C. R. GABRIEL.

MINE ANCHOR.

APPLICATION FILED JUNE 10, 1910.

**1,023,832.**

Patented Apr. 23, 1912.

5 SHEETS—SHEET 1.

*Fig. 1.*

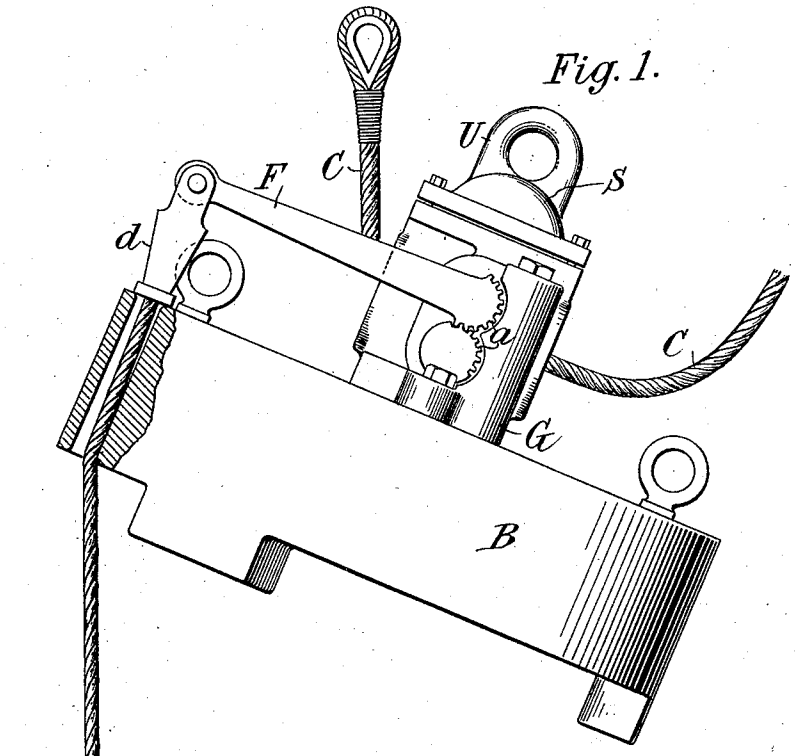
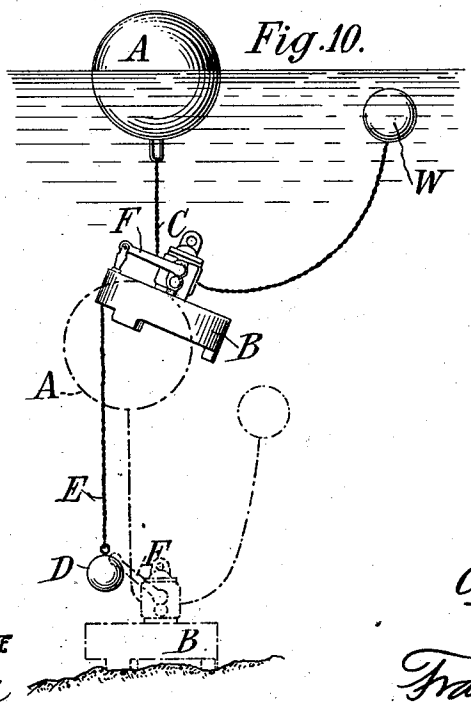
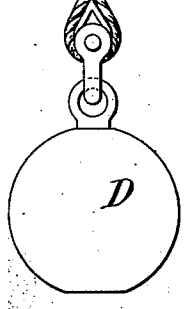



*Fig. 10.*

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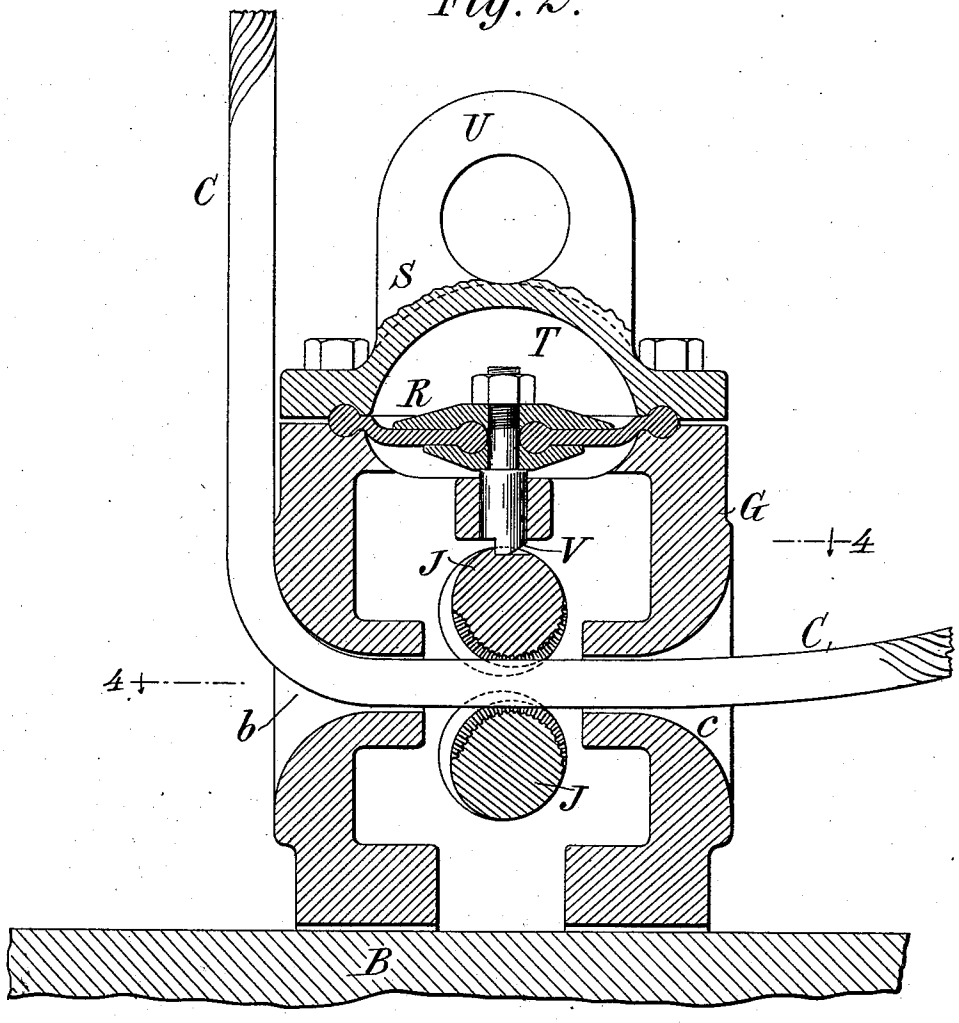
5 SHEETS—SHEET 2.

*Fig. 2.*

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5 SHEETS—SHEET 3.

*Fig. 3.*

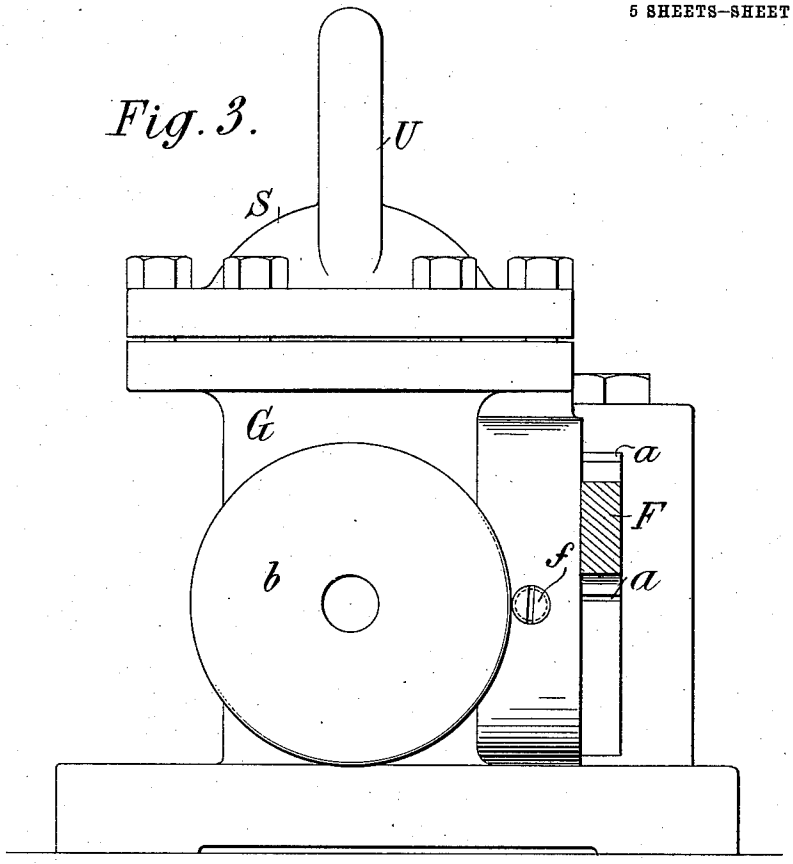
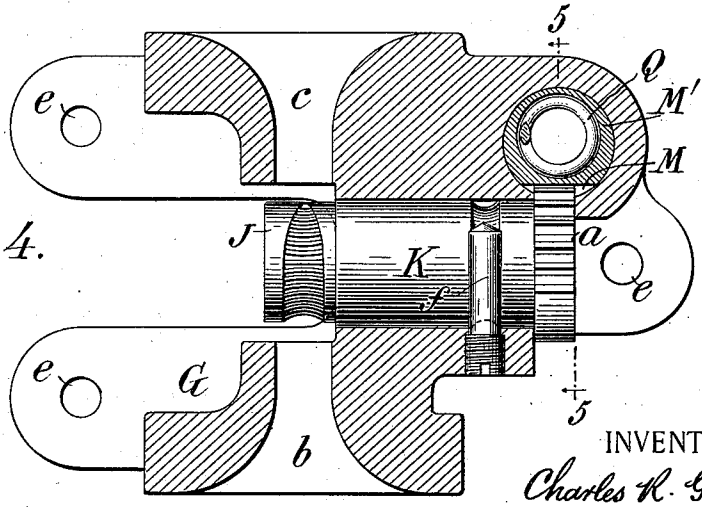



*Fig. 4.*

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5 SHEETS—SHEET 4.

*Fig. 5.*

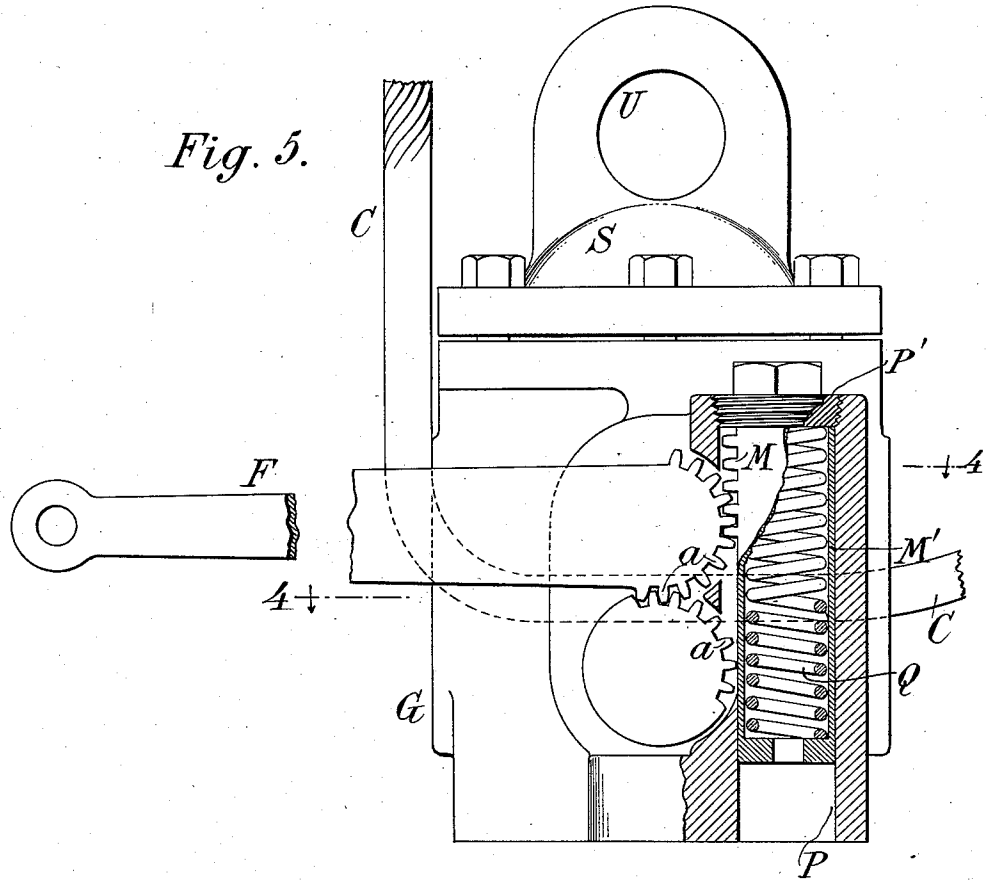
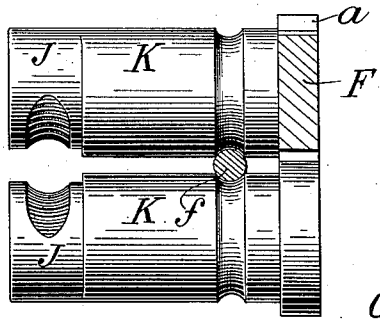



*Fig. 6.*

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APPLICATION FILED JUNE 10, 1910.

**1,023,832.** **Patented Apr. 23, 1912.**

5 SHEETS—SHEET 5.

*Fig. 7.*

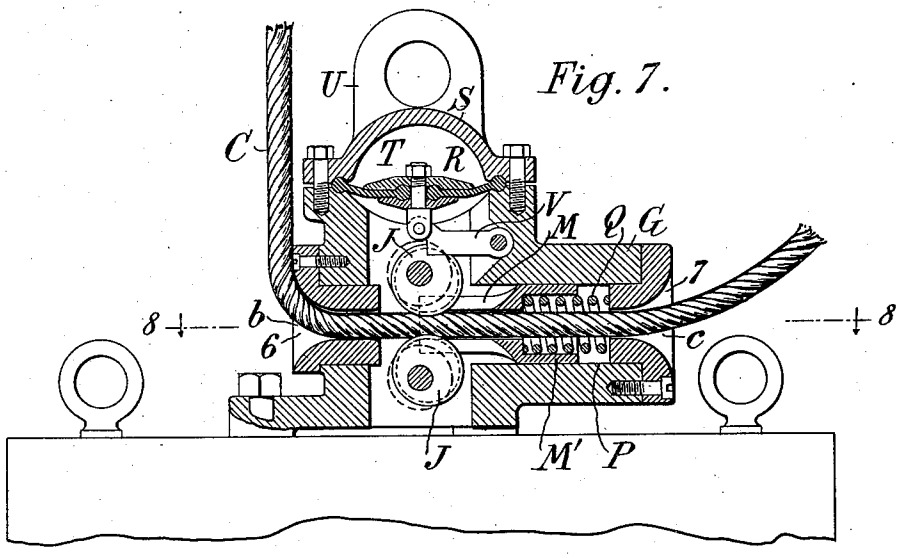



*Fig. 8.*

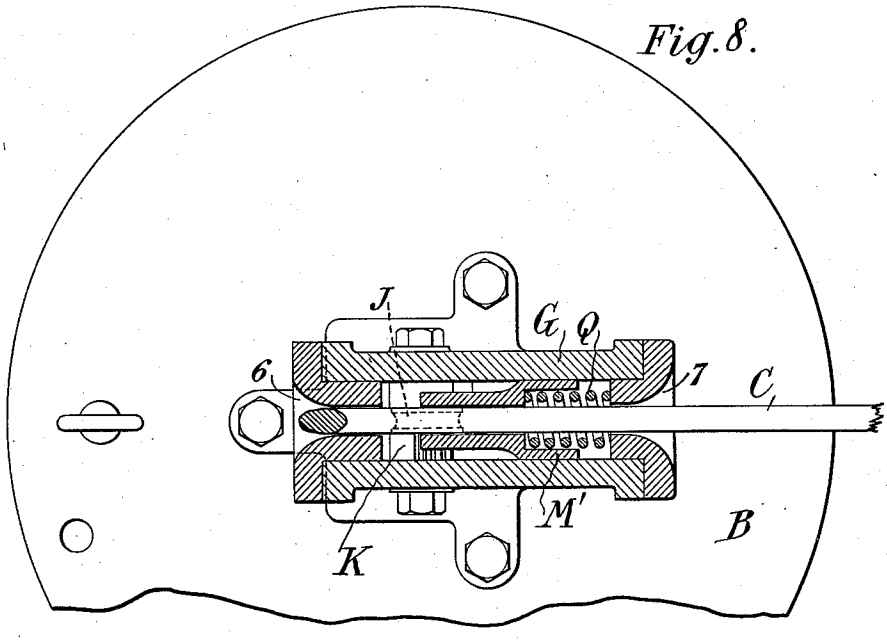
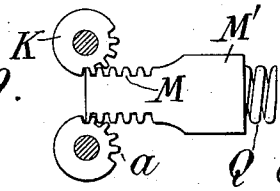



*Fig. 9.*

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# UNITED STATES PATENT OFFICE.

CHARLES R. GABRIEL, OF NEW YORK, N. Y., ASSIGNOR TO E. W. BLISS COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

## MINE-ANCHOR.

1,023,832. Specification of Letters Patent. Patented Apr. 23, 1912.

Application filed June 10, 1910. Serial No. 566,233.

*To all whom it may concern:*

Be it known that I, CHARLES R. GABRIEL, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Mine-Anchors, of which the following is a specification.

This invention relates to automatically operating moorings for submarine mines, fixed buoys or like devices.

The mooring anchor is of the same general character as that set forth in my Patent No. 947,230, granted January 25, 1910.

The present invention is designed to improve the practical working of automatic mine anchors so as to facilitate the launching of the mines and provide against submerging the mine to a depth other than that predetermined.

Figure 1 of the accompanying drawings is a side elevation of a mine anchor and appurtenances embodying the present invention. Fig. 2 is a vertical mid-section through the grip mechanism. Fig. 3 is a front elevation thereof, the operating lever being in section. Fig. 4 is a horizontal section in the plane of the line 4—4 in Fig. 2. Fig. 5 is a side elevation partly in vertical section in the plane of the line 5—5 in Fig. 4. Fig. 6 shows the gripping rollers removed, viewed in the same direction as in Fig. 3. Fig. 7 is a vertical mid-section of a modified construction. Fig. 8 is a horizontal section thereof in the plane of the line 8—8, and Fig. 9 is a fragmentary cross-section. Fig. 10 is a somewhat diagrammatic view on a reduced scale showing the mine anchor and appurtenances during the launching or planting operation.

Referring to the drawings, let A designate the buoy, mine or torpedo shown only in Fig. 10, B the anchor, C the mooring-cable, D the plummet, E the sounding line, F the grip-operating lever, and G the casing containing the gripping mechanism. In general, and except as to the features hereinafter pointed out, these parts are similar to the corresponding parts in my said previous patent.

The construction shown in Figs. 2 to 6 inclusive will first be described.

The gripping mechanism may consist of any suitable means for grasping and holding the cable when this mechanism is rendered operative by the plummet D striking bottom so as to relieve the lever F of its weight. The particular gripping mechanism shown comprises gripping jaws J J formed as eccentric portions upon oscillatory shafts K K which are connected together so that they oscillate in unison. Each of the shafts K has a hub or enlargement formed with gear teeth *a a* so that the hubs constitute sectors which mesh together as best shown in Fig. 5. With one of them meshes a toothed rack M formed on a plunger M′ which is movable vertically in a cylindrical bore or cavity P formed in the casing G, and is pressed by a spring Q in such direction as to tend to turn the jaws so that they shall grasp the cable. The plunger is best constructed as a hollow shell, the spring Q being seated within it; for compactness the plunger is made eccentrically so as to leave a thicker portion on the side on which the rack M is formed, as shown in Fig. 4. Its lower portion is made concentrically with its interior chamber and works in the bore P which is eccentrically counter-bored at the top, and its upper end is closed by a screw plug P′ which receives the upward reaction of the spring Q. On the hub of one of the jaws is fixed the operating lever F, the free end of which is connected to the sounding line E so that the weight of the plummet D pulls down on this lever and holds it initially in the position shown, where it is stopped by the spacing piece *d* abutting against the top of the anchor (Fig. 1). The lever F may be forged to one of the shafts K, or otherwise united thereto in any suitable manner. The shafts K K are best seated directly in transverse holes bored through the casing G, and are held against endwise displacement by a screw pin or key *f* which enters coinciding grooves in the shafts as best shown in Fig. 6.

To prevent premature operation I employ the hydrostatic safety device set forth in my prior patent, which comprises a diaphragm R (Fig. 2) on one side of which is an air chamber T, the diaphragm being connected on its opposite side to a latch V which has a shoulder or projection engaging a shoulder formed in one of the jaws J. Thus the jaws are initially locked and remain so until as the anchor descends the hydrostatic

pressure so far overcomes the pressure of air in the chamber T as to displace the diaphragm and withdraw the latch V.

In my prior construction the mooring cable C was passed vertically through the grip casing and anchor and the spring Q was seated in a chamber counterbored in the anchor itself. To prevent the too free or rapid descent of the anchor a friction brake was provided to exert a slight gripping action upon the cable as the latter runs through it by reason of the descent of the anchor. That construction necessitated that the anchor should be cast or formed with the necessary holes and passages, or in the case of applying the invention to an anchor already in use, necessitated that the necessary holes and chamber be formed by boring and counterboring. My present invention avoids the expense of this and dispenses with the friction brake besides introducing other advantages as will be explained. By my present invention, instead of passing the mooring cable vertically through the anchor, I so construct the apparatus that this cable does not pass through the anchor at all, but passes only through the shell or casing of the grip mechanism and this it traverses horizontally instead of vertically. The normally vertical cable is bent so as to enter the flaring mouth-piece or eye of a throat-piece or bushing *b* which centers it and directs it between the gripping rolls or jaws J J, and the cable then passes through another eye *c*. When the weight of the anchor is thrown upon the cable in launching it draws the cable into the curve of the throat-piece *b*, as shown in Fig. 2, thereby giving the cable a somewhat sharp bend whereby is generated sufficient friction to suitably retard the descent of the anchor so that no other friction brake is necessary. The grip casing G is best fastened to the anchor B in such position that the ascending portion of the cable C shall be out of center with the anchor so that the center of gravity of the anchor, being to one side of the cable, will cause the anchor to assume an inclined position, as shown in Figs. 1 and 5, which facilitates its descent. Since the free end of the cable does not pass through and hang beneath the anchor as heretofore, but extends off in lateral direction, as shown in Figs. 1 and 10, it is practicable to support this free end or spare portion of the cable at a higher level than the anchor and so that it cannot pass foul with the anchor or any appurtenant parts. This may be done by paying off this spare portion from the launching vessel in proportion as the descent of the anchor draws it down; or a small line may be attached to it for this purpose and paid out from the vessel; or, preferably, a small float W may be attached to the end of the cable, being sufficiently buoyant to sustain the weight of the cable and yet not afford any material resistance to the drawing-down of the cable as it is pulled by the descent of the anchor. The cable will of course be cut originally to a length proportional to the depth of the sounding and so that there will still be some margin of slack cable at the instant when the grip operates to attach the anchor to the cable.

All the parts of the structure embodying my present invention are contained in the one shell or casing G which is fastened in any suitable manner to the anchor B, preferably by three screws or bolts passing through the bolt holes *e e*, as shown in Fig. 4. The anchor requires no other machining or preparation than the drilling and tapping of the bolt holes for these screws. The housing for the rack M, slide M′ and spring Q are thus formed entirely within the casing G. The cap or dome S inclosing the diaphragm chamber T is arranged on the top of the casing instead of at one side thereof. For conveniently lifting the anchor an eye U is provided, being best constructed by casting it in one piece with the cap S.

An important advantage of my invention lies in the increased facility which it affords for the launching of the mine anchor. These anchors are very heavy and as the launching is performed usually from a steamboat it is desirable to be able to conveniently apply the cable to the anchor on shipboard. With my present invention this can be done by simply threading the cable through the horizontal passage designed for it in the grip casing and without the necessity of lifting the anchor as would be necessary if the cable had to be passed vertically through the anchor. When the anchor is launched the plummet is necessarily thrown overboard at the same time or previously, so that it may hang beneath the anchor and if the cable were to pass through the anchor as heretofore there would be liability of its fouling with the sounding line; but by gripping the spare portion of cable entirely above the anchor while the sounding line hangs beneath the anchor, this liability is entirely avoided. The mechanism is also simplified by the omission of the brake and is cheapened by being self-contained so that no machining or preparation of the anchor is required.

My invention is not limited to the precise details of construction herein set forth, being susceptible of such variation as may be within the skill of the mechanic or engineer.

My invention is not limited to the anchoring of mines but is applicable to buoys or other devices that may be required to be moored at a prescribed depth.

A modified construction is shown in Figs. 7, 8 and 9. In this construction the same

general arrangement of the gripping jaws J J with the cable passing horizontally between them from eye *b* to eye *c* and with the diaphragm R above the gripping rolls, is retained; but instead of gearing the gripping rolls directly to each other they are geared each to a double rack M and this is arranged to move horizontally instead of vertically, its plunger M′ being made hollow so that the cable passes through it as clearly shown. The latch V is constructed as a pivoted dog jointed to the diaphragm R. The eyes *b c* are formed in separate bushings 6 and 7 which are fastened by screws to the casing or shell G. The construction thus shown is considered less desirable than that first described.

I claim as my invention:—

1. The combination of an anchor, mooring cable and grip mechanism, the latter having a transverse passage through which the cable may play as the anchor descends, and having an eye for the cable arranged to one side of the center of gravity of the anchor, whereby, during launching, the anchor is presented obliquely to facilitate its descent.

2. The combination of an anchor, a grip mechanism applied thereon having an opening transversely therethrough, and a mooring cable passing through said opening, and means applied to the slack of said cable for keeping it above the anchor.

3. The combination with an anchor of a grip casing, having a transverse passage therethrough for the mooring cable above the anchor, gripping jaws therein, a slide movable in said casing and adapted to engage and operate said jaws, and a spring seated wholly in said casing for moving said slide whereby the casing and gripping mechanism are distinct from the anchor.

4. The combination of a grip casing, oscillatory shafts seated therein geared together, and formed with gripping jaws, and a key engaging grooves in said shafts to prevent endwise displacement thereof.

5. The combination of a grip casing, oscillatory gripping jaws mounted therein formed with intermeshing gear teeth, a sliding tubular plunger having rack teeth meshing with the gear teeth on one jaw for turning said jaws, and a spring housed within said plunger.

6. The combination of a grip casing, of oscillatory shafts seated therein having gripping jaws and formed with gear teeth, a sliding plunger moving in a socket formed in said casing having rack teeth meshing with said gear teeth, a cap closing said socket and a spring within said plunger reacting against said cap.

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

CHARLES R. GABRIEL.

Witnesses:
FRED L. COLWELL, Jr.,
G. GRAHAM BROWN.