No. 875,199. PATENTED DEC. 31, 1907.

T. S. MILLER.

CONVEYING APPARATUS.

APPLICATION FILED APR. 21, 1906.

6 SHEETS—SHEET 1

Fig. 1.

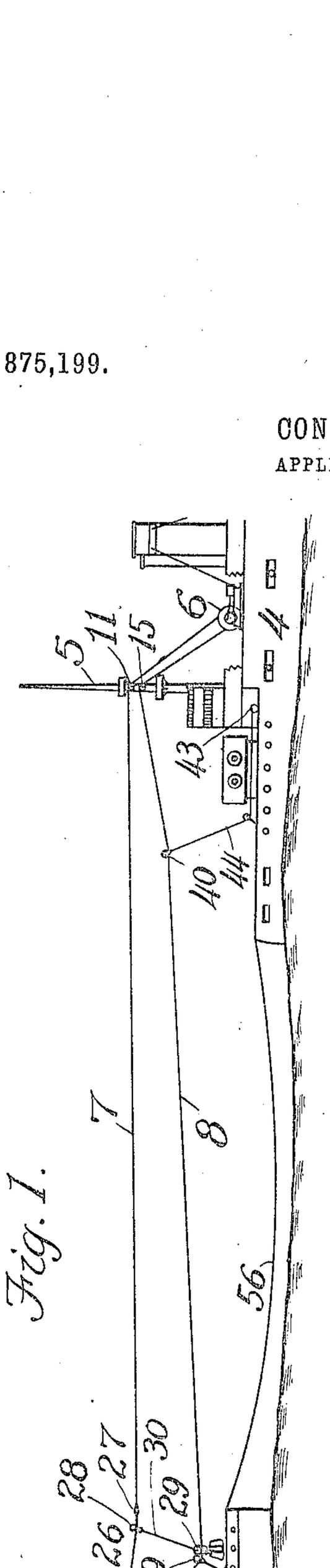


Fig. 2.

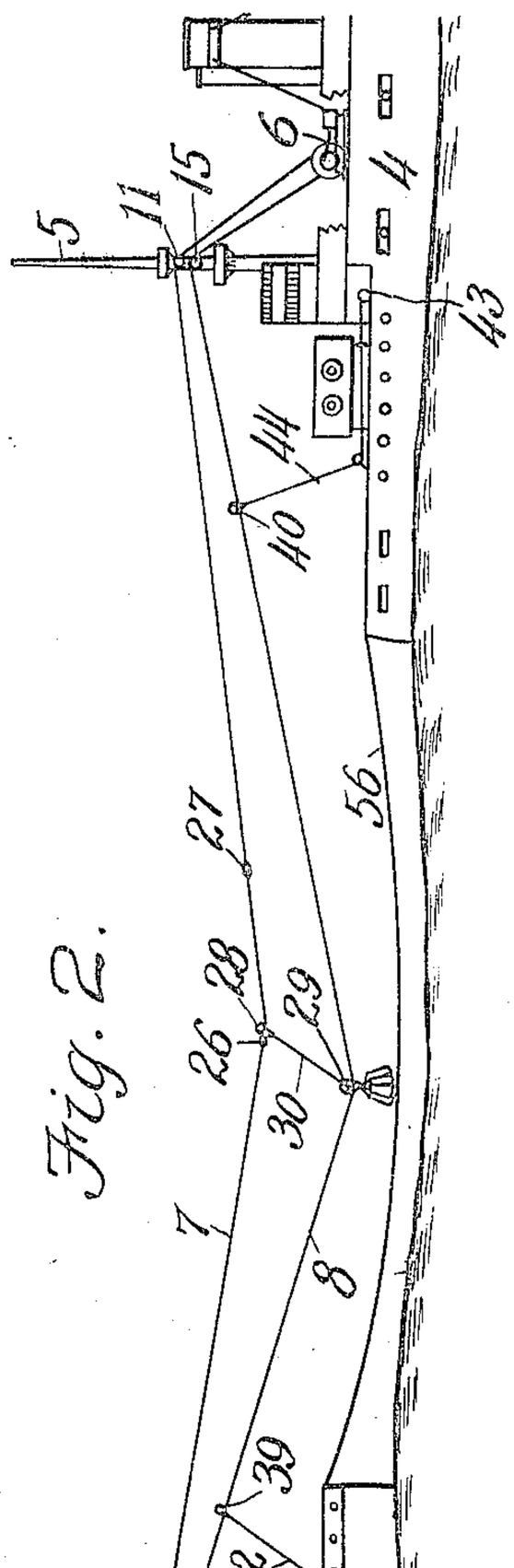
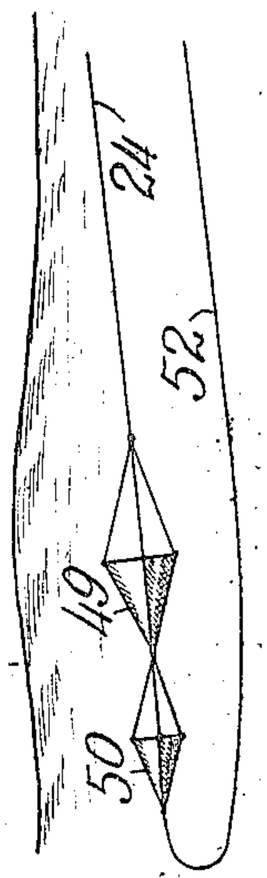


Fig. 10.



Witnesses
Ernest Publyford
Wm. E. Paulding

Inventor
Thomas Spencer Miller
By his Attorneys
Gifford & Bacon

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T. S. MILLER.

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5 SHEETS—SHEET 2.

Fig. 3.

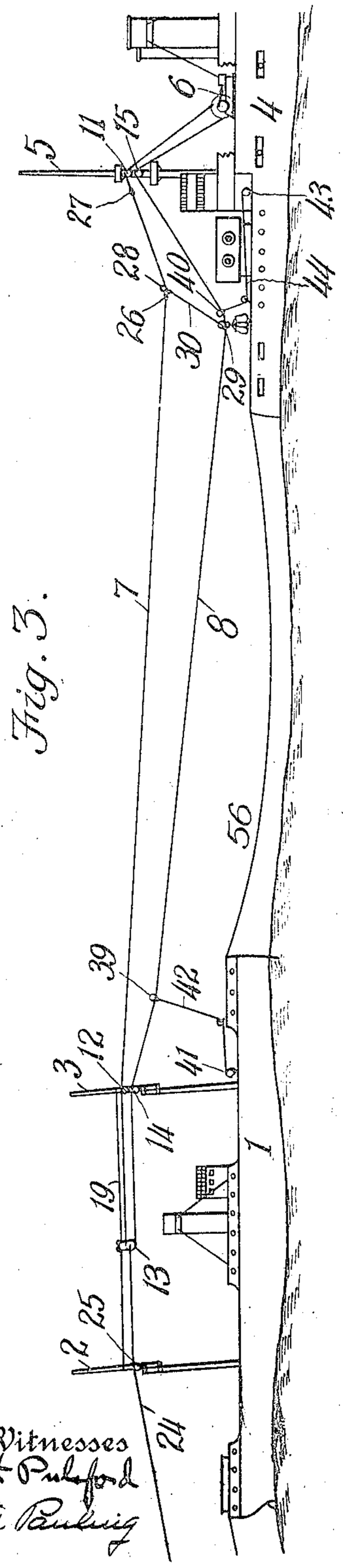


Fig. 4.

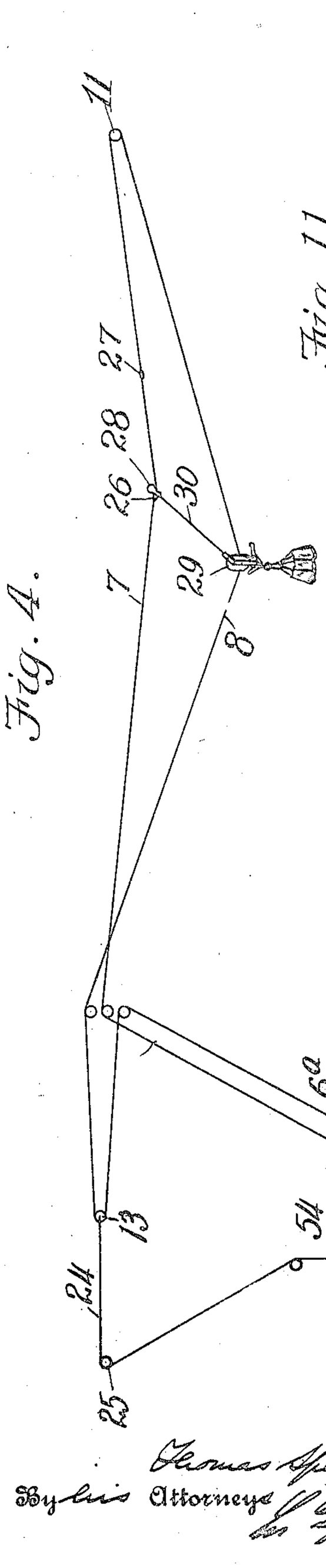
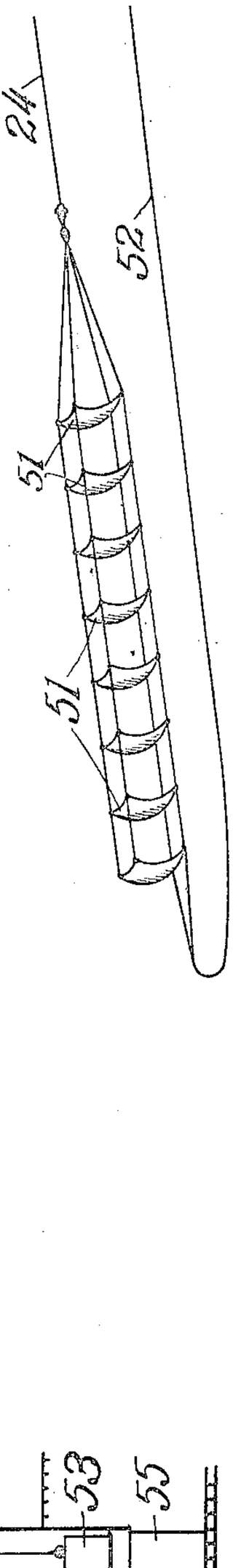


Fig. 11.



Witnesses
Ernest Pickford
W. A. Parkinson

Inventor
Thomas Spencer Miller
By his Attorneys
Wright Brown & Quinby

No. 875,199. PATENTED DEC. 31, 1907.

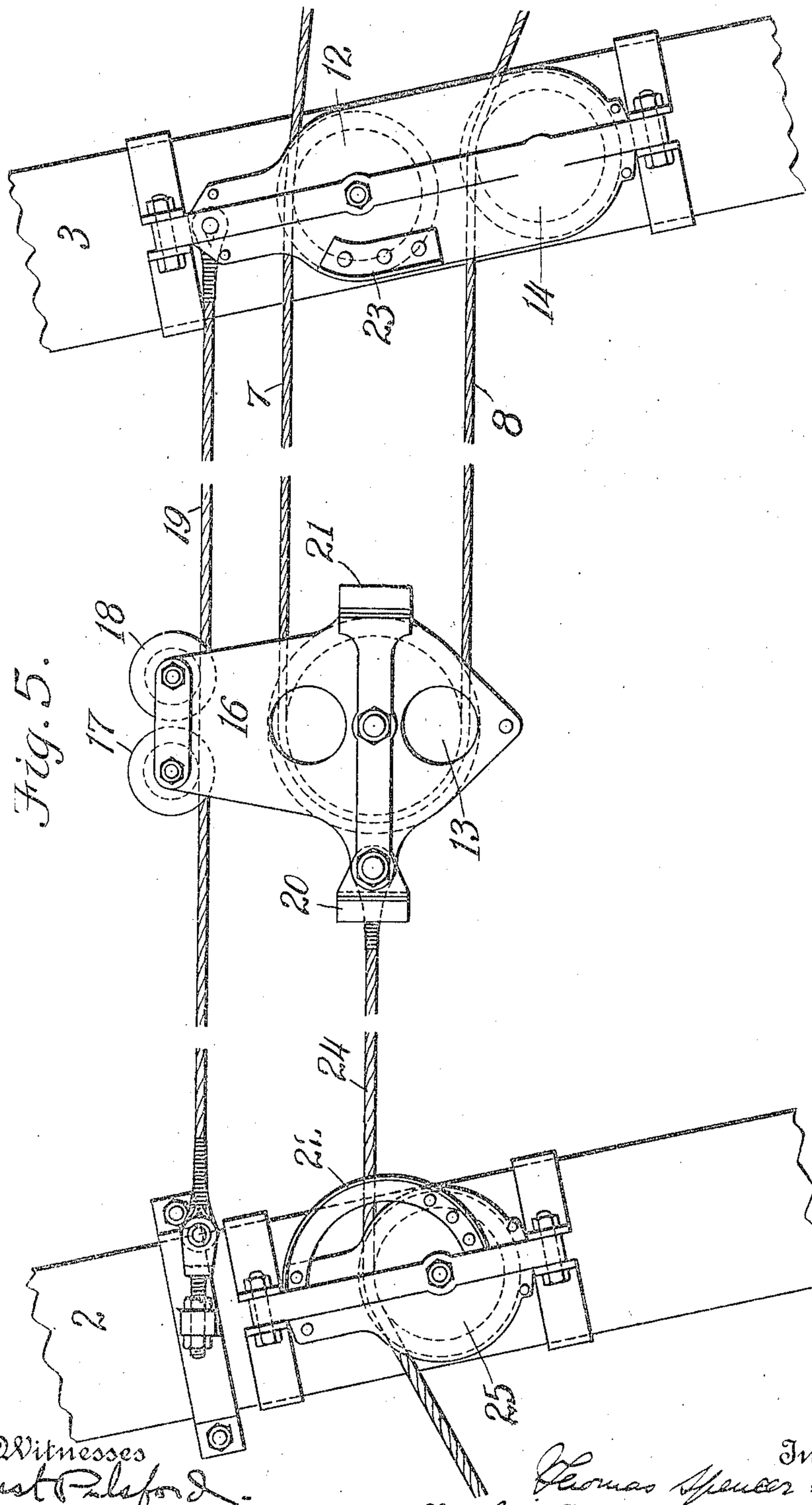
T. S. MILLER.

CONVEYING APPARATUS.

APPLICATION FILED APR. 21, 1906.

5 SHEETS—SHEET 3.

Fig. 5.



Witnesses
Ernest Palsford.
W. A. Barling

Inventor
Thomas Spencer Miller
By his Attorneys
Griffin & Brace.

No. 875,199. PATENTED DEC. 31, 1907.

T. S. MILLER.

CONVEYING APPARATUS.

APPLICATION FILED APR. 21, 1906.

5 SHEETS—SHEET 4.

Fig. 7.

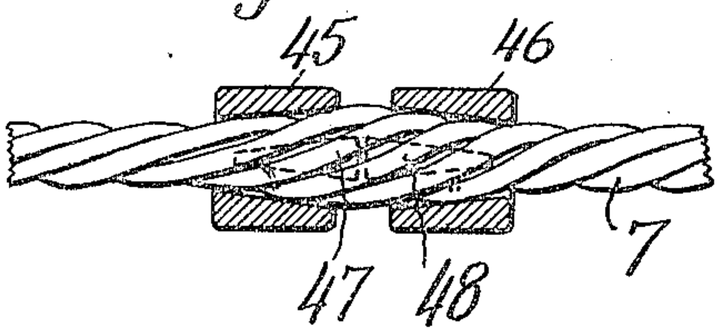
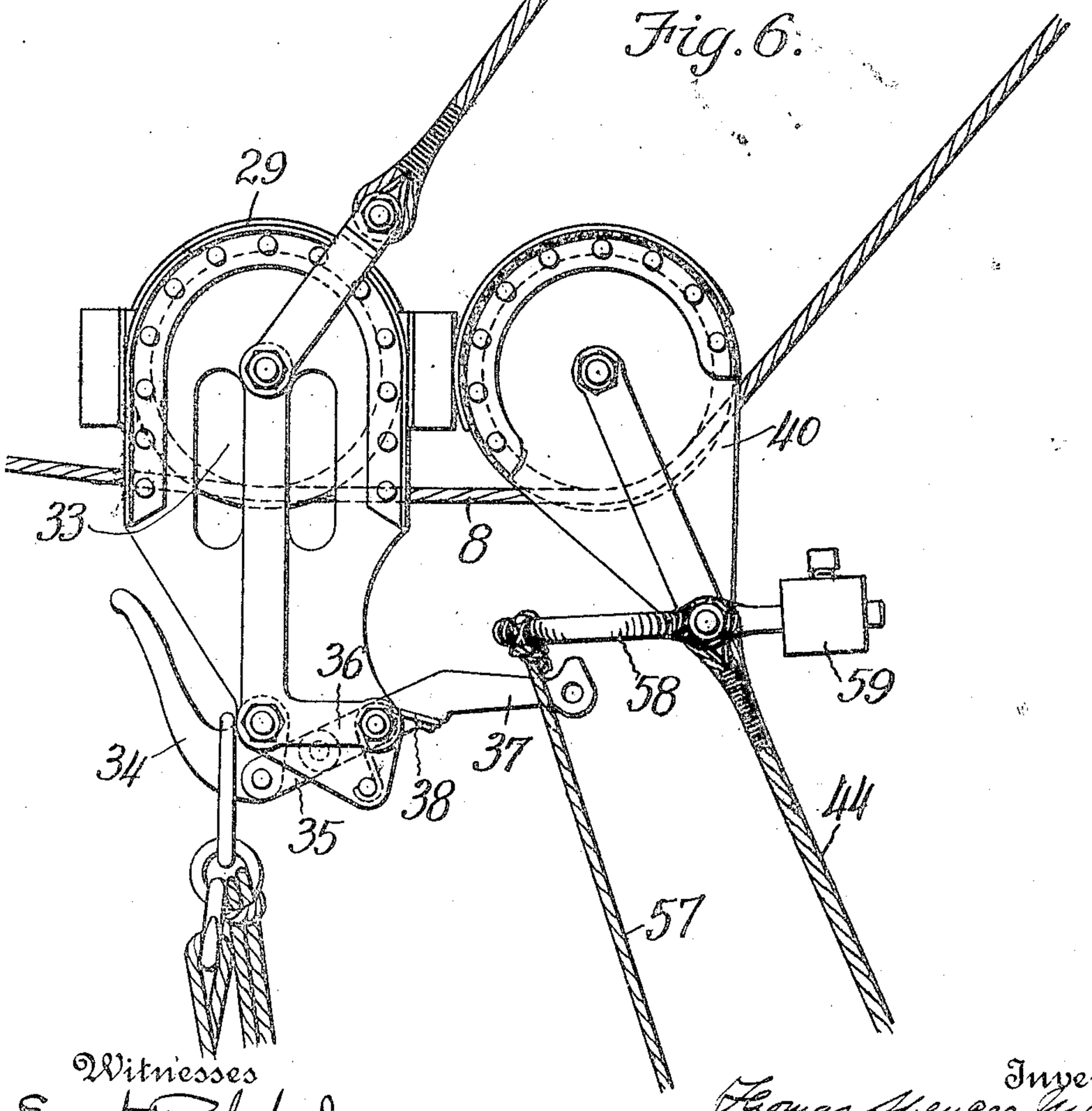


Fig. 6.



Witnesses
Ernest Pulsford
W. C. Pauling

Inventor
Thomas Spencer Miller
By his Attorneys
Coffin & Beer

No. 875,199 PATENTED DEC. 31, 1907

T. S. MILLER.

CONVEYING APPARATUS.

APPLICATION FILED APR. 21, 1906.

5 SHEETS—SHEET 5.

Fig. 8.

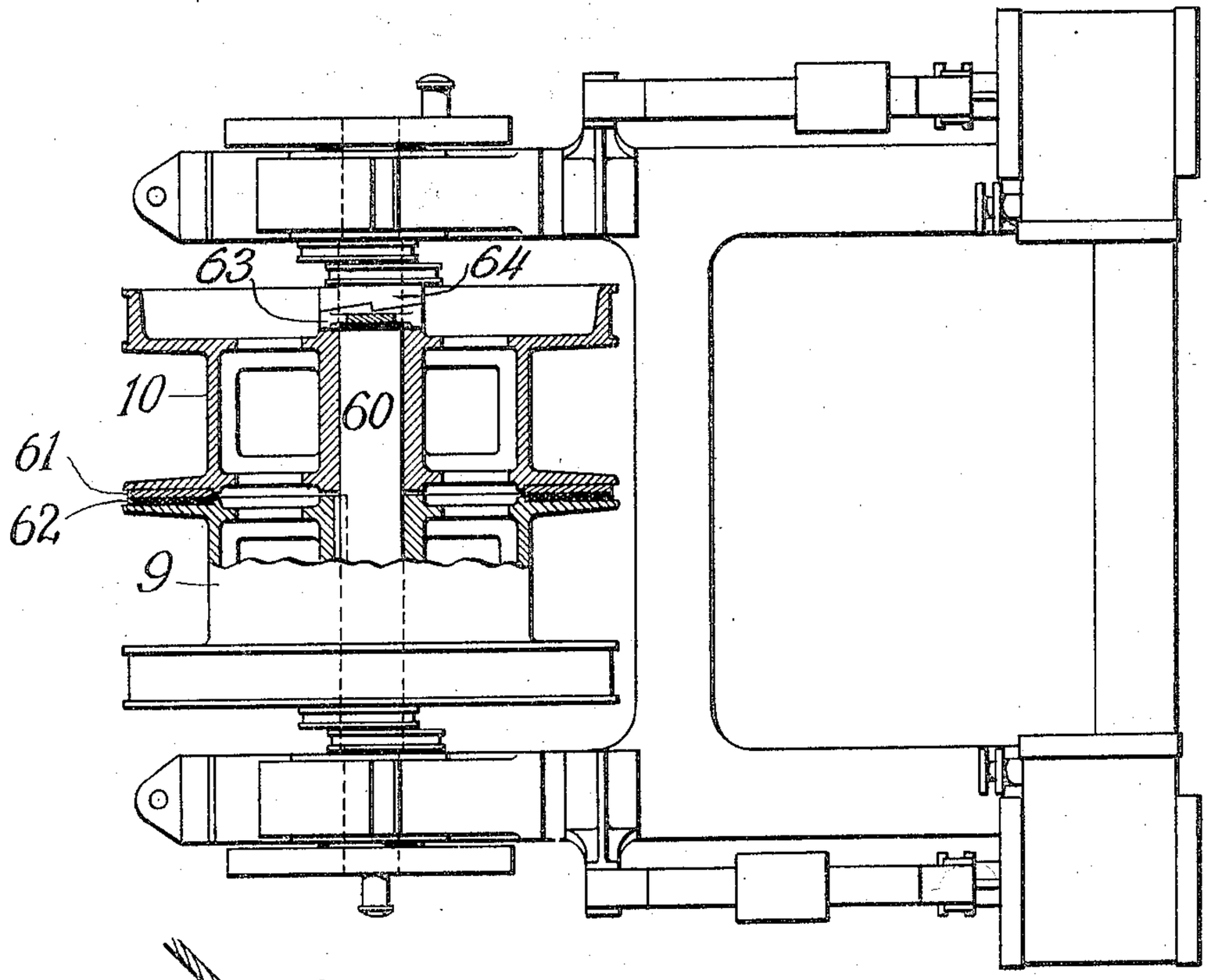
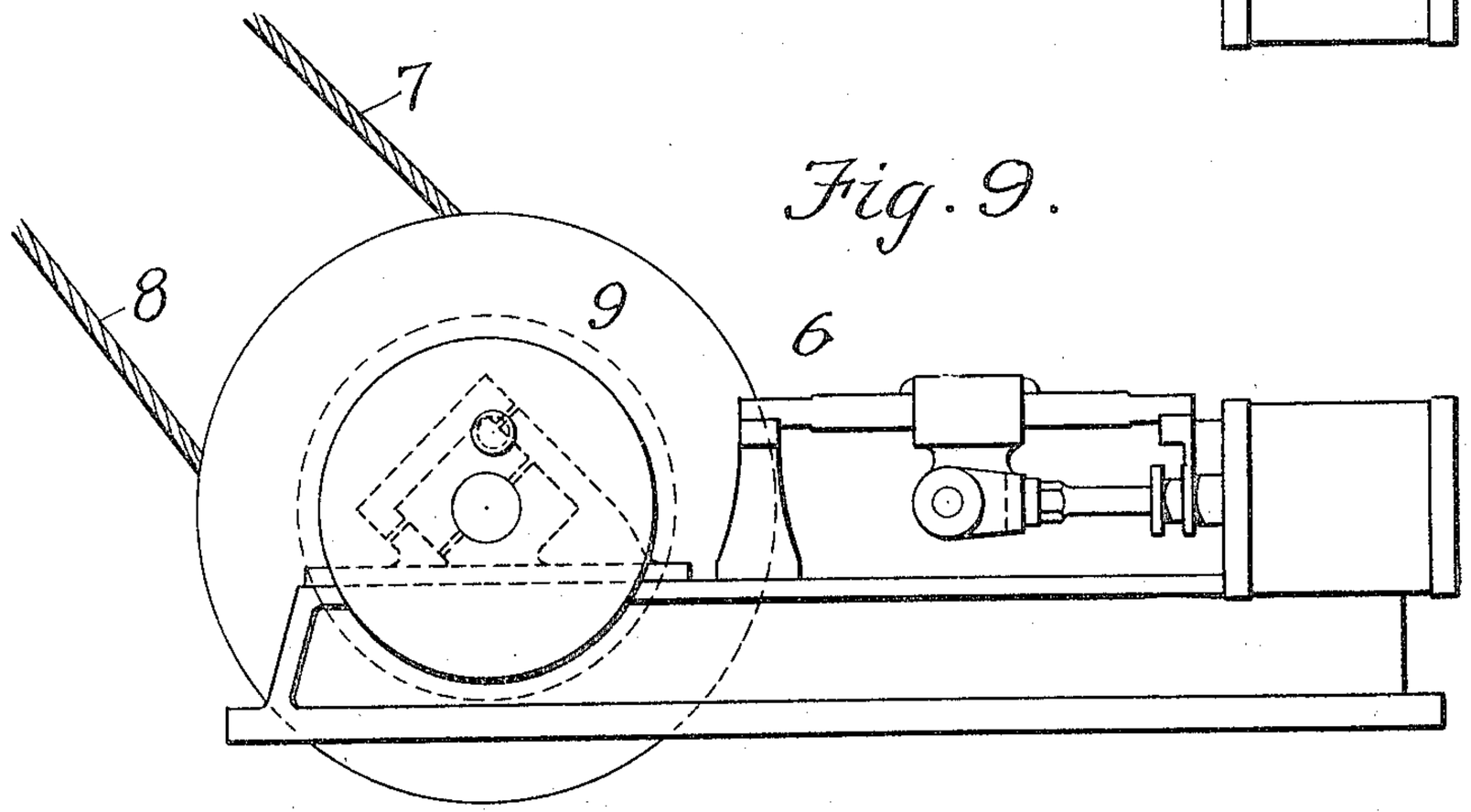


Fig. 9.



Witnesses
Ernest Pulsford.
W. E. Pauling

Inventor
Thomas Spencer Miller
By his Attorneys
Griffin & Bacon.

UNITED STATES PATENT OFFICE.

THOMAS SPENCER MILLER, OF SOUTH ORANGE, NEW JERSEY.

CONVEYING APPARATUS.

No. 875,190. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed April 21, 1906. Serial No. 312,846.

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, county of Essex, and State of New Jersey, have invented a new and useful Improvement in Conveying Apparatus, of which the following is a specification.

The primary object of my present invention is the transfer of coal or other cargo between ships at sea, although features of it may be applicable to other purposes.

In the accompanying drawings, Figures 1, 2 and 3 are side views of two ships showing the apparatus in different positions. Fig. 4 is a diagrammatic view of a modification. Figs. 5 to 11, inclusive, are details.

1 is the transmitting ship or collier containing the masts 2 and 3.

4 is the receiving ship or warship containing the mast 5 and the traction engine 6 constructed as shown in Figs. 8 and 9.

7 and 8 are the two runs of a rope which constitute the cableway, the ends of which are inversely wound, respectively, upon the drum parts 9 and 10 of the traction engine 6. This rope starting at one end from the traction engine 6 on the deck of the receiving ship extends over the sheave 11 on the mast thereof thence over the sheave 12 on the mast 3 of the transmitting ship, thence around a sheave 13 between the masts 2 and 3 of the transmitting ship, thence back over the sheave 14 on the mast 3 and over the sheave 15 on the mast 5 back to the traction engine 6.

The sheave 13 is mounted in a tension carriage shown in detail in Fig. 5. This carriage contains a frame 16 in which the sheave 13 has its bearings and which carries the wheels 17 and 18 running on a rope or stay 19 stretched between the masts 2 and 3 which forms a support and guide for the carriage of sheave 13.

20 and 21 are elastic buffers on opposite ends of the frame 16. 22 and 23 are stops for these buffers upon the masts to serve as a protection in case of collision.

24 is a tension rope secured to the rear end of the tension-carriage and extending over the sheave 25 and attached at its rear end to a sea anchor such as that shown in Fig. 10 or Fig. 11, or to a counterweight such as that shown in Fig. 4.

26 and 27 are button stops upon the rope 7, each of which may be constructed as shown in Fig. 7, and which are located a distance apart dependent upon the conditions under which the apparatus is used and which may be anywhere from 20 to 75 feet apart.

The load-carriage consists of the upper part 28 and the lower part 29 connected by the member 30 which is shown in the form of a wire rope and which is of such construction as to permit of considerable latitude of relative vibratory movement between the upper part 28 and the lower part 29 of the load-carriage. The upper part 28 of the load-carriage consists of a block through which runs the rope 7 between the sheaves 31 and 32 which are close enough together to prevent the passage of either the stop 26 or 27. The wheel 33 journaled in the lower part 29 of the load-carriage carries it upon the rope 8 and between this rope is suspended the pivoted finger 34 upon which the load is supported. This finger is held normally in the raised or holding position shown in Fig. 6 by the toggle 35, 36, one link 36 of which is extended into the arm 37. This arm is normally held in elevated position by the spring 38 in which position the toggle is locked. Upon pulling down upon this arm 37, however, so as to break the toggle, the weight of the load depresses the finger 34 so as to drop into unloading position.

39 and 40 are two haul-down blocks each of which forms a running connection with the rope 8; one being located to haul down at the transmitting and the other at the receiving ship, and each containing a sheave engaging the rope 8. The haul-down block 39 is controlled from a drum or winch head 41 through the rope 42. The haul-down block 40 is controlled by a drum or winch head 43 through the rope 44.

Pivotally connected to the haul-down block 40, as shown in Fig. 6, is an arm 58 broadened at its extremity and counterweighted at 59 and manually controlled by the rope 57 extending down to the deck of the receiving ship. When the load carriage comes into the position shown in Fig. 6, the arm 37 will be below the arm 58 and the at-

tendant by pulling down on the rope 57 can depress the arm 37 and thus cause the finger 34 to drop into unloading position.

It will be observed that the apparatus above described provides a method of transporting coal or cargo between ships at sea in which a rope passes twice across the span. This rope supports and propels the load-carriage; one branch of the rope having a playing attachment to the carriage and the other a running engagement.

The form of button stop shown in Fig. 7, consists of the two button parts 45 and 46 having bores which are divergently tapering toward each other. 47 and 48, shown in dotted lines, are conical spreaders that are tapered parallel to the bores of the button parts. These conical spreaders are inserted head to head in the center of the rope. The button parts are brought toward them and driven toward each other until they firmly clamp themselves into position, as shown in Fig. 7. In use, the more strain exerted upon them, the more firmly they are seated, and being separated from each other, the driving of one part onto its seat has no tendency to drive the other off its seat.

The sea anchor shown in Fig. 10, consists of the two canvas cones 49 and 50 arranged in tandem; the smaller preferably behind the larger. A double cone of this kind has been found to be less erratic in its movement than a single cone and will produce a more uniform tension upon the cable.

The sea anchor shown in Fig. 11, consists of a series of canvas diaphragms 51, 51, etc. arranged in tandem and each held by its corners so as to present an approximately flat surface of resistance. A single flat diaphragm will have an exceedingly erratic movement, but it has been found that where a series are employed one behind another, particularly where the series exceeds four in number, the result is great steadiness of movement. The number of these diaphragms employed may be adjusted to suit the tension required and the speed at which the ships run. 52 is the tripping line which is connected at the rear to one side of the diaphragms so that when it is desired to haul in the sea anchor the diaphragms come in edgewise.

With a collier especially equipped for the purpose, the construction shown in Fig. 4 may be employed. wherein the traction engine is transferred to a position 6^a on the deck of the collier, and wherein the counterweight 53 is employed to provide the tension through the sheave 13 and the tension rope 24 which, in this instance, passes down into a well-hole 54 located approximately amidships of the collier so as to be as near the center of motion as possible and thereby less affected by the motion of th ship. The lower end 55 of the well-hole may conform to the diameter of the weight 52 so as to provide an air cushion therefor.

The traction engine shown in Figs. 8 and 9 is a reversible engine with the drum parts 9 and 10 mounted upon the crank shaft 60. The drum-part 9 is keyed to the shaft 60. The drum-part 10 is rotatably mounted upon the shaft 60 and is driven from the drum-part 9 through the friction disks 61, 62. 63 and 64 are two nonrevolving collars upon the shaft 60, the contacting surfaces between which are reversely inclined so that by the partial rotation of the collar 63 upon the collar 64 the attendant can set the friction disks 61 and 62 together for any required degree of friction. This friction is set at such a degree that in normal operation the two drum parts move as a unit. The provision of the friction between them is both for the purpose of safety and facilitating the setting up of the apparatus and also for adjusting tl length of the rope to the distance between the ships. In the direction of safety if, for example, the tension carriage should move so far forward as to strike against the mast 3, a slip will occur between the two drum parts so as to lengthen the traction rope and prevent damage to the mast. The degree of friction between the two drum parts will, therefore, in operation be in excess of the holding strain of the rope but less than the breaking strain of any of the parts. The lever controlling the position of the collar 63 will always be in the hand of the operator so that he can instantly or gradually release the friction between the disks 61 and 62 in case of necessity as, for example, if the tow line should part.

The operation is as follows: The vessel 1 being towed by the vessel 4 through the towline 56 and the drums 9, 10, of the traction engine being at rest, the rope-runs 7 and 8 will be held under constant tension by the tension rope 24. In whatever position the load-carriage may be, the effect of the pitching movements of the vessels will be to produce movement of the tension carriage along the rope 19 and to produce movement of the rope runs 7 and 8 on the sheaves supporting them at the collier. The spacing apart of the button stops 26 and 27 is sufficient to permit any movement that may be expected of this kind without substantially disturbing the position of the upper part 28 of the load carriage and, of course, the lower rope run 8 runs freely through the lower part 29 of the load carriage. Thus, in whatever position the load carriage may be, and particularly when in loading position, it is substantially undisturbed by the movements of the vessels.

In whatever position the load-carriage may be, the division of it into two parts with capability of relative movement, enables the two runs 7 and 8 of the traction-rope to be so widely separated from each other that they will not clash when running at high speed in opposite directions. When it is desired to transport a load from one vessel to the other, the button stops 26 and 27 and the load carriage are run into position above the deck of the transmitting vessel and the load-carriage is hauled down to the deck by the haul-down block 39 and the load attached. Thereupon, the haul-down block 39 is released and the traction engine 6 started so as to haul in on the rope 7 and pay out on the rope 8. The button stop 26 therefore pushes the carriage part 28 forward and the carriage part 29 is dragged along by the connecting member 30 in somewhat the position shown in Fig. 2. Under these conditions, the weight of the load will be shared by both branches of the rope though the greater part of the weight will be carried by the lower branch. Shortly before the button stops have arrived above the deck of the receiving ship, as shown in Fig. 3, the rope 8 will be hauled down by the haul-down block 40 so that the load will be received in the position shown in Fig. 3 where it is readily detached by the attendants.

Means are provided to maintain a uniform tension in the transit rope. The tendency of the ropes to clash and twist about each other which, in former systems, has had the effect of reducing the ed of the load carriage and of wearing the ropes, is obviated in the present system. By the employment of the reversible double drum of moderate power but great speed in place of drums operating antagonistically upon the traction rope, I gain in speed and economize in power and simplify the system by the reduction of operating levers. The improved method by which I am enabled to hold the carriage still relatively to the deck while loading and unloading notwithstanding the pitching of the vessels and the attendant to and fro movement of the tension carriage is another important feature of my present invention.

Although I have shown the ships in tandem position I do not wish to be limited to the use of my present apparatus between them in that position since I am aware that it might be employed with them in broadside position or nearly so.

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

1. In a conveying apparatus, in combination, connected outgoing and incoming traveling ropes, an engine whereby the same are moved inversely, a tension tail sheave around which they pass, a load carriage engaging both of said ropes and stops on one of said ropes on opposite sides of the load carriage.

2. In a conveying apparatus, in combination, an outgoing rope, an incoming rope, an engine whereby they are moved inversely, stops on one of said ropes and a load carriage engaging said rope between said stops and also engaging the other rope.

3. In a conveying apparatus, in combination an outgoing rope, an incoming rope, two parts of the rope carriage engaging said ropes respectively and a vibratory connection between said carriage parts.

4. In a conveying apparatus, in combination, an outgoing rope, an incoming rope, two parts of the rope carriage engaging said ropes respectively, a vibratory connection between said carriage parts and two stops on opposite sides of the carriage part engaging one of said ropes.

5. In a conveying apparatus, in combination, an outgoing and an incoming rope forming a loop at the tail end, a tension sheave in said loop, two load rests and a haul-down rope at each of said load rests.

6. In combination a pulling boat, a pulled boat, a pull rope, a transit rope, a load carriage moved thereby, an actuator for said transit rope, a tension device acting upon said transit rope, and stops on said transit rope on opposite sides of the load carriage.

7. In combination, two boats, outgoing and incoming ropes between them, an engine whereby said ropes are operated, a tension mechanism, a haul-down rope at each boat, a two-part load carriage engaging both of said ropes and a vibratory connection between the two parts of said load carriage.

8. In combination, two boats, outgoing and incoming ropes connecting the same, an engine whereby said ropes are propelled, a tension mechanism, a two-part load carriage engaging both of said ropes and a vibratory connection between the two parts of said carriage.

9. In a conveying apparatus, in combination, an outgoing and an incoming rope, a sheaved load-carriage part engaging the upper rope, a sheaved load-carriage part engaging the lower rope, a vibratory connection between said parts and a load supporting finger pivotally mounted upon said lower part.

10. In a conveying apparatus, in combination, a load carriage, a load-supporting finger mounted thereon, a trigger whereby the said finger may be tripped, a down-haul rope and an arm pivoted to said down-haul rope whereby said trigger may be pulled.

11. In combination with a rope, a button,

stop consisting of two separated parts containing inversely tapered bores and a complementally tapered filler within the rope.

12. In combination, a pulling boat, a pulled boat, a transit rope, a load support moved thereby, an actuator of said transit rope, a tension device acting upon said transit rope and two stops on said transit rope on opposite sides of said load support.

13. In a conveying apparatus, in combination, an outgoing and incoming rope, a tail end tension sheave for the same, a reversible engine containing drum parts for the opposite ends of said ropes and a normally non-slipping friction between said drum parts.

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

THOMAS SPENCER MILLER.

Witnesses:

ERNEST PULSFORD,

H. A. BARRINGTON.