

W. W. ALEXANDER & M. J. APPEL.
CABLE OPERATED CARRIER FOR CONDUITS.
APPLICATION FILED JAN. 18, 1906. RENEWED MAR. 25, 1909.

928,300.

Patented July 20, 1909.

2 SHEETS—SHEET 1.

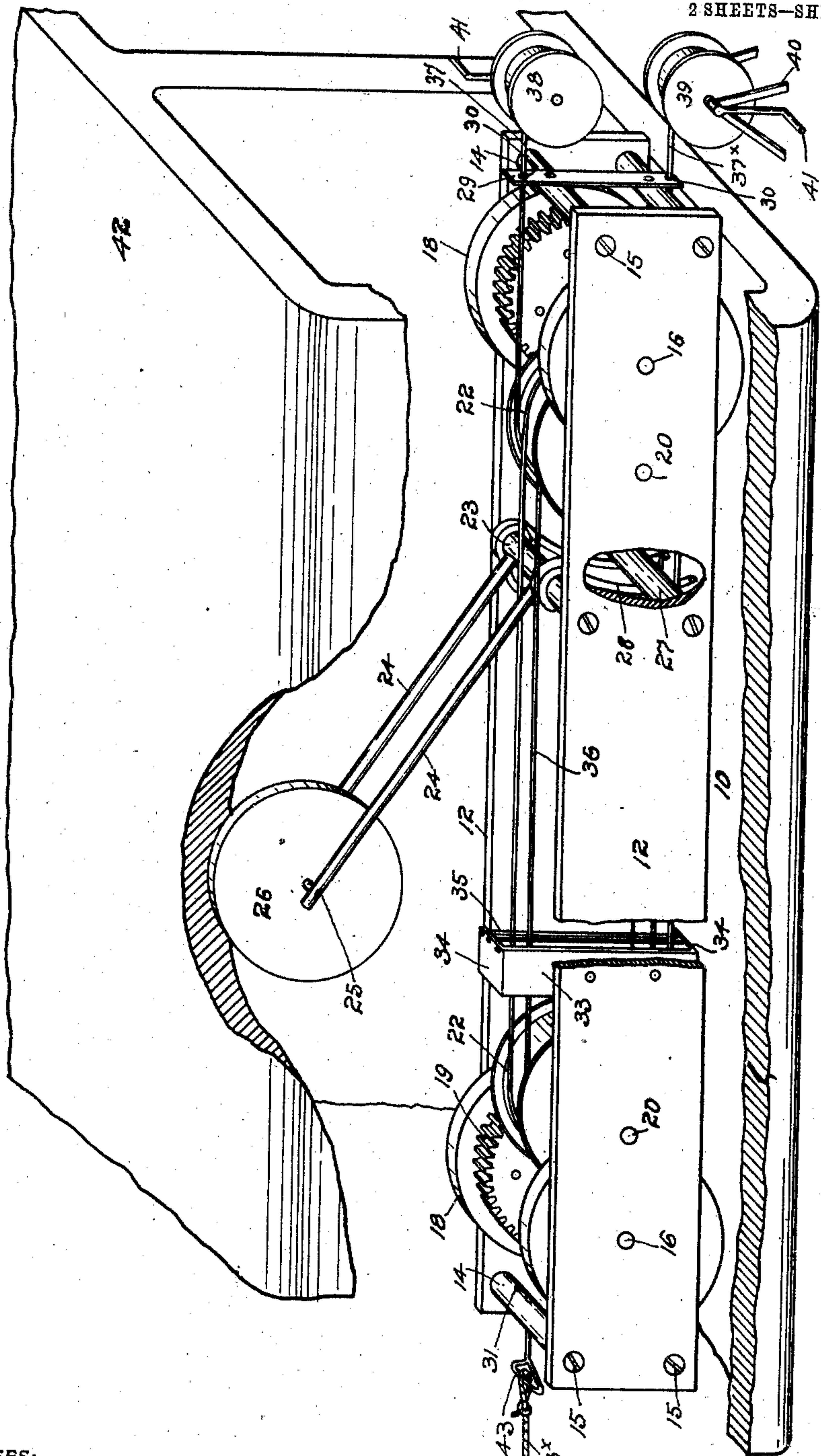


Fig. 1

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2 SHEETS—SHEET 2.

Fig 2

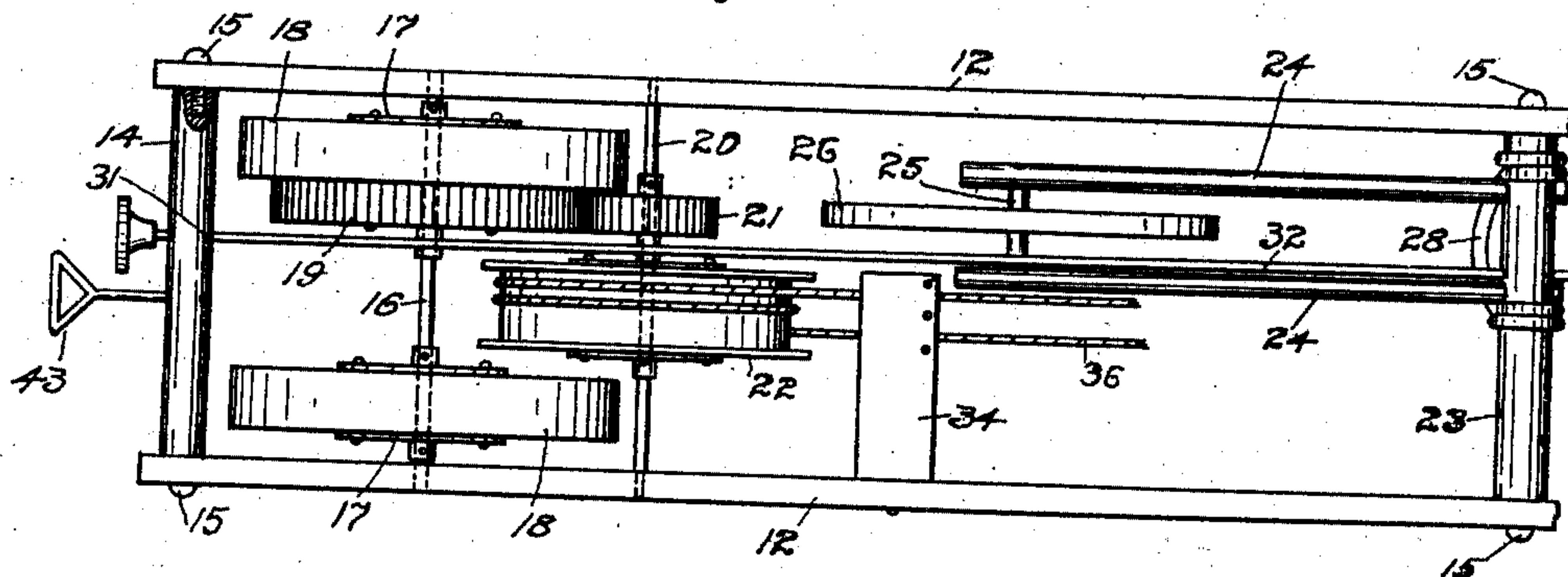


Fig 4.

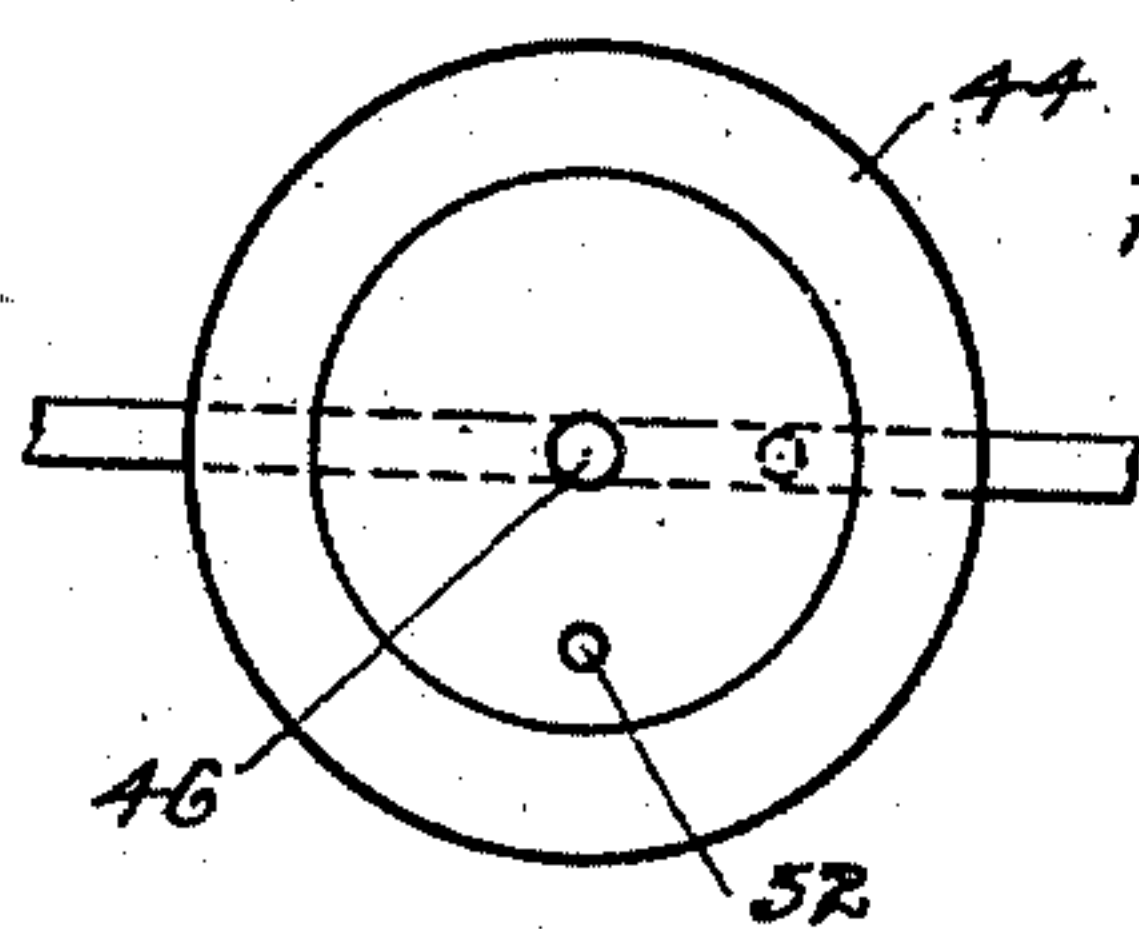
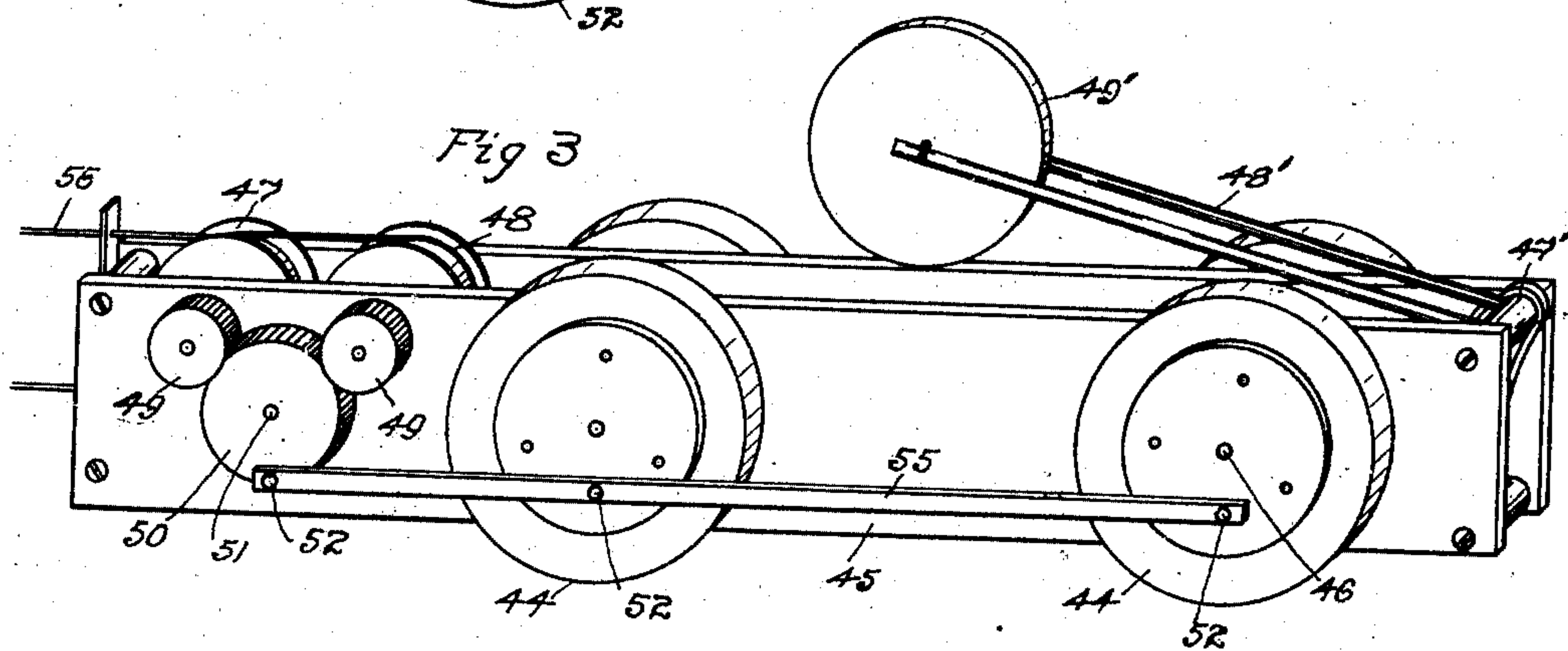


Fig 3



WITNESSES:

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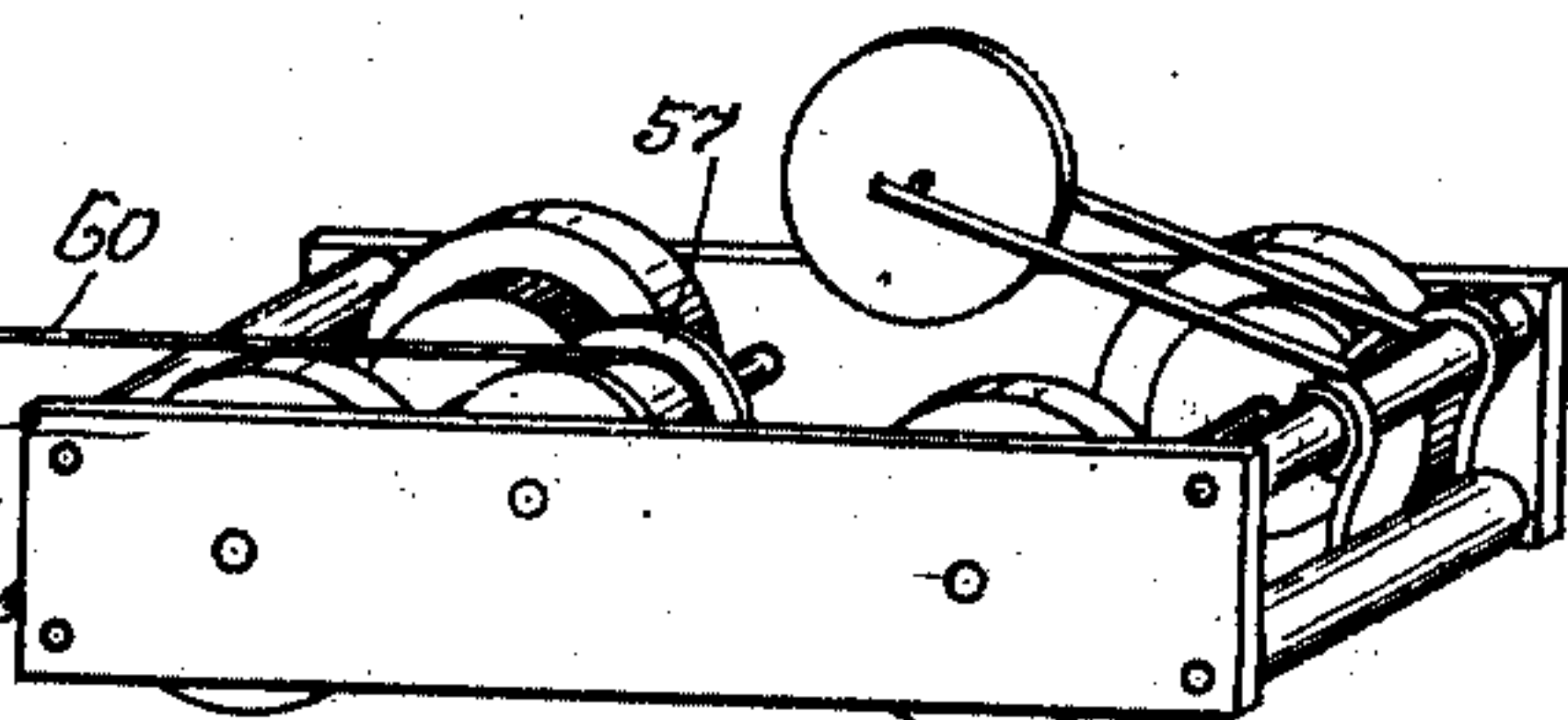


Fig 5

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UNITED STATES PATENT OFFICE.

WILLIAM W. ALEXANDER AND MICHAEL J. APPEL, OF KANSAS CITY, MISSOURI;
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CABLE-OPERATED CARRIER FOR CONDUITS.

No. 928,300.

Specification of Letters Patent.

Patented July 20, 1909.

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To all whom it may concern:

Be it known that we, WILLIAM W. ALEXANDER and MICHAEL J. APPEL, citizens of the United States of America, and residents of Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Cable-Operated Carriers for Conduits; and we do hereby declare that the following is a full, clear, and exact description of the invention, such as will enable others to make and use the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of the invention primarily is a cable operated line carrier for conduits, the propulsion of which forwardly and rearwardly is effected by the power applied to reel the cable.

The invention consists in the novel construction and combination of parts such as will be first fully described and then specifically pointed out in the claims.

In the drawings Figure 1 is an isometric view of the invention shown within a conduit, the latter being broken away upon its side and at one end, a portion of the side of the carrier being broken away to show the bearing for the lower ends of the elevating springs for the roller supporting arms, also showing the cable winding reels at the end of the conduit. Fig. 2 is a plan view of that portion of the carrier taken forward of the rear traction wheels showing the spring controlled traction wheel held by the securing rod. Fig. 3 is an isometric view of the invention showing an alternate construction of parts. Fig. 4 is a detail view showing the positions of the connecting rods on one of the traction wheels on the other side of the carrier from that seen in Fig. 3. Fig. 5 is a view in perspective of a modification.

Similar numerals of reference indicate corresponding parts in all the figures of the drawing.

Referring to the drawings, 10 indicates the frame of the carriage or carrier which consists of the longitudinally extended side plates 12, 12 arranged in a vertical position and parallel with each other. The plates 12 are connected at the ends by the transverse separating posts 14 upon the inner surfaces and corners of the plates and through the plates into the ends of the posts extend the screws 15. In the forward and rear end portions of the plates 12 at the requisite dis-

tances inwardly from the separating posts 14 and at points equidistant from the upper and lower longitudinal surfaces of the plates 12 are journaled the ends of rotary shafts or axles 16. Upon the axles 16 are mounted the traction wheels 18 composed preferably of rubber having clamping disks 17 on the axle on both sides of the wheels. Upon the axles 16 adjacent to the inner surfaces of the respective traction wheels are mounted the large gear wheels 19, smaller in circumference than the traction wheels. At the requisite distances inwardly from the ends of the frame 12 and the axles 16 and journaled in the sides of said frame in the horizontal plane of said axles are separate rotary shafts 20 upon which are small cog wheels or spur gear 21 meshing with the large gears 19. Upon the shafts 20 as points equidistant from their ends are mounted the cable carrying drums 22. Journaled at each end in the sides 12 of the frame near the upper longitudinal surfaces and at a point about one third the distance inwardly from the rear ends of the frame is a rock shaft 23 with which shaft are connected rigidly the inner ends of the radial arms 24, in the outer ends of which arms is a pivot 25, upon which pivot is a traction wheel 26. Beneath the rock shaft 23 and near the lower longitudinal surfaces of the plates 12 is a transverse connecting post 27 secured by screws in like manner as the posts 14.

Over the lower ends and forward surfaces of the radial arms 24 is extended the intermediate portion of a wire spring 28 the ends being extended rearwardly over the rock shaft 23 thence downwardly and in contact with the forward surfaces of the connecting post 27. Upon the rear end of the frame and secured to the outer surfaces of the posts 14 is a vertical plate 29 in the upper and lower ends of which plate are perforations 30. In the upper connecting posts 14 at the forward end of the frame is an opening through which extends a rod 32 the inner end of which rod when the wheel is forced downwardly in position extends over the pivot 25 on the arms 24 thence beneath the rock shaft 23 and holds the said wheel from upward movement—(see Fig. 2). On the said upper post 14 is a staple 43. Secured rigidly to the inner surface of one side 12 of the frame of the carrier at a point a short distance in rear of the forward drum 22 is a cable guiding de-

vice, consisting of a vertical plate 33, upon the upper and lower ends of which plate are inwardly extended plates 34 extending transversely to the drum 22 and connected with which plates are vertical cable spreading rods 35.

36 indicates the cable or rope propelling the carrier one end of which cable is extended through the perforation 30 in plate 29 thence between the separating rods 35 in the plates 34 thence over the forward drum 22 and coiled around said drum then extended rearwardly between the separating rods 30, and coiled around the rear drum 22 on the rear end of the frame in the carrier thence through the perforation 30 in the lower end of plate 29. The upper and lower ends 37—37^x of the cable or rope extend over the respective rotary reels 38—39 the reel 39 being mounted upon a fixed support 40 secured to the ground or other suitable base and the reel 38 being shown unsupported. Upon each wheel is a winding crank arm 41.

42 indicates a cable conduit.

In operation the rod 32 is withdrawn from the opening 31 in the forward connecting post 14 of the frame of the carrier thus permitting the arms 24 on the rock shaft 23 which are held within the frame of the carrier to extend upwardly under control of the spring 28. In this position of the arms 24 the carrier is introduced within one end of a cable conduit as seen in Fig. 1, the traction wheels 18 bearing upon the lower inner surfaces of the walls of the conduit and the spring controlled wheel 26 bearing upon the upper inner surfaces of the wall of the conduit.

The circuit as shown in the illustration may be employed for the purposes of insulating electro telephone and similar conducting wires, the length of which conduits are commonly maintained between manholes at considerable distances apart, and in order to draw the cables through the conduits pilot ropes must first be drawn through the conduit.

In the application of our invention to the purposes illustrated the novel carrier is introduced within the end of the conduit, with the traction wheel 26 bearing upon the upper surface of the conduit. The end 37 of the cable is then wound upon the reel 38 and the power applied to the said end of the cable rotates the drums 22 on the carriage in the direction of the tractive force on the cable and this power transmitted through the forward rotary shaft 16 rotates the wheels 18 in an opposite direction to that of the drum 22 in the circle of rotation thus drawing forwardly within the conduit the carrier frame which traverses the length of the conduit and at the same time unwinds the cable on the reel 39. A cord or rope 43^x is then connected with the staple 43 on the forward end of

the frame of the carrier and the carrier is now ready to return. The movement of the coils in the cable upon the drums is now changed. Power is applied to the crank arm 41 and the end 37^x of the cable is wound upon the reel 39 and the end 37 unwound from reel 38, the power exerted upon the coils of the rope upon the drums communicating a reverse rotary movement of said drum and the traction wheels 18 move rearwardly in their circle of rotation and with the carrier frame is drawn the pilot rope 43^x to the starting point in the conduit thereby installing the pilot rope in the conduit.

In the illustration of the invention as shown in Fig. 1 the winding drums are wide apart and within the coils of the cable. In passing over the joints in the sections of the conduit should depressions occur into which the forward or rear traction wheels may meet resistance or the movement of the carrier from rough surfaces be impeded the traction wheels may be brought closer in position as seen in Fig. 3. In this latter construction the traction wheels 44 are located adjacent to the outer surfaces of the side plates 45 of the carrier frame and mounted on the rotary shafts or axles 46. The rock shaft 47' carrying the spring controlled arms 48' and wheel 49' are located at the forward end of the frame of the carrier and are the same as in Fig. 1. The axles for the wheels 44 are located a short distance in rear of the forward end and also at a point intermediate the ends of said frame. The mechanism for propelling the carrier consists of two drums 47—48, arranged adjacent to each other at the rear ends of the frame of the carrier the shafts supporting the drums being located at points a short distance below the upper longitudinal surfaces of said side plates 45 and extending through one side of said plates upon which ends of the respective shafts are small spur gear 49. Beneath the spur gear 49 is a large gear 50 meshing with both spur gears 49 and journaled upon a stud shaft 51 on the outer surface of said side plate. The means for transmitting power to the wheels and causing the carrier to go forward or backward is by means of wrist pins 52 on the large gear wheel 50 and also the wrist pins 52 in the traction wheels 44. With these wrist pins are connected connecting rods 55 the connected rod on one side of the carrier frame being off the center from that on the other side of the frame as seen in Fig. 4. The cable 56 is coiled around both drums 47—48. In Fig. 4 the mechanism is similar to that seen in Fig. 1 the drum and gear wheels at the rear end of the carrier frame as seen in Fig. 1 being dispensed with and the cable connected at one end with and coiled around the end drum at the forward end of the carrier frame which is the same as the drum 22 in Fig. 1. Drawing power applied to the ca-

ble 60 causes the carrier frame to move forward in one direction as the drum is rotated in the direction of the drawing power applied to the end of the cable. In this instance the pilot rope is drawn into the conduit with the entrance of the carrier. It is obvious that the invention may be employed without the upper traction wheel 26 and that increase of weight upon the carrier frame increases the adhesive power of the traction wheels and these drums may be driven by any power applied to the cable.

The invention is applicable to any trackway, aerial or surface, or any conduit, the carrier being at any time movable in the conduit in any desired position in the line of travel.

Having fully described our invention what we now claim as new and desire to secure by Letters Patent is—

1. In cable operated carriers for conduits, the combination with the supporting frame, and the traction wheels therefor, of the drum on said frame, the rotary shaft supporting said drum, motion reversing devices communicating power to, and actuating the traction wheels in one direction of rotation and the drum supporting shaft in an opposite direction, and the cable wound on said drum imparting rotation thereto by means of the drawing power applied to the end of the cable, to unwind the said cable from the drum.

2. In cable operated carriers, the combination with the supporting frame the traction wheels at the ends thereof, the drum on said frame, the rotary shaft supporting said drum, reversing gear on said frame, power transmitting means communicating uniform motion in one direction of rotation from the reversing gear to the traction wheels, and in an opposite direction to the drum supporting shaft, and the cable wound on said drum, communicating rotary motion thereto, and to the traction wheels, by means of the application of drawing power to the end of the cable to unwind the same from the drum.

3. In cable operated carriers for conduits, the combination with the supporting frame, the traction wheels, rotary axles supporting said wheels, gear wheels upon said axles, drums mounted upon said frame, rotary

shafts upon said frame supporting said drums, spur gear on said latter shaft engaging with the gear wheels on the axles for said traction wheels, the cable coiled upon the said drums and actuated by drawing power applied to one end of the cable, to impart a forward movement, and to the other end a rearward movement of the carrier frame.

4. In cable operated carriers for conduits, the combination with the supporting frame and the traction wheels therefor, rotary axles supporting said wheels, spring controlled pivoted arms on said frame, the wheel carried by said arms adapted to come into contact with the upper surface of the conduit, drums on said frame, rotary shafts supporting said drums, reversing gear upon said shafts and the axles for the traction wheels, and the cable coiled upon said drums, actuated by the power applied to the respective ends of the cable.

5. In a pilot rope installing device for conduits, the combination with the supporting frame, and with the traction wheels, rotary axles therefor at the ends of said frame, gear wheels on said axles, drums upon said frame, and rotary shafts supporting said drums, spur gear upon said shafts, meshing with the gear on said axles, spring controlled pivoted arms on said frame, and the wheel carried by said arms, the cable coiled upon said drums, and cable reeling devices imparting power to the incoming end of the cable.

6. In a pilot rope installing device for conduits, the supporting frame having longitudinally extended sides, traction wheels and rotary axles therefor journaled in the sides of said frame, gear wheels on said axles, drums adjacent to said axles, rotary shafts supporting the drums on said frame, spur gear on said shafts meshing with the gear wheels on said axles, the cable coiled upon said drums, a perforate guide upon the rear end of said frame through which the ends of the cable are extended, and cable reeling devices adapted to pay out and wind up said cable.

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