

Dec. 20, 1966

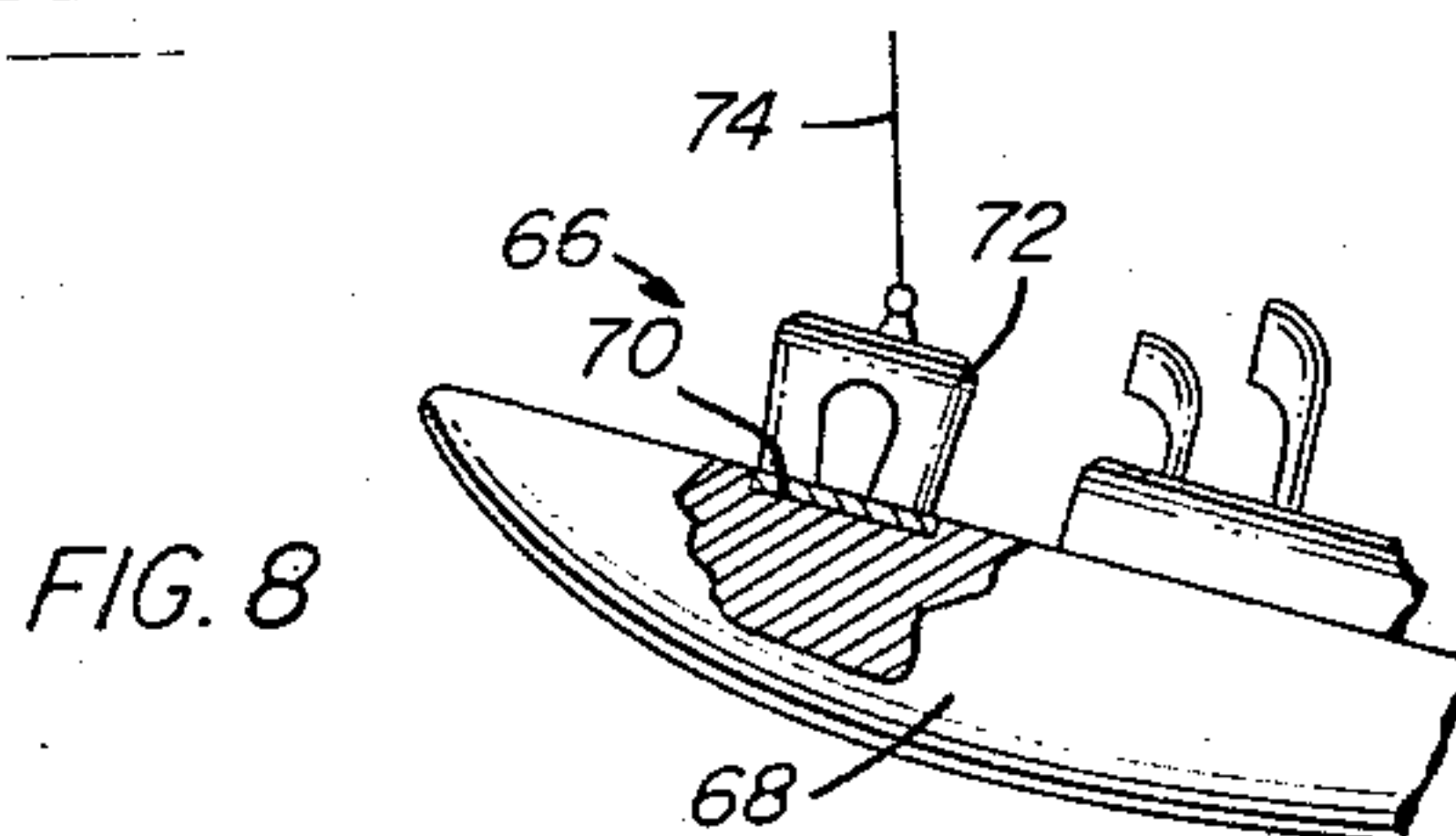
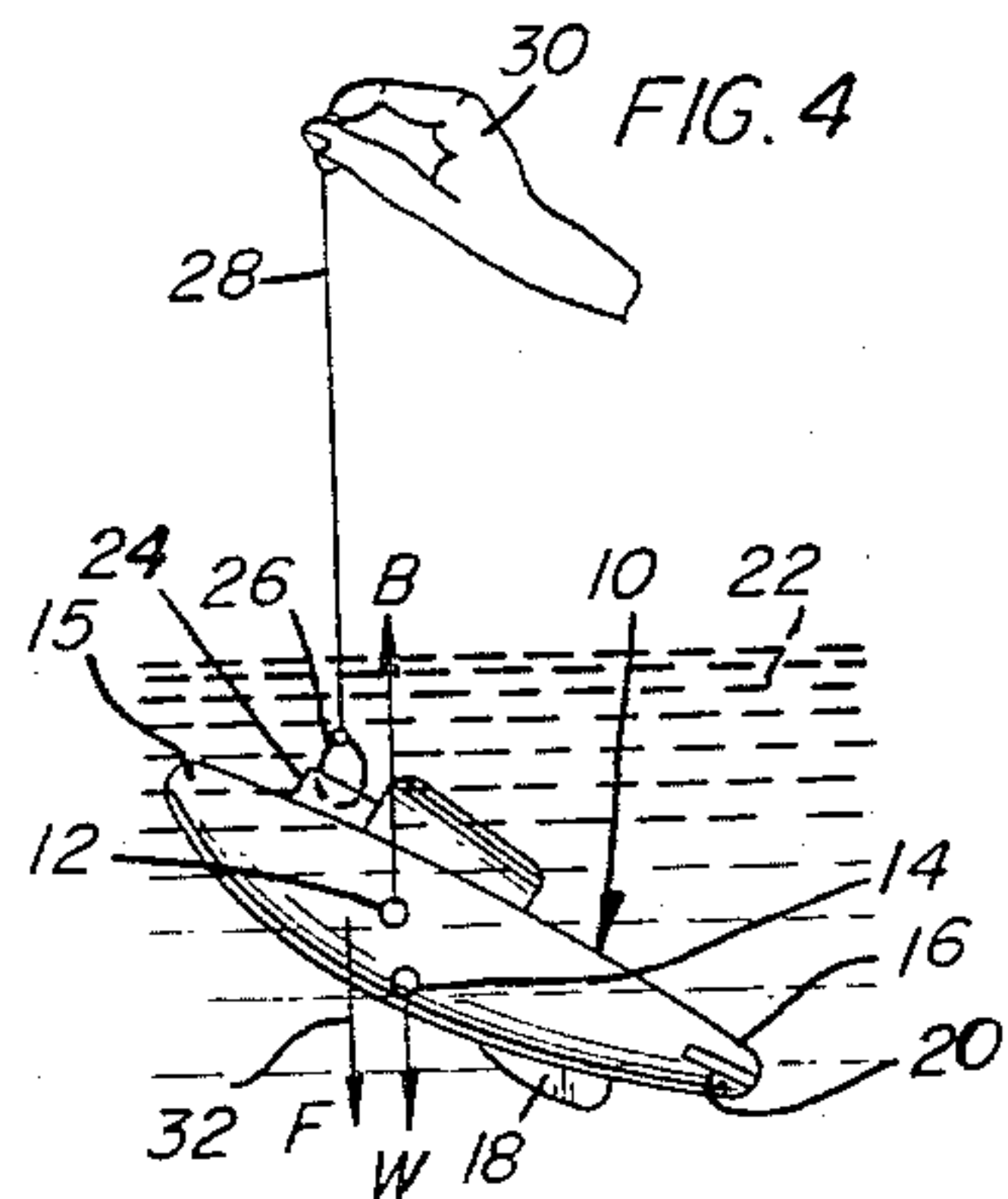
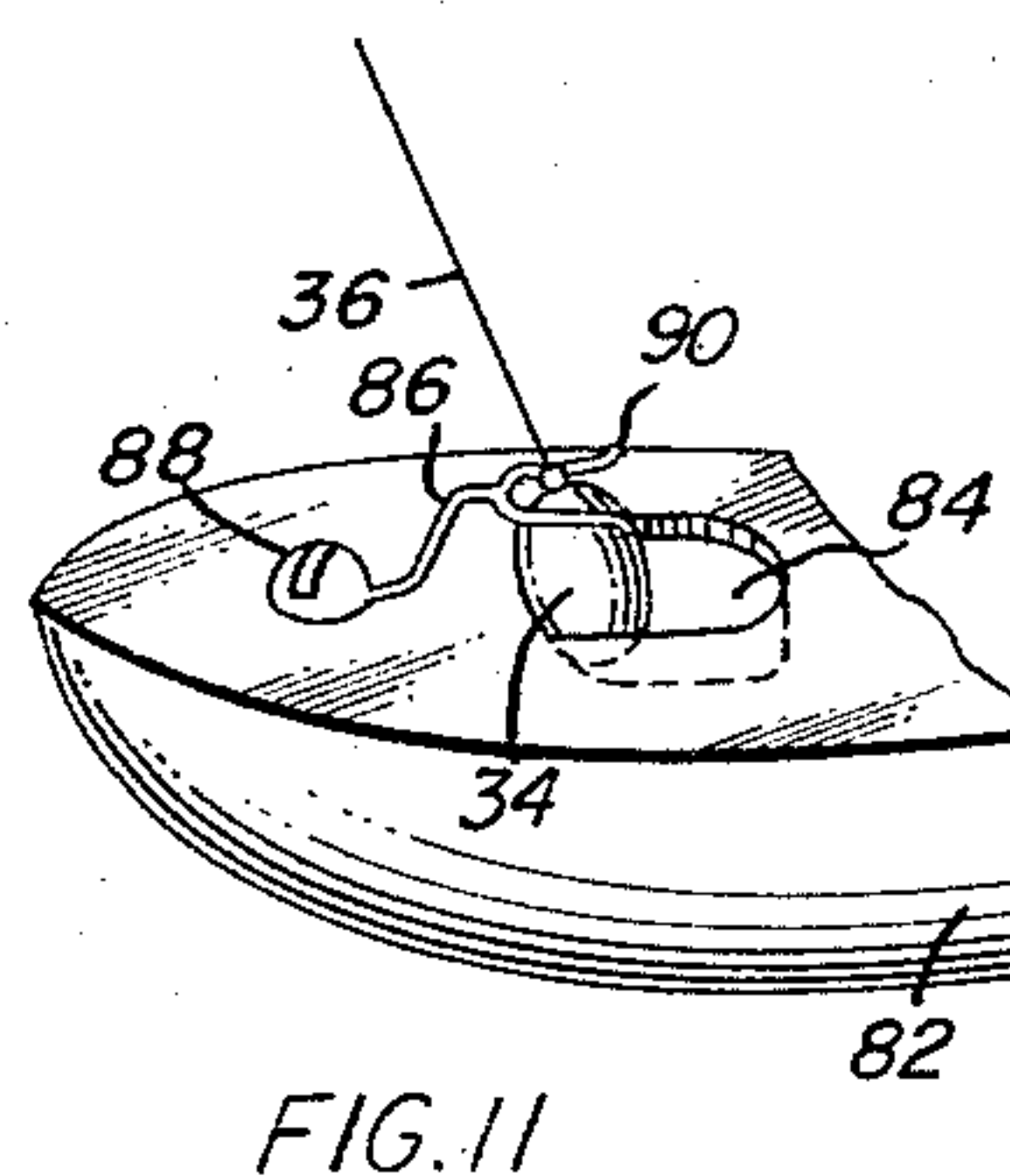
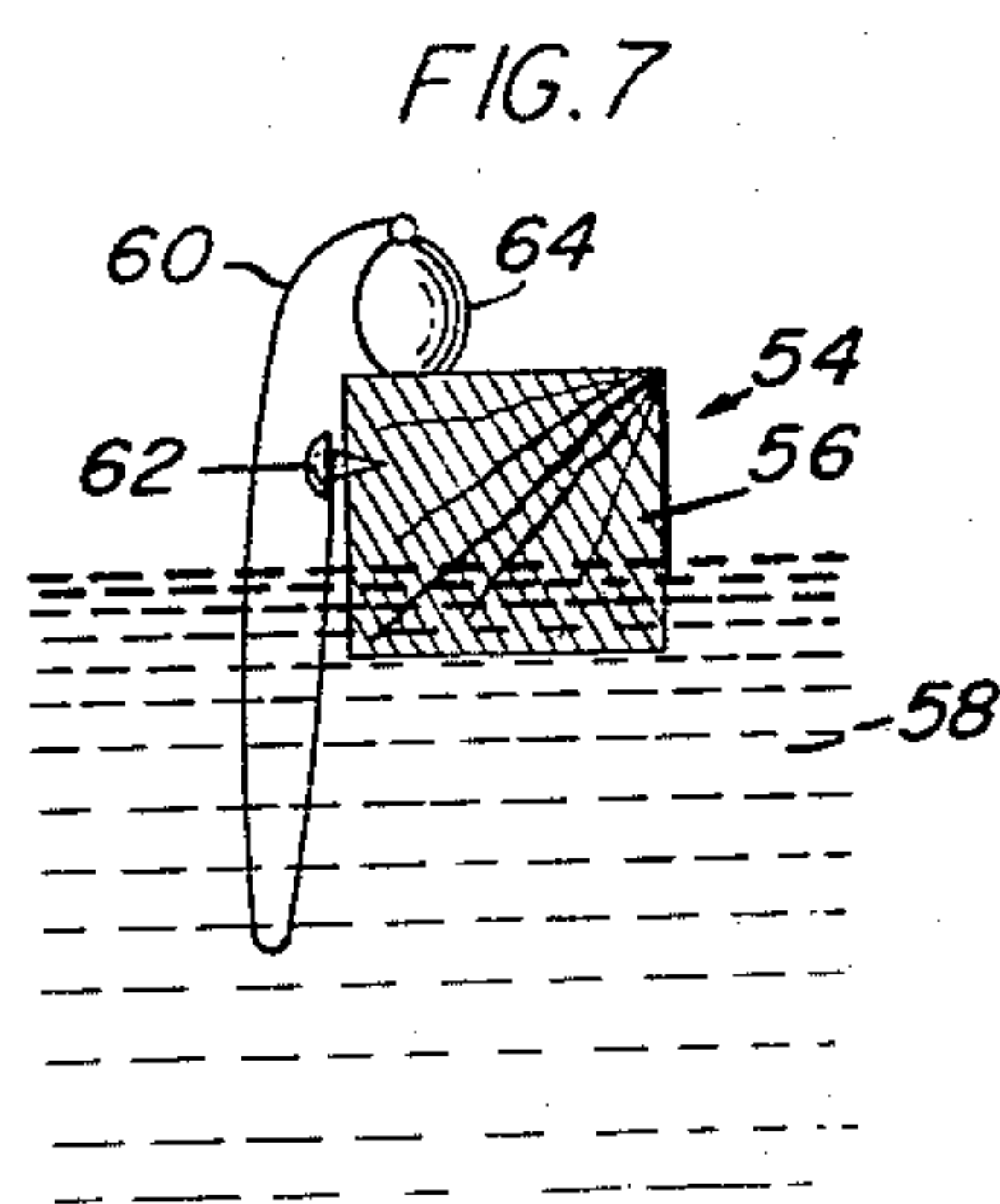
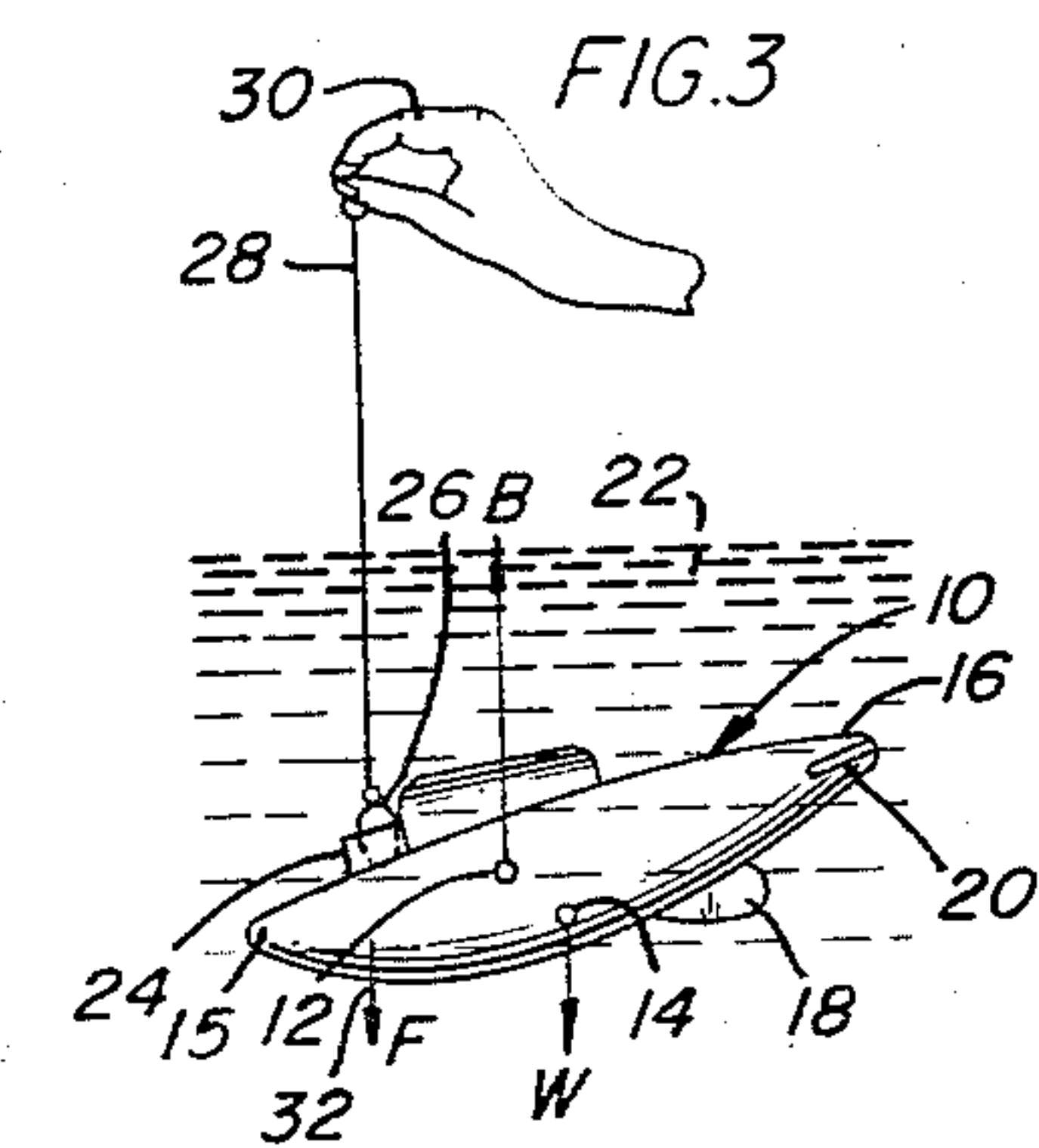
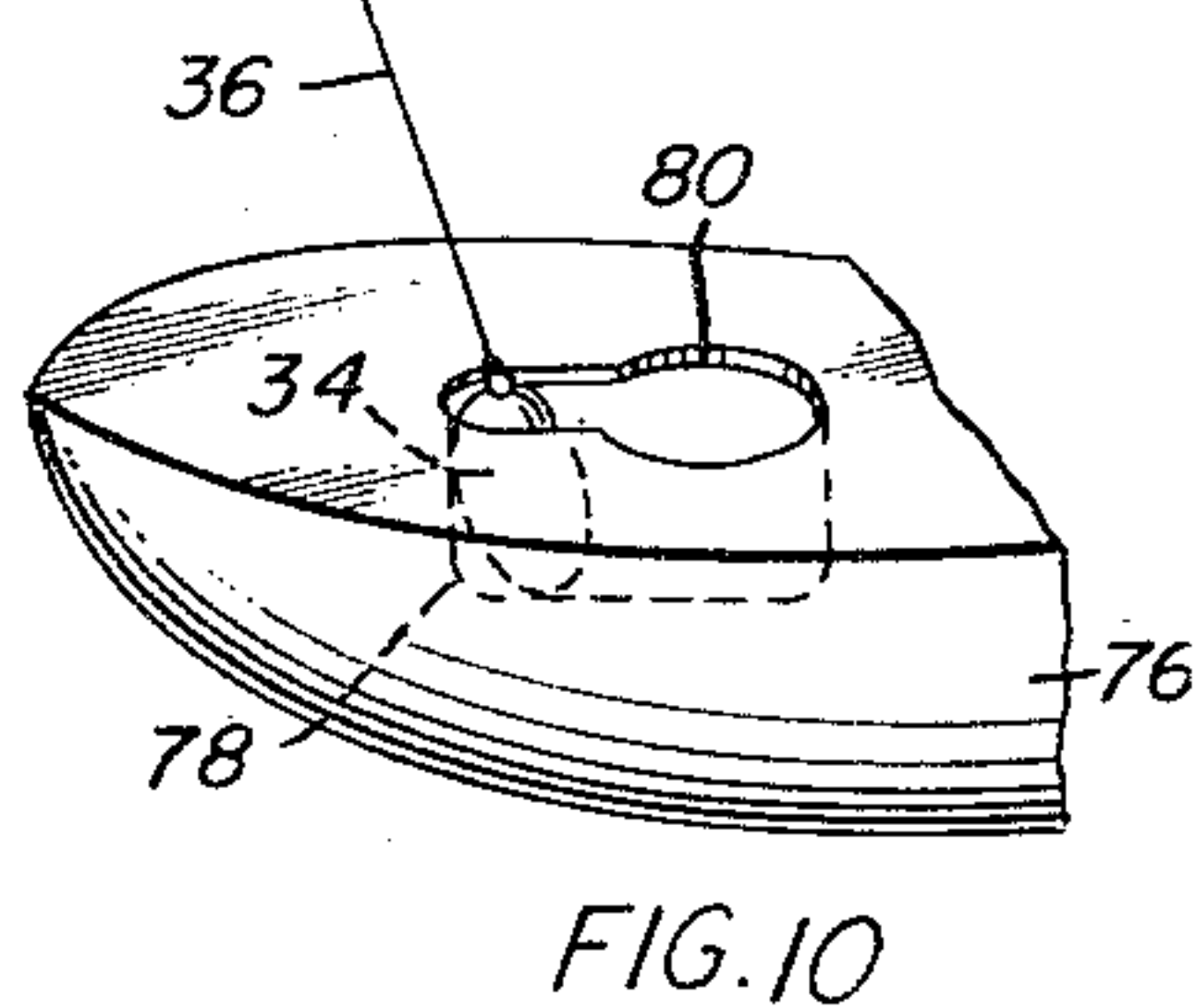
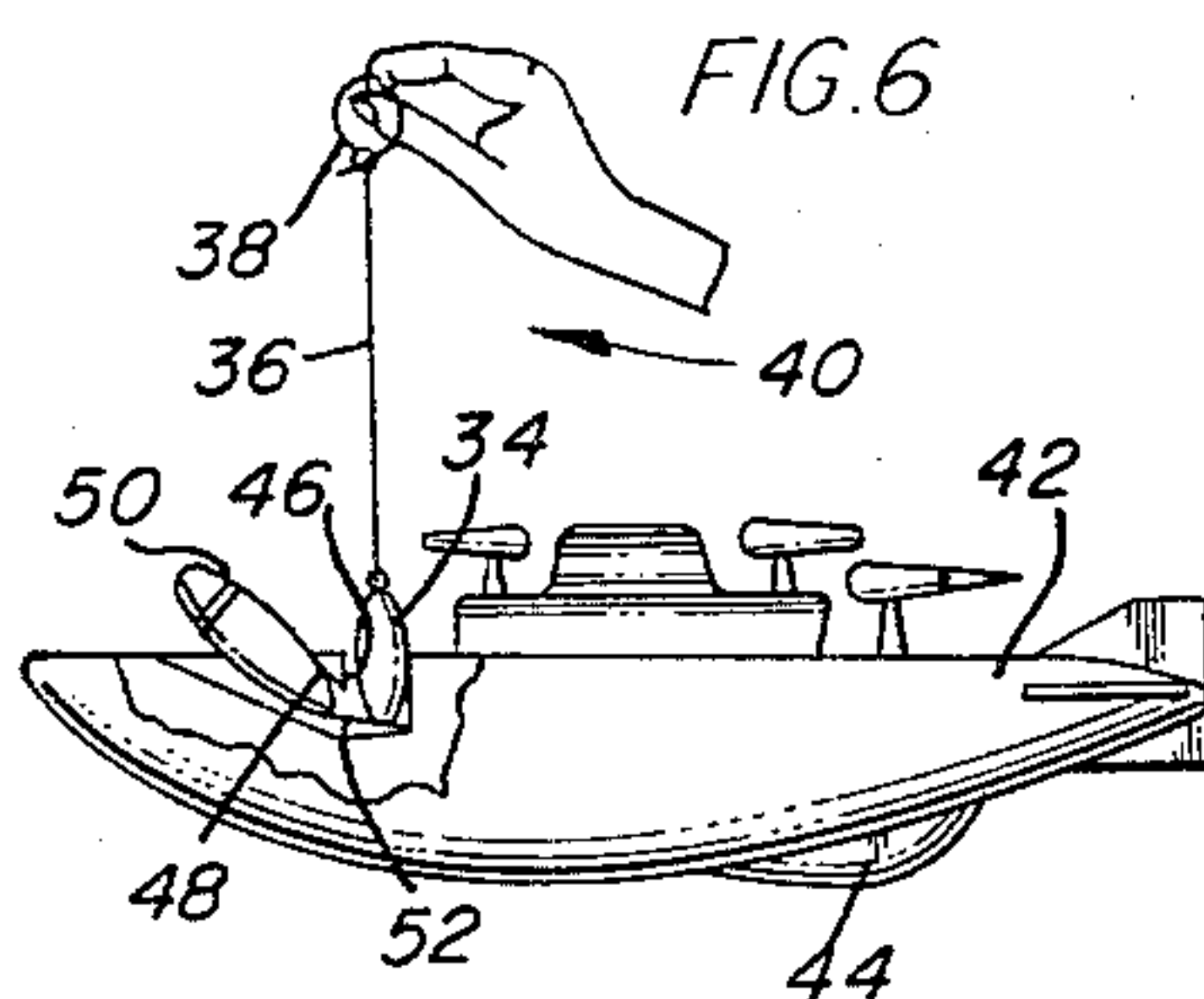
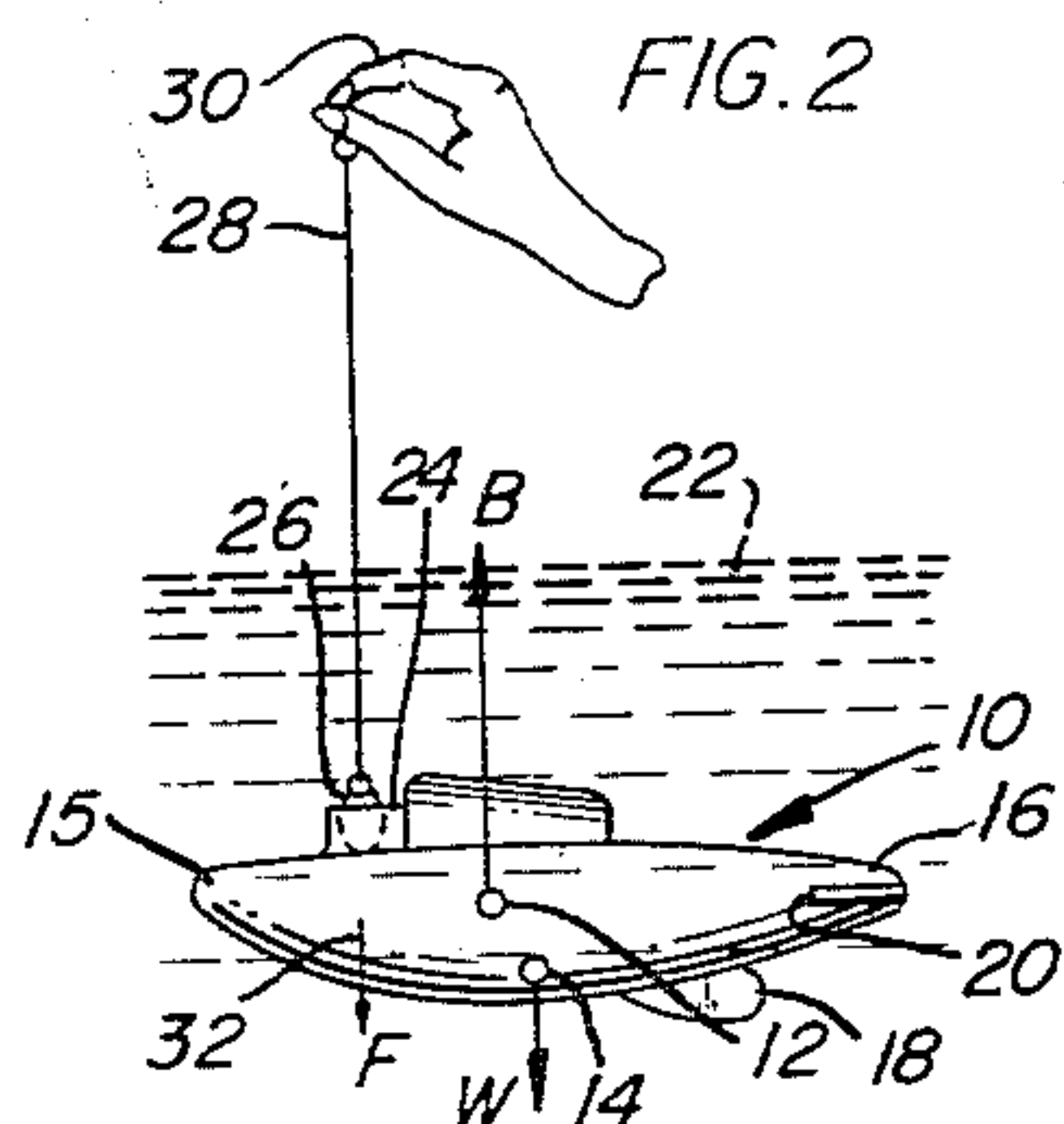
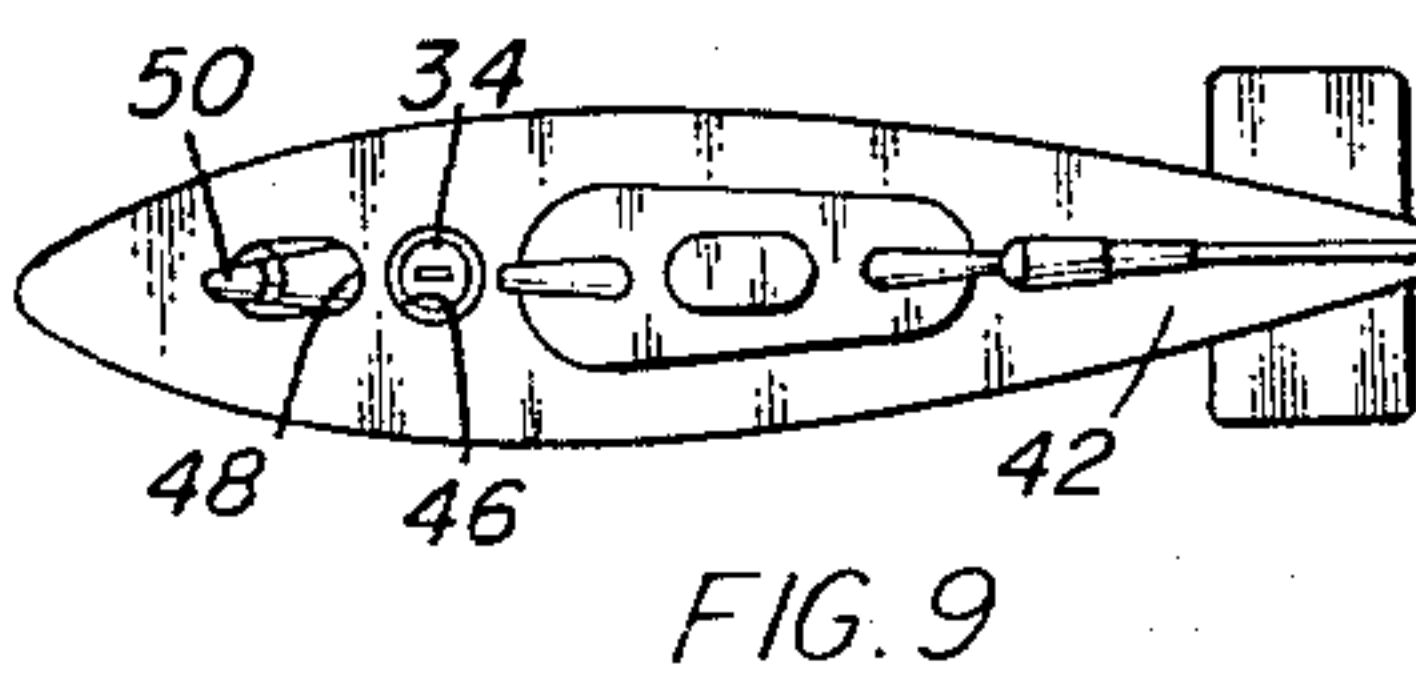
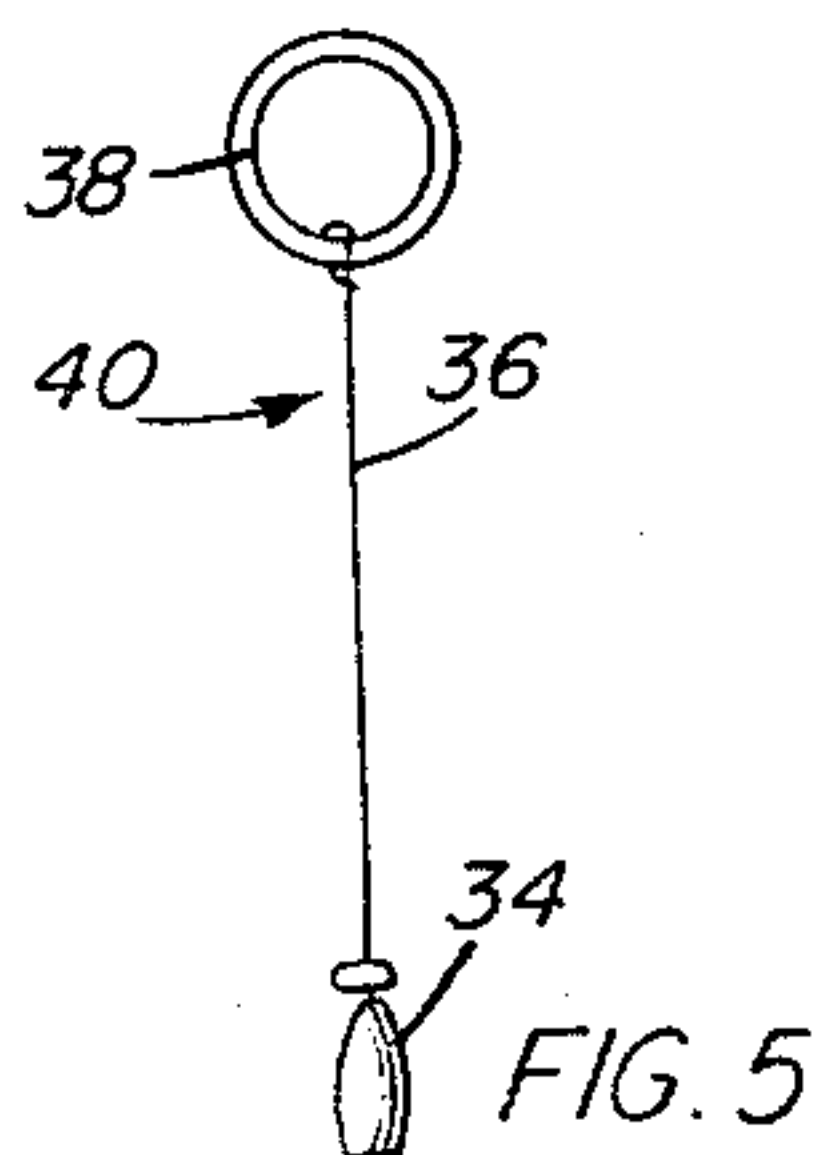
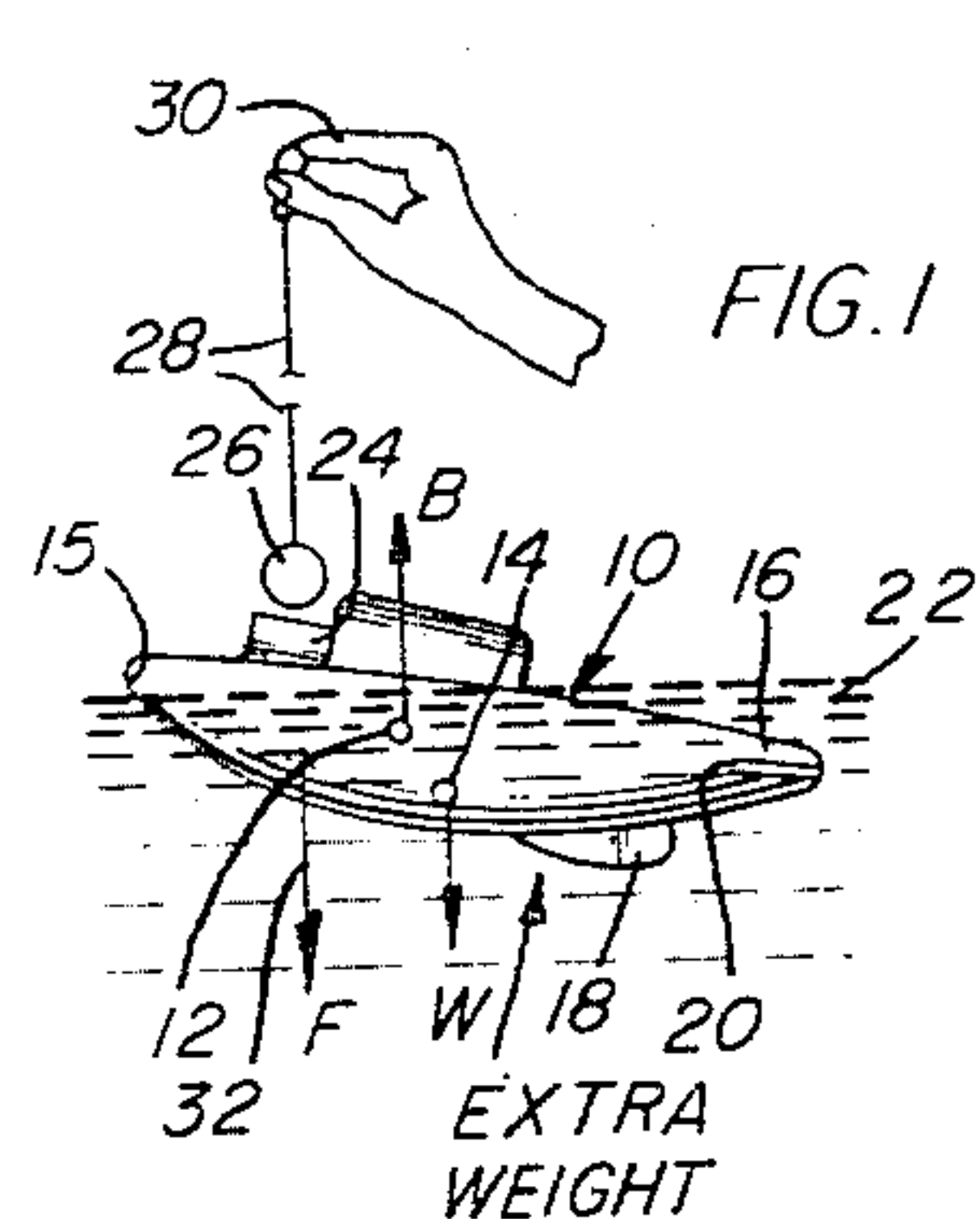
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3,292,303

CONTROLLABLY SUBMERSIBLE TOY

Filed Aug. 27, 1964

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

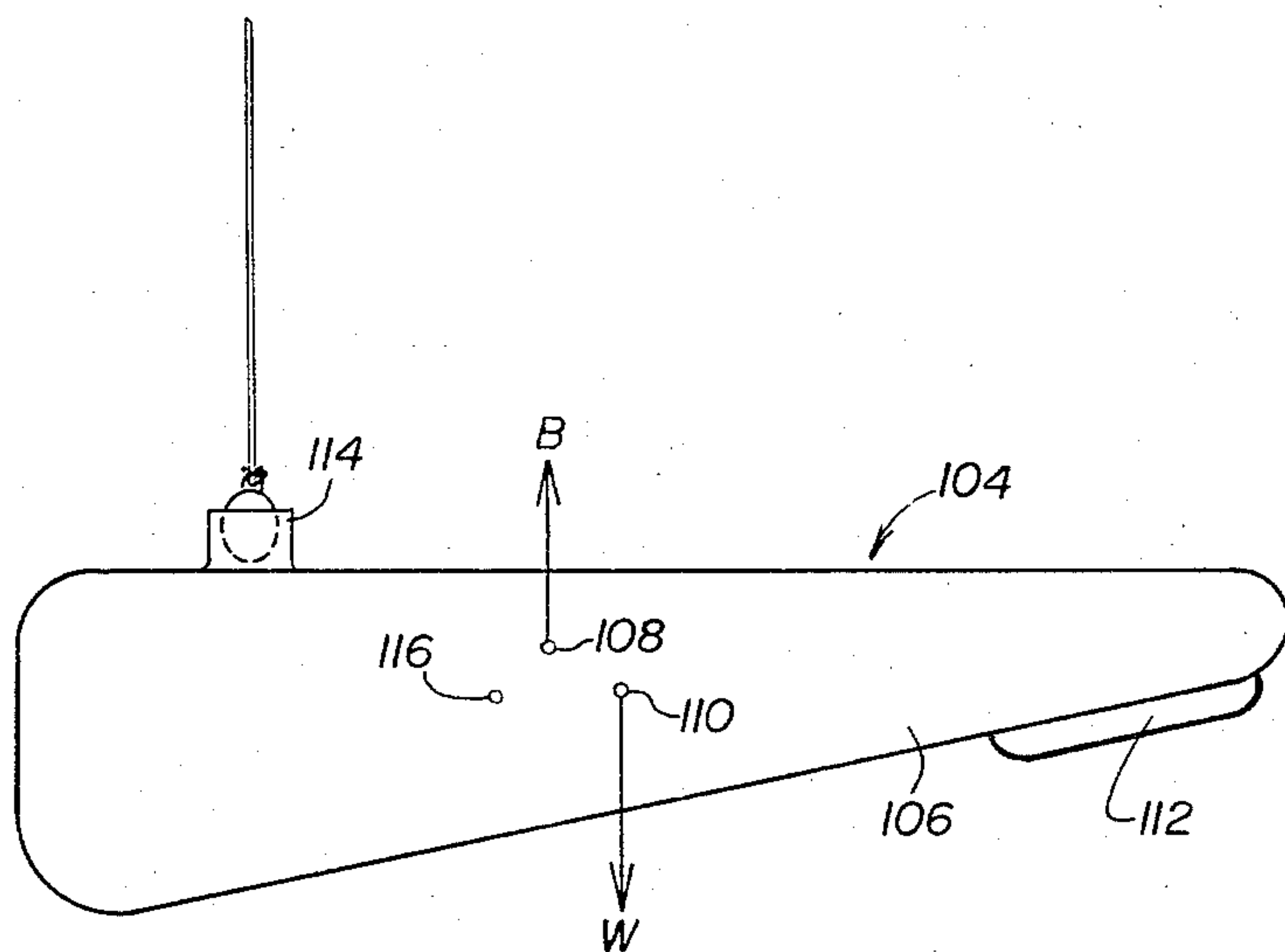


FIG. 14

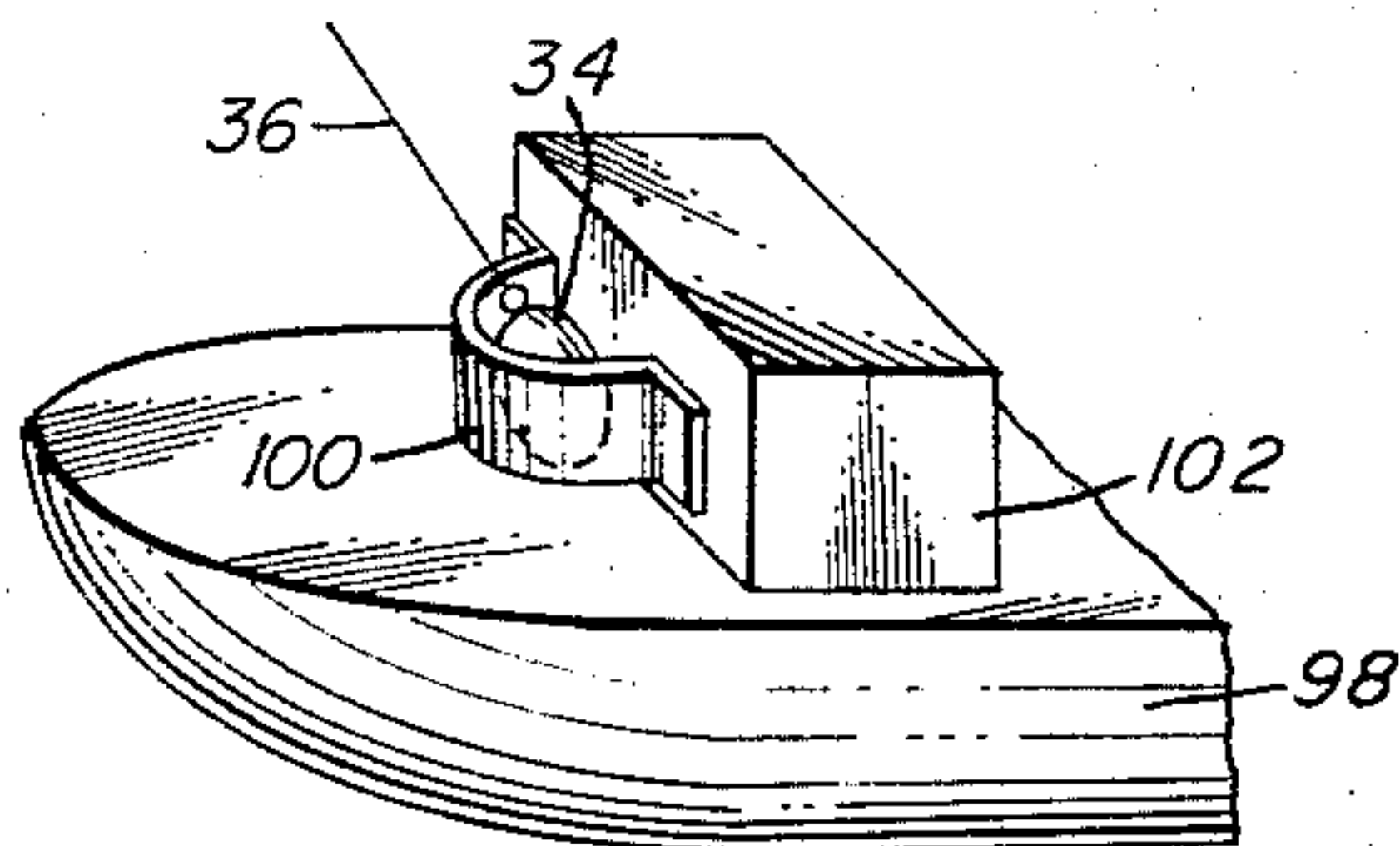


FIG. 13

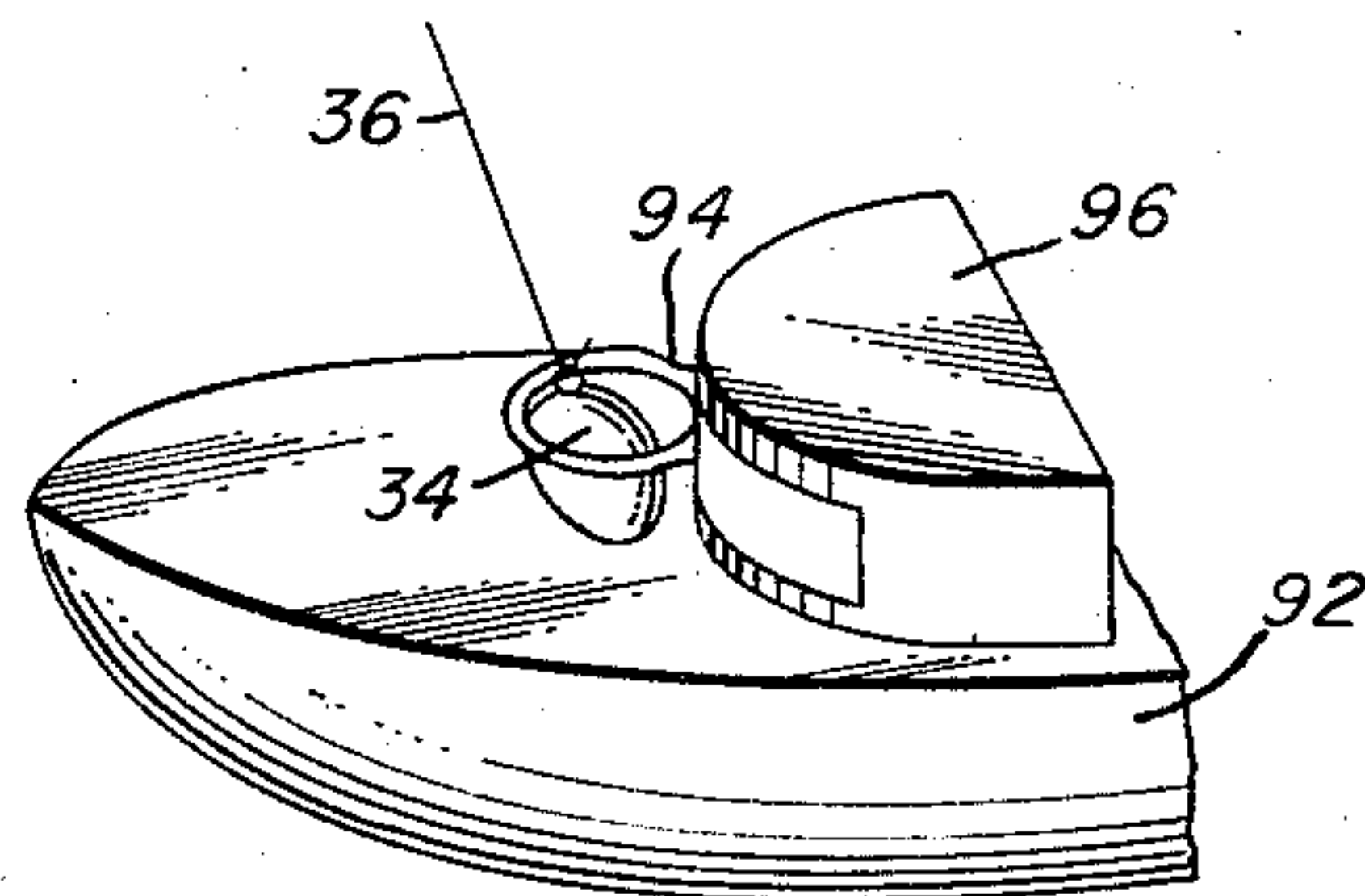


FIG. 12

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## 3,292,303 CONTROLLABLY SUBMERSIBLE TOY

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6 Claims. (Cl. 46-94)

This is a continuation-in-part of application Serial No. 95,124, now Patent No. 3,147,567, filed Mar. 13, 1961.

This invention relates to a submersible toy. More particularly it relates to a toy which may be manually manipulated in water in any desired direction.

It is an object of this invention to provide a toy which under manual control through a cord or string may be manipulated up and down and about in a body of water.

A further object is to provide a submersible toy manually controlled by a cord or string which is separable from said toy.

Still another object is to provide such a toy in which separation of the control cord is readily effected manually without touching the submersible toy.

A still further object is to provide a toy which under manual control through a cord or string may be manipulated up and down and about in a body of water and in which the cord or string is readily separable from the remainder of the toy without touching the latter.

A further object is to provide such a toy having a portion simulating a torpedo releasable by said cord or string.

Other objects will appear hereinafter.

In order that the invention may be better understood, reference is made to the accompanying drawings which form a part of this specification and in which

FIGURE 1 is a view in elevation of a toy embodying features of this invention;

FIGURE 2 is a view of the same toy submerged;

FIGURE 3 is another view of the same toy being directed downwardly;

FIGURE 4 is still another similar view showing the same toy being directed upwardly;

FIGURE 5 is a view in elevation of a cord and weight embodying features of the present invention;

FIGURE 6 is a view in elevation of another submersible toy embodying features of the present invention;

FIGURE 7 is a view in elevation of a simulated depth charge and floating support used in accordance with the present invention;

FIGURE 8 is an enlarged view in elevation of another modification of the submersible toy forming the subject matter of this invention;

FIGURE 9 is a plan view of the toy shown in FIGURE 6; and

FIGURES 10, 11, 12, and 13 are fragmentary views in perspective of various modifications of the toy shown in FIGURE 1; and

FIGURE 14 is a view in elevation of another toy embodying features of this invention.

Referring first to FIGURES 1 to 4, it is pointed out that these figures show a toy element 10 generally simulating a submarine although it could just as well simulate a fish or any other submersible body. Whatever it simulates, however, the element 10 should have a specific gravity less than that of water so that by itself it has substantial buoyancy and will float in water.

Another important characteristic of the toy element 10 is that it is so constructed that its center of buoyancy 12 indicated by the arrow and the letter "B" is located forwardly of the center of gravity 14 indicated by the arrow and the letter "W" in FIGURES 1 to 4, inclusive.

As a result, the toy element 10 floats alone with its for-

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ward end 15 higher than its rear end 16 as shown in FIGURE 1.

The toy element 10 may be formed of any desired material. As might be expected, a particularly suitable material of which to form the body of element 10 is wood. Whatever may be the way in which the element 10 is given its buoyancy, it is particularly convenient to displace the center of gravity 14 toward the rear 16 by including in the element 10 a portion 18 designated "extra weight," which is located toward the rear 16 and has a density substantially greater than that of the remainder of the element 10. By locating the portion 18 on what is intended to be a lower part of the element 10, the element is caused to remain in the desired position in the water with the portion designed to be uppermost in that position. A body of relatively dense metal serves very well as the body 18. Fins such as 20 may be provided if desired but should not normally be depended upon to maintain the element 10 in the desired position in the water or to guide its movements within the water designated 22.

Forwardly of the center of buoyancy 12 and on what is intended to be the upper surface of the element 10, a cup-shaped portion 24 is preferably provided at a location predetermined as hereinafter explained, to maintain the desired balance of element 10 in the water 22. The position of portion 24 is such as to satisfy two conditions as will become clear and in this connection has a distinct relation to the locations of the center of buoyancy 12 and the center of gravity 14 as will be explained.

The toy element 10 as heretofore indicated, by itself, floats in water in the position shown in FIGURE 1. It will be noted that in this FIGURE 1 there is shown suspended above the toy element 10 a weight 26 supported on a string or cord 28 held by the hand 30 of the person manipulating the toy 10. The weight 26 as will appear is designed to be received relatively snugly in the cup-shaped portion 24. The weight 26 is so selected with reference to the element 10 that when manual support of weight 26 by the hand 30 of the manipulator is no longer provided the element 10 will dive as shown in FIGURE 3. The arrow 32 and letter "F" in FIGURES 1 to 4 indicate the position and direction of the force exerted by the weight 26 on the element 10. The weight of the portion 26 is of such magnitude that the center of gravity of the combination of element 10 and weight 26 when positioned as shown in FIGURES 2, 3, and 4 is forwardly of the center of buoyancy 12 of element 10. On the other hand, the weight of weight 26 preferably does not greatly exceed the value required to meet the foregoing requirements. It is, however, desirable that weight 26 remain in the cup 24 except when lifted therefrom by a sharp jerk or when it is removed therefrom by continued lifting after toy element 10 has reached the position shown in FIGURE 1.

The value of weight 26 and the position of cup 24 in addition to being such that vertical manual manipulation of cord 28 as described may cause element 10 to be disposed in various positions as shown in FIGURES 1 to 4 should also be such that element 10 may be readily guided through a body of water such as illustrated at 22. It has been found that when element 10 and weight 26 are so designed that the foregoing conditions are satisfied and the cup 24 or its equivalent are located in the forward portion and preferably the forward one third of element 10, the latter may be very readily guided through forward movements, upward, downward, or horizontal through a cord or string 28 attached, as shown, to the weight 26. Manipulation of the hand 30 under the circumstances described will cause the element 10 to follow substantially exactly the movements of the hand 30 through a path varying as to the horizontal from a circle



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to any other desired form and the weight balance described at the same time permits the path to be varied vertically by the same means. The design is still further improved by locating the position of cup 24 in the forward one fourth of element 10 and still better results are obtained if the location is just within the forward one fifth. Attempts to place the location of cup 24 closer to the forward end of element 10, however, while acceptable from the guidance standpoint tend to produce unrealistic designs and structures in which the element 10 when free of weight 26 as shown in FIGURE 1 tilts upwardly too far. For each of the possible locations on element 10 at which weight 26 acts, the center of buoyancy 12 must be located to the rear of the position where weight 26 acts and the center of gravity 14 must, in turn, be located rearwardly of the center of buoyancy 12.

Referring next to FIGURE 5, it will be seen that there is shown therein a device consisting of a weight 34 secured to a lower end of a cord 36 which correspond, respectively, to the weight 26 and cord 28 above described. Secured to the upper end of cord 36 is a ring 38 preferably of a size conveniently received on a finger. The ring 38 when placed over the finger of a manipulator serves to insure that the weight 34 and cord 36 remain under the control of the manipulator when the cord and weight are placed in the water or the weight 34 is dropped into a body of water. Since the weight 34 is similar to the weight 26, it can serve the purposes of the weight 26 as above described in connection with manipulations of the elements such as element 10. The device designated generally 40, consisting of weight 34, cord 36 and ring 38, also has another use, however, in connection with which the ring 38 becomes particularly desirable. Assuming that the element 10 simulates a submarine, the device 40 may be employed to simulate a depth charge employed to damage the element 10. If, while the element 10 is being manipulated under water as shown in FIGURES 2, 3, and 4, the weight 34 is dropped down through the water 22 so that it engages the top part of the element 10 adjacent to the position where the weight 26 is acting upon element 10, the effect of the weight 34 is to push the forward end of element 10 downwardly in the water 22, in many cases causing the weight 26 to become separated from the cup 24 so that the hand 30 of the manipulator loses control over the element 10 which is then considered to have been damaged or sunk.

FIGURE 6 shows, in enlarged form, a simulation 42 of a submarine, which corresponds to the element 10 shown in FIGURES 1 to 4 for the purposes of the present invention. It is preferably provided with a weight 44 similar to weight 18 and has its centers of gravity and buoyancy located as above described. As shown in FIGURE 6, a portion of the submarine 42 is broken away adjacent the forward end to reveal a recess 46 which is somewhat deeper than the cup 24, but as is clearly shown in FIGURE 9, the recess 46 like the cup 24 is located midway between the sides of the submarine 42. Communicating with the recess 46 within the body of the submarine 42 is a second recess 48 extending forwardly and upwardly from the bottom of the recess 46 as shown. The submarine 42 is designed to be manipulated in substantially the same way as is described above in connection with the element 10, and to this end, the device 40 is shown positioned in operating relation to the submarine 42 with the weight 34 seated in the recess 46 which is preferably of such size that it just receives the weight 34 comfortably.

Extending upwardly out of the recess or opening 48 is a device 50 simulating a torpedo. The lower end of this torpedo 50 has a strip 52 thereon either formed integrally with the torpedo 50 or suitably secured thereto. The strip 52, which is preferably thin, may be formed of any desired material, but as shown in FIGURE 6 is long enough to extend from the lower end of the torpedo 50 down underneath the weight 34 so that the weight 34

## 4

rests on the lower end of the strip 52. In addition to being thin, strip 52 is also preferably relatively narrow laterally of the submarine 42.

In the use of the submarine 42 illustrated in FIGURE 6, the submarine is positioned in a body of water such as the body of water 22 with the torpedo 50 extending in the recess 48 as shown and with the weight 34 resting on the end of the strip 52 as is also shown. The submarine 42 may then be manipulated in the water manually in the same way as the element 10 described above. The torpedo 50 and the associated strip 52 are so constructed that this combination has substantial buoyancy in a body of water such as 22, which may be accomplished in any desired way such as by forming the torpedo 50 of a material having a specific gravity less than that of water or by providing a closed air-chamber within the torpedo 50. In any event, with the various parts assembled as shown in FIGURE 6, when the submarine 42 is manipulated in a body of water such as 22 in the normal manner described above, the weight 34 resting on the strip 52 retains the torpedo 50 in the position shown in the recess 48 despite the buoyancy of the torpedo 50. However, if the manipulator gives a slight upward jerk to the cord 36, the weight 34 is momentarily lifted part way out of the recess 46 so that it no longer rests upon the strip 52 and the result is that the buoyancy of the torpedo 50 then causes the latter to rise upwardly out of the recess 48 and travel upwardly in an inclined path toward the surface of the water 22. A little bit of practice will enable the person manipulating the submarine 42 to jerk the cord 36 just sufficiently to release the torpedo 50 without jerking the weight 34 all the way out of the recess 46, thus losing control over the submarine 42. Also, with a moderately minimum amount of practice it becomes possible for the manipulator to so release the torpedo 50 that in its path of travel upwardly it will strike another object in the water at which it is aimed, as, for example, another submarine like the submarine 42.

Turning now to FIGURE 7, it is pointed out that the device 54 as shown serves a purpose which is at least in part similar to that served by the device 40. The device 54 comprises a float portion 56 which may be of any desired size or configuration, its chief characteristic being that it has substantial buoyancy so that the float may, for example, simply be a block of wood. The float 56 has a cord 60 secured thereto by suitable fastening means such as the tack 62 illustrated. The other end of the cord 60 is secured to a weight 64 generally similar to the weights 34 and 26 previously described. The weight 64 like the weight 34 is used to simulate a depth charge and which is normally supported on the float 56 as shown. When it is desired to employ the weight 64 as a depth charge, the float 56 is manually manipulated on the surface of the water to a position such that when the weight 64 is pushed off the float, it will drop on a submarine such as the submarine 42 or another type of element 10 in such a way as to cause the element to become disengaged from the weight and cord by which it is manipulated. The weight 64 is then pushed off the float 56 so that it drops down into the water as desired. Alternatively, the float 56 may serve merely as a support for the weight 64, which when used as a depth charge, is lifted off the float 56 and aimed and dropped manually.

FIGURE 8 is a fragmentary view of the forward end of an element such as the element 10, which simulates a submarine. This device designated generally by the numeral 66 comprises a portion 68 which simulates the submarine and has the same characteristics and features as the element 10 except as will be pointed out. In the drawing a portion of the submarine 68 adjacent the bow is broken away to reveal an iron plate 70 embedded in the deck of the submarine 68 and secured thereto. Positioned in engagement with the plate 70 is a magnet 72 having a cord 74 secured thereto. The plate 70, which is located centrally between the sides of the sub-



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marine 68, preferably has a periphery conforming substantially to the overall periphery of the end of the magnet 72. By this is meant that the plate is continuous across the open space between the two holes of the magnet 72 as well as across the pole faces. This arrangement facilitates location of the magnet in a desired predetermined position which is indicated by the location of the plate 70.

In the device 66 the magnet 72 serves two purposes. In addition to serving as a means for connecting the cord 74 to the submarine 68, it also serves the functions of the weights 26 and 34 which are described above. Thus, the position of the plate 70 is determined in the same way as the position of the cup 24 and of the recess 46 is determined as already described, and a weight is selected for the magnet 72 in the same way as the value of the weights 26 and 34 is determined. Thus, when the magnet 72 is positioned on the plate 70 as shown, the submarine 68 may be manipulated about a body of water in the same way as element 10 is manipulated as shown in FIGURES 2, 3, and 4. On the other hand, the device 66 has the characteristic that the magnet 72 is more difficult to dislodge from the submarine 68 than are the weights 26 and 34. The plate 70 and magnet 72 are preferably chosen so that the force of attraction between them is of a low order with the result that the magnet 72 can be disengaged from the plate 70 by an upward jerk on the cord 74. This feature is advantageous where it is desired to manipulate an element such as the submarine 68 so as to cause it to pass beneath some other object in or on the same body of water. To this end, the submarine 68 is manipulated so as to give it the necessary momentum to pass under the object in question and then the cord 74 is jerked to disconnect the magnet 72 from the plate 70 and the latter are lifted over the object in question and then lowered again into engagement with the plate 70 after the submarine 68 has completed its passage under the object. It will also be apparent that this same maneuver may be executed with the element 10 or the submarine 42 in which the weights are merely seated in recesses such as the cup 24 and the recess 46.

FIGURE 10 shows the forward end of another form 76 of the element 10, also simulating a submarine. The submarine 76 also has the same characteristics and features as the element 10 except that a recess 78 is provided below the deck of the submarine to receive a weight such as the weight 34. Access to the recess 78 is provided by a key hole slot 80 on the deck of the submarine. The larger portion of the key hole slot 80, which is positioned toward the stern of the submarine, is of suitable size to permit the weight 34 to pass therethrough, but the narrower portion of the key hole slot is narrow enough so that the weight 34 cannot pass through it. The recess 78 is so formed and positioned that when the weight 34 is in the forward portion thereof as shown beneath the narrow portion of the key hole slot 80, the weight 34 is properly positioned with respect to the remainder of the submarine 76 in the same manner as the weights 26 and 34 are positioned, respectively, by the cup 24 and the recess 46 with respect to the element 10 and the submarine 72.

In the use of the submarine 76 illustrated in FIGURE 10, the weight 34 is passed through the larger portion of the key hole slot 80 into the recess 78 and the cord 36 is then given a pull in a forward direction with respect to the submarine 76 to seat the weight 34 under the narrow portion of the slot 80. Thereafter, so long as the submarine 76 is manipulated in the water in the normal way in which the cord 36 extends forwardly from the slot 80, the weight 34 will be retained in the recess 78. However, if it is desired to disengage the weight 34 from the submarine 76 for a purpose such as is described above in connection with the device 66, by manipulating the cord 36 rearwardly in connection with the submarine 76

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the weight 34 is brought into alignment with the larger portion of the slot 80 and may then readily be lifted through it.

FIGURE 11 shows still another modification similar to that shown in FIGURE 10. In this embodiment of the invention, an element 82 simulating a submarine is provided, only the forward portion thereof being shown in the drawing. The submarine 82 also corresponds in all respects with the element 10 as described above except in respect to the means provided thereon for cooperating with the weight 34 and cord 36. As revealed by breaking away a portion of the submarine 82 in FIGURE 11, a recess 84 is provided below the deck of the submarine. This recess 84 is similar in horizontal cross section and position to the recess 78, but as appears in the drawings is shallower than the recess 78 so that the weight 34 when seated therein extends above the deck of the submarine 82.

Forwardly of the recess 84 an arm 86 is secured to the deck of the submarine 82 as at 88. This arm 86 as may be seen extends upwardly and rearwardly and terminates in a yoke 90. The yoke 90 as may be seen is centrally located laterally of the submarine and is positioned over the forward portion of the recess 84. The weight 34 is readily placed in the recess 84 by inserting it in the rear portion of the recess. When the cord 36 is then pulled forwardly in normal operation of the submarine 82, the weight 34 becomes engaged in the yoke 90 so that it is held in position in the recess 84 in proper relation to the centers of gravity and buoyancy of the submarine 82 as described above in connection with element 10. As will be apparent, to remove the weight 34 from the recess 84 the cord 36 is moved rearwardly carrying the weight 34 to the rear of the recess from which it may readily be lifted without engaging the yoke 90.

Two additional ways in which the weight 34 may be retained in operating position are shown in FIGURES 12 and 13. In FIGURE 12, which shows the forward end of a submarine 92, a ring 94 is provided which is suitably secured to the forward wall of the superstructure 96 of the submarine a short distance above the deck. The submarine 92 is similar to the element 10 in its main features of construction, and in particular, in reference to the locations of its center of gravity and its center of buoyancy. The ring 94 is positioned on the submarine 92 in such a way as to locate the weight 34 centrally between the sides of the submarine and in the proper relation to the center of buoyancy and the center of gravity as above described. The simulation 98 of a submarine shown in FIGURE 13 is identical with the submarine 92 with the exception that the ring 94 is omitted and in its place there is substituted a band 100 secured to the forward wall of the superstructure 102 to provide means for receiving and retaining the weight 34 in its proper operating relation to the submarine 98.

The modification shown in FIGURE 14 further illustrates the feature of this invention which is concerned with the guidance of the toy through forward movements in a generally horizontal direction, particularly when it is completely submerged. As may be seen, this embodiment also includes an element 104 simulating a submarine which for the purpose of better illustrating the guidance feature is provided with a hull 106 having a somewhat unusual or exaggerated configuration in that the broadside area of the forward or bow end is much larger than that of the stern end.

Like the toy element 10, the toy 104, by itself, floats in water and is so constructed that its center of buoyancy 108 indicated by the arrow and letter B is located forwardly of the center of gravity 110 indicated by the arrow and the letter W. Thus, as explained above, element 104, like element 10, floats alone with its forward end higher than its rear end. The body or hull 106 of toy 104 also, similarly to element 10, is preferably formed of wood and, as also explained above, the center of gravity is displaced



toward the stern by a weight 112 secured to the underside of the hull 106 adjacent the stern, which weight also serves when the toy 104 is in the water, to maintain a predetermined surface of the hull uppermost.

On the uppermost portion of the hull of toy 104 a cup-shaped portion 114 is provided which corresponds to cup-shaped portion 24 on element 10 and thus serves to receive a weight such as the weight 26 during manipulation of the toy in water, as explained above. It has already been pointed out above that in accordance with the teachings of this invention, the cup-shaped portion 114, which serves as the weight-receiving means, must be located forwardly of the center of buoyancy in a position such that the center of gravity of the combination of the element 104 and the weight 26 when positioned in recess 114 is located forwardly of the center of buoyancy 108. It has also been pointed out that in addition to satisfying the foregoing conditions, the weight-receiving means, such as recess 114, should be located in the forward portion of the toy and preferably in the forward one-third portion in order to facilitate movements of the toy 104 in horizontal paths, particularly in such paths which are curved or circular.

While for the purpose of such horizontal guidance, the location of the open upper end of the weight-receiving means in the forward portion of the toy or element 10 which have a more or less conventional and symmetrical configuration, it is necessary to state the requirement in different terms in order to make it applicable in respect to toy submarines and the like having hulls of other configurations such as that of the hull 106 of toy 104. More particularly, such more general statement is that the open upper end of the weight-receiving means must be located forwardly of the centers or horizontal pressure on the sides of the toy when the toy is submerged. In the circumstances involved here, these centers will lie on the lines of intersection of the outer surface of the hull with a plane perpendicular to the longitudinal axis of the hull and intersecting a central, vertical longitudinal plane through the hull in a line which passes through the centroid of the area defined by the intersection of the latter plane with the outer surface of toy 104. Preferably, the open upper end of the weight-receiving means is also located so that the maximum vertical longitudinal cross-sectional area of said toy forwardly the midpoint longitudinally of said open upper end is less than the corresponding area to the rear thereof. In FIGURE 14 the center of pressure on the side of toy 104 which is shown is indicated at 116, the center of pressure on the other side being directly opposite thereto.

While the precise pressures are immaterial, the reference to the centers of pressure provides a convenient means for expressing the idea that when a lateral pull is exerted on the toys herein disclosed, the turning effect on the toy will be determined by whether the vertical cross-sectional area of the water against which the portion of the toy forward of the point where the pull is exerted has to move is greater or less than the remainder of that area. If the area forward is lesser, the forward portion of the toy will encounter less resistance to its movement and will thus move more rapidly in the direction of the pull than the after portion, thus causing the toy to turn in the proper way.

As will be apparent, when the weight-receiving means, such as 114 and the like, is located forwardly of the centers of horizontal pressure on the sides of the hull, the weight 26 when in the weight-receiving means will also be located forwardly of those centers of pressure. In a more general way, the important point is that the place where the string or cord 28 is secured to the weight 26 should be located forwardly of the said centers of pressure when the weight 26 is in the weight-receiving means since this is generally the place where the lateral pull is actually exerted on the toy. Also, it is preferable

that such place of connection or place where the pull is applied be located a substantial distance forwardly of the said centers of pressure and to this end, it is desirable that all of the open upper end of the weight-receiving means be located forwardly of the said centers of pressure. It is also pointed out that when the toy or element 104 is submersed in water and maintained in a horizontal position solely by the buoyancy of the water and the effect of the weight 26 on the toy in the position in which toy or element 10 is shown in FIGURE 2, and the string or cord 28 is taut and is held as shown in that figure with the upper end thereof positioned directly above the lower end, the string or cord throughout its entire length extends parallel to the vertical axis of toy 104 and is in its entirety located forwardly of the said centers of pressure.

It is indicated above that elements such as the element 10, submarine 42, and various other modifications of the element 10 may be constructed of any desired material, wood being given as an example. By way of further illustration, it is pointed out that these elements may also be formed of plastic and even of materials that have a specific gravity greater than water if an air chamber is provided therein to give the desired buoyancy. A cord such as cords 28 and 36 are particularly convenient means upon which to support weights such as the weights 26 and 34 but the invention is not intended to be limited to the use of cords for this purpose, it being within the scope of the invention to employ other types of supporting means as desired.

Referring particularly to FIGURE 8 of the drawings, it is pointed out that the plate 70 may be formed of any material which is attracted to a magnet such as the magnet 72. Furthermore, the positions may be reversed and a magnet may be secured on or embedded in the deck of the submarine 68 in place of the plate 70, there being available on the market small relatively light magnets which would still permit the submarine 68 to have the desired buoyancy even when carrying such magnet. Then, in place of the magnet 72, a piece of iron or other material attracted to a magnet and having the desired weight could be employed by securing it to the string or cord 74.

A wide variety of means of locating weights such as 26 and 34 in respect to elements such as the element 10 has been shown and described, but it is to be understood that the invention is not limited to the various means shown but includes within its scope other means of locating the weight on an element 10 in accordance with the principles described so that it may be manipulated up and down and around in a body of water. The depth charge devices as shown in FIGURES 5 and 7 are likewise merely illustrative and may be varied widely within the scope of the invention.

Many of the advantages of the invention will be apparent from the foregoing description. A novel submersible toy has been provided which may be manipulated under water manually both upwardly and downwardly and around as desired. At the same time, the control means is readily separable from the submersible toy to add to the variety of maneuvers which may be performed with the submersible toy.

It is apparent that many widely different embodiments of this invention may be made without departing from the spirit and scope thereof and therefore it is not intended to be limited except as indicated in the appended claims.

I claim:

1. A submersible toy which comprises an elongated body having a specific gravity less than that of water and shaped to facilitate its movement through water in a path extending in a predetermined direction generally axially of said body, the center of buoyancy of said body in water being located forwardly of the center of gravity of said body in said predetermined direction, means including a weight and means for supporting the same



manually, and means on said body having an open upper end for receiving said weight and located on a portion of said body designed to remain uppermost, said open upper end being located forwardly of the centers of horizontal pressure of the water on the sides of said body and forwardly of the said center of buoyancy of said body in a relation causing said body to move forwardly with said weight and supporting means, and said weight having a value sufficient to submerge said body completely and to tilt the axis of said body downwardly in water when the weight is so received on said body.

2. A submersible toy which comprises an elongated body having a specific gravity less than that of water and shaped to facilitate its movement through water in a path extending in a predetermined direction generally axially of said body, the center of buoyancy of said body in water being located forwardly of the center of gravity of said body in said predetermined direction, means including a weight and means for supporting the same manually, and means on said body having an open upper end for receiving said weight and located on a portion of said body designed to remain uppermost, all of said weight receiving means being located forwardly of the centers of horizontal pressure of the water on the sides of said body and forwardly of the said center of buoyancy of said body in a relation causing said body to move forwardly with said weight and supporting means, and said weight having a value sufficient to submerge said body completely and to tilt the axis of said body downwardly in water when the weight is so received on said body.

3. A submersible toy which comprises an elongated body having a specific gravity less than that of water and shaped to facilitate its movement through water in a path extending in a predetermined direction generally axially of said body, the center of buoyancy of said body in water being located forwardly of the center of gravity of said body in said predetermined direction, means including a weight and means for supporting the same manually, and means on said body having an open upper end for receiving said weight and located on a portion of said body designed to remain uppermost, said weight supporting means throughout its entire length extending parallel to the vertical axis of said body forwardly of the centers of horizontal pressure of the water on the sides of said body when said means is taut, said body is submersed in water and maintained in a horizontal position solely by the buoyancy of the water and the effect of the weight on the body, said weight is in said weight-receiving means and the upper end of said weight supporting means is positioned directly above the lower end thereof, and the said weight at the same time being located forwardly of the said center of buoyancy of said body in a relation causing said body to move forwardly with said weight and supporting means and said weight having a value sufficient to submerge said body completely and to tilt the axis of said body downwardly in water when the weight is so received on said body.

4. A submersible toy which comprises an elongated body having a specific gravity less than that of water and shaped to facilitate its movement through water in a path extending in a predetermined direction generally axially of said body, the center of buoyancy of said body in water being located forwardly of the center of gravity of said body in said predetermined direction, means including a weight and means for supporting the same manually, and means on said body having an open upper end for receiving said weight and located on a portion of said body designed to remain uppermost, said open upper end being located so that its midpoint longitudinally is forward of the centroid of the maximum vertical longitudinal cross-sectional area of said body and so that the portion of said area forwardly of the said midpoint is less than the corresponding area to the rear thereof and said open upper end at the same time being located forwardly of the said

center of buoyancy of said body in a relation causing said body to move forwardly with said weight and supporting means, and said weight having a value sufficient to submerge said body completely and to tilt the axis of said body downwardly in water when the weight is so received on said body.

5. A submersible toy which comprises an elongated body having a specific gravity less than that of water and shaped to facilitate its movement through water in a path extending in a predetermined direction generally axially of said body, the center of buoyancy of said body in water being located forwardly of the center of gravity of said body in said predetermined direction, means including a weight and means for supporting the same manually, and means on said body having an open upper end for receiving said weight and located on a portion of said body designed to remain uppermost, all of said weight-receiving means being located so that it is forward of the centroid of the maximum vertical longitudinal cross-sectional area of said body and so that the portion of said area forwardly of said weight-receiving means is less than the corresponding area to the rear thereof and said weight at the same time being located forwardly of the said center of buoyancy of said body in a relation causing said body to move forwardly with said weight and supporting means, and said weight having a value sufficient to submerge said body completely and to tilt the axis of said body downwardly in water when the weight is so received on said body.

6. A submersible toy which comprises an elongated body having a specific gravity less than that of water and shaped to facilitate its movement through water in a path extending in a predetermined direction generally axially of said body, the center of buoyancy of said body in water being located forwardly of the center of gravity of said body in said predetermined direction, means including a weight and means for supporting the same manually, and means on said body having an open upper end for receiving said weight and located on a portion of said body designed to remain uppermost, said weight-supporting means throughout its entire length extending parallel to the vertical axis of said body in a location such that it is forward of the centroid of the maximum vertical longitudinal cross-sectional area of said body and so that the portion of said area forwardly of said weight-supporting means is less than the corresponding area to the rear thereof when said means is taut, said body is submersed in water and maintained in a horizontal position solely by the buoyancy of the water and the effect of the weight on the body, said weight is in said weight-receiving means and the upper end of said weight-supporting means is positioned directly above the lower end thereof, and the said weight at the same time being located forwardly of the said center of buoyancy of said body in a relation causing said body to move forwardly with said weight and supporting means, and said weight having a value sufficient to submerge said body completely and to tilt the axis of said body downwardly in water when the weight is so received on said body.

#### References Cited by the Examiner

##### UNITED STATES PATENTS

1,736,270	11/1929	Mackintosh	46—94
2,168,767	8/1939	Ellsworth	46—94
2,708,810	5/1955	Canto et al.	46—94
2,909,868	10/1959	Lewis	46—241
3,147,567	9/1964	Fors	46—242

##### OTHER REFERENCES

Hausman: "Physics," published 1941, pp. 193, and 194.

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