

No. 746,204.

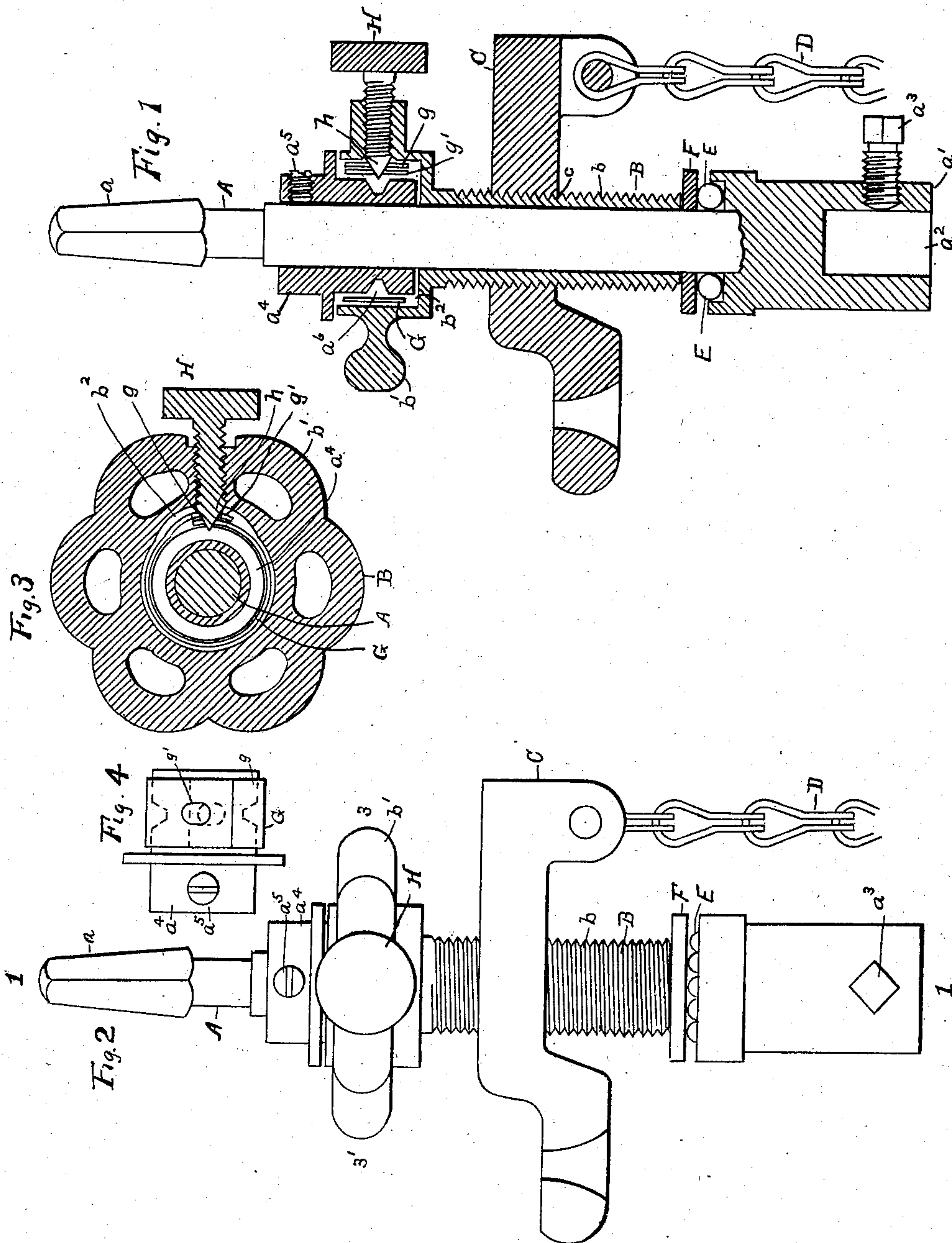
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DRILLING APPARATUS.

APPLICATION FILED FEB. 20, 1902.

NO MODEL.



WITNESSES.

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UNITED STATES PATENT OFFICE.

CHARLES T. UPTON AND GEORGE S. GILMAN, OF LOWELL, MASSACHUSETTS.

DRILLING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 746,204, dated December 8, 1903.

Application filed February 20, 1902. Serial No. 94,998. (No model.)

To all whom it may concern:

Be it known that we, CHARLES T. UPTON and GEORGE S. GILMAN, citizens of the United States, residing in Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Drilling Apparatus, of which the following is a specification.

This invention relates to drilling apparatus of that variety in which a feed-screw and a drill-carrying spindle are supported in a yoke, arm, or frame, by which said spindle is directed toward the work, said yoke, arm, or frame being at least temporarily secured at a fixed distance from said work and said spindle being fed by the rotation of said screw in said yoke, arm, or frame and said spindle and screw being so frictionally connected that turning said spindle automatically turns said screw, thus dispensing with the need of any pressure on the part of the operator.

Said invention consists in the means hereinafter described and claimed for securing a uniform feed of the drill-spindle and for varying the feeding friction when desired by very slight increments or decrements.

Attempts have heretofore been made by the pressure of a washer upon a relatively small surface of a collar or cylindrical enlargement on the spindle to rotate the feed-screw by the rotation of the spindle, said washer or plate being carried by the feed-screw and forced against said collar by a pressure-screw arranged to turn radially in the feed-screw and thrust against said washer; but unless the spindle be perfectly round and straight this arrangement is unsatisfactory, because any increase or diminution in the size of the spindle or any projection thereon or depression therein will vary the friction between said washer and said collar and cause the feed to be intermittent or jerky. Where the friction is applied wholly to one side of the spindle, the opposite inner wall of the feed-screw will wear more rapidly than the other and the spindle will become eccentric to said feed-screw and loose therein. It is, moreover, very difficult to make the pitch of the pressure-screw so fine that a slight turn of said pressure-screw will not make a very great difference in the pressure and feed of the washer, so that this arrangement does not permit a

fine adjustment of the feed. To remedy these defects, we apply a pressure on all sides of the spindle or of its collar or enlargement by means of a strap of practically inextensible material, preferably a metallic ribbon-spring, as a piece of clock-spring, long enough to reach around said collar and to allow its ends to lap one over the other. In each end portion of the strap we form a hole at such a distance from the adjacent end of the strap that when the ends of the strap are lapped and the strap is in close proximity to the collar throughout the whole circumference of the latter said holes will lap very slightly and so that a tapering piece, wedge, or cone being pushed through both holes will increase the lap of the strap ends and draw said strap into closer contact with the circumference of said collar, and we arrange a tension-screw to turn radially in the feed-screw and to enter said holes, the point of said screw being conical or tapering. To allow the tension-screw to pass through the holes for a sufficient distance, we groove the surface of the spindle or collar annularly to receive the point of said tension without contact between said point and collar.

It will be seen that our construction makes possible a very fine adjustment of the strap and that the tendency to crowd the spindle and the feed-screw out of concentricity with each other is very slight.

In the accompanying drawings, Figure 1 is a vertical longitudinal section on the line 1-1 in Fig. 2, the drill-spindle being in side elevation; Fig. 2, a side elevation of the drilling apparatus provided with my improvement; Fig. 3, a vertical cross-section on the line 3-3 in Fig. 2; Fig. 4, a plan of the spindle-collar and tension-spring.

The spindle A, having an end a , adapted to fit the socket of a bit-brace, wrench, or similar tool, and having another end a' , provided with a socket a^2 to receive a boring-bit and with a set-screw a^3 to retain a bit in said socket, the hollow feed-screw B, which receives the spindle and is externally threaded at b to engage an internal screw-thread c in the yoke, arm, or frame C, are of any usual construction and operation, the yoke C being represented as carrying a chain D, adapted to surround a pipe or post or other work to be operated on in the usual manner.

The spindle A is represented as provided with a collar a^4 , which for convenience of construction is commonly made in a separate piece and is prevented from turning on said spindle and from moving longitudinally thereon by a set-screw a^5 , as heretofore practiced.

Antifriction-balls E may be interposed between the socket a^2 and the adjacent end of the feed-screw B, and the washer F may be placed around the spindle A and between said feed-screw and antifriction-balls in the usual manner.

The fixed positions of the collar a^4 and the socket a^2 are such that the spindle and the feed-screw cannot move longitudinally independently of each other.

The hollow feed-screw B is represented as provided with a hand-wheel b' , by means of which said feed-screw may be turned by hand when necessary, and with a circular chamber b^2 , which is larger than the collar a^4 and receives said collar, said chamber being preferably arranged within said hand-wheel.

The strap G surrounds the collar a^4 within the chamber, the ends of said strap overlapping each other and being provided with holes $g g'$, as shown. The strap G is preferably a ribbon-spring, the elasticity of which normally tends to open said spring out of contact with the collar a^4 .

A tension-screw H is represented as turning radially in the hand-wheel and is provided with a long conical or tapering point h , which enters holes $g g'$ in the end portions of the spring G, said holes being so arranged that forcing said point through said holes increases the amount of the overlap of the strap ends and tends to tighten said strap against the collar a^4 and to cause the feed-screw B to rotate with the spindle, and thereby to advance the spindle toward the work or to retract the same from the work, as the strap cannot be turned around the center of the spindle unless the feed-screw is also turned, owing to the connection of the strap and feed-screw by means of the tension-screw.

As the length of the taper of the point h of the tension-screw is much greater than the thickness of the combined ends of the spring G, it is necessary to provide the collar a^4 with an annular groove a^6 to admit said point h ,

which does not come in immediate contact with said collar.

The tension-screw H may be turned to produce any degree of frictional contact between the strap G and the spindle, so that the feed-screw will be slightly advanced by the turning of the spindle or so that the spindle and feed-screw will absolutely turn together without slip.

We claim as our invention—

1. The combination of a hollow feed-screw, a spindle arranged therein, a strap carried by said feed-screw and surrounding said spindle, and means carried by said feed-screw for adjusting the tension of said strap on said spindle.

2. The combination of a hollow feed-screw, a spindle arranged therein, a strap carried by said feed-screw and surrounding said spindle within said feed-screw and means carried by said feed-screw for adjusting the tension of said strap on said spindle.

3. The combination of a hollow feed-screw, a spindle arranged to turn therein, a strap, carried by said feed-screw and having overlapping ends provided with holes radial to said spindle, and a movable tapering piece carried by said feed-screw and passing radially through said holes, to increase the lap of said ends, and to clamp said spindle to said feed-screw.

4. The combination of a suitable supporting part, a feed-screw turning therein and having an enlarged central chamber, a spindle arranged to turn in said feed-screw without advancing, a strap surrounding said spindle within said chamber, and having overlapping ends, and a tension-screw having a tapering point and turning radially in said feed-screw and passing through holes, with which the end portions of said strap are provided, said spindle being provided with an annular groove to admit the point of said tension-screw.

In testimony whereof we have affixed our signatures in presence of two witnesses.

CHARLES T. UPTON.
GEORGE S. GILMAN.

Witnesses:

ALBERT M. MOORE,
ELLA L. WRIGHT.