L. V. W. FROGER.

CABLE ARRANGEMENT FOR TOWING.

APPLICATION FILED DEC. 8, 1919.

1,378,102.

Patented May 17, 1921.

7 SHEETS—SHEET 1.

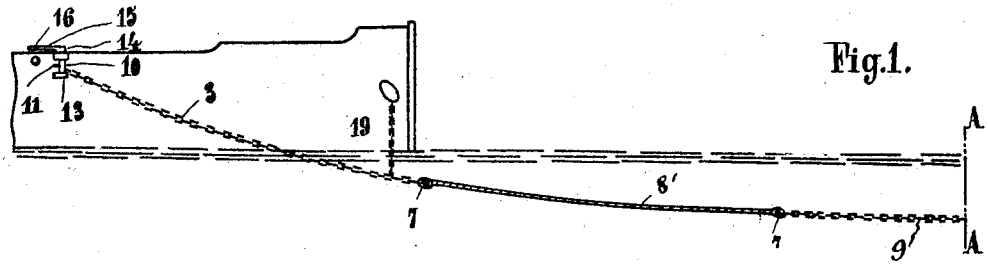


Fig.1.

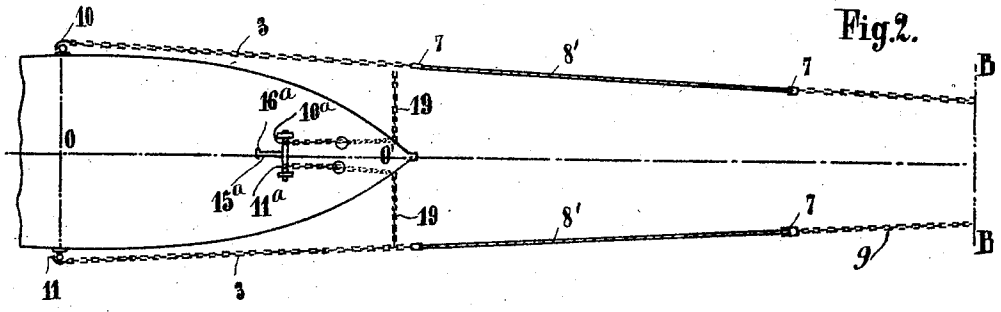


Fig.2.

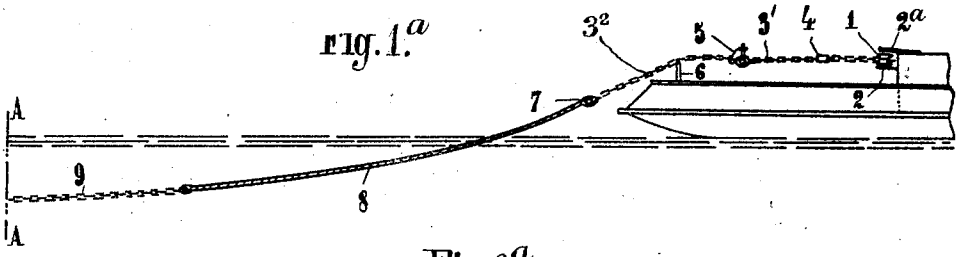


Fig.1a.

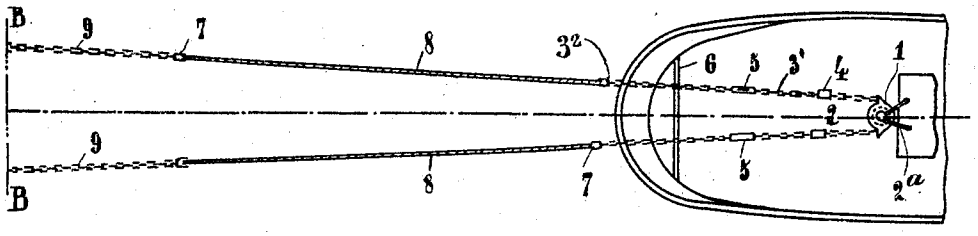


Fig.2a.

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By Louis Bouvelyke

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7 SHEETS—SHEET 2.

Fig. 10.

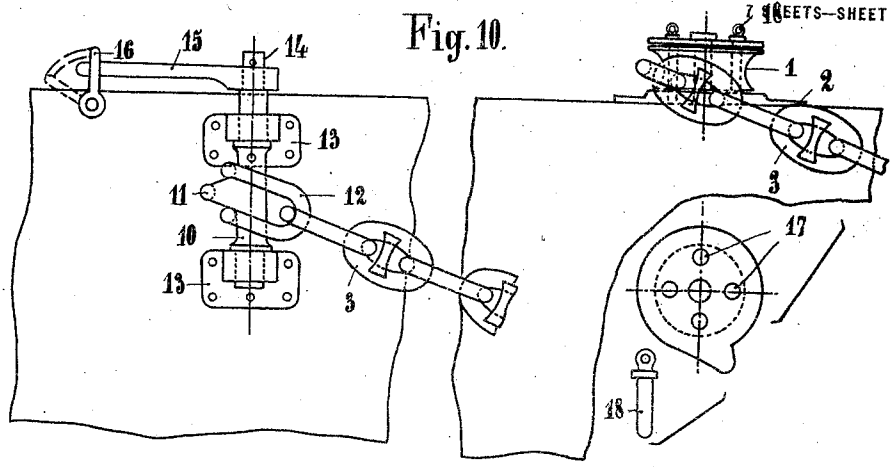


Fig. 3.

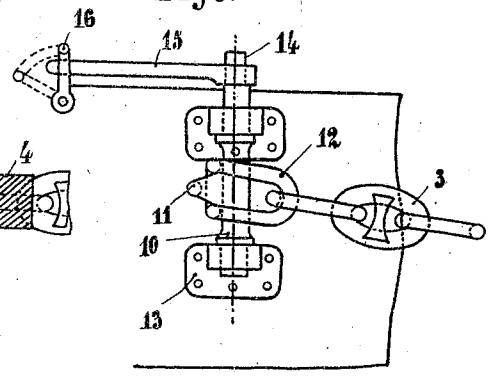


Fig. 6.

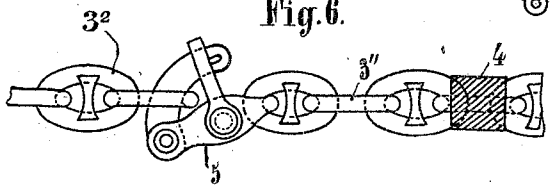


Fig. 4.

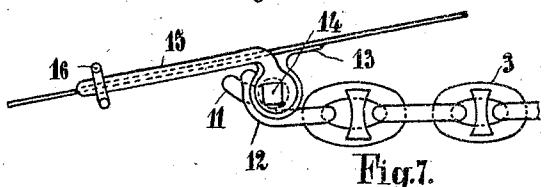


Fig. 7.

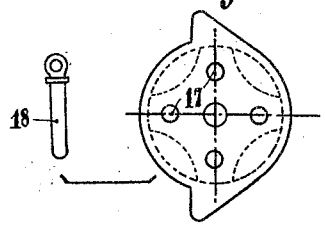
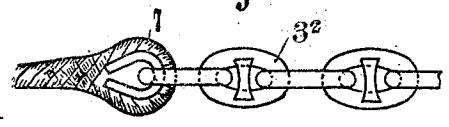


Fig. 5.



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7 SHEETS—SHEET 3.

Fig. 8.

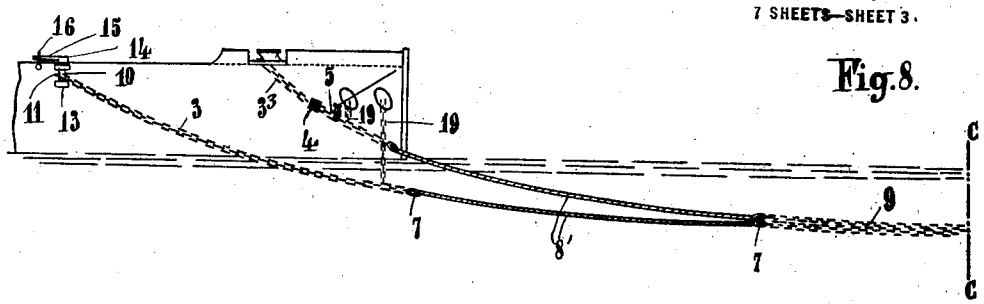


Fig. 9.

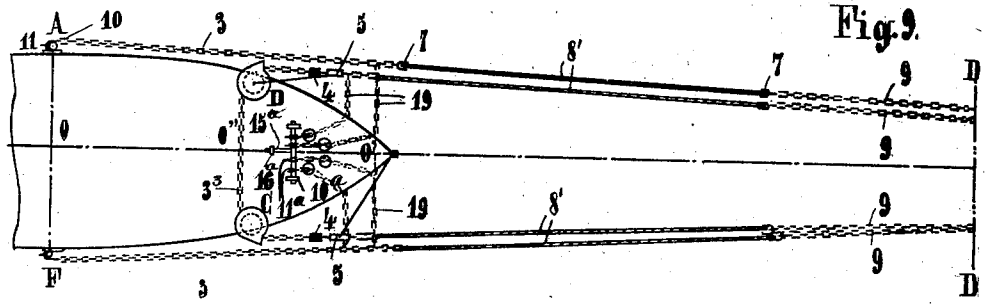


Fig. 8ª

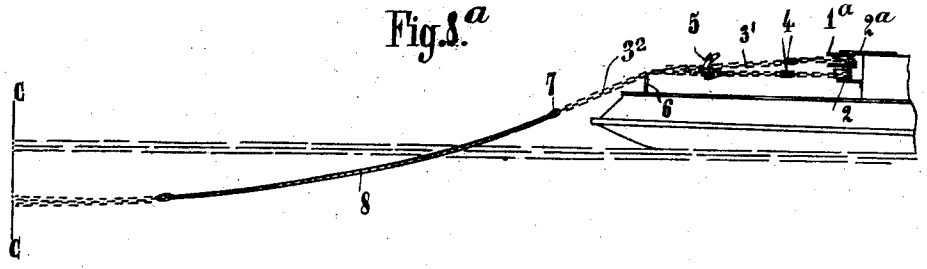
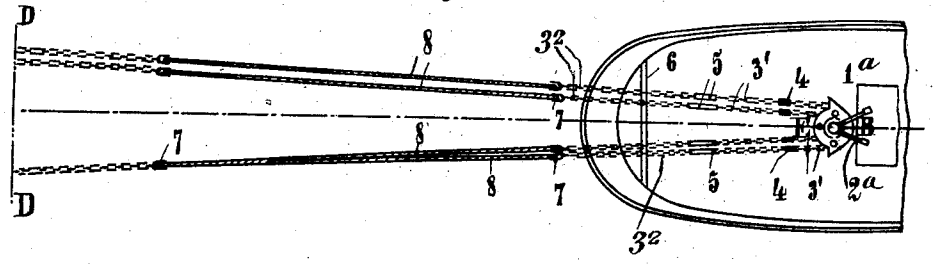


Fig. 9ª



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7 SHEETS—SHEET 4.

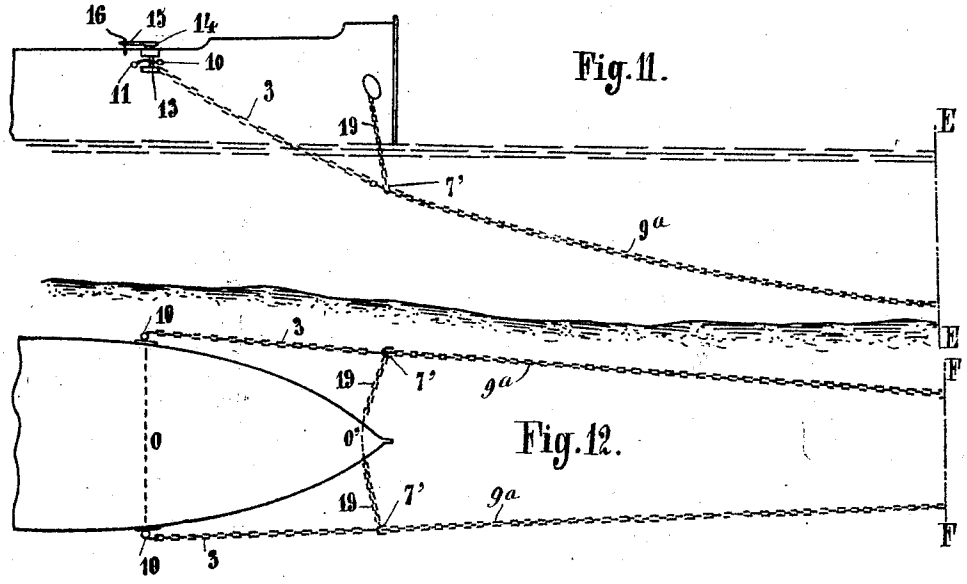


Fig. 11.

Fig. 12.

Fig. 11a

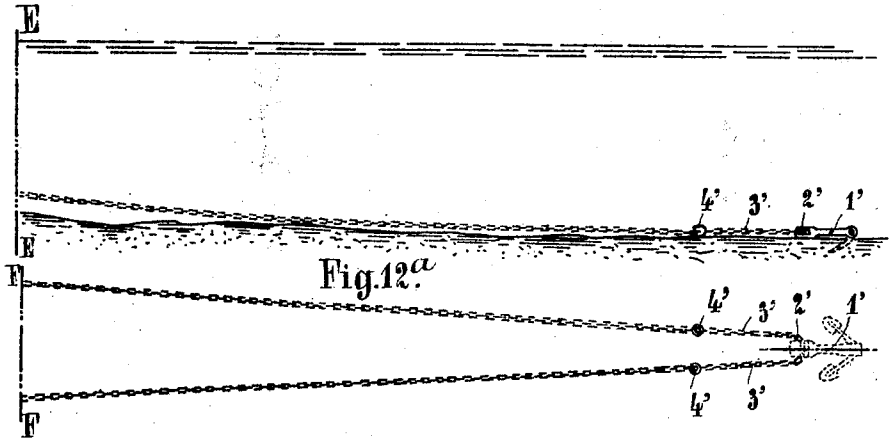


Fig. 12a

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7 SHEETS—SHEET 5.

Fig.13.

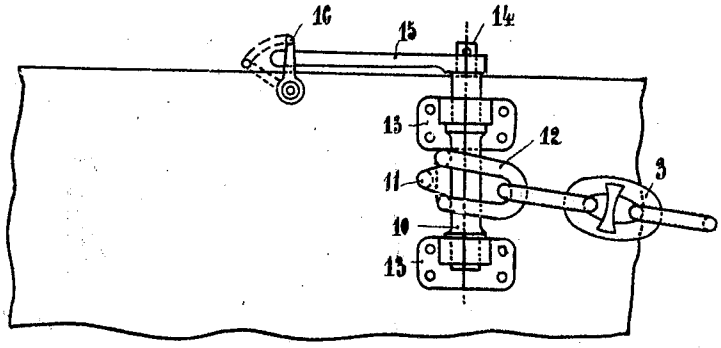


Fig.16.

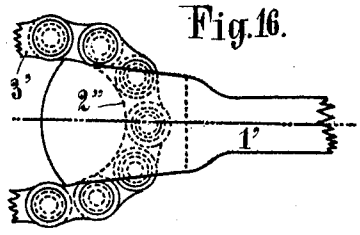


Fig.14.

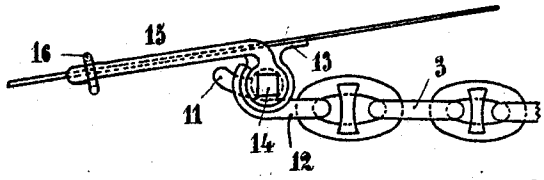


Fig.17.

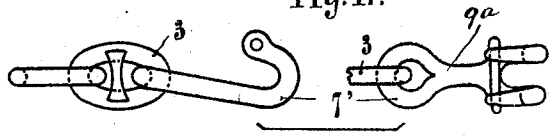
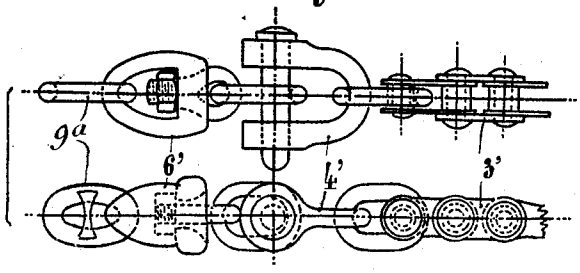


Fig.15.



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7 SHEETS—SHEET 6.

Fig. 18.

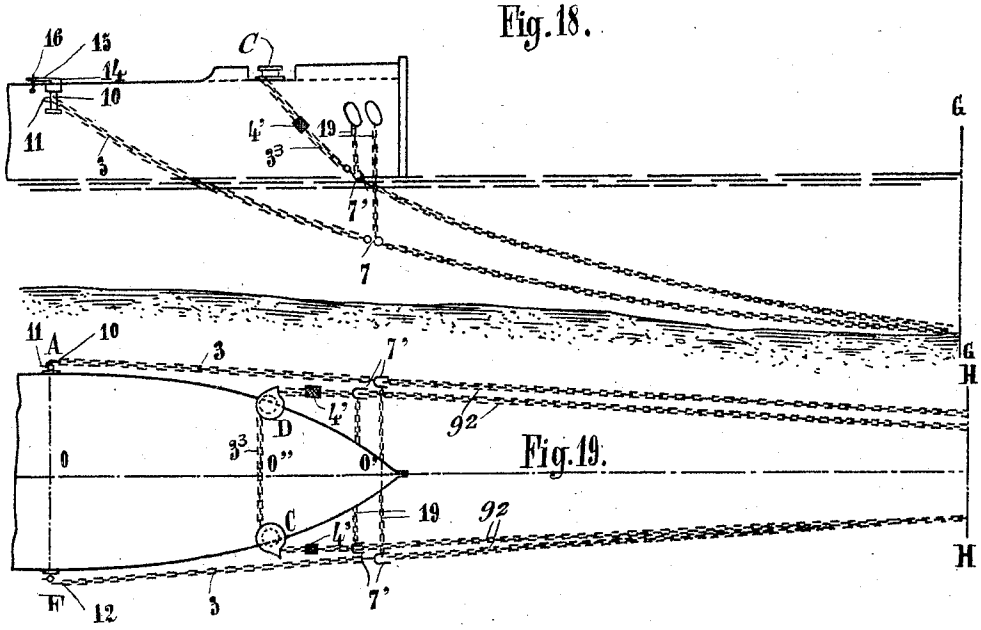


Fig. 19.

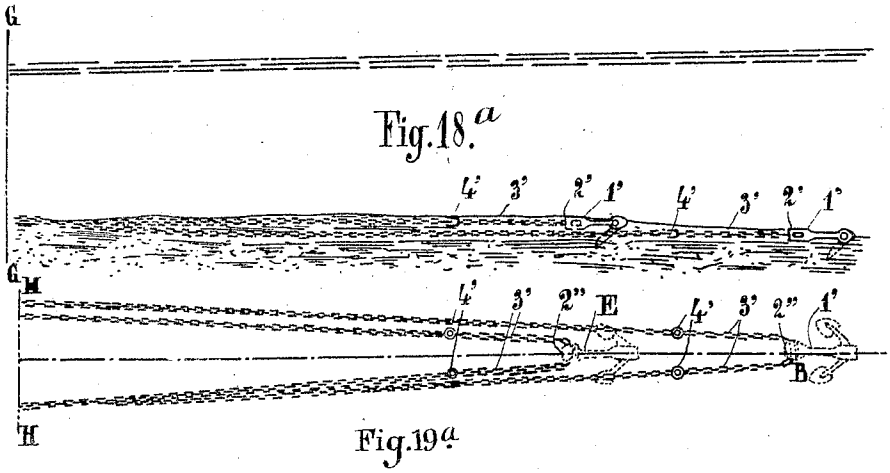


Fig. 18a

Fig. 19a

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CABLE ARRANGEMENT FOR TOWING.

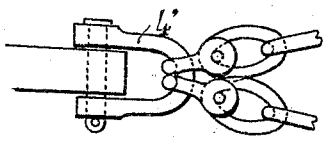
APPLICATION FILED DEC. 8, 1919.

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Patented May 17, 1921.

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Fig. 22.



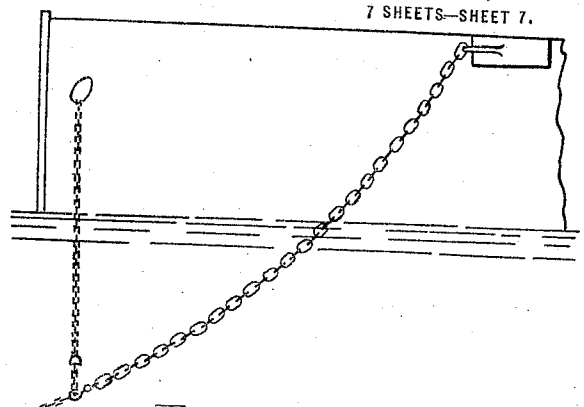


Fig. 20.

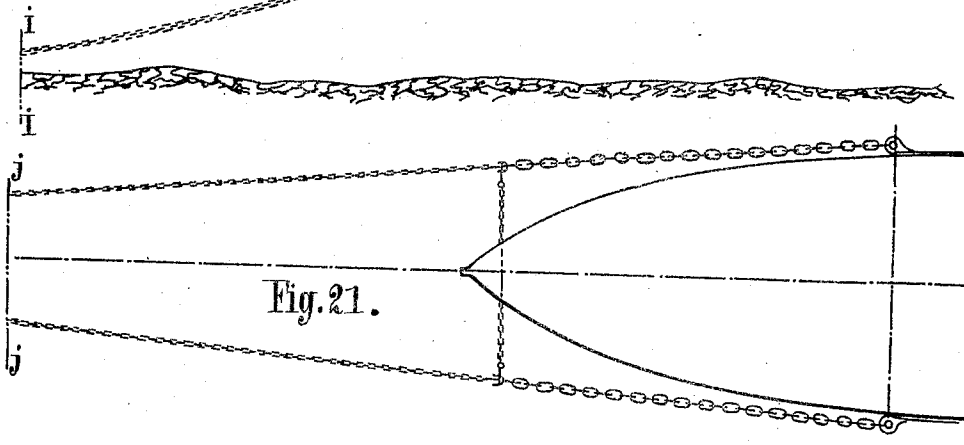


Fig. 21.

Fig. 20a.

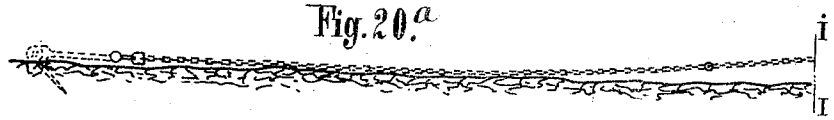
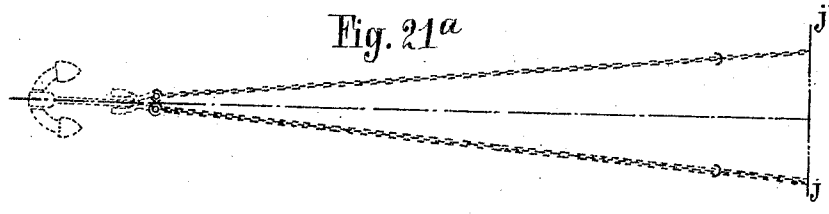


Fig. 21a



INVENTOR

Louis Victor William Froger

BY

Louis Raimey Ke

ATTORNEY

UNITED STATES PATENT OFFICE.

LOUIS VICTOR WILLIAM FROGER, OF LORIENT, FRANCE.

CABLE ARRANGEMENT FOR TOWING.

1,378,102. Specification of Letters Patent. Patented May 17, 1921.

Application filed December 8, 1919. Serial No. 343,361.

To all whom it may concern:

Be it known that I, LOUIS VICTOR WILLIAM FROGER, citizen of the Republic of France, and resident of Lorient, Morbihan, France, (post-office address, 26 Rue Victor Hugo,) have invented a new and useful Cable Arrangement for Towing, which improvements are fully set forth in the following specification.

This invention relates to the towing of ships by means of an endless tow line, based on the Varignon theorem and is also applicable, as will be explained later on, to the mooring of ships.

In order to make the following explanation as clear as possible, the accompanying drawing shows by way of example the device forming the subject of the present invention.

Figures 1 and 1^a are halves of an elevation of the towing device forming the subject of the present invention.

Figs. 2 and 2^a are halves of a plan of the same.

Fig. 3 is an elevation of the part of the ship's side, to which is secured a simple bolt which receives the tow line on a projection.

Fig. 4 is a plan of the same part.

Fig. 5 shows the joint of the tow line with its chain extension.

Fig. 6 shows the joint of the extension to the chain by means of an escapement hook.

Fig. 7 shows a pulley with stop lugs, provided with holes by means of which the tow line can be temporarily locked by means of a stud, in order to facilitate the maneuvering of the towed ship by exercising only a moment opposed to the falling off or casting that it is desired to impart quickly to the ship in question.

Figs. 8 and 8^a are halves of an elevation of the same towing device with a double endless tow line passing over a differential tackle.

Figs. 9 and 9^a are halves of a plan of the same.

Fig. 10 shows in elevation the side of the ship to which is secured a movable bolt on starboard, just as there is another one on the port side, to the hooks or projections of which are made fast the two standing parts of the endless tow line with two or four strands, as well as those of the endless mooring chain with two or four strands.

On the rail on the starboard side of the ship, as on the one on the port side, a pulley with lugs, secured in front of each bolt, is intended to be used as a return for the endless tow line passing through the differential tackle for mooring.

Figs. 11 and 11^a are halves of an elevation of the same device applied to the mooring and making fast of a ship in accordance with the same arrangement, by means of a double endless chain.

Figs. 12 and 12^a are halves of a plan of the same, and

Figs. 13–17 are detail views.

Figs. 18 and 18^a are halves of an elevation of the same device with an endless mooring chain having two anchors.

Figs. 19 and 19^a are halves of a plan of the same and

Figs. 20, 20^a, 21, 21^a and 22 show the mooring of an anchor on two chains.

As shown in Figs. 1–7, as regards the endless tow line, on board the tug is arranged a single sheave pulley 1, (Figs. 1^a and 2^a).

This part is the "heart" of the system, and in fact it is on it that depend the uniform distribution of the traction, of the tension on the cords and the stability of direction, a very important point, in the propulsion. The pulley spindle is journaled in plate 2 and forks 2^a.

The pulley 1 on the towing ship is engaged by the middle section 3′ of the tow line, which latter passes over the support or bracket 6 and comprises a pair of terminal sections 3 hooked to the side bolts 10 on the towed ship and pairs of intermediate sections 8, 9, 8′. The sections 3′, 3 and 9 are preferably in the form of chains as shown, while the intermediate sections 8, 8′ are made of hemp or of steel wire and are connected at their ends to the chain sections 3′, 9, 3 by means of metal eyelets 7, best shown in Fig. 5. The middle section or chain 3′ carries a pair of stop blocks 4 to engage the pulley 1 in the event of breakage of one of the intermediate sections 8 or 8′, so as to limit the movement of said chain, and also carries a pair of releasing hooks 5 (see Fig. 6), said hooks serving to detachably couple the central portion of the section or chain to the end portions 3^a. The intermediate chain sections 9 are used for ballast purposes, and must be of equal length and of equal diameter, weight and strength; and they also act somewhat in the manner of powerful springs in that they provide for

a material elasticity in the tow line and at the same time take up and absorb any shocks which may be transmitted to the line.

The two side bolts 10 are disposed vertically, as shown in Fig. 3, and are mounted or journaled in bearings 13, each bolt being provided with a lateral hook 11 for releasable engagement with the bent link 12 on the end of the corresponding chain section 3. These bolts are formed with squared upper ends 14 on which are fitted the lever arms or handles 15 for turning said bolts, the free ends of said handles being engageable by pivoted catches 16 for holding the bolts in the position in which their hooks 11 are coupled to the links 12. The said hooks are situated in the plane of the main section of the towed ship and at equal distances from a point 0 in the center line thereof, so that the forces acting on the ship at opposite sides of such point will thus be balanced. But the pulley 1 may, if desired, be locked to its sheave and thereby held against movement, in order to cut out or to render inoperative one of said forces, by forming the pulley and sheave with a set of four registering openings 17 (Fig. 7) to interchangeably receive a pin 18; such action facilitating the casting off of the tug.

Similar devices are preferably provided to balance the ship at a second point 0′ in its center line, this second point 0′ being located forward of the first point 0 adjacent the end of said line. For this purpose there is connected to the forward portion of each chain 3 a rope, chain or other flexible relieving element 19 which is passed through the hawser opening in the adjacent side of the ship and then led rearward and detachably connected to one of the two hooks 11^a on a rotatably mounted, horizontal bolt 10^a which is generally similar to the side bolts 10 and, like them, is provided with an operating handle 15^a engageable by a catch 16^a.

The devices thus far described, that is to say, the pulley 1 and the tow line, may be permanently attached to any tug, and the tow line readily coupled to the ship to be towed by hitching the ends of the chains 3 to the side bolts 10 or, if the said chains 3 form part of the equipment of the tow and not part of the tow line, by hitching them to the ends of the ropes 8.

The structure shown in Figs. 8–9^a is generally similar to that represented in Figs. 1–7 and described above, excepting that a double tow line is employed which comprises two middle sections 3′, two pairs of rope sections 8 and 8′, two pairs of chain sections 9, two terminal chain sections 3 and an additional chain section 3^2 which connects the ends of the inner pair of rope sections 8′. The middle sections 3′ pass over the two members of a differential pulley 1^a on the tug and include the outer portions or members 3^2 which are detachably coupled to the central portions of said sections or chains by the releasing hooks 5, as in the first form. The connecting section or chain 3^3 passes around two pulleys C, D, on the towed ship which are so arranged that the portion of the chain between said pulleys is disposed parallel to an imaginary line A—F connecting the two side bolts 10 and intersects the center line of the ship at the point 0″ intermediate the previously-mentioned points 0 and 0′, the said sections 3^3 having releasing hook connections with the ends of the said rope sections 8′.

In Figs. 11, 11^a, 12 and 12^a, the tow line is shown as connected with an anchor 1′ instead of with a pulley on the tug; in which case, its middle section 3′ (constituted by a Gallic chain as represented in Fig. 16) passes through a transverse opening 2′ in the anchor stem, the rear wall of such opening being of convex or forwardly-curved formation as indicated at 2″ in Fig. 16. The tow also comprises a pair of long side sections or chains 9^a, which are connected at their rear ends to the terminal sections or chains 3. The ends of the middle section 3′ are connected to the front ends of the side sections 9^a by shackles 4′ (Figs. 11^a, 12^a and 15), while the rear ends of the sections 9^a are coupled by chains 7′ (Fig. 17) to the front ends of the chains 3. The section 3′ may be provided adjacent its ends with swivels 6′ (Fig. 15) for reducing the torsion of the chains 9^a.

Figs. 18, 18^a, 19 and 19^a show the features of Figs. 11, 11^a, 12 and 12^a applied to the double tow line construction of Figs. 8, 8^a, 9 and 9^a and require no special explanation.

In the case of fogs or the like, the first of the two ships to notice the danger can effect uncoupling of the connections almost instantaneously, due to the absence of the clamps, cleats, etc., which are usually employed with the tow lies and are especially dangerous with large hawsers or steel cables. The risk of abandonment by the towed ship is greatly reduced, and along a coast in case of wind from the sea, this will often mean avoidance of shipwreck. The omission of all cleats, clamps, etc., also facilitates letting go of the tow lines both on the tug and on the towed ship by driving out with a blow of a hammer the movable shackles from the lever arm at each side. Where the differential tackle (Figs. 8, 8^a, 9, 9^a, 18, 18^a, 19 and 19^a) is employed, the four releasing hooks may be connected by means of special cords or the like which may be pulled to release the tow lines.

Figs. 20, 20^a, 21, 21^a and 22 show a construction in which the ship is provided with two anchor chains connected at one end to the shackle 4′ on the stem of the anchor (Fig. 22) and at the other end to the moor-

ing rings, the arrangement being generally the same as that illustrated in Figs. 11, 11ª, 12 and 12ª.

I claim as my invention:

1. In a cable arrangement for towing, the combination, with a pair of releasing hooks adapted to be positioned on the tow at the ends of a transverse line normal to the longitudinal axis of the tow; of a tow line having its ends detachably coupled to said hooks; and balancing connections forward of said hooks between the tow and each bight of the tow line, the bend in the latter adapted to run in a grooved part on the tug or anchor.

2. In a cable arrangement for towing, the combination, with a pair of rotatable bolts adapted to be positioned vertically on the tow at the ends of a transverse line normal to the longitudinal axis of the tow, a handle for operating each bolt, a catch engageable with each handle to hold the corresponding bolt in one position, and a lateral hook on each bolt; of a tow line having its ends detachably coupled to said hooks; and balancing connections forward of said hooks between the tow and each bight of the tow line, the bend in the latter adapted to run in a grooved part on the tug or anchor.

3. In a cable arrangement for towing, the combination, with a pair of transversely-grooved elements, a pair of releasing hooks adapted to be positioned on opposite sides of the tow at the ends of a transverse line normal to the longitudinal axis of the tow, and a pair of pulleys arranged on the tow at the ends of a transverse line parallel with and forward of the first-named line; of a double tow line detachably coupled at one end to one hook and thereafter successively led forward and inserted in the groove in one grooved element, passed rearward to the opposite side of the tow, led across said pulleys to the first named side of the tow, led forward again and inserted in the groove in the other grooved element, and led rearward and detachably coupled at its free end to the other hook.

4. In a cable arrangement for towing, the combination of a tow line having its ends connected to the tow at two points situated equidistant from the longitudinal axis of the tow and to the rear of the bow thereof, the bend in the tow line adapted to run in a grooved part on the tug or anchor; fastening devices on the tow; and balancing lines branching from the tow line and connected to said fastening devices.

5. In a cable arrangement for towing, the combination of a tow line having its ends connected to the tow at two points situated equidistant from the longitudinal axis of the tow and to the rear of the bow thereof; a pulley mounted on the tug in the longitudinal axis of the said tug, the bend in the tow line running around said pulley; fastening devices on the tow; and balancing lines branching from the tow line and connected to said fastening devices.

6. A cable arrangement according to claim 4, in which the balancing lines, those portions of the tow line proper between the balancing lines and the fastening devices on the tow, and the portion of the tow line which forms its bend each consist of a chain, while the intermediate lengths of the tow line comprise portions consisting of rope.

7. A cable arrangement according to claim 5, in which the fastening devices on the tow for the tow line and the balancing lines have manual releasing devices associated with them at points accessible from the deck of the tug.

8. In a cable arrangement for towing, the combination of two grooved elements; fastening devices at each side of the tow situated at points equidistant from the longitudinal axis thereof and to the rear of the bow; two pulleys upon the tow situated at points equidistant from the said axis thereof and forward of said fastening devices; and a tow line connected to one of the fastening devices extending forwardly over one of said grooved elements, then backwardly over both pulleys on the tow, then forwardly over the other grooved element, and finally back to the other fastening device on the tow; said tow line having four balancing lines branching therefrom and connected to the tow by fastening devices on the tow.

In testimony whereof I, Louis Victor William Froger, have signed this specification in the presence of two subscribing witnesses.

LOUIS VICTOR WILLIAM FROGER.

Witnesses:
George M. Studley,
Raoul E. Mouton.