No. 816,500. PATENTED MAR. 27, 1906.

C. F. PRESLAR.

FEEDING MECHANISM FOR DRILLING MACHINERY.

APPLICATION FILED MAR. 23, 1904.

2 SHEETS—SHEET 1.

Fig. 2.

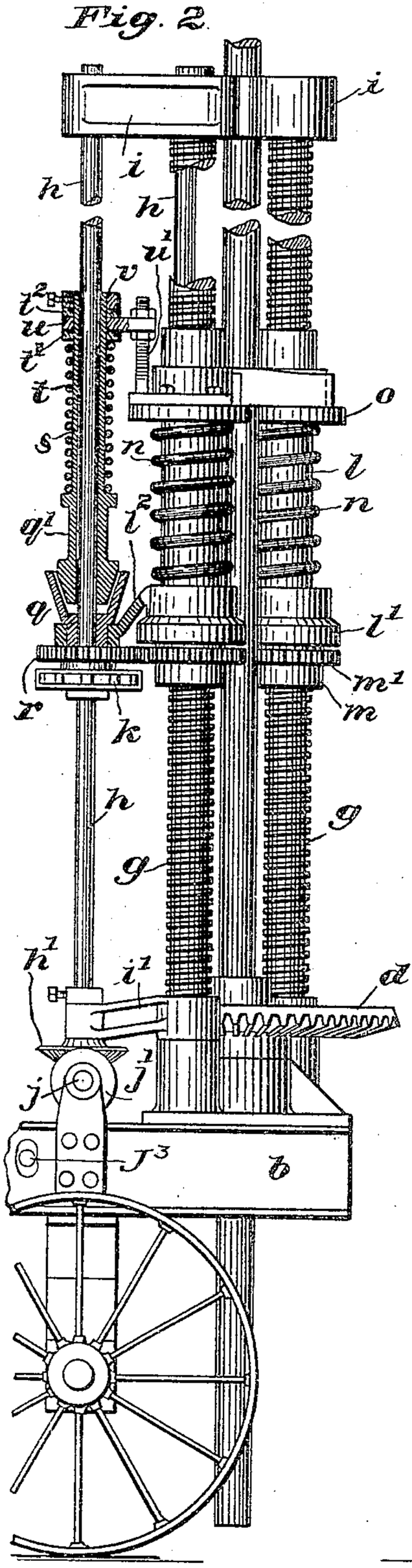
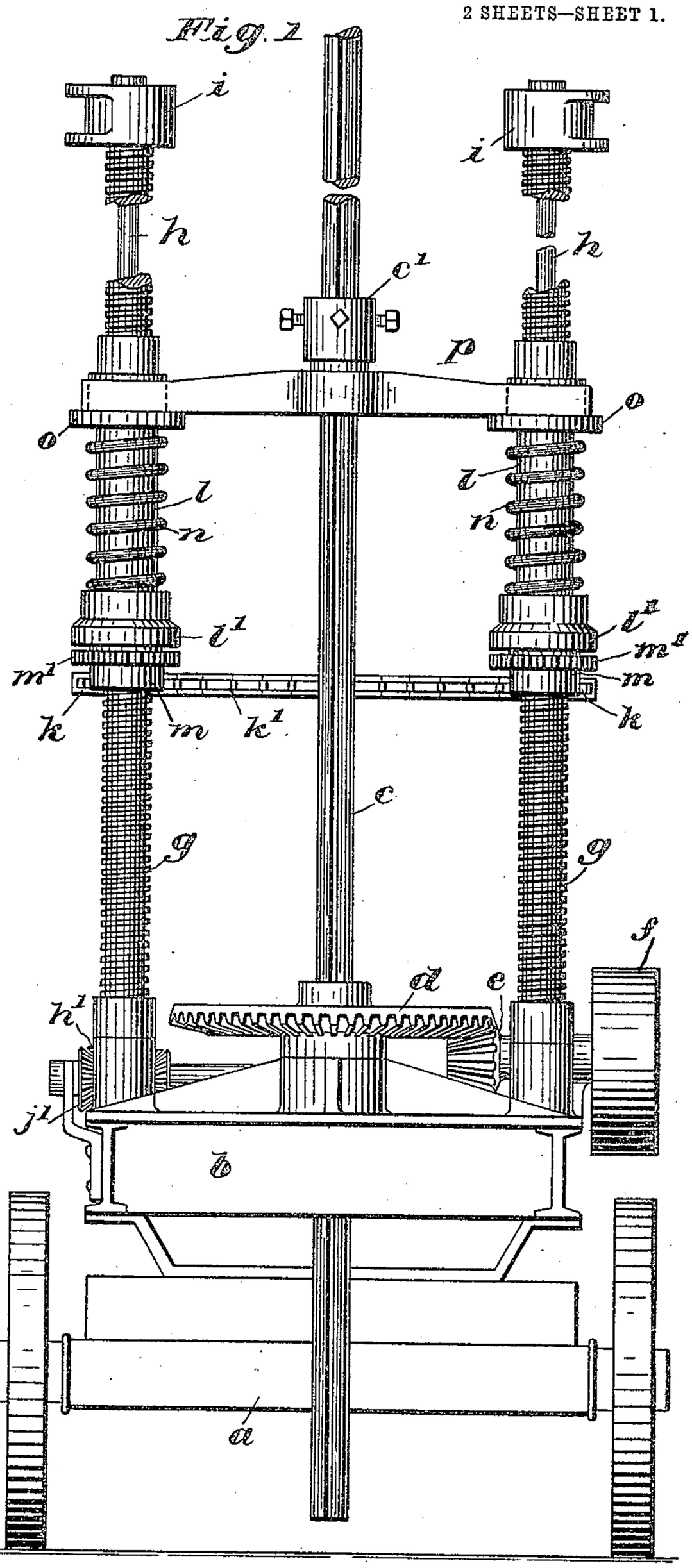


Fig. 1.



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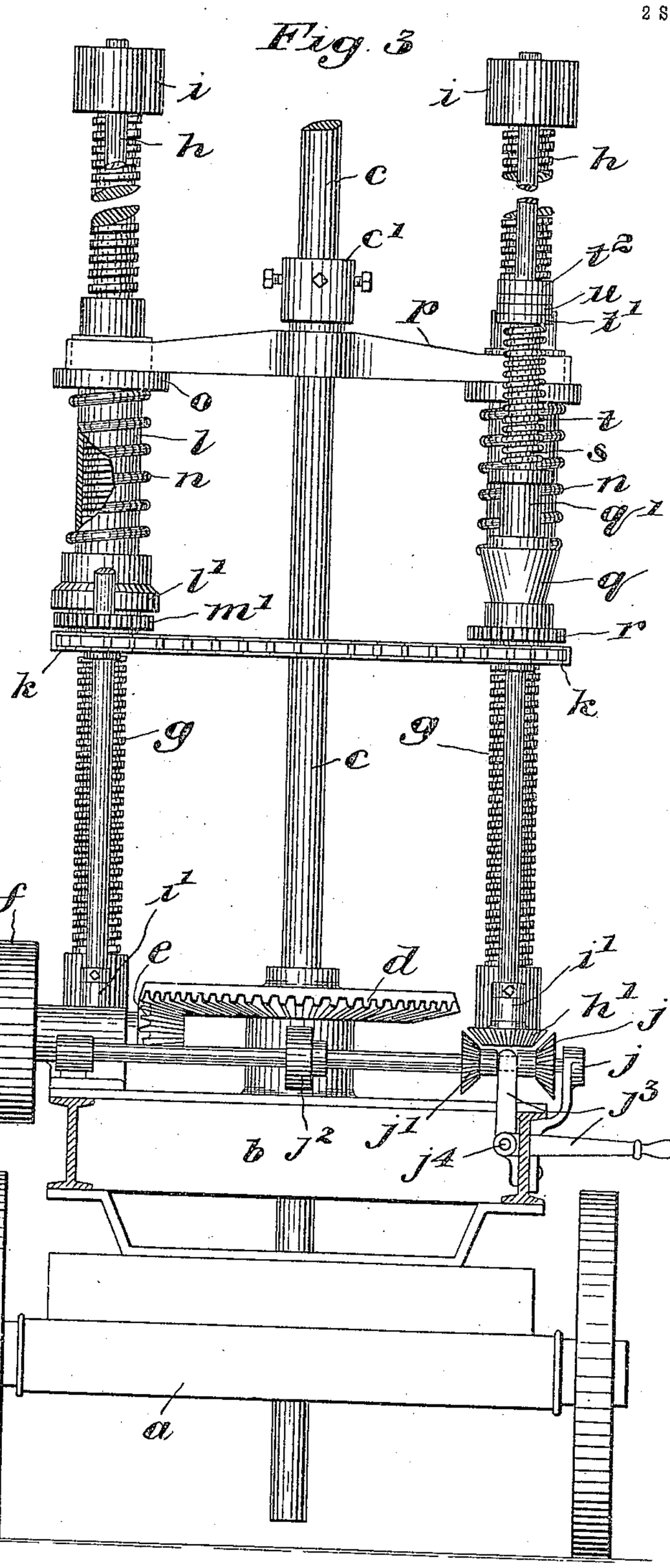
2 SHEETS—SHEET 2.

Fig. 3



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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM FOR DRILLING MACHINERY.

No. 816,500. Specification of Letters Patent. Patented March 27, 1906.

Application filed March 23, 1904. Serial No. 199,585.

To all whom it may concern:

Be it known that I, CHARLES F. PRESLAR, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented new and useful Improvements in Feeding Mechanism for Drilling Machinery, of which the following is a specification.

This invention relates to feeding mechanism for drilling machinery, and particularly to such mechanism as applied to well or core drilling machines; and the object of the invention is to provide a feeding mechanism for such machine which will automatically adapt itself to the various formations as they are encountered by permitting the drill to descend at a rate proportionate to the rate at which the drilling operation may be accomplished within the limits of safety, while at the same time supporting so much of the weight of the drill as is in excess of the amount necessary for successful operation. In mechanism of this class as commonly constructed the drill is usually fed downwardly by a positively-operating feeding mechanism by which a uniform positive feeding movement is imparted to the drill regardless of the character of the soil or other material through which it is operating. In other types of machines the entire weight of the drill rod or member is permitted to rest upon the bit at times when the drill is operating. At other times there may be practically no weight on the bit, and, again, there may be positive downward pressure in excess of the weight of the drilling-tools. These and similar constructions have been found unsatisfactory for the reason that upon encountering hard substances the bit is often mashed over or otherwise injured or twisted entirely off.

The character and scope of my invention will be clearly understood by a description of one embodiment thereof illustrated in the accompanying drawings, in which—

Figure 1 is a front elevation of the drilling mechanism and carriage therefor, and Fig. 2 is a side elevation thereof. Fig. 3 is a rear elevation of the parts shown in Fig. 1.

In the particular embodiment of my invention herein selected for illustration the drilling mechanism is preferably mounted upon a suitable carriage *a*, of any desired construction necessary to facilitate transportation of said mechanism and the actuating-engine therefor. The drilling mechanism proper is mounted upon a suitable frame *b*, which in this case forms a part or the bed of the carriage *a*. The drill-rod proper, *c*, as shown in Fig. 1, is splined to the gear-plate *d*, mounted to rotate upon the frame *b*, whereby the drill may have free longitudinal movement transversely of said gear. The gear *d* may be actuated in any suitable manner, but, as here shown, is meshed with an actuating-gear *e*, mounted upon a short shaft journaled at one side of the frame *b* and upon which also is mounted a suitable pulley *f*, which may be driven by means of a belt from the actuating-engine mounted on the carriage above referred to.

The feeding mechanism proper for the drill-rod *c* consists of the vertical screw-threaded standards *g g*, which are securely mounted in any suitable manner upon the frame *b*, and adjacent thereto and preferably at the rear thereof are the vertical shafts *h h*, which may be mounted in any suitable manner, but, as here shown, are journaled in the arms *i i* and *i′ i′*, which project from the upper and lower ends, respectively, of the standards *g g*. As will be apparent from an inspection of Fig. 2 of the drawings, the standards *g g* are arranged slightly out of alinement transversely of the bed *b* in order to accommodate the shaft of the driving-gear *e*. The shafts *h h* may be rotated in any desired manner; but in the present construction such motion is imparted through bevel-gears *j′ j′*, secured to a counter-shaft *j*, which also may be driven by a belt on the pulley j^2, Fig. 3, from the engine. The gears *j′ j′*, as will be seen from Fig. 3, are located upon opposite sides of a gear *h′* and are preferably loosely splined on the shaft *j*, or, if desired, the shaft may be slidably mounted in its bearings, whereby said gears may be alternately shifted into mesh with the gear *h′* by a bell-crank lever and handle j^3, pivoted at j^4 on the machine-frame (see Fig. 3) to rotate the shaft *h* in opposite directions to lower and raise the drill. Sprocket-wheels *k k*, connected by a chain *k′* serve to produce synchronous motion of the gears *r r*.

Upon the standards *g* are mounted the unthreaded sleeves *l l*, which are provided at or near their lower extremities with flanged

hubs l' l', one of said hubs having an arm l^2, extending between its standards g g and one of the shafts h h. Powerful spiral springs n n of a predetermined degree of compression are mounted upon the sleeves l l between the hubs l' l' and the flanged rings o o, which also slidably surround said sleeves. Upon these rings o o rest the extremities of a guide and feed bar p, through an aperture in which the drill-rod c passes and to which the weight of said rod is transmitted by means of a collar c', adjustably secured to the latter, whereby the weight of the bar and the rod is transmitted to the springs n n. Gears m' m', fixed to the nuts m m, serve to rotate the latter in a manner hereinafter described. Between hubs l' l' and nuts m m may be any suitable bearing; but no rotary motion is transmitted from nuts m m to hubs.

Upon one of the shafts h above the arm l^2 is mounted a clutch mechanism of any suitable construction, comprising the members q and q', the lower member q of which is connected by a suitable sleeve passing through the arm l^2, with a gear r and one of the sprocket-wheels k, whereby these three elements—namely, the clutch member q', gear r, and sprocket k—are mounted to rotate together freely upon the shaft h. To the upper member q' of the clutch is attached a sleeve s, upon which is coiled a spiral spring t, interposed between said clutch member and the washer t', which is slidably mounted on the sleeve s. Also slidably mounted upon said sleeve and resting upon the washer t' is an arm u, which is adjustably connected in any suitable manner, as by bolt u', with one of the rings o. A second washer t^2 and a stop-ring v, fixed to the sleeve s above the arm u, serve to hold said arm securely on said sleeve. The clutch member q' and the sleeve s are splined to rotate with the shaft h, but are free to move longitudinally thereon.

The operation of the mechanism is as follows: With the drill member c in position over the point at which the boring is to be made, rotary motion is imparted thereto by the gear d, and at the same time the shaft h is also rotated from the counter-shaft j. The gear d and shaft j may be operated from the same or different sources of power and may be arranged so that one or the other or both may be thrown out of operation by suitable clutch mechanism, if desired. When the drill is boring through comparatively soft material, the rate of work will be proportionately rapid, and the feed of the drill to be effective must be at a speed in proportion thereto. In order to provide therefor, the compression of the springs n n is so gaged that any pressure exerted thereupon by the weight of the drill-rod c and the guide p in excess of a predetermined amount will cause the springs n n and the rings o to be depressed, which movement will be transmitted through the bolt u' and arm u to the spring t, and consequently to the clutch member q', causing said member to contact with the lower member q to an extent sufficient to effect operative engagement of the two members, and inasmuch as the clutch member q will upon and during such engagement also be rotated, which rotation will be transmitted by the gears r r, sprockets k, chain k', and gears m' m' to the nuts m m, causing said nuts and attendant parts l' l', n n, and o o, and consequently the bar p, supported thereon, to be fed downwardly upon the threaded supports g g, thus lowering the drill c. On the other hand, when the drill encounters hard substances, such as stone and the like, the work of boring will proceed more slowly and the feed will be proportionately slow. This result is accomplished by the fact that very slight depression of the springs n n will be sufficient to maintain the drill in effective contact with the substances being drilled, and harder strata encountered will have a tendency to throw a larger proportion of weight of the drill upon such substances, and thus relieve the springs n n of such weight, whereupon said springs will hold the rings o o stationary, while the further downward movement of the nut m, operating through the arm u and bolt u' and ring v, will disconnect the clutch member q' from the member q, and thus check further feeding movement automatically.

It is understood that the springs n are to be gaged to carry a predetermined proportion of the weight of the drilling-rod or member c, and the stop-ring v, together with the arm u and adjustable nuts on u', is also gaged to a predetermined degree in order that any tendency of the feed to throw a proportion of the weight of the drill upon the drilled substance beyond a predetermined factor of safety will automatically operate to stop the feeding operation.

In order to withdraw the drilling member from the bore, it is only necessary to reverse the shaft h.

Many changes may be made in the details and relative arrangement of parts without departing from the spirit of my invention.

I claim—

1. In a feed mechanism for a drilling-machine means to support a drill, a spring carrying said support and means responsive to the compression of said spring to vary the rate of feed of said drill.

2. In a feed mechanism for a drilling-machine a support for a drill, springs carrying said support, a feed-actuating member and means responsive to variance in pressure of the drill on said support whereby said actuating member is moved to operative position.

3. In a feed mechanism for a drilling-machine a support for the drill, a standard carrying said support, a spring mechanism inter-

posed between such standard and said support, and means responsive to the compression of said spring mechanism whereby said support is fed relatively to said standard.

4. In a feed mechanism for a drilling-machine a yielding drill-support and means adapted to be thrown into operative position by the yielding of said support to feed the drill.

5. In a feed mechanism for a drilling-machine a yielding drill-support and a clutch adapted to be thrown into operative position by the yielding of said support to feed the drill.

6. In a feed mechanism for a drilling-machine a yielding drill-support, feeding means therefor, and a clutch interposed between said support and feeding means adapted to be thrown into operative position by the yielding of said support to actuate said feeding means.

7. In a feed mechanism for a drilling-machine a yielding drill-support, a clutch member connected therewith, feeding means for said support having a complemental clutch member, said clutch members being arranged to move into operative connection upon yielding of said support.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CHARLES F. PRESLAR.

Witnesses:
CHAS. HERBERT JONES,
JOSEPH R. GARDNER.