No. 841,140. PATENTED JAN. 15, 1907.

A. H. GIBSON.

PRESSOR.

APPLICATION FILED AUG. 12, 1905.

2 SHEETS—SHEET 1.

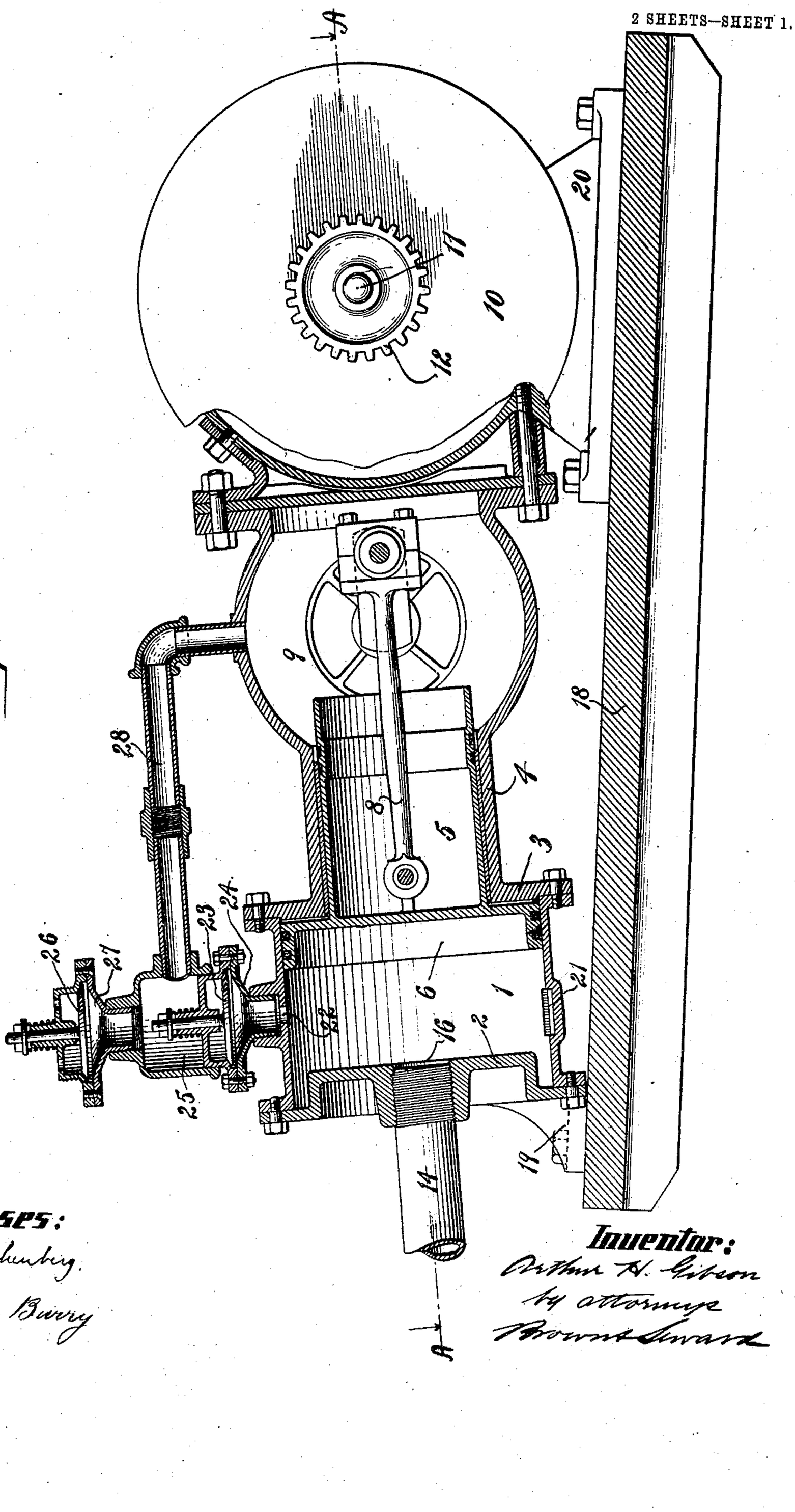

Fig. 1.

Witnesses:

S. L. Hachenberg.

F. George Barry

Inventor:

Arthur H. Gibson

by attorneys

Brown & Swan

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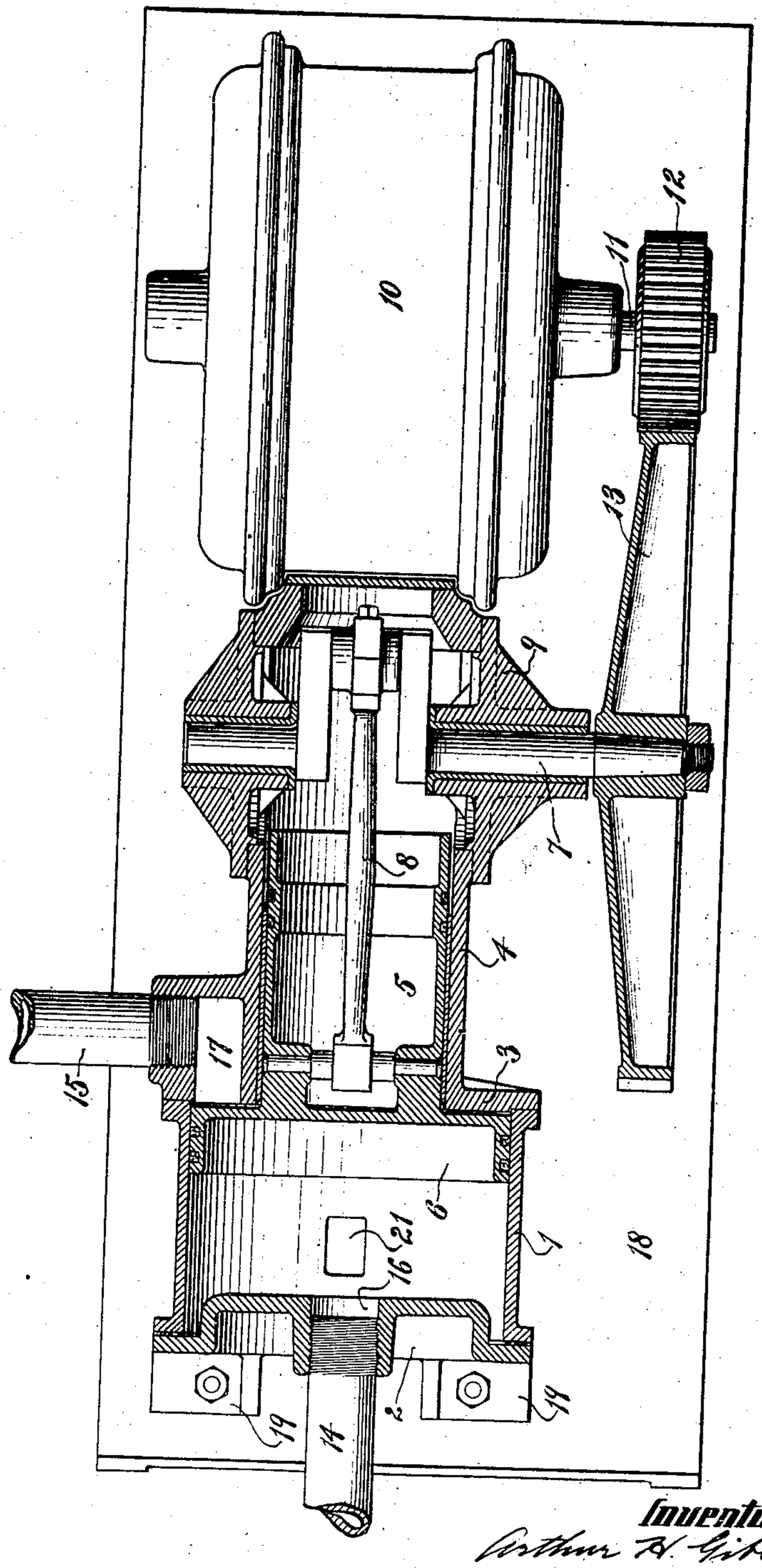
2 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

F. G. Hachmbury.

J. George Barry.

Inventor:

Arthur H. Gibson

By attorneys

Brown & Lemmond

UNITED STATES PATENT OFFICE.

ARTHUR H. GIBSON, OF EASTON, PENNSYLVANIA, ASSIGNOR TO THE INGERSOLL-SERGEANT DRILL COMPANY, OF NEW YORK, N. Y., A CORPORATION OF WEST VIRGINIA.

PRESSOR.

No. 841,140. Specification of Letters Patent. Patented Jan. 15, 1907.

Application filed August 12, 1905. Serial No. 273,924.

To all whom it may concern:

Be it known that I, ARTHUR H. GIBSON, a subject of the King of Great Britain and a resident of Easton, in the county of Northampton and State of Pennsylvania, have invented a new and useful Improvement in Pressors, of which the following is a specification.

The object of my present invention is to provide certain improvements in pressors which are especially adapted for use in connection with percussive tools, the pressor and its motor being portable and being connected with the percussive tool by means of flexible tubes through which columns of air are reciprocated for operating the tool.

This invention is particularly directed to improved means for keeping the pressure of the motive fluid raised a slight amount above atmospheric pressure, so as to facilitate the operation of the percussive tool.

In the accompanying drawings, Figure 1 represents the pressor and its motor, partially in longitudinal vertical section and partially in side elevation; and Fig. 2 is a horizontal longitudinal section through the pressor in the plane of the line A A, Fig. 1, looking in the direction of the arrows, the motor being shown in top plan.

The pressor-cylinder is denoted by 1, its front head by 2, and its back head by 3. The back head 3 is extended rearwardly, as shown at 4, to form a tubular extension in which the hollow trunk 5 of the pressor-piston 6 is fitted to slide. The crank-shaft is denoted by 7, and it is connected to the interior of the piston-trunk 5 by a pitman-rod 8. The crank-shaft 7 is mounted in a closed crank-shaft casing 9. The motor for driving the pressor is herein represented as an electric motor 10, its shaft 11 being provided with a pinion 12, which meshes with a gear 13, fixed to the crank-shaft 7 of the pressor. Flexible tubes 14 and 15 lead from ports 16 and 17 in the front and rear heads 2 and 3, respectively, of the pressor-cylinder, which flexible tubes are intended to be connected to the percussive-tool cylinder. (Not shown herein.)

The pressor and motor are firmly mounted on a portable platform 18, as follows: The front head 2 of the pressor-cylinder is provided with bracket extensions 19, which are bolted to the platform 18, and the motor 10 is provided with a base 20, which is bolted to the said platform.

A bridge-port 21 is formed in the inner wall of the pressor-cylinder 1, which port is of sufficient length to bridge the head of the piston 6 and so arranged that communication between the spaces at the front and back of the piston is established when the piston is at a point a short distance from the outer limit of its stroke.

An inlet-port 22 is formed in the pressor-cylinder 1 at a point midway between the front and back heads 2 and 3, which port is arranged to be alternately opened to the front and back sides of the pressor-piston as the piston is reciprocated. A non-return inlet-valve 23 controls the admission of air to the port 22, the casing 24 of which valve is secured to the pressor-cylinder. A hollow cap 25 is secured to the inlet-valve casing 24 above the valve 23. Communication to the interior of this cap 25 above the non-return inlet-valve 23 is established from the external atmosphere through a non-return inlet-valve 26, the casing 27 of which is secured to the cap 25. Communication is established from the interior of the crank-shaft casing 9 to the interior of the cap 25 between the inner and outer inlet-valves 23 and 26 by means of a pipe 28.

In operation, supposing the piston to be in the position shown in the accompanying drawings, as the piston moves forwardly air will be drawn through the inlet-valve 26, cap 25, and pipe 28 into the interior of the crank-shaft casing 9. At the same time the columns of air will be forced out through the tube 14 from in front of the piston, and columns of air from the tube 15 will be drawn into the space back of the piston. As the piston passes the bridge-port 21 open communication will be established for a short time between the spaces to the front and back of the piston, thus equalizing the pressures in the two spaces. The further forward movement of the piston will close communication from the front to the back thereof, and the remaining air in front of the piston will be forced out through the tube 14.

As the piston starts on its inward movement it will force the air back of the piston out through the tube 15 and draw in the air

from the tube 14. At the same time the pressure of the air in the crank-shaft casing 9 will be raised to a slight degree, and as soon as the piston-head opens the port 22 to the space in front of the piston the air compressed in the crank-shaft casing will pass through the valve 23 into the space in front of the piston, thus raising the pressure slightly therein. As the piston in its inward movement passes over the bridge-port 21 there will be a momentary communication between the spaces in front and back of the piston, thus again equalizing the pressures on the two sides of the piston. This equalizing of pressures upon opposite sides of the piston by the bridge-port 21 is necessary, as the device herein shown for connecting the interior of the crank-casing with the interior of the pressor-cylinder is arranged to raise the pressure on the front side only of the piston.

It is to be understood that by arranging the bridge-port 21 at different distances from the ends of the cylinder the pressures may be equalized in front and back of the piston at different points during its movements. For instance, if the bridge-port 21 was arranged at the outer end of the cylinder practically no air would pass one way, whereas a very large amount of air would pass the other way. A point exists between the two heads where the side which receives no air from the crank-casing can be made to secure its proper share. In the accompanying drawings the bridge-port is shown as located in the proper position to obtain this result.

What I claim as my invention is—

1. A pressor-cylinder, its piston, fluid-pressure ports upon opposite sides of the piston, a crank-shaft casing, a passage leading from the crank-shaft casing to the pressor-cylinder at a point which will open the passage alternately to the opposite sides of the piston as it reciprocates, a valve for opening and closing communication between the interior of the crank-shaft casing and the interior of the pressor-cylinder and a valve for opening and closing communication from the external atmosphere to the interior of the crank-shaft casing.

2. A pressor-cylinder, its piston, fluid-pressure ports upon opposite sides of the piston, a closed crank-shaft casing, a passage leading from the crank-shaft casing to the pressor-cylinder, a valve for opening and closing communication between the interior of the crank-shaft casing and the interior of the pressor-cylinder, a valve for opening and closing communication from the external atmosphere to the interior of the crank-shaft casing and a bridge-port in the pressor-cylinder for opening communication from one to the other side of the pressor-piston at a predetermined point in its movement.

3. A pressor-cylinder, its piston, fluid-pressure ports upon opposite sides of the piston; a closed crank-shaft casing, an inlet-port in the cylinder arranged in position to be alternately opened to the opposite sides of the piston as it reciprocates, a non-return inlet-valve therefor, a passage leading from the crank-shaft casing to the said valve and a second non-return inlet-valve for opening and closing communication from the external atmosphere to the said passage intermediate the first-named valve and the crank-shaft casing.

4. A pressor-cylinder, a hollow trunk-piston therefor, fluid-pressure ports upon opposite sides of the piston, a closed crank-shaft casing in open communication with the piston-trunk, a passage leading from the closed crank-shaft casing to the pressor-cylinder at a point which will open the passage alternately to the opposite sides of the piston as it reciprocates, a non-return inlet-valve therein and a second non-return inlet-valve for opening and closing communication from the external atmosphere to the said passage intermediate the first-named valve and the crank-shaft casing.

5. A pressor-cylinder, its piston, fluid-pressure ports upon opposite sides of the piston, a closed crank-shaft casing, a non-return inlet-valve having its port located in the pressor-cylinder intermediate the ends thereof, a hollow cap above the inlet-valve, a second non-return inlet-valve for opening and closing communication from the external atmosphere to the interior of said cap and a pipe leading from the interior of the crank-shaft casing to the interior of the said cap between the two valves.

6. A pressor-cylinder, its piston, fluid-pressure ports upon opposite sides of the piston, a closed crank-shaft casing, a non-return inlet-valve having its port located in the pressor-cylinder intermediate the ends thereof, a hollow cap above the inlet-valve, a second non-return inlet-valve for opening and closing communication from the external atmosphere to the interior of said cap, a pipe leading from the interior of the crank-shaft casing to the interior of the said cap between the two valves and a bridge-port in the inner wall of the pressor-cylinder arranged to open communication from one to the other side of the piston when the piston is at a predetermined point in its movement.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 10th day of August, 1905.

ARTHUR H. GIBSON.

Witnesses:
H. D. MAXWELL,
FRANK P. MCCLUSKEY.