

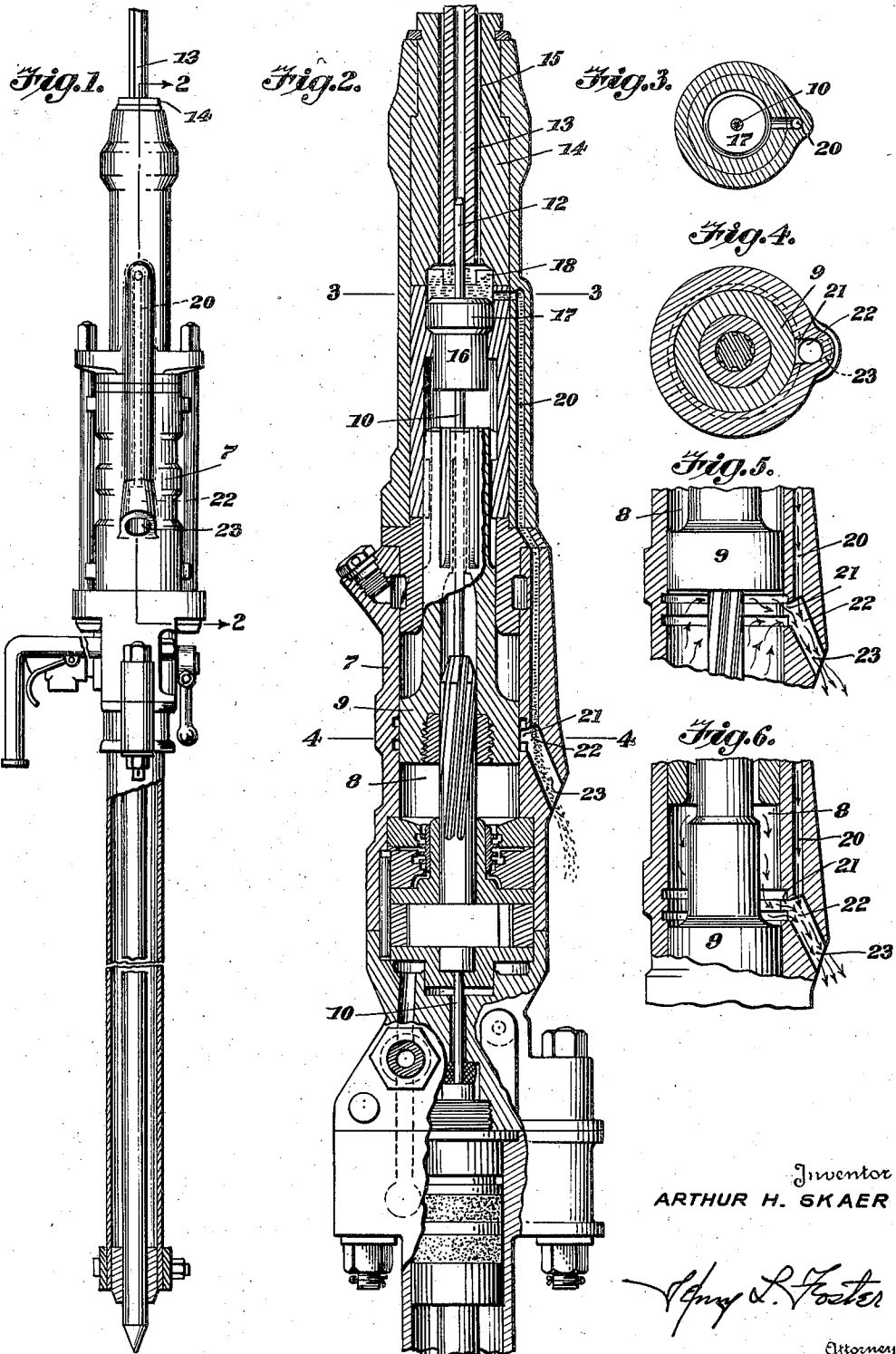
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ROCK DRILL SLUDGE EJECTOR

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ROCK DRILL SLUDGE EJECTOR

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The present invention relates to sludge ejectors for rock drills, and more particularly for drills of the pneumatic hammer type. While useful with any pneumatic drill it is more particularly intended for use with those having a splined socket-like chuck for the reception of drill steels. Where drills having such chucks are used for overhead drilling there is a tendency for the sludge, composed of rock dust and water, to run down along the drill steel and enter the chuck between the splines. This sludge is very harmful to the mechanism of the drill inasmuch as it is somewhat abrasive in nature and causes rapid wear of the tappet, hammer, and other moving parts.

One object of the present invention is to provide means located at the bottom or inner end of the chuck for removing the sludge from the chuck, and ejecting it at a point where it will have no harmful effect.

Another object is to provide such an ejector which does not require the addition of any parts to the drill and, therefore, does not materially add to the expense of manufacturing the drills.

Still another object is to provide such an ejector which is operated by the air exhaust from the piston.

These objects are attained by forming a passage in the wall of the cylinder casing, which communicates at one end with the back of the chuck, or the tappet chamber, and at the other end with the exhaust passage leading from the cylinder, in such a manner that the exhaust fluid creates suction in the passage and draws the sludge from the chuck through the passage and blows it out through the exhaust port.

In the accompanying drawing, Figure 1, is an elevation of a rock drill, provided with an ejector.

Figure 2 is an enlarged sectional view taken on the line 2—2 of Figure 1.

Figure 3 is a sectional view taken on line 3—3 of Figure 2.

Figure 4 is a sectional view taken on line 4—4 of Figure 2.

Figure 5 is a detailed view of the section around the exhaust passage with the piston in its forward position.

Figure 6 is a similar view showing the piston in its rearward position.

Describing the drawing more particularly, a usual type pneumatic drill is shown having a barrel 7 within which is a cylinder 8. The usual piston 9 reciprocates in the cylinder 8, due to the action of compressed air, in the usual manner, all of the working mechanism of the drill

being of ordinary construction. A water tube 10 delivers water by means of a nozzle 12 to a drill steel 13 positioned in a chuck 14.

At the rear of the chuck 14 is a tappet 16 mounted for reciprocation under the blows of the hammer 9 in the usual manner and having a head 17 that operates in a tappet chamber 18 to strike the steel 13.

The chuck 14, which may be of any cross sectional shape is slightly larger than the drill steel in order to provide a free fit for the steel.

In order to eject any sludge which may run between the side walls 15 of the chuck, when the drill is in the position shown in Figures 1 and 2, a passage 20 is provided in the barrel 7 and runs longitudinally of the barrel from a point in the tappet chamber opposite the top of tappet 16, when it is in its most rearward position, to a point adjacent the exhaust port 21 of the cylinder 8.

The exhaust port, as will be seen by reference to Figure 2, opens into a pocket 22 formed at the junction of the port 21, and an exhaust passage 23, the latter being directed outwardly and rearwardly of the drill. The passage 20 opens through the forward wall of the pocket 22 and opposite the inner or forward end of the passage 23, which is of sufficient size to give free exit to the exhaust and not cause pressure to act through the relatively small passage 20.

It will be seen that air under pressure escaping from port 21 will rush through the passage 22 in escaping to atmosphere. The passage 22 being comparatively large with respect to the passage 20, the rush of the exhaust air will tend to create suction along the passage 20, and this suction will tend to draw the sludge from the chamber 18 into and through the passage and to deliver it into the stream of exhaust air passing through passage 22. It will then be blown out with the exhaust from the opening of the exhaust passage.

In Figure 2 the piston is shown as closing the exhaust port 21. When the parts are in this position, as indicated in that figure, the sludge tends to run downwardly to the passage 20 under influence of gravity, and out through the passage 22.

Figures 5 and 6 illustrate the manner in which the exhaust rushes from the respective sides of the piston 9, according to whether it is in its forward or rearward position.

This structure provides an extremely simple and yet effective means of withdrawing sludge from tappet chamber 18 where it will cause ex-

cessive wear and rusting if allowed to accumulate. The sludge also tends to run down past the tappet and into the piston where it causes undue wear and friction. In view of the fact

- 5 that no additional parts are required the attachment does not add materially to the expense of the drill and because there are no moving parts there is no wear. It has been determined by tests that this is an extremely efficient manner
10 of obviating the difficulties encountered in overhead drilling due to the sludge.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to
15 those skilled in the art without further description and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any
20 of the advantages of the invention.

What I claim, is:

1. In a pneumatic rock drill for overhead drilling, having a socket-like chuck, a working cylinder, and an exhaust passage, means for removing
25 sludge from the chuck, comprising a passage

entering the chuck at its most rearward point and at its other end opening into the exhaust passage in the direction of flow of the exhaust.

2. In a pneumatic rock drill for overhead drilling, having an upwardly and forwardly open
5 socket-like chuck, a working cylinder, and an exhaust passage terminating in an exhaust port at a point rearwardly of and lower than the lowest surface of the chuck, means for ejecting sludge
10 from the chuck, comprising a passage opening into the chuck at its most rearward and lowest point, running downwardly throughout its entire length, and opening into the exhaust passage.

3. In a pneumatic rock drill for overhead drilling, having a socket-like chuck at its forward
15 end, a working cylinder and an exhaust passage terminating in a rearwardly directed exhaust port located at a point removed from the forward end of the drill, means for removing sludge from the chuck and ejecting it at a point and in a direction
20 away from the forward end of the drill, comprising a passage entering the chuck at its most rearward point and at its other end opening in a rearward direction into the exhaust port.

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