

937,673.

Patented Oct. 19, 1909.
3 SHEETS—SHEET 1.

Fig. 1.

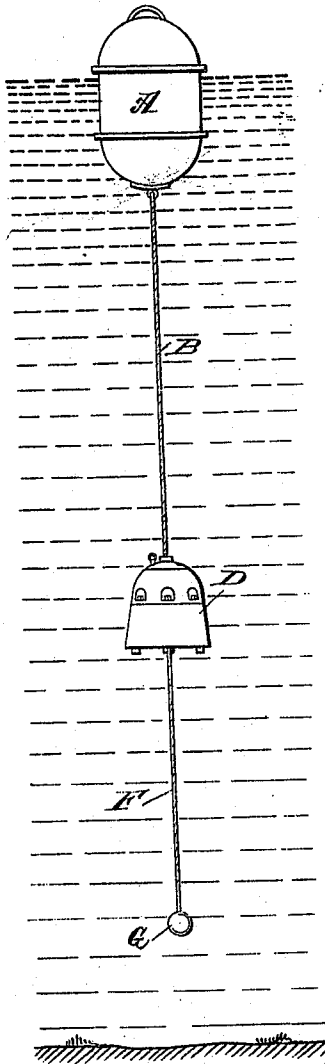


Fig. 2.

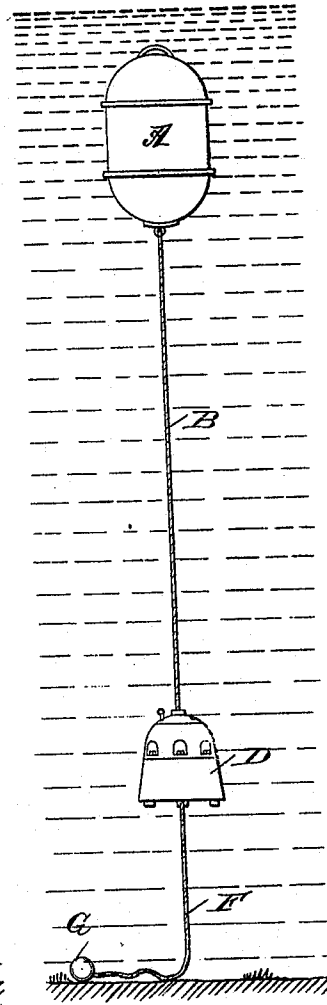
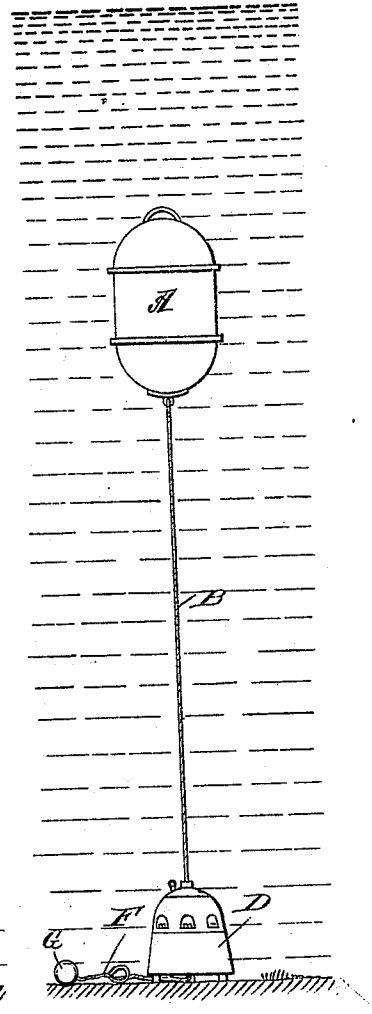


Fig. 3.



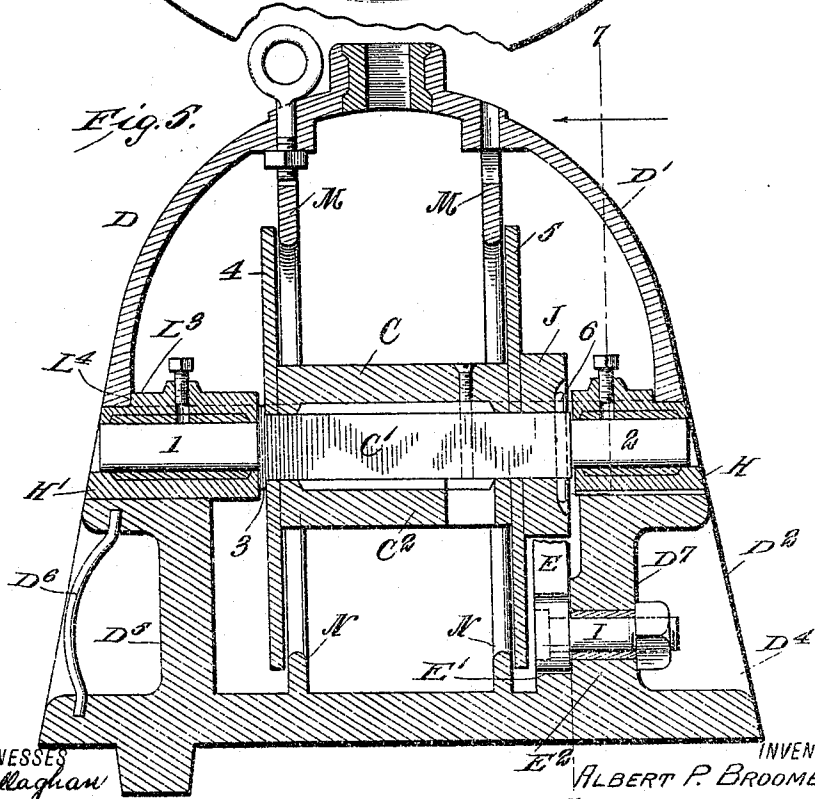
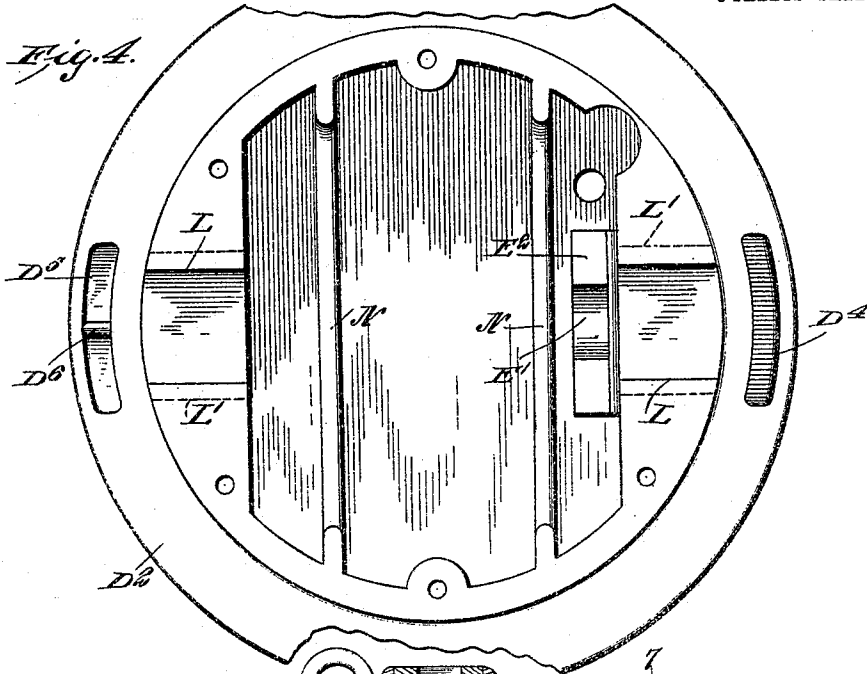
WITNESSES
E. M. Gallagher
Perry B. Turpin

INVENTOR
ALBERT P. BROOMELL
BY *Munn & Co.*
ATTORNEYS

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3 SHEETS—SHEET 2.

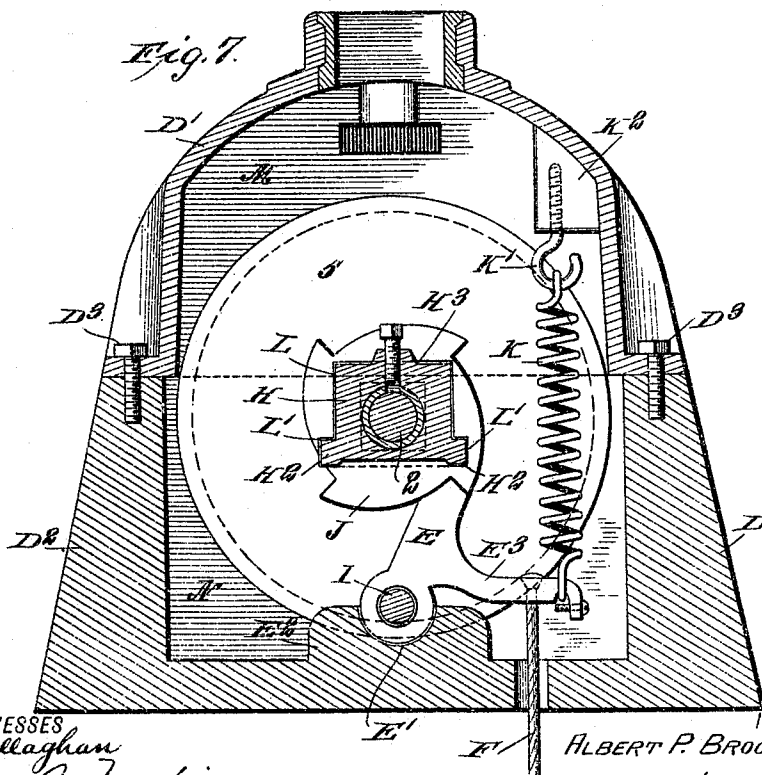
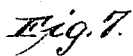


WITNESSES
E. M. Gallagher
Perry B. Turpin

INVENTOR
ALBERT P. BROOMELL
BY *Munn & Co.*

ATTORNEYS

Patented Oct. 19, 1909.
3 SHEETS—SHEET 3.



WITNESSES
C. M. Callaghan
Perry B. Furpin

INVENTOR
ALBERT P. BROOMELL
BY *Munn & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

ALBERT P. BROOMELL, OF YORK, PENNSYLVANIA.

SUBMARINE MINE.

937,673.

Specification of Letters Patent.

Patented Oct. 19, 1909.

Application filed June 30, 1909. Serial No. 505,192.

To all whom it may concern:

Be it known that I, ALBERT P. BROOMELL, a citizen of the United States, and a resident of York, in the county of York and State of Pennsylvania, have made certain new and useful Improvements in Submarine Mines, of which the following is a specification.

This invention is an improvement in submarine mines and particularly in the anchoring device therefor, and the invention relates especially to that class of mines in which a mine is connected by a line with an anchor provided with means for paying out the line and with means for checking the paying out of the line so that when the mine and attached anchor are thrown overboard the mine will float as the anchor descends toward the bottom, and as the anchor approaches the bottom it will operate to draw the mine below the surface to an extent proportioned to the length of a gage line connected with the anchor; and the invention consists in certain novel constructions and combinations of parts as will be hereinafter described and claimed.

In the drawings Figure 1 is a side view of the mine, anchor, and gage line in the position the parts assume as the anchor descends through the water before the gage line with its attached weight reaches the bottom. Fig. 2 is a similar view of the parts after the gage line has touched the bottom and before the anchor has reached the bottom, the anchor and the mine occupying the position they assume as they descend through the water, the mine being pulled down by the anchor. Fig. 3 is a similar view showing the anchor and the mine, with the latter in its ultimate position. Fig. 4 is a top plan view, partly broken away, of the lower section of the anchor. Fig. 5 is a vertical longitudinal section of the anchor drawn alongside the reel shaft. Fig. 6 is a top plan view of the upper section of the anchor, and Fig. 7 is a vertical section of the anchor on about line 7—7 of Fig. 5.

As before suggested, the present invention relates to mine anchors used in connection with buoyant mines in which the anchor is provided with a reel which is connected by a cable with the buoyant mine, and a detent mechanism is provided for stopping the operation of the reel as the anchor approaches the bottom, such detent being restrained by a weight on a gage line so that when the

gage line weight strikes the bottom, the pawl will be free to move into engagement with the reel and stop the operation of same, thus stopping the paying out of the cable between the reel and the mine so that the downward movement of the anchor subsequent to the stoppage of the reel will pull the buoyant mine below the surface to an extent proportioned to the length of the gage line connecting the weight with the detent. The present invention includes certain improvements in the means for supporting and operating the detent pawl in order to prevent the breakage thereof by a blow or shock occasioned by the stopping of the reel, also to secure the boxes for the reel shaft between the upper and lower sections of the anchor in such manner as to avoid the necessity of fastening bolts for said boxes by securing the boxes by the bolts which connect the anchor sections together; also certain improvements in the construction of the reel whereby the same is built up, so parts may be renewed in case of breakage without much trouble or loss of time, and further to provide certain improvements in the construction of the anchor proper, all of which will be described.

The mine A is a buoyant mine and is connected by a cable B, with a reel C carried by the anchor D, and a detent E carried by the anchor has connected with it a gage line F, which connects it with the ball G. The mine A may be of any suitable construction and the line or cable B may be of any suitable construction which may be freely wound upon the reel C.

The anchor proper includes an upper section D' and a lower section D², which are bolted together at D³ and upon the boxes H for the reel shaft. The lower section D² is provided in its opposite sides near its lower end with recesses D⁴ and D⁵, the latter being crossed by the handle D⁶, and the base wall D⁷ of the recess D⁴ being perforated for the passage of the pivot bolt I of the detent pawl E, which detent pawl is pivoted on the bolt I, and seats at its lower end in a recess E' formed in a block E² cast upon the base of the anchor, the said recess E' and the lower end of the pawl E being rounded to form a broad base for the said pawl in the different positions thereof. At its upper end the pawl E is adapted to engage with the ratchet J secured on the reel shaft in the manner presently described. The pawl E is provided

with a lateral arm E^3 , to which is connected the gage line F whose weight acts to hold the pawl away from the ratchet in the position of parts shown in Fig. 1, and a spring K also connects at one end with said arm E^3 , and at its other end with a hook K' and operates to throw the pawl into engagement the bottom and the strain thereof on the pawl E is released. The hook K' is threaded into a block K^2 cast at the inner side of the upper section D' of the anchor. By the described construction the pawl E is constantly under tension. This tension in the position of parts shown in Fig. 1 is a dual one, the spring K tending to pull the pawl into engagement with the ratchet, while the weight of the gage line F resists the action of the spring K and holds the pawl out of engagement with the ratchet so the reel may freely revolve to pay off the line connecting it with the buoyant mine. When the weight G rests on the bottom and the pawl is relieved of the gravity of said weight, the spring instantly jerks the pawl into engagement with the ratchet J . At such time, if the pawl be supported in any ordinary manner, there is a tendency to break the pawl or tear it away from its fastenings by the blow or shock occasioned by the stopping of the reel and the instantaneous transmission to the said pawl of the weight of the anchor and the buoyancy of the float which is pulled down by the anchor when the reel is stopped. I avoid this difficulty by supporting the lower end of the pawl in the recess or pocket E' , which latter is chilled in the operation of casting and efficiently sustains the shock and blow relieving the bolt from all such strain. As shown, the pawl is pivoted diametrically below the axis of the reel and the pawl and ratchet are so constructed and related to the pivoted pawl that the strain on the pawl is an endwise one, or in the direction of length of the pawl as best shown in Fig. 7 of the drawings. In practice the pawl is made from a high quality of steel casting or steel forging and its lower end which fits in the chill pocket E' , is machine finished. The pivot bolt I is a bronze bolt and is purposely made a loose fit where it passes through the pawl.

The reel shaft has its trunnions 1 and 2 journaled in the boxes H and H' , which latter may be babbitted as shown, and are provided at their lower edges with the lateral ribs H^2 . These boxes fit into notches L formed in the upper edges of the lower section D^2 of the anchor at the sides thereof, and said notches are provided at their lower ends with lateral wings L' receiving the lateral ribs of the boxes H , the boxes H being slipped longitudinally into the seats formed by the notches L as will be understood from Fig. 7 of the drawings. The boxes extend at H^3 above the upper edge of

the lower section D^2 of the anchor, and form at L^4 upwardly facing shoulders which are overlapped by the side plates of the upper section D' of the anchor as best shown in Fig. 5, to prevent any outward displacement of the boxes when the anchor sections are connected as will be understood from Figs. 5 and 7 of the drawings. By this construction when the parts are applied as shown in Figs. 5 and 7, the reel trunnions will be securely held in the boxes and the boxes will be secured in place by the construction of the anchor proper as shown and before described. When the boxes are fitted to the lower section of the anchor as shown in Figs. 5 and 7, care should be taken to have the joint at the upper side of the lateral flanges H^2 a close fit, and if there is any play up and down between the boxing and the casting, the box may be wedged up until the joint at the upper side of the flanges H^2 is tight. While in this position the upper side of the lower section D^2 is faced off, and at the same time the upper edges of the boxes are faced off between the shoulders L^4 and the upper ends of the boxes which insures the upper edges of the boxes being bevel with the corresponding edge of the section D^2 , and also insures a close joint between the upper and lower sections of the anchor. When the anchor is descending toward the bottom of the sea with the pawl held in its disengaged position by the lead weight on the gage line, the reel will revolve rapidly and when the weight strikes the bottom and slacks the distance or gage line F , the spring K will pull the pawl into the position shown in Fig. 7, and suddenly stop the revolution of the reel or drum. When the reel stops revolving, the mine, which has up to this time been floating on the water, and weighs several hundred pounds, is suddenly jerked under the water making a sudden and severe upward pull on the reel with a tendency to tear the reel and its shaft out of its bearings: The construction as shown, provides all the weight of the anchor to take up the shock occasioned by the lifting force of the rope on the reel, and the upper half or section of the anchor is bolted onto the lower section and the boxes are fitted into undercut recesses in the anchor providing a hook-under box which is simple, strong and efficiently prevents any disarrangement of the parts.

In constructing the reel I provide a shaft having a central squared portion C' , with trunnions 1 and 2 at the ends thereof to fit in the boxes, and at the inner end of one trunnion I provide a shoulder 3 for abutment by one end plate 4, of the reel. The body C^2 of the reel forms a spacing block between the plates 4 and 5, as well as a drum on which to wind the rope B , and the ratchet J is fitted on the squared portion of the

shaft up against the plate 5, and is held by a pin 6 passing through the shaft as shown. By this construction, the reel may be readily taken apart in order to renew any portion thereof that may become worn or broken. Where desired a pin such as 6, may be used instead of the shoulder 3.

As best shown in Fig. 5, the sections D' and D² are provided with inner alined flanges M and N which lap along the inner faces of the end plates 4 and 5 of the reel and aid in preventing any clogging or tangling of the rope as it passes from the reel as well as to strengthen and brace the sections D' and D² of the anchor.

I claim—

1. In an apparatus substantially as described, an anchor composed of upper and lower sections secured together, the lower section being provided in its upper edges with notches provided with lateral wings, and the said section being also provided upon its bottom plate with a recess or pocket, a reel in the anchor and having a ratchet wheel, and also provided with a shaft having trunnions, boxes having bearings for said trunnions and fitting in the notches of the lower anchor section and having lateral ribs operating in the wings of said notches, and outwardly facing shoulders at their upper sides opposing the inner faces of the side walls of the top anchor section, a detent pawl pivoted at its lower end and operating at such end in the pocket or recess of the bottom plate of the anchor, and means for operating said pawl all substantially as and for the purposes set forth.

2. The combination with an anchor, and a reel therein, of boxes forming journal bearings for said reel, and having undercut engagement with the anchor.

3. The combination with an anchor having notches provided with lateral wings, of a reel in the anchor, and boxes forming journal bearings for the reel and fitted in the notches of the anchor, and having lateral ribs fitting the wings of said notches.

4. The combination of a reel, an anchor receiving the reel and having upper and lower sections, and means securing the same together, and boxes forming journal bearings for the reel and held between the sections of the anchor.

5. The combination of a reel, an anchor having a lower section provided in its upper side with the opposite notches having undercut portions, the boxes forming journal bearings for the reel, and fitting in said notches and having portions fitting the undercut portions of the notches, and the upper anchor section secured to the lower section and overlying the box.

6. The combination of a reel, boxes forming journal bearings therefor, and having at its upper sides outwardly facing shoulders,

and an anchor having a lower section notched for the reception of the boxes, and an upper section secured to the lower section and overlying the boxes and abutted at their inner sides by the outwardly facing shoulders of the boxes.

7. The combination of a reel, having end plates, and an anchor receiving the reel and composed of upper and lower sections secured together, said sections being provided at their inner sides with alined flanges fitting along the inner faces of the end plates of the reel.

8. The combination of an anchor having upper and lower sections, removable boxes held between the upper and lower sections of the anchor, and a reel having trunnions journaled in the said boxes.

9. The combination of a reel having a ratchet wheel, an anchor within which the reel is journaled, said anchor being provided with a recess or pocket opposite the reel ratchet and in line below the axis of the reel, a pawl arranged at one end to engage the teeth of the ratchet wheel and having its other end fitted to the pocket or recess, and bearing against the base wall thereof when the pawl is engaged with the ratchet wheel, said pawl being provided with a lateral arm, a spring acting upon said arm to press the pawl into engagement with the ratchet wheel, and a gage or distance line connected with the pawl and having a weight for operating the pawl in opposition to the spring.

10. A reel having a ratchet wheel, and an anchor in which said reel is journaled, and provided opposite the ratchet wheel with a recess or pocket, and a pawl movable into and out of engagement with the ratchet wheel, and seated at one end in and bearing at said end endwise against the base wall of the said pocket or recess.

11. The combination of a reel having a ratchet wheel, an anchor within which said reel is journaled and provided below the axis of the reel with a recess or pocket, a pawl seated at one end in and bearing at said end endwise against the base wall of the recess or pocket and movable at its other end into and out of engagement with the ratchet wheel, and means for operating the pawl.

12. The combination of a reel having a shaft formed with a central angular portion, and with trunnions at the ends thereof, a body or drum portion fitting on the angular portion of the shaft, and plates fitted on the angular portion of the shaft at the ends of the body portion, a ratchet wheel fitted on the angular portion of the shaft against one of the end plates, removable boxes having journal bearings for the trunnions of the reel shaft, an anchor supporting said boxes, and a pawl carried by the anchor for engaging the ratchet wheel.

13. The combination of an anchor com-

posed of upper and lower sections, boxes fitting removably between said sections and having journal bearings, a reel having a shaft provided with end trunnions journaled
5 in said bearings and with an intermediate angular portion, a body or drum portion fitted on the angular portion of the shaft, and end plates, and a ratchet wheel also fitted on the angular portion of the shaft, a
10 pawl engaging with said ratchet wheel, and means for operating the pawl.

14. In an anchor for submarine mines, the combination of a reel shaft, boxes carrying the same, and an anchor having upper and

lower sections between which the said boxes 15 are held substantially as set forth.

15. The combination in submarine mines of an anchor provided with a recess or pocket, a reel, and a pivoted pawl cooperating with said reel and seated at its pivoted end loosely in the recess or pocket whereby the blow on said pawl will be borne entirely by the anchor, substantially as set forth.

ALBERT P. BROOMELL.

Witnesses:

GEO. S. SCHMIDT,
ANDREW J. HERSLEY.