

(No Model.)

H. J. REEDY.
Hoisting Machine.

No. 235,649.

Patented Dec. 21, 1880.

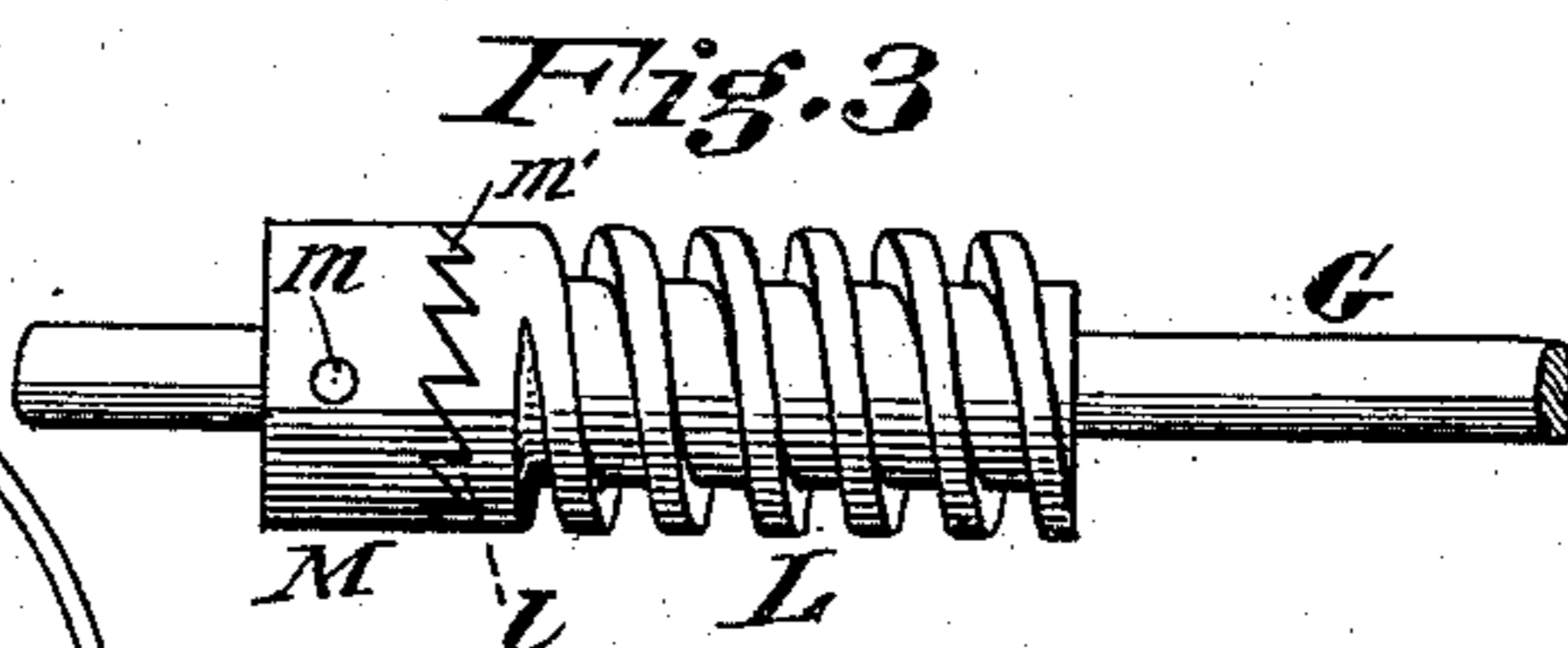
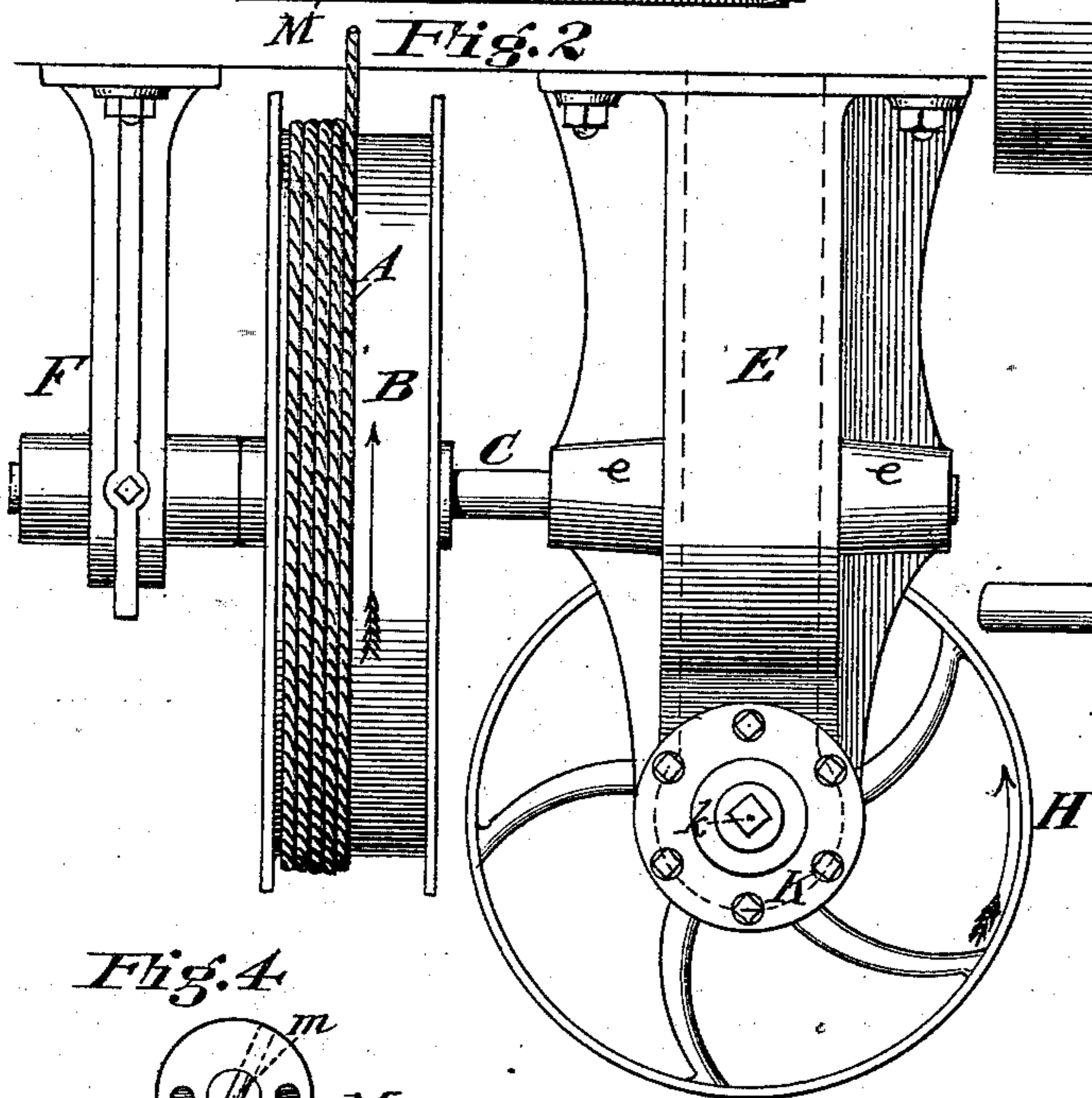
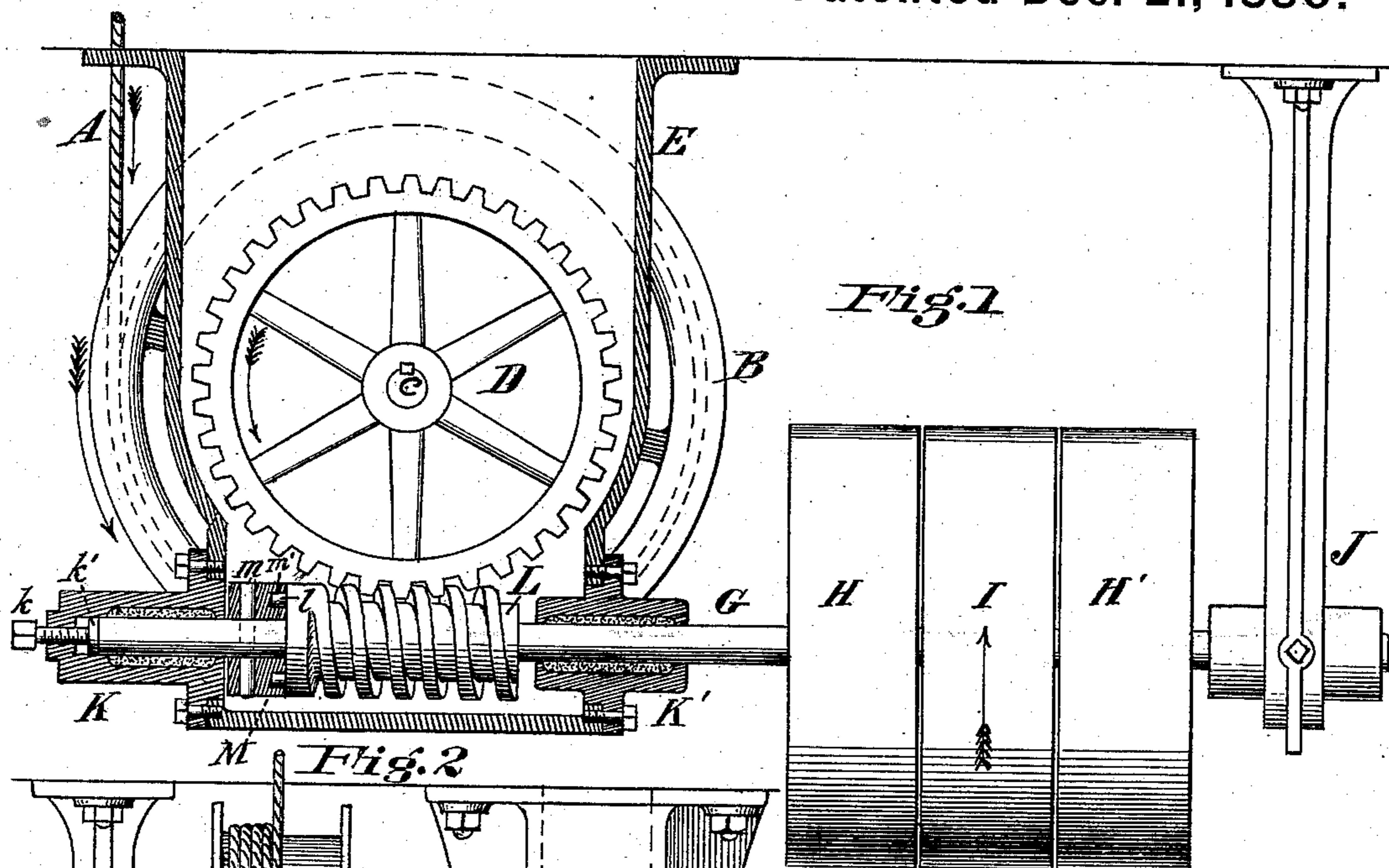


Fig. 4

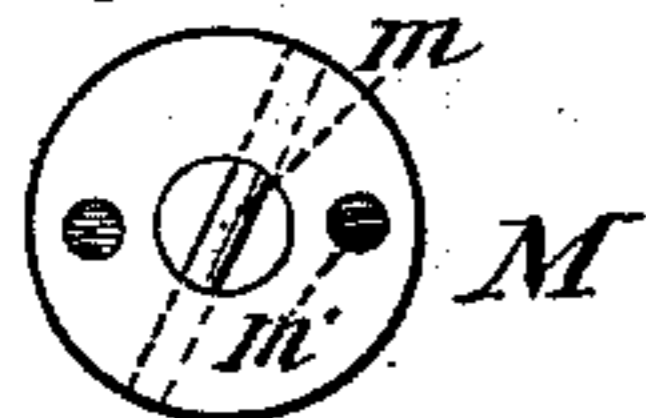
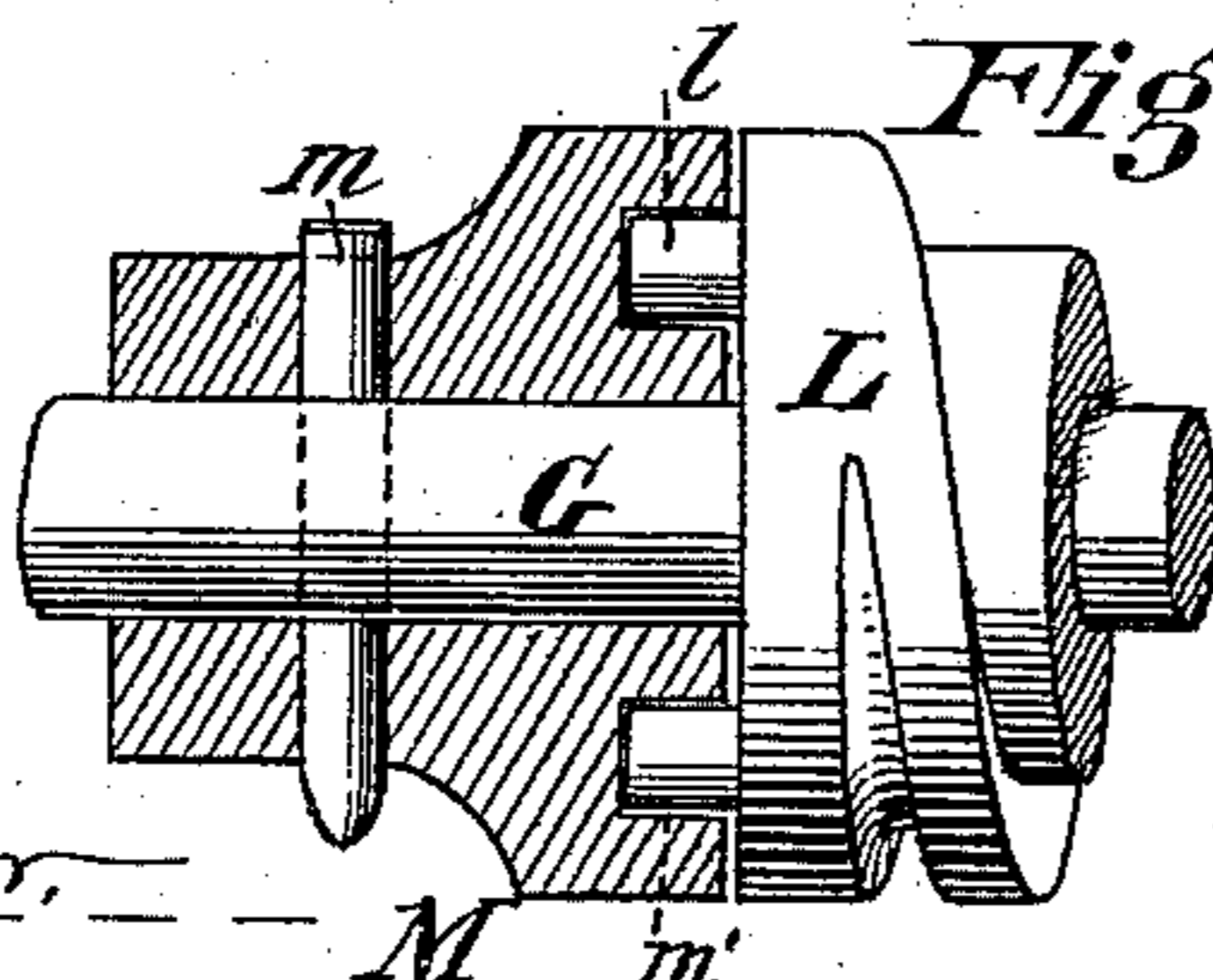


Fig. 5



Attest

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HENRY J. REEDY, OF CINCINNATI, OHIO.

HOISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 235,649, dated December 21, 1880.

Application filed October 18, 1880. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. REEDY, of Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Hoisting-Machines, of which the following is a specification.

My invention relates to that class of hoisting-machines which are driven by open and crossed belts to produce the elevation and descent of the platform, the power of the belts being transmitted to the lifting-rope by means of the usual worm and worm-gear and winding-drum keyed to the worm-gear shaft, and has for its object the construction and arrangement of the worm on the worm-shaft in such a manner that while the connection of the worm with the worm-shaft will be positive during the elevation of the platform the connection of the worm with the worm-shaft during the descent of the platform will be negative, and should any stoppage of the platform occur during its descent the worm will promptly disengage itself from the driving-connection on the worm-shaft and permit the shaft to revolve freely within it, whereby the worm-gear and winding-drum will remain stationary, and the dangerous consequences of uncoiling the lifting-rope on the winding-drum with the cage suspended in the hoist will be entirely avoided. Experience has shown the majority of accidents with this class of elevators to occur during the descent of the cage or platform. The sticking of the cage in its grooves or between the rails produces a stoppage in the descent. Meanwhile, the worm-gear being rigidly secured to the worm-shaft, the winding-drum continues to revolve in a backward direction, the lifting-rope uncoiling and hanging slack. When from any cause the cage or platform is relieved down it falls, and usually breaks the lifting-rope, precipitating itself and contents to the bottom of the hoist.

My invention consists in loosely fitting the worm to the worm-shaft to revolve freely thereon as a sleeve, and rigidly securing to the worm-shaft a driving-connection with which the worm engages, and by which it is driven during the ascent of the platform or cage and during the descent of the cage or platform, so long as the lifting-rope is strained by the descending load. Whenever the strain is re-

moved from the lifting-rope the worm backs off and disengages from the driving-connection, thereby preventing the continued motion of the winding-drum and permitting the worm-shaft to revolve freely within the worm without actuating the worm, worm-gear, winding-drum, or lifting-rope.

When matching teeth or cogs are provided upon the collar and worm they are preferably of the ratchet form.

In the accompanying drawings, Figure 1 is a side elevation of the hoisting device referred to, with a portion of the housing or worm and worm-gear case removed to show the internal construction. Fig. 2 is an end elevation of the same. Fig. 3 shows the method of connecting the worm and collar by means of ratchet-teeth. Fig. 4 is a detached view of the driving-collar. Fig. 5 is a detached section of collar and worm.

Similar letters of reference indicate similar parts.

A is the customary lifting-rope, coiled around and secured to the winding-drum B, which is, in turn, keyed or otherwise secured to the worm-gear shaft C. D is the worm-gear, of the usual form, rigidly secured to the shaft C. E is the housing or worm and worm-gear case, provided with the ordinary form of bearings *ee* for the shaft C. F is the outboard hanger and bearing for the shaft C. G is the usual worm-shaft, upon which are mounted the loose pulleys H H' and fast pulley I. J is the outboard hanger and bearing for shaft G. K and K' are followers or flanged bosses fitted and secured to the housing E to form bearings for the shaft G. The follower K is provided with a tempering-screw, *k*, and steel die *k'*, against which the thrust of the worm-shaft G is taken.

L is the worm, of the usual form, bored to turn freely upon the shaft G, and faced upon the end next to the collar M. The collar M is secured to the shaft by means of the pin *m*, or in any other suitable manner, and is provided with recesses or holes *m' m'* for the reception of the projecting pins *l l* in the end of the worm L. In Fig. 3 I have shown the worm L and collar M furnished with ratchet-teeth *l l l* and *m' m' m'*.

The action of the device is as follows: In raising the platform or cage of the elevator the worm-wheel D and lifting-rope A have a

motion in the direction of the arrows, Fig. 1,
 and the worm a motion from right to left, as
 shown by the arrow in Fig. 2. Now, it will be
 obvious that so long as the motion of the worm-
 5 shaft and worm is in the direction to raise the
 platform the abutting faces of the worm L and
 collar M will be held in forcible contact and
 the worm L caused to revolve with the collar
 M by means of the engagement of the pins ll
 10 with the holes $m' m'$ in the collar M, or by
 means of the ratchet-teeth lll and $m' m' m'$;
 but when the motion of the lifting-rope A,
 winding-drum B, worm-gear D, and collar M
 is in an opposite direction to lower the cage or
 15 platform of the elevator, the worm M would
 obviously back off from the connection with
 the driving-collar M unless some means existed
 to maintain the contact of the collar and
 worm. This means is found in the weight of
 20 platform and load on rope A, which forces the
 worm L into contact with the collar M and
 causes the worm and collar to revolve together;
 but directly the strain upon the lifting-rope A
 is removed the worm will back out of contact
 25 with the collar M and stand idly in position
 upon the shaft G, and when the strain is re-
 applied to the rope A the worm will be in-
 stantly forced in contact with the collar M and
 revolve with the collar, as already explained.
 30 In former devices for the stoppage and start-
 ing of the winding-drum when the strain is
 removed from and applied to the rope A the
 effect is had by engaging and disengaging
 pawls from ratchets on the rim of the winding-
 35 drum and upon parallel disks keyed to the
 winding-drum shaft; but these devices require
 a considerable slack of rope to work at all, and
 are of such a form as to fail at critical mo-
 ments and permit the very accident they are
 40 sought to avoid.

In my device (omitting the breakage of the

worm or collar) failure to promptly arrest the
 slacking of the rope when the strain is re-
 moved, or of the worm to re-engage with the
 collar when the strain upon the rope is reap- 45
 plied, is absolutely impossible.

I have shown but two pins in the worm L
 and two holes in the collar M; but it is obvious
 that the number of pins and holes may be
 more or less than two, and that the teeth on 50
 the abutting faces of the worm and collar may
 be of any number or form, without departing
 from the principle of my invention.

Having described my invention, what I
 claim is— 55

1. In a hoisting-machine, the combination
 of a drum on which the lifting-rope is wound,
 a worm-wheel arranged on the shaft of the
 drum, a rotating and longitudinally-sliding
 worm, a horizontal shaft on which said worm 60
 is arranged, and mechanism, substantially as
 described, for connecting and disconnecting
 the worm and shaft by the action of the lift-
 ing-rope and drum, essentially as and for the
 purpose set forth. 65

2. The combination, with the drum, its shaft,
 and the lifting-rope of a hoisting-machine, of
 the worm-wheel D, the horizontal worm-shaft
 G, having the collar M, provided with holes
 or teeth m' , and the worm L, having pins or 70
 teeth l , and adapted to be moved longitudi-
 nally by the action of the lifting-rope and
 drum to cause it to engage the collar of the
 worm-shaft, substantially as described.

In testimony whereof I have signed my name 75
 to the foregoing specification in the presence of
 two subscribing witnesses.

HENRY J. REEDY.

Witnesses:

JOHN W. HILL,
 EDGAR J. GROSS.