

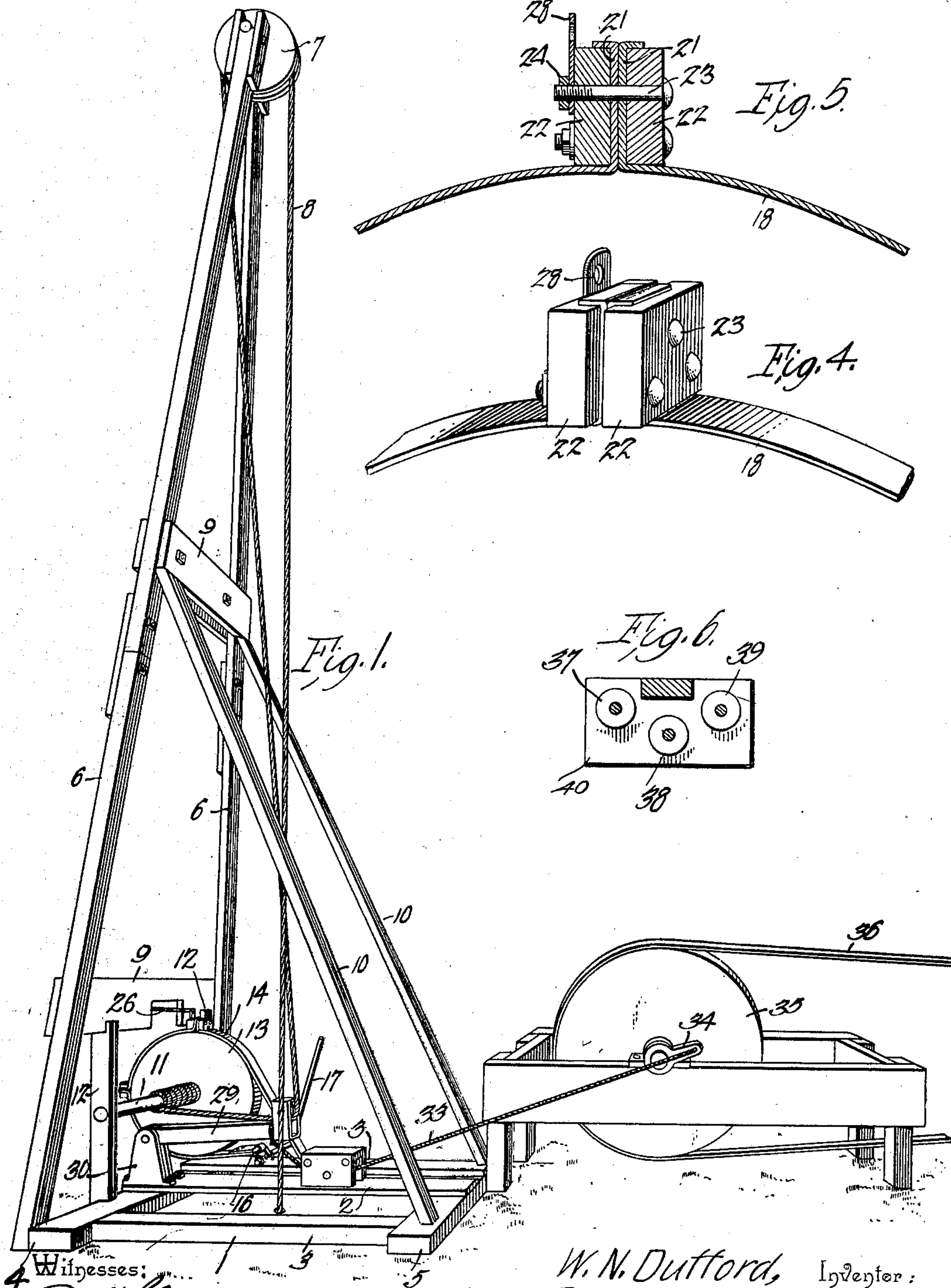
No. 735,222.

PATENTED AUG. 4, 1903.

W. N. DUFFORD.
WELL DRILLING MACHINE.
APPLICATION FILED OCT. 25, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
E. J. Stewart
R. M. Elliott

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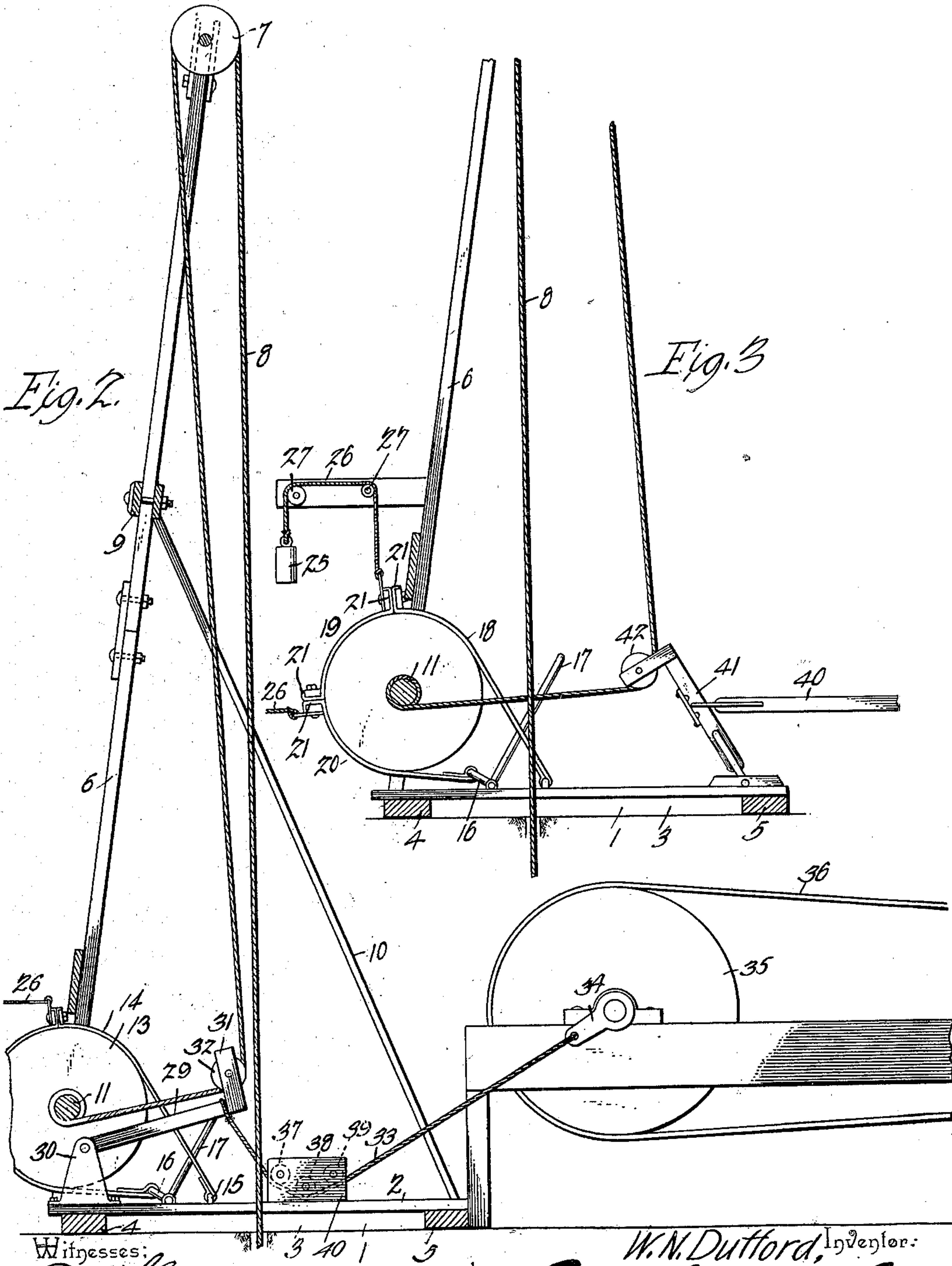
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by

W. N. Dufford, Inventor:

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UNITED STATES PATENT OFFICE.

WILLIAM N. DUFFORD, OF FINDLAY, OHIO.

WELL-DRILLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 735,222, dated August 4, 1903.

Application filed October 25, 1902. Serial No. 128,817. (No model.)

To all whom it may concern.

Be it known that I, WILLIAM N. DUFFORD, a citizen of the United States, residing at Findlay, in the county of Hancock and State of Ohio, have invented a new and useful Well-Drilling Machine, of which the following is a specification.

This invention relates to well-drilling machines.

The objects of the invention are to simplify and improve the construction of the derrick by reducing the number of parts thereof to the minimum and disposing the parts in such manner as to effect mutual bracing of the structure as a whole, to reduce wear of the spudding-rope to a minimum, to improve the construction of and to facilitate disconnection and shipment of the band-brake, and generally to improve the construction of machines of this character.

With the above and other objects in view, as will appear as the nature of the invention is better understood, the same consists in the novel construction and combination of parts of a well-drilling machine, as will be herein-after fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which like characters of reference indicate corresponding parts, there are illustrated two forms of embodiment of the invention, each capable of carrying the same into practical operation, it being understood that the elements therein exhibited may be varied or changed as to shape, proportion, and exact manner of assemblage without departing from the spirit.

In the drawings, Figure 1 is a view in perspective of one form of the embodiment of the invention. Fig. 2 is a view in elevation, partly in section. Fig. 3 is a sectional detail view of a slightly-modified form of machine. Fig. 4 is a perspective detail view of a portion of the band-brake. Fig. 5 is a longitudinal section of Fig. 4. Fig. 6 is a sectional detail view of one of the operating-sheaves.

The supporting-frame of the spudding apparatus comprises a base 1, composed of longitudinal and transverse beams 2, 3, 4, and 5, respectively, and a derrick constructed of two sectional masts 6, that converge toward their upper ends and support a sheave 7, around

which passes a spudding-rope 8. The up-rights are held spaced at the proper distance apart by cross-beams 9, two inclined beams 10 serving to brace the derrick against rearward movement under the operation of the drill. In the present machine the spudding-rope operates intermediate of the ends of the base, and in order to permit the same to operate without interference with any part of the derrick the latter is inclined toward the forward part of the machine and is held in this position by the beams 10. Under this disposition of the parts the weight of the drill and the spudding-rope will be transmitted from the masts to the beams 10 and from these to the front of the base, such weight operating to hold the front of the base firmly seated, thereby obviating the necessity of employing anchors of any kind for the purpose.

The spudding mechanism comprises a drum 11, around which the spudding-rope is wound, the drum being supported in the bearing-beams 12, extending from the cross-beams 9 to the base-beam 4. As before stated, one of the objects of the present invention is to reduce wear of the spudding-rope to a minimum, and this is effected by making the drum 11 of such length that only single coils of rope will be wound thereon in raising and lowering the drill, as opposed to the common practice of causing the spudding-rope to be coiled upon itself in two or more layers. By this arrangement it will be seen that the lifting power of the drum is always the same, inasmuch as its diameter is not increased by superposed coils of the rope. In order to permit of the employment of a drum such as described—that is, of greater length than the drums in ordinary use—said drum is located at the rear of the machine, and thus out of the way of the operative parts, presently to be described, this disposition of the drum being permitted by attaching the lower ends of the mast to the terminals of the beam 4, as clearly shown in Fig. 1, and by this arrangement a drum coextensive with the width of the base may be employed, which could not be effected if the masts were disposed intermediate of the ends of the base. Under the operation of the drill with a derrick such as described there will be no lateral strain upon the der-

rick for the reason that, as above pointed out, the weight of the drill and the spudding-rope will be in a vertical line and will be transmitted to the two ends of the base. The drum
 5 has secured to it a band-wheel 13, around which passes a band-brake 14, one end of which, as clearly shown in Figs. 2 and 3, is stapled or otherwise secured to one of the longitudinal beams at 15, the other end being connected
 10 with the crank 16 of a lever 17, as clearly shown in Fig. 1. In well-drilling machines of the ordinary construction these band-brakes are of considerable length—of from twenty to thirty feet—and in taking down the
 15 machine it is necessary to fold the brake, thus frequently resulting in forming bends or kinks in it, which when the brake is again placed in position materially militates against its proper operation. In order to obviate this
 20 objection and to facilitate transportation of the band-brake, the same is made in a plurality of sections, in this instance of three, designated 18, 19, and 20, respectively, one terminal of the section 20 being secured to
 25 one of the longitudinal beams described and one terminal of the section 18 being secured to the crank of the lever 17, as described, the intermediate section 19 serving to connect the two first-named sections. In order to assem-
 30 ble the sections to cause them to present a continuous structure, one terminal of each of the sections 18 and 20 and both terminals of the section 19 are bent to present recessed abutments 21, in which are placed filler-blocks
 35 22, and through the filler-blocks and abutments pass bolts 23, carrying nuts 24, by which to facilitate separation of the band-sections when desired. By making the band-brake in sections it may be made to conform more
 40 readily to the periphery of the band-wheel, and in the event of becoming kinked or bent a section or sections may be readily trued.

While the band-brake is herein shown as constructed in three sections, it is to be un-
 45 derstood that it may be made in two sections or of a greater number than three and still be within the scope of the invention. The band-brake is applied and released by the lever 17 in the manner usual with such de-
 50 vices, and, if desired, in order to cause the band-brake to be more responsive in freeing the band-wheel releasing devices may be employed, as shown in Figs. 1, 2, and 3, said devices consisting of a counterweight 25, car-
 55 ried by one end of a rope 26, which passes around sheaves 27, supported in any preferred manner from the frame, the other end of the rope 26 being secured to a plate 28, bolted to one end of the filler-blocks. It will
 60 be seen by the employment of these releasing devices that as soon as the lever 17 is released the counterweights will instantly operate to move the band-brake out of engagement with the band-wheel, thus to permit the drill (not
 65 shown) to drop. In this instance there is no mechanism shown associated with the drum 11 for winding up the spudding-rope, as it

is deemed unnecessary, being no part of the present invention.

By disposing the drum in the manner de- 70 scribed—that is to say, at the rear of the derrick—the drill, as before pointed out, is caused to operate intermediate of the length of the base, and to throw the draft on the two members of the spudding-rope—namely, that 75 member extending from the drum to the sheave 7 and the member extending from the sheave and carrying the drill—it is necessary that means be provided for holding a length of the spudding-rope outward some distance 80 from the drum. This is effected by the employment of a rocking beam 29, as shown in Figs. 1 and 2, one end of which is fulcrumed between standards 30, secured upon the base- 85 piece 2, the free end being provided with a yoke 31, in which is pivoted a sheave 32, around which passes the spudding-rope. To impart oscillatory movement to the rocking beam when the same is disposed in the man- 90 ner described, it will be necessary to employ a flexible connection between it and the driving mechanism, for the reason that a vertical down-pull will have to be exerted on the beam 29 to reciprocate the spudding-rope, and thus the drill, and this is accomplished through 95 the medium of a rope or cable 33, one end of which is secured to the beam adjacent to the yoke 31, the other end of the rope being connected with a crank 34, carried by the shaft of a drive-wheel 35, around which passes a 100 belt 36 to a suitable source of power. (Not shown.) The intermediate portion of the rope 33 passes around three sheaves 37, 38, and 39, arranged in a boxing 40, attached to the base- 105 beam 2, the sheave 38 being disposed in a plane below that occupied by the other two sheaves, so that a broad and extended bearing is presented to the beam-actuating rope or member, which will reduce its wear to a minimum. 110

As will be seen by reference to Fig. 2, the rocking beam and length of spudding-rope between the sheave 32 and the drum are dis- posed approximately in a horizontal plane and in parallelism, and by this arrangement un- 115 der the oscillation of the rocking beam that portion of the spudding-rope passing around the sheave 32 will remain practically station- ary or, in other words, there will be but slight rolling motion, so that wear of the rope at 120 that point will practically be obviated.

In the form of embodiment of invention shown in Fig. 3 instead of employing a flexi- ble beam-operating member a pitman-rod 40 is employed, one end of which connects 125 with the crank of the driving mechanism (not shown) and the other end with the rocking beam 41. This beam occupies under operation an approximately vertical position or is disposed at such an angle as to bring the 130 sheave 42, around which the spudding-rope passes, approximately in alinement with the drum, thus to reduce wear of the rope at the point where it engages said sheave. With

this exception the construction of the two devices is practically the same.

It will be seen from the foregoing description that although the machine of this invention is exceedingly simple in construction it will in a ready and feasible manner obviate many objections inherent to well-drilling machines of more intricate character, and, further, by the prevention of chafing and wearing of the spudding-rope that a large saving is effected in the operation of the machine.

Having thus described the invention, what I claim is—

1. In a well-drilling machine, a spudding-rope-receiving drum, a rocking beam fulcrumed adjacent thereto and carrying a sheave disposed, when the machine is in operation, approximately in horizontal alinement with the drum, driving mechanism, a plurality of sheaves supported on the base of the machine, and a flexible power-transmitting element

connecting the driving mechanism and the rocking beam.

2. In a well-drilling machine, the combination with a frame, of a spudding-rope, a receiving-drum therefor mounted in bearings at one end of the frame, a rocking beam fulcrumed adjacent to the drum and carrying a sheave adapted to receive the rope, and mechanism for operating the beam to reciprocate the rope, said mechanism being situated at a point distant from the drum; whereby the drum may be made of a length equal to the width of the frame.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

WILLIAM N. DUFFORD.

Witnesses:

J. ROSS COLHOUN,
J. H. JOCHUM, Jr.