(No Model.) 2 Sheets—Sheet 1.

G. W. MIDGLEY & H. E. HARBAUGH.

DRILLING MACHINE.

No. 431,606. Patented July 8, 1890.

Fig. 1.

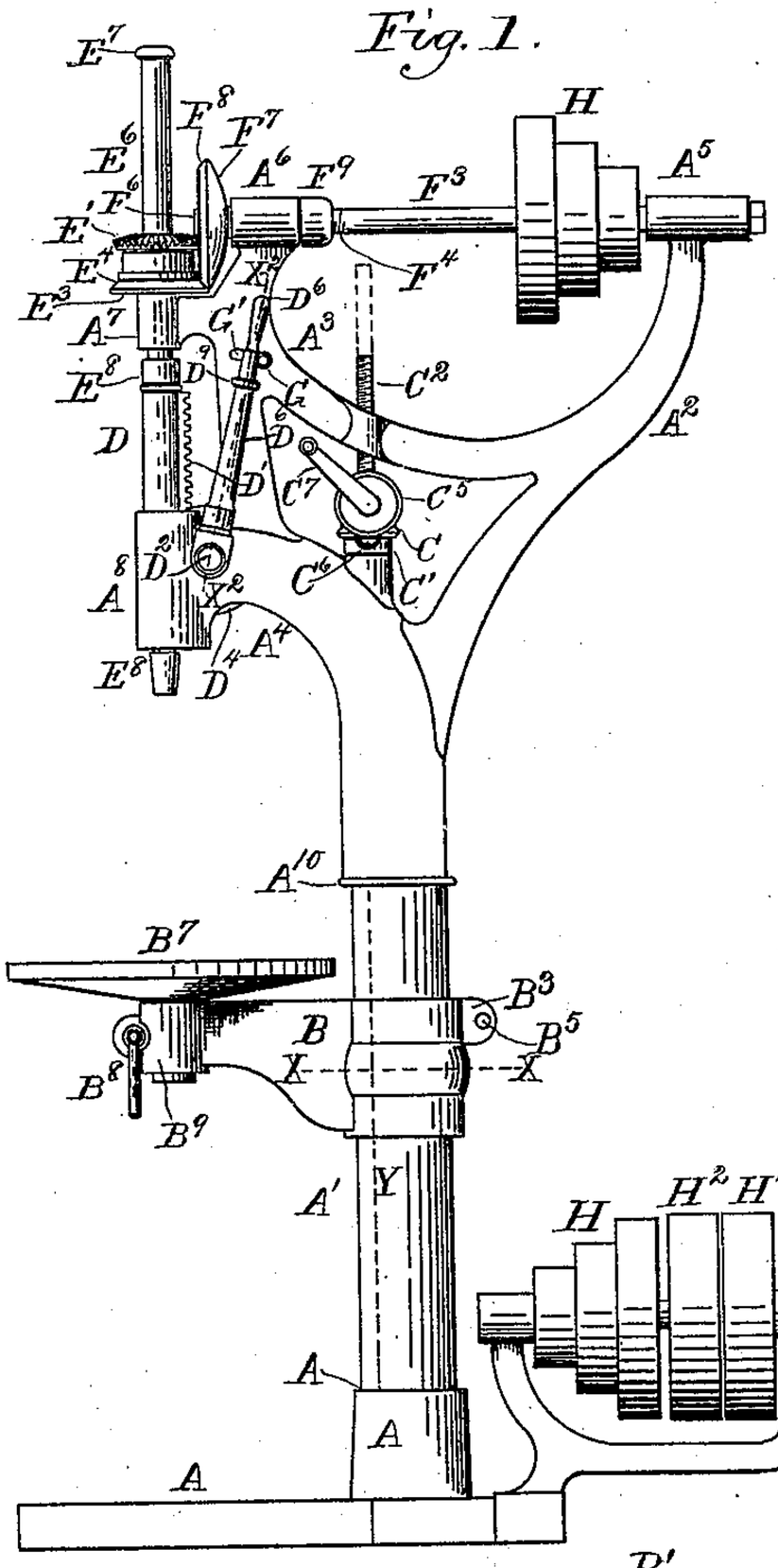


Fig. 2.

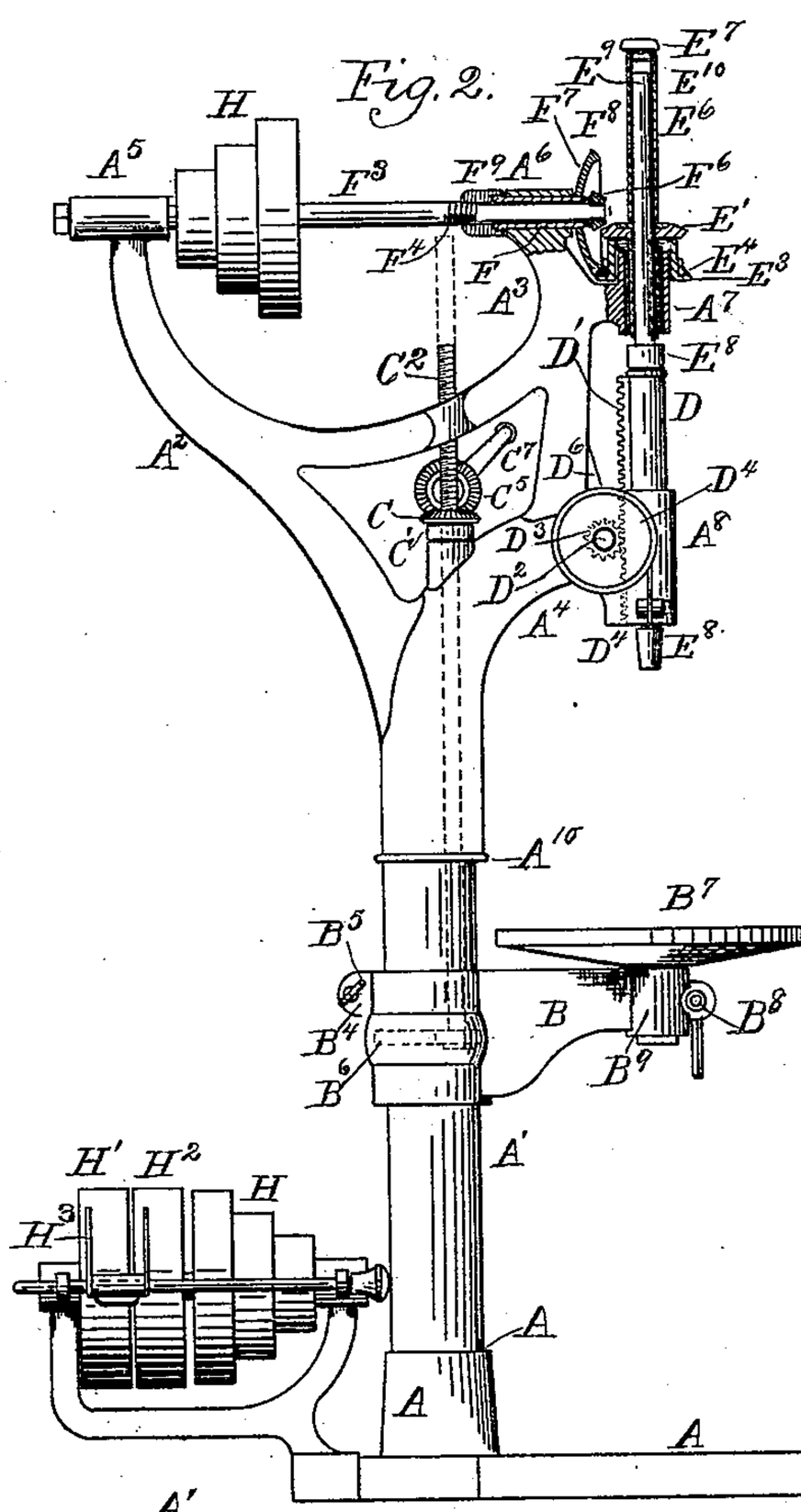


Fig. 4.

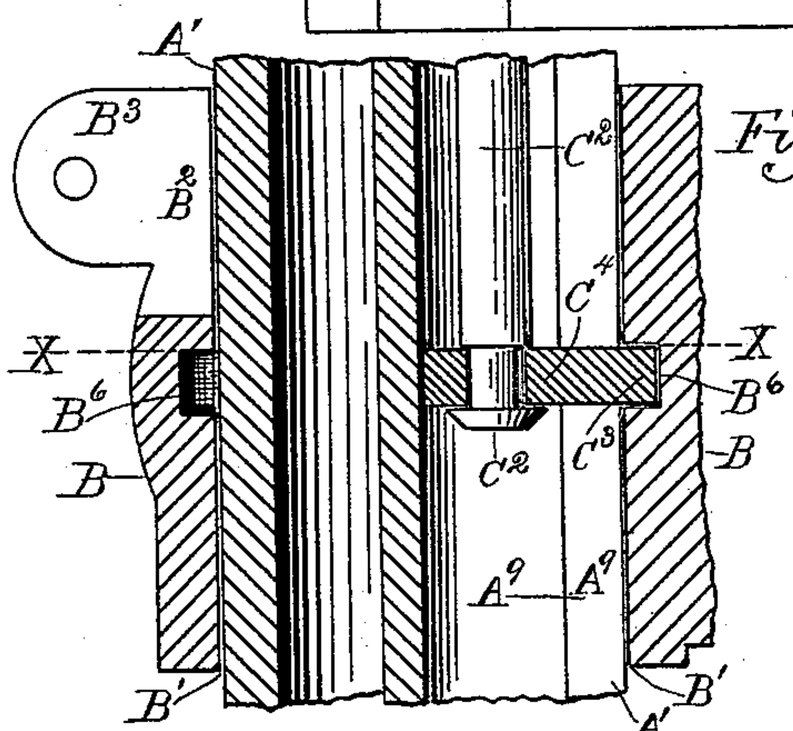


Fig. 7.

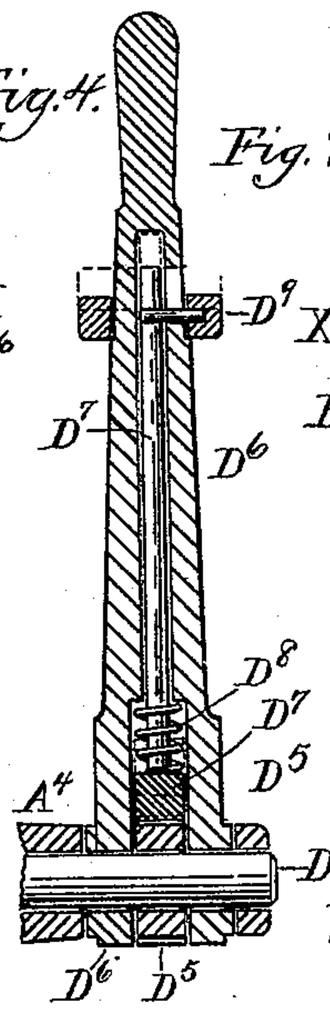
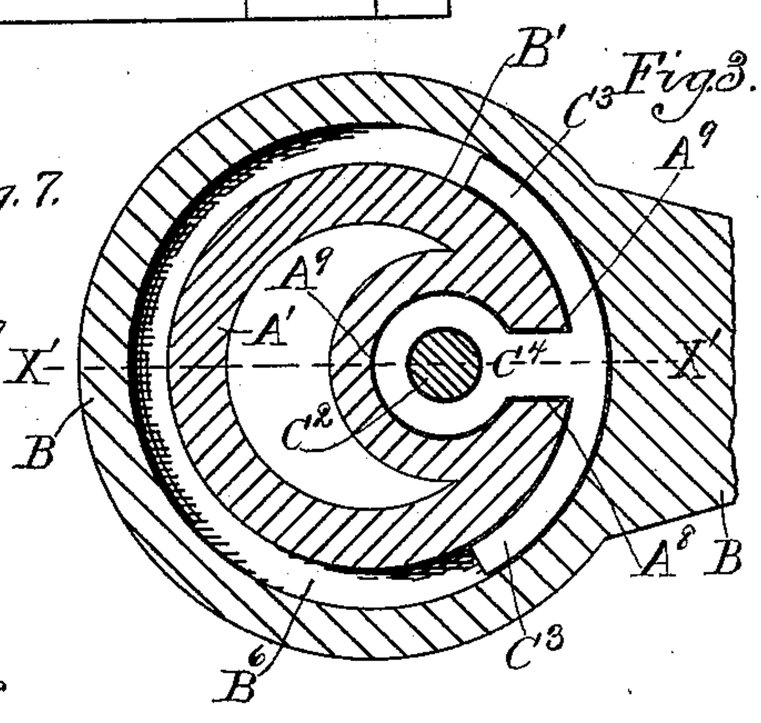


Fig. 3.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 5.

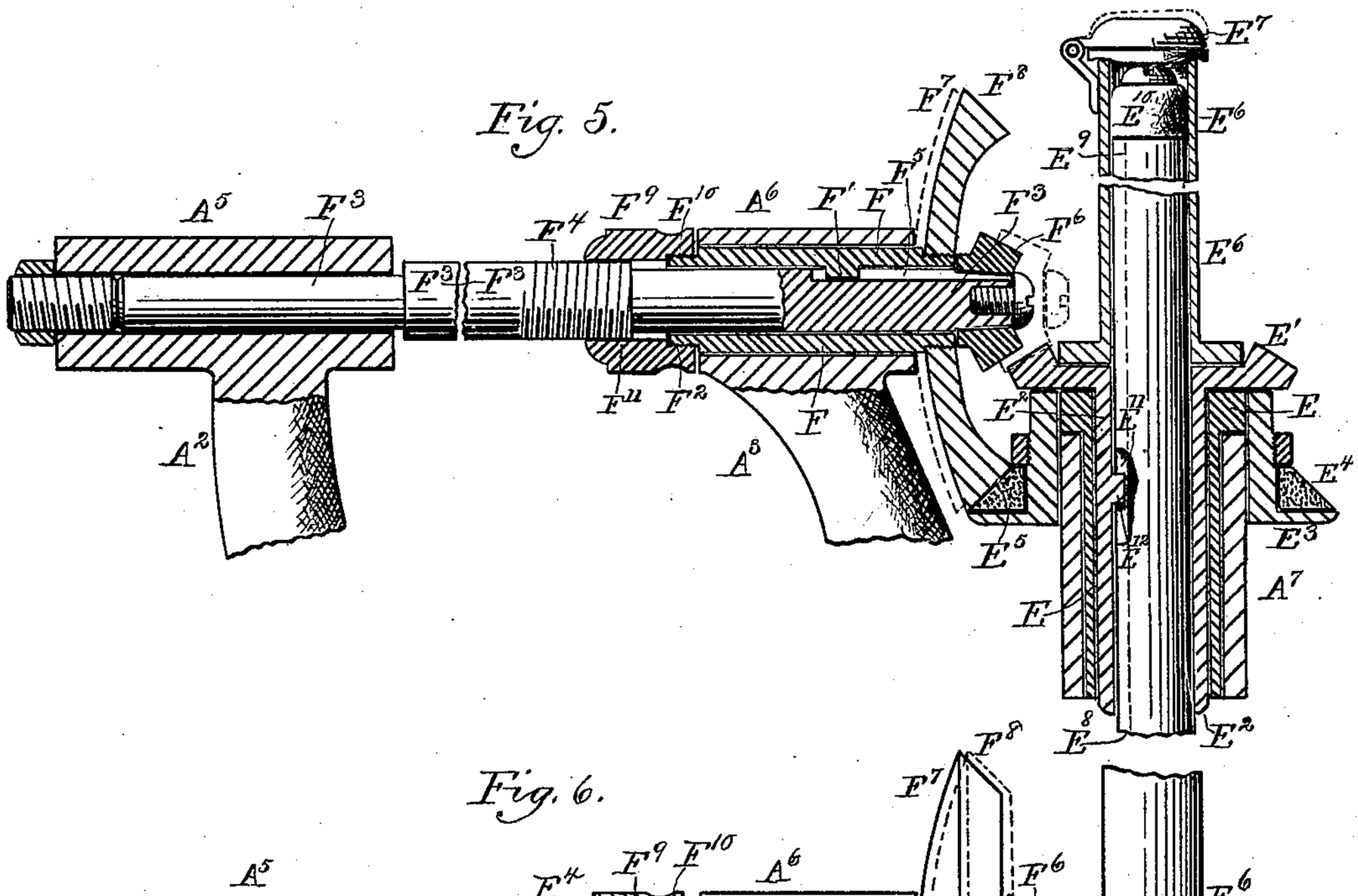

Fig. 6.

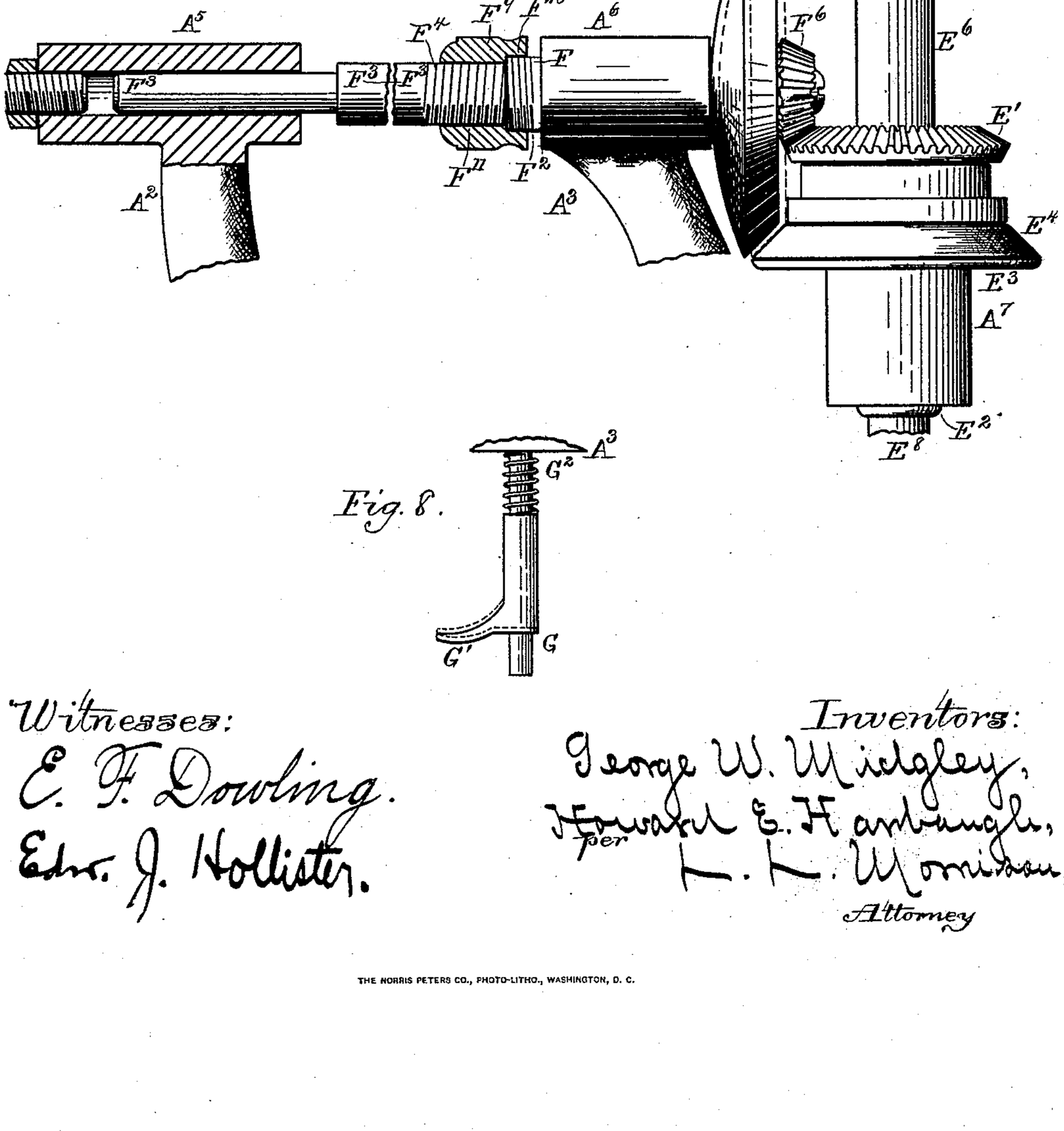

Fig. 8.

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UNITED STATES PATENT OFFICE.

GEORGE W. MIDGLEY AND HOWARD E. HARBAUGH, OF ROCKFORD, ILLINOIS.

DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 431,606, dated July 8, 1890.

Application filed April 18, 1890. Serial No. 348,557. (No model.)

To all whom it may concern:

Be it known that we, GEORGE W. MIDGLEY and HOWARD E. HARBAUGH, citizens of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Drilling-Machines, of which the following is a specification.

The objects of our invention are, first, to provide both pinions and friction-wheels that may be used alternately for driving the drill-spindle, according as power or speed may be the main thing required; second, to afford means for preventing the drill-spindle from sliding down too suddenly in its bearings; third, to introduce the screw-rod for operating the platen-bracket within the column of the drill-frame, and, fourth, to provide means for connecting the platen-bracket with its adjusting screw-rod.

This invention consists of certain new and useful features of construction and combinations of parts hereinafter described, and specifically pointed out in the claims.

Referring to the accompanying drawings, which form a part of this specification, Figures 1 and 2 are respectively right and left side elevations of the drilling-machine embodying our improvements, a small portion thereof being in central vertical section in Fig. 2. Fig. 3 is a horizontal section at dotted line X X of Figs. 1 and 4. Fig. 4 is a vertical section at dotted line X′ X′ of Fig. 3. Fig. 5 is a central vertical longitudinal section of the pinions and friction-wheels that drive the drill-spindle and the parts operating, supporting, and co-operating with the same. Fig. 6 is a like view of the same in partial section. Fig. 7 is a longitudinal section, at the dotted line X^2 X^2 of Fig. 1, of the drill-spindle feed-lever. Fig. 8 is a top view of a spring-catch for retaining the feed-lever in position when not in use.

Like letters of reference indicate corresponding parts throughout the several views.

A is the base of the drill-frame. A′ is a vertical tubular column rigidly connected therewith.

A^2 A^3 A^4 are trifurcations integral with the column A′, provided with bearings A^5 A^6 A^7 A^8 at their free ends for supporting parts to be described hereinafter.

A^9 is a vertical groove in the column A′, extending from the base A to the bead A^{10}, (indicated by the dotted line Y in Fig. 1.)

B is a platen-bracket having a vertical tubular opening B′ extending therethrough to admit the column A′, whereon it may be vertically slid and horizontally revolved for adjustment. The tubular portion of the bracket B is cleft vertically at B^2 and provided with ears B^3 B^4 and a screw B^5 for securing the same at any desired point on the column A′.

B^6 is a horizontal annular groove in the tubular portion of the platen-bracket B, open on the inside—that is, the side adjacent to the column A′.

B^7 is a platen both connected with the platen-bracket and operated in the usual manner.

B^8 is a bar-screw for clamping the platen B^7 rigidly in the socket B^9.

C is a horizontal miter-pinion having a central circular vertical threaded opening extending therethrough and being mounted on the bearing C′.

C^2 is a vertical platen-adjusting screw-rod for regulating the height of the platen-bracket B, included in the groove A^9 in the column A′ and the upper portion of the drill-frame, the threaded portion thereof being inserted through and operating in the pinion C.

C^3 is a segment of a ring of suitable diameter to coincide with and slide on the column A′ of the drill-frame, included in the annular groove B^6 in the platen-bracket B, provided with a lug C^4, which projects into the groove A^9 in the column A′ and connects with the lower end of the platen-adjusting screw-rod C^2. Obviously a complete ring might be substituted for the segment C^3 and be located below the lower end of the tubular portion of the platen-bracket B without departing from the spirit and scope of our invention.

C^5 is a miter-pinion mounted on a bearing supported by a bracket C^6 and meshing with the miter-pinion C.

C^7 is a crank connected with the miter-pinion C^5 for operating the same.

D is a drill-spindle sleeve-bearing mounted

in the vertical bearing A^8 so as to freely slide therein, and having a vertical and preferably integral rack D′ projecting from the back side thereof.

D^2 is a horizontal shaft mounted in a bearing in the part A^4.

D^3 is a pinion fast to the central portion of the shaft D^2 and meshing with the rack D′.

D^4 is a hand-wheel rigidly connected with the shaft D^2.

D^5 is a ratchet-wheel fast to one end of the shaft D^2.

D^6 is a tubular feed-lever mounted and rotatable on the shaft D^2.

D^7 is a pallet that may engage with or be disengaged from the ratchet-wheel D^5.

D^8 is an actuating-spring for holding the pallet D^7 into engagement with the ratchet-wheel D^5.

D^9 is a ring connected with and for disengaging the pallet D^7 from the ratchet-wheel D^5, as indicated by dotted lines.

E, Fig. 5, is a bushing driven snugly into the bearing A^7. The parts E A^7 may be integral, if desired.

E′ E^2 are a miter-pinion and sleeve-shaft, integral or rigidly connected together, the latter inserted through and mounted in the bushing E.

E^3 is a miter friction-wheel, the periphery E^4 thereof being mitered, as shown, mounted concentrically with the miter-pinion E′ by being rigidly connected therewith, as shown. The mitered periphery E^4 of the wheel E^3 should be composed of or covered with leather or other suitable elastic material E^5, capable of affording the amount of friction necessary to cause the same to readily engage with its counterpart friction-wheel.

E^6 is a friction-tube of the same interior diameter as the sleeve-shaft E^2, integral or rigidly connected with the miter-pinion E′ and said sleeve-shaft E^2.

E^7 is a valve for closing the upper end of the friction-tube E^6 when desired.

E^8 is a drill-spindle mounted in the sleeve-bearing D and having the upper end E^9 thereof extending well into the friction-tube E^6, for a purpose to be described hereinafter.

E^{10} is a friction-ring of leather or other elastic material inclosing the upper end of the drill-spindle to produce friction between the latter and the friction-tube E^6.

E^{11} is a longitudinal spline-groove in the upper portion E^9 of the drill-spindle E^8.

E^{12} is a spline rigidly connected with the sleeve E^2 and adapted to slide in the groove E^{11} in the part E^8.

F is a sleeve inserted through and mounted in the bearing A^6.

F′ is a spline rigidly connected with the sleeve F. The sleeve F is provided with an exterior right-hand screw F^2.

F^3 is a shaft provided with an exterior left-hand screw F^4 and mounted in the bearing and sleeve A^5 F, wherein it may be reciprocated endwise by means of a part to be described hereinafter.

F^5 is a longitudinal spline-groove wherein the spline F′ may slide in the shaft F^3.

F^6 is a miter-pinion rigidly connected with the shaft F^3 and adapted to mesh with and unmesh from the miter-pinion E′.

F^7 is a miter friction-wheel, the periphery thereof being mitered, as shown, rigidly connected with the sleeve F, and adapted to engage with and be disengaged from the friction-wheel E^3.

F^9 is a nut provided with interior right and left hand screws F^{10} and F^{11}, respectively.

G, Figs. 1 and 8, is a horizontal stud projecting from the portion A^3 of the drill-frame.

G′ is a tubular catch adapted to slide on the stud G.

G^2 is a spring for actuating the catch G′. The office of the catch G′ is to retain the feed-lever D^6 in the position shown in Fig. 1 when the same is not in use.

H H′ H^2 are cone-pulleys—fast and loose pulleys, respectively.

H^3 is a belt-shipper.

The platen-bracket B and platen B^7, being supported by a screw-rod C^2 and ring-segment C^3 in the manner already described, may be raised and lowered to any desired point between the parts A A^{10} by means of the crank C^7 and revolved about the columnar portion A′ of the drill-frame.

The combined function of the friction-tube E^6, the ring E^{10}, and the produced portion E^9 of the drill-spindle E^8 is to insure the latter by producing frictional contact between itself and the friction-tube E^6 against descending too suddenly. The friction produced, as already indicated, or in any equivalent manner, will cause the drill-spindle to slide down easily whenever it descends, thereby preventing injury to drills, to work on the platen, and to the operator from drills on the free end of the feed-lever D^6, which frequently becomes disengaged from its catch and descends with dangerous force.

The valve E^7 may be used as an auxiliary of the friction-tube E^6 or dispensed with, according as desired.

The drill-spindle E^8 may be raised and lowered by means of the hand-wheel D^4 and the feed-lever D^6, precisely the same as in other drilling-machines.

Fig. 5 shows the friction-wheels E^3 F^7 in engagement. Whenever it is desired to substitute gear for friction-connection, turn the nut F^9 to the position shown in Fig. 6. The friction-wheel F^7 will thereby recede from and the pinion F^6 advance to positions there shown, thereby meshing the pinion F^6 with the pinion E′. A reverse motion of the nut F^9 will obviously restore the parts to which reference has just been made to the positions shown in Fig. 5.

We claim—

1. In combination, in a drilling-machine, the

platen-bracket, the ring-segment whereby the same is supported and whereon it may be revolved, the platen operatively connected with the platen-bracket, and the screw-rod connected with the ring-segment, substantially as and for the purpose specified.

2. In combination, in a drilling-machine, the drill-frame having a vertical groove in the columnar portion thereof, the platen-bracket connected therewith, the ring-segment whereby the platen-bracket is supported and whereon it is revoluble, and the screw-rod connected with the platen-bracket by means of the ring-segment and included in the vertical groove in the drill-frame, substantially as and for the purpose specified.

3. In combination, in a drilling-machine, the friction-tube, the drill-spindle adapted to slide therein, and the friction-ring or other equivalent means of producing friction between said friction-tube and drill-spindle for causing said drill-spindle to slide down slowly in said friction-tube, substantially as and for the purpose specified.

4. In combination, in a drilling-machine, the miter-pinion and sleeve-shaft mounted in a suitable bearing, the friction-tube integral or rigidly connected with the miter-pinion, and the produced drill-spindle provided with a friction-ring and inserted through the sleeve, pinion, and friction-tube, and having a groove and spline or cognate connection with the parts through which it passes and in which it operates, substantially as and for the purpose specified.

5. In combination, in a drilling-machine, a pair of mounted pinions and a pair of friction-wheels mounted concentrically therewith, each pair being arranged to engage as the other pair disengages, substantially as and for the purpose specified.

6. In combination, in a drilling-machine, a pair of friction-wheels arranged to engage and be disengaged, a pair of pinions arranged to mesh and unmesh and having concentricity with a pair of friction-wheels, and suitable shafts and bearings for operatively connecting said friction-wheels and pinions, substantially as and for the purpose specified.

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