(Model.) 2 Sheets—Sheet 1.

# H. F. TEMPLE.

## PLUNGER FOR PUMPS.

No. 260,802. Patented July 11, 1882.

*Fig. 1.*

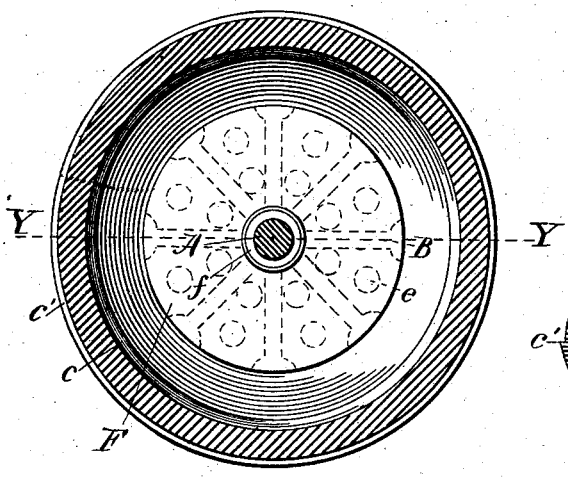



*Fig. 2.*

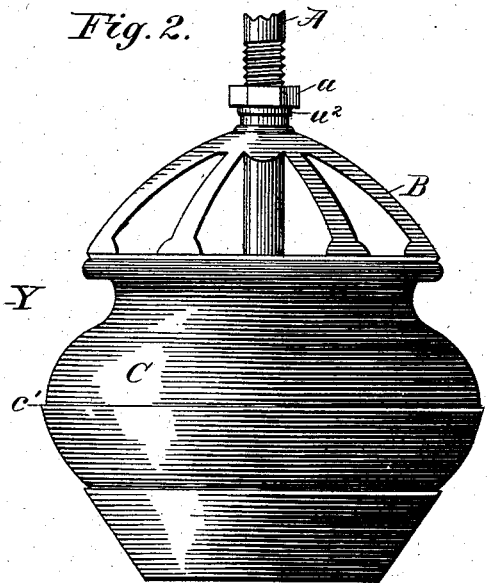
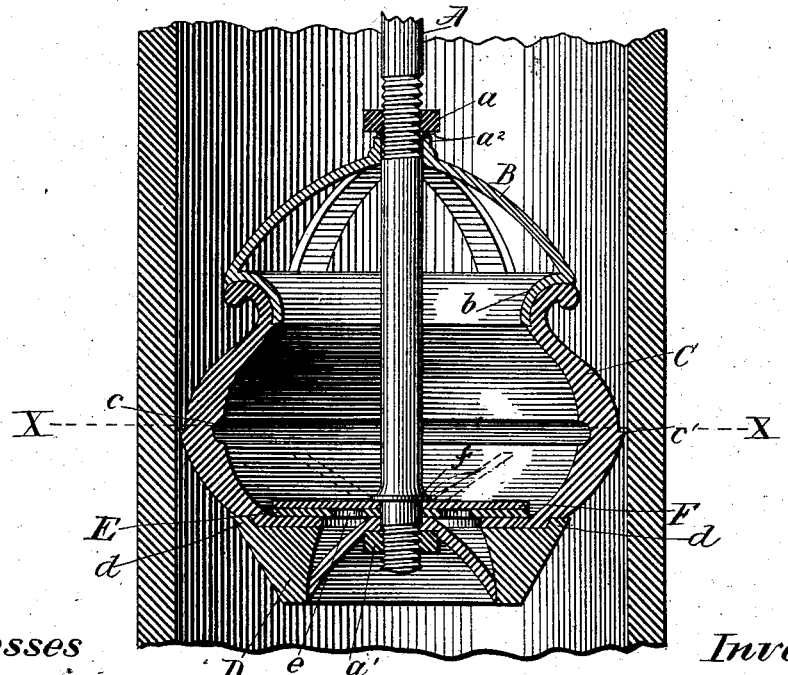



*Fig. 3.*




Witnesses

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W. W. Elliott

Inventor.

Henry F. Temple

By Jno. G. Elliott

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(Model.) 2 Sheets—Sheet 2.

# H. F. TEMPLE.

## PLUNGER FOR PUMPS.

No. 260,802. Patented July 11, 1882.

*Fig. 4.*

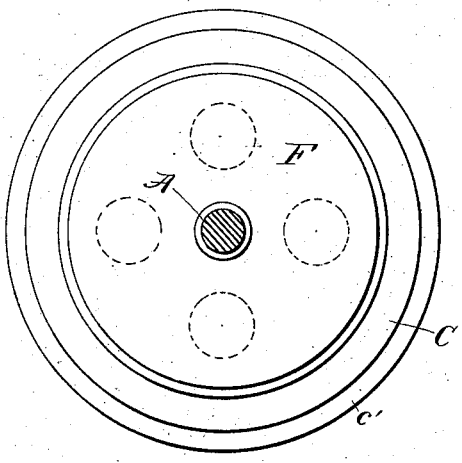
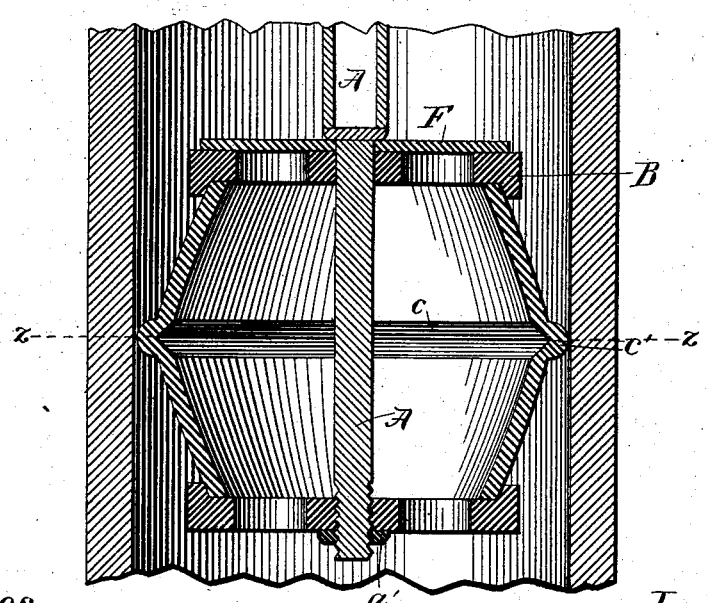



*Fig. 5.*




*Witnesses.*

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# UNITED STATES PATENT OFFICE.

HENRY F. TEMPLE, OF CHATTANOOGA, TENNESSEE.

## PLUNGER FOR PUMPS.

SPECIFICATION forming part of Letters Patent No. 260,802, dated July 11, 1882.

Application filed January 31, 1881. (Model.)

*To all whom it may concern:*

Be it known that I, HENRY F. TEMPLE, a citizen of the United States, residing at Chattanooga, in the county of Hamilton and State of Tennessee, have invented a new and useful Self-Adjustable Expansion Bucket or Plunger for Pumps, of which the following is a specification.

My invention relates to improvements in buckets or plungers for pumps, in which an elastic or other valve is secured so as to open upwardly during the downward stroke of the plunger, and to be automatically closed by the column of water above it when the plunger is making its upward stroke.

Heretofore much annoyance has arisen by reason of the difficulty experienced in providing plungers which would effectually operate in the varying bores, both in size and configuration, which result from imperfect boring mechanism, and more frequently the unavoidable unequal shrinkage of the wooden pumps, as well, also, as the inevitably imperfect casting of metal pipes. In wooden pumps that portion of the bore representing the length of stroke of bucket becomes enlarged in time by friction of the bucket wearing away the wood, and the result is that a larger bucket must be provided, or else the pump becomes worthless and must be thrown away; for the reason that if the bucket were enlarged it could not be passed through the original bore at the top of the pump to its operative position in the same. Furthermore, the packing used in pump-buckets also becomes worn away by friction in use, so that it becomes necessary to renew the packing at more or less frequent intervals, causing loss of time and expense.

The objects of my invention are to obviate these objections by providing, first, a valve-bucket which will adjust itself to inaccuracies and varying bores both in wood and metal cylinders or bucket-chambers; second, to provide a valve-bucket which will adjust itself to the bore of a wooden pump or pipe as it become worn away by friction; third, to provide a bucket which will contract and expand so that it may be introduced into and used in what are usually termed "worn out" wooden pumps or pipes; fourth, to provide a valve-bucket which may be adjusted so as to operate either in a larger or smaller bore of pipe; fifth, to provide a valve-bucket which may be expanded by mechanism, so as to take up the wear in the packing caused by friction in use; and, finally, to provide a valve-bucket in which the perforated water-way plate, the valve, and the packing may be simultaneously clamped to the pump-rod and to the supporting-base, so that a water-tight joint will be formed between the packing and said perforated and base plates. I attain these objects by mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a sectional plan view taken on the line *x x* of Fig. 2; Fig. 2, a side elevation of a bucket embodying my invention; Fig. 3, a vertical section taken on the line *y y* of Fig. 1, and showing the bucket in its operative position in the cylinder; Fig. 4, a plan view of a modification shown in vertical section in Fig. 5, and Fig. 5 a vertical section of said modification.

Similar letters of reference indicate the same parts in the several figures of the drawings.

A represents a "pump-rod," provided with screw-threads both at its lower end and at a suitable distance from said end to permit the adjustment of nuts *a a'*, respectively.

B represents an open basket-shaped cap, movable upon the pump rod below the nut *a* and an intermediate washer, $a^2$, said basket being provided with an annular rim, *b*, to receive the upper edge of the elastic portion or packing of the bucket.

C represents a bowl-shaped or annular packing, of rubber, leather, or other suitable elastic material, rubber being preferable, which forms not only the packing, but the side walls of the bucket, and is held between the annular rim of the cap and the base-plate, as will be presently described. This packing or chamber is provided upon its inside, at the fullest portion of its bulge, with an annular groove, *c*, and at the same points at its outside with an annular ring or flange, *c'*, which recedes toward and merges into the lower portion of the body of the annular packing. The flange *c'* forms the bearing of the annular packing against the walls of the bore of the pipe, and the annular groove serves the purpose of permitting the flange to freely give in adapting itself to the

configuration of said rolls, while the flange itself serves to prevent the body of the packing from being worn by friction and to provide a tighter joint than if it were removed.

D represents a base-plate supporting the packing, and provided with an annular rim, *d*, to prevent such packing from moving outwardly or laterally at its base and becoming accidentally detached from the base-plate. Base-plate D is also provided with arms or braces converging toward its center, at which point they provide a bearing for the nut *a'* upon the end of the pump-rod, which pump-rod passes through the point at which said arms intersect.

E is a circular plate, provided with a series of perforations or water-ways, *e*, and resting upon the packing supported upon the base-plate.

F is a circular valve, of rubber, leather, or other elastic material adapted for that purpose, and held upon the pump-rod against a shoulder, *f*, annular or otherwise formed, or a nut upon the pump-rod, which shoulder serves as a base, against which the base-plate, the perforated plate, and the washer are simultaneously clamped by the nut *a'* working up the end of the rod, so that the packing will be firmly held and a water-tight joint be formed between the base and the perforated plates.

Instead of forming my bucket as above described, I may omit the perforated plate and secure the valve between the upper face of a flat cap-plate and a nut or shoulder upon the pump-rod, as shown in Fig. 5, in which case the base and cap plates are formed alike and the rubber packing provided with straight edges resting against and held between the inner faces of the base and top plates.

In the construction above described the rubber packing or bucket is made in a form resembling a double and hollow cone with the apices removed and a V-shaped annular groove upon its inner side at the intersection of the bases, and annular ring upon the outside and opposite the apex of the groove. In some respects the modified construction is preferable, for the reason that there is less obstruction to the passage of the water to a point above the bucket, and that the lateral pressure of the water upon the packing is avoided. Furthermore, a greater volume of water may be raised to a given number of strokes than by the construction first described.

The pump-rod, instead of being made solid, may have that portion of it extending above the bucket made hollow, as shown in Fig. 5, in order to obtain lightness without diminishing its strength.

The base and top plates may be perforated, as indicated in dotted lines in Fig. 4, or be provided with radial arms, as shown in Fig. 1, without departing from the spirit of my invention.

In operation it will be readily understood that the elasticity of the packing, when properly adjusted, will cause the packing to adjust itself to any ordinary inaccuracy of the bore, and that should the bore become enlarged by the friction of the bucket the bucket itself may have its packing enlarged by screwing down the nut *a* or screwing up the nut *a'*, the elasticity of the packing permitting it to be passed through the smaller bore above its operative position.

It will be observed that the bulge of the packing is sufficient to prevent the contact of the cap and base-plate with the walls of the bore, as well as to cause the line of pressure, when tightening the cap and base-plate for enlarging the packing, to fall within the bulge, and thereby preventing the packing from collapsing.

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

1. The combination, with a pump-rod, of an annular elastic bucket provided with an automatically-operating valve, and adapted to adjust itself in the bore of a pipe or pump, substantially as and for the purpose described.

2. The combination, with a pump-rod, of an annular elastic bucket provided upon its inside with an annular groove, *c*, and upon its outside with a ring or flange, *c'*, and supporting an automatically-operating valve, as and for the purpose described.

3. The combination, with the pump-rod and with the annular elastic bucket, of the adjustable cap, the removable base-plate, and an automatically-operating valve arranged within the bucket, substantially as described.

4. The combination, with the pump-rod, the elastic bucket, and the valve, of the perforated plate or water-way, arranged between said valve and bucket and adapted to clamp the bucket to the base-plate, as and for the purpose described.

5. The combination, with the pump-rod, the base-plate, and the valve, of an adjustable cap movable upon the pump-rod and an elastic bucket held between the base-plate and said cap, substantially as and for the purpose described.

HENRY F. TEMPLE.

Witnesses:
GEORGE W. DERICKSON,
JOSEPH F. SHIPP.