No. 822,597. PATENTED JUNE 5, 1906.

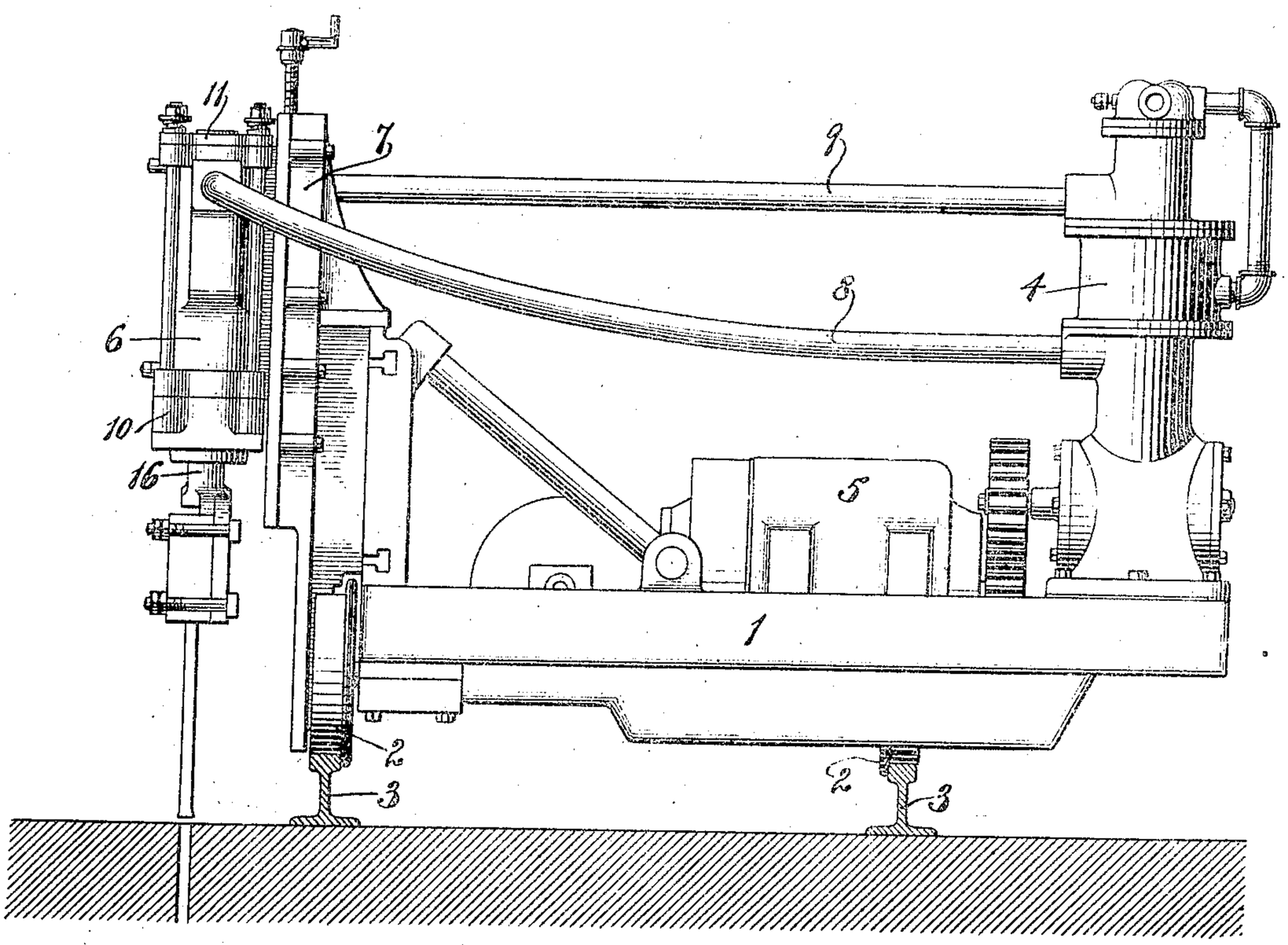
A. H. GIBSON.

CHANNELING MACHINE.

APPLICATION FILED FEB. 14, 1906.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

F. G. Hachenberg.

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Inventor:

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3 SHEETS—SHEET 2.

Fig. 2.

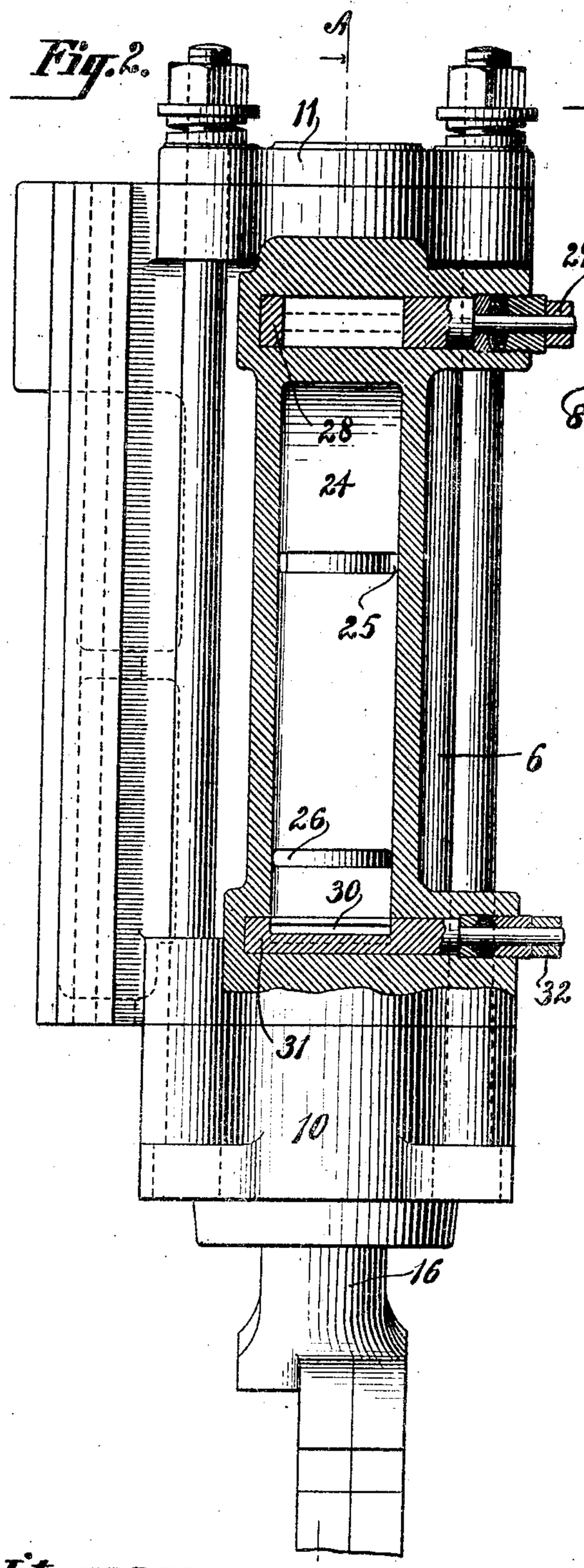
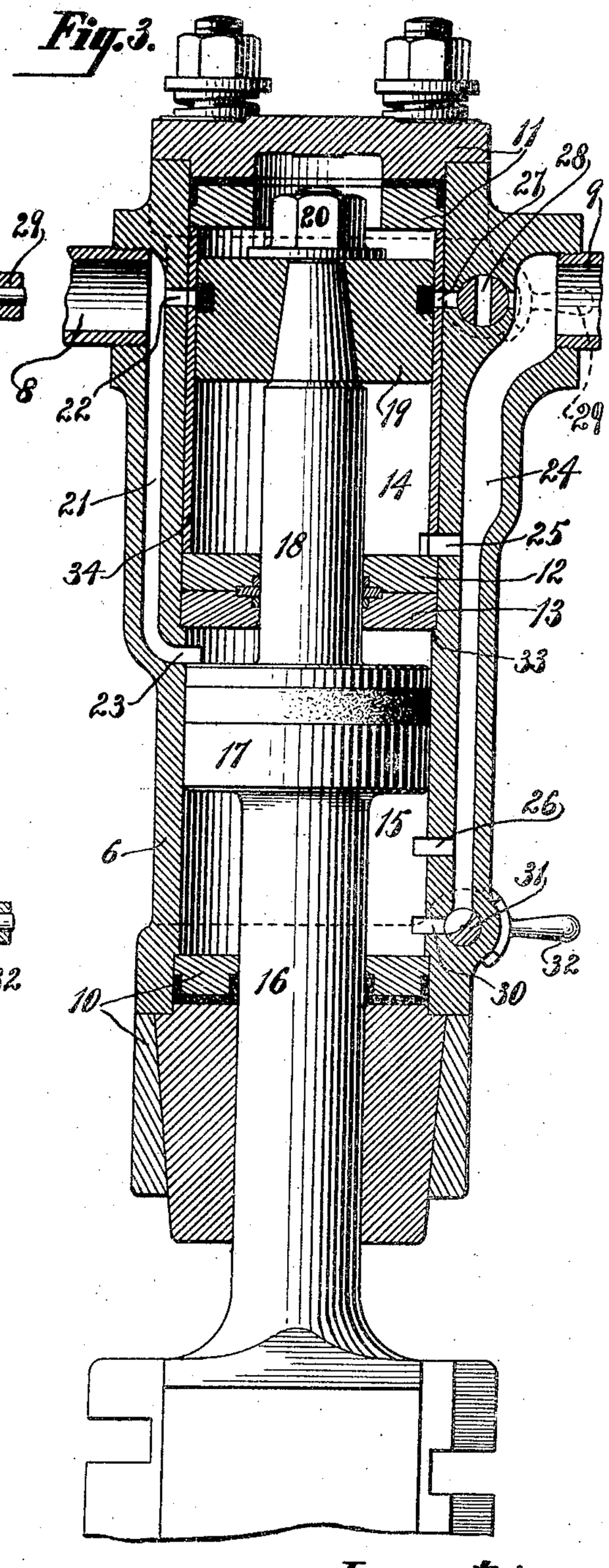


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

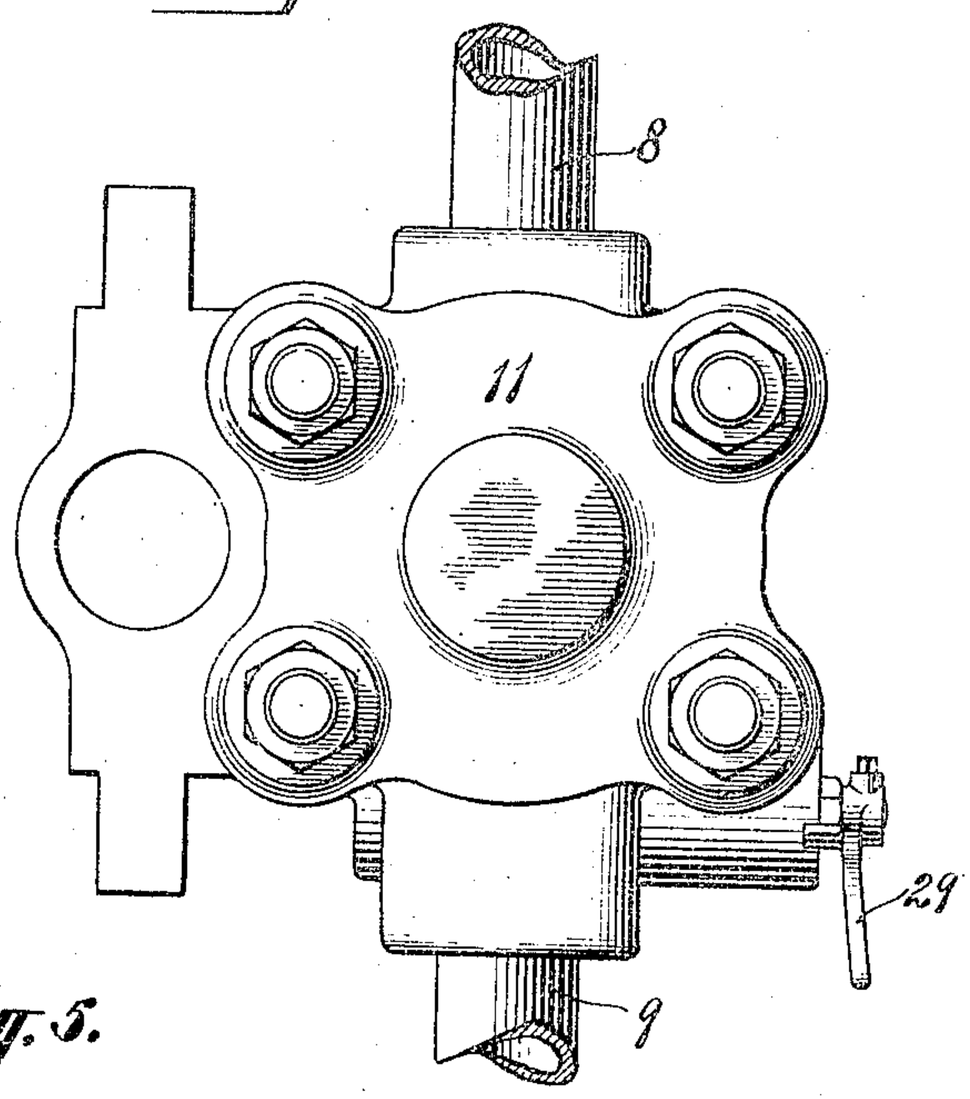


Fig. 5.

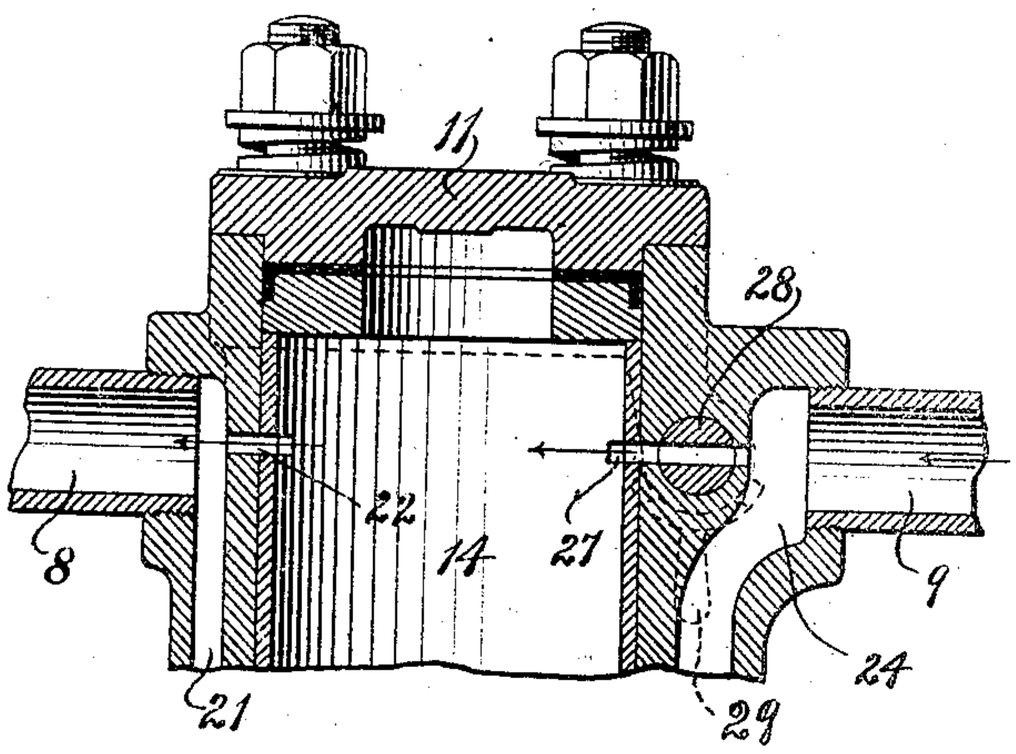
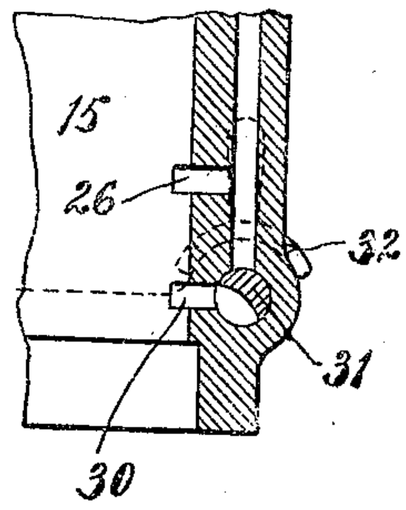


Fig. 6.



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UNITED STATES PATENT OFFICE.

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

CHANNELING-MACHINE.

No. 822,597. Specification of Letters Patent. Patented June 5, 1906.

Application filed February 14, 1906. Serial No. 301,013.

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 Channeling-Machines, of which the following is a specification.

My invention relates to improvements in channeling-machines in which the tool-piston is operated by reciprocating columns of air from a pressor.

The object of my invention is to provide certain improvements in the construction, form, and arrangement of the several parts whereby automatic means are provided for cushioning the blow of the tool when it is not striking its work and also for manually controlling the movement of the tool-piston.

A further object is to provide the tool-piston with two heads and the cylinder with two separated piston-chambers arranged tandem, whereby a very large piston area may be obtained without the necessity of making the whole tool-cylinder too large in diameter for convenient operation and in which the several parts may be very readily assembled.

In the accompanying drawings, Figure 1 represents the channeling-machine in elevation mounted on a truck, an electric motor being shown for driving the pressor. Fig. 2 is a side view of the tool-cylinder, a portion of the same being shown in section along the plane which passes through the manually-operated controlling-valves. Fig. 3 is a section taken in the plane of the line A A of Fig. 2 looking in the direction of the arrows. Fig. 4 is a rear end view of the tool-cylinder. Fig. 5 is a detail section taken in the plane of the line A A of Fig. 2, showing the inner manually-operated controlling-valve turned in position to bring the tubes which lead from the air-pressor into open communication with each other through the back piston-chamber for rendering the tool inoperative without stopping the operation of the pressor; and Fig. 6 is a detail section in the same plane as Fig. 5, showing the outer manually-operated controlling-valve turned in position to cut off the front port of the front piston-chamber from the passage leading from one of the pressor-tubes.

I have shown my improved channeling-machine as mounted on a truck 1, provided with traction-wheels 2, arranged to travel along the rails 3 of a track. This truck may be of any well-known or approved form and may be driven along the track by any desired motive power.

The air-pressor is denoted by 4 and is herein shown as being driven from an electric motor 5, mounted on the truck 1. The shell which supports the tool-cylinder 6 is denoted by 7 and is mounted on the truck 1 in the usual manner. Flexible tubes 8 and 9 lead from the air-pressor 4 to the tool-cylinder 6 for the purpose of conveying reciprocating columns of air to the tool-cylinder. This tool-cylinder 6 is provided with a front head 10, a back head 11, and an intermediate head composed of two plates 12 13. This intermediate head divides the interior of the cylinder into back and front piston-chambers 14 15. The tool-piston is shown as comprising an outer rod 16, provided with a head 17, arranged to reciprocate in the front piston-chamber 15, and an inner rod 18, passing through the intermediate head 12 13 and provided with a piston-head 19, fitted to reciprocate in the back piston-chamber 14. This inner piston-head 19 is removably secured to the rod 18 by a nut 20, which has a screw-threaded engagement with the inner end of the said rod 18.

A longitudinal passage 21 in the walls of the tool-cylinder 6 connects the air-tube 8 with the back port 22 of the back piston-chamber 14 and the back port 23 of the front piston-chamber 15. The port 22 is located a short distance from the rear end of the back piston-chamber so as to form an air-cushion when the piston-head 19 is approaching the limit of its rearward movement and has closed the said port 22. A longitudinal passage 24 is also located in the walls of the tool-cylinder 6, which passage connects the air-tube 9 with the front port 25 of the back piston-chamber 14 and the intermediate front port 26 of the front piston-chamber 15. The back piston-chamber 14 is also provided with an auxiliary back port 27 opposite the port 22, which may be opened and closed to the passage 24 by means of a manually-operated valve 28, the handle 29 of which is located exterior to the cylinder. The front port 30 of the front piston-chamber 15 may

be opened and closed to the longitudinal passage 24 through a manually-operated valve 31, the handle 32 of which is located exterior to the tool-cylinder.

The several parts of the tool-cylinder are assembled as follows: An annular shoulder 33 is formed in the interior of the cylinder by boring the back portion of the same of slightly greater diameter than the front portion. The plates 12 13, which form the intermediate head, are inserted into position on the annular shoulder 33. A cylindrical lining 34 is then inserted into the back portion of the cylinder with its front end resting on the plate 12 of the intermediate head. The front member of the back head 11 is then inserted into position with its front face resting against the back end of the cylindrical lining.

In operation when the tool is working normally it is desirable that the column of air which is used for withdrawing the tool should be admitted to the piston-chambers through the ports 25 and 30, so as to get the full effect. When the truck on which the channeling-machine is mounted runs over a hollow spot in the rock, it would be desirable to provide a cushion for the forward stroke of the tool-piston. This is accomplished by closing the port 30 to the passage 24 by manipulating the outer or cushion valve 31. The air is then caused to enter the front piston-chamber 15 in front of the head 17 through the intermediate port 26. This arrangement will prevent the piston-head 17 from striking the front head 10. As soon as the truck has passed beyond the hollow spot in the rock in the vertical course of stone-channeling work the valve 31 may be again manipulated to open the port 30 to the passage 24 and the full withdrawing force of the column of air is effected. The inner valve 28 may be designated a "stop-valve" and is used for stopping the operation of the tool without stopping the operation of the pressor. When the valve 28 is turned to open communication from the port 27 to the passage 24, it will be seen that open communication is established from the air-pressor tube 9 to the air-pressor tube 8 at the back of the piston-head 19. This will cause the tool to remain at the limit of its outward movement.

What I claim is—

1. A tool-cylinder having piston-chambers therein, a piston having heads in said chambers, air-feeding tubes, said cylinder having front and back ports for the two chambers communicating with their respective tubes, and an auxiliary back port for one chamber communicating with the tube other than the one with which the other back port communicates and a valve for opening and closing said auxiliary back port.

2. A tool-cylinder having piston-chambers therein, a piston having heads in said chambers, air-feeding tubes, said cylinder having front ports for the chambers communicating with one air-tube, back ports for the chambers communicating with the other tube, and an auxiliary back port for one of said chambers communicating with the first-named air-tube and a valve for opening and closing the said auxiliary back port.

3. A tool-cylinder having piston-chambers therein, a piston having heads in said chambers, air-feeding tubes, said cylinder having front ports for the chambers communicating with one air-tube, back ports for the chambers communicating with the other air-tube, and an auxiliary back port for one of said chambers communicating with the first-named air-tube and a manually-operated valve for opening and closing the auxiliary back port.

4. A tool-cylinder having front and back piston-chambers therein, a piston having heads in said chambers, air-feeding tubes, said cylinder having front and back ports for the two chambers communicating with their respective tubes, and an auxiliary back port for the back piston-chamber communicating with the tube other than the one which the other back port in said chamber communicates and a valve for opening and closing the auxiliary back port.

5. A tool-cylinder having front and back piston-chambers therein, a piston having heads in said chambers, air-feeding tubes, said cylinder having front ports for the chambers communicating with one air-tube, back ports for the chambers communicating with the other air-tube, and an auxiliary back port for the back chamber communicating with the first-named air-tube and a valve for opening and closing the auxiliary back port.

6. A tool-cylinder having piston-chambers therein, a piston having heads in said chambers, air-feeding tubes, said cylinder having front ports for the chambers communicating with one air-tube, an intermediate front port for one chamber communicating with said air-tube, an auxiliary back port for said other chamber communicating with said air-tube, and back ports for both chambers communicating with the other air-tube, a valve for opening and closing the front port for one chamber and a valve for opening and closing the auxiliary back port for the other chamber.

7. A tool-cylinder having piston-chambers therein, a piston having heads in said chambers, air-feeding tubes, said cylinder having front ports for the chambers communicating with one air-tube, an intermediate front port for one chamber communicating with said air-tube, an auxiliary back port for said other chamber communicating with said air-tube, and back ports for both chambers communicating with the other air-tube, a manually-operated valve for opening and closing the front port for one chamber and a manu-

ally-operated valve for opening and closing the auxiliary back port for the other chamber.

8. A tool-cylinder having front and back piston-chambers therein, a piston having heads in said chambers, air-feeding tubes, said cylinder having front ports leading from the said chambers to one air-tube, an intermediate front port for the front chamber communicating with said air-tube, an auxiliary back port for the back piston-chamber communicating with said air-tube, and back ports for the front and back chambers communicating with the other air-tube, a valve for opening and closing the front port for the front piston-chamber and a valve for opening and closing the auxiliary back port for the back piston-chamber.

9. A tool-cylinder having front and back piston-chambers therein, a piston having heads in said chambers, air-feeding tubes, said cylinder having front ports leading from the said chambers to one air-tube, an intermediate front port for the front chamber communicating with said air-tube, an auxiliary back port for the back piston-chamber communicating with said air-tube, and back ports for the front and back chambers communicating with the other air-tube, a manually-operated valve for opening and closing the front port for the front piston-chamber and a manually-operated valve for opening and closing the auxiliary back port for the back piston-chamber.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 9th day of February, 1906.

ARTHUR H. GIBSON.

Witnesses:
H. D. MAXWELL,
C. D. PATTERSON.