No. 616,308. Patented Dec. 20, 1898.

# W. D. FORSYTH & J. S. THOMPSON.

## PUMP PISTON.

(Application filed Feb. 5, 1898.)

(No Model.)

Fig. 1.

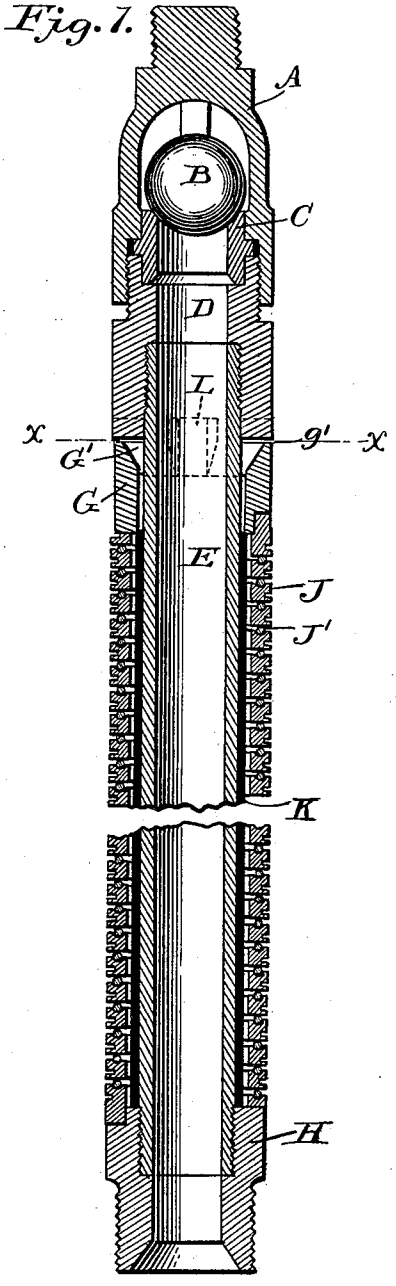



Fig. 2.

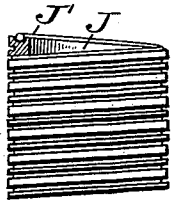
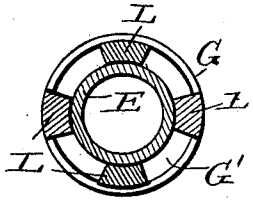



Fig. 3.




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# UNITED STATES PATENT OFFICE.

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## PUMP-PISTON.

SPECIFICATION forming part of Letters Patent No. 616,308, dated December 20, 1898.

Application filed February 5, 1898. Serial No. 669,257. (No model.)

*To all whom it may concern:*

Be it known that we, WILBER D. FORSYTH, a resident of Pittsburg, Allegheny county, and JAMES SCOTT THOMPSON, a resident of Washington, in the county of Washington, State of Pennsylvania, citizens of the United States, have invented certain new and useful Improvements in Pump-Pistons; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Figure 1 of the drawings is a vertical central section of the piston or valve. Fig. 2 is an elevation of a portion of the elastic packing; and Fig. 3 is a section on the line *x x*, Fig. 1.

This invention has relation to a pumping-piston for use in pumping oil and other liquids from deep wells.

The object of the invention is to do away with the leather and other styles of packing or rigid cups secured to the center or core of the piston and which, being cut away by the action of dirt and grit, are unable to expand to compensate for such wear, and to provide in lieu thereof means which are capable of lateral expansion and contraction—that is to say, which will contract upon the downstroke of the pump-rods and work more loosely in the barrel or chamber and which will expand upon the upstroke to fit the barrel tightly and closely.

With this object in view the invention consists in the novel construction and combination of parts, all as hereinafter described, and pointed out in the appended claims.

Referring to the accompanying drawings, the letter A designates the ordinary cage for the valve. B is the ball within the said cage, and C is the ball-seat.

D designates a tight sleeve, in the upper end portion of which the lower portion of the ball-seat is held and upon which is screwed the cage A. This sleeve is screwed upon the upper end portion of the body E of the valve, said body consisting of a section of pipe, as shown.

G is a sleeve which is loosely seated upon the upper portion of this pipe or body and which is coned out at its upper end portion, as indicated at G′, being separated from the lower end of the tight sleeve D by a space *g′*.

H is a tight sleeve which is screwed upon the lower end portion of the body or core.

J designates a spiral metallic packing which is wound around the body or core between the loose sleeve G, to which it is secured at its upper end, and the tight sleeve H, to which it is secured at its lower end. This winding or packing may be of any material suited for the purpose, that which we now use being a strip of drawn copper with interposed layers J′ of hemp or other fibrous material. The packing may, however, be all metallic, the fibrous interposed layers being omitted.

K designates a tubular section of hose or webbing which is placed around the body or core, between it and the packing.

L designates oppositely-located internal lugs or projections, two of which are upon the lower end portion of the tight sleeve D and two upon the upper portion of the loose sleeve G. The purpose of these lugs is to prevent said loose sleeve with the packing from turning entirely around upon the body or core while permitting a partial rotary movement thereof, usually equal to about one-half the circumference of said body or core.

It will be readily seen that upon the downstroke the spiral packing will be pushed upwardly on the core or body, being thereby extended and its diameter reduced, so as to cause it to work somewhat loosely in the barrel or chamber and doing away in a large measure with the sand and grit which is usually held between the piston and barrel. On the upstroke the packing is drawn downwardly on the body or core, thereby expanding it and increasing its diameter. At the same time the fluid which enters within the hose or webbing K through the sleeve G under the high pressure found in deep wells also assists largely in this expansion and causes the piston to make a close fit with the barrel or chamber.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a piston, the combination with a smooth cylindrical tubular body or core, of a flexible metallic packing surrounding the same, and connected thereto at one end only, and free to move longitudinally thereof, whereby upon the downstroke of the piston, said packing is extended longitudinally and its diameter is thereby decreased, and upon the upstroke, it is contracted longitudinally and its diameter is thereby increased, substantially as specified.

2. In a pump-piston, the combination of a tubular body, or core, of a flexible metallic packing spirally wound loosely about the same and entirely exterior to the surface thereof and connected thereto at one end only, whereby upon the downstroke of the piston, said packing is extended longitudinally and its diameter thereby decreased, and upon the upstroke is contracted longitudinally and its diameter thereby increased, substantially as specified.

3. In a pumping-piston, of the class described, the combination with a body portion, or core, of a flexible, expansible, and extensible metallic packing wound thereon, and layers of fibrous material interposed between the turns or windings of the metal packing, substantially as specified.

4. In a pumping-piston, of the class described, the combination with a hollow extended body or core, of a flexible, expansible and longitudinally-extensible packing around the same, and a section of webbing or hose interposed between said packing and the body or core, together with means for admitting fluid-pressure within said webbing or hose, substantially as specified.

5. The herein-described pumping-piston, for deep wells, consisting of an extended hollow body portion or core, a valve-seat and valve secured to the upper portion thereof, a loose sleeve thereon below the said valve and capable of a limited rotary and vertical movement, and a flexible, extensible and expansible packing around the said body or core, said packing being secured at one end to the said sleeve and at the opposite end to the body or core or a fixture thereof, substantially as specified.

6. The herein-described pumping-piston, for deep wells, consisting of an extended hollow body portion, or core, a valve-cage secured to the upper portion thereof, a valve therein, a loose sleeve thereon below the valve and capable of a limited rotary and vertical movement, said sleeve having its opening enlarged at its upper portion, and a flexible, extensible and expansible packing around the said body or core, said packing being connected at one end to the said sleeve and at the other end to the body or core or a fixture thereof, substantially as specified.

7. The herein-described pumping-piston, for deep wells, consisting of an extended hollow body portion, or core, a valve-cage secured to the upper portion thereof, a valve therein, a loose sleeve below the valve and capable of a limited vertical and rotary movement thereon, a spiral metallic flexible packing wound around the said core or body and secured thereto at one end and at its opposite end to the said sleeve, and a section of hose or webbing between the body or core and the packing, together with means for admitting fluid-pressure within said hose or webbing, substantially as specified.

8. In a piston, the combination with a central body or core, of a flexible spiral packing wound loosely about the same and separated from the surface thereof, said packing having an extended bearing or packing surface, and means connecting said packing with the core or body whereby the coils of the packing are caused to separate upon the downstroke and to close upon the upstroke of the piston, substantially as specified.

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

WILBER D. FORSYTH.
JAMES SCOTT THOMPSON.

Witnesses:
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