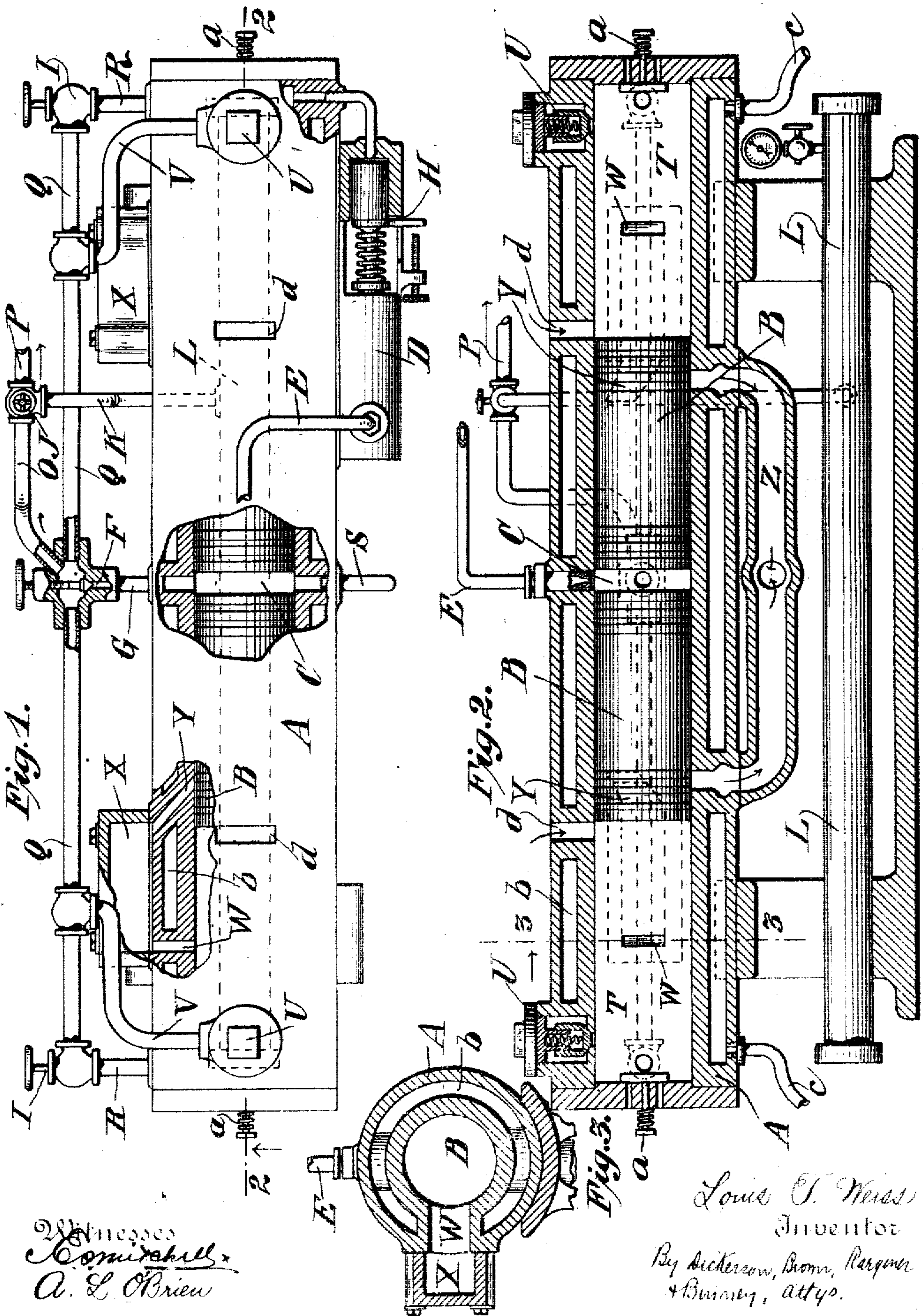


No. 814,179

PATENTED MAR. 6, 1906.

L. T. WEISS.
PUMP.

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UNITED STATES PATENT OFFICE.

LOUIS T. WEISS, OF BROOKLYN, NEW YORK.

PUMP.

No. 814,179.

Specification of Letters Patent.

Patented March 6, 1906.

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To all whom it may concern:

Be it known that I, LOUIS T. WEISS, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, State of New York, have invented certain new and useful Improvements in Pumps, of which the following is a specification accompanied by drawings.

This invention relates to improvements in pumps, but more particularly to compressors for compressing air or other expansible fluids.

The objects of the invention are to enable a compressor to be effectively and economically operated with great simplicity of parts and increased efficiency.

Another object of the invention is to enable a compressor to be operated by gas-actuated means—as, for instance, by means of an explosive-engine.

Further objects of the invention will hereinafter appear; and to these ends the invention consists of apparatus for carrying out the above objects embodying the features of construction, combinations of elements, and arrangement of parts having the general mode of operation, substantially as hereinafter fully described and claimed in this specification, and shown in the accompanying drawings, in which—

Figure 1 is a plan view of apparatus embodying the invention, with parts of the casing broken away and partly in section. Fig. 2 is a longitudinal sectional elevation of the same, and Fig. 3 is a transverse sectional view on the line 3 3 of Fig. 2.

According to this invention the compressor is operated upon the principle of the gas-engine, and one embodiment of the invention is shown in the accompanying drawings.

Referring to the drawings, A represents a casing in which are shown plungers B. Although the apparatus is illustrated in duplex form, it is to be understood that a simple compressor having one plunger may be used in accordance with this invention. Air is compressed between the ends of the plunger or plungers and the casing on the outward stroke, and the plunger or plungers are actuated outwardly by the ignition of an explosive mixture in the explosion-chamber between the plungers. The return stroke is effected by a portion of the air or other expansible fluid compressed on the outward stroke, and means are provided for washing out the explosion-chamber with a portion of the air compressed. Suitable means are pro-

vided for admitting an explosive mixture to the explosion-chamber C. Oil or vapor is admitted from the tank D through the pipe E, while air is admitted through the valve F and pipe G. The supply of oil or vapor is controlled by means of the pump H, operated by air-pressure.

In order to start the apparatus, the valves I are opened, which valves may be connected to operate together, if desired, and the three-way valve J is also opened to open connection between the pipes O and K to the compressed-air tank L, which tank may be pumped up by hand, if desired. When the pipes O and K are placed in communication, passage to the pipe P, which may lead to a storage-tank, is closed. The opening of the valves I and J thus admits compressed air from the tank L to the ends of the casing through the pipes Q and R, thereby forcing the plungers B toward the center. The plungers having been brought to the center, the valves I are closed and the valve J is turned to open communication between the pipes O and P, leading to storage, at the same time closing communication to the pipe K, leading to the tank L. Air is admitted through the valve F and oil or vapor through the pipe E to the explosion-chamber, where ignition takes place by any suitable means—as, for instance, by means of a hot rod S, which may be of copper suitably heated initially, as by means of a lamp.

The plungers, if two are used, are forced outwardly by the explosion of the charge and in their outward movement compress air in the ends T of the casing. Air is admitted to the casing by suitable valve-apertures d. The spring-controlled valves U permit the air to be compressed until the springs of said valves are overcome and the air passes through pipes V and Q to the pipe O and from thence by pipe P to a suitable storage-tank. At the same time some of the air is forced through the valve-openings W in the casing into the wash-boxes X, which are also in communication with the interior of the casing by means of the valve-openings Y. As the inner ends of the plungers B pass beyond the valve-openings Y at the outer end of the stroke the air compressed in the wash-boxes X passes into the explosion-chamber and from thence into the exhaust-passage Z; thus washing out the products of combustion.

Relief-valves a may be provided at each end of the cylinder or casing, so that on the

return stroke of the plungers a vacuum may be avoided. A portion of the air compressed in front of the plungers reacts to move the plungers toward the center again. As this occurs the pump H is actuated by the compressed air in front of one of the plungers and forces a charge of oil or vapor in the explosion-chamber, which is compressed, together with the air admitted on the return stroke. After the copper rod S has once been heated initially the continued action of the engine maintains this rod or igniter hot enough to ignite the charge each time. Water-jackets b, supplied from the pipes c, are arranged to cool the casing.

The amount of compression which can be obtained between the cylinders on the return stroke will be determined by the amount of charge admitted between the cylinders and exploded, and it will also depend upon the pressure of the air stored.

Obviously some features of this invention may be used without others, and the invention may be embodied in widely-varying forms.

Therefore, without limiting the invention to the construction shown and described nor enumerating equivalents, I claim, and desire to secure by Letters Patent, the following:

1. The combination with a casing, of a working plunger therein, gas actuated in one

working direction to compress air in the casing, and actuated in the other direction on the return stroke by a portion of said air compressed, provision being afforded for admitting a portion of the compressed air in front of the plunger on the return stroke to wash out the explosion-chamber, for substantially the purposes set forth.

2. The combination with a casing, of a plurality of working plungers therein, gas actuated outwardly in one working direction to compress an expansible fluid in the casing, and actuated inwardly in the other direction on the return stroke by the fluid compressed in the casing, for substantially the purposes set forth.

3. The combination with a casing, of a plurality of working plungers therein, gas actuated away from each other to compress an expansible fluid in the casing, and actuated toward each other on the return stroke by the fluid compressed in the casing, for substantially the purposes set forth.

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

LOUIS T. WEISS.

Witnesses:

WESLEY W. WHITLEY,
JAMES BIGGART.