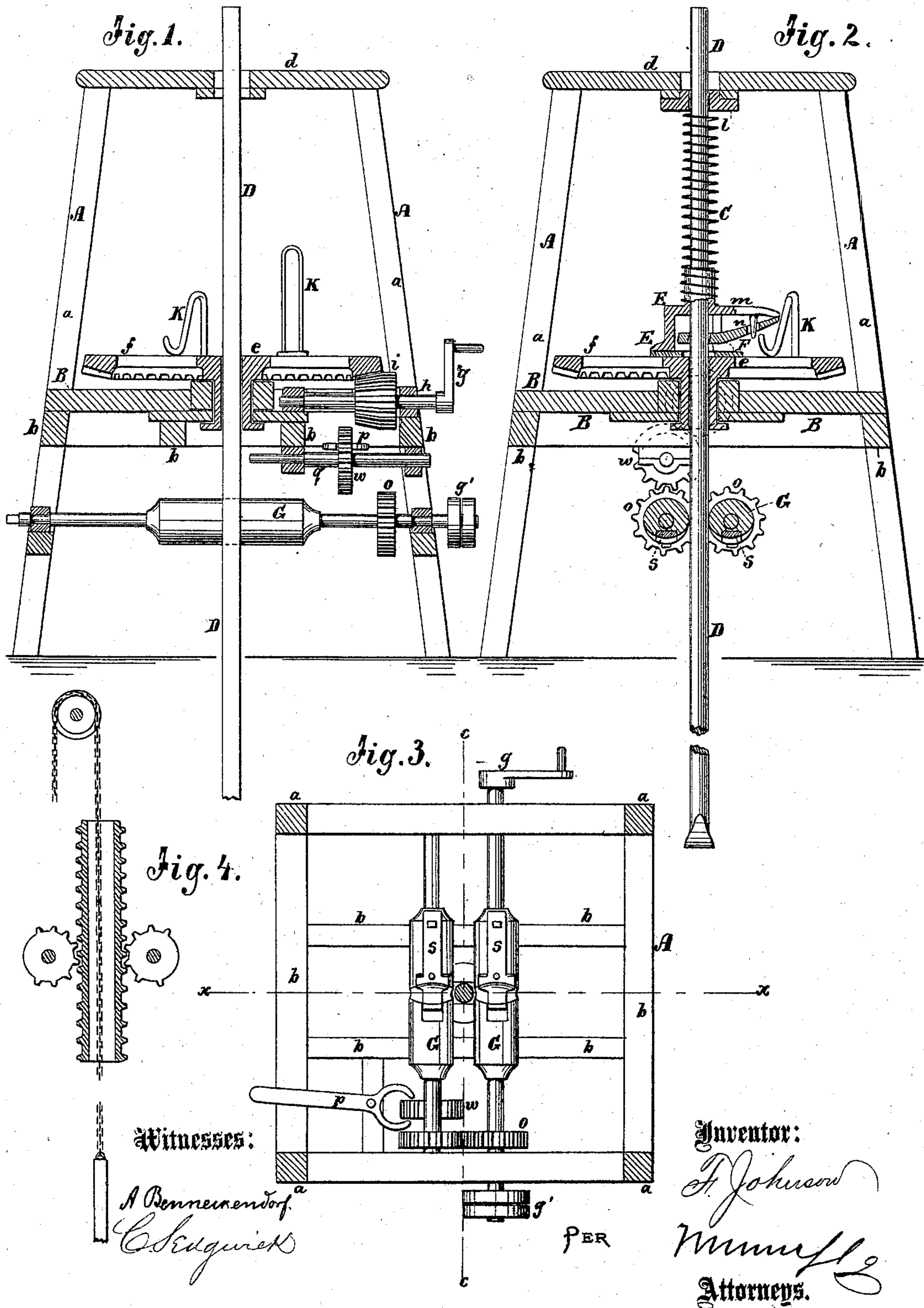


F. JOHNSON.
Rock-Drilling Machines.

No. 137,372

Patented April 1, 1873.



UNITED STATES PATENT OFFICE.

FERDINAND JOHNSON, OF TOLEDO, OHIO.

IMPROVEMENT IN ROCK-DRILLING MACHINES.

Specification forming part of Letters Patent No. **137,372**, dated April 1, 1873; application filed February 8, 1873.

To all whom it may concern:

Be it known that I, FERDINAND JOHNSON, of Toledo, in the county of Lucas and State of Ohio, have invented a new and Improved Drill, of which the following is a specification:

Figure 1 is a vertical section of my improved drill on the line *c c*, Fig. 3. Fig. 2 is a vertical transverse section of the same on the line *x x*, Fig. 3. Fig. 3 is a bottom view, partly in section, showing the slide arrangement of rollers for raising and lowering the drill; and Fig. 4 shows a cog-wheel arrangement of the rollers for the same purpose.

Similar letters of reference indicate corresponding parts.

The object of my invention is to construct a drill for boring for water or oil, which, by a rapid succession of strokes and turns, accomplishes quick and effective work, and which may be easily raised and lowered as the exigencies of the work require it. My invention consists, mainly, in a spring-lever connection of the drill, which imparts a strong force to the same in connection with grooved rollers with a slide arrangement for the purpose of lifting and guiding the drill.

In the drawing, A represents the frame to which the drill is attached, which consists of strong posts *a*, of timber or other material, connected laterally by cross-beams *b* and a top connection, *d*. To a platform, B, placed at convenient height in frame A, and rigidly connected by cross-beams *b* therewith, is applied centrally a vertical casing, *e*, with a square perforation for the guiding and play of the drill. The horizontal cog-wheel *f* is rigidly connected to casing *e* and turns with it by means of crank *g*, shaft *h*, and pinion *i*. A square auger may be inserted to the casing *e* from below, and thereby the loose ground be penetrated. To the upper part of cog-wheel *f* are attached two strong vertical guide-hooks, K, by means of which the rotating motion of the wheel *f* is communicated to the drill when placed in casing *e*. The solid ground, rocky, and other strata are bored by means of a round drill, D, with sharp bit at the end thereof. It moves freely in casing *e* and the aperture in the top *d* of frame A. A strong spiral spring, C, rests on washer *l* of the top and is con-

nected with its lower end to a bell-shaped flanged cylinder, E, which rests on a washer on the central part of wheel *f*. A cylindrical upward extension of E gives steadiness to spring C. Cylinder E is partly open, and is provided with a hook-like horizontal projection, *m*, which rests on a similarly-shaped but upward-turned lever, F, which is loosely attached to drill D by a ring-shaped band inside of cylinder E. A pin, *n*, of extension hook *m*, further projects into a short slot of lever F, securing thereby, as soon as spring C acts on cylinder E, a rigid spring-lever connection with F. Below the platform B are, resting on cross-beams *b* and moving in suitable journals, two cylindrical guide-rollers, G, which are turned by means of cog-wheels *o* and crank *g*, or other motive power applied to rollers *g'*, and which may be made adjustable toward each other by strong spring arrangement. Rollers G are provided with T-shaped slides *s*, adjustable longitudinally, and formed in such a manner that the extension of the longer part of the T is grooved to correspond with the grooved parts of the rollers, the T cross-pieces being of cylindrical shape so that when the slides *s* are opened the grooved parts act on the drill C, passing between the rollers G when closed, the cylindrical parts of the slides and rollers take hold of drill C, lifting or lowering the same, as desired.

Instead of the slides the rollers may be provided with cog-wheels gearing into a guide-cylinder, to which a chain is attached, which works the drill at lower depths. A forked lever, *p*, beneath the platform, acts on intermediate cog-wheel *w*, placed on shaft *q*, so that it may be connected or disconnected with pinion *i* and wheels *o*, and thereby, by means of platform-wheel *f*, a turning motion may be imparted to the drill C, as required.

To work the drill, the square auger is inserted into casing *e*, wheel *w* disconnected, and the motion imparted to the auger by means of crank *g* placed on shaft *h*, or other suitable motive power. The auger penetrates the soft ground; for the harder strata the drill D must be inserted, and spring-lever E F adjusted to it; wheel *w* is then connected with pinion *i* and cog-wheels *o* and the motive power transferred to shaft G through pulley

g'; the slides *s* are opened to form the roller-grooves, and thereby a continuous succession of rapid strokes is executed by the drill by the alternate action of the cylindrical and grooved parts of the rollers in connection with the spring-lever, the turning motion being given by wheel *f* and guide-hooks *K*.

The cog-wheel arrangement works by means of chain and pulley in similar manner at lower depths.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. Spring *C* and cylindrical spring-rest *E*, having projection *m* and pin *n*, in connection with slotted ring-lever *F* and drill *D*, substantially as set forth.

2. The combination, with the spring *C*, spring-

rest *E*, projection *m*, pin *n*, ring-lever *T*, and drill *D*, of the guide-hooks *K*, platform-wheel *f*, casing *e*, pinion *i*, shaft *h*, and crank *g*, to impart turning motion to said drill, as described.

3. The grooved guide-rollers *G*, with adjustable *T*-slides or cog-wheel arrangement, in connection with drill *D*, for raising and lowering the same, as specified.

4. The combination of the cog-wheels *o* and *w* and lever *p* with the guide-rollers *G*, adjustable *T*-slides, and drill *D*, for imparting the stroke and turn motion to said drill, substantially as and for the purpose described.

FERDINAND JOHNSON.

Witnesses:

PAUL GOEPEL,
T. B. MOSHER.