No. 647,329. Patented Apr. 10, 1900.

J. H. ROBINSON.

BICYCLE PUMP.

(Application filed Aug. 3, 1899.)

(No Model.)

Fig. 1.

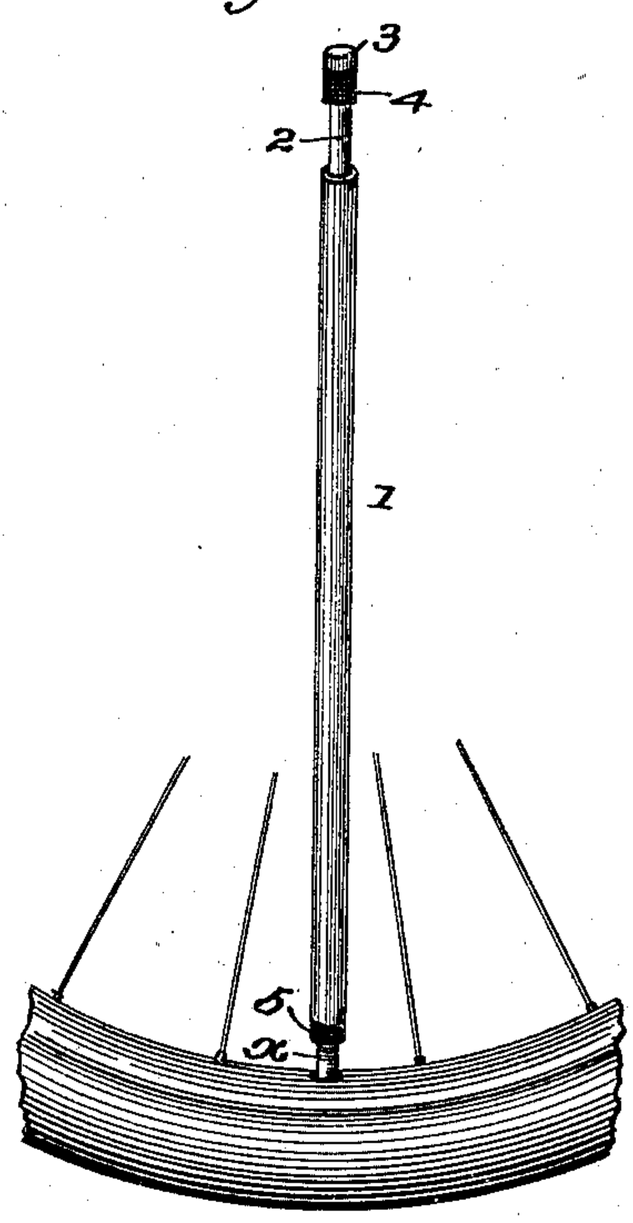


Fig. 2.

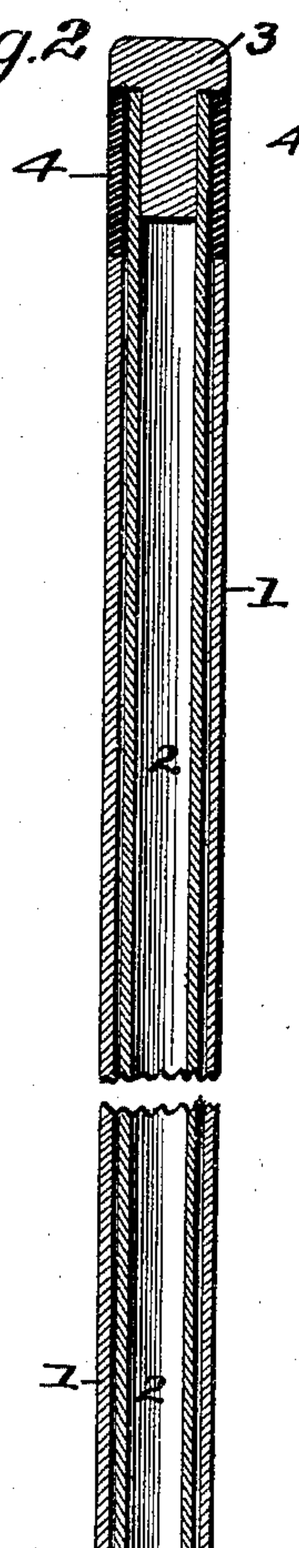


Fig. 6.

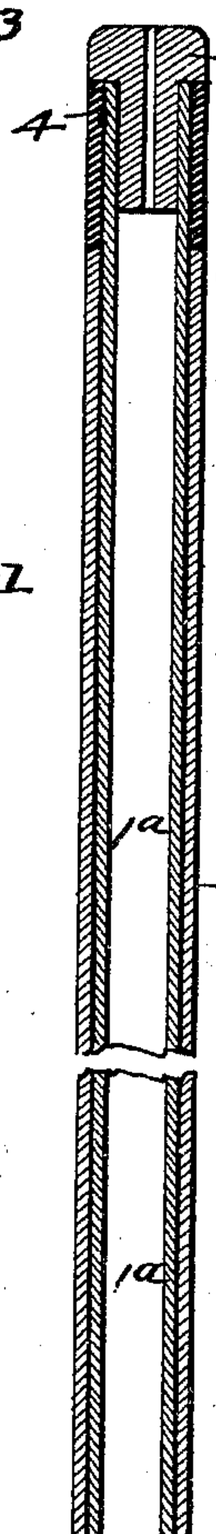


Fig. 7.

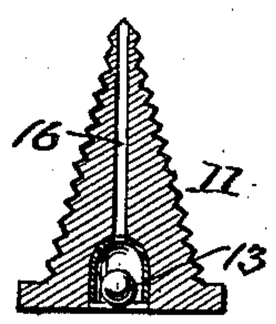


Fig. 8.

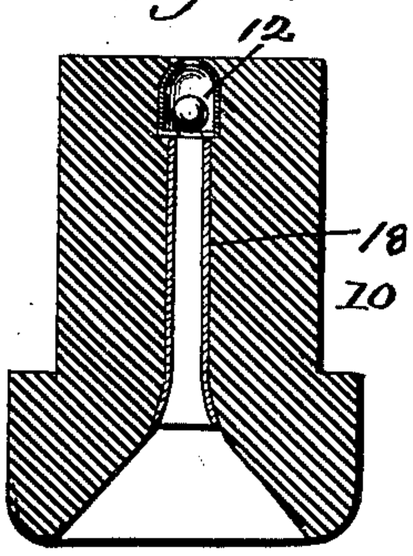


Fig. 3.

Fig. 4.

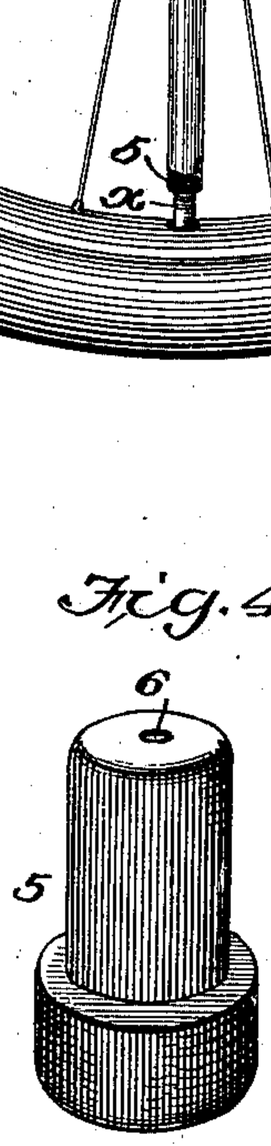
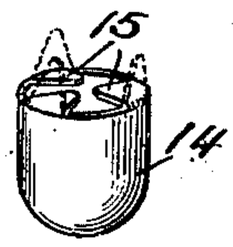


Fig. 5.

Fig. 9.



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JOHN H. ROBINSON, OF WASHINGTON, DISTRICT OF COLUMBIA.

BICYCLE-PUMP.

SPECIFICATION forming part of Letters Patent No. 647,329, dated April 10, 1900.

Application filed August 3, 1899. Serial No. 726,026. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. ROBINSON, of Washington city, in the District of Columbia, have invented a new and Improved Bicycle-Pump, of which the following is a specification.

The ordinary hand or foot pump used for inflating bicycle-tires requires the attachment of a flexible tube as a means for connecting it with the nipple on the wheel-tire. The pump also lacks power and efficiency and requires the application of great force to operate it, besides having other objections which I seek to remove.

I have devised a pump that may be applied and operated without the flexible connecting-tube above referred to, it being adapted to be applied directly to the tire-nipple, so that cost, labor, and time are economized. It is also adapted to be operated with less force and with greater efficiency than pumps of the usual construction.

The several features of novelty and superiority are as hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is a view illustrating the pump as applied in practice. Fig. 2 is a central longitudinal section of my preferred form of pump. Fig. 3 is an enlarged cross-section on line 3 3 of Fig. 2. Fig. 4 is a perspective view of the end plug for the barrel. Fig. 5 includes two views of the piston proper. Fig. 6 is a longitudinal section of a modified or valved form of pump. Fig. 7 is a central longitudinal section of the modified form of piston-expander. Fig. 8 is an enlarged central longitudinal section of the modified valved form of end plug for the barrel. Fig. 9 is a perspective view of the metal cage or holder for the valves employed in the modified form of pump.

I will first describe the preferred form of my invention, Figs. 1 to 5.

The body or barrel 1 of the pump has a much greater length and less diameter than that of the ordinary one. The piston-tube 2 is fitted loosely in the barrel 1 and has about the same length as the latter. An elastic shouldered plug 3 is inserted in its upper end, and a rubber sleeve 4 encircles it, as shown. The said plug serves as a cushion for the hand of the operator, and the annular sleeve, striking upon the barrel 1 at each down stroke, relieves the shock of impact. It also enables the operator to obtain a better handhold or grip on the piston-tube 2. The sleeve 4 also forms a smooth or flush surface with the lateral shoulder of the plug 3 and the adjacent end of the barrel 1.

A rubber plug 5 is fitted tightly in the lower end of the barrel and provided with a small lengthwise perforation 6 for passage of air. The mouth or outer end 7 of such passage is flared, as shown in Fig. 2, to adapt it to fit closely upon the end of the nipple *x* of a bicycle-tire. (See dotted lines, Fig. 2.) The said plug 5 has an enlarged circumferential shoulder against which the end of the barrel 1 abuts.

The piston 8 is constructed of elastic material, preferably rubber, and has normally the form of an ordinary tapered bottle cork or stopper. It is fitted closely and tightly in the end of the piston-tube 2, which end may be correspondingly flared, as shown. The tapered form of the piston 8 prevents it being forced completely into the tube 2 when the pump is operated, and it fits so tightly as to prevent withdrawal therefrom when the piston-tube is being retracted. The piston-head fits snugly in the barrel 1, so that when pushed inward it prevents passage of air past it, but when retracted its enlarged elastic rim yields sufficiently to allow such passage of air. It will be understood that the air enters and passes between the barrel 1 and piston-tube 2 when the latter is retracted, and thus supplies the vacuum created between the plug 5 and piston 8 at the moment of retraction.

To compensate for wear and insure at all times a proper close fit of the piston in the tube 2, I employ an expander 9, which is in the form of a conical screw, the same having an enlarged milled head by which it may be easily gripped and rotated to screw it into the piston proper or subsequently adjust it, as may be required.

The head of the piston is made concave, as shown best in Fig. 5, whereby an annular rim is formed that works in yielding contact with the barrel 1. I have found this shape particularly advantageous in that the rim yields readily to allow passage of air when the pis-

ton is retracted, yet fits the barrel very snugly, but without undue friction, when the piston is forced down.

In practical use the pump is applied as shown in Fig. 1, the plug 5 resting directly on the tire-nipple *x*, which enters and fits air-tight in its flaring mouth 7, as shown in Fig. 2. The operator holds the pump as nearly in alinement with the nipple *x* as practicable, and while pressing down the barrel 1 with one hand he grips and reciprocates the piston-tube 2 with the other. The length of the pump, which is from twenty to twenty-four inches, enables the operator to manipulate it without bending low, and the cross-sectional area of the same being comparatively small the friction is less than in the ordinary pump.

The pump is light and symmetrical and may be carried unobtrusively in suitable elastic hangers beneath and parallel to the upper or top bar of a bicycle.

The modified form of my invention (shown in Figs. 6 to 9) differs from the preferred one mainly in the use of valves in the barrel-plug 10 and piston 11, the barrel 1^a and piston-tube 2^a being constructed as before—that is to say, the plug 10 has a ball-valve 12 and the piston 11 a similar one, 13. The plug-valve 12 seats downward and the piston-valve 13 seats upward as the latter descends, and it is obvious that these positions are reversed in the retractile movement. I propose to employ any suitable device for attaching the valves and allowing them to operate in the required manner. In this instance I show a form of metal cage 14, (see Fig. 9,) which is conical and perforated at one end and has flexible inwardly-bent lips or flanges 15 at the other. It is apparent that the valves will seat in the conical end of this cage or holder 14, so as to prevent passage of air, but the flanges 15 offer no obstruction thereto. The cage 14 may be secured in the plug 10 by cement or by other mechanical means, and it may be soldered in the metal expander. The latter has necessarily a longitudinal perforation 16, Fig. 7, and the piston-tube plug 17, Fig. 6, has also a longitudinal passage for admission of air.

In Fig. 8 I show the barrel-plug 10 provided with a metal tube or bushing 18, which lines its central passage and is slightly flared at its outer end. This tube may be employed when required to prevent the passage from closing by compression on the tire-nipple *x*.

What I claim is—

1. A bicycle hand-pump comprising an elongated barrel and a sliding piston-tube, an elastic plug secured in the outer end of said tube and having a shoulder, and the rubber sleeve surrounding the tube adjacent to such shoulder, and forming a surface which is flush or smooth with the barrel and said shoulder of the plug, as shown and described.

2. In a pump, the combination with an elastic piston, of a conical screw which is inserted in the head of the same and serves to expand it as shown and described.

3. A bicycle-pump comprising an elongated barrel, and piston-tube, perforated end plugs for said barrel and piston-tube, an elastic piston secured in the latter, a perforated expander applied to the piston, and valves held in the barrel-plug and expander and adapted to alternately open and close the passages, as shown and described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. ROBINSON.

Witnesses:
AMOS W. HART,
SOLON C. KEMON.