

(No Model.)

3 Sheets—Sheet 1.

R. J. VICTOR.  
TOWING MACHINE.

No. 467,529.

Patented Jan. 26, 1892.

Fig. 2.

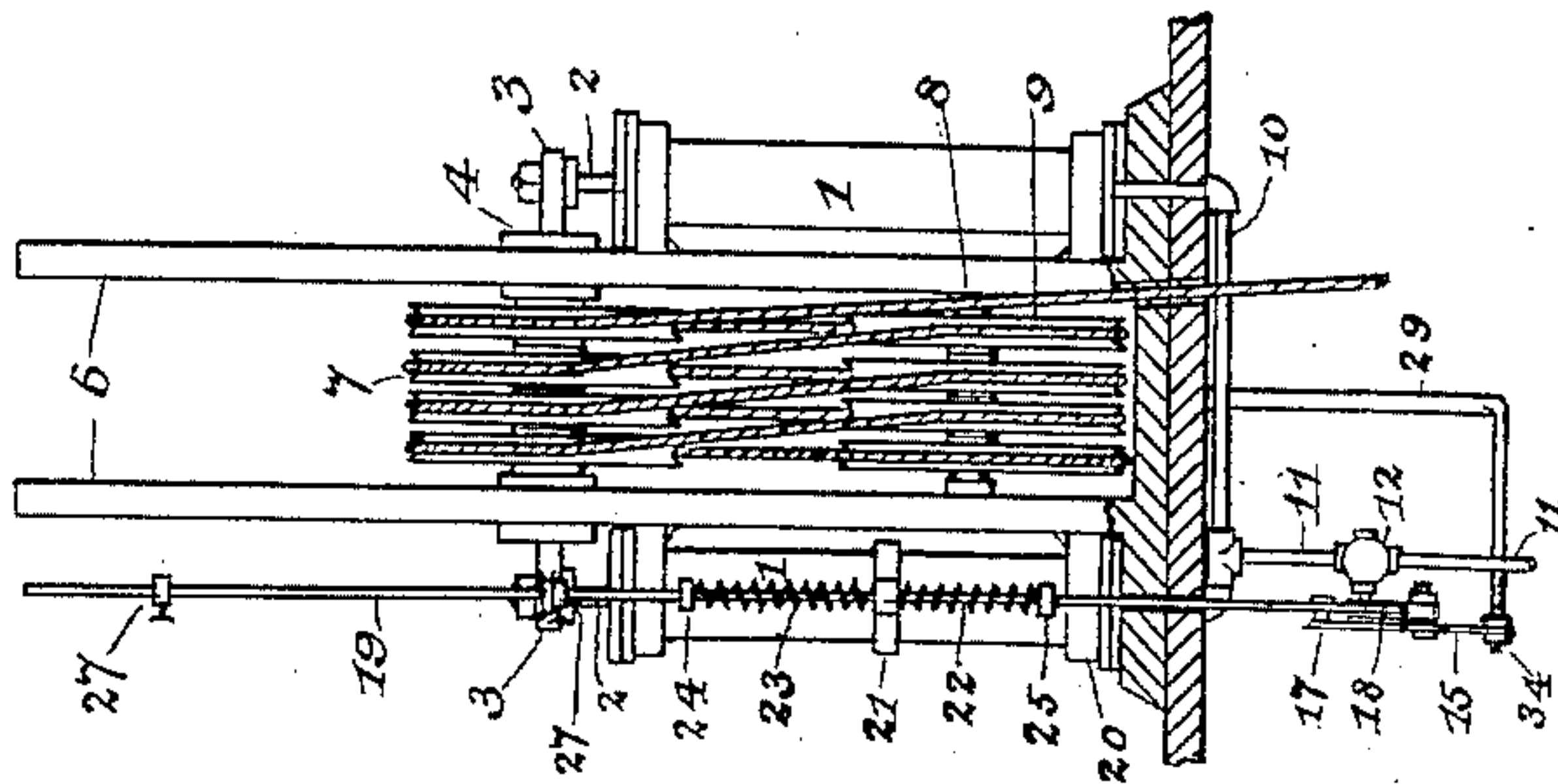
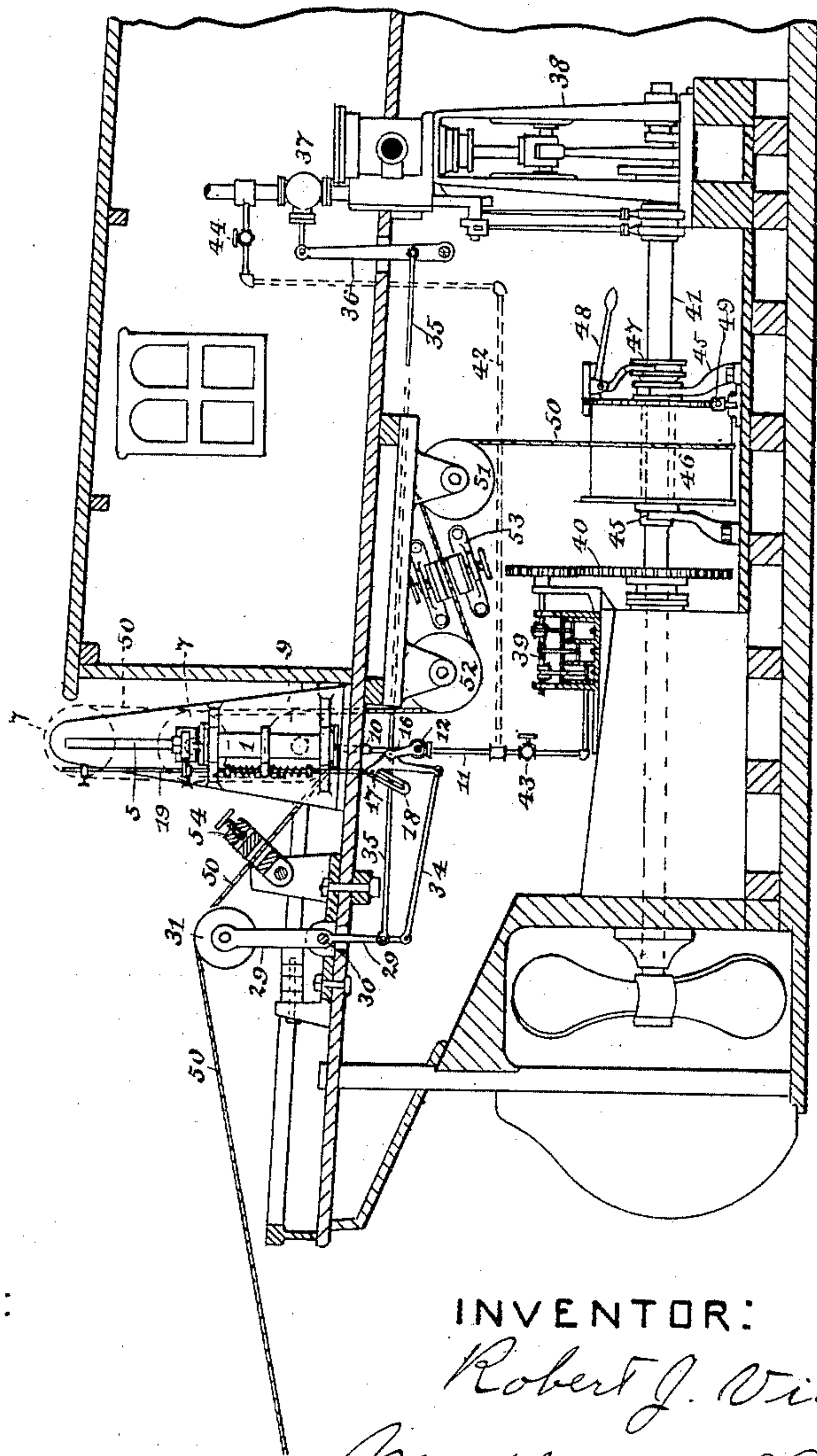


Fig. 1.



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By

*Marble Mason Hanfield*

*his Attorneys.*

(No Model.)

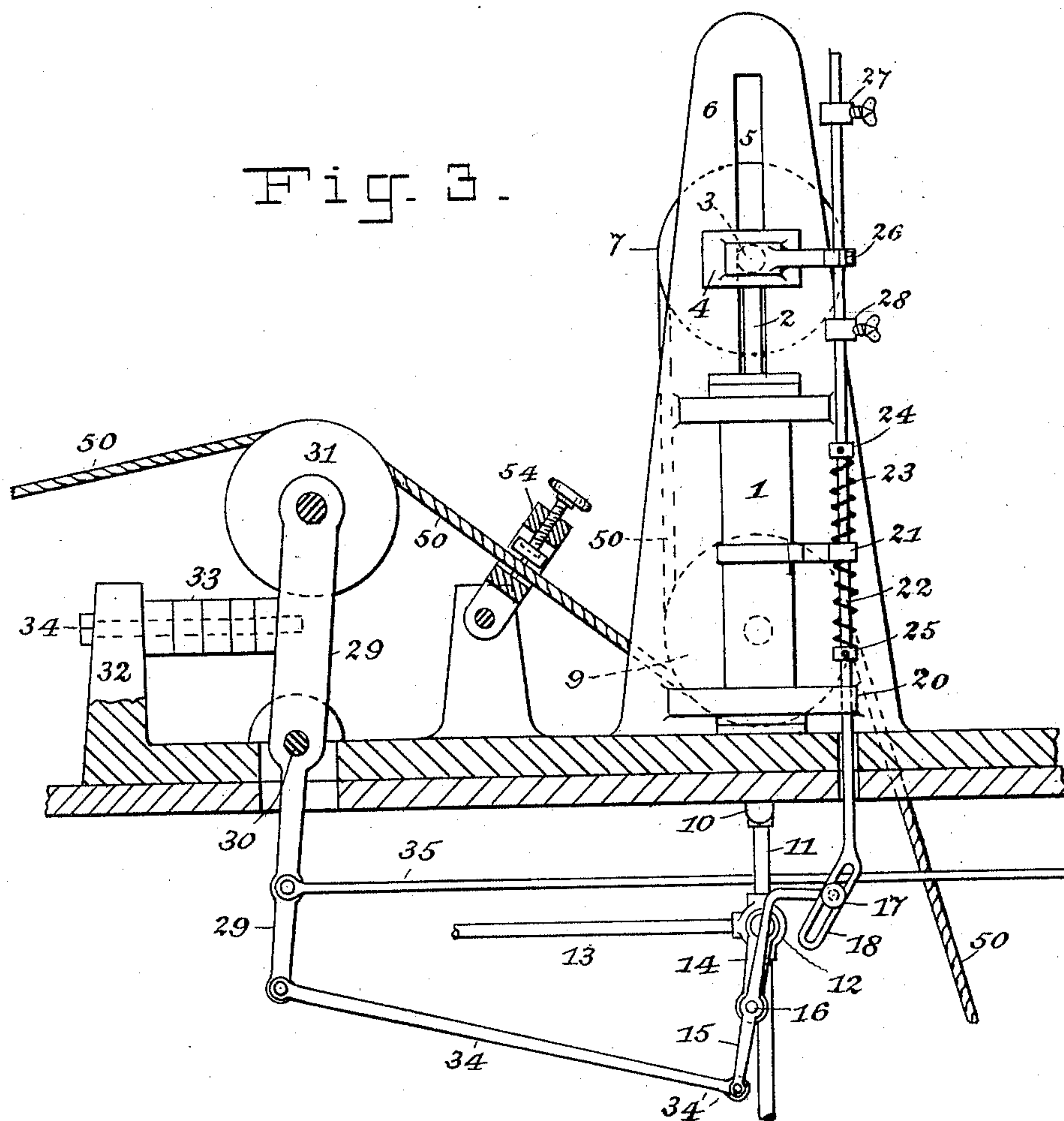
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Fig. 3.



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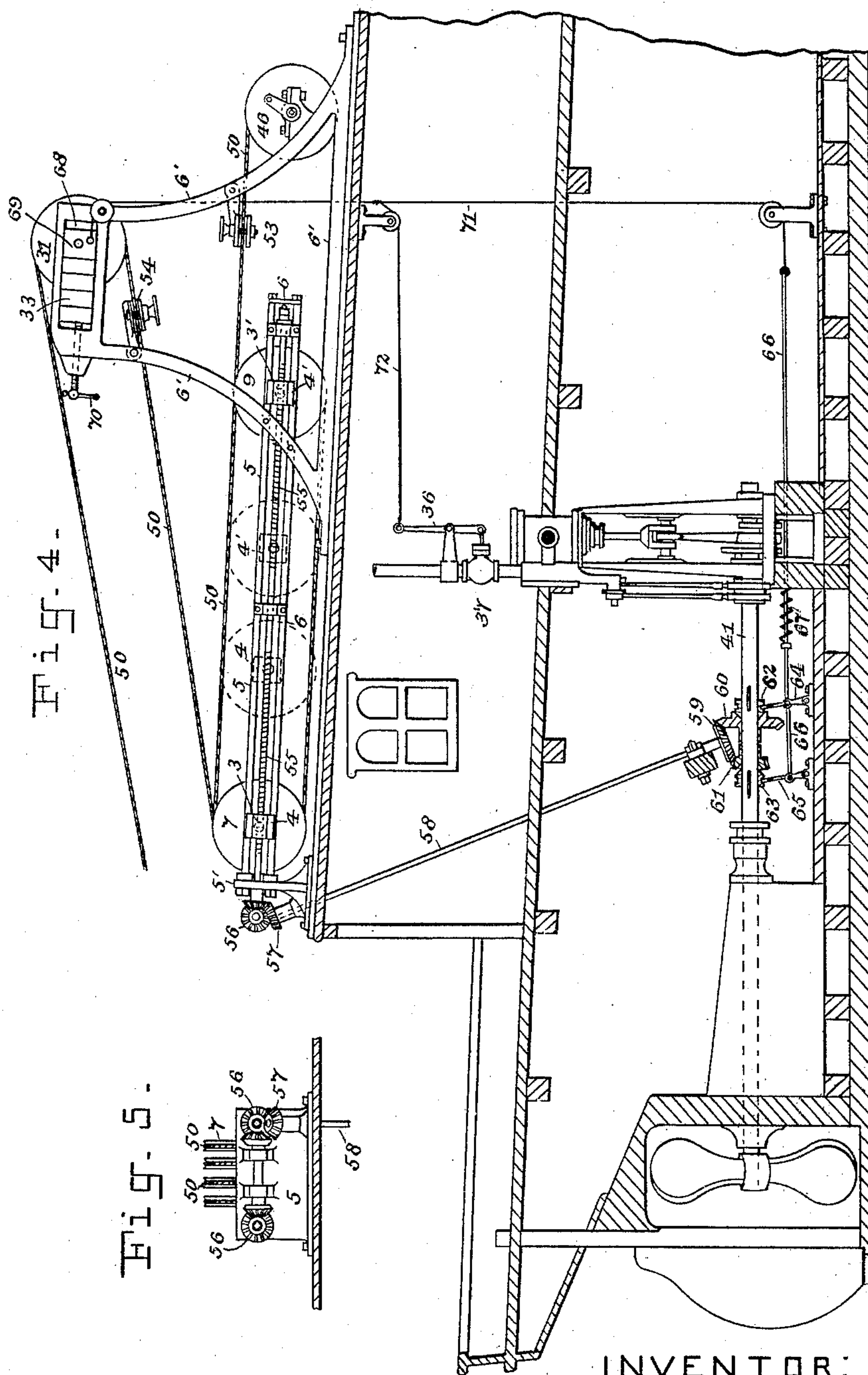
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By

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# UNITED STATES PATENT OFFICE.

ROBERT J. VICTOR, OF NEW YORK, N. Y.

## TOWING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 467,529, dated January 26, 1892.

Application filed April 9, 1891. Serial No. 388,313. (No model.)

*To all whom it may concern:*

Be it known that I, ROBERT J. VICTOR, a citizen of the United States of America, residing at the city and county of New York, in the State of New York, have invented certain new and useful Improvements in Towing-Machines, of which the following is a specification, such as will enable others skilled in the art to which it appertains to make and use the same.

When one vessel is being towed by another in a heavy sea, the tow-line, cable, or hawser is subjected to sudden alternating degrees of tension caused by the changing relation of the vessels to each other as they ride upon the waves or settle in the trough of the sea, and the sudden strains thus brought upon the cables or tow-lines are frequently sufficient to break them, whereby property and life are often endangered.

The object of my invention is to obviate this difficulty by providing an automatic surge-reliever and take-up mechanism for the tow-line or cable whereby the same is kept at all times taut and under a nearly equal degree of strain, irrespective of the tossing and pitching of the vessels, and so arranged that when extra strain is put upon the cable it comes upon the same gradually and not with a jerk, and, if desired, so constructed that in addition to thus relieving the strain upon and the taking up of the slack of the tow-line or cable, it will at the same time regulate automatically the speed of the engines propelling the tug or towing-vessel accordingly as the strain upon the tow-line is slackened or increased.

The said invention is fully disclosed in the following specification, of which the accompanying drawings form a part, wherein similar numerals of reference designate like or equivalent parts wherever found throughout the several views, and in which—

Figure 1 is a view in central vertical longitudinal section of the stern portion of a tug or steam-vessel provided with my improved towing-machine; Fig. 2, a front view of a portion of the mechanism thereof; and Fig. 3, a detail view, upon an enlarged scale, of portions of the construction shown in Figs. 1 and 2. Fig. 4 is a view in central vertical longitudinal section of a like vessel provided with

a modified form of the device shown in Fig. 1, and Fig. 5 is a rear view of a portion of the construction shown in Fig. 4.

Referring to the drawings, the numeral 1 designates two cylinders of any desired size, within which work pistons of the usual construction provided with piston-rods 2, which are connected by a bar or shaft 3, provided with gibs 4, arranged to slide in suitable ways 5 in the upright supporting frame-work 6. Upon the rod or shaft 3 are mounted a series of independently-revoluble sheaves 7, and secured to the two sides of the frame-work 6, between the cylinders 1 and below the sheaves 7, is a shaft or bar 8, upon which is mounted a series of independently-revoluble sheaves 9, corresponding to the series of sheaves 7. These cylinders 1, the frame-work 6, and sheaves 7 and 9 are preferably placed upon the after-deck of the vessel in an upright position, as shown, and entering the cylinders at the bottom thereof are pipes 10, connected with a supply-pipe 11, through which compressed air or steam is admitted thereto, as hereinafter described. This pipe 11 serves for a small portion of its length as an exhaust as well as a supply pipe for the cylinders 1, it being provided with a three-way cock or valve 12, from which leads an exhaust-pipe proper 13.

To the valve-stem of the three-way cock 12 is secured a crank 14, to the end of which is secured a crank-lever 15 by means of a central pivotal connection 16, and the upper end of this crank-lever 15 is bent, as shown, and is provided with a pin or stud 17, which passes through and slides freely in the angle-slotted portion 18 of the rod 19. This rod 19 passes upward through the deck and through guides or supports 20 and 21, secured to one of the cylinders 1 or to the frame-work 6, as desired, and slides freely up and down therein, but is kept normally in a neutral position by springs 22 and 23, which bear upon collars 24 and 25, secured to the rod 19, which springs and collars are placed one above and one below the guide or support 21, as shown. This rod 19 extends nearly to the top of the frame-work 6, and arranged to slide up and down thereon is an arm 26, rigidly secured to the bar or shaft 3, which is made to extend through the gib 4 for that purpose, and this



arm 26 is adapted to raise or depress the rod 19 by striking against the collars 27 and 28, secured thereto, accordingly as the piston-rods 2 are pushed out of or drawn back into the cylinders 1.

A short distance in the rear of the cylinders 1, the frame-work 6, and the accompanying mechanism is a bar 29, mounted upon a pivot 30 and extending downward through the deck, as shown, which is provided at its upper end with a grooved wheel or sheave 31, and behind this bar 30 is a post 32, between which and the bar 30 is interposed a spring 33, preferably composed of rubber disks strung upon a rod or bolt 34, by which the upper end of the pivoted bar 29 is kept normally pressed forward toward the cylinders 1 and their accompanying mechanism. This bar 29 is also provided at its lower end with a side-wise-extending portion 29', bent at right angles to the main portion thereof, to the end of which is pivotally connected a connecting-rod 34, the other end of which is also pivotally connected with the lower end of the crank-lever 15, and to the main portion of said bar 29 is also pivotally connected a second connecting-rod 35, the other end of which is pivotally connected with a pivoted lever 36, which operates a throttle-valve 37, by which the admission of steam to the cylinders of the propelling-engine 38 of the vessel may be regulated.

Connected to the pipe 11, leading to the cylinders 1, is an air-compressor 39, to which power is applied in any desired manner, preferably by means of gearing 40, connecting the same with the propeller-shaft 41. If desired, a second pipe 42 (shown in dotted lines in Fig. 1) may be provided leading from the steam-supply to the pipe 11, whereby, if any accident should happen to the air-compressors, the latter could be shut off by means of the valve 43, and steam instead of compressed air admitted to the cylinders 1 by opening the valve 44; or, if preferred, the air-compressor 39 may be entirely omitted and steam alone be used in such cylinders.

Loosely mounted upon the propeller-shaft 41 and supported by a frame-work 45 is a drum 46, provided with a clutch-coupling 47, also mounted upon the propeller-shaft by means of which the drum may be brought into connection with and revolved by the said shaft when desired. This clutch-coupling is brought into and out of connection with the drum by any desired means, preferably by a hand-lever 48, attached to and supported by the frame-work 45, and the drum is also provided with a ratchet-pawl 49 or other similar device, by which the same is stopped and prevented from rotating in the wrong direction when necessary. This drum 46 serves as a storage-drum for the tow-line or cable when the same or any portion thereof is not in use, and the stowing of a wire cable is made much easier by its use than by attempting to coil the same in the manner common with hempen ca-

bles. From it the tow-line or cable 50 passes over sheaves or pulleys 51 and 52 up through the deck, around the series of sheaves 7 and 9, and over the sheave 31 to the tow, passing on its way thither through the clamps or grips 53 and 54, adapted to be closed down upon the same in such manner as to firmly hold and fasten the same. These clamps or grips may be of any preferred form, and may in some cases be omitted, although I prefer to use the clamp 53 to grip the cable when in use, in order to prevent too much strain from coming upon the ratchet and pawl 49 of the storage-drum 46, and to have the clamp or grip 54 placed aft of the cylinders 1 and accompanying mechanism, in order to grip and secure the cable in case any accident should happen to the cylinders 1 or to the take-up mechanism operated thereby. When the bar 29 and the rod 19 are in their normal positions, the valve 12 will be open so as to admit of the entrance of compressed air (or steam, if the same is used) to the bottom of the cylinders 1, through the pipes 11 and 10, upon the opening of the valves 43 and 44. When this is done, the piston-rods 2 are of course forced out and upward, carrying with them the bar 3 and the sheaves 7, around which are rove the cable or tow-line 50, by which the slack of the cable is at once taken up. As soon, however, as the piston-rods 2 have been driven out far enough to enable the arm 26 to engage with the collar 27 upon the upper end of the rod 19, the same is lifted, and the valve 12 is so operated by the slotted portion 18 thereof pushing back the crank-lever 15 that the steam or air is shut off and the exhaust opened, when, of course, as the pressure decreases in the cylinders 1, the piston-rods 2, and consequently the sheaves 7, will resume their normal position, partly through the attraction of gravity and partly through the strain upon the cable. As soon, however, as the arm 26 descends low enough to strike the collar 28 on the rod 19, the same will be depressed and the valve 12 consequently so manipulated as to close the exhaust and again admit air or steam to the cylinders 1, when the operation described will be repeated. On this downward stroke, however, the exhaust is closed while the piston is but half-way back into the cylinder, and the supply of air or steam is not turned on until the same has descended fully to the bottom thereof by the gradual escape of the compressed air or the condensation of the steam, if the latter is used. By this it will be seen that as soon as the exhaust is closed a sufficient quantity of compressed air or steam is left in the bottoms of the cylinders 1 to act as an air or steam cushion therein, which will receive the strain of the cable or tow-line 50 through the sheaves 7, the piston-rods 2, and the pistons connected therewith.

It will be seen upon an examination of Fig. 3 that the cable 50 strikes the sheave 31 at



an angle thereto, and that consequently as soon as strain is put upon said cable such sheave 31 will be forced backward toward the stern of the vessel, and thus push forward the connecting-rods 34 and 35, attached to the lower end of the pivoted bar 29, upon which said sheave 31 is mounted; also, that the crank 14 of the valve 12 being in any given position, if the rod 19 remain stationary and the connecting-rod 34 be moved forward or backward, the stud 17 will form a fulcrum for the crank-lever 15, and that the crank 14 will consequently be moved and the valve 12 therefore opened or closed, as the case may be, and that, if in turn, the connecting-rod 34 remain stationary and the rod 19 be moved up or down the pivot 34', which forms the connection between the connecting-rod 34 and the lower end of the crank-lever 15, will in turn become the fulcrum and the pivot 17 the power, and that the crank 14 and the valve 12 will be actuated in precisely the same manner as when operated in the manner described in the first instance.

In practice the operation of the entire device is as follows: The outboard or free end of the tow-line or cable 50 having been attached to the vessel desired to be towed, compressed air or steam, as the case may be, is admitted to the cylinders 1, as hereinbefore described, when the sheaves 7 will be forced upward to the extreme length of the pistons 2. The tug or towing-vessel then being started forward, the tow-line or cable 50 will be drawn taut, and the same pressing upon the sheave 31 at an angle thereto will pull backward the upper end of the lever 29 and open the exhaust by means of the rod 34, connected with the crank-lever 15 at the bottom thereof. The pistons will then be forced back into the cylinders by the strain of the cable upon the sheaves 7 and 9 until the same are half-way into the cylinders, when the exhaust will be closed by the action of the arm 26 upon the collar 28, as hereinbefore described, and the strain of the cable will then come upon the air or steam cushion in the bottom half of the cylinders 1, and it is evident that the natural spring of such air or steam cushion will be sufficient to instantly take up any ordinary slack of the tow-line or cable caused by the pitching of the vessels without the admission of extra air or steam to the cylinders, especially when, as shown herein, eight sheaves are used upon the bars 3 and 8, four upon each, around which the cable is rove, as in that event the pushing out of the pistons 2 a distance of one foot and a consequent separation of the sheaves 7 and 9 the same distance will take up eight feet of slack cable, and it is evident that by simply increasing the number of such sheaves 7 and 9 the amount of slack cable thus taken up may be proportionately added to. When, however, the natural spring of such air or steam cushion is not sufficient to take up the cable at the very instant the same is slacked, the pressure is of course re-

moved from the sheave 31, and the bar 29, upon which the same is mounted, forced forward by the spring 33, by which movement the connecting-rod 34, crank-lever 15, and crank 14 of the valve 12 are actuated and steam or compressed air, as the case may be, admitted to the cylinders 1, as heretofore described, whereby the pistons and piston-rods 2 are forced out, the sheaves 7 and 9 separated, and the slack of the cable taken up, as before described. At the same time and by the same movement of the bar 29 the connecting-rod 35 is pushed forward and through its connection pushes open the regulating throttle-valve 37, so as to admit more steam to the engine propelling the tug or towing-vessel, and the additional speed thus caused also assists in taking up the slack of the tow-line or cable. As soon, however, as the strain again comes upon the cable the bar 29 is again pulled backward, the speed of the vessel is slightly slackened by the partial closing of the valve 37, the valve 12 is so manipulated as to open the exhaust thereof, the sheaves 7 automatically descend, the cable is slowly paid out, until by the closing of the exhaust, as hereinbefore described, an air or steam cushion is again formed in the cylinders 1, upon which the strain of the cable comes, and the mechanism is again in a position to automatically take up the slack of the cable the instant the strain is removed therefrom, in the manner hereinbefore set out.

In the modified form of the device shown in Figs. 4 and 5 the take-up mechanism is manipulated by a system of gearing connected with the main shaft and the cylinders 1 and much of the accompanying mechanism shown in Figs. 1, 2, and 3 are consequently omitted; but it is evident that instead of gearing the same to the main shaft the mechanism shown may be operated by an engine provided exclusively for that purpose, if desired. In this modified form of construction two similar frames 6, provided with ways 5, are held in place side by side a short distance from one another, preferably in a horizontal position upon the deck-house, as shown, by being attached to an end piece 5' at one end and to a frame-work 6' at the other, both being securely bolted to the deck. In the ways 5 of the frame 6 slide gibs 4 and 4', carrying shafts 3 and 3', upon which are mounted two corresponding series of sheaves 7 and 9, similar to those used in the form of device shown in Figs. 1, 2, and 3. The gibs 4 and 4' are provided with screw-threaded holes, through which pass corresponding screw-threaded shafts 55, the thread upon one portion thereof being a right-hand and that upon the other a left-hand one, so that when the shafts 55 are rotated in one way the gibs, and consequently the series of sheaves carried by each, will be spread farther apart, and when in the other drawn closer together, as shown in dotted lines in Fig. 4. At one end of these double-



screw-threaded shafts 55 is an arrangement of bevel-gearing 56, by which the two are made to revolve at exactly the same rate of speed, and enmeshing with this bevel-gearing is a bevel-pinion 57, attached to a shaft 58, which passes downward through the deck and ends in a bevel friction-wheel 59 in contact with two independently-revoluble corresponding bevel friction-wheels 60 and 61, loosely mounted upon the propeller-shaft 41 and provided with clutch-couplings 62 and 63, connected with the shaft 41, by which the wheels 61 and 62 may, when desired, be revolved. These clutch-couplings 62 and 63 are manipulated by means of levers 64 and 65, which are connected to a rod 66, provided with a spring 67, by which the clutch 62 is kept normally in gear with the wheel 60, so as to revolve the same.

The top portion of the frame-work 6' is provided on either side with ways 68, in which slide gibs 69, carrying between them a bar or shaft upon which is revolubly mounted a grooved sheave or pulley 31, the gibs 69 being normally forced toward the bow of the vessel by a spring 33, preferably of rubber blocks or disks, as shown, the tension of which may be regulated, if desired, by a screw 70; and attached to one of the sliding gibs 69 is a wire, rope, or chain 71, connected at the other end with the rod 66 and also connected with another similar wire, rope, or chain 72, which is in turn connected with the handle or lever of the regulating throttle-valve 37 of the propelling-engine of the tug or vessel.

Revolubly mounted upon the frame-work 6' is a storage-drum 46, upon which is wound and stored the cable 50 when not in use. If desired, this storage-drum may be rotated by means of gearing connected with the main shaft or may be placed directly on the same, as shown in Fig. 1.

Attached to the frame-work 6' are clamps or grips 53 and 54, similar to those shown in Figs. 1 and 3, for gripping and holding the cable 50, which passes from the storage-drum 46, through the clamp or grip 53, around the series of sheaves 7 and 9, through the clamp or grip 54, and over the sheave 31 to the tow.

The operation of this form of device is as follows: The sheaves 7 and 9 being in their normal position at the extreme ends of the frame-work 6, the tug or vessel being started forward, the strain brought upon the cable by the tow attached to the outboard end thereof, will pull back the wheel 31, carrying with it the gibs 69, which, being connected with the clutch-couplings 62 and 63 by means of the wires, ropes, or chains 71, the rod 66 and levers 64 and 65 will cause the clutch-coupling 63 to be thrown into gear with the wheel 61, which, being in frictional contact with the wheel 59, will through it rotate the shaft 58, the gearing 56, and the screw-shafts 55, so that the sheaves 7 and 9 will be slowly brought toward the center of the frame-work 6, and the cable thus slowly paid out until said

sheaves are in the positions shown in dotted lines in Fig. 4, when they being able to be forced no farther, the wheel 61 will continue to revolve against the frictional surface of the wheel 59, but without rotating the same. The instant, however, that the cable is slackened and the strain thereon from any cause removed the gibs 69 will be forced back in the ways 68 by the spring 33. The wires or ropes 71 and 72 will consequently be slackened, when the spring 67 will force back the rod 66, so as to throw the clutch-coupling 63 out of gear with the wheel 61 and the clutch-coupling into gear with the wheel 60, when the wheel 59 will be rotated rapidly in the opposite direction, and the consequent rotation of the screws 55 will force the sheaves 7 and 9 toward the end of the frame-work 6, where they will remain until strain is again brought upon the cable, the wheels 60 during this time of course slipping upon the surface of the wheel 59 when the sheaves 7 and 9 are at the limit of their course in the same manner as did the wheel 61 when they were closed together. When strain is again brought upon the cable, the wheel 61 will be again brought into gear, as hereinbefore described, and the wheel 60 taken out, whereupon the said sheaves 7 and 9 will again assume the position shown in dotted lines, and such operation is repeated automatically as often as the strain is put on or taken from the cable.

In order that the cable might be taken in more rapidly than it is paid out, the wheel 60 is, as shown, preferably made larger than the wheel 61, and the regulating throttle-valve 37 is, by means of its connection with the wire or rope 72, closed or opened slightly as the strain upon the cable is increased or diminished, as hereinbefore described with reference to the form of construction shown in Fig. 1.

It is evident that by making slight changes in the form thereof, the last-mentioned form of device may be placed upright, or that shown in Figs. 1, 2, and 3 placed horizontally; also, that water or any suitable hydraulic fluid may be used in the cylinders 1 in place of compressed air or steam, and that many other changes in the construction, combination, and arrangement of the parts of my improved towing-machine other than those mentioned herein may be made without departing from the scope of my invention, and I do not limit myself to the exact construction, location, or combination of parts herein shown and described; but,

Having fully described my invention, its construction and operation, what I claim, and desire to secure by Letters Patent, is—

1. A towing-machine having separating sheaves around which the tow-line is rove, located between the inboard or secured and the outboard or free end of the tow-line, and mechanism whereby the sheaves are automatically separated when the strain on the tow-line is lessened or removed and auto-



atically brought together when strain is again brought thereon, substantially as shown and described.

2. A towing-machine having separating sheaves around which the cable is rove, located between the inboard or secured and the outboard or free end of the tow-line, and means operated by the propelling or main shaft of the vessel adapted to cause said sheaves to automatically separate and take up the slack of the tow-line when the strain thereon is lessened or removed and to return together again when the strain is again brought thereon, substantially as shown and described.

3. The combination, with a vessel, of a device adapted to automatically take up the slack of the tow-line when the strain thereon is lessened or removed and to pay out the same when the strain is again brought thereon, said device being connected with and operated by the propeller or main shaft of the vessel, substantially as shown and described.

4. In a towing-machine, the combination, with separating sheaves around which the tow-line is rove, located between the secured or inboard and the free or outboard ends thereof, of one or more cylinders provided with pistons movable therein, connected with and adapted to actuate the separating sheaves, and means for automatically admitting a fluid under pressure to the cylinders when the strain upon the tow-line is lessened or removed, whereby the pistons and connected sheaves are actuated so as to take up the slack of the tow-line, and for automatically exhausting the fluid from the cylinders and actuating the separating sheaves so as to pay out the slack of the tow-line taken up when strain is again brought thereon, substantially as shown and described.

5. In a towing-machine, the combination, with separating sheaves around which the tow-line is rove, located between the secured or inboard and the free or outboard ends thereof, of one or more cylinders provided with pistons movable therein, connected with and adapted to actuate the separating sheaves, and means for automatically admitting a fluid under pressure to the cylinders when the strain upon the tow-line is lessened or removed, whereby the pistons and connected sheaves are actuated so as to take up the slack of the tow-line, and for automatically exhausting the fluid from the cylinders and actuating the separating sheaves so as to pay out the slack of the tow-line taken up when strain is again brought thereon, a sufficient quantity of the fluid under pressure to serve as a cushion to receive the strain of the cable always remaining in the cylinder or cylinders, substantially as and for the purposes described.

6. In a towing-machine, the combination, with separating sheaves around which the tow-line is rove, of a cylinder or cylinders

provided with pistons connected with and adapted to actuate the separating sheaves, and means for admitting a fluid under pressure to the cylinders in such manner that the same will form a cushion upon which the strain of the cable is received, substantially as shown and described.

7. In a towing-machine, the combination, with separating sheaves around which the tow-line is rove, of a cylinder or cylinders provided with pistons connected with and adapted to actuate the separating sheaves, said cylinders being adapted to receive a fluid in such manner that the same will form a cushion upon which the strain of the tow-line will be received, substantially as shown and described, and for the purposes set forth.

8. The combination, with a vessel, of a surge-relieving and take-up mechanism for the tow-line, and a grip, clamp, or fastening for the inboard end of the tow-line, the surge-relieving and take-up mechanism being located between the grip and the outboard or free end of the tow-line, substantially as shown and described.

9. The combination, with a vessel, of a storage-drum for the tow-line and an automatic surge-relieving and take-up device for the tow-line connected therewith and located between the storage-drum and the outboard or free end of the tow-line, substantially as shown and described.

10. In a towing-machine, the combination, with a storage-drum for the tow-line, of an automatic surge-relieving and take-up device connected with the tow-line, and a grip, clamp, or fastening for holding or securing the tow-line, located between the storage-drum and the surge-relieving and take-up device, the take-up device being located between the grip, clamp, or fastening and the free or outboard end of the tow-line, substantially as shown and described.

11. The combination, with a vessel having a propeller-shaft, of a storage-drum for the tow-line, gearing connecting the drum with the propeller-shaft for revolving the same, and mechanism whereby the drum may be brought into and out of gear with the propeller-shaft and rotated when desired, substantially as shown and described.

12. The combination, with a vessel having a propeller-shaft, of a storage-drum for the tow-line or hawser revolubly mounted on the propeller-shaft, and means for bringing said drum into connection with said shaft and operating the same, substantially as shown and described.

13. The combination, with a vessel, of a regulator or valve controlling the propelling mechanism, and a lever or levers connected with the regulator or valve and with the tow-line in such manner that the slackening and tightening of the tow-line will actuate the regulator or valve, substantially as and for the purposes set forth.

14. The combination, with a vessel provided



with an automatic surge-relieving and take-up mechanism for the tow-line, of a regulator or valve controlling the propelling mechanism, and a lever or levers connected with the regulator or valve and with the tow-line in such manner that the slackening and tightening of the tow-line will actuate the regulator or valve, substantially as and for the purposes set forth.

15. In a towing-machine, the combination, with separating sheaves around which the tow-line is rove, located between the in and the out board ends thereof, of a cylinder or cylinders 1, having pistons provided with piston-rods 2, adapted to separate the sheaves when the same are pushed out, said cylinders being also provided with a pipe, as 11, connected with a supply of fluid under pressure, a valve 12, so arranged in pipe 11 as to act as an admission and exhaust valve for the cylinder or cylinders, and means for automatically actuating said valve as the strain upon the tow-line is increased or diminished, substantially as and for the purposes set forth.

16. In a towing-machine, the combination, with separating sheaves around which the tow-line is rove, located between the in and the out board ends thereof, of a cylinder or cylinders 1, having pistons provided with piston-rods 2, adapted to separate the sheaves when the same are pushed out, means for admitting a fluid under pressure to the cylinders so as to separate the sheaves and to exhaust the same therefrom so as to bring them together again, and a lever or bar 29, adapted

to be actuated by the strain upon the tow-line so as to admit and exhaust the fluid to and from said cylinders, as and for the purposes set forth.

17. In a towing-machine, the combination, with separating sheaves around which the tow-line is rove, located between the in and the out board ends thereof, of a cylinder or cylinders 1, having pistons provided with piston-rods 2, adapted to separate the sheaves when the same are pushed out, means for admitting a fluid under pressure to the cylinders so as to separate the sheaves and to exhaust the same therefrom so as to bring them together again, and a lever or bar 29, adapted to be actuated by the strain upon the tow-line so as to admit and exhaust the fluid to and from said cylinders, said cylinders being also provided with mechanism connected with one or more of the piston-rods thereof, whereby the fluid under pressure is admitted to and exhausted from them, whereby the pistons, piston-rods, and sheaves connected therewith are actuated automatically irrespective of the strain upon the tow-line, substantially as shown and described, and for the purposes set forth.

Signed at the city and county of New York, in the State of New York, this 4th day of April, A. D. 1891.

ROBERT J. VICTOR.

Witnesses:

FRANK C. KNAAK,  
C. L. DAVIS.