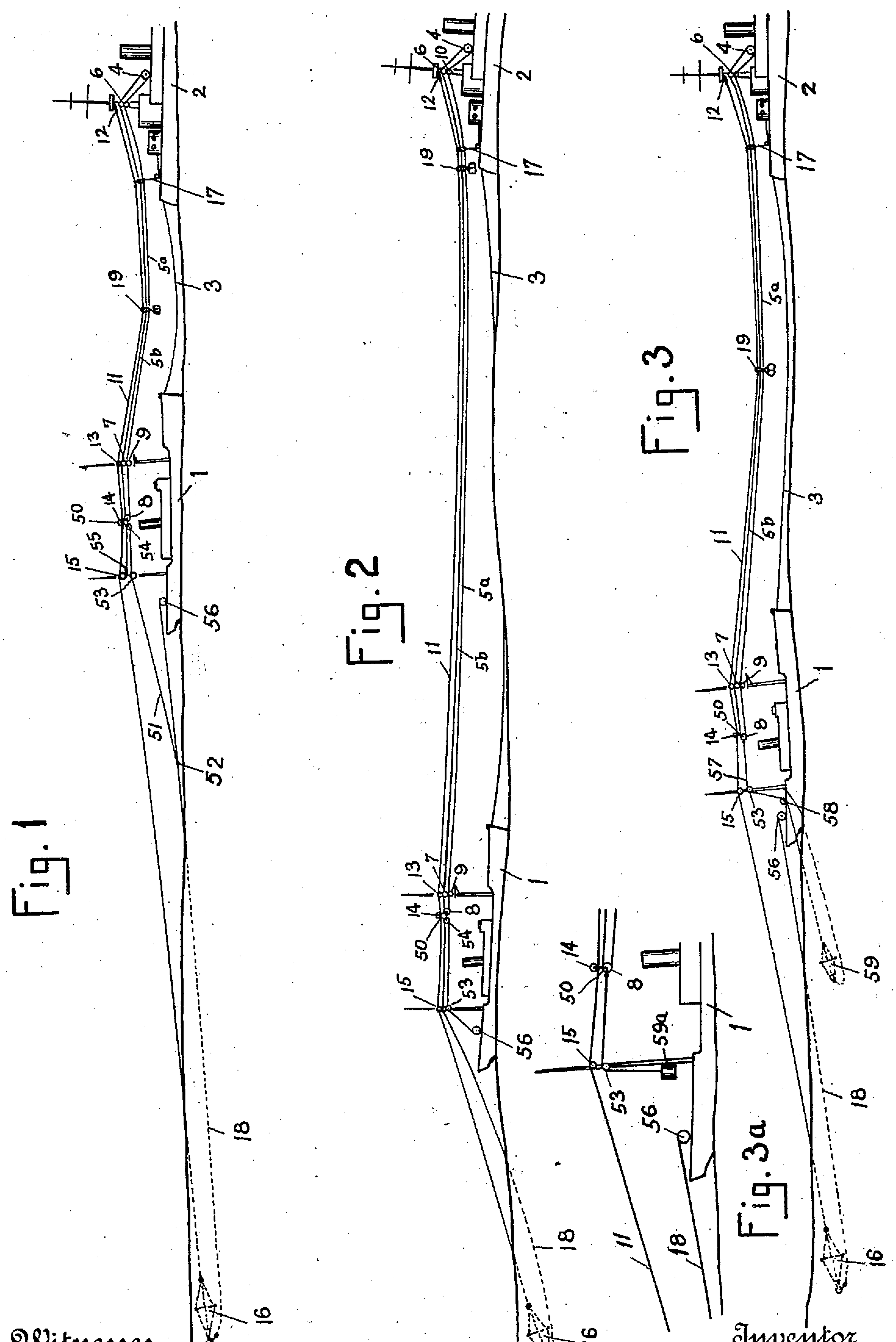
No. 889,387. PATENTED JUNE 2, 1908.

T. S. MILLER.

MARINE CABLEWAY.

APPLICATION FILED JUNE 20, 1904.

3 SHEETS—SHEET 1.



Witnesses

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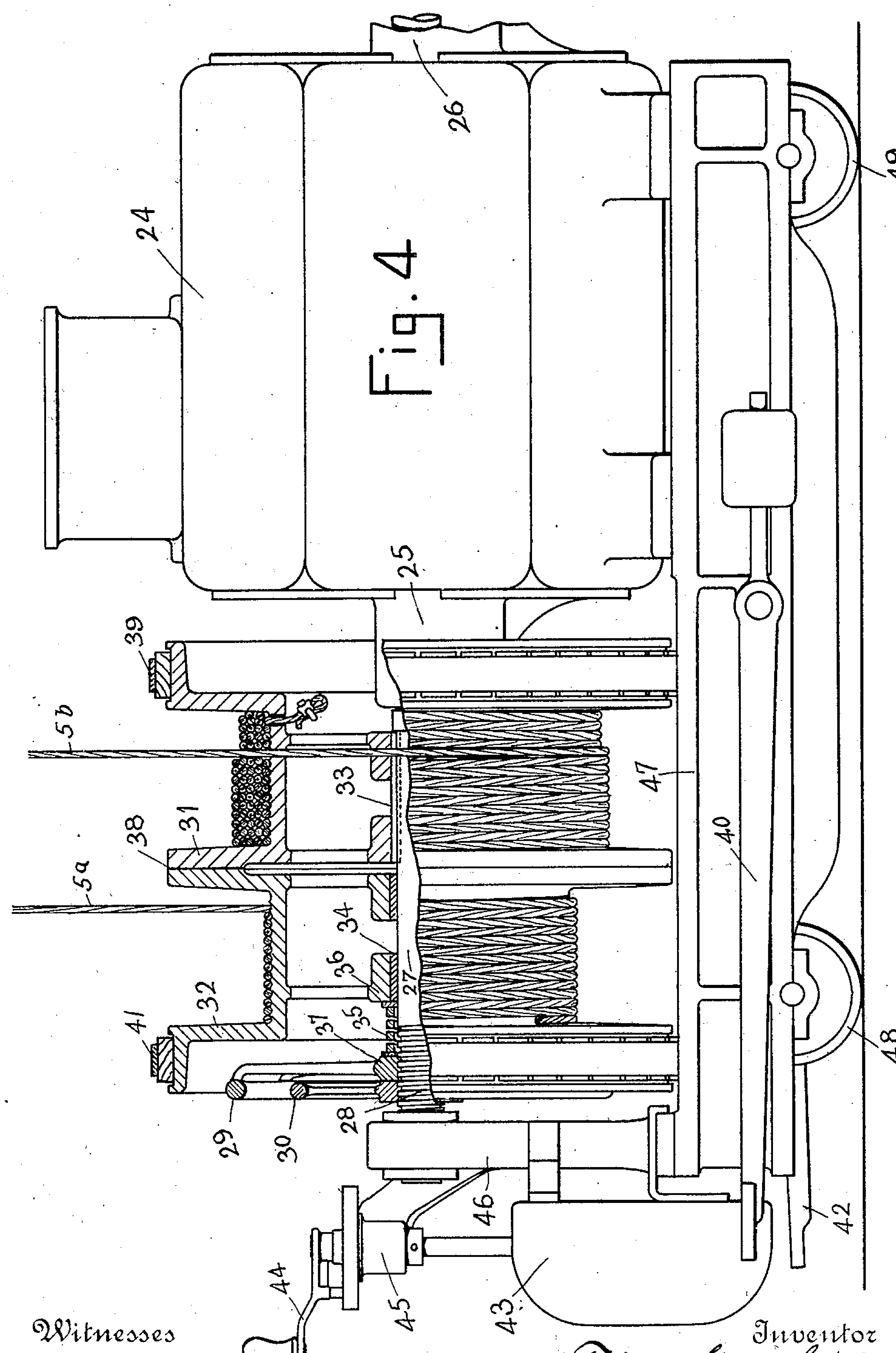

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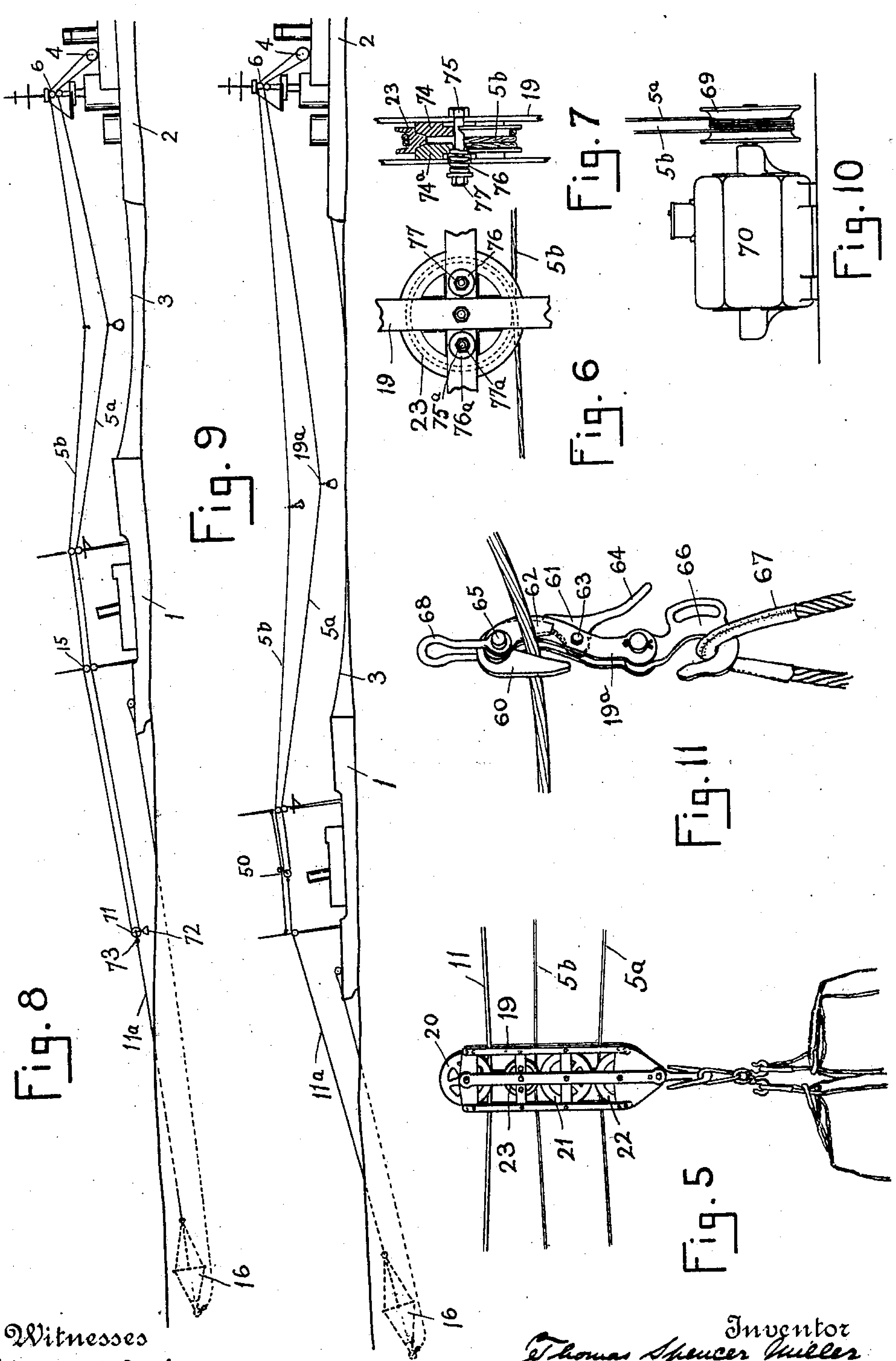

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UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF SOUTH ORANGE, NEW JERSEY.

MARINE CABLEWAY.

No. 889,387. Specification of Letters Patent. Patented June 2, 1908.

Application filed June 20, 1904. Serial No. 213,339.

To all whom it may concern:

Be it known that I, Thomas Spencer Miller, a citizen of the United States, and a resident of South Orange, Essex county, and State of New Jersey, have invented a new and useful Improvement in Marine Cableways, of which the following is a specification.

In my Patents Nos. 759295, 736996 and 637142, I have shown marine cableways in various forms in which the transit or traction rope is substantially endless; the variations in said rope required by the relative movement of the vessels being provided for by a tension applied to a loop of said rope. In my Patents Nos. 691911 and 637143, I have shown marine cableways in various other forms in which the transit or traction rope is not endless; the variations in the same required by the relative movement of the vessels being provided for by a relative movement between the actuators controlling, respectively, the opposite ends of said rope. Said two systems possess, respectively, certain advantages and disadvantages and the object of my present invention is to combine in one system the advantages of both the above without their disadvantages.

One of the advantages of the endless rope system is that the transit or traction-rope may be propelled by a single actuator while one of the advantages of the nonendless rope system is the unlimited latitude that it affords for variation in distance between the two vessels.

One feature of my present invention consists in the fact that while in normal operation for a given length of tow line, the actuator for the transit or traction-rope may act substantially as a unit, nevertheless in case of the extension or breakage of the tow line, the transit or traction-rope may pay out to suit the requirements and prevent breakage.

Figures 1, 2, 3 and 3^a show slightly different modifications of my device in which a load carriage is employed reciprocating between a collier and a warship, the former in tow of the latter. Fig. 4 is the preferred type of winding mechanism for operating either one of the above three constructions. Fig. 5 shows the details of carriage shown in Figs. 1, 2 and 3. Figs. 6 and 7 are details of the rope grip being a part of the carriage shown in Fig. 5. Fig. 8 represents a further modification whereby an endless rope constitutes the means of supporting as well as transporting the loads. This may be operated either in alternation or continuously in one direction. The winch shown in Fig. 10 may be employed to operate this form. Fig. 9 illustrates a further modification whereby both branches of the rope forming the cableway are employed for supporting as well as transporting a load, and these lines work in alternation; they may be operated by the winding mechanism shown in Fig. 4. Fig. 10 shows a form of winding mechanism which may operate the form of cableway shown in Fig. 8. Fig. 11 shows the style of hanger or load carriage employed in carrying coal in plan illustrated in Figs. 8 and 9.

In all the figures, 1 is the collier or towed ship. 2, the warship or towing ship. 3, the tow line between the same. It is preferable that operating mechanism for the marine cableway be placed on the towing ship, as shown.

4 is the transit motor which is preferably located on the warship.

5^a and 5^b are the two runs forming the transit or traction-rope which extends from the motor 4 over the sheave 6 on the warship, across the span, over the sheave 7 on the foremast of the collier, around the sheave 8 and back again over the sheave 9 on the mast of the collier, across the span, over the sheave 10 on the warship to the transit motor.

11 is the supporting rope, the forward end of which is made fast at 12 to the mast of the warship, or may be supported on the mast or other elevated support and then secured to any other part of the warship. This rope extends thence rearwardly across the span over the sheave 13 on the foremast of the collier, under the sheave 14, over the sheave 15 on the rear mast of the collier to the sea anchor 16.

17 is the down-haul rope shown in my application, Serial No. 45432, filed Jan. 31, 1901.

18 is the sea-anchor-trip-rope which has heretofore been essential for the recovery of the sea anchor but upon which I now impose an additional function.

19 is the load carriage, shown in detail in Fig. 5, containing the wheel 20 running on the supporting rope 11; also the wheels 21 and 22 to guide the lower run of the transit-rope; also the grip in contact with the branch 5^b of the transit-rope, and the preferable form of which will be more particularly described hereafter.

The transit-motor 4 is shown in detail in Fig. 4. 24 is a motor, shown as an electric motor, provided with bearings 25 and 26 and operating a shaft 27 through the same extending outwardly in one direction. This shaft revolves with the motor at all times. The operation of this electric motor is no different from that of any other electric motor; that is to say, the current is turned on the electric motor by the lever 44 and motion thereby given to the drums 31 and 32. It is also essential that this motor be provided with a reversing switch so that it may run in either direction. Near the outer end of the shaft 27, threads 28 are provided upon which operate the hand wheels 29 and 30; one forming a lock-nut for the other. Mounted on this shaft, are two drums 31 and 32. The drum 31 is fixedly secured to the shaft by the key 33, or in any other manner. The drum 32 is looesly mounted upon the shaft 27 and provided with soft metal bushings 34. 35 is a spring engaging with the hub 36 of the drum 32. The spring 35 also engages with the hub 37 of the hand wheel 29. It is clear, therefore, that if the hand wheel 29 be revolved relatively to the shaft 27, it will either increase or decrease the compression of the spring 35. The drum 32 has frictional driving contact with the drum 31 by the surfaces 38; that is to say, the flanges of drums 31 and 32 are faced off and are held in contact with each other by the pressure transmitted through the spring 35. This pressure may be regulated in the construction of the spring and also by the amount of its compression as given by the hand wheel 29. 39 is the ordinary form of foot-brake for the drum 31 operated by the foot-lever 40. 41 is a corresponding foot-brake for drum 32 and operated by the foot-lever 42.

43 indicates an electric controller and 44, a handle for operating the same. The controller handle 44 is supported by the bracket 45 attached to the end stand 46 which forms also the outward bearing of the extended shaft 27. The motor and the drums are shown mounted upon a bed-plate 47 which is provided with wheels 48 and 49. The wheels provide means for moving the electric winch from place to place in a convenient manner.

In the operation of the cableway shown in Figs. 1, 2 and 3, the load-carriage 19 is caused to move to and fro between warship and collier by the transit motor 4. In this operation, the upper run of the transit-rope 5^b is wound upon the drum 31. This causes the carriage with its load to be pulled toward the warship carrying the transit motor. At the same time that rope 5^b is being wound in, rope 5^a is being paid out. It will be observed, however, that the speed of winding in the rope 5^b may be either more or less than the speed of paying out the rope 5^a; this being due to the fact that as the rope is wound upon the drum, the effective diameter of the drum is increased, while on the other hand, as the rope is being paid out the effective diameter is being reduced. I propose to compensate for this difference by providing a tension carriage 50. This tension carriage has a wheel 14 adapted to travel along the cable or supporting rope 11, preferably between the masts of the collier. This tension carriage will be provided, also, with a pulley 8 about which the transit-rope forms a loop. It is essential that both branches of the transit-rope 5^a, 5^b, between the carriage 19 and the tension carriage 50 shall be provided with a reasonably constant tension. It is also desirable that the carriage 50 have a considerable range of operation. The method by which I provide a constant pull on the tension carriage 50 in opposition to the pull of the transit rope is shown in modified form in Figs. 1, 2, 3, and 3^a. In Fig. 1, I provide a rope 51 attached to the trip-line 18 at 52. This rope is led upwardly over a pulley 53 on the main mast, thence about the pulley 54 on the tension carriage 50, thence rearwardly and secured to the main mast at 55.

The trip-line 18 offers a certain amount of resistance in being drawn through the water. If this resistance is inadequate, it may be increased by the addition of disks. One end of the trip-line is secured to a common winch 56 on the stern of the towed ship and by it the tension due to the trip-line can be somewhat regulated. In Fig. 2, I show the trip-line 18 passing about a pulley on the main mast of the collier, thence around a pulley 54 in the carriage 50, thence backward to the pulley 53 on the main mast, thence downward to the winch 56 on the stern of the towed ship. In Fig. 3, I indicate a single line 57 attached to the carriage 50, led from thence to the pulley 53 on the mainmast of the towed ship, thence downwardly to a pulley 58 located at the side of the ship and thence to a small sea anchor 59. I do not wish to limit myself to any particular means of maintaining this tension on the tension carriage 50, for it is clear that a counterweight 59^a in Fig. 3^a might be substituted or an additional winch, or any other means for maintaining a reasonably constant tension on the tension carriage 50.

In Fig. 1, I show the two ships being towed with a short tow-line which is permissible in the event of the sea being comparatively smooth. If the sea should become disturbed, the tow line can be paid out and the collier will then settle back in conformity with the added length of the tow-line 3. When this takes place, the tension carriage 50 will collide with the foremast of the collier. The effect of this will be to cause the drum 32 on the transit motor 4 to slip and pay out the required rope to permit of the increased span. By reducing the pressure between the two drums 31 and 32, the tension device acting upon the tension carriage 50 will cause the same to move rearwardly until it arrives at approximately the center of the span between the two masts of the towed ship. The pressure between the two drums 31 and 32 is then increased by screwing up on the hand wheel 29 and the operation can be controlled as before. Thus, it will be observed that the movement of the tension carriage 50 will conform not only to the pitching of the towed ship 1, but also for the inequality of effective diameter of the rope drum 31 and 32.

In Fig. 9, I show a further modification of my invention in which the transit ropes 5^a and 5^b not only transport the load between the ships but support it as well. In this view, the transit motor 4 operates the same as in Figs. 1, 2 and 3, with the following exception: Each branch of the rope may carry a load; that is to say, when the branch 5^a is moving from the towed ship to the towing ship it can carry a load with it and an empty carriage can be returning on branch 5^b. As soon as the transit rope is arrested so as to permit the unloading at the warship end, a load can then be placed upon the branch 5^b; the operating winch or tension motor 4 is then reversed and the load is carried over on branch 5^b and the empty carriage returned on branch 5^a. It is clear, however, that a larger drum and stronger rope will be required to carry a substantial load between the vessels. It will also be observed that in this case the main sea-anchor-line 11^a is attached directly to the tension carriage 50.

When operating the device indicated in Fig. 9, I employ a different form of load carriage shown in Fig. 11. 60 is the tongue of a hook adapted to engage either branch of the transit rope 5^a or 5^b. This tongue is held from revolving by virtue of the latch 61 engaging with the shoulder 62. The latch 61 is pivoted at 63 and is also provided with a handle 64. Inward pressure on the handle 64 will cause the latch to rotate about the pivot 63 which, in turn, will release the shoulder 62 and permit the tongue 60 to revolve upwardly on the pivot 65. Thus, the load will fall from the cable.

To the lower end of the carriage 19^a, shown in Fig. 11, I pivot a hook 66 to which is attached a load, which may be a bag of coal. 67 shows the bail of such a bag. 68 shows a loop in the upper part of the carriage 19^a which is used for hoisting the carriage 19^a with its load from the deck of the towed ship to the mast-head of the same where it may be attached to either branch of the transit rope 5^a or 5^b.

In Fig. 8, I indicate a still further modification in which the transit rope 5^b and 5^a is shown with its ends spliced together forming an endless rope. Such a rope may be operated by the drum 69 shown in Fig. 10, which also indicates both branches of the transit rope; one branch being wound on at the same time that the other is being paid out. The motor 70 may be of any form capable of being reversed. It is clear that an endless rope does not permit of being elongated and, therefore, I provide in the outboard loop of the same a pulley 71 mounted in a frame. Below the pulley 71 is suspended a weight 72, the object of which is to prevent the pulley 71 from revolving. 73 is a swivel by which the sea-anchor-line 11^a may revolve freely without causing the pulley 71 to revolve. If it is desired to extend the distance between the ships, the tow-line 3 is paid out. The towed boat will then settle back. It is clear, however, that it will not be admissible for the towed boat to recede from the towing boat sufficiently to allow the pulley 71 to collide with the pulley 15 on the main mast of the collier. It is clear that with this form, the transit motor 4 may operate continuously in one direction, if desired, and loads may be placed upon the lower branch 5^a as frequently as desired. In this event, of course, branch 5^a would carry the loads to the towing ship while branch 5^b would carry back the empty carriages 19^a and the empty bags 67. On the other hand, the motor can, if desired, be operated in the same manner as in Fig. 9; that is to say, it may be reversed after each load is delivered.

Figs. 6 and 7 show details of a grip which forms a part of the carriage 19, shown in Fig. 5. 23 represents a metallic ring. 74 and 74^a indicate disks which are caused to be pressed against the beveled sides of the ring 23. Passing through the side frames of the carriage 19, are bolts 75, 75^a. Mounted near one end of the bolts 75 and 75^a are springs 76 and 76^a and nuts 77 and 77^a. The springs 76 and 76^a press against the disk 74^a. By tightening the nut 77, the spring will be compressed which will regulate the pressure between the plates or disks 74 and 74^a. The importance of this slipping grip can be appreciated by reference of Figs. 1, 2 and 3. In the event of the carriage 19 colliding suddenly with the pulleys 13 and 7 on the foremast of the towed ship, this grip will permit the carriage to be slipped relatively to the transit rope 5^b; that is to say, the carriage will remain in contact with the pulleys of the foremast of the towed ship while the conveyer rope 5^b may slip through the same. Another advantage of this grip over my previous forms as shown in my previous patents, is that the holding pressure is independent of the strain upon the transit rope. In my previous forms of grip, if the transit rope were slack, the grip was reduced while if the transit rope were taut the grip or the holding power was increased. With this form of grip, the holding power is regulated wholly by the springs 76 and 76^a and the nuts 77 and 77^a.

I do not wish to limit myself to the exact forms shown, for it is clear that many modifications may be made in the details of my device without departing from the spirit of my invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. In combination, a towing boat, a towed boat, a tow-line, an elevated rope forming a trackway attached to the towing boat passing over and being supported by a pulley on the towed boat and extending astern of said pulley to a tension take-up device, a transit motor provided with two winding drums located on the towing boat, a transit rope and a load carriage; said transit rope leading from one drum to the load carriage, thence to the towed boat and forming a loop about a tension carriage and returning by an approximately parallel route to the remaining drum of the transit motor; said two drums having a frictional driving engagement between the same.

2. In a conveying device, in combination, a main cable or trackway, a load-carriage traveling thereon, a transit rope for moving the load carriage to and fro on said cable or trackway, a pair of drums for driving said transit rope having frictional driving engagement with each other, a tension carriage containing a pulley about which the said transit rope forms a loop, a counterpoise acting on said tension carriage in opposition to the pull of said transit rope.

3. In a conveying apparatus, in combination, two relatively movable supports, a trackway, a load-carriage traveling on said trackway, a transit rope, means for actuating said rope, a tension carriage connected to said transit rope and adapted to move along the trackway, and means for maintaining tension upon the tension carriage.

4. In a conveying apparatus, two relatively movable supports, a trackway between said supports, a carriage for said trackway, a transit rope having two branches, a transit motor containing two relatively movable actuators, one for each branch of the rope, and a tension device movable along said trackway and operating upon said transit rope adapted to accommodate the same to relative movements of said support.

5. In combination a towing boat, a towed boat, a tow line connecting said boats, a transit rope, a transit motor for the transit rope acting substantially as a unit, and adapted to accommodate itself to variations during normal operation, said transit motor being adapted to pay out and take in said transit rope to permit the latter to accommodate itself to variations in the tow line.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

THOMAS SPENCER MILLER.

Witnesses:
RICHARD W. SEABURY,
CHARLES W. TRIBKEN.