(No Model.) 2 Sheets—Sheet 1.

H. BOLTHOFF.

HOISTING MACHINE.

No. 568,832. Patented Oct. 6, 1896.

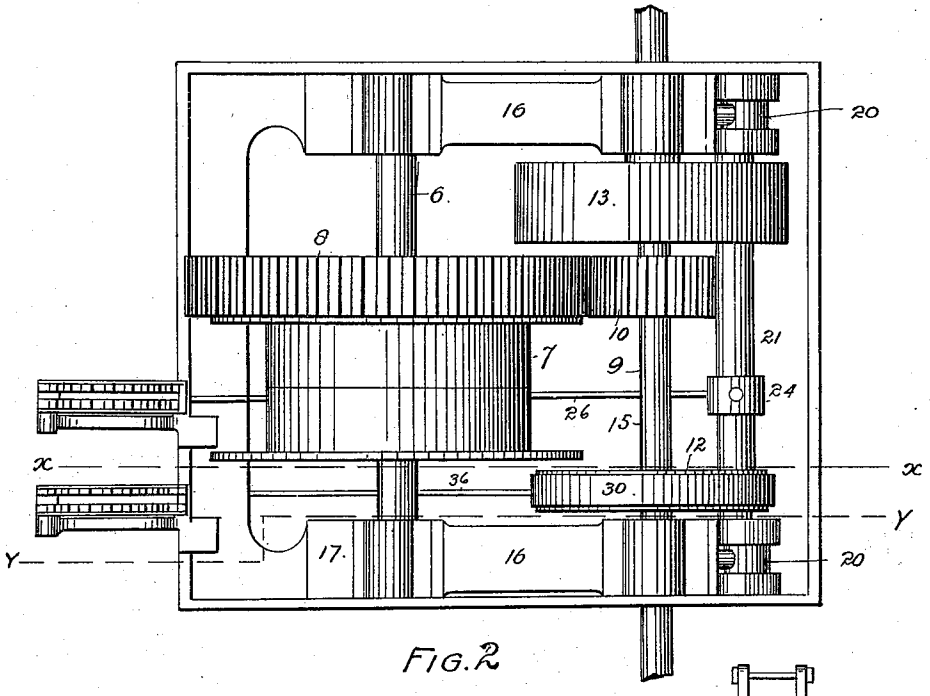

FIG. 2

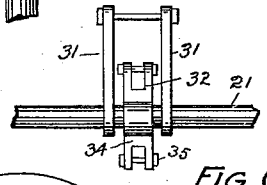

FIG. 6.

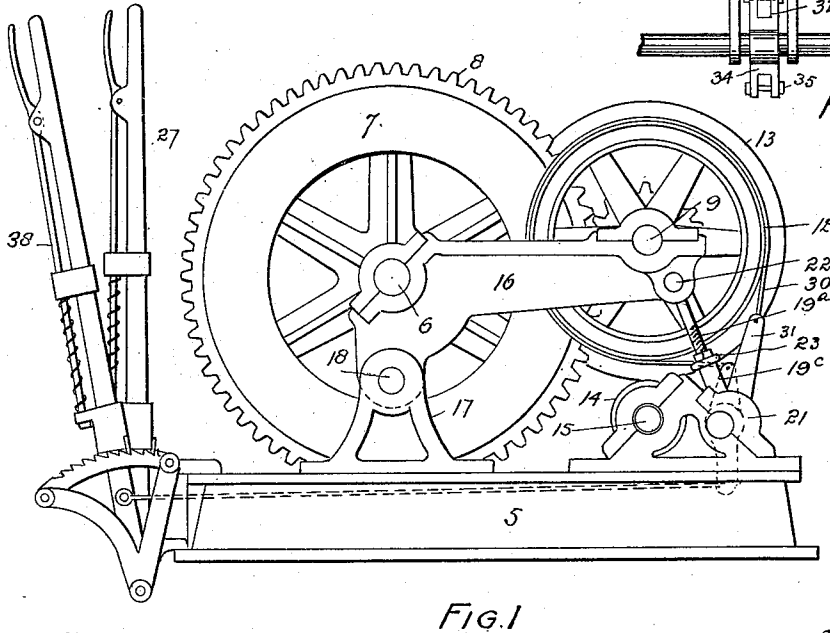

FIG. 1

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(No Model.) 2 Sheets—Sheet 2.

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HOISTING MACHINE.

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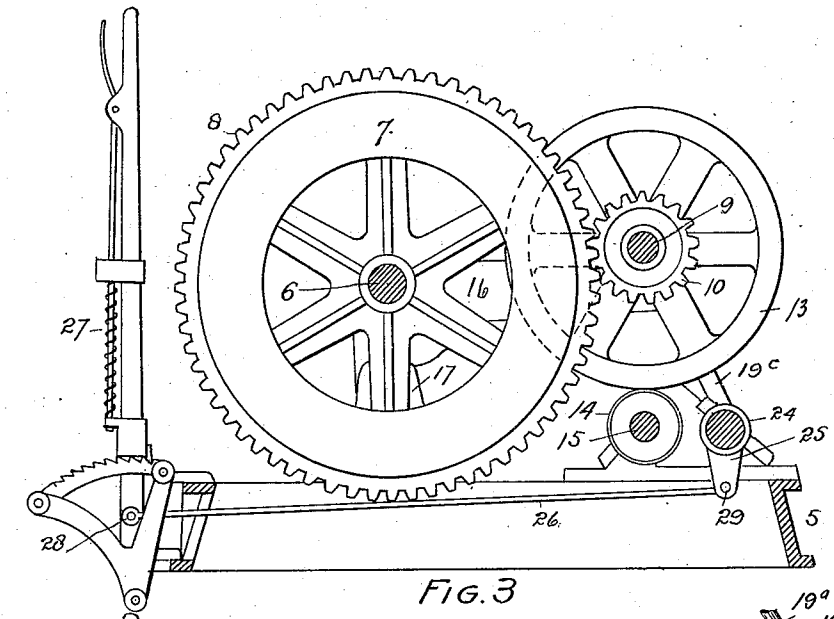

FIG. 3

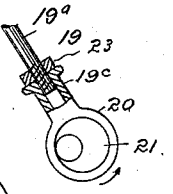

FIG. 5.

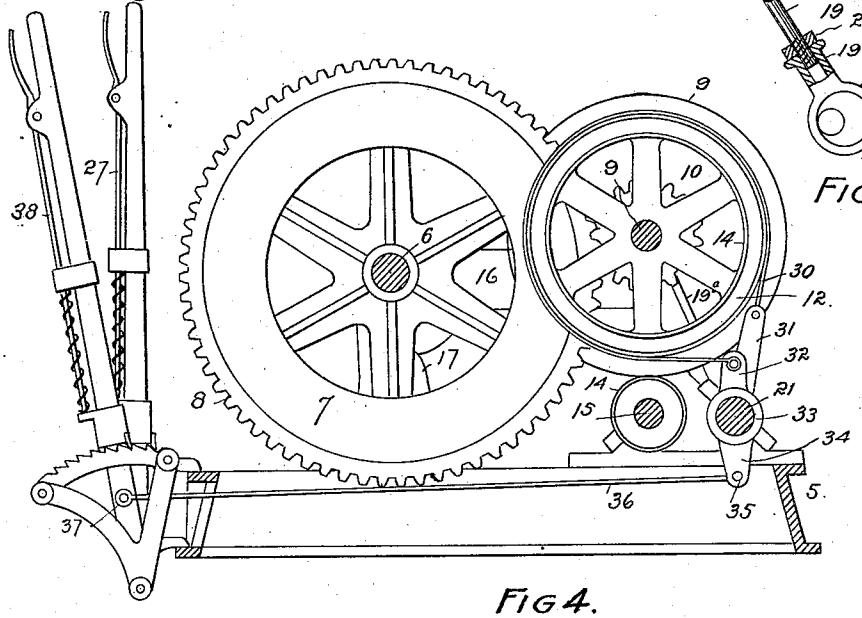

FIG 4.

Witnesses
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UNITED STATES PATENT OFFICE.

HENRY BOLTHOFF, OF DENVER, COLORADO.

HOISTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 568,832, dated October 6, 1896.

Application filed February 12, 1896. Serial No. 579,106. (No model.)

To all whom it may concern:

Be it known that I, HENRY BOLTHOFF, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Hoisting-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in hoisting-machines; and it consists of the features hereinafter described and claimed, all of which will be fully understood by reference to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of the machine. Fig. 2 is a top or plan view of the same. Fig. 3 is a section taken on the line *x x*, Fig. 2. Fig. 4 is a section taken on the line *y y*, Fig. 2. Figs. 5 and 6 are details of construction.

Similar reference-characters indicating corresponding parts in the views, let the numeral 5 designate the base, and 6 the main shaft, upon which are mounted the hoisting drum or spool 7 and the large gear-wheel 8. The gear 8 meshes with a smaller gear 10, fast on a counter-shaft 9, located considerably to the right of the shaft 6. On the shaft 9 is also made fast a brake-wheel 12 and a pulley 13, whose face engages a small friction-pulley 14 on a shaft 15, journaled in a suitable support attached to the base 5. This shaft 15, to which the power is applied for operating the machine, is located below the shaft 9. The shafts 6 and 9 are journaled in a yoke composed of two twin arms 16 of angular shape. The operating parts of the machine are located between these yoke-arms, which engage the extremities of said shafts. Each arm 16 is pivoted at 18 below the shaft 6 in a suitable support 17. attached to the base 5.

The extremity of each yoke-arm farthest to the right, or that remote from the pivoted point 18, is supported by an adjustable arm 19, whose lower extremity terminates in a collar 20, surrounding a shaft 21, eccentrically journaled in suitable boxes attached to the base 5. The upper extremities of the arms 19 are movably attached to the yoke-arm extremities, as shown at 22. The arms 19 are composed of two parts, 19^a and 19^c. The parts 19^a are uppermost and their lower extremities are threaded and project into the tubular lower parts 19^c. The length of these arms is regulated by nuts 23, engaging the threads on the parts 19^a and resting upon the upper extremities of the parts 19^c, forming lock-nuts.

On a collar 24, fast on shaft 21, is formed a depending crank-arm 25, to which is attached at 29 one extremity of a rod 26, whose opposite extremity is connected at 28 with a lever 27, movably mounted on the base and provided with an adjustable locking-dog engaging a segmental ratchet of ordinary construction. It is evident that by the use of the lever 27 the shaft 21 may be given a partial rotation, and if the movement of the lever is such that the shaft is turned in the direction indicated by the arrow (see Fig. 5) the yoke-arm extremities, with which the supporting-arms 19 are connected, may be raised and the pulley 13 on the counter-shaft disconnected from the friction-pulley 14 on the shaft 15. When the shaft is turned in the opposite direction, by reversing the movement of the lever the pulley 13 is lowered to contact with the friction-pulley.

The gravity of the parts above the pulley 14 has a tendency to cause the pulley 10 to press the friction-pulley, according to the work to be performed. If there is no load, this pressure will be just sufficient to operate the mechanism when the shaft is rotated. When, however, there is a load on the rope or cable which winds around the drum 7, the the pressure or friction between the pulley 10 and the friction-pulley 14 is proportionately increased and regulated according to the requirements of the load. Hence the friction is automatically applied, since it is only necessary to bring the pulley 13 in actual contact with the friction-pulley, since the weight of the load carried by the rope on the drum will increase the friction, if necessary. That is to say, if the weight on the drum is great enough to require additional

friction the pressure on the yoke-arms will be sufficient to give the eccentrically-journaled shaft a partial rotation in the direction opposite that indicated by the arrow (see Fig. 5) through the instrumentality of the arms 19, since the weight on the last-named arms is applied to one side of the shaft-journal centers, the lever 27, together with its locking-dog and segmental ratchet, being so constructed as to allow the lever to move automatically when the eccentrically-mounted shaft is actuated or operated. This is one of the main advantages of this invention, since only the friction actually necessary is employed, while in machines of ordinary construction the friction is usually much greater than is necessary, since it is applied at random or guess, and will therefore be seldom, if ever, exactly commensurate with the necessities of the case. It generally happens, however, in the case of an ordinary machine, that the friction is much greater than is required, and the power necessary to operate the machine must be proportionately increased. My improved construction is intended to overcome this difficulty.

The brake-strap 30, surrounding the wheel 14, has one extremity attached to a double link 31, whose lower extremity surrounds the shaft 21 and is loose thereon. The opposite extremity of the brake-strap is attached to a short upwardly-projecting arm 32, formed integral with a loose collar 33, surrounding the shaft 21. This collar is also provided with a depending arm 34, to which is attached at 35 one extremity of a rod 36, whose opposite extremity is connected at 37 with a lever 38, suitably fulcrumed and provided with an adjustable locking-pawl coacting with a segmental ratchet of the usual form.

It will be readily understood that as the brake-lever is moved toward the left the arm 32 is thrust toward the right and the brake-strap tightened, while the reverse movement of the lever loosens the brake-strap.

By reason of the introduction of the counter-shaft 9, carrying the large pulley 13 and the small gear or pinion 10, respectively engaging the small friction-pulley 14 and the large gear 8, this machine is specially adapted for use with electric motors, the armature-shaft of the motor being connected with shaft 15. The high speed of the motor is thus regulated to the requirements of a machine of this class.

From the foregoing description the operation of the machine will be readily understood. Power being applied to the shaft 15, by connecting it with any suitable prime motor, motion is communicated from the friction-pulley 14 to the large pulley 13 on the shaft 9, and thence from the small gear 10 on the last-named shaft to the large gear 8 on the main shaft carrying the spool or winding-drum.

Having thus described my invention, what I claim is—

1. In a hoisting-machine the combination with a suitable frame, of the yoke pivotally mounted on the frame at one extremity, a shaft eccentrically mounted on the frame, an arm connecting the eccentric shaft with the extremity of the yoke remote from its pivotal extremity, the main shaft journaled in the yoke and carrying the winding-drum, the counter-shaft journaled in the yoke remote from its pivotal extremity, a pulley fast on the counter-shaft, suitable gearing connecting the main and counter shafts, the motor-shaft journaled in the frame below the counter-shaft and carrying the friction-pulley adapted to engage the face of the pulley on the counter-shaft, and suitable means for actuating the eccentric shaft, whereby the pulleys on the counter and motor shafts are connected and disconnected at will substantially as decribed.

2. In a hoisting-machine, the combination with a suitable supporting-frame, of the yoke having one extremity pivotally mounted on the frame, a shaft eccentrically mounted on the frame, a supporting-arm connecting the eccentric shaft with the extremity of the yoke remote from its pivoted extremity, the main shaft journaled in the yoke above the pivotal point and carrying the winding-drum, the counter-shaft journaled in the extremity of the yoke remote from the pivotal extremity, suitable gearing connecting the main shaft and the counter-shaft, another shaft journaled in the framework below the counter-shaft and carrying the friction-pulley, another pulley fast on the counter-shaft and adapted to engage the face of the friction-pulley, and suitable means for imparting a partial rotation in reverse directions to the eccentrically-mounted shaft, substantially as described.

3. In a hoisting-machine, the combination with a suitable frame, of the yoke-arms pivoted at one extremity on the frame, a shaft eccentrically mounted on the frame, arms 19 connecting the eccentric shaft with the yoke-arm extremities remote from their pivoted extremities, the arms 19 having collars surrounding the eccentric shaft, the main shaft journaled in the yoke above the pivoted extremities of the yoke-arms and carrying the winding-drum, the counter-shaft journaled in the yoke-arm extremities remote from their pivoted extremities, a pulley fast on the counter-shaft, suitable gearing connecting the main and counter shafts, the motor-power shaft carrying the friction-pulley adapted to engage the face of the pulley on the counter-shaft, and an arm fast on the eccentric shaft and connected with a suitable lever for actuating the last-named shaft, substantially as described.

4. In a hoisting-machine, the combination with a suitable supporting base or frame, of the yoke pivotally mounted on said frame at one extremity, a shaft eccentrically mounted on the frame, arms connecting the eccentric shaft with the extremity of the yoke remote

from its pivoted extremity, the main shaft carrying the winding-drum, the counter-shaft journaled in the yoke extremity remote from its pivotal extremity and carrying the brake-wheel, a link attached to the eccentric shaft and connected with one extremity of the brake-strap, a collar movably mounted on the eccentric shaft and having two oppositely-disposed arms, the opposite extremity of the brake-shaft being connected with one of said arms, and the brake-lever with the other arm, a pulley also mounted on the counter-shaft, gearing connecting the main and counter shafts, the motor-shaft carrying the friction-pulley adapted to engage the pulley on the counter-shaft, and suitable means for actuating the eccentric shaft, substantially as described.

In testimony whereof I affix my signature in the presence of two witnesses.

HENRY BOLTHOFF.

Witnesses:

G. J. ROLLANDET,

ALFRED J. O'BRIEN.