G. W. BALDWIN & P. H. STAPLEY.

COMPOUND AIR PUMP.

APPLICATION FILED MAY 11, 1914.

1,149,324. Patented Aug. 10, 1915.

Fig. 1

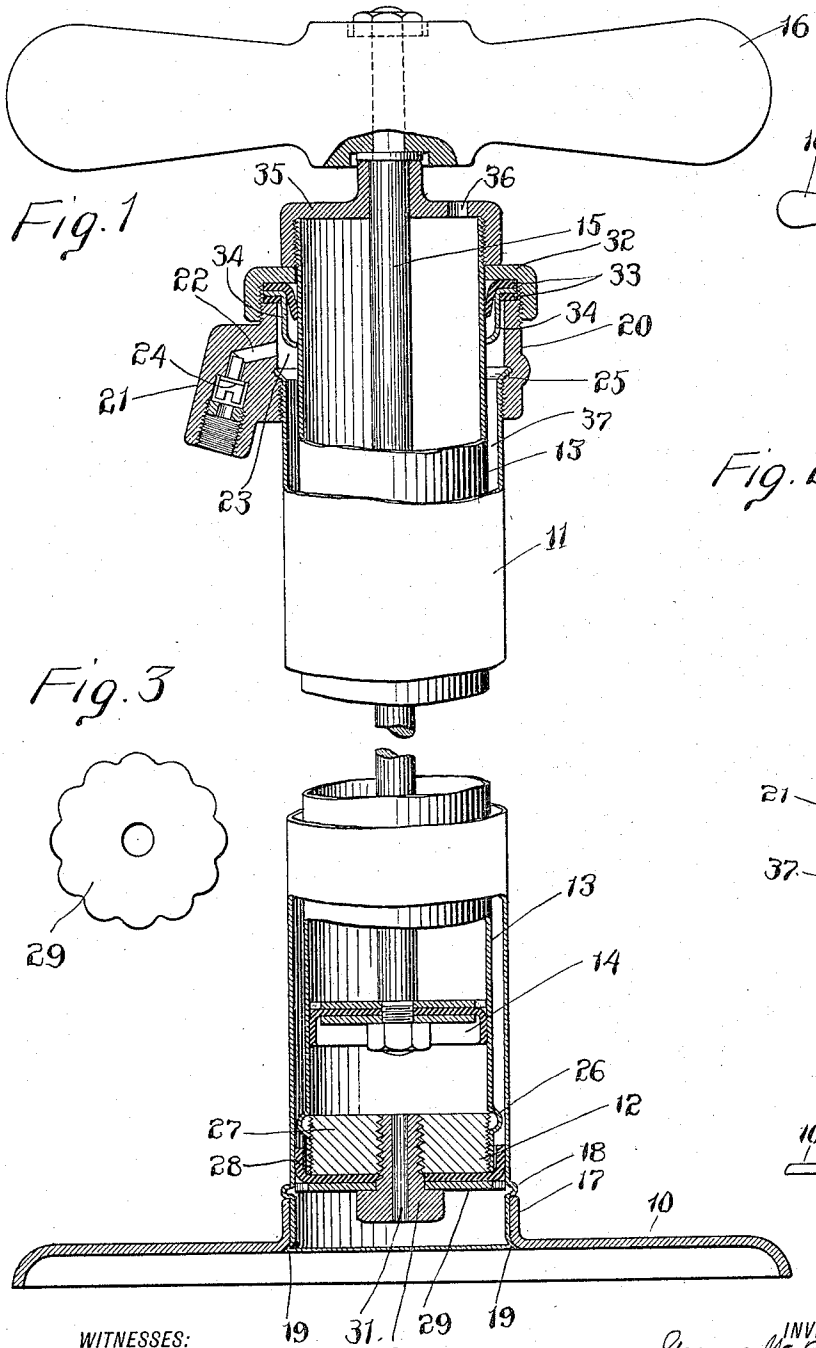
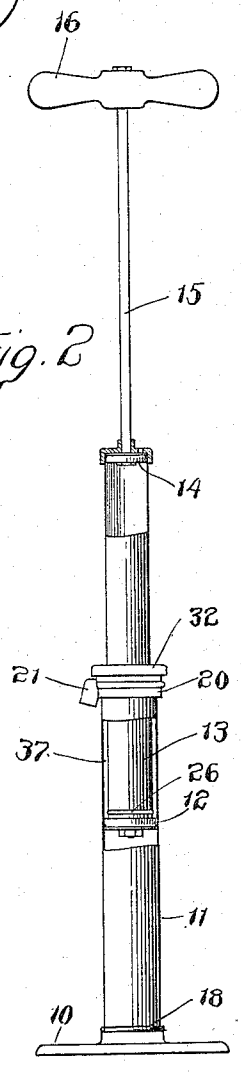


Fig. 3

Fig. 2



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GEORGE W. BALDWIN AND PHILIP H. STAPLEY, OF BRIDGEPORT, CONNECTICUT, ASSIGNORS TO THE COE-STAPLEY MANUFACTURING COMPANY, OF BRIDGEPORT, CONNECTICUT, A CORPORATION OF CONNECTICUT.

COMPOUND AIR-PUMP.

1,149,324. Specification of Letters Patent. Patented Aug. 10, 1915.

Application filed May 11, 1914. Serial No. 837,680.

To all whom it may concern:

Be it known that we, GEORGE W. BALDWIN and PHILIP H. STAPLEY, both citizens of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented an Improvement in Compound Air-Pumps, of which the following is a specification.

This invention relates to single barrel, double acting, compound air pumps.

It is one of the objects of the invention to produce an easy working single barrel pump of this type which shall be so constructed as to permit the barrel to be materially shortened without appreciably increasing its diameter, and which shall retain the full efficiency of the longer barreled pumps.

A further object of the invention is to produce a pump of this character that will take air at the top and thus permit the use of a sheet metal base, which is impossible where air is taken at the bottom.

With these and other objects in view, we have devised the novel pump of which the following description in connection with the accompanying drawing is a specification, reference characters being used to indicate the several parts.

Figure 1 is a view partly in elevation and partly in section showing our novel pump, the parts being in the position at the end of a complete down stroke; Fig. 2 a similar view on a reduced scale showing the position of the parts near the end of a complete up stroke, and Fig. 3 is an elevation of a piston washer detached.

This pump has been devised for the purpose of meeting a requirement of the trade for a fifteen-inch single barrel pump which shall be easy to work, strong and durable and shall have the full efficiency of the ordinary twenty-inch pump.

10 denotes the base which is blanked out and formed from sheet metal, 11 the barrel, 12 a piston therein which is carried by a piston tube 13 and 14 a piston in the piston tube which is carried by a piston rod 15 having a handle 16. The sheet metal base is provided with a central unthreaded flange 17 which receives the lower end of the barrel, which is a drawn tube closed at its lower end. The barrel is provided with a rib 18 which rests upon the top of the flange and is rigidly secured to the base by upsetting the closed end of the barrel against the under side of the base on the inner side of the lower end of the flange, as at 19, the ends of the flange being gripped between the rib and the upset end of the barrel. At the upper end of the barrel is a head 20 carrying a hub 21 for the attachment of a nozzle, not shown. The hub is provided with an air passage 22 communicating with a circular air space 23 within the hub and provided with a valve 24, which permits air to pass outward freely and is closed by backward pressure. The upper end of the barrel has threaded engagement with the head and the joint is made air-tight by flanging the edge of the barrel into a circular groove 25 in the inner wall of the head.

Near the lower end of the piston tube is a rib 26 for a purpose presently to be explained. 27 denotes a block which has threaded engagement with the lower end of the piston tube, 28 the flexible washer of piston 12, 29 a metallic washer lying outside the flexible washer, and 30 a screw, provided with a longitudinal hole 31 through it, which passes through block 27 and clamps the flexible washer between the metallic washer and the block. The metallic washer is preferably provided with a scalloped edge, as shown in Fig. 3, the diameter at the scallops fitting loosely in the barrel so as to give firm support to the flexible washer in the upward movement and the depressions between the scallops permitting air to pass freely in the downward movement. A similar scalloped washer is preferably used in piston 14. The piston tube in use slides through a cap 32 which has threaded engagement with head 20. The joint is made tight by packing washers 33 between which is a flanged ring 34 which is shaped to form a stop adapted for engagement by rib 26 on the piston tube to limit the upward move-

ment of said tube. The upper end of the piston tube is closed by a cap 35 through which piston rod 15 slides. Air is admitted to the piston tube through a hole 36 in cap 35.

The operation is as follows: On the down stroke, air before piston 14 is compressed in the piston tube and forced through hole 31 in screw 30 into the barrel, where it is again compressed before piston 12 and passes said piston into the circular air chamber 37 between the piston tube and the barrel, which communicates with air space 23 in the head, from whence the air passes out through hub 21. On the up stroke, air passes piston 14 freely and compression is produced by piston 12 in air spaces 37 and 23. It will be seen, therefore, that there is a double compression or compounding on the down stroke and a single compression on the up stroke, both strokes effecting compression in air space 37 and forcing air out through the hub.

Having thus described our invention we claim:

1. In a pump, the combination with a barrel and a tube forming an air space between said barrel and tube, of a down stroke piston adapted to reciprocate in the tube and compress air in the space and an up stroke piston carried by the tube by which the air is further compressed and forced out of the pump.

2. In a pump, the combination with a barrel closed at its lower end, of a sheet metal base having a central flange to receive the barrel, the barrel being secured to the base by upsetting the closed end of the barrel against the under side of the base at the inner side of the lower end of the flange.

3. In a pump, the combination with a barrel provided near its lower end with a rib, of a sheet metal base having a central flange which is engaged by the rib, the closed end of the barrel being upset against the under side of the base at the inner side of the lower end of the flange, so that the ends of the flange are gripped between the rib and the upset end of the barrel.

4. In a pump, the combination with a barrel, a piston in said barrel, a piston tube by which said piston is carried and which is provided near its lower end with a rib, of a head to which the barrel is secured, a cap secured to the head through which the piston tube slides and a flanged ring and packing washers gripped between the head and the cap, said ring being adapted to be engaged by the rib on the piston tube to limit the upward movement of the tube.

5. In a pump, the combination with a barrel closed at its lower end, a piston in said barrel having a hole through it and a piston tube by which said piston is carried, of a head to which the barrel is secured, a cap secured to the head through which the piston tube slides, a piston in the piston tube, a piston rod by which said second piston is carried and a cap secured to the piston tube through which the piston rod slides, said second cap being provided with a hole for the admission of air.

6. In a pump, the combination with a barrel and a head with which the barrel has threaded engagement and which is provided with a groove into which the upper end of the barrel is flanged, of a piston carrying tube within the barrel, a cap through which said tube slides and which has threaded engagement with the head, a piston carrying rod in the piston tube and a cap having threaded engagement with the tube through which said rod slides.

7. In a pump, the combination with a barrel closed at its lower end, a piston in the barrel having a hole through it and a piston tube by which said piston is carried, a circular air space being formed between said tube and barrel, of a piston in the tube, a rod by which said piston is carried and a cap secured to the tube through which the rod slides and which is provided with a hole for the admission of air, the piston in the tube forcing air through the piston in the barrel and the latter piston forcing air into the air space on the down stroke and the piston in the barrel compressing air in said space on the up stroke.

8. In a pump, the combination with a barrel closed at its lower end, an up stroke piston in the barrel having a hole through it and a piston tube by which said piston is carried, of a down stroke piston in said tube which forces air through the piston in the barrel on the down stroke, the piston in the barrel compressing air between the tube and the barrel on the up stroke.

9. In a pump, the combination with a barrel closed at its lower end, a piston tube in said barrel, an up stroke piston comprising a block having threaded engagement with the tube, a flexible washer and a screw having a hole through it by which the washer is secured to the block, of a down stroke piston reciprocating in the tube, a rod by which said second piston is carried and a cap secured to the tube through which the rod slides and which is provided with a hole for the admission of air.

10. A pump for producing a double compression on the down stroke and a single compression on the up stroke, comprising a barrel, a tube forming an air space between said barrel and tube and adapted to reciprocate in the barrel, a down stroke piston adapted to reciprocate in the tube, and an

up stroke piston carried by the tube and having a hole therethrough, the down stroke piston compressing air in the tube and forcing it into the barrel, and the tube and up stroke piston further compressing the air and forcing it into the air space from which it is forced by the upward movement of the up stroke piston.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE W. BALDWIN.
PHILIP H. STAPLEY.

Witnesses:
B. S. COE,
F. E. HATCH.

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