F. T. SANDERS.

AIR AND WATER BLOWPIPE FOR ROCK DRILLING.

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1,146,284. Patented July 13, 1915.

Fig. 1

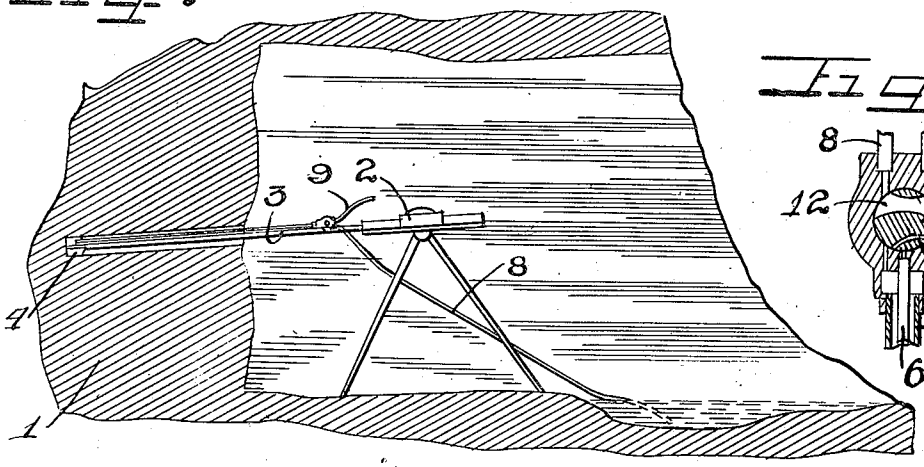


Fig. 5

Fig. 2

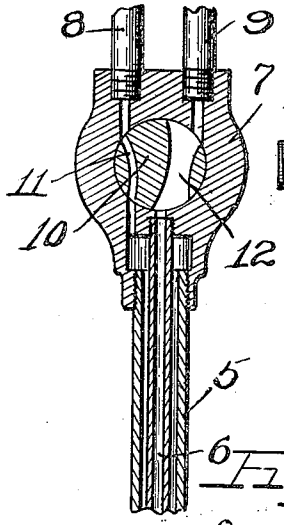


Fig. 3

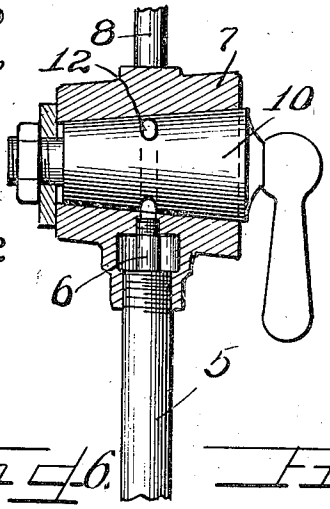


Fig. 6.

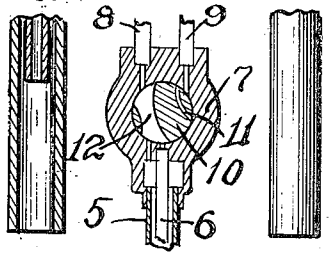
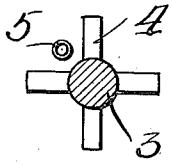


Fig. 4



Witnesses

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AIR AND WATER BLOWPIPE FOR ROCK-DRILLING.

1,146,284. Specification of Letters Patent. Patented July 13, 1915.

Application filed January 16, 1913. Serial No. 742,368.

To all whom it may concern:

Be it known that I, FRANK T. SANDERS, a citizen of the United States, and a resident of the city of Colorado Springs, in the county of El Paso and State of Colorado, have invented certain new and useful Improvements in Air and Water Blowpipes for Rock-Drilling; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numbers of reference marked thereon, which form a part of this specification.

In mining and other operations, wherein rock drills are used, the accumulation of the drilling from the rock in the drill hole, in the form of fine dust, interferes greatly with the operation of the drill, unless removed.

The object of this invention is to afford a blow pipe for the purpose specified, wherein air under pressure is utilized in displacing the dust and drillings, and is injected into the drill hole, together with a sufficient amount of water to carry the dust outwardly from the drill hole without contaminating the atmosphere thereby.

It is an object of the invention to afford a device of the class described whereby water, associated with air under pressure, may be injected into the drill hole at or near the point of the drill, to carry outwardly the drillings as fast as formed, not only to facilitate the drilling, but maintaining the hole at all times unobstructed therefrom, but also to protect the workmen from injury by saturating the dust from the drilling sufficiently to prevent the same being blown into the air.

It is an object of the invention to afford a construction whereby a regulable amount of air and of water may be delivered simultaneously or independently into the drill hole, to enable the driller to maintain the hole at all times clean from the drillings, thereby facilitating drilling.

It is also an object of the invention to afford a construction whereby the quantity of water with respect to the air, may be varied at will, dependent upon the conditions obtaining in the drill hole, and to afford means when the drilling operation is completed, or practically so, to shut off the supply of water either wholly or in part, to permit the air blast to cleanse and practically drive a hole preparatory to blasting, or such other operation as may be required.

It is an object of the invention to afford a device of the class described, equipped with a suitable valve convenient of access to the operator, and whereby the application of air and water may be varied at the will of the operator to suit the requirements of the work.

While I have illustrated the operation as a preferred form applied to drilling, as in mining and tunneling operations, it is to be understood that the invention is applicable in well drilling, or in any situation wherein in connection with drilling operations, it is necessary or desirable to remove the drillings as the operation progresses.

The invention (in a preferred form) is illustrated in the drawings, and hereinafter more fully described.

In the drawings: Figure 1 is a sectional view in side elevation, of a device embodying my invention, showing the same in operation. Fig. 2 is an enlarged, longitudinal section thereof, broken away. Fig. 3 is a section taken through the valve casing at a right angle with that shown in Fig. 2. Fig. 4 is an enlarged section taken through the drill rod and blow pipe, and showing the relative positions of the same while in use. Fig. 5 is a diagrammatic view of the valve in position to admit air under pressure into the water pipe connection. Fig. 6 is a diagrammatic view of the valve in position to admit only water into the two pipes 5 and 6.

As shown in the drawings: 1, indicates the rock in which the drill is to be operated, and which (in the drawing) is shown as used in a tunnel heading or drift.

2, indicates the drilling machine, which may be of the pneumatic, or any kind; 3, the drill rod, and 4, the cutter or head. The blow pipe comprises a relatively large water pipe 5, and an inner co-axial air pipe 6, of less length. As shown, a valve casing 7, is provided with an inlet or connection 9. A rotatable plug closure 10 is provided in said casing, having a port 11, through which the inlet water pipe 8, communicates with the water discharge pipe 5. A relatively broad port 12, is also provided in the plug closure, through which the air pipe 9, may be brought into communication with the air discharge pipe 6, said port 12, in said plug, being of such dimensions as to permit

the same to be adjusted by rotation of the plug closure to admit air from the inlet pipe 9, into both the water and air pipes 5 and 6, or to admit water into both of said pipes from the pipe 8, or, as shown in Fig. 2, to admit air only through the pipe 6, while water is admitted through the pipe port 11, into the water discharge pipe 5. As shown, the water discharge pipe 5, is threaded into the lower end of the valve casing, and above the upper end of said pipe in said casing, is a chamber or space through which the pipe 6, extends, and is threaded into the casing at the inner side of said chamber.

The operation is as follows: The air pipe 9, is connected with any suitable source of air pressure, such as a tank of compressed air, or a suitable compressor. Of course, if the drills employed are pneumatic drills, a branch line may be taken from the drill line, or even the exhaust from the drills may be utilized, if desired. The water inlet pipe 8, leads to any suitable source of supply for the water. Inasmuch as the pressure is supplied by the air, the water may be supplied from a pail or any suitable container. With the beginning of the drilling operation, the blow pipe is inserted in the drill hole with the end of the pipe 5, positioned between the blades of the drill head 4, when the valve closure 10, is adjusted to permit a sufficient blast of air to be admitted through the air pipe 6, to keep the hole clear. The admission of the air under pressure through the pipe 6, produces a partial vacuum in the pipe 5, above the end of said air pipe, facilitating a flow of water through the pipe 5, even though the pail, or other source of supply, be somewhat below the level of the discharge. The dust and drillings are thus saturated with the water, the amount, of course, being regulated by the proper adjustment of the valve closure, and the hole is constantly flushed thereby, the pressure of the air assisting also in carrying the drillings outwardly as rapidly as formed. Should a larger flow of water be desired, it may be obtained by suitably adjusting the valve.

Should the source of water supply be sufficiently elevated, or under pressure from any cause, the closure may be rotated so as to discharge water only through both pipes 5 and 6, to increase the flushing action. Ordinarily, however, this is not done and is not desirable. Instead, if a larger flow of water be desired, the discharge of air is increased, thereby increasing the siphoning action and augmenting the flow of water. When the drilling operation is completed, the valve closure may be adjusted to shut off the supply of water altogether and to admit air under pressure, through the port 12, to the air discharge pipe 6, and the water discharge pipe 5, thus greatly increasing the volume of air, blowing all water out of the hole, and, if desired, drying the same preparatory to charging.

Of course, it is to be understood that the invention is susceptible of application in numerous ways other than those hereinbefore described, and I have shown but a preferred embodiment of my invention. I therefore do not purpose limiting the patent granted on this application otherwise than necessitated by the prior art, as many details of construction and operation may be varied without departing from the principles of this invention.

I claim as my invention:

1. In an air and water blowpipe an outer water pipe, an inner air pipe, a casing member in which the ends of said pipes are secured, a doubly passaged rotatable valve element communicating in said casing, the arrangement of the passages in said valve element permitting air and water to flow from said inlets into said respective inner and outer pipes, and by adjustment to admit water into both of said pipes simultaneously with the air inlet cut off.

2. In a device of the class described coaxially arranged pipes, the inner pipe for air, the outer pipe for air and water, a casing member in which said pipes are secured at their ends, an inlet for air and an inlet for water communicating in said casing, and means effecting communication between said respective air and water inlets and said respective inner and outer coaxial pipes whereby the water is drawn through due to the aspiration effect of the air flowing, said means adjustable to effect communication between said respective air and water inlets with said coaxial pipes closed off.

3. In a device of the class described coaxially arranged outlet pipes, the inner pipe adapted to receive air under pressure to draw water through the outer pipe by aspiration, a casing member into which said pipes are secured at their ends, passages in said casing member communicating with the ends of said pipes, inlet pipes, one for air and one for water respectively communicating in said casing, and a rotatable member therein having a plurality of passages, by one adjustment adapted to permit a flow of air from the inlet air pipe through the inner pipe of said coaxial outlet pipe, the other passage adapted to permit a flow of water into the outer of the coaxial pipes, said member by adjustment adapted to effect communication between both of said coaxial pipes and the inlet water pipe, and by further adjustment to effect communication between said respective air and water inlet pipes with the outlet pipes cut off therefrom.

4. In a device of the class described

means effecting a combined flow of air and water therethrough, said means when adjusted adapted to effect a flow of water only therethrough, air and water inlets for said device, and said means when further adjusted acting to effect direct communication between said air and water inlets cutting off the outlet from the device.

5. In a device of the class described coaxial outlet pipes, individual inlet pipes, one for air and one for water, a valve element having a plurality of passages therein, one passage larger than the other, the arrangement thereof being such as to permit a flow of air through one of said outlet pipes to draw water through the other of said outlet pipes by aspiration, and to permit flow of water through both of said outlet pipes when said air inlet pipe is cut off, and by further adjustment to effect communication between said respective air and water inlet pipes with communication through said outlet pipes cut off.

6. In a device of the class described coaxially arranged outlet pipes, a casing in which said pipes are secured at their ends, passages in said casing communicating with the ends of said pipes, inlet air and water pipes communicating in said casing, passages in said casing communicating with said respective inlet pipes, a rotatable valve element in said casing, a plurality of passages therein, one passage larger than the other, the arrangement permitting communication to be effected individually between the respective air inlet pipe and air outlet pipe of said coaxial pipes, and the water inlet pipe and water outlet pipe of said coaxial pipes, and by adjustment effecting communication between the water inlet pipe and both of said outlet pipes.

7. In a device of the class described coaxial air and water tubes, a unitary rotatable element controlling the supply of fluid thereto, a plurality of passages of different size arranged symmetrically therein adapted to afford communication between either of said air and water pipes and the source of supply to permit a simultaneous or individual flow for each thereof.

8. In a device of the class described coaxially mounted air and water pipes arranged so that either one thereof may have an aspiration effect on the other, sources of air and water supply, a unitary valve adapted to control the communication therebetween, said valve having a plurality of varied sized passages therein, symmetrically arranged so as to afford communication between said respective pipes by either of said passages to afford a simultaneous or individual flow of the fluids.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

FRANK T. SANDERS.

Witnesses:
OLLIE HARRELL,
WALTER SHEMWELL.