O. A. YOUNGREN.

NET AND CABLE CUTTING ATTACHMENT FOR SUBMARINE BOATS.

APPLICATION FILED JAN. 25, 1917.

1,272,168.

Patented July 9, 1918.

2 SHEETS—SHEET 1.

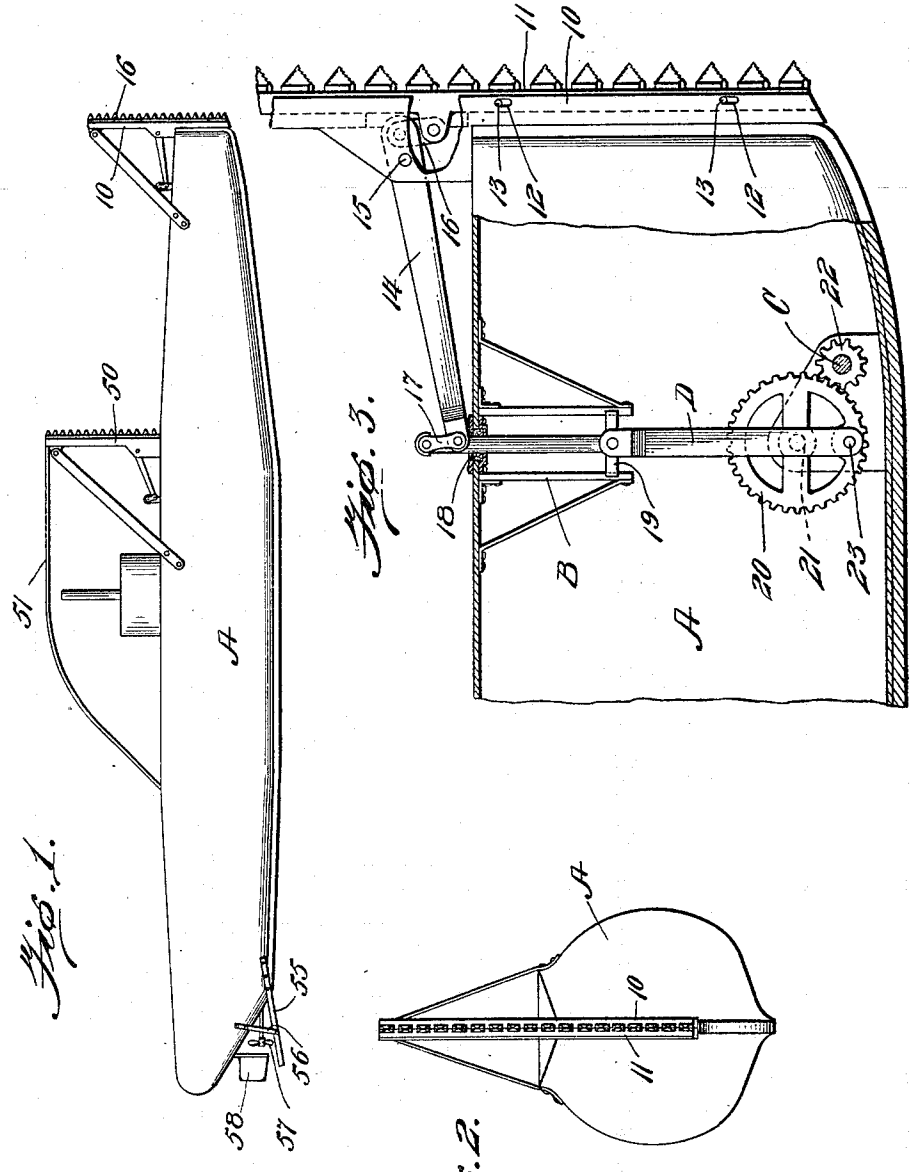


Fig. 1.

Fig. 3.

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 6.

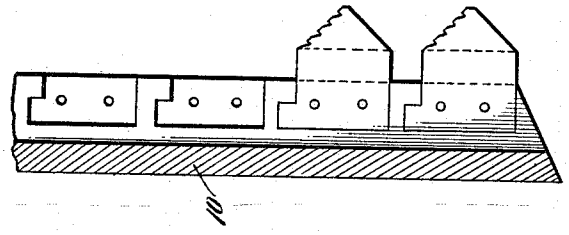


Fig. 5.

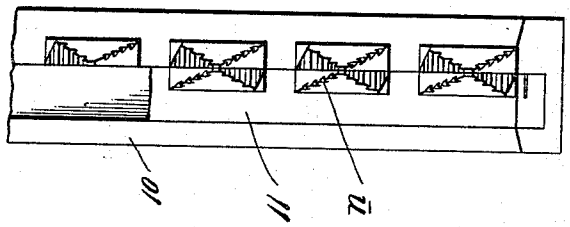
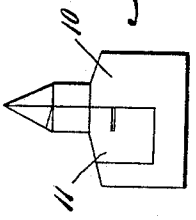


Fig. 7.



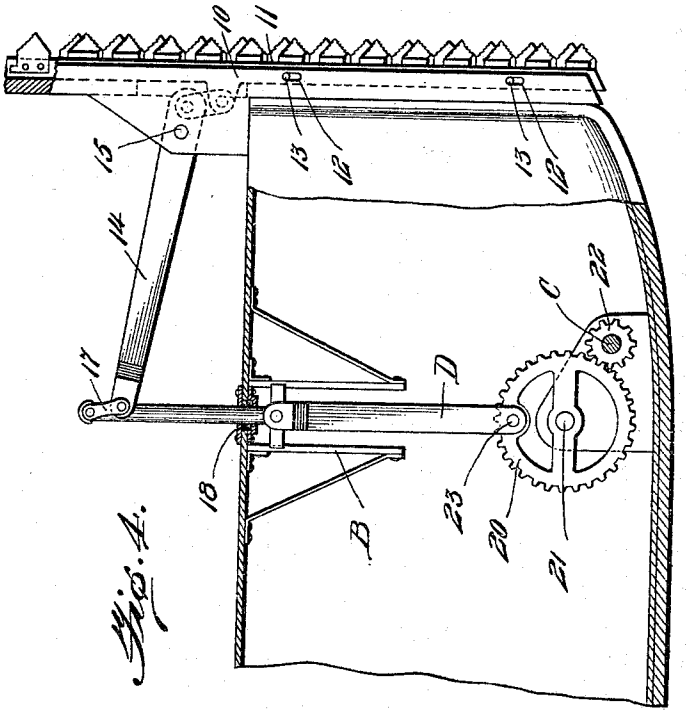


Fig. 4.

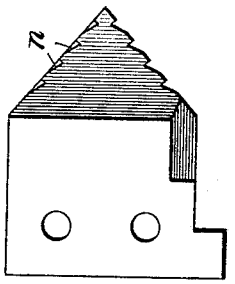


Fig. 9.

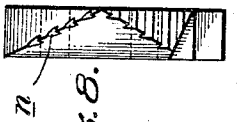


Fig. 8.

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UNITED STATES PATENT OFFICE.

OSCAR A. YOUNGREN, OF NEW YORK, N. Y.

NET AND CABLE CUTTING ATTACHMENT FOR SUBMARINE BOATS.

1,272,168. Specification of Letters Patent. Patented July 9, 1918.

Application filed January 25, 1917. Serial No. 144,488.

To all whom it may concern:

Be it known that I, OSCAR A. YOUNGREN, a citizen of the United States, residing at New York, New York county, and State of New York, have invented and discovered certain new and useful Improvements in Net and Cable Cutting Attachments for Submarine Boats, of which the following is a specification.

My said invention consists in an approved apparatus for attachment to, or be made a part of, a submarine boat, whereby such a boat is equipped for cutting nets and cables, which may be spread to catch the same, or stop, or interfere with its operations under water. All this will be hereinafter more fully described and claimed.

Referring to the accompanying drawings, which are made a part hereof, and on which similar reference characters indicate similar parts,

Figure 1 is a side elevation of a submarine boat equipped with my said apparatus,

Fig. 2 a front elevation of a boat as it appears when equipped with my said invention,

Fig. 3 a view, on an enlarged scale, of a section of the apparatus showing the parts in the position they occupy when the cutters are open,

Fig. 4 a similar view showing the parts in the position they occupy when the cutters are closed, and

Figs. 5, 6, 7, 8 and 9 are detail views illustrating parts of the apparatus on an enlarged scale.

In said drawings the portions marked A represent the hull of the submarine, B a guiding structure or cylinder depending from the deck thereof, C a power shaft and D a pitman rod.

These parts are of any appropriate type and construction and need no special description except incidentally in describing the operative parts comprising the invention.

The apparatus consists essentially of a stationary bar 10 and a reciprocating bar 11 mounted in the center of the bow of the boat, in a vertical position and extending nearly to the keel of the boat and to a point a considerable distance above the deck of the boat, or a sufficient distance, so that the sweep of the knives will cut any net or wire that would contact with the boat at its bow. One such set of knives may be mounted on the bow, and another set is preferably mounted to extend above the deck of the boat midway thereof (as shown in Fig. 1) or between the knives on the bow and any superstructure carried on the deck, being preferably located just in front of such superstructure to make sure that all obstructions will be cleared before the superstructure (as turrets and periscopes) reach them.

The second set of cutting apparatus, which I have indicated in Fig. 1 by the reference numeral 50, has a distinct, and in some instances, an important function in addition to the function of the cutting apparatus on the bow of the boat. For example, in cutting through a net, the cutting apparatus on the bow of the boat will cut an opening from the keel to a considerable distance above the deck, which will permit the boat to enter. However, as the boat increases in width from the bow toward the middle, it will be seen that its entrance into said opening will drag the top of the net downward and bring uncut portions of the net down to where they will interfere with the turret or periscope and prevent the boat's passage. The second set of cutting apparatus then comes into play and severs the net from the opening made by the first cutting apparatus to a point high enough to clear the structures above the deck. A bar or cable 51 may extend from the upper end of the frame of the second cutting apparatus 50 over the top of the turret and periscope in order to guard said parts against contact with any uncut strands of the net. It is understood, of course, that the construction and operation of the second cutting apparatus 50, is substantially identical with the construction and operation of the apparatus on the bow of the boat, and a detailed description of the apparatus on the bow of the boat is therefore deemed sufficient to enable the construction and operation of the second apparatus to be clearly understood.

While the mechanical structure of the device may be varied to suit the different conditions or types of boats, or other machines or engines the use of which may be aided by such an apparatus, the structure shown will serve to illustrate the scope and purpose of my invention.

The bars 10 and 11 are connected by interengaging slots 12 and pins 13, the bar 10 being preferably a heavy bar with a vertical way in which bar 11 is mounted to recipro-

cate. A lever 14 is mounted on a pivot 15 in a bracket formed near the upper end of the bar 10 and is connected by means of a link 16 with the reciprocating bar 11. The opposite end of lever 14 is connected by a link 17 to the upper end of the pitman D. Said pitman D works through a stuffing box, or other appropriate closure member 18 centrally of the guide B, and carries a cross-head 19, which engages with said guide B for guiding the pitman. A crank wheel 20 is mounted on a shaft 21 and geared to a pinion 22 on power shaft C. Said crank wheel is connected by a crank pin 23 with the lower end of pitman D. The power shaft C is driven by a special motor provided for the purpose, or may be driven by the engine, or motor, used for driving the boat, as found most advantageous.

The guide B for the cross-head 19 may be formed by depending brackets, with which the ends of the cross-head engage, or of any suitable construction, as will be readily understood, and many other modifications in details may be made within the scope of my invention.

Each of the bars 10 and 11 are armed with teeth of the form best illustrated in Figs. 5 to 9 inclusive. These teeth are each formed with interlocking bases and securely riveted in recesses formed in the faces of the respective bars. They are also of thick heavy steel hardened and beveled from their outer faces toward a central point, the adjacent faces of the teeth being flat to adapt them to lie in close contact with each other. The horizontal edges of said teeth are sharpened to adapt them to cut cables and wires and the tapered points are preferably notched as best illustrated in Figs. 8 and 9 to enable them to catch the strands of wire composing nets.

In operation the crank wheel 20 is driven through the gear connection, before described, by the power shaft C, which operates to reciprocate the pitman D and this, through the lever 14, reciprocates the bar 11 carrying the teeth up and down so that the cutting edges thereon meet the cutting edges of the corresponding teeth of the bar 10. The pointed ends of the teeth receive and guide the wires of the net or cable to between the cutting edges of the reciprocating knives and the cutting edges of the stationary knives, and because of the powerful structure these knives operate to sever the wires, and thus remove the obstruction to the passage of the boat. In the case of nets composed of small wires, or of a mesh that would not ordinarily pass over the cutting teeth to between the cutting edges thereof, the notches in the edges will catch the wires and the reciprocation of the bar will serve to break and tear them to pieces, or open up the meshes of the net so that the wires will pass to between the cutting edges and be severed.

It is understood, of course, that the structure must be made of sufficient strength and rigidity to withstand the work required of it, and also that the notches *n* in the pointed edges of the teeth should be made, as illustrated, with the angle of the notch positioned to catch the wires of the net and drag them either upward or downward to break or sever them. The angle of the short face of the notch, as illustrated, is practically at right angles with the main face of the edge, while the other face of the notch is at a much longer angle, this construction facilitating the reception of the wire and insuring the result desired.

At the stern of the boat and adjacent to its keel are also provided guard bars 55 supported by brackets 56, which extend under the propeller 57 and the rudder 58, and guard said parts from becoming entangled with strands of wires or nets as the boat is passing over them, or through an opening formed in the net.

While I have shown and described this invention as applied to a submarine boat, it will be understood that it may be applied in almost an identical manner to other motor driven machines, such as those now commonly termed "tanks," being motor driven vehicles armored and fitted for operating against wire guarded trenches and similar fortifications. Such a "tank" so equipped would be able to make its way through any character of wire obstructions, and its progress thereby much facilitated. In all cases the operating devices for the cutters are located almost wholly within the machine and thus protected from danger. It will thus be understood that in the claims I intend to cover the application of my invention to all such motor driven machines as may find its employment advantageous.

Having thus fully described my said invention, what I claim as new and desire to secure by Letters Patent, is:—

1. The combination with a motor driven machine, such as a submarine boat, of a cutting apparatus mounted on the front thereof consisting of vertically reciprocating knives extending from a point approximately even with its bottom to a point above the top and a second cutting apparatus mounted in line with and in advance of the turret of the boat and extending from the deck to a point above the top of the first mentioned cutting apparatus, means for guiding wires and nets between the knives, and means for reciprocating said knives to cut said wires or nets, substantially as set forth.

2. A machine equipped with a set of net cutting apparatus, said apparatus comprising a rigid vertical bar mounted on the

front and top of the machine and armed with a series of projecting knives spaced a distance apart and formed with horizontal cutting edges and pointed outer ends, a reciprocating bar mounted to reciprocate alongside said stationary bar and carrying complementary knives, and means for reciprocating said bar, substantially as set forth.

3. A submarine provided with a double set of wire cutting apparatus each comprising a vertical bar mounted on the bow and deck of said boat and formed with a vertical way therein and also provided with a series of knives projecting horizontally therefrom and formed with horizontal cutting edges and tapered points, a bar mounted to reciprocate in the way formed in said stationary bar and also provided with knives corresponding to the knives on the stationary bar, and means for reciprocating said bar, substantially as set forth.

4. A double set of wire cutting apparatus for submarine boats comprising vertical bars mounted on the bow and deck of the boat and entirely traversing said bow and to above the deck of the boat and extending from the deck to a point above the highest structure of said boat, horizontally projecting knives mounted on said bars and arranged to guide the wires between the cutting edges thereof, and means for reciprocating said knives, substantially as set forth.

5. A wire cutting apparatus for moving machines comprising reciprocating knives mounted on the front and top of the machine, said knives being formed with points having notched edges for catching and breaking and cutting the wires, substantially as set forth.

6. A submarine boat provided with wire cutting knives on the front and top thereof, said knives being formed with tapered points having notched edges, substantially as set forth.

7. A knife for a wire cutting apparatus for moving machines having horizontal cutting edges and tapered points with notched upper edges, substantially as set forth.

8. In a submarine boat provided with a vertically arranged cutting apparatus on its bow extending from the keel to a point above the deck, and with a second cutting apparatus adjacent to the superstructure extending above the deck midway thereof, and means for operating said cutting apparatus, substantially as set forth.

9. A submarine boat provided with a cutting apparatus on its bow adapted to cut an opening through a net arranged to catch the same, and with another cutting apparatus arranged in front of any superstructure extending above the deck, and arranged to cut an enlarged opening to clear said superstrcture, and means for operating said cutting apparatus, substantially as set forth.

In witness whereof, I have hereunto set my hand and seal at New York, New York, this 8th day of January, A. D. nineteen hundred and seventeen.

OSCAR A. YOUNGREN. [L. S.]

Witnesses:

E. W. BRADFORD,

L. VON KERINKY.

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