(No Model.)

W. W. GILES.

DRILLING MACHINE.

No. 250,907. Patented Dec. 13, 1881.

Fig. 1.

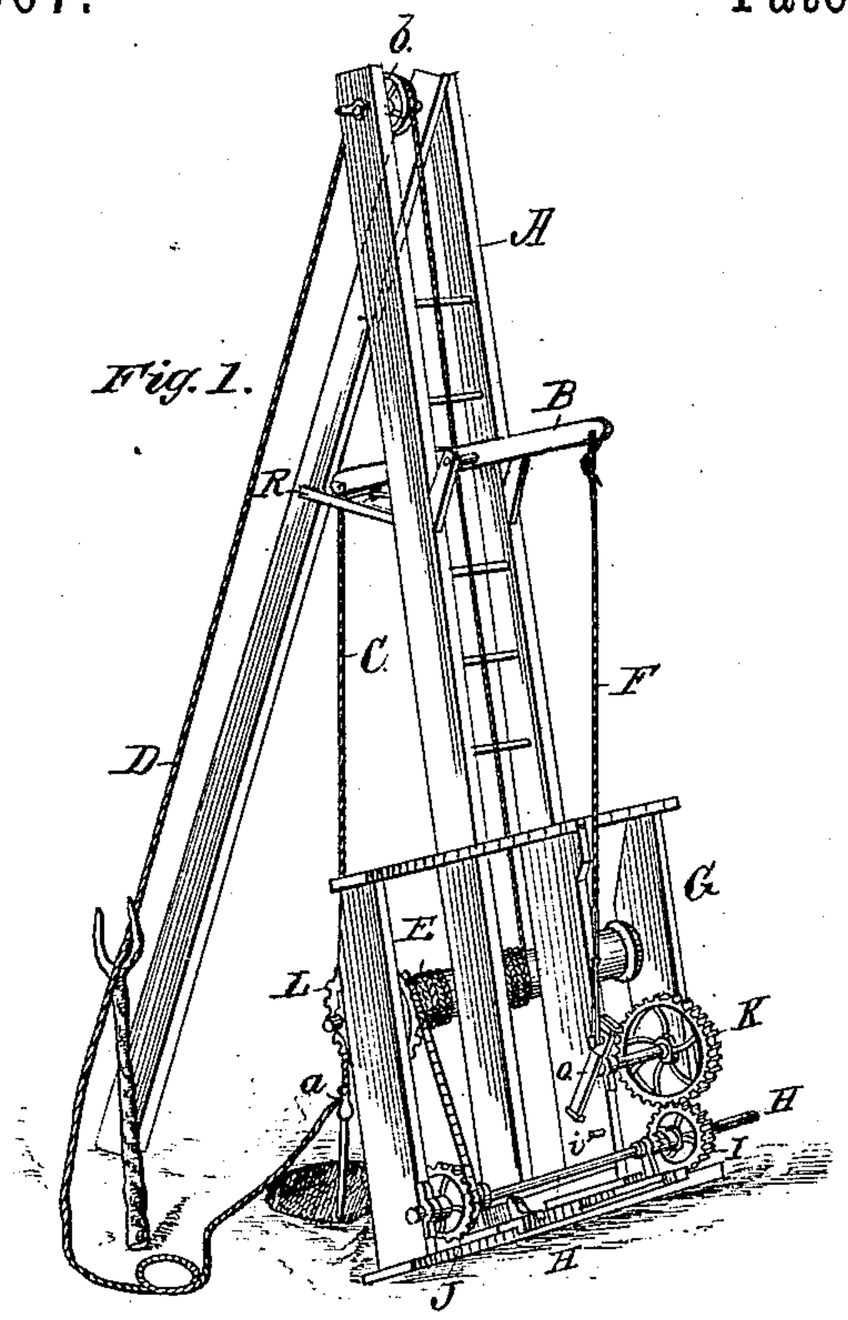
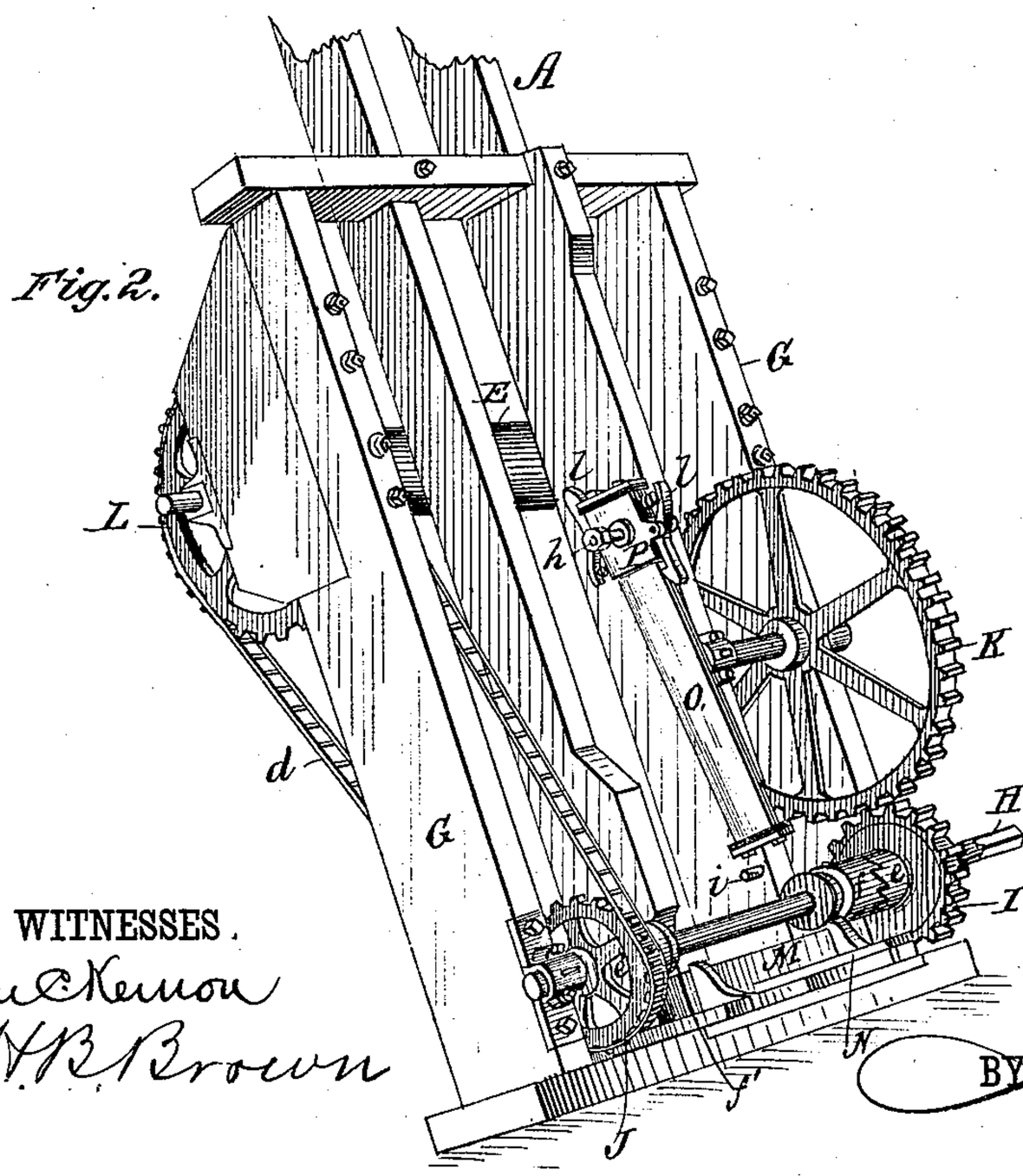


Fig. 3.

Fig. 2.



WITNESSES.

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DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 250,907, dated December 13, 1881.

Application filed October 1, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. GILES, of Chicago, in the county of Cook and State of Illinois, have invented a new and Improved Drilling-Machine; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of the entire machine. Fig. 2 is a perspective view, on an enlarged scale, of the driving mechanism. Fig. 3 is a detail of the double crank with sliding block.

My invention relates to an improved construction of drilling-machine designed to operate a vertically-reciprocating drill for the purpose of sinking wells or prospecting for minerals. In its general construction it embodies a derrick with a walking-beam fulcrumed in the same, near the top, which walking-beam is connected at one end to the drill-rope, and at the other end is connected to a rope that is alternately pulled down and released to operate the drill.

The invention consists in the novel construction of devices for alternately pulling and releasing the rope for operating the walking-beam, which devices are designed to avoid lost motion in operating the drill, to avoid the whipping or lateral swaying of the drill-rope when the drill falls, and to avoid, also, the sudden strain on the horse or jerking of the traces when the drill falls.

The invention also consists in the peculiar means for simultaneously disconnecting the driving mechanism from the drilling devices, and throwing in gear the winding devices for raising the drill, or vice versa, all as hereinafter more fully described.

In the drawings, A represents a derrick, in the upper portion of which is fulcrumed a walking-beam, B.

C is the working-section of the drill-rope, which, at its upper end, is fastened to one end of the walking-beam, and at its lower end is detachably fastened by a clamp, *a*, to the main drill-rope D, which passes around a pulley, *b*, at the top, and thence descends and is wound upon a drum, E.

F is a rope-section connecting the outer end of the walking-beam to the working mechanism for oscillating said walking-beam. By alternately straining or pulling down upon this rope F and releasing it the drill is raised and allowed to fall of its own gravity to produce the drilling effect in the earth. When the drill is to be raised the clamp *a* is released from the main drill-rope D, and the latter wound upon the drum E.

I will now proceed to describe the means for operating the drill and raising it, which I claim as my invention.

At the lower end of the derrick there is a frame, G, formed of four upright parallel bars, the two middle ones of which are prolongations of the derrick-bars, to which the two outer ones are fastened by cross-bars at top and bottom. In the upper and inner portion of this frame G is journaled the winding-drum E, and on the lower and outer portion of which is journaled a main drive-shaft, H. This drive-shaft is arranged to be coupled to a driver by a horse-power or other prime mover.

Upon the main drive-shaft are two toothed wheels, I and J, which are loose on the shaft and rest respectively between the outer bars of the frame and the derrick-bars. One of these wheels, I, gears with and drives a wheel, K, for working the walking-beam, and the other one, J, is connected by a chain, *d*, with a toothed wheel, L, on the winding-shaft for winding up the drill.

On the two wheels I and J are formed clutch-sections *e e'*, and immediately adjacent to the same are corresponding clutch-sections, *f f'*, which, while they are permitted to slide longitudinally on the shaft, always revolve rigidly with it, this result being attained by a feather-and-groove connection or angular form of shaft. These two clutch-sections *f f'*, I connect, by means of peripheral grooves, with a frame, M, sliding parallel with the main shaft and worked by a lever, N, or by other suitable means, so that when the clutch *f* is thrown into gear with *e* for working the walking-beam the clutch *f'* is thrown out of gear from *e'* for disconnecting the driving devices of the winding-drum, and vice versa. It will thus be seen that only one movement and one set of devices is employed

for changing the application of power from the working of the drill to raising it from the well.

For working the walking-beam by alternately pulling down its outer end and letting it go, loose cranks, operated by a lug on the shaft, have heretofore generally been used, and when these are connected with the walking-beam by a rope the revolution of the crank causes the rope to whip against the derrick, wearing away both the derrick and the rope. There was, moreover, some lost motion, because only one-half of the revolution was used for lifting the drill, and, besides, a jerking strain was produced on the traces of the team by the fact that when the crank passed the dead-center it ran away from the lug on the shaft from the weight of the drill, and when the lug caught up again it produced the jerking strain on the team, which was very objectionable. To remedy these difficulties I place upon the inner end of the shaft of the wheel K a straight rigid bar, O, connected at its middle portion firmly to the shaft of said wheel, or formed in one piece with it, and occupying a position at right angles to said shaft, and forming therewith a T-shaped double crank. This double-crank bar is formed with heads *g* at its ends, cushioned on their inner edges with rubber or other soft material. This double crank is smoothly planed, and forms a guide upon which moves, from end to end, the sliding block P, which partially embraces said double crank. Laterally from the said block there projects a hook, pin, or bolt, *h*, which constitutes a point of attachment for the working-rope F. Upon the opposite sides of the sliding block P are fulcrumed locking-catches *l l*, one end of each of which is formed with a shoulder that locks over the ends of the double crank, and the other ends of which catches are forced up by springs to hold the shoulder at the opposite end over the head of the crank till it is time for it to be released. For this latter purpose a tripping-pin, *i*, is arranged in one of the bars of the frame, in a position where it will be struck by the projecting ends of each locking-catch whenever the sliding block reaches its lowest point in its revolution, and which locking-catch will by impact with the pin be removed from its position over the head of the crank, and the block allowed to slide up by the gravity of the drill. This action takes place at or about the time when the double crank is in line with the rope F, and the rope, in its retraction, therefore moves in a direct longitudinal line, without any lateral movement or whipping action. When the sliding block reaches the high end of the double T-crank its shock is broken by the rubber, and the catch on the opposite side locks over this end of the crank, and it immediately commences to be drawn down again. It is therefore evident that two movements of the drill are obtained for every revolution of the T-crank, and as the interval of the retraction of the rope is so short, and the pulling down of the beam so quickly commenced again, all lost motion and jerking strain on the team is avoided.

In making use of my invention I may use, as an equivalent of the walking-beam, a wheel or pulley.

In constructing the derrick I prefer, also, to arrange a stop-bar, R, just beneath the inner end of the walking-beam, which bar is struck by the walking-beam at the end of its down-stroke to relieve the strain exerted on the head of double crank *o* by sliding block P.

In connection with the winding-shaft E, I find it advantageous and propose to use a brake of any suitable construction.

Now, in defining my invention more clearly with respect to what has preceded it, I would state that I am aware that the lift-rope F of a drilling-machine has been attached to a sliding block moving transversely to the axis of revolution, but having no locking or catch devices for holding the sliding block to its place at the ends of its travel while pulling on the lift-rope, as shown in Patent No. 53,022. It is obvious, therefore, that the movement of the sliding block was not confined to the line of the rope, and, besides, the same irregular jerking action on the team existed, and the advantages enumerated for my invention could not therefore be obtained.

Instead of making the sliding block to embrace the double crank as its guide the double crank may be slotted and the block arranged to play in said slot; or instead of a double crank the shaft may have a large drum whose diameter is traversed by a slot in which the sliding block can play, it being necessary in all cases, however, to have some sort of a catch or locking device to hold the sliding block at the ends of its travel until in the proper right line position for retractile movement.

Having thus described my invention, what I claim as new is—

1. The combination, in a drilling-machine, with the rope operating the drill and the driving mechanism, of a rotary shaft bearing a guide arranged at right angles to the said shaft, and a sliding block connected to said rope and moving over said guide, the said sliding block and rotating guide being connected and held together when the block is at the ends of the guide, and the block being free to move over the guide at intermediate points, substantially as and for the purpose described.

2. In a drilling-machine, the combination, with the rope operating the drill and the driving mechanism, of a rotating shaft having on its end a rigid guide-bar extending at right angles across its end, and a sliding block connected with the drilling-rope and sliding over the said guide-bar, the said sliding block and guide-bar being connected when the block is at the ends of the guide-bar, and free to move thereon at intermediate points.

3. In a drilling-machine, the combination, with the rope operating the drill and the driving mechanism, of a rotating shaft having a rigid guide-bar extending across the end of the same and provided with heads, a sliding block arranged upon the guide-bar, and provided with spring-catches adapted to engage with the ends thereof, and a tripping-pin or abutment for throwing out the catches when the guide-bar is in alignment with the rope, substantially as and for the purpose described.

4. In a drilling-machine, the combination, with a derrick having a frame, G, at its lower end, with a set of operating-gears for working the drill at one side of the frame, and a set of winding-gears for raising the drill at the other, a drill-shaft extending across the frame and having loose wheels I and J, with clutch-sections, and the connected clutches *f f*, with mechanism, substantially as described, for simultaneously connecting the gears on one side and disconnecting them on the other.

The above specification of my invention signed by me in the presence of two subscribing witnesses.

WILLIAM W. GILES.

Witnesses:
EDW. W. BYRN,
SOLON C. KEMON.