Aug. 14, 1923. 1,464,653

C. H. HALLAUER

PUMP AND PUMP PISTON

Filed Sept. 13, 1920

Fig. 1.

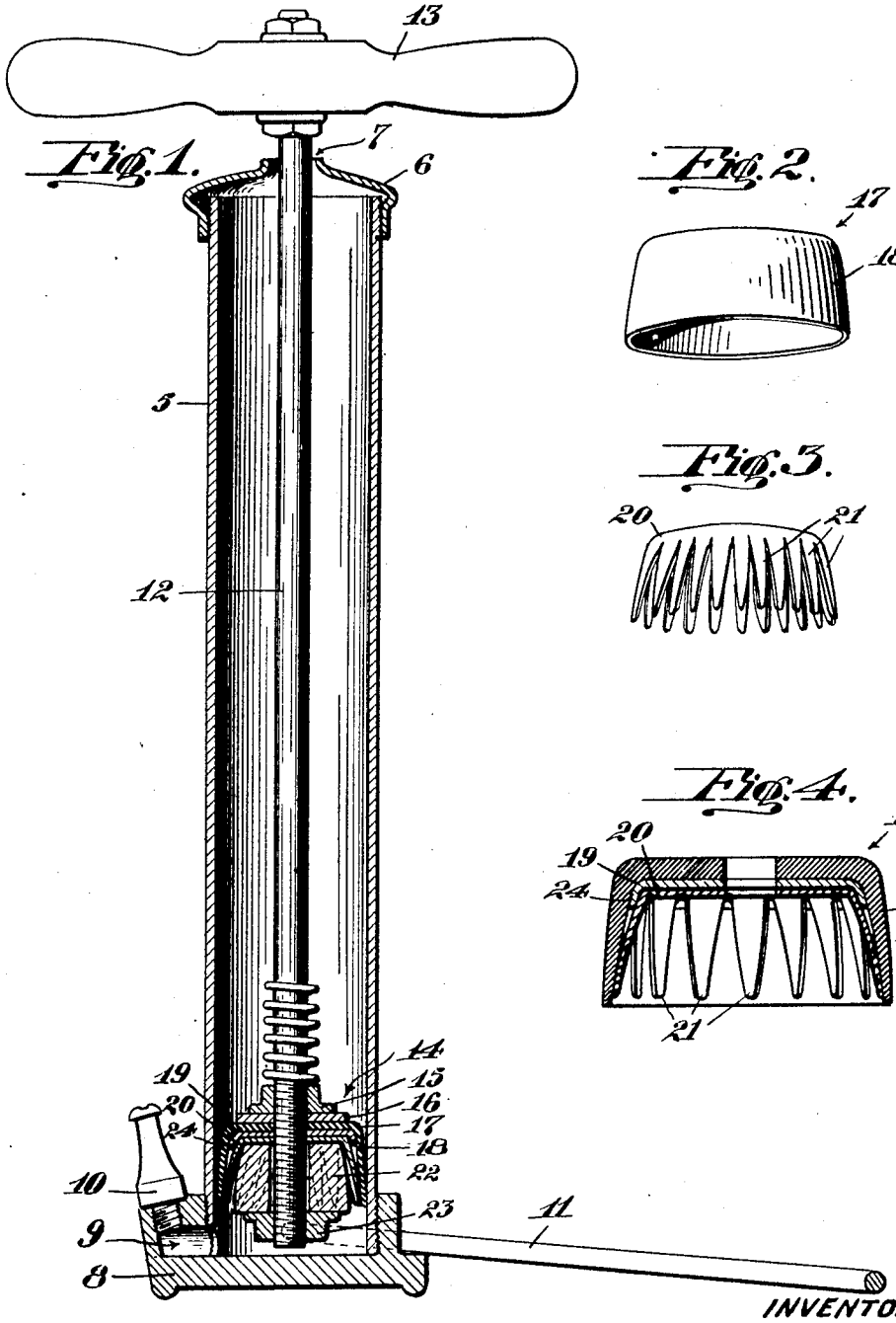


Fig. 2.

Fig. 3.

Fig. 4.

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PUMP AND PUMP PISTON.

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To all whom it may concern:

Be it known that I, CARL H. HALLAUER, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Pumps and Pump Pistons, of which the following is a specification.

This invention relates to a pump and particularly pertains to the construction of a piston therefor.

An object of this invention is to provide a pump which is especially adapted for use as an air pump of the type commonly employed in inflating pneumatic tires and to provide a piston therefor which is so constructed as to insure entrapment of the air on the force stroke of the piston and thereby prevent the loose inoperative stroke or missing of the pump which frequently occurs in the ordinary air pump particularly when the cup leathers with which the piston is equipped become hardened or excessively soft.

Another object is to provide a simple and effective means for expanding a cup leather on a piston to maintain it in close contact with the walls of the pump cylinder during the compression stroke, but which will permit ready contraction of the cup leather on the air intake or charging stroke.

A further object is to provide a cup leather spreader which is adapted to be applied to the piston of the ordinary hand operated air pumps without necessitating alteration of the construction of the usual piston parts.

Other objects will appear hereinafter.

The invention is illustrated in the accompanying drawings, in which:

Figure 1 is a view in vertical section of an air pump showing it as equipped with a piston in accordance with this invention.

Figure 2 is a detail in perspective of the cup leather.

Figure 3 is a detail in perspective of the cup leather spreader.

Figure 4 is a detail in section illustrating the cup leather as fitted with the spreader.

More specifically, 5 indicates a pump cylinder which may be of any suitable construction, which cylinder is here shown as fitted with a top cap 6 formed with an air inlet opening 7 and with the cylinder mounted on a base member 8 having an outlet passage 9 communicating with the interior of the cylinder 5 at its lower end and fitted with a check valve 10; the base 8 having a foot rest 11 attached thereto.

Extending into the pump cylinder through the air inlet opening 7 is a piston rod 12, the upper end of which is fitted with a handle 13 and the lower end of which carries a piston 14 in which the essence of the present invention is embodied. The lower end of the piston rod is fitted to receive a nut 15 constituting a shoulder or abutment against which a washer 16 rests, and seating against the washer 16 is a cup leather 17 having flexible side walls 18 which cup leather opens downwardly in the cylinder. A second washer 19 may be arranged in the cup leather 17 to bear against the bottom wall thereof. Mounted interiorly of the cup leather is an annulus 20, which is formed with a series of spring tines 21 which project upwardly from the annulus on substantially a frusto-conical plane, which tines are arranged to bear against the inner face of the flexible side wall 18 of the cup leather 17 to bear thereagainst, as shown in Figure 4 and act to press the wall 18 outwardly.

A filler block 22 is placed on the outer end of the piston rod and seats on the annulus 20; the filler block serving to nearly fill the space bounded by the spreader tines. A nut 23 is screwed on the piston rod against the filler block 22 and acts to clamp the filler block, the spreading member, the cup leather and the washers against the abutment 15 to hold the piston in place on the piston rod. The end of the piston rod terminates a short distance below the cup leather so as to prevent the cup leather from striking the bottom of the pump at the end of the downstroke of the piston. The filler block in substantially filling the space within the cup leather serves to displace air so that on the termination of the downstroke of the piston substantially all the air under pressure beneath the piston will be discharged from the pump.

In the operation of the invention, on the upstroke of the piston the pressure of air in the upper portion of the pump cylinder will be sufficient to crowd the flexible side of the cup leather inwardly in opposition to the pressure of the spring tines, so that air will flow to the underside of the piston. On the termination of the upstroke of the piston the spring tines will operate to press the flexible sides of the cup leather close against the inner face of the pump cylinder, so that on

the downstroke of the piston the cup leather will be sure to entrap the air therebeneath and thus prevent missing of the piston. In order that the spreader tines do not excessively oppose the flexure of the cup leather the tines are tapered from their inner to their outer ends and their narrower outer end portions formed with greater flexibility than their inner end portions.

The washer 19 is formed with a marginal flange 24 which extends between the base portion of the tines and the rounded shoulder of the cup leather formed at the base of its flexible flange, so as to prevent the cup leather from packing or jamming against the tines at their base and thereby act to press the outer ends of the tines inwardly and relieve their pressure against the outer portion of the cup leather flange.

I claim:

1. A piston comprising a piston rod, a cup leather, a seat on said piston rod on which said cup leather bears, a plate seated interiorly of said cup leather formed with a series of spring tines arranged to bear against the side of the cup leather to press the latter outwardly, and a washer interposed between the plate and the cup leather formed with an annular flange extending between the base of the tines and the cup leather and terminating in spaced relation to the edge of the cup leather.

2. A piston comprising a piston rod, a cup leather seated on said rod, a plate seated interiorly of said cup leather formed with a series of spring tines arranged to bear against the side of the cup leather to press the latter outwardly, a washer interposed between the plate and the cup leather formed with an annular flange extending between the base of the tines and the cup leather, and terminating in spaced relation to the edge of the cup leather, and a filler block on said piston rod extending over the spring plate with its periphery extending adjacent and spaced from the tines for the purpose set forth.

CARL H. HALLAUER.