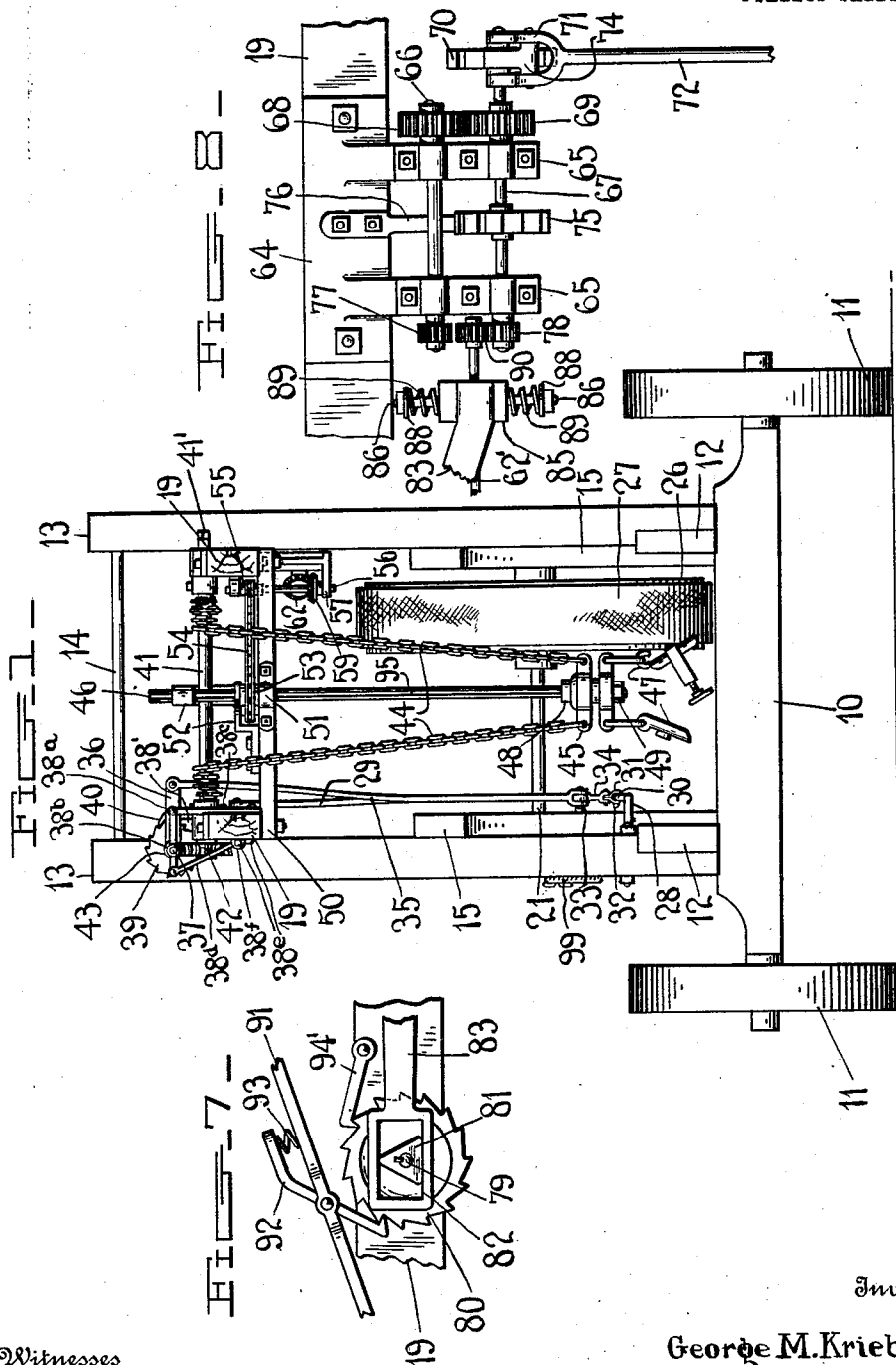


G. M. KRIEBEL.
WELL DRILL.
APPLICATION FILED FEB. 10, 1910.

1,011,818.

Patented Dec. 12, 1911.

4 SHEETS—SHEET 1.



Inventor

George M. Kriebel

Witnesses

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L. N. Ellis

By

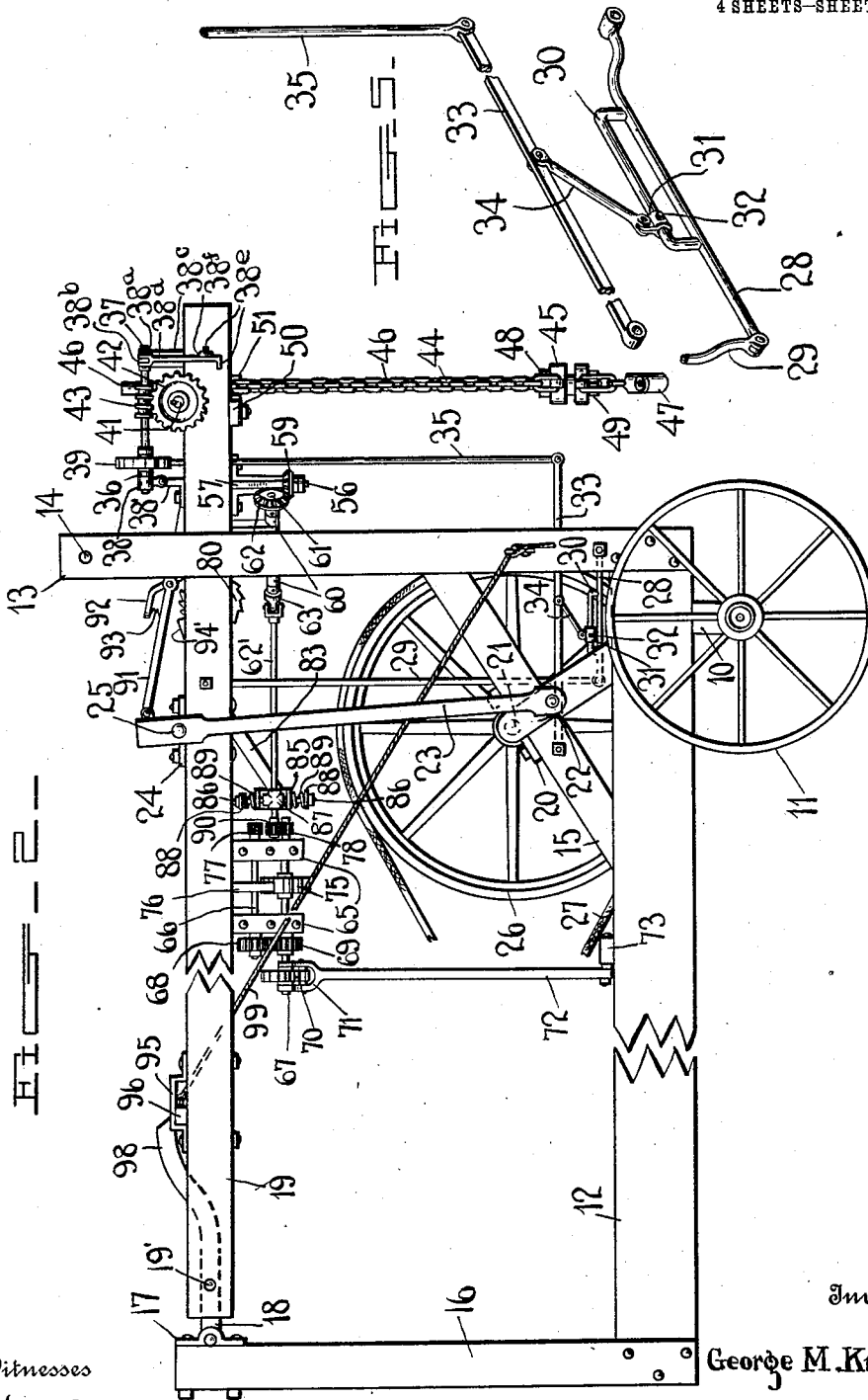
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WELL DRILL.

1,011,818.

4 SHEETS—SHEET 2.



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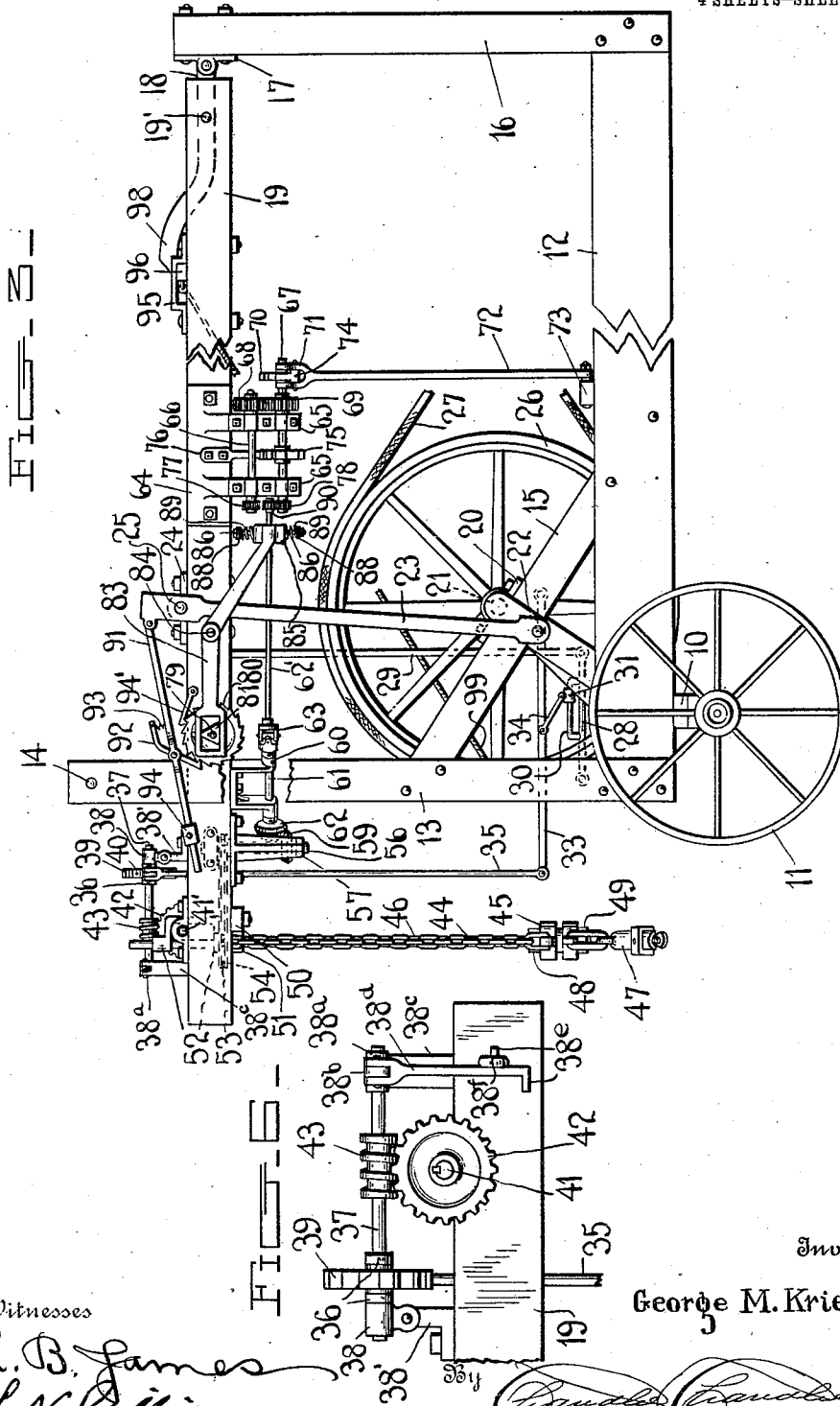
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4 SHEETS-SHEET 3.



Witnesses

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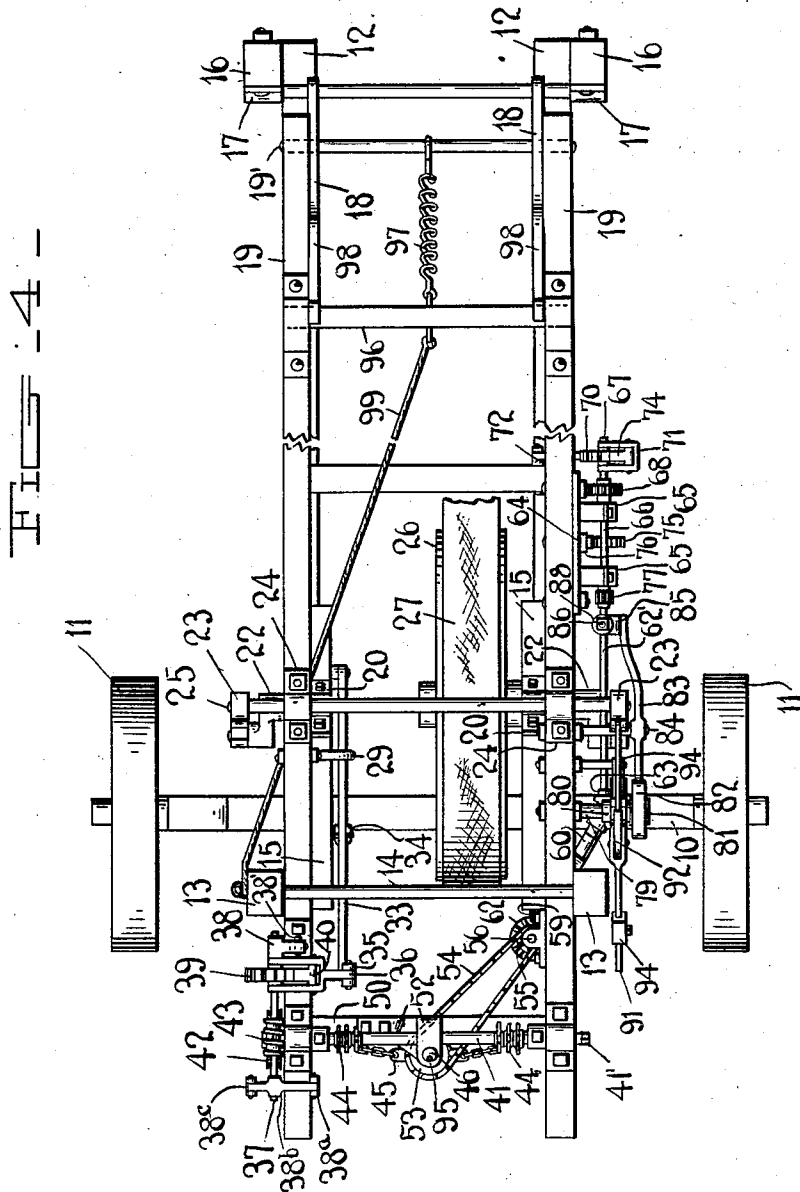
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4 SHEETS—SHEET 4.



Witnesses

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UNITED STATES PATENT OFFICE.

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WELL-DRILL.

1,011,818.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE M. KRIEBEL, a citizen of the United States, residing at Garfield, in the county of Whitman, State of Washington, have invented certain new and useful Improvements in Well-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 appertains to make and use the same.

This invention relates to well drills.

One object of the invention is to provide a portable well drill wherein there shall be improved means for automatically lowering the drill gradually as the drilling proceeds.

A second object of the invention is to provide means whereby the operation of drilling will automatically cause the drill to be rotated so that the bit will be turned and its edge prevented from striking twice in the same place, this being accomplished by a novel means.

A third object of the invention is to provide a novel means whereby the rotating mechanism may be automatically reversed after a predetermined number of strokes of the drill is had.

With the above and other objects in view as will be hereinafter apparent, the invention consists in general of a frame, drilling mechanism, improved feeding mechanism, and improved drill rotating and reversing mechanisms.

The invention further consists in certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings, and specifically set forth in the claims.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:—Figure 1 is a front elevation of a drill constructed in accordance with this invention certain of the parts being omitted to more clearly show those immediately in front. Fig. 2 is an elevation of the right side of the drill shown in Fig. 1. Fig. 3 is a similar view of the left side of this drill. Fig. 4 is a top plan view of this drill. Fig. 5 is a detail perspective of a certain lever system employed in this drill. Fig. 6 is a detail to an enlarged scale showing certain gearing and ratchet mechanism used in connection with this drill and actuated by the lever system shown in Fig. 5. Fig. 7 is an enlarged de-

tail view of a portion of the reversing mechanism above referred to. Fig. 8 is an enlarged detail of another portion of this reversing mechanism.

The main frame is supported on a front truck comprising an axle 10 and wheels 11 at one end and at the other end is supported on a similar truck not deemed necessary here to be shown as the same is of ordinary character. Extending from one of these trucks to the other are main frame members 12 from the forward ends of which rises a gallows frame comprising side members 13 and a tie rod 14. This gallows frame is securely braced to the members 12 by braces 15. At the opposite end of the main frame members 12 rise uprights 16 to the upper end of each of which is bolted a bearing. In these bearings are carried levers 18 which are attached to the rear end of a beam 19 as indicated at 19'. Carried in bearings 20 on the braces 15 is a crank shaft 21 provided with cranks 22. To each of these cranks 22 is pivoted one end of a pitman 23. Upon the beams 19 are bearings 24 whereto the pitmen 23 are pivoted as indicated at 25, it being noted that the pivot 25 lies intermediate the ends of the respective pitman so that a portion thereof extends above said pivot. Now, if the shaft 21 be rotated it will be obvious that the beams 19 will have their front ends raised and lowered. In order to rotate the shaft 21 a band wheel 26 is provided around which extends a belt 27 which leads to any suitable engine, the latter being omitted from the drawings in order to add clearness thereto.

The mechanism just described is that common to well drills of this type, but the mechanism of improved character whereby the drill is lowered into the well as the drilling proceeds will now be described.

Pivoted at one end to one of the gallows frame side members 13 is a lever 28 the opposite end of which is connected to a lift link or rod 29 which has its upper end pivotally connected with one of the beams 19. This lever 28 is furthermore provided with an offset loop 30 slidably mounted on which is a sleeve 31 which may be locked in any desired position on the loop by means of a set screw 32. At 33 is a lever which has one end pivoted to one of the brace members 15. Pivoted fixedly to this lever 33 is a link 34 the opposite end whereof is pivoted to the sleeve 31. Extending up-

ward from the free end of the lever 33 is a rod 35 and this rod is connected to a pawl lever 36 which is pivoted on a shaft 37, one end of which is carried in a suitable bearing 38 pivoted to a bracket 38', mounted on one of the beams 19. The other end of the shaft 37 is carried in a bearing 38^a formed intermediate the ends of a bar 38^b one end of which is pivoted to the upper end of a bracket 38^c mounted on said beam, while the opposite end is supported in the forked end of a resilient latch member 38^d the lower end of which is provided with arms 38^e extending from opposite sides thereof and positioned in spaced relation along said latch, the arms being engageable in an eye 38^f secured to the side of said beam 19 so that the end of the shaft carried by the bar 38^b may be raised or lowered as desired.

The pawl lever 36 is provided at its pivot end with a fork between the arms of which lies a ratchet 39. This ratchet 39 is securely keyed upon the shaft 37 so that as the ratchet rotates the shaft also will rotate. Between the jaws of the fork just described is held a pawl 40 which bears against the ratchet so that as the pawl lever 36 is oscillated about its pivot point the ratchet 39 will be actuated. Now, by reason of the peculiar lever system just described every time the beams 19 are raised the end of the lever 28 to which the link 29 is attached will be raised. This in turn will raise the end of the lever 33 to which the link 35 is attached, this being accomplished by means of the link 34 and it will be plain from an inspection of Fig. 2 that by varying the position of the sleeve 31 upon the offset 30 the lift of the beams 19 may remain constant whole the lift of the rod 35 may be varied. Now as the rod 35 is lifted the pawl 40 will actuate the ratchet 39 and consequently rotate the shaft 37.

Mounted in suitable bearings on the beams 19 is a shaft 41 at one end whereof is a worm wheel 42 which meshes with a worm 43 fixed upon the shaft 37. By means of this gearing the shaft 41 is rotated by the actuation of the pawl and ratchet mechanism. Upon the shaft 41 are wound chains 44 to the lower ends of which is attached a sleeve 45 through which passes a vertical drill shaft 46 having at its lower end a drill attaching clamp as indicated at 47. In order to prevent this shaft from slipping through the sleeve 45 a collar 48 is pinned thereon above said sleeve and to prevent slipping in the other direction the lower end of the shaft is threaded and provided with a nut 49. Extending across the beams 19 is a guide bar 50 provided with a centrally disposed guide 51 wherethrough the upper end of the shaft 46 passes. The chains 44 are so wound upon the shaft 41 that as the beams 19 are moved up and down and the shaft 41 rotated

as previously described, these chains will be unwound. Now it will be obvious from the foregoing that the amount of motion of the rod 35 will regulate the revolution of the ratchet 39 in such manner that the chains may be unwound as rapidly or as slowly as desired.

In order to actuate the shaft 41 by hand so that the drill clamp 47 may be quickly positioned the said shaft 41 is provided with a polygonal end 41' upon which a crank may be placed.

Turning now to the means whereby the shaft 46 is rotated during the drilling movement, it will be observed that upon the guide bar 50 is mounted a bracket 52 and between this bracket and the guide bar 51 is a sprocket 53 around which passes a chain 54. At 55 is a second sprocket around which said chain 54 passes and this second sprocket is mounted on a shaft 56 supported in suitable bearings 57 carried by one of the beams 19. At the lower end of the shaft 56 is mounted a bevel gear 59. Beneath the beam 19 is a bracket 60 provided with suitable bearings to receive a shaft 61 whereon is mounted a bevel gear 62 which meshes with the gear 59. Connected by a Hooke's joint 63 to the shaft 61 is a shaft 62' the opposite end of which is supported in a manner hereinafter to be described.

Mounted on one of the beams 19, the same being that on which the bracket 60 is mounted, is a bracket 64 provided with bearings 65, there preferably being two pairs of these bearings. The upper bearings 65 receive a shaft 66 while the lower bearings 65 receive a shaft 67. Mounted on the shafts 66 and 67 are gears 68 and 69 which mesh with each other so that as one shaft is rotated in one direction the other shaft will be rotated in the opposite direction. The shaft 67 extends beyond the gear 69 and on this extended portion is a ratchet 70. At 71 is a pawl lever which is forked at one end and straddles the ratchet 70 while the opposite end thereof is connected to a rod 72 which is in turn connected pivotally as at 73 to one of the frame members 12. In the fork of the lever 71 is carried a pawl 74. By means of this arrangement every time the beams 19 are raised the pawl moves freely around the ratchet 70 while when these beams are allowed to drop the pawl engages the ratchet and rotates the shaft 67, thereby also rotating the shaft 66. In order to prevent backward rotation of these shafts there is mounted on the shaft 67 a ratchet 75 and on the bracket 64 is a spring pawl 76 which engages with this ratchet in such manner as to permit free movement in one direction and prevent any movement in the opposite direction. On the ends of the shafts 66 and 67 opposite the gears 68 and 69 respectively are gears 77 and 78. These

gears do not mesh but on the contrary are spaced a considerable distance apart.

Mounted well forward of the pitman 23 on this side of the machine is a stub shaft 79 whereto is secured a ratchet 80. This stub shaft also is provided with a triangular member 81 which lies inside of a loop of rectangular shape as at 82 formed at the end of a lever 83 pivoted as at 84 intermediate its ends. This triangle and loop are of such character that the rotation of the triangle causes the loop to move up and down alternately. The lever 83 is provided at the end opposite the loop with a fork 85 comprising a pair of vertically disposed ears and through these ears extend stems 86 which carry at their inner ends a bearing 87 wherethrough passes the shaft 62'. Collars 88 are held upon the outer ends of the stems 86 and between these collars and the fork 85 are springs 89. Upon the extremity of the shaft 62' is a gear 90 of uniform pitch with the gears 77 and 78 and of such diameter that when engaged with one of these gears it will be free from the other. In order to rotate the shaft 79 a rod 91 is secured at one end to the upstanding portion of one of the pitmen 23 and to this rod is pivoted a pawl 92 normally urged by a spring 93 into engagement with the ratchet 80. This rod is furthermore provided with a weight 94 to prevent the jumping of the rod during the movement of the machine. Now as the crank rotates the upper end of the pitman will be moved backward and forward as well as raised and lowered and it is this backward and forward component of this movement that reciprocates the rod 91 and consequently causes the pawl 92 to actuate the ratchet 80. In order to hold the ratchet in position after its actuation there is provided a retaining pawl 94'.

In order that the beams 19 may be dropped back for the purpose of withdrawing or inserting tools in a well the members 18 are connected to the beams 19 by pivot connections shown, as previously noted, at 19'. On top of each of the members 19 is a guide bracket 95 and extending across said members 19 is a locking bar 96. This locking bar is normally drawn toward the pivoted end of the members 19 by a spring 97 one end of which is secured to the locking bar at its center while the opposite end is secured to the rod forming the pivot 19' as clearly seen in Fig. 4. The members 18 are upwardly curved and extend forwardly so that they normally lie with their extremities above the locking bar 96 as indicated at 98. Extending from the center of the locking bar 96 to a suitable point at the front of the machine is a pull cord 99. Now, if it be desired to drop the drill head rearwardly the pull cord 91 is drawn upon so that the ends 98 of the members 18 are released.

This permits said members 18 to swing downward and in consequence the members 19 will move rearwardly. In the operation of this portion of the device it will be seen from an inspection of Fig. 3 that the movement of the beams 19 actuates the shafts 66 and 67 as previously described. Now, if the gear 90 be in mesh with the gear 78 the shaft 62' will be turned in one direction and will turn, through the gearing previously described, the shaft 46 in the corresponding direction. After the beams have been raised and lowered a certain number of times depending on the distance between the member 25 and the point of attachment of the rod 91, the triangle 81 will be rotated from the position shown to that in which one of the angles will point downward. This will depress the end of the lever surrounding the triangle and consequently raise the opposite end thereof. The raising of this opposite end will raise the free end of the shaft 62' and cause the gear 90 to mesh with the gear 77 and rotate the shaft 62' and consequently the shaft 46 in the opposite direction. The springs 89 are provided for the purpose of preventing the gears 77 and 78 having the gear 90 forced too strongly into mesh therewith.

It will be observed from the foregoing that by means of this mechanism the operation of the beams 19 will cause the shaft 46 to be fed downward while at the same time it is rotated first in one direction and then in the opposite direction. In order to provide for this downward feed through the gear 53 the shaft 46 has a long splineway 95 cut therealong while the gear 53 is provided with a suitable key to enter said splineway, the latter not being deemed necessary to be shown as being of ordinary construction.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that minor changes may be made in the form and construction of this invention without departing from the material principles thereof. It is not therefore desired to confine the invention to the exact form herein shown and described, but it is wished to include all such as properly come within the scope of the appended claims.

Having thus described the invention, what is claimed as new, is:—

1. In a well drill, a main frame, a gallows frame extending upwardly from one end of the main frame, uprights at the opposite end of said main frame, drill shaft supporting beams pivoted to said uprights to swing in vertical planes, a horizontal shaft carried on the free ends of said beams, gearing to rotate said shaft, a pawl and ratchet mechanism to actuate the gears, a lever pivoted at one end to the gallows frame, a link

connecting said lever to one of the beams, a second lever pivoted on a portion of the frame, a link pivoted to the second lever and slidably connected to the first lever, means
5 to hold said link in adjusted position on the first lever, and a rod connecting the end of the second lever and the pawl and ratchet mechanism.

2. In a well drill, a main frame, a gallows
10 frame at one end thereof, uprights at the other end thereof, drill shaft supporting beams pivoted to said uprights to swing in vertical planes, a guide extending across said beams, a rotatable drill shaft held in
15 said guide, parallel shafts mounted on one of said beams, gears on said shafts meshing with each other, other gears on said shafts of relatively small diameter and spaced apart, a pawl and ratchet mechanism for

actuating one of said shafts, an operative 20 connection between the main frame and said pawl and ratchet mechanism, a shaft supported from said beam, a gear on said shaft arranged to mesh with one or the other of the last mentioned gears, gearing actuated 25 by said shaft to rotate the drill shaft, a pitman to move the beams, and elements arranged to shift the last mentioned gear and cause the same alternately to mesh with the spaced gears and reverse the movement of 30 said shaft, said elements being operated by the movement of said pitman.

In testimony whereof, I affix my signature, in presence of two witnesses.

GEORGE M. KRIEBEL.

Witnesses:

U. R. COUCH,

I. M. McCARTHY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."