

No. 705,317.

Patented July 22, 1902.

E. H. BROWNING.

EXCAVATING AND HOISTING APPARATUS.

(Application filed July 23, 1900. Renewed Sept. 6, 1901.)

(No Model.)

2 Sheets—Sheet 1.

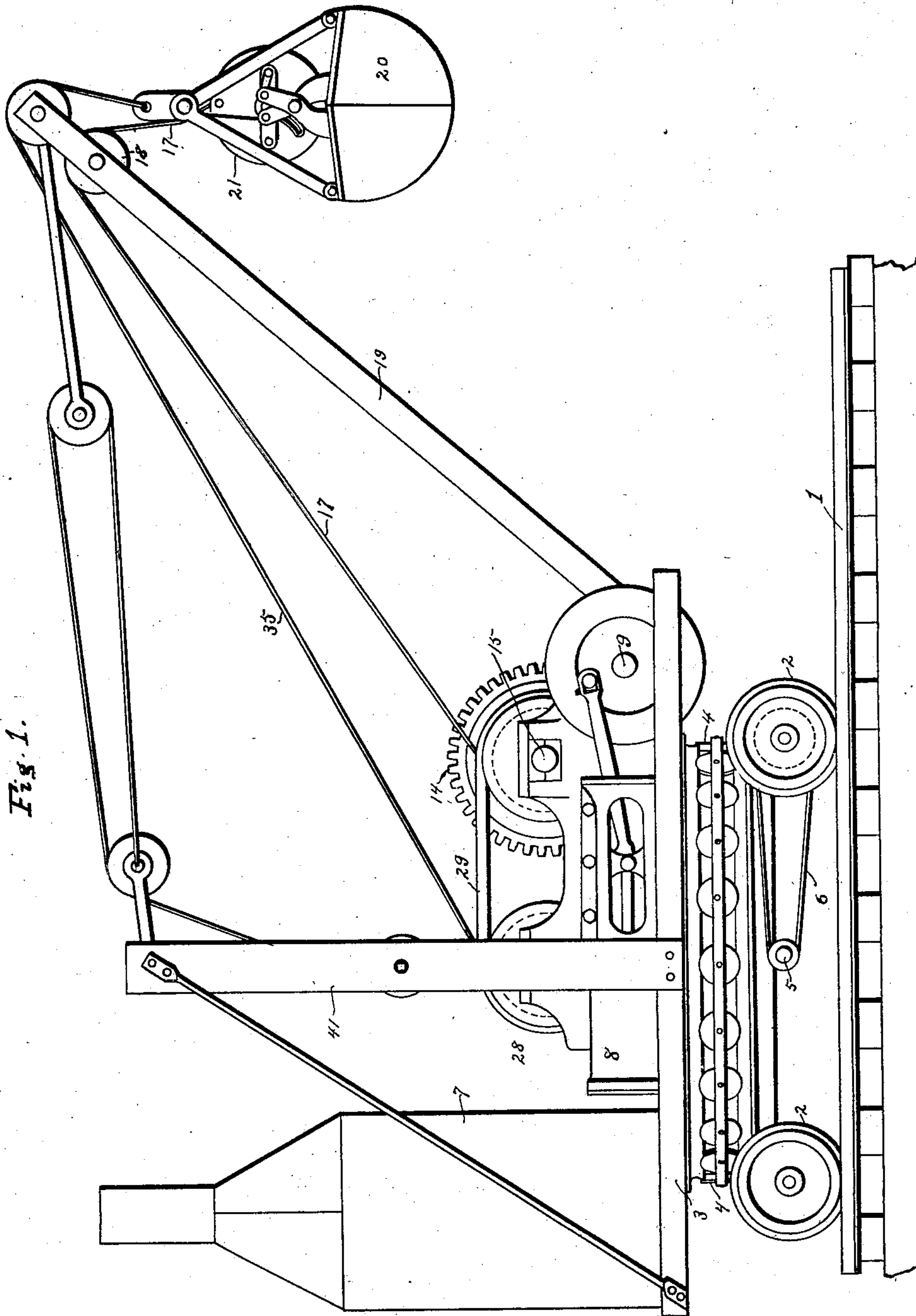


Fig. 1.

Witnesses,
Clark S. Somers.
Walter H. Wheeler.

Inventor,
Earl H. Browning,
By S. E. Foulis, Atty.

No. 705,317.

Patented July 22, 1902.

E. H. BROWNING.

EXCAVATING AND HOISTING APPARATUS.

(Application filed July 23, 1900. Renewed Sept. 6, 1901.)

(No Model.)

2 Sheets—Sheet 2.

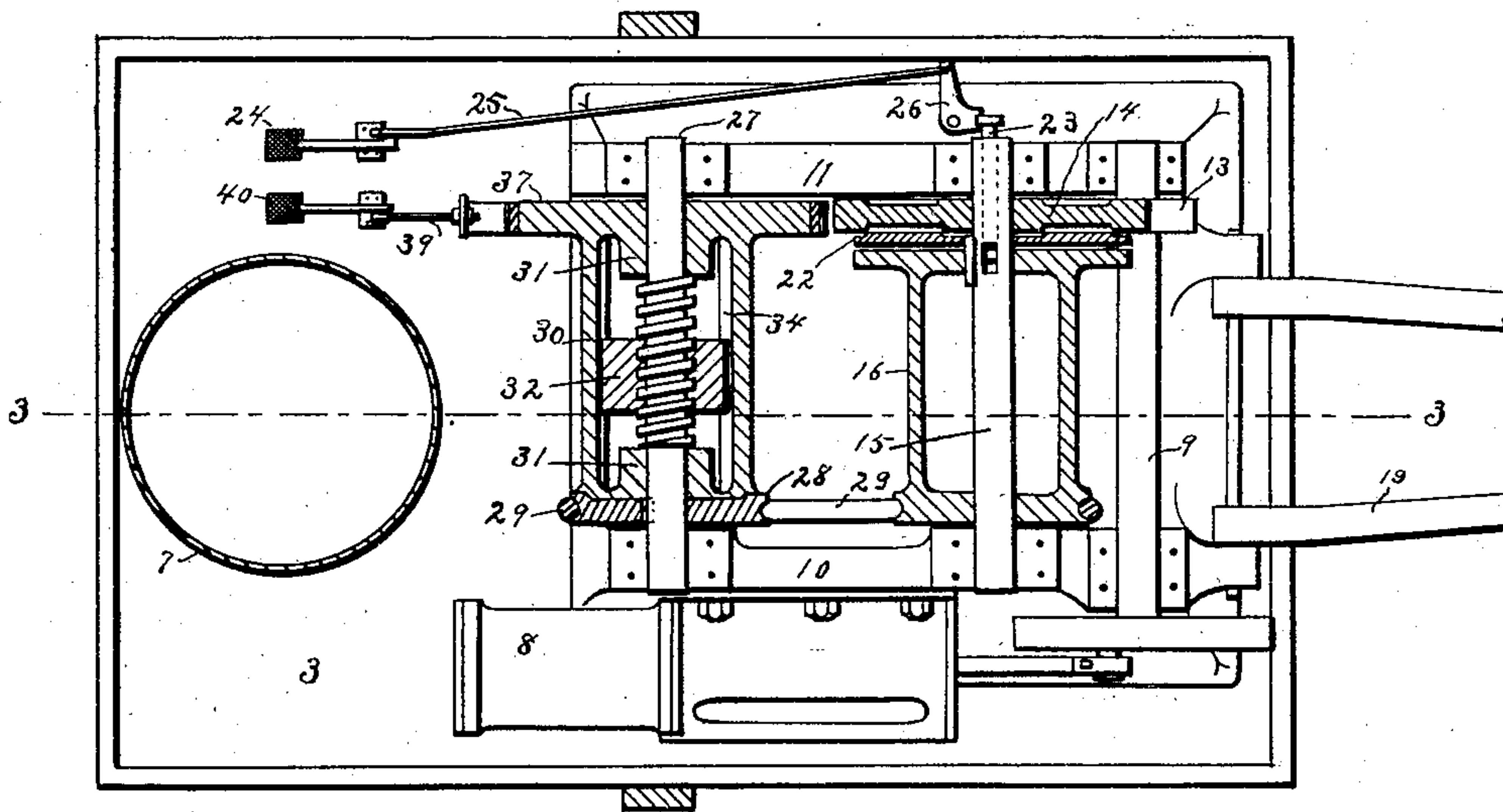


Fig. 2.

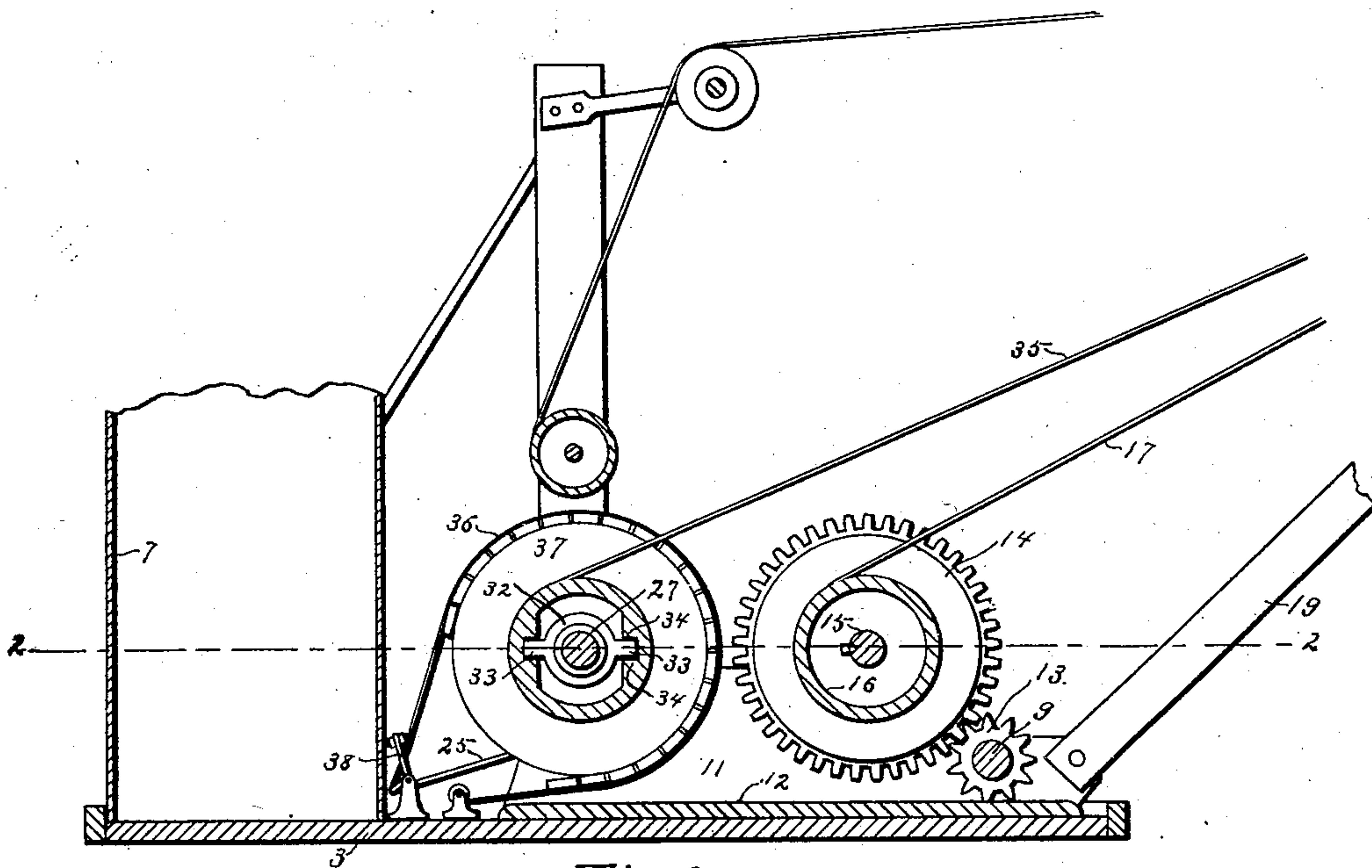


Fig. 3.

Witnesses,

Clark S. Somers.

Walter H. Wheeler.

Inventor,

Earl H. Browning.
By S. E. Foulke, Atty.

UNITED STATES PATENT OFFICE.

EARL H. BROWNING, OF CLEVELAND, OHIO.

EXCAVATING AND HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 705,317, dated July 22, 1902.

Application filed July 23, 1900. Renewed September 6, 1901. Serial No. 74,576. (No model.)

To all whom it may concern:

Be it known that I, EARL H. BROWNING, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Excavating and Hoisting Apparatus, of which the following is a specification.

This invention relates in general to excavating and hoisting apparatus, and has particular reference to those machines which are intended for operating clam-shell or orange-peel buckets. In such machines it is necessary to provide means for closing the bucket in order to fill the same before it is lifted and also means for opening the bucket to dump its contents before it is lowered. This is usually effected by having two ropes or cables, the one to close and lift the bucket and the other to hold the bucket while it is dumping. In such cases it is necessary to haul in on the bucket-closing cable a certain definite amount before the dumping-cable is moved, and in order to dump the bucket it is necessary to hold the dumping-cable and permit the bucket-closing cable to run off until the bucket is open, when both cables are thereafter run off together. In order to effect this result, I have invented the novel device shown in the accompanying drawings, in which—

Figure 1 is a side elevation of a hoisting-machine having my invention applied thereto. Fig. 2 is a sectional plan view taken on the line 2 2 of Fig. 3, and Fig. 3 is a sectional view taken on the line 3 3 of Fig. 2.

Similar reference characters refer to corresponding parts throughout the several views.

While this invention is applicable to all machines—such as dredges, steam-shovels, or excavators—where clam-shell or orange-peel buckets are employed, I have shown it as applied to a traveling locomotive-crane—that is to say, to a crane which operates while standing on a track upon which it travels by its own power back and forth as may be necessary to properly reach the material upon which it is operating. This track is represented in the drawings by 1.

2 2 are the wheels of the traveling carriage, and 3 is the rotating base, which rests upon the carriage and is mounted on antifriction-rollers 4 in order that it may be turned about

to bring the bucket into the desired position. Any proper gearing may be employed for this purpose; but as this is no feature of my invention it is not deemed necessary to show the same in this application. The crane is caused to move along the track by gearing the axles of the carriage to the source of power in any suitable manner. As shown, a shaft 5 is secured to the carriage and is driven when desired from the engine on the rotating base. This shaft is connected with one of the axles of the traveling carriage by a driving chain or cable 6. Suitable means (not shown) will be provided for reversing the direction of rotation of this shaft, which reversal will result in changing the direction of motion of the crane along the track.

7 is the boiler from which steam is supplied to the engine 8. This boiler and engine may be of any proper and convenient type and do not require any further description. In fact, it may be found best under some conditions to substitute other sources of power, which may be done without in any manner affecting the operation of the parts in which reside my invention.

The engine is connected with and drives the shaft 9, which is journaled in the side pieces 10 11 of the main-frame casting 12. Secured to this shaft is a pinion 13, which meshes with a large gear-wheel 14 on the bucket-closing drum-shaft 15. Being mounted loosely on this shaft it will be seen that this gear will normally turn without driving the shaft.

Keyed to the shaft 15, so as to be driven therewith, is the bucket-closing drum 16, upon which is wound the bucket-closing rope or cable 17. This cable leads from the drum 16 to and over a sheave 18 near the outer end of the boom 19, and thence to the bucket 20. This bucket may be of any form of the well-known clam-shell or orange-peel type. The one shown is substantially like the one illustrated and described in the patent to Hulett, No. 516,864, March 20, 1894, and need not be specifically described here. The bucket is closed by hauling in on the cable 17, which being secured to the disk 21 turns the same to close the bucket.

In order to drive the bucket-closing drum-shaft 15 when desirable, it is necessary to provide some form of clutch connection between

the shaft and the gear 14. As far as my invention is concerned, this clutch may be of any suitable type. For purpose of illustration I have shown a disk 22, which is keyed 5 to the shaft and is capable of a slight transverse movement thereon. The outer face of this disk is formed to fit the adjacent face of the gear 14, so that when these faces are brought into contact the shaft 15 will be 10 driven with the gear. This is effected by making the end of the shaft hollow and in placing therein a T-shape bar 23, which is capable of endwise movement. The arms of this bar extend outwardly through slots in the shaft 15 15 and lie next the plain face of the disk 22. The bar is moved longitudinally by any convenient means, as by a treadle 24, connecting-rod 25, and bell-crank 26. It will be seen that by these means the operator can connect 20 the bucket-closing drum with the engine-shaft 9 whenever he so desires.

As has been stated, it is necessary to close the bucket before the dumping mechanism is brought into operation—that is to say, in the 25 device shown it is necessary to turn the bucket-closing drum an amount sufficient to insure the closure of the bucket before the dumping-drum is turned. To effect this, I have invented a simple device which includes 30 the bucket-dumping shaft 27, also journaled in the side frames 10 and 11. Keyed to this shaft near one end is a sheave-pulley 28, about which and one end of the bucket-closing drum 16 extends a driving-cable 29. In- 35 stead of a single cable, as shown, I may use two or more cables of a smaller size, or I may substitute ropes, chains, gear-wheels, or any other equivalent driving means which will cause the shafts 15 and 27 to turn together. 40 Mounted to turn loosely on the shaft 27 is the dumping-drum 30. This drum is made hollow and at each end is provided with inwardly-projecting hubs 31 for the purpose hereinafter explained. Within the drum and between 45 the hubs 31 the shaft 27 is threaded, and back and forth upon this threaded portion travels the nut 32. This nut is preferably of the form best seen in Fig. 3, with arms 33 projecting from diametrically opposite sides. These 50 arms slide back and forth in guideways formed on the interior of the dumping-drum between the ribs 34, the ribs holding the nut from turning except as the drum is driven. As the shaft 27 is turned the nut 32 being held 55 against rotation with the shaft is compelled to travel along the same until the nut abuts the end of one of the hubs 31. This checks the travel of the nut and forces it to rotate with the shaft, and as the nut extends into 60 the guideways of the drum the latter will also be forced to turn with the shaft, thus drawing in the cable 35.

From this description it will be clear that the bucket-closing drum is permitted to move 65 a certain definite amount independently of the hoisting-drum—an amount a trifle more than is sufficient to close the bucket—in or-

der that the weight of the bucket will be sustained by the bucket-closing cable. This will keep the bucket from opening while it is being hoisted. 70

After the bucket has been closed, filled, hoisted, and swung to the desired position for unloading it is necessary to hold the dumping-drum while the bucket-closing 75 drum rotates backwardly to open the bucket. This is done by any practicable sort of brake, that shown in the drawings consisting of the brake-strap 36, which is tightened about the brake-flange 37 by means of bell-crank le- 80 vers 38, connecting-rod 39, and treadle 40.

Assuming that the bucket is lowered and is in its position for filling, the operation is as follow: The operator bears down on treadle 24 and throws the clutch-disk 22 into engage- 85 ment with the driven gear 14, which starts the bucket-closing drum. This hauls in on the cable 17. Simultaneously the shaft 27 is turned by means of the cable 29 and sheave-pulley 28, the dumping-drum 30 remaining 90 stationary owing to the weight of the bucket. Meanwhile the nut 32 is fed along the shaft until an instant after the bucket is closed it contacts with the hub 31. Thereafter the 95 two drums rotate in unison and both haul in on their respective cables. When the bucket is in position for dumping, the operator bears down on the treadle 40 to hold the dumping-drum, and at the same time releases the 100 clutch-disk 22. This releases the bucket-closing drum, which rotates in a reverse direction under the impulse of the force due to the weight of the contents of the bucket, which tends to open the same. Meanwhile 105 the shaft 27 has also been rotating in a reverse direction, and just after the bucket is completely opened the nut 32 reaches the opposite head 31 and engaging with the same locks the drum 30 to its shaft and causes it to rotate in unison with the bucket-closing drum 110 as the bucket is lowered.

In order to get the threaded shaft and nut 32 into the drum, it is necessary to make one or both of the heads of the drum 30 removable. 115 As it is apparent how this may be done, it is not deemed necessary to show it in the drawings.

The crane is provided with the usual mast 41, with which are connected the boom-hoisting sheaves and ropes. 120

It will of course be understood that instead of using cables or ropes to close and dump the bucket I may employ chains or any other equivalent means.

Having thus described my invention, what I 125 claim as new, and desire to secure by Letters Patent, is—

1. In a device of the character described, a rotatable shaft, a drum normally loose on said shaft so that either may turn relatively 130 to the other, means for locking the shaft and the drum together after a relative rotation of a predetermined amount, a clutch through which power is transmitted to the shaft to

turn it and the drum in one direction, and means for applying power to the drum to turn it and the shaft in the opposite direction when the clutch is released.

5 2. In a device of the character described, a rotatable shaft having a threaded portion, a closed drum normally loose on said shaft so that either may turn relatively to the other, said drum surrounding the threaded portion
10 of the shaft, a nut engaging said threaded portion and turning with the drum whereby the nut is caused to travel longitudinally of the shaft within the drum when there is relative rotation between the drum and the shaft,
15 and stops formed on the drum to limit the travel of the nut and thus prevent further relative rotation between the drum and the shaft.

3. In a device of the character described, a
20 pair of drums, means for driving one of the drums, and means controlled by said driven drum for first permitting the remaining drum to remain stationary and then turning the same after the driven drum has been turned
25 a predetermined amount.

4. In a device of the character described, a bucket, a closing-drum for the bucket, a shaft to which said drum is secured, a dump-

ing-drum for the bucket, a shaft upon which said dumping-drum is loosely mounted, means
30 connecting said shafts to drive the same together, and means for connecting the dumping-drum and its shaft so that one is driven after the other has turned a predetermined amount.

5. In a device of the character described, a
35 bucket, a closing-drum for the bucket, a shaft to which said drum is secured, a dumping-drum for the bucket, a shaft upon which said dumping-drum is loosely mounted, said
40 shaft being threaded for a portion of its length, a nut upon said threaded portion of the shaft and loosely engaging with the drum to cause the nut to travel back and forth
45 upon the shaft, means for driving said shafts together, and means for holding the dumping-drum while its shaft rotates until the nut moves into contact with the end of the drum to lock the drum to the shaft.

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

EARL H. BROWNING.

Witnesses:

F. E. GILLMORE,

WALTER H. WHEELER.