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F. TARRANT, ADMINISTRATRIX.
TOWING APPARATUS.
APPLICATION FILED JULY 22, 1918.

1,297,418.

Patented Mar. 18, 1919.

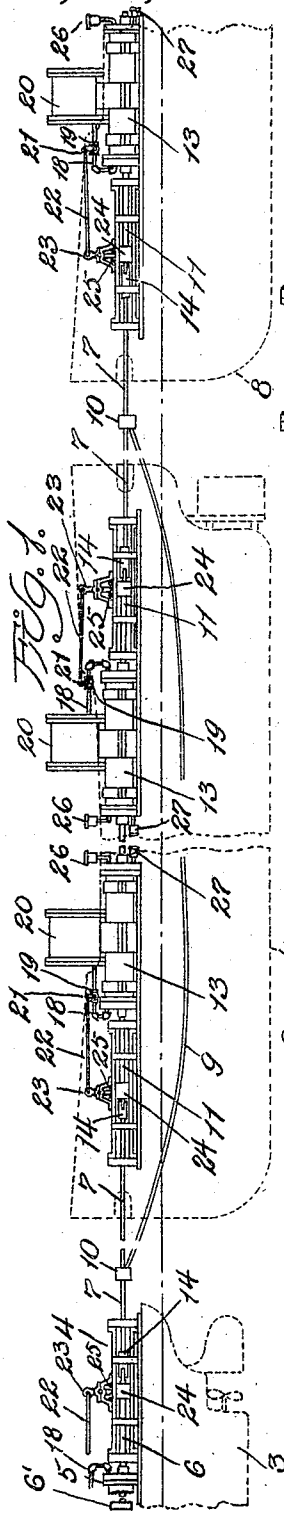


FIG. 1.

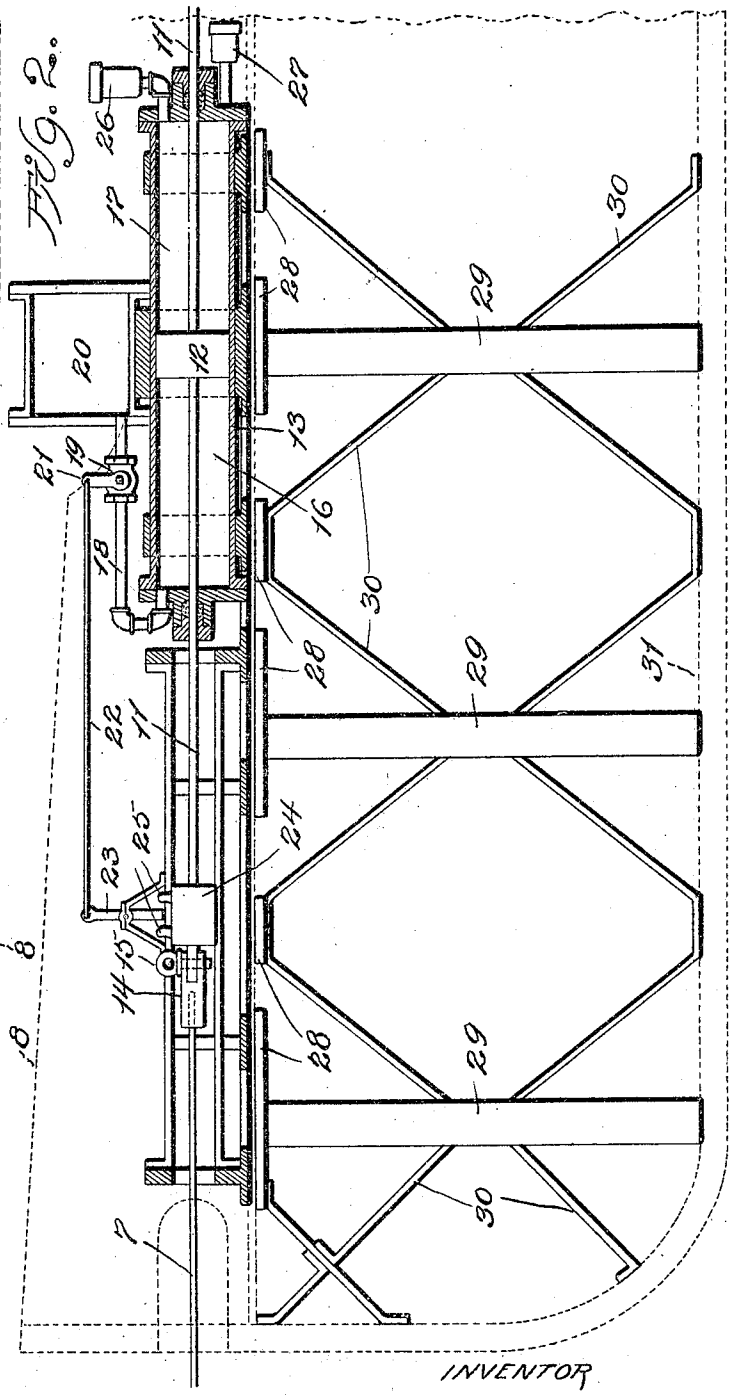


FIG. 2.

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TOWING APPARATUS.

1,297,418. Specification of Letters Patent. Patented Mar. 18, 1919.

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To all whom it may concern:

Be it known that I, WILLIAM P. TARRANT, a citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Towing Apparatus, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to improvements in towing apparatus, and has for its object to provide mechanical equipment for tug-and-tow service adapted to inland or ocean duty, in which the pull of the tug is carried by direct tensile medium throughout a series of towed vessels, and in which either of a series of towed vessels may be disengaged from the tug or traction vessel without disturbing the remainder of the tow, when necessary for purposes of jettison, unloading, or safety.

In applying the tractive power to the tow, my invention is intended to have the pull directed along the median line of each of the towed vessels by means of a main towline connecting with a bar or shaft mounted in or on each of the towed vessels; said bar or shaft being of approximately the same length as the towed vessel whereon it is mounted. Said shaft also is adapted to resist the abnormal stresses incident to wave surges and the like, by reason of its forming of itself, in connection with its mountings, a shock-absorber or surge-reliever. To that end the bar or shaft is equipped with piston heads mounted in fluid-containing cylinders, said cylinders being provided with the usual relief means to prevent the bursting of the cylinder under excessive pressure upon or accidental loss of its fluid contents.

As one of the primary objects of my invention is to provide for deep-sea towing, and as either in war or peace conditions any one of a series of towed vessels may become so injured as to necessitate its removal from the main towline, I provide connecting or coupling means between the said shafts carried by the towed vessels, and the main towline, which permit the main towline to be cast off as to such vessel as may be desired. To that end the main towline is equipped with sections of auxiliary towline, each auxiliary section being attached to the main towline at points beyond the extremities of one of the towed vessels.

In the drawings—

Figure 1 is a diagrammatic view illustrating a tug and portions of two vessels towed thereby.

Fig. 2 is an enlarged view in vertical mid-section of one of the two shock-absorbing or surge-relieving mechanisms with which each of the towed vessels is equipped.

In the drawings, the tug or traction vessel is indicated by the numeral 3, and has mounted thereon the shock-absorber 4, comprising cylinder 5, shaft 6, and piston 6′, mounted on said shaft 6.

The main towline is indicated by the numeral 7, and the towed vessels as 8—8. An auxiliary towline 9 is secured to the main towline 7 by clamps 10—10. One of said auxiliary lines 9 is provided for each of the tows 8, and is of a greater length than the tow, as shown, in order that it may act as a section of the main towline 7 whenever the towed vessel 8 which it encircles is disconnected and cast off from the said main towline 7.

A main bar or shaft 11 is provided for each of the vessels 8. Said shaft 11 extends from end to end of the vessel 8 whereon it is mounted, and toward each of its ends said shaft 11 is provided with a piston 12, seated in a cylinder 13. At its extremity the shaft 11 is connected to the clamp 14 by a coupling pin 15, or equivalent means, the clamp 14 being mounted upon the main towline 7 as shown.

The cylinder 13, for the purpose of affording resistance to the movement of piston 12, is provided with fluid. The fluid in the end of the cylinder 13 nearest to that end of the vessel 8 which it abuts, will preferably be denser than the fluid used in the opposite or inner end of said cylinder 13. Thus, in Fig. 2, the portion 16 of the cylinder 13 will probably be oil filled, while the compartment 17 may be filled with air or any other fluid of less density than the oil contained in the chamber 16. The liquid in the compartment 16 will be subjected to the pressure of the piston 12 whenever the forward progress of the vessel 8 is impeded by waves, or the like, and to relieve against excessive pressure I have provided the outlet pipe 18, in which is seated the valve 19, said outlet pipe 18 connecting with the dome or auxiliary chamber 20. The valve 19 is

operated by means of the lever 21, connecting rod 22, and finger 23. Shaft 11 is provided with the block 24, carrying the trips 25—25, by the forward and backward movement of which the finger 23 will be actuated, through its connections, to operate the valve 19. The function of these parts is to maintain the piston 12 in approximately the position indicated in Fig. 2, in which the piston 12 is approximately at the center of its possible limitation of stroke in the cylinder 13, and the trips 25—25 are out of contact with the finger 23, the valve 19 then being open, allowing free communication between the auxiliary chamber 20 and the compartment 16. Any sufficient forward movement of the shaft 11 will cause the rear trip 25 to contact with the finger 23 and cause the valve 19 to be rotated without interrupting communication between the compartment 16 and auxiliary chamber 20; the return movement of the shaft 11 releasing said rear trip 25 from contact with the finger 23, when the block 24 has reached approximately the position indicated in Fig. 2; continued rearward movement of the shaft 11 serving to bring the forward trip 25 in contact with the finger 23, its adjustment being such as to close the valve 19 when the fluid content of the compartment 16 has been replenished from the auxiliary chamber 20.

Excessive pressure in the compartment 17 will be accommodated by the relief valve 26, the intake valve 27 serving to admit a fresh supply of fluid to compartment 17 when necessary.

It will be understood that the mechanism thus described, as shown in Fig. 2, is a duplicate of the mechanism at the opposite end of the same vessel, as indicated in Fig. 1. It will be further understood that this mechanism is disposed along the median line of the vessel 8, and I have indicated by means of the base-plates 28, vertical standards 29, and truss rods 30, elements whereby the said mechanism is not only mounted in alinement with the keel 31, but is directly attached thereto, for purposes of securing strength and conveying the pull of the traction vessel 3 directly to and along the line of the keel 31.

I am aware that in the art of towing, surge-relievers or tension-buffers have been employed, and I disclaim the invention of such mechanism in a broad sense; my invention being directed to providing means for a direct pull throughout the entire length of a main towline connecting a series of tows to its tug or tractor; a mechanism of my invention conveying the pull of the tractor directly along the towline throughout its entire length, from the shaft on the tractor vessel to the shaft slidably mounted upon the rearmost of the towed vessels, the towline and the series of shafts practically forming a unit which is substantially independent of the various towed vessels in conveying its pull; the connection between this unit and the various towed vessels being only sufficient to pull the vessel, and no part of that pull being conveyed to the next following towed vessel through the framework of either of the towed vessels. In addition to which, my invention guards against the condition which arises when either of a series of towed vessels is so injured as to necessitate its sinking, or removal from the tow as a whole. This I accomplish by means of the auxiliary towline and means for disconnecting the injured vessel from the main townline, which I have above described.

The disposition of the cylinders 13, as I have described them, provides for extraordinary shocks occuring between the tug and the line of towed vessels, and between the towed vessels themselves, in storms or rough weather, and serves to obviate, up to the limits of the tensile strength at which the main towline 7 and the bars 11 may be constructed, the rupture or snapping of the main towline, which is now an ever-present danger in deep-sea towing by a single tug, and a practical bar to the towing of more than one vessel by a single tug. The series of shafts 11, constructed and mounted as I have described, serves to neutralize the snapping stresses to which the main towline is subjected by the various movements to which towed vessels are subjected in rough seas.

The form of my invention illustrated in the drawings is not of the essence of my invention, whose broad purposes, and the wide range of equivalent mechanisms which may be employed without departing from my invention, are obvious from the foregoing description.

Having thus described my invention, what I claim as new and desire to have secured to me herein are:

1. In a towing apparatus, a towed vessel; a shaft longitudinally and slidably mounted thereon, and of approximately the same length as said vessel; a piston head mounted on said shaft; and a fluid-filled cylinder wherein the said piston head is mounted.

2. In a towing apparatus, a towed vessel; a shaft longitudinally and slidably mounted thereon, and of approximately the same length as said vessel; hawser coupling mounted on the extremities of said shaft; a piston head mounted on said shaft; and a fluid-filled cylinder wherein the said piston head is mounted.

3. In a towing apparatus, in combination, a traction vessel; a series of towed vessels; a shaft of approximately the same length as that of the towed vessel, longitudinally and yieldingly mounted upon each of said towed vessels; couplers mounted upon the extremities of each of said shafts; a main towline connecting the series of towed vessels with

each other and with the traction vessel; and a plurality of auxiliary towlines, each mounted on the main towline at points beyond the extremities of one of the towed vessels; and means for disconnecting either of said towed vessels from the said main towline.

4. In a towing apparatus, the combination of a traction vessel; a traction element secured to said traction vessel and comprising a fluid-containing cylinder, a piston slidably mounted in said cylinder, and a traction bar mounted in said piston; a series of towed vessels; a shaft of approximately the same length as that of the towed vessel, longitudinally and yieldingly mounted upon each of said towed vessels; couplers mounted upon the extremities of each of said shafts; a main towline connecting the series of towed vessels with each other and with the traction vessel; and a plurality of auxiliary towlines, each mounted on the main towline at points beyond the extremities of one of the towed vessels; and means for disconnecting either of said towed vessels from the said main towline.

In testimony whereof I hereunto affix my signature.

WILLIAM P. TARRANT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."