H. CASLER.

TIRE PUMP.

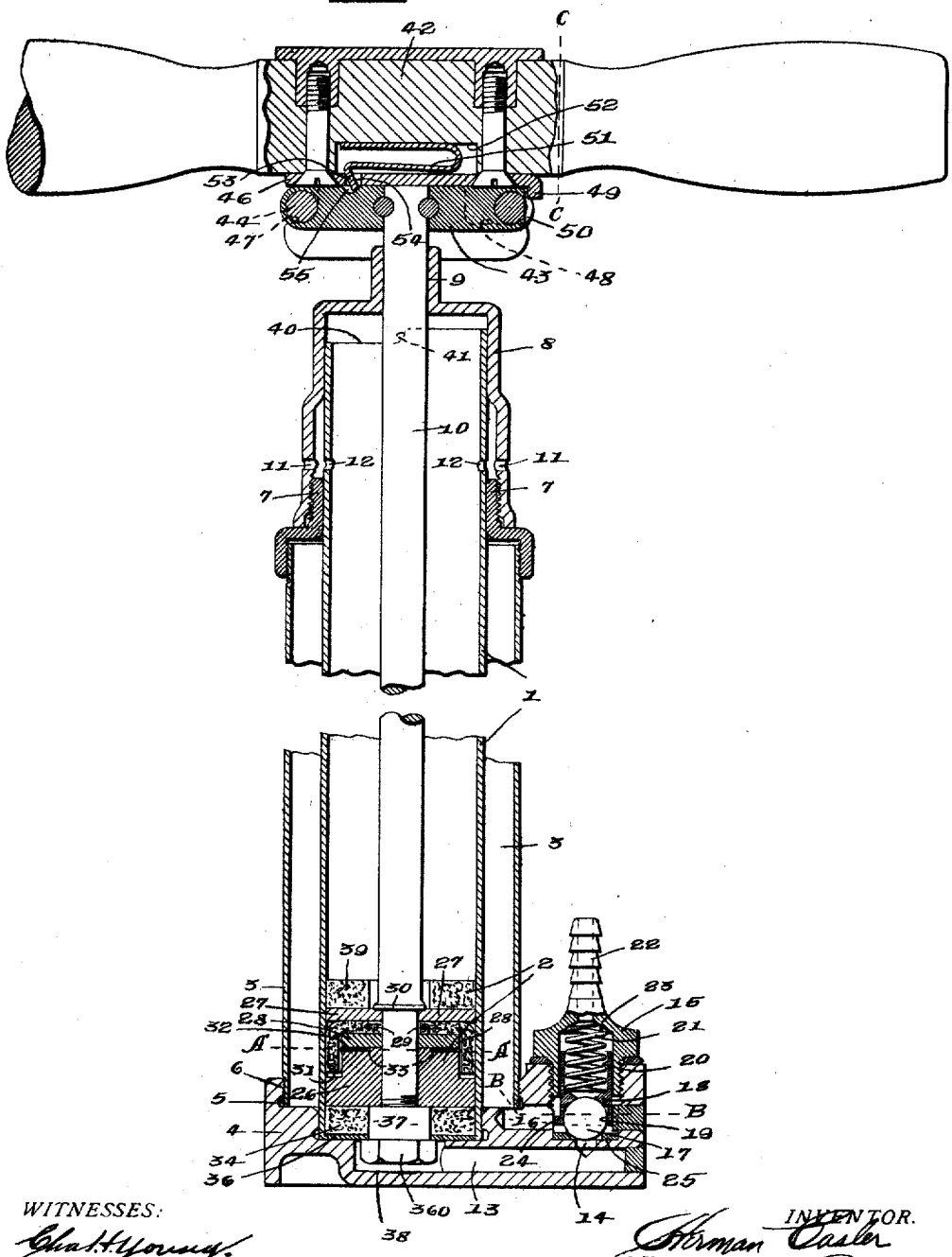
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1,307,039.

Patented June 17, 1919.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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2 SHEETS—SHEET 2.

Fig. 2.

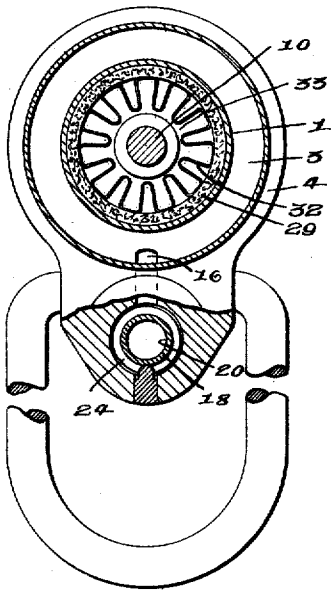


Fig. 5.

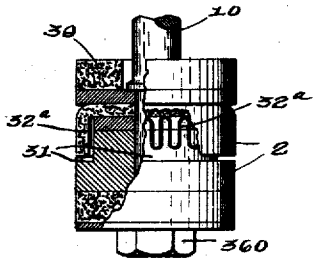


Fig. 6.

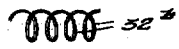


Fig. 3.

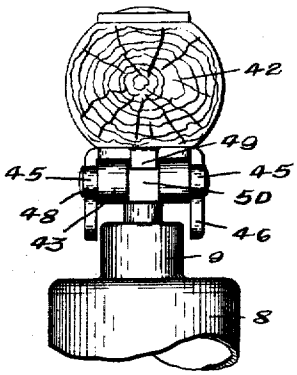
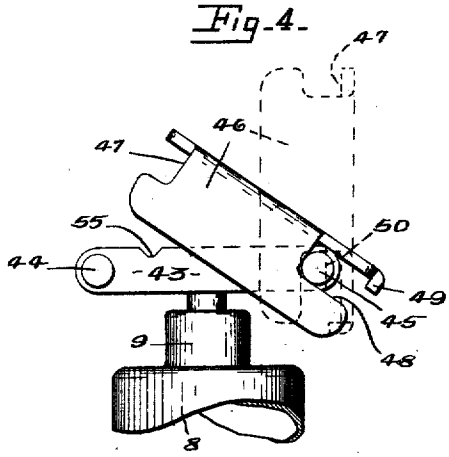


Fig. 4.



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UNITED STATES PATENT OFFICE.

HERMAN CASLER, OF CANASTOTA, NEW YORK.

TIRE-PUMP.

1,307,039. Specification of Letters Patent. Patented June 17, 1919.

Application filed May 28, 1914. Serial No. 841,479.

To all whom it may concern:

Be it known that I, HERMAN CASLER, a citizen of the United States, and a resident of Canastota, in the county of Madison and State of New York, have invented a certain new and useful Tire-Pump, of which the following is a specification.

This invention relates to tire or air pumps. One of the objects thereof is means whereby an air receiver is compactly embodied in the structure. Another object is a particularly simple piston construction. Another object is a means by which the handle can be attached and detached so that the pump can be readily packed in the tool box of a vehicle. Other objects will appear throughout the specification. The invention consists in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings, in which like characters designate corresponding parts in all the views.

Figure 1 is a vertical sectional view, partly broken away, of this tire pump.

Fig. 2 is an enlarged sectional view, taken partly on line A—A, and partly on line B—B, Fig. 1.

Fig. 3 is a section on line C—C, Fig. 1.

Fig. 4 is a detail view of the means for attaching the handle to the piston rod.

Fig. 5 is a modification of the piston; and

Fig. 6 is a detail view of different forms of piston spring.

1 is the cylinder or barrel of the pump, 2 the piston as a whole, and 3 the air receiver which, in this embodiment of my invention, is in the form of an annular chamber around the cylinder or barrel 1. The cylinder 1 is mounted in a suitable base 4 which is formed with a recess 5 for receiving the lower end of the cylinder, the bottom of the recess constituting the bottom of the cylinder.

The receiver 3 has a threaded connection at 6 with the base 4, and is provided with a closure in the form of a cap at its upper end which terminates in an upwardly extending tube 7 engaging the periphery of the barrel or cylinder 1. The cylinder is closed at its upper end by a cap 8 threading on the tube 7 and formed with an upwardly extending bearing 9 at its top which guides the piston rod 10. The cap 8 and the cylinder 1 are formed with alined air inlet openings 11 and 12.

The base 4 is also formed with an outlet 13 opening through the bottom of the cylinder 1 and having a branch 14 leading through a coupling 15 by means of which connection is made with a hose to the tire. The base is also provided with an additional branch outlet 16 leading from the branch 14 into the receiver 3. A suitable check valve is located in the branch 14 near the junction of the branches 14, 16 to check the back flow of air from both branches into the main outlet 13.

The coupling 15 threads into the base, and the check valve is a ball 17 which is carried by a spring pressed cage 18 located in the coupling 15, the cage having a socket 19 at its lower end for receiving the ball, and a socket 20 opening through its upper end and forming a seat for the spring 21 which extends into said socket and bears at its lower end against the bottom of the socket 20 and at its upper end against the upper wall of the passage within the body of the coupling 15. This coupling also includes a nipple 22 at its upper end which has a passage communicating with the passage of the main body of the coupling 15, and of less diameter than the same, thus providing a shoulder 23 for the upper end of the spring 21.

The cage 18 is provided at its lower edge with an annular flange 24 which extends under the lower end of the coupling 15 and limits the outward throw of the cage 18 under the influence of the air pressure. After the ball has been placed in its socket, the edge of the socket contiguous to the ball is snugly pressed over the periphery of the ball to retain the ball in position and to hold the ball from turning relatively to its seat and the cage 18. The seat for the ball is preferably provided on a washer 25, and in order that the ball may fit said seat, the ball, after its securement in the cage, is placed on the washer and is impressed into the washer by striking the cage, and thus forming the seat.

The described check valve consisting of the ball 17 and the cage 18 is particularly economical in manufacture and efficient in use, since the ball and the cage are cheaply assembled, and the ball is made extremely cheaply and accurately by automatic machinery, and the cage, which guides the ball in its movement is not required to accurately fit the internal cavity of the coupling which receives the cage, and the cage by holding

the ball from turning relatively to its seat and the cage, insures the contact with the seat, of the surface of the ball forced against the washer 25 to form said seat and thus avoids any liability of leakage due to irregularity in the form of the ball, which irregularity, if the ball turned, might permit of leakage.

The piston includes the rod 10, a head 26 mounted on the rod, disks 27 and 28 mounted on the rod above the head 26, a packing disk or washer 29 interposed between the disks 27, 28, and having a downturned margin which engages the inner face of the cylinder 1. The disk 27 slidably fits the cylinder 1 and abuts against an annular downwardly facing shoulder 30 on the rod 10. The disk 28 is of smaller diameter than the disk 27 so that its periphery is spaced apart from the inner wall of the cylinder 1, and the head 26 is formed with an annular rabbet 31 opening through its periphery and through its upper face and alined with the space between the periphery of the disk 28 and the inner wall of the cylinder 1. The packing disk or washer extends over the periphery of the disk 28 and into the rabbet of the head 26.

Means is provided for pressing the margin of the disk 29 against the wall of the cylinder, said means consisting of an annular expansible and contractile spring arranged to press radially on the downturned margin of the disk 29. Preferably, said spring consists of a single piece or length of metal as a wire having its ends joined together and being bent throughout its length into a tortuous or zigzag path forming lobes which press against the margin of the disk 29. Owing to this formation, the spring can expand and contract radially at all points equally and occupies a very small space. The spring 32 shown in Figs. 1 and 2 is flat and located between the upper face of the head 26 and the disk 28, and is here shown as located in an annular recess 33 formed in the upper face of the head 26, and as consisting of a single piece of wire bent to form radial projections all arranged in the same plane and in the form of lobes narrower at their bases than at their ends, the ends engaging the inner face of the margin of said packing disk 29. Owing to the formation of the spring, it contracts in a plane, from normal into a circle of smaller diameter, and when in position tends to expand into a circle of the normal diameter of the spring and to press against the margin of said packing disk 29. The spring may, however, be formed cylindrical with its zigzags or lobes arranged vertically or parallel to its axis, and such spring may be located in the rabbet 31, as shown at 32^a in Fig. 5; or the spring may be composed of a wire in which parts of contiguous zigzags or loops closely lap upon each other, as shown at 32^b in Fig. 6. Instead of forming the springs illustrated in Figs. 1, 2 and 5, of wire, they may be stamped from sheet metal in the forms illustrated.

It will be particularly noted that the zigzags or lobes of the springs form a ring which is of less thickness in one direction than in a direction at a right angle thereto, and that the loops composed of the zigzags or lobes are arranged edgewise with opposite sides thereof spaced apart a distance less than the length of the loops. To those skilled in the art it will be understood that the described construction of spring not only occupies a minimum space, but since it is in the form of a ring narrow in one direction (axially, as shown in Figs. 1 and 2, or radially, as shown in Figs. 5 and 6), a minimum space is provided contiguous to the spring for the presence of air, and thus the efficiency of the pump is augmented.

The piston also includes a cushion 34 carried at its lower end and interposed between the lower end of the head 26, and a metal washer 36 at the lower end of the piston, the washer 36 being held in position by suitable means as a nut 360 threading on the lower end of the rod 10. A suitable spacer is interposed between the nut and the head 26, this spacer being preferably a cylindrical extension 37 of the nut. The spacer prevents compression of the cushion by the nut 360 and transmits the compression of the nut to the head so that the parts of the piston with the exception of the cushion are pressed toward the shoulder 30 on the rod.

When the piston is in the lower end of the cylinder 1, as indicated in Fig. 1, the nut 360 enters the entrance end of the outlet 13, which entrance end is in the form of a recess 38 opening through the bottom of the cylinder 1, that is, the bottom of the recess 5. A suitable cushion 39 rests on the upper face of the washer 27 and engages the end wall of the cap 8 when the piston is pulled upwardly to its full extent.

Owing to the arrangement of the cushion 34, there is practically no air space between the piston and the bottom of the cylinder when the piston is at the limit of its down stroke, and owing to the fact that the cushion 34 is carried by the piston, the heated compressed air does not pass through the cushion, which is of fibrous material and is more or less liable to injury by heating. Furthermore, the cushion is cooled by the air rushing into the cylinder on each upstroke of the piston.

In order that the piston may be readily placed in the cylinder 1, a portion, substantially one-half, of the upper edge of the cylinder is cut out, as shown at 40. Hence, a portion of the piston can be inserted in the cylinder and upon rotation of the piston

the packing ring, owing to the cut out 40, will tuck under the side edge 41 of the high portion of the cylinder so that it is not necessary to squeeze the packing ring by hand at all points on its periphery, to fit it within the cylinder 1.

42 designates the handle as a whole, which is attached to the piston rod 10 by vertical movement, with the handle in vertical position substantially parallel to the rod, and by a horizontal movement after swinging the handle into a horizontal position, the horizontal movement of the handle bringing shoulders and notches provided on the handle and on the head of the piston rod into interlocking engagement. The handle is detached by the reverse of these movements.

As here shown, the piston rod is provided with a head 43 at its upper end and with two sets of laterally extending shoulders 44, 45 on opposite sides of the rod; and the handle is provided with a socket piece 46 for receiving the head and having open ended, laterally extending slots 47, 48, for interlocking with the shoulders 44, 45, the slots opening through opposite ends of the socket piece 46. The socket piece 46 and the head 43 are also provided with a tongue and groove which interlock only by a vertical movement of the handle when the handle is in vertical position substantially parallel to the piston rod, the socket piece 46 being formed with the tongue 49 at one end, and the head 43 being formed with the groove 50 at one end for receiving the tongue.

In operation, in attaching the handle 42, it is moved so that the socket piece 46 is in vertical position as shown by dotted lines, in Fig. 4, with the tongue 49 alined with the groove 50. Upon downward movement of the handle 42 and the socket piece 46, the tongue 49 enters the groove 50 and the open ends of the slots 48 of the socket piece 46 receive the shoulders 45. The handle is then moved about the axis of the shoulders 45 until the socket piece 46 fits over the head 43 bringing the open ends of the slots 47 at the other end of the socket piece into alinement with the shoulders 44 of the head, whereupon the handle is moved laterally relatively to the rod so that the slots 47 receive the shoulders 44 while the other shoulders 45 remain in their slots 48. The handle is frictionally locked from lateral sliding movement by a spring snap catch 51 located in a recess 52 in the handle above the socket piece 46, the catch having a lug 53 projecting through a slot 54 in the socket piece into a notch 55 in the upper face of the head, this notch having an inclined side which forces the lug 53 out of the notch 55 when sufficient pressure is applied laterally on the handle in such direction as to move the socket piece out of interlocking engagement with the shoulders 44. The spring catch 51 exerts sufficient pressure to prevent displacement of the handle laterally in the normal operation of the pump.

In removing the handle 42, it is moved laterally to disengage the socket piece 46 from the shoulders 44, and swung into vertical position about the shoulders 45, and lifted upwardly to disengage the socket piece from the shoulders 45 and move the tongue out of the groove 50.

In the operation of the pump, during the upstroke of the piston to the limit of its movement, air enters the openings 11 and 12, and during downstroke of the piston, the air is forced out through the outlet 13 as fast as it is pumped, the excess air passing into the receiver 3, and during upstroke of the piston, the air in the receiver passes back through the passage 16 past the check valve into the coupling 15 and into the tire. Thus there is no back pressure on the piston, and the operation of the pump is practically even.

What I claim is:

1. In a tire pump, a cylinder, and a piston movable in the cylinder including a rod, a head mounted on the rod and a cushion carried at the lower end of the head and movable therewith, the cushion having means at its lower end for striking the lower end of the cylinder, substantially as and for the purpose specified.

2. A tire pump comprising a cylinder, and a piston movable in the cylinder including a rod, a head mounted on the rod, a washer mounted on the rod below the head and a cushion interposed between the washer and the head, the washer being arranged to strike the lower end of the cylinder, substantially as and for the purpose set forth.

3. A tire pump comprising a cylinder, and a piston movable in the cylinder including a rod, a head mounted on the rod, a cushion below the head, a metal washer below the cushion for engaging the bottom of the cylinder, the washer engaging the lower end of the cylinder, and means at the lower end of the rod for engaging the washer to hold the same in position, substantially as and for the purpose described.

4. A tire pump comprising a cylinder, and a piston movable in the cylinder including a rod, a head mounted on the rod, a washer mounted on the rod below the head, a cushion interposed between the washer and the head, a nut threading on the lower end of the rod, and a spacer interposed between the nut and the head to prevent compression of the cushion by the nut, the base of the cylinder being formed with a depression for receiving the nut, the portion of the base around the depression being arranged in the path of the washer, substantially as and for the purpose specified.

5. A tire pump comprising a cylinder, and

a piston movable in the cylinder including a rod, a head mounted on the rod, a cushion located below the head, and means at the lower end of the rod for holding the cushion in position, the lower surface of the piston being designed to strike the bottom surface of the cylinder and one of said surfaces being formed with a depression for receiving said means, substantially as and for the purpose set forth.

6. A tire pump comprising a cylinder, and a piston in the cylinder including a rod, a head mounted on the rod, a cushion located below the head, a nut threading on the lower end of the rod, and a spacer interposed between the nut and the head to hold the cushion from compression by the nut, the pump being formed with a depression in the bottom of the cylinder for receiving the nut in order that the piston will strike the bottom of the cylinder, substantially as and for the purpose described.

7. A tire pump comprising a cylinder, and a piston movable in the cylinder including a rod, a head mounted on the rod, a metal washer located below the head and spaced apart therefrom, a disk cushion interposed between the washer and the head, means for holding the cushion on the lower end of the rod, and a spacer interposed between the means and the head and extending through the hole of the washer and the cushion for preventing the compression of the cushion by the nut, substantially as and for the purpose specified.

8. A pump comprising a cylinder, and a piston movable in the cylinder including a rod, a head mounted on the rod, a metal washer located below the head and spaced apart therefrom, a cushion interposed between the washer and the head, and a nut threading on the lower end of the rod and having a cylindrical extension extending through the washer and the cushion to hold the cushion from being compressed by the nut and serving as a spacer between the head and the nut, the cylinder having a base formed with a depression for receiving the nut and the washer striking the bottom of the cylinder on the base around the depression, substantially as and for the purpose set forth.

In testimony whereof, I have hereunto signed my name in the presence of two attesting witnesses, at Canastota, in the county of Madison, in the State of New York, this 23rd day of May, 1914.

HERMAN CASLER.

Witnesses:
S. DAVIS,
CHAS. H. YOUNG.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."