

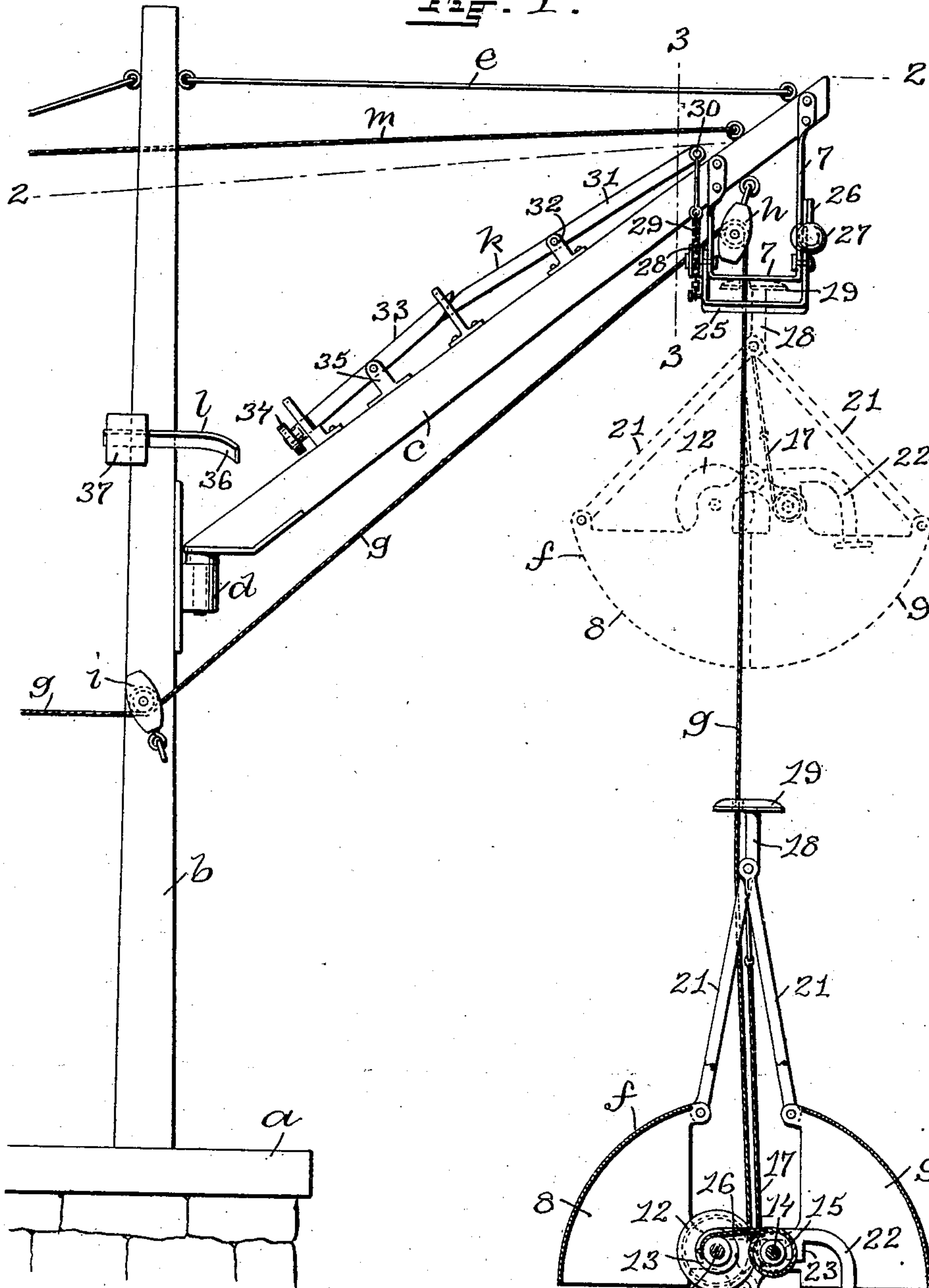
No. 886,113.

PATENTED APR. 28, 1908.

H. P. CLOUGH.
HOISTING APPARATUS.
APPLICATION FILED AUG. 16, 1907.

2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

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2 SHEETS—SHEET 2.

Fig. 2.

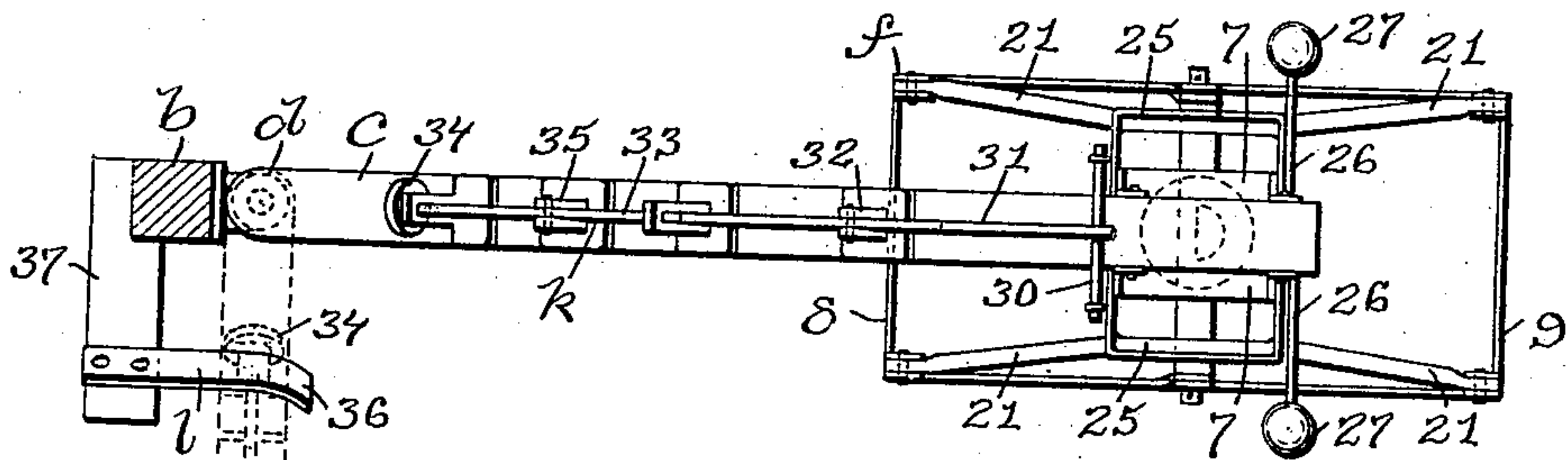


Fig. 3.

Fig. 4.

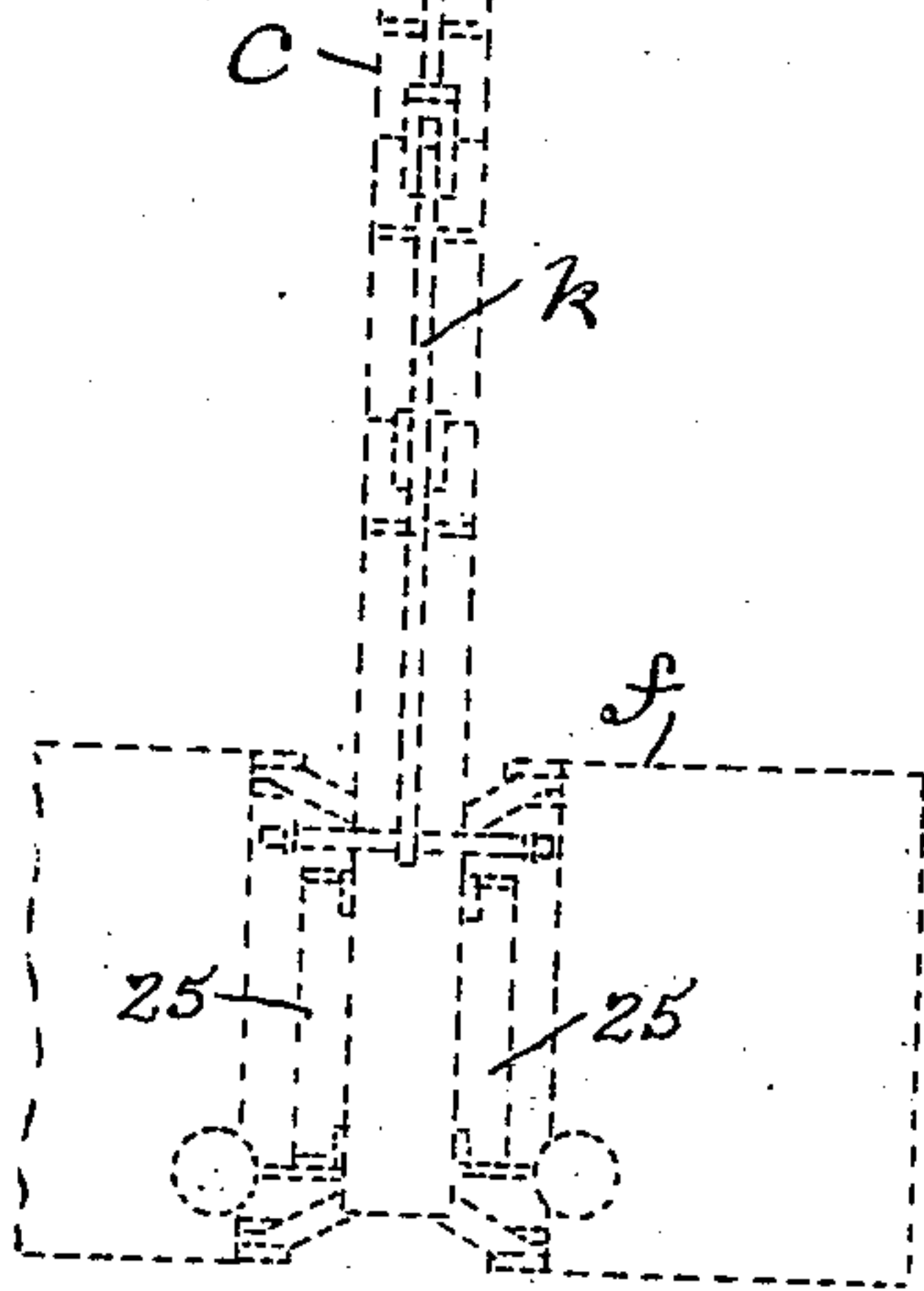
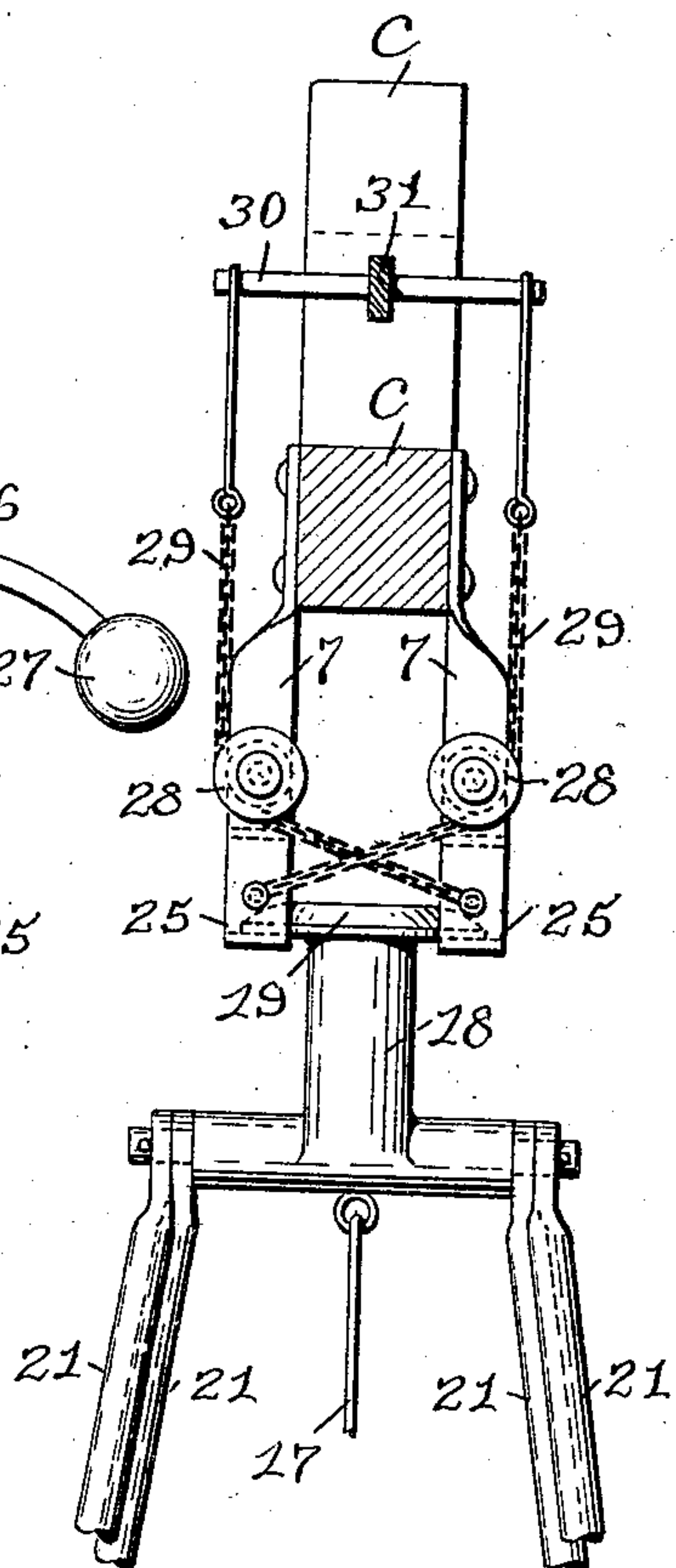
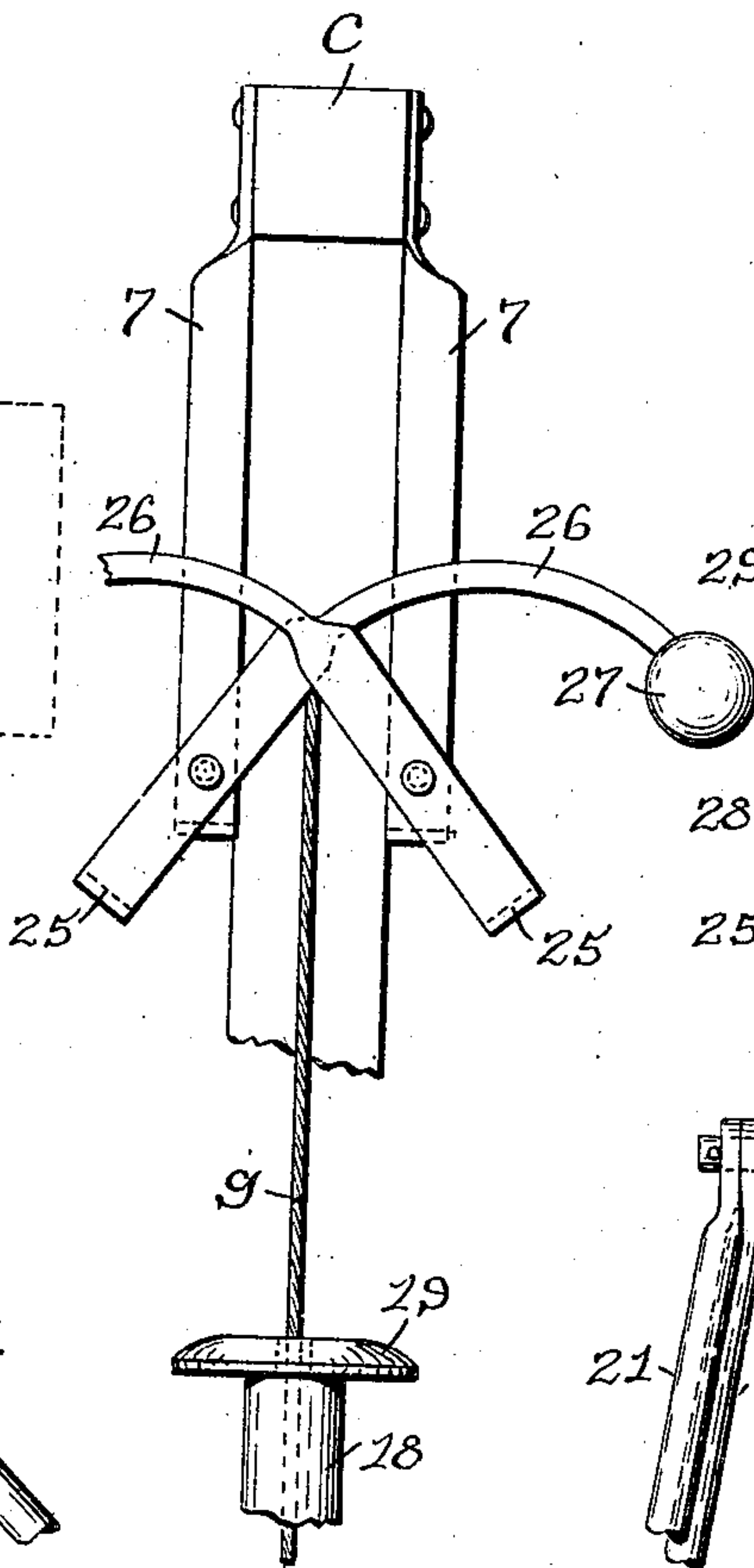
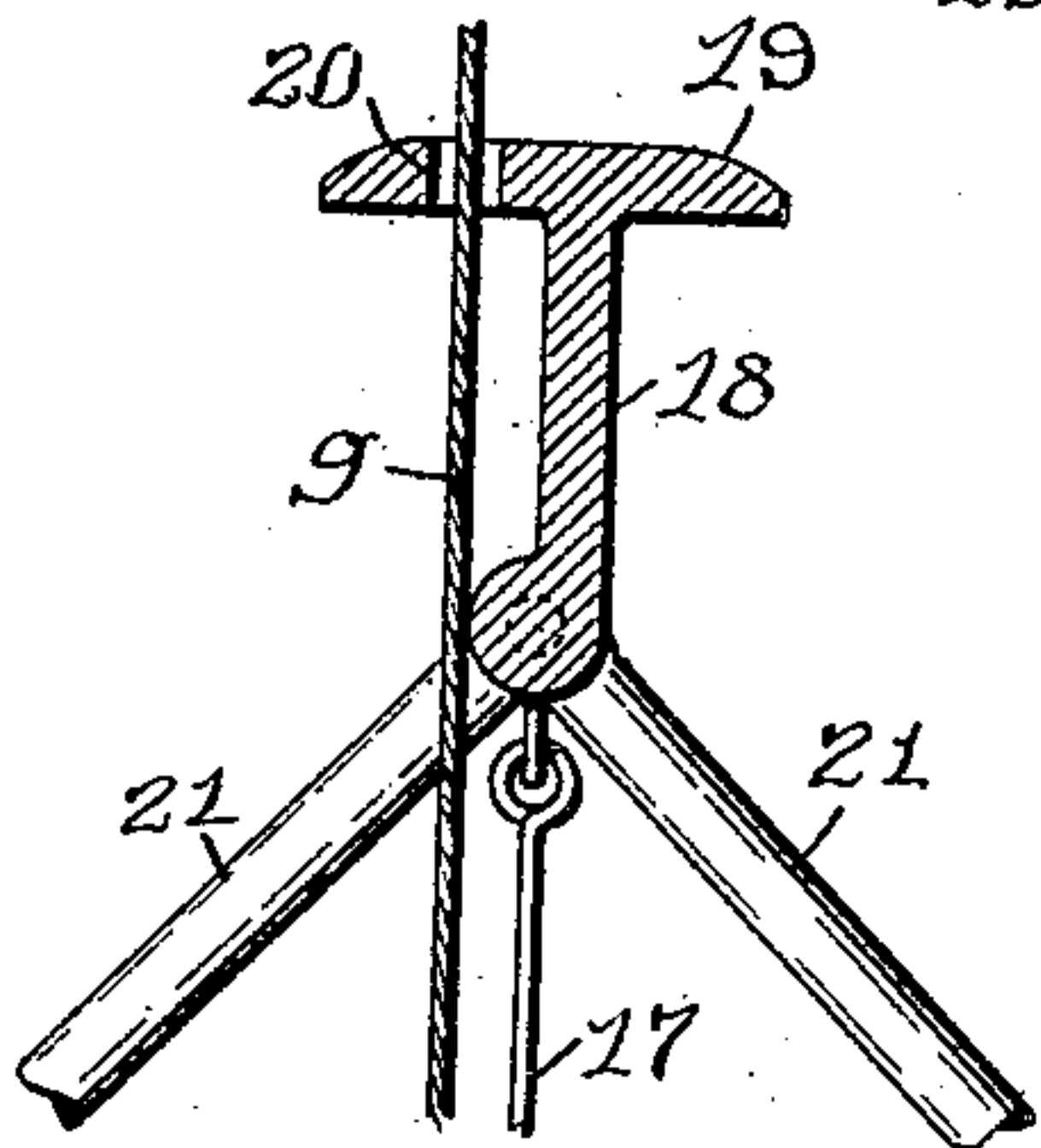


Fig. 5.



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UNITED STATES PATENT OFFICE.

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HOISTING APPARATUS.

No. 886,113.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed August 16, 1907. Serial No. 388,851.

To all whom it may concern:

Be it known that I, HENRY P. CLOUGH, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Hoisting Apparatus, of which the following is a specification.

This invention has reference to an improvement in hoisting apparatus and more particularly to an improvement in hoisting apparatus comprising a derrick and bucket adapted to hoist coal from the hold of a vessel.

The object of my invention is to improve the construction of a hoisting apparatus whereby a bucket is lowered in the open position into the hold of a vessel, closed and filled with coal, the filled bucket hoisted, swung into the discharge position and emptied, all through the operation of one rope.

A further object of my invention is to simplify the operation of a hoisting apparatus, thereby discharging the coal from a vessel in less time than has heretofore been done.

A still further object of my invention is to simplify the construction of a hoisting apparatus, thereby dispensing with one of the two ropes heretofore found necessary in the operation of the bucket.

My invention consists in the peculiar and novel construction of a hoisting apparatus, said hoisting apparatus having details of construction, whereby a bucket is lowered, closed and filled, raised, swung into the discharge position and emptied through the operation of one rope, as will be more fully set forth hereinafter and claimed.

Figure 1 is a side elevation of my improved hoisting apparatus, showing the bucket in the lowered open position in section and in full lines and in the raised closed position in broken lines. Fig. 2 is a horizontal sectional view taken on line 2 2 of Fig. 1, looking down on the hoisting apparatus and showing the boom in the position it would assume over the hatchway of a vessel in full lines and in the discharge position in broken lines. Fig. 3 is an enlarged detail view looking at the end of the hoisting boom and showing the automatic bucket locking jaws in the open position. Fig. 4 is an enlarged detail vertical sectional view taken on line 3 3 of Fig. 1 through the boom and showing the bucket locking jaws in the closed position and the means for operating the same, and Fig. 5 is an

enlarged vertical sectional view through the bucket holding member.

In the drawings, *a* indicates a portion of a wharf, *b* a derrick mast which is secured in a vertical position to the wharf, *c* a hoisting boom which is pivotally secured at its inner end to the mast *b* by a pin and socket member *d*, *e* a stay rod connected by eyes to the mast *b* and the free end of the boom *c*, *f* a hoisting bucket, *g* a combined hoisting and operating rope, *h* a pulley block secured to the outer end of the boom *c*, *i* a pulley block secured to the mast *b* under the pin and socket member *d*, *k* an automatic bucket holding mechanism on the boom *c*, *l* a cam arm on the mast *b* above the pin and socket member *d* and *m* a rope for swinging the boom *c* back over the hatchway of the vessel. The hoisting boom *c* has on its outer end two U-shaped frames 7 7 each frame being secured at its upper ends to the sides of the boom, as shown in Figs. 1 and 3. The center of the pin and socket member *d* is placed so as to bring the same outward beyond a vertical line drawn through the center of the eye on the mast *b* to which the stay rod *e* is pivotally secured, as shown in Fig. 1. By this construction the hoisting boom *c* will swing by gravity from the hoisting position, as shown in full lines in Fig. 2, to the discharge position, as shown in broken lines in Fig. 2.

The hoisting bucket *f* is constructed in two halves 8 and 9, each provided with the arms 10 10 pivotally secured together at their ends by a pivot pin, thereby pivotally connecting the two parts of the bucket together, which in opening or closing swings upon the pivot pins of the arms 10 10. A shaft 11 is rotatably supported at its ends in the arms 10 10 on the half 8 of the bucket. This shaft 11 has a central rope drum 12 on which the lower end of the combined hoisting and operating rope *g* is secured and wound in opening the bucket and from which it is unwound in closing the bucket, and a smaller side rope drum 13. A shaft 14 is rotatably supported at its ends in the arms 10 10 on the half 9 of the bucket and has a side rope drum 15. A rope 16 is secured to and wound around the side rope drum 15 in an opposite direction to the rope *g* on the drum 12, carried across to the drum 15 on the shaft 14 and wound around the drum 15 in an opposite direction and secured to the drum 15. A rope 17 is secured centrally at

its lower end to and wound around the shaft 14 in an opposite direction to the winding of the rope 16 on the drum 15. The upper end of the rope 17 is secured to a locking member 18 having the enlarged flat circular head 19 in which is a vertical hole for the hoisting and operating rope *g*. An arm 21 is pivotally secured at its lower end to each upper corner of the bucket and at its upper end to the locking member 18, as shown in Figs. 1 and 2. A latch 22 is pivotally secured at one end to the shaft 11 and has a lug 23 adapted to drop over the shaft 14 and lock the bucket in the open position and a downwardly-curved end 24 which extends below the bucket, when the bucket is in the open position, as shown in full lines in Fig. 1. The hoisting and operating rope *g* comes from the central rope drum 12 in the bucket *f* up through the hole 20 in the locking member 18 through the pulley block *h* on the end of the hoisting boom *c*, down through the pulley block *i* on the mast *b* and then to the engine or mechanism for operating the rope, not shown.

The automatic bucket holding mechanism *k* consists of two U-shaped locking jaws 25 25 pivotally secured to the U-shaped frames 7 7 on the end of the boom *c* in a position to bring the jaws 25 25 under the bottom of the frames 7 7 when the jaws are in the closed position. Each of the locking jaws 25 25 has an oppositely-disposed outwardly-curved arm 26 above the pivot on the end of which is a weight 27 which holds the jaws in the open position, as shown in Figs. 2 and 3. A pulley 28 is rotatably supported on each of the pivots of the locking jaws 25 25. A chain 29 is secured at its lower end to each of the locking jaws 25 25 below the pulleys 28 28. Each chain 29 extends across the other, then under an opposite pulley 28 28 and then up to a cross bar 30 to the ends of which it is secured, as shown in Fig. 4. The cross bar 30 is secured to a lever 31 which is pivotally secured adjacent its center to a bracket 32 secured on the top of the boom *c*. A lever 33 having a roll 34 on its lower end is pivotally secured to a bracket 35 which is secured to the top of the boom *c* in a position for the upper end of the lever 33 to rest on the lower end of the lever 31, as shown in Fig. 1. The cam arm *l* has a downwardly-curved end 36 and is secured to a bracket 37 which is secured to the mast *b* in a position for the roll 34 on the lever 33 of the bucket holding mechanism *k* to engage with the cam arm *l* and operate the bucket holding mechanism *k* to hold the bucket in the discharge position.

In the operation of my improved hoisting apparatus the boom *c* is swung outward into the hoisting position by the rope *m* and the hoisting and operating rope *g* allowed to run out to lower the bucket *f* in the locked open position (as shown in full lines in Fig. 1) into

the hold of a vessel. As the bucket reaches the coal the end 24 of the latch 22 is pushed upward by the coal, thereby disengaging the lug 23 on the latch from the shaft 14 and unlocking the bucket. A long pull on the hoisting and operating rope *g* now unwinds the same from the drum 12, winds the rope 16 onto the drum 13, unwinds the rope 16 from the drum 15, winds the rope 17 onto the shaft 14, closes and fills the bucket with coal, raises the bucket until the head 19 on the locking member 18 comes into contact with the bottom of the U-shaped frames 7 7 on the end of the boom *c*, as shown in broken lines in Fig. 1, when the pull on the hoisting and operating rope *g* will start the boom *c* toward the discharge position, when by the force of gravity the boom and bucket will move into the discharge position, as shown in broken lines in Fig. 2. As the boom *c* moves with the bucket *f* into the discharge position the roll 34 on the lower end of the lever 33 rides up the cam arm *l* on the mast *b*, thereby raising the lower end of the lever 33, depressing the upper end of the lever 33 and the lower end of the lever 31, raising the upper end of the lever 31 and through the cross bar 30 and the chains 29 29 closes the locking jaws 25 25 under the enlarged head 19 of the bucket locking member 18. The hoisting and operating rope *g* is now allowed to run out, when the head 19 of the locking member 18 will drop onto the locking jaws 25 25, thereby holding the bucket in the discharge position. As the rope *g* runs out it is wound onto the drum 12, the rope 16 unwinds from the drum 13 onto the drum 15, the rope 17 unwinds from the shaft 14, the bucket opens, discharges the coal and the latch 22 falls over the shaft 14 and locks the bucket in the open position. The open bucket is now swung into the lowering position by the rope *m*, the hoisting and operating rope *g* given a slight pull to move the bucket locked member 18 upwards and release the same from the locking jaws 25 25 which now open through the pull of the weights 27 27 on the arms 26 26 and moves the automatic bucket holding mechanism *k* back into its normal position, as shown in Fig. 1. The bucket is now lowered into the hold of the vessel and the operations repeated in discharging the coal.

It is evident that the structural details of my improved hoisting apparatus may be varied without materially affecting the spirit of my invention.

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

1. In a hoisting apparatus, a derrick having an off-center swinging boom, a bucket, a holding member on the bucket, a single rope operatively connected with the bucket and the boom, locking jaws on the end of the boom, and mechanism on the derrick adapt-

ed to automatically close the locking jaws onto the holding member on the bucket, when the bucket is swung into the discharge position.

5 2. In a hoisting apparatus, a derrick having an off-center swinging boom, a bucket adapted to open and close and automatically lock in the open position, a holding member, arms pivotally connecting the holding mem-
10 ber with the bucket, a frame on the end of the boom, locking jaws pivotally secured to the frame, a single rope operatively connected with the bucket and the boom, and coöperative mechanism on the derrick operatively
15 connected with the locking jaws, whereby the bucket is lowered, closed, hoisted, swung into the discharge position, held in the discharge position and opened, all by the operation of the single rope.

20 3. In a hoisting apparatus, a derrick having an off-center swinging boom, a two part bucket, a holding member, arms pivotally connecting the holding member with the bucket, a single rope operatively connected
25 with the bucket and the boom, a frame on the end of the boom, locking jaws pivotally secured to the frame, a cam arm on the derrick mast, and mechanism intermediate the locking jaws and the cam arm, whereby the
30 bucket is lowered, closed, hoisted, swung into the discharge position, held in the discharge position and opened, all through the operation of the single rope.

35 4. In a hoisting apparatus, a derrick having an off-center swinging boom, a two part bucket, a holding member, arms pivotally connecting the holding member with the bucket, a single rope operatively connected
40 with the bucket and the derrick, a frame on the end of the boom, locking jaws pivotally secured to the frame, a cam arm on the derrick mast, mechanism on the boom adapted to engage with the cam arm on the derrick mast and operate the locking jaws, and
45 means for swinging the boom into the hoisting position, whereby the bucket is lowered, closed, hoisted, swung into the discharge position, held in the discharge position and

opened, all through the operation of the single rope. 50

5. In a hoisting apparatus, a derrick having an off-center swinging boom, a two part bucket, a holding member, arms pivotally connecting the holding member with the bucket, a single rope operatively connected
55 with the bucket and the boom, a frame on the end of the boom, locking jaws pivotally secured to the frame, a cam arm on the derrick mast, a system of levers on the boom operatively connected with the locking jaws, a
60 roll on one of the levers in a position to engage with the cam arm on the derrick mast, whereby the bucket is lowered, closed, hoisted, swung into the discharge position, held in the discharge position and opened, all
65 through the operation of the single rope.

6. In a hoisting apparatus, the combination of the following instrumentalities: a mast *b*, a boom *c*, a pin and socket member *d* pivotally connecting the boom off-center to
70 the mast *b*, a stay rod *e* pivotally connecting the end of the boom *c* with the mast *b*, a two part bucket *f* having the holding member 18 pivotally connected to the bucket *f* by the arms 21 21, a combined hoisting and operating
75 rope *g* operatively connected with the bucket, a pulley block *h* on the boom *c* for the rope *g*, a pulley block *i* on the mast *b* for the rope *g*, a bucket holding mechanism *k* on the boom having the locking jaws 25 25, a
80 cam arm *l* on the mast *b*, and a rope *m* connected to the boom *c*, whereby the bucket *f* is lowered, closed, hoisted, swung into the discharge position, held in the discharge position and opened, all through the operation of
85 the rope *g*, and the boom *c* swung back into the hoisting position by the rope *m*, as described.

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

HENRY P. CLOUGH.

Witnesses:

ADA E. HAGERTY.

J. A. MILLER.