

S. P. WATT.
CABLE TRAMWAY.

APPLICATION FILED JAN. 12, 1911.

Patented May 30, 1911.

2 SHEETS—SHEET 1.

993,423.

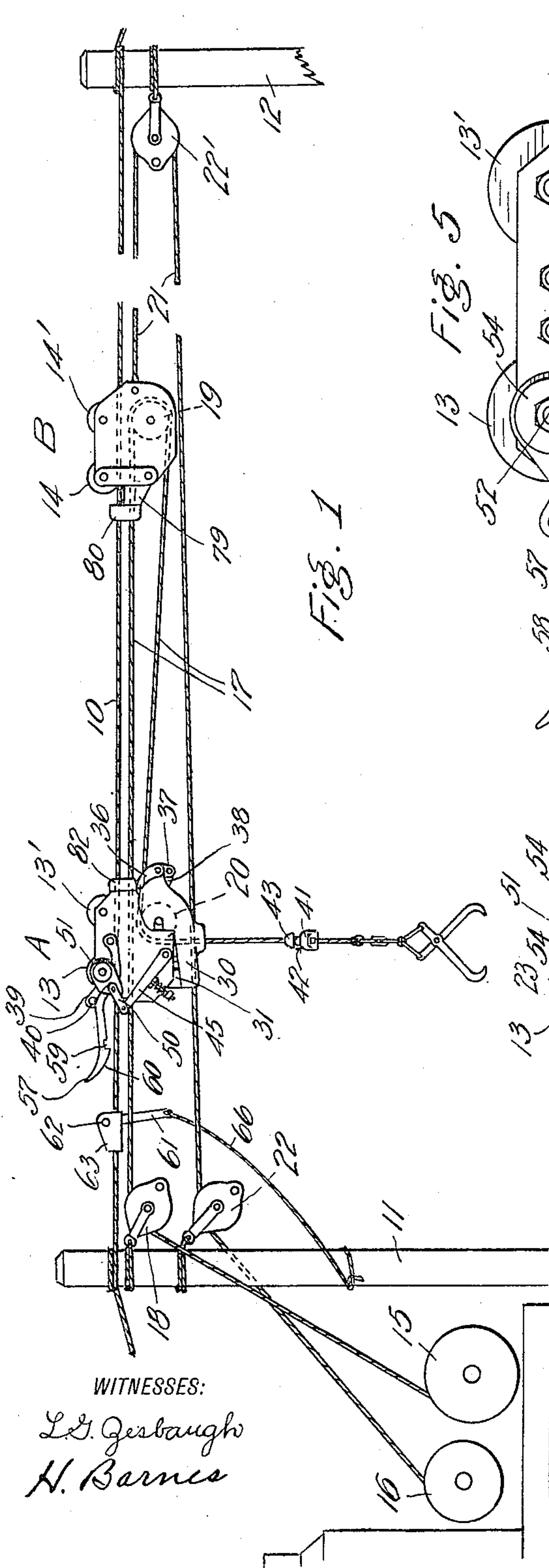


Fig. 1

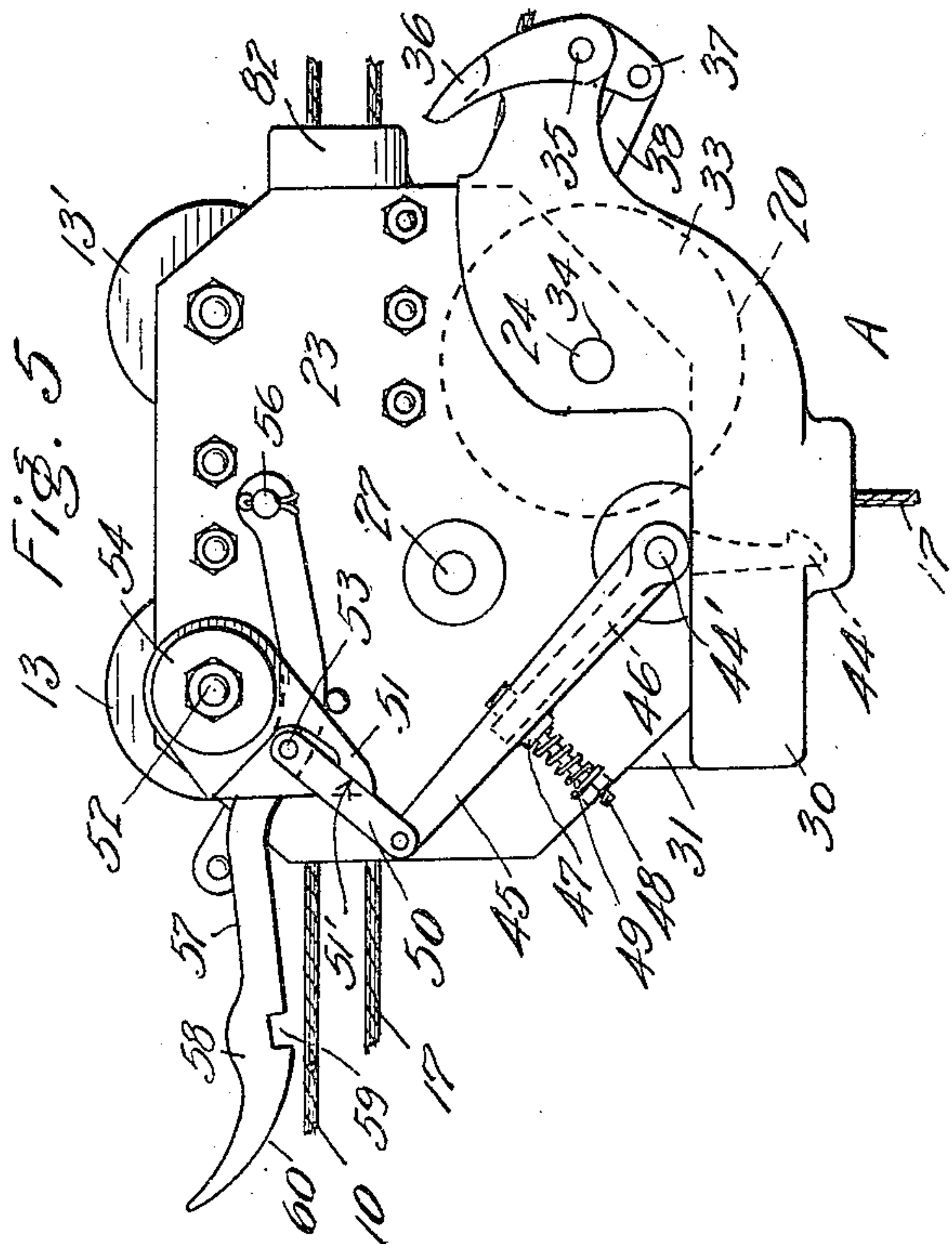


Fig. 5

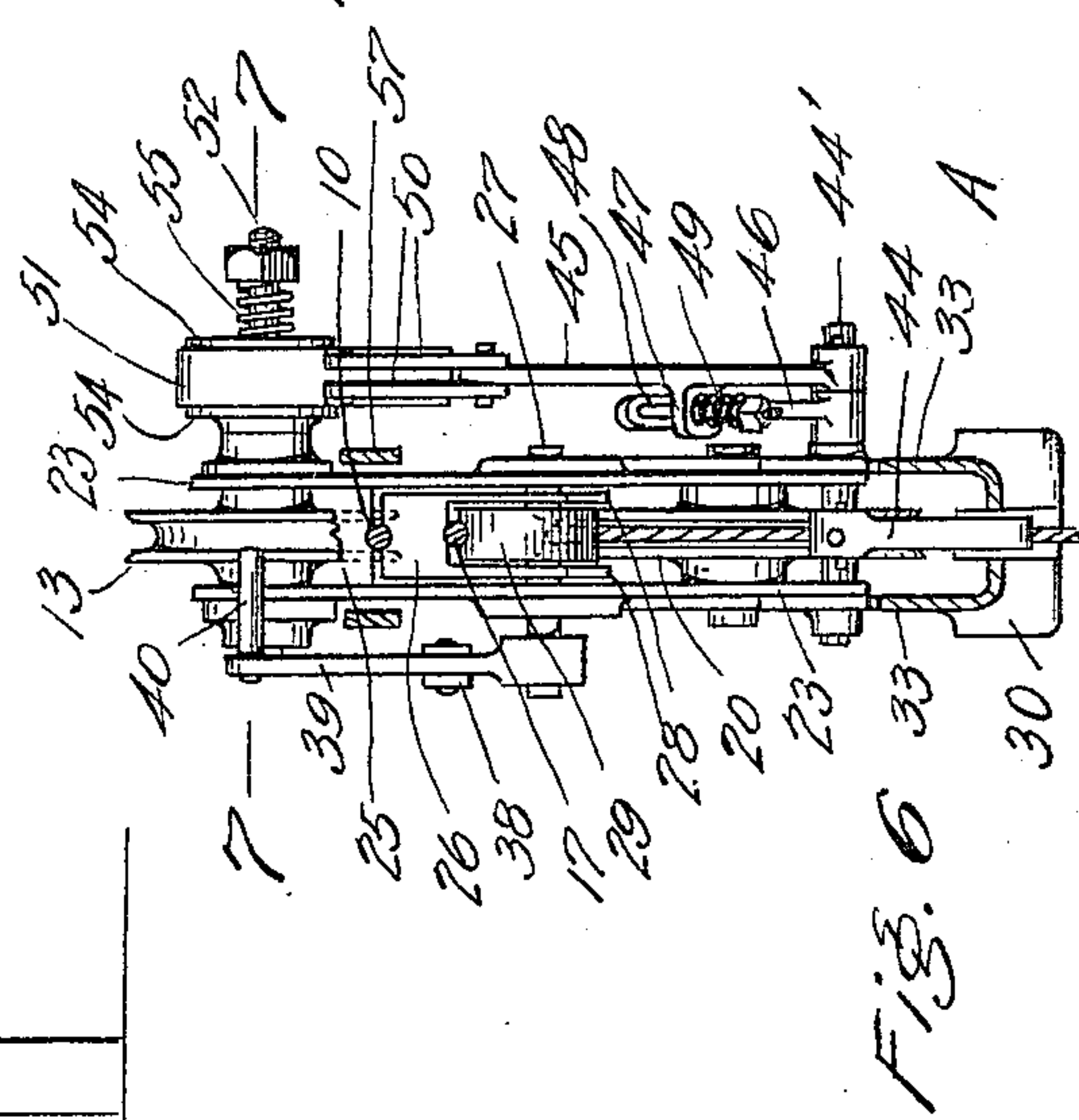


Fig. 6

WITNESSES:

L. S. Gerbaugh
H. Barnes

INVENTOR :

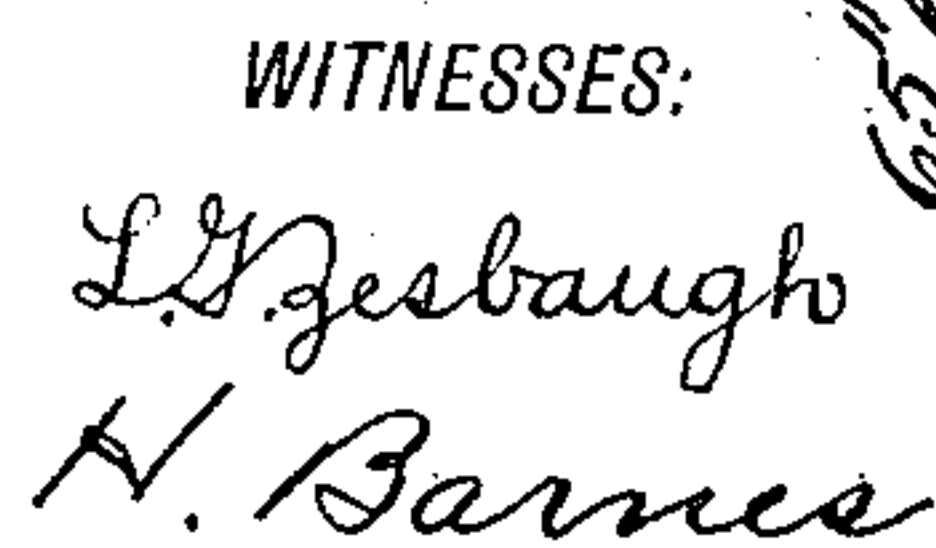
Sern P. Watt

BY

Pierre Barnes
ATTORNEY

993,423.

2 SHEETS--SHEET 2.



INVENTOR:
Sern P. Watt

BY
Pierre Barnes
ATTORNEY

UNITED STATES PATENT OFFICE.

SERN P. WATT, OF SEATTLE, WASHINGTON, ASSIGNOR TO WASHINGTON IRON WORKS,
OF SEATTLE, WASHINGTON, A CORPORATION OF WASHINGTON.

CABLE-TRAMWAY.

993,423.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed January 12, 1911. Serial No. 602,220.

To all whom it may concern:

Be it known that I, SERN P. WATT, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Cable-Tramways, of which the following is a specification.

This invention relates to aerial tramways having cables on which load carrying trolleys travel and are operable by lines controlled from power winding drums.

The invention is especially applicable to and is an improvement upon such apparatus employed in the conveyance of logs from and to various locations along the line. Its object is to afford efficient and conveniently controlled devices of this nature whereby the loads may be expeditiously handled.

With these and other ends in view, the invention consists in the novel construction and combination of parts, as will be hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a side elevation of apparatus embodying my invention. Fig. 2 is a plan view of the load carriage and trailer. Fig. 3 is a longitudinal vertical section of Fig. 2. Fig. 4 is an underside plan view of the load-carriage. Fig. 5 is a side elevation of the same. Fig. 6 is a front view thereof with parts broken away. Fig. 7 is a partial section taken through 7—7 of Fig. 6.

Referring to Fig. 1, the numeral 10 designates a cable serving as a track-way which is secured to supporting posts 11 and 12. Mounted for travel upon said cable is a trolley or load carriage A, and a supplementary carriage, or trailer B, supported by grooved traction-wheels 13, 13' and 14, 14', respectively.

15 and 16 represent rope winding drums of a hoisting engine, or other motor, which is located adjacent to the post 11. A hoisting and traveling line 17, hereinafter designated as the main line, from the engine drum 15, passes through a guide pulley 18 attached to the post 11, thence through the carriage A to and about a sheave 19 provided in the trailer B and then returns to the load-carriage where it passes over a sheave 20 provided therein to extend through the underside of the carriage. A second cable 21, hereinafter designated as the out-

haul rope, from the engine drum 16 passes through a guide pulley 22 on post 11 then through a pulley 22' on the remote post 12 and from there the rope extends to and is secured to the trailer B. Said load-carriage is desirably formed with a rigid frame or casing comprising two plates 23 which are spaced apart and wherein are journaled the axles of the respective traction wheels and the axle 24 of the sheave 20. Fixedly secured to said casing plates and directly above the trackway 10 is a block 25. Intermediate said trackway and the main line 17 is a second block 26 which is tiltably connected to a pin 27 through the medium of spaced arms 28 extending in a substantially horizontal direction forwardly from the pin and to within a short distance of the front of the casing. A third block 29 is disposed below the main line and is keyed or otherwise rigidly secured to the pin 27 so as to be oscillated therewith. The aforesaid blocks constitute gripping-jaws whereby the load carriage may be detachably connected with either the trackway or the main line, as required in the operation of the invention. The block 26 is controlled through the agency of a member 30 disposed longitudinally below said casing and provided at its forward end with an arm 31 extending upwardly within the casing to terminate with a hook 32 and a shoulder 32' between which the arms of the grip-block 26 are at all times operatively engaged. From its other end, said member is provided with two upwardly and rearwardly extending wings 33 which are apertured, as at 34, to receive a fulcrum support, such, for example, as the projecting ends of the aforementioned axle 24. To the rear of the casing, said wings afford a support for the fulcrum pin 35 of a lever having upwardly directed arms 36 which are integrally connected above the wings by a bridge element 36', and a downwardly directed arm 37. The last named arm is connected by a link 38 with an arm 39 which is keyed to the end of the pin 27 which carries the grip-block 29. This arm is arranged to extend in an inclined direction to in front of the casing and above the trackway and is provided with a finger 40 directed laterally over the latter. The member 30 is constructed to have the greater portion of its

weight anterior of the axis 24 of its oscillatory movement and, consequently, when the member is unconstrained, the forward end thereof will have a tendency to drop to
 5 actuate the block 26 with respect to the trackway 10, while the end carrying said lever will be correspondingly elevated.

There is clamped to the main line 17 and near its outer end a heavy body 41, desirably
 10 circular, formed medially of its height with a shoulder 42 whence extends upwardly a neck which is surmounted by a conoidal head 43. When the part of the main rope carrying said body is pulled upwardly in the
 15 hoisting operation, the head and neck of the body 41 are introduced into an opening therefor provided in the member 30 but, such opening being of less size than said body, the shoulder 42 of the latter will en-
 20 counter the member to swing the same from the position in which it is represented in Fig. 1 to that in which it is shown in Figs. 3 and 5. When thus moved, said body is arrested by the latch devices which I will
 25 now describe.

A hook 44, Fig. 3, is keyed or otherwise secured to a pin 44' extending transversely through the casing plates. Loosely mounted upon this pin is an arm 45, and also an arm
 30 46 which is rigidly secured to the pin. Secured to the arm 46 and extending through an apertured lug 47 of the arm 45 is a bolt 48 about which and interposed between the lug and the arm 45 is a helical spring 49
 35 whose main office is to afford resilient motion to the hook for engaging the latter under the head of the aforesaid body 41 without disturbing the arm 45. A two-part toggle element 50 connects the arm 45 with another
 40 toggle element 51 through which extends loosely the axle 52 of the traction wheel 13. The pivotal connection 53 between the above named toggle elements which is located intermediate the axle 52 and the extreme end
 45 of the element 51 is provided with lateral projections 51' to limit the swinging movement of the other toggle element in one rotary direction. The element 51 is yieldingly coupled to the axle 52 by being embraced between companion disks 54, see Fig.
 50 7, which are splined to said axle and made operative through the instrumentality of a helical spring 55 positioned between the outer of such disks and an adjustable nut screwed upon the threaded end of the axle.
 55 Hingedly connected by a pin 56 to the casing is a bail 57 projecting forwardly from the carriage and terminating in a tongue 58 which is provided with a notch 59 and having an upwardly inclined extremity, or bill
 60 60, there in front. Said bail is disposed to be between the aforementioned finger 40 and the trackway 10. Attached in a predetermined position to this trackway is a trip
 65 device comprising a lever 61 fulcrumed at 62

to a support 63 which is clamped to the trackway and provided with a channel 64 thereabove. Within the channel and connected to the lever 61 for movement therewith is an angle-shaped catch 65 whereof
 70 one of its diverging legs 65' is normally maintained by the weight of the lever 61 to be in a horizontal position and the other leg 65'' would then be directed downwardly, as shown in Fig. 3. The fulcrum of the lever
 75 61 is in alinement with the juncture of the catch-legs 65' and 65''. A line 66 is secured to the pendent end of lever 61 and extends within convenient reach of the operator, for example, the attendant at the hoisting
 80 engine.

Referring now to Figs. 2 and 3, the trailer B is provided with a frame having side plates 67 formed with bearings for the axles
 85 of the traction wheels 14, 14' and the axle of the sheave 19. Interposed between the frame plates is a pair of gripping members 68 and 69 which are designed to grip the main line 17 when the trailer is influenced by the outhaul rope 21. More particularly,
 90 the member 68 is suspended by spaced wing elements 70 at each side of the wheel 14 to the axle 71 of the same. The underside of this member is provided with a jaw 72 at the rear, a depending tooth 73 at the front
 95 end of the member, and with an intervening recess 74. The other member 69 is tiltably supported upon a pin 75 extending through the frame at a distance below and in the vertical plane, preferably, of the axis of
 100 the axle 71'. In its upper face this member is provided with a jaw 76 opposing the jaw 72 of the other member and is likewise provided with a recess 77 and a tooth 78, respectively interfitting with the tooth and
 105 recess of the other member. The member 69 is formed with a relatively heavy forwardly projecting portion 79 terminating in a socket 80 provided with a flaring or bell-shaped mouth 81. The weight of the part
 110 of the member 69 which is in front of its pivotal support 75 exceeds that of the part which is disposed upon the other, or jaw side, consequently the tendency of such unbalanced portion is to exert a limited grip-
 115 ping pressure against the main line contributory to a pressure being applied from the jaw of the other member by virtue of the above described interfitting teeth and recesses of the respective members. By the
 120 disposition of the weight, with relation to the jaws, it is to be noted that when a pull is exerted upon the outhaul line it will normally serve to swing the gripping members forwardly and allow of the gripping of the
 125 main line relative to the trailer.

The operation is as follows: The engine drum 15 is first operated for winding in the main line 17 to draw the carriage A and the trailer B to carry the tongue 58 of the car-
 130

riage bail 57 over the catch 65 and until the carriage casing is brought against the catch support 63. By then releasing the main line and employing the outhaul rope 21, a reverse travel is imparted to the carriage until interrupted by the hooked end of the bail encountering the catch to allow the latter entering the notch 59. The purpose of such reversal in the carriage's travel is to afford turning movements to the traction wheel 13 and the disks 54 to render the toggle elements 51 and 50 operative to swing the arms 45 and 46 for positioning the hook 44 to be engaged by the weight 41 when presented. To insure the weight 41 being thus presented, it may be necessary to further draw in the main line to which it is attached. The outhaul rope 21 is now actuated by the drum 16 to primarily draw the trailer B for a distance away from the carriage simultaneously with or subsequent to the release of drum 15 to pay out the main line sufficient to accommodate the outward movement of the trailer and afford slack line, so to speak, between the carriage and the trailer. Whereupon the catch 65 is manipulated to cause the leg 65'' thereof to be swung toward the post 11 through the medium of lever 61 and the attached rope 66, the leg 65'' being brought under the bill 60 will urge the bail upwardly to withdraw the notch 59 from the catch. The trailer being gripped by the gripping members 68 and 69 to the line 17 will cause the carriage, when freed, to accompany the trailer in its travel to the place for receiving the load. In such situation, the drum 16 is freed and a pull applied through the main line will result in a relatively small forward movement obtaining to the carriage to produce a rotary movement to the traction wheel 13 which is transmitted through the clutch elements 54 to influence the arm 45, through the medium of the toggle elements 51 and 50, whereby the associated arm 46 is, in turn, influenced to cause the hook 44 to be unlatched from the weight 41. Upon being released, this weight, supplemented by the weight of suspended grappling devices (such as hook, choker-strap or grappling tongs, which may be provided upon the end of the line 17) and assisted by the drawing of the trailer toward the carriage will result in a desired amount of the above mentioned slack being taken to the ground. Meanwhile, and through the withdrawal of the weight 41 which has previously supported the member 30 in its most elevated position, the effective weight of such member acts through arms 28 to elevate the block 26 into position to coact with the fixed block 25 for gripping the trackway therebetween to obviate any movement in the carriage which might interfere with the delivery of the slack line.

After securing the load to the main line as, for example, by means such as grappling

tongs T (Fig. 1) and while the outhaul rope remains free, the main line is again actuated to cause the trailer to be brought against the carriage when a knob 82 protruding from the rear of the latter is impacted against the inclined surface within the mouth 81 of the grip member 69 which then asserts itself (through the instrumentality of the meshing teeth 73, 78) to actuate the other grip member 68 whereby the main rope is effectually released by the jaws 76 and 72 of the respective members. In the performance of such duty, the bridge 36' of lever arms 36 is pushed downwardly against the wings 33 of the member 30 resulting in the tilting upwardly of the forward end of this member and the disengagement of the grip block 26 from the trackway 10. The grip block 26 is thus lowered upon the main line 17, but does not engage therewith inasmuch as the opposing grip block 29 has been retracted through the offices of the arm 39, link 38 and the lever arm 37 which was forced into action when the other arms 36, as above noted, were acted upon by the salient portion of the trailer grip-member 69. Under such conditions, the carriages are not directly coupled to any line or rope, so that a pull applied to the main line will serve to elevate the load and cause the progressive travel of both of the carriages to transport the load to the place of delivery. During such conveyance of the load, a counter pull is maintained in the outhaul rope sufficient to suspend the load at a desired height. The paying out of the main line will suffice to lower the load.

The finger 40, it is to be noted, is engaged by the bail 57 when the same is raised in mounting the catch 65. In the performance of which the arm 39 is effected to disengage the grip block 29—a function which may also be attained through the agency of link 38 when actuated by lever 36—37. Moreover, the finger being above the bail is free to rise without disturbing the bail from its engagement with the catch 65, as has been found essential when the aforescribed cycle of operation is to be repeated.

With this invention, the various operations of hoisting and conveying loads upon the aerial tracks are accomplished through the agency of two operating lines—the main line and the haul-back rope—which are themselves controlled by simply winding upon or paying out of the same from suitable power driven drums.

What I claim, is—

1. In apparatus of the class described, the combination of a trackway, a hoisting and hauling line, two carriages, mechanism provided on the respective carriages and adapted for engagement with said line, the mechanism upon one of said carriages being also adapted for engagement with the

trackway, and means whereby said mechanism may be actuated for selectively engaging the trackway or the line.

2. In apparatus of the class described, the combination of a trackway, two carriages thereon, a single hoisting and hauling line making a running engagement with both of said carriages, and means affecting both of said carriages whereby said line may be paid out to afford slack.

3. In apparatus of the class described, the combination of a trackway, two carriages thereon, a line making a running engagement with both of the carriages and serving selectively for load hoisting and carriage hauling purposes, an outhaul rope secured to one of the carriages, and means made operable through the instrumentality of the outhaul rope and said line whereby a load may be carried upon the line.

4. In apparatus of the class described, the combination with a trackway and two carriages thereon, of an outhaul rope secured to one of said carriages, a hoisting and hauling line, and means controlled by the action of said rope and line whereby the latter is operatively connected with one or the other of said carriages selectively.

5. In apparatus of the class described, the combination of a trackway, two carriages thereon, a hoisting and hauling line extending through both of said carriages, an outhaul rope secured to one of said carriages, devices controlled by said line and said rope whereby the carriages may be caused to travel together or individually in either direction upon the trackway.

6. In apparatus of the class described, the combination of a trackway, two carriages thereon, a single hoisting and hauling line coöperating to actuate both carriages, and an outhaul rope connected with one of the carriages.

7. In apparatus of the class described, the combination of a trackway, two carriages thereon, a single hoisting line employed with both of said carriages, an outhaul rope for one of the carriages and means whereby the two carriages may be detachably coupled together.

8. In apparatus of the class described, the combination with a trackway, two carriages thereon, a single hoisting and hauling line for both of said carriages, an outhaul rope secured to one of said carriages, and means actuated through the agency of said line and the rope whereby the carriage may be secured to the trackway.

9. In apparatus of the class described, the combination with a trackway, two carriages thereon, a single hoisting and hauling line for both of said carriages, an outhaul rope secured to one of said carriages, and means actuated through the agency of said line and the rope whereby the carriage may be

secured to the trackway and also arranged to be operated to cause either of said carriages to be secured to the line while the line has a running engagement with the other of the carriages.

10. In apparatus of the class described, the combination with a trackway, two carriages thereon, a single hauling and hoisting line coöperating with both carriages, an outhaul rope secured to one of the carriages, grip mechanisms for each of the carriages, and means for causing said grip mechanisms to become operable through the medium of said line and the rope whereby the carriages may be selectively engaged with said line and also affording means for engaging one of said carriages to said trackway.

11. In apparatus of the class described, the combination of a trackway, two carriages thereon, a hauling and hoisting line making a running engagement with both of said carriages, an outhaul rope secured to one of the carriages, grip devices provided in the other carriage, means made operable through the agency of said line and the rope whereby the carriage to which the rope is secured may be individually moved subsequent to actuating the grip devices for securing the other of the carriages to the trackway.

12. In apparatus of the class described, the combination with a trackway, a load carriage thereon, a sheave in said carriage, a second carriage also mounted on the trackway, and a sheave in the second named carriage, of an outhaul rope secured to said supplementary carriage, a hauling line passing about both of said sheaves and having a portion depending from the first named one, and devices regulated through the action of said line and the rope for paying out and taking up the referred to depending portion of the line.

13. In apparatus of the class described, the combination with a trackway, a load carriage thereon, a sheave in said carriage, a second carriage also mounted on the trackway and a sheave in the second named carriage, of an outhaul rope secured to the second named carriage, a hauling line passing about both of said sheaves and having a portion depending from the first named one, devices regulated through the action of said line and the rope for paying out and taking up the referred to depending portion of the line, and means actuated by the line and rope for releasably securing said line to the carriages whereby the same may be hauled upon the trackway with an attached load for depositing the load at a predetermined location.

14. In apparatus of the class described, the combination of a trackway, a load carriage traveling thereon, and provided with a rope sheave, a second carriage also travel-

ing on the trackway and provided with a rope sheave, a hoisting and conveying line passing through the load carriage and thence about the sheave in the second named carriage and finally over the sheave of the load carriage, an outhaul rope secured to the second named carriage, and coöperating mechanism carried by the carriages and made operative through the agency of said line and rope whereby said line may be controlled to first pay out the line to be secured to a load, then haul in the line to raise the load, then effect the travel of both the carriages to transport the load, and finally to pay out the line for depositing the load.

15. In apparatus of the class described, the combination of a trackway, a carriage thereon, a single hoisting and hauling line making running engagement in the carriage, an outhaul rope connected with the carriage, devices hingedly connected with the carriage and provided with a hooked end projecting forwardly therefrom, a catch on the trackway arranged for releasably engaging said devices, grip elements provided in the carriage for gripping either the line or said trackway, one of said elements being operatively connected with said devices, a member suspended from the car-

riage and operatively connected with the other of said grip elements, and means provided upon said line and controlled thereby for causing the member to coöperate with said devices to effect the gripping of the line by said grip elements subsequent to the release of said devices from said catch.

16. In apparatus of the class described, the combination of a trackway, two carriages thereon, a hoisting line arranged to support a load from one of the carriages, an outhaul rope secured to the other carriage, said line and rope coöperating for effecting the tractive movements of either of said carriages and likewise serving to regulate their relative positions on the trackway.

17. In apparatus of the class described, the combination of a trackway, a load supporting carriage and a trailer on said trackway, an outhaul rope secured to said trailer, and a line making a running engagement with both the carriage and the trailer, said line being arranged to be selectively employed for hoisting or hauling purposes.

SERN P. WATT.

Witnesses:

PIERRE BARNES,
E. PETERSON.