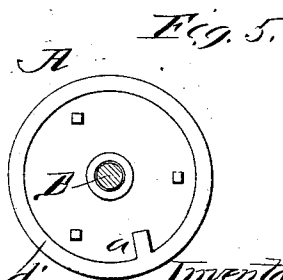
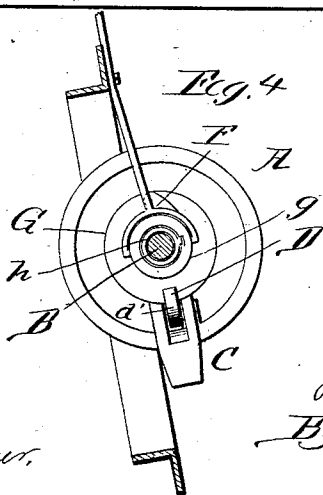
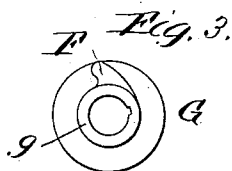
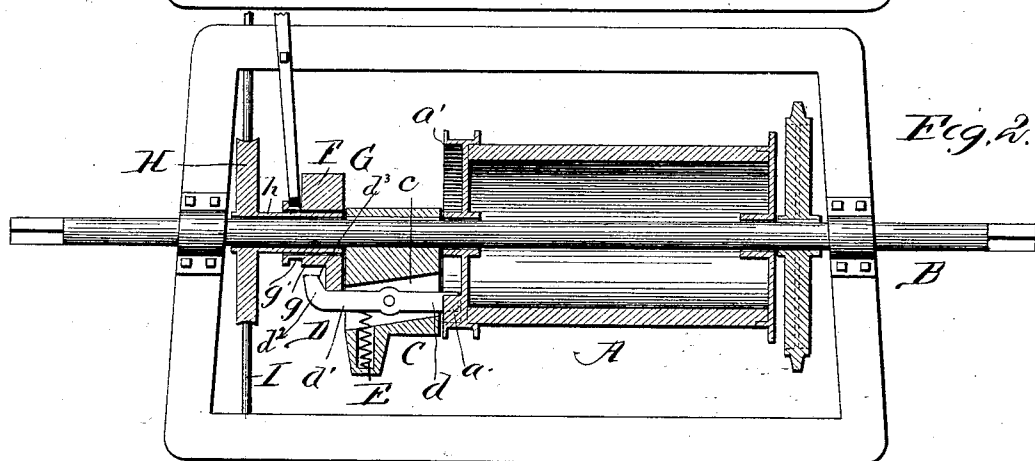
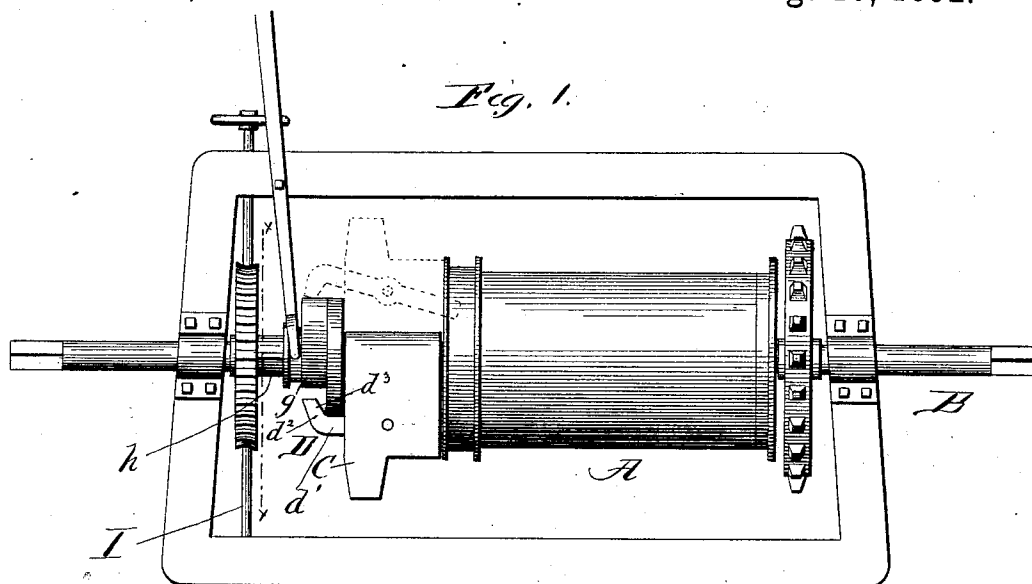


J. GARDNER.
WELL DRILLING MACHINE.

Patented Aug. 16, 1892.



Witnesses.
Frederic H. Mills.
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John Gardner
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UNITED STATES PATENT OFFICE.

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WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 480,906, dated August 16, 1892.

Application filed July 17, 1891. Serial No. 399,881. (No model.)

To all whom it may concern:

Be it known that I, JOHN GARDNER, a citizen of the United States, residing at Bloomington, in the county of Du Page and State of Illinois, have invented a certain new and useful Improvement in Well-Drilling Machines, of which the following is a specification.

My invention relates to well-drilling machines of that class in which the chain or cable for suspending and alternately raising and permitting the drop of a well-tube or drill-rod is governed by a reversibly-rotating winding-drum, which is arranged loose upon a revolving shaft and alternately locked upon and unlocked from the same, so that during the brief periods in which the drum is locked upon the shaft it will be revolved in a direction to wind up the chain or cable, while, on the other hand, during the periods of the release of the drum from the shaft it will be permitted to turn in an opposite direction, so as to allow the chain or cable to unwind.

In a machine characterized by my invention the winding-drum is arranged loose upon the rotary driving-shaft and provided at one end with a stop or abutment. Adjacent to said end of the winding-drum is a spring-latch, which revolves with the shaft and which is normally in position to engage the stop on the drum, the latch being at a point in its revolution released from the drum by reason of its engagement with a stationary cam. As a means for placing and locking the latch out of position for engaging the drum and cam I provide an adjustable dog arranged to engage the latch, as hereinafter more fully set forth.

In the accompanying drawings, Figure 1 represents in elevation a portion of a well-drilling machine embodying my invention. Fig. 2 is a vertical longitudinal section of the same, the frame being, however, in elevation. Fig. 3 is an end view of the cam and adjustable dog. Fig. 4 is a section on line *xx* in Fig. 1. Fig. 5 is an end view of the winding-drum with the rotary shaft in cross-section.

A indicates the winding-drum, and B denotes the rotary driving-shaft upon which the winding-drum is loosely arranged. The bear-

ing C, for the latch D, is keyed or otherwise secured upon the driving-shaft, and is provided with a recess *c*, adapted to afford suitable working space for the latch. The latch is pivoted between its ends and is confined between the two side walls of recess *c*, which said sides form abutments arranged to oppose lateral shocks to which the latch may be subject. The latch is arranged as a lever, and may be said to have its front arm *d* adapted to extend forwardly from the bearing so as to normally lie in the path described by a stop *a*, arranged at one end of the winding-drum. A spring E, for causing the forward end of the latch to normally lie in the path of the stop *a* on the winding-drum, is confined within the bearing C and applied to the rear arm *d'* of the latch. The cam F for operating the latch is stationary with regard to the rotation of the shaft, although it can be adjusted, as hereinafter set forth. The rear arm of the latch is arranged so that while the latch is being carried round with the revolving driving-shaft its said arm will engage the cam, which will serve to swing the latch about its pivot in a way to cause its forward end to clear the stop on the drum and thus temporarily unlock the latter from the driving-shaft.

As a means for locking the latch in condition to allow it to be revolved by the driving-shaft without engaging the winding-drum, I provide an annular non-rotating stop or dog G, which is arranged for adjustment toward and away from the winding-drum, and I so relatively form and position the said stop or dog and the rear arm of the latch that by properly adjusting the annular stop or dog it can be caused to engage and force the rear end of the latch-arm in a direction to cause the forward end of said latch to clear the stop *a* on the drum, and hence permit the latch to revolve with the shaft without operating the drum and without engaging the cam.

While the dog or stop G is non-rotative—that is to say, it does not rotate with the driving-shaft—I prefer as a simple and compact arrangement to provide a hub or sleeve *g*, both with said stop or dog and with the cam F, and arrange said sleeve or hub to slide along a sleeve or hollow bearing *h*, which is

rigid with a worm-wheel H, by which arrangement the sleeve *g*, cam F, and dog G can, if preferred, be all of one piece. The hub or sleeve *g* can be feathered on the sleeve or hollow journal *h* of the worm-wheel, which latter can be turned by a worm arranged on a shaft I, but not shown. The driving-shaft extends through the worm-wheel and its hollow journal, but does not affect the same.

10 The rotary adjustable worm-wheel can be turned by turning the shaft I, and by thus adjusting the worm-wheel the sleeve *g*, which carries the cam, can be turned, and hence a rotary adjustment given to said cam for the purpose of timing the operations of the drum.

15 The stop or dog G and cam can be adjusted independently of the worm-wheel by means of a lever K, having at one end a fork arranged to straddle the sleeve *g* and engage in an annular groove *g'* in the same.

20 As a desirable way of arranging the stop *a*, one of the ends of the drum is provided with an annular flange *a'*, which is in turn provided with said stop.

25 The rear arm *d'* of the latch has its end *d²* bent inwardly or toward the driving-shaft, the general arrangement being such that when the latch is in working condition the dog G will be forward of the inclined shoulder *d³*, formed by bending the end of the latch-arm,

as aforesaid. When, however, the dog is adjusted in a direction away from the drum it will engage said incline or inclined shoulder *d³* on the latch, and hence force the latter out of position for engaging the drum.

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What I claim as my invention is—

1. The combination, with the drum and pivoted latch for engaging and releasing the same and cam for operating the latch, of the adjustable dog, adapted and arranged for engaging and holding the pivoted latch out of position for engaging the cam and the drum, substantially as described.

40

2. The combination, with the drum, of the pivoted latch provided with an incline, and the adjustable annular dog G for engaging said incline on the latch, for the purpose set forth.

45

3. The combination, with the drum and latch for engaging and releasing the same, of the cam F and dog G, for the purpose set forth, arranged upon a hub or sleeve which is applied to slide along a bearing formed by the hollow journal *h* of a worm-gear, substantially as described.

50

JOHN GARDNER.

Witnesses:

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