No. 632,921. Patented Sept. 12, 1899.

H. S. & C. E. GLENN.

PORTABLE DRILLING MACHINE.

(Application filed Oct. 29, 1897.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 7.

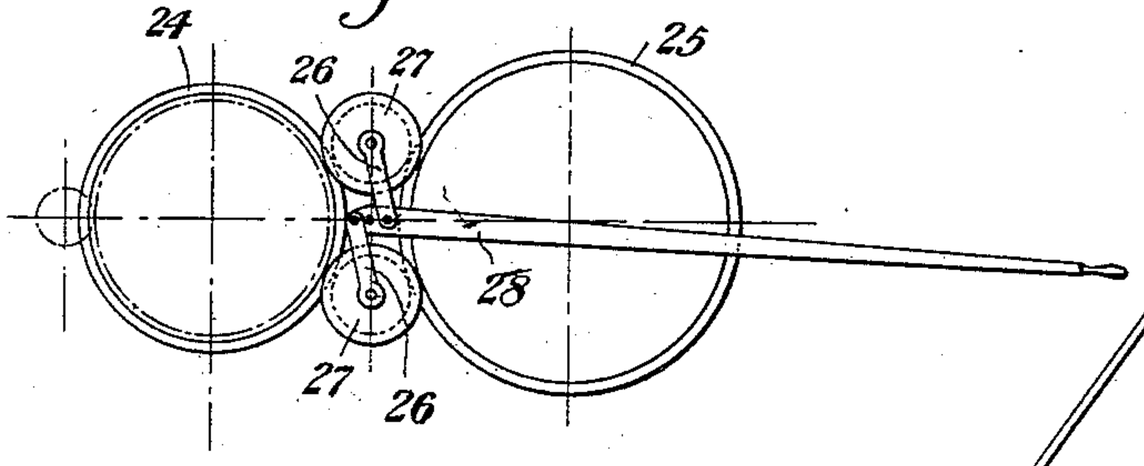

Fig. 8.

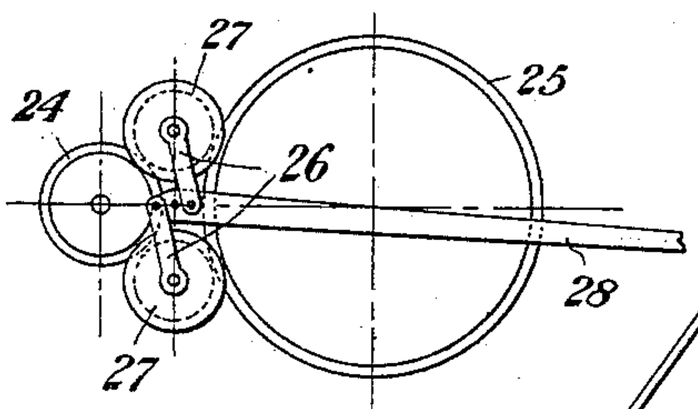

Fig. 1.

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Fig. 5.

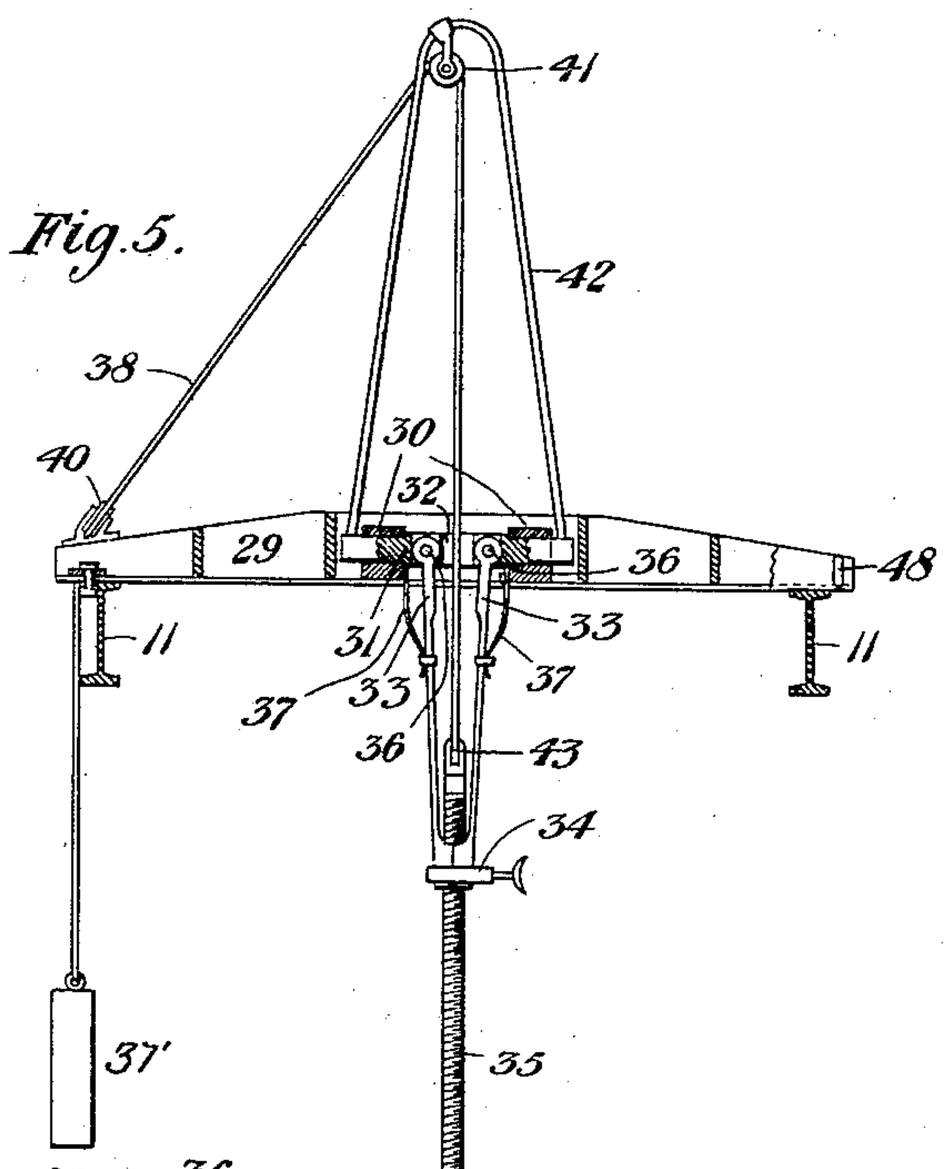


Fig. 6.

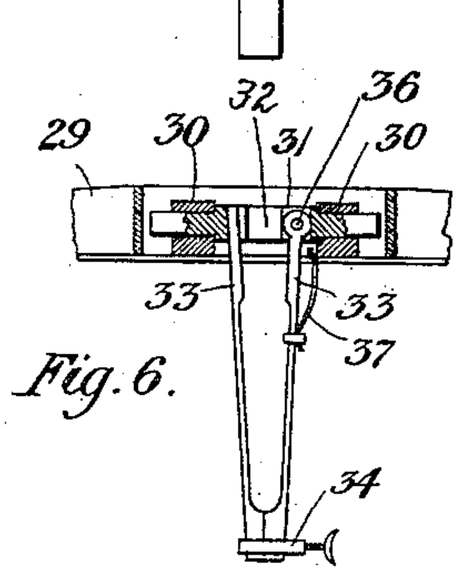


Fig. 4.

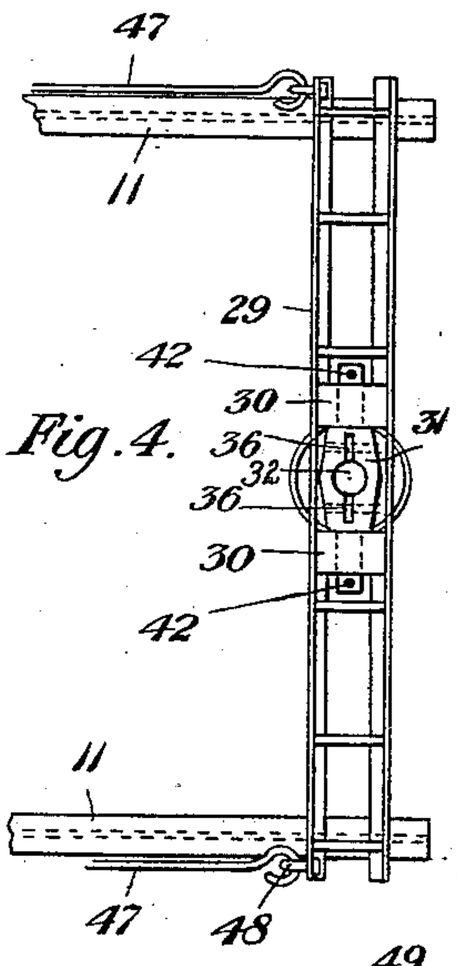


Fig. 3.

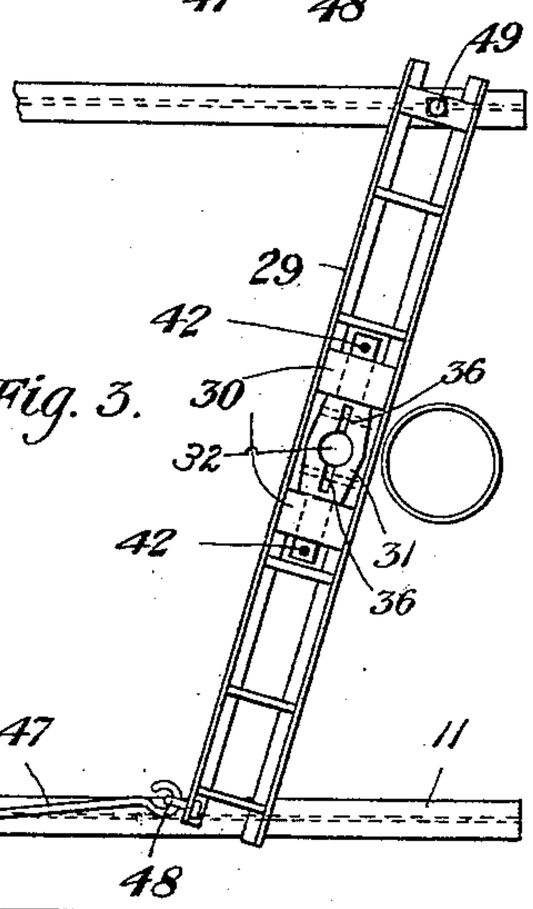
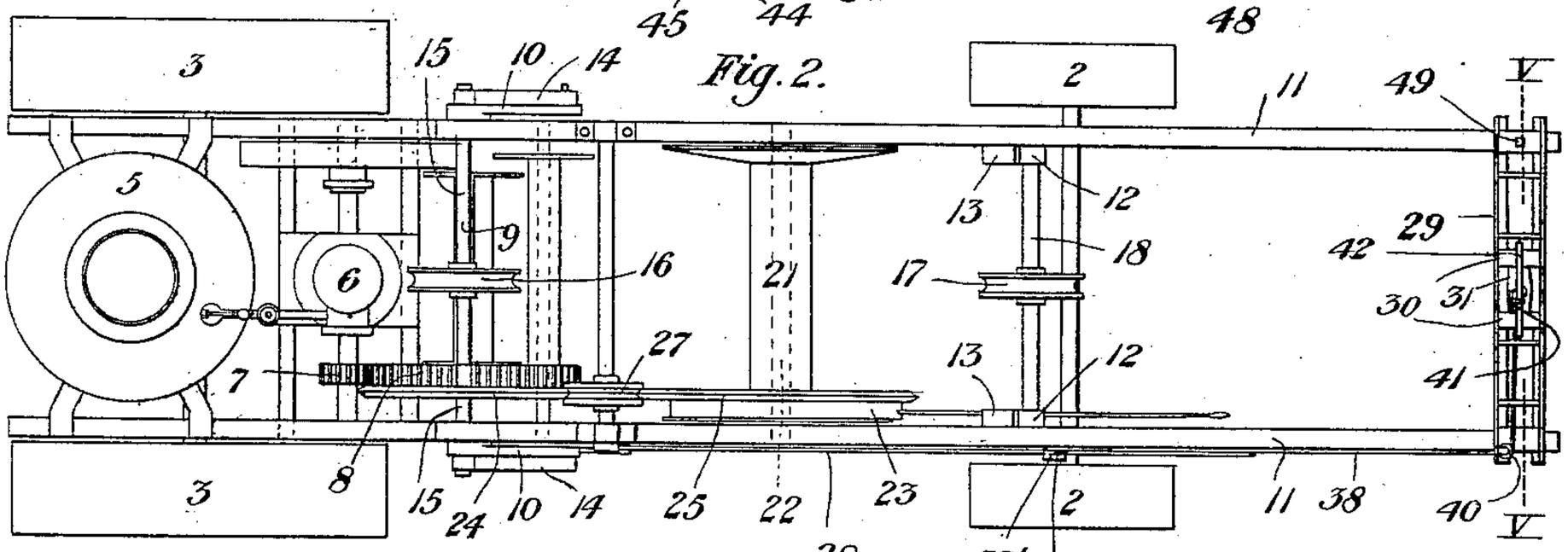


Fig. 2.



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UNITED STATES PATENT OFFICE.

HARVEY S. GLENN AND COULTER E. GLENN, OF NEW KENSINGTON, PENNSYLVANIA.

PORTABLE DRILLING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 632,921, dated September 12, 1899.

Application filed October 29, 1897. Serial No. 656,803. (No model.)

To all whom it may concern:

Be it known that we, HARVEY S. GLENN and COULTER E. GLENN, citizens of the United States, residing at New Kensington, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Portable Drilling-Machines, of which the following is a specification.

Our invention pertains to portable machinery or apparatus for drilling wells; and it consists in various novel features, details, and combinations hereinafter set forth, whereby the weight and the strains are better balanced and equalized under varying conditions of use.

In the accompanying drawings, Figure 1 is a side elevation of a drilling-machine constructed in accordance with the present invention; Fig. 2, a top plan view thereof; Fig. 3, a plan view of the forward end of the double walking-beam, on a larger scale, showing an adjustable support for the temper-screw; Fig. 4, a similar view showing provision for adjusting said support at either or both ends at will; Fig. 5, a transverse vertical section on the line V V of Fig. 2; Fig. 6, a view illustrating a slight modification of the reins shown in Fig. 5; Fig. 7, a detail view of the friction-gear through which power is transmitted; Fig. 8, a view showing a modification of the same.

Portable drilling machinery consists usually of a wheeled frame bearing a derrick, either fixed or folding, a boiler and engine carried by the wheeled frame, a winding drum or drums, a walking-beam, and suitable connecting and controlling devices, through which power and motion are transmitted from the engine to the operating parts of the machine.

In the practical operation of the machine weights and strains are differently brought upon it and its parts according to the particular operation or portion of the work being performed, and it is in all cases desirable that there be as even a distribution of such weights and strains as attainable or that moving parts be as nearly balanced or in equilibrium as may be practicable. This is important not only because of the greater durability of the apparatus, but also because of greater steadiness or stability in transporting and in operating the machine. It is further important that all changes, adjustments, and adaptations necessary to the different operations which the machine is required to perform be easily and quickly made. With these purposes in view we construct our improved machine in the manner set forth in the following description.

2 2 and 3 3 indicate, respectively, front and rear wheels, upon the axles of which is carried the main frame of the machine, which in turn supports a steam generator or boiler 5 and an engine 6. The shaft of the engine carries a fly-wheel, as usual, and also a pinion or gear-wheel 7, which latter, meshing with a gear-wheel 8 on the main driving-shaft 9 of the machine, gives motion to said shaft, and consequently to the crank-arms 10, with which it is provided at both ends.

The cranks 10 are designed to give motion to a walking-beam or lever, which in the present instance and contrary to the ordinary practice is made of two parallel beams arranged one at either side of the machine over or nearly over a side beam of the main frame 4. It is found expedient to make the double walking-beam of two steel or iron I-beams 11, suitably cross-connected and each having a hinge-block or fulcrum-piece 12 hinged or jointed to the upper end of its own supporting post or standard 13. Said posts or standards are firmly bolted or otherwise made fast at their lower ends to the side beams of the main frame 4 and are suitably stayed or braced to give them the requisite stability. Each crank-arm 10 of the main driving-shaft is connected by a pitman 14 to the inner end of the walking-beam or to one or the other protruding end of a shaft 15, extending across from one to the other member 11 of the walking-beam, as seen in Figs. 1 and 2. The shaft 15 is supported in boxes or bearings secured upon the inner ends of the beams or members 11 of the walking-beam and carries at a point midway between said members a grooved pulley 16. It thus serves to connect or tie together the two members of the walking-beam to carry the pulley 16 and to afford convenient means of connection for the pitmen 14.

17 indicates a pulley, similar to pulley 16 and in vertical plane therewith, carried by a shaft 18, journaled in boxes or bearings secured to or carried by the standards 13, which support the walking-beam.

Rising from the forward end of main frame 4 is a derrick or pair of sheer-legs 1, which are here represented as jointed or hinged at about the level of the walking-beam or slightly above, so that the derrick may be lowered and its upper section be made to rest upon a suitable support at the rear of the main frame for convenience in transportation. The derrick is inclined, so that its upper end shall overhang or reach beyond the main frame 4, and thus give a clear fall to a rope or cable 19, which is carried upward over a pulley 20 at the top of the derrick from a drum or winding-barrel 21, mounted in main frame 4.

In "spudding," which is the operation performed in starting the tools into the ground, the cable 19 is passed from the drum or windlass 21 about wheels 17 and 16, thence upward and over crown wheel or pulley 20 and down to the tools, as shown in Fig. 1; but after the work is properly started and the drilling operation is to be begun the cable is passed directly from the drum or windlass 21 to the crown-pulley, as shown by dotted lines in the same figure.

When the machine is in operation, it is desirable ordinarily to keep the engine in motion and to throw into and out of action the other parts when or as required, and this may best be done through the aid of friction-clutches or friction-gearing. As commonly constructed, however, such clutches do not afford the firm and reliable connection necessary without an expenditure of force or of time on the part of the operator greater than is convenient or desirable. To meet this objection, we employ a friction-drive in which two idler-wheels are drawn toward each other by a common lever and made to wedge into the space between the driving and the driven wheel, each idler or intermediate wheel serving as a fulcrum-support for the lever in drawing the other idler to its proper bearing on the driver and driven wheel. This arrangement is illustrated in Fig. 1 and more clearly in Figs. 7 and 8, where 24 indicates the wheel from which power or motion is taken and 25 the wheel to be driven. These wheels are each made with wedged-shaped peripheries, as best seen in Fig. 2. Two wheels or pulleys 27, each V-grooved to receive the wedge-shaped peripheries of the wheels 24 and 25, are connected by links 26 with a hand-lever 28, which lever is made quite long to afford the necessary power and delicacy of actuation or control. One wheel 27 is placed above the horizontal plane of the axes of wheels 24 and 25, and the other wheel 27 is located below said plane, each in vertical plane with the wheels 24 and 25 and in the narrowing space between their peripheries.

Lever 28 is represented as having a fulcrum midway between the points at which the links 26 are attached to it; but this is not essential, as each wheel 27, with its link, will serve as a support or fulcrum for the lever in acting upon the other, and the two wheels 27 will thus be drawn with equal force into the space between the wheels 24 and 25 and secure a firm and equal bearing thereon. In the drawings we have represented the lever as having an independent fulcrum midway between the points at which the links are attached to it, and this is desirable, as it enables both wheels 27 to be withdrawn from contact with wheels 24 and 25; but it will be found best to make the opening in the lever somewhat larger than its fulcrum-pin, in order that the two wheels 27 may take a firm and equal bearing upon wheels 24 and 25 regardless of any slight inequality in the lengths of links 26 or in the diameters of the wheels 27, the inexact placing of the fulcrum-pin, or the like.

Wheel 24 may be placed upon the driven shaft 9, in which case it will be relatively large, as in Fig. 7, or it may be carried by the engine-shaft, in which event it should be relatively smaller, as in Fig. 8. An important result of the arrangement described is that any tendency of the upper wheel 27 to cause a downward pressure of shafts 9 and 22 in their boxes or bearings is exactly compensated and neutralized by a like upward pressure of the lower wheel 27 and the fulcrum-pin of lever 28 is relieved of strain, all the pressure being brought upon the wheels themselves.

A single wheel 27 may be used for light work; but we regard the double-wheel arrangement as preferable and as something more than the mechanical equivalent of the single wheel for reasons stated.

Wheel 25 is formed with a brake-drum at its side, which is encircled by the usual band or strap brake 23. (Seen in Figs. 1 and 2.)

At the forward or outer end of the walking-beam 11 is a supporting-bridge 29, designed to carry the temper-screw and its attendant parts. As this bridge has to carry a considerable weight and to sustain the same at a point midway between the two members of the walking-beam, upon which its ends rest, it is necessarily made quite strong. To secure adequate strength and yet have the bridge reasonably light, it may be constructed of two angle-plates of steel or iron, the vertical webs of which are made comparatively deep in their middle portion but taper toward their ends, said plates being connected by cross-ties or transverse plates at frequent intervals, as shown in Figs. 2, 3, 4, 5, and 6. Any other simple construction affording the requisite strength may, however, be adopted.

30 30 indicate two bearing blocks or boxes made fast in the bridge 29 and bored to receive the journals or trunnions of a block 31, having a central vertical opening 32 large enough to permit the free passage through it

of the temper-screw 35 or its supporting cord, rope, or band 38.

Lateral extensions or slots 36, opening from the central hole or opening 32, receive the heads or upper ends of "reins" 33. These reins are simply two coacting arms extending downward from the block 31 and terminating at their lower ends each in a half-nut, the two parts being forced and held together by a bail or clamp 34, as seen in Figs. 5 and 6.

It has been the usual practice heretofore to make the reins stiff and to attach their upper ends rigidly to their support, so that when free their lower ends should spring apart or separate. Under the present construction, however, the reins are hinged or pin-jointed to the supporting-block 31 and provided with a spring or springs 37, tending to move one away from the other. In Fig. 5 we have shown both members so provided, and in Fig. 6 we have represented one member as fixed and the other alone hinged and provided with a spring 37. It is obvious that the two constructions are mechanically equivalent and produce the same result—that is to say, both effect a ready separation of the reins or of the divided nut in which the temper-screw 35 is held. By thus separating the nut the temper-screw 35 is made free to be elevated or lowered to any desired extent without performing the tedious operation of turning and screwing it up or down.

From a swivel at the upper end of the temper-screw 35 a cord or flexible band 38 is carried upward over a pulley or sheave 41 at the upper end of a yoke or bail 42 or equivalent upright, the legs of which bail are secured to or inserted in the trunnions of block 31, where said trunnions project beyond their bearing-blocks. The cord or band 38 is carried about guide pulleys or sheaves 40 and 39 and has at its free end a counterweight 37', which balances the weight of the temper-screw and the clamp at the lower end thereof. By this arrangement of parts, which is illustrated in Figs. 1 and 5, the adjustment of the temper-screw is made easy and the counterweight draws always in the line with the axis of the temper-screw, because the yoke or bail and the reins, being both carried by rocking block 31 maintain a fixed relation, while the sheave 41 and the divided nut of the reins 33 are kept in alinement with the yoke and bridle. The rocking block 31 permits the temper-screw to maintain a vertical position during the drilling operation notwithstanding the tipping of the walking-beam.

It is desirable that the bridge or cross-support 29 be made readily movable or adjustable to and from working position in order that the temper-screw may be placed in alinement with the axis of the well, as in Figs. 1 and 4, or drawn back to make room for the pump or other tools, as in Fig. 3. This is conveniently attained by pivoting or hinging one end of the bridge to that member of the walking-beam which supports it and connecting the opposite end by a rod or link 47 to one arm of a lever 44, fulcrumed upon the walking-beam at 45, as seen in Figs. 1 and 3. It is found convenient to make the lever 44 of "elbow" form, and a stop may be provided, as at 49, to cause the link or rod 47 and that arm of lever 44 to which the rod is attached to maintain a practically straight line, and thus to act as a brace to prevent the accidental shifting of bridge 29 while the walking-beam is in action. Any equivalent locking device may of course be employed or the weight and frictional contact of the bridge may be depended upon without other provision.

In Fig. 4 we have shown the bridge as furnished with the lever and connecting-rod at both ends, thus permitting the attendant to control the bridge from either side of the machine at will.

It will be seen that in the general arrangement and proportions of parts and mechanism we have secured great economy of space with the highest degree of efficiency. By the use of the friction-gearing the use of intervening toothed wheels is avoided and the machine is relieved from sudden jars and strains.

The location of the grooved wheels 16 17 in the center of the machine overcomes the uneven strain usual when the wheels are mounted on a single walking-beam located at one side of the machine, and in this respect our construction involves important features of novelty and value over any similar apparatus known to us.

Changes and modifications will suggest themselves to the skilled mechanic, and the proportions, arrangement, and size may be changed and regulated to suit different conditions of use without departing from our invention.

It is obvious that the driving and driven wheels may be grooved and the intermediate wheels formed with V-shaped or wedge-like edges to enter the grooves therein.

What we claim, and desire to secure by Letters Patent, is—

1. In a drilling apparatus, the combination of a main frame; an engine or motor carried thereby; a shaft 9 driven by said motor and provided with friction-wheel 24; windlass or drum 21 turning upon a shaft or axle in the main frame and provided with friction-wheel 25; friction-wheels 27 interposed between the friction-wheels 24 and 25 and on opposite sides of a line drawn through their axes; and means, substantially as described, for drawing the interposed wheels into the spaces between wheels 24 and 25.

2. In a drilling apparatus, the combination of a main frame; an engine or motor carried thereby; a shaft 9 journaled in or upon said frame and provided with a wheel 24 having V-shaped periphery; a drum or windlass 21

turning upon a shaft or axle in the main frame and provided with a wheel 25 having V-shaped periphery; friction-wheels 27 interposed between wheels 24 and 25 on opposite sides of a line drawn through the axes of said wheels, and peripherally grooved to receive the V-shaped edges of said wheel; an operating-lever 28 pivoted midway between the driving and driven wheels 24 and 25; and links 26 pivoted to the lever at each side of its fulcrum and serving to support and carry the friction-wheels 27, substantially as set forth.

3. In a drilling apparatus provided with a double walking-beam, a support resting across the ends of the beam members; a rein-block mounted in trunnions thereon; and reins pivotally connected with and depending from the rein-block, substantially as set forth.

4. In a drilling apparatus provided with a double walking-beam, a support resting across the ends of the beam members; a rein-block mounted in trunnions thereon; and reins depending from said block, one of them pivoted thereto, substantially as set forth.

5. In a drilling apparatus provided with a double walking-beam, a support resting upon the ends of the beam members; a rein-block provided with a central opening and mounted in trunnions in said support; reins pivotally connected with and depending from said rein-block; and a pulley-support mounted upon the block, substantially as set forth.

6. In a drilling apparatus having a temper-screw support and temper-screw; reins pivotally mounted in said support; and retracting-springs acting upon and serving to separate the reins, substantially as set forth.

7. In a drilling apparatus provided with a double walking-beam and an adjustable temper-screw support mounted thereon; temper-screw reins pivotally mounted therein; and retracting-springs adapted to separate the reins, substantially as set forth.

8. In a drilling apparatus provided with a double walking-beam, an adjustable temper-screw support mounted upon the beams; a rein-block provided with a central opening, supported on trunnions therein; temper-screw reins pivoted in the block at each side of the central opening; and retracting-springs secured to the support and to the reins, adapted to open the reins, substantially as set forth.

9. In a drilling-machine provided with a double walking-beam, an adjustable temper-screw support or bridge mounted upon the beams, and a rein-block provided with a central opening and supported on trunnions in the bridge; temper-screw reins pivoted in the block at each side of the central opening; retracting-springs secured to the support and to the reins, adapted to open the reins; and a pulley-support extending above the block, substantially as set forth.

In witness whereof we hereunto set our hands in the presence of two witnesses.

HARVEY S. GLENN.
COULTER E. GLENN.

Witnesses:
J. F. PECHT,
J. G. HEASLET.