

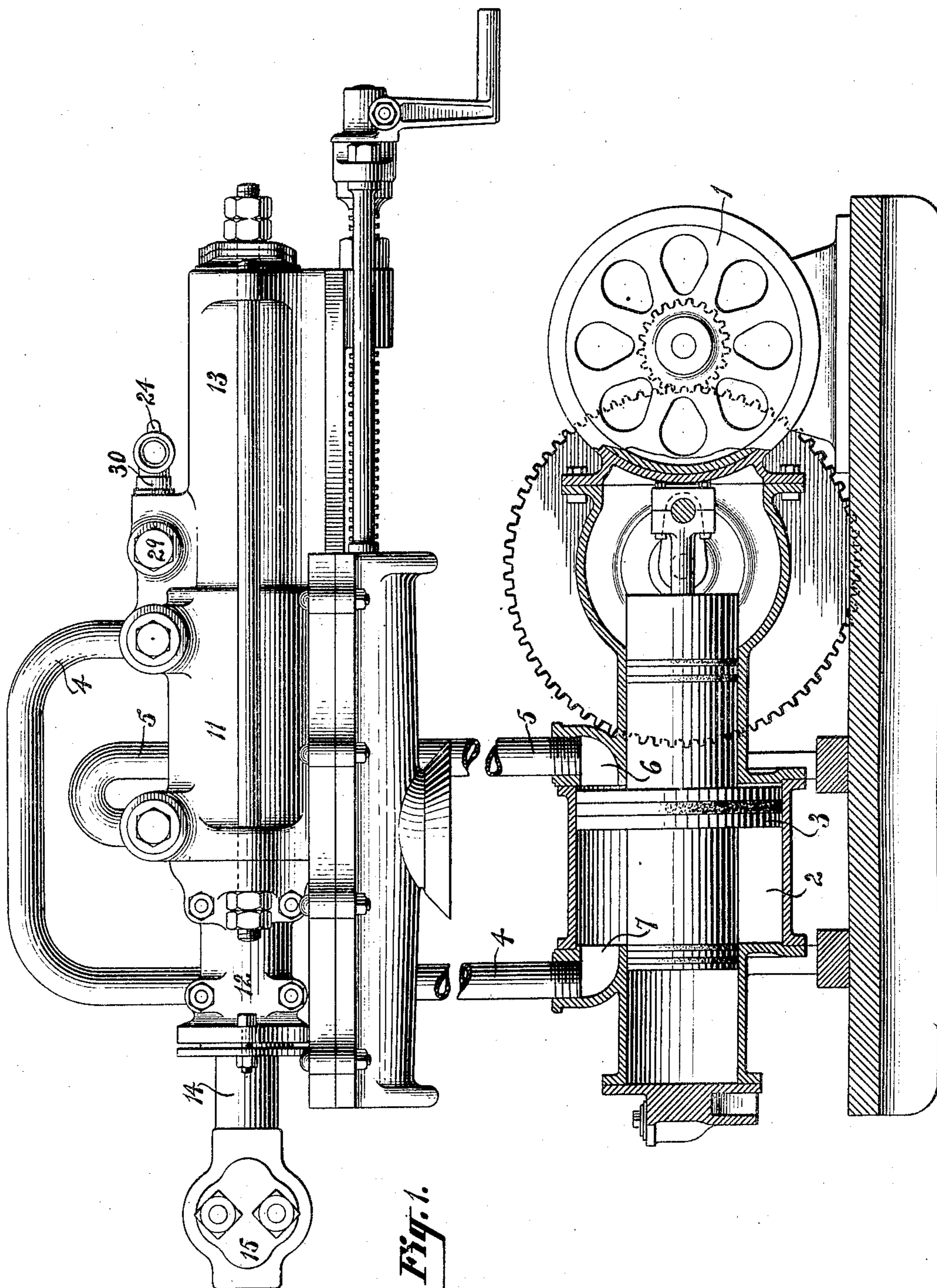
No. 822,596.

PATENTED JUNE 5, 1906.

A. H. GIBSON.  
ROCK DRILL.

APPLICATION FILED DEC. 21, 1905.

2 SHEETS—SHEET 1.



***Witnesses:***

F. G. Wachenberg.  
Newy Thine.

***Inventor:***

Arthur T. Gibson  
by attorneys  
~~James M. Gibson~~

No. 822,596.

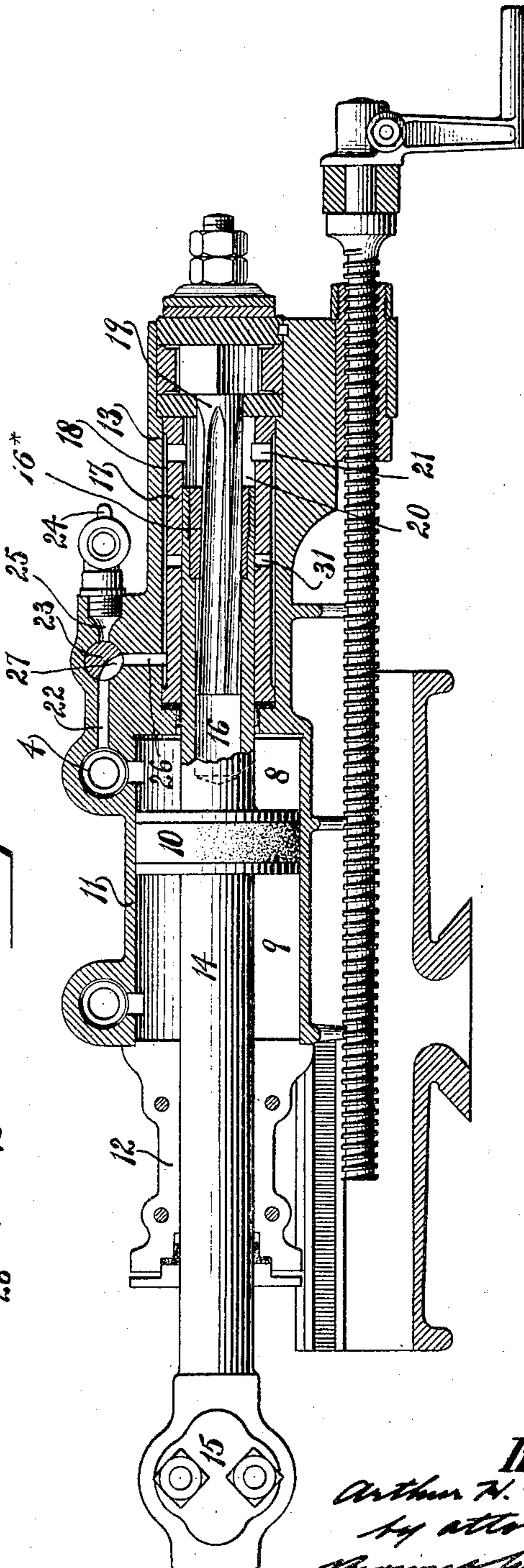
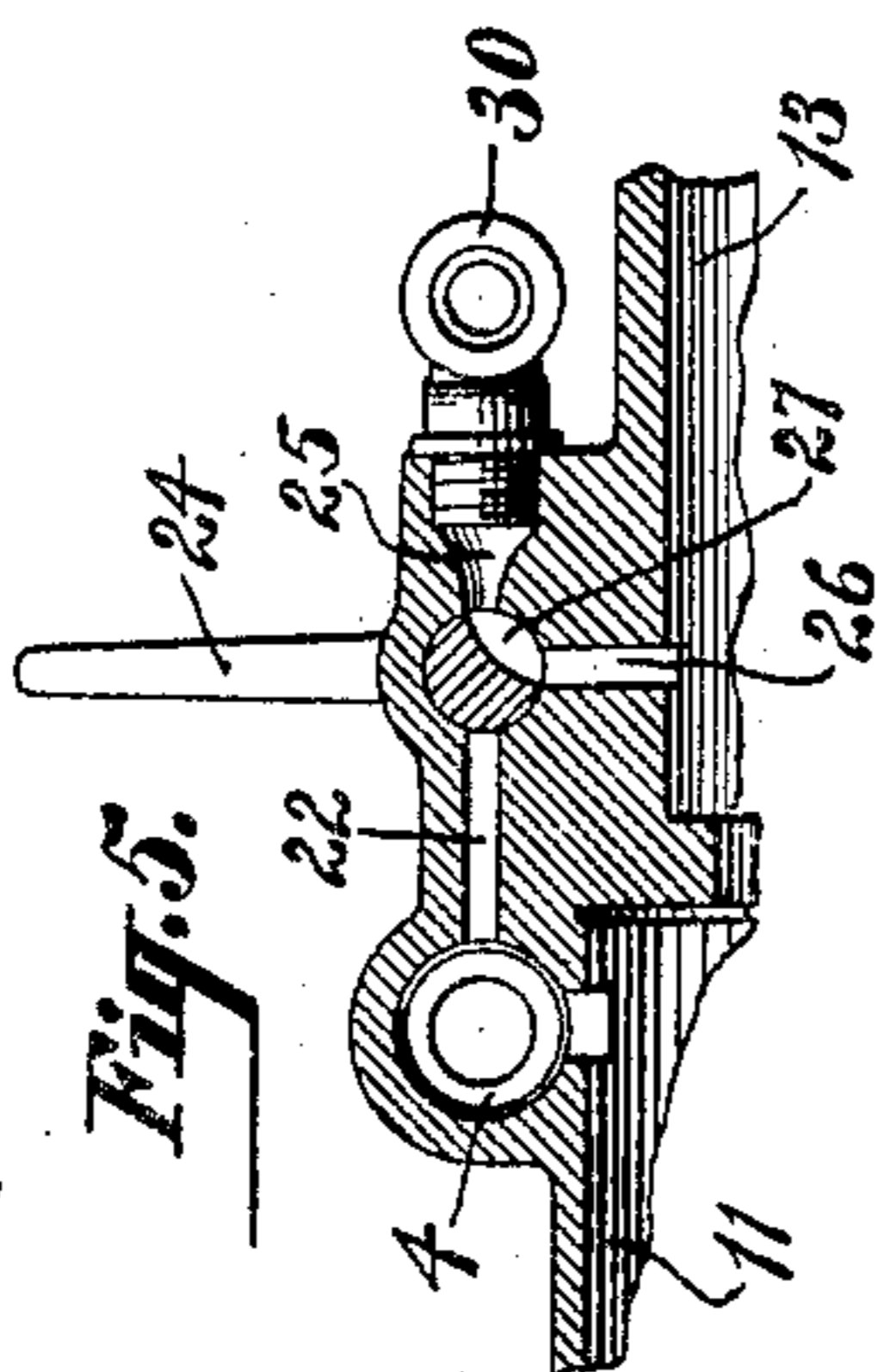
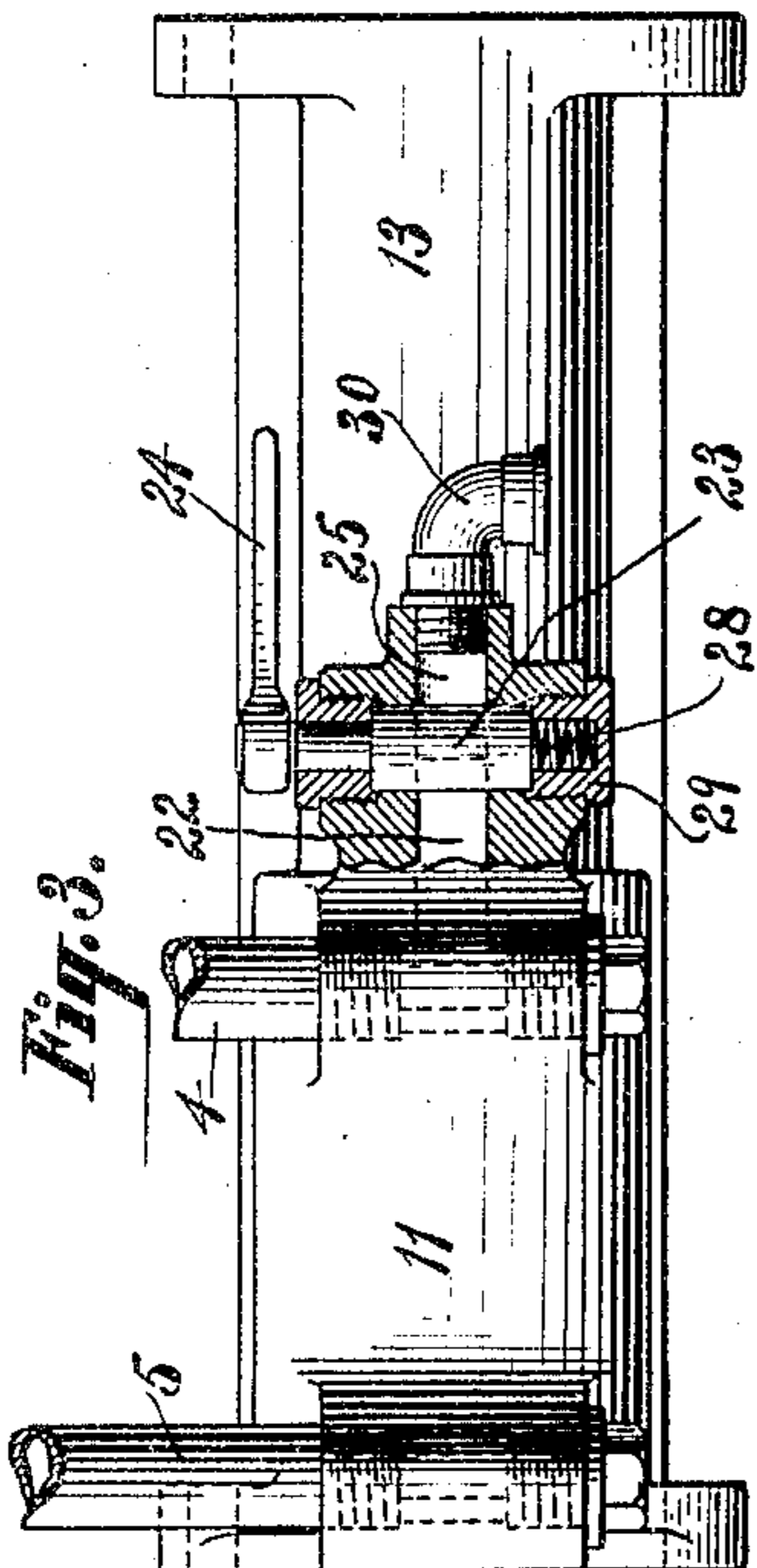
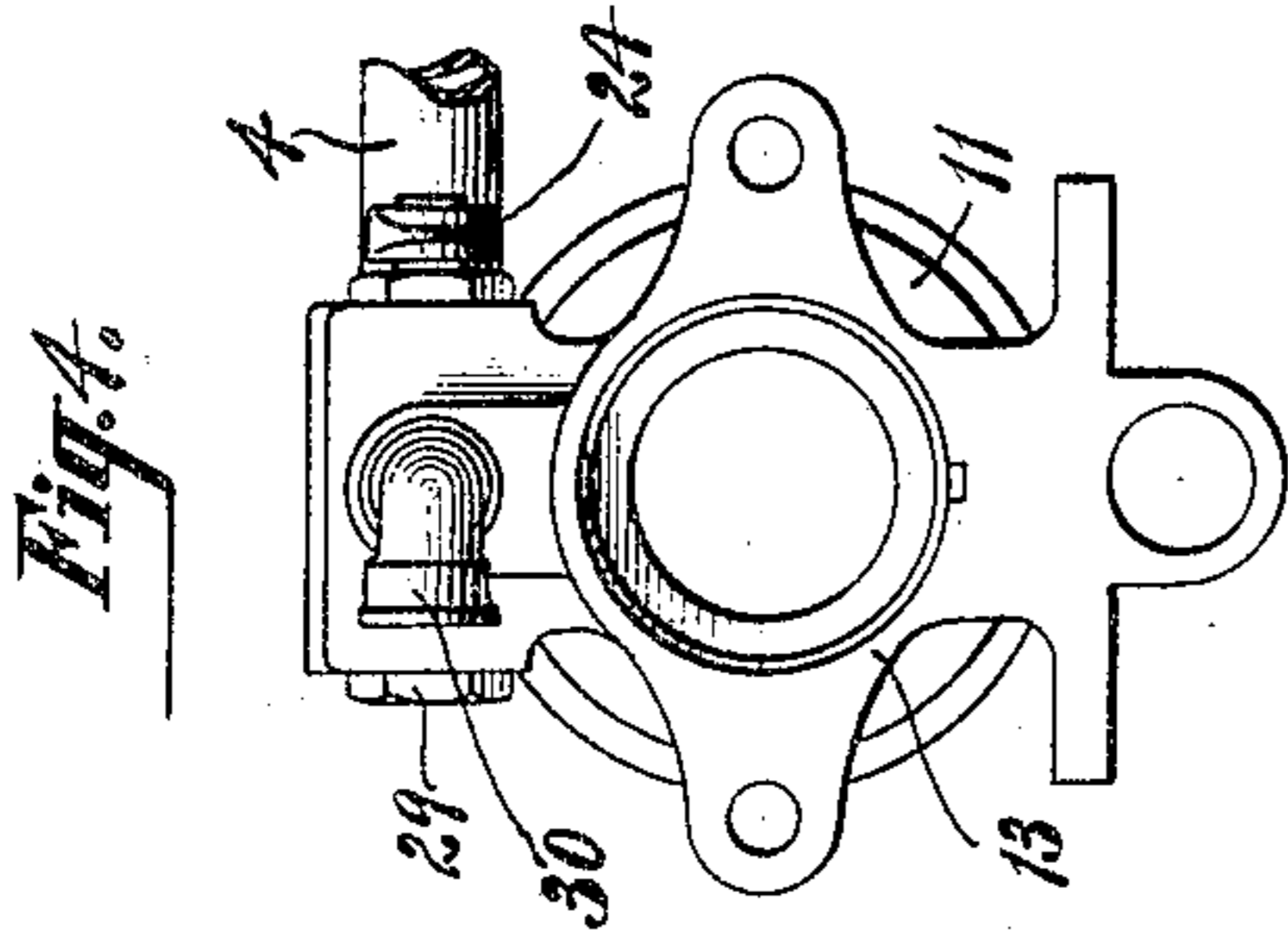
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2 SHEETS—SHEET 2.



*Witnesses:*

*J. S. Hackenbug.*

*Henry Thiering.*

*Inventor*  
*Arthur H. Gibson*  
*by attorney*  
*Thomson & Seward*

# UNITED STATES PATENT OFFICE.

ARTHUR H. GIBSON, OF EASTON, PENNSYLVANIA, ASSIGNOR TO INGER-SOLL-RAND COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

## ROCK-DRILL.

No. 822,596.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed December 21, 1905. Serial No. 292,756.

*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 Rock-Drills, of which the following is a specification.

My invention consists in certain improvements in that class of rock-drills in which the drills are operated by reciprocating columns of air.

The object of my invention is to provide manually-operated means for bringing the closed tail-rod chamber into open communication with one of the fluid-pressure pipes or the atmosphere at pleasure for controlling the operation of the drill.

In the accompanying drawings, Figure 1 represents the drill in side elevation in connection with an air-pressor of any well-known or approved construction, the pressor being shown in longitudinal central section and the flexible pipes which connect it with the drill being shown broken away. Fig. 2 is a detail view in longitudinal central section of the drill, the piston, the front rod, and a portion of the tail-rod being shown in side elevation, the manually-operated valve being shown in position to open communication from the interior of the tail-rod chamber to one of the fluid-pressure pipes. Fig. 3 is a top plan view of the tool-cylinder, a portion of the same being broken away to more clearly show the manually-operated valve for bringing the interior of the tail-rod chamber either into communication with one of the fluid-pressure pipes or the atmosphere. Fig. 4 is a rear view of the same, and Fig. 5 is a detail section showing the manually-operated valve in position to open the interior of the tail-rod chamber to the atmosphere.

An electropneumatic pressor is shown for driving the drill, the motor of which is denoted by 1, the pressor-cylinder by 2, and its trunk-piston by 3. Flexible pipes 4 and 5 lead from the spaces 6 and 7 at the front and back of the piston 3 to the spaces 8 and 9 at the back and front of the tool-piston 10 in the cylinder 11. This cylinder 11 has a front head 12 and a rear head extension 13.

The head of the tool-piston 10 is provided with the usual front rod 14, which passes

through the front head 12, and is provided with a chuck 15 for the attachment of the drill-tool. This piston-head is also provided with a hollow rearwardly-extended tail-rod 16, which is fitted to slide in a sleeve 17 in the rear head extension 13, the walls of which sleeve 17 are spaced from the walls of the rear head extension sufficiently to form a passage 18.

A rifle-bar 19 is arranged to telescope within the tail-rod 16 in engagement with the usual nut 16\* for imparting the usual twisting movement to the drill, which rifle-bar may be rotated step by step by any suitable mechanism. (Not shown specifically herein.)

A tail-rod chamber 20 is formed back of the tail-rod within the hollow sleeve 17, which chamber is connected with the passage 18 by means of holes 21 through the walls of the sleeve a short distance from the rear end of the said tail-rod chamber. A passage 22 leads from the pipe 4 to the face of a manually-operated valve 23, provided with a suitable handle 24. Passages 25 26 lead from the atmosphere and from the passage 18, respectively, to the face of the valve 23, and the valve 23 is provided with a port 27, so arranged that it may bring the passage 26 into open communication with the fluid-pressure pipe 4 or into communication with the passage 25, and thereby the atmosphere, at pleasure.

The manually-operated valve 23 is frictionally held in any desired position by means of a spring 28, which is interposed between the inner end of the valve and a suitable removable cap 29. A deflector 30 is also provided for the passage 25 for directing the air laterally. Additional holes 31 are provided in the sleeve 17 at a distance to the front of the holes 21, so as to give a free release of the air from the tail-rod chamber as the tail-rod starts on its rearward movement.

It is to be understood that the passages 22, 26, and 18 and holes 21 and 31 are of sufficient size to permit a free reciprocation of the air therethrough when the valve 23 is turned into the proper position to bring the interior of the tail-rod chamber into communication with the fluid-pressure pipe 4.

It is also to be understood that the passage 25 is of ample size to permit the free escape and intake of the air when the valve 23

is turned into position to bring the interior of the tail-rod chamber into open communication with the atmosphere.

In operation when the valve 23 is turned into position to bring the tail-rod chamber into open communication with the fluid-pressure pipe 4 and the pressor is moved in direction to drive the tool-piston forwardly the pressure of air will be not only brought against the cross-sectional area of the piston, but will also be brought against the cross-sectional area of the tail-rod, thus causing the drill to hit a harder blow than has heretofore been possible.

If the drill should stick in the hole, the valve 23 may be turned into position to bring the tail-rod chamber into open communication with the atmosphere, thus withdrawing some of the back pressure on the piston and permitting the piston to be more readily moved rearwardly by the column of air in the pipe 5.

What I claim is—

1. A tool-piston having a front rod and a tail-rod, a cylinder having a tail-rod chamber, pipes for feeding motive fluid alternately to the opposite sides of the piston and a single means for bringing the tail-rod chamber into open communication with one of said pipes or the atmosphere at pleasure.

2. A tool-piston having a front rod and a

tail-rod, a cylinder having a tail-rod chamber, pipes for feeding motive fluid alternately to the opposite sides of the piston and a single means for bringing the tail-rod chamber into open communication with the pipe which effects the forward stroke of the tool or to the atmosphere at pleasure.

3. A tool-piston having a front rod and a tail-rod, a cylinder having a tail-rod chamber, pipes for feeding motive fluid alternately to the opposite sides of the piston and a manually-operated valve for bringing the tail-rod chamber into communication with one of the pipes or the atmosphere, at pleasure.

4. A tool-piston having a front rod and a tail-rod, a cylinder having a tail-rod chamber, pipes for feeding motive fluid alternately to the opposite sides of the piston and a manually-operated valve for bringing the tail-rod chamber into communication with the pipe which effects the forward stroke of the tool or to the atmosphere, at pleasure.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 13th day of December, 1905.

ARTHUR H. GIBSON.

Witnesses:

FREDK. HAYNES,  
C. S. SUNDGREN.