewith into the receiver. Such action permits the escape of air from the chamber 30' beneath the diaphragm 27 with the effect that the spring 32 pulls said lever 20 to the right in Fig. II until the point of the cam on the link 51 is snapped past the dead center of the roller 53 to the left in Fig. II by the stress of the spring 55 thus thrusting the valve 7 to its opened position and permitting the escape of the compressed air through conduits 2, 5, 12, 16, 17, and 18, into the tire or other receiver. Such sudden increase of the air pressure in the fitting 13 beneath the valve 14 uplifts the latter to restrict the free flow of air

through the passageway 13' so as to retard the restoration of the parts to their position shown in Fig. II in which the valve 7 is closed, while a pulsation of the highly compressed air is thus injected into the tire. That pulsation of air into the receiver is terminated when the pressure of air from the source 1 rises in the chamber 30' to such a degree as to again turn the lever 20 counter-clockwise and cause the parts to again snap into position shown in Fig. II, in which the valve 7 is again closed. When the pressure in the hose 18 and the conduits connected therewith, and the air chamber 30', is reduced to that for which the screw 34 has been adjusted by the manipulation of the handle 36, say, 40 pounds per square inch, the spring 32 again pulls the lever 20 clockwise so that the cam 52 of the link 51 snaps down on the left hand side of the roller 53 in Fig. II, to again open said valve 7 for another pulsation of the highly compressed air into the tire.

In order to produce an audible signal by each such pulsation of air through the apparatus; I find it convenient to provide two bells 73 and 74, which are mounted in the relative positions indicated by the dash lines in Fig. II, upon the front of the casing 10, as shown in Fig. I, by means of respective posts 73' and 74' which latter is conveniently supported in a flange 10' projecting from the side of the casing 10 as indicated in Fig. I. Said bells are arranged to be alternately struck by respective clappers 76 and 77, each of which is a bell crank lever fulcrumed on the shaft 78 projecting from the front of said casing 10 as shown in Fig. I. The short arms of said clapper levers 76 and 77 are alternately struck by the detent pin 46' carried by the trip lever 46 as the latter is snapped back and forth by the action of the spring 55 and parts connected therewith as above described. Consequently, during the continued normal operation of said apparatus to charge a receiver with compressed air, the operator and the customer are both informed of such continuation by the sounding of said bells. However, the mechanism comes to rest with the trip lever 46 in the position shown in Fig. II and the inflating operation is terminated by the fact that the air in the hose 18 and the pressure of air in the chamber 30' balances the stress of the spring 32 to which it has been set as aforesaid.

As shown in Fig. I, I find it convenient to cover the dial and indicating hand aforesaid with the transparent glass panel 80. Also to provide the incandescent lamp bulb 81 to illuminate said dial; said bulb being mounted in the socket 82 and supplied with electrical energy through the conductors 83 and 84, which, as shown at the lower portion of said view, extend exterior to the casing 67 through the conduit 85, to any convenient source of energy.

Although the structure above described may be supported at the desired height convenient to the operator by any suitable means; as indicated in Fig. III, I find it convenient to support the casing 67 upon the vertical column 86, (conveniently a piece of ordinary wrought iron pipe,) by means of two clamps 87 and 88 which are U-shaped bolts provided with respective nuts 87' and 88'.

In order to facilitate inspection and repairs within said casing 67 I prefer to make the rear wall 67' thereof separate from the rest of said casing and connect the same by the two hinges 89 and 90 indicated in Figs. II and III. The right hand edge of said casing wall 67' may be provided with any suitable fastening means, exemplified by the screws 91 and 92 which extend through said wall 67' into the lugs 93 and 94, on the other part of said casing 67.

I also find it convenient to provide means whereby said screw 34 and its pin 34' may be used to shift said lever 20 clockwise, by rotation of said handle 36, to the limit of movement of said lever 20 to permit a receiver to be charged to the high pressure maintained in the container 1, without pulsatory operation of the mechanism as above described, and subject to control only by the chuck valve 19 at the end of the dispensing hose. When thus adjusted the pointer 41 registers with the graduation mark indicated at H on the dial 42'. Such means includes the hook plate 95 which, as shown in Fig. II, is engaged with the pin 96 on said lever 20 and is supported by the stud 97 in said casing 10, and has its right hand end 95' notched to embrace the screw 34. When said handle 36 is turned by the operator to draw the screw 34 to the right in Fig. II, to the limit of its movement, said pin 34' encounters the end 95' of said hook plate 95 and holds it against the right hand end of the casing 10, and thus prevents the normal automatic pulsatory operation of the device by maintaining direct communication from said container 1 into the receiver until said screw is restored to its normal position for pulsatory operation of the device by reverse rotation of said handle 36.

However, I do not desire to limit myself to the precise details of construction, arrangement, or method of operation of the apparatus above set forth; as it is obvious that various modifications may be made therein without departing from the essential features of my invention as defined in the appended claims.

I claim:

1. In a device of the class described, means for automatically preventing irregular operation thereof, including an air service line having a valve controlled portion, and means for discharging air in successive charges when said valve is opened, comprising a second valve in the air service line, a lever, means for subjecting the lever to pressure in the air line between said valves; a spring arranged to stress said lever in opposition to the effect of air pressure on said lever; whereby said lever is oscillated by successive charges; means for variably predetermining the maximum pressure between said valves, including means for adjustably varying the stress of said spring upon said lever; and means for detaining said lever in one extreme position of oscillation when the air between said valves reaches such predetermined pressure, including a movable support for said valve controlled portion of the line, when in idle position, with means movable to detain said lever when said line is hung on said support.

2. In a device of the class described, means for automatically preventing irregular operation thereof, including an air service line having a valve controlled portion, and means for discharging air in successive charges when said valve is opened, comprising a second valve in the air service line, a lever, means for subjecting the lever to pressure in the air line between said valves; a spring arranged to stress said lever in opposition to the effect of air pressure on said lever; whereby said lever is oscillated by successive charges; means for variably predetermining the

maximum pressure between said valves, including means for adjustably varying the stress of said spring upon said lever; and means for detaining said lever in one extreme position of oscillation when the air between said valves reaches such predetermined pressure; including a stop pin on said lever, a movable support for said valve controlled portion of the line, when in idle position, and an intermediate lever between said support and said oscillatory lever, movable to engage said pin, when said line is hung on said support.

3. In a device of the class described, means for automatically preventing irregular operation thereof, including an air service line having a valve controlled portion, and means for discharging air in successive charges when said valve is opened, comprising a second valve in the air service line, a lever, means for subjecting the lever to pressure in the air line between said valves; a spring arranged to stress said lever in opposition to the effect of air pressure on said lever; whereby said lever is oscillated by successive charges; means for variably predetermining the maximum pressure between said valves, including means for adjustably varying the stress of said spring upon said lever; and means for detaining said lever in one extreme position of oscillation when the air between said valves reaches such predetermined pressure, including a stop pin on said lever; and a movable support for said valve controlled portion of the line, when in idle position, movable to engage said pin, when said line is hung on said support.

4. Apparatus as in claim 3, including an audible signaling device arranged to be operated by said lever and wherein the detent means is operative to prevent operation of said signaling device when the pressure to which said apparatus is adjusted is reached.

5. In a device of the class described, means for automatically preventing irregular operation thereof, including an air service line having a valve controlled portion, and means for discharging air in successive charges when said valve is opened, comprising a second valve in the air service line, a lever, means for subjecting the lever to pressure in the air line between said valves; a spring arranged to stress said lever in opposition to the effect of air pressure on said lever; whereby said lever is oscillated by successive charges; means for variably predetermining the maximum pressure between said valves; including means for detaining said lever in one extreme position of oscillation when the air between said valves reaches such predetermined pressure, including a stop element on said lever; and a movable support for said valve controlled portion of the line, when in idle position, movable to engage said stop element, when said line is hung on said support.

6. In a device of the class described, means for automatically preventing irregular operation thereof, including an air service line having a valve controlled portion, and means for discharging air in successive charges when said valve is opened, comprising a second valve in the air service line, a lever, means for subjecting the lever to pressure in the air line between said valves; a spring arranged to stress said lever in opposition to the effect of air pressure on said lever; whereby said lever is oscillated by successive charges; means for variably predetermining the maximum pressure between said valves; including means for detaining said lever in one extreme position of oscillation when the air between said valves reaches such predetermined pressure, including a stop element on said lever; and a movable support for said valve controlled portion of the line, when in idle position, movable to engage said stop element, when said line is hung on said support; whereby said apparatus is locked in inoperative condition, regardless of the reduction of pressure of air therein.

7. Apparatus as in claim 3, including an audible signaling device arranged to be operated by said lever and wherein the detent means is operative to prevent operation of said signaling device when the pressure to which said apparatus is adjusted is reached; whereby said apparatus and signaling device are locked in inoperative condition, regardless of the reduction of pressure of air in said apparatus.

DAVID S. WILLSON.