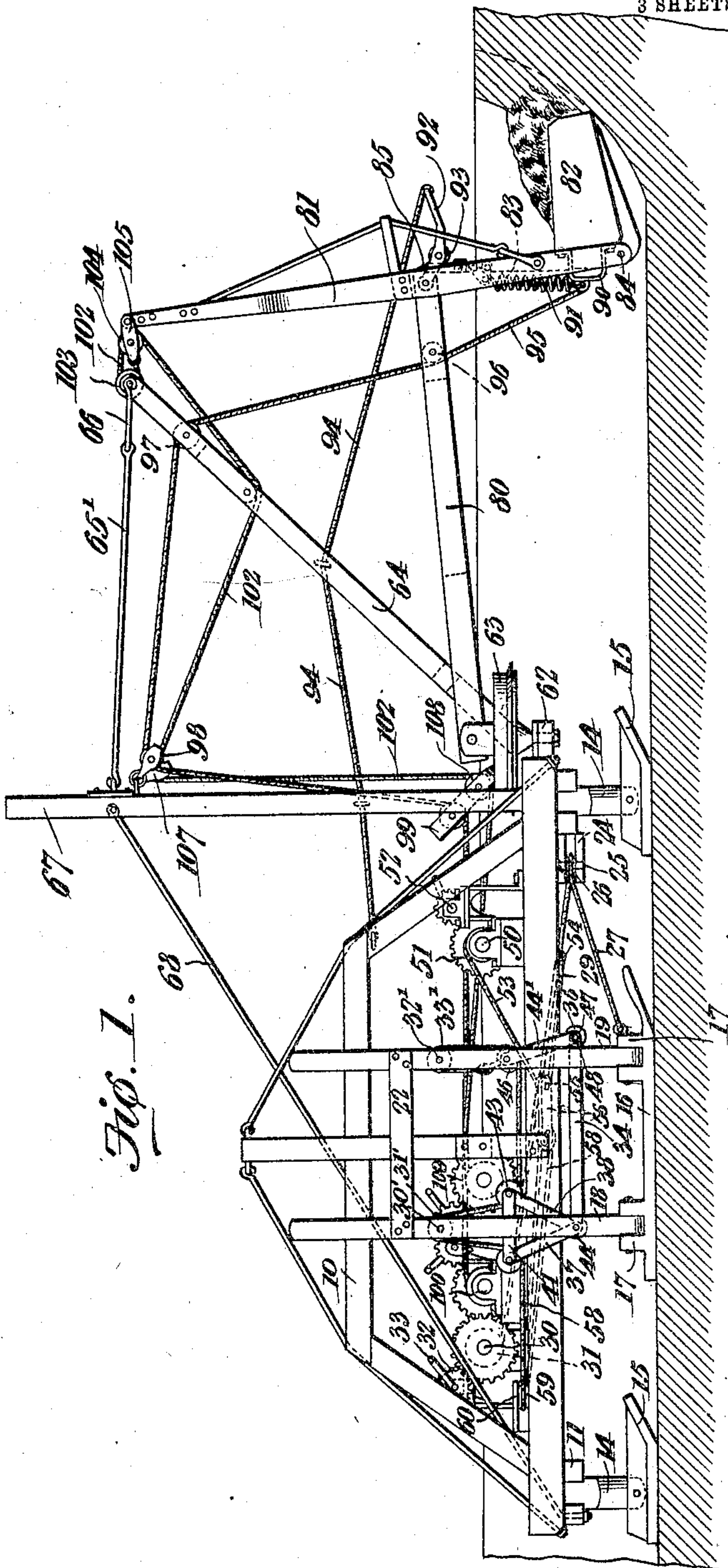
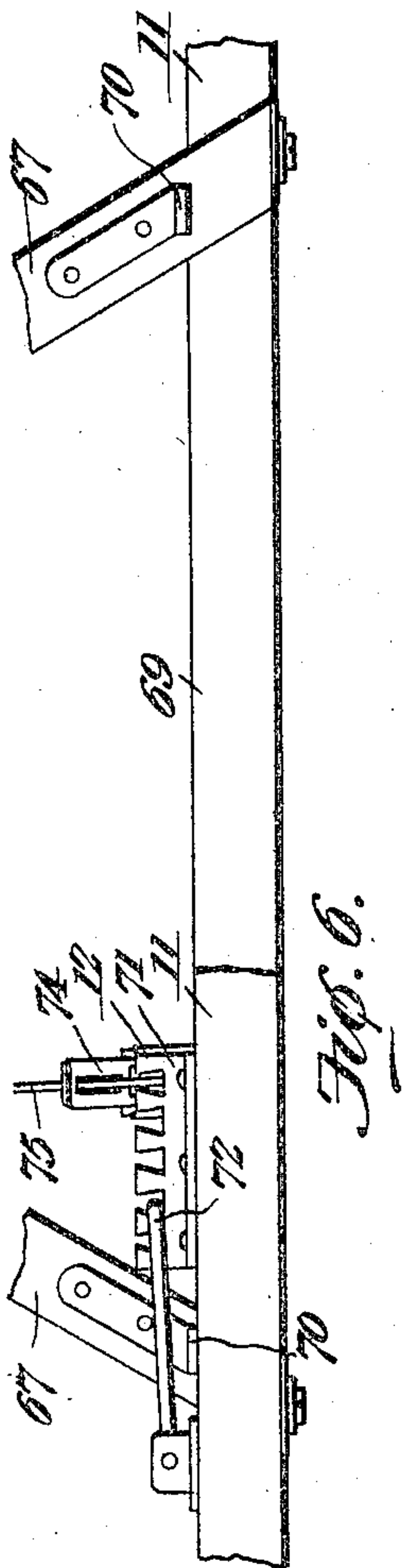


No. 794,346.

PATENTED JULY 11, 1905.

A. N. CROSS.
EXCAVATING MACHINE.
APPLICATION FILED OCT. 18, 1904.

3 SHEETS—SHEET 1.



Witnesses
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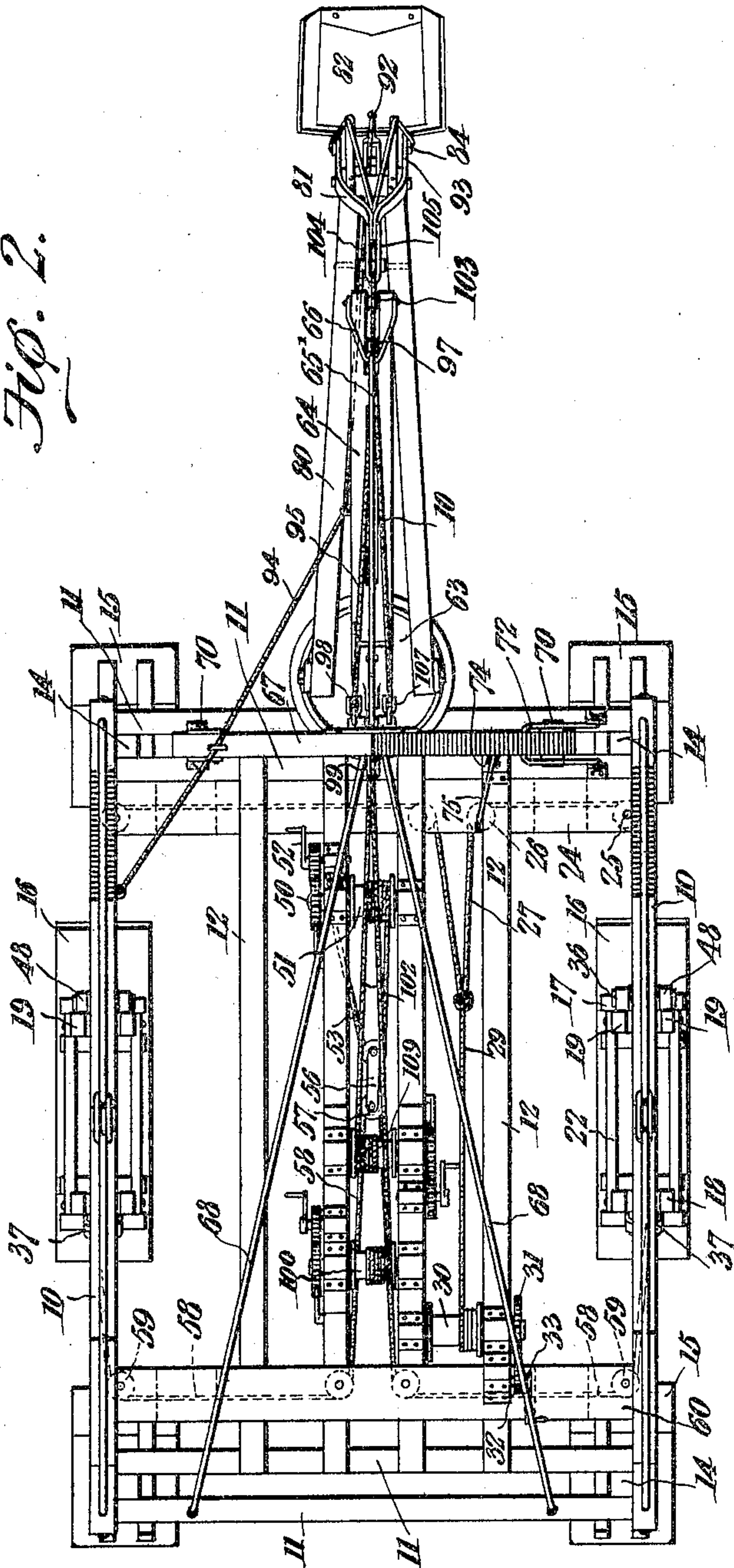
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3 SHEETS—SHEET 2.

FIG. 2.



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3 SHEETS—SHEET 3.

Fig. 7.

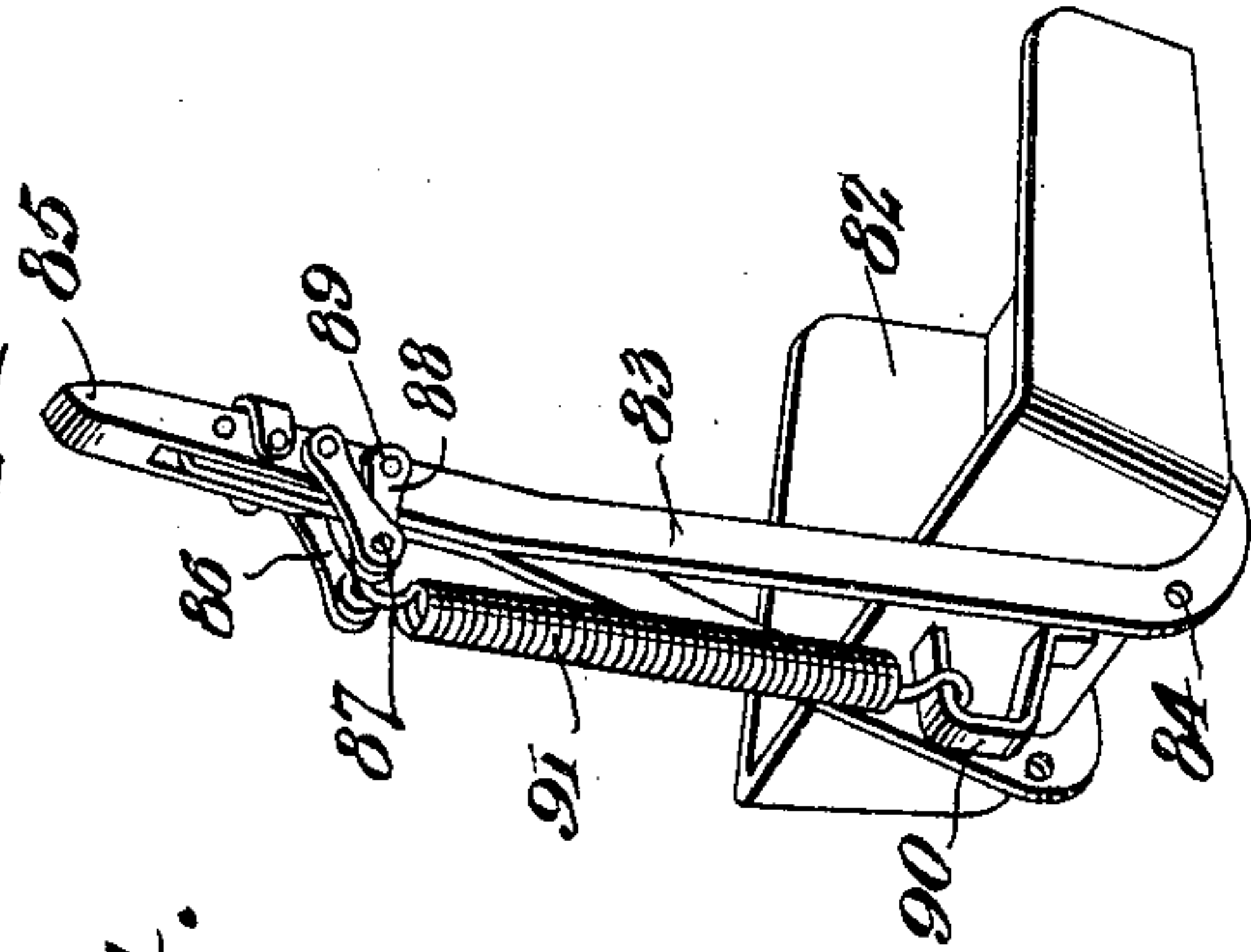


Fig. 5.

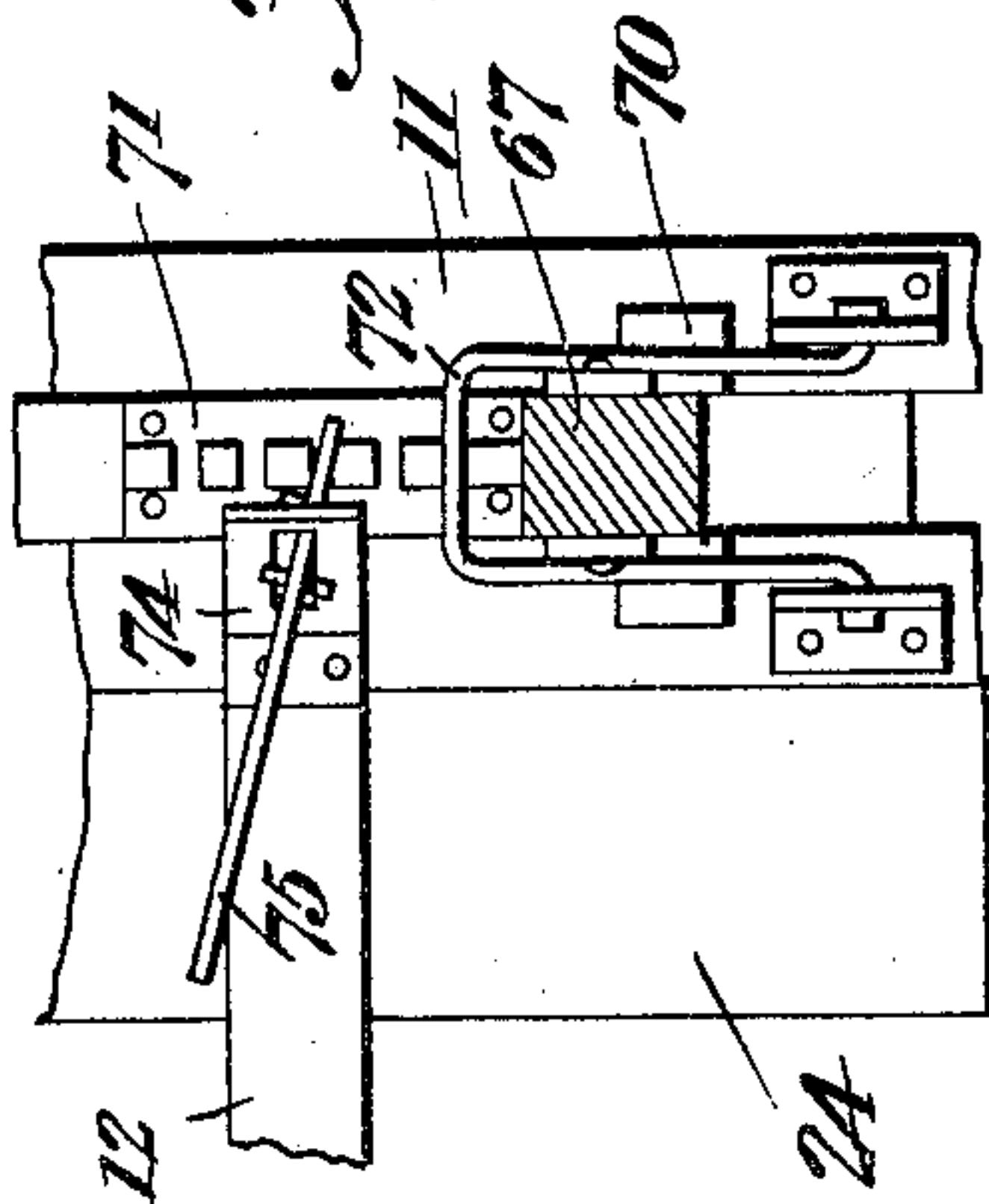


Fig. 4.

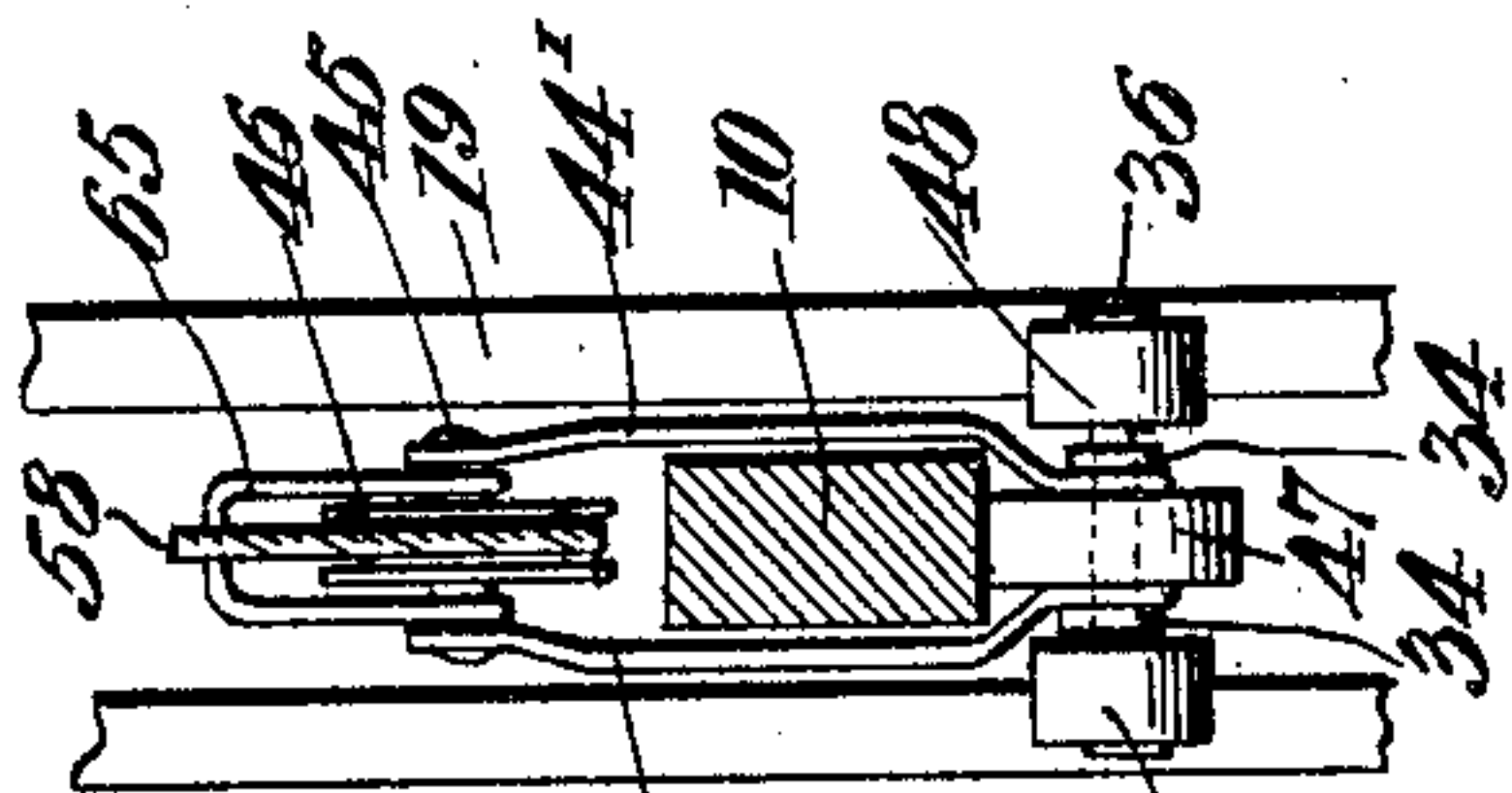
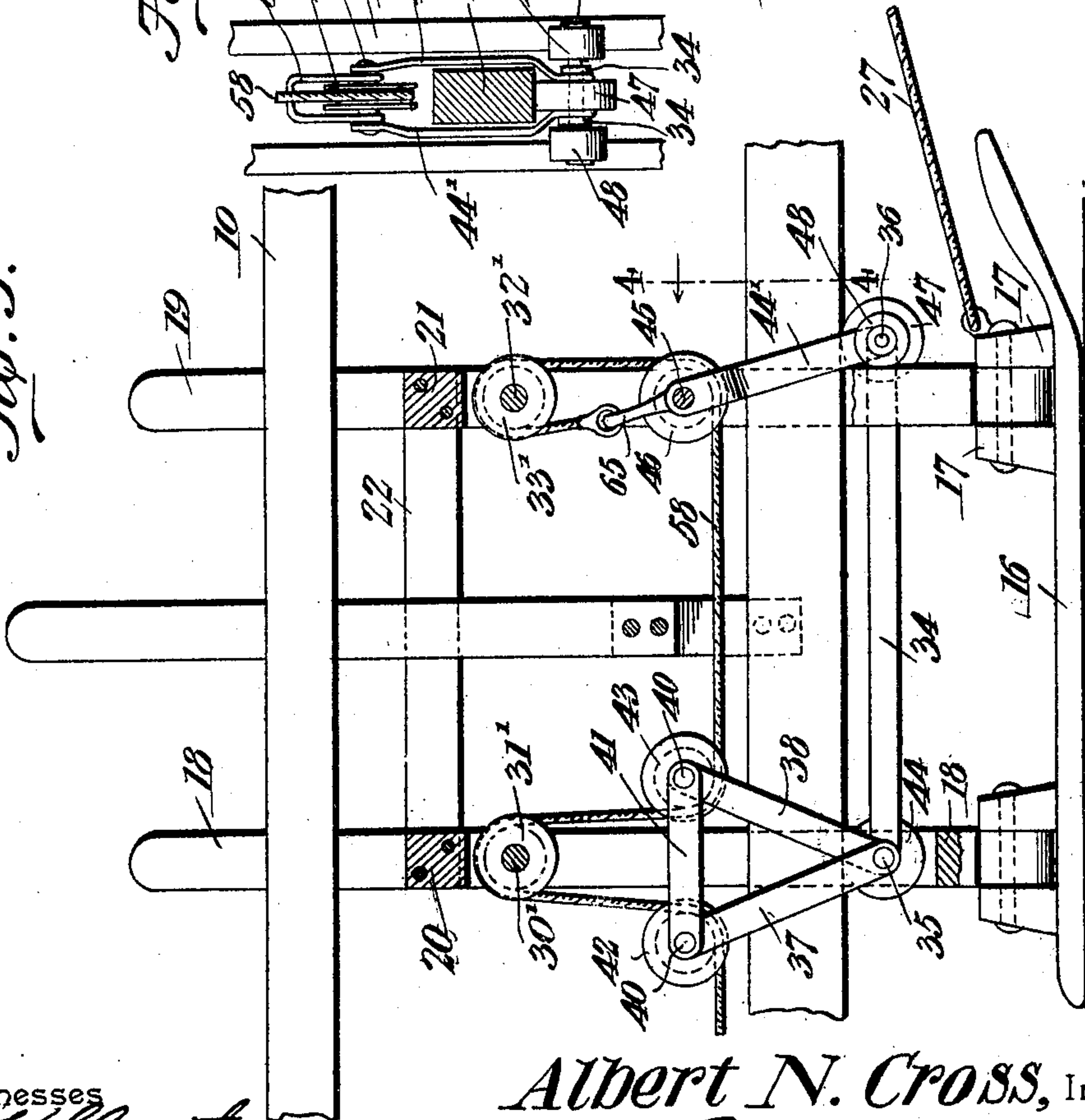


Fig. 3.



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UNITED STATES PATENT OFFICE.

ALBERT N. CROSS, OF TOMAH, WISCONSIN.

EXCAVATING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 794,346, dated July 11, 1905.

Application filed October 18, 1904. Serial No. 228,968.

To all whom it may concern:

Be it known that I, ALBERT N. CROSS, a citizen of the United States, residing at Tomah, in the county of Monroe and State of Wisconsin, have invented a new and useful Excavating-Machine, of which the following is a specification.

This invention relates to dredging and excavating apparatus, and has for one of its objects to provide means whereby a dredge may be propelled to follow up the work.

A further object of the invention is to provide a simple and novel form of dredge-propelling mechanism in which the feet or runners are so mounted as to form a firm support for the dredge and at the same time permit the ready manipulation of the dredge in following up the work, the apparatus being so arranged as to be operable either manually or by power.

With these and other objects in view, as will more fully hereinafter appear, the invention consists in certain novel features of construction and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a side elevation of a dredging-machine constructed in accordance with the invention. Fig. 2 is a plan view of the same. Fig. 3 is a detail sectional view, on an enlarged scale, of a portion of the derrick-frame and one of the movable supporting-shoes. Fig. 4 is a detail sectional view of the same on the line 4 4 of Fig. 3. Fig. 5 is a sectional plan view of a portion of the derrick, showing particularly the means for adjusting and locking the A-derrick. Fig. 6 is a front elevation of the lower portion of the A-derrick and its adjusting and locking means. Fig. 7 is a detail perspective view of the shovel or scoop detached.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The general framework of the dredge comprises opposite trusses 10, that are united at the front and rear by two sets of transversely-disposed sills 11, and these sills are further connected by longitudinal bars 12, the whole forming a strongly-braced structure which may be provided with a flooring of any character, the flooring in the present case being omitted for the sake of clearness.

At each corner of the frame is secured a post 14, and to the bottom of this post is pivoted a shoe 15, the latter having an inclined or curved front edge, so that it may be slid freely over the ground while the frame of the dredge is being moved along to follow the work. Between the shoes 15 at each side of the dredge is arranged a movable shoe 16, having an upturned front and preferably of considerable length in order to afford an extensive surface for contact with the ground. At the top of each shoe are arranged pairs of ribs 17, to which are pivoted the lower ends of standards 18 and 19, each of which is formed of a pair of parallel spaced bars, preferably maintained in spaced relation by blocks 20 21, and the upper ends of said standards being connected by cross-bars 22 in such manner as to form a practically rigid frame that may be moved longitudinally of the truss members and is also free for vertical movement with respect thereto, the frame being held from lateral displacement by contact of the bars of each standard with the opposite sides of the trusses 10. The pivotal connection between the lower ends of the standards 18 and 19 and the ribs 17 is such as to permit a shoe to conform to irregularities of the supporting-surface without danger of breaking or straining the shoe or its connections; but at the same time there can be no independent longitudinal play of the shoe, the latter at all times maintaining a practically fixed relation with its carrying-frame.

Near the front of the machine is arranged a pair of transversely-extending parallel bars 24, carrying a number of pins or studs 25, on which are mounted guiding-sheaves 26, and around these sheaves extends a cable or chain 27, the opposite ends of which are connected, respectively, to the two movable shoes 16.

An intermediate portion of the cable 27 is connected by a cable or chain 29 to a winding-drum 30, that may be manipulated either by hand or power, and in the present case the drum is illustrated as provided with a gear-wheel 31, intermeshing with a pinion 32 on a crank-shaft 33 for convenience in operating this portion of the device by hand. When the winding-drum is turned in the proper direction, the cable will be wound, and the shoes, together with their carrying-frames, will be drawn forward independently of the main frame of the derrick.

Mounted in the blocks 20 of the shoe-carrying frame is a pin 30', carrying a grooved guiding-sheave 31', and in the block 21 is a similar pin 32', carrying a guiding-sheave 33'. Extending under and parallel with each of the main beams or trusses is a pair of links 34, that are connected at one end by a spindle 35 and at the opposite end by a spindle 36. To the spindle 35 are pivoted two sets of arms 37 and 38, each set comprising a pair and each pair being connected at its upper end by a spindle 40, and said spindles 40 being connected together by a link 41, disposed at a point above the main truss-beams. On the spindles 40 are mounted grooved guiding-sheaves 42 and 43, and on the spindle 35 is mounted a roller 44, which at times will be moved into contact with the under side of the main beam of the truss.

Pivoted to the spindle 36 are the lower ends of a pair of links 44', that extend up one on each side of the main beam of the truss and carry a spindle 45, on which is mounted a grooved guiding-sheave 46. Mounted on the spindle 36 is a roller 47, that may be moved into engagement with the bottom of the main beam of the truss, and on each end of the spindle at a point outside the links 44' is an antifriction-roller 48, that may be engaged against the forward sides of the bars or standards 19.

The frame of the machine has bearings for the shaft 50 and winding-drum 51, that is shown in the present instance as connected by gearing to the crank-shaft 52 to permit turning of the winding-drum by hand. To this winding-drum is connected one end of a cable 53, the opposite end of which is rigidly secured to an eye 54 on the frame. An intermediate portion of the cable receives a sheave 55, arranged at one end of a pair of links 56, and at the opposite end of said links is a sheave 57, over which passes a cable 58, that is further guided by sheaves 59, that are mounted on spindles carried by cross-bars 60 at the rear of the main frame. The opposite ends of the cable are led to opposite sides of the machine, and each is passed under one of the sheaves 42, thence up over sheave 31', under sheaves 43 and 46, thence over sheave 33' and secured, as by a yoke 65, to the links 44'.

When the winding-drum 51 is turned, the ca-

bles 58 will be pulled to the rear at each side of the frame, and this will result in the raising of the main frame. When stress is exerted on the cables 58, the link 44' will be pulled rearward until the antifriction-rollers 48 engage against the front faces of the bars forming the standard 19, and continued movement will elevate the main frame of the derrick, the weight of the latter being imposed through the cables, sheaves, and links on the standards 18 and 19 and the sheaves 31' 33'. Still further movement of the cable will cause the main frame of the derrick to travel forward independently of the two shoes 16 until the rear shoes 15 are adjacent to the rear ends of the shoes 16. Strain on the cable 58 is then relieved, and the frame is allowed to descend until the shoes 15 come into contact with the ground, and after this the winding-drum 30 may be turned and strain exerted on the cable 29 to draw the shoes 16 forward, this operation being repeated as often as necessary as the work progresses.

At the front of the frame is a forwardly-extended arm 62, on which is pivoted a turntable 63, and to this turn-table is secured a fixed boom 64, the upper end of which is connected by a tension-rod 65' and yoke 66 to the top of an A-derrick 67, the top of said derrick being connected by tension members 68 to the rear transverse sills 11 on the frame. The two standards which form the A-derrick extend down between the two transverse sills 11 at the front of the frame and are connected by a transverse bar 69, the construction being such as to permit free longitudinal play of said bar. Each of the bars of the A-derrick is provided with a pair of projecting lugs or stops 70, that slide on top of the sills and prevent downward movement of the derrick.

It is desirable at times to alter the point at which the load is imposed with respect to the longitudinal center of the dredge, and for this purpose the A-derrick is made adjustable, and it may be moved transversely of the derrick-frame to any desired position. The adjustment is accomplished, preferably, by means of a rack 71, placed on the transverse bar 69 and provided with a series of teeth, with which may engage a yoke 72, serving to lock the rack and the derrick in any position of adjustment, the width of the spaces at the root of the teeth being greater than the width of such spaces at the crown-line. One of the longitudinal bars 12 is provided with a bracket 74 at its forward end, and to said bracket is loosely pivoted a lever 75, which may be engaged with the successive teeth of the rack in order to effect the adjustment of the derrick.

To the turn-table is pivoted the inner end of a vertically-swinging boom 80, and to the outer end of said boom is pivoted a walking-beam 81, carrying a shovel 82. The shovel-carrying arm 83 is bifurcated and is connected by pivots 84 to the lower end of the walk-

ing-beam. The upper ends of the carrying-arm 83 converge, and at the extreme upper end is pivoted a tooth 85, having bifurcated ends that extend one on each side of the upper portion of the carrying-arm. The bifurcated ends of the tooth are connected by links 86 to a pin 87, and the latter is in turn connected by links 88 of a pivot-pin 89, carried by the bar. Between the pivot-pin 87 and the fixed eye 90 of the shovel extends a tension-spring 91, said spring tending normally to resist movement of the tooth 85 in the direction indicated by the arrow, Fig. 7.

To the outer ends of the pivoted boom is pivoted a latch 92, carrying an antifriction-roller 93 for engaging the tooth 85, and to the outer end of this latch is connected a cord or cable 94, running inboard to the dredge in convenient position to be grasped by the operator when it is desired to unlatch and dump the bucket. Should the weight or strain imposed on the bucket be in excess of the strength of the latter, the spring 91 will yield and the tooth will pass from under the latch, automatically dumping the bucket and preventing breakage of any of the parts.

To the clip 90 is secured a cable or chain 95, extending from a guiding-roller 96 on the pivoted boom and thence over guiding-sheaves 97, 98, and 99 to a winding-drum 100, that is connected to a suitable crank-shaft or an engine, and in operation this cable is first actuated to draw the shovel to the rear and effect the latching of said shovel. To the top of the walking-beam is connected a cable 102, that extends over a guiding-sheave 103 on the outer end of the fixed boom, thence back over a guiding-sheave 104, carried by a pair of links 105 at the top of the walking-beam, and thence over guiding-sheaves 107 and 108 to a winding-drum 109, that may be driven by either hand or power, this cable being manipulated to draw the shovel and slightly raise the same in order to scrape the earth and fill the shovel. This turn-table may then be operated in the usual manner to turn the beams and shovel to one side of the ditch being excavated in order to dump the load at any convenient point.

Having thus described the invention, what is claimed is—

1. In an excavating-machine, the combination with a frame, of supporting-shoes connected to and movable with the frame, propelling-shoes, standards carrying the propelling-shoes, and means for raising the frame on the standards, and moving said frame forward while the propelling-shoes form stationary supports therefor.

2. The combination with a frame, of propelling-shoes, standards connected to the shoes, a frame, elevating means connected to the standards, and means for moving the frame forward while in elevated position.

3. The combination with a frame, of propelling-shoes, standards connected thereto, supporting-rollers arranged under the standards, links forming frames for the support of said rollers, sheaves carried by the upper portions of said links, sheaves supported by the standards, and a cable extending around said sheaves and having one end secured to one of the links whereby endwise thrust on the cable will first elevate the frame and then propel it forward.

4. The combination with the frame, of propelling-shoes, standards connected thereto, rollers for the support of the frame, links forming a carrying-frame for the rollers, sheaves at the upper ends of said links, sheaves carried by the standards, a cable extending over the sheaves, and having one end secured to one of the links, and means for preventing endwise movement of the link roller-carrying frames.

5. The combination with the frame, of propelling-shoes, standards connected to said shoes, link frames partly embracing the main frame, means for connecting said linked frames to each other, rollers carried by the links and movable into contact with the main frame, auxiliary rollers for engaging against the forward face of one of the standards, and preventing endwise movement of the links, sheaves carried by the upper end of the links, sheaves carried by the standards, and a cable extending over said sheaves and having one end secured to one of the links.

6. The combination with a frame, of propelling-shoes, a pair of standards pivotally connected to each of the shoes at points near the opposite ends of said shoes, and a frame-elevating means carried by the standards and arranged to automatically equalize the strain on said standards.

7. The combination with a frame, of propelling-shoes, and standards pivotally connected to said shoes to permit lateral swinging movement of the shoes with respect to the frame.

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

ALBERT N. CROSS.

Witnesses:

R. L. JONES,

E. NORDGREN.