No. 787,609. PATENTED APR. 18, 1905.

W. A. BARKER.

HOISTING MACHINE.

APPLICATION FILED AUG. 25, 1904.

4 SHEETS—SHEET 1.

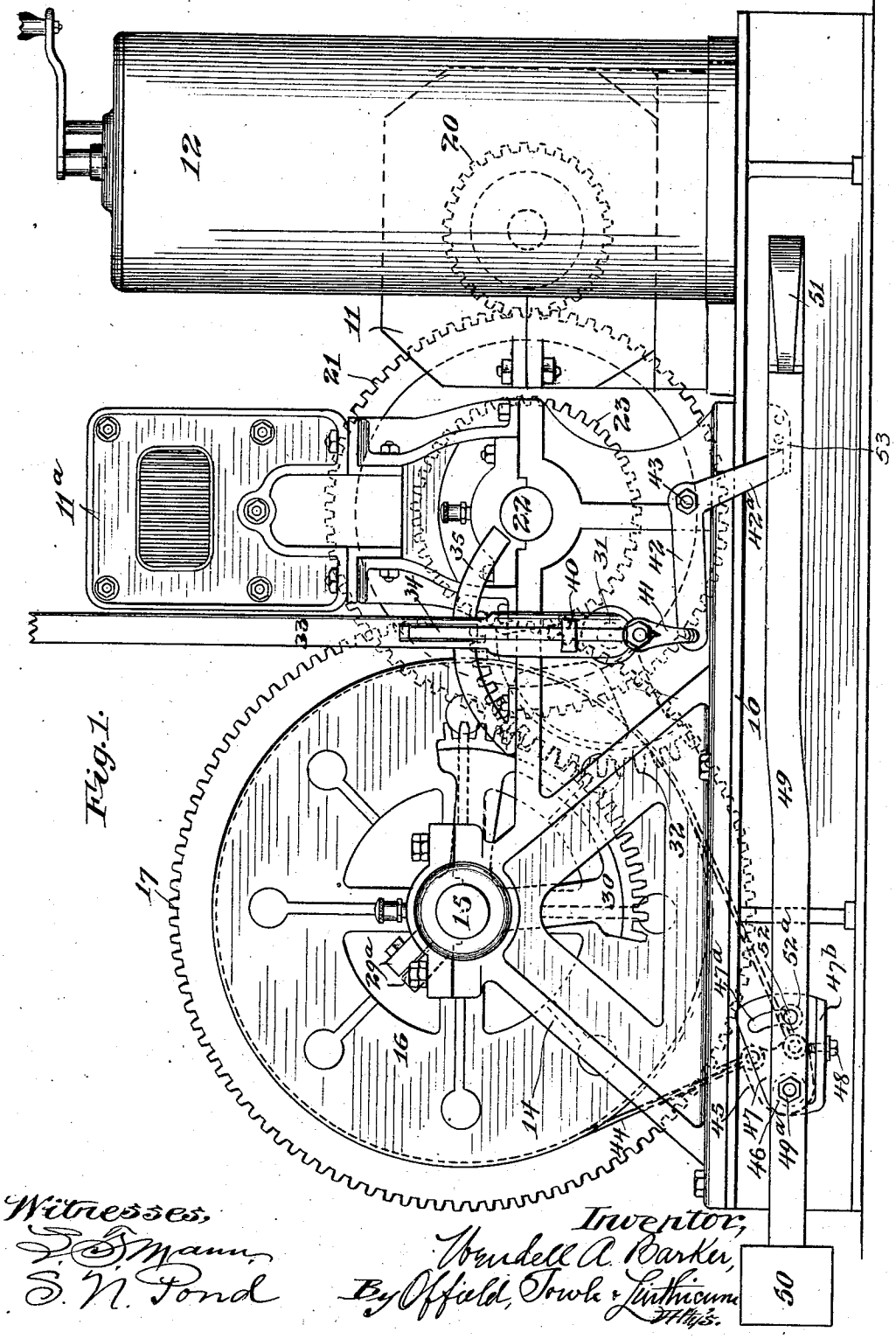


Fig. 1.

Witnesses,
S. B. Mann,
S. N. Pond

Inventor,
Wendell A. Barker,
By Offield, Towle & Linthicum
Attys.

No. 787,609. PATENTED APR. 18, 1905.

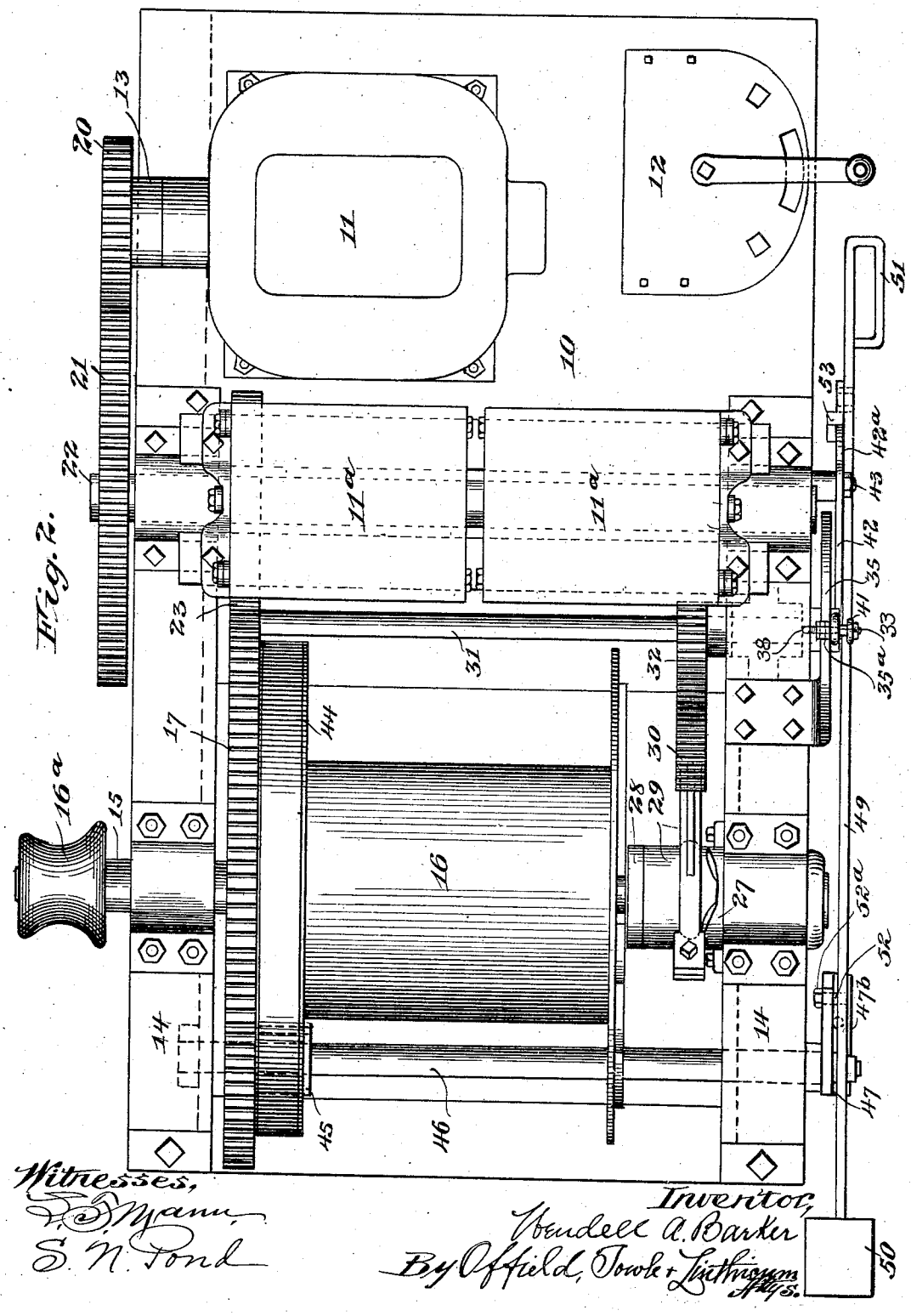
W. A. BARKER.

HOISTING MACHINE.

APPLICATION FILED AUG. 25, 1904.

4 SHEETS—SHEET 2.

Fig. 2.



Witnesses,
R. F. Lyon,
S. N. Pond.

Inventor,
Wendell A. Barker
By Offield, Towle & Linthicum Attys.

No. 787,609. PATENTED APR. 18, 1905.

W. A. BARKER.

HOISTING MACHINE.

APPLICATION FILED AUG. 25, 1904.

4 SHEETS—SHEET 3.

Fig. 5.

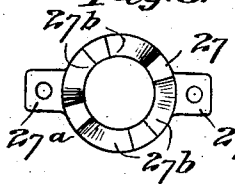


Fig. 6.

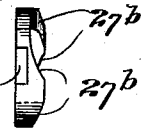


Fig. 7.

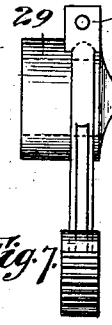


Fig. 8.

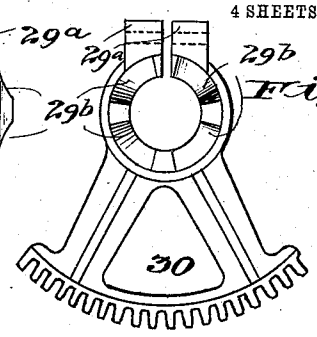
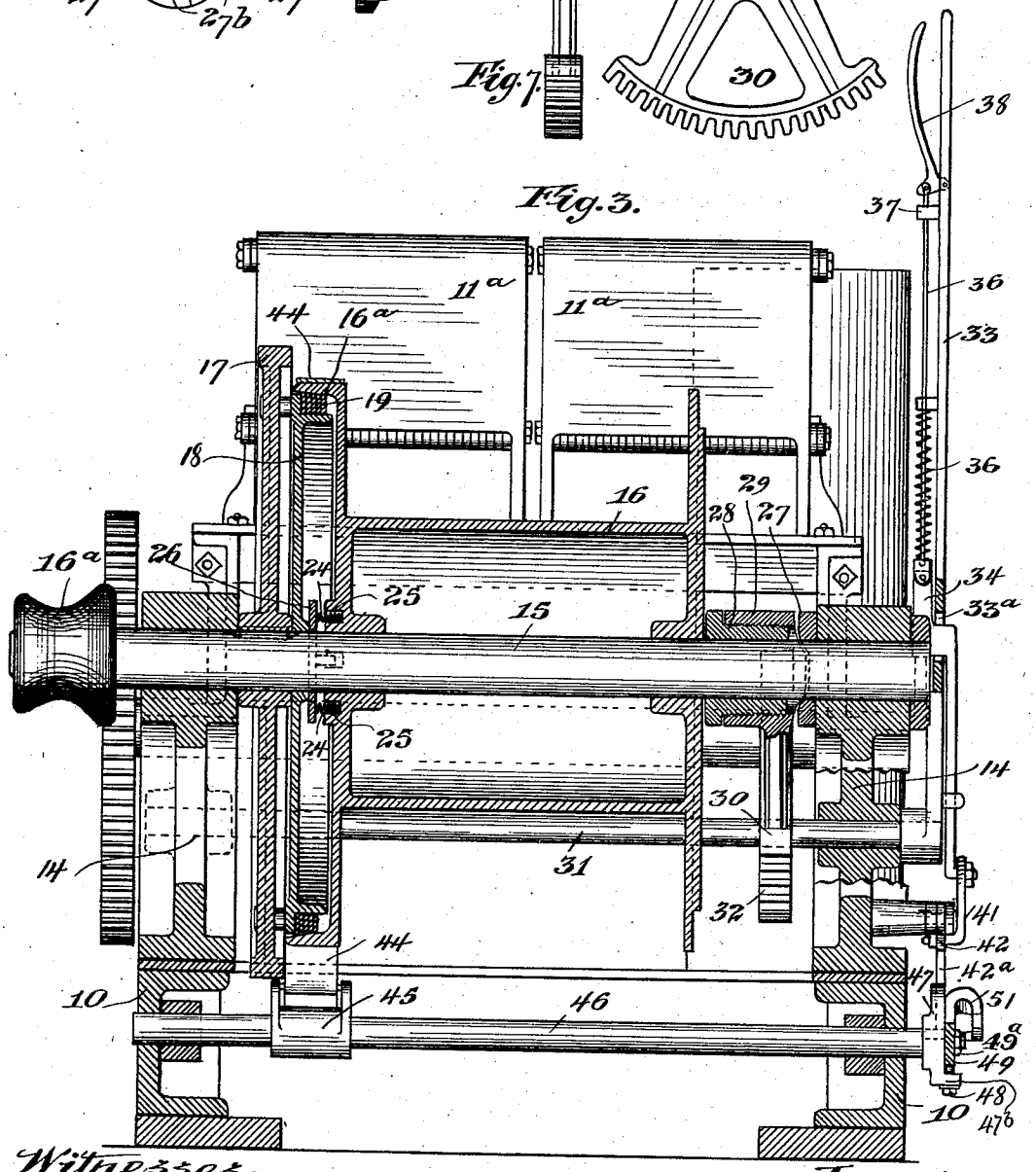


Fig. 3.



Witnesses,

S. N. Pond

Inventor,

Wendell A. Barker

By Offield, Towle & Linthicum

Attys.

No. 787,609. PATENTED APR. 18, 1905.

W. A. BARKER.

HOISTING MACHINE.

APPLICATION FILED AUG. 25, 1904.

4 SHEETS—SHEET 4.

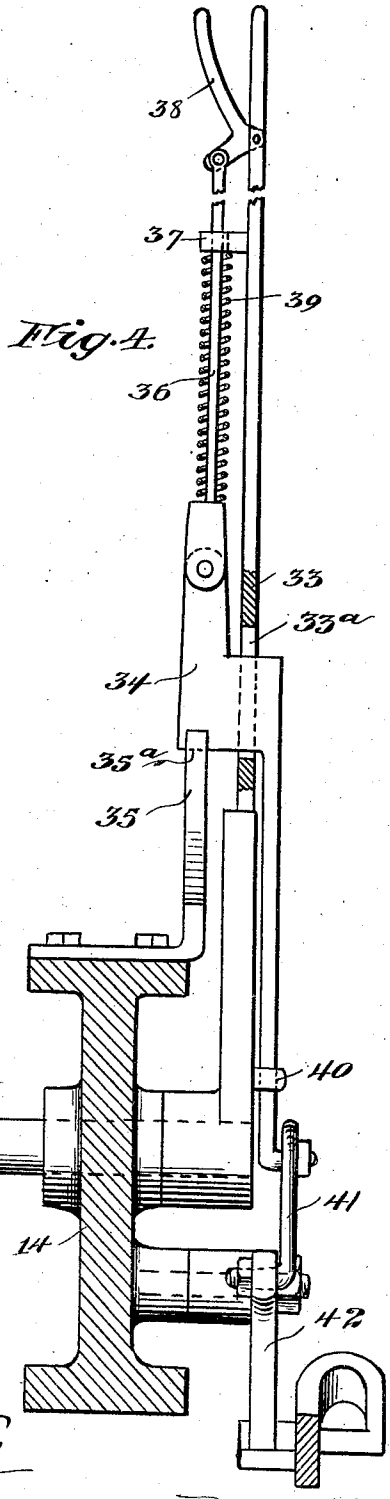


Fig. 4.

Witnesses,
F. S. Mann,
S. N. Pond

Inventor,
Wendell A. Barker,
By Offield, Towle & Linthicum
Attys.

No. 787,609. Patented April 18, 1905.

UNITED STATES PATENT OFFICE.

WENDELL A. BARKER, OF CHICAGO, ILLINOIS, ASSIGNOR TO EMMET A. THOMAS, OF CHICAGO, ILLINOIS.

HOISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 787,609, dated April 18, 1905.

Application filed August 25, 1904. Serial No. 222,130.

To all whom it may concern:

Be it known that I, WENDELL A. BARKER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hoisting-Machines, of which the following is a specification.

My invention relates to improvements in hoisting-machines, having reference more particularly to that class of machines employing an electrically-driven winding-drum which may be positively rotated or held stationary when desirable or necessary; and my invention has for its object to provide an improved machine of this character wherein the starting and stopping of the winding-drum may be independent of the starting and stopping of the motor and may be at all times under the perfect control of the operator irrespective of the operations of the motor. This object I accomplish principally through the provision of a winding-drum having a friction-clutch drive, with means for readily connecting and disconnecting the elements of the friction-clutch and means for readily applying a brake to the winding-drum when the same is disconnected from its friction driving mechanism.

In the preferred embodiment of my invention, as herein shown, the winding-drum itself, provided on one end with one element of a friction-clutch, is positively moved longitudinally of its axis into and out of engagement with the coöperating member of the friction-clutch, which is positively driven by the motor, the drum being provided with a brake and with means for operating the brake adapted to be interlocked in operative position with the drum-shifting means when the latter is in a position corresponding to the disconnected position of the drum relatively to its driving means.

My invention in its preferred mechanical form is illustrated in the accompanying drawings, wherein—

Figure 1 is a side elevational view of the complete machine, including its electrical driving mechanism. Fig. 2 is a top plan view of the same. Fig. 3 is a vertical sectional view in the plane of the longitudinal axis of the drum. Fig. 4 is a detail edge elevational view of the drum-controlling lever and its immediately-associated parts. Figs. 5 and 6 are respectively face and edge views of a stationary cam member constituting an abutment for the drum-shifting mechanism, and Figs. 7 and 8 are respectively edge and face views of an oscillatory cam-sleeve and segment-gear which coöperates with said stationary cam member in effecting the shifting of the drum between operative and idle positions.

Referring to the drawings, 10 designates a bed or base plate, on which the parts of the machine are mounted; 11, a conventional form of electric motor; 11^a, resistance-boxes for the same; 12, a usual form of controller, and 13 the armature-shaft of the motor. In and between a pair of upright journal-supports 14 on the opposite end of the bed-plate is journaled a drum-shaft 15, on which is loosely and slidably mounted the winding-drum 16, said shaft also having fast on one end the spool 16^a, sometimes used as a power-hoist in short miscellaneous operations not requiring the use of the regular winding-drum 16. Splined or shrunk on the shaft 15 between one of its journals and the adjacent end of the drum 16 is a large spur-gear 17, which carries on its inner face one member of a friction-clutch, herein shown as comprising a disk 18, having a flanged periphery, on which is tightly fitted a series of rings of suitable friction material 19, Fig. 3. The adjacent head of the drum 16 has a laterally-projecting annular flange 16^a, the inner surface of which is outwardly flared or beveled to form the coöperating member of the clutch fast with the drum. The spur-gear 17 is positively driven from the motor 11 by means of a pinion 20 on the armature-shaft meshing with a gear 21 on a counter-shaft 22, this latter shaft having a small gear 23, directly meshing with and driving the large gear 17.

As shown in Fig. 3, the two members of the drum-operating clutch are normally maintained separated by means of a series of compression-springs 24, seated in sockets 25 in the outer face of the hub of the drum and at their other ends abutting against a disk 26, loosely surrounding the shaft 15 and in turn

resting against the inner end of the hub of the clutch-disk 18.

Referring now to the means for shifting the drum into and out of driven engagement with the positively-driven clutch member carried by the large gear 17, 27 designates a ring or collar that is rigidly secured to the inner face of one of the journal-bearing blocks, supporting the shaft 15 by means of screws or bolts passed through edgewise-projecting lugs or ears 27^a, Figs. 5 and 6. The opposite halves of the inner face of the ring 27 are each formed with a pair of inclined or cam surfaces 27^b. Loose on the shaft 15 is an externally-threaded sleeve or bushing 28, Fig. 3, with which engages an internally-threaded longitudinally-split hub 29, Figs. 7 and 8, said hub being adapted to be screwed onto the sleeve 28 until adjusted to the proper position longitudinally of the latter, and then rigidly clamped thereon by a suitable bolt passed through apertured lugs or ears 29^a on said sleeve, Figs. 7 and 8. The outer annular face of the hub 29 is provided with a pair of inclined or cam surfaces 29^b on each half thereof corresponding to and coöperating with the cam-surfaces 27^b of the stationary ring 27. The hub 29 carries a radially-extending toothed segment 30, by which it is oscillated.

Suitably journaled in and between the journal-carrying standards 14 is a shaft 31, which has fast thereon a segment-gear 32 in mesh with the segment-gear 30. One end of this shaft 31 has fast thereon the lower end of an upwardly-extending operating-lever 33. The lever 33, as more plainly shown in Fig. 4, is vertically slotted about midway of its length, as shown at 33^a, to accommodate an offset locking-bar 34, the lower edge of the inner offset portion of which constitutes a locking-tooth coöperating with a stationary quadrant 35, having a central notch 35^a. To the upper end of the locking-bar 34 is pivoted a rod 36, guided in an apertured lug 37 on the inner face of the lever 33 and connected to the lower end of a gripping-lever 38, pivoted immediately below the upper end or handle of the lever 33. A coil compression-spring 39, surrounding the rod 36 and abutting the under side of the lug 37 and a shoulder on the lower end of the connecting-rod 36, normally tends to force the tooth of the locking-bar 34 upon the segment 35. The lower outer offset portion of the locking-bar 34 is guided in a lug 40 on the outer face of the lever 33 and at its lower end engages the upper end of a link 41, the lower end of which latter engages one end of a bell-crank lever 42, pivoted at 43 to the side frame and having a downwardly-extending arm 42^a.

The periphery of the clutch-flange 16^a of the drum 16 receives a brake-band 44, the ends of which are connected at different angularly-situated points to a short brake-actuating arm 45, Fig. 3, fast on a shaft 46, journaled in and between the low side-frame members of the bed 10, the outer projecting end of said shaft also having fast thereon a short sector-shaped arm or plate 47, provided in its outer end with an arc-shaped slot 47^a and on its lower edge with a horizontal flange 47^b, this latter carrying a vertical adjusting-screw 48. Clamped by a nut 49^a on the outer end of the shaft 46 against the outer face of the plate 47 is a pedal-lever 49, which carries at one end a counterweight 50 and has its opposite end bent to form a convenient pedal 51. The pedal-lever 49 carries an inwardly-projecting clamping-bolt 52, which engages the slot 47^a, said bolt having a head or nut 52^a on the inner side of the plate, whereby the lever and plate may be adjustably clamped rigidly together. On the inner face of the pedal-lever 49, slightly inwardly of the pedal 51, is secured a laterally-projecting stop 53, adapted to be engaged by the lower end of the depending arm 42^a of the bell-crank lever 42, as shown in Fig. 1, when the pedal-lever 49 is depressed to a brake-applying position.

The operation of the machine is as follows: The parts as shown in the drawings are in their relative positions corresponding to the idle position of the winding-drum 16, in which it is held from rotation by the band-brake 44, actuated by the pedal-lever 49, said lever being held in its locked position through engagement of its stop 53 with the bell-crank lever 42. At this time the motor may be either inactive or running idly, in which latter case the drum-shaft 15 will be rotated idly by the large gear 17, which is geared to the armature of the motor. Assuming that the motor is running continuously, the drum 16 is started in operation by first depressing the pedal-lever 49 by the foot sufficiently to release the bell-crank 42 from its stop or catch thereon, whereupon the locking-bar 34 is raised out of the central notch of the segment 35 by clamping the lever 38, and the lever 33 is then swung to one side or the other, which operation, through the segment-gears 32 and 30, rocks the cam-faced hub 29 against the correspondingly cam-faced ring 27, the sliding engagement of such cam-faces resulting in an inward thrust of the connected sleeves 29 and 28, which thereby forces the drum 16 bodily over and upon the friction-clutch member 18, thereby throwing the elements of said clutch into operating engagement, and thus imparting the rotary movement of the spur-gear 17 and its clutch member 18 to the drum. As this driving engagement is established the operator raises his foot from the pedal-lever 49, allowing the counterweight 50 to release the band-brake 44. To stop the rotation of the drum irrespective of the operation of the motor, the lever 33 is swung to central position again, which allows the springs 24 to separate the coöperating members of the friction-clutch

at the same time that the pedal-lever 49 is depressed, bringing the stop 53 beneath the lower end of the bell-crank 42 and locking the brake in holding position on the drum. If the brake-band wears or stretches, the effect of such slack can be neutralized by loosening the nut 52^a and setting up the adjusting-screw 48, which determines the position of the pedal-lever on the shaft 46, at which it is effective to hold the brake applied when engaged with the bell-crank arm 42^a.

Where the motor is provided with a manually-operable controller, such as that indicated at 12, the stopping and starting of the machine can obviously be effected by the stopping and starting of the motor alone, the friction-clutch having been previously thrown into operating position by the lever 33. The leading advantage of the described construction, however, resides in the fact that the stopping and starting of the winding-drum can be instantly effected through the lever 33 and the mechanism controlled thereby without the necessity of stopping and starting the motor. Also when it is desired to let the drum pay out idly by disconnecting the clutch this can be effected without requiring the reversing or stopping or idle backward running of the motor.

I claim—

1. In a hoisting-machine, the combination with a drum-shaft and a driving-gear fast thereon carrying one member of a friction-clutch, of a winding-drum loosely mounted on said shaft and carrying on one head the cooperating member of said friction-clutch, stationary and movable coöperating cam-faced members embracing said shaft, said movable cam member abutting against the other head of said drum, an operating-lever, means actuated thereby for oscillating said movable cam-faced member to shift the drum and engage the clutch members, means normally tending to separate said clutch members, a brake carried by said drum, a brake applying and releasing lever, and an interlocking connection between the latter and said clutch-operating lever whereby when said clutch-operating lever is in releasing position said brake-actuating lever is locked in brake-applying position, substantially as described.

2. In a hoisting-machine, the combination with a drum-shaft and a driving-gear fast thereon carrying one member of a clutch, of a winding-drum loosely mounted on said shaft carrying on one head the coöperating member of said clutch, a stationary cam-faced member embracing said shaft, a coöperating movable cam-faced member surrounding said shaft and abutting against the other head of said drum, a radially-extending segment-gear carried by said movable cam-faced member, an operating-lever and another segment-gear actuated thereby and coöperating with said first-named segment-gear, means normally tending to separate said clutch members, a brake carried by said drum, a brake applying and releasing lever, and an interlocking connection between the latter and said operating-lever whereby when the latter is in releasing position said brake applying and releasing lever is locked in brake-applying position, substantially as described.

WENDELL A. BARKER.

Witnesses:
SAMUEL N. POND,
FREDERICK C. GOODWIN.