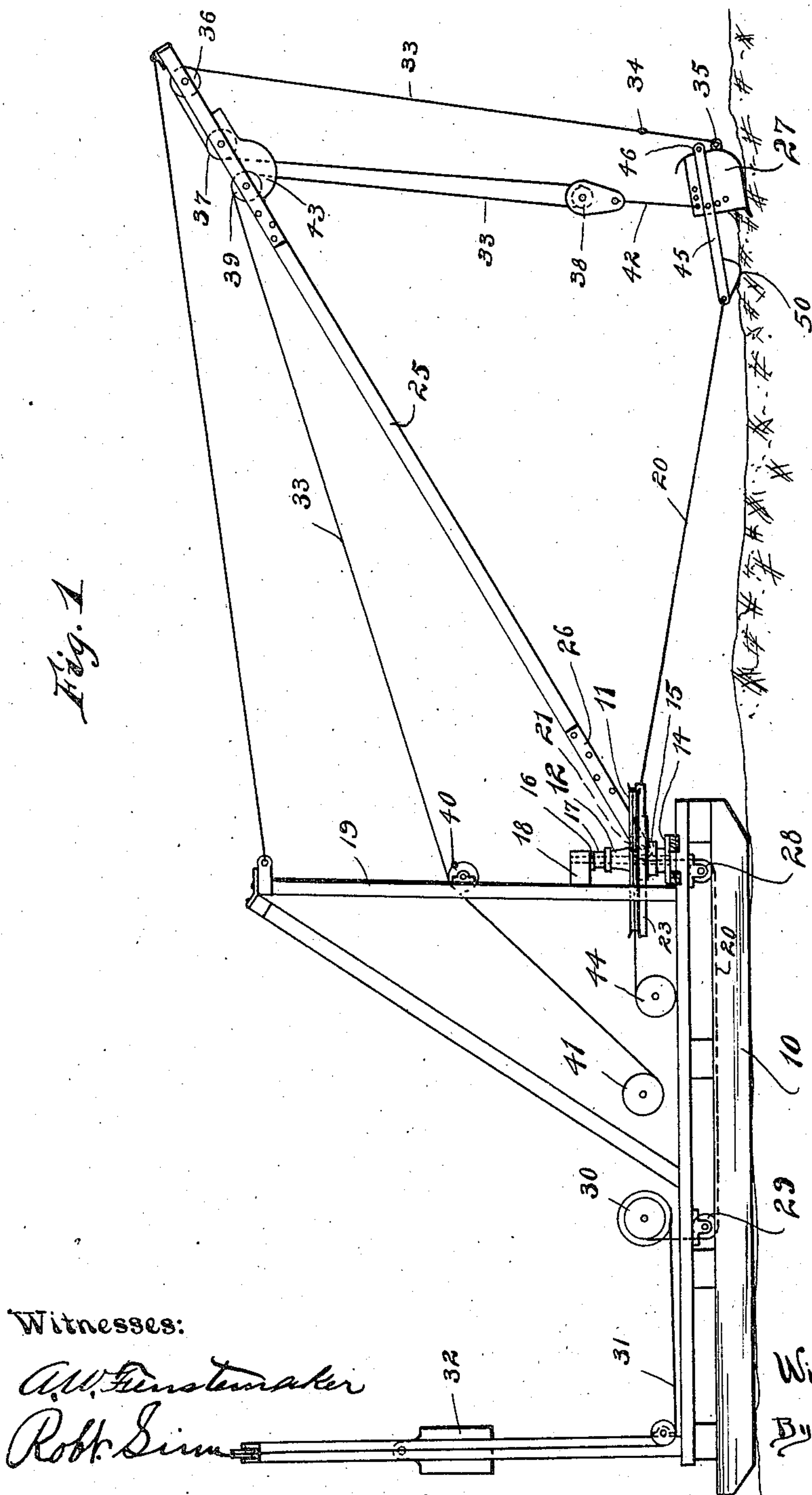


No. 860,102.

PATENTED JULY 16, 1907.

W. J. NEWMAN.  
EXCAVATING APPARATUS.  
APPLICATION FILED AUG. 27, 1906.

4 SHEETS—SHEET 1.



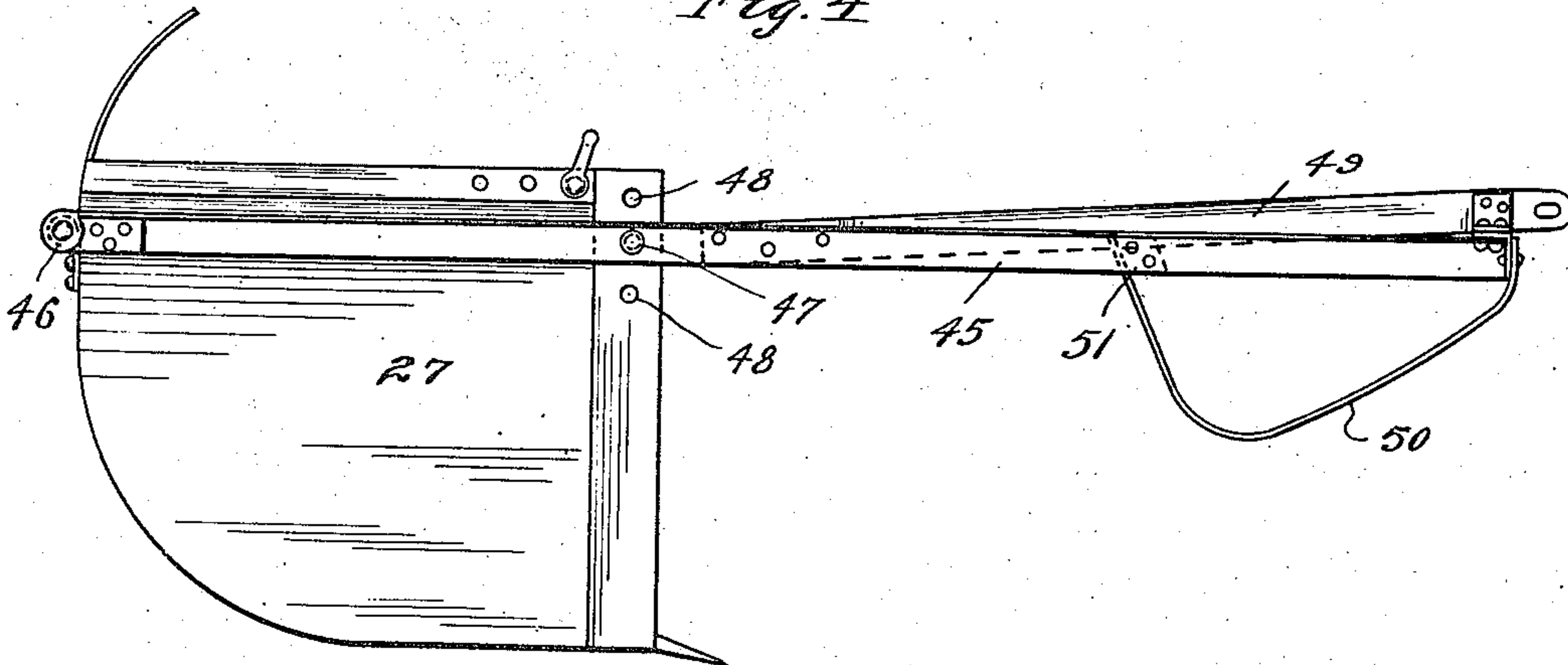
No. 860,102.

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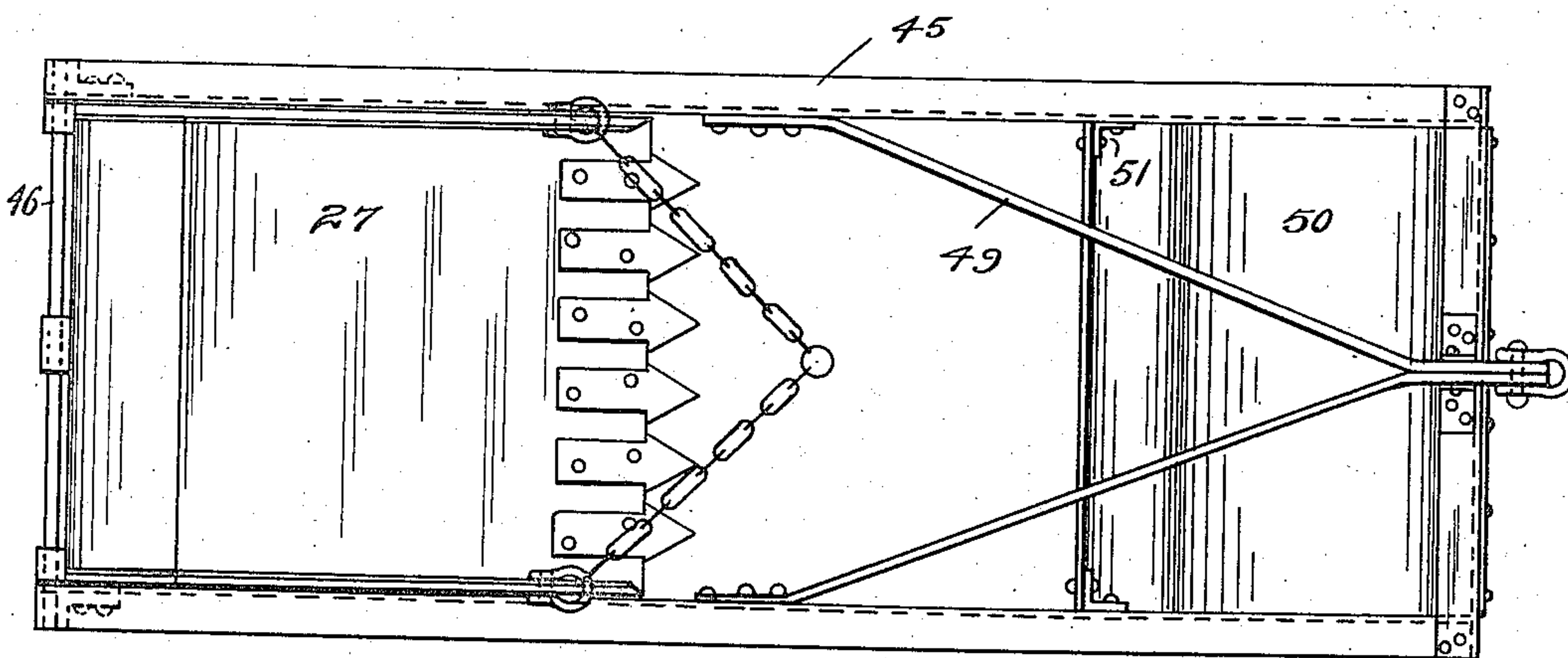
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APPLICATION FILED AUG. 27, 1906.

4 SHEETS—SHEET 3.

*Fig. 4*



*Fig. 5*



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4 SHEETS—SHEET 2.

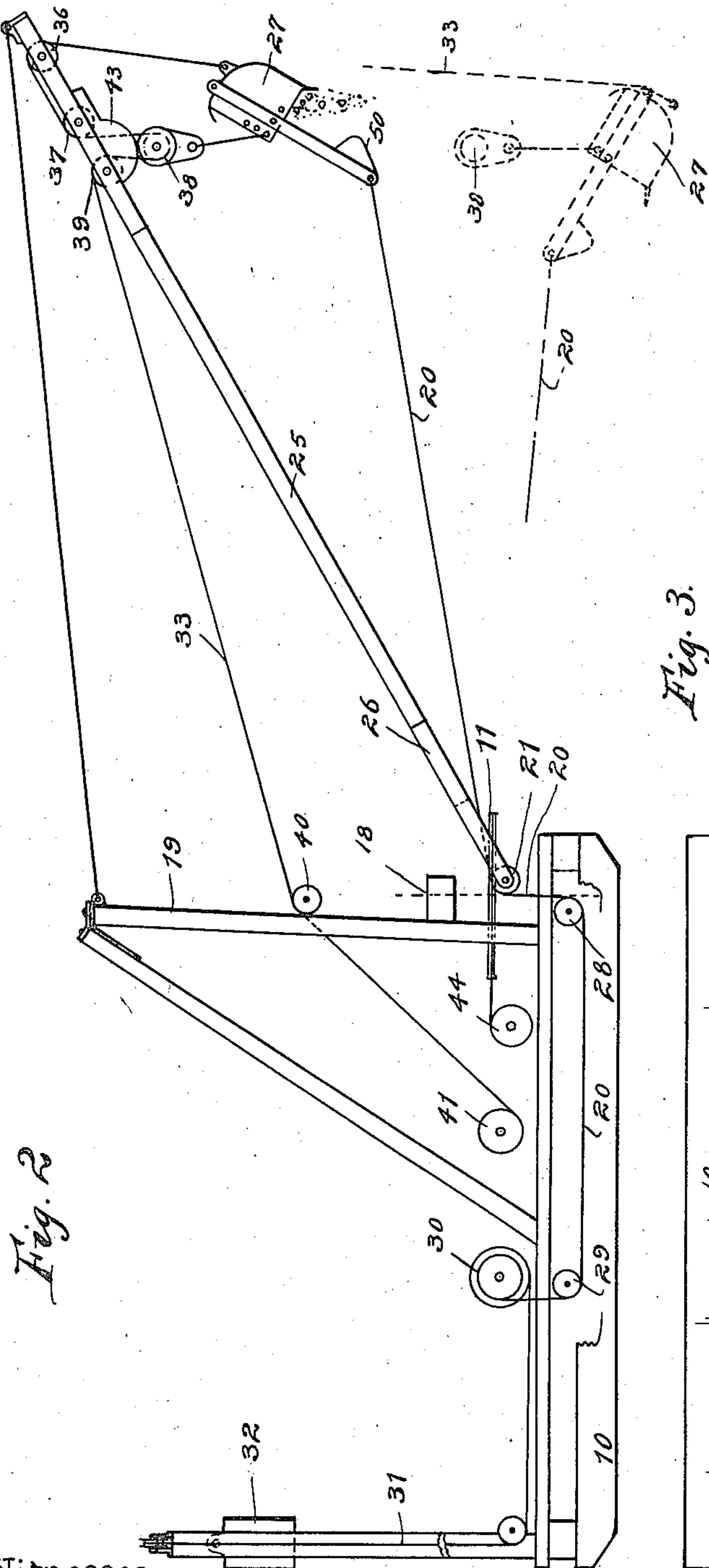
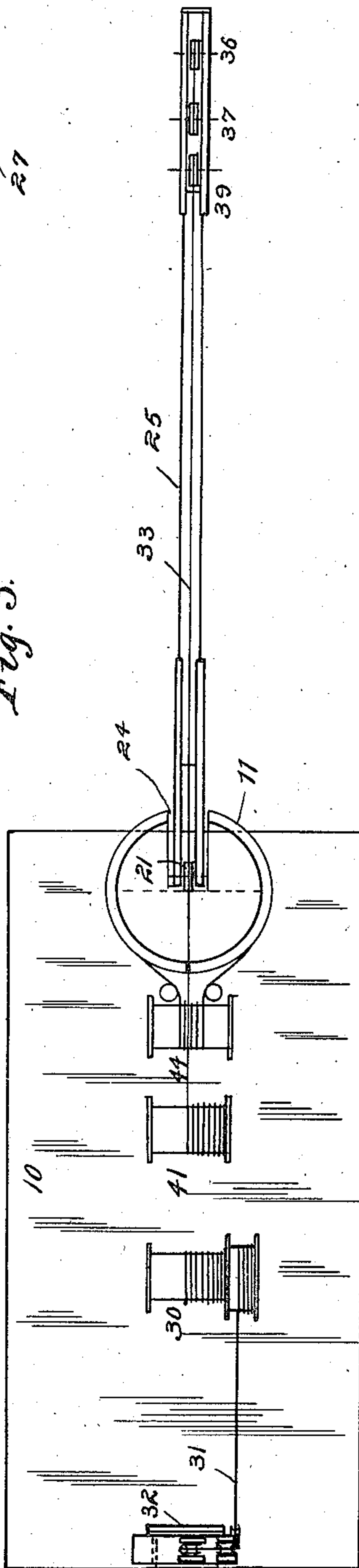


Fig. 2

Fig. 3.



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APPLICATION FILED AUG. 27, 1906.

4 SHEETS—SHEET 4.

Fig. 6

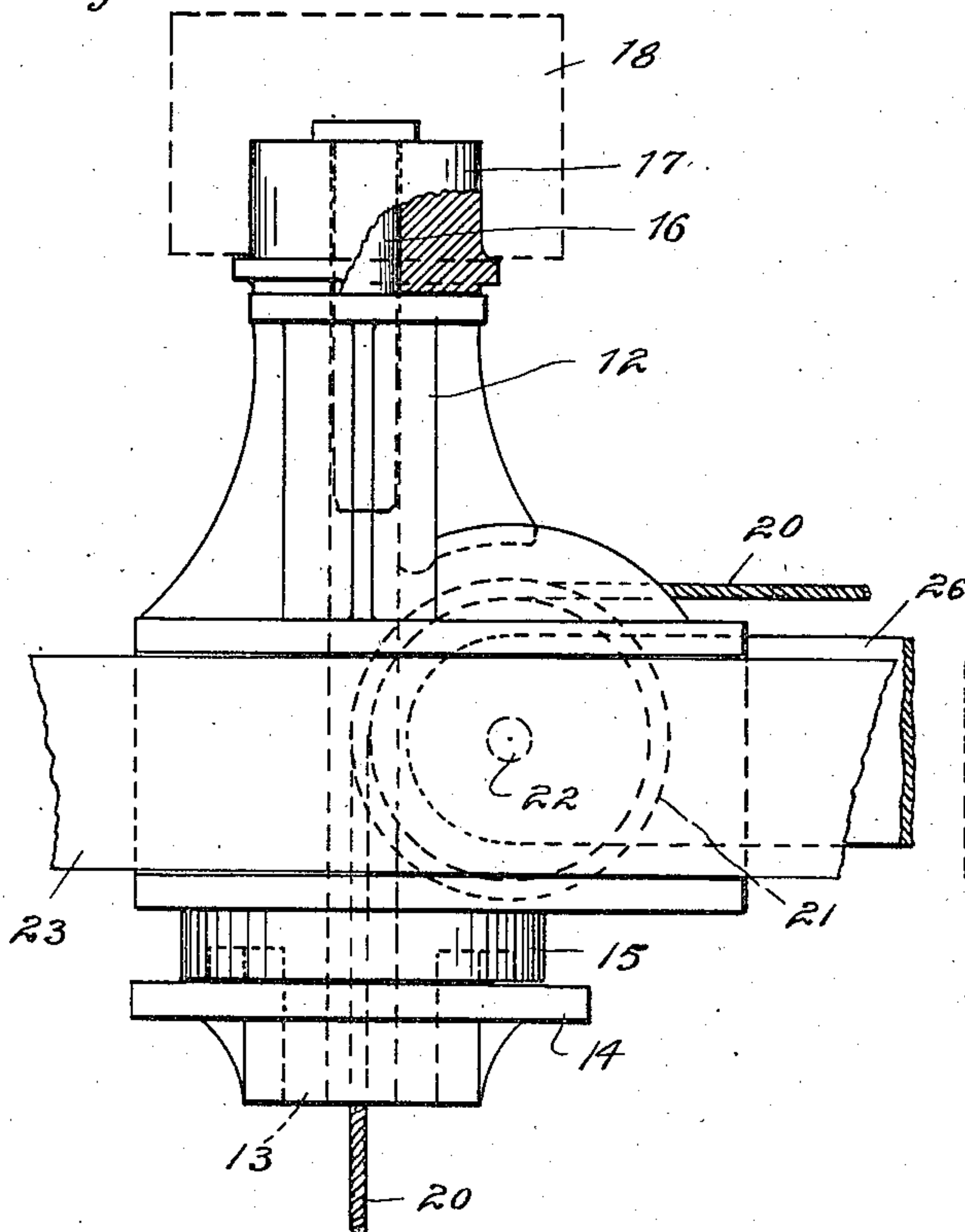


Fig. 7

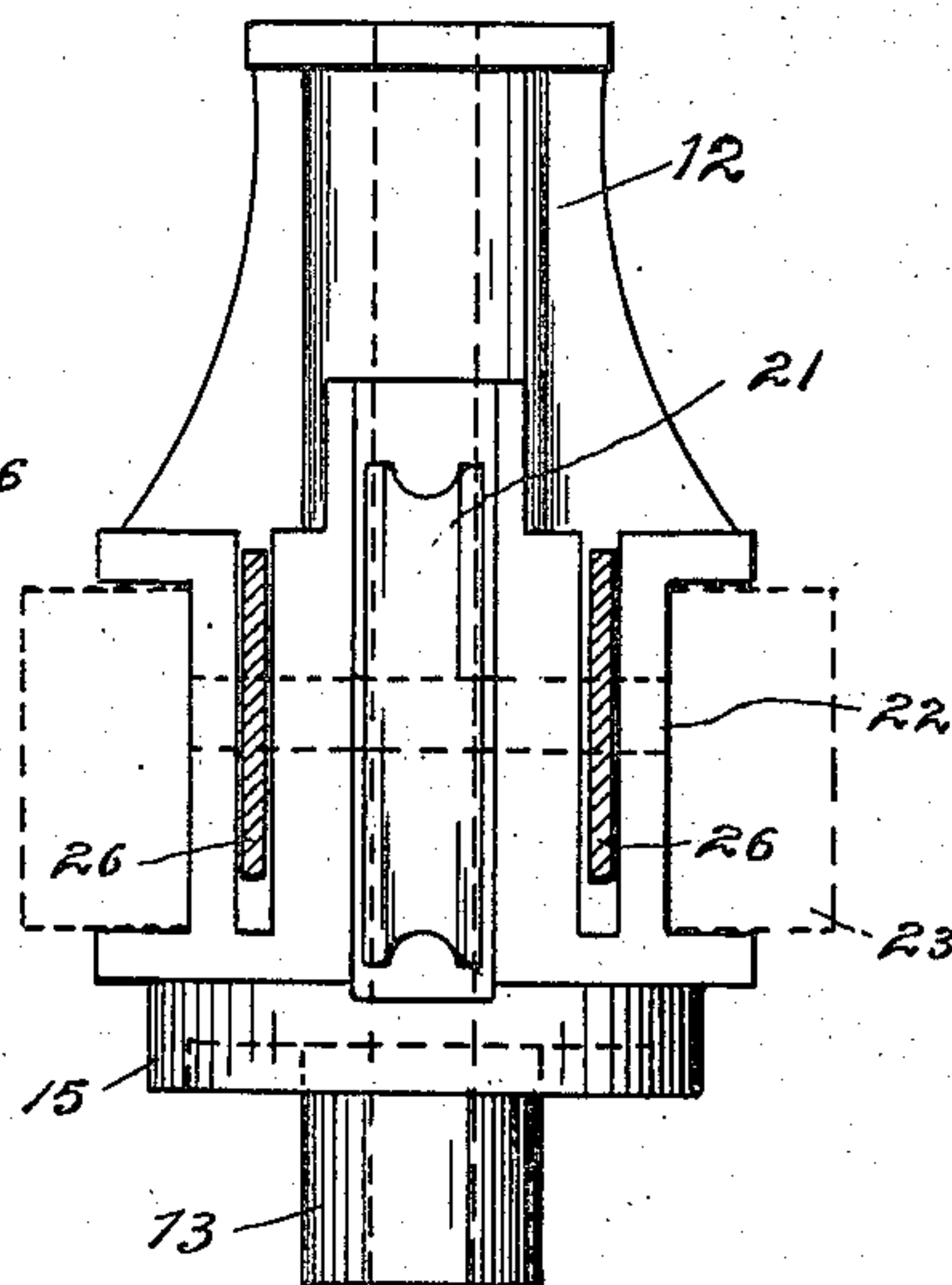
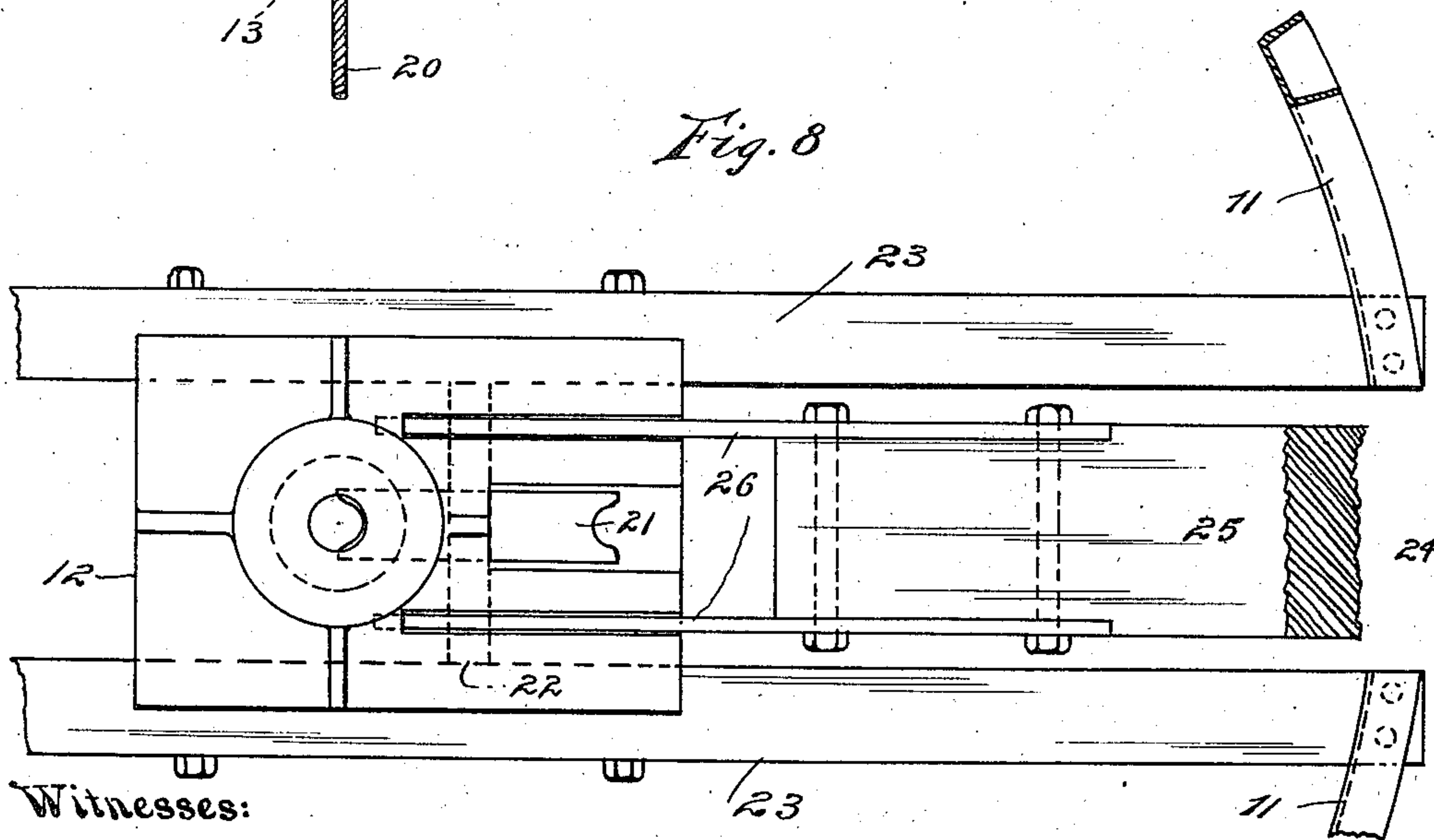


Fig. 8



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# UNITED STATES PATENT OFFICE.

WILLIAM J. NEWMAN, OF CHICAGO, ILLINOIS.

## EXCAVATING APPARATUS.

No. 860,102.

Specification of Letters Patent.

Patented July 16, 1907.

Application filed August 27, 1906. Serial No. 332,208.

*To all whom it may concern:*

Be it known that I, WILLIAM J. NEWMAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Excavating Apparatus, of which the following is a specification.

This invention relates more particularly to improvements in apparatus for excavating earth or dirt and elevating the same to discharge either along side of the bank or into cars or wagons, and its objects are to improve the general character and efficiency of such apparatus, and to provide novel means for performing various of the operations necessary in digging, elevating and discharging material.

This invention is illustrated in the accompanying drawings in which

Figure 1 represents a side view of the improved apparatus embodying this invention, showing the apparatus in digging position; Fig. 2 is a similar view, showing the apparatus in dumping position, and also showing the apparatus in dotted lines in elevating position; Fig. 3 represents a top-plan view of the same. In all of these figures, various details and operating parts have been omitted or shown in diagrammatical form for clearness in illustration; Fig. 4 is a side view of the digging shovel; Fig. 5 is a top-plan view of the same; Figs. 6, 7 and 8 are details of the bull-wheel support and casting, showing the method of attaching the boom and directing the drag cable through the center of rotation of said wheel.

As shown in Figs. 1, 2 and 3, 10 represents a suitable frame work or skids which carries the apparatus. At the front end of the frame work is mounted a bull-wheel 11 which is carried by a special casting or hub 12, as shown in Figs. 6, 7 and 8. This hub is cylindrical in form and has a cylindrical projection 13 at the bottom thereof, which fits into a socket in a bearing plate 14 and is further supported by a ring 15 which rests on the top of said plate. This bearing plate or socket 14 is supported in the frame in any desired manner, as by securing it to suitable cross-beams. The top of the hub is held by means of a pin 16 which extends down through a bearing socket 17 into the upper end of said hub, as shown in Fig. 6. This socket 17 is also supported in the frame, as by means of a cross-timber 18 on an A frame 19. The hub 12 is made cylindrical in order to allow the drag cable 20 to pass in and through the same, so that when the bull-wheel turns, the cable will always swing from the center of rotation and will not bind. The cable 20 is directed to the center of the hub by means of a sheave 21, which is carried by a shaft 22 passing through the parallel sides of the hub at a suitable distance from the center thereof. The sides of the hub are formed to receive beams 23, 23 which support the bull-wheel proper 11. An opening 24 is left in the

front part of the bull-wheel to allow the cable 20 or the boom to swing freely in a vertical plane. The boom 25 is also supported on the pin or shaft 22 by means of plates or irons 26, 26 which are bolted to the ends of said boom and provided with holes to receive said shaft. As shown in the first figures, the cable 20 which is attached to the forward end of the shovel 27, after passing over the sheave 21 and down through the hub 12, passes over a guide sheave 28 along under the frame to a second guide sheave 29 and up to a winding drum 30. In order to take up the slack in the cable 20 and always keep it taut, I have provided a line 31 which is wound on said drum 30 in a reverse direction from the cable 20 and then passes over suitable guide pulleys to a counterweight 32, the arrangement being such that the counterweight will always act to wind up the drum 30 and take up the slack in said cable. This, and the other drums used in the apparatus may be driven in any desired manner, as by means of an ordinary hoisting engine.

The shovel 27 is elevated and discharged by means of a single cable 33 which is rove around suitable pulleys and operates suitable devices for accomplishing these purposes. This cable is connected at 34 to chains, or the like, attached at 35 to the rear end of the shovel. From this point it passes up over a pulley 36 in the outer end of the boom 25, then over a second pulley 37 and down and around a pulley or block 38 and up over a third pulley 39 in the end of the boom, and then to a guide pulley 40 on the A frame 19 and down to a winding drum 41. If desired, the guide pulley 40 may be dispensed with, or any other suitable pulleys arranged for conveniently directing or leading the cable to the winding drum. The block 38 is connected by means of chains 42 to the upper sides of the shovel 27, and for convenience, a number of points of attachment are provided for such chains.

The operation of the device as thus far described is as follows: The shovel 27 being lowered to digging position, and the drag cable 20 being wound up, a load will be gathered in said shovel. As soon as the load is gathered, the drag cable 20 is released, but a slight tension is maintained on the same by means of the counterweight and line. The lift cable 33, then being wound up, will first raise the shovel to the position shown in dotted lines in Fig. 2, in which position the dirt will remain in the shovel to be elevated. As soon as the block 38 strikes the curved face of a stop 43 on the boom 25, it will be held from further vertical movement, but the cable 33 will continue to be wound up. This causes the outer portion of the cable which extends over the pulley 36 and down to the rear end of the shovel, to be drawn up, as shown in Fig. 2, and the contents of the shovel will be discharged. The operation may then be repeated, the boom each



time being swung around to desired position by means of the third winding drum 44 which operates the bull-wheel 11.

By means of this novel form of apparatus, only two lines are necessary for handling the shovel, whereas it was formerly customary to use at least three lines. Furthermore, by means of my improved method of supporting the bull-wheel and the boom, no mast is necessary, the A frame which is shown in these drawings, being used for attaching the supporting guides for the boom.

As part of my improved apparatus, I have shown in Figs. 4 and 5 a shovel which is especially adapted for excavating or digging. This shovel 27 is preferably made in about the form shown in the drawings, and is provided with a forwardly-extending frame 45 which is pivoted at 46 to the rear end of the shovel and is adjustably secured at 47 to the front of the sides thereof, as by means of bolts, or the like, which pass through holes in said frame and through suitable holes in the sides of the shovel, adjustment being secured by having a plurality of holes 48 in said sides with which said bolts may engage. The frame is preferably braced by means of diagonal bars 49 which are secured to the sides of said frame and extend forward to the center thereof and provide means for attachment for a drag cable. At the forward end of the frame 45 is a guide shoe 50 which is preferably made of sheet metal and extends from the front end of the frame down and backward at a suitable angle for passing over the ground and is then bent up and secured to the frame, as by means of clips or other suitable means of fastening, as shown at 51. By means of this adjustable frame and guide shoe, the shovel may be arranged to dig in any desired manner, as for instance, in different kinds of material. The adjustment of the frame serves the double purpose of presenting the digging portions of the shovel at different angles to the ground, and at the same time adjusting the guide shoe which prevents the shovel from digging too deeply into the ground; and furthermore, prevents the forward end of the frame from being thrown down into the soil as the shovel begins to cut into the ground. In other words, for hard material the frame 45 may be set with bolts 47 in the lowest set of holes. This would give the shovel a comparatively slight cutting angle, and at the same time, would lessen the distance of the guide 50 above the cutting edge or teeth of the shovel. Therefore, when the shovel would be drawn forward, the guide would prevent its digging too deeply into the earth, and only a light cut would be taken. On the other hand, in soft or loose material, the frame could be adjusted to give the shovel a greater digging angle, and the guide would also allow the shovel to cut more deeply into the earth.

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

1. The combination with a suitable frame work, of a bull-wheel having a cylindrical hub, supports for pivotally holding said hub in vertical position, a boom pivoted in said hub, and a sheave mounted in said hub substantially tangent to the opening in the center thereof.
2. A center casting for a bull-wheel and boom, comprising a substantially cylindrical portion, side plates for engagement with the wheel supporting beams, an enlarged ring and pivot for engagement with a supporting plate, and lateral recesses for a guide sheave and for the ends of a boom.
3. A bull-wheel having a segmental opening therein to allow for the free passage of the boom and drag cable, substantially as described.
4. The combination with a drag cable for a digging shovel and a winding drum for said cable, of a line wound on said drum in the opposite direction from said drag line and connected with a counterweight whereby, when said drum is released, there will always be a tension on said drag cable.
5. The combination with an excavating shovel and an operating boom, of a line secured to the rear end of said shovel, then passing up and over a wheel at the end of said boom, then over a second wheel and down and around a block attached to said shovel, then up and over a third wheel in said boom, and then to a winding drum.
6. The combination with a boom and a digging shovel, of a hoisting and dumping cable, said cable being connected with the rear end of said shovel, then passing up and over suitable guide means in said boom, then down and around a block connected with said shovel, then up and over other guide means in said boom, and then to a winding drum; and a stop on said boom adapted to engage with said block, the arrangement being such that as the cable is drawn in, the shovel will first be elevated, said shovel hanging at such an angle as to hold the material therein, then as the block strikes the stop and the cable continues to be drawn in, the rear end of said shovel will be raised to discharge the material.
7. In a digging apparatus, the combination of a frame work, a boom mounted on said frame work, an excavating shovel having a forward guide shoe, a drag line from said shovel leading to the axis of rotation of said boom then along said axis and back to a winding drum, a counterweight and line for maintaining a tension on said drag cable, and a hoisting and discharging cable rove through suitable pulleys on said boom and a block connected to said shovel, and having its end connected with the back portion of said shovel, and a stop on said boom whereby the shovel, after being filled, may be raised and discharged by said line.
8. In an excavating apparatus, the combination of a shovel, means for drawing said shovel forward for filling the same, means for raising said shovel whereby the load will tip the same to prevent spilling, and coacting means for raising the back end of the shovel when the lifting means has ceased operation whereby the shovel will be dumped.

WILLIAM J. NEWMAN.

Witnesses:

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A. H. BERNES.