

No. 644,321.

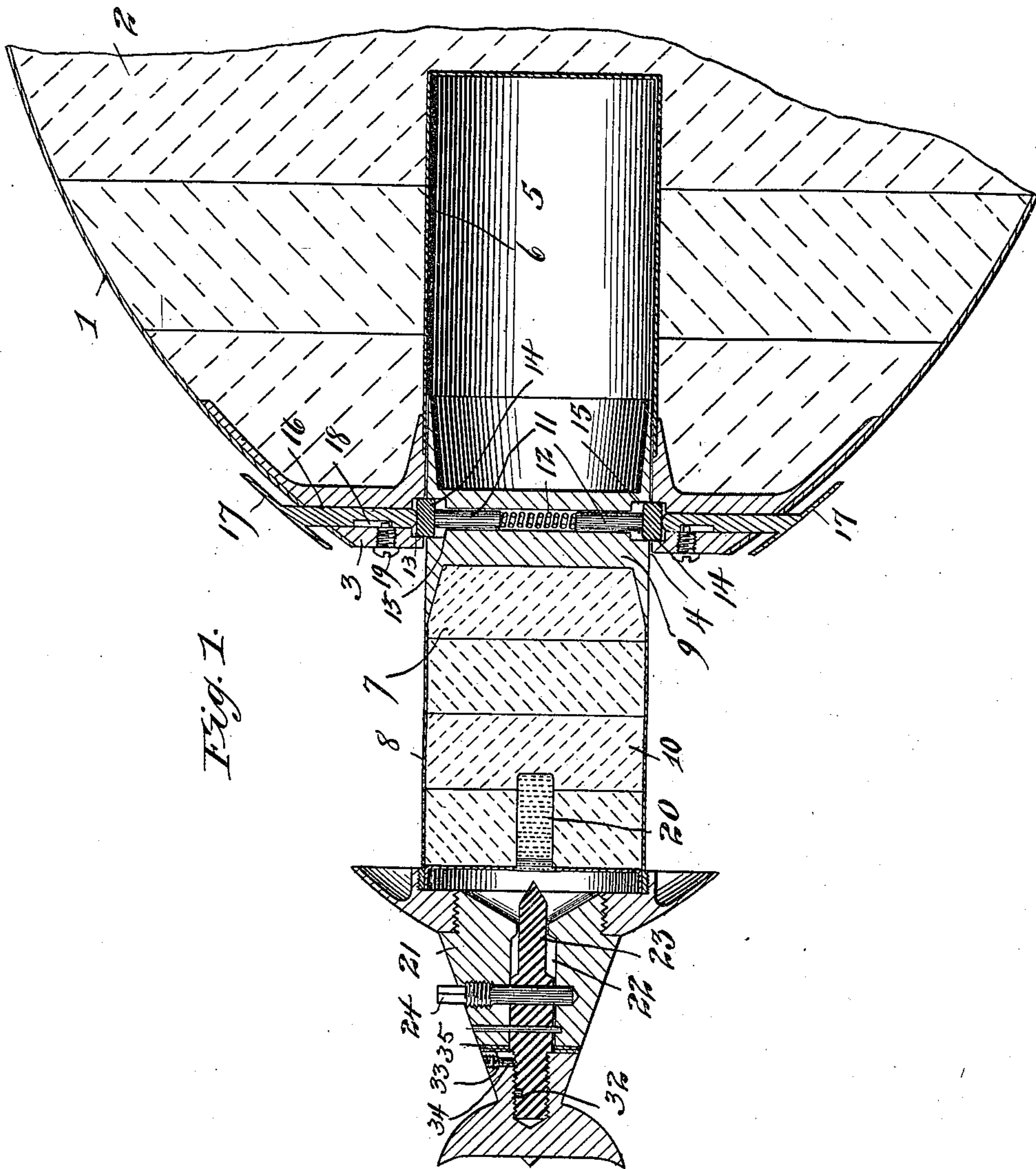
Patented Feb. 27, 1900.

E. GATHMANN.
TORPEDO.

(Application filed Apr. 27, 1899.)

(No Model.)

4 Sheets—Sheet 1.



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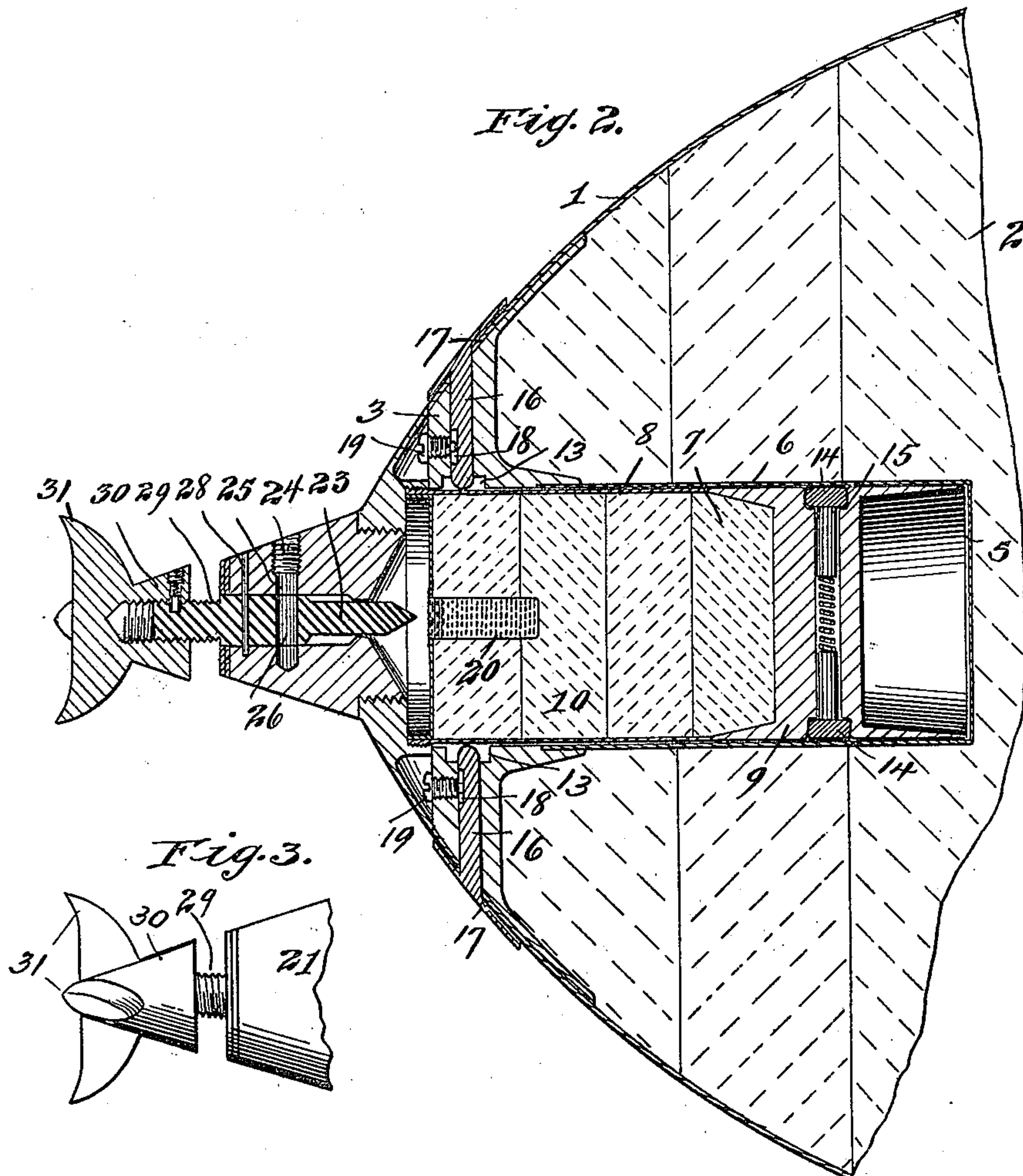
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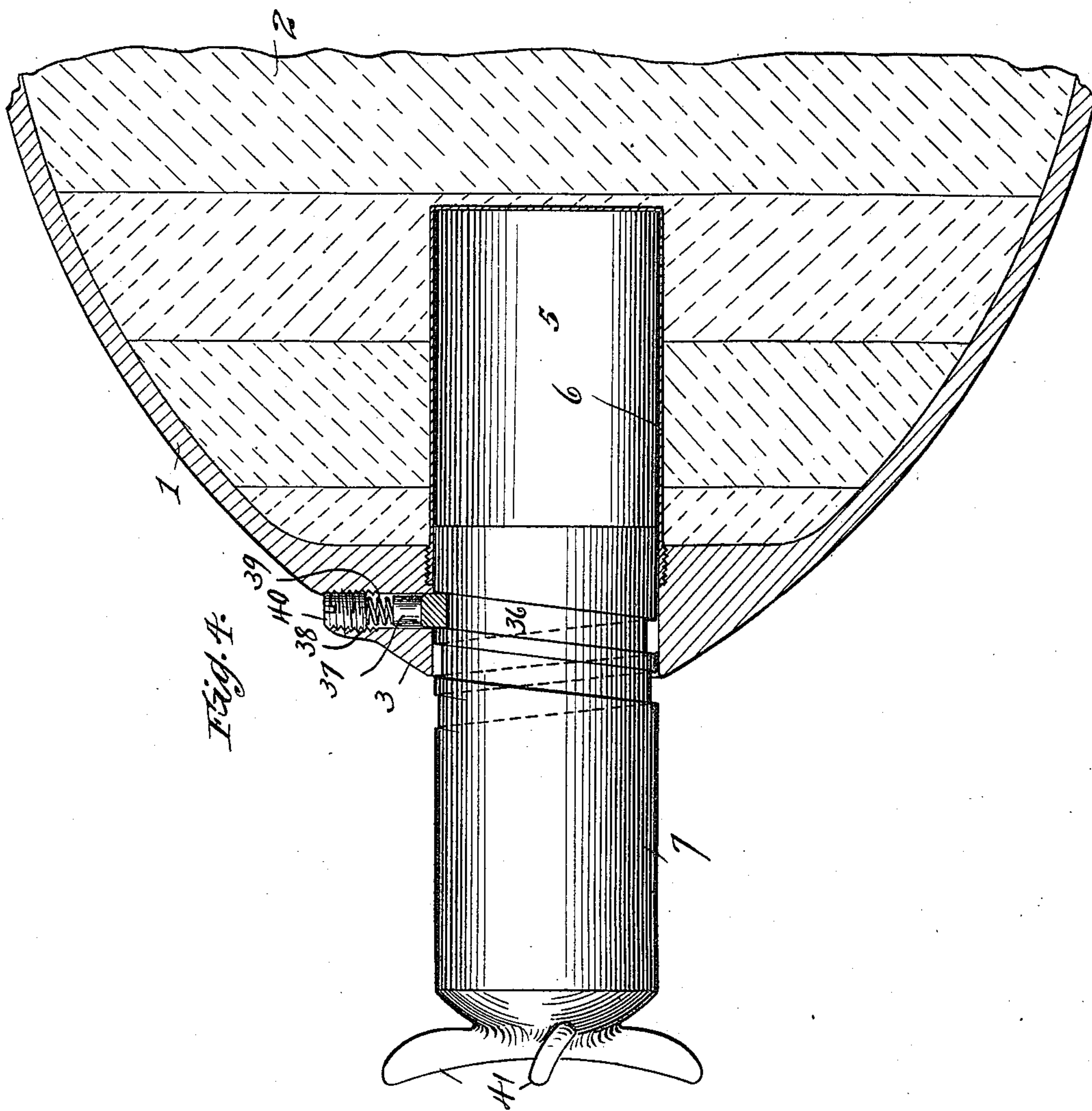
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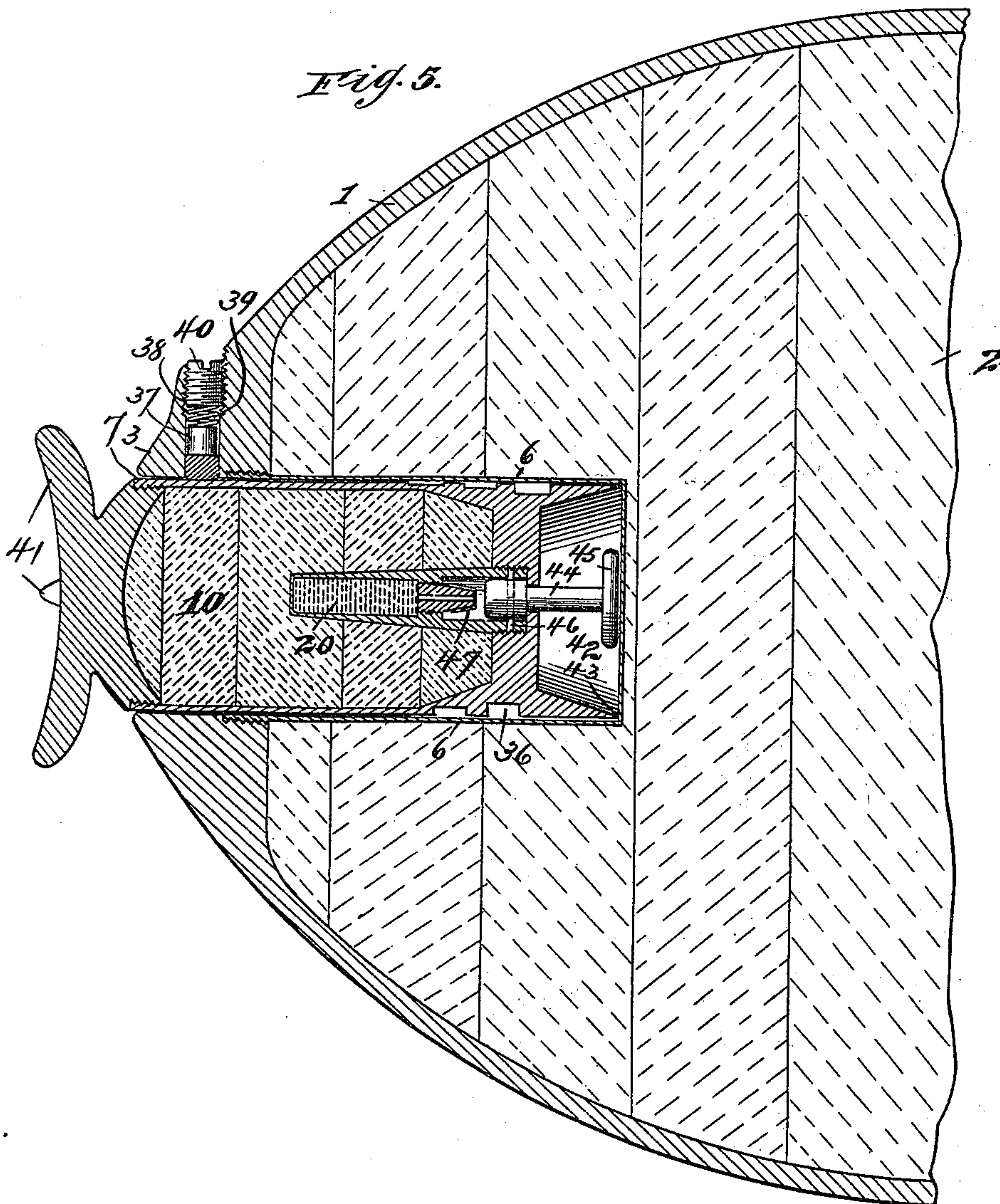
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

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TORPEDO.

SPECIFICATION forming part of Letters Patent No. 644,321, dated February 27, 1900.

Application filed April 27, 1899. Serial No. 714,630. (No model.)

To all whom it may concern:

Be it known that I, EMIL GATHMANN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Torpedoes, of which the following is a specification.

This invention relates to torpedoes, and more particularly to that class known as "fish-torpedoes," and has for its object to provide means for isolating or separating the detonator or detonating charge from the bursting charge of the torpedo during the handling of the same and prior to its actual discharge along with automatic mechanism, whereby during the passage of the torpedo through the water the detonator or detonating charge is moved into close proximity to the bursting charge of the torpedo, so as to become effective in exploding said charge when the torpedo meets a resisting object.

To these ends my invention consists in certain novel features, which I will now proceed to describe and will then particularly point out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal section of the front end or head of a torpedo embodying my invention in one form, the parts being shown in the position assumed by them before or at the time of discharging the torpedo. Fig. 2 is a similar view showing the position which the parts assume after the torpedo has been discharged and has traveled a sufficient distance to bring the several portions of the mechanism into proper position for exploding the torpedo. Fig. 3 is a detail elevation of the extreme forward end of the torpedo shown in Figs. 1 and 2. Fig. 4 is a view, partly in section and partly in elevation, of the forward end of a torpedo embodying my invention in another form, the parts being shown in the safety position or that which they assume during handling and at the time of discharge; and Fig. 5 is a sectional view showing the construction illustrated in Fig. 4, with the parts in operative position to explode the torpedo.

Referring first to the construction shown in Figs. 1, 2, and 3 of the drawings, 1 indicates the shell or body of the torpedo, which contains a bursting charge 2 of wet guncotton. At its forward end the body or shell is pro-

vided with a head-block 3, having a central aperture 4 to receive the detonator or fuse, and there is formed in the body of the bursting charge 2 a fuseway or recess 5, which is preferably surrounded by a casing 6 of comparatively-weak or easily-frangible metal, such as thin brass or copper, and is secured at its forward end to the head-block 3. 7 indicates the fuse or detonator as a whole, comprising a cylindrical casing having a thin and easily-frangible lateral wall 8 and a thick strong base 9, forming a block or partition which is interposed between the detonating charge 10 contained within the fuse and the bursting charge 2 of the torpedo when the parts are in the safety position shown in Fig. 1 of the drawings. This fuse or detonator is adapted to fit and move in the aperture 4 and fuseway 5 and when applied to the torpedo is maintained normally in the position shown in Fig. 1, with its detonating charge outside of and separated from the bursting charge of the torpedo, the block or partition 9 intervening between the two. In order to maintain the fuse or detonator in this position, there are provided in the base thereof pins 11, radially movable in suitable recesses and thrust outwardly by means of a spring 12. The outer ends of these pins extend into recesses 13, formed in the head-block 3, and by their engagement with these recesses the pins prevent longitudinal movement of the fuse or detonator relatively to the torpedo. The pins 11 are preferably provided with enlarged heads 14, and the outer ends of the recesses in which they move are shouldered, as shown at 15, to receive said heads and limit the inward motion of the pins. Said pins are operated by means of other pins 16, mounted in the head-block 3 of the torpedo in line with the pins 11 and corresponding in number therewith, the inner end of each pin 16 bearing upon the outer end of the corresponding pin 11. Each pin 16 is provided at its outer or exposed end with an inclined plate or vane 17, so located and arranged that as the torpedo moves through the water the resistance of the water to the advance thereof will act against said inclined plates or vanes and move the pins 16 inward toward the central line or axis of the torpedo. In order to prop-

erly limit the movement of the pins 16, each of said pins is provided with a longitudinal groove or slot 18, and a screw or pin 19 extends into said groove or slot and by its contact with the end walls thereof determines the limits of the inward and outward movement.

The fuse 7 may be of any suitable construction, and in Figs. 1 and 2 I have shown it as provided at its forward end with a charge of fulminate (indicated at 20) and as having a head 21, provided with a central longitudinal passage 22, in which is located a plunger 23, adapted to move longitudinally of said passage. This plunger is normally held in its most forward position, away from the charge of fulminate, by means of a strong pin 24, which extends through an aperture 25 in the head and through a similar aperture 26 in the plunger, said pin and the aperture 25 being threaded, so that the pin may be screwed into place through the plunger, as shown in Fig. 1, to hold this latter firmly in inoperative position. When required for use, the strong pin 24 is withdrawn and the aperture closed by a short screw-plug 27, which does not engage the plunger, and when the parts are thus assembled the plunger is held from longitudinal movement by a fragile or break pin 28. The forward end of the plunger 23 is threaded, as shown at 29, and there is mounted on said threaded portion a correspondingly-threaded cappiece 30, carrying a propeller-wheel 31 or other similar device adapted to rotate by reason of the resistance of the water when the torpedo moves through the same. Near its forward end the threaded portion 29 of the plunger 23 is provided with a recess 32, while the cappiece 30 is provided with an aperture 33, having therein a pin 34, backed by a spring 35, which presses said pin normally against the threaded surface of the plunger and will cause the same to engage with the recess 32 therein when it comes opposite said recess.

The operation of the torpedo thus constructed is as follows: Prior to the discharge of the torpedo and its entry into the water, the fuse 7, even if connected to the torpedo in the manner shown in Fig. 1 of the drawings, is effectually isolated from the bursting charge thereof not only by the distance separating them and the fact that the detonating charge of the fuse lies outside of the bursting charge of the torpedo, but also by the direct interposition between the two of the stout partition formed by the block which constitutes the thickened base of the fuse. The fuse when applied in the manner shown in Fig. 1 of the drawings, is prevented from moving backward in the fuseway by reason of the engagement of the outer ends of the pins 11 with the recesses 13 in the head of the torpedo. This safety position of the parts is maintained during the discharge of the torpedo and continues until the torpedo has actually entered the water and is moving

through the same. The resistance offered by the water to this forward movement is exerted upon the inclined plates or vanes 17 at the exposed outer ends of the pins 16 and moves these pins inward toward the central line or axis of the torpedo. The pins 16 bear against the outer ends of the pins 11, and these latter are also moved inward correspondingly against the action of the spring 12. When this inward movement of the pins 11 has withdrawn them clear of the recesses 13, the fuse 7 is then free to yield to the pressure caused by the resistance of the water to the forward motion of the torpedo and moves backward along the fuseway into the position shown in Fig. 2 of the drawings, in which its detonating charge is brought into immediate proximity to the bursting charge of the torpedo. In this position of the parts the torpedo is ready to be exploded upon contact with the object aimed at. When the particular construction shown in Figs. 1 and 2 is employed, the forward movement of the torpedo through the water causes a rotary movement of the propeller-wheel 31 and cap 30, and this latter is thereby moved forward upon the threaded portion of the plunger 23 until the spring-actuated pin 34 engages the recess 32 and stops said rotary motion. This forward movement of the cap carries it clear of the body of the head and leaves a space between the cap and head of the fuse sufficient to permit rearward motion of the plunger. The parts being now in the position shown in Figs. 2 and 3 of the drawings, when the forward end of the cap comes in contact with a resisting object the break-pin 28 is fractured and the plunger 23 is free to move rearward, and in so moving comes in contact with the fulminate 20, thereby successively exploding the fulminate, detonating charge, and bursting charge. Prior to the forward movement of the cap 30, due to its rotation, rearward movement of the plunger 23 to bring it into contact with the fulminate is prevented by reason of the said cap bearing upon the forward end of the head 21 of the fuse.

In Figs. 4 and 5 of the drawings I have shown a modified form of my invention, in which the fuse 7 is provided upon its outer cylindrical surface with a spiral groove of gradually-diminishing depth 36 or vanishing thread, while the head-block 3 of the torpedo is provided with a spring-actuated pin 37 to engage said groove. The pin 37 is located in an aperture 38, passing radially through the head-block, and the actuating-spring 39 of said pin is located in said aperture between said pin and a screw-plug 40, which closes the outer end of the aperture 38. The form of fuse shown in Figs. 4 and 5 is provided at its forward end with a propeller-wheel 41, directly connected therewith and adapted to impart a rotary movement to the entire fuse during the passage of the torpedo through the water. It will thus be seen that while the engagement of the pin 37 with the groove

36 will effectually prevent any rearward movement of the fuse to bring it within the torpedo during the handling or discharge of the torpedo immediately after the torpedo has been discharged and is moving through the water the rotary movement imparted to the fuse by its propeller-wheel will cause the pin 37 to travel along the groove or vanishing thread 36 and permit the rearward movement of the fuse into the torpedo. When the pin 37 has reached the vanishing-point of the groove or thread 36, the rearward movement of the fuse, which up to this point is slow and indirect, becomes rapid and direct and by a straight rearward movement the fuse seats itself within the torpedo in the position shown in Fig. 5 of the drawings. This construction presents certain features of advantage over that shown in Figs. 1, 2, and 3 in that while in the latter construction the fuse is free to move rearward into the torpedo almost as soon as the torpedo strikes the water in the construction shown in Figs. 4 and 5 some little time must elapse and the torpedo must have traveled a considerable distance through the water before the fuse can move entirely back into its operative position. This of course contributes to the safety of those discharging the torpedo.

In Figs. 4 and 5 of the drawings I have shown a form of fuse differing somewhat from that shown in Figs. 1 and 2. The base of the fuse is hollowed out, as indicated at 42, and the rear edge 43 is comparatively sharp, so as to be adapted to cut through the casing 6 when the forward end of the fuse strikes a resisting object. 44 indicates the firing-plunger, which extends through the base of the fuse and is provided with a head 45, enlarged to bear against the rear end of the fuseway. The plunger 44 is held in place by a break-pin 46, and when the forward end of the fuse strikes the object aimed at and the fuse moves farther rearward from the position shown in Fig. 5, its sharp edge 43 cutting through the casing 6 and into the body of the bursting charge, the head 45 of the plunger 44 meets with resistance and the break-pin 46 is fractured, so that the forward end of the plunger comes in contact with a cap 47, which explodes the fulminate 20.

It is obvious that by making the groove or thread 36 of an equal depth throughout the rearward movement of the fuse into the torpedo may still be obtained; but I prefer the vanishing groove shown and described, for the reason that it permits the employment of a fuse having an exceedingly-thin wall, and thereby insures a better detonation of the bursting charge.

It is obvious that the various details of construction hereinbefore set forth may be modified without departing from the principle of my invention, and I therefore do not wish to be understood as limiting myself strictly to such details.

I claim—

1. In a fish-torpedo, the combination, with the torpedo proper having a fuseway therein, of a fuse having its detonating charge normally separated or isolated from the bursting charge of the torpedo, and means actuated by the resistance of the water for bringing said fuse and its detonating charge into close proximity to the bursting charge, substantially as described.

2. In a fish-torpedo, the combination, with the torpedo proper having a fuseway therein at its forward end, of a fuse having its detonating charge normally separated or isolated from the interior of said torpedo, and automatic mechanism actuated by the resistance of the water whereby the fuse is moved along said fuseway into the interior of the torpedo, substantially as described.

3. In a fish-torpedo, the combination, with the torpedo proper having a fuseway in its forward end, of a fuse having its detonating charge normally separated or isolated from the interior of said torpedo, means for holding the fuse against direct longitudinal motion, and means actuated by the resistance of the water to the movement of the torpedo, whereby to release said holding means and permit the rearward motion of the fuse along the fuseway into the interior of the torpedo, substantially as described.

4. In a fish-torpedo, the combination, with a torpedo proper having a fuseway in its forward end, of a fuse having a spiral groove or thread and provided with means for rotating it when exposed to the resistance of the water, the torpedo having a projection adapted to engage the spiral groove or thread of the fuse and move the same longitudinally of the fuseway during its rotation, substantially as described.

5. In a fish-torpedo, the combination, with a torpedo proper having a fuseway in its forward end, of a fuse provided on its body portion with an external spiral groove of gradually-diminishing depth and having means for imparting to said fuse a rotary motion when exposed to the resistance of the water, the torpedo proper being provided with a spring-actuated pin to engage said spiral groove, substantially as described.

6. In a fish-torpedo, the combination, with a torpedo proper having a fuseway at its forward end and provided with a spring-actuated pin projecting into said fuseway, of a fuse having a thickened base to form a partition, a propeller or fan wheel at its forward end, and a spiral groove of gradually-diminishing depth upon the rear portion of its body with which said spring-actuated pin engages, substantially as described.

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