

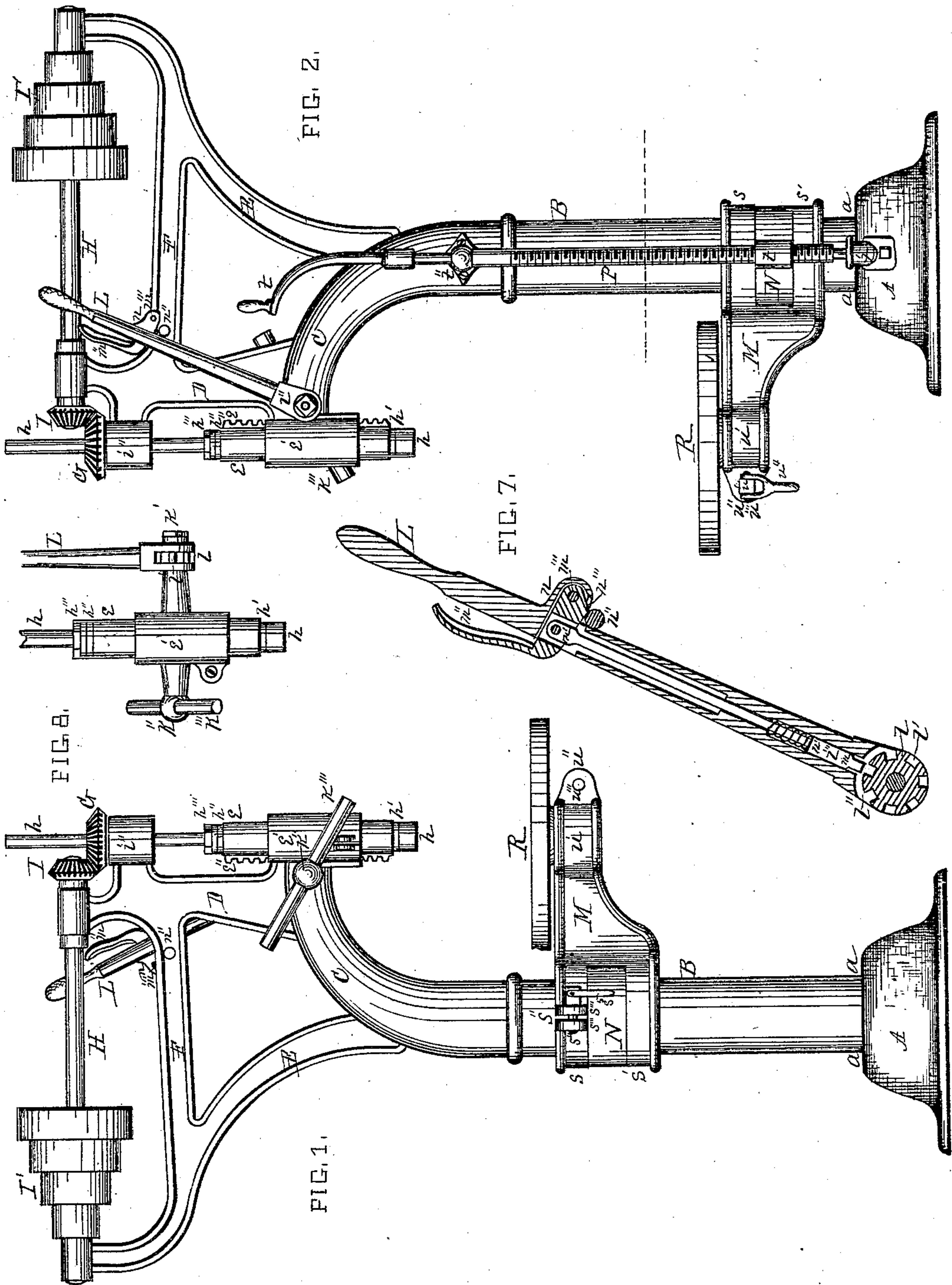
(No Model.)

2 Sheets—Sheet 1.

W. F. & J. BARNES.
DRILLING MACHINE.

No. 285,726.

Patented Sept. 25, 1883.



ATTEST:

Isaiah Sovereign
A. O. Behl

INVENTORS:

William F. Barnes,
John Barnes.
BY Jacob Behl.

ATTY.

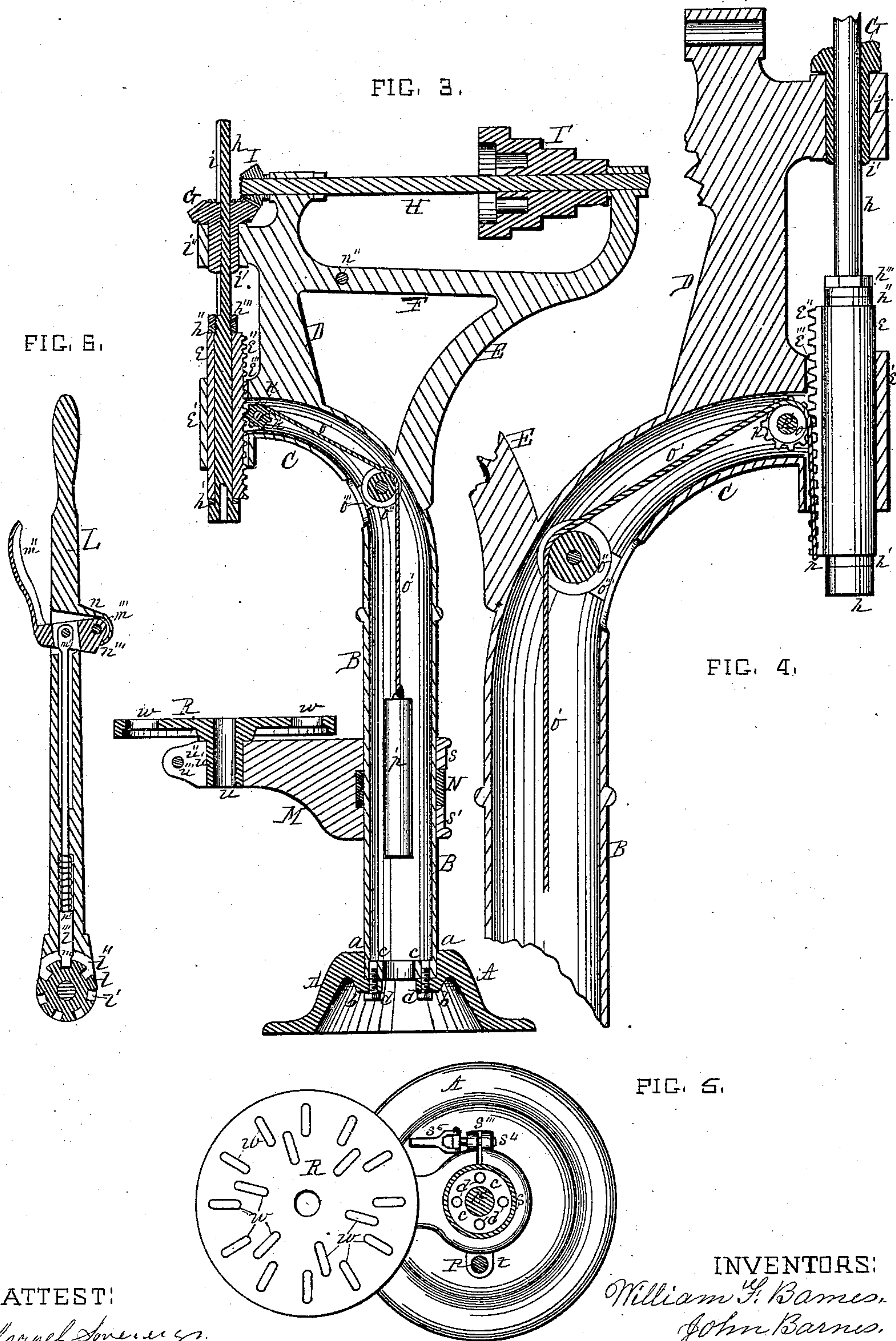
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DRILLING MACHINE.

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Patented Sept. 25, 1883.



ATTEST:
Ismael Sweeney Jr.
A. O. Behel

INVENTORS:
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John Barnes,
BY Jacob Behel,
ATTY.

UNITED STATES PATENT OFFICE.

WILLIAM F. BARNES AND JOHN BARNES, OF ROCKFORD, ILLINOIS.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 285,726, dated September 25, 1883.

Application filed April 8, 1882. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM F. BARNES and JOHN BARNES, citizens of the United States, residing in the city of Rockford, in the county of Winnebago and State of Illinois, have invented new and useful Improvements in Drilling-Machines, of which the following is a specification.

This invention relates to that class of drilling-machines known as the "vertical drill."

The object of this invention is to improve this class of drilling-machines, to render them more efficient.

To this end we have designed and constructed the drilling-machine represented in the accompanying drawings, in which—

Figures 1 and 2 represent the opposite sides of our improved drilling-machine in elevation, of which Fig. 3 is a vertical central section. Fig. 4 is also a vertical central section of a part of the upper portion of the drilling-machine enlarged, and represents the opposite side from that shown in Fig. 3. Fig. 5 is a section on dotted line *x*, showing the base and drill-table in plan; and Fig. 6 is a lengthwise central section of the feed-lever. Fig. 7 is also a lengthwise central section of the feed-lever, showing its connection with the stop; and Fig. 8 is a front elevation of the drill-spindle bearing and the parts immediately connected with it.

In the figures, A represents the base of the drill-frame, circular in plan, of suitable dimensions, its central portion rising in mound form. The center of this base at *a* is fitted to receive the lower end of the vertical column of the frame, and is provided with an inward-projecting flange, *b*, on which to support the column. This flange-support *b* is perforated to receive suitable bolts to fix the column to the base.

The main column of the drill-frame consists of the vertical portion B and the outward-curving portion C, which are of cylindrical tubular form in section. The lower portion, B, of this column is suitably turned, having its end portion of proper dimensions to enter the seat *a*, formed in the base, snugly. The lower end of this column is provided with an inward-projecting flange, *c*, to rest on the flange *b* of the base, and is provided with screw-threaded

holes, to coincide with the holes in the flange of the base, to receive the screw-bolts *d*, to fix the column to the base firmly.

At D and E are flanged arms rising from the curved upper portion of the column, and these arms are connected, toward their upper ends, by means of a flanged bar, F, which serves to give firmness to the upward-rising arms. These parts, in connection with the column and its base, constitute the drill-frame.

At *e* is represented a tubular spindle-bearing, supported to move vertically endwise in a bearing, *e'*, on the overhanging end of the curved portion C of the main column. This spindle-bearing is provided on one side with a gear-toothed rack-bar, *e''*, of feather form, extending lengthwise of the spindle-bearing; and its bearing-support *e'* is provided with a lengthwise vertical groove, *e'''*, to receive the gear-toothed feather to slide therein lengthwise freely, but in such a manner as to prevent rotation of the spindle-bearing.

At *h* is represented a drill-spindle, of suitable diameter to enter the spindle-bearing snugly. The lower end of this drill-spindle is enlarged, and between its enlargement and the lower end of the spindle-bearing is provided with a brass washer, *h'*. This spindle is also provided with a like brass washer, *h''*, at the upper end of the spindle-bearing; and immediately above the brass washer *h''* it is provided with a screw-nut, *h'''*, which serves to keep the parts in place, to permit the drill-spindle to revolve in the spindle-bearing, and to cause it to move endwise therewith. This screw-nut also serves to readjust the parts to prevent endwise movement of the drill-spindle in the spindle-bearing, when from wear they have become loose. The upper portion of this drill-spindle is grooved lengthwise on one side, as at *i*, to receive a suitable feather.

At G is represented a beveled toothed gear-wheel having a hub-journal, *i'*, supported to revolve in the same vertical axial line with the drill-spindle in a bearing, *i''*, projecting from the forward edge of the forward flanged arm, D. The hub-journal *i'* of this beveled toothed gear-wheel is centrally bored to receive the grooved upper portion of the drill-spindle, and it is provided with a feather to enter the

groove *i* in the drill-spindle in such a manner as to permit the spindle to slide endwise in the hub-bearing, and to cause the spindle to revolve with the gear-wheel.

5 At H is represented a horizontal shaft supported to revolve in suitable bearings on the upper ends of the flanged arms D and E, which rise from the curved upper portion of the main column.

10 At I is represented a beveled toothed gear-wheel mounted upon the projecting end of the horizontal shaft H in such position thereon that its gear-teeth will engage the gear-teeth of the beveled toothed gear-wheel G, through
15 which the drill-spindle is passed.

At I' is represented a cone of belt-pulleys mounted upon the rear end portion of the horizontal shaft H. This cone of pulleys is designed to receive a belt, which connects it with
20 a like cone mounted upon a counter or driving shaft, for the purpose of connecting the drill with the prime mover to impart motion to the drill-spindle.

At *k* is represented a spur-toothed pinion
25 mounted within the tubular column in its outward-curving end portion on a transverse shaft, *k'*, supported in bearings projecting from the side walls of the column, and in such relation with the tubular spindle-bearing that the
30 teeth of the spur-pinion mounted upon the shaft will engage the teeth of the feather of the spindle-bearing in such a manner that the oscillatory movement of the shaft will cause the spindle-bearing to move endwise in its bearing-support. One end of the transverse shaft
35 *k'* is provided with a spherical enlargement, *k''*, through which a suitable bar, *k'''*, is passed at right angles to the shaft, extending a suitable distance on opposite sides thereof. This bar
40 is employed as a means by which to impart a rotary or oscillatory movement to the shaft, and, through its gear-wheel connection with the spindle-bearing, to rapidly raise and lower the drill-spindle.

45 At *l* is represented a ratchet-wheel fixed to the projecting end portion of the transverse shaft. The periphery of this ratchet-wheel is provided with radial grooves or notches *l'*, adapted to receive a suitable detent.

50 At *L* is represented a hand-lever having its end portion slotted to freely receive the ratchet-wheel *l*, and its jaws *l''* are fitted to receive the shaft *k'* in a free pivotal manner. The shaft of this lever is tubular, and is provided with a
55 spring-actuated bolt-detent, *l'''*, inserted in its tubular portion, having its inner end at *m* fitted to engage the teeth of the ratchet-wheel, and its outer end, *m'*, pivoted to a thumb-lever, *m''*, which has a pivotal connection at *m'''*
60 in suitable jaws, *n*, which project from the side of the lever.

At *n'* is represented a spiral spring surrounding the rod portion of the bolt *l'''*, and its connection with the bolt and with the lever are
65 such that its spring action will tend to hold the bolt engaged with the ratchet-wheel.

At *n''* is represented a pin or stud project-

ing from the main frame, producing a stop in position to limit the rearward movement of the lever and support it in a rearward inclined
70 position, and the relative position of stop *n''* and the thumb-lever *m'''* is such that when the feeding-lever is carried against the stop the under inclined edge, *n'''*, of the thumb-lever will engage the stop and operate to disengage the bolt from the ratchet-wheel, and permit the drill-spindle and its spindle-bearing to
75 be raised or lowered by means of the transverse bar *k'''*, independent of the feeding-lever; and when the feeding-lever is disengaged from the stop, the bolt, by means of its spring action, will engage the teeth of the ratchet-wheel in its forward movement and cause a downward feeding movement of the drill-spindle. The spur-toothed pinion *k* is provided on one
80 side with a sheave, *o*, fitted to receive a suitable cable, chain, or cord, *o'*.

At *o''* is represented a sheave, of suitable construction, supported to revolve on suitable journals having their bearings in bars *o'''*,
90 formed in the tubular column. The under curved portion of the column is provided with an opening through which the sheave *o''* is passed into its position between the bars *o'''*. The outer end of the cable *o'* is suitably connected at *p* to the lower end of the spindle-bearing, from which point it rises through a
95 suitable opening in the bearing of the spindle-bearing, and is passed over the sheave *o* on the side of the spur-pinion, and from thence over the sheave *o''* in the column and extending centrally downward in the column, and to its lower end is fixed a weight, *p'*, to operate as a counter-balance to the drill-spindle and the parts connected therewith.
100

At M is represented a bracket having a slotted sleeve fitted snugly to the turned portion B of the column, but in such a manner as to be capable of a vertical sliding and a horizontal turning movement thereon. The upper portion,
105 *s*, of this sleeve is split vertically, as at *s''*, and its end portions are provided with outward-projecting ears *s'''*, which are fitted with a clamping screw-bolt, *s⁴*, having a suitable wrench, *s⁵*, pivoted to its head end portion, by
110 means of which the bracket may be clamped to the column to hold it in its adjusted position.

At N is represented a collar, which is fitted to the turned portion B of the column to slide
120 up and down thereon freely. This collar is fitted to enter between the parts *s* and *s'* of the slotted sleeve of the bracket M snugly, but in such a manner as to permit the bracket to be turned freely on the column without causing
125 the collar to turn with it. This collar is provided on one side with a suitable screw-threaded projection, *t*, fitted to receive a suitable screw-threaded shaft.

At P is represented a screw-threaded shaft
130 fitted to enter the screw-threaded projection *t* on the collar N. The lower end of this screw-threaded shaft is supported in a bearing, *t'*, fixed to the base of the column, and its upper

portion is supported in a bearing, t'' , fixed to the column. The upper end portion of this screw-threaded shaft is fitted in crank-handle form, as represented at t''' , by means of which the shaft may be rotated in either direction.

From this construction and arrangement of the parts it will be seen that if the screw-shaft be turned to the right the bracket will be made to rise on the shaft or turned portion of the column, and if turned to the left the bracket will be made to descend thereon.

At R is represented a platen, or that portion usually known as the "drill-table," and it is centrally provided with a tubular stud-journal, u , depending from its under side, fitted to enter a suitable bearing, u' , in the free outer end portion of the bracket M, fitted to receive it in such a manner as to permit the table to be turned in its bearing. The outer end portion of the bracket is slotted vertically, and is provided with outward-projecting ears u'' , provided with a clamping-screw, u''' , having a suitable screw-wrench, u^t , pivoted to its head end portion, by means of which the clamping-screw may be turned to fix the table in its adjusted position by clamping the bearing onto the tubular stud-journal. This drill-table is provided with the usual openings, as represented at w , to receive suitable bolts or other of the usual devices employed to fix the work in place on the table.

From the foregoing it will be seen that by this construction and arrangement of parts the platen or drill-table may be turned in any position on its bracket-support, and when adjusted can readily be fixed in its adjusted position by means of the clamping-bolt, and, by means of the bracket-connection with the column, can be turned to either side from under the drill; and by means of the screw-connection the table can be raised and lowered to any extent within the limits of the devices, and when adjusted can be firmly fixed in position by the clamping-screw.

It will also be seen that in the construction of the parts the collar, fitted snugly between the upper and lower parts of the slotted sleeve

of the bracket, will have a bearing on these parts on opposite sides, to hold it in a vertical position, and to prevent any clamping action of the collar, either on the column or on the screw-shaft.

We claim as our invention—

1. The combination, with the bolt or detent and with the thumb-lever for disengaging the detent from the ratchet, of a stop to engage the thumb-lever to disengage the detent from the ratchet, substantially as and for the purpose set forth.

2. The combination, substantially as hereinbefore set forth, of a ratchet having an operative connection with the drill-spindle, a feeding-lever, a pawl and latch for engaging the ratchet, and a stop to engage the latch of the pawl to disengage the same from the ratchet, substantially as described.

3. The combination, with the vertical column of the drill and with the herein-described sleeved bracket-support, of a central collar loosely fitted to the column between the parts of the slotted sleeve of the bracket, and having bearings against the upper and lower parts of said sleeve, substantially as and for the purpose hereinbefore set forth.

4. The combination, with the collar and with the bracket-support capable of a vertical sliding movement on the column, of a screw-shaft fitted to revolve in suitable bearing-supports on the drill-frame, and having a screw-threaded connection with the collar, substantially as and for the purpose hereinbefore set forth.

5. The combination, with the screw-shaft provided with the hand-crank t''' , said shaft fitted to revolve in its bearing-supports t' t'' , connected to the drill-frame, of the collar N and screw-threaded projection t , all arranged and operating substantially as and for the purpose set forth.

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Witnesses:

ALLAN R. REA,
A. O. BEHEL.