E. M. CULP.

PUMP.

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1,357,544. Patented Nov. 2, 1920.

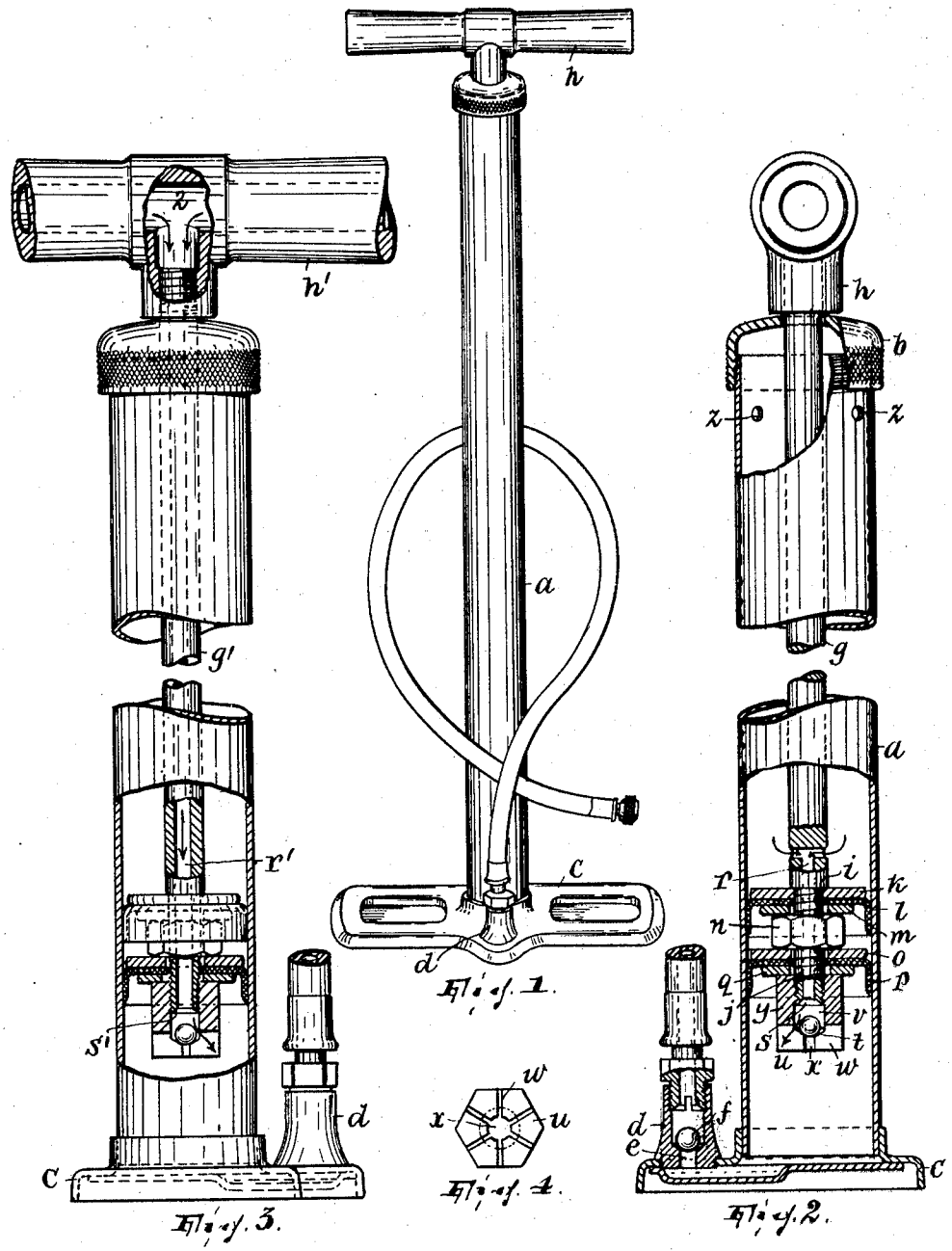


Fig. 1. Fig. 4. Fig. 3. Fig. 2.

WITNESS

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PUMP.

1,357,544. Specification of Letters Patent. Patented Nov. 2, 1920.

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To all whom it may concern:

Be it known that I, ERNEST M. CULP, a citizen of the United States, residing at Paterson, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

My present invention relates to pumps, and more especially to pumps, in the nature of those used for inflating vehicle tires, which are operated by hand. The invention contemplates providing such pumps with novel improvements whereby on the recharging or return stroke of the plunger atmospheric air will be freely allowed to pass the plunger head or piston, without unduly increasing the cost of manufacture of such pumps or impairing their efficiency and durability.

The drawing shows my invention in two forms,

Figure 1 showing the improved pump in side elevation;

Fig. 2 one form thereof partly in side elevation and partly in vertical section;

Fig. 3 the other form, also partly in side elevation and partly in section; and

Fig. 4 showing a detail.

In both forms of the invention illustrated the cylinder structure includes a cylinder proper *a* having a cap *b* screwed on its upper end and a base *c* substantially like that set forth in the U. S. patent to Spencer, No. 1,290,796, said base being provided with a discharge nozzle *d* formed with the discharge outlet *e* normally closed by the valve *f*.

Referring to Fig. 2, *g* is the piston rod, which in this case is solid from end to end except as hereinafter stated. The rod projects through the cap *b* and has a T-handle *h* secured to its upper end, as by being screwed thereon. At its lower end the piston rod has an abutment *i* produced by forming its lower end portion *j* reduced, the same being threaded. In the present adaptation there are two piston heads (the number thereof, however, is not material) on the rod. The upper one comprises a disk *k* abutting the shoulder or abutment *i*, a cup *l* of flexible material, as rubber or leather, abutting the disk, and a washer *m* bearing against the inner or under side of the cup and held against the abutment *i* by the nut *n* screwed on extension *j*. The lower one comprises the disk *o* abutting the shoulder or abutment which the nut affords, a flexible cup *p* abutting the disk *o* and a washer *q* abutting the inner or under side of the cup. The threaded reduced portion of the stem *j* of the rod penetrates these piston heads and it has a T-shaped port *r*, the top or horizontal portion of which penetrates the rod *g* above the upper piston head and the vertical portion of which extends axially through the stem *j* to its lower end, where it is formed as a valve seat *s*. *t* is a ball valve adapted to seat against the valve seat *s*. It is a part of the object of this invention to provide means to retain the valve in place and also serve to hold the piston head against the superjacent abutment, as *n*, and which will add little to the cost of manufacture of the pump, and to this end I employ an elongated faceted nut *u* provided with a bore *v* open upwardly for the reception of the valve and threaded at its upper end, the lower end of the nut being provided with transverse vertical slits or saw-cuts *w* which reach to and thus communicate with the lower end of the bore *v*. There is shown an aperture *x* entering to the bore from the lower end of the nut, but its presence is not material, the object being to form a cage for the valve which will retain it in place while allowing (by the slits *w*) fluid communication between its bore and the exterior, and to form this case so that as a nut it will serve for clamping the piston head against the abutment *n*, it being screwed on the protruding lower end of the extension *j*, as shown; and to this latter end it will be observed that the nut is only slitted at its lower end portion, the nut being intact or solid, as at *y*, for the major part of its depth. In the form of the invention now being described, air may be admitted to the cylinder above the piston by the holes *z* formed in the cylinder near the top thereof.

In the construction shown in Fig. 3 the parts are all the same as in Fig. 2 excepting that the piston rod *g'* has a bore *r'* which extends from the valve seat *s'* at its lower end clear to the top of the rod *g'*, where it communicates with the atmosphere through the bore 2 of the handle *h'*.

The operation of both forms of the pump is the same, viz: on the down stroke the fluid beneath the piston will be forced through the outlet *e*, unseating the valve *f*, valve *t* being caused by the pressure to bear against seat *s* and so close port *r*. On the

upstroke valve *f* will be seated, preventing return of the discharged fluid to the cylinder, while valve *t* will fall and so allow the fluid above the piston head to flow downwardly through the latter, in consequence of which the operator is saved the fatigue incident to overcoming atmospheric pressure on the upstroke and the flexing of and consequent wear and tear on the sides of the cups *l* and *p* as the pressure above seeks to find its way downward between said cups and the cylinder wall are avoided.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A piston for a pump of the class described including a piston head, a rod penetrating and protruding from the head at one side of the latter and having its protruding end terminating in a valve-seat and also having an abutment means for the other side of the head, said rod having a passage extending through the same from said other side of the head to the valve-seat, a check-valve loosely arranged opposite said seat, and a cage containing the valve and holding the same in place and screwed on the protruding end of the rod externally thereof and clamping the head against said abutment means.

2. A piston for a pump of the class described including a piston head, a rod penetrating and protruding from the head at one side of the latter and having its protruding end exteriorly threaded and terminating in a valve-seat and also having an abutment means for the other side of the head, said rod having a passage extending through the same from said other side of the head to the valve seat, a check-valve loosely arranged opposite said seat, and a nut having a threaded bore extending from one end thereof but not through the same and receiving and having its threading engaged with the threading of said rod, said nut loosely containing the valve in its said bore and clamping the head against said abutment means, and said nut also having radial slits extending into the same from its other end to the bore.

In testimony whereof I affix my signature.

ERNEST M. CULP.