D. S. WAUGH.

DRILL HOLE CLEANING ATTACHMENT FOR HAMMER DRILLS.

APPLICATION FILED MAY 25, 1907.

**907,430.** Patented Dec. 22, 1908.

2 SHEETS—SHEET 1.

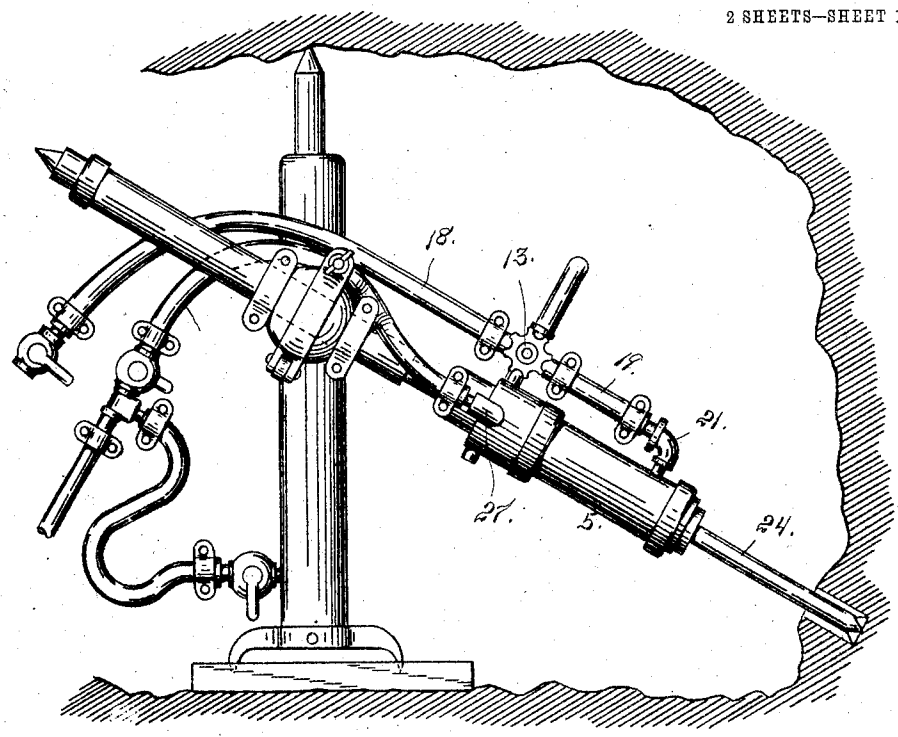



Fig. 1.

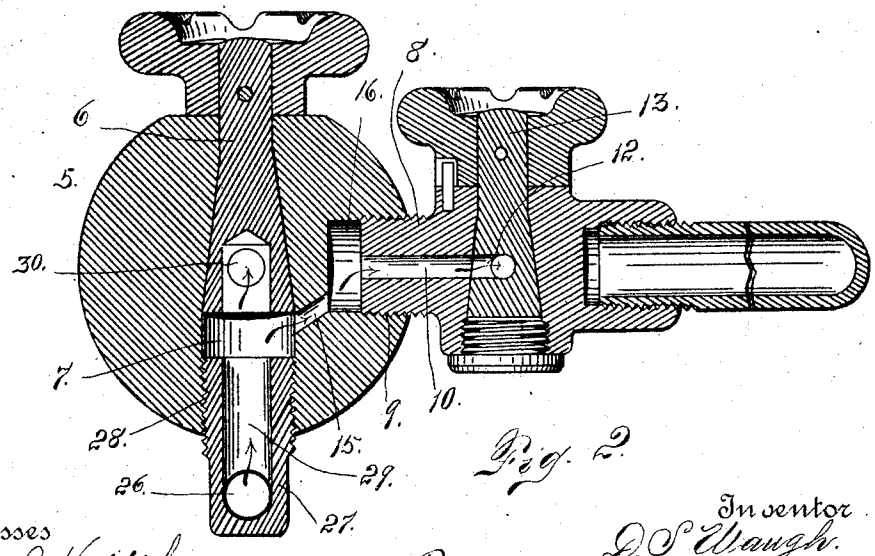



Fig. 2.

Witnesses
Otto E. Hoddick.
Dena Nelson.

Inventor
D. S. Waugh.
By A. G. Wrenn
Attorney

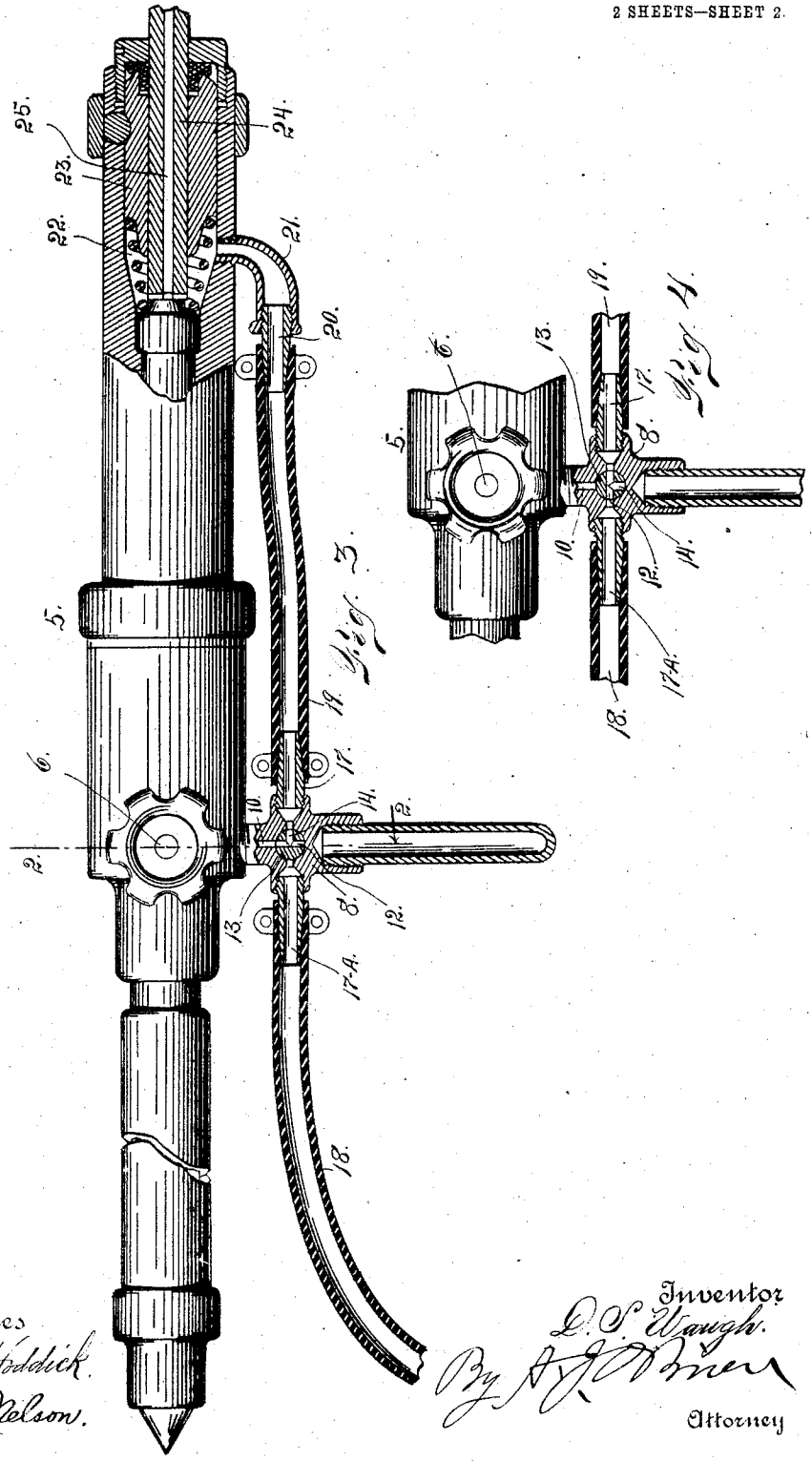
D. S. WAUGH.

DRILL HOLE CLEANING ATTACHMENT FOR HAMMER DRILLS.

APPLICATION FILED MAY 25, 1907.

**907,430.** Patented Dec. 22, 1908.

2 SHEETS—SHEET 2.




Witnesses
Otto E. Hoddick.
Dena Nelson.

Inventor
D. S. Waugh.
By H. J. Owen
Attorney

# UNITED STATES PATENT OFFICE.

DANIEL S. WAUGH, OF DENVER, COLORADO, ASSIGNOR TO THE DENVER ROCK DRILL AND MACHINERY COMPANY, OF DENVER, COLORADO.

## DRILL-HOLE-CLEANING ATTACHMENT FOR HAMMER-DRILLS.



No. 907,480. Specification of Letters Patent. Patented Dec. 22, 1908.

Application filed May 25, 1907. Serial No. 375,740.

*To all whom it may concern:*

Be it known that I, DANIEL S. WAUGH, a citizen of the United States, residing at the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Drill-Hole-Cleaning Attachments for Hammer-Drills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in means for controlling the passage of air and water through a hollow drill bit to the drill hole in hammer drills.

By virtue of my improvement, the same valve that regulates the supply of water to the drill hole, may also be utilized for cutting off the water and turning on the air whereby the one or the other fluid as may be desired may be utilized for this purpose. In putting in down-holes it is preferred to utilize the water, while in drilling up-holes, it is preferred to utilize the air since in the up-hole work the drill cuttings are washed out in the form of mud and interfere with the work of those in charge of the drill. On the other hand it is advisable to use the water as much as possible since it obviates or overcomes the dust incident to the use of air alone for cleaning the drill hole.

By virtue of my improvement the mechanism may be readily adjusted to cut off the water and turn on the air or vice versa without stopping the machine. To this end I employ a three way valve adapted to be so adjusted that one of its ports communicates with a passage leading from the motive fluid supply of the main valve, at the same time cutting off the water supply. Again the valve may be so adjusted as to cut off the air supply and allow the passage of water to the drill hole.

Having briefly outlined my improved construction, I will proceed to describe the same in detail reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing, Figure 1 is an elevation illustrating a hammer drill equipped with my improvements. Fig. 2 is a section taken through the valve mechanism, the parts being shown on a larger scale. This section is taken on the line 2—2 Fig. 3. Fig. 3 is a view of a drill illustrating my improvements, the conduit for supplying the fluid to the drill hole as well as the valve for controlling said supply, is shown in section. Fig. 4 is a view similar to Fig. 3 but showing the three-way valve in a different position.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the body of the drill, and 6 the valve for controlling the motive fluid supply thereto. Connected with one side of the body of the drill and communicating with the chamber 7 of the main valve, is a valve body 8 which is threaded into an opening 9. This valve body 8 is provided with a passage 10 adapted to communicate with a port 12 formed in an auxiliary valve 13 located in the valve body. This last named valve is a three-way valve having its port 12 extending therethrough and an additional port 14. From the chamber 7 of the main valve 6, a passage 15 leads to the recess 16 into which the valve body part 8 is inserted. Screwed into the valve body 8 on opposite sides are two nipples $17^A$ and 17 with which conduit members 18 and 19 are respectively connected. The conduit member 8 leads from a source of water supply while the conduit member 19 is utilized to carry either air or water as may be desired. The extremity of the conduit member 19 remote from the valve body 8, is connected with a nipple 20 threaded into an elbow 21 whose opposite extremity communicates with a chamber 22 in which the chuck 23 for holding the drill steel 24 is inserted. This drill steel as shown in the drawing is provided with a longitudinal passage 25 for delivering fluid to the bottom of the drill hole, the inner extremity of said passage communicating with the chamber 22.

Assuming that the parts are in the position shown in Fig. 4, that is to say assuming that the auxiliary valve 13 is adjusted to bring its port 12 into alinement with the nipples 16 and 17, the water will pass freely from the conduit-member 18, through the port 12 of the valve, and thence through the member 19, the nipple 20 and the elbow 21, into the chamber 22 of the drill and thence through the passage 25 of the drill steel to the bottom of the hole. Now assuming that it is desired

to cut off the water supply and introduce air to the drill for cleaning purposes, the auxiliary valve 13 will be adjusted or turned to the position shown in Fig. 3, whereby the water supply is cut off, and the motive fluid allowed to pass from the valve chamber 7, through the passage 15, the chamber 16, the passage 10, and the ports 12 and 14 of the auxiliary valve, to the conduit member 19 and thence to the drill hole by the same path as heretofore explained in describing the course of the water.

Attention is called to the fact that the motive fluid for actuating the drill is introduced thereto through an opening 26 formed in a nipple 27 threaded into the body of the drill as shown at 28 and having a passage 29 communicating with the valve chamber 7. The motive fluid passes from the chamber 7 to the body of the drill through a port 30 of the valve. As nothing is claimed on the special construction whereby the motive fluid is supplied to the drill body for operating the drill steel, no further explanation in regard to this subject will be required.

When it is desired to admit motive fluid to the hole independently of the operation of the drill, the auxiliary valve 13 is adjusted or turned to the position as shown in Fig. 3, whereby the water supply is cut off. The main valve 6 is then adjusted so that communication between the operating mechanism of the drill is also cut off. This allows the motive fluid to pass direct from the motive fluid supply to the valve chamber 7 through the passage 15, the chamber 16, the passage 10 and the ports 12 and 14 to the auxiliary valve, to the conduit member 19 and thence to the drill hole.

Having thus described my invention, what I claim is:

A drill body provided with a hollow drill bit, a conduit connected with the forward end of the drill body for delivering the drill-hole-cleaning fluid to said hollow drill bit, a valve body interposed between the forward and rear members of the said conduit and threaded in the body of the drill, the valve piece passage therein located in said valve body, a connection between the motive fluid receiving portion of the drill body and the chamber of the valve whereby motive fluid is supplied from the drill body to the valve, the valve being capable of adjustment to allow the motive fluid to pass through the forward member of the conduit while communication with the rear member is cut off, or to open communication between the two members of the conduit while the motive fluid is cut off, and suitable means for delivering motive fluid to the drill hole independently of the operation of the drill, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

DANIEL S. WAUGH.

Witnesses:
DENA NELSON,
A. J. O'BRIEN.