

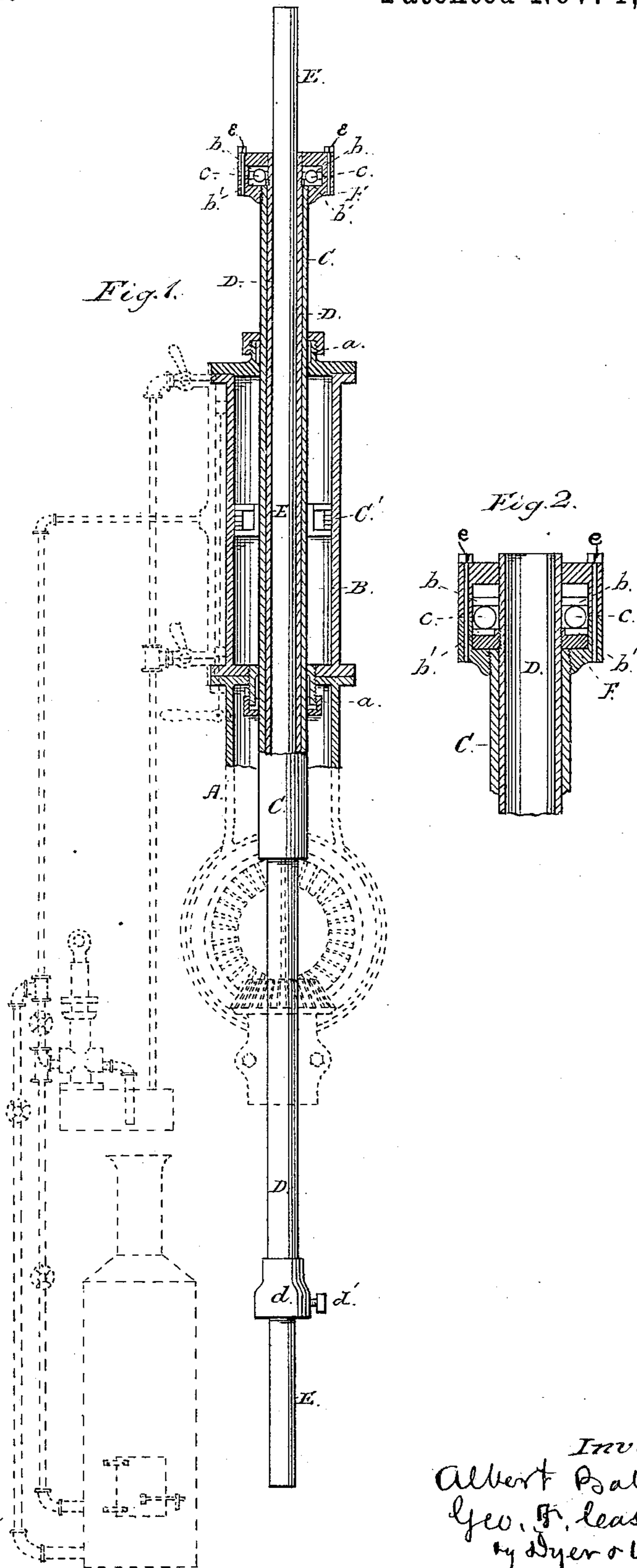
(No Model.)

A. BALL & G. F. CASE.

METHOD OF FEEDING DIAMOND OR OTHER ROTARY DRILLS.

No. 248,982.

Patented Nov. 1, 1881.



Attest;  
F. W. Howard  
John C. Schraier

Inventor;  
Albert Ball  
Geo. F. Lease  
by Dyer & Wilber atty

# UNITED STATES PATENT OFFICE.

ALBERT BALL AND GEORGE F. CASE, OF CLAREMONT, NEW HAMPSHIRE.

## METHOD OF FEEDING DIAMOND OR OTHER ROTARY DRILLS.

SPECIFICATION forming part of Letters Patent No. 248,982, dated November 1, 1881.

Application filed August 8, 1881. (No model.)

*To all whom it may concern:*

Be it known that we, ALBERT BALL and GEORGE F. CASE, both of Claremont, in the county of Sullivan and State of New Hampshire, have invented a new and Improved Method of Feeding Diamond or other Rotary Drills; and we do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Our invention relates to an improvement in the method of feeding diamond or other rotary drills; and it consists in providing a novel and simple means for connecting the piston that feeds the driving-rod with said rod, so that the piston may properly perform its work and yet not be affected by the revolution of the driving-rod; and it further consists in peculiar and novel means for reducing the friction at certain points of connection between these operative parts, all as more fully hereinafter explained and claimed.

To enable those skilled in the art to which our invention pertains to know how to make and use the same, we will proceed to describe the construction and operation of its parts, reference being had to the accompanying drawings, in which—

Figure 1 is a part longitudinal section, showing also the driving mechanism and means for supplying pressure in dotted lines; and Fig. 2, a longitudinal section of the disk.

Like letters denote corresponding parts in each figure.

A represents a portion of the frame, to which the cylinder B is bolted. This cylinder is provided at each end with a stuffing-box, *a*, constructed and secured thereto in the ordinary manner. Passing longitudinally through the center of this cylinder and the stuffing-boxes, and extending outwardly for some distance beyond each end of the cylinder, is the hollow piston-rod C, to the upper end of which is screwed the disk F, presently to be described. To the center of this piston-rod, in the cylinder, is secured the piston C', which imparts motion to the piston-rod, when pressure is applied thereon, by water or other liquid introduced into the cylinder by means of the devices shown in dotted lines in Fig. 1, which devices are not nec-

essary to here describe, as we have described them more particularly in an application filed of even date herewith. Passing longitudinally through this piston-rod is the rotary driving or feed rod D, carrying with it the drill-rod E, secured thereto by the clutch *d* and its screw *d'*, also described in the application above referred to. This driving-rod D and drill-rod E extend out of the lower end of the piston-rod for some distance, and are made to rotate by the driving mechanism shown in dotted lines, Fig. 1, which mechanism is also described in the application heretofore mentioned.

The disk F, heretofore mentioned, is screwed at its lower end to the hollow piston-rod C, as may be more clearly seen by referring to Fig. 2, which clearly shows the construction of the disk and its connection with the several parts. This disk is preferably made in two parts and secured together by means of bolts *e*. These parts are so constructed to form, when bolted together, a central recess in the disk for the reception of the rings *b b'* and anti-friction balls *c*. Two of these rings, *b b*, are inserted in the recess, one on each side of the driving-rod, which is secured to the lower rings, *b' b'*, and with which rod they revolve. The balls *c* are interposed between the rings *b b'* on each side of the driving-rod, and serve to lessen the friction of said driving-rod, (the part coming in contact therewith.) This recess in the disk is of sufficient depth to allow the said rings and balls to have plenty of play therein.

The operation of this drill is similar to that described in the application filed of even date herewith, with the exception of the movement of the piston, which in the other case was both progressive and rotary, while in this case it is only progressive, the driving and drill rods having the rotary movement. The pressure by water or other liquid is supplied to the cylinder by either of the devices shown in dotted lines, Fig. 1, and the speed of the piston regulated in like manner as that in the other application. As the pressure is exerted on the piston it moves forward toward the lower end of the cylinder, carrying with it the disk and the driving and drill rods, the two latter being revolved by means of the driving mechanism shown in dotted lines, Fig. 1, and the former not revolving, but moving forward entirely in-

dependent of the revolution of the driving and drill rods, the revolution of the piston being prevented by its connection with the disk. The driving-rod being secured to the lower rings, *b'*, and they being perfectly loose and free, permit this rod to revolve entirely independent of the piston-rod, and the friction of the driving-rod incident with its revolution in the disk is much reduced by the anti-friction balls *c*, interposed between the rings *b b'*. When the desired depth of hole is reached, the piston is made to recede in like manner as described in the other application. The depth of hole is unlimited, as the drill-rod can be lowered to reach any depth by means of the clutch *d* and its screw.

It will be seen that the device is very simple and effective in its work and can be constructed at a very small cost. Its parts are few and not liable to become deranged or be much worn, from the fact that there is very little friction produced in its operation, and what little there is is reduced by the anti-friction balls.

Having described our invention, what we claim, and desire to secure by Letters Patent,

is—

1. In a rotary drill, the combination, with a direct-acting cylinder and a suitable pressure-supply, of a piston, hollow sliding piston-rod, and disk secured to the upper and outer end

of such piston-rod, substantially as described, and for the purpose set forth.

2. In a rotary drill, the combination, with the driving-mechanism frame, cylinder, piston, and piston-rod, arranged as shown, of a rotary feed-rod passing longitudinally through said piston-rod, and attached at its upper end to rings inserted in a recess of the disk secured to said piston-rod, substantially as described, and for the purpose set forth.

3. In a rotary drill, the combination, with the cylinder, piston, piston-rod, disk, and rotary feed-rod, arranged as described and shown, of a drill-rod passing longitudinally through said feed-rod, and arranged to operate substantially as described, and for the purpose set forth.

4. In a rotary drill, the combination of the frame, cylinder, piston, piston-rod, disk, and rotary feed and drill rods, the several parts constructed and arranged to operate substantially as described, and for the purpose set forth.

This specification signed and witnessed this 27th day of June, 1881.

ALBERT BALL.  
GEO. F. CASE.

Witnesses:

HERMON HOLT,  
H. S. PARMALEE.