

No. 724,668.

PATENTED APR. 7, 1903.

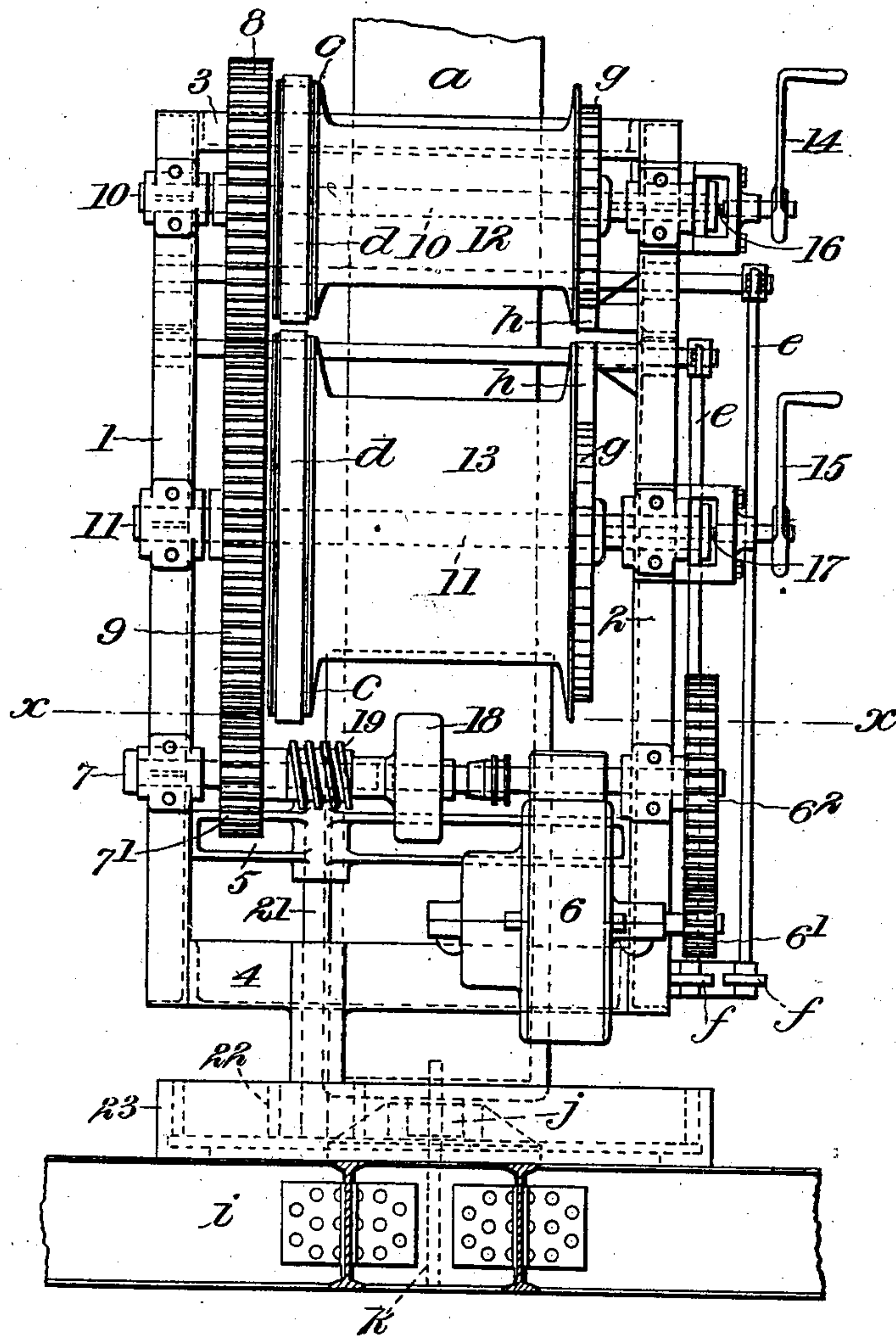
J. M. CORNELL.
HOIST FOR DERRICKS.

APPLICATION FILED JAN. 13, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.



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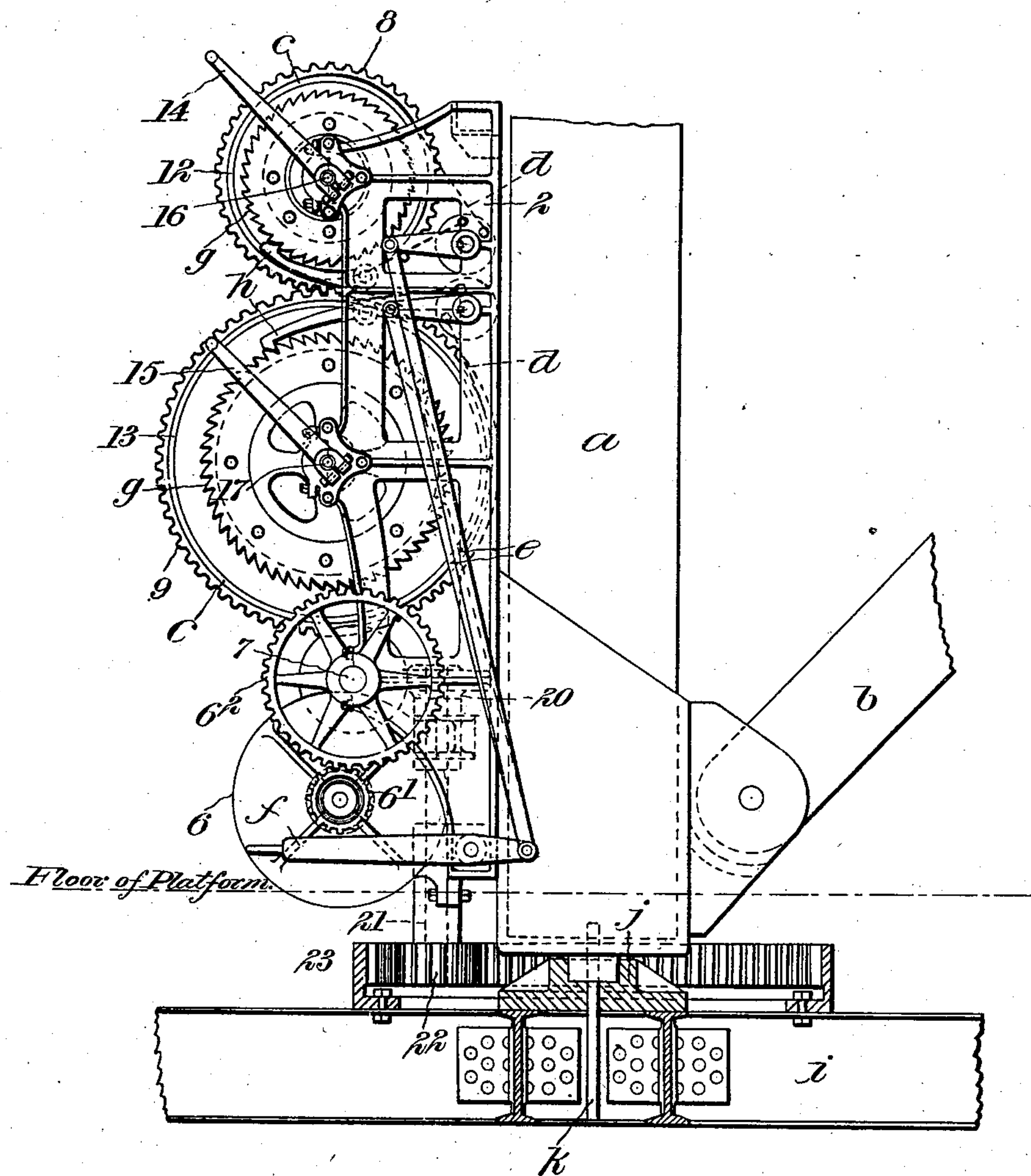
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3 SHEETS—SHEET 2.

Fig. 2.



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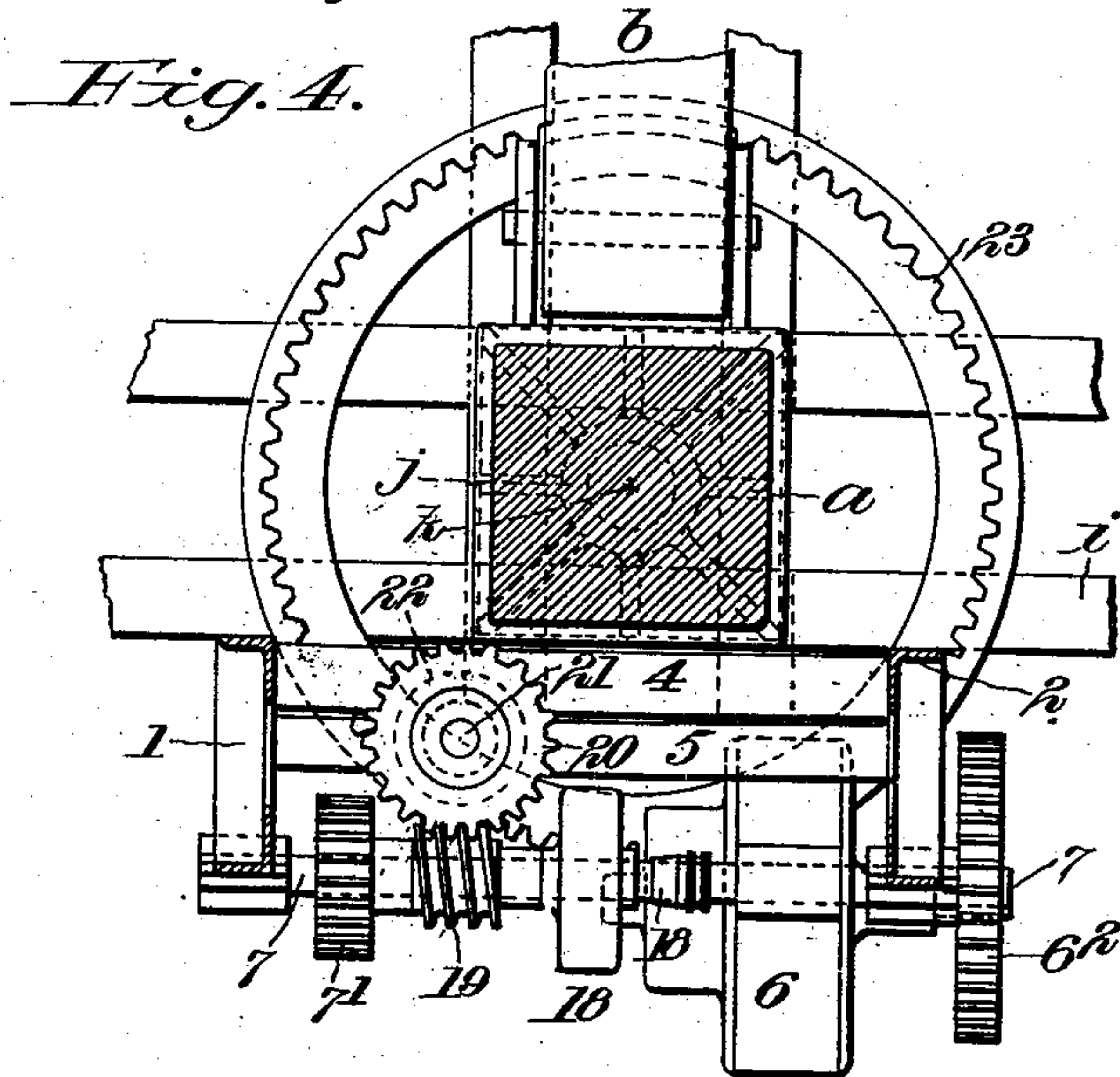
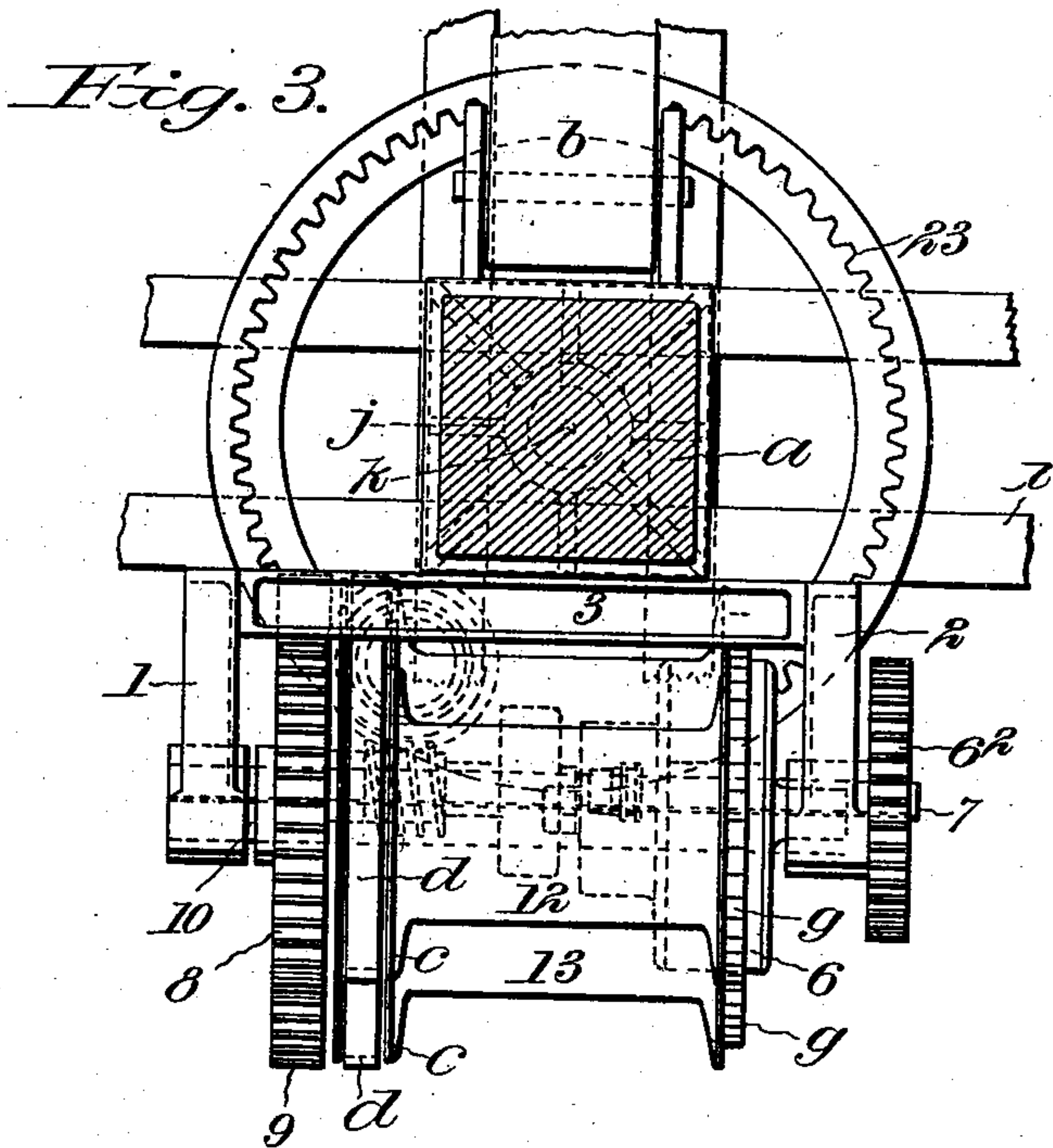
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3 SHEETS—SHEET 3.



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HOIST FOR DERRICKS.

SPECIFICATION forming part of Letters Patent No. 724,668, dated April 7, 1903.

Application filed January 13, 1903. Serial No. 138,902. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. CORNELL, a citizen of the United States of America, and a resident of the borough of Manhattan, New York city, in the State of New York, have invented a certain new and useful Improvement in Hoists for Derricks, of which the following is a specification.

This invention relates to the hoisting-gear or hoists of boom-derricks and other forms of derrick, and especially to the adaptation of such hoists to be operated more conveniently and economically than heretofore by electric motors.

The improved hoist is provided with one or more drums, according to the service for which it is intended, each drum being connected to the driving mechanism by a friction-clutch, which can be applied or released instantly, and further fitted with a suitable brake for lowering or temporarily sustaining the load and with a pawl-and-ratchet device for holding the load suspended indefinitely. The driving mechanism operates continuously and is common to all the drums. The respective clutches are operated by means of hand-levers, the brakes are applied by the foot of the operator, and the load-sustaining pawls are thrown into or out of action by hand. All the various operating-levers and treadles are conveniently located, so that the operator does not need to leave a fixed position to reach any one of them.

When the hoist is applied to a "revolving" or turning derrick or derrick-crane, the turning motion is controlled by means of a friction-clutch on the main shaft of the hoist, which throws into or out of gear a counter-shaft and worm-gearing terminating in a pinion which meshes with a large gear that is fixedly supported concentric with the step of the derrick. When it is desired to turn the derrick, a small hand-lever is operated, which through said friction-clutch on the main shaft connects up the worm-driven counter-shaft, and this in turn drives the pinion which is in mesh with the large fixed gear. When the friction-clutch is thrown out of gear, the counter-shaft and pinion are locked by the worm-gearing, so that the derrick is held securely in the desired angular position.

The objects of the present invention are to

simplify the mechanism and render the same as compact as practicable, to facilitate the control of the hoist as a whole by a single operator, to render the drums, where two or more are employed, independent of each other for all the purposes where independent operation is desirable and as numerous as may be necessary, and at the same time to provide for connecting them up with a single motor and to provide for revolving or turning the derrick by means of the same motor.

The invention consists in certain novel combinations of parts hereinafter set forth and claimed.

Three sheets of drawings accompany this specification as part thereof.

Figure 1 is a front view of a hoist for a boom-derrick constructed according to this invention. Fig. 2 is a side view of the same, partly in section. Fig. 3 is a general plan view; and Fig. 4 is a plan view in section on the line *xx*, Fig. 1.

Like reference letters and numbers indicate corresponding parts in the several figures.

The improved hoist, as shown in the drawings, is constructed with a frame made up of two side frames 1 and 2, two end frames 3 and 4, and a bridge-piece 5 above and parallel with the lower end frame 4. This frame is bolted fast to the vertical mast *a* of the derrick near its base and supports all the movable parts of the hoist. An electric motor 6 is conveniently attached to the lower end frame 4 and is connected by spur-gears 6' and 6² with the lower or main shaft 7 of the hoist, and this in turn is connected by a pinion 7' and spur-gears 8 and 9 with shafts 10 and 11, parallel with said main shaft 7, each of which is provided with a hoisting-drum, the upper drum 12 being preferably small and designed for raising and lowering the end of the boom *b*, with which it may be connected in any known or improved manner, while the larger drum 13, located immediately below the small one, is the main hoisting-drum and connected in like manner with the load. The aforesaid shafts 7, 10, and 11 and gearing 6', 6², 7', 8, and 9 are driven continuously by the electric motor 6. The drums 12 and 13 are loose on their shafts and are connected to their respective driving-gears 8 and 9 by V-clutches, each of which is com-

posed of a member carried by the gear and a matching member carried by the drum, the drums being movable endwise on their shafts to provide for clutching and unclutching them. The respective clutches are operated by hand cranks or levers 14 and 15 through the medium of screws 16 and 17 in line with the respective drum-carrying shafts 10 and 11. Each drum is constructed with a brake-wheel *c*, integral therewith or fixedly attached thereto at one end, and this wheel is embraced by a brake-band *d*, operated through customary connections, including a connecting-rod *e*, by a treadle *f*. Each drum is also provided in like manner with a ratchet-wheel *g*, and a pawl *h*, pivoted adjacent thereto, is constructed and arranged to be interlocked therewith or disengaged therefrom at will by hand.

To provide for revolving or turning the derrick on its vertical axis at will by the same power, the main shaft 7 is further provided with a friction-clutch 18 and a worm 19, made fast or loose at will by means of such clutch. A worm-wheel 20, in constant mesh with said worm 19, is fast on the upper end of a short vertical shaft 21, the lower end of which carries a pinion 22. In mesh with the latter an annular rack or large gear 23, the teeth of which are preferably internal, is fixedly attached to the structure *i*, which supports the derrick, so as to be concentric with the vertical axis of the mast *a*, as determined by its lower bearing or step *j*.

The electrical conductors may conveniently be carried to the motor 6 through an axial pipe *k*, extending upward through the step *j* of the revolving derrick, as shown in the plane of section in Fig. 2.

By clutching either drum 12 or 13 to the driving mechanism it will be driven instantly and as long as may be required without interfering with the other drum or drums, and by simply varying the relative proportions of the respective drums and their gears each drum may be adapted to receive the necessary power from the common motor.

By operating the respective brakes *d* the load may be temporarily suspended or lowered under the control of the operator, or by throwing the appropriate pawl-and-ratchet device *g h* into action the load may be suspended indefinitely.

By operating the clutch 18 on the main shaft the derrick may be turned on its vertical axis by the same power to any required angular position and when stopped is locked in place by the worm-gearing 19 20.

The positions of the various hand-levers and treadles may be changed to suit the conditions under which the apparatus is to be used. The brake-wheels and ratchet-wheels may be arranged at one and the same end of the drums, if preferred, and other like mod-

fications will suggest themselves to those skilled in the art.

Having thus described said improvement, I claim as my invention and desire to patent under this specification—

1. A hoist for derricks comprising a frame adapted to be fixedly attached to the mast, a main shaft and one or more drum-shafts mounted in said frame, gearing connecting said shafts with each other, a motor geared to said main shaft and serving to continuously operate said shafts and gearing, a drum loosely mounted on each drum-shaft, a friction-clutch for connecting each drum with the driving mechanism at will, a brake applied to each drum for controlling the lowering operation, and a pawl-and-ratchet device applied to each drum for suspending the load indefinitely at will.

2. A hoist for a revolving derrick comprising a frame adapted to be fixedly attached to the mast, a main shaft and one or more drum-shafts parallel therewith mounted in said frame, gearing connecting said shafts with each other, a motor geared to said main shaft and serving to operate said shafts and gearing continuously, a drum loosely mounted on each drum-shaft, a friction-clutch for connecting each drum with the driving mechanism at will, a friction-clutch carried by said main shaft, a worm mounted on said main shaft and connected therewith at will by the clutch last named, a counter-shaft driven by said worm and carrying a pinion, and a fixed gear concentric with the vertical axis of the mast and in mesh with said pinion.

3. A hoist for a revolving boom-derrick comprising a frame adapted to be fixedly attached to the mast, a main shaft and upper and lower drum-shafts mounted in said frame, gearing connecting said shafts with each other, a motor geared to said main shaft and serving to continuously drive said shafts and gearing, a boom-operating drum mounted on said upper shaft, a larger main drum mounted on said lower drum-shaft, a friction-clutch serving to connect each drum with the driving mechanism at will, a brake for controlling the lowering operation applied to each drum, a pawl-and-ratchet device for suspending the load indefinitely at will applied to each drum, a clutch carried by said main shaft, a worm mounted on said main shaft and connected therewith at will by the clutch last named, a vertical shaft driven by said worm and carrying a pinion, and a fixed gear concentric with the vertical axis of the mast and in mesh with said pinion, substantially as hereinbefore specified.

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