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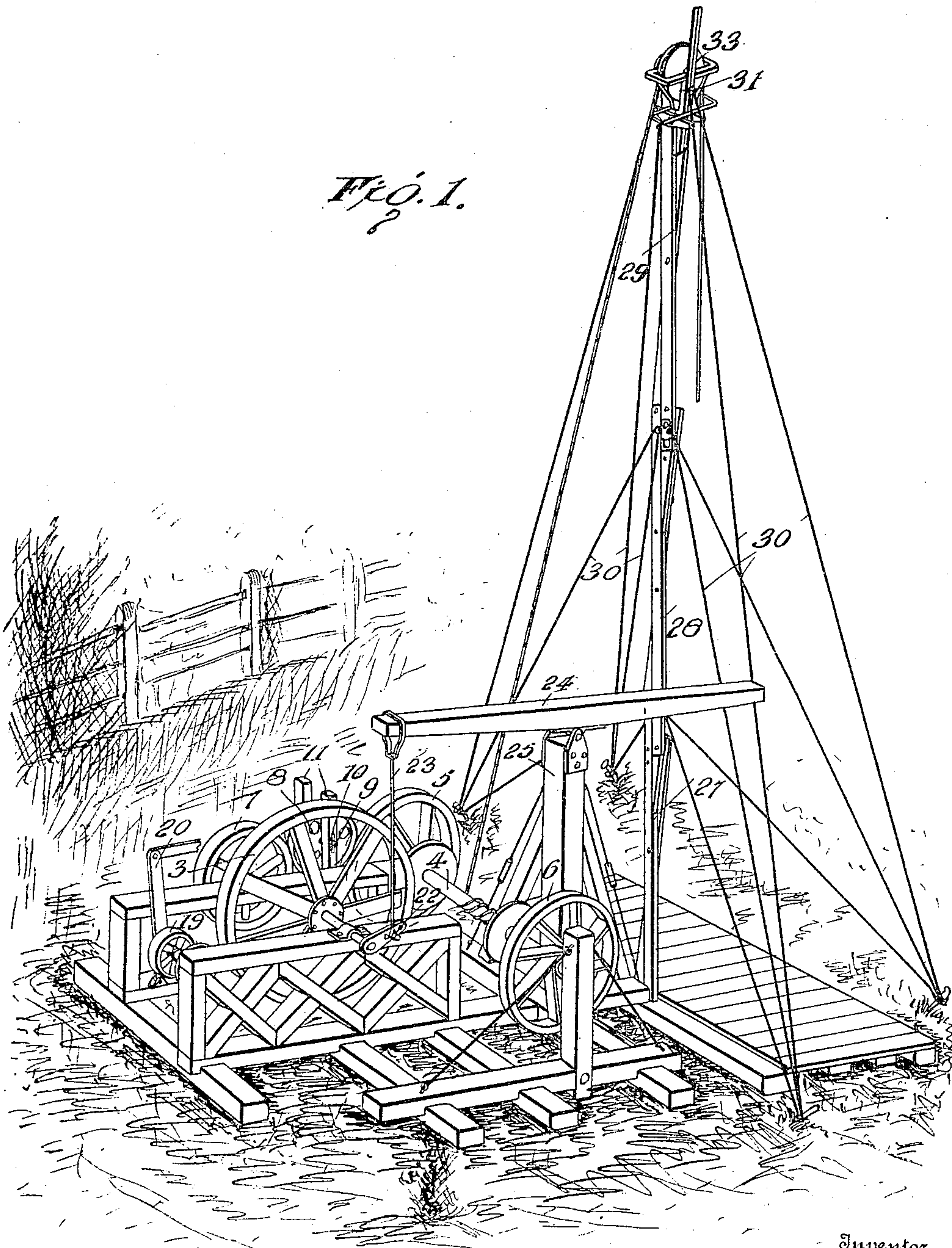
PATENTED MAR. 27, 1906.

W. L. KNOWLES.
WELL DRILLING MACHINE.

APPLICATION FILED APR. 22, 1905.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses

W. L. Knowles
W. L. Knowles.

Inventor

W. L. Knowles

By

W. L. Knowles
W. L. Knowles, Attorneys

No. 816,341.

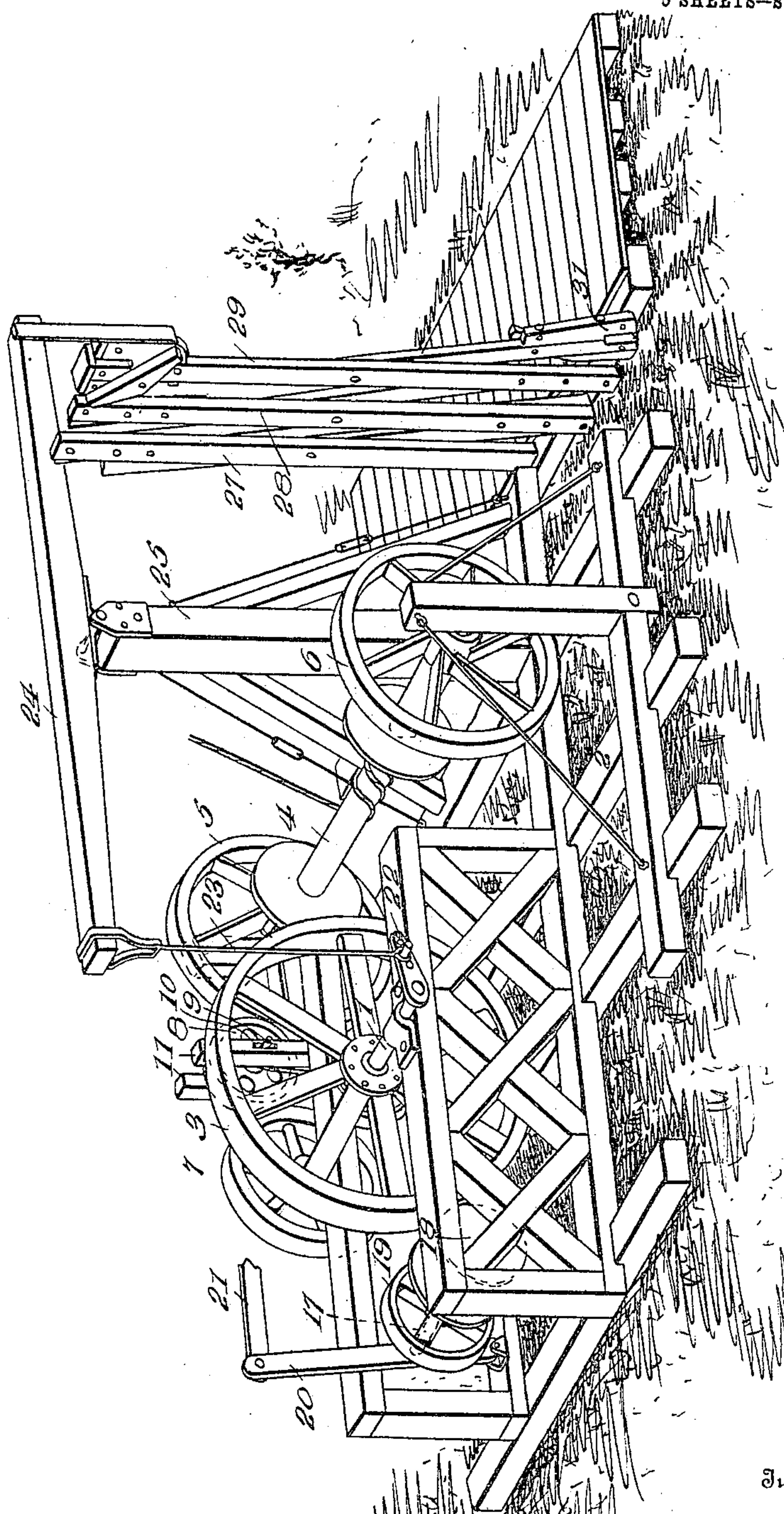
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FIG. 2.



Inventor

W.L. Knowles.

By

R.H. Macy, Attorneys

Witnesses

J.M. Mice
W.L. Hoodson

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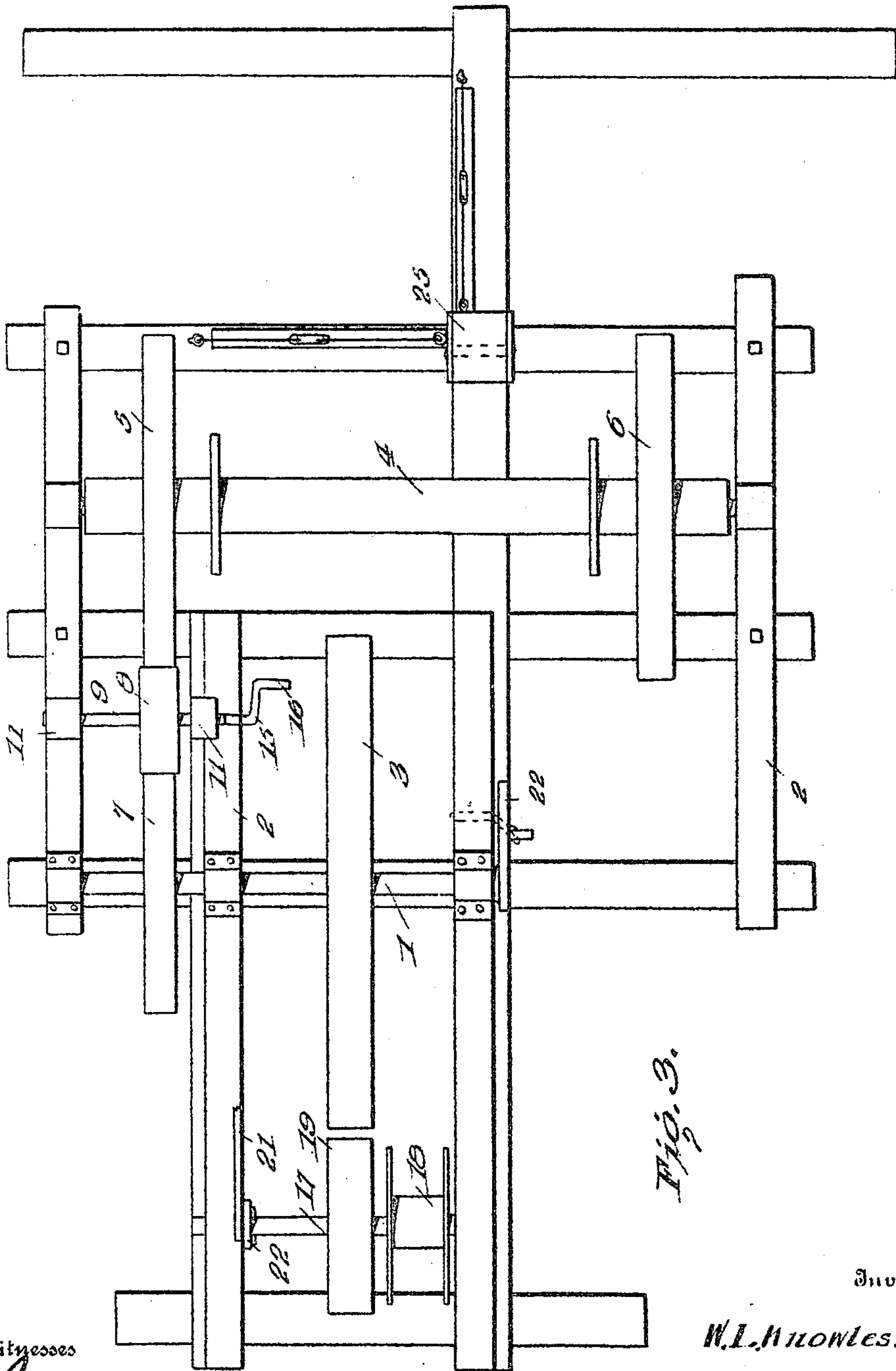


Fig. 3.

Inventor

W. L. KNOWLES.

Witnesses

For Inve
W. L. Knowles

By

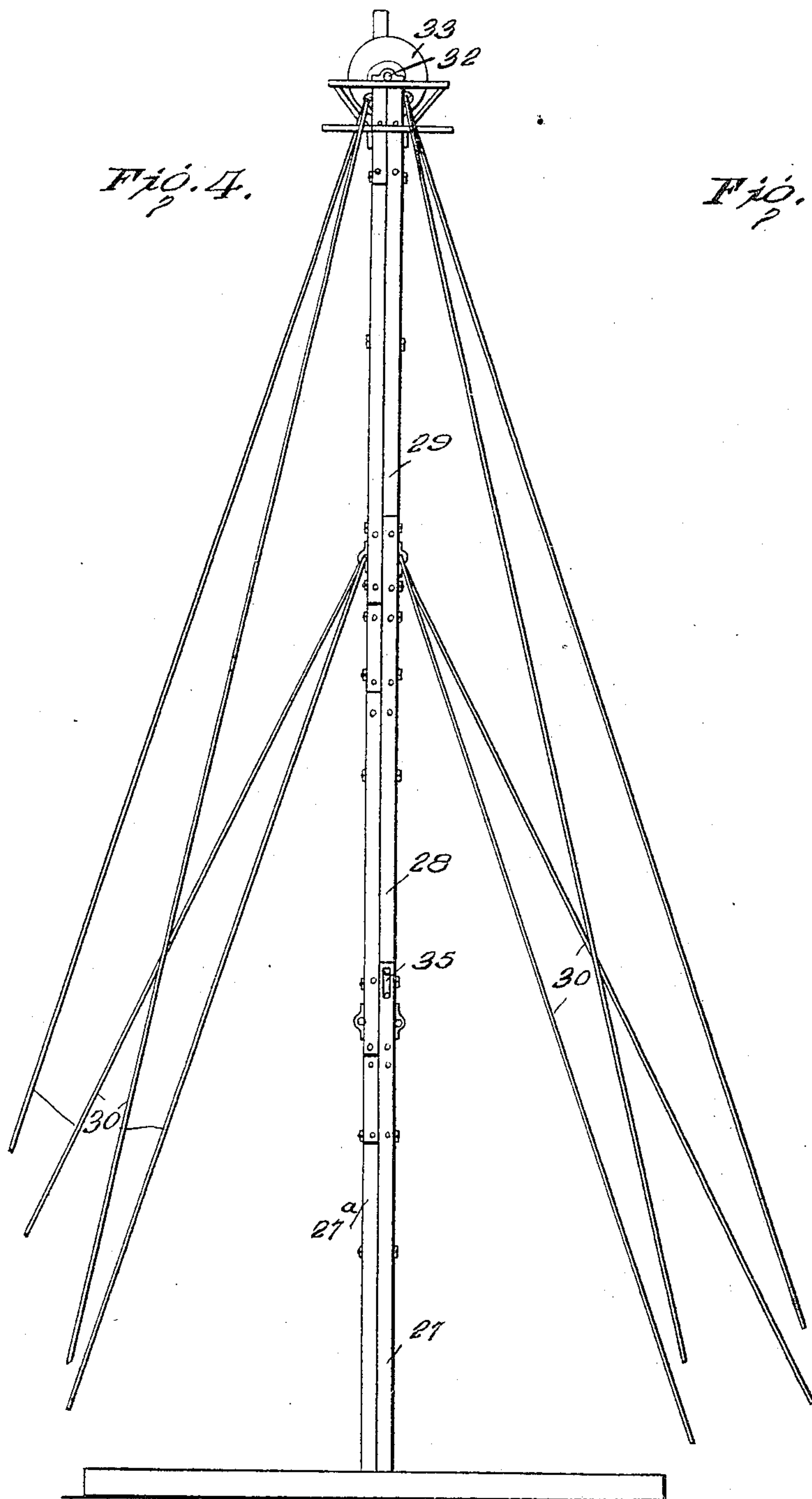
R. H. Racy, Attorneys

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W. L. KNOWLES.
WELL DRILLING MACHINE.
APPLICATION FILED APR. 22, 1905.

5 SHEETS—SHEET 4.



Witnesses

McMie
W. V. Woodson

By

W. L. Knowles.
R. A. Macey, Attorneys

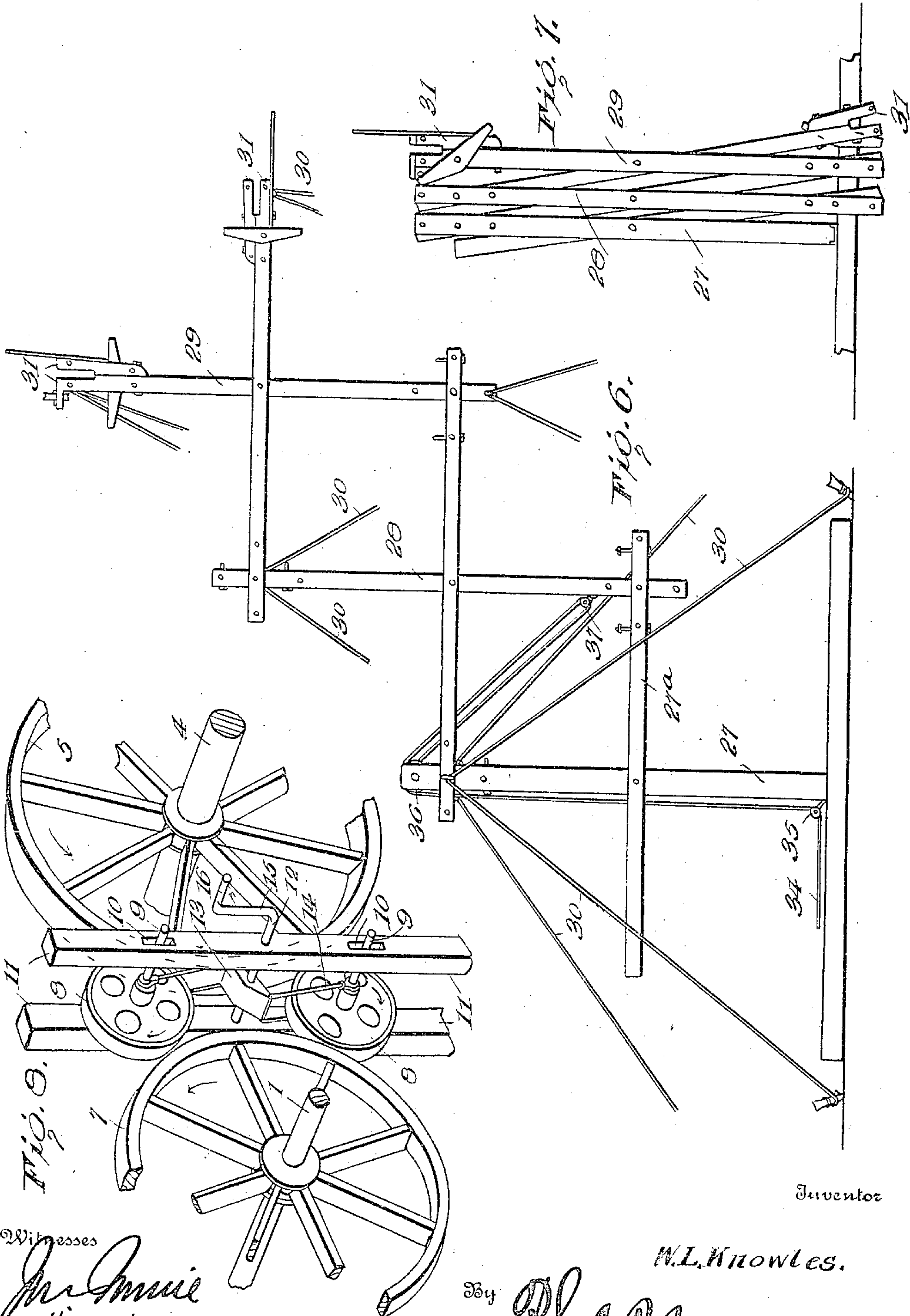
Inventor

No. 816,341.

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W. L. KNOWLES.
WELL DRILLING MACHINE.
APPLICATION FILED APR. 22, 1905.

5 SHEETS—SHEET 5.



Inventor

Witnesses
Mr. Annie
W. A. Woodson

By *W. L. Knowles.*
R. A. B. Racy, Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM L. KNOWLES, OF HATTON, OHIO.

WELL-DRILLING MACHINE.

No. 816,341.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed April 22, 1905. Serial No. 257,013.

To all whom it may concern:

Be it known that I, WILLIAM L. KNOWLES, a citizen of the United States, residing at Hatton, in the county of Wood and State of Ohio, have invented certain new and useful Improvements in Well-Drilling Machines, of which the following is a specification.

The aim of this invention is to simplify the structure and operation of oil-well-drilling machines; and the invention resides, essentially, in the peculiar mechanism whereby power is communicated to the bull-wheel shaft through the interposition of friction means operably connecting the bull-wheel with the drive-shaft, doing away with the use of the customary bull-rope supplying power and with the positive power obtained by the use of the link-chain belt. The friction power-transmitting means above mentioned is greatly advantageous in spudding operations, and the arrangement of parts is conducive to simplicity, which is desirable in this class of machines.

A further feature of the invention is the provision of a special construction of mast to be substituted for the derrick which is commonly employed in well-drilling operations at the present time, the mast embodying a lazy-tongs structure, particularly advantageous because the same may be "knocked down" to occupy a minimum amount of space in transporting the machine from one place to another.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the results reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a perspective view of a machine embodying the invention, the same being shown with the parts in the position assumed when using the same in actual operation. Fig. 2 is a perspective view bringing out more clearly the arrangement of the parts of the power-transmitting mechanisms, the mast, and adjacent parts of the machine. Fig. 3 is a top plan view showing the arrangement of the power-transmitting mechanism, the mast omitted. Fig. 4 is a side elevation of the mast for the crown-pulley, the same being in operative position extended. Fig. 5 is a front elevation of the mast, the stays being omitted. Fig. 6 is a view in side elevation, showing the levers composed in the lazy-tongs structure of the mast partially

extended in the operation of raising the latter. Fig. 7 is a side elevation of the mast knocked down or parts lowered. Fig. 8 is a detail perspective view of the friction-transmitting means employed for communicating power to the bull-shaft from the drive-shaft.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Various parts of the machine which are shown in the drawings are substantially the same as are employed in drilling-machines at present in use. The drive-shaft is indicated at 1 and is mounted in spaced longitudinal sills 2, comprised in the framework of the machine, said drive-shaft having a drive-wheel 3. Located in paralleling relation with the drive-shaft 1 is a bull-shaft 4, having bull-wheels 5 and 6 near opposite ends. The bull-wheel 6 constitutes a brake-wheel, about which the customary brake-band (not shown) is passed for operation in the usual way. The bull-wheel 5, however, is utilized to transmit power to the bull-shaft 4 from the drive-shaft by use of peculiar friction means. The friction-transmitting means coöperates with a friction-wheel 7, carried by the drive-shaft 1 in alinement with the bull-wheel 5, said friction means embodying upper and lower friction-wheels 8, situated between the adjacent rims of the bull-wheel 5 and the friction-wheel 7 upon the drive-shaft 1. The wheels 8 are mounted upon short shafts 9, which shafts are carried in elongated bearings 10 in spaced uprights 11 at one side of the machine. The bearings 10 preferably consist of vertical slots in the upright 11, which permit of vertical movement of the friction-wheels 8 to raise and lower the same. The means for operating the friction-wheels 8 so as to throw the same into and out of contact with the rims of the wheels 5 and 7 includes an operating-shaft 12, mounted in the uprights 11 also and arranged about intermediate the bearings or slots 10, in which the shafts 9 are mounted. Crank-arms 13 project from the shaft 12 in opposite directions and preferably in alinement, each of said crank-arms being connected with a respective friction-wheel 8 by means of spaced rods 14. A pair of the rods 14 is used to connect each crank 13 operably with its wheel 8, the end of each rod being pivoted to the crank at which it is connected, the opposite end having an opening receiving a shaft 9 of the wheel 8 which it

actuates. The cranks 13 project from the shaft 12 between the uprights 11, and extending from one end of the shaft 12 is another crank 15, having an arm 16, which is connected by any suitable means with a lever or like device situated adjacent the operator of the machine, so as to be conveniently manipulated by him in order to throw the friction-wheel 8 into and out of contact with the adjacent wheels 5 and 7.

Located adjacent the drive-shaft 1 is a shaft 17, carrying the sand-line reel 18. A friction-wheel 19 upon the shaft 17 is arranged to be thrown into and out of contact with the drive-wheel 3 in order to communicate power to said line-shaft in a manner which will be apparent. The shaft 17 is operated by a lever 20, which is actuated by a suitable lever or like member operably connected therewith by a rod or bar 21, which is partially broken away in the drawings. The drive-shaft 1 has a crank 22 extending from the end thereof, the wrist-pin of said crank being adjustable and adapted to be connected, by means of the usual pitman 23, with the walking-beam 24, which is pivoted in the usual way to a samson-post 25. The pitman 23 is of course not actuated in the spudding, and a spudding-line wheel is journaled to the wrist-pin of the crank 22 of the drive-shaft after the pitman has been disengaged therefrom. The spudding-line will pass about the bull-shaft 4 over the spudding-line pulley upon the crank 22, and thence up over the crown-pulley, carried by the mast or derrick of the machine. The power-transmitting means before described, by which power is communicated to the bull-shaft from the drive-shaft 1, is of great advantage in the spudding operation, since the mast of the bull-shaft is absolutely controlled in a manner which is clear. The operation of the bull-shaft is not only controlled by the friction power-transmitting means comprised in the members 8 and the actuating mechanism therefor, but the operation of the bull-shaft may also be controlled through the brake-wheel 6, affording virtually double or independent controlling means for said bull-shaft and insuring safe operation of the machine.

The mast which comprises a part of this invention and which is substituted for the derrick commonly used consists, essentially, of a supporting-post 27, rigidly mounted upon the bed of the machine adjacent the post 25, which carries the walking-beam 24, said supporting-post 27 forming a part of the lazy-tongs structure of the mast. Pivoted at a point between its ends to the post 27 is a lever 27^a, said lever and the post 27 carrying pairs of levers 28 and 29, the arrangement of the parts 27, 27^a, 28, and 29 being such as to form a folding lazy-tongs mast which may be readily extended so that the various members thereof are in approximately vertical

alinement, in which position the parts of the mast are rigidly reinforced by means of suitable stays 30, these stays being preferably guy-ropes, a set of which are connected with each set or pair of lazy-tongs levers in the mast structure, the guy-ropes being connected with suitable entering stakes at opposite sides of the machine. The stays 30 are preferably connected with the upper portions of the levers of the mast and are hoisted with the mast as the latter is being extended in elevating the parts preparatory to use. The construction of the mast above described is such that the same may be readily folded into a comparatively small space for purposes of transportation, and it will be obvious that any suitable number of pairs of levers may be utilized, so that the mast may be of greater or less length, according to the necessities arising under actual working conditions. The uppermost levers 29 of the mast are provided with spaced members 31, which receive the shaft which carries the crown-pulley 33, over which passes the drill rope or cable connected with the drilling-tools. In order to elevate the mast-levers in extending the latter preparatory for use, it is preferred to employ a suitable hoisting-rope 34, which passes about the bull-shaft 4, extending therefrom to a pulley 35 at the lower end of the post 27, from thence passing over a pulley 36 at the upper extremity of the post 27 to a third pulley 37, carried by one of the levers 28 included in the mast structure. If desirable, the hoisting-rope 34 may be passed over the pulley upon the samson-post 25 before the walking-beam 24 has been placed in position; but it is clear that the manner of connecting said hoisting-rope with the lever 28 of the mast will enable the mast to be hoisted very quickly and easily by means of the bull-shaft 4. The structure of the mast when folded is compact, and the parts thereof are so arranged that they may be readily elevated or extended, obviating the danger both to life and property that is incident to the erection of the long heavy legs of the derricks at present in use.

As before mentioned, in spudding the pitman is disengaged from the wrist-pin 22, and said pitman may only be pulled forwardly and backwardly from the wrist-pin, so that the lower end will rest upon the main sill of the machine, and this will tilt the walking-beam in such a manner that the latter will remain in a position permitting the spudding-pulley to be adjusted to the wrist-pin, as described hereinbefore. The advantages of the construction in spudding reside in the fact that the driller is able to raise and lower the tools without stopping the machine or reducing the speed thereof, which is very important when a stone falls in from the wall of the well upon the tools, when the walls of the well are caving in on the tools, when fishing for lost

tools, when cutting the rope preparatory to fishing for lost tools that are stuck in the well, and in various other instances, instantaneous movement of the bull-wheel being had by merely applying the friction appliance hereinbefore set forth.

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

1. In a well-drilling machine, a derrick-mast composed of the supporting-post 27, the lever 27^a pivoted thereto, the pairs of lazy-tongs levers 28 and 29 connected with each other, the levers 28 being pivoted to the supporting-post 27 and the lever 27^a, a shaft mounted on the upper ends of the uppermost levers 29, a crown-pulley mounted on said shaft, the pulleys 35 and 36 attached to the post 27, the hoisting-rope 34 passing about the pulleys 35 and 36 and extending from the

pulley 36 to one of the levers 28, the pulley 37 carried by said lever 28, and the stays 30 connected with the upper end portions of the several pairs of lazy-tongs levers and adapted to be raised as the mast is extended by operation of the hoisting-rope 24.

2. In a well-drilling machine, a derrick-mast composed of a supporting-post, lazy-tongs levers carried by said supporting-post, spaced members at the ends of the uppermost of the lazy-tongs levers, a shaft supported in said spaced members, and a pulley mounted upon said shaft.

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

WILLIAM L. KNOWLES. [L. s.]

Witnesses:

G. G. MYERS,
C. M. KROUS.