

E. H. LAGERSTRÖM.
PNEUMATIC HAMMER.
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1,017,562.

Patented Feb. 13, 1912.

Fig. 1.

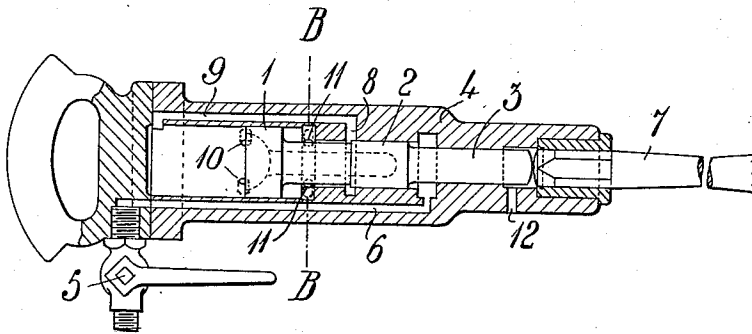
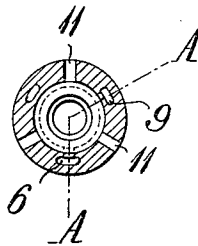


Fig. 2.



Witnesses

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PNEUMATIC HAMMER.

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To all whom it may concern:

Be it known that I, ERNST HJALMAR LAGERSTRÖM, a citizen of the Kingdom of Sweden, residing at Stockholm, Sweden, have invented new and useful Improvements in Pneumatic Rock-Drilling Machines, Hammers, or the Like, of which the following is a specification.

This invention relates to a pneumatic rock drilling machine, hammer or the like without distributing valve or any other distributing member. In such machines the piston generally is carried out as a differential piston and the air pressure used for returning the piston acts in one type of machines on the shoulder between the two piston portions and in another type on the fore or outer end surface of the piston portion of the smaller diameter. In the first mentioned type it is necessary in order to reach a reliable function of the machine that the piston portion of the larger diameter be polished very accurately to fit in an airtight manner in the corresponding part of the cylinder. If the said piston portion has not been polished accurately enough or if it becomes worn and does not move in an airtight manner in the cylinder, the air acting on the shoulder between the two piston portions leaks past the piston portion of the larger diameter into the space behind this piston portion, where it counteracts the returning of the piston and thus reduces the efficiency of the machine. The leakage can be obviated only by inserting a new piston which on account of the difficulty of polishing the pistons cannot be made at the place where the machine is used. The second type referred to above has been constructed with the view to obviate the disadvantage just described. In this type the air pressure, as mentioned, acts on the fore end of the piston portion of the smaller diameter, while the cylinder space in front of the shoulder between the two cylinder portions is in open communication with the atmosphere. The air pressure that eventually leaks into said space in the one direction or the other will thus be without influence on the function of the machine inasmuch as it escapes directly into the atmosphere. It is however necessary to prevent the air pressure acting on the fore end of the piston from leaking past the tool inserted in the cylinder. For this purpose it has been proposed to provide between the piston and the tool an interme-

mediate piece fitting in an airtight manner in the cylinder and freely movable in the latter. This device however, is objectionable in that the efficiency of the machine is greatly reduced on account of the so called "dead" strokes which occur very often and are due to the fact that said intermediate piece cannot always follow the movements of the tool.

The object of the present invention is to overcome the said disadvantages, and the present invention consists, briefly, in that the piston in addition to the usual forward portion of reduced diameter has at the forward end of said reduced forward portion an extension of still smaller diameter which fits in an airtight manner in the forward end of the cylinder and acts directly on the tool inserted in the usual manner in the cylinder. The air pressure used for returning the piston from the tool acts on the shoulder between the said extension and the intermediate piston portion, while the cylinder space in front of the rear and largest portion of the piston is in open communication with the atmosphere in the ordinary well known manner.

In the accompanying drawing I have shown one embodiment of my invention applied to a rock drilling machine.

Figure 1 shows a longitudinal section of the machine on line A—A in Fig. 2, while Fig. 2 shows a cross-section on line B—B in Fig. 1, the piston being removed.

As is shown in the drawing, the piston comprises a rear large portion 1 and a portion 2 of reduced diameter in front of the portion 1, and the said portion 2 is provided at its forward end with an extension 3 of still smaller diameter, which extension 3 fits in an airtight manner in the corresponding part of the cylinder 4. The air pressure is admitted in the usual manner through a cock 5 and flows through the channel 6 to a point in front of the forward end of the piston portion 2, and returns the piston from the bit 7. When the forward end of the piston portion 2 passes, incidental to the backward movement of the piston, the port or ports 8, the air pressure passes through said port or ports and the channel or channels 9 into the cylinder space behind the large portion 1 of the piston, and forces the piston toward the bit. As soon as the piston portion 2 has, incidental to the forward movement of the piston, covered the port or ports

8, the air pressure behind the piston acts on the latter by expansion until the piston portion 1 uncovers the usual exhaust ports 10, whereupon the piston is again forced backward, and so on. The air pressure that eventually leaks past the piston portions 1 and 2 into the cylinder space in front of the shoulder between said piston portions escapes through exhaust ports 11 connecting in well known manner said cylinder space directly with the atmosphere, while the air pressure that eventually leaks past the forward extension 3 escapes through a port or ports 12.

15 Having now described my invention, what I claim as new, and desire to secure by Letters-Patent, is:

In a pneumatic rock-drilling machine or the like in which no distributing valve or any other special distributing member is employed, the combination of a cylinder and a piston; the piston being of differential type and having a large rear portion and an intermediate portion of smaller diameter than the rear portion arranged in front of

said rear portion and also having at the forward end of the intermediate portion an extension of smaller diameter than said intermediate portion, and the cylinder having a forward interior portion which receives in an airtight manner the said extension of the piston, and the piston and the cylinder being so constructed and relatively arranged that the air pressure for returning the piston from the tool or bit acts on the shoulder between the said extension and the intermediate portion of the piston, and the cylinder being further provided with a space in front of the shoulder between the intermediate portion and the rear portion of the piston, which space communicates directly with the atmosphere.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

ERNST HJALMAR LAGERSTRÖM.

Witnesses:

CARL DELMAR,
JOHN DELMAR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."