

(No Model.)

4 Sheets—Sheet 1.

J. H. PENDLETON.

CABLE RAILWAY.

No. 387,909.

Patented Aug. 14, 1888.

FIG. 1.

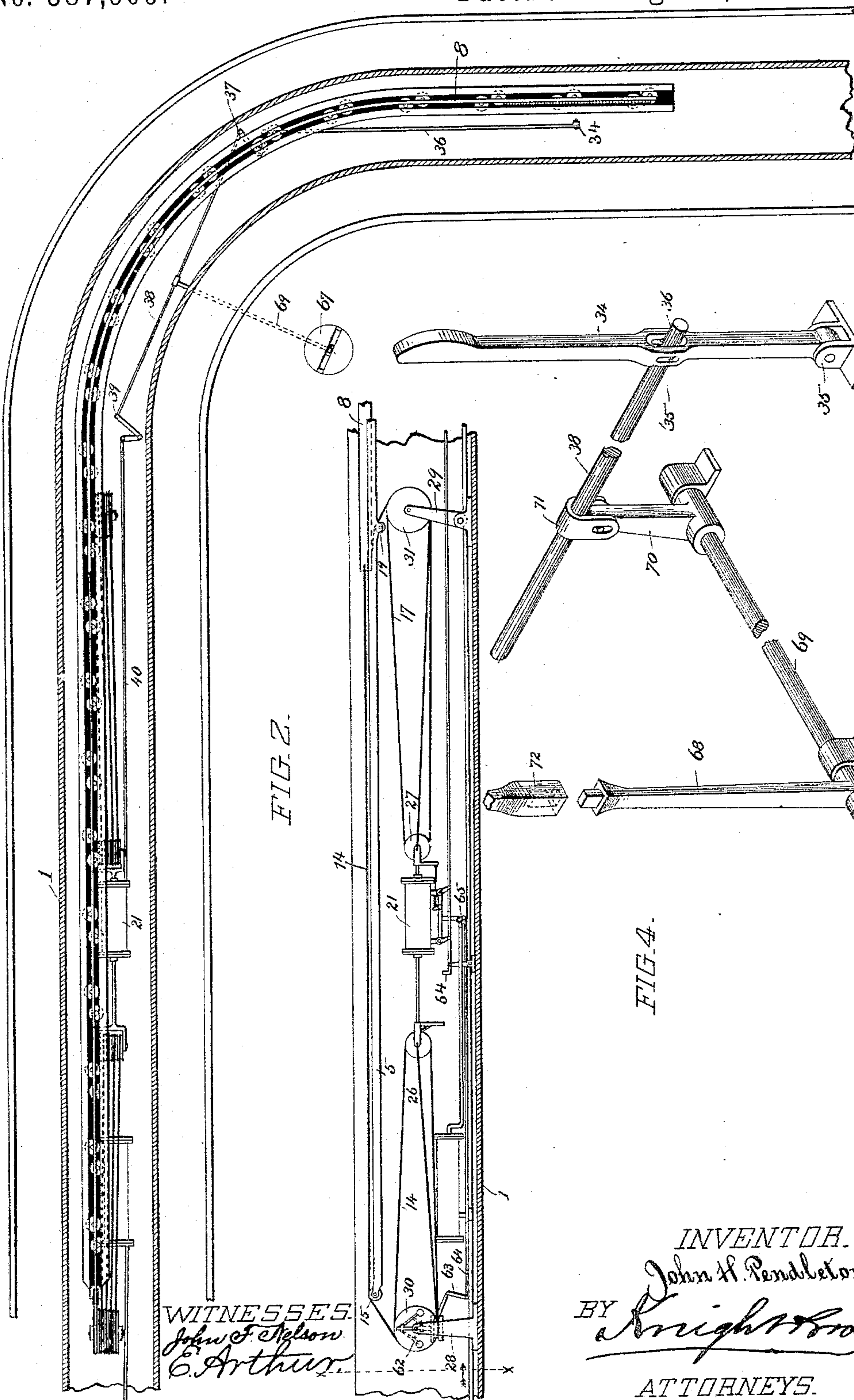


FIG. 2.

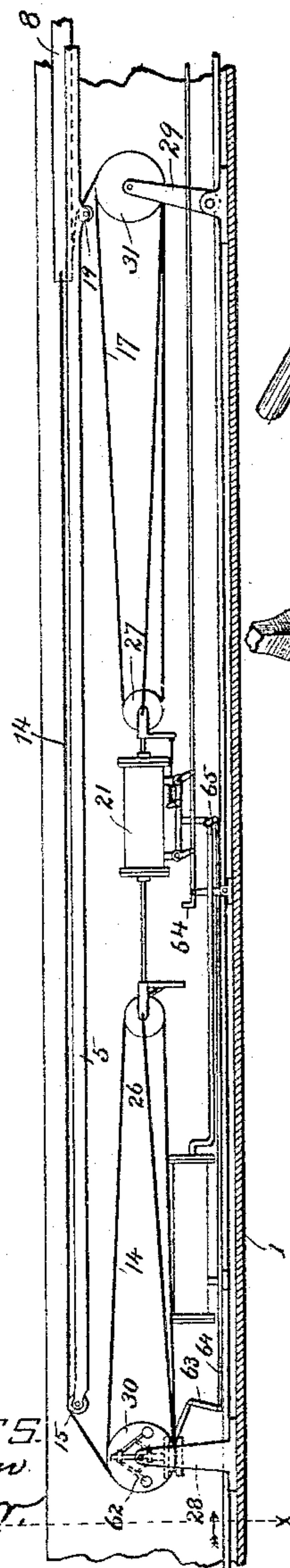
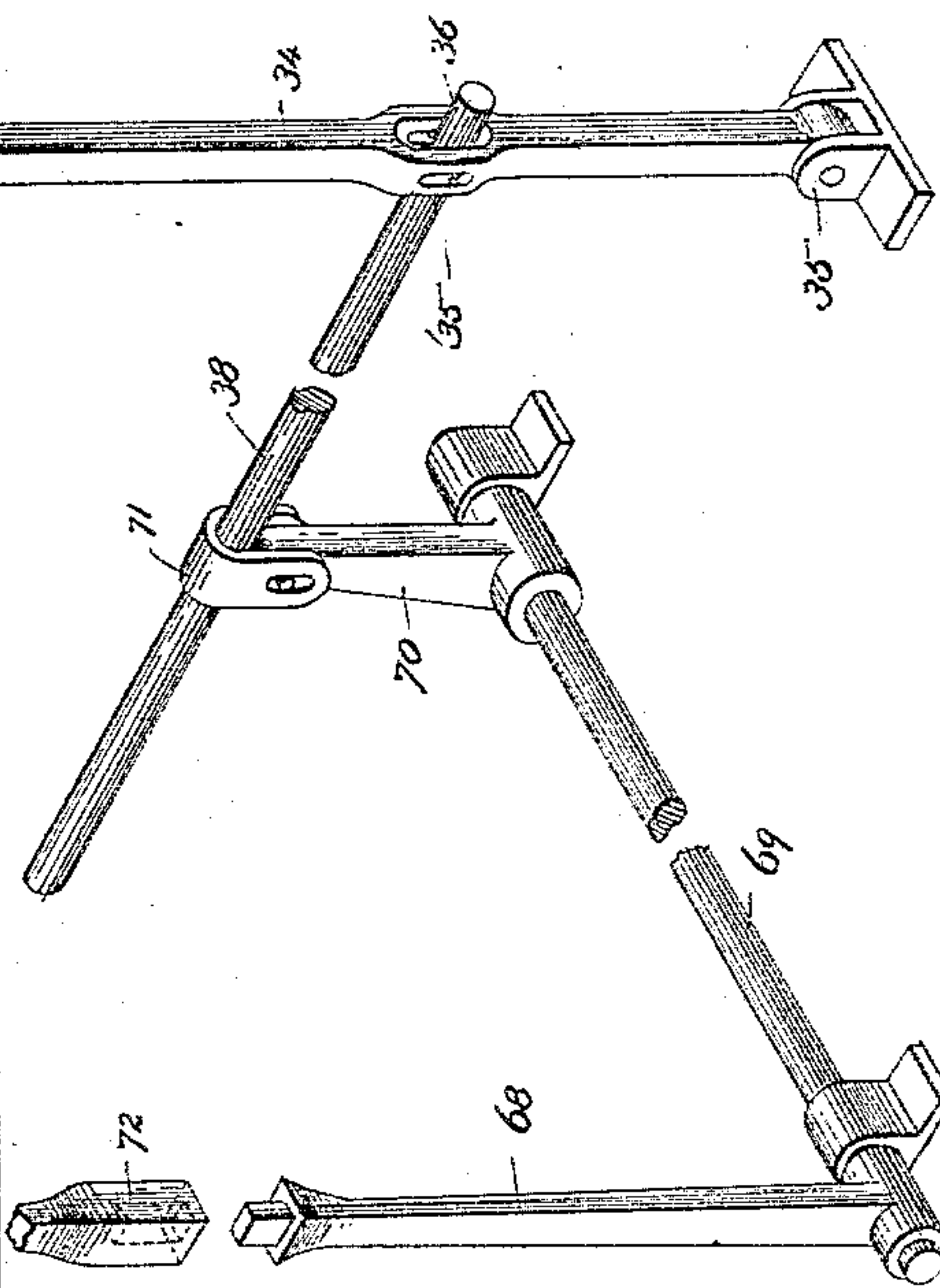


FIG. 4.



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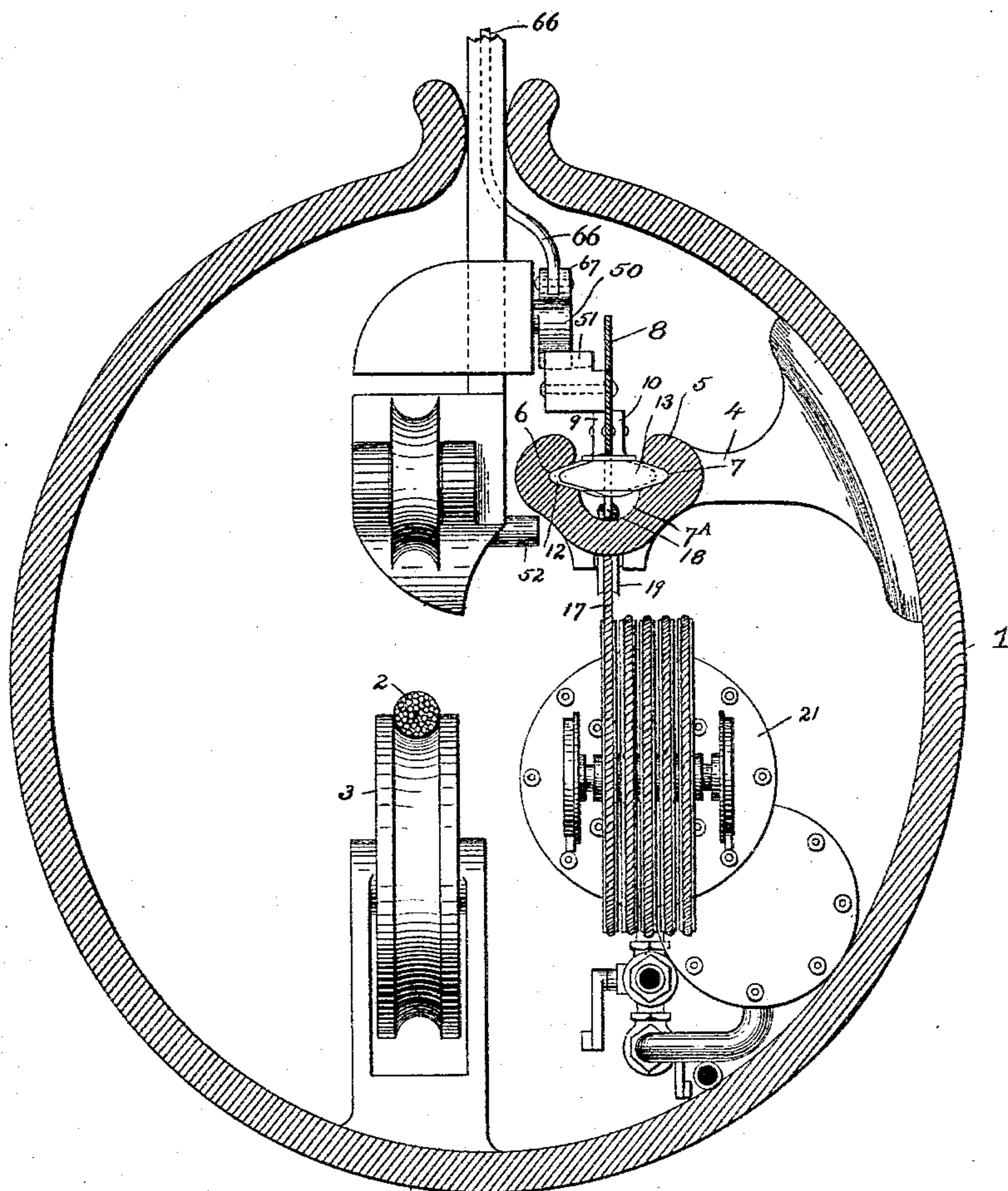
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FIG. 3.



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4 Sheets—Sheet 3.

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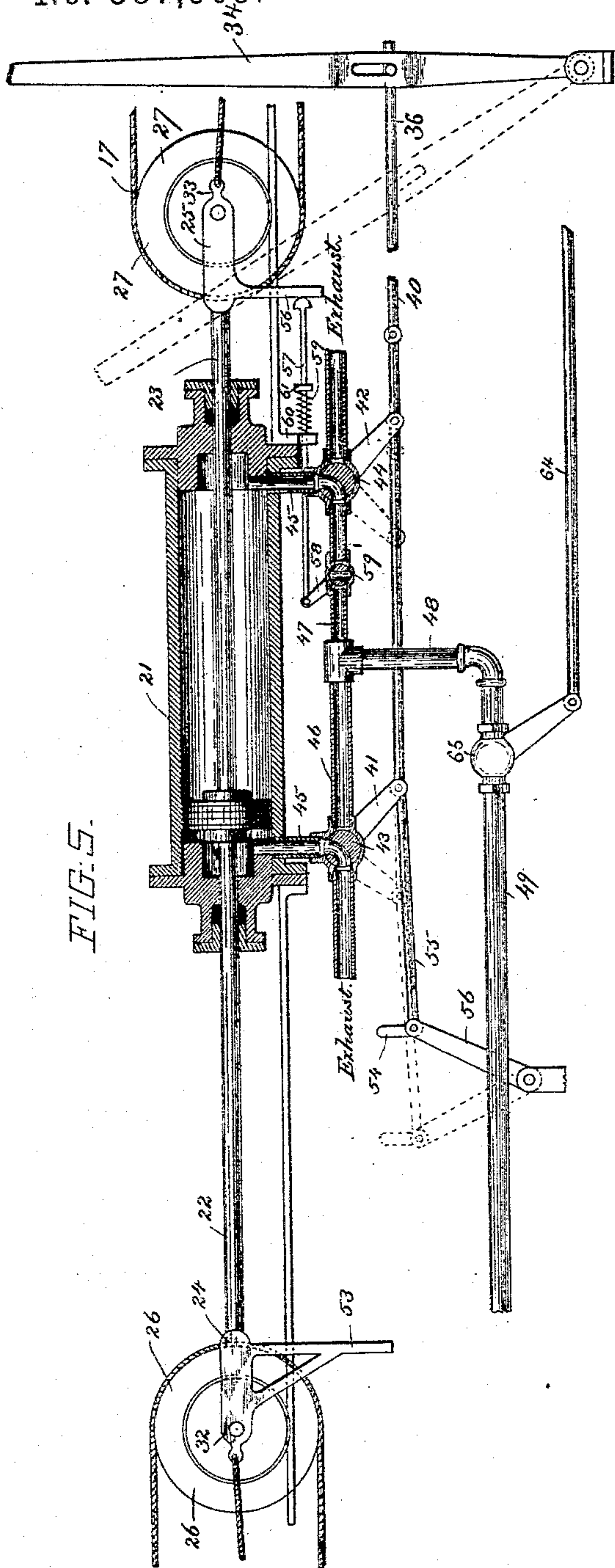


FIG. 5.

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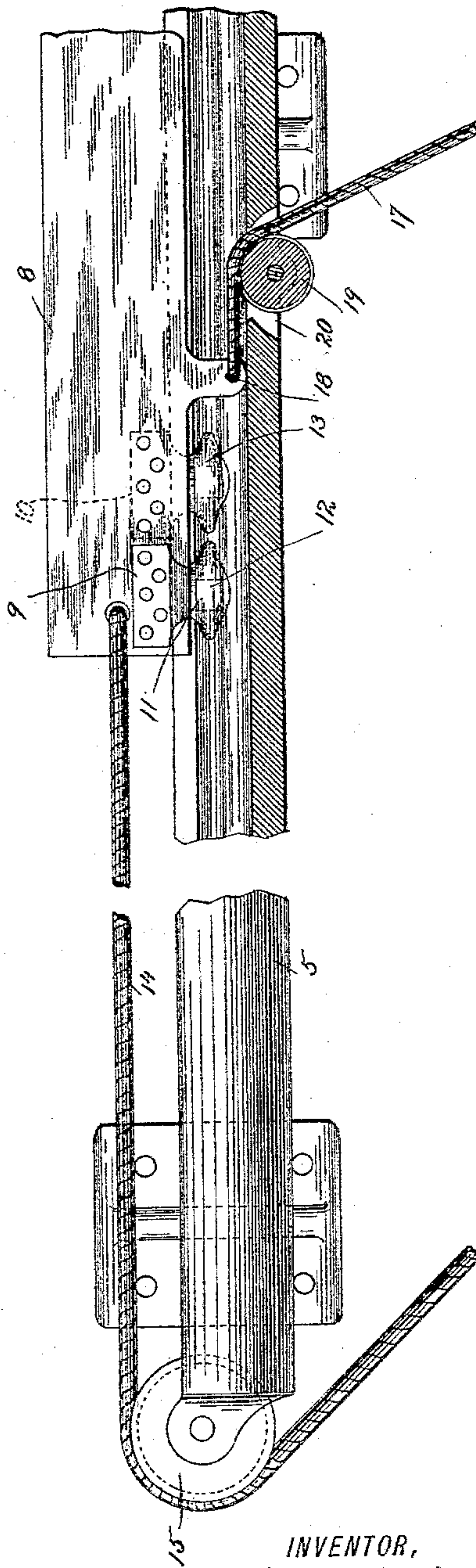


FIG. 6.

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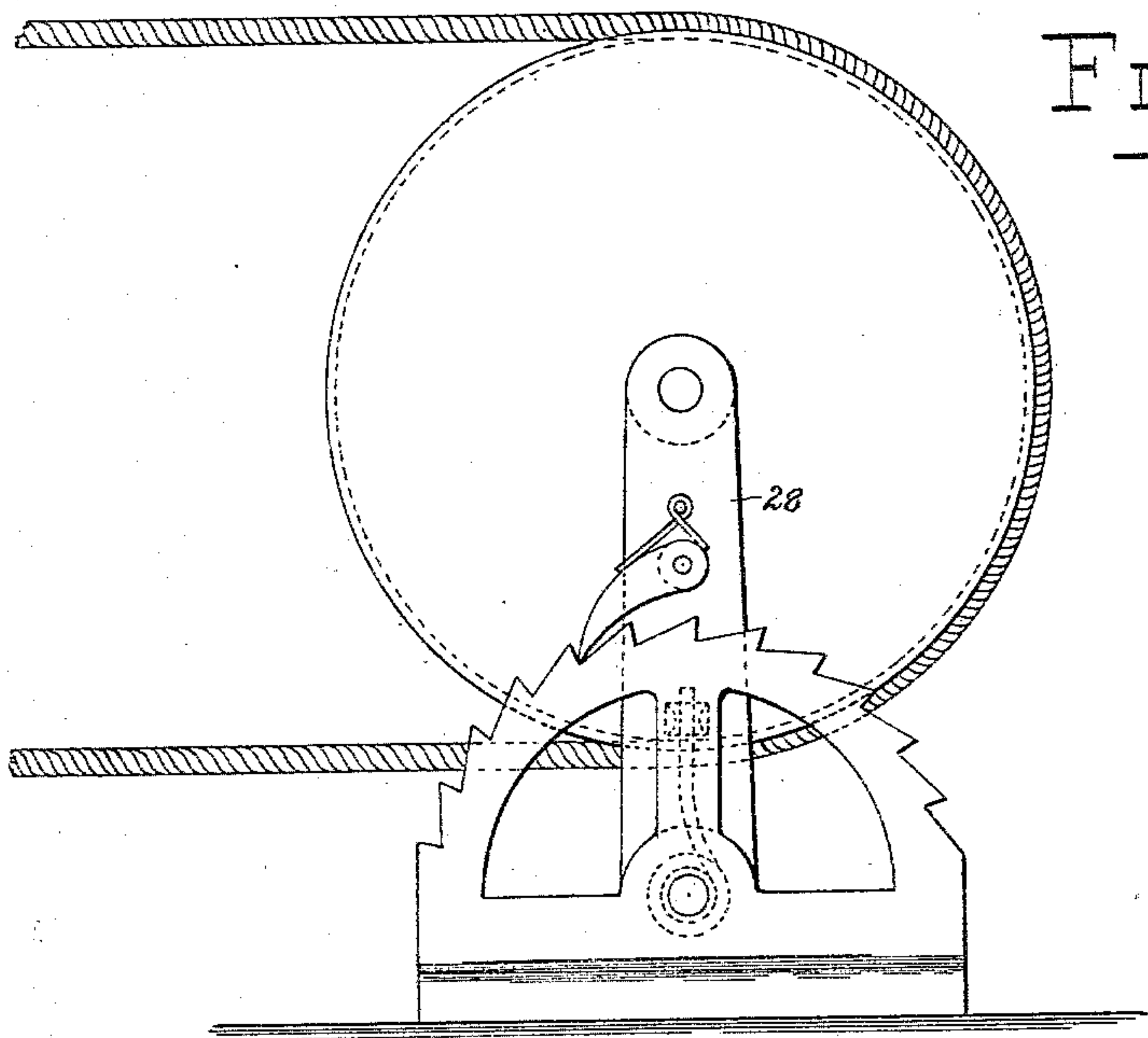
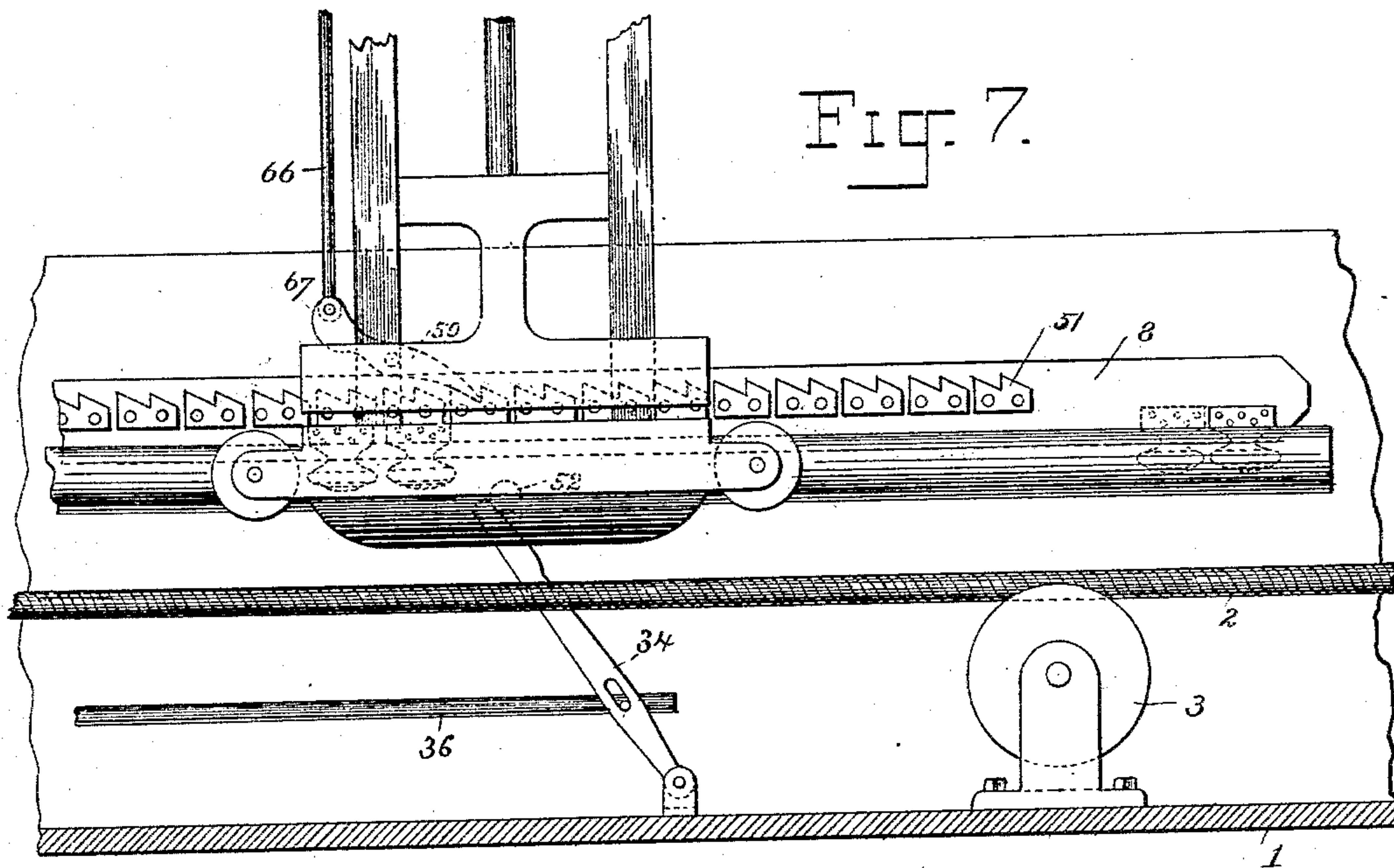
4 Sheets—Sheet 4.

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UNITED STATES PATENT OFFICE.

JOHN H. PENDLETON, OF BROOKLYN, ASSIGNOR TO THE RAPID TRANSIT
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CABLE RAILWAY.

SPECIFICATION forming part of Letters Patent No. 387,909, dated August 14, 1888.

Application filed December 19, 1887. Serial No. 258,346. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. PENDLETON, a citizen of the United States, residing at Brooklyn, county of Kings, and State of New York, have invented certain new and useful Improvements in Cable Railways, of which the following is a full, clear, and exact specification.

My invention relates to traction devices for cable railways; and it has for its object to provide an apparatus to be situated at curves for automatically conveying the cars around curves in the road, and in accomplishing this object I obviate the necessity of employing horses or the like for this purpose, or passing the main traction cable around a series of small wheels arranged to conform to the radius of the curve. The mechanism by which I effect this object is also shown and described in my application Serial No. 258,344, filed herewith. This latter-named method of rounding the curves has until now been one of the most preferable, and is one of the latest improvements in the art, but it has many disadvantages which are entirely obviated by my method. An example of these disadvantages is that the cable in a very short time—say a week or ten days, for instance—wears these small wheels so, by reason of the very great pressure it produces upon their peripheries and bearings, that they become useless and have to be replaced by new ones, and, further, the same pressure on their peripheries wears a channel therein the exact size of the cable, and into which the cable embeds itself, and consequently when the spliced places in the cable meet these worn wheels they are chafed by reason that they are of larger diameter than the rest of the cable, and come in contact with the sharp edges of the groove in the cast-iron wheel, thereby causing great detriment to the cable and entailing considerable loss.

With my device I am enabled to abandon the use of small wheels for guiding the cable around the curves, and employ but one large wheel, which may be filled to prevent the cable from wearing it rapidly.

My invention consists, essentially, in placing at the curves a flexible tongue or strip, which is supported and guided by a suitable

track in the cable-tunnel, and has means at one end for engaging with a projection on the grip of the car, and a suitable engine for imparting motion to the said tongue for drawing the car around the curve and for causing the tongue to remain normally projected around the curve in readiness to receive the car.

I will now proceed to describe my invention with reference to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a plan view of a curve in a railroad-track, showing the relation of my improvements thereto, the cable-tunnel being in longitudinal section. Fig. 2 is a vertical longitudinal section of the straight portion of the tunnel, showing the operating mechanism in side elevation. Fig. 3 is an enlarged transverse sectional view of the tunnel, taken on the line X X, Fig. 2, looking in the direction of the arrow, and showing a grip in the tunnel with the pawl and rack in engagement. Fig. 4 is a perspective view of the operating-levers. Fig. 5 is a detail view, partly in section, of the engine employed for imparting motion to the tongue. Fig. 6 is an enlarged detail view of the track for guiding the tongue, it being shown partly in section and partly in side elevation, with the tongue in position. Fig. 7 is an enlarged side elevation of the grip, showing the pawl engaged with the ratchet and a projection or pin on the grip in contact with the operating-lever. Fig. 8 is an enlarged view of the cable-tightener employed in connection with my invention.

1 represents the tunnel, in which the cable travels over the idle-rollers 3, as usual. Secured to the inner walls of the tunnel are brackets 4, which support at their extremities a track, 5, which is located a little above, and in this instance to the right of, the traction cable, and extends parallel with the tunnel. This track is preferably trough-shaped, as shown in Fig. 3, and provided with longitudinal grooves 6 7 on both sides of its interior, and with a channel, 7^A, in the bottom, extending throughout the length of the operating mechanism.

8 is the said flexible tongue, preferably com-

posed of steel or some other tough and flexible metal, in practice to be about one-fourth of an inch in thickness and from eight to ten inches in breadth, and which has bolted to it at intervals of two or three feet throughout its length two brackets or plates, 9 10, one on each side, which have shoulders 11, and downwardly-projecting journals upon which bevel-edged wheels 12 13 are journaled, and retained thereon by riveting the heads of said journals or otherwise. These wheels are adapted to play in the V-grooves 6 7, respectively, in the track 5, and thus support and guide the tongue. By arranging these wheels on both sides of the tongue and by forming them with bevel-edges it will be seen that the tongue will be held rigidly in the center of the track, and the wheels will only contact with the groove on the side on which they are located, thus preventing undue friction.

Attached to the rear end of the tongue 8 is a stout cable, 14, which passes over an idle-pulley, 15, bracketed to the end of the track 5, and 17 is a slight cable attached to a lug, 18, on the bottom of the tongue 8, and passes over a pulley, 19, mounted in a slot, 20, in the bottom of the track, which is generally located at the point where the curve in the track commences.

Now it will be seen that if the cable 17 is pulled upon the tongue will follow the track around the curve until the lug 18 comes up even with the pulley 19, and when the other cable is pulled the tongue will move in the reverse direction.

In many instances it is necessary that the thrust of the tongue should be at least from ninety to one hundred feet, and of course it is impracticable for many reasons to have a cylinder whose stroke is of such length for giving the tongue this long thrust. Therefore I am compelled to resort to other methods of accomplishing it, a preferable form of which will now be described.

21 is a cylinder of ordinary length—such, for instance, as generally employed on cars for operating the brakes—containing a piston from which project two piston-rods, 22 23, one through each head of the cylinder. The outer ends of the rods are threaded, and have screwed thereon brackets 24 25, respectively, both having mounted therein on a suitable pintle five independently-revoluble sheaves, 26 27, respectively. Planted at a short distance from each of these sets of sheaves 26 27 are brackets or standards 28 29, which have mounted therein sheaves 30 31, respectively, which are equal in number and similar in other respects to the sheaves 26 27.

The cable 17 is secured at one end to the lug 18, as before stated, and passes down over the pulley 19, through the track, and around the large sheave in the series 31, from whence it passes to and around the first sheave on this side in the series 27, and so on, passing back and forth around all of the sheaves in these

two series, and having its end secured in a link, 33, on the bracket 25. The sheaves 26 and 30 are rove with the cable 14 in an identical manner, and the cable is secured in a similar link, 32, on the bracket 24. By passing the cable around the sheaves in this way, forming a tackle at each end of the cylinder, I multiply the length of the piston-stroke as produced on the tongue as many times as the cable is passed from sheave to sheave. In this instance the cable is passed from sheave to sheave ten times; hence the thrust of the tongue is ten times as great as the stroke of the piston; but of course the laws governing this are well understood, and therefore the same require no explanation here.

For causing this tongue to operate automatically upon the approach of the car, I locate at a point around the curve about where the cable is dropped a vertical lever, 34, which is pivoted to the floor of the tunnel in such a position as to be a little to one side of the grip when it passes. This lever is pivoted at 35 to a rod, 36, which is itself pivoted to a bell-crank, 37. This bell-crank is connected by a rod, 38, to another bell-crank, 39, from which extends a long rod, 40, to the crank-arms 41 42 of the valves 43 44. The said valves are capable of opening communication between the port-pipes 45 of the cylinder and the horizontal pipes 46 47, which are in direct communication with an elbow, 48, on the supply-pipe 49, and they are so connected by the rod 40 that they are both operated together; but one is in communication with the exhaust while the other communicates with the supply. It will now be seen that when the car approaches the curve the grip-man or other attendant on the car drops the cable, and the pawl 50, pivoted to the grip, is forced in engagement with the ratchet 51 on the side of the tongue 8, which is caused, by mechanism presently to be described, to remain normally around the curve in waiting for the car, and the pin 52, projecting from the side of the grip, strikes and runs down the vertical lever 34, the valves 43 44 will be reversed, and the piston will set the tongue in motion to draw the car around the curve. When the car has rounded the curve, its speed on by its own momentum and resumes the cable; but when the piston has nearly finished its stroke a downwardly-projecting arm, 53, on the bracket 24 comes in contact with a lug, 54, on the end of a link, 55, (which is a continuation of the rod 40,) supported at its free end by an arm, 56, pivoted to it and to the tunnel-floor, and shoves the lever 34 back to its normal vertical position and again reverses the valves 43 44, whereupon the piston immediately returns the tongue projected to the extremity of its permitted movement around the curve; but before the piston fully reaches the head of the cylinder the pressure is shut off by an arm, 56, on the bracket 25 coming in contact with the end of a rod, 57, which is pivoted to the crank 58 of the valve 59 in the pipe 47,

and thereby closes the said valve. This valve, however, is held normally open by a spiral spring, 59, coiled on the rod 57 between the projection 60 and a lug, 61, on the rod.

5 The manner of connecting the cables with the tongue and of roving the sheaves 26 and 27 and 30 and 31 with the cables, and an engine somewhat similar to that herein described, are shown and described in my application Serial
10 No. 258,347, and an analogous engine is also shown in my application Serial No. 258,351.

As a preventive against the engine at any time whipping the tongue around the curve with too great rapidity, I provide an ordinary
15 form of governor, 62, which is supported by the standards 28 and operated by a bevel-gear on the end of the pintle on which the sheaves 30 are mounted, one of said sheaves, however, being keyed to the pintle, is also shown and
20 described in my application Serial No. 258,347, and is similar to an arrangement shown in my application Serial No. 258,351. When the centrifugal action raises the balls of the governor, it also raises with them one arm of a pivoted
25 bell-crank, 63, whose other arm is pivoted to, and consequently draws upon, a rod, 64, which is connected to the crank-arm of a valve, 65, in the supply-pipe and regulates the pressure admitted to the cylinder.

30 In case the track should become obstructed after the car has been seized by the ratchet of the tongue and make it necessary to stop the car, I provide the pawl 50 on the grip with an operating-rod, 66, which is pivoted to the
35 counter-balance 57 of the pawl, and by which the pawl may be disengaged with the ratchet and allow the tongue to go around the curve without the car, the said tongue of course returning to its normal position as soon as the
40 stroke is completed. Now, in order to set the car in motion again when the track is clear, I provide about half-way around the curve a man-hole, 67, in which is located a vertical lever, 68, secured to one end of a horizontal rock-
45 shaft, 69, at whose other end is a crank-arm, 70, pivoted to the rod 39 by a strap, 71, and by which arrangement the conductor is enabled, by placing a key, 72, on the end of the lever 68, to gradually push the rod 38 in the
50 same direction that the car would have done, and cause the ratchet to gradually come up from behind and engage with the pawl, whereupon the conductor throws the valves all the way open and jumps upon his car, which is
55 then getting under way.

It is necessary to employ some form of tightener for taking up the slack in the cable 14 17, and the form I prefer to use is shown in Fig. 8 of the drawings, and also in my aforesaid
60 applications Serial Nos. 258,344 and 258,347, which consists simply of a stout spiral spring coiled around the shaft or pivot of the pivoted standards 28, and having one end bearing against the standard and its other against the
65 block to which the standards are pivoted, or against some stationary part thereof, and thus

holding the rope taut. A semicircular ratchet-rack is secured to the aforesaid block and a pawl is pivoted to the standard, which engages with said rack and holds the sheaves and stand- 70
ards to the position gained by the spring.

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

1. The combination, with the engine having 75 valves for admitting pressure thereto and a reciprocating piston and with the car, of a track, a tongue or strip guided by said track and connected at one end with said piston, whereby it is reciprocated, a pivoted lever, a 80
rod connecting said lever with the said valves of the engine, and a projection from said car for striking said lever whereby the valves are operated, and a grip on the car having means for engaging said tongue, substantially as set 85
forth.

2. The combination, with the car and with the reciprocating piston, of valves for admitting pressure against said piston, a rod for operating said valves, a lever pivoted to said rod, 90
piston-rods, a projection on the car adapted to run said lever down, and thereby operate the valves in one direction, and an arm carried by said piston-rod, adapted to contact with the said rod for operating the valves, and thereby 95
operate the valves in the opposite direction.

3. The combination, with the car and the reciprocating piston, of valves for admitting pressure against said piston, having pipes leading thereto, a normally-open valve in one 100
of said pipes, rods for operating said valves, a lever pivoted to one of said rods, a projection on the car adapted to run said lever down, and thereby operate the valves in one direction, and arms carried by said piston-rods and 105
adapted to contact alternately with said valve-operating rods as the pistons reciprocate, and thereby operate the valves in the opposite direction, for the purposes described.

4. The combination, with the engine hav- 110
ing valves, of a rod for operating said valves, an upwardly-projecting lever pivoted to said rod, a crank-arm pivoted to said rod and secured to a rock-shaft, and a lever extending upward from said shaft, substantially as set 115
forth.

5. The combination, with an engine having a reciprocating piston and with the grip of the car having a pin, 52, of the tongue 8, having the guide-track 5, a ratchet on said tongue, 120
valves 43 44, having operating-levers for admitting pressure to said engine, rods 36, 38, and 40, connected together by bell-cranks, and connected to the operating-levers of said valves and extending around the curve, the vertical 125
lever 34, pivoted to one of said rods around the curve, for engaging with said pin 52, the man-hole, an upwardly-projecting lever in said man-hole, a rock-shaft secured to said lever and connected with the rods 36, 38, and 40 by 130
means of a crank-arm, arm 53, link 55, connected to rod 40 and supported by a pivoted

arm, a lug, 54, on said link for engaging with the arm 53, an inlet-pipe, a valve having an operating-crank in said pipe, a spring for holding said valve open, an arm, 56, carried by the
5 piston-rod, for compressing said spring and closing the said valve, the governor 62, bell-crank 63, operated by said governor, a valve, 65, in the inlet-pipe, and a rod, 64, connected with said valve and bell-crank, all substantially as and for the purposes set forth.

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Witnesses:

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