

No. 871,978.

PATENTED NOV. 26, 1907.

H. WULFF.
ICE CUTTING MACHINE.
APPLICATION FILED AUG. 21, 1906.

4 SHEETS—SHEET 1.

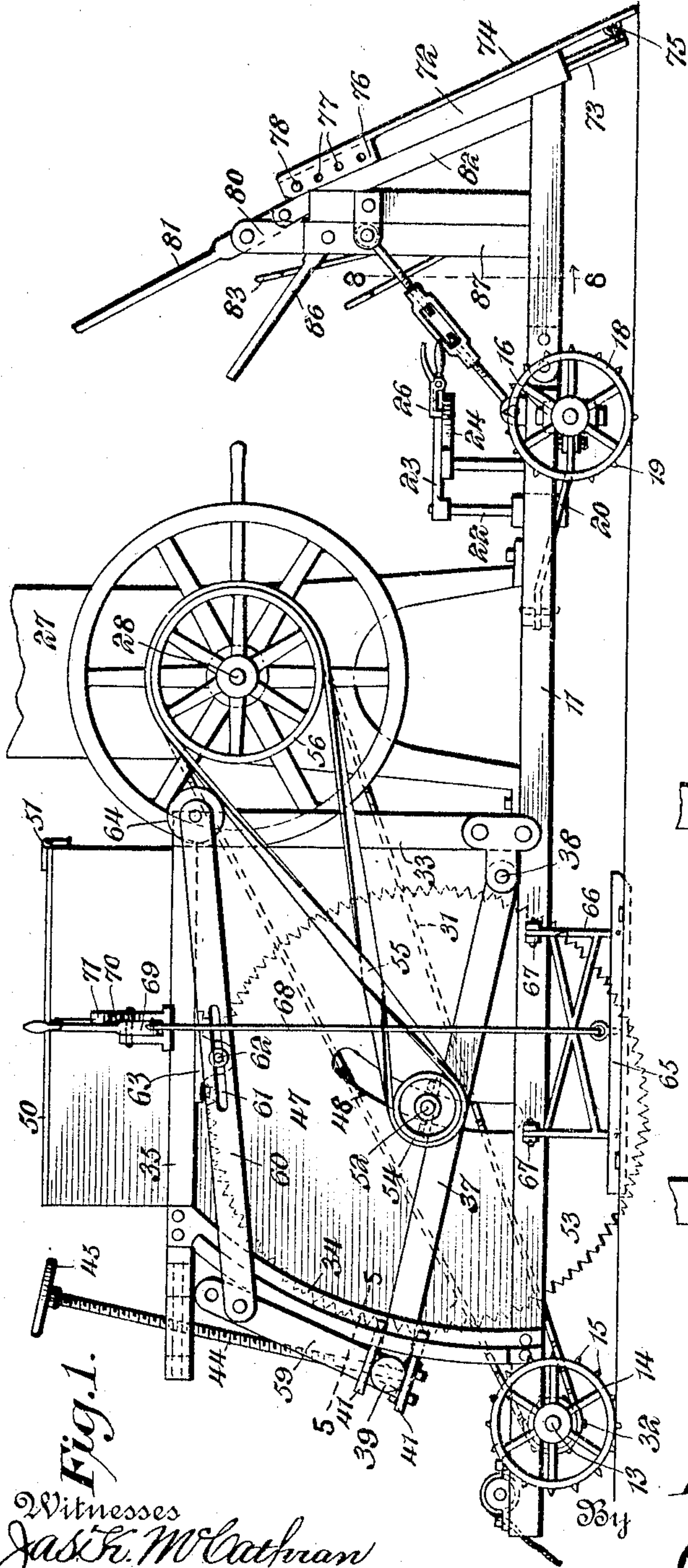


Fig. 1.

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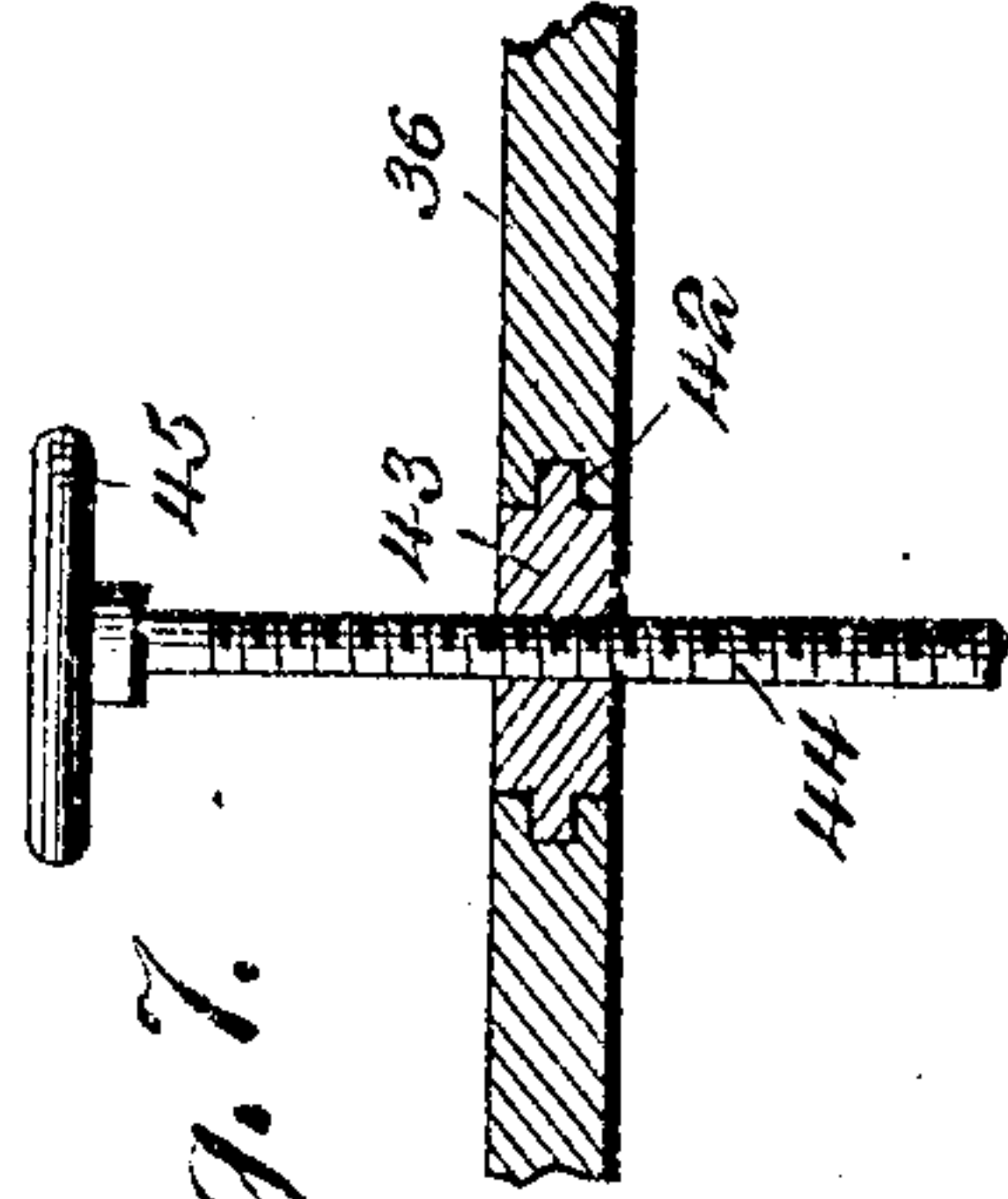


Fig. 7.

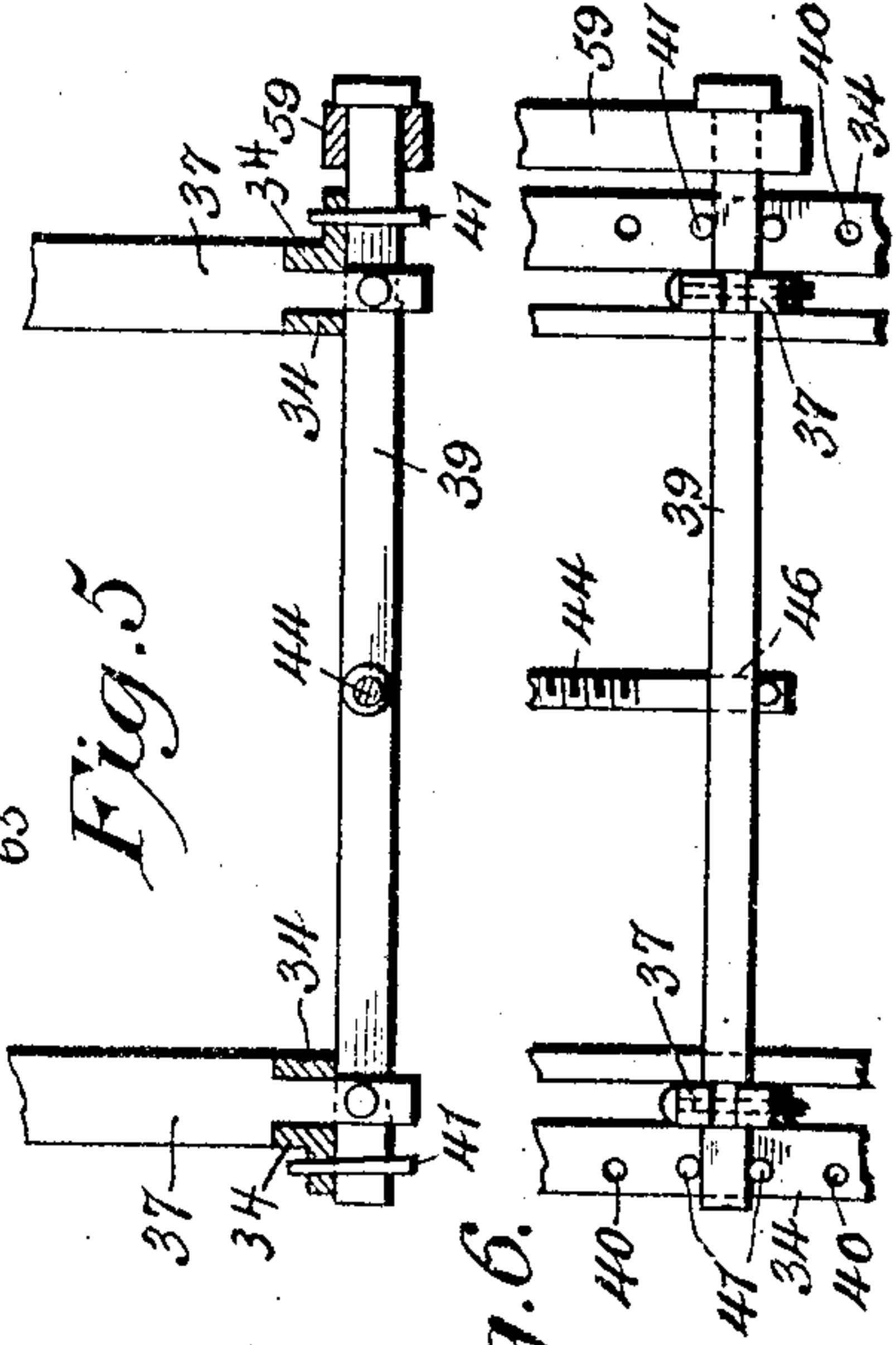


Fig. 5.

Fig. 6.

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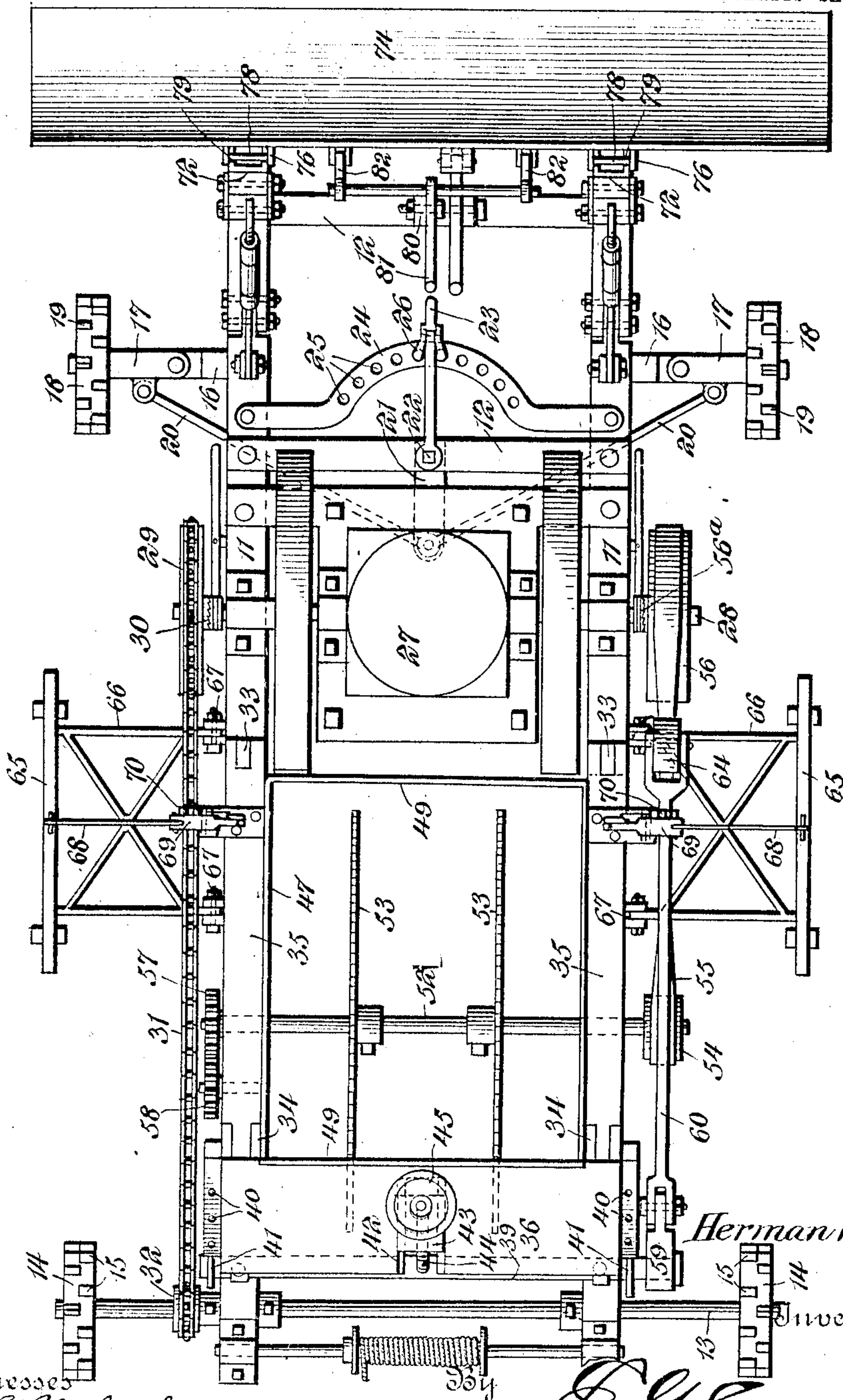
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

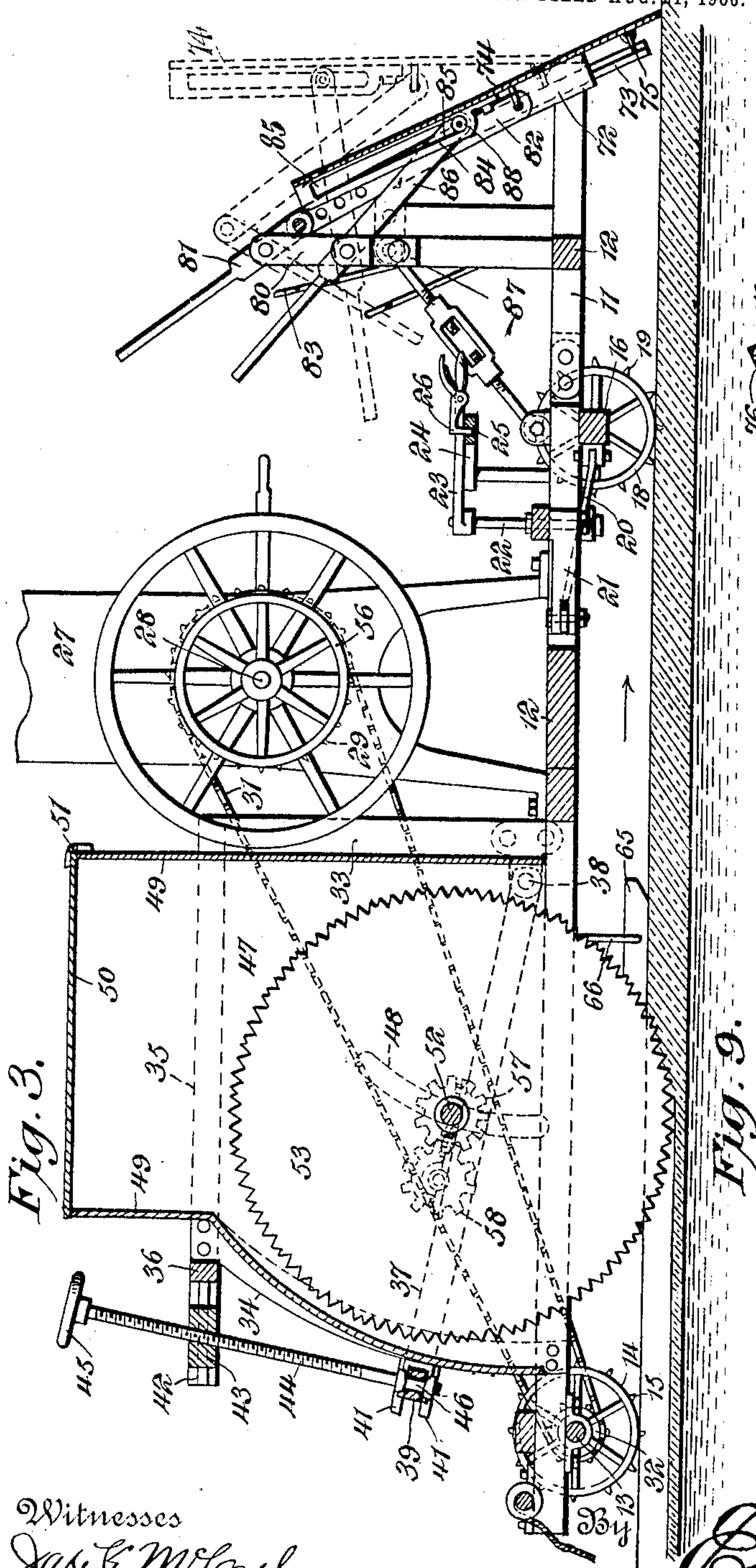


Fig. 3.

Fig. 9.

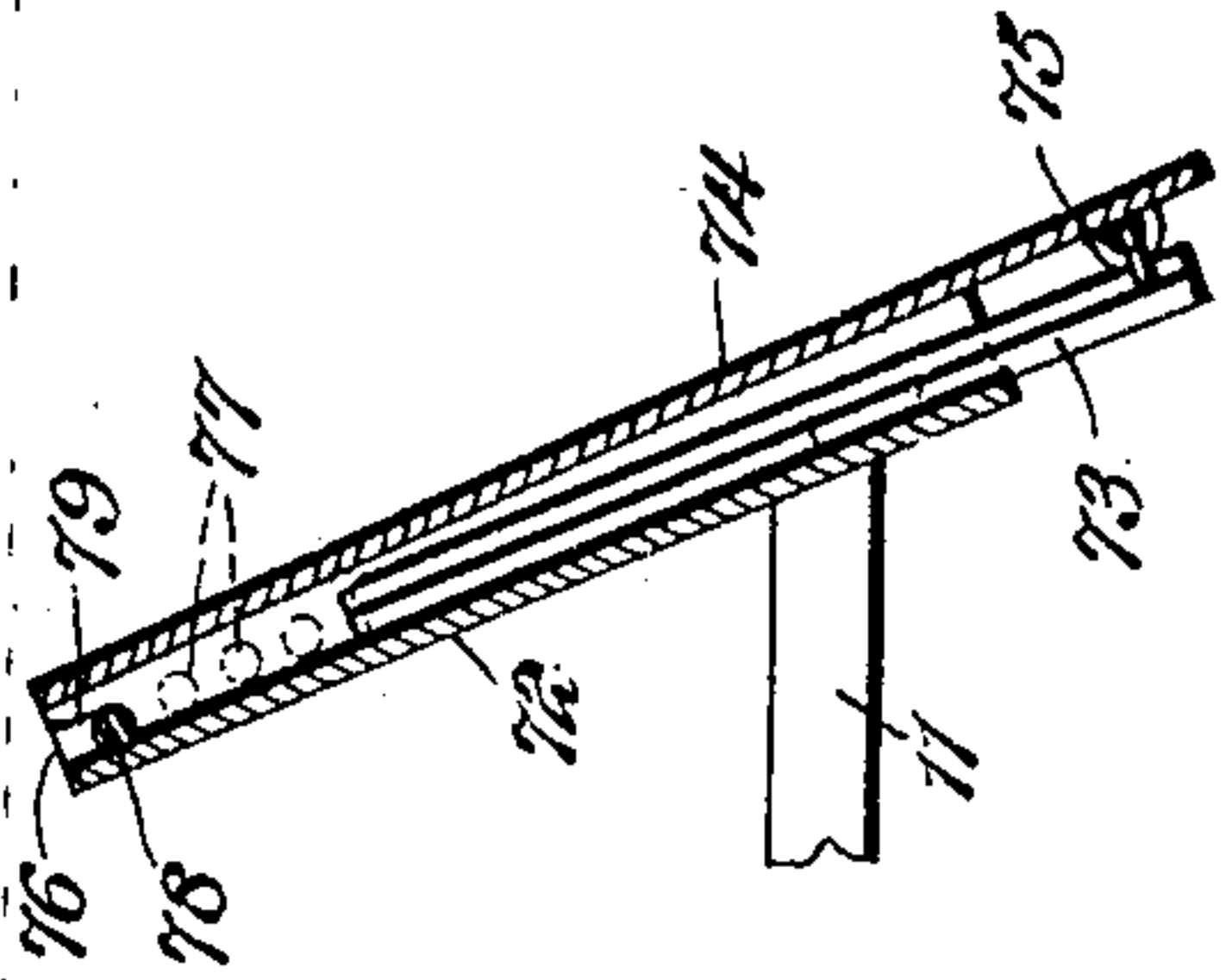
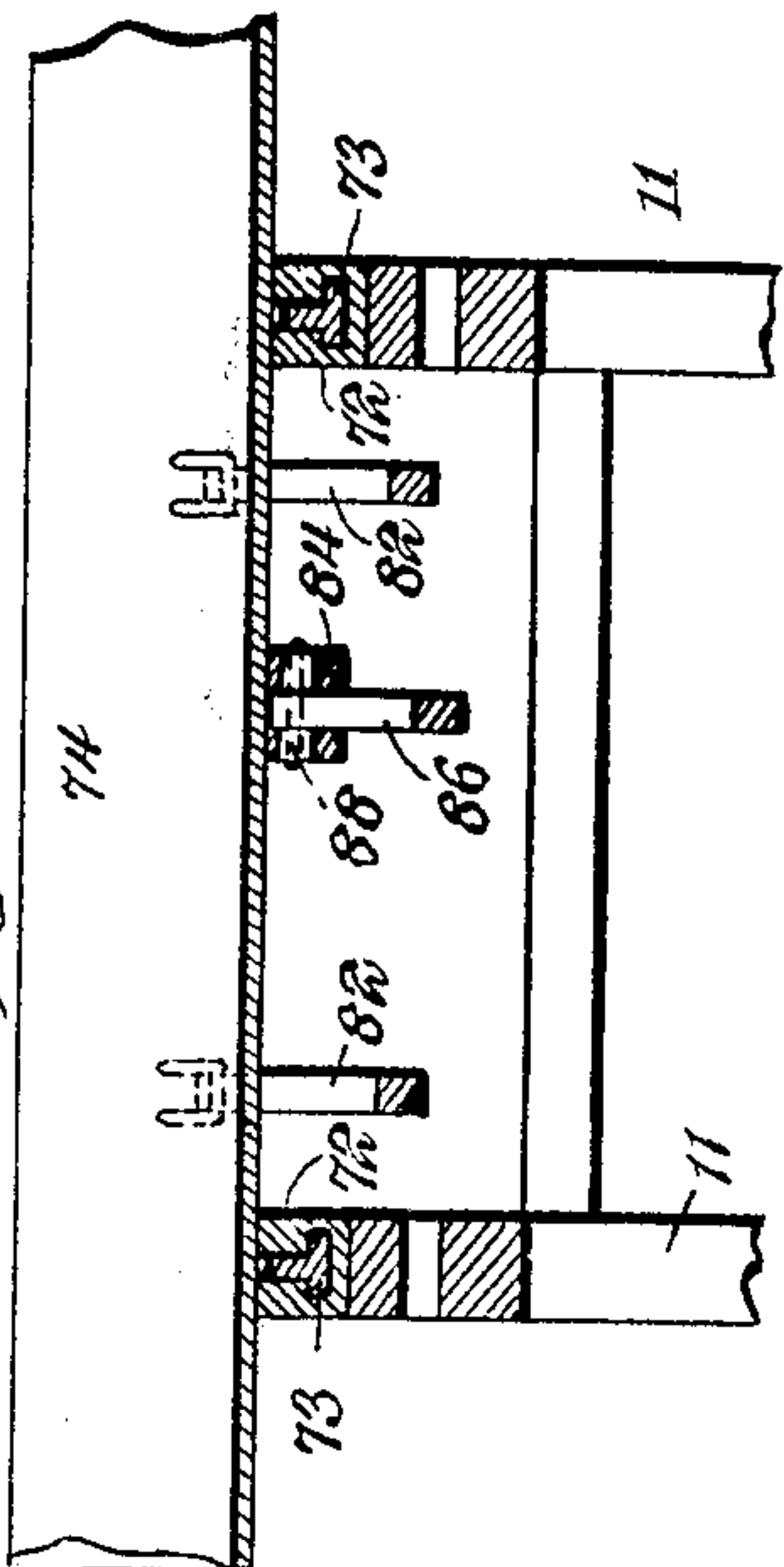


Fig. 10.



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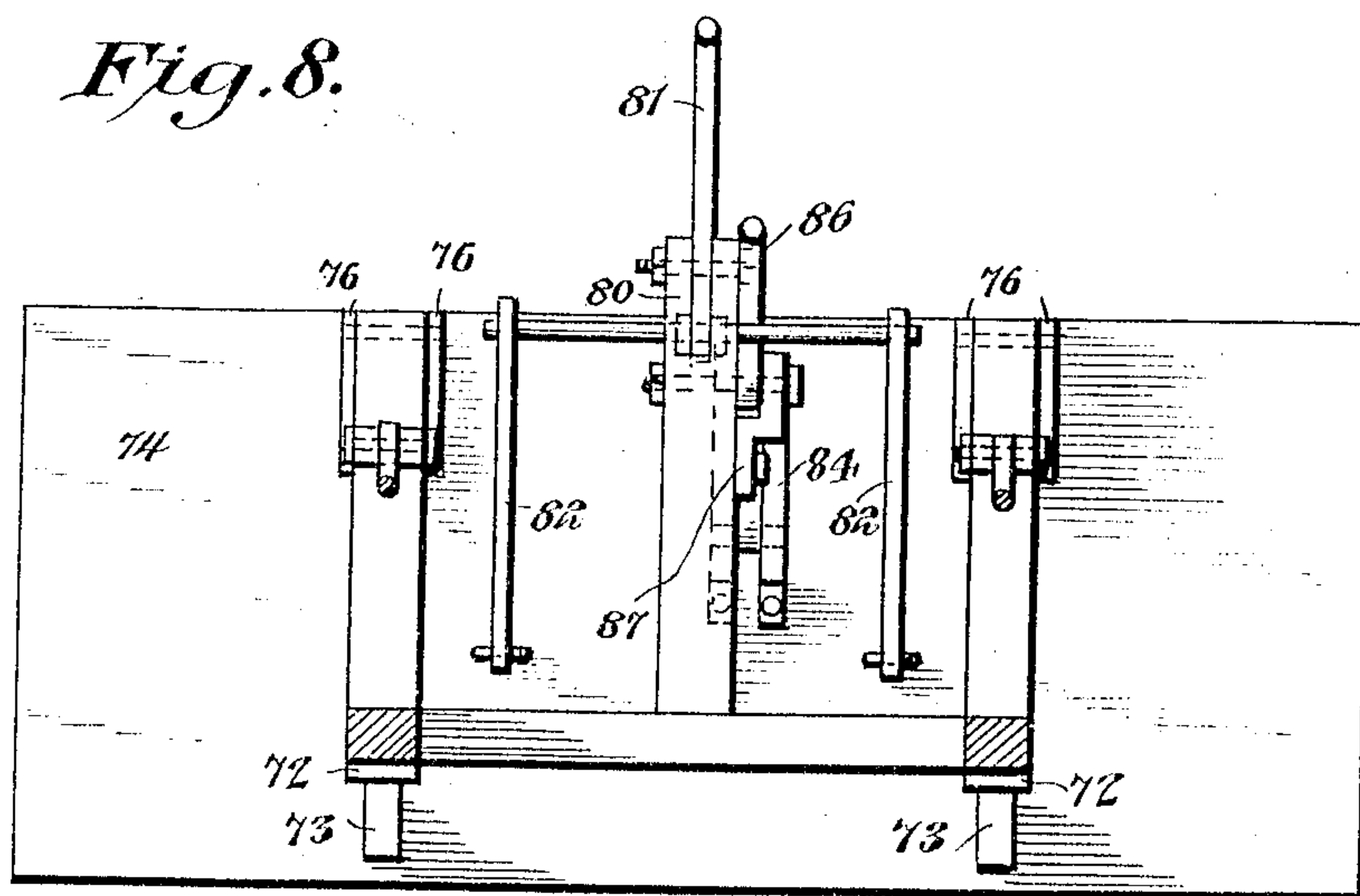
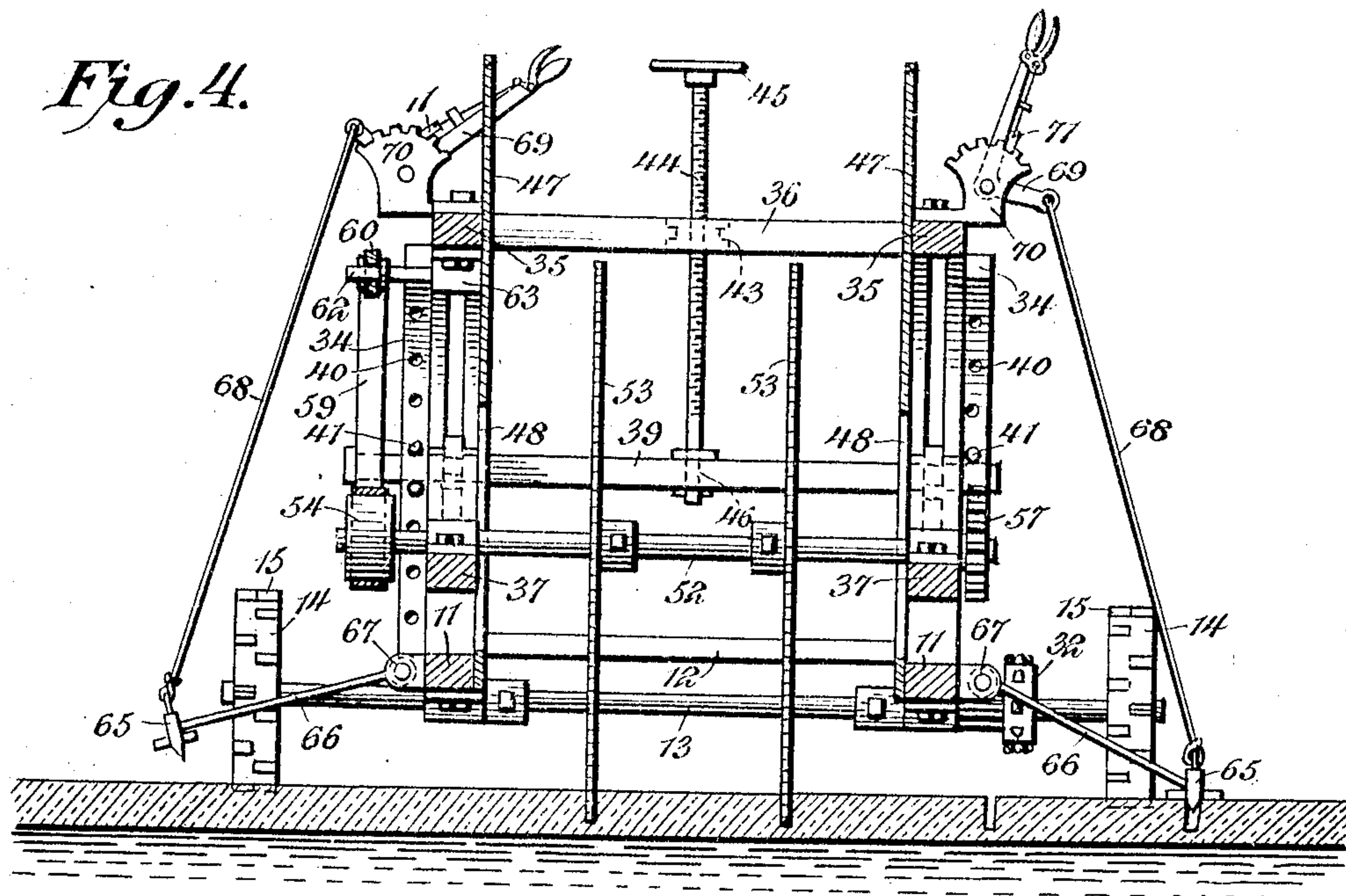
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

HERMAN WULFF, OF TOLEDO, OHIO.

ICE-CUTTING MACHINE.

No. 871,978.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed August 21, 1906. Serial No. 331,480.

To all whom it may concern:

Be it known that I, HERMAN WULFF, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Ice-Cutting Machine, of which the following is a specification.

This invention relates to means for scoring ice fields, and one of the principal objects is to provide novel, simple and effective mechanism, whereby ice of different thicknesses may be cut, and the depth of the cut readily regulated.

Another object is to provide, in connection with rotary cutters, which can be rotated at a high rate of speed, means whereby the cuttings will be confined, and not thrown over the entire machine, said means not interfering with the remainder of the mechanism or the adjustment of the cutters.

Still another object is to provide means for removing snow, slush and the like from the surface of the ice, said means being movable to effectively relieve itself from the accumulation at the end of the cut.

The preferred form of construction is illustrated in the accompanying drawings, wherein:—

Figure 1 is a side elevation of the machine. Fig. 2 is a top plan view thereof. Fig. 3 is a longitudinal sectional view. Fig. 4 is a cross sectional view. Fig. 5 is a horizontal sectional view through the guide frame and substantially on the line 5—5 of Fig. 1. Fig. 6 is a rear elevation of a portion of the guide frame and the swinging frame. Fig. 7 is a detail sectional view through the upper cross bars of the guide frame. Fig. 8 is a sectional view on the line 8—8 of Fig. 1. Fig. 9 is a horizontal sectional view through the scraper mechanism. Fig. 10 is a vertical sectional view through a portion of the same.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated, a supporting frame is employed, comprising a pair of sills 11 connected by cross beams 12. On the rear ends of the sills is journaled a driving axle 13 having traction wheels 14, preferably provided with spurs 15. The front portions of the sills have outstanding studs 16, on which are pivotally mounted stub axles 17. Guide wheels 18 are journaled on the axles 17, and are also preferably provided with

spurs 19. The axles 17 are connected by links 20 to a crank arm 21, carried by the lower end of a shaft 22 that is journaled in a cross bar of the supporting frame. The upper end of the shaft is provided with a handle lever 23 operating over a curved bar 24 provided with a plurality of sockets 25. The lever includes a double toothed dog 26, the teeth of said dog engaging in the sockets, as will be apparent.

A motor 27 of any suitable type, preferably an explosive engine, is mounted on the supporting frame, preferably in advance of the center thereof, and has a driving shaft 28 projecting on opposite sides of said frame. A sprocket wheel 29, carried by one end of the shaft, has a suitable clutch connection 30 therewith, and a chain 31, passing about the sprocket wheel 31, also passes about another sprocket wheel 32, carried by the rear axle 13.

A guide frame is mounted on the supporting frame in rear of the engine, and includes front standards 33 and rear standards 34, the latter being curved, as shown. The upper ends of these standards are connected by longitudinally disposed beams 35, and a rear cross beam 36. The rear curved standards 34 are arranged in sets, as clearly illustrated in Figs. 5 and 6, and extending between the standards of each set are the side bars 37 of a swinging carrier frame, said side bars being pivoted at their front ends, and as shown at 38 to the front standards 33, and having their rear ends connected by a bar 39 that is disposed in rear of the curved standards 34. The outer curved standards 34, as shown in Figs. 5 and 6, are provided with a series of sockets 40, and pins 41 are adapted to be placed in said sockets on opposite sides of the cross bar 39. The cross beam 36, as clearly illustrated in Figs. 2, 3 and 7, is provided with a central guide-way 42, in which a block 43 is slidably mounted. An adjusting screw 44 has a threaded engagement with this block, said adjusting screw being provided at its upper end with a suitable hand wheel 45, and having its lower end journaled in the cross bar 39, as shown at 46.

Arranged within the guide frame is a casing, comprising side walls 47, provided with curved slots 48, that are disposed concentrically to the pivot axis of the swinging frame. This casing also has front and rear walls 49, and a top 50, which top is hinged

at one end, as shown at 51. A shaft 52 is journaled on the side bars 37 of the swinging frame, and extends through the slots 48 and across the casing. Rotary saws or cutters 5 53 are secured to the shaft, and are located within the casing. In the present embodiment, two saws are shown, but it will be evident that one or more may be employed, as is found desirable or necessary. One end 10 of the shaft 52 is provided with a pulley 54, around which passes a crossed belt that also passes about another pulley 56, carried by the opposite end of the engine shaft 28 to that carrying the sprocket wheel 29. The 15 pulley 56 has a suitable clutch connection 56^a with the shaft 28. The other end of the shaft 52, to that carrying the pulley 54, has a pinion 57, which is in mesh with an idler pinion 58, secured to the adjacent bar 37 20 of the swinging frame. The pinion 58 constitutes in effect a rotary bearing, to which is transmitted the lateral strain upon the shaft 52 due to the belt 55. The cross bar 39 on said swinging frame projects at one 25 end beyond the adjacent side bar 37, and suitably secured thereto, is an arm 59. To the free end of this arm is adjustably connected a link 60, having a longitudinal centrally disposed slot 61, that receives a pin 30 62 suspended by a bracket 63 from the guide frame. The front end of the link 60 is provided with a roller 64 that bears against the belt 55, and constitutes, in connection with the link and arm, a belt tightener, as here- 35 inafter described.

Guides for the machine are employed that are in the shape of runners 65, carried by swinging brackets 66, hinged, as shown at 40 67 to the opposite side of the supporting frame. These brackets are connected by links 68 with bell crank levers 69 that are fulcrumed on racks 70 secured to the upper bars 35 of the guide frame. Dogs 71, carried by the lever 69, cooperate with the rack. 45 Upon the front end of the supporting frame are fixed space guide-ways 72 that are preferably disposed at an inclination, and have reciprocatory slides 73 mounted therein. A scraper blade 74 has hinge connections 75 with the lower ends of the slides 73, 50 this blade, as shown in Figs. 1 and 8, being provided with rearwardly extending ears 76, having openings 77 therein. Pins 78 are located in certain of these openings, and bridge 55 the spaces between the ears, said pins engaging in sockets 79, formed in the upper ends of the guide-ways 72, as clearly shown in Fig. 10. A post 80 has a lever 81 fulcrumed upon the upper end thereof, and this lever is con- 60 nected by links 82 with the rear side of the scraper blade 74. A suitable hook 83 is arranged to engage the lever to hold the rear end thereof in depressed condition. The scraper plate 74 is furthermore provided with 65 a central rearwardly extending flange 84,

having a longitudinal slot 85, therein, and another lever 86, fulcrumed on a bracket 87 secured to the post 80, has a roller bearing 88 in the slot 85.

The operation of the machine may be 70 briefly described as follows. Assuming the motor in operation, it will be apparent that if the pulley 56 and sprocket wheel 29 are thrown into clutch with the driving shaft 28, the machine will be propelled forwardly, and 75 the cutters will be rotated. The depth of the cut made can be readily regulated by the screw 44, but in order to remove unnecessary strain from this screw, the pins 41 are employed. The cuttings will be thrown out by 80 the saws with great force, but they will strike the interior of the casing and gravitate back upon the ice. At the same time if it becomes desirable or necessary to gain access to the cutters, for instance, for the purpose of plac- 85 ing salt thereon to prevent the freezing, the cover 50 can be readily raised, as will be evident by reference to Fig. 3. It will be observed, in connection with this mechanism, that the saws or cutters rotate in a direction 90 opposed to that in which the machine is running, and thus the said cutters hold themselves to their work and all liability of their riding up on to the ice is avoided. The proper location of the cuts is readily obtained 95 by means of the gages 65, one of which is placed in a previous cut, as shown in Fig. 4, the other being out of action. The depth of the cut is of course regulated by the screw 44, and pins 41, and in this connection, it will be 100 noted that when the swinging frame is raised or lowered to vary the depth, the belt tightener comprising the parts 59, 60 and 61, will be moved in order to always maintain the proper tension of the belt 55. 105

In case, there is snow or slush to be removed, from the surface of the ice being cut, the scraper 74 is placed in operative position, as shown in Figs. 1 and 3, in which case the 110 material to be removed, is carried by the machine in front of the cutters. When the end of the cut is reached, the machine is stopped, and the levers 81 and 86 are operated, the former effecting an upward movement of the blade, and latter swinging the same upon the 115 slides 73 so as to deposit the material in a pile. In turning at the ends or the sides of the field, the lever 23 is actuated so as to turn the axles 17 and thereby the front or guiding wheels 18. 120

From the foregoing, it is thought that the construction, operation, and many advantages of the herein described invention, will be apparent to those skilled in the art, without further description, and it will be under- 125 stood that various changes in the size, shape, proportion, and minor details of construction, may be resorted to without departing from the spirit or sacrificing any of the ad- 130 vantages of the invention.

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

1. In an ice cutting machine, the combination with a supporting frame, of a swinging carrier frame, pivoted on the supporting frame, a shaft journaled on the carrier frame, cutters secured to the shaft, means for rotating the shaft and cutters, a guide frame associated with the carrier frame and comprising curved standards, and a cross bar connecting the standards, said bar having a transverse guide-way, a block slidably mounted in the guide-way, and an adjusting screw threaded through said block and having a rotatable bearing in the carrier frame, the path of movement of the rear end of the carrier frame being substantially parallel to the curved standards.

2. In an ice cutting machine, the combination with a supporting frame, of a casing mounted thereon, a swinging frame located outside the casing, a shaft journaled on the frame and extending through the casing, said casing having slots in its opposite side walls through which the shaft passes, a cutter carried by the shaft and having its upper portion located in the casing, means connected to the shaft exteriorly of the casing for rotating said shaft, and means located exteriorly of the casing for raising and lowering the frame.

3. In an ice cutting machine, the combination with a supporting frame, of a casing mounted thereon and having side walls provided with curved slots, a door constituting a closure for the upper portion of said casing, a swinging frame mounted outside the casing, a guide frame associated with the casing and the swinging frame, an adjusting screw connecting the guide and swinging frames, a shaft journaled on the swinging frame and located exteriorly of the casing, said shaft extending through the slots of the casing and across the interior of said casing, a plurality of rotary saws fixed to the shaft, and a motor mounted on the supporting frame and connected to the shaft outside the casing for rotating the same.

4. In an ice cutting machine, the combination with a supporting frame, of cutting mechanism movably mounted thereon, a carrier movably mounted on the supporting frame independently of the cutting mechanism, a scraper movably mounted on the carrier, means for moving the carrier, and other means for moving the scraper on the carrier.

5. In an ice cutting machine, the combination with a supporting frame, of cutting mechanism mounted thereon, a guide-way carried by the supporting frame, a recipro-

catory carrier mounted in the guide-way, means for moving the carrier, a scraper movably mounted on the carrier, and means for moving the scraper on the carrier.

6. In an ice cutting machine, the combination with a supporting frame, of cutting mechanism mounted thereon, spaced upwardly extending guide-ways carried by one end of the supporting frame, reciprocatory carriers slidably mounted in the guide-ways, a scraper secured to the carriers, and a lever connected to the scraper for raising and lowering the same.

7. In an ice cutting machine, the combination with a supporting frame, of cutting mechanism mounted thereon, a swinging scraper mounted on the frame, said scraper having a slot in its rear side, and an actuating lever for swinging the scraper, said lever having a portion movable in the slot.

8. In an ice cutting machine, the combination with a supporting frame, of means for propelling the same, cutting mechanism mounted on the frame, spaced guide-ways supported on the frame in advance of the cutting mechanism, reciprocatory slides mounted in the guide-ways, a scraper hinged to the lower ends of the slides, a lever connected to the scraper for raising and lowering the same, and another lever connected to the scraper for effecting its swinging movement on the slides.

9. In an ice cutting machine, the combination with a supporting frame, of means for driving the same, a carrier movably mounted on the supporting frame, a scraper movably mounted on the carrier, means for moving the carrier and the scraper together, and other means for moving the scraper on the carrier to effect a dumping movement of said scraper.

10. In an ice cutting machine, the combination with a supporting frame, of means for moving the same, spaced guide-ways carried by the supporting frame, reciprocatory slides mounted in the guide-ways, a scraper hinged to the lower ends of the slides, said scraper having a slot in its rear side, a lever mounted on the supporting frame and having an engagement in the slot, and another lever mounted on the supporting frame and having a link connection with the scraper.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

HERMAN WULFF.

Witnesses:

CHARLES S. NORTHUP,
WILLIAM WULFF.