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W. M. HALE.
POWER SHOVEL.
APPLICATION FILED AUG. 31, 1910.

Patented May 23, 1911.

4 SHEETS—SHEET 1.

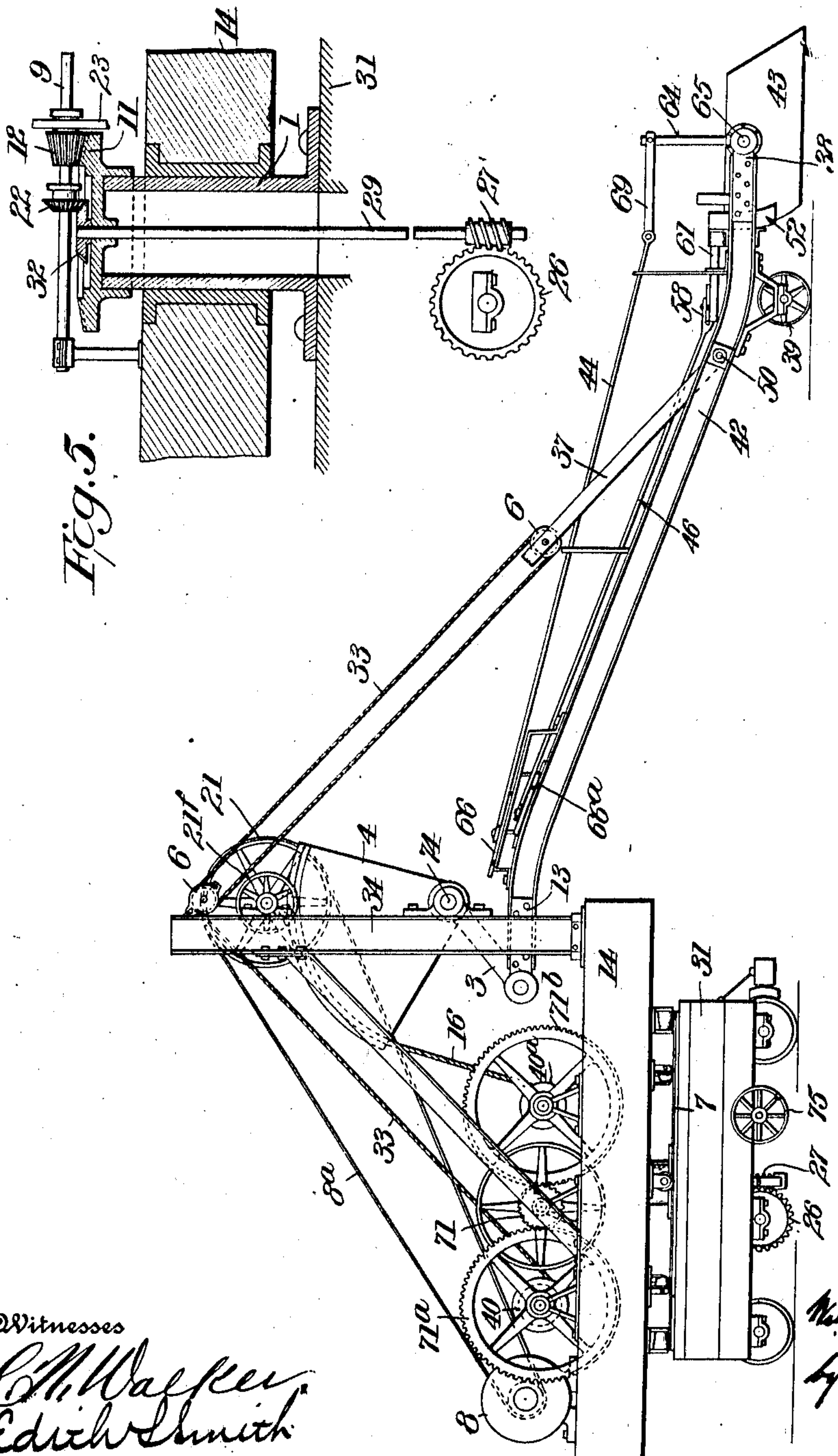


Fig. 5.

Fig. 1.

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4 SHEETS-SHEET 2.

Fig. 3.

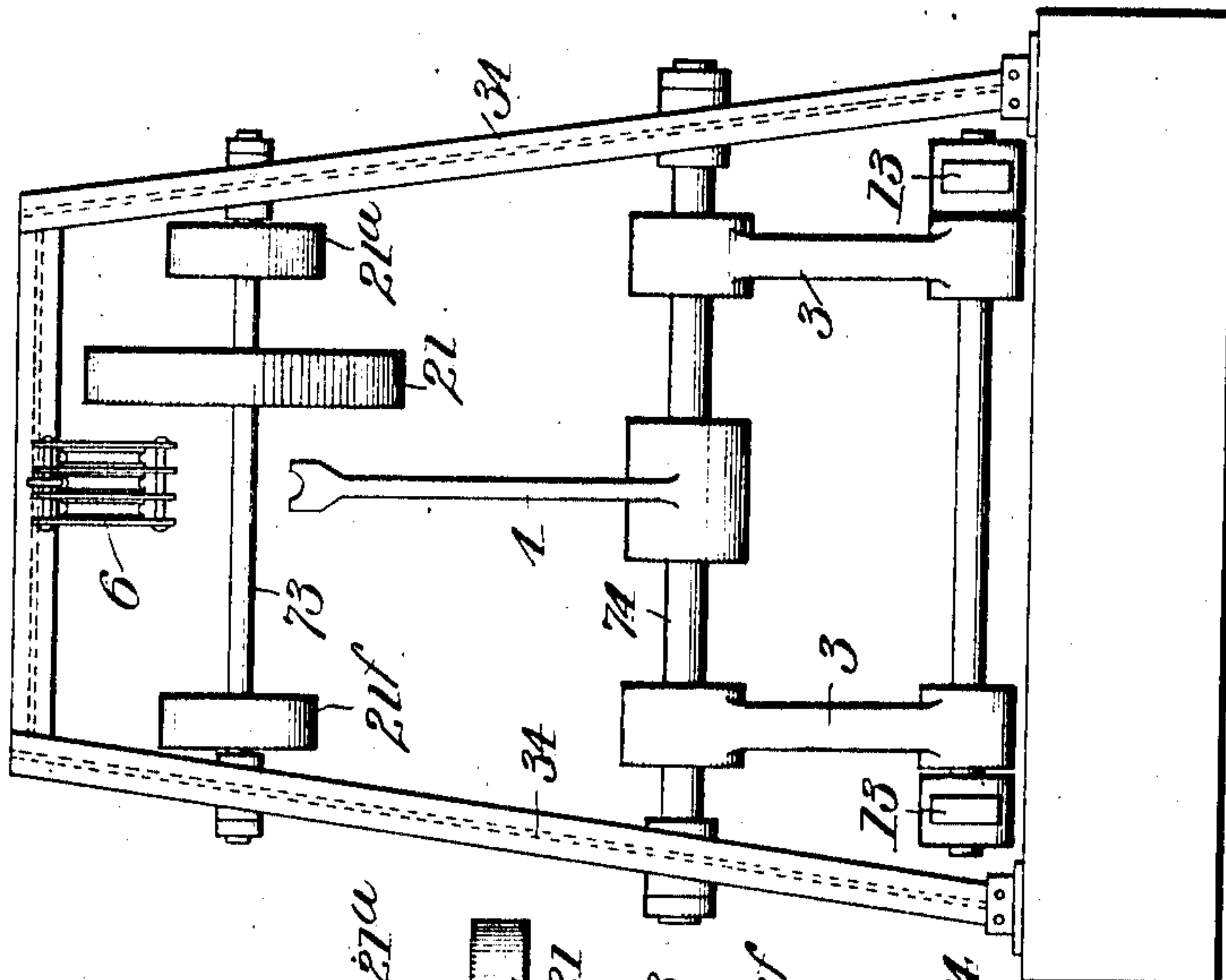
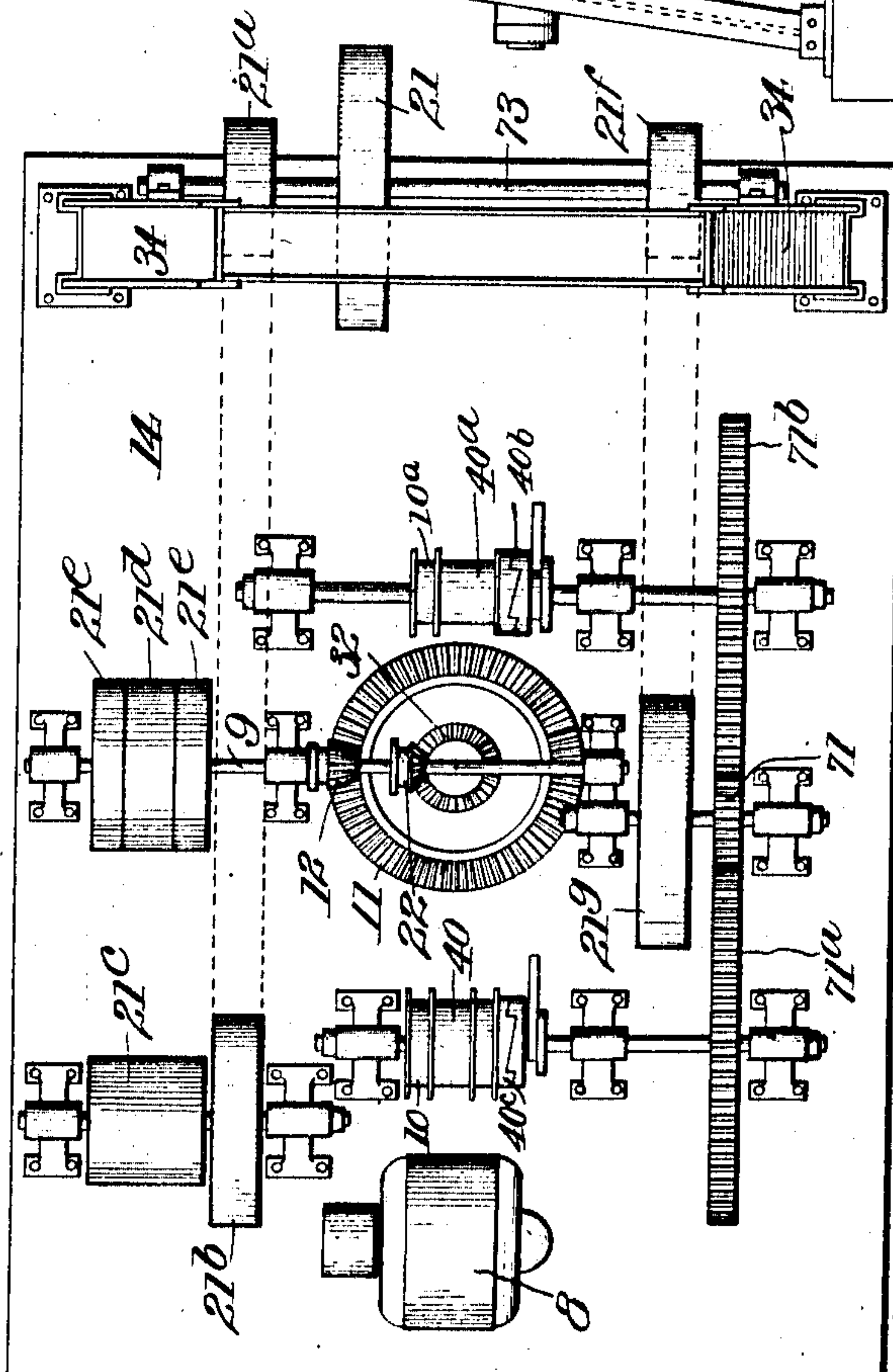


Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 8.

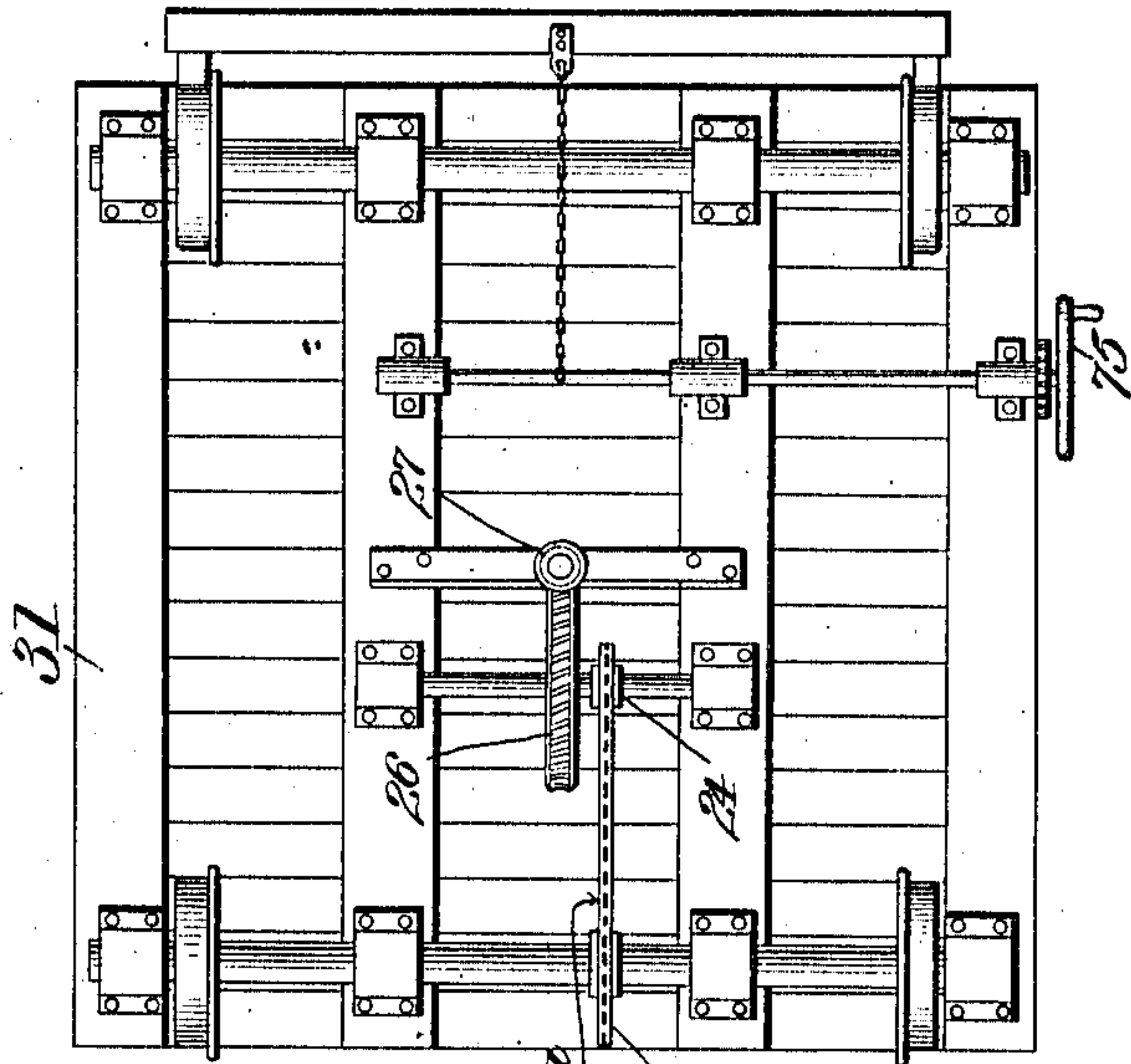
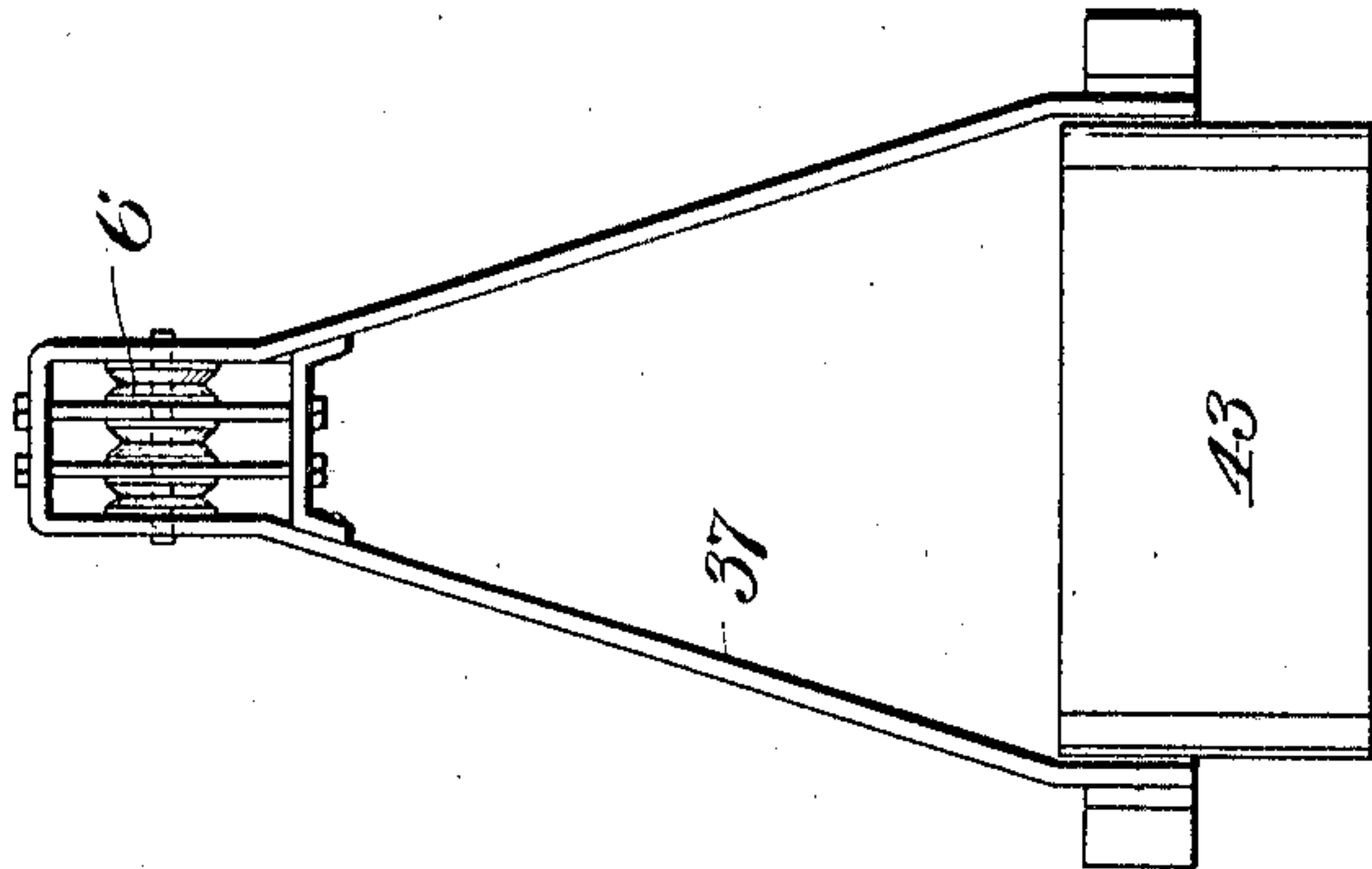
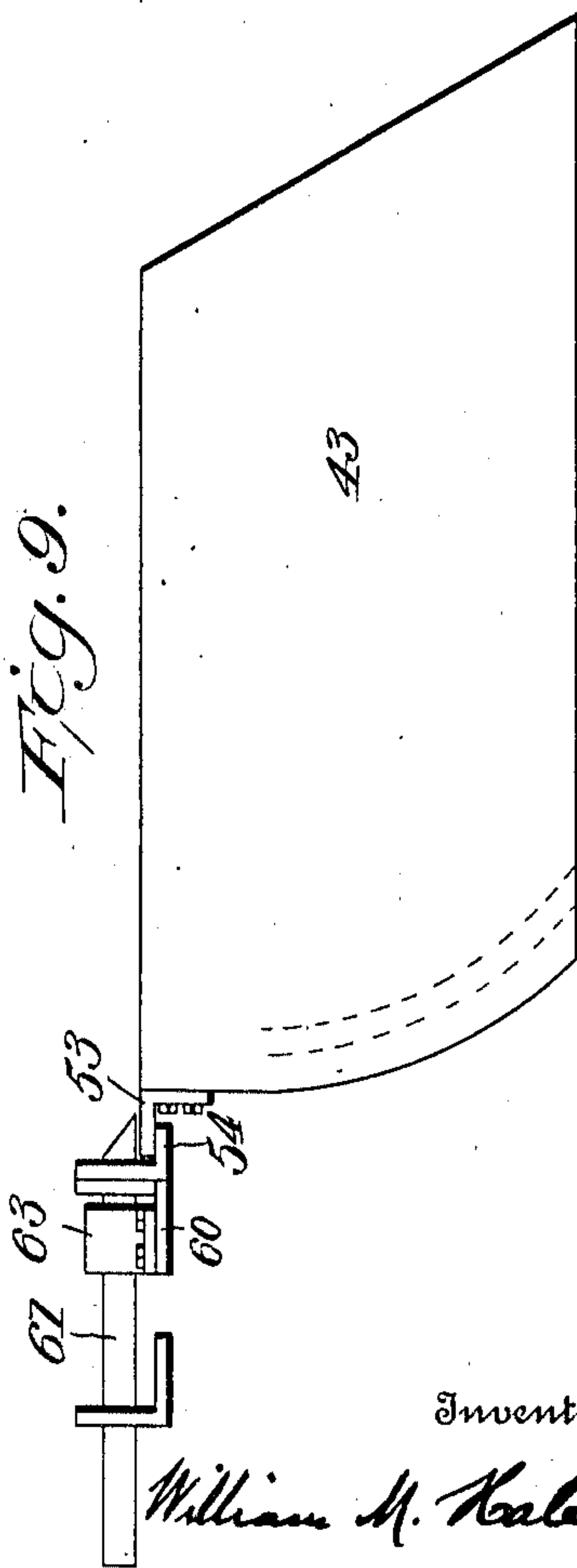


Fig. 4.

Fig. 9.



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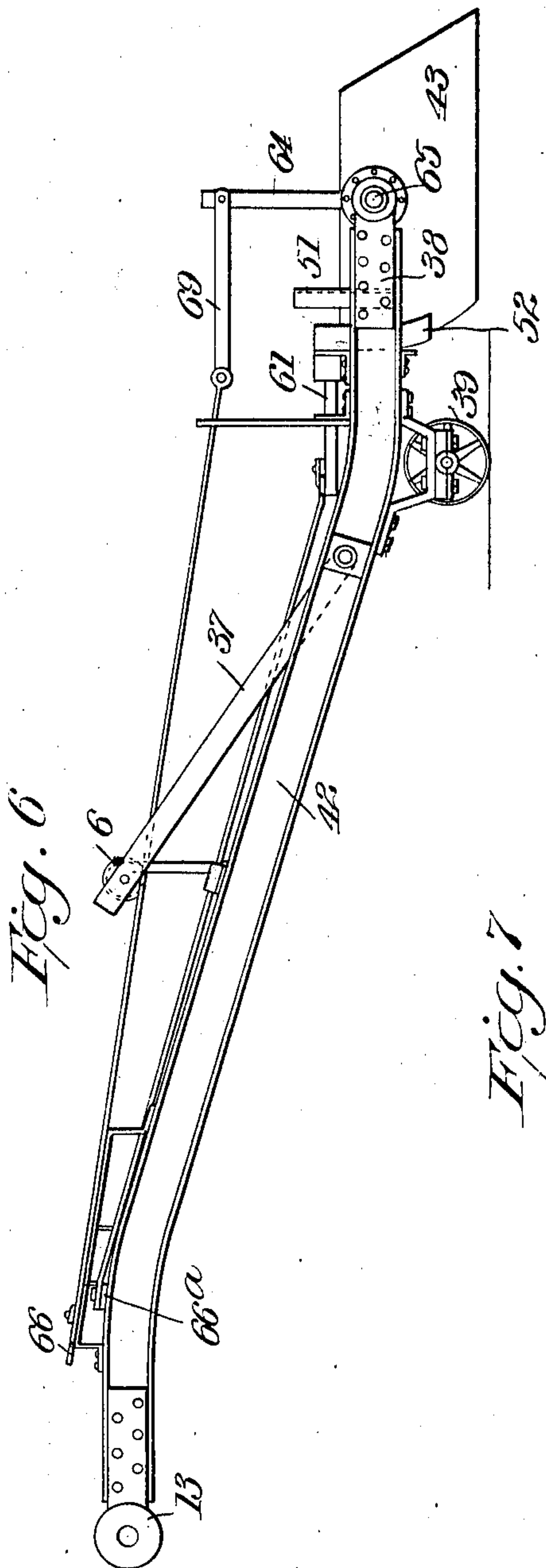
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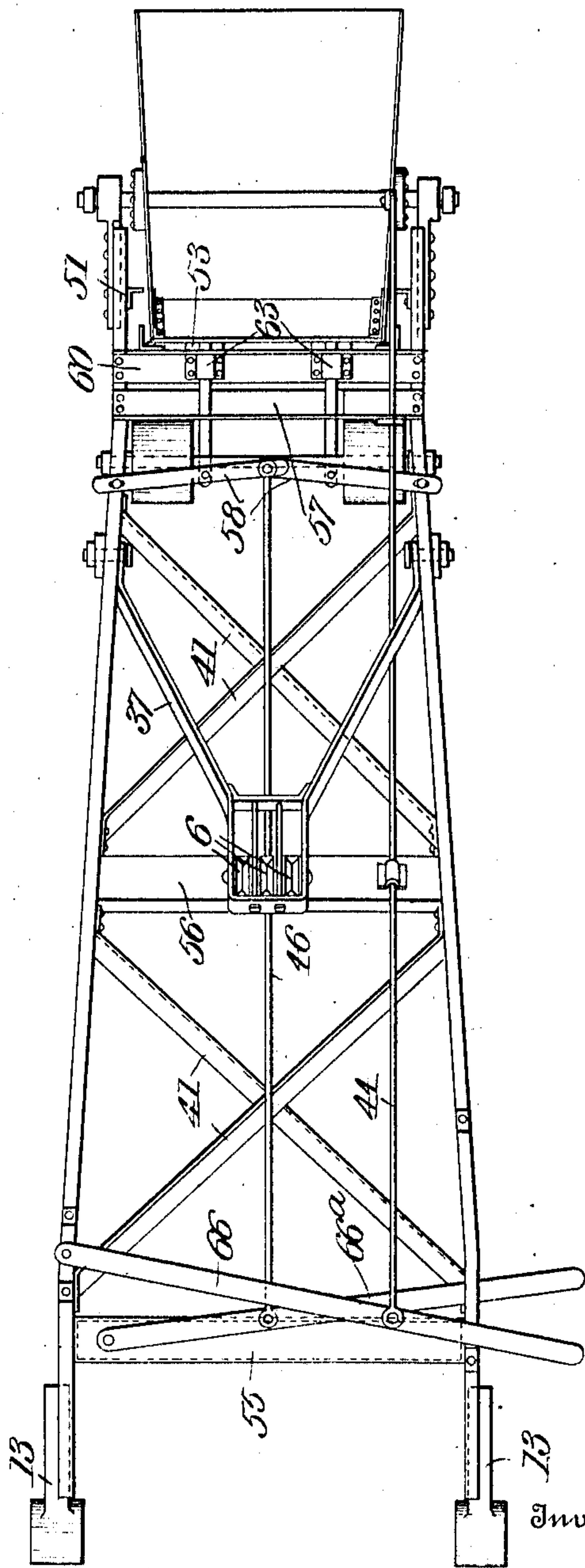
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4 SHEETS-SHEET 4.



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UNITED STATES PATENT OFFICE.

WILLIAM M. HALE, OF NASHVILLE, TENNESSEE.

POWER-SHOVEL.

993,059.

Specification of Letters Patent.

Patented May 23, 1911.

Application filed August 31, 1910. Serial No. 579,904.

To all whom it may concern:

Be it known that I, WILLIAM M. HALE, citizen of the United States, residing at Nashville, in the county of Davidson and State of Tennessee, have invented certain new and useful Improvements in Power-Shovels; of which the following is a specification.

This invention relates to power shovels or excavators of the shovel type and comprises a shovel pivotally mounted at the outer ends of thrust beams, the inner ends of which are connected to crank arms projecting from a rock shaft operated by suitable transmission devices. A hoisting yoke and cable is connected to the shovel arms, and the cable passes thence over sheaves to a hoisting drum. This mechanism is supported on a turntable carried by a car, the turntable permitting lateral swing of the shovel, and the car permitting the apparatus to be advanced into the body of the material. The car is driven by a motor mounted on the turntable, by means of a central upright shaft and gearing to the car wheels. Improved devices are provided for driving the car, for rotating the turntable, and for hoisting the shovel, as well as for operating the shovel to dig into the material.

Various other improvements with respect to the details of construction will be apparent from the following description and the accompanying drawings.

In the drawings—Figure 1 is a side elevation of the apparatus. Fig. 2 is a plan view of the turntable and the gearing carried thereby. Fig. 3 is an end elevation showing particularly an upright frame and the parts supported thereby. Fig. 4 is an inverted plan view of the car. Fig. 5 is a detail in vertical section of the turning and driving devices for the car and turntable. Fig. 6 is an enlarged detail in side elevation of the shovel and its beams. Fig. 7 is a plan of the same. Figs. 8 and 9 are details of the shovel devices.

Referring specifically to the drawings 14 is a turntable mounted upon a car 31 by means of rollers and a circular track 7. The turntable has at the center a cylindrical casting 1 at the upper end of which is fastened a bevel gear 11, which has a central bearing for a vertical shaft 29. The shaft 29 has a worm 27 which meshes with a gear 26 the shaft of which is connected by sprockets 24

and 25 and chain 25^a to one of the axles of the car, whereby the car is driven. The car may be provided with a suitable brake operated by hand wheel 75. When the shaft 29 is rotated the car will be driven in an ob- 60
vious manner. The shaft 29 has at its upper end a gear 32 which may be engaged by a sliding gear 22, controlled by a suitable lever and yoke, the gear 22 being mounted on a cross shaft 9 supported in suitable stands 65
on the turntable. This shaft 9 also carries a sliding pinion 12 which may be engaged with the gear 11 by means of a lever 23. When the pinion 12 is engaged and the shaft rotated the turntable will be turned, through 70
the central cylinder 1.

The turntable carries an electric or other motor 8, belted to a pulley 21 on a shaft 73 supported by uprights 34, the belt being indicated at 8^a. The shaft 73 has a pulley 21^a 75
belted to a pulley 21^b the shaft of which is mounted in stands on the turntable and has a pulley 21^c belted to tight and loose pulleys 21^d and 21^e on the shaft 9. One straight and one cross belt are provided, to reverse 80
the drive, and the shaft 9 transmits power to the turning and driving gear above described. The shaft 73 also has a pulley 21^f belted to a pulley 21^g the shaft of which has a pinion 71 meshing with spur gears 71^a and 85
71^b, the former being mounted on a shaft supported on the turntable which carries a clutch drum 40, and the latter being mounted on a shaft supported on the turntable which carries a drum 40^a. The drum 40 90
controls the hoist of the shovel through cable 33 and the drum 40^a controls the thrust of the shovel through cable 16. The cable 33 passes over sheaves 6 to connection with a yoke 37 which is pivotally attached at 50 to 95
the thrust beams 42 of the shovel. The cable 16 is connected to a segment 4 mounted on a rock shaft 74 supported by the standards 34, and the rock shaft has a pair of crank arms 3 connected by bearing pieces 13 100
to the thrust beams 42. The segment and crank arms are so disposed that when the former is pulled down by the cable the latter swing forward to force the shovel into the material. 105

The shovel 43 is pivotally mounted by means of a shaft 65 and suitable bearing pieces 38 to the front ends of the beams 42, which beams are suitably braced by diagonals 41 and cross bars 55, 56, and 57. The 110

shovel beams also carry ground wheels or rollers 39 which support the shovel when lowered, an inch or two above the ground.

The dump or tilt of the shovel is controlled by a lever 66 fulcrumed on the shovel beams and connected by a rod 44 and bar 69 to an upright arm 64 fastened to the shovel, and shovel is latched by latch pins 61 connected to levers 58 operated by a pipe or rod 46 connected to a lever 66^a, the pins working through guides 63 on a cross piece 60 and arranged to engage over an angle strap 53 fastened to the back of the shovel and arranged to strike an angle 54 fastened to the beams 42.

The rear end of the shovel is curved on the axis 65 as a center to fit within or against curved angles 52 fastened to the side beams, in a position to receive the thrust of the shovel, and said beams also carry angles 51 which serve as side guides to return the shovel to exact position after being dumped. The rods 44 and 46 pass through suitable guides on the shovel frame, and the parts will be constructed of suitable material, preferably of structural metal and sheet steel, for the intended purpose. The drums 40 and 40^a will be provided with suitable brakes the drums of which are indicated at 10 and 10^a.

In operation, the shovel will be lowered by letting off the cables 33 and 16, until the rollers 39 rest on the ground in front of the pile of material from which the shovel is to take. The car will be suitably positioned by operation of the pinion 22 and the worm shaft 29 and connections to the car wheels. Then the clutch 40^b of the drum 40^a will be thrown in and by means of the cable 16 segment 4, rock shaft 74 and crank arms 3 the shovel will be advanced into the pile. Then the clutch 40^c of the drum 40 will be thrown in, taking up the cable 33 and hoisting the shovel and its beams and the connecting yoke. Then by manipulation of the pinion 12 the turntable will be turned to swing the shovel to unloading position where it may be dumped by releasing the latches 61 and operating the lever 66^a. After being dumped reverse operation of

the lever 66^a will swing the shovel to original position where it may be again latched, and by letting off the hoisting drums the parts may be returned to original position for the next operation. The driving connections through the center of the turntable provide simple and efficient means for the control of the hoist, and the thrust of the shovel, and the movement of the car, by one operator, who may also control the dump effected by the levers 66 and 66^a.

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

1. In an excavator, the combination of a supporting car, a turntable thereon, standards on the turntable, a rock shaft mounted in bearings at the lower part of said standards and having depending cranks at opposite ends, a winding drum mounted on the turntable, a segment on the rock shaft, a cable connecting the drum and segment, a pair of thrust beams connected at their rear ends to said cranks, a dumping shovel mounted at the front ends of said beams, with its cutting edge, when in digging position, substantially in alinement with the direction of thrust of said beams, and means on the turntable to hoist the beams.

2. In an excavator, the combination of a car, a turntable thereon having a central opening, a motor on the turntable, a cross shaft mounted on the turntable and extending over said opening and geared to the motor, driving devices for the car including a shaft extending vertically through the opening and provided with a gear wheel at its upper end, a central bearing cylinder attached to the car and extending through the turntable and provided with a gear wheel at its upper end, pinions on the cross shaft, engageable with said gear wheels respectively to drive the car or turn the turntable and an excavating device carried by the turntable.

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

WILLIAM M. HALE.

Witnesses:

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M. P. O'CONNOR.