No. 841,141. PATENTED JAN. 15, 1907.

A. H. GIBSON.

PRESSOR.

APPLICATION FILED SEPT. 12, 1905.

3 SHEETS—SHEET 1.

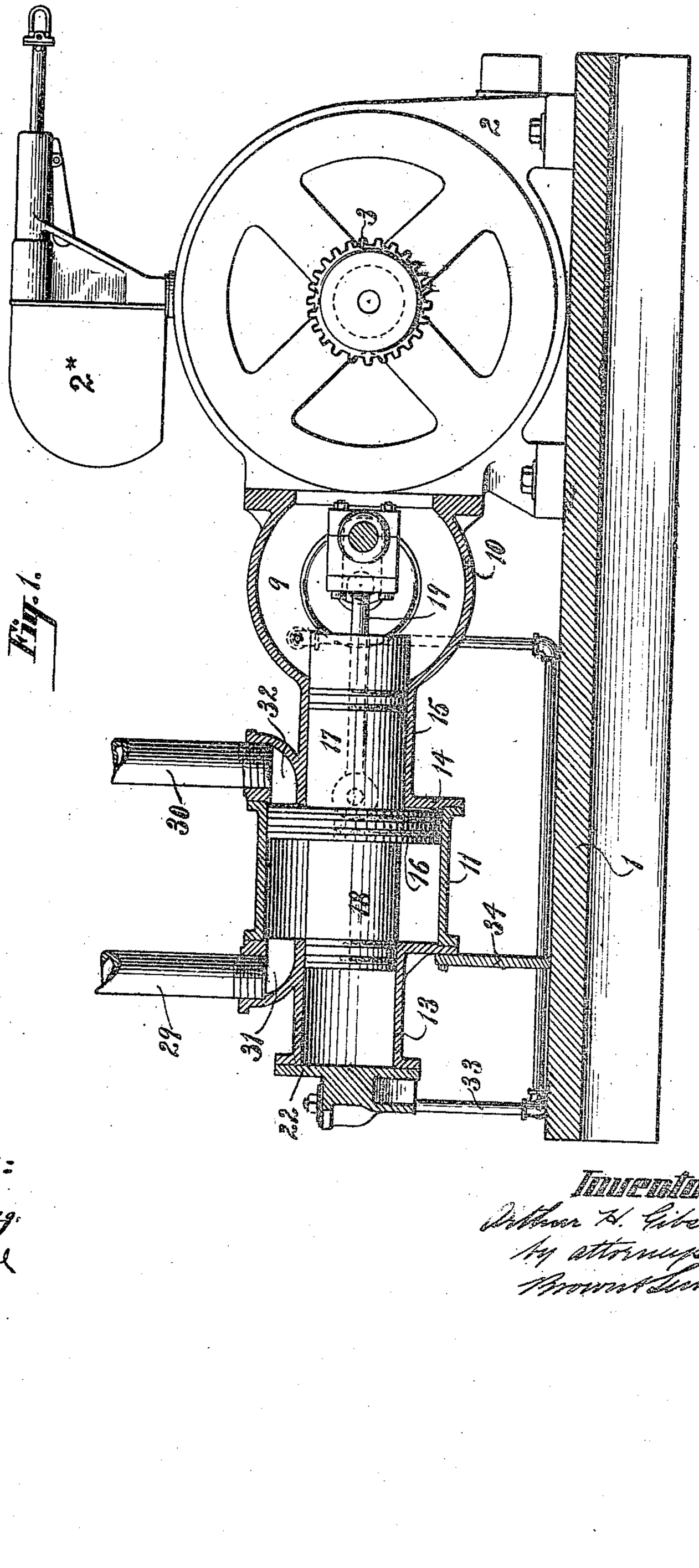

Fig. 1.

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Henry Thieme

Inventor:
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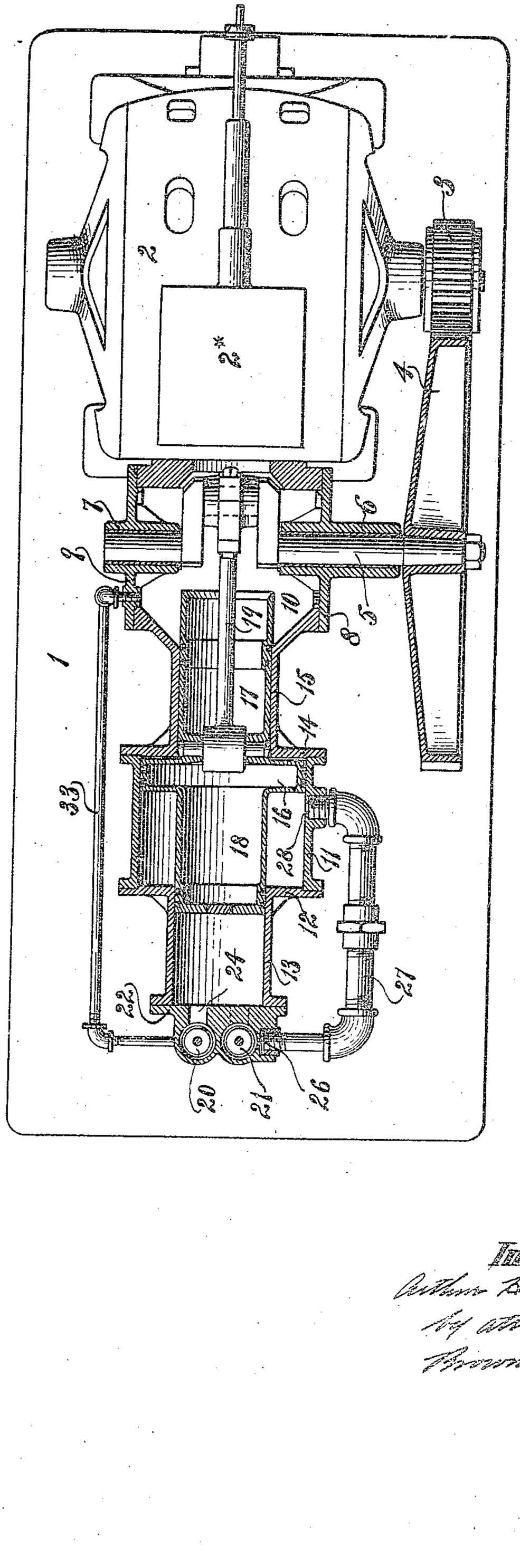
3 SHEETS—SHEET 2.

Fig. 2.



Witnesses:

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3 SHEETS—SHEET 3.

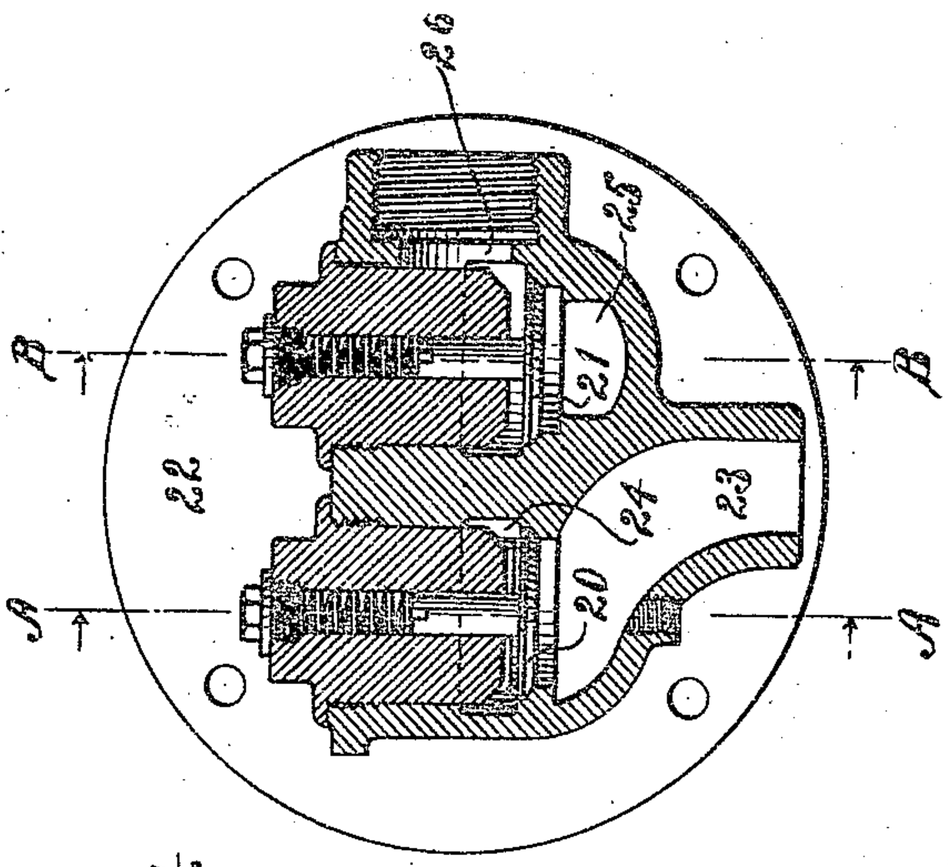

Fig. 4.

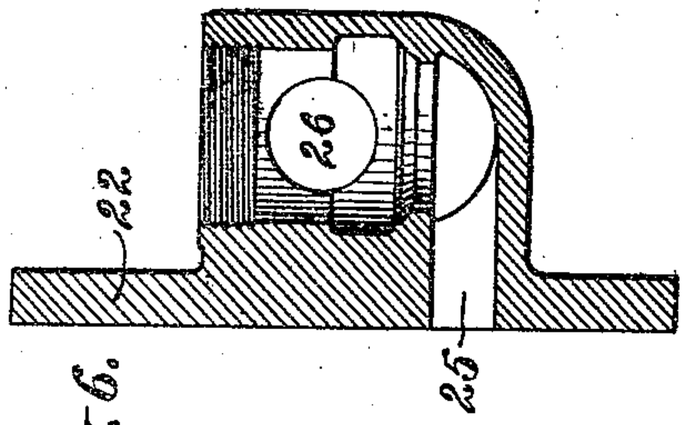

Fig. 6.

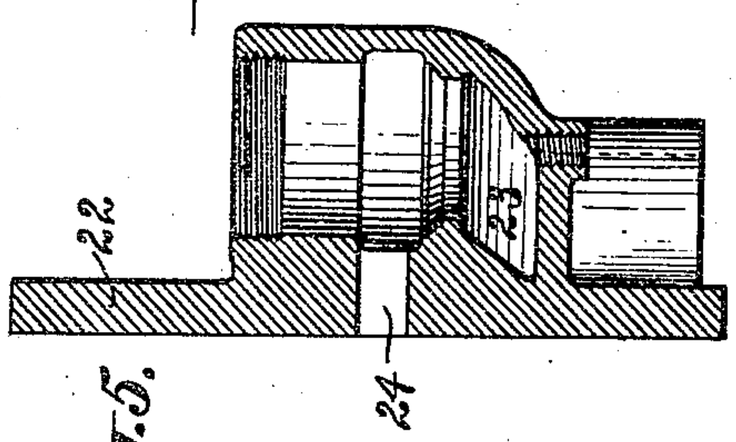

Fig. 5.

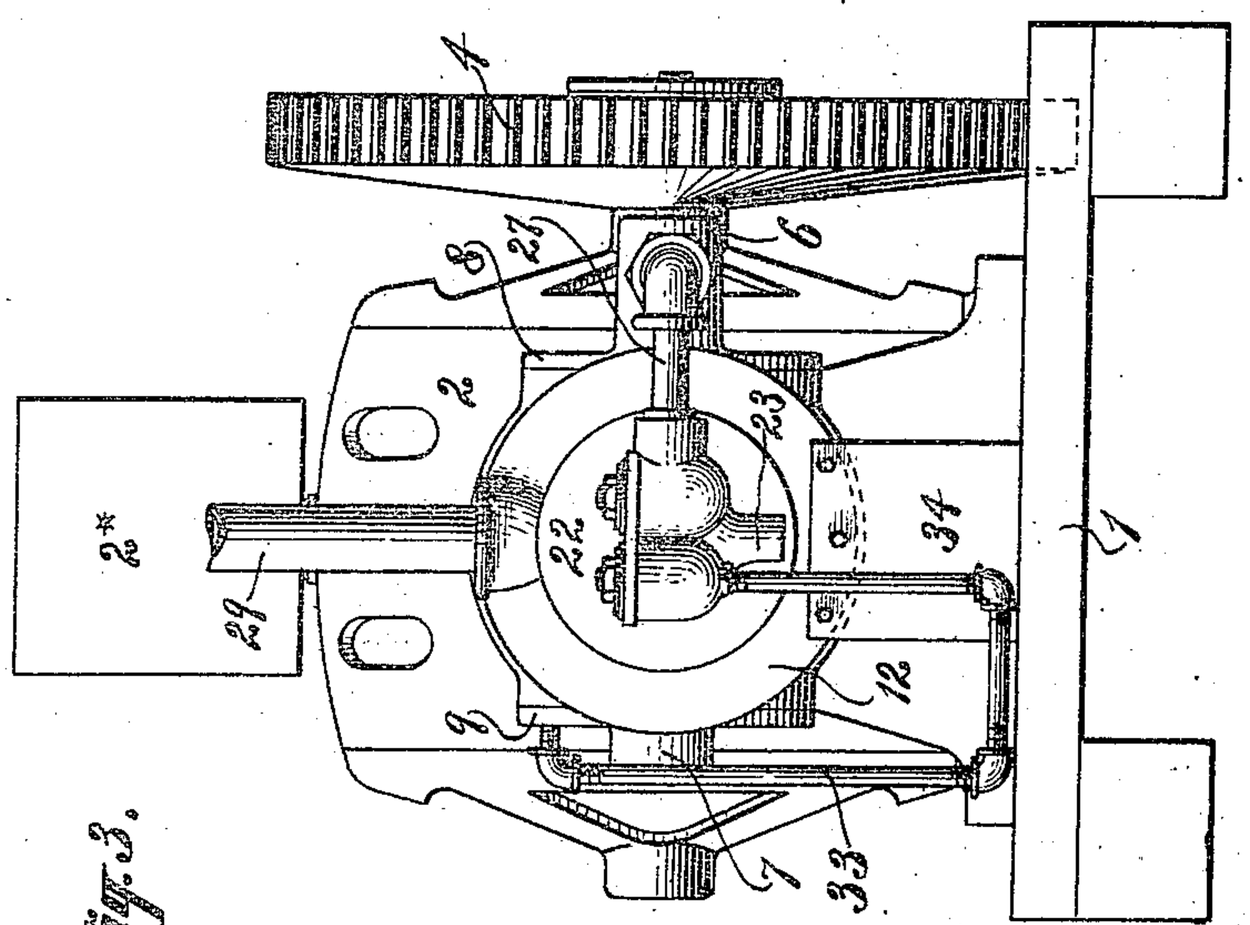

Fig. 3.

Witnesses.

F. G. Hachenberg.

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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. 841,141. Specification of Letters Patent. Patented Jan. 15, 1907.

Application filed September 12, 1905. Serial No. 278,172.

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 this present invention is to provide certain improvements in the construction, form, and arrangement of the several parts of a pressor of that type which is used for operating a tool by the use of reciprocating columns of air; and it is more particularly devoted to means for gradually regulating air-pressures upon both sides of the pressor-piston in a very simple and complete manner by the use of a single-acting pump combined with the pressor.

A further object is to provide other improvements in the pressor whereby the leakage of oil from the crank-shaft casing is not only obviated, but a proportion of the oil is used to good effect in connection with the lubrication of the pump portion of the pressor.

In the accompanying drawings, Figure 1 represents the pressor in vertical longitudinal central section, the same being combined with an electric motor, which is shown in side elevation, the whole being mounted on a portable platform, also shown in longitudinal section. Fig. 2 is a partial top plan and transverse longitudinal central section of the parts shown in Fig. 1. Fig. 3 is a front view of the pressor. Fig. 4 is an enlarged detail section through the inlet and discharge valves. Fig. 5 is a section taken in the plane of the line A A of Fig. 4, and Fig. 6 is a section taken in the plane of the line B B of Fig. 4.

The portable platform or base of the pressor is denoted by 1. An electric motor 2 of a well-known and approved construction is mounted on the platform, the driving-gear 3 of which motor intermeshes with the gear 4 of the crank-shaft 5 of the pressor. This crank-shaft 5 is mounted in suitable bearings 6 and 7 in the end plates 8 and 9 of a closed casing 10. A switch-controlling device 2* of approved construction is mounted on the motor 2 for controlling the starting and stopping of the same.

The pressor-cylinder is denoted by 11, its front head 12 being extended forwardly to form the pump-cylinder 13 and its rear head 14 being extended rearwardly to form a cylinder 15 for the pressor-piston trunk. In practice the rear head 14, cylinder 15, and crank-shaft casing may be formed integral. The pressor-piston is of the trunk-piston type, the piston-head being denoted by 16 and the hollow trunk, which slides in the cylinder 15, being denoted by 17. This pressor-piston is further provided with a forward extension 18, which is fitted to slide within the cylinder 13 and forms together therewith the air-pump for raising the air-pressure in the pressor-cylinder.

A pitman 19 connects the pressor-piston with the crank-shaft 5, whereby the pressor and pump may be operated from the motor through the said crank-shaft.

Inlet and discharge valves 20 21 are located in the front head 22 of the pump-cylinder, which front head also serves as a valve-casing. An inlet-port 23 leads to the under side of the inlet-valve 20, and a port 24 leads from the upper side of the valve 20 into the pump-cylinder 13. A port 25 leads from the pump-cylinder to the under side of the discharge-valve 21, and a port 26 leads from the top of the discharge-valve to a pipe 27, which forms a passage from the top of the said discharge-valve to a port 28 in the pressor-cylinder 11.

The tubes which lead to the tool-cylinder (not shown herein) and through which the columns of air are reciprocated by the movement of the pressor-piston are denoted by 29 and 30, the ports for the said pipes being denoted by 31 32, respectively, which ports open through the front and rear heads of the pressor-cylinder to the front and back of the piston.

A passage leads through the pipe 33 from the interior of the crank-shaft casing 10 to the inlet-port 23 just below the inlet-valve 20, the passage at this point being directed upwardly, so as to cause the mixed air and oil which passes from the pipe 33 to be directed past the inlet-valve 20 when the valve is opened. The pressor is supported upon the base 1 by a suitable upright 34.

While I have shown an electric motor for driving the pressor, it is to be understood that

any other type of motor may be used, if so desired, for this purpose.

In operation, supposing the parts to be in the position in which they are shown in Figs. 1 and 2, as the pressor-piston is moved forwardly to compress the air in front of the same and force it out through the port 31 and pipe 29 and at the same time permit the expansion of the air from the pipe 30 and port 32 into the space back of the piston the air in the space in front of the pump-piston will be forced out through the discharge-valve into the pipe 27 and from thence through the port 28 into the space back of the pressor-piston as soon as the piston is moved forwardly a sufficient di tance to uncover the port to its rear side. This will raise the pressure of air on the rear side of the pressor-piston at a time when the air therein is at its lowest pressure, and thereby when the least resistance will be imparted to the inrush of the additional supply of air through the port 28 and pipe 27 from the pump-cylinder chamber.

After the pressor-piston has reached the limit of its forward movement and as it starts on its inward movement for forcing the air through the port 32 and pipe 30 and for permitting the expansion of air from the pipe 29 and port 31 the inlet-valve 20 will be opened, thus permitting the pump-cylinder chamber to be filled with a new supply of air. At the same time air will be compressed in the pipe 27 because of its end being closed by the closure of the discharge-valve 21. As soon as the pressor-piston passes the port 28 of the said pipe to open it into the space in front of the pressor-piston the air which has been compressed in the pipe 27 will be fed to the space in the pressor-cylinder in front of the pressor-piston at a time when the pressure of air in this space is at a minimum.

It will thus be seen that by properly locating the port 28 with respect to the stroke of the pressor-piston and also by changing the size or length of the pipe 27 the proper amount of additional air-pressure may be supplied to both sides of the pressor-piston to suit the particular requirements for each pressor. By the use of a single-acting pump only it will furthermore be seen that the pressures on both sides of the pressor-piston may be kept equal, or one side of the pressor-piston may be provided with a greater mean pressure than the other side.

It has been found in practice that the pressure in the crank-shaft casing is gradually raised by the leakage of pressure past the piston-trunk 17, and in the case of a closed crank-shaft casing having no relief the mixture of air and oil would be forced out along the crank-shaft bearings 6 and 7, and thus cause a very disagreeable spraying of the same when released at the ends of the bearings.

By the provision of the pipe 33 I am enabled to overcome this disagreeable feature, for the reason that as the pressor-piston and pump-piston move inwardly and the inlet-pipe 20 is opened a jet of the mixed air and oil from the interior of the crank-shaft casing is forced from the end of the pipe 33 past the said inlet-valve. The oil of this mixture serves also to lubricate the pump and all of the working parts adjacent to the same. As this jet of mixed oil and air only exists during the suction-stroke of the pump and while the inlet-valve is being opened for drawing in air through the inlet 23, there is no loss of oil, and, furthermore, there will be no escape of oil when the apparatus is at rest.

What I claim as my invention is—

1. A pressor-cylinder, air-tubes leading therefrom, a pressor-piston, a pump, its inlet and discharge valves and a passage leading from the discharge-valve of the pump to the cylinder and arranged to be alternately opened to the opposite sides of the pressor-piston.

2. A pressor-cylinder and a pump-cylinder arranged in alinement, air-tubes leading from the pressor-cylinder, inlet and discharge valves for the pump-cylinder, connected pressor and pump pistons and a passage leading from the discharge-valve of the pump to the pressor-cylinder and arranged to be alternately opened to the opposite sides of the pressor-piston.

3. A pressor-cylinder, a pump-cylinder, air-tubes leading from the pressor-cylinder, inlet and discharge valves for the pump-cylinder, connected pressor and pump pistons and a passage leading from the discharge-valve of the pump to the pressor-cylinder in a position to be alternately opened to the opposite sides of the pressor-piston, communication being closed from the interior of the pump-cylinder to the passage when the pressor-piston is moved in one direction and opened when the pressor-piston is moved in the other direction.

4. A pressor-cylinder, its piston, a pump-cylinder, its piston, inlet and discharge valves for the pump-cylinder, air-tubes leading from the pressor-cylinder and a passage leading from the discharge-valve to the pressor-cylinder and arranged to be alternately opened to the opposite sides of the pressor-piston, the said discharge-valve being arranged to open and close one end of the passage according to the direction in which the pressor-piston is moved whereby the said passage may be used to raise the air-pressure upon opposite sides of the pressor-piston.

5. A pressor-cylinder, its piston, air-tubes leading from the cylinder, a single-acting pump, inlet and discharge valves therefor and a passage leading from the discharge-valve to the pressor-cylinder and arranged to be opened to the opposite sides of the pressor-

piston whereby the pressure of air may be raised upon opposite sides of the pressor-piston by the use of the said single-acting pump.

6. A pressor including a trunk-piston, a closed crank-shaft casing and a pump, inlet and discharge valves for the pump, and a passage leading from the closed crank-shaft casing to the inlet-valve of the pump as and for the purpose set forth.

7. A closed crank-shaft casing, a pressor-cylinder, a pump-cylinder, inlet and discharge valves for the pump-cylinder, air-tubes leading from the pressor-cylinder, pressor and pump pistons, a passage leading from the discharge-valve of the pump to the pressor-cylinder and arranged to be opened to the opposite sides of the pressor-piston and a passage leading from the crank-shaft casing to the inlet-valve of the pump.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 6th day of September, 1905.

ARTHUR H. GIBSON.

Witnesses:
H. D. MAXWELL,
WARD RAYMOND.