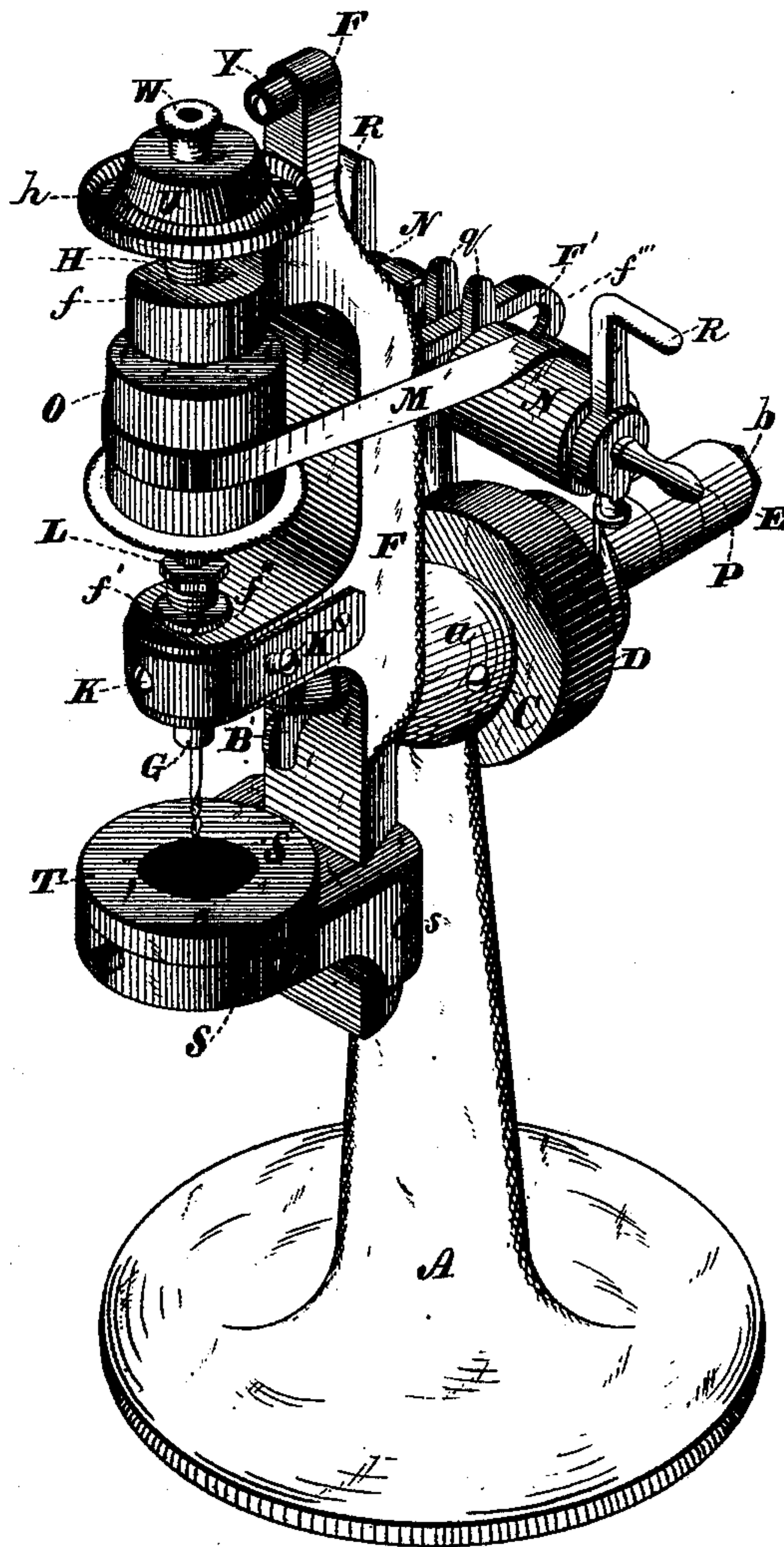


O. SMITH.
Drilling-Machine.

No. 222,321.

Patented Dec. 2, 1879.

Fig. 1.



WITNESSES:

*Jas. E. Hutchinson.
 Henry C. Hazard.*

INVENTOR.

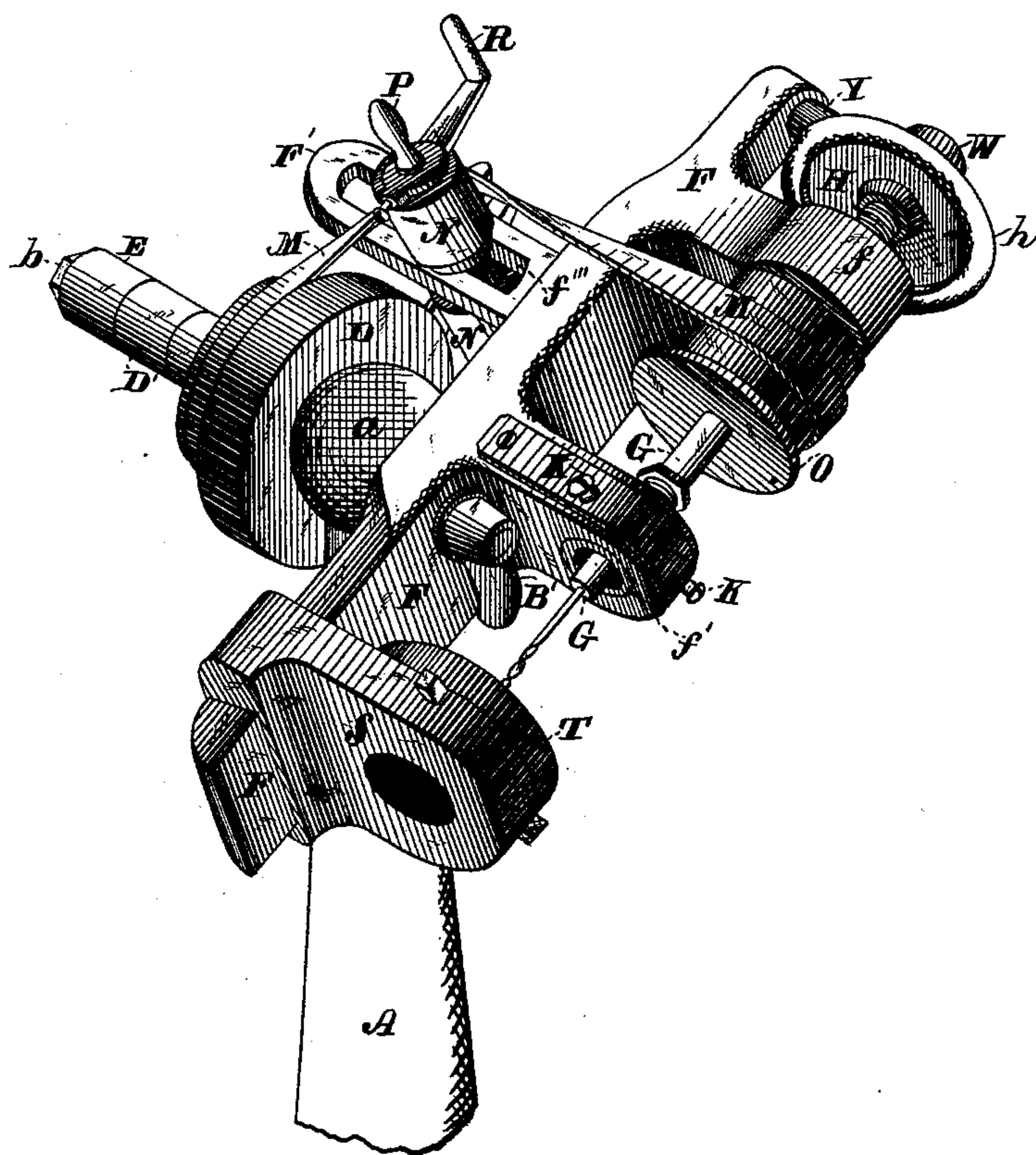
*Othello Smith, by
 Grindle and his Attys*

O. SMITH.
Drilling-Machine.

No. 222,321.

Patented Dec. 2, 1879.

Fig. 2.



WITNESSES

Jas. C. Hutchinson
 Henry C. Hazard

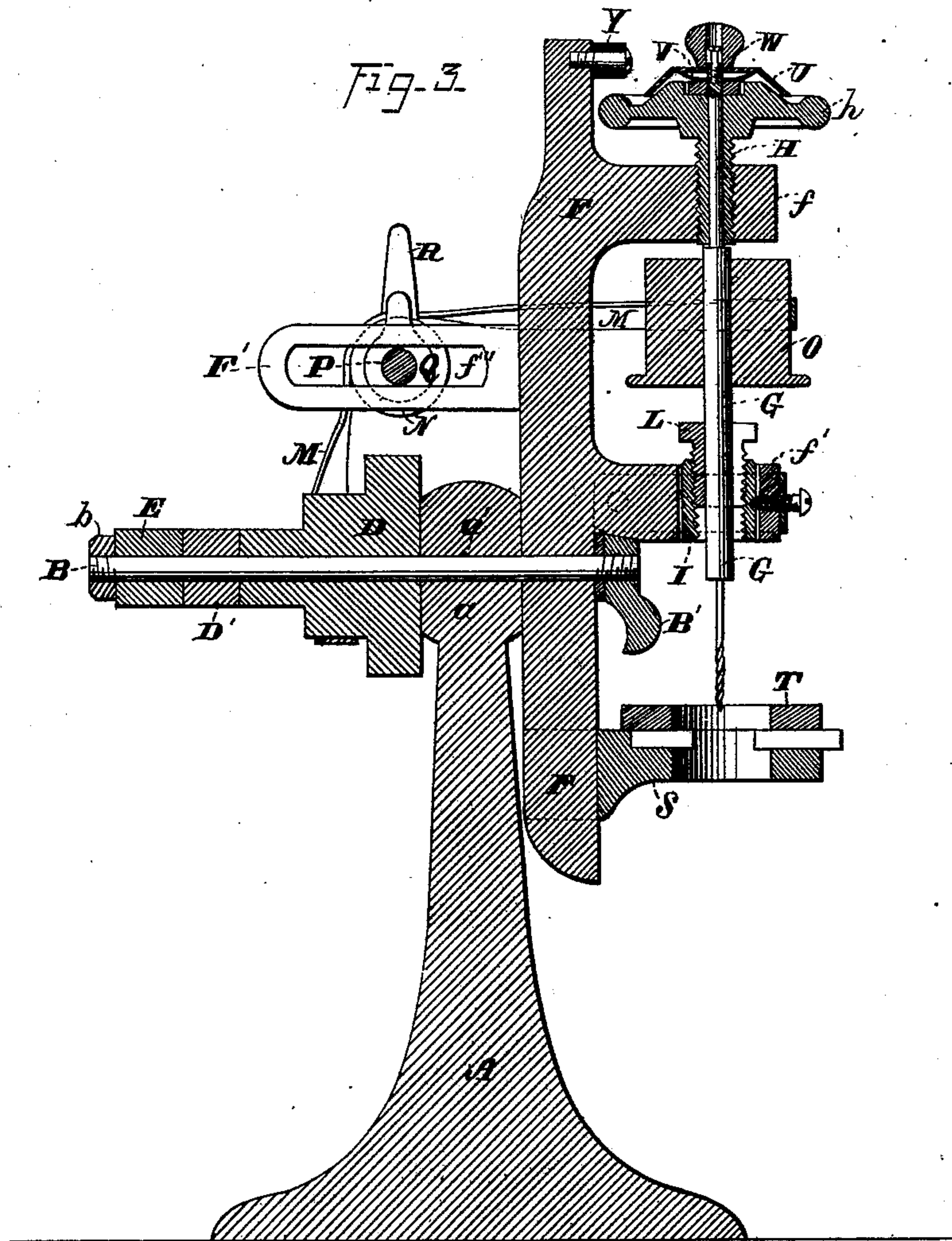
INVENTOR.

Othello Smith, by
 Prindle & Co. his Attys

O. SMITH.
Drilling-Machine.

No. 222,321.

Patented Dec. 2, 1879.



WITNESSES=

Jas. E. Hutchinson
Henry C. Hazard

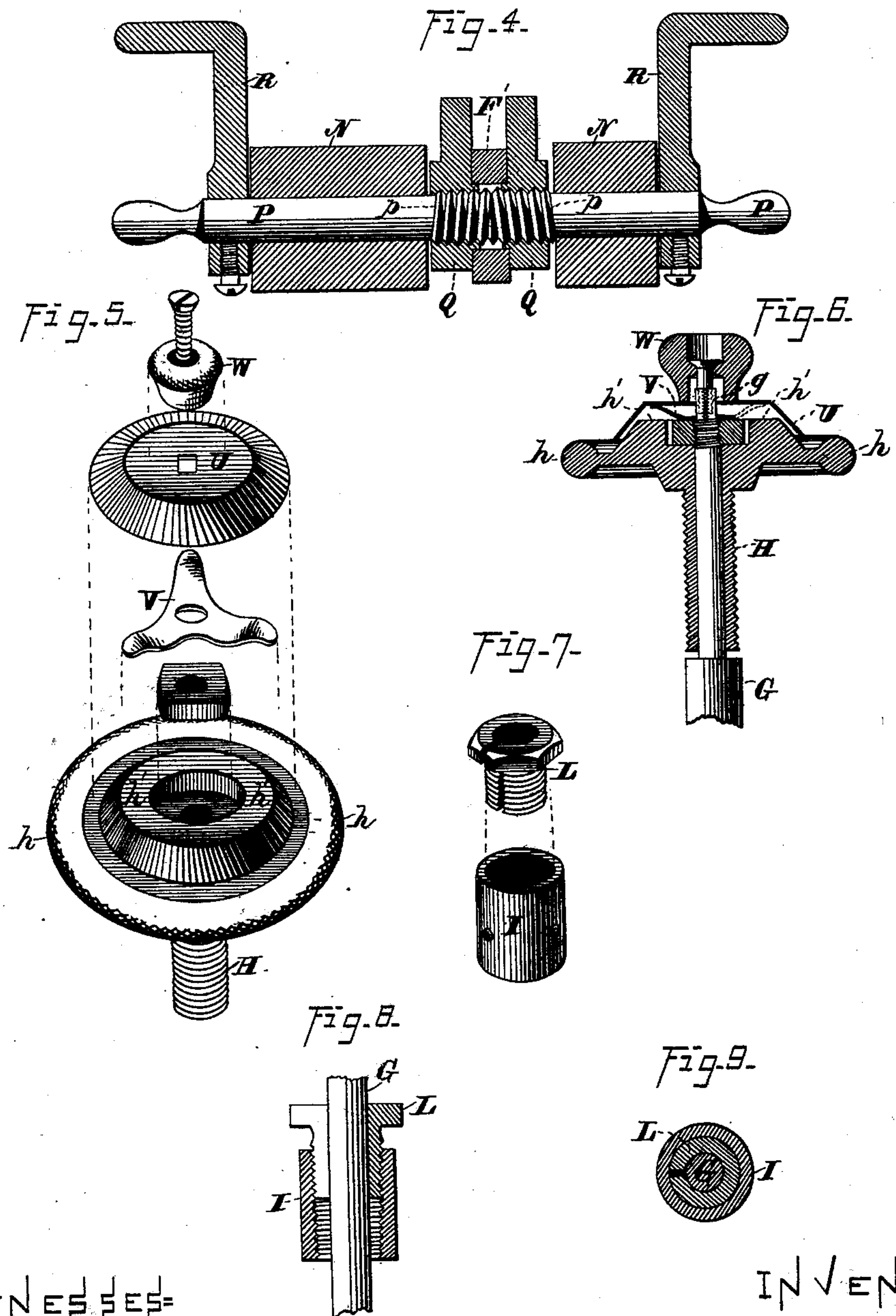
INVENTOR-

O. Smith, by
Pindle & Co. his Attys

O. SMITH.
Drilling-Machine.

No. 222,321.

Patented Dec. 2, 1879.



WITNESSES=

Jas. C. Hutchinson.
 Henry C. Hazard.

INVENTOR-

Othello Smith, by
 Prindle and his Attys

UNITED STATES PATENT OFFICE.

OBERLIN SMITH, OF BRIDGETON, NEW JERSEY.

IMPROVEMENT IN DRILLING-MACHINES.

Specification forming part of Letters Patent No. 222,321, dated December 2, 1879; application filed November 6, 1878.

To all whom it may concern:

Be it known that I, OBERLIN SMITH, of Bridgeton, in the county of Cumberland, and in the State of New Jersey, have invented certain new and useful Improvements in Combined Drill-Press and Centering-Machine; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of my machine when arranged with the drill in a vertical position. Fig. 2 is a like view of the same arranged obliquely. Fig. 3 is a vertical central section upon a line passing from front to rear. Fig. 4 is a central longitudinal section of the idler-pulleys and bearing-stud upon a vertical line. Fig. 5 is an enlarged perspective view of the feed-wheel, friction-cap, and operating-knob employed for raising the drill-spindle rapidly, said parts being separated from each other. Fig. 6 is a vertical central section of the same, the full lines showing the normal position of parts, and the dotted lines their position when the feed-wheel and cap are in engagement. Fig. 7 is a perspective view of the adjustable bearing for the lower end of the spindle, the parts being separated from each other; and Figs. 8 and 9 are, respectively, vertical and horizontal sections of the same.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to increase the efficiency and ease of operation of drill-presses and centering-machines; and to this end it consists, principally, in combining, with a cone-pulley and a spindle-pulley whose axes are arranged at right angles to each other, idler-pulleys whose axes are arranged at a right angle to each of the same, and capable of adjustment toward or from said spindle-pulley, substantially as and for the purpose hereinafter shown.

It consists, further, in the means employed for locking the shaft which supports the idler-pulleys, and upon which they are journaled, in position within or upon its support, substantially as and for the purpose hereinafter set forth.

It consists, further, in the means employed

for providing an adjustable compensating-bearing for the lower portion of the drill-spindle, substantially as and for the purpose hereinafter shown and described.

It consists, further, in the means employed for enabling the rotary motion of the drill-spindle to raise said spindle, substantially as and the purpose hereinafter specified.

It consists, finally, in the machine as a whole, its several parts being constructed and combined to operate substantially as and for the purpose hereinafter set forth.

In the annexed drawings, A represents the pedestal of my machine, constructed with a broad base and provided at its upper end with a cylindrical enlargement, *a*, through the axis of which is a round horizontal opening, *a'*, that receives and contains a shaft, B, said shaft being held firmly in position therein by means of a set-screw, C.

The principal portion of the shaft B projects from one side of the pedestal A, and upon the same is journaled a cone-pulley, D, and a loose pulley, E, said pulleys being held in position by means of a nut, *b*, upon the outer threaded end of said shaft.

Upon the front shorter end of the shaft B is journaled a frame, F, which, as seen in Fig. 3, has its principal length above said shaft, and such portion is provided with two arms, *f* and *f'*, that extend horizontally outward and furnish support for a drill-spindle, G, and its feed-screw H. A wing-nut, B', upon the other threaded outer end of said shaft B enables said frame to be clamped in position upon the latter.

The feed screw or sleeve H is journaled upon the drill-spindle G, so as to be capable of rotation, but not to have longitudinal motion thereon, and has its threaded exterior contained within a correspondingly-threaded opening, which passes vertically through the arm *f*, the arrangement being such as to cause said screw H, and with it said spindle, to rise or fall when the former is rotated upon the latter, all in the usual manner.

A hand-wheel, *h*, attached to the upper end of the screw-sleeve H, enables the latter to be rotated when it is desired to raise or lower the spindle G.

Within an opening, *f''*, in the arm *f'* is

placed a cylindrical block, I, which is held centrally in place by means of three set-screws, K, that pass radially inward through said arm from equidistant points, and at their inner ends impinge upon the periphery of said block. The opening within said block is slightly larger at its upper than at its lower end, and is threaded, and receives a box or bushing, L, which exteriorly is correspondingly tapered and threaded, and interiorly corresponds to and receives the spindle G. Said bushing L is split at one side upon a longitudinal radial line, so that by screwing it downward within said block it will be compressed so as to reduce its interior dimensions and enable the wear of parts to be compensated for.

Motion is imparted to the spindle G by means of a belt, M, which passes from the cone D over two idler-pulleys, N and N, which are arranged horizontally and at a right angle with said cone, and thence around a pulley, O, that is secured upon said spindle. The pulleys N are journaled upon a shaft, P, which passes through an arm, F', that extends horizontally rearward over the shaft B, and is provided with a horizontal longitudinal slot, f''' , for the reception of said shaft.

The central portion of the shaft P is somewhat enlarged, and such portion p is provided with a right and a left hand thread, which threads extend from the center outward in opposite directions, and each receives a correspondingly-threaded nut, Q. The inner face of each of said nuts is rabbeted at its upper and lower sides, so as to permit its central portion to extend into the slot f''' and prevent the rotation of said nut as said shaft is turned.

As thus arranged, it will be seen that by turning the shaft P in one direction—preferably forward—the nuts Q will be moved apart, while by turning said shaft in an opposite direction said nuts will be moved toward each other and caused to bear firmly against the arm F', so as to confine said shaft in place, by which means the latter may be moved to and secured in position at different points, to enable the belt M to pass around any of the pulleys of the cone D.

The relative proportions of the pulleys of the cone D are such that by moving the idler-pulleys N to the right position to enable them to act as guides the belt M will ordinarily have the necessary tension; but should it be too loose or too tight, a sufficient change can be made in the position of the shaft P to remedy such difficulty.

The shaft P is turned by means of two crank-arms, R, one of which is secured upon each end, and when said shaft is clamped in position extends upward beside the outer end of the pulley N upon the same end of the latter, in which position said arm operates as a guide for the belt M. An arm, q , extending upward from each nut Q, operates as a guide for the inner edge of said belt.

The arrangement of pulleys described enables a variety of changes in the speed of the

spindle to be had with the use of one cone-pulley, while heretofore two cones have been required in order to secure the same result.

Outside the cone-pulley D is journaled a loose pulley, D', which receives the driving-belt, and from which said belt may be run upon a fixed pulley that is attached to and forms part of said cone. Below its pivotal bearing the frame F has parallel rearwardly-beveled edges, and upon such part is fitted a table, S, that is capable of vertical adjustment, and when in position is securely clamped by set-screws s , which pass inward through its jaws, all in the usual manner.

The table S is provided with a round opening, S', which has the same axis as the spindle G, and within the same or forming part of said table is arranged a scroll-chuck, T, for centering and holding in position the shaft or other part being drilled. Said chuck has preferably four jaws, such number having been found best adapted to the holding of pieces having different shapes.

In order that, after a part has been drilled, the spindle G may be quickly raised to its highest point, the following-described means may be employed: Upon the upper side of a hand-wheel, h , which is secured upon the upper end of the feed-screw H, is provided a raised part, h' , that has a conical form, and over the same is fitted a cap, U, which corresponds upon its lower face to the shape of said part h' .

The cap U has a square opening at its center, and is loosely fitted over a squared portion, g , of the upper end of the spindle G, the arrangement being such as to cause said cap to rotate with said spindle, while free to move vertically within certain limits.

Between the shoulder formed by squaring the upper end of the spindle G and the lower face of the cap U is placed a spring, V, which operates to raise said cap from contact with the hand-wheel h , while, by means of a knob, W, placed around and held loosely in position upon the upper end of said spindle and capable of a certain degree of vertical motion, said cap may be pressed downward and caused to engage with said hand-wheel, so that if said spindle is rotating said hand-wheel and the feed-screw will be moved in the same direction.

The screw-thread upon the feed-screw H turns to the left, so that when the spindle G is in motion, and the friction-cap U is caused to engage with the feed-wheel h , said screw will be caused to rotate in the same direction and raise said spindle.

In order that the spindle G may not be raised accidentally above the proposed point, a stop, Y, preferably covered with rubber, projects outward from the upper end of the frame F, and, when said spindle reaches its upper limit, engages with the periphery of the hand-wheel h , and arrests further movement of the latter, the friction of said lug being sufficient to overcome the friction of the cap U.

This device may be used either as a drill-pressor or a centering-machine, for either of which purposes the frame is adjustable to any desired angle, so as to accommodate the drill to the position of the shaft or other part to be drilled.

For centering purposes it is only necessary to insert the end of a shaft within the chuck and tighten the jaws of the latter, when the center of said shaft will be brought into line with the drill with certainty and ease.

When a long shaft is to be centered it is only necessary that the end to be operated upon should be raised from the floor and placed within the chuck, the frame having been loosened and turned to the necessary position, when, by tightening the jaws of said chuck, said frame will automatically adjust itself to position to bring the drill accurately in a line axially with said shaft.

As the frame is journaled upon the shaft which furnishes a bearing for the cone-pulley employed for driving the spindle, changes in the position of said frame have no effect upon the belt, the relative positions of the pulleys remaining the same under all circumstances.

Having thus fully set forth the nature and merits of my invention, what I claim as new is—

1. In combination with a cone-pulley and with a spindle-pulley arranged at right angles to each other, idler-pulleys arranged at a right angle to each of the same, and capable of adjustment toward or from said spindle-pulley, substantially as and for the purpose shown.

2. As a means for locking the shaft P in position upon or within the arm F', the enlarged central portion, p, of said shaft, provided with a right-hand and a left-hand thread, and the nuts Q, fitted upon said threaded por-

tion, and at their inner sides engaging loosely with said arm, said parts being combined in the manner and for the purpose substantially as set forth.

3. As a means for centering the lower portion of the spindle G, and for furnishing therefor a compensating-bearing, the block I, placed within the opening f'' of the frame-arm f', and adjusted to and secured in axial position by means of the set-screws K, and the box or bushing L, fitted upon said spindle, split at one side, and having a tapering threaded periphery which fits into a correspondingly-tapered threaded axial opening in said block, said parts being combined in the manner and for the purpose substantially as shown and described.

4. In combination with the spindle G and with the feed-screw H, the hand-wheel h, having the conical raised part h', the cap U, corresponding upon its lower face to said conical part and arranged to revolve with and move vertically upon the upper end of said spindle, the spring V, placed beneath said cap, and the knob W, sliding upon the upper end of said spindle and operating to depress said cap, substantially as and for the purpose specified.

5. The hereinbefore-described machine, in which the pedestal A, shaft B, carrying the cone-pulleys D, the frame F, carrying the spindle G, feed-screw H, idler-pulleys N, and chuck-table S are constructed and combined to operate in the manner and for the purpose substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand this 4th day of November, 1878.

OBERLIN SMITH.

Witnesses:

FRANCES S. HILL,

CHARLOTTE H. SMITH.