

(No Model.)

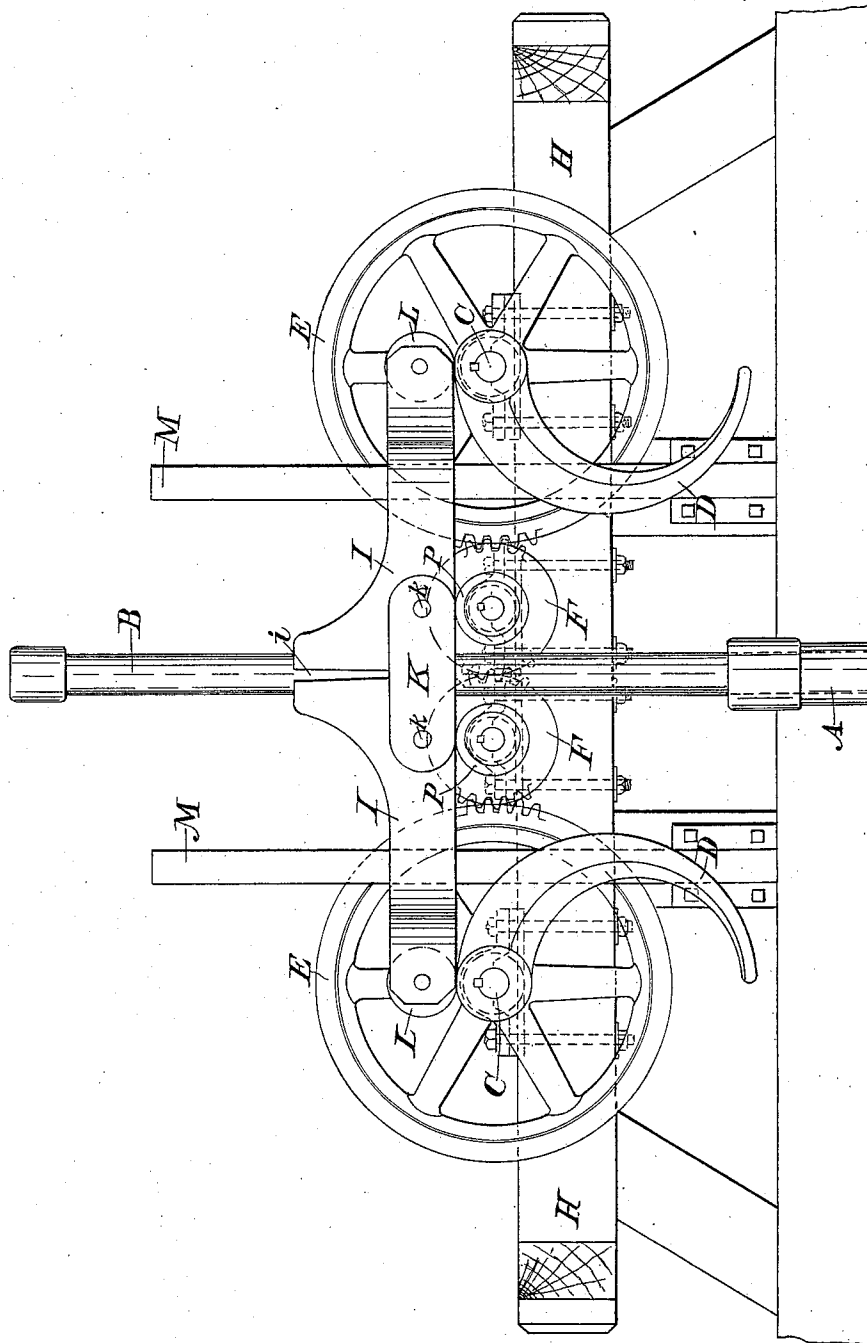
2 Sheets—Sheet 1.

M. G. BUNNELL & T. G. CHAPMAN.
WELL DRILLING MACHINE.

No. 575,693.

Patented Jan. 26, 1897.

Fig. 1.



Witnesses:

A. M. Belfield.
L. A. Gardiner

Inventors,
Morton G. Bunnell.
Thomas G. Chapman,
by Nee & Nee
Attys.

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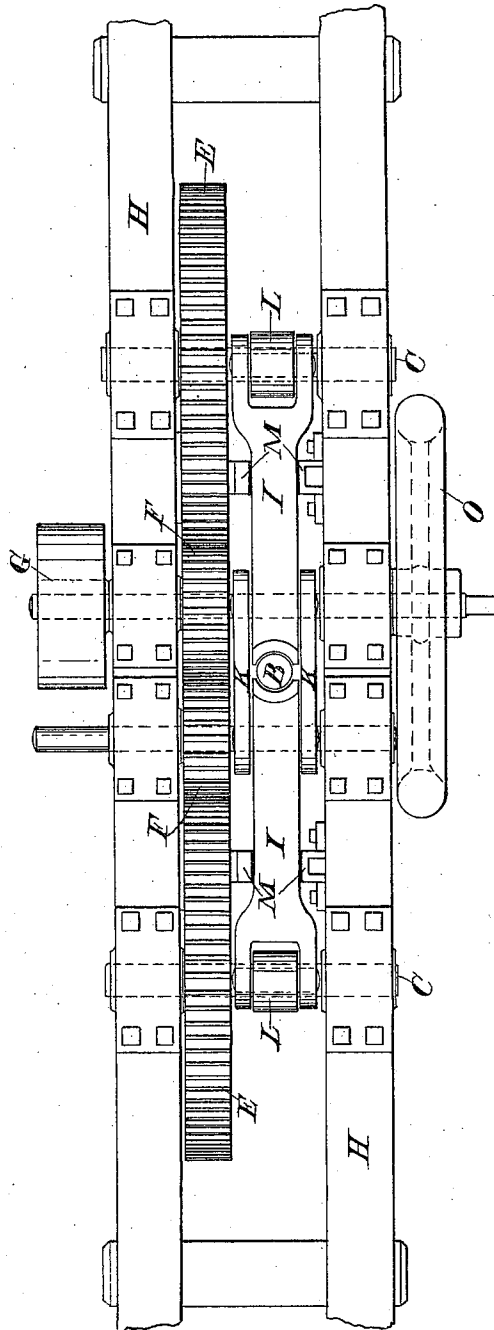


Fig. 2.

Witnesses:

A. M. Belfield.
L. A. Gardiner

Inventors:

Morton G. Bunnell,
Thomas G. Chapman
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Att'ys.

UNITED STATES PATENT OFFICE.

MORTON G. BUNNELL AND THOMAS G. CHAPMAN, OF CHICAGO, ILLINOIS,
ASSIGNORS TO FREDERICK C. AUSTIN, OF SAME PLACE.

WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 575,693, dated January 26, 1897.

Application filed December 24, 1894. Serial No. 532,903. (No model.)

To all whom it may concern:

Be it known that we, MORTON G. BUNNELL and THOMAS G. CHAPMAN, citizens of the United States of America, residing at Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Well-Drilling Machines, of which the following is a description.

Referring to the accompanying drawings, wherein like reference-letters indicate like or corresponding parts, Figure 1 is a side elevation of our improved machine in partial section, and Fig. 2 is a top plan of the same.

In drilling wells it is necessary that the drill be alternately raised and dropped in order that its contact with the opposing rock, &c., may be effective. To do this, it is necessary to connect the drill, which is deep in the earth, with a member extending above the surface, which serves as a means of attachment for thus operating the drill. The connecting member may be flexible or inflexible, as preferred. Thus in some cases it is a rod or pipe of suitable material, while in other cases it is a cable or rope. The operation is substantially the same in either case.

The object of our invention is to provide a simple and effective machine which will temporarily grasp the connecting member and thus alternately lift and drop the drill.

To this purpose our invention consists, essentially, in a vertically-reciprocating gripping device which grasps the member attached to the drill, lifts it the necessary distance, and then falls with it to the first position, opening to permit the member to pass through the increased distance the drill sinks into the earth.

Our invention also consists in the novel construction and arrangement of parts hereinafter more particularly pointed out and claimed.

In the drawings, A represents the outer casing or pipe ordinarily used to hold the walls in place and prevent caving.

B is the member extending downward within the casing, to the lower end of which is attached the drill. As here shown, it consists of a rod or pipe properly jointed for convenience in handling. When the drill is in operation, the member B and its attached drill

are alternately lifted and dropped, as before mentioned.

C C are two driven shafts preferably revolving in opposite directions, each having fixed thereto a cam D. As shown in the drawings, the said shafts are driven by pinions E E, which are in turn driven by intermeshing pinions F F, driven in any preferred way, for example by the pulley G.

The above-described manner of driving the shafts is preferred, but any other means for rotating the shafts may be employed, as preferred, the essential feature being that the two cams or their equivalents shall be of substantially the same form and size and that they shall act in unison in lifting and releasing the gripping device.

The several parts mentioned are properly mounted and sustained in a frame H, which may be of any preferred form or construction.

Above the cams and extending to the member B are two substantially bell-crank levers I I, pivotally connected in such a manner that the arms in proximity form opposing jaws between which passes the member B. The levers are pivotally connected, preferably, by a link K on each side, the pivotal points being at *k k*. The outer ends of the levers are preferably provided with rollers L to prevent undue friction with the cams with which they coöperate, and a stop or stops P near the center, together with the cams, limit the downward movement of the gripping device.

In the drawings the stops P P are formed by mounting loose rollers upon the shafts that support the pinions F F, but any preferred form of stop may be adopted, the only essential requisite being that the inner ends of the jaws shall be stopped in such a manner that the jaws will open to release the member B. The stop or stops may also be placed at any point desired so long as they are so arranged that when the jaws are in contact therewith they will open to allow the member B to pass through.

Any preferred means may be employed to cause the jaws to retain their relative position with the cams, &c., for example, simple vertical guides M M.

A balance-wheel O may be used, if desired,

to give the machine a regular movement or to serve as a hand-wheel to aid in partially lifting the drill for any purpose.

The mode of operation is as follows: The shafts C C and cams D D are operated in unison by means of the connecting mechanism. As the cams move upward they raise the outer ends of the levers I I, which, rocking on the pivots *k k*, move the upward extension of the levers or jaws toward one another, thus gripping the member B firmly between them. As the cams continue their action the levers and member B, with the attached drill, are lifted. When the gripping device has been lifted to its highest limit and the cams have passed under and released the levers, the member B, with the drill and the levers on the gripping device, falls. The stops P P and the cams arrest the fall of the gripping device, which being then open allows the member B to pass through uninterruptedly, so that the drill may sink into the rock or earth. As the shafts continue to rotate the operation is repeated.

We do not desire to limit ourselves to the exact means here shown for alternately lifting and releasing the lever-jaws, as any means preferred may be employed for this purpose, the essential thing being the peculiar gripping device, with means for raising and releasing the same.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a device of the kind described, the

horizontal shafts C C, carrying the cams, D, D, and means for driving the shafts in opposite directions at a uniform speed, in combination with the connected gripping-jaws, I, I, means for guiding the jaws in the vertical plane of the cams, and stops near the inner ends of the jaws for limiting their fall, substantially as set forth.

2. In a device of the kind described, the horizontal shafts, C C, driven in opposite directions at a uniform rate of speed by the cog-wheels E, E, and their intermediate connections, and the cams, D, D, rigidly secured to the shafts and revolving in a vertical plane, in combination with the gripping-jaws, I, I, connected by the links, K, K, means for retaining the jaws in the plane of the cams and stops near the inner ends of the jaws for limiting their downward movement.

3. In a device of the kind described, the horizontal shafts, C C, the cog-wheels, E, E, the driven pinions, F, F, meshing with the cog-wheels and driving the shafts in opposite directions at a uniform speed, the cams, D, D, rigidly secured to the shafts and revolving in a vertical plane, in combination with the connected gripping-jaws, I, I, means for retaining the said jaws in the plane of the cams, and stops near the inner ends of the jaws for limiting their downward movement.

MORTON G. BUNNELL.

THOMAS G. CHAPMAN.

In presence of—

L. A. GARDINER,

A. M. BELFIELD.