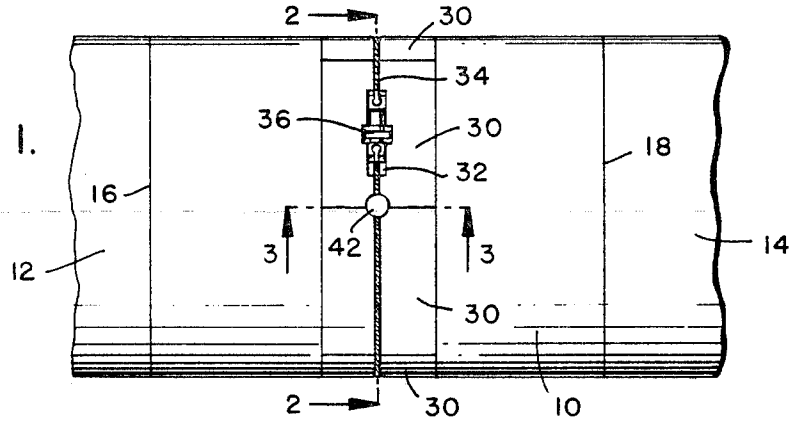
Oct. 8, 1968 S. M. VALIHORA 3,404,649

BALLAST CONFIGURATION AND RELEASE CONCEPT

Filed Feb. 16, 1967

FIG. 1.



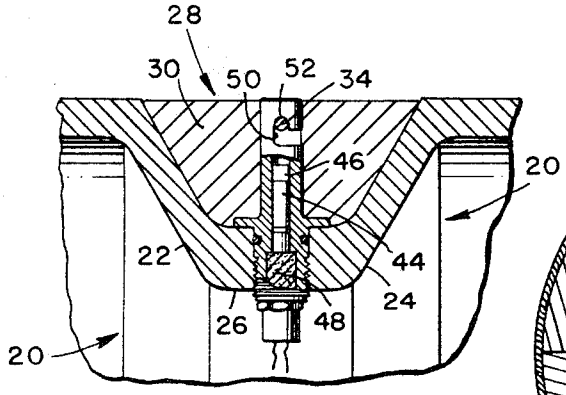


FIG. 3.

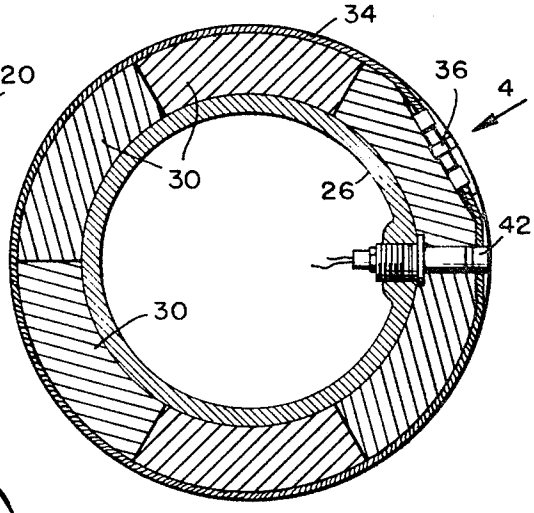


FIG. 2.

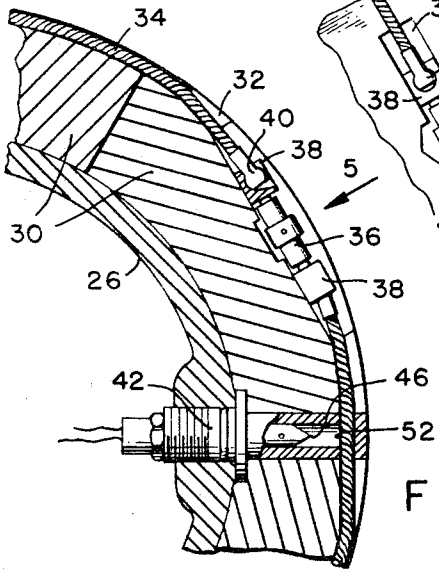


FIG. 4.

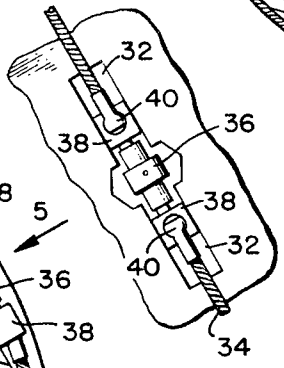


FIG. 5.

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BALLAST CONFIGURATION AND RELEASE CONCEPT

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1 Claim. (Cl. 114—20)

ABSTRACT OF THE DISCLOSURE

Torpedo exercise hull section is constructed with an outwardly open annual recess which is filled with a plurality of ballast segments which may be released by severing an encircling cable.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

This invention relates to torpedoes and more particularly to improvements in a hull section constructed to removably receive ballast weights in a symmetrical configuration externally of the hull.

In the prior art it has been conventional practice to provide exercise hull sections with cavities which receive ballast, such as lead discs or shot, which may be released at the end of an exercise run to thereby render the torpedo buoyant so that it may be recovered at the surface of the sea. With the advent of deeper running torpedoes, such hull secitons have become inadequate to withstand the increased external crushing pressure of the sea due to the inherent discontinuities in structural design.

One of the objects of the present invention is to provide a ballast hull section which is of minimum weight and optimum strength.

Another object is to provide a ballast configuration in which the center of gravity of the ballast is disposed on the longitudinal axis of the hull section.

A further object is to provide a simplified release for the ballast which occupies a minimum volume within the hull envelope.

A further object is to provide a ballast space which is completely filled with ballast to thereby fully utilize available space within the hull envelope.

Another object is to eliminate ballast release mechanisms which occupy useful pay load space within the hull and which are usually complicated with their attendant unreliability.

Still further objects, advantages and salient features will become more apparent from the description to follow, the appended claim, and the accompanying drawing, in which:

FIG. 1 is an elevation of the subject of the invention;

FIG. 2 is a section taken on line 2—2, FIG. 1;

FIG. 3 is a section taken on line 3—3, FIG.1;

FIG. 4 is an enlarged section of FIG. 2, in the portion indicated by arrow 4; and

FIG. 5 is an elevation of FIG. 4 as viewed in the direction of arrow 5.

Referring now to the drawing, and first to FIG. 1, the subject of the invention comprises a cylindrical exercise hull section **10** which is disposed axially between adjacent sections **12, 14** and connected to them by any conventional joints, such as disclosed in Patent 3,100,121 to Hillmer, which are disposed beneath connecting ends **16, 18.** Such ends are usually thickened to receive the joint rings and

provide a structure of substantially uniform crushing strength.

Referring now to FIG. 3, section **10** is provided midway of its length with an annular wall **20** consisting of side walls **22, 24,** joined by a bottom wall **26,** which forms an annular space **28** which is trapezoidal in cross section. A plurality of lead weights **30,** six being illustrated, are formed to fit and fill the annular space, their peripheries being cylindrical to conform to the cylindrical envelope of the hull section.

A circumferential groove **32** is disposed in the outer surfaces of the weights which receives a cable **34,** the ends of which are connected together by a turnbuckle **36** having suitable open ball sockets **38** which receive ball ends **40** swaged to the cable ends.

As best shown in FIGS. 3 and 4, a cable cutting device **42** is secured to wall **26** and comprises a piston **44,** having a knife-edge **46** as its outer end which may be forced radially outwardly by a propellant **48** which may be initiated by an electric squib (not shown). The cable is disposed within a bayonet slot **50** and abuts an anvil **52.** As will be apparent, when the piston is forced outwardly by the propellant its knife-edge engages the cable and severs same. The weights are then free to fall from the torpedo under gravitational urge. Normally, the lowermost weights fall away first and one or more of the upper weights will either slide around space **28** and fall from same or produce an out-of-balance torque which will rotate the torpedo about its axis to move the weight to a position where it may fall out of space **28.** The torpedo then becomes buoyant and rises to the surface where it may be located and recovered.

As will now be apparent, annular wall **20,** in addition to forming the annular recess or groove for receiving the ballast weights, forms a continuous annular stiffening rib midway between the ends of the hull section which resists crushing of the section under sea pressure. In the prior art referred to, ballast weight cavities weakened a similar section and required special ribbing or other reinforcement, adding weight and complexity to the section to render it of uniform crushing strength. Also, the elimination of internal obstructions and the provision of an unobstructed space within wall **20,** renders the internal space more readily adaptable to receive internal components (not shown) which may occupy such space.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claim the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A cylindrical tubular hull section for a torpedo comprising;

(a) a circular wall disposed between ends of the section and extending into the space within the section, forming an outwardly open annular space of uniform cross section surrounding the wall, the ends of said space tapering inwardly and toward each other,

(b) a plurality of angularly spaced segmental weights filling said space, their outer surfaces being defined by a cylindrical envelope of the diameter of the hull section,

(c) a tensioned cable surrounding the weights and maintaining same in said space, and

(d) an explosive cable cutter operatively associated with a portion of the cable for severing same to permit release of the weights.

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