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S. M. FOLTZ.
PORTABLE DERRICK.
APPLICATION FILED JAN. 20, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

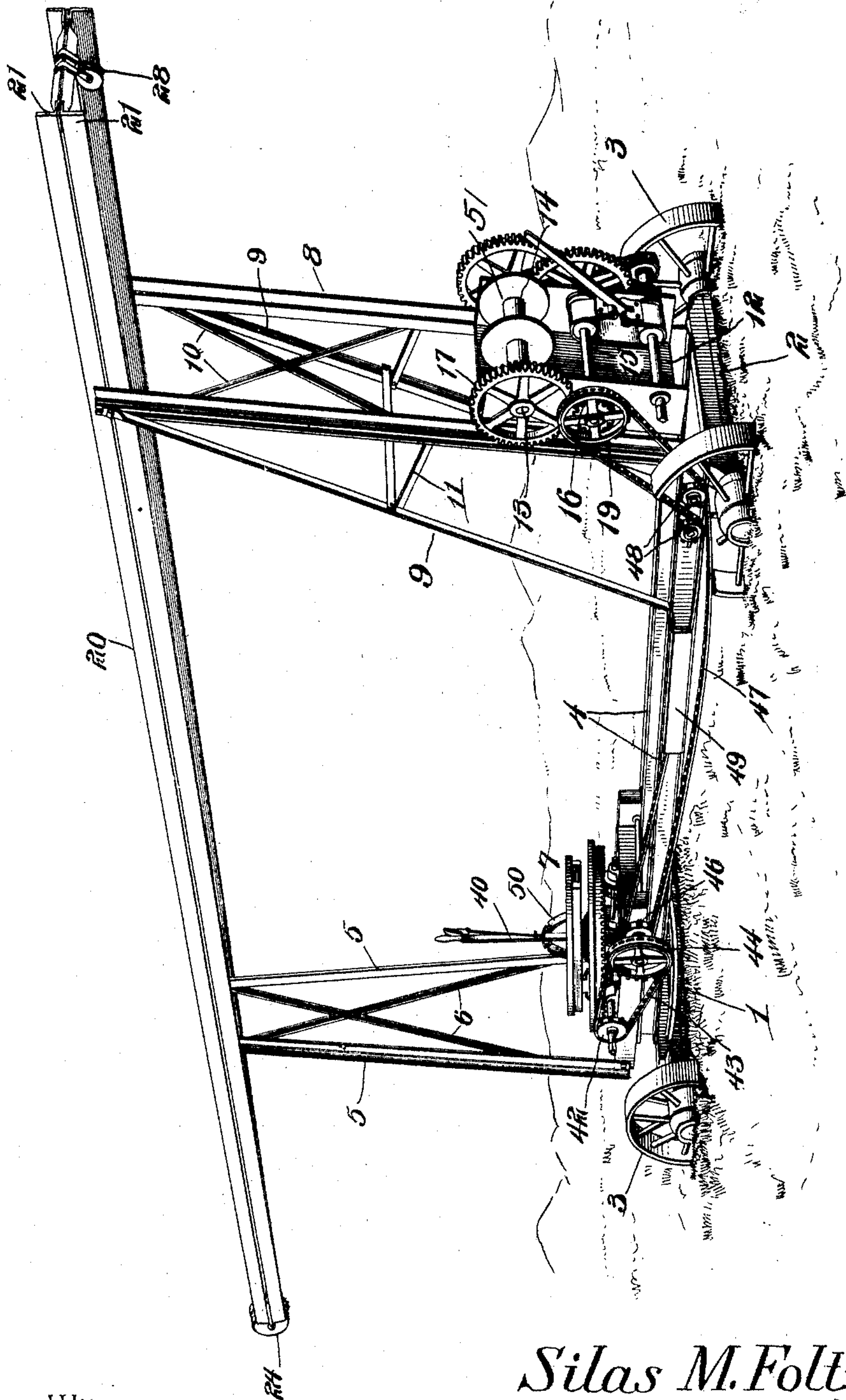


Fig. 1.

Witnesses

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by

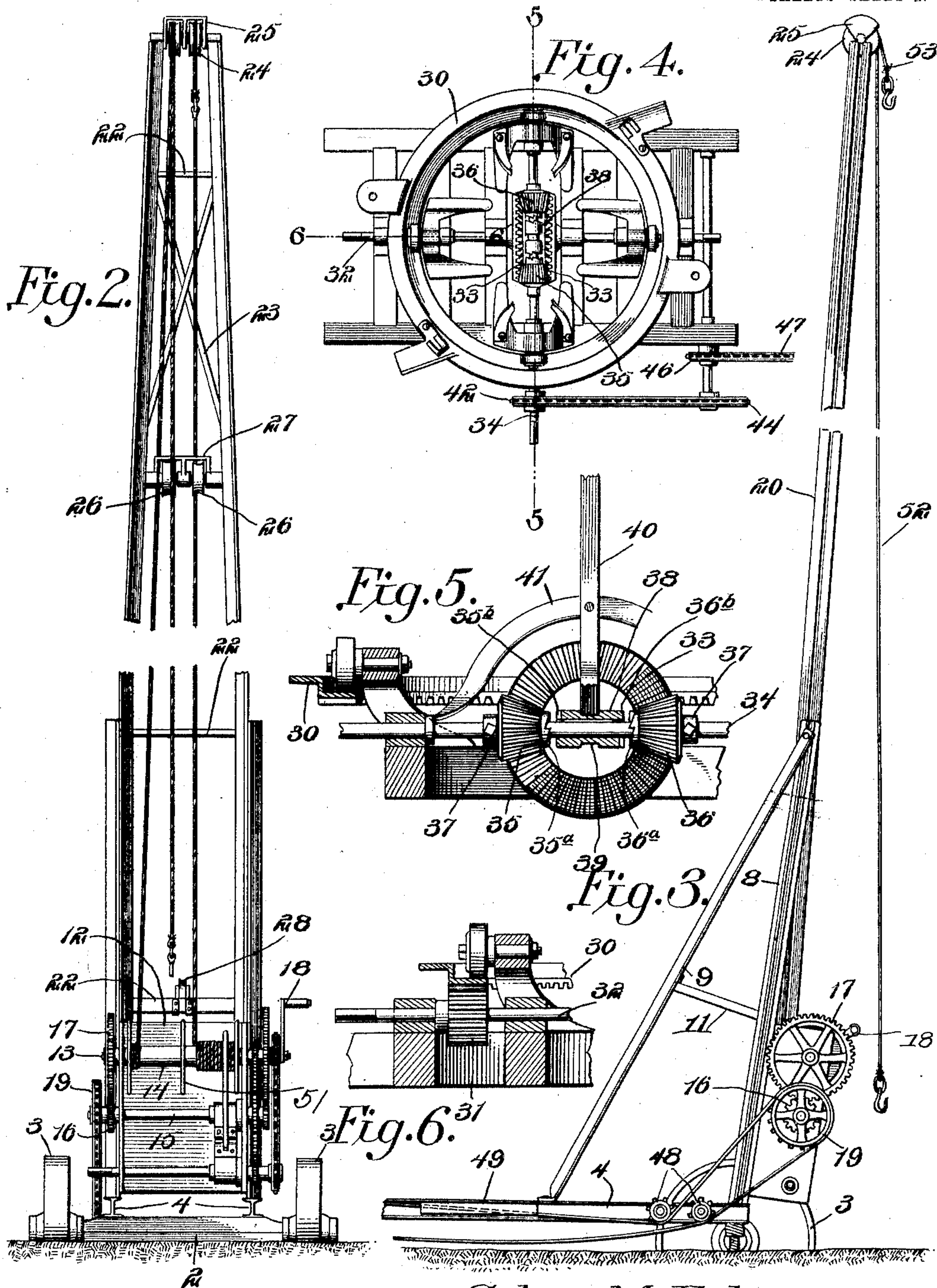
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

SILAS M. FOLTZ, OF RAWSON, OHIO.

PORTABLE DERRICK.

SPECIFICATION forming part of Letters Patent No. 776,657, dated December 6, 1904.

Application filed January 20, 1904. Serial No. 189,885. (No model.)

To all whom it may concern:

Be it known that I, SILAS M. FOLTZ, a citizen of the United States, residing at Rawson, in the county of Hancock and State of Ohio, have
5 invented a new and useful Portable Derrick, of which the following is a specification.

This invention relates to derricks, and especially to that class of derricks which are utilized in oil-fields for the purpose of pulling, hoisting, and otherwise handling tubing
10 or casing, rods, and the like.

The object of my present invention is to provide a derrick of this class which shall be mounted in such a manner as to be portable,
15 which shall be possessed of great strength, durability, and general efficiency, and which shall be double-acting, so that while one hoisting medium ascends another hoisting medium descends for connection with the article to be
20 hoisted.

A further object of my invention is to provide power for driving the hoisting mechanism operated continuously in one direction, reversing-gear being provided whereby the
25 direction of movement of the hoisting mediums may be reversed when desired.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists
30 in the improved construction, arrangement, and combination of parts, which will hereinafter be fully described, and particularly pointed out in the claims.

In the accompanying drawings I have shown
35 a simple and preferred form of embodiment of my invention, it being understood, however, that I do not necessarily limit myself to the precise structural details therein exhibited, but reserve the right to any changes, alterations,
40 and modifications which may be resorted to within the scope of my invention and without departing from the spirit or sacrificing the utility of the same.

In said drawings, Figure 1 is a perspective
45 view of my improved portable derrick, showing the same in position for operation prior to the hoisting of the derrick. Fig. 2 is an end view showing the derrick hoisted. Fig. 3

is a side elevation of the front end of the machine, showing the derrick hoisted and in position for operation. Fig. 4 is a top plan
50 view of mechanism used in connection with my improved derrick, the shifting lever and part of the supporting-brackets for said lever having been removed. Fig. 5 is a sectional
55 detail view, enlarged, taken on the line 5 5 in Fig. 4. Fig. 6 is a sectional detail view taken on the line 6 6 in Fig. 4.

Corresponding parts in the several figures are indicated by similar numerals of reference. 60

In the construction of my improved derrick I provide a supporting-truck comprising front and rear axles 1 2, supported upon low wheels 3, having broad treads. The front and rear
65 axles are connected by the side bars 4 4, which are made of angle-iron and of suitable length to space the front and rear trucks sufficiently apart, the front truck being provided with a fifth-wheel in the usual manner. Upon the
70 front ends of the side bars, directly above the front axle, are supported a pair of uprights 5, which are connected by cross-braces 6, and between the lower ends of these uprights is supported the frame of a mechanism 7, which
75 will be presently more fully described. Upon the frame-bars 4, directly above the rear axle, are supported a pair of uprights 8, each of which is preferably composed of a pair of
80 angle-irons suitably bolted or riveted together or otherwise connected, said uprights being connected with the frame-bars 4 4 by means
85 of braces 9, which are of such a nature as to insure great strength and stability. Cross-braces, as 10, and struts, as 11, may also be utilized in order to strengthen the structure.

12 designates the base-plate of the hoisting-machine, which is secured to the lower ends of the uprights 8 in such a manner as to rest
90 upon the frame-bars 4. This plate may be made of cast-iron, and it is provided with bearings for the shaft 13 of the winding-drum 14 and also with bearings for a counter-shaft 15, having pinions 16 meshing with gear-wheels 17 upon the drum-shaft. The latter is
95 provided with a crank 18 to enable it to be rotated by hand. The counter-shaft 15 is pro-

vided at one end with a sprocket-wheel 19 to receive motion from the mechanism, as will be presently more fully described.

20 designates the derrick-frame, each side 5 of which is composed of two angle-bars 21, which are suitably connected and slightly spaced apart, as will be readily seen, for the accommodation of the cross-bars or connecting devices 22, of which any desired number may 10 be used. The sides of the derrick-frame, which, as stated, are each composed of two bars 21, are connected and spaced apart by the cross-bars 22 and diagonal braces 23, said frame sides being made to converge slightly in 15 the direction of their upper ends. This derrick-frame is connected pivotally with the upper ends of the uprights 8 by means of one of the cross-braces 22, which serves as a pivot-bolt upon which the derrick-frame may turn as upon 20 a fulcrum. The proportions are so calculated that the part of the derrick-frame below the fulcrum-bolt shall equal in length that portion of the uprights 8 which extends above the base-plate 12 of the hoisting-machine. Con- 25 sequently when the derrick-frame is raised in operative position the lower ends of the side pieces of the derrick-frame will be supported directly upon the base 12, thus making a derrick structure which is practically without a 30 joint and which is consequently much stronger and more capable of supporting heavy weights than an ordinary jointed or extension structure, it being obvious that all downward pressure will be exerted directly upon the edge of 35 the base-plate 12, which in turn is supported upon the main supporting-frame of the machine.

The top cross-piece 22 of the derrick-frame supports a pair of pulleys 24, which are suitably journaled on said cross-piece and which 40 are protected by means of a hood 25, which also serves to prevent any possibility of the hoisting-ropes or other hoisting elements jumping off the pulleys when the machine is 45 in operation. Additional pulleys, as 26, may be journaled upon the lower cross-piece and may likewise be guarded by a hood 27. These lower pulleys may be brought into requisition 50 when heavy weights are to be lifted and when the distance to which such weights are to be elevated is not very great. When folded, the free end of the frame is adapted to rest and be supported upon the upper end of the uprights 5 at the front end of the frame 55 of the machine. In order to raise the derrick-frame, the rope is made fast by a hook or in some other convenient manner to the upper cross-piece 22. From thence said rope is guided over a pulley 28, connected with 60 the lower cross-piece and passed to the winding-drum, with which it is connected. By operating the winding-drum by means of the handle 18 it is obvious that the derrick-frame will be elevated until it assumes a slightly-

tilted position in a forward direction, when it 65 is arrested by the cross-braces connecting the uprights 8 and is thereby retained in operative position with the lower ends of its side pieces bearing upon the upper edge of the base-plate 12. 70

The mechanism 7, which is supported upon the front end of the frame, comprises a master-wheel 30, which is mounted to revolve in a horizontal plane upon suitable supporting means and the under side of which constitutes 75 a bevel-gear meshing with pinions 31 upon a pair of longitudinally-disposed shafts 32, the inner ends of which carry bevel-gears 33, facing each other.

34 designates a transversely-disposed shaft 80 mounted between the bevel-gears 33 and carrying loose pinions 35 and 36, meshing with said bevel-gears 33 and held in engagement with the latter by means of collars 37. The inner ends of the pinions 35 and 36 constitute 85 clutch members 35^a 36^a, which are adapted to be engaged by corresponding clutch members 35^b 36^b, formed upon the ends of a sleeve 38, which is mounted slidably upon and revolvable with the shaft 34 between the said pinions. 90 The sleeve 38 has an annular groove 39, engaged by a forked lever 40, which is fulcrumed between a pair of arched braces 41, which are suitably mounted upon the frame of the mechanism. It is obvious that by ma- 95 nipulating the lever 40 the clutch-sleeve 38 may be disposed between the inner ends of the pinions 35 and 36, which latter will thus be caused to rotate loosely upon the shaft 34, which latter by engaging the clutch-sleeve 100 with the said pinions may be caused to rotate in opposite directions, according to the direction of rotation of the pinion with which the clutch-sleeve is placed in engagement. The shaft 34 is extended at one end of the frame 105 and has a sprocket-wheel 42 connected by a chain 43 with a sprocket-wheel 44 upon a counter-shaft, which latter carries an additional sprocket-wheel 46, connected by a chain 47 110 with the sprocket-wheel 19 upon the shaft 15 of the hoisting-machine, said chain 47 being guided over adjustable sprockets 48, which also serve as chain-tighteners. The side bar 4 of the main frame, adjacent to which the chain 47 is guided, is provided with a protective hood or casing 49, which will prevent 115 the horses operating the power from stepping upon the chain. Means such as an ordinary segment-rack is provided, as shown at 50, to retain the hand-lever 40 at its proper adjustment. The mechanism is also provided with 120 sweeps for the hitching thereto of the draft-animals in the usual manner.

The hoisting-drum 14 of the machine is provided with a central partition 51, at the opposite sides of which the hoisting-ropes 52 and 53 are wound in opposite directions, said hoisting-ropes being passed over the pulleys 24 or 125

26, as the case may be, and thence down to the material to be elevated. It is obvious that when the machine is in operation it will travel continuously in one direction. By means of the reversing-lever 40 the clutch member may be adjusted in such a manner as to cause the main power-shaft 34 to remain stationary or to be rotated in either direction, thus obviously reversing the direction of rotation of the winding-drum, and consequently lowering one hoisting element while the other is being raised. My improved hoisting-machine is thus made capable of being operated continuously or with very brief intervals of stoppage, one of the hoisting elements being always ascending no matter what may be the direction of rotation of the hoisting-drum.

Additional means to those herein described may be used for the purpose of regulating speed and power, such means being in the nature of means for transmitting motion at variable rates of speed, as will be readily understood. Brake mechanism is also preferably provided to be used for the purpose of checking speed of descent when heavy weights are being lowered.

From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of my invention will be readily understood by those skilled in the art to which it appertains. It will be seen that when the derrick-frame is folded in such a manner as to be supported partly upon the rear uprights 8 and partly upon the front uprights 5 the machine may be readily transported from one place to another. When the machine has reached its destination, the horses are detached, and the wheels are then sunk in the ground by digging away the soil from under them until the axles of the machine rest bodily upon the ground. The frame and the entire weight supported thereon will thus be easily and firmly anchored. The derrick-frame is now elevated in the manner already described, and the machine is then ready for operation.

The machine, it will be seen, requires practically no attention beyond the shifting at the proper times of the reversing-lever, whereby the direction of the rotation of the hoisting-drum is reversed, stopped, or started, as the case may be.

The machine, it will be understood, is extremely useful for pulling well-tubing, rods, and the like or for various operations connected with oil and other wells.

Having thus described my invention, I claim—

1. In a machine of the class described, a wheeled supporting-frame, a pair of uprights rising from said frame above the rear axle, a base-plate connected to the lower ends of the uprights supporting the hoisting machinery, and a derrick-frame mounted pivotally be-

tween the upper ends of said uprights, the side members of said derrick-frame being adapted to rest upon the upper edge of the base-plate of the hoisting-machine when the derrick-frame is raised to operative position.

2. In a machine of the class described, a wheeled supporting main frame, derrick-supporting beams rising from said main frame above the rear axle, bracing means for said uprights, and a derrick-frame consisting of side members, each comprising two angle-irons suitably connected and spaced apart, cross-pieces and diagonal braces, said derrick-frame being connected pivotally by one of its cross-pieces with the upper ends of the supporting-uprights.

3. In a machine of the class described, a wheeled supporting-frame, uprights rising from the same above the rear axle, hoisting machinery connected with the lower ends of said uprights, uprights rising from the frame above the front axle, a mechanism mounted upon the frame near said uprights, and a derrick-frame pivotally connected with the upper ends of the rear uprights and adapted to rest, when folded, upon the front uprights, the latter and the weight of the mechanism serving to counterbalance the derrick-frame when the latter is raised to operative position.

4. In a machine of the class described, a wheeled supporting-frame, uprights rising from said frame above the rear axle, a derrick-frame connected pivotally with the upper ends of said uprights, a base-plate secured to the latter and engaging the lower ends of the side members of the derrick-frame when the latter is raised in operative position, a drum mounted upon said base-plate, said drum having a central partition, flexible hoisting elements wound in opposite directions upon the drum on opposite sides of the partition and guided over pulleys supported by the derrick-frame, means for rotating said drum, and means for reversing the direction of rotation.

5. In a machine of the class described, a wheeled supporting-frame, uprights rising from said frame above the rear axle, hoisting machinery including a drum connected with said uprights, a derrick connected with said uprights, flexible hoisting elements wound in opposite directions upon the winding-drum and guided over pulleys upon the derrick, a mechanism supported at the front end of the wheel-supported frame, means, including a sprocket-chain, for transmitting motion from said mechanism to the hoisting-drum, means for reversing the direction of rotation, and a shield or casing connected with one of the side pieces of the wheel-supported frame and protecting said chain.

6. In a machine of the class described, mechanism including a master-wheel suitably supported for rotation, a pair of shafts having pinions engaging said master-wheel and pro-

vided at their inner ends with bevel-gears
facing each other, a driven shaft mounted be-
tween said bevel-gears and having loose pin-
ions engaging the latter, said pinions being
5 provided with clutch members at their inner
ends, a sleeve mounted slidably upon and ro-
tatable with said shaft and provided at its
ends with clutch members adapted to engage
those of the pinions, lever means for adjust-
10 ing and retaining in position the said clutch-
sleeve, a derrick, a hoisting-drum, hoisting
elements wound in opposite directions upon

said drum and guided over pulleys upon the
derrick, and means for transmitting motion
from the driven shaft to the shaft of the wind- 15
ing-drum.

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

SILAS M. FOLTZ

Witnesses:

LEONARD S. WOODRUFF,
MIKE SMITH.