

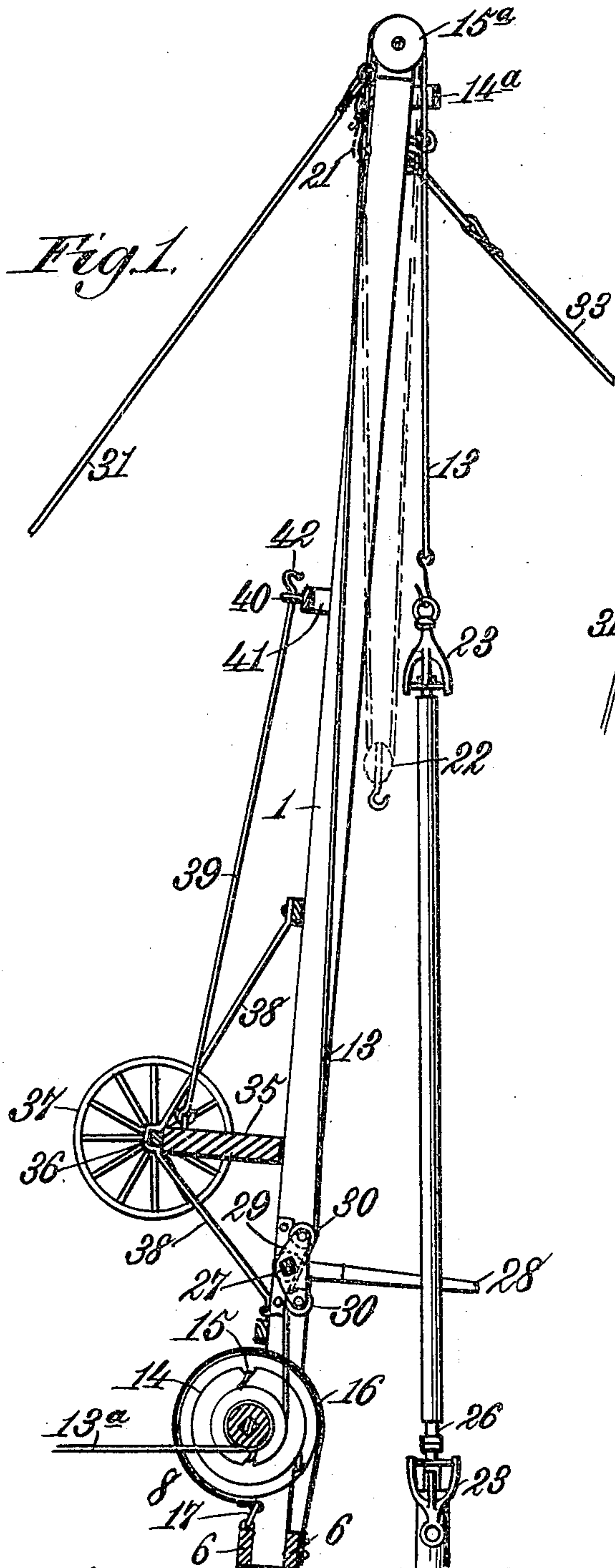
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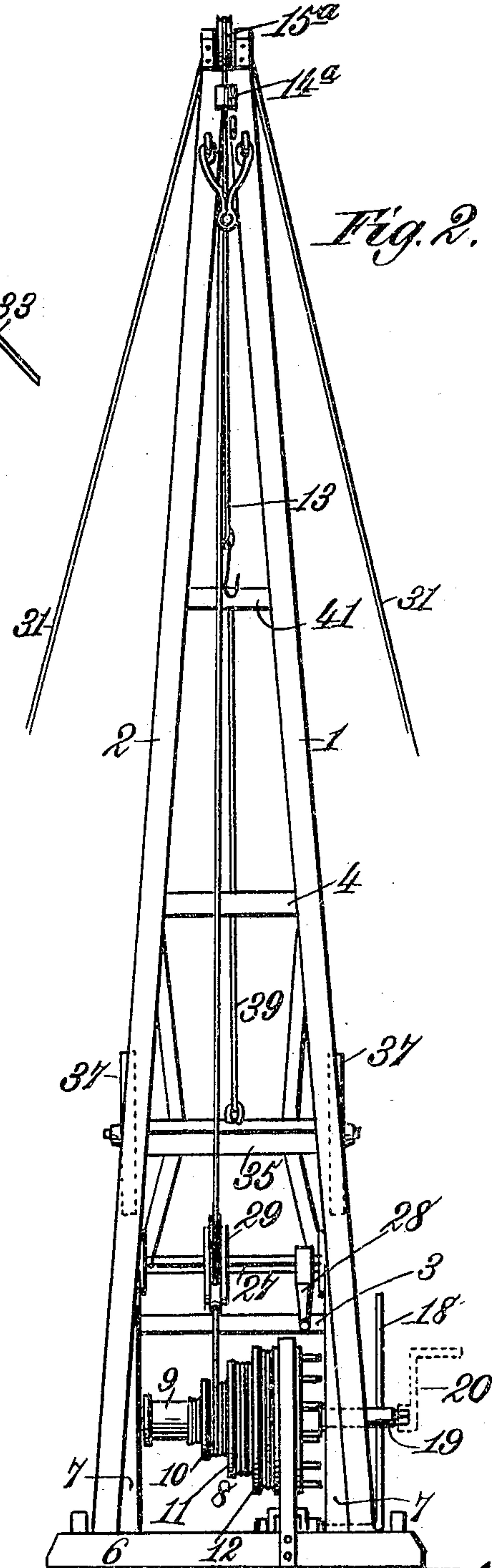
F. W. PENNELL.
RIG FOR OIL WELLS.

APPLICATION FILED OCT. 26, 1904.

2 SHEETS--SHEET 1.



Witnesses.
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UNITED STATES PATENT OFFICE.

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RIG FOR OIL-WELLS.

No. 807,861.

Specification of Letters Patent.

Patented Dec. 19, 1905.

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To all whom it may concern:

Be it known that I, FRANK W. PENNELL, a citizen of the United States, residing at Lima, in the county of Allen and State of Ohio, have
5 invented new and useful Improvements in Rigs for Oil-Wells, of which the following is a specification.

This invention relates to a portable rig for pulling oil-wells; and the purpose of the in-
10 vention is to provide a simple structure portably disposed on rotatable elements or wheels in such manner that the rig proper or derrick-frame when lowered will have the weight
15 equally distributed on opposite sides of the rotatable element, and, further, when it is desired to elevate the rig proper or derrick-frame the base end, or that end which con-
20 tacts with the ground-surface, may be lowered to the latter and hold the longer part of the rig proper or derrick-frame on the opposite
side of the rotatable elements or means for rendering the entire device portable at an ele-
25 vation above the ground surface, and thereby facilitate the erection of the rig proper to operative position by materially decreasing the weight resistance on the draft-animals or
motive medium employed for such erection.

A further advantage of the invention is that the rig proper or derrick-frame is equipped
30 with winding means for operating the hoisting or lowering cable and checking and incidental draft devices, the hoisting and lowering cable and the drum having structural features coöperating therewith and forming a
35 part thereof for regulating the power in accordance with the weight of the rods or pipes with which they engage. The rig has been especially devised for pulling the rods or
40 pipes of oil-wells; but it will be understood that it is equally well adapted and will be used for lowering said rods or pipes into wells.

In the drawings, Figure 1 is a transverse vertical section of a rig embodying the fea-
45 tures of the invention and shown in erect position. Fig. 2 is a front elevation of the same in erect position. Fig. 3 is a side elevation of the rig lowered and ready for transporta-
tion or in the position it occupies previous to erecting the same. Fig. 4 is a top plan view
50 of the rig in lowered position. Fig. 5 is a detail perspective view of one form of rod or tube grapple or holder used in connection with the rig. Fig. 6 is a detail perspective view of the upper end of a rod or tube, show-

ing the formation thereof for engagement by 55
the grapple or holder illustrated by Fig. 5.

Similar numerals of reference are employed to indicate corresponding parts in the several views.

The rig proper or derrick-frame comprises 60
tapering side sections 1 and 2, consisting, preferably, of continuous beams of suitable dimensions which have a maximum diver-
gence at the terminals thereof located adja-
cent to the ground-surface when the frame is 65
erected and connected at intervals by transverse braces or ties 3 and 4. To the diverged
ends of the sections or beams 1 and 2 are se-
cured transverse strips 6, which are spaced
70 apart from each other, as clearly shown by Fig. 1, and are of such dimensions as to pro-
vide a stable support for the frame when erected in conjunction with stakes or analo-
gous holding devices driven therebetween at
75 intervals, preferably located between the outer terminals of the said strips. The strips
6 may be properly termed "sills," which
unitedly form a base for the frame, and im-
mediately above the same, inside of the sec-
80 tions or beams 1 and 2, auxiliary shaping-
pieces 7 are secured and taper gradually from their thick ends near the base toward their
opposite ends, the purpose of these shaping-
pieces being to square the space between the
85 ends of the sections or beams 1 and 2 adja-
cent to the base for the practical application therebetween of a drum 8. This drum 8 has
a series of winding portions 9, 10, 11, and 12
of different diameters to regulate the power
90 required to control the weight of the rods or
pipes attached to the hoisting and lowering
cable or analogous device 13, coöperating with
the winding portion 9 of the said drum. The
cable 13 passes through a guide 14^a at the re-
95 duced terminal of the frame and over a pul-
ley 15^a, held between the converged ends of
the sections or beams 1 and 2, and then down-
wardly to the portion 9 of the drum, a drum-
actuating cable 13^a when the rig is in use be-
100 ing projected rearwardly from at least one of
the remaining winding portions of the drum
for the attachment thereto of draft-animals
or a mechanical motive mechanism.

It will be understood that various forms of
drums could be employed in connection with 105
the frame without in the least modifying the
features of the invention; but it is preferred
that the form of drum set forth be used and

having an operating-cable 13^a continuing over the several winding portions differing in diameter and running from one to another regularly, the portions 10, 11, and 12 being
 5 separated by rims or flanges 14, regularly increasing in diameter and having grooved or notched edges 15, as shown by Fig. 1, through which the cable 13^a passes as the said cable is
 10 shifted from one portion of the drum to another, either increasing or decreasing in diameter, as the operation and attending conditions may require, in consonance with the increase or decrease in weight imposed on the end of the cable connecting directly with the
 15 well rods or tubes. The drum is also equipped at one side with a band-brake 16, operated by a crank extremity 17, connected to or forming part of a band-bar 18, projecting along one side of the frame to manually control the
 20 lowering of the cable 13, the cable 13^a in this operation running loose. In addition to the operation of the drum by means of draft-animals or mechanical motive power in raising or lowering the cable the shaft 19 of said drum
 25 is extended past one of the sections or beams and its end formed angular in cross-section to receive a crank-handle 20, and by this means the said drum may be manually operated in pursuing certain operations or in coöperating
 30 with wells where a manual actuation of the drum is necessary.

The hoisting and lowering cable 13 is adapted to be used in either one of two ways. It can pass straight downwardly from the pulley or
 35 sheave 15^a and be connected to the pipe or other device to be elevated thereby, or, if additional power is desired, said cable may be doubled, as shown by dotted lines in Fig. 1, the free end of the cable under such arrange-
 40 ment being attached to a hook or analogous device 21, secured to the converged end of the derrick-frame on the side opposite the guide 14^a, or that side which constitutes the rear of the frame when the latter is in erect position.
 45 Previous to the attachment of the end of the cable to the hook 21 a block 22 of suitable nature is arranged on the cables, and the means for attaching the rod or pipe end to the cable is connected to said block.

50 A grapple or holding device 23 (shown in detail by Fig. 5) is connected to the end of the cable 13 or to the block 22, as the case may be, and said grapple is provided with a longitudinally-slotted slip-head 24, pivotally support-
 55 ed by a suspending-yoke 25, the latter having a finger 25^a to enter the slot when the yoke is arranged vertically to hold the rod or pipe end in the head and prevent accidental disengagement of the rod or pipe. The ends of
 60 each rod-section, as shown by Fig. 6, are angularly recessed, as at 26, to correspond to the slot in the head 24, and the latter is slipped over the said reduced end of the successive rods, and in the operation of lowering the rods
 65 into a well when the head 24 rests on the up-

per curbing or casing projecting above the ground it holds the rod with which it is connected against further depression until released. Under such conditions it will be ob-
 70 vious that considerable weight is imposed on the head 24, and such weight will resist ordinary manual efforts to withdraw the head after another rod-section is coupled on the projecting end of that which has been lowered into the well. It will be necessary to release
 75 the head, and for this purpose a preferred attachment is employed to elevate the cable 13 slightly without actuating the drum. This attachment is in the form of a kinker and comprises an angular shaft 27, terminally held
 80 between the sections or beams 1 and 2 above the drum and having a handle 28 secured to one extremity thereof. Slidably mounted on the shaft 27 is a carrier 29, having grooved pulleys or sheaves 30 rotatably held in the op-
 85 posite terminals thereof and over and between or through which the cable 13 is passed or threaded, said cable being brought to bear against the front portion of the upper pulley 30 and downwardly over the rear portion of
 90 the lower similar pulley. By pressing downwardly on the handle 28 the shaft 27 will be rotated to throw the carrier 29 and the pulleys 30, carried thereby, forwardly and kink the cable to such an extent as to pull upwardly on
 95 the extremity thereof attached to the rod length or section and raise it and that below to which it is secured and release the grapple or holding device 23, which has been supporting the rod length previously lowered in the
 100 well. After this operation the kinker returns to normal position by the stress on the cable.

When the derrick-frame or rig is erected, as shown by Figs. 1 and 2, guy-cables 31 or the like, attached to the rear side of the upper re-
 105 duced terminal thereof, are drawn taut and attached at their lower terminals to stakes or other analogous devices, the said lower terminals being in the form of adjustable chain lengths 32. To facilitate raising the rig or
 110 frame to an upright position, a draft-cable 33 is attached to the center of the side of the reduced upper end opposite that to which the guy-cables are secured and has a pulley 33^a at its lower extremity, through which a pull-cable
 115 or other analogous device 34 is passed and attached to a doubletree, to which draft-animals may be hitched or other motive means may be employed for this purpose. After the rig or
 120 frame is properly erected the pull-cable 34 is attached to a stake or the like, and the elevating or draft cable 33 then becomes a guy acting in opposition to the guide-cables 31.

One of the most essential features of the invention is the application thereto of a bolster
 125 35 on the side to which the guy-cables 31 are secured and at a point between the ends of the sections or beams 1 and 2, the said bolster supporting an axle 36, having wheels 37 rotatable on the opposite terminals, the said bol-
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ster, axle, and wheels having suitable braces 38 connecting therewith and the adjacent portions of the frame and constituting a truck in permanent engagement with the derrick.

5 The bolster 35 is projected at such distance from the sections or beams 1 and 2 as to effect a balanced structure when the rig or frame is lowered. The truck is located much nearer the diverged ends of the sections or beams 1

10 and 2 than the opposite converged ends thereof; but the weight of the entire derrick structure is equally distributed on opposite sides of the truck to materially assist in transporting or moving the complete device from one

15 well to another. The rig as an entirety is drawn by draft-animals, which are hitched thereto, and attached to the center of the lower portion of the bolster 35 is a draft rod, cable, or analogous device 39, having its op-

20 posite extremity loosely held in an eye 40, carried by a projecting yoke 41, attached to the sections or beams 1 and 2 a proper distance from the truck. The draft rod, cable, or analogous device 39 terminates in a hook

25 42, to which a doubletree 43 is secured, and is of such length as to locate swingletrees thereon outside of the opposite sections or beams 1 and 2, said doubletree being detachable and used in connection with the cables 33 in erect-

30 ing the derrick and also the rearwardly-projecting portion of the cable 13^a for operating the drum. Coöperating with the doubletree is a neck-yoke 45, which is detachably connected to a hook 46 on the reduced extremity

35 of the rig or derrick-frame adjacent to the guide 14^a. When the rig or derrick-frame is erected, this neck-yoke is detached from the hook 46.

As before noted, the truck is so applied to

40 the rig or truck-frame that the latter is balanced when lowered to ease the movement thereof by draft-animals without imposing excessive weight on such animals. When the shorter portion of the rig or derrick-

45 frame between the truck and the sills is lowered to the ground or inclined with respect to the wheels 37, acting as fulcrums, the longer portion of the said rig or derrick-frame is held elevated, and this is facilitated by the dispo-

50 sition of the working parts, including the drum in the rig or derrick between the truck and the sills 6. When the sills 6 are placed on the ground prior to elevating or erecting the rig or derrick-frame, as shown by Fig. 5,

55 the longer portion of the rig or derrick is held at a considerable elevation and the draft-animals or other elevating medium will be relieved of considerable weight resistance, and, further, the rig will be more expeditiously

60 erected.

It will be therefore understood that by holding the axle 36 at a considerable distance from the sections or beams 1 and 2 by the bolster 35 or other analogous means it is mate-

65 rially important from a structural stand-

point in effecting the balance of the rig structure when lowered and also in elevating the greater portion of the rig proper or derrick-frame just previous to the erection of the latter to operative position.

From the foregoing description it will be seen that the rig can be readily backed up to the point of application adjacent to a well and quickly erected and held in operative position, and when the work at such well is completed the rig can be quickly lowered and readily moved to another well. When the rig is lowered, the guy and lifting cables are thrown over onto the frame and loosely secured, so they can be readily unfastened and

80 used for their intended purpose without delay. The main advantage of the present form of rig is that it overcomes the expense of individual structures adjacent to each well to perform the work for which this device is

85 adapted. It will be understood also that changes in the proportions, dimensions, and minor details may be resorted to without departing from the spirit of the invention.

Having thus described the invention, what

90 I claim as new is—

1. In a device of the class set forth, the combination of a rig or derrick-frame consisting of members converging toward one end, a drum disposed in the diverged extremity of

95 the rig or derrick-frame, a pulley carried in the converged extremity of said frame, a hoisting and lowering cable coöperating with the drum and passing over the pulley, and a kinker device disposed above the drum and

100 having the hoisting and lowering cable passed therethrough, the kinker device being automatically slidable in a transverse direction with respect to the rig or derrick-frame and longitudinally over the drum.

2. In a device of the class set forth, the combination of a rig or derrick-frame, a drum disposed in one extremity of the frame and having a reduced extremity provided with means for manually operating the drum and

110 also with winding-surfaces of different diameters, an actuating-cable engaging one end of the drum and operative by power other than manual, an elevating and lowering cable engaging the winding-surfaces of the drum hav-

115 ing different diameters and movable over the end of the frame opposite that in which the drum is located, and a kinker device having the elevating and lowering cable passed there-

120 through and located above the drum for imparting to said cable an elevating movement without operating the drum, the kinker device being automatically adjustable over the drum to compensate for the position of the cable with respect to the latter.

3. In a device of the class set forth, the combination of a rig or derrick-frame converged toward one extremity of the frame, an elevating and lowering cable over the reduced extremity of the frame and operating

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with the drum, and a kinker automatically slidable with relation to the longitudinal extent of the drum and having means engaging separate portions of the cable for causing the
5 latter, when pressure is applied in the proper direction, to have an elevating movement independent of the operation of the drum.

4. In a device of the class set forth, the combination of a rig or derrick-frame, a drum
10 disposed in one extremity of the frame, an elevating and lowering cable movable over the opposite extremity of the frame and operating with the drum, and a kinker attach-

ment adjacent to the drum comprising an angular shaft having a handle, and a carrier 15 slidably mounted on the shaft having roller devices in the extremities thereof for engagement with the cable.

In testimony whereof I have hereunto set my hand in presence of two subscribing wit- 20 nesses.

FRANK W. PENNELL.

Witnesses:

WILLIS H. PEATE,
D. J. CABLE.