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PATENTED AUG. 25, 1903.

J. B. LYFORD & C. E. HARTMAN.

AIR PUMP.

APPLICATION FILED FEB. 25, 1902.

NO MODEL.

Fig. 1.

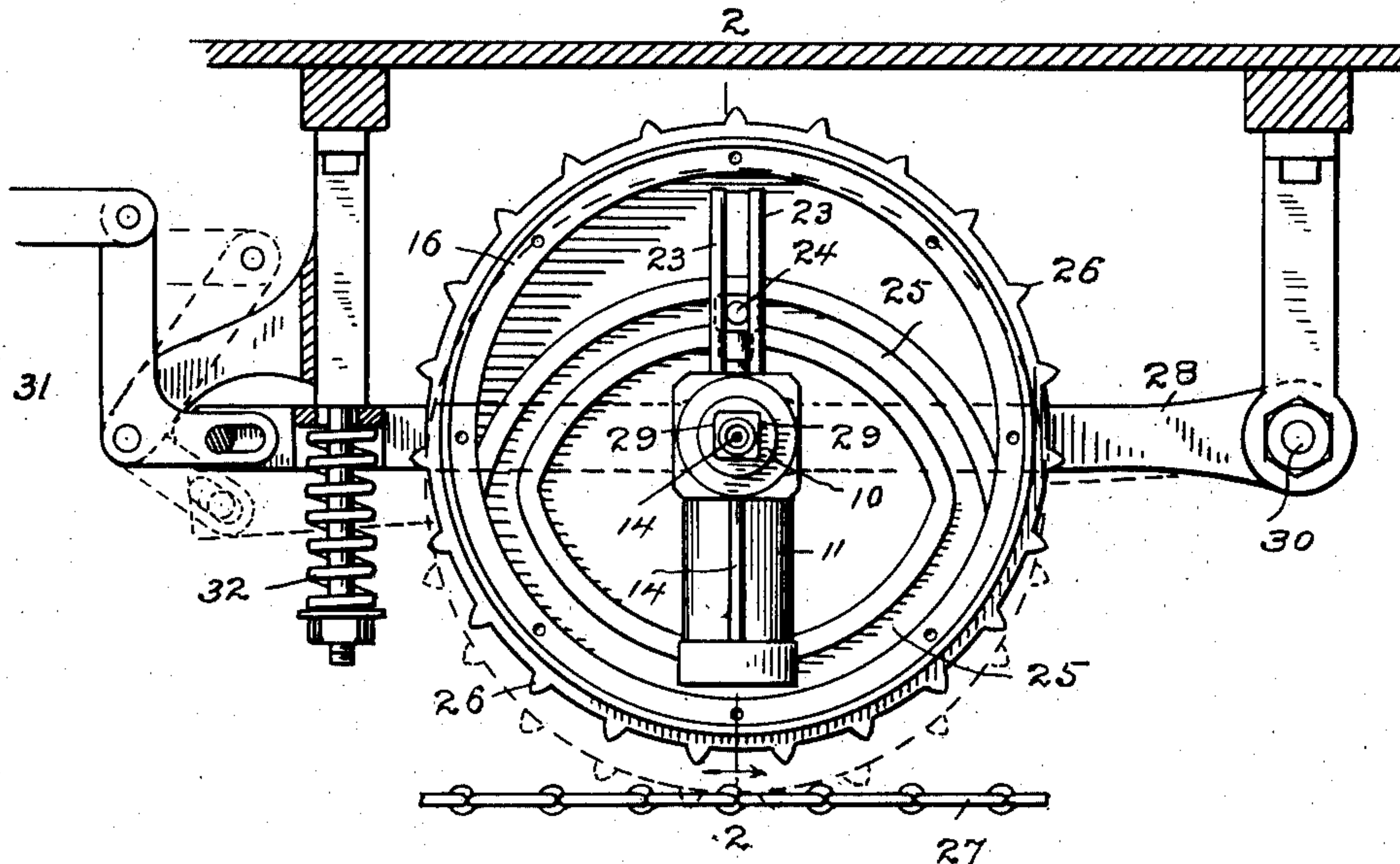
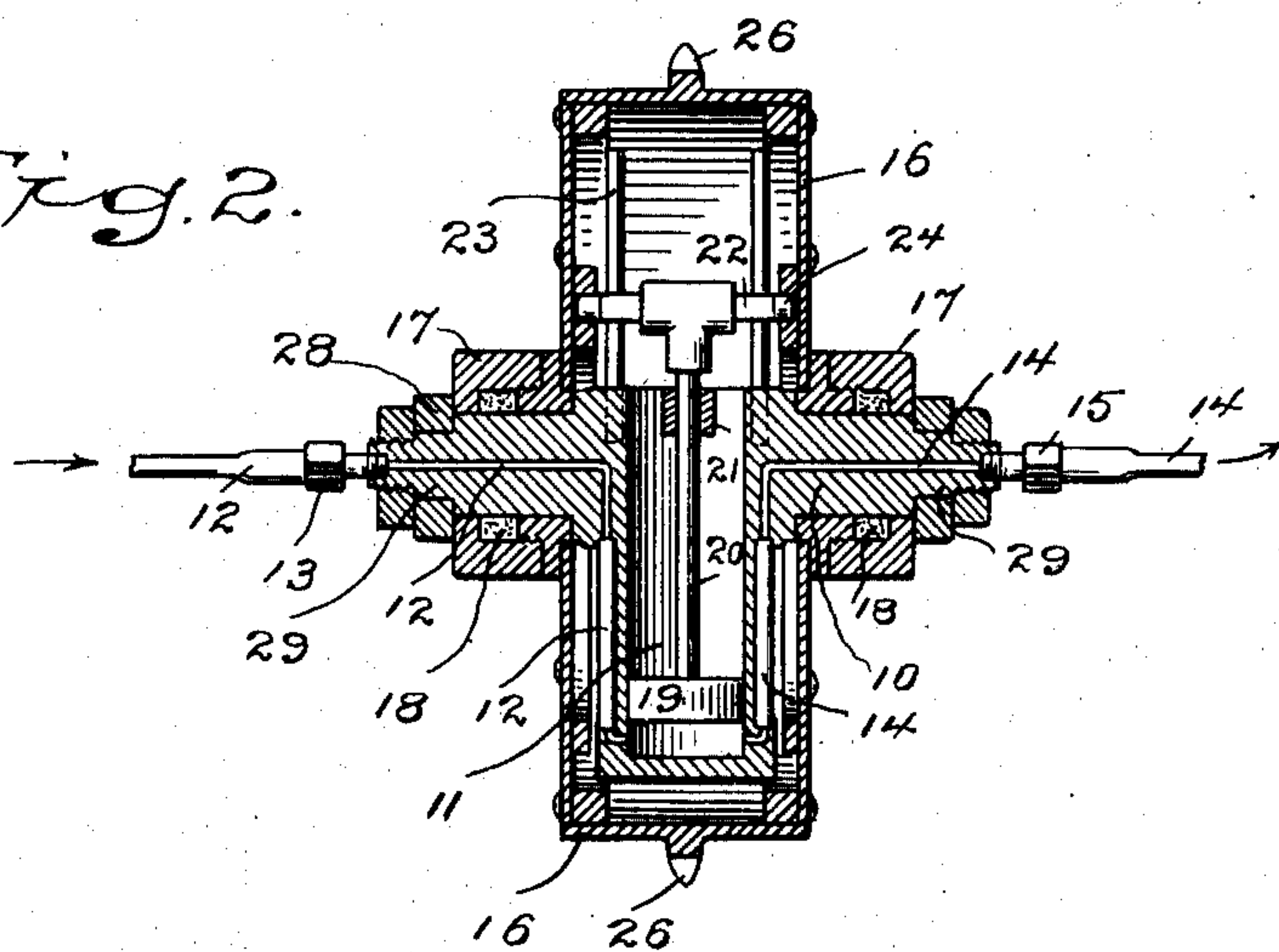


Fig. 2.



WITNESSES.

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UNITED STATES PATENT OFFICE.

JAY B. LYFORD AND CHARLES E. HARTMAN, OF BRIDGEPORT,
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AIR-PUMP.

SPECIFICATION forming part of Letters Patent No. 736,986, dated August 25, 1903.

Application filed February 25, 1902. Serial No. 95,601. (No model.)

To all whom it may concern:

Be it known that we, JAY B. LYFORD and CHARLES E. HARTMAN, citizens of the United States, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented a new and useful Air-Pump, of which the following is a specification.

Our invention has for its object to provide a reversible air-pump adapted for general use wherever it is required to fill a tank or other receptacle with air, as in shops or upon launches, and especially adapted for use upon motor-vehicles requiring air under pressure.

With this end in view we have devised the air-pump which we will now describe, referring to the accompanying drawings, forming part of this specification, and using reference characters to designate the several parts.

Figure 1 is a view, partly in elevation and partly in section, with one side of the drum removed; and Fig. 2 is a section on the line 1 1 in Fig. 2.

The essential feature of our invention is that the cylinder of the pump is placed within an operating-drum which is adapted to be moved into and out of the operating position at the convenience of the operator and is preferably made tight, so as to hold oil or other liquid.

10 denotes a fixed shaft by which the pump-cylinder 11 is carried. An inlet air-passage 12, provided with an inlet-valve 13, admits air at the bottom of the cylinder, and an outlet air-passage 14, having an outlet-valve 15, conveys air from the cylinder to a tank or other suitable receptacle. (Not shown.)

16 denotes a drum which incloses the cylinder and is adapted to rotate on the shaft. Air-passages 12 and 14 preferably enter and leave the shaft axially, it being wholly immaterial so far as the principle of our invention is concerned whether these passages are made wholly in the shaft and the cylinder-casting or partly external thereto, as shown in the drawings, or whether the shaft and the cylinder are cast integral or are formed in separate parts and rigidly secured together, it being of course required that air be admitted to and taken from the cylinder in such a manner as to permit free rotation of the drum upon the shaft. This drum may

be constructed in any ordinary or preferred manner, but is preferably made tight, so as to retain oil or any other liquid that will serve the purpose of lubrication and will also prevent the pump-cylinder from becoming heated in use. We have shown the hubs 17 of the drum as provided with internal packing 18 to prevent the escape of oil at the bearings.

19 denotes the piston of the pump, and 20 the piston-rod, adapted to slide in a guide 21 at the upper end of the cylinder. At the upper end of the piston-rod is a cross-piece 22, the opposite ends of which are supported by guides 23 and are shown as provided with rollers 24, which engage cam-grooves 25 on the side walls of the cylinder.

The drum may be rotated in either direction to operate the pump, as by gearing, a band, or a sprocket-chain, as shown in the drawings. We have shown the drum as provided with sprocket-teeth 26, adapted to engage a sprocket-chain 27. This chain may be the driving-chain of a motor-vehicle or of a marine or stationary engine, it being of course wholly immaterial how motion is imparted to the drum. We have shown the drum as carried by levers 28, which are engaged by angular portions 29 of the shaft, are pivoted at one end to a fixed support, as at 30, and are provided at the other end with operating mechanism 31, which may be a bell-crank lever and connections, as shown in the drawings, or any ordinary or preferred device of a similar character. A spring or springs may be provided to raise and retain the levers, drum, and pump out of operative position, as shown in full lines in the drawings, except when said parts are thrown to the operative position against the power of the spring by the operating mechanism, as indicated by dotted lines in Fig. 1.

The operation of our novel pump will be so obvious from the drawings as hardly to require further explanation. When it is desired to pump air into a tank or other receptacle, the drum is swung from the normal or inoperative position (indicated by full lines in Fig. 1) to the operative position, (indicated by dotted lines in said figure,) in which in the present instance the sprocket-teeth of the drum will be in engagement with the sprocket-

chain, and the drum will be rotated in either direction, depending, of course, upon the direction of movement of the chain. The rotation of the drum will cause reciprocation of the piston in the cylinder through the engagement of cross-piece 22, shown as provided with antifriction-rollers with the cam-grooves on the inner side walls of the drum. Air will enter inlet air-passage 12, passing inlet-valve 13 when the piston is raised, the outlet-valve 15 closing, and will be forced out through outlet air-passage 14 by the downward movement of the piston, inlet-valve 13 closing and the outlet-valve permitting air to pass. As soon as the tank or other air-receptacle (not shown) is filled the drum and pump are lifted out of engagement with the chain by means of the operating mechanism. By making the drum fluid-tight, so that it may be filled with oil, we provide for perfect lubrication of the pump and also insure that the pump will remain cool, no matter how long it may be used continuously.

Having thus described our invention, we claim—

1. The combination with an air-pump having a piston provided with a cross-piece and a shaft by which the pump is carried and which is provided with air passages and valves, of a drum inclosing the air-pump and having on its inner walls cam-grooves engaged by the cross-piece, whereby the pump is operated when the drum is rotated.

2. The combination with a shaft, an air-pump carried thereby, a drum inclosing the pump and connections intermediate the drum and the pump, whereby the latter is operated, of levers by which the shaft is carried, means for rotating the drum, and mechanism by which the drum and pump may be moved into and out of operative position with reference to the rotating means.

3. The combination with a shaft, an air-pump carried thereby and a drum inclosing the pump and having a cam by which the pump is operated, of means for rotating the drum and means for moving the drum and pump into and out of operative position with reference to the operating means.

4. The combination with a shaft, an air-pump carried thereby, a drum inclosing the pump and having a cam by which the pump is operated, and a chain for rotating the drum, of levers by which the shaft is carried, connections by which said parts are moved into and out of operative position with reference to the chain and a spring for retaining said parts out of operative position.

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

JAY B. LYFORD.

CHARLES E. HARTMAN.

Witnesses:

A. M. WOOSTER,

S. W. ATHERTON.