

No. 883,858.

PATENTED APR. 7, 1908.

C. CHRISTIANSEN.
THRUST BORING MACHINE.
APPLICATION FILED APR. 27, 1907.

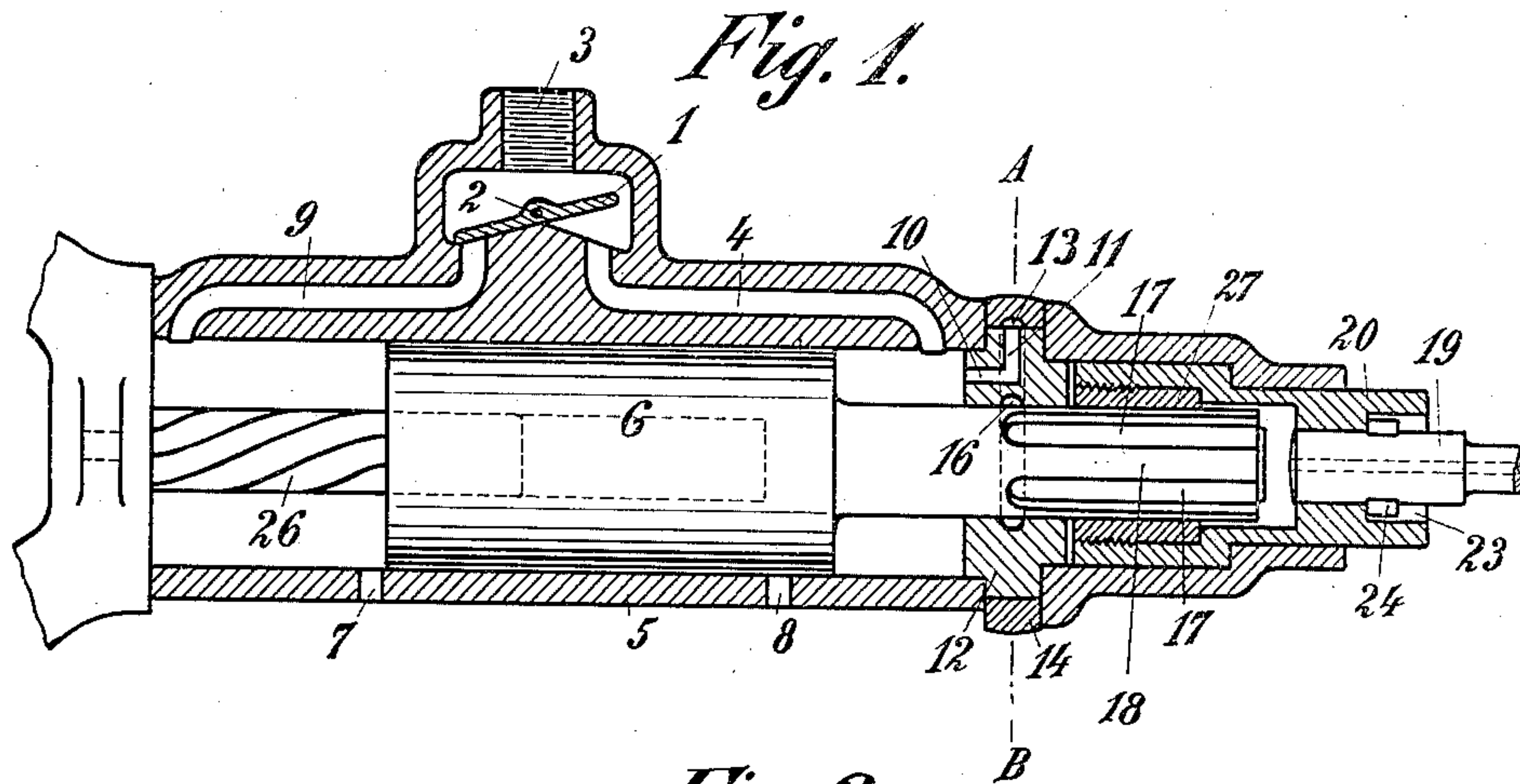


Fig. 2.

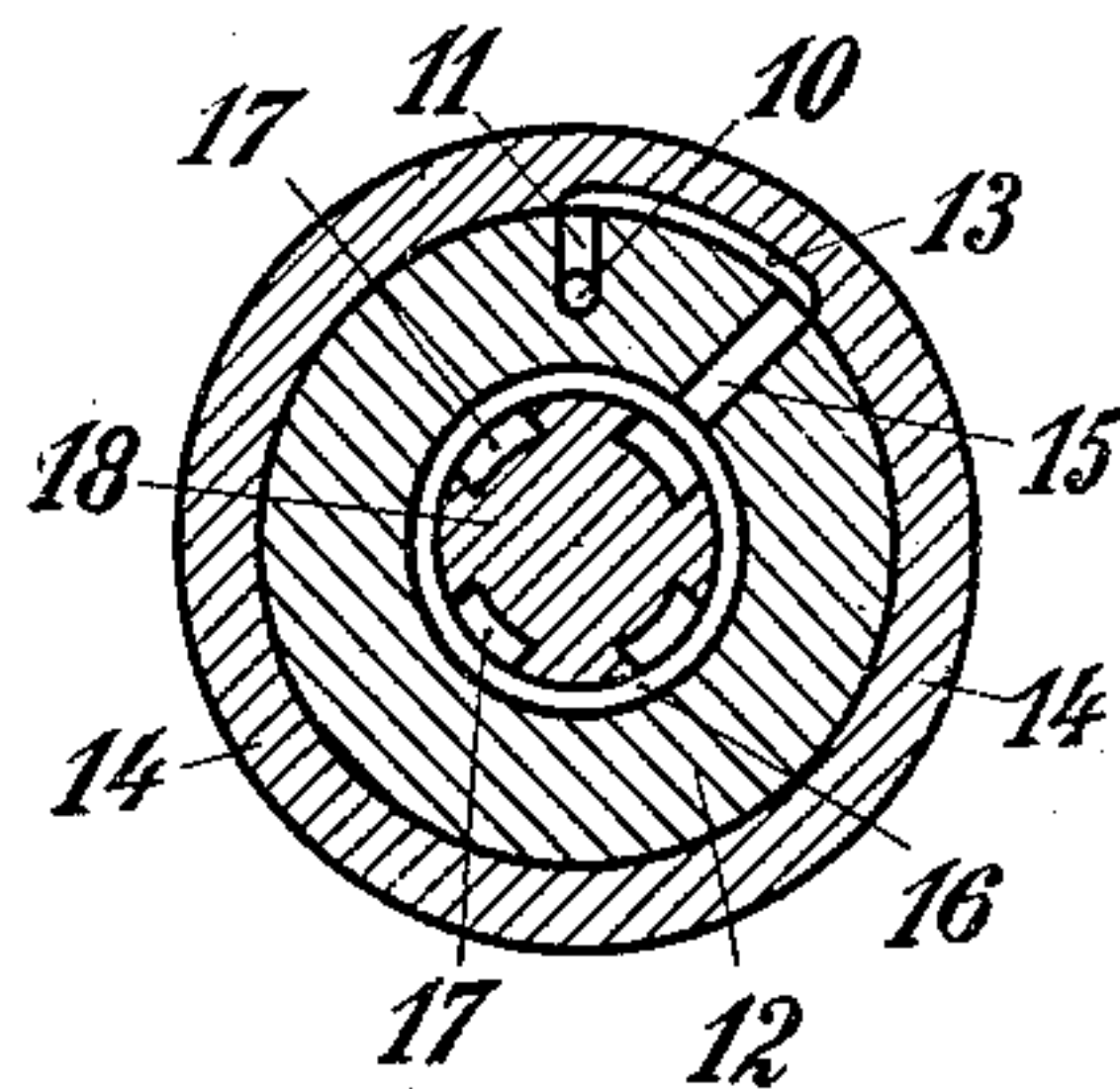
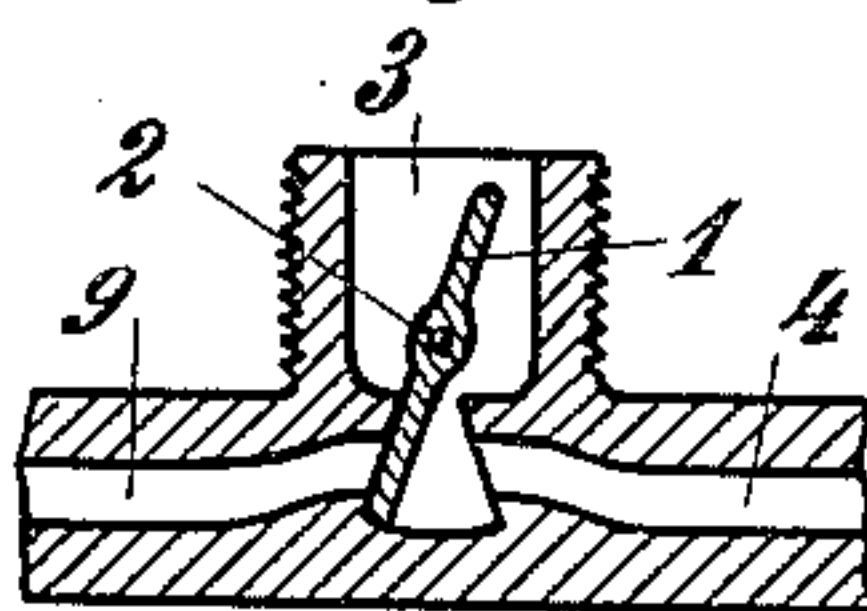


Fig. 3.



Witnesses:
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THRUST BORING-MACHINE.

No. 883,858.

Specification of Letters Patent.

Patented April 7, 1908.

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To all whom it may concern:

Be it known that I, CHARLES CHRISTIANSEN, a subject of the King of Prussia, and a resident of Gelsenkirchen, Province of Westphalia, Kingdom of Prussia, and German Empire, have invented a certain new and useful Hand-Manipulated Thrust Boring-Machine, of which the following is a specification.

10 The subject matter of this invention has reference to hand manipulated thrust boring machines of such construction as to be adapted especially for use in mining operations, but which might also be employed
15 with advantage for other purposes as well, where it is essential to impart a great number of blows in rapid succession to a tool or implement, regardless of its being a chisel, a borer or the like.

20 The new hand manipulated thrust boring machine is operated by compressed air and the most important improvements in this machine comprise special means of control, a device for the introduction of air into the
25 boring hole for the purpose of removing the boring dust and a very practicable attachment of the borer or other tool or implement in the machine.

The new arrangement is illustrated on the
30 accompanying drawing in Figures 1, 2 and 3, Fig. 1 being a longitudinal section through the machine and Fig. 2 being a cross section on the line A—B, in Fig. 1. Fig. 3 illustrates a modification of the controlling valve or flap
35 of Fig. 1.

Rock boring machines have been known heretofore, the operation of which is controlled by an automatic valve in such a manner, that the compressed air forces the
40 valve against its seat alternately on one side and then on the other side, thereby keeping the entering channel closed at this side, until the opposite stroke of the working piston is to be commenced. Rock boring machines
45 have also been used heretofore, in which the controlling of the valves is effected in a similar manner by means of balls. These well-known controlling means however, present the inconvenience, that they do not
50 operate uniformly in consequence of the weight of the controlling parts, when the boring machine is for instance directed downwards or upwards.

According to the invention, about to be
55 described, a flap valve is to be employed as controlling means, the weight of said valve

being compensated, so that it operates uniformly, no matter in what position the boring machine is placed.

The flap valve 1, Fig. 1, is a two-armed
60 lever, which is kept suspended in its center of gravity 2 and which therefore is in equilibrium in every position. The pressure fluid, for instance pressure air, enters at 3 and in the position of the flap valve 1, shown
65 in the drawing, the fluid passes through a channel 4 into the cylinder 5 and pushes the piston 6 towards the left, while the air at the rear of the piston 6 escapes through the channel 7. When the piston 6 has been
70 moved over the bore or channel 7, thereby closing the same, the momentum imparted to the piston 6 causes a compression of the air, which has remained at the rear of the piston, during the continuance of its back-
75 ward movement, whereby an over-pressure is produced in front of the flap valve 1, as compared with the air entering at 3. In consequence thereof, the flap valve will be reversed, that is to say it will turn around on
80 its axis 2 and will uncover the entrance passage 9. Now, the air entering through the passage 9, operates at the rear of the piston, pushing the piston forward, while the air in front of the piston escapes through the
85 channel 8, which has been opened meanwhile. The same procedure will then be repeated in the inverse order. The flap valve 1 may also be secured in position according to the arrangement shown in Fig. 3, the
90 manner of operation of the valve controlling mechanism being absolutely unaffected thereby.

As will be seen from Fig. 1, of the drawing, the machine is provided in the well known
95 manner with a reversing device for the piston, that is to say with a device for imparting rotation to the piston, with a view, of imparting a rotating movement to the borer at the time the piston moves backward. As a
100 means for rotating the piston, a threaded spindle 26 is provided, which engages with a correspondingly threaded bore of the piston 6, so that the piston is compelled to perform a rotating movement as spindle 26 is con-
105 nected with a well known ratchet arrangement. This rotating movement is transmitted to the borer 19, since the sleeve 27 engages by means of projections or pins attached thereto, (but not shown in the draw-
110 ing) with the grooves 17 of the pushing rod. The sleeve 27 is connected by screw threads

to the sleeve 20 or it may be made in one piece with the same, so that therefore the rotating movement of the piston 6 and of the pushing rod 18 is transmitted to the sleeve 5 20 which carries the borer 19 and consequently to the borer itself also. This device for producing a rotary movement of the piston is known by itself and does not form the subject matter of the claim.

10 The device, above referred to and constituting an important feature of my invention, of rinsing with air, that is to say of blowing air into the boring hole for the purpose of removing the bore dust, is so arranged, that it can easily be thrown out of 15 operation, that is to say that the introduction of air into the boring hole is interrupted. As a rule, the rinsing is necessary in such cases, where the borer is worked in a downward direction. The boring dust collects at 20 the bottom of the boring hole and is blown out by the air blown in and introduced by a hollow borer down to the bottom of the boring hole. When the machine is employed 25 in such a position, that the borer is horizontal or is even directed upwards, the removal of the boring dust from the hole by rinsing with air is not always necessary, inasmuch as the dust in this case does not interfere with the work or drops out from the 30 hole by itself. In such cases the air rinsing device should be disengaged and an ordinary borer may then of course be substituted in place of the hollow borer.

35 The air rinsing device is shown in Fig. 1. During the backward movement of the piston, pressure air is contained in the front part of the cylinder 5, that is to say in front of the piston. Part of this air passes through

the bores 10 and 11, provided in the front 40 abutting ring 12, into the groove 13, provided in the ring 14 which surrounds the abutting ring when this ring 14 is in the position shown in Fig. 2. From the groove 13, 45 the air passes through a bore 15 in the abutting ring 12 into the circular passage 16 and flows then through the ports 17 in the pushing rod 18 of the piston 6 into the hollow borer 19 and thence through the latter to the 50 bottom of the boring hole. The ring 14 with the groove 13 is rotatably arranged on the abutting ring 12. Therefore, when it is desired to have the machine operate without air rinsing, a slight rotation of the ring 14 in 55 relation to the abutting ring 12 is sufficient to disconnect the bores or passages 10 and 11 from the groove 13, so that the air, coming from the cylinder 5, is prevented from passing further.

What I claim and desire to secure by 60 Letters Patent of the United States is:—

A boring machine provided with a cylinder, an inclosed piston, a pair of compressed air inlet ducts communicating with opposite ends of the cylinder, a flap valve 65 fulcrumed at its center of gravity and controlling both of said ducts, a pair of exhaust ports in the cylinder adapted to be alternately uncovered by the piston, and a boring bit operable by said piston, substantially as 70 specified.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

CHARLES CHRISTIANSEN.

Witnesses:

H. CHRISTIANSEN,
LOUIS VANDORN.