(No Model.) 3 Sheets—Sheet 1.

A. BALL.

PROSPECTING DRILL.

No. 478,077. Patented July 5, 1892.

Fig. 3.

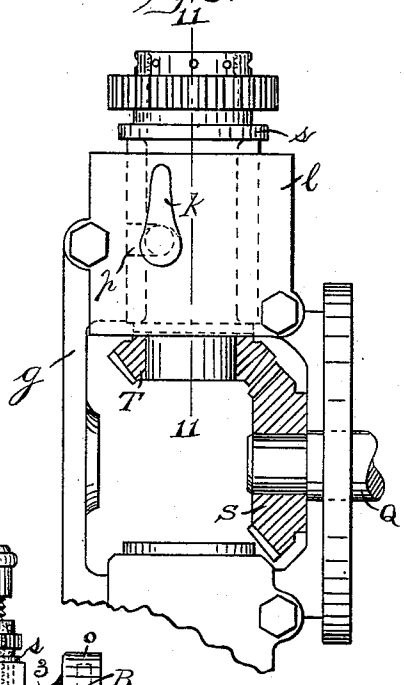


Fig. 2.

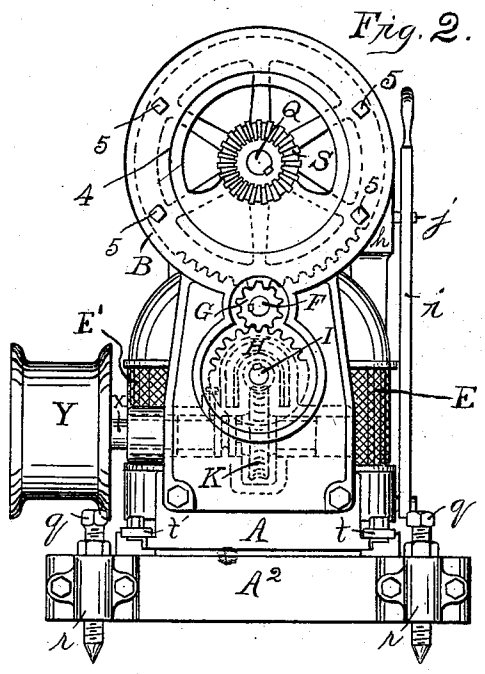


Fig. 1.

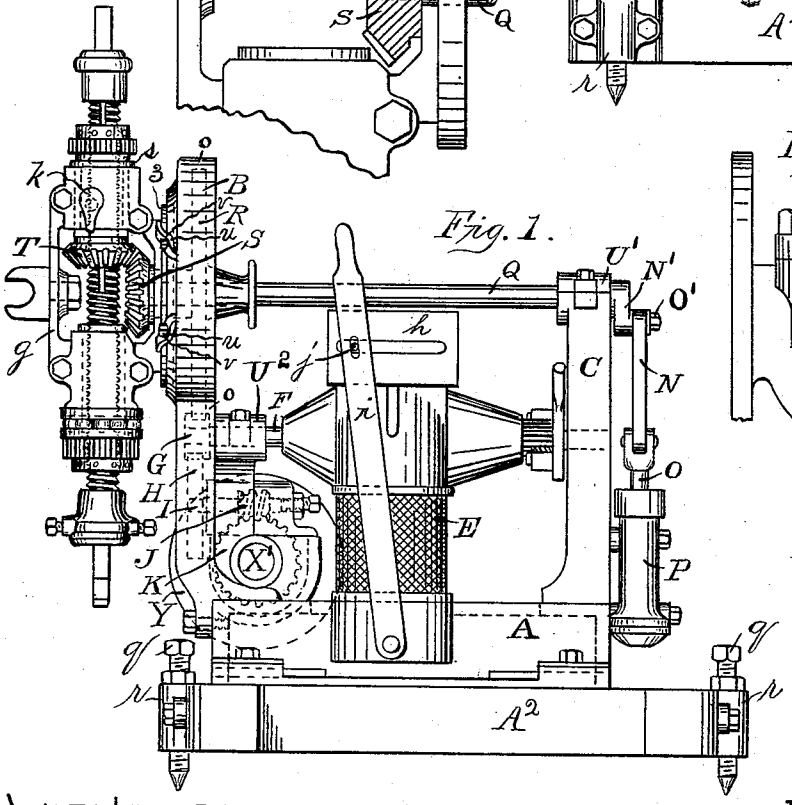


Fig. 4.

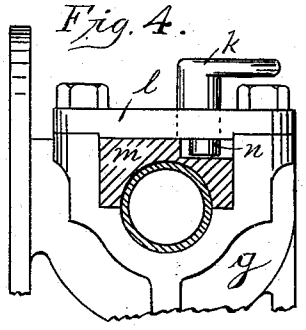
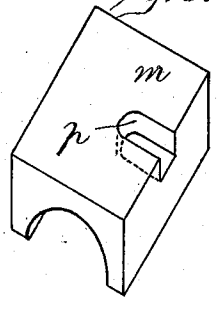


Fig. 5.



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(No Model.) 3 Sheets—Sheet 2.

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PROSPECTING DRILL.

No. 478,077. Patented July 5, 1892.

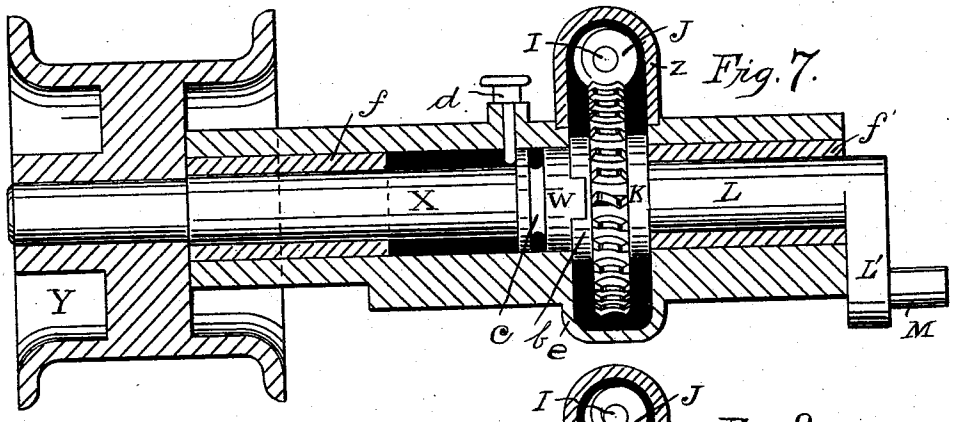

Fig. 7.

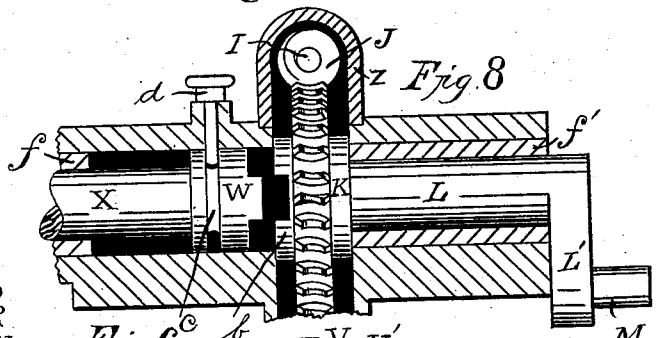

Fig. 8

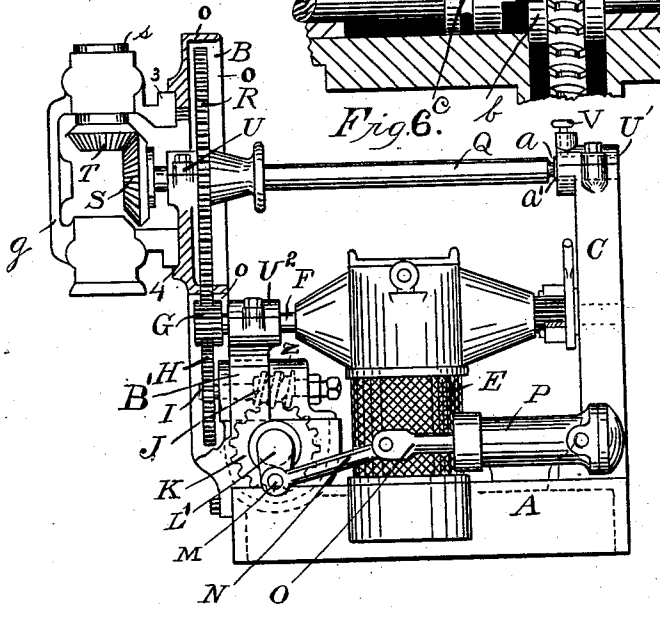

Fig. 6.

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(No Model.) 3 Sheets—Sheet 3.

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PROSPECTING DRILL.

No. 478,077. Patented July 5, 1892.

Fig. 9.

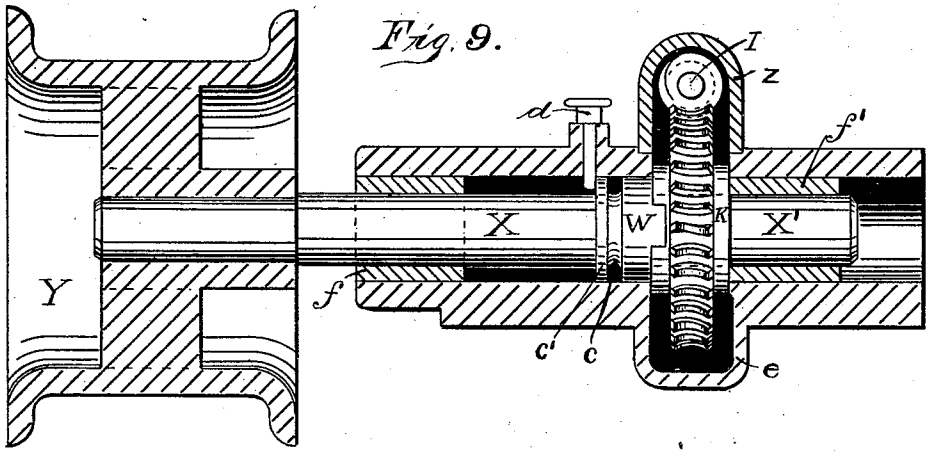


Fig. 10.

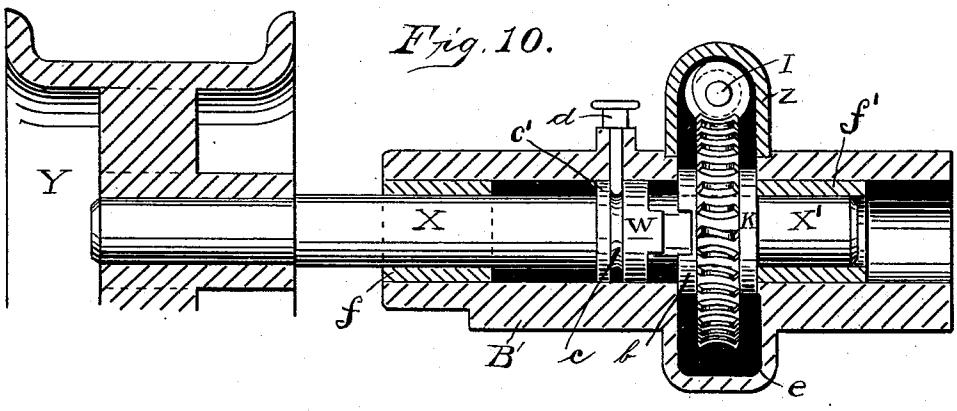
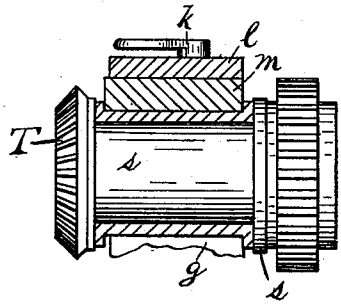


Fig. 11.



WITNESSES
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by
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UNITED STATES PATENT OFFICE.

ALBERT BALL, OF CLAREMONT, NEW HAMPSHIRE, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE SULLIVAN MACHINERY COMPANY, OF SAME PLACE.

PROSPECTING-DRILL.

SPECIFICATION forming part of Letters Patent No. 478,077, dated July 5, 1892.

Application filed December 21, 1891. Serial No. 415,822. (No model.)

To all whom it may concern:

Be it known that I, ALBERT BALL, a resident of Claremont, in the county of Sullivan and State of New Hampshire, have invented certain new and useful Improvements in Prospecting-Drills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

This invention relates to improvements in prospecting-drills adapted to be operated by electricity; and it consists in the construction hereinafter described and pointed out.

In the accompanying drawings, Figure 1 is a side elevation of the machine; Fig. 2, a front elevation of the same, the drill and drill-supporting frame being omitted. Fig. 3 is a side elevation of a detail, partly in section, with parts either broken away or omitted. Fig. 4 is a partial plan, partly in section, of the same detail. Fig. 5 is a perspective of a sliding block shown in section in Fig. 4. Fig. 6 is a side elevation, partially in section, of a form modified in respect to certain pump connections. Figs. 7 and 8 are enlarged sectional views of worm-gear and shafts, suitable for use in the form of machine indicated in Fig. 6, showing different positions of the clutch and sliding shaft, which latter for convenience is represented in Fig. 8 as broken away, being indicated in said figure; Figs. 9 and 10, similar views of worm-gear and shafts suitable for use in the construction indicated in Fig. 1, and Fig. 11 is a partial section on line 11, Fig. 3.

The reference-letter A denotes a movable base supported upon a wooden frame or bed A^2, and $t\ t'$ clamps for holding the base upon the bed. The latter is provided with adjusting-screws q, movable in the bracket attachments r. Upon the base A is erected an electric motor, including the coils E and E', armature-shaft F, and rheostat h, the latter being provided with a pin j, adapted to be adjusted by a slotted lever i. These may be of any preferred type and need no further description.

B and C are oppositely-placed stands fixed on the base and provided with bearings for the armature-shaft F and for a counter-shaft Q, having boxes U, U', and U^2. These stands may be bolted to base A or secured thereto in any convenient manner.

G is a pinion fast on shaft F and meshing with gear-wheel R on shaft Q and also with gear-wheel H on a worm-shaft gear I.

The stand B is provided with flanges o, whereby it is strengthened and also adapted to inclose the gear-wheels, as shown. The upper part of stand B, with its flange o, constitutes a circular protecting-case or inclosure for wheel R. Immediately below this wheel a similar but smaller case is provided, by a continuation of the flange, for the pinion G, below which is also a third case for the wheel H. These cover and protect the various gear-wheels circumferentially and in part laterally.

B' is in effect a lateral extension of the stand B, connected to the flange o thereof, and is enlarged at its bottom, and in said enlargement is formed an oil-chamber e. These parts may be cast integral and are provided with bearings, as indicated, and they constitute a very solid support, which also covers the wheels of the latter, being a matter of practical importance as well as the former. Both results are secured by the particular construction. The oil-chamber e, provided with a removable cover z, incloses the worm and worm-wheel, and these parts are lubricated from the oil-chamber, and also the worm-wheel and pulley-shaft.

g indicates a drill-frame provided with a circular plate or head 3, fitting a suitable seat 4 in the stand B and adapted to be held therein by clamps u and clamp-bolts v. These bolts are made angular in cross-section and adapted to fit similarly-shaped holes 5 in the stand B. (See Fig. 2.) The clamp u can be turned away from the head when the nut on bolt v is loosened.

The drill is adapted to be driven by the bevel-gear T, normally meshing with bevel-wheel S on the shaft Q. The construction is of the usual form, except that an adjustable block m, provided with a lining to fit the internally-screw-threaded extension or tubular shaft of the bevel T and combined with means for moving it, whereby the bevel-wheels are thrown out of gear. The shaft of the bevel-

gear T carries a half-lining corresponding to that fastened to the block. In the present instance the block *m* has a recess *p*, which receives an eccentric-pin *n* on the end of a short-cranked shaft *k*, said shaft having suitable bearing in a cap or plate *l*, which bears upon the block *m* and suitably bolted to the drill-frame *g*. This plate can be tightened on the block to compensate for the wear of the linings. By suitably turning the shaft *k* the block is moved endwise through the medium of the pin *n*, which engages the sides of the recess *p*, and the block by reason of its engagement with the flange *s* on the tubular shaft of the bevel-wheel T moves the latter out of engagement with the bevel S. The operation of the drill by this simple and conveniently-located device can be instantly arrested without interfering with the remaining part of the machine. To spur-gear H is fixed the worm-shaft I, suitably journaled in stand B and having the worm J, which latter engages the wheel K loose on the shaft X, which supports and carries the hoisting-drum Y.

e is an oil-chamber in which the wheel K runs, and *z* a cap to the gear-box, of which latter the chamber *e* is a part.

X′ denotes the worm-gear shaft, and *f* and *f′* shaft-box linings, and W the male member of a clutch adapted to engage a corresponding member on the worm-shaft.

The extension B′ is cored out or bored transversely to the oil or worm-wheel chamber and is provided with the linings *f f′*. The clutch member W of the drum-shaft has a diameter equal to that of the said transverse bore. The hub of the worm-wheel K has a greater diameter than the bore and a length equal to the width of chamber *e* and is held against lengthwise movement by the walls of said chamber.

The shaft X, to which is fixed the pulley Y and which carries the male clutch W, is moved lengthwise in its bearings to engage and disengage said clutch by any usual means. The worm and worm-wheel shafts are both journaled in the walls of the chamber *e*, the worm-shafts being removable with cover *z* from the lower or main part of said chamber.

d denotes a pin suitable for entering the groove *c* or for engaging the opposite side of the flange *c′*, according as it is desired to hold the shafts in or out of engagement. By this means the drum-shaft can be run or allowed to rest, as desired.

P indicates a pump, of which O is the piston-rod.

N is a connecting-rod.

N′ is a crank-arm on the shaft Q, and O′ a pin or stud thereon loosely connected to the piston-rod by said rod N.

In Fig. 6 is shown a modified construction whereby the pump is driven from the drum-shaft. L′ indicates a crank-arm on the worm-gear shaft L, which, by the medium of a connecting-rod N, drives the pump-piston. Clutch mechanism similar to that above described is shown in Figs. 7 and 8, whereby the drum-shaft can be thrown into or out of gear.

In Fig. 6 are shown devices for holding the bevel-gear S in or out of engagement with gear T. *a* denotes a groove in shaft Q, adapted to receive a pin V, which, as indicated, also engages when desired on the opposite side of a rib or flange *a′* to hold the bevel-wheels in mesh. The construction of the machine above described is such that the drill and hoisting mechanism, either one or both, can be readily and conveniently moved into or out of gear with the driving mechanism. The arrangement of parts is compact and strong and the gears protected, the worm-gear being entirely inclosed.

Having thus described my invention, what I claim is—

1. The combination of the base provided with stand B, having flanges *o* and with stand C, the stand extension B′, connected to flange *o* of the stand B, the motor having a shaft F with one journal bearing in stand C and the other in stand extension B′, pinion G, fast on said shaft and located between the stand and its extension, and the gear H, both gears being within the flanges *o*, shaft I, worm-wheel K, and shaft X, all substantially as set forth, whereby the shaft is suitably journaled in the stands and the gears are inclosed.

2. The combination of the driving-shaft F, the pinion G, the gear H on the worm-shaft I, the drum-shaft having the gear K, adapted to be driven by the gear H, through the medium of the worm-shaft, and the oil-chamber *e*, having cover *z*, said drum-shaft and worm-shaft being journaled in the walls of the oil-chamber and adapted, together with the worm and worm-wheel, to be lubricated by the contents of said chamber, and said cover being removable with the worm-shaft, substantially as set forth.

3. In a machine for drilling, the stand, the oil-receptacle having tubular extensions or boxes on opposite sides, adapted to receive tubular linings *f* and *f′*, said linings, shafts X and L fitting the same, the clutch W on shaft X fitting one of said bores, and the female clutch on shaft L, situated in the oil-chamber and having a diameter larger than the bore and fitting the oil-chamber in the direction of the length of the shafts, whereby the male clutch is made movable and the female clutch and worm-gear are held against lengthwise movement and all the parts are lubricated, substantially as set forth.

4. The drill-frame, the base, the stand B, supporting bevel-gear S, the bevel-wheel T, having a tubular shaft revoluble in said drill-frame, the adjustable block *m*, embracing said tubular shaft, and a device for moving said block and shaft endwise to throw the bevel-wheels out of gear, substantially as set forth.

5. The drill-frame, the base, the stand B, supporting bevel-gear S, the bevel-wheel T,

having a tubular shaft revoluble in said drill-frame, the adjustable block *m*, embracing said tubular shaft, and a device for moving said block and shaft endwise to throw the bevel-wheels out of gear, consisting of the cranked shaft provided with the eccentric-pin adapted to suitably engage the block, substantially as set forth.

6. The drill-frame, the base, the stand B, supporting bevel-wheel S, the bevel-wheel T, having a tubular shaft revoluble in said drill-frame, the adjustable block *m*, embracing said tubular shaft, and a device for moving said block and shaft endwise to throw the bevel-wheel out of gear, and the plate *l*, bearing laterally upon the said block and provided with fastening devices, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ALBERT BALL.

Witnesses:
FRANK A. BALL,
GEO. E. WOLCOTT.