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Patented Jan. 29, 1901.

S. W. & H. F. BUCKWALTER.
FORCE JET DEVICE FOR CLEANING QUARRY HOLES, &c.

(Application filed Nov. 1, 1900.)

(No Model.)

FIG. 1

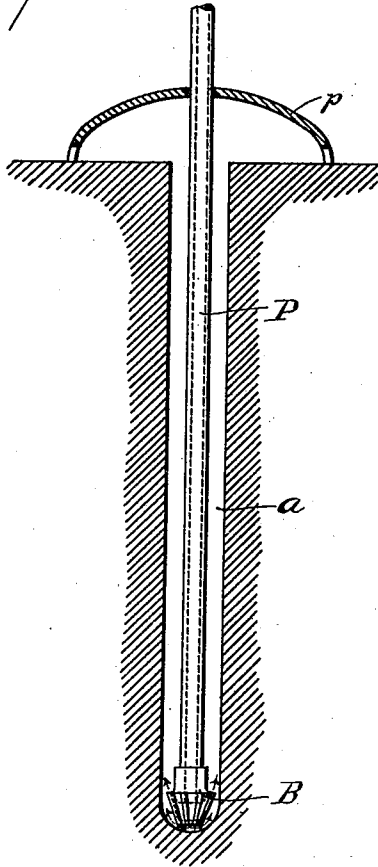


FIG. 2

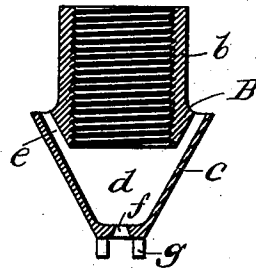
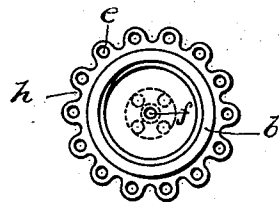


FIG. 3



Witnesses
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FORCE-JET DEVICE FOR CLEANING QUARRY-HOLES, &c.

SPECIFICATION forming part of Letters Patent No. 666,799, dated January 29, 1901.

Application filed November 1, 1900. Serial No. 35,089. (No model.)

To all whom it may concern:

Be it known that we, SAMUEL W. BUCKWALTER and HEBER F. BUCKWALTER, citizens of the United States of America, and residents of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Force-Jet Devices for Cleaning Quarry-Holes, &c., of which the following is a specification.

Our invention relates more particularly to apparatus for conveniently raising either semi solid or liquid matter from drilled quarry-holes or the like by utilizing the steam or compressed air ordinarily employed to drive the drill in the form of a force-jet; and it consists in the novel construction of the nozzle, by means of which said jet is effectively employed for the purpose.

The invention is fully described in connection with the accompanying drawings, and is specifically pointed out in the claims.

Figure 1 represents our improved device as applied to a drilled hole in rock for the purpose of cleaning the same. Figs. 2 and 3 are respectively a sectional elevation and plan view of our improved force-jet nozzle.

a represents a rock-drill hole from which the drill has been removed and our force-jet nozzle B, with its connected supply-pipe P, introduced to clean out the same preparatory to further drilling or to charging the hole. The pipe P of course is provided with a suitable valve to control the supply of steam or compressed air, as the case may be. The cleaning operation consists merely in lowering the nozzle until its lower end, which is preferably provided with a series of supporting-feet *g*, touches the bottom and then turning on the jet and raising the supply-pipe and nozzle, the dirt, &c., in the hole being forced out in advance of the latter, as hereinafter described. A flexible hose connection to the supply-pipe is employed to permit of convenient manipulation.

The force-jet device B is a single piece, preferably of cast-brass. It is formed with a cylindrical shank or body portion *b*, screw-threaded for attaching it to the pipe P, and a conical tip portion *c* of larger diameter at the top than the body *b* and provided with an inner chamber *d*, in communication with

the supply-pipe through the body *b*, and with a circular series of outlets *e*, opening upwardly therefrom around said body *b* and inclined outward, so as to direct the circle of discharging steam or air-jets against the wall of the hole or bore *a*. In addition to these upwardly-discharging outlets from the chamber *d* we provide for cleaning purposes a bottom outlet *f*, the mouth of which is preferably supported somewhat above the bottom of the hole *a* by means of feet *g*, as already stated, so as to prevent possible clogging of the outlets by the dirt naturally collected at the bottom of the hole. To insure communication between the bottom outlet *f*, with sufficient space for the raising of the dirt at the bottom of the hole, the outer wall of the tip *c* is provided with longitudinal grooves *h*, opening above between the outlets *e*, as indicated in Fig. 3.

Having introduced the device as indicated in Fig. 1 and turned on the steam or compressed air the latter will be discharged upwardly through the circular series of outlets *e* and downwardly through the outlet *f*. The effect of this bottom discharge is to thoroughly loosen and displace any removable matter below the nozzle B, which matter will be raised upward around the grooved walls of the device and come under the direct action of the circular series of jets from the outlets *e* and be carried out by the latter, together with any matter adhering to the walls of the hole above the nozzle as the latter is raised. To prevent undue scattering of the ejected matter and escaping steam or air, we preferably employ a guard *p* at the top of the hole through which the pipe P loosely passes.

By means of our improved device every particle of dirt may be quickly and easily removed from the hole and the walls and bottom left clean and dry for immediate charging of the hole. Furthermore, the device may be very satisfactorily used for raising water or other liquid from driven pipes, the bottom outlet *f* being dispensed with, if desired.

What we claim is—

1. A force-jet nozzle for cleaning quarry-holes, &c., having a shank or body adapted to be connected to a pressure-supply pipe, and

a chambered tip below said connection having a circular series of discharge-outlets opening upwardly around said shank or body, said tip having exterior longitudinal grooves between said outlets substantially as set forth.
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2. A force-jet nozzle for cleaning quarry-holes, &c., having a shank or body adapted to be connected to a pressure-supply pipe, and a chambered tip below said connection having
10 a circular series of discharge-outlets opening upwardly around said shank or body, and

a central bottom outlet, and said tip having exterior longitudinal grooves between said outlets, substantially as set forth.

Signed at Reading, Pennsylvania, this 26th 15 day of October, 1900.

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Witnesses:

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