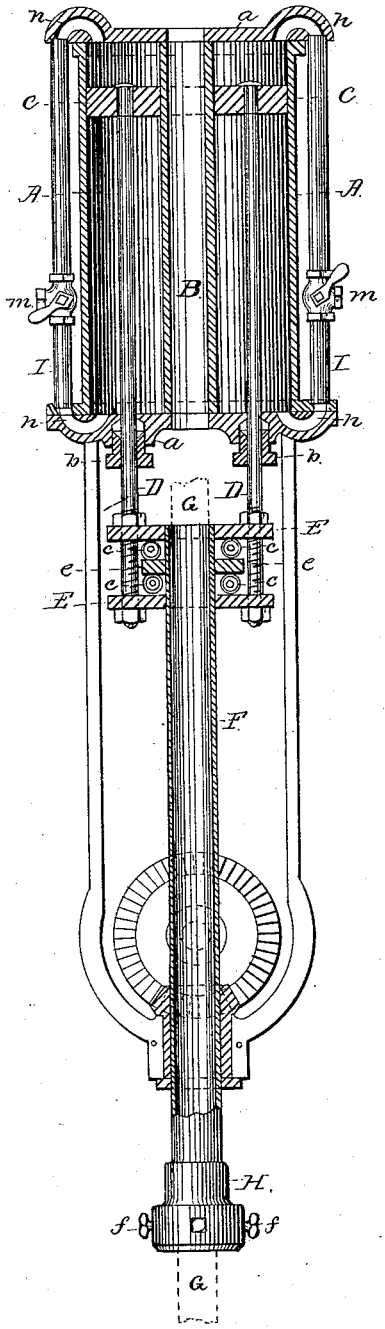
(No Model.)

C. B. RICE.

FEEDING APPARATUS FOR ROTARY DRILLS.

No. 305,962. Patented Sept. 30, 1884.



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UNITED STATES PATENT OFFICE.

CHARLES B. RICE, OF CLAREMONT, NEW HAMPSHIRE.

FEEDING APPARATUS FOR ROTARY DRILLS.

SPECIFICATION forming part of Letters Patent No. 305,962, dated September 30, 1884.

Application filed April 4, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. RICE, of Claremont, in the county of Sullivan and State of New Hampshire, have invented a new and Improved Feeding Apparatus for Rotary Drills; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawing, and to the letters of reference marked thereon.

My invention relates to an improvement in hydraulic feed for diamond and other rotary drills, and has for its object simplicity in the construction and arrangement of parts, compactness of form, and great economy in the length of the driving-rod, all of which features tend to increase the efficiency and greatly facilitate the operation of drills.

The invention herein consists in the construction, arrangement, and combination of the several parts of the device, all as more fully hereinafter described, and set forth in the claims.

For a better comprehension and understanding of the device, and to acquaint those skilled in its relative art with the construction, arrangement, and operation of its parts, reference may be had to the accompanying drawing, which is a vertical longitudinal section of a drill constructed in accordance with my invention.

A represents the cylinder, with a tube, B, passing longitudinally through its center, and secured at each end (which is open) in the heads *a a* of the same. Within this cylinder is arranged the piston C, which provided at its center with a cylindrical perforation of a diameter adapting it to fit loosely over the tube B, and permit of a free up-and-down movement of said piston. To this piston are secured two or more piston-rods, D D, which pass down through the cylinder and through stuffing-boxes *b b*, located in the lower head of said cylinder. These rods are secured each at its lower end to a cross-head, E, which is hollow and contains friction-rings or any other suitable frictional devices, *c c*. In this cross-head E the upper end of the hollow driving-rod F has vertical bearings, and it has further support and bearing within the same by means of a plate, *e*, cast upon the exterior surface of said driving-rod, and interposed between the frictional devices *c c*. By this arrangement of the driving-rod within the cross-head E, and the latter's connection with the piston-rods, a vertical reciprocating movement is imparted to said driving-rod when pressure is exerted upon the piston. This driving-rod receives its rotary motion from connection with any convenient and suitable mechanism—such as gears or pulleys—the preferred construction and arrangement of such mechanism being like that described and illustrated in the patents of Ball and Case, Nos. 247,872 and 248,982, granted October 4 and November 1, 1881, respectively. The drill-rod G, which is hollow, passes longitudinally through the driving-rod, and in order that it may reciprocate and rotate concurrently with the latter it is made rigidly adjustable within the same by means of a clutch, H, and its set-screw *f*.

I I are the fluid-supply pipes arranged upon the exterior and opposite sides of the cylinder, and connecting with the interior of the same by means of passage-ways *h h*. Each of the said pipes I is provided with a valve or cock, *m*, for regulating the feed, and is adapted to receive the pipe or hose leading from the source of pressure-supply.

By this construction and arrangement of the drive-rod I am enabled to employ very short and cheap drive-rods and drill-rods, where the character of the work calls for such. At the same time I may employ very long drive-rods and drill-rods, or very long drill-rods and short drive-rods, where the character of the work makes such more convenient.

In the construction of the cylinder the central opening not only permits the passage of the drill-rod in case of deep prospecting or well-boring, but permits the use of a stream of water to cool the cutting-tool and wash away the detritus, and serves as an interior guide or bearing for the piston, and strengthens the cylinder and the cylinder-heads.

I am aware that I am not the first or original inventor of a hollow driving-rod, or of a cylinder with two piston-rods, or of friction-rollers in connection with drive-rods; but I

do believe that I am the first inventor of the the combinations hereinafter claimed.

Having thus described my invention and set forth its use and advantages, what I claim, and desire to secure by Letters Patent, is—

1. In a rotary prospecting or well-boring drill, the combination, with the feed-cylinder having two or more piston-rods, of the cross-head which connects the outer ends of the piston-rods, and the drive-rod which is journaled at its upper end in said cross-head, substantially as described.

2. In a rotary drill of the substantial character described, the combination, with a feed-cylinder having a central longitudinal opening, and two or more piston-rods, of a hollow drive-rod, F, arranged to operate wholly below the cylinder and in line with the central opening therein, and secured at its upper end between friction-rollers mounted in the cross-head connecting the piston-rods, substantially as and for the purposes set forth.

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

CHARLES B. RICE.

Witnesses:

J. DUNCAN UPHAM,

HERMON HOLT.