

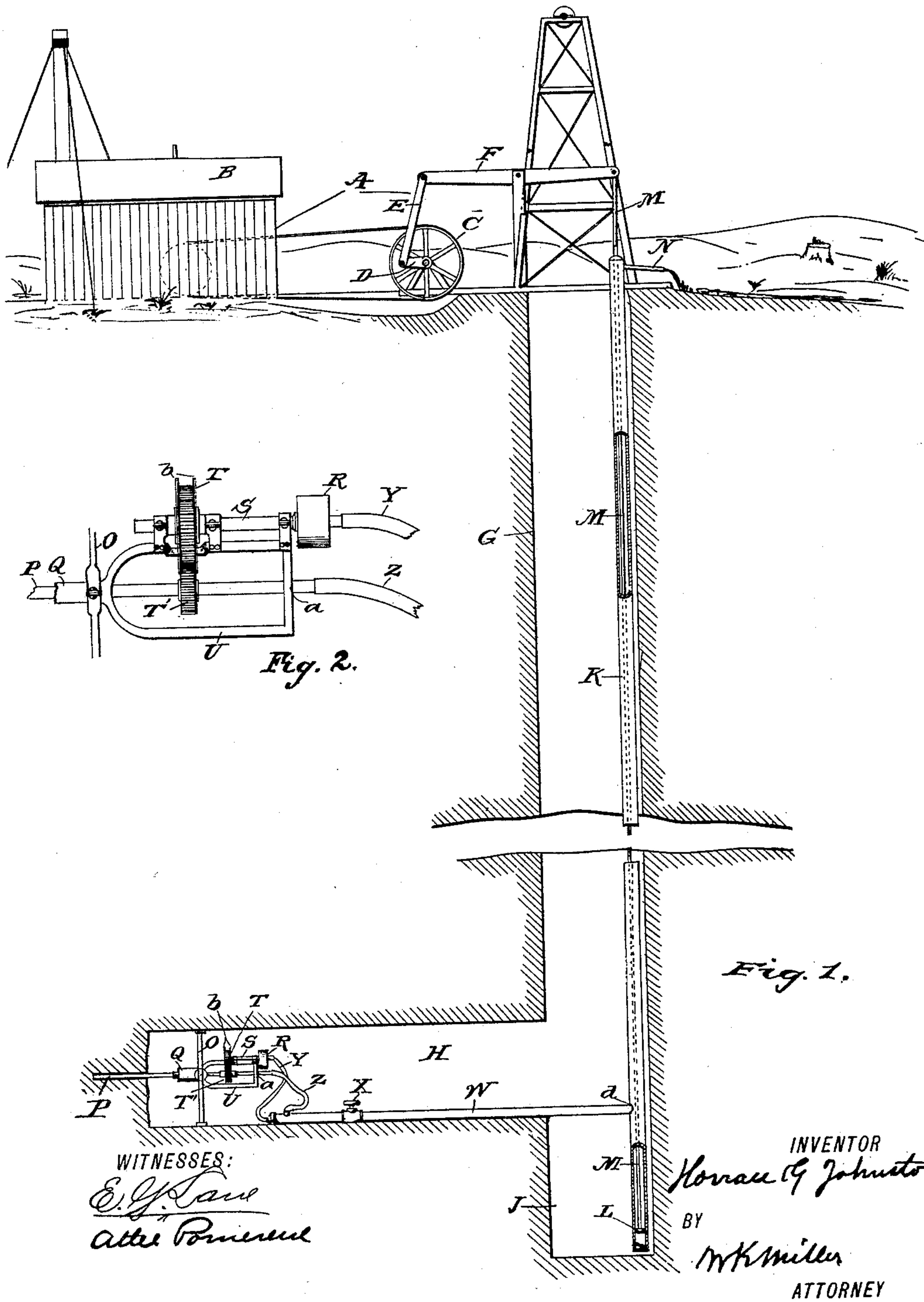
(No Model.)

H. G. JOHNSTON.

APPARATUS FOR OPERATING DIAMOND DRILLS IN MINES.

No. 435,648.

Patented Sept. 2, 1890.



UNITED STATES PATENT OFFICE.

HORACE G. JOHNSTON, OF SALINA, KANSAS.

APPARATUS FOR OPERATING DIAMOND DRILLS IN MINES.

SPECIFICATION forming part of Letters Patent No. 435,648, dated September 2, 1890.

Application filed February 24, 1890. Serial No. 341,398. (No model.)

To all whom it may concern:

Be it known that I, HORACE G. JOHNSTON, a citizen of the United States, and a resident of Salina, county of Saline, State of Kansas, have invented a new and useful Improvement in Apparatus for Operating Diamond Drills in Mines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to an improved apparatus for operating drills in mines; and it consists in providing means for utilizing the pressure and a portion of the water in the drain-pipe to operate drills and other mining-tools.

With these ends in view my invention consists in certain features of construction and combination of parts, as hereinafter described, and pointed out in the claims.

Figure 1 of the accompanying drawings illustrates my invention as applied to operate diamond drills, and Fig. 2 a portion of detail enlarged.

The surface structure A is intended to represent one of the well-known means of operating a lift-pump for draining mines. A suitable power, located in the building B, is transmitted to band-wheel C, thence by a crank D and pitman E to a working-beam F, as shown. G represents the vertical shaft of the mine, and H a horizontal drift, and J a sump.

K is a water-pipe extending from the sump to a point above the surface of the ground. On the lower end of said pipe and in the sump J is placed a pump L, the sucker-rod M extending upwardly and connected to the free end of the working-bar F. At the top portion of said pipe is provided a spout or spill N, through which water raised from the mine is discharged.

For the purpose of this application I have shown my invention applied to operate a rotary diamond drill in a mine, O representing the drill-support, and P the drill, which is of the usual pipe form, having diamonds placed about the outer or free end thereof. Q is a supporting journal-box, in which the drill is rotated, said drill having a geared connection with the motor R.

To support the driving-shaft S, drill P, and gear-wheel T, a frame U is provided, which is secured to and supported by the support O.

The rear end portion of the hollow drill-shaft is also journaled on said frame, as shown at a. On said shaft is placed a gear-wheel T' to engage wheel T, which is secured from rotation by a feather in the usual way, and to secure said wheel from longitudinal movement on the drill-shaft the driving-wheel T is provided with side flanges b, between which the wheel T' is placed, the cogs of which engage the cogs of the wheel T, the flange b holding the wheel T' in position as the drill-shaft is advanced or withdrawn.

The motor R may be of any of the well-known water-motors and will need no further explanation; but to operate said motor a water-pipe W is provided, one end of which is connected with the vertical drain-pipe K, at a point above the pump L and below the spout or spill N, as indicated at d. In said pipe W is provided a valve X, by which it may be closed.

To convey the water from the pipe W to the motor, a hose Y is provided, by which a yielding connection and water-conduit is provided, that will not only supply the water to the motor, but will also provide for the movement of the drilling-machine as occasion may require; and to provide a wash-out for the drill a similar hose Z is provided, one end of which is swiveled to the open end of the drill-shaft, by which water is allowed to flow through the drill between the core of rock and the inside of the drill-shaft and out of the hole between the outside of the shaft and the wall of the hole, to prevent clogging and heating, as would be the case without the use of such wash-out, and by the use of which means the frequent withdrawal of the drill to clean out is avoided.

In operation the pumping machinery on the surface is put in operation, the pump L operated thereby, and the water drained from the mine into the sump J is raised to the discharge pipe or spout N. The valve X is opened to allow water to flow from the pipe K, through the pipe W and hose Y, to the motor and through the hose Z, to wash out the drill, the amount of water required to operate the motor being very small, owing to the great pressure in the pipe K, which will, however, vary with the height of said pipe, varying from one-sixteenth to one-twentieth

so far as demonstrated. The water being passed through a small nozzle varying from one-eighth to one-fourth of an inch will strike the wheel or motor with such power as may be required to rotate the wheels T and T', and thereby the drill P. The speed of the machinery may be regulated by the use of the valve X to regulate the flow of the water to the motor. After leaving the motor and the drill, the water will find its way back to the sump by a surface-drain. Heretofore drills have been operated by steam generated at the surface and carried down into the mine in pipes, and after passing through some form of driving-machinery exhausted into the mine, greatly to the discomfort and health of the operators, by an increase of temperature and humidity of the atmosphere of the mine; and, again, by the use of air compressed by the well-known machinery at the surface and conveyed down into the mine and through the proper machinery to operate the drill and is then exhausted into the mine, which operation so reduces the temperature of the mine as to greatly injure the operators, as well as be damaging to the machinery.

It will be clear to all persons familiar with the subject and processes of mining that my invention is not only conducive to the comfort and health of the operators, but will greatly reduce the cost of mining, as the quantity of water used to operate the motor is so small, because of the great pressure in the pipe K, that when deducted from that raised by the pump L will be small compared with the results attained.

By the use of the valve X the drill-motor may be stopped or started without interrupting or interfering with the operation of draining the mine.

Having thus fully described the nature and

object of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination, to operate drills in mines, the drain-pump L, vertical pipe K, having a horizontal pipe, as W, secured thereto at a point interjacent the pump and the discharge-pipe, said pipe having at its free end portion a hose portion Y to convey water from said pipe to the motor R to operate said motor, and a hose portion Z to convey water to the drill, substantially as described, and for the purpose set forth.

2. In combination, the support O, having secured thereto the supporting-frame U, drill-shaft P, and shaft S, journaled thereon, gear-wheels T and T', a water-motor mounted on the shaft S, a flexible pipe or hose connecting said motor to a water-supply pipe communicating with the mine drain-pipe at a point between the lift-pump and the discharge-pipe, substantially as described, and for the purpose set forth.

3. The combination, with a drain-pipe located within the shaft of a mine, a pumping-piston within said pipe, a drill located within the mine, mechanism within the mine for operating said drill, and a branch pipe communicating with the drain-pipe and the drilling mechanism, said pipe connected to the drain-pipe above the highest horizontal plane of movement of the pumping-piston and beneath the outlet to said drain-pipe, whereby a constant water-pressure within the branch pipe is maintained, substantially as set forth.

In testimony whereof I have hereunto set my hand this 21st day of January, A. D. 1890.

HORACE G. JOHNSTON.

Witnesses:

W. K. MILLER,
ATLEE POMERENE.