No. 663,886. Patented Dec. 18, 1900.

W. S. HALSEY.

LOWERING BRAKE FOR HOISTS.

(Application filed Aug. 30, 1900.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

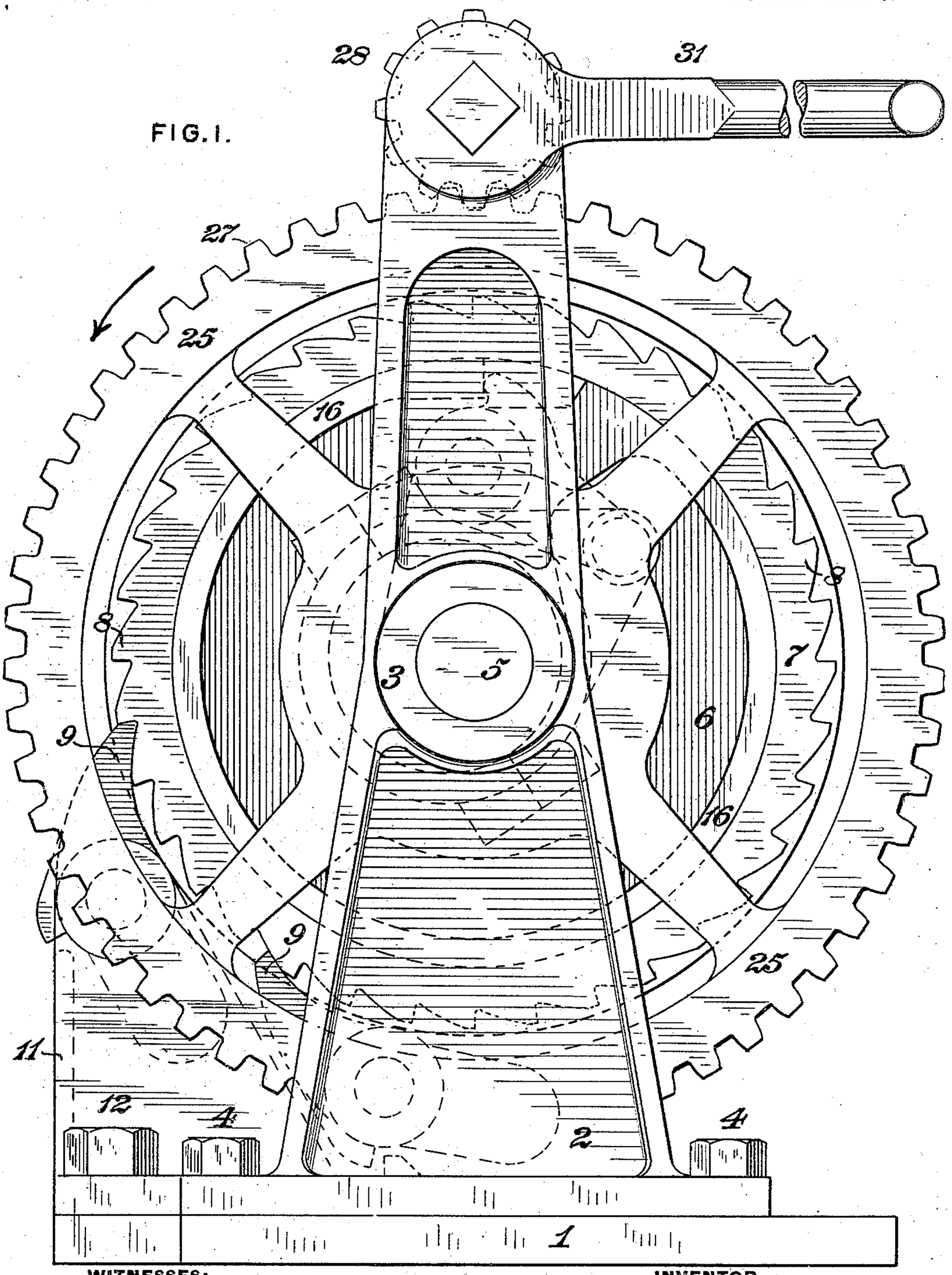

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FIG.3.

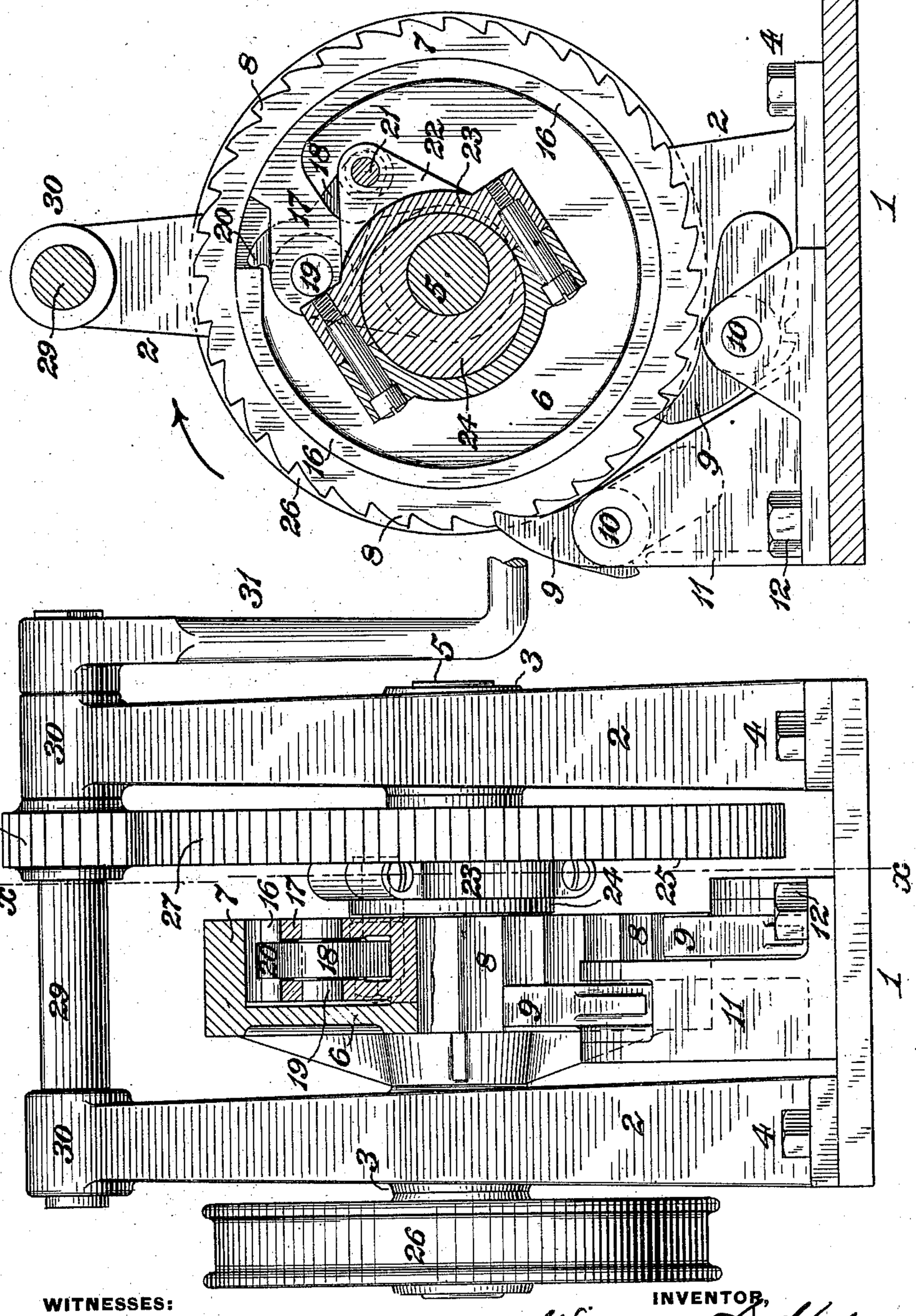

FIG.2.

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LOWERING-BRAKE FOR HOISTS.

SPECIFICATION forming part of Letters Patent No. 663,886, dated December 18, 1900.

Application filed August 30, 1900. Serial No. 28,509. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. HALSEY, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Lowering-Brakes for Hoists, of which improvement the following is a specification.

The object of my invention is to provide effective and reliable mechanical means whereby a load suspended from a hoist may be held in position upon the cessation of the application of the hoisting power and may be lowered at any desired rate of speed with a steady and uniform movement.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is an end view in elevation of a hoist, illustrating an embodiment of my invention; Fig. 2, a side view, partly in section, of the same; and Fig. 3, a transverse section at the line *x x* of Fig. 2.

In the practice of my invention I provide a suitable bed or base plate 1, upon which standards 2, which support shaft-bearings 3, are secured by bolts 4. A shaft 5 is journaled in the bearings 3, and a friction-wheel 6, having a circumferential flange or rim 7, is fixed upon the shaft 5. The friction-wheel 6 is provided with means for permitting its free rotation with the shaft 5 in one direction and for preventing it in the other, these being in the instance shown ratchet-teeth 8, formed on the periphery of the rim 7, which are engaged by pawls 9, fixed upon shafts 10, which are journaled in a standard 11, secured to the bed-plate 1 by bolts 12. Any equivalent device may be substituted for the pawl-and-ratchet mechanism illustrated—as, for example, a band within which the wheel 6 rotates freely in one direction and by which it is frictionally clamped and held against movement in the opposite direction.

The rim 7 of the friction-wheel 6 is bored out truly to provide a frictional surface, which receives and forms a bearing for a friction-ring 16, which is split or divided transversely, so as to be capable of being expanded to fit tightly against the frictional surface of the rim or of being contracted, so as to rest more or less loosely within the rim. A connecting-arm 17 is formed upon or fixed to one end of the friction-ring 16, and the opposite end of said arm is provided with a hub or boss which is keyed to the shaft 5. An expanding-lever 18, of substantially bell-crank form, is fulcrumed by a pin or bolt 19 in the arm 17, the outer arm of said lever having a bearing-face 20, which abuts against the end of the friction-ring 16 opposite that which carries the arm 17. The inner arm of the expanding-lever 18 is coupled by a pin or bolt 21 to an arm 22 on the strap 23 of an eccentric 24, which is fitted freely on the shaft 5. The eccentric 24 is secured to an operating-wheel 25, which is also fitted freely on the shaft, and the adjustment of the eccentric relatively to the arm 17 is such that its rotation in one direction outwardly moves the bearing-face 20 of the expanding-lever 18, which, as before stated, is fulcrumed in the arm 17, and its rotation in the opposite direction moves said bearing face inwardly. A hoisting drum or pulley 26, to which the rope or chain used for lifting and lowering loads is attached, is secured upon the shaft 5. The operating-wheel 25 may be rotated by the direct application of manual or other power, or, as shown, may be provided with a spur-gear 27 on its rim, meshing with a pinion 28 on a driving-shaft 29, journaled in bearings 30 on the standards 2 and having fixed upon it a crank 31 or a driving gear or pulley.

In the operation of the device when a load is to be hoisted the wheel 25 is turned in the direction of the arrow, Figs. 1 and 3, and the coincident movement of the eccentric 24 and its strap 23 and arm 22 turns the expanding-lever 18 on the axis of its fulcrum-pin 19, thereby moving the bearing-face 20 of said lever outwardly or in the direction of the adjacent end face of the friction-ring 16 and expanding said ring into frictional contact with the bearing-face of the rim 7 of the friction-wheel 6. Said wheel will thereby be held fast upon the shaft 5 through the connection of the friction-ring and shaft by the arm 17. Upon the continued application of power to the shaft 5 by the rotation of the operating-wheel 25 the shaft, together with all the members upon it, will be rotated in the direction

of the arrows, the pawls 9 slipping over the ratchet-teeth 8 and permitting such rotation. Upon the release of hoisting power the load will move the shaft in the opposite direction sufficiently far to enable one of the pawls to engage the adjacent ratchet-tooth, and thereby to hold the shaft and connected load stationary.

In order to lower a load with a uniform speed, which may be greater or less, as desired, the operating-wheel 25 is turned in the direction opposite to the arrows, and the corresponding movement of the eccentric and strap releases the bearing-face 20 of the expanding-lever 18 from contact with the friction-ring, and the arm 17 draws inwardly the opposite end of the friction-ring, thereby diminishing the degree of or wholly releasing, as the case may be, the frictional contact of the friction-ring with the rim of the wheel 6 and permitting the shaft 5 and connected hoisting-drum 26 to be rotated at desired speed in opposite direction to the arrow by the load, the friction-wheel 6 being held stationary during such rotation by the engagement of one of the pawls with the adjoining ratchet-tooth.

It will be seen that by reason of the capability afforded by a construction, substantially as hereinabove described, of imposing a greater or less degree of frictional resistance to the gravity of a load the load may be lowered at any desired speed and with an absolutely uniform motion, thereby completely obviating the injurious effects of jars or sudden changes of speed. The load will also be positively held stationary upon the release or cessation of hoisting power, whether the same be accidental or intended, and may be hoisted as required with the same certainty as if the power were applied directly to the shaft of the hoisting-drum.

I claim as my invention and desire to secure by Letters Patent—

1. In a hoist, the combination of a shaft, a hoisting-drum fixed thereto, a friction-wheel fitted to turn freely on said shaft, means for preventing rotation of the friction-wheel in one direction upon the shaft and permitting its rotation thereon in the opposite direction, an expansible friction-ring fitting a bearing-surface on the friction-wheel and connected to the shaft, an operating-wheel fitted freely on the shaft, and means, substantially as set forth, interposed between the operating-wheel and the friction-ring, through which movement of the operating-wheel in one direction expands the friction-ring into frictional contact with the friction-wheel, and movement in the opposite direction contracts the friction-ring and correspondingly reduces the degree of frictional contact.

2. In a hoist, the combination of a shaft, a hoisting-drum fixed thereto, a friction-wheel fitted to turn freely on said shaft, means for preventing rotation of the friction-wheel in one direction upon the shaft and permitting its rotation thereon in the opposite direction, a transversely-divided expansible friction-ring fitting a bearing-surface on the friction-wheel and connected to the shaft, an operating-wheel, fitted freely on the shaft, an expanding-lever fulcrumed in a bearing fixed to the shaft, and having an arm adapted to abut against one end of the friction-ring, an eccentric fixed to the operating-wheel, and a strap encircling the eccentric and coupled to the expanding-lever.

3. In a hoist, the combination of a shaft, a hoisting-drum fixed thereto, a friction-wheel fitted to turn freely on said shaft, means for preventing rotation of the friction-wheel in one direction upon the shaft and permitting its rotation thereon in the opposite direction, a transversely-divided expansible friction-ring fitting a bearing-surface on the friction-wheel and connected to the shaft, a double-armed expanding-lever fulcrumed in a bearing fixed to the shaft, and having its outer arm adapted to abut against one end of the friction-ring, an eccentric fixed to the operating-wheel, and a strap encircling the eccentric and coupled to the inner arm of the expanding-lever.

4. In a hoist, the combination of a shaft, a hoisting-drum fixed thereto, a friction-wheel fitted to turn freely on said shaft, means for preventing rotation of the friction-wheel in one direction upon the shaft and permitting its rotation thereon in the opposite direction, an internally-bored circumferential rim or flange forming a frictional bearing-surface, on the friction-wheel, a transversely-divided expansible friction-ring fitting said bearing-surface, a connecting-arm fixed to one end of the friction-ring and to the shaft, a double-armed expanding-lever fulcrumed in said connecting-arm and having its outer arm adapted to abut against the end of the friction-ring opposite that to which the connecting-arm is fixed, an eccentric fixed to the operating-wheel, and a strap encircling the eccentric and coupled to the inner arm of the expanding-lever.

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