No. 772,568. PATENTED OCT. 18, 1904.

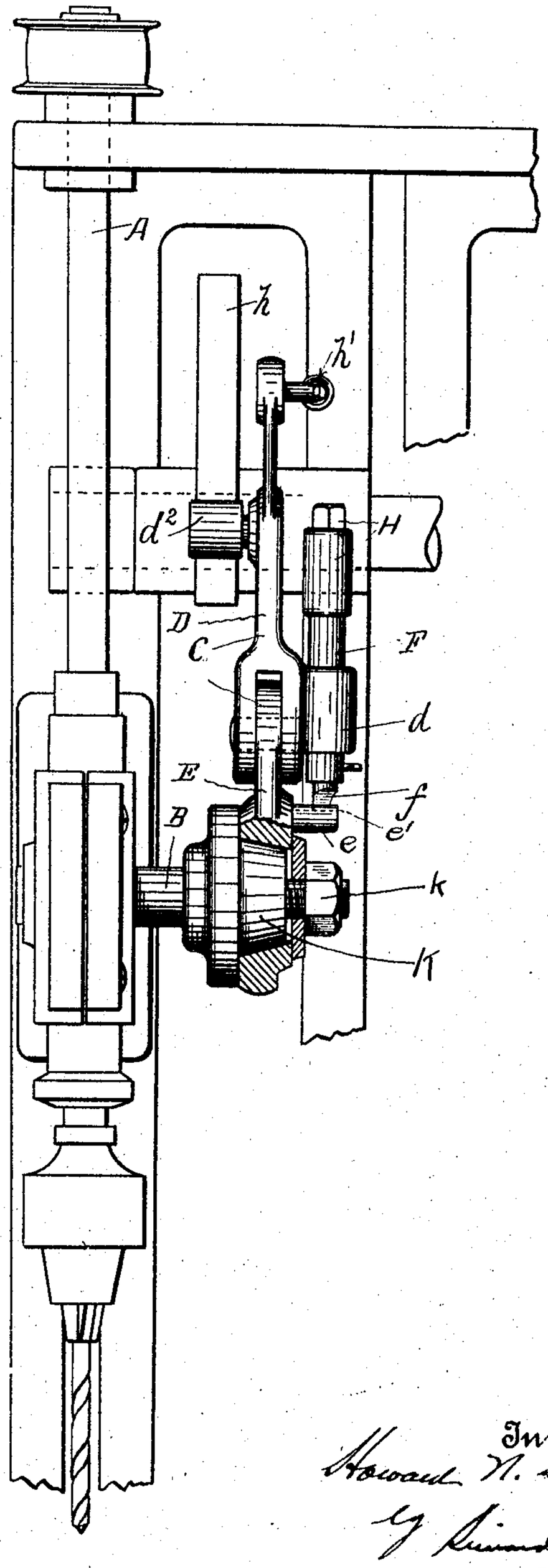
H. N. HINCKLEY.

DRILL PRESS.

APPLICATION FILED JAN. 16, 1902.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1



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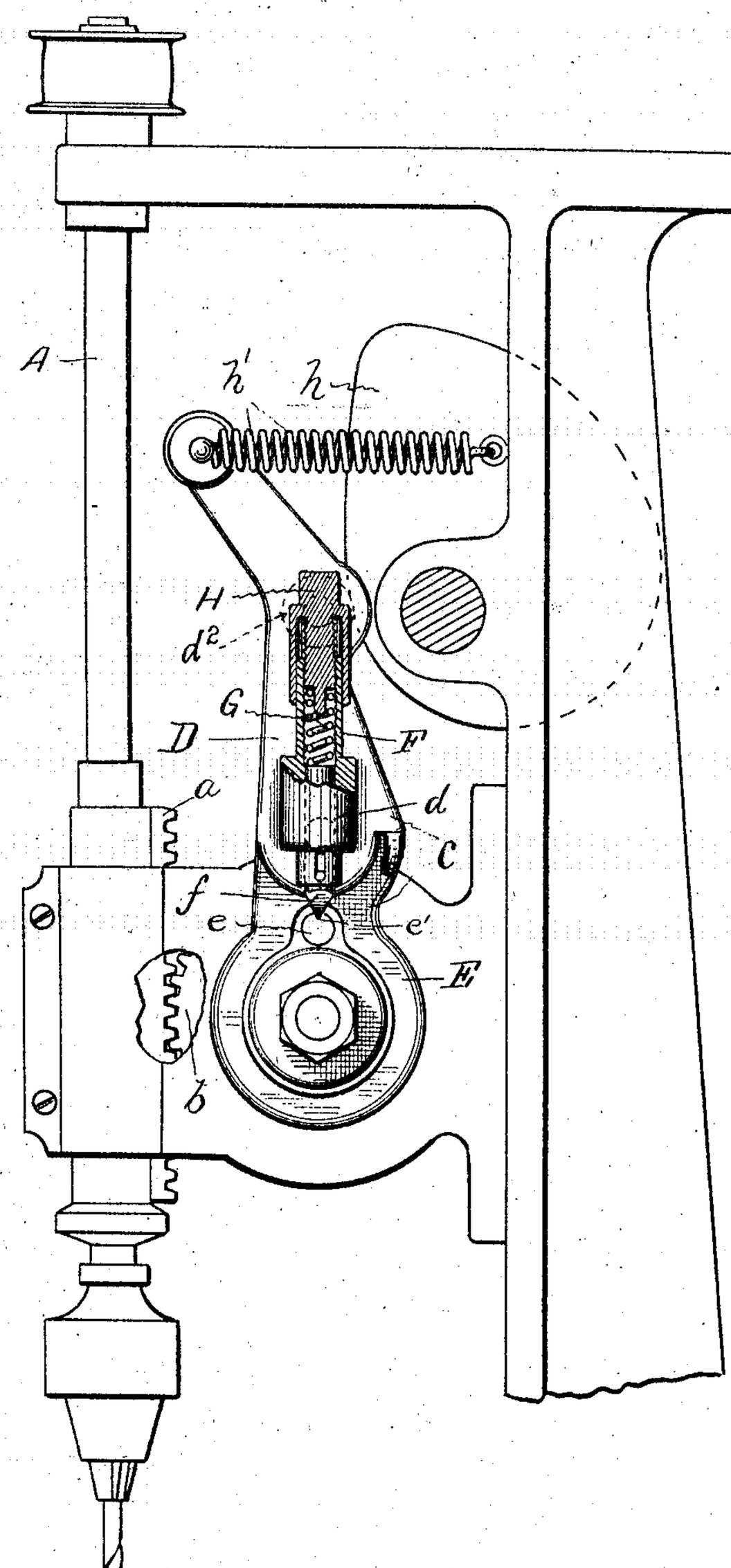
NO MODEL. 3 SHEETS—SHEET 2.

Fig. 2



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 3

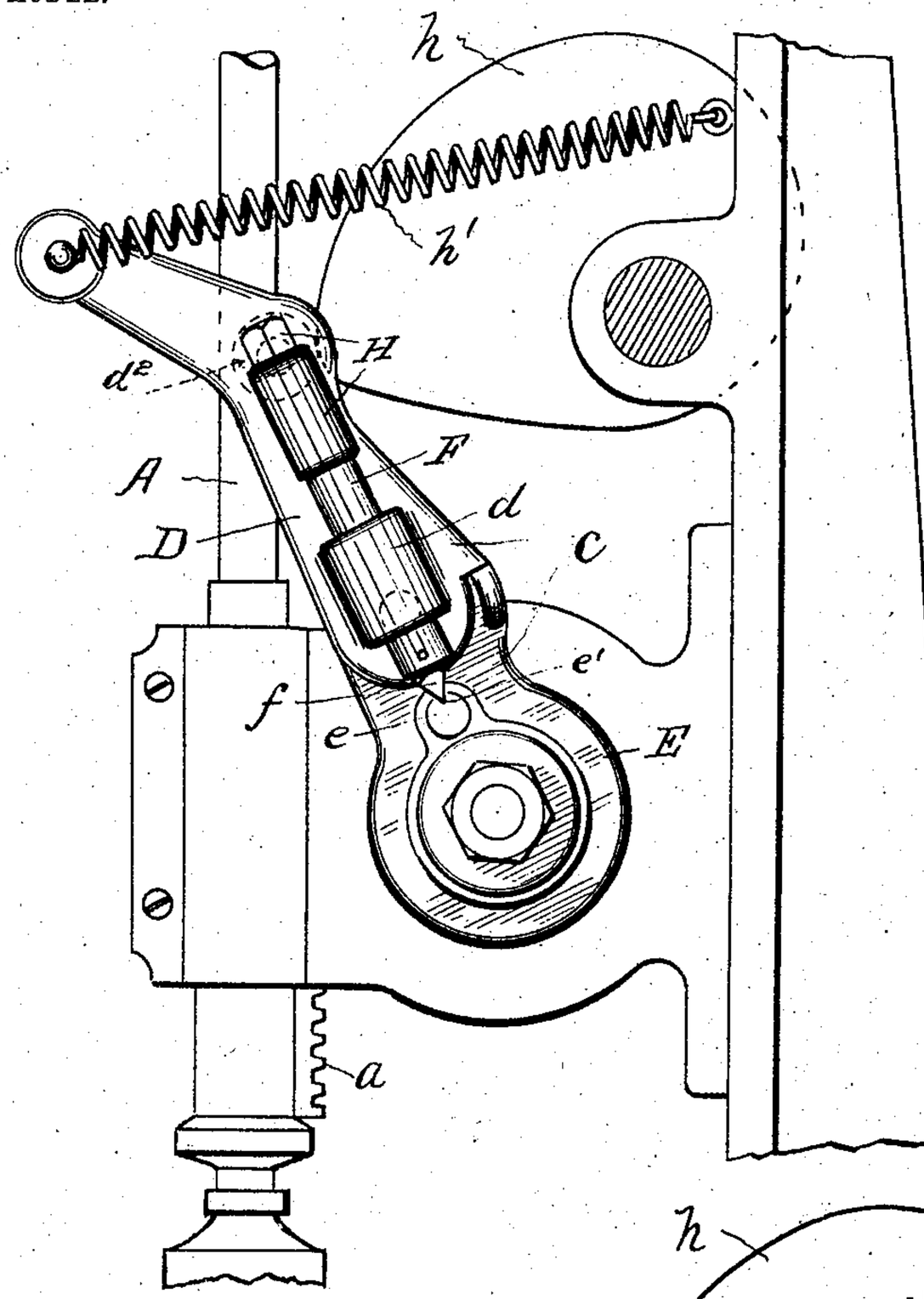
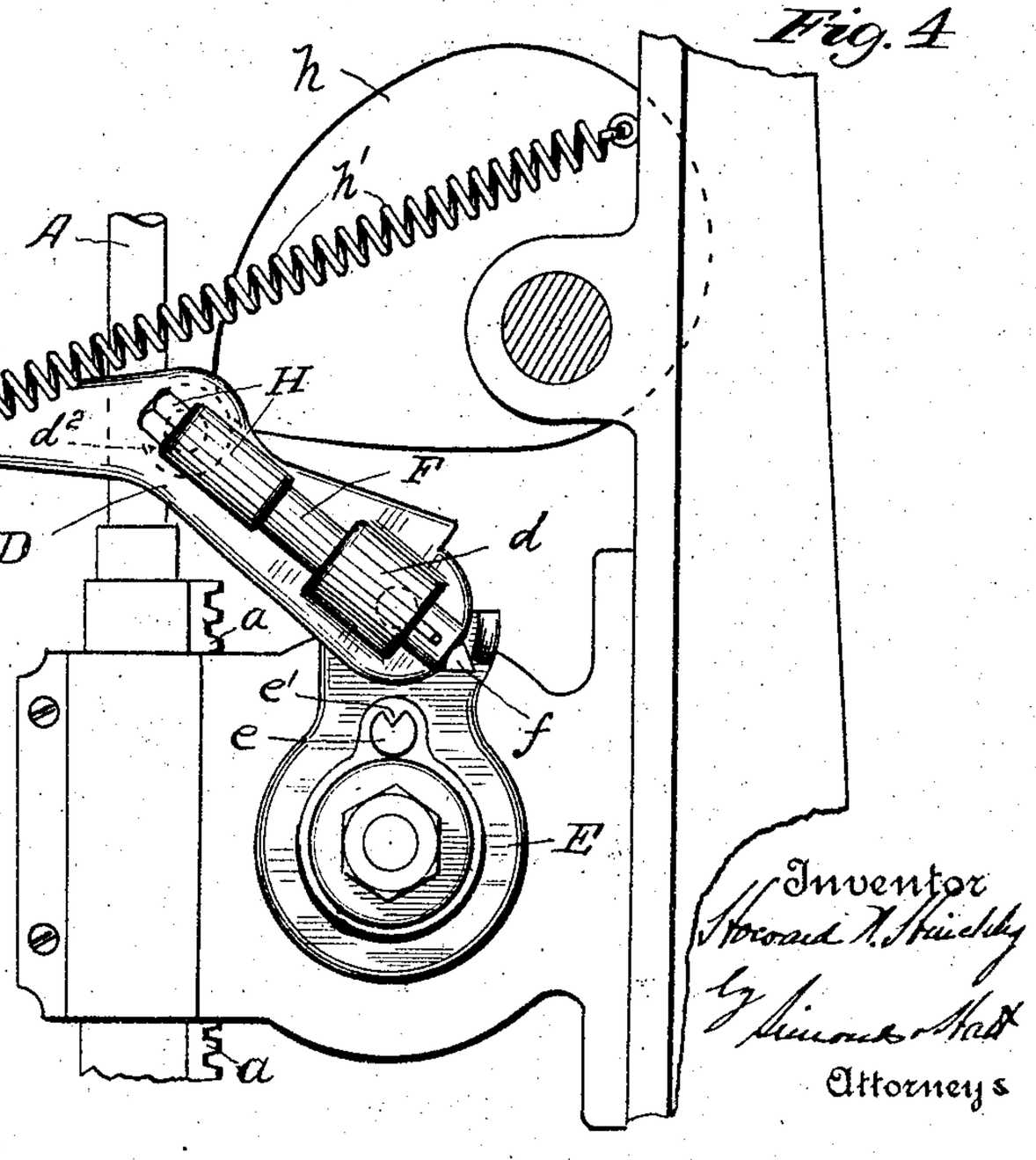


Fig. 4



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No. 772,568. Patented October 18, 1904.

UNITED STATES PATENT OFFICE.

HOWARD N. HINCKLEY, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE DWIGHT SLATE MACHINE COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

DRILL-PRESS.

SPECIFICATION forming part of Letters Patent No. 772,568, dated October 18, 1904.

Application filed January 16, 1902. Serial No. 89,991. (No model.)

To all whom it may concern:

Be it known that I, HOWARD N. HINCKLEY, a citizen of the United States, and a resident of Hartford, in the county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Drill-Presses, &c., of which the following, when taken in connection with the drawings, is a specification.

The object of this invention is to provide features of novelty and advantage in machines of the class specified. One embodiment of my invention is shown in the drawings, in which—

Figure 1 shows the device in front view with its attachment to a spindle, being partly in section. Fig. 2 is a side view of the same. Fig. 3 is a view similar to Fig. 2, but with the arm broken down.

This invention is particularly adaptable for use in gang drilling-machines—that is to say, in machines in which there are anywhere from five to ten spindles driven from the same source of power. Each spindle is separate from every other spindle, and all of them are driven from the same shaft, as by means of cams. This drive is what is known as a "positive" drive for the spindles, and when, as often happens, one of the drills is stopped for any reason the power continues to be applied, with the result that something must give way, very often causing a serious break in the machine or driving mechanism. By my invention I introduce between the positive drive and the spindle a breakdown arm, whose parts are normally maintained in rigid association and relation to drive the spindle; but if for any reason the drill ceases to cut and the downward movement of the spindle is retarded the arm breaks down, cutting off the power and permitting the remaining spindles to continue in their operation.

To more particularly describe my invention, I will refer to the drawings, in which A denotes the spindle, carrying at its lower end a chuck in which the drill is held. On this spindle is the rack *a*, meshing with a pinion *b*, mounted on the short shaft B, which is rotated by means of the breakdown arm C. The breakdown arm is made up of the two parts D E pivoted together. The upper part of the arm D, which I will refer to as the "lever-arm," has a lug *d* projecting therefrom, in which is fastened a sleeve F. In this sleeve are mounted the pawl *f* and the spring G, pressing against the pawl. Mounted on the sleeve, as by means of interengaging screw-threads, is the nut H, which is adapted to bear against the spring and by means of the interengaging screw-threads to vary its pressure on the pawl. There is also secured to the upper end of the part D a roller d^2, against which the driving-cam *h* works. On the lower member E of the breakdown arm is a pin *e*, having a groove *e'*, which is adapted to be engaged by the pawl *f*. This member E is secured to the shaft B, on which the pinion *b* is mounted, and moves with and is virtually an extension of the pinion.

It is to be understood that the breakdown arm is connected to a stationary part of the machine by means of a spring *h'*. The operation of the device is as follows:

When the parts are in their effective working positions, they occupy the positions shown in Fig. 2, the end of the pawl engaging the groove *e'* in the pin *e*, the tension of the spring which bears against the pawl being sufficient for the purposes of the work in hand. The main power is delivered to the cam-shaft and from the cam-shaft transmitted through the cams, the breakdown arm, and the pinion and rack, feeding the spindle down at each revolution of the cam, the spindle being raised by means of the spring *h'*. So long as the machine continues to operate normally all of the parts will remain in the position shown in Fig. 2, the pressure of the spring G, which holds the pawl in engagement with the groove *e'*, being sufficient to transmit the required power between the two parts of the arm. If for any reason one of the drills becomes stuck, as by running into a hard spot in the metal or by fouling of the rack-and-pinion drive, the power exerted by the cam-shaft continues,

and the resistance on the drill-point being greater than the tension of the spring G can withstand the cam will force the lever-arm over, disengaging the pawl from the groove.

It will be seen that when one spindle in a gang drilling-machine is stuck that particular drill is disconnected from the power-shaft by means of the breakdown arm, while the remaining drills in the gang continue their operation without hindrance.

Another valuable feature of this invention is the connection of the pinion-shaft to the breakdown arm, so that the spindle may be adjusted readily and with accuracy. I accomplish this by forming the pinion-shaft near its end in substantially conical shape, as at K, terminating in a screw-threaded shank of reduced diameter. When the arm is driving, the conical end of the shaft is drawn up into its corresponding conical socket in the arm by a nut *k* engaging the shank. When it is desired to readjust the spindle because of the wear of a drill or the insertion of a new drill or the like, it is only necessary to loosen the nut *k*, which leaves the spindle free to be raised or lowered at will.

It is evident that other constructions and arrangements of parts may be had which will accomplish the desired object than those shown in the drawings, and I wish to include herein and in the following claims any and all such modifications.

I claim as my invention—

1. In a drill-press, a spindle and rotary feed device therefor, a member mounted to move with and as a part of the rotary part of said feed device; a lever-arm; and a yielding pawl carried thereby and having a one-point connection with said member for holding the parts in their operative connection or automatically releasing them therefrom.

2. In a drill-press, a spindle and rotary feed device therefor; a member mounted to move with and as a part of the rotary part of said feed device, a lever-arm; and a spring-pressed pawl carried thereby and having a one-point connection with said member for holding the parts in their operative connection or automatically releasing them therefrom.

3. In a drill-press a spindle and a feed device therefor including a rack, a pinion, and a lever-arm and means for moving it to and fro, and a yielding pawl having a one-point connection, said pawl being located between the lever-arm and the spindle to hold the lever-arm in its operative connection or automatically release it therefrom.

4. In a drill-press a spindle and a feed device therefor including a rack, a pinion, and a lever-arm and means for moving it to and fro, and a spring-pressed pawl having a one-point connection, said pawl being located between the lever-arm and the spindle to hold the lever-arm in its operative connection or entirely release it therefrom.

5. In a drill-press in combination the driving-shaft; the driven spindle-actuating shaft; and means for communicating motion from the driving to the driven shaft; said means including an arm secured to the driven shaft and made up of two sections pivoted together, interengaging parts on said sections and yielding means for holding said parts in engagement, substantially as described.

6. In combination the driving-shaft, the driven shaft, the arm secured to the driven shaft, and means for rocking the arm, said arm being made up of two sections pivoted together, a grooved pin secured to one section, and a spring-controlled pawl coacting with the grooved pin whereby the sections of the arm are held in rigid association and relation until the resistance offered by the driven shaft exceeds a certain degree.

7. In a machine of the class specified, the spindle, the shaft, the coacting rack and pinion located respectively on the spindle and the shaft, an oscillating actuating member for said shaft having a conical recess, a conical shoulder on the shaft adapted to fit in said recess and means for drawing said conical shoulder into said recess and binding the parts together, substantially as described and for the purposes set forth.

8. In a machine of the class specified the shaft, the coacting rack and pinion located respectively on the spindle and shaft, an oscillating actuating member for said shaft having a conical recess, said shaft having a conical shoulder adapted to fit into said recess, and a threaded end extending through said actuating member, and a nut on the threaded end of the shaft and adapted to draw the conical shoulder on the shaft into the conical recess in said actuating member to firmly bind them together, as and for the purposes specified.

HOWARD N. HINCKLEY.

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