No. 847,754.

PATENTED MAR. 19, 1907.

F. T. FLINCHBAUGH.

HOISTING ENGINE.

APPLICATION FILED OCT. 11, 1906.

2 SHEETS—SHEET 1.

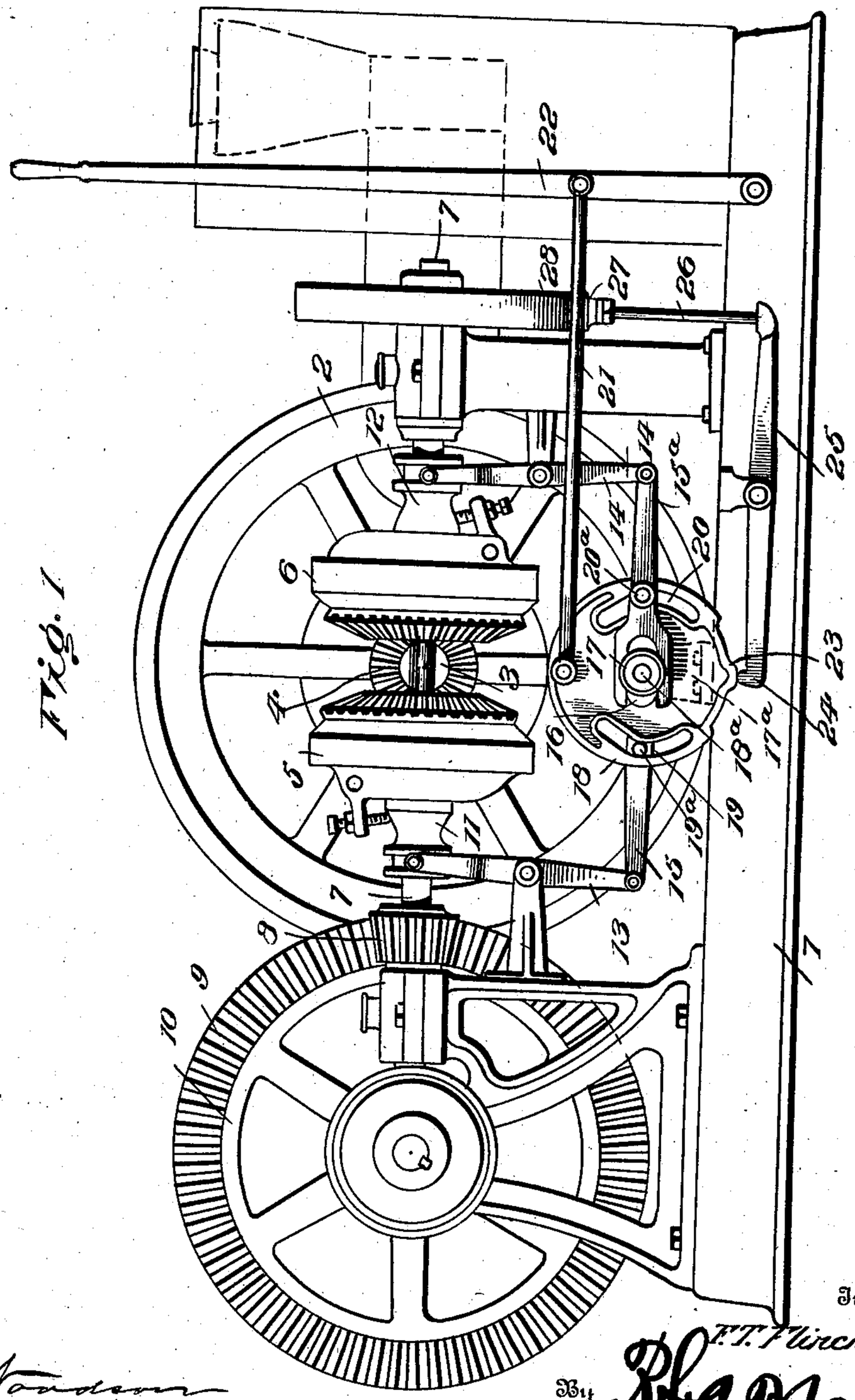

Fig. 1.

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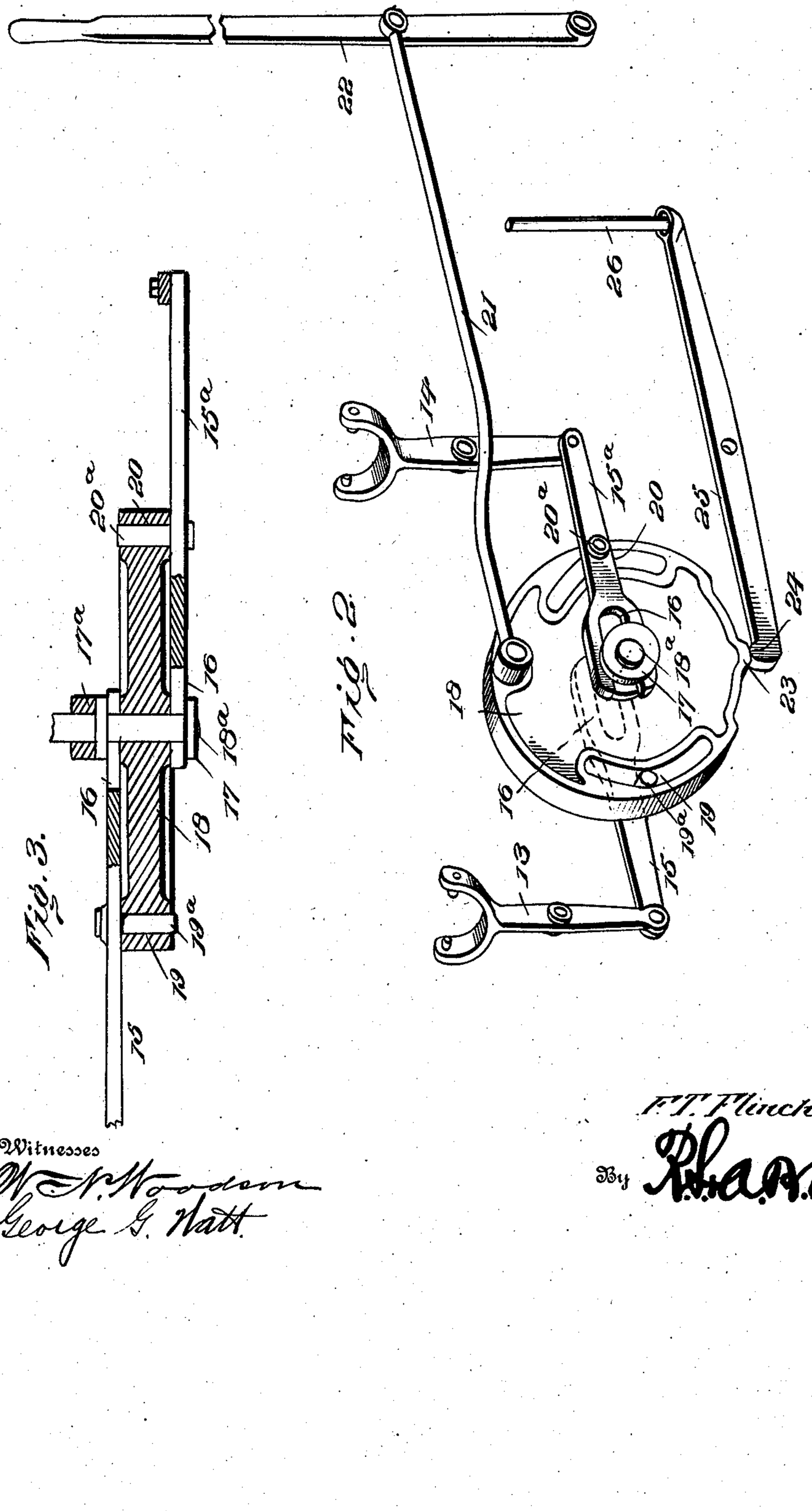

Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

FREDERICK T. FLINCHBAUGH, OF YORK, PENNSYLVANIA.

HOISTING-ENGINE.

No. 847,754. Specification of Letters Patent. Patented March 19, 1907.

Application filed October 11, 1906. Serial No. 338,477.

To all whom it may concern:

Be it known that I, FREDERICK T. FLINCHBAUGH, a citizen of the United States, residing at York, in the county of York and State of Pennsylvania, have invented certain new and useful Improvements in Hoisting-Engines, of which the following is a specification.

This invention contemplates certain new and useful improvements in hoisting-engines; and the object of the invention is to provide an improved apparatus of this type which will operate with a positive drive on lowering, as well as elevating, which will also operate under perfect control to hoist or lower within small distances, even one inch at a time, in which a load may be stopped and held at any point of travel, and which will embody such an arrangement and construction of parts hereinafter described, as will enable the apparatus to be controlled both upon the up and down motion and to apply and release a brake by the manipulation of but one lever.

For a full understanding of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a front elevation of a hoisting-engine embodying the improvements of my invention. Fig. 2 is a detail perspective view, upon an enlarged scale, illustrating the reversing mechanism; and Fig. 3 is an enlarged detail sectional view through the cam-disk.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

Referring to the drawings, the numeral 1 designates the bed-plate of the apparatus, and 2 one of the fly-wheels of the prime mover, which is preferably an internal-combustion engine, although not necessarily so.

3 designates the engine-shaft, which is provided at one end with a bevel-pinion 4, meshing at opposite sides of the shaft 3 with two miter-gears secured to or formed integral with the clutch members 5 and 6, which are both loosely mounted upon a longitudinal counter-shaft 7. This shaft is mounted in suitable journal-boxes, as shown, and is provided near one end with a bevel driving-pinion 8, meshing with the miter-gear 9, operatively connected to the hoisting-drum 10, around which the cable is wound.

Two spools or complemental clutch members 11 and 12 are mounted to slide on the shaft 7 and are held to turn therewith in any desired manner customary to devices of this character, and to these spools actuating yoke-bars 13 and 14 are operatively connected, as shown. The bars 13 and 14 are mounted to rock intermediate of their ends upon supporting-brackets on the framework of the apparatus, preferably in a vertical plane. To the lower ends of the rocking bars 13 and 14 sliding beams 15 and 15ª are pivotally connected at one end, and said beams extend toward each other and are bifurcated at their adjacent ends, which preferably overlap each other side by side, as shown. The forks 16 of these beams 15 and 15ª are mounted to slide back and forth on collars 17, which is supported between two short standards 17ª on the bed-plate 1. Also mounted in these standards 17ª, and preferably extending through the collars 17, is a bearing-stud 18ª, upon which a cam-disk 18 is mounted to partially rotate about its center, as shown. The disk 18 is preferably provided with two diametrically opposite slots 19 and 20, which receive, respectively, the oppositely-extending pins 19ª and 20ª of the sliding beams 15 and 15ª. To turn the cam-disk 18, it has secured to one side, preferably near its edge, a link rod 21, which is in turn connected to an actuating lever or handle 22, which preferably extends upright, as shown, and is fulcrumed in the bed-plate. At a point diametrically opposite the point of connection of the link rod 21 with the cam-disk the latter is provided with a peripheral cam 23, having a flat "dwell" surface and adapted to engage with the laterally-extending lug 24 of the brake-beam 25. This beam is mounted to rock by being fulcrumed at a point intermediate of its ends, and to the outer end of the brake-beam a brake-rod 26 is connected, said rod extending upwardly and provided at its upper end with a brake-shoe 27, adapted to engage a brake band or wheel 28, fixedly held on the counter-shaft 7.

It is to be particularly noted that the two slots 19 and 20 are curved concentrically with respect to the disk throughout a portion of their length and are substantially straight or otherwise shaped to constitute cams for the remainder of their length.

In the practical operation of the apparatus when the actuating handle or lever 22 is in a true vertical position the peripheral cam 23 of the disk 18 is in engagement with the lug 24, so as to rock the brake-beam 25 and hold it in such a position that the brake-shoe 27 is in frictional engagement with the brake band or wheel 28. If the handle 22 be swung to the left, the cam-disk 18 will be turned in a corresponding direction, and this motion of the disk will be communicated, through the cam portion of the slot 19 and the pin or stud 19ª, to the sliding beam 15, so as to rock the bar 13 and carry the spool 11 into clutching engagement with the clutch member 5, thereby causing the counter-shaft 7 to turn in one direction. This motion of the cam-disk 18 is not communicated to the other sliding beam 15ª, because the pin 20ª of said beam will then work in the concentric portion of the slot 20. To reverse the motion, the same single actuating handle or lever 22 is swung back again beyond the center and to the right, and this will manifestly cause the engagement of the spool 12 with the other clutch member 6 to rotate the shaft 7 in the opposite direction through the instrumentality of the beam 14, sliding beam 15ª, and its stud 20ª, working in the cam portion of the slot 20. It is also to be particularly noted that whenever the cam-disk 18 is moved to either the right or the left to drive the hoisting-drum 10 either in one direction or the reverse the positive driving engagement is preceded by a release of the brake. This is accomplished by the change in position of the peripheral cam 23, which slides off of the lug 24 and allows the drive-beam 25 to rock in the direction to withdraw the brake-shoe 27. Conversely the cam-slots 19 and 20 are so arranged with respect to the disk 18 and the lever 22 thereof that in stopping the engine the engaged clutch is first thrown into an inoperative position before the brake is brought into play. Hence by this arrangement both in starting and stopping and reversing the engine there will be no undue strain upon the parts, and it is obvious that the hoists may be operated one inch or more at a time and lowered one inch or more at a time and that a load may be stopped and held at any point of travel without interference of the parts. It will be seen that only one lever or handle is used to operate both of the clutches and the brake mechanism in their predetermined succession, so as to control the up-and-down motion and apply and release the brake wherever necessary without the necessity of manipulating several actuating-handles for this purpose.

From the foregoing description, in connection with the accompanying drawings, it will be seen that I have provided a very simple and efficient construction of hoisting-engine, which may be kept sensitively under control at all times and which is not raised by power and lowered by brake only, but has a positive drive upon lowering by means of the herein-described brake appliance.

As one handle alone by the herein-described movements controls all the parts of the hoist in starting, stopping, and reversing the movement of the hoist, it is obvious that only one attendant is necessary for the engine, because a cable may be used, and the man on the first, second, or tenth story or any place between the highest point and the engine may have full control of it.

While the invention as herein described and shown is embodied in a hoisting-engine, it is obvious that the invention is not limited thereto, but that the arrangement of the clutch parts and their single actuating cam-disk with its single lever and brake mechanism is applicable also to boats, automobiles, traction delivery-wagons or trucks and similar vehicles where it is a desideratum to reverse the movement of the vehicle or part to be driven without reversing the motion of the prime mover. This is especially of importance when the prime mover is an internal-combustion engine with the shaft always working in one direction.

Having thus described the invention, what is claimed as new is—

1. In a hoisting-engine, the combination of a hoisting-drum, a main drive-shaft, a counter-shaft operatively connected to the drum, two clutch members loose on the counter-shaft and geared with the main drive-shaft so as to turn in opposite direction, clutch-spools mounted on the counter-shaft and adapted to engage with either one of the clutch members mounted on the counter-shaft, bars pivoted intermediate of their ends and connected to the clutch-spools at one end, beams connected to the other ends of the said bars and each beam provided with a stud, the said beams extending toward each other and provided with bifurcated ends, a support for the said ends upon which the beams are mounted to slide, a cam-disk centrally pivoted between the beams and provided with two diametrically opposite slots, each of which ha. a concentric portion and a cam portion, and the two concentric portions and the cam portions lying opposite each other, the beams being provided with studs working in said slots, and means for turning said cam-disk in either one direction or the other, the arrangement of the concentric portions and the cam portions of the slots providing that when the disk is turned in either direction motion will be communicated to either one of the sliding beams.

2. The combination with a prime mover and its shaft, of a counter-shaft, a part to be driven operatively connected to the counter-shaft, oppositely-driving clutch mem-

bers on the counter-shaft and meshing with the shaft of the prime mover, a single clutch-disk arranged to couple either one or the other of said clutch members with the counter-shaft, a brake device for the counter-shaft, and means whereby the clutch-disk will operate the brake device.

3. The combination with a prime mover and its shaft, of a counter-shaft, a part to be driven operatively connected to the counter-shaft, oppositely-driving clutch members and a counter-shaft meshing with the shaft of the prime mover, a single clutch-disk arranged to couple either one or the other of said clutch members with the counter-shaft, a brake mechanism arranged for operatively engaging with the counter-shaft to brake the same, and means whereby the actuation of the cam-disk to couple either of the clutch members with the counter-shaft will be preceded by an automatic actuation of the brake mechanism upon turning the cam-disk.

4. The combination with a prime mover and its shaft, of a counter-shaft, a part to be driven operatively connected to the counter-shaft, oppositely-driving clutch members and a counter-shaft meshing with the shaft of the prime mover, a single clutch-disk arranged to couple either one or the other of said clutch members with the counter-shaft, a brake mechanism for the counter-shaft, and means whereby the turning of the cam-disk to couple either one or the other of the clutch members with the counter-shaft will be preceded by an actuation of the brake through the instrumentality of the cam-disk and whereby the reverse movement of the cam-disk to uncouple the clutch member of the shaft will be succeeded by the actuation of the brake mechanism.

5. The combination with a prime mover and its shaft, of a counter-shaft, a part to be driven operatively connected to the said counter-shaft, clutch members loosely mounted on said shaft and meshing with the shaft of the prime mover for rotation in opposite directions, a clutch-disk, clutch-spools arranged to be actuated by the said clutch-disk to couple either one or the other of said clutch members to the counter-shaft, a peripheral cam 23 on said disk, a brake-beam 25 arranged for engagement by said cam, a brake-rod 24 and shoe 27 operatively connected to said beam, a brake-band 28 mounted on the counter-shaft and designed for engagement with the brake-shoe, and a single operating-lever connected to said disk, the arrangement of the peripheral cam on the disk being such as to insure the positive actuation of the brake-beam and its brake-shoe subsequent to the uncoupling actuation of the clutch members by said disk and to also insure the release of the brake mechanism just preparatory to the coupling actuation of the clutch members by said disk.

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

FREDERICK T. FLINCHBAUGH. [L. S.]

Witnesses:

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