

No. 709,199.

Patented Sept. 16, 1902.

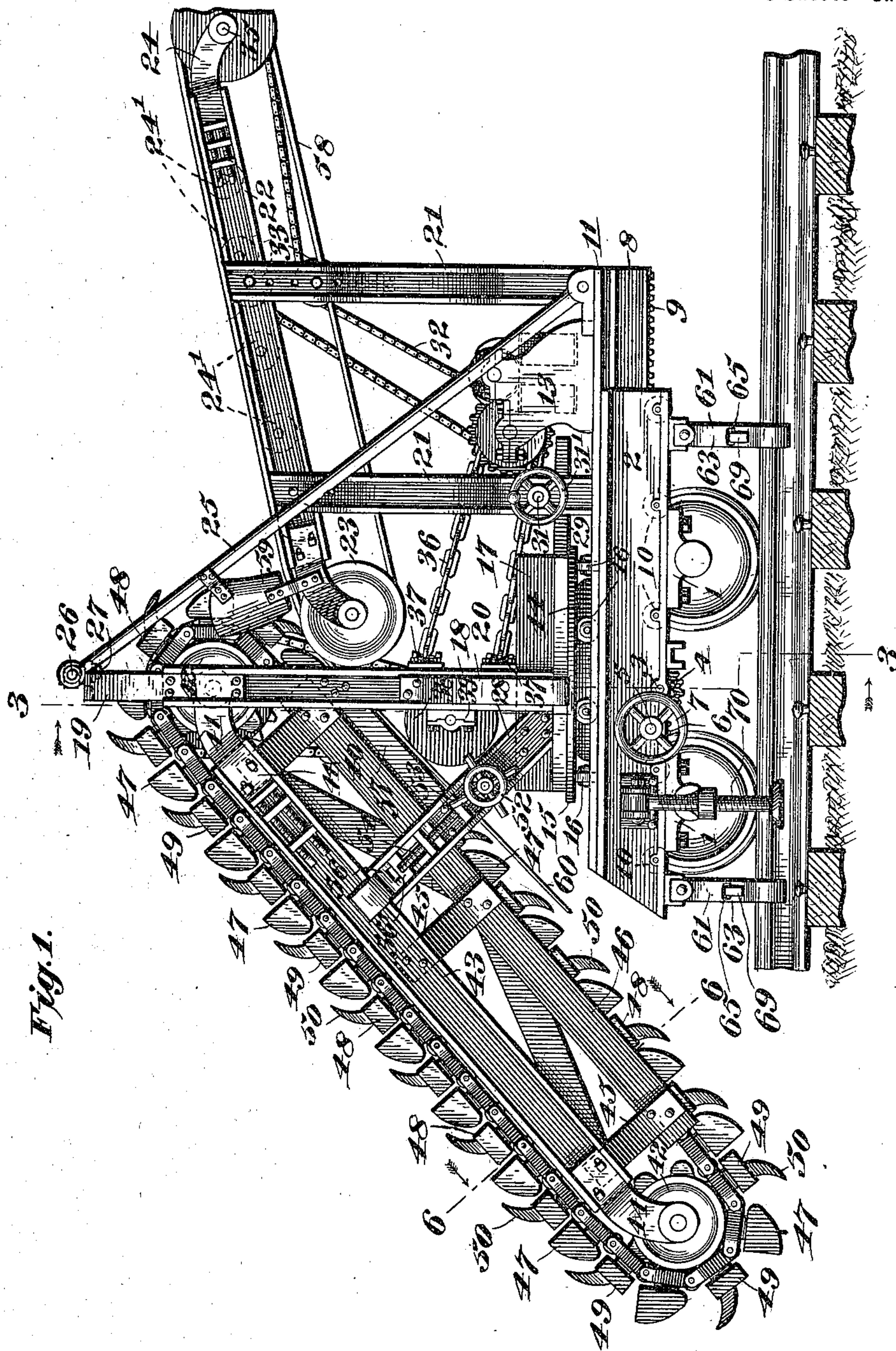
G. C. BROWN.

PORTABLE MECHANICAL LOADER AND DIGGER.

(Application filed Nov. 30, 1901.)

(No Model.)

5 Sheets—Sheet 1.



WITNESSES

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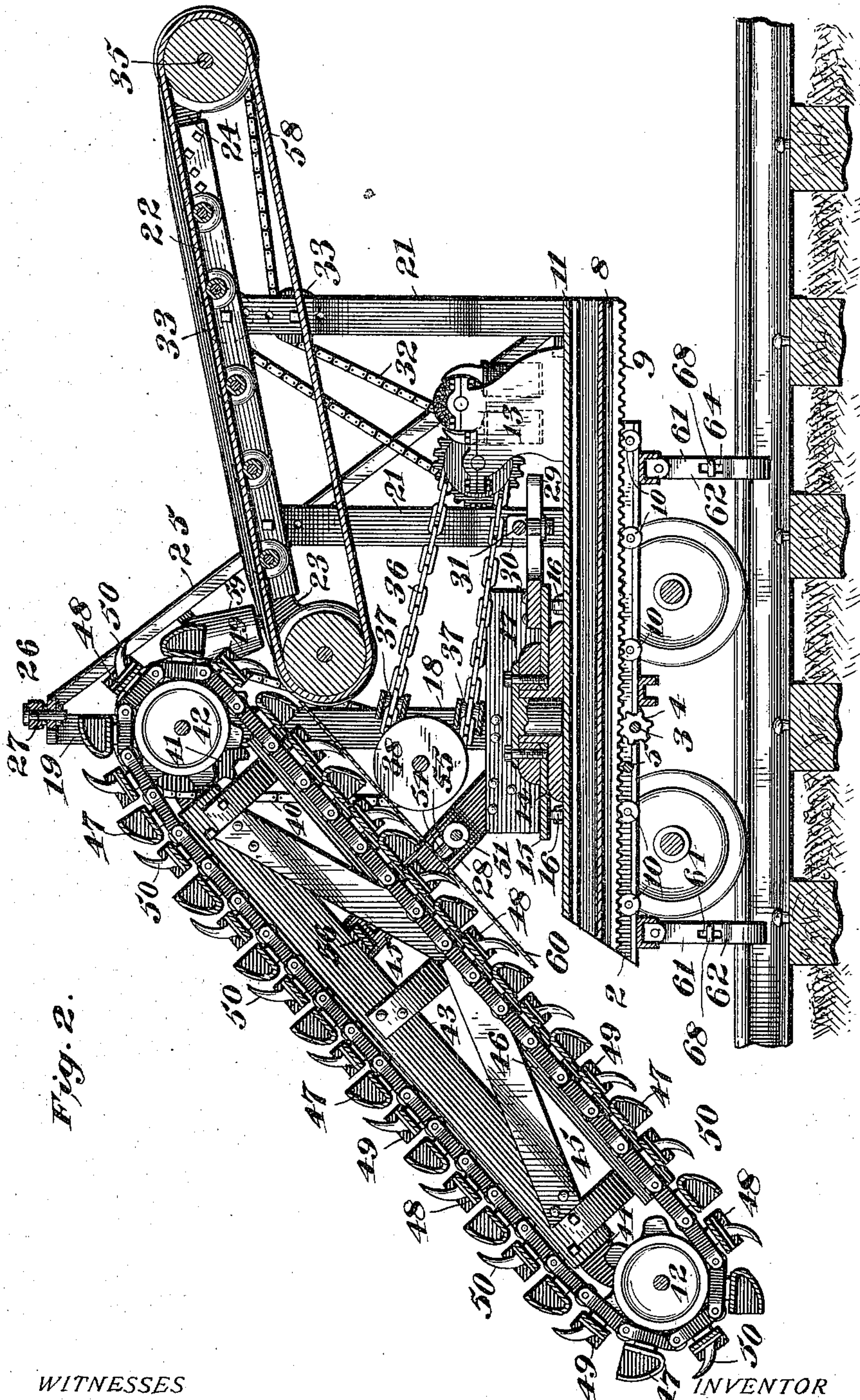
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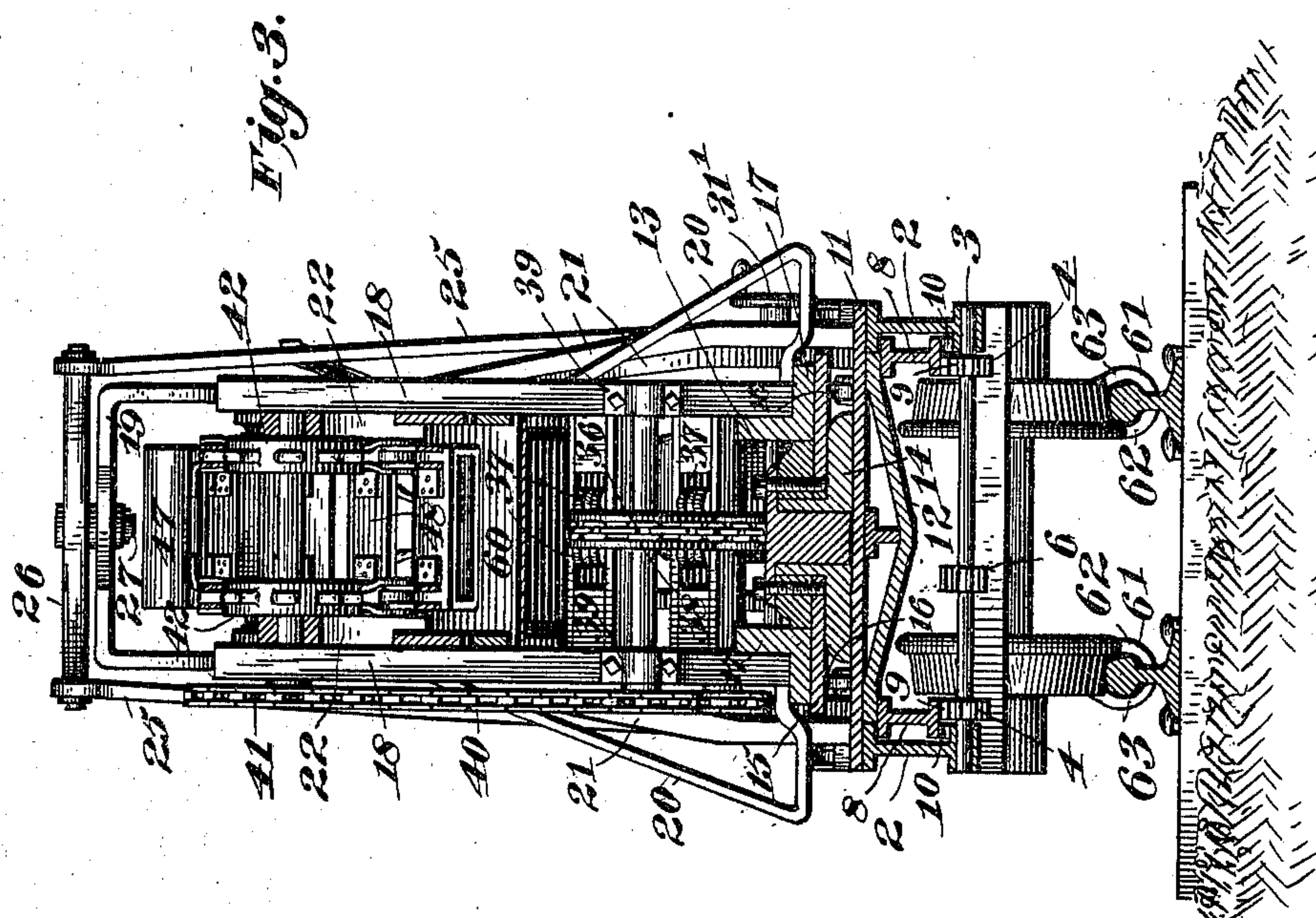
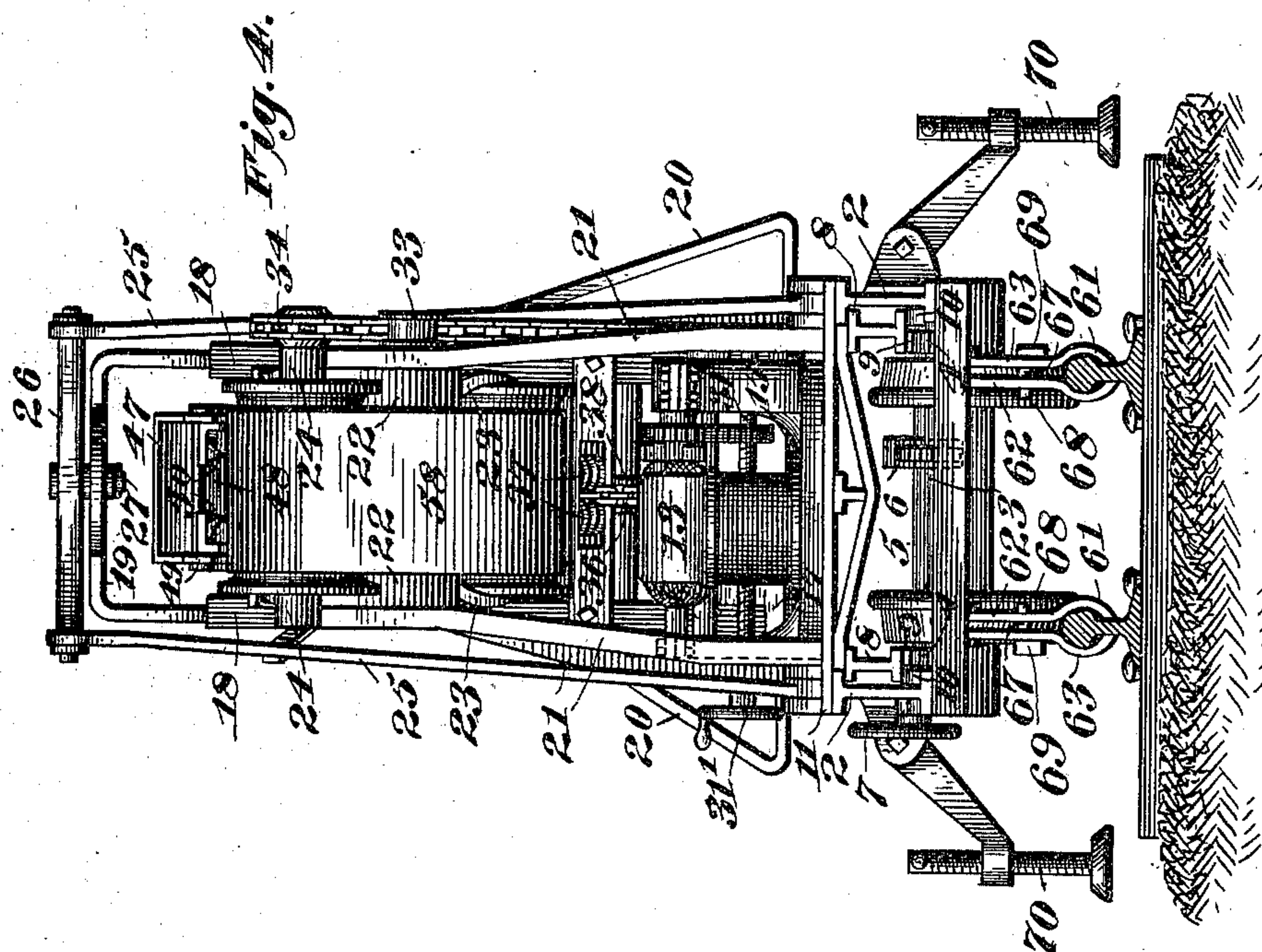
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5 Sheets—Sheet 3.



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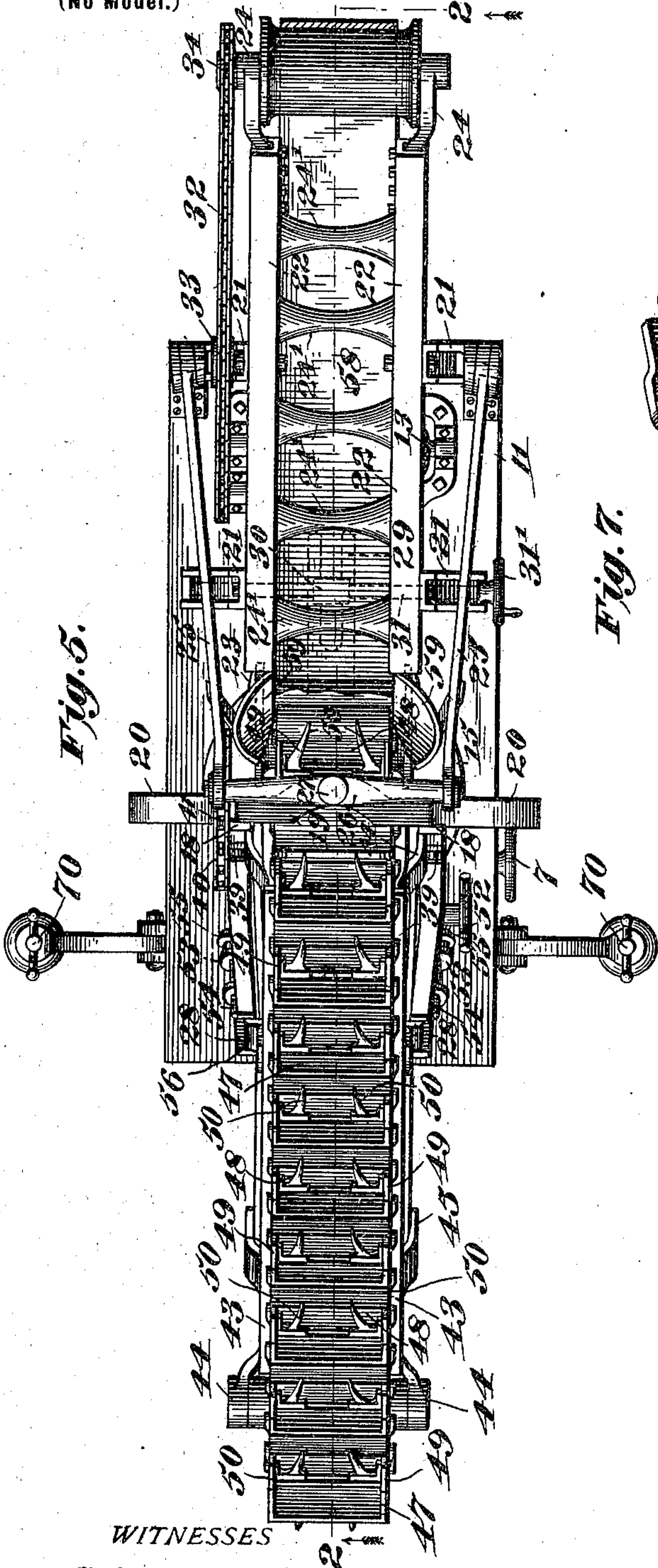


Fig. 5.

Fig. 7.

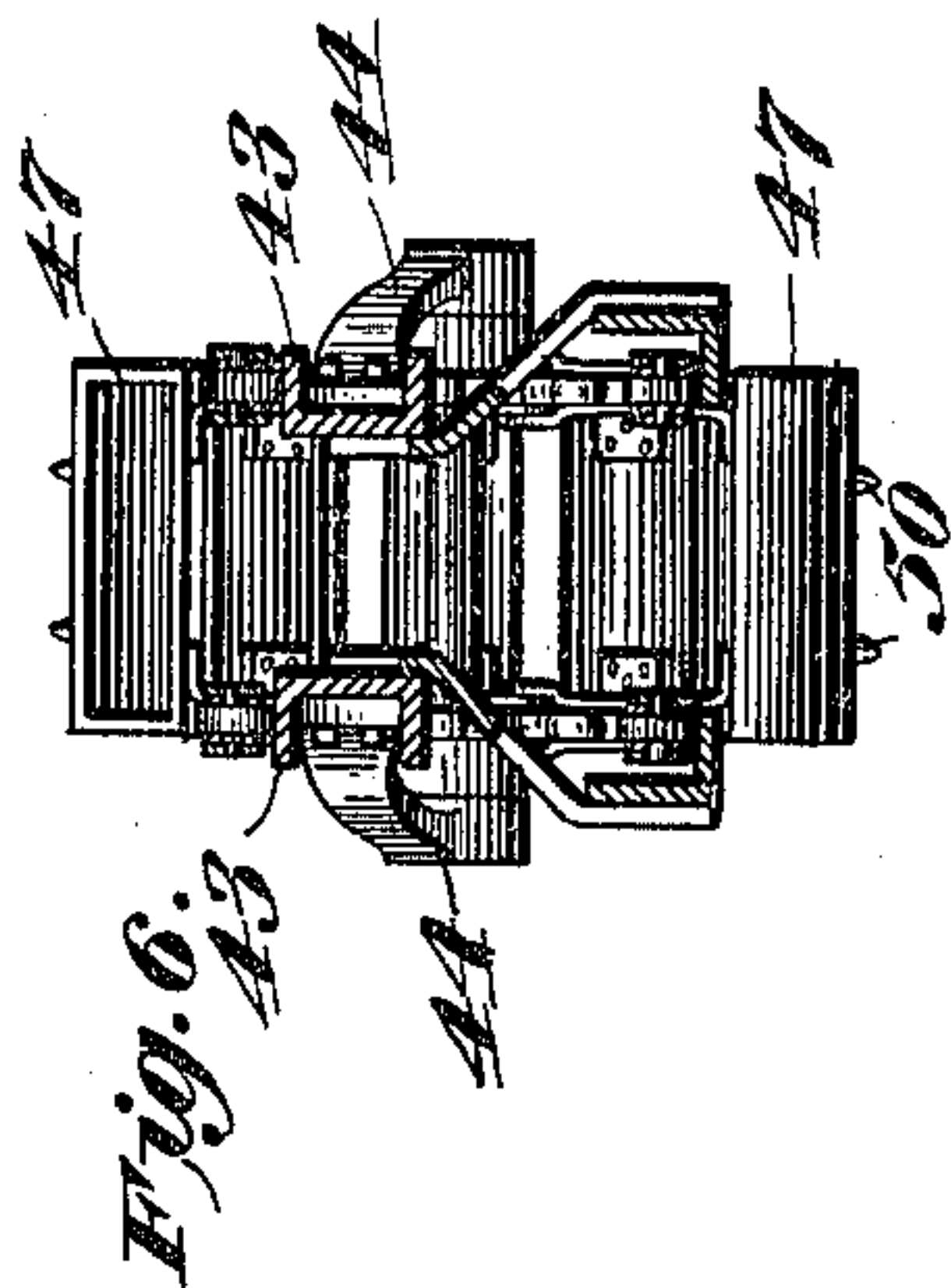
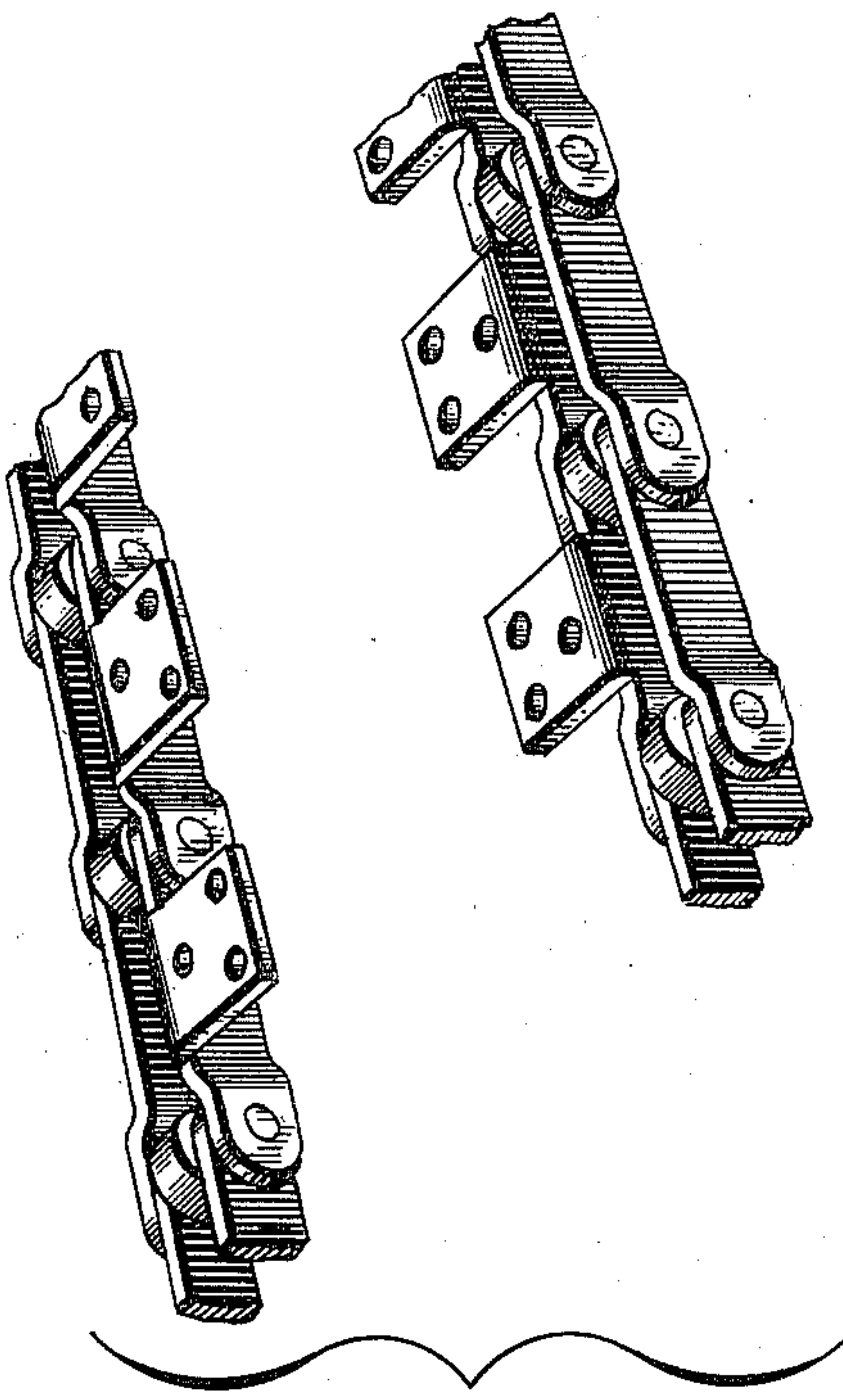


Fig. 6.

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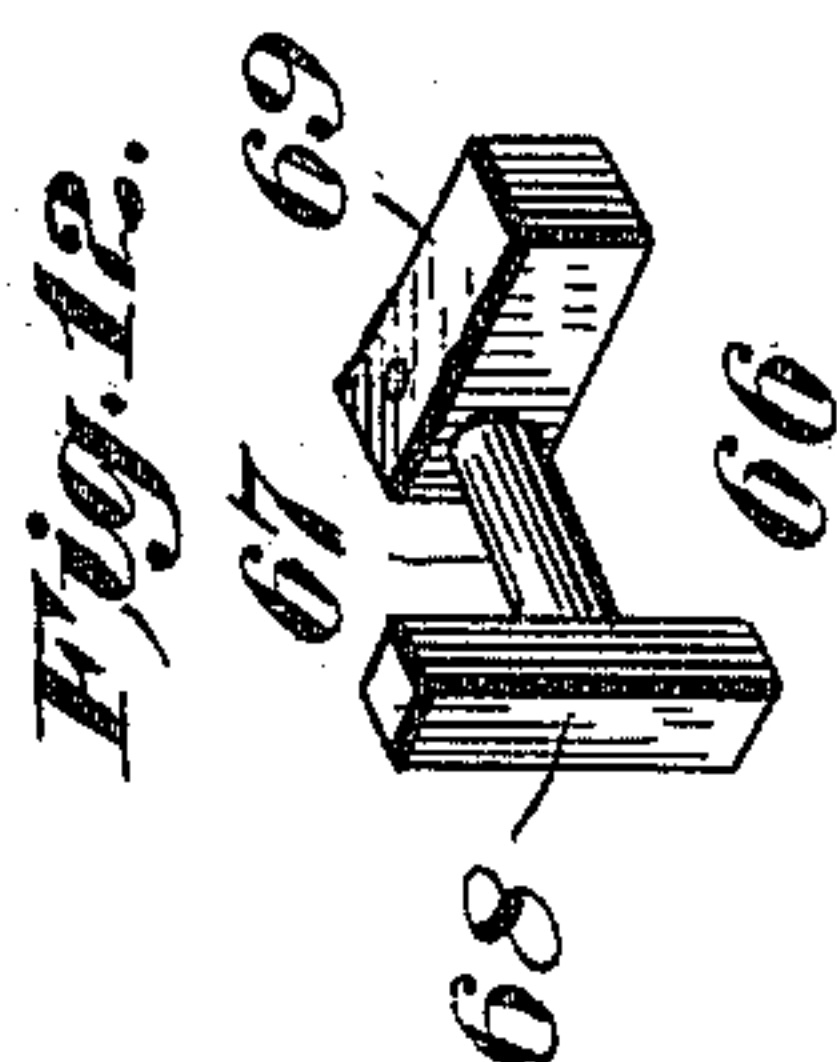
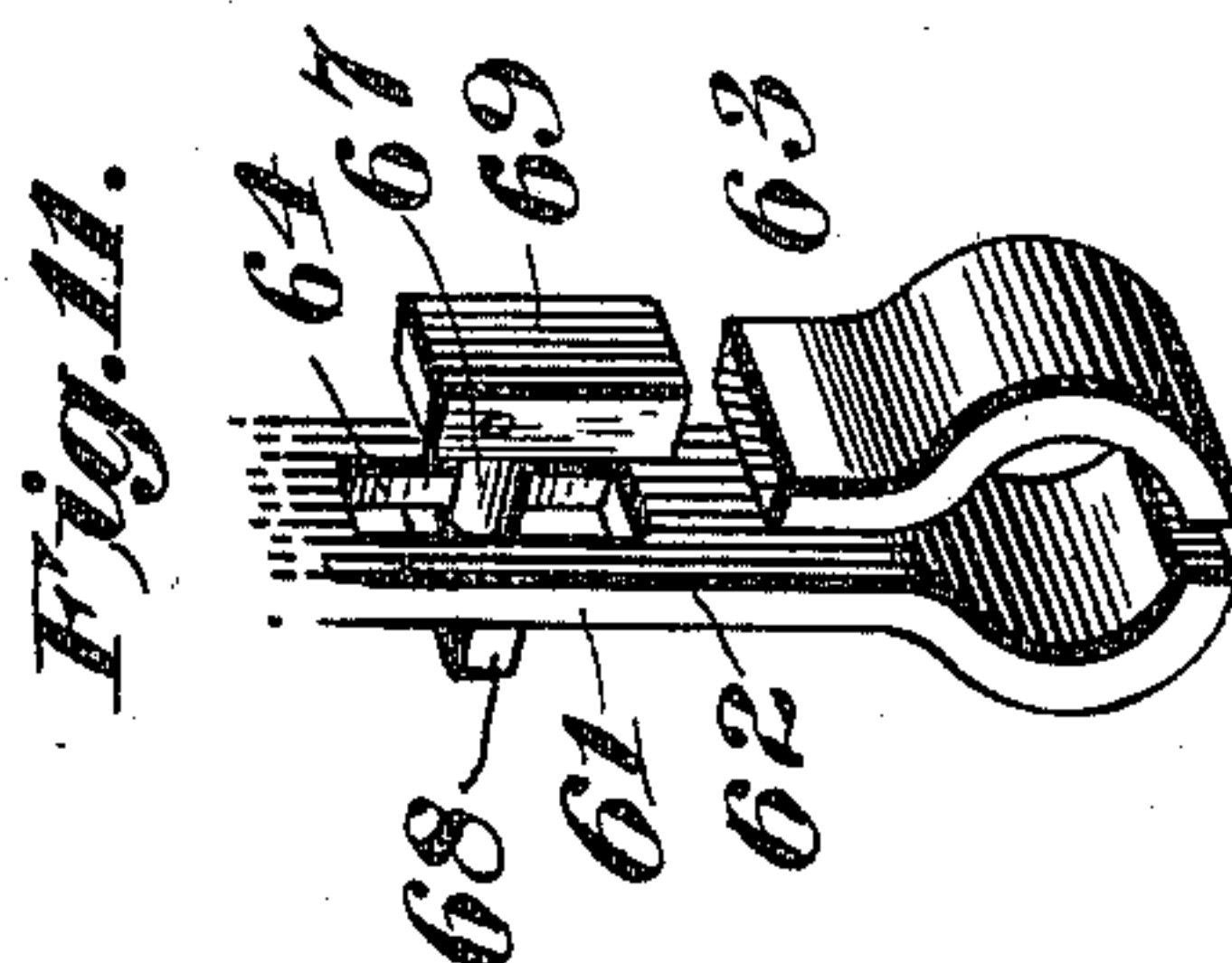
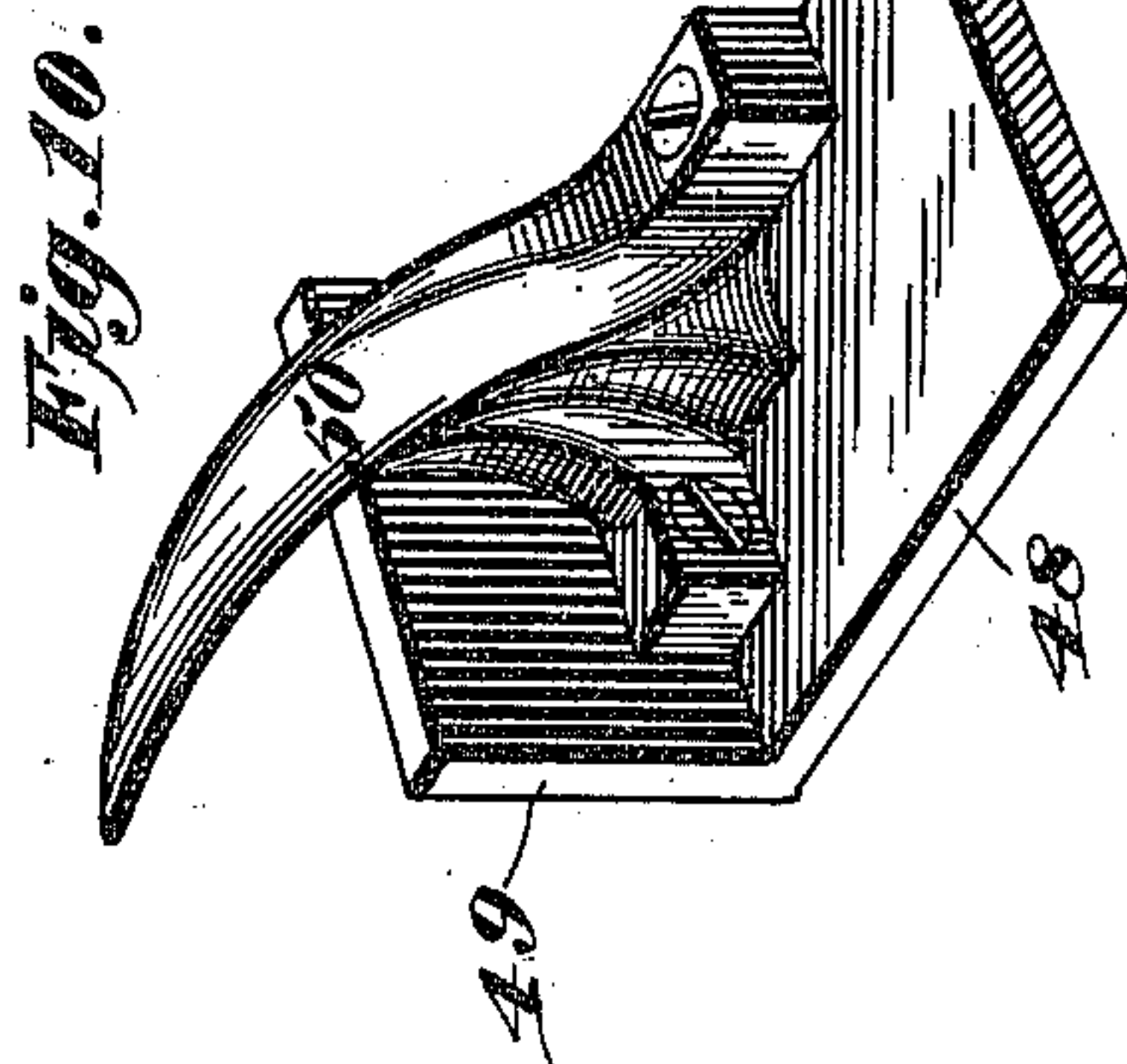
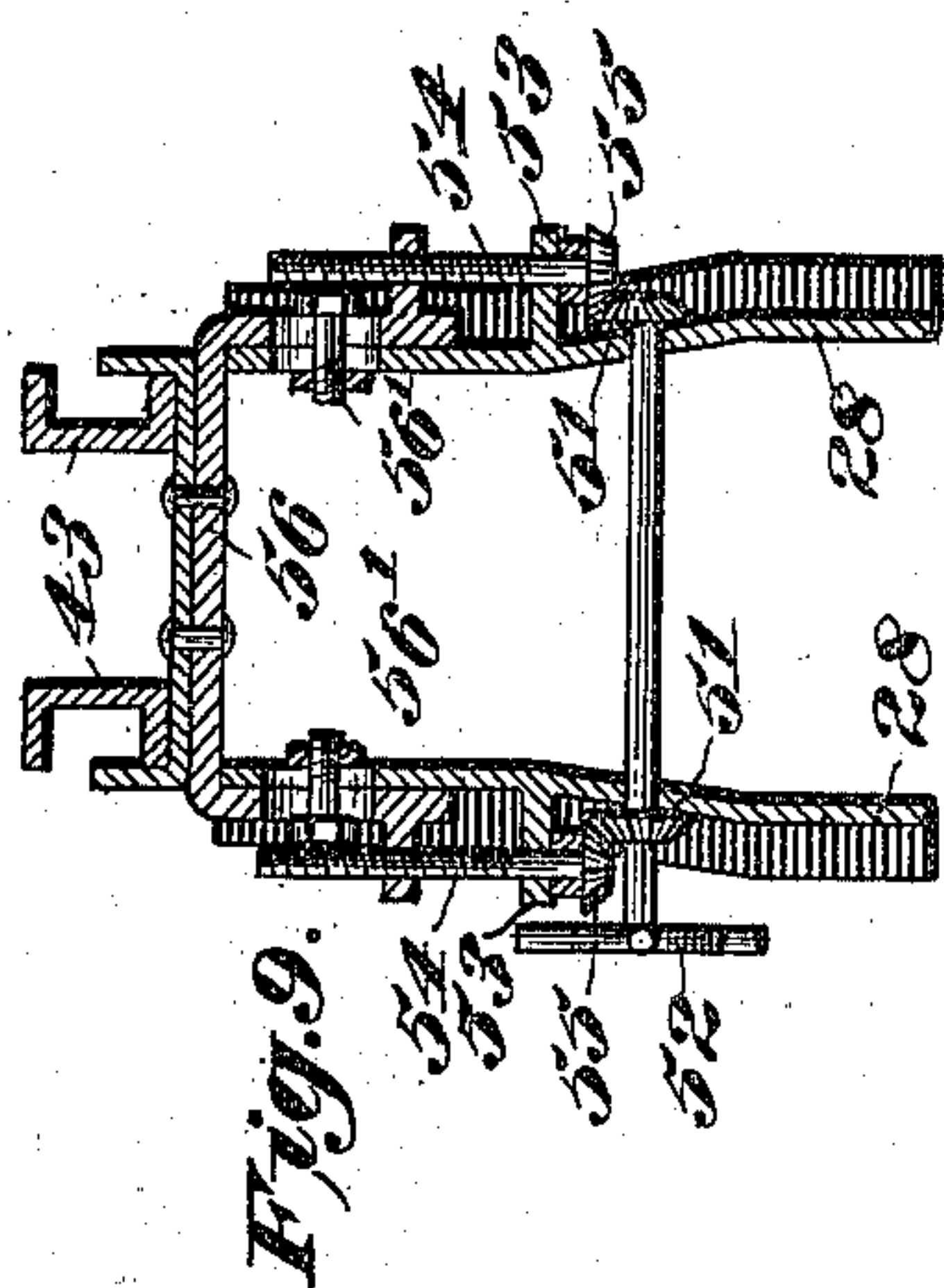
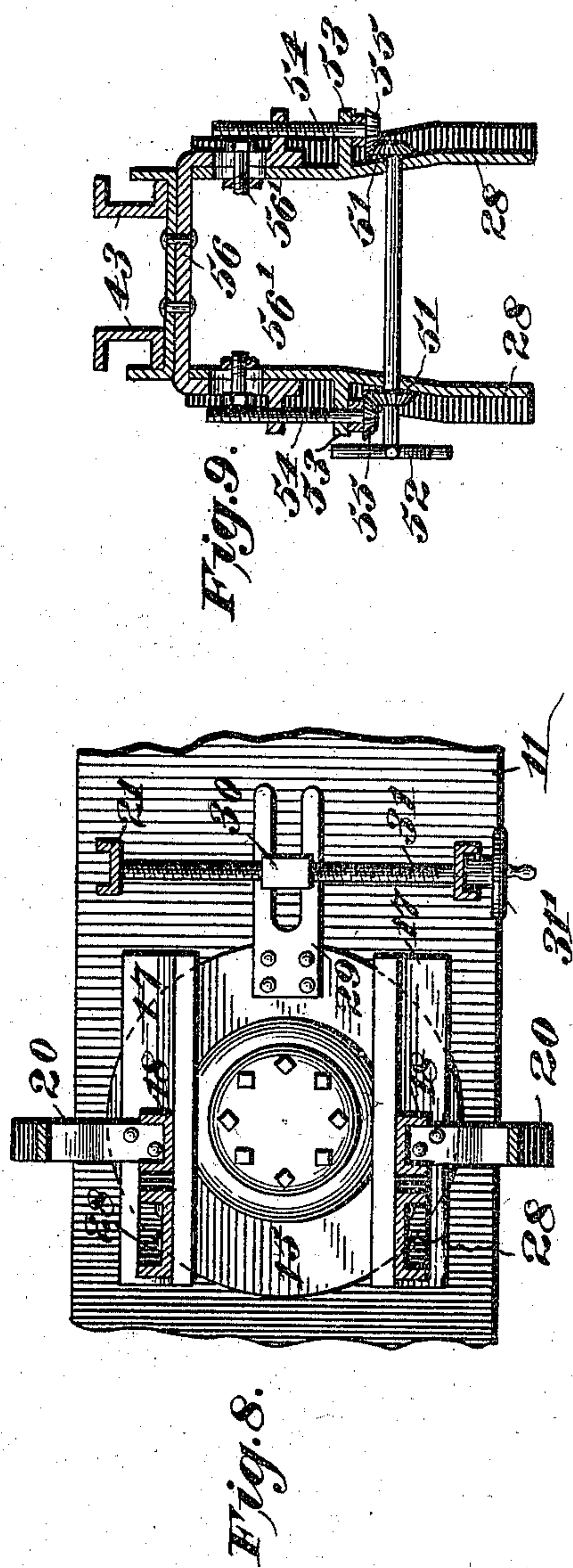
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UNITED STATES PATENT OFFICE.

GLENN CHARLES BROWN, OF BIRMINGHAM, ALABAMA.

PORTABLE MECHANICAL LOADER AND DIGGER.

SPECIFICATION forming part of Letters Patent No. 709,199, dated September 16, 1902.

Application filed November 30, 1901. Serial No. 84,190. (No model.)

To all whom it may concern:

Be it known that I, GLENN CHARLES BROWN, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Portable Mechanical Loaders and Diggers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to loading, and has for its object to provide a portable mechanical loader.

A further object of my invention is to provide a portable mechanical loader the buckets and bucket-carrier of which are capable of being swung from side to side and thrust forward, thus increasing the efficiency of the loader.

A further object of my invention is to provide a novel bucket-carrier frame and pivoted upright, as will be hereinafter fully described, and also provide a belt-carrier to move the excavated or elevated material from bucket-carrier to bin.

A further object of my invention is to provide a novel manner of driving and loading mechanism.

With all these objects in view my invention consists in the novel arrangement and construction of a portable mechanical loader designed particularly for use in mines.

My invention also consists in certain features of construction and combination of parts, which will be hereinafter fully described and afterward specifically pointed out in the appended claims.

Referring to the accompanying drawings, which form a part of this specification, and which must be taken in connection herewith, Figure 1 is a side elevation of my invention in an operative position. Fig. 2 is a vertical longitudinal section through same. Fig. 3 is a vertical transverse section along the lines 3-3 of Fig. 1. Fig. 4 is a rear elevation of my loader. Fig. 5 is a top plan view of the same. Fig. 6 is a section through the chain and buckets, taken along the lines 6-6 of Fig. 1. Fig. 7 shows perspective views of sections of my bucket-carrier chain. Fig. 8 is a detail top plan of revolving plate with means for swinging from side to side. Fig. 9 is a detail

section of adjusting means for raising and lowering the bucket-carrier frame. Fig. 10 is a detail perspective of one of the bucket-teeth. Fig. 11 is a detail of my rail-clamp, and Fig. 12 is a view of my clamp-locking arrangement.

Like numerals of reference indicate the same parts throughout the several figures, in which—

1 indicates trucks provided with ordinary car-wheels adapted to travel on a track. Upon said trucks I secure two I-beams 2-2, and I journal in said beams a shaft 3, carrying pinions 4-4-4. Just forward of said shaft 3 is a shaft 5, journaled in said beams and carrying a gear-wheel 6 and provided with a hand-wheel 7. Said gear-wheel 6 meshes with the intermediate pinion on said shaft 3. On the inner sides of said I-beams 2-2 I provide two I-beams 8-8 of a considerably smaller size, and on the bottom flanges of said I-beams 8-8 I provide racks 9-9, with which the outer pinions 4-4 mesh. Journaled in equal distances in I-beams 2-2 are rollers 10, upon which the bottom flanges of said I-beams 8-8 rest. Secured to said I-beams 8-8 is the sliding base 11, provided with appropriate braces 12. Mounted on said base is the drawing mechanism 13, which may be a steam, gas, air, or electric motor. Mounted on said base forward of said driving mechanism is a foot-plate 14, and pivotally mounted in any approved manner in said foot-plate is a revolving plate 15, which rests on rollers 16, secured on the sliding base 11. Secured to said revolving plate 15 by means of angle-irons 17 are two upright channels 18-18, united at their tops by a connecting-piece 19, securely bolted to said upright channels. Secured to said revolving plate or to said angle-irons 17 on the outside of said upright channels 18-18 are two braces or brackets 20. Secured to the sliding base behind said foot-plate and revolving plate are four upright channels or legs 21, which slightly converge toward their tops. Secured to said upright channels or legs 21 are two parallel channels 22, to which are secured the belt-drum hangers 23 and 24. 24' indicates the belt-rollers, journaled in the channels 22, which support the belt when loaded and which reduce the strain and friction on the drums. Secured to said sliding base opposite the two after upright channels

or legs 21 are two brace-rods 25, which are connected at their tops by a connecting-rod 26, directly over the pivotal point of the revolving plate 15. Secured in the center of said connecting-rod 26 is a pin 27, which enters and is pivotally secured to the connecting-piece 19 of the upright channels 18 18.

Bolted to the revolving plate 15 or preferably to the angle-irons 17 are two braces or standards 28, forwardly inclined, of channel-iron, which support the bucket-carrying apparatus. Secured to revolving plate 15 or formed integral therewith is a slotted arm 29 and adapted to carry a nut 30, provided with a stem and a roller (not shown) slidable in its slot. Journaled in the forward upright channels or legs 21 is a threaded bolt 31, which passes through said nut 30 and which is provided with a hand-wheel 31' at one end thereof.

The driving mechanism 13, located on the sliding base 11, drives two chains, the chain 32 passing upwardly and rearwardly over two chain-guide sheaves 33, journaled on the after upright channel or leg 21, and thence to a sprocket 34, secured on the after belt-drum shaft 35. I also provide a means of tightening said chains 32 by constructing the hanger of the lower guide-sheave so that said guide-sheave may be raised or lowered, thus tightening or loosening said chain, as may be required and as shown in dotted lines in Fig. 1. The chain 36 passes from the driving mechanism upwardly and forwardly and between the guide-sheaves 37, which are located directly over the pivoted point of the revolving base 15 and which are secured to frames bolted to the channels 18. Said chain 36 passes over a sprocket-wheel 38, secured in boxings 39 and bolted to said upright channels 18. Secured to the shaft of said sprocket-wheel 38 is a sprocket-wheel which carries a chain 40, said chain running upwardly and over a sprocket-wheel 41, secured to the shaft of the bucket-chain sprocket-wheel 42.

43 indicates the channels of the bucket-carrying apparatus, and secured to the ends thereof are sprocket-hangers 44, which carry the bucket-chain sprockets 42. The rear bucket-chain sprockets 42 are journaled in the upright channels 18. The rear sprocket-hangers 44 are capable of longitudinal adjustment in order to tighten or loosen the bucket-chain, as may be required, and may be adjusted by any convenient means, but preferably by threaded pins, as shown in Fig. 1. Depending from said channels 43 are two pieces 45, to which the lower angle-irons 46 are securely bolted. The bucket-chain is of the roller type, the inner links being provided with plates formed integral therewith and at right angles thereto, Fig. 7, to which are bolted or riveted the carrying-buckets 47 and the alternate buckets 48. It will be noticed by referring to Fig. 1 that the rollers of said roller-chain travel on the upper flanges of said upper channels 43 while the chain and buck-

ets are ascending. The lower channels 46, however, are faced in the opposite direction, so that the chain-rollers travel on the inner surface of the lower flange of the lower channel-iron while on their downward run. Thus the chain is supported in such a manner that the chain-sprockets are relieved of a constant strain, thereby saving a large amount of wear. The carrying-buckets 47 are formed like a scoop, while the alternates or open buckets are provided with sides 49, but no backs, and I provide a pair of forwardly-inclined teeth 50 for each alternate, said teeth being securely bolted or riveted within the bucket. The supports or standards of channel-iron which hold the bucket-carrying apparatus in position are provided at their upper portion with an adjusting means for the purpose of raising or lowering the bucket-carrying apparatus. Said adjusting means consists of a shaft journaled in said supports and provided with two bevel-gears 51 and a hand-wheel 52. Extending from said supports are seats 53, which carry threaded pins 54, provided with bevel-gears 55, which mesh with bevel-gears 51, Fig. 9. 56 represents a connecting-piece which extends some distance down said supports and which is provided with two projecting lugs, through which said threaded pins pass, and on said channel 28 is a clamp-bolt 56' to hold said connecting-piece in the desired position. Bolted or riveted to the top of said connecting-piece is a U-shaped piece, within which the upper channels 43 rest. Connecting said supports 28 with the channels 18 are the pieces 57 for the purpose of strengthening said supports 28 and of tying them and the channels 18 together. The after belt-drum hangers 24 are adjustably secured to the channels 22 by means of threaded pins, as clearly shown in Fig. 1, thus making it possible to tighten or loosen the belt 58, as may be required. Said belt and carrying apparatus may be raised or lowered on the upright channels or legs 21 by simply changing the bolts to different holes in said upright channels or legs 21, and said belt may be swung at right angles to the track or transversely thereto, if desired.

Secured to the brace-rods 25 and to the forward belt-drum hangers 24 are two curved plates 59, forming the sides of a hopper which guides the material from the buckets to the belt. I also provide a light cover extending from the forward belt-drum to the forward end of the truck in order to prevent dust and small particles of material from falling on the mechanism below. Secured to the I-beams 2 in line with the truck-wheels I provide clamps 61, composed of two sections 62 and 63. Clamp-section 62 is provided with a longitudinal slot 64 therein, and section 63 is provided with a transverse slot.

66 represents the clamp-locking device, which consists of a pin 67 and knobs 68 and 69, secured to the ends of said pin and at right angles to each other, as shown in Fig. 12. The knob 68 is held horizontally and inserted

in the transverse slot in section 63. Then said knob is turned vertically and inserted in slot 64. When said knob 68 is turned horizontally, knob 69 is turned vertically, as shown in Fig. 11, and as the slot in section 63 is transverse said knob cannot pull through. Pivoted to each I-beam 2 is a jack 70, extending some distance to either side of the track.

Having thus described the several parts of my invention, its operation is as follows: When the loader is brought into position, the clamps 61 are clamped to the tracks in the manner aforescribed, which hold the loader in the desired position. The jacks 70 are then unscrewed until their bases rest firmly on the ground or road-bed. The loader being now in position for operating, the driving mechanism is started, which puts the buckets in motion, and they immediately eat into the material to be loaded, or should it be desired to dig or excavate the teeth in the open or alternate buckets cut out the earth and assist the carrying-buckets in their work. As aforescribed, the carrying-belt is operated by the driving mechanism, and said belt begins to travel on its drums. As the buckets reach their highest point and start down on their return run they dump their contents onto the belt, and the same is carried back and dumped into a car, bin, or other receiving device. When it is desired to shift the buckets to either side, as would be necessary in loading a pile of ore or in excavating, the hand-wheel 31' is turned according to the direction it is desired to swing the buckets and the threaded shaft 31 is turned in the nut 30, which is carried in the arm 29, formed on the revolving plate 15. As the threaded shaft 31 is threaded into said nut it draws said nut and arm 29 toward the hand-wheel 31', which obviously causes the revolving plate 15 to revolve, and as said plate carries the entire bucket-carrying apparatus said apparatus turns with said revolving plate and said buckets are swung in the opposite direction to said arm 29 and nut 30. The radius of the swing of said buckets depends upon the swing of the arm 29 and nut 30. The chain-guide sheaves 37, carried on the upright channels 18, as aforesaid, are directly over the pivotal point of the revolving plate 15, and therefore they do not move, but simply revolve and always keep the chain 36 in line with the sprocket-wheel 38, thus transmitting power to the bucket-chain, as hereinbefore described.

It is unnecessary to go into further detail concerning the adjustment of the chains and the raising or lowering the bucket-carrier or belt, as the same has been fully described. I do not wish, however, to be understood as limiting myself to the exact constructions described, as the entire arrangement may be changed in numerous ways, which changes would fall within the limit and scope of my invention, and I consider myself entitled to all such changes and modifications.

What I claim as my invention, and desire

to secure by Letters Patent of the United States, is—

1. In a portable mechanical loader and digger, the combination with the trucks of body portion, a sliding base secured on said body portion, a revolving plate secured on said sliding base, bucket-carrying apparatus supported on said revolving plate, belt-carrying apparatus supported on said sliding base, and a motor, substantially as described. 70

2. In a portable mechanical loader and digger, the combination with the trucks, of a body portion secured thereon, a sliding base carried on said body portion, racks formed on said sliding base, pinions carried in said body portion to mesh with said racks, a revolving plate carried on said sliding base, bucket-carrying apparatus supported on said revolving plate, belt-carrying apparatus and a motor carried on said sliding base substantially as described. 80

3. In a portable mechanical loader and digger, the combination with a body portion of track-clamps and jacks secured thereto, a sliding base carried thereon, a revolving plate secured on said sliding base, bucket-carrying apparatus supported on said revolving plate, belt-carrying apparatus and a motor supported on said sliding base, substantially as described. 90

4. In a portable mechanical loader the combination of I-beams forming the body portion, rail-clamps and jacks secured thereto, smaller I-beams, a sliding base carried thereon, rollers supporting said smaller I-beams and sliding base, racks formed on said smaller I-beams, pinions carried in said body portion to mesh with said racks, a hand-wheel adapted to turn said pinions, and move said sliding base, bucket-carrying apparatus supported on said sliding base, belt-carrying apparatus and a motor supported on said sliding base, substantially as described. 100

5. In a portable mechanical loader the combination of the body portion, a sliding base carried thereon, a foot-plate secured to said sliding base a revolving plate pivotally mounted on said foot-plate, bucket-carrying apparatus supported on said revolving plate, means for revolving said plate and bucket-carrying apparatus, belt-carrying apparatus and a motor supported on said sliding base, substantially as described. 110

6. In a portable mechanical loader and digger, the combination of a body portion, a sliding base carried thereon a foot-plate secured on said sliding base, a revolving plate pivotally mounted on said foot-plate, rollers adapted to support said revolving plate, a rearwardly-extending arm secured to said revolving plate, means for swinging said arm in either direction, bucket-carrying apparatus supported on said revolving base, belt-carrying apparatus and a motor supported on said sliding base, substantially as described. 120

7. In a portable mechanical loader and digger, the combination of a body portion, a slid-

ing base carried thereon, a foot-plate secured on said sliding base, a revolving plate pivotally mounted on said foot-plate, rollers adapted to support said revolving base, a rearwardly-extending slotted arm secured to said revolving plate, a nut loosely carried in said slot, a threaded bolt passing through said nut, means for turning said bolt, bucket-carrying apparatus supported on said revolving plate, belt-carrying apparatus and a motor supported on said sliding base, substantially as described.

8. In a portable mechanical loader and digger, the combination of a base, a revolving plate supported thereon, uprights carried on said revolving plate, braces for said uprights, bucket-carrying apparatus supported by said uprights, belt-carrying apparatus and a motor supported on said base, substantially as described.

9. In a portable mechanical loader and digger, the combination of a base, a revolving plate supported thereon, uprights carried on said revolving plate, upwardly and forwardly inclined supports carried on said revolving plate, bucket-carrying apparatus pivoted to said uprights and adapted to be supported by said upwardly and forwardly inclined supports, belt-carrying apparatus and a motor supported on said base, substantially as described.

10. In a portable mechanical loader and digger, the combination of a base, a revolving plate mounted thereon, uprights supported on said revolving plate upwardly and forwardly inclined bucket-carrier supports carried on said revolving plate, bucket-carrying apparatus pivoted to said uprights, adjusting means carried on said upwardly and forwardly inclined bucket-carrier supports, brace-rods extending from said base to the tops of said uprights, belt-carrying apparatus and a motor supported on said base, substantially as described.

11. In a portable mechanical loader and digger, the combination of a base, a revolving plate mounted thereon, uprights supported on said revolving plate, bucket-carrying apparatus pivoted to said uprights, chain sprocket-wheels and chain-guide sheaves carried on said uprights, belt-carrying apparatus and a motor supported on said base, substantially as described.

12. In a portable mechanical loader and digger, the combination of a base, a revolving plate mounted thereon, uprights carried on said revolving plate bucket-carrying apparatus pivoted to said uprights, a connecting-piece uniting said uprights at their tops, brace-rods extending from said base to a point above said connecting-piece, a connecting-rod uniting said brace-rods, a pin connecting said connecting-piece and connecting-rod directly over the pivotal point of said revolving plate, belt-carrying apparatus and a motor supported on said base, substantially as described.

13. In a portable mechanical loader and digger, the combination of a base, a revolving plate carried thereon, uprights secured to said revolving plate, upwardly and forwardly inclined supports secured to said revolving plate, a connecting-piece uniting said supports, means for raising and lowering said connecting-piece, bucket-carrying apparatus supported on said connecting-piece, belt-carrying apparatus and a motor supported on said base, substantially as described.

14. In a portable mechanical loader and digger, the combination of a base, a revolving plate carried thereon, uprights secured to said revolving plate, upwardly and forwardly inclined supports secured to said revolving plate, a connecting-piece uniting said supports at their tops means for raising said connecting-piece in position, a U-shaped piece secured to said connecting-piece, bucket-carrying apparatus adapted to be supported in said U-shaped piece belt-carrying apparatus and a motor supported on said base, substantially as described.

15. In a portable mechanical loader and digger, the combination of a base, belt-carrying apparatus and a motor supported thereon, a revolving plate mounted thereon, uprights and supports secured to said revolving plate, bucket-carrying apparatus carried by said uprights and supports, and comprising channels, sprocket-hangers secured to the ends thereof, chain-sprockets carried by said hangers, a bucket-chain carried on said sprockets, buckets carried on said chain, and means for raising or lowering said buckets and carrying apparatus, substantially as described.

16. In a portable mechanical loader and digger, the combination with a base and bucket-carrying apparatus of uprights secured to said base, chain-guide sheaves secured in the after uprights, a belt-carrier frame secured to said uprights, belt-drums carried at the ends of said frame, a belt carried on said drums, means for adjusting said belt, means for raising and lowering said frame, and means for driving said belt, substantially as described.

17. In a portable mechanical loader and digger, the combination with a base, and bucket-carrying apparatus of uprights carried on said base, a belt-carrier frame supported on said uprights, belt-drums carried at the ends of said frame, a belt-carrier on said drums, means for adjusting said belt, means for raising and lowering said frame, chain-guide sheaves journaled in the after uprights means for adjusting said chain-sheaves, and means for driving the belt, substantially as described.

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

GLENN CHARLES BROWN.

Witnesses:

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J. W. CUNNINGHAM.