

(No Model.)

2 Sheets—Sheet 1.

A. WOLFF & T. R. HYDE, Jr.
AIR PUMP.

No. 518,302.

Patented Apr. 17, 1894.

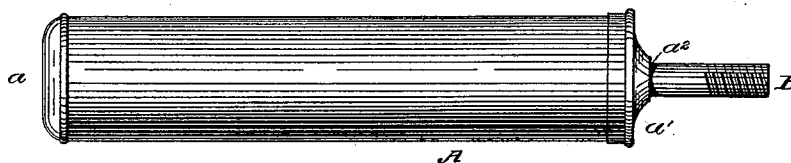


Fig. 1.

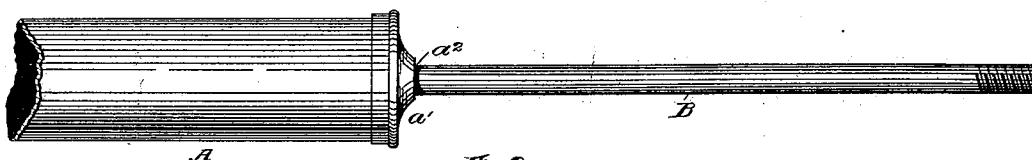


Fig. 2.

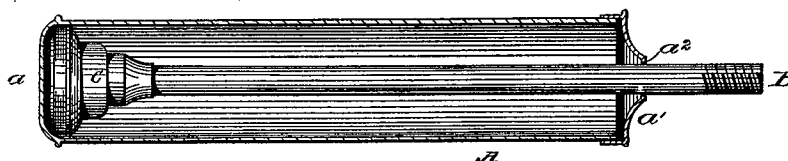


Fig. 3.

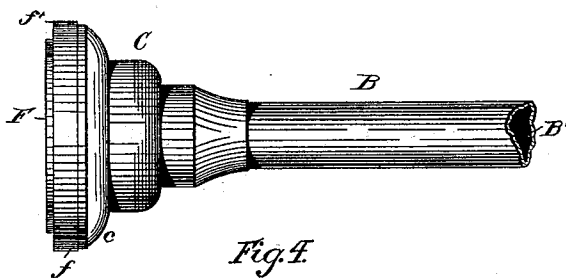


Fig. 4.

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(No Model.)

2 Sheets—Sheet 2.

A. WOLFF & T. R. HYDE, Jr.
AIR PUMP.

No. 518,302.

Patented Apr. 17, 1894.

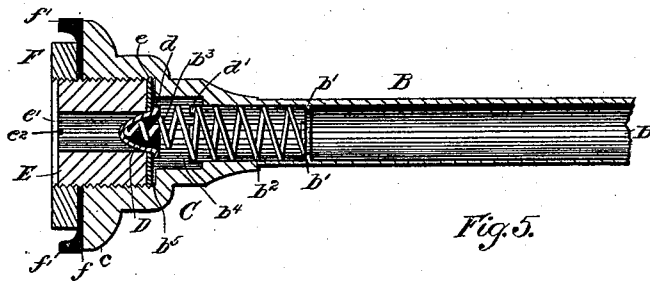


Fig. 5.

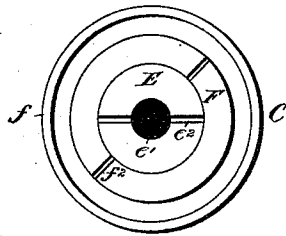


Fig. 6.

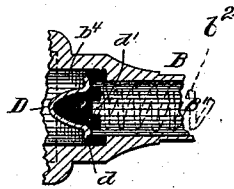


Fig. 7.

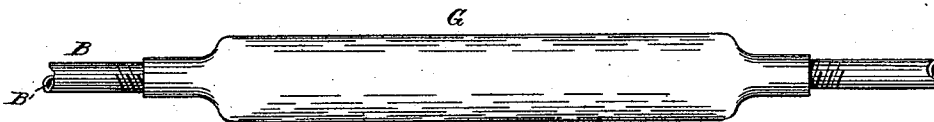


Fig. 8.

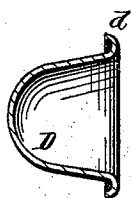


Fig. 9.

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UNITED STATES PATENT OFFICE.

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AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 518,302, dated April 17, 1894.

Application filed February 9, 1893. Serial No. 461,573. (No model.)

To all whom it may concern:

Be it known that we, ADRIAN WOLFF and THEOPHILUS R. HYDE, JR., citizens of the United States of America, and residents of the city of Waterbury, in the county of New Haven and State of Connecticut, have invented a new and useful Improvement in Air-Pumps, of which the following is a specification.

Our invention relates to certain new and useful improvements in air pumps and has for its object the provision of an article which shall be simple and durable in construction and efficient in operation.

To this end the invention consists in the construction and combination of the several parts, as will be hereinafter fully described and pointed out in the claims.

In the drawings Figure 1 is a side view of our invention, the cylinder inclosing, to its maximum extent, the piston rod or discharge tube. Fig. 2 is a similar view, the cylinder being withdrawn to its maximum extent to allow air to enter the cylinder. Fig. 3 is a partially sectional view illustrating the interior of the cylinder and its contained mechanism. Fig. 4 is an enlarged side view of the piston and a portion of the rod or discharge tube. Fig. 5 is a vertical section of Fig. 4. Fig. 6 is an end view of Fig. 4. Fig. 7 is a sectional detail view illustrating more clearly the valve mechanism. Fig. 8 is a side view of the connecting tube through which the air is forced into the receptacle to be filled, and Fig. 9 is an enlarged sectional view illustrating in detail a modification of the check valve.

Referring to the drawings in which similar letters of reference denote corresponding parts, A designates a cylinder having a hermetically closed end *a*. Its other end is screw threaded and is provided with a cap *a'* which is adapted to be screwed thereon and which is provided centrally with a perforation *a²* for a purpose to be presently described. This cylinder may be constructed plain as to its exterior or may, if desired, be serrated or knurled in order to afford a more unyielding surface to the hands.

B designates a combined piston rod and discharge tube having a longitudinal perforation B'.

For convenience of description we shall hereinafter refer to this member by the latter name. That end of this tube which is within the cylinder is provided with a piston C which may be formed integral with the tube B, or may be soldered or otherwise secured thereto. The longitudinal perforation in the discharge tube B is provided with a shoulder *b'* and bearing against the shoulder *b'* is a coiled spring *b²*. The other end of this spring is reduced in diametrical area at *b³* and fits within a cap D, which constitutes a check valve. This check valve D is provided with an annular flange *d*.

d' is a stop which consists of a projection extending inwardly from the discharge tube B into the enlarged portion *b⁴* in the piston head, and is perforated or cut away, as illustrated in detail in Fig. 7 to permit the passage of the air around and under the check valve and into the discharge tube. The perforation *b⁴* is still further enlarged at *b⁵* and the interior of the perforation *b⁵* is screw-threaded to receive an externally screw-threaded plug E, which is adapted to be screwed therein, and which is provided at its inner end with a washer *e* of rubber, leather or other similar material. This plug is also provided with a longitudinal perforation *e'* communicating with the perforations leading to and connecting with the discharge tube. When the check valve D is in its normal position, that is to say, when the spring *b²* is expanded to its maximum extent, the annular flange *d* will rest against the washer *e* and the valve will seat itself within the perforation in the plug E as shown in Fig. 5 and when the pressure of the spring *b²* has been overcome by the pressure of the compressed air upon the top of the check valve D the check valve D will pass downward until it rests upon the stop *d'*.

F designates a nut which is provided with a screw threaded perforation and is adapted to be screwed upon the outer end of the plug E. Between this nut and the outwardly flaring portion *c* of the piston C, is interposed a washer or packing *f* which may be of rubber, felt, leather or other suitable material. This washer is L shaped in cross section, being provided with an outwardly extending flange *f'*, and is slightly greater in circumference than

the portion *c* of the piston C. The flange *f'* of the washer extends partially over the nut F at a short distance from it, the object of which construction is that when the cylinder is being forced down upon the piston, the air compressed between the piston and the closed end of said cylinder may come between the exterior of the nut F and the interior of the flange *f'* of the washer and force the latter outwardly and thereby bind it more closely against the interior of the cylinder A. On the other hand when the cylinder is withdrawn a partial vacuum will be formed between the closed end of the cylinder and the piston and the pressure of the atmosphere on the other side of the piston head will collapse said washer or bend it inwardly upon the nut F and air will thus be admitted between the piston and the closed end of the cylinder.

The perforation *a*² in the cap *a'* is to some extent greater in diameter than the discharge tube B, the object of which construction is to allow the air free access to the interior of the cylinder between said cap and the piston C. The plug E and nut F may, if desired, be provided upon their outer faces with slots *e*², *f*² for convenience in screwing them, the former into the perforation *b*⁵ and the latter upon the former.

In its present embodiment, our invention is shown as constructed for use in forcing air into the tires of bicycles—known as pneumatic tires. In this connection we make use of a flexible connecting tube G (shown in Fig. 9) into one end of which the screw threaded end of the discharge tube B is screwed. The other end of the flexible tube is connected with the nipple governing access to the interior of the tire.

To operate the pump it is only necessary to make the proper connection between the discharge tube and the tire and to force the cylinder to and fro upon the discharge tube. The air between the piston and the closed end of the cylinder will be compressed and will pass through the perforation in the plug E and, overcoming the resistance of the spring *b*², force the check valve D from its seat and pass under the same, through the discharge tube B and, by means of the flexible connecting tube, into the bicycle tire.

When the cylinder is drawn back preparatory to another stroke, the spring *b*² will force the check valve from the stop *d'* and into the perforation in the plug E until the flange *d* rests against the washer *e* where it will be firmly held by the pressure of the air in the discharge tube B, and thus prevent the air which has been pumped into the tire from escaping through said perforation.

In Fig. 9 we have illustrated another modification of the check valve D. In this construction the check valve is shown as convex with a concave flange. This concave flange *d* renders the surface of the valve which bears upon the washer *e* very small, and as the washer *e* is of soft rubber, leather or similar material the flange will sink into the washer *e* and form an air tight valve.

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

1. In an air pump the combination with a cylinder, of a piston provided with a cut out portion *b*⁴ for the conical valve D, said cut out portion being provided with stops *d'* between which an air passage is formed and against which the valve D rests when opened by the air, of a spring *b*² to return said valve to its seat *e*, said seat being retained by a perforated screw-threaded plug E substantially as described.

2. In an air pump the combination with a cylinder, of a piston provided with a cut out portion *b*⁴ for the conical valve D, said cut out portion being provided with stops *d'* between which an air passage is formed and against which the valve D rests when opened by the air, and a seat *e* against which the valve rests when closed, said seat being retained by a perforated screw threaded plug E, substantially as described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 4th day of February, 1893.

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T. R. HYDE, JR.

Witnesses:

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