L. V. W. FROGER.

SHEET ANCHOR.

APPLICATION FILED MAR. 26, 1918.

**1,305,507.**

Patented June 3, 1919.

4 SHEETS—SHEET 1.

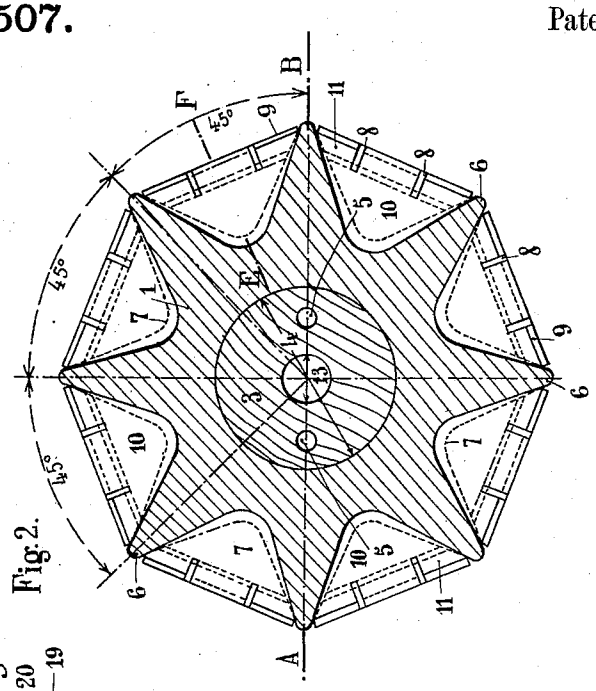



Fig. 2.

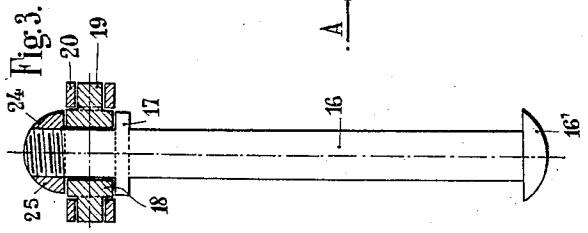


Fig. 3.

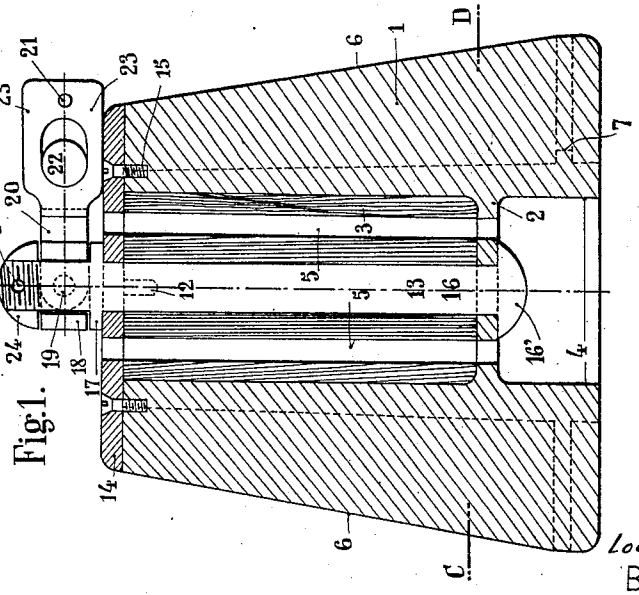


Fig. 1.

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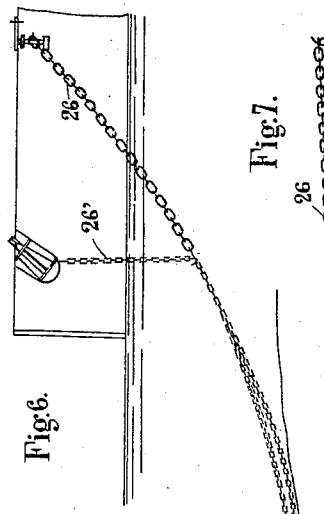



Fig. 6.

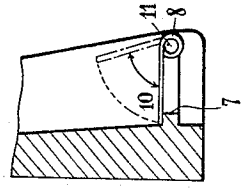



Fig. 5.

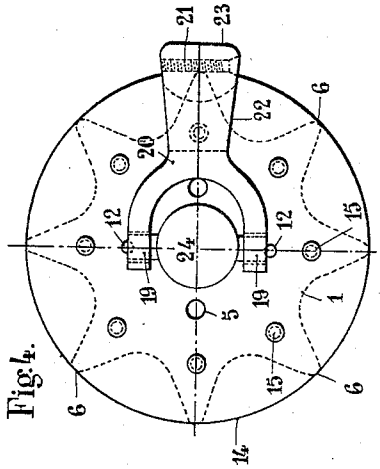



Fig. 4.

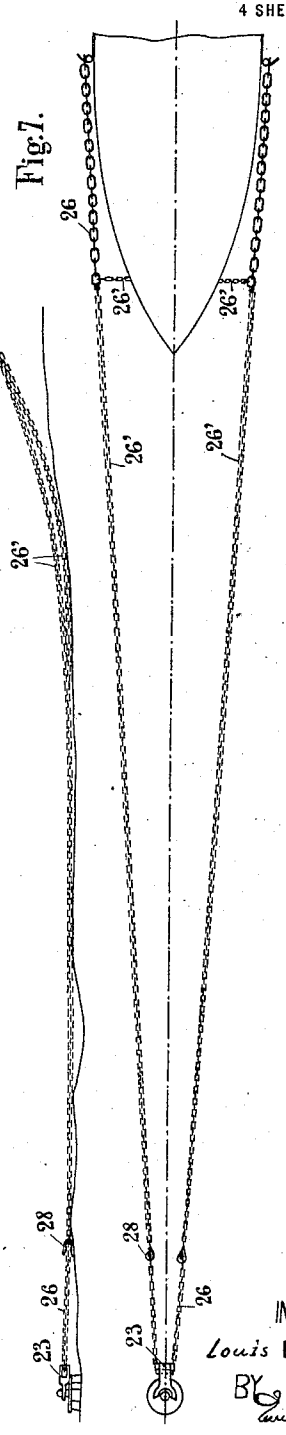



Fig. 7.

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Fig. 8

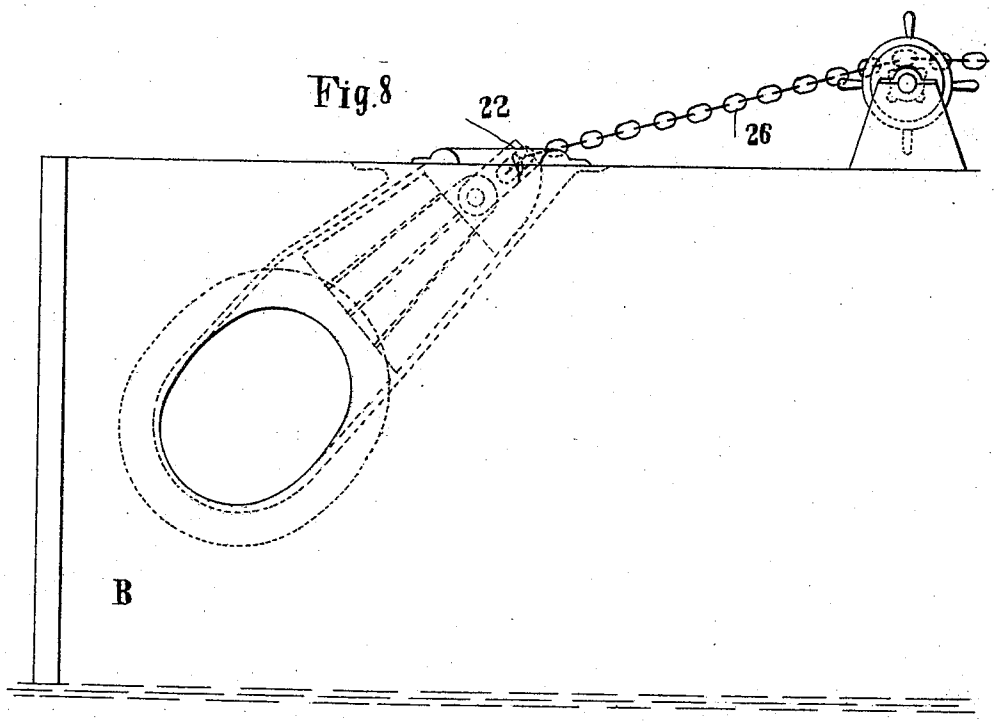
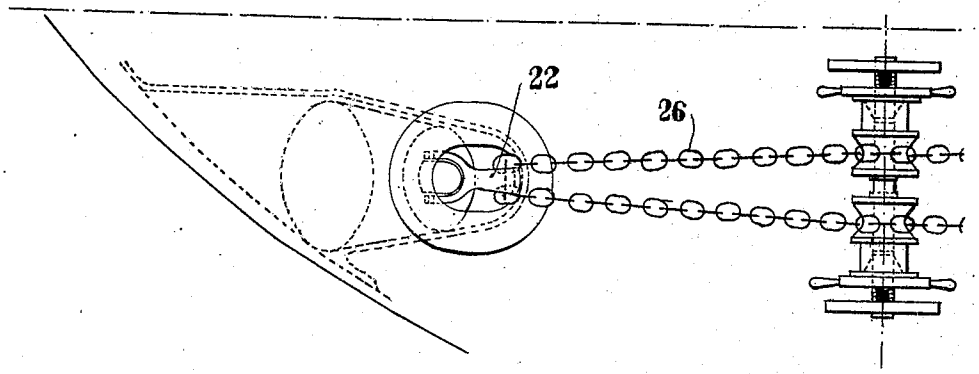



Fig. 10




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4 SHEETS—SHEET 4.

Fig. 9

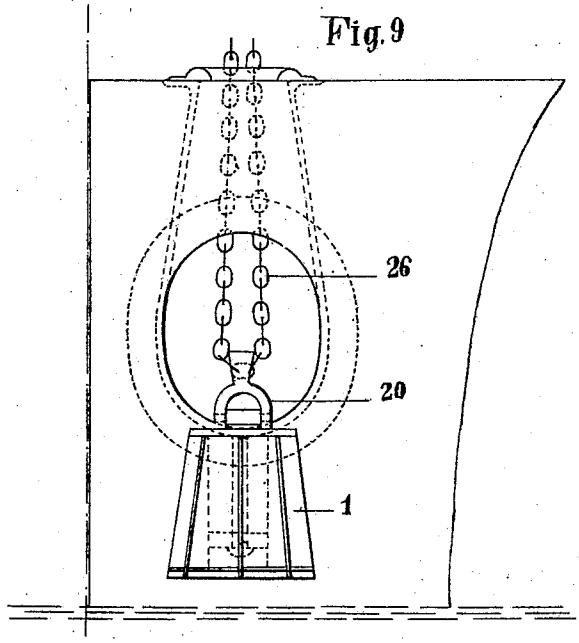
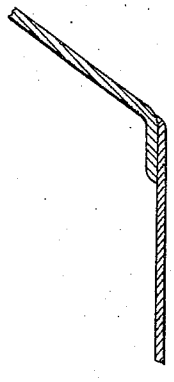



Fig. 11



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# UNITED STATES PATENT OFFICE.

LOUIS VICTOR WILLIAM FROGER, OF LORIENT, FRANCE.

## SHEET-ANCHOR.

1,305,507. Specification of Letters Patent. Patented June 3, 1919.

Application filed March 26, 1918. Serial No. 224,831.

*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, France, (post-office address 26 Rue Victor Hugo,) have invented a new and useful Sheet-Anchor, which improvement is fully set forth in the following specification.

This invention relates to sheet anchors; and it resides in the provision of an improved device of the class or character indicated which is constructed in such a way as to overcome the objectionable tendency of the ordinary anchor to turn in its bed simultaneously with the ship and thus dig funnel-shaped holes which reduce its grip upon the bottom and which is also so constructed that it tends to assume an upright position upon striking the bottom. Other objects and advantages will appear as the description of the invention proceeds.

The accompanying drawings show one embodiment of the invention, and therein:

Figure 1 is a vertical section of the improved anchor, taken on line A—B, Fig. 2;

Fig. 2 is a horizontal section on line C—D, Fig. 1;

Fig. 3 is a detail elevation of the central shank of the anchor;

Fig. 4 is a plan view of the anchor;

Fig. 5 is a section on line E—F, Fig. 2, showing one of the valves and its mounting;

Figs. 6 and 7 are, respectively, a diagrammatic side elevation and a plan view, showing the connection between the anchor and a ship;

Fig. 8 shows the anchor in place in its bed;

Fig. 9 shows the anchor ready to be dropped into the sea;

Fig. 10 shows the anchor suspended by its double cable passing over a windlass; and

Fig. 11 is a section through the side of the ship.

The improved anchor shown in said drawings comprises, essentially, a metal core or body 1 which, in order to bring the center of gravity of the anchor as close as possible to the plane of its base, is given a frusto-conical or frusto-pyramidal shape, the dimensions of the core being determined by the displacement of the particular ship with which it is to be used. The core or body is provided with an axial recess, the bottom wall of which is formed by a metal web or plug 2, that serves to ballast the core and may be cast with the same; and into this recess there may be inserted, if considered advisable, a filling plug 3, preferably constructed of cement.

Below the web 2 is provided a recess 4, which opens through the base of the core to facilitate the sinking of the anchor to the bottom of the sea, two cylindrical vent holes 5 being formed through the parts 2 and 3 and the head-plate 14 (hereinafter more particularly described) to enable the air trapped and compressed in the recess 4 to be discharged.

The core is provided along its perimetric surface with laterally-projecting ribs 6, preferably eight in number, which extend from top to bottom thereof and are designed to take the place of the flukes of the ordinary anchor. These ribs or flukes form dihedral angles with respect to the core, and are of counterpart construction and equidistantly arranged, their width gradually decreasing from bottom to top, as will be understood from Figs. 1 and 2. Between each pair of flukes and close to the base of the core, there is cast a projecting web or lug 7 providing a seat whereon a flap valve 10 is adapted to rest, said valve being hinged or pivoted by means of a pair of rings 8, to a small, horizontal spindle 11 which bridges the space between, and is disposed adjacent the outer edges of, said flukes, (Figs. 1, 2 and 5). The angular or vertical movements of the valves are limited by suitable stops 9 to about 87°. At the moment when the anchor falls into the sea and sinks into the bottom, the valves swing upwardly about their spindles, so as to avoid offering any resistance to penetration. Moreover, they increase the opposition surface of the anchor, when the latter is occupying a horizontal position, and by their combined weight serve to lower still further the center of gravity of the anchor, owing to which

the said anchor is enabled to assume automatically a vertical position in a friable bottom.

The head-plate 14, previously referred to rests upon the top face of the core, as will be understood, and is secured thereto, and to the filling plug 3, respectively, by means of screws or pins 15 and 12, though it may be soldered to the core, if desired. It is preferably circular in shape, and is designed to protect the upper edges of the flukes, as well as to cover the joint between the plug and the core. The plug 3 has formed through it an axial bore or passage 13, which may be either circular or polygonal in cross-section, and which registers with similarly-shaped holes in the head-plate and the web 2, this bore receiving the shank of a bolt 16, whose lower end 16′ is swaged or flattened against the under face of said web, while its upper end projects beyond the head-plate and is formed with an annular enlargement or collar 17 that rests upon said head-plate, the extreme end of the bolt being threaded, as shown in Figs. 1 and 3. Collar 17 supports a ring 18, which fits loosely around the bolt and is held against displacement by a cap or nut 24, threaded upon the terminal of the bolt and secured by a cotter pin 25; said collar being provided with a pair of diametrically-opposite pins or trunnions 19, on which are pivoted the two arms of a fork-shaped shackle 20.

The latter is preferably constructed of two counterpart members, which are fastened together by a screw 21, the portion 23 of the shackle through which the screw passes constituting its stem, as will be understood. In rear of the screw, there is formed through said stem a transverse opening 22, having a straight or flat rear wall and an inwardly-curved front wall (Fig. 4), the latter wall serving as a guide for a short pendant 26, in the nature of a chain, cable or other suitable flexible element, which passes loosely through said opening and bears against said wall. Each end of this pendant 26 has connected to it by a swivel 28 the rear end of an anchoring chain or cable 26′, the other end of which is connected in some approved manner with a suitable windlass mechanism, such as that shown in Figs. 8 and 10, mounted on the deck of the ship. The endless flexible operating element formed by the sections 26 and 26′ may be hauled in any desired way by means of the windlass; but since this operation forms no part of the actual invention, it has been deemed unnecessary to describe it in detail.

The construction and arrangement of parts as above set forth, enables the pendant 26 to move through the guide opening 22 in the shackle, during the turning or swinging movements of the ship, without entailing any movement of the anchor, due not only to the provision of the convex front wall of said opening, but also to the ability of the shackle both to swing or rock vertically about its trunnions 19 and to turn horizontally with the ring 18 about the bolt 16 as an axis, (during which time it rides, or may ride on the head-plate 14), or, in other words due to its virtual gimbal mounting with relation to said bolt, so that the drag upon the anchor is equalized on both sides thereof.

The uniform distribution of the pull on the sections 26 and 26′ of the operating element takes place in the shackle; while the formation of the anchor with its projecting dihedral flukes causes said anchor to very effectively oppose any pulls or strains exerted by the operating element and which would tend to turn it in its bed, since the surfaces of said flukes will always remain in the same direction with relation to the resultant of the pull exerted by the endless operating element, so that there will be permanently an equilibrium in the opposition of the said surfaces on the right and on the left of the plane of pull when the anchor is in an upright position, which position it will tend to automatically assume, due to the shape and to the extreme proximity of its center of gravity to its base, in case it lands in an inclined position upon a hard, impenetrable bottom. For the same reasons, it follows that whatever be the direction of the plane of the resultant relative to the pull, the said resultant will always act at an angle of about 270° and on three faces of the flukes out of four, thereby giving an opposition surface, in addition to its uniformly distributed weight. The anchor, whether standing upright or lying horizontally on a rocky bottom, will be caught and stopped by a projecting rock or the like, as in the case of ordinary anchors, by their own weight, and more particularly by that of the chain or other operating element which may be five and even six times as great as that of the anchor. The elasticity of weight of the operating element produces a slow, gradual pull, without jerks or shocks, which are so injurious to the ordinary chains, and consequently sudden pulls and recoils will be suppressed. A single anchor anchored by an endless cable will keep the ship anchored better than four anchors used in the ordinary manner. Finally, the provision of dihedral flukes obviates all danger of the chains catching on and becoming entangled with the flukes, the head-plate 14 preventing the shackle from dropping between the flukes.

I claim as my invention:—

1. A sheet anchor connected to a ship by

an endless, flexible operating element, comprising a substantially frusto-conical body having upper and lower axial recesses opening through its top and bottom faces, with a separating ballasting web between them, the perimetric surface of said body being provided with spaced, vertical flukes in the form of laterally-projecting dihedral angles; a filling plug secured in the upper recess, said plug and web having longitudinal air vents extending therethrough; a bolt secured in said plug and provided adjacent its upper end with an annular shoulder; a collar loosely mounted on the upper end of said bolt and resting on said shoulder, said collar having a pair of oppositely-located trunnions; a shackle having a formed portion straddling said collar and pivoted on said trunnions, and a solid stem portion formed with a transverse guide opening for the passage of said endless, operating element therethrough; and means for holding said collar on said bolt.

2. A sheet anchor connected to a ship by an endless, flexible operating element, comprising a substantially frusto-conical body having upper and lower axial recesses opening through its top and bottom faces, with a separating ballasting web between them; and a filling plug secured in the upper recess, said plug and web being provided with registering passages which unite in forming longitudinal air vents opening at their bottoms into the lower recess, and at their tops through the top of said body.

3. A sheet anchor, connected to a ship by an endless, flexible operating element, comprising a substantially frusto-conical body having its perimetric surface provided with spaced, vertical flukes in the form of laterally-projecting dihedral angles which extend from top to bottom of said surface.

4. A sheet anchor, connected to a ship by an endless, flexible operating element, comprising a substantially frusto-conical body having its perimetric surface provided with spaced, vertical flukes in the form of laterally-projecting dihedral angles which extend from top to bottom of said surface, and which gradually increase in width in the same direction.

5. A sheet anchor connected to a ship by an endless, flexible operating element, comprising a substantially frusto-conical body having its perimetric surface provided with spaced, vertical flukes in the form of laterally-projecting dihedral angles which extend from top to bottom of said surface; a lug cast at the bottom of the space between each pair of adjacent flukes; and an upwardly-opening valve pivoted at the bottom of each said space and normally resting upon the respective lug.

6. A sheet anchor connected to a ship by an endless, flexible operating element, comprising a solid body having an axially-disposed bolt embedded therein, the upper end of said bolt projecting above said body; a collar loosely mounted on said bolt end and provided with a pair of diametrically-opposite trunnions; a shackle having a forked portion straddling said collar and pivoted on said trunnions, and a solid stem portion formed with a transverse guide opening for the passage of said endless operating element therethrough; and means for holding said collar on said bolt.

7. A sheet anchor, connected to a ship by an endless, flexible operating element, comprising a substantially frusto-conical body having upper and lower axial recesses opening through its top and bottom faces, with a separating ballasting web between them, a filling plug secured in the upper recess; a bolt embedded in said plug and having its upper end projecting above the same; a collar loosely mounted on said bolt end and provided with a pair of diametrically-opposite trunnions; a shackle having a forked portion straddling said collar and pivoted on said trunnions, and a solid stem portion formed with a transverse guide opening for the passage of said endless operating element therethrough; and means for holding said collar on said bolt.

8. A sheet anchor connected to a ship by an endless, flexible operating element, comprising a substantially frusto-conical body having its perimetric surface provided with spaced, vertical flukes in the form of laterally-projecting dihedral angles which extend from top to bottom of said surface; and a circular head-plate mounted on the upper faces of said body and its flukes and covering the tops of the spaces between the latter.

9. A sheet anchor connected to a ship by an endless, flexible operating element, comprising a substantially frusto-conical body having its perimetric surface provided with spaced, vertical flukes in the form of laterally-projecting dihedral angles which extend from top to bottom of said surface; a circular head-plate mounted on the upper faces of said body and its flukes and covering the spaces between the latter; a bolt embedded in said body and having its upper end projecting through and above said head-plate; and a shackle having a gimbal connection with said bolt end to swing or rock in both vertical and horizontal planes; said shackle being adapted to rest on said head-plate and to ride along the same during its horizontal swinging movements, and having a transverse guide opening for the passage of said endless operating element therethrough.

10. A sheet anchor connected to a ship by an endless, flexible operating element, comprising a substantially frusto-conical body

having its perimetric surface provided with spaced, vertical flukes in the form of laterally-projecting dihedral angles which extend from top to bottom of said surface; and a shackle pivotally connected to said body and having a transverse opening formed through its stem for the passage of said endless operating element therethrough.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

LOUIS VICTOR WILLIAM FROGER.

Witnesses:
JULES TOUSSET,
CHARLES LÈON LOISEL.

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