

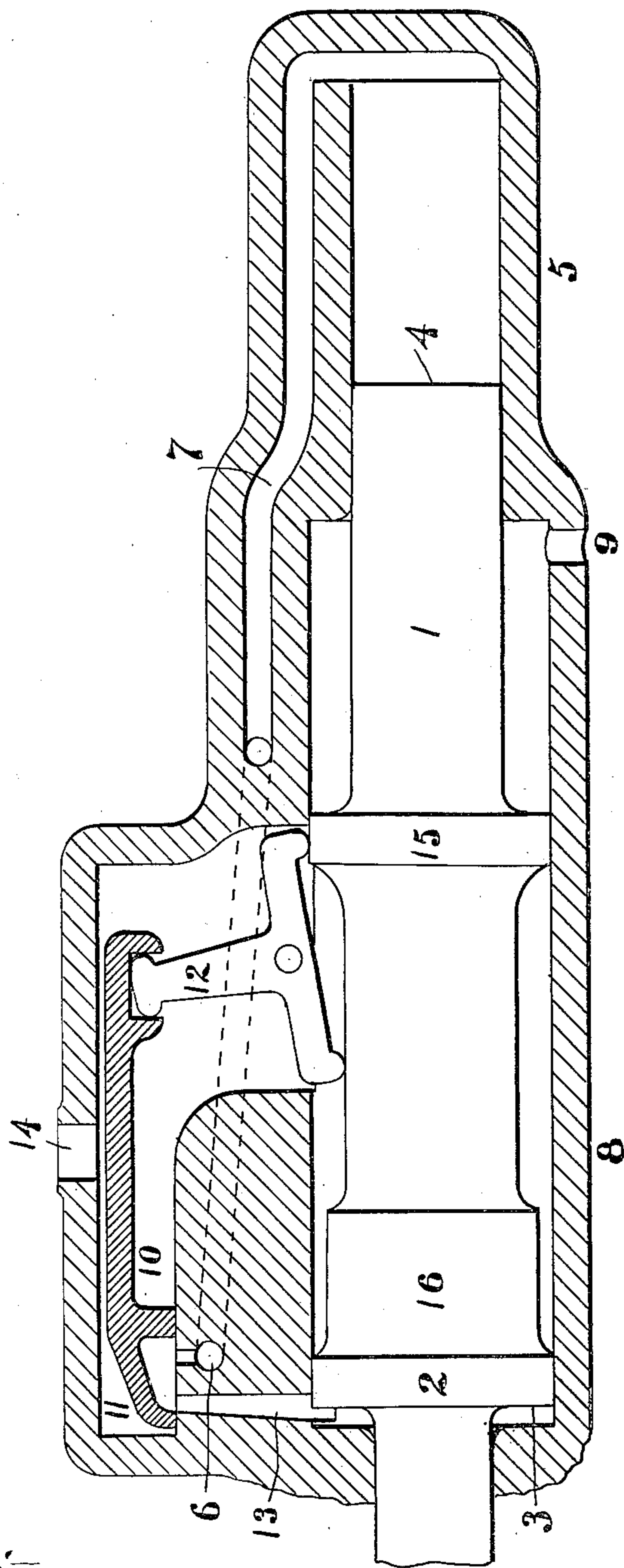
W. MAUSS.

PERCUSSIVE MACHINE AND TOOL.

APPLICATION FILED MAR. 12, 1906. RENEWED APR. 17, 1909.

936,550.

Patented Oct. 12, 1909.



Witnesses:-

C. H. Crawford
V. Heeren

Inventor:-

Wilhelm Mauss
by B. Singer
Attorney

UNITED STATES PATENT OFFICE.

WILHELM MAUSS, OF BRAKPAN, TRANSVAAL, ASSIGNOR TO THE KONOMAX ROCK
DRILL SYNDICATE LIMITED, OF JOHANNESBURG, TRANSVAAL.

PERCUSSIVE MACHINE AND TOOL.

936,550.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed March 12, 1906, Serial No. 305,685. Renewed April 17, 1909. Serial No. 490,639.

To all whom it may concern:

Be it known that I, WILHELM MAUSS, a British subject, residing at the Rand Central Electric Works, Brakpan, in the Colony of the Transvaal, have invented certain new and useful Improvements in Percussive Machines and Tools Operated by Expansible Fluid, of which the following is a specification, reference being had therein to the accompanying drawing.

The object of the present invention is to provide an improved form of fluid-driven percussive machine or tool adapted to utilize the working fluid expansively, yet without impairing the effectiveness of the blow delivered, the arrangement being such that the working stroke is made throughout under the full working pressure.

The accompanying drawing depicts more or less conventionally a longitudinal section through an air driven rock drilling machine embodying the invention.

The piston consists of two portions, 1 and 2 respectively, of different diameters, working in a corresponding double cylinder. The rear portion 1 is smaller in diameter than the forward one 2, the effective area of the face 3 being considerably greater than, for example double, that of the face 4. The smaller cylinder member 5 is in constant communication with the inlet 6 through a port 7, while the supply of fluid to the fore part of the large cylinder member 8 is controlled by any suitable piston-operated distributing device to effect the following cycle. The piston being in the position shown, live air is admitted to the front of the cylinder, and acting on the face 3 drives the piston back against the lesser total pressure upon the face 4. At a predetermined point in the backward stroke such supply is cut off and expansion occurs with, of course, corresponding reduction of pressure, the point of cut off being such that at the end of the backward stroke, the total pressure upon the face 4 exceeds that upon 3 sufficiently to overcome the momentum of the piston and bring it to rest. At this instant the air is exhausted from the front end of the piston, whereupon the piston is driven forward unimpeded and makes its working stroke. Air is now again supplied to the larger piston and the cycle is repeated. Atmospheric pressure is maintained behind the larger piston by means of an aperture 9 in the cylinder walls.

It will be obvious that the apparatus exhausts only once per cycle and upon the backward stroke; the air in the rear part of the cylinder is never exhausted, but is maintained throughout at full pressure.

In the particular mechanism illustrated the slide valve 10 is traversed within the valve chest 11 by a tappet lever 12. Numeral 13 represents the port to the large cylinder, and 14 the exhaust from the valve chest. The tappet is operated by enlargements or annular bosses upon the piston rod after the usual manner, the boss 15 controlling the admission, 16 the cut off and 2 the exhaust.

An advantage of some importance, resulting from the fact that no fluid distributing contrivance is employed in connection with the rear end of the cylinder, is that the slide valve or its equivalent may be located near to the cylinder head and thus the corresponding port 13 may be made very short, so reducing waste due to dead space.

In applying this invention to such machines as rock drills in which intermittent rotation of the piston is required, in order to obviate the enlargement of the diameter of the piston member 1 and the corresponding inconvenient increase in the size of piston member 3, which would be necessary were part of the face 4 of the former taken up by a rifle bar of the usual type, it is advisable to employ a ratchet device arranged to operate upon a rifled portion of the side of the piston or piston rod.

I claim as my invention:—

1. In combination with a cylinder, a piston therein having two portions of different diameters, the end of the portion of smaller diameter being of less area than the forward end of the larger portion, a pressure fluid supply in constant communication with the rear end of that portion of the cylinder in which said smaller piston portion operates to maintain constant full air pressure in said cylinder portion at all times throughout the operation, means for supplying fluid pressure to the larger area of the piston, means for cutting off said supply prior to the piston completing its rearward stroke, the piston completing its rearward stroke due to expansion, and means located at the front end of the cylinder and maintained open during substantially the entire forward stroke for exhausting the fluid pressure from the front end of the piston whereby the total

pressure on the smaller area exceeds that upon the larger area and drives the piston forward to effect its working stroke by means of said constant pressure.

5 2. In combination with a cylinder, a piston therein having a relatively large front pressure area and a relatively small rear pressure area, a pressure fluid supply in constant communication with the rear pressure area to maintain constant full fluid
10 pressure on said rear pressure area at all time throughout the operation, means for supplying fluid pressure to the large area of the piston, means for cutting off said supply prior to the piston completing its rearward stroke, the piston completing its rearward stroke due to expansion, and means
15 maintained open during substantially the entire forward stroke for exhausting the fluid pressure from the front end of the piston whereby the total pressure on the smaller area exceeds that upon the larger area and drives the piston forward to effect its working stroke by means of said constant pressure.
20 sure.
25

3. In combination with a cylinder, a pis-

ton therein having a relatively large front pressure area and a relatively small rear pressure area, a pressure fluid supply in constant communication with the rear pressure area to maintain constant full fluid pressure on said rear pressure area at all time throughout the operation, means for supplying fluid pressure to the large area of the piston, means for cutting off said supply prior to the piston completing its rearward stroke, the piston completing its rearward stroke due to expansion, and means, located at the front end of the cylinder and, maintained open during substantially the entire forward stroke for exhausting the fluid pressure from the front end of the piston whereby the total pressure on the smaller area exceeds that upon the larger area and drives the piston forward to effect its working stroke by means of said constant pressure. 30 35 40 45

In testimony whereof I affix my signature in presence of two witnesses.

WILHELM MAUSS.

Witnesses:

HAROLD E. KISCH,

JABEZ WARREN DENNING.