

March 10, 1970

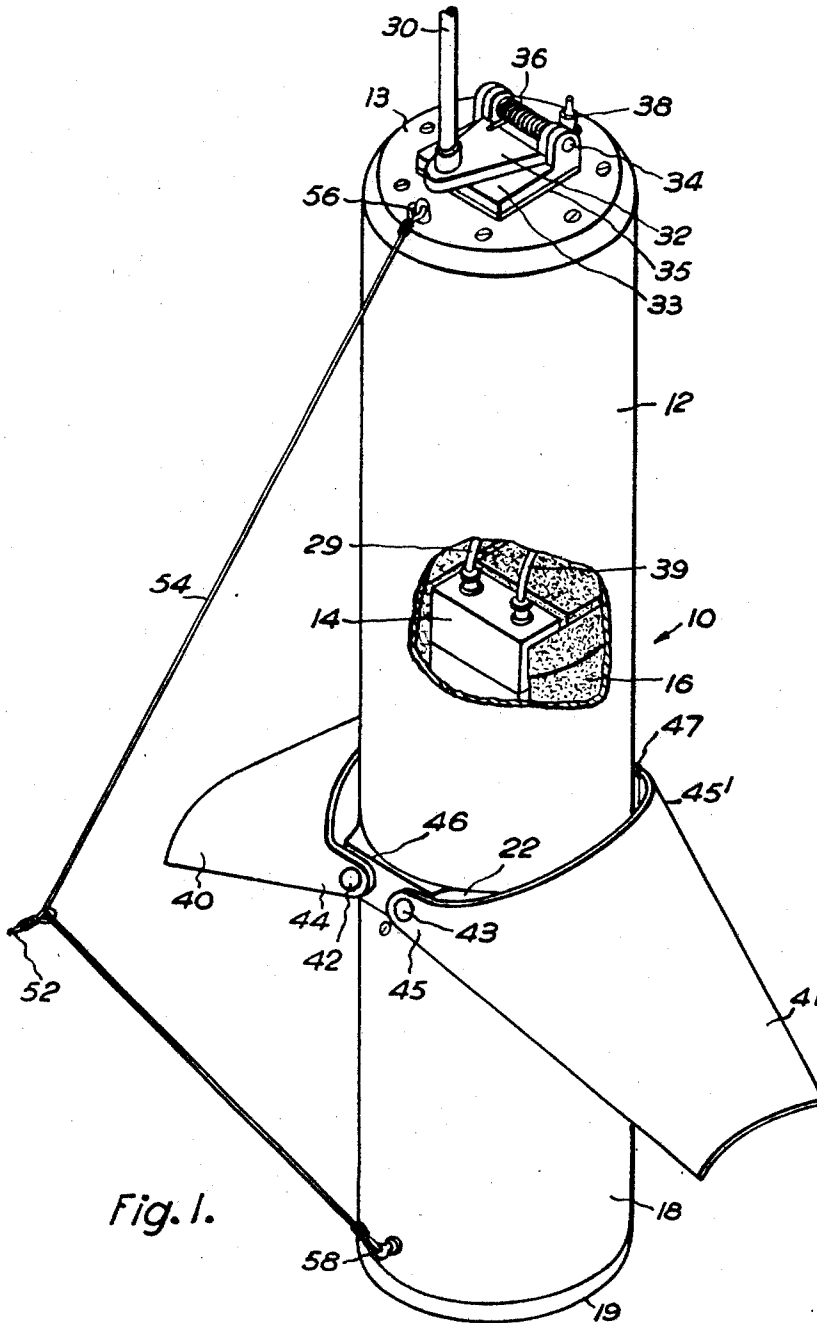
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3,500,209

STABILIZED RADIO RESCUE BEACON

Filed Nov. 24, 1965

4 Sheets-Sheet 1



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4 Sheets-Sheet 2

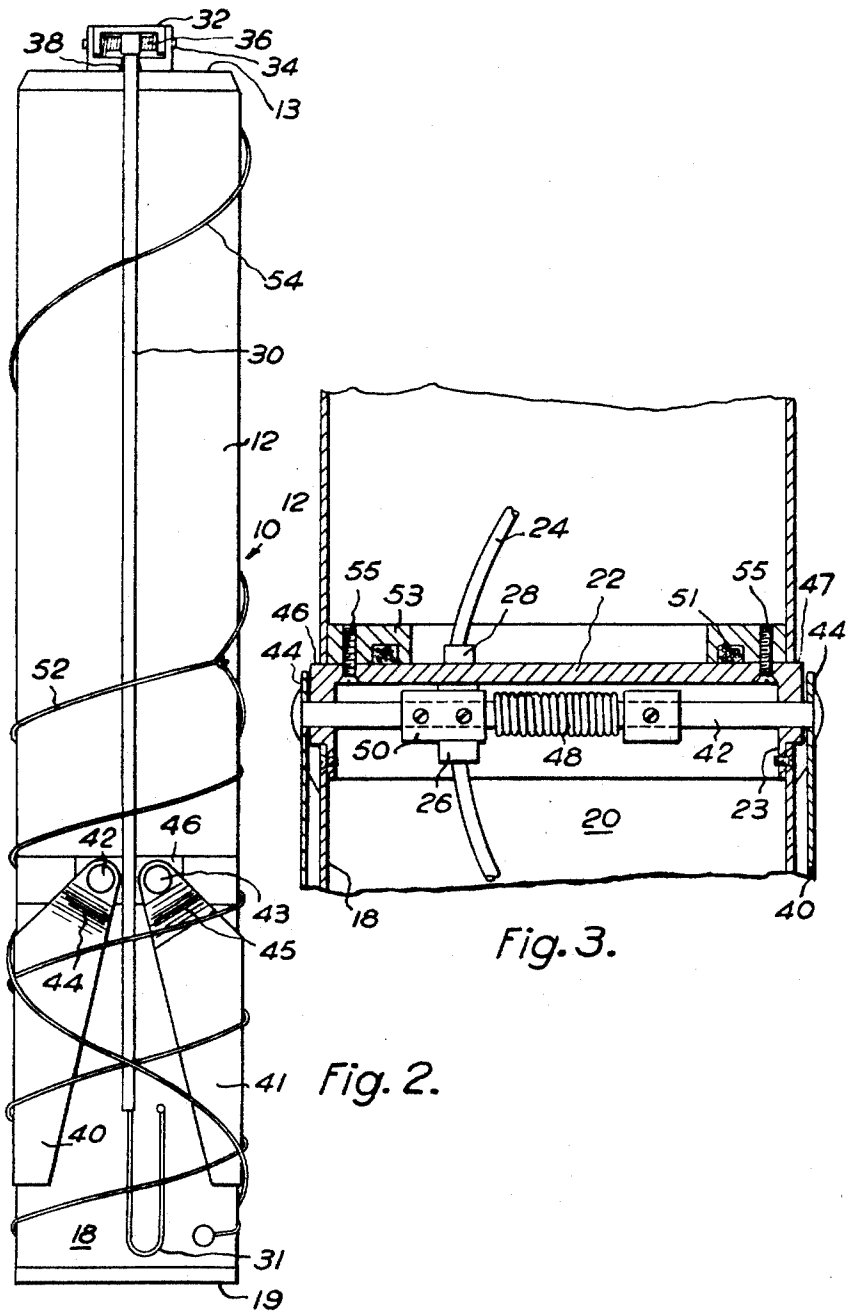


Fig. 3.

Fig. 2.

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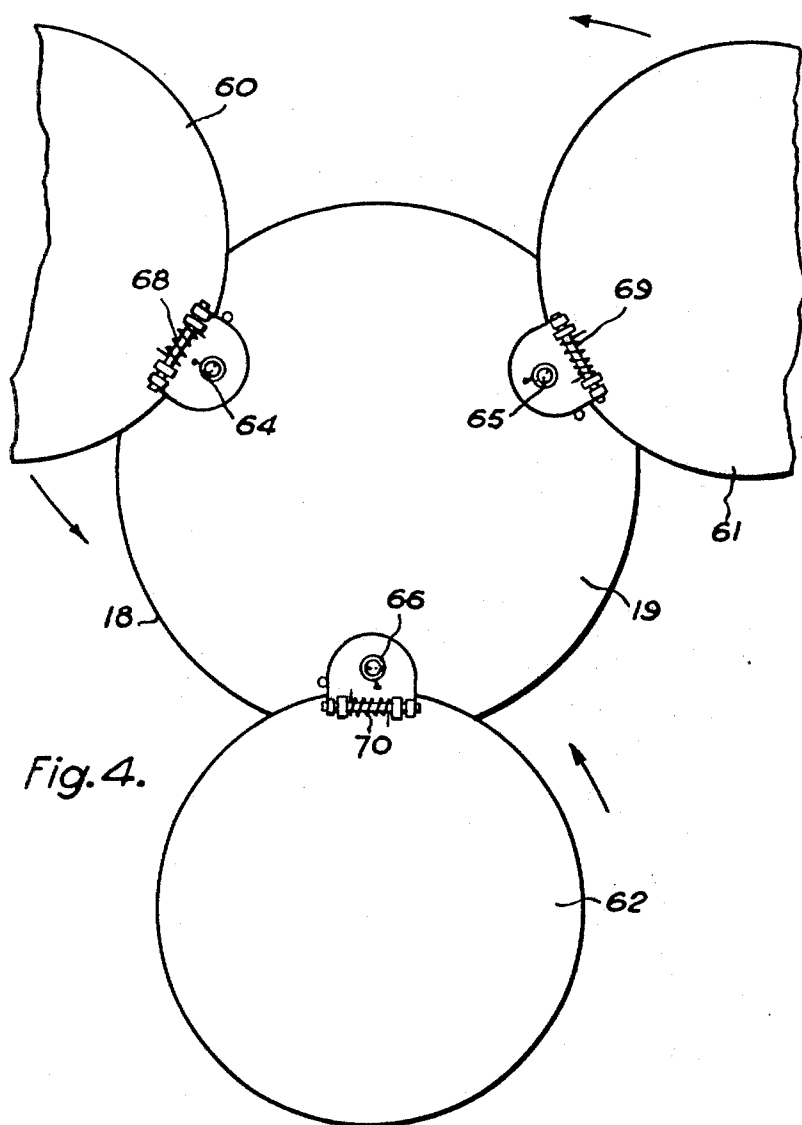
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STABILIZED RADIO RESCUE BEACON

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4 Sheets-Sheet 3



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4 Sheets-Sheet 4

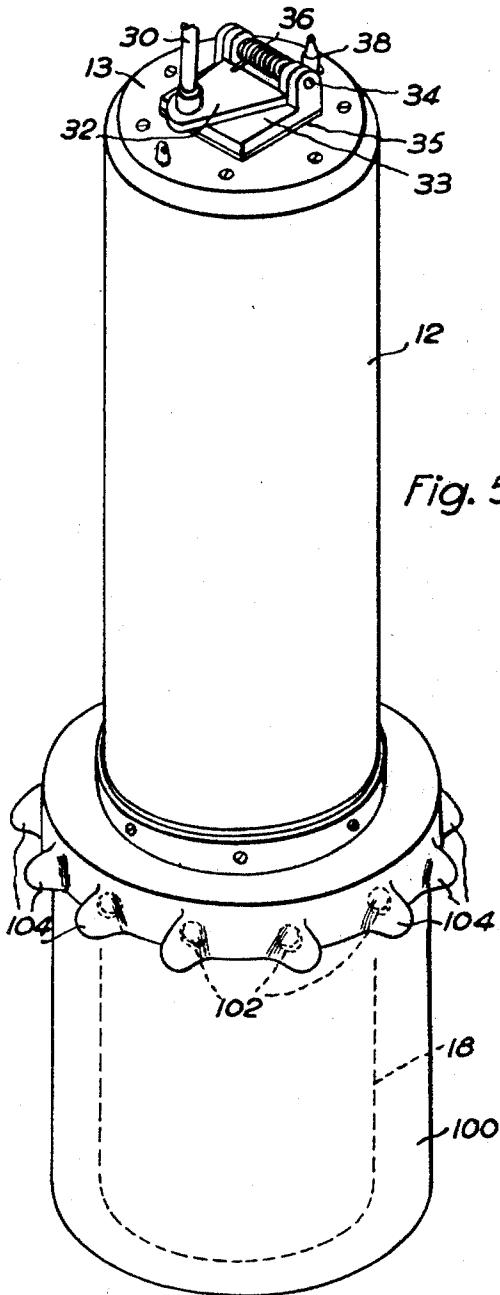


Fig. 5.

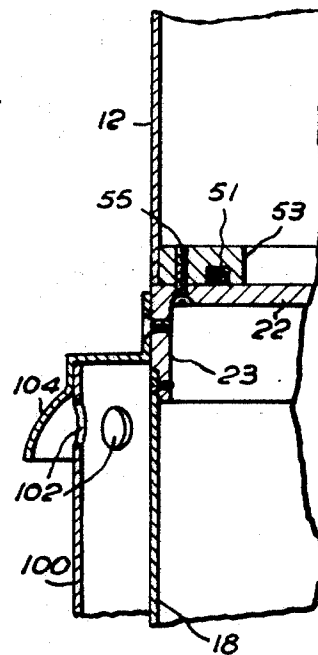


Fig. 6.

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STABILIZED RADIO RESCUE BEACON
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48,440/64

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U.S. Cl. 325—116

6 Claims

ABSTRACT OF THE DISCLOSURE

A buoyant radio rescue beacon having a battery with a transmitter powered thereby, with the transmitter and battery housed in an elongated buoy, forming a part of the beacon and a substantially rigid antenna mounted to project from the buoy. The body of the buoy is provided with stabilizing means comprising at least two paddles which are adapted to swing outwardly from the body of the buoy to full open position when the buoy falls in the water.

The invention relates to buoyant radio rescue beacons and is concerned with the aerials and with the stabilisation of such beacons against the tendency of wind and sea to swing a projecting whip aerial to such an extent as to interfere with the efficiency of radiation.

It has been observed that the curved spring leaf aerials which have been used in rescue beacons have a tendency to fold and collapse in high winds and that the conventional end-weighted cylindrical buoys in which beacons are usually housed are not at all stable in high winds and seas.

In a beacon in accordance with the invention the conventional spring leaf aerial is replaced by a substantially rigid aerial pivotally mounted on the beacon buoy, preferably at or near what will in use be the uppermost part of the outer surface of the buoy, to lie alongside the buoy in a stowed position when the beacon is not in use and spring-loaded to project upwards from the buoy when released, as by the action of water on some water soluble fastening.

If the length of aerial required is such that a wholly rigid aerial would project beyond the buoy in its stowed position the outer length may be made of flexible material and folded.

The need for stabilisation of the buoy is preferably met in a beacon in accordance with the invention by the provision of paddles pivotally mounted on the buoy to swing about an axis which will be generally horizontal when the buoy is floating normally, and which can swing towards a closed position alongside the buoy as it rises through the water and to a fully open position projecting from the buoy as it falls. An alternative stabilizer is described below.

Preferably the paddles are urged by springs towards the open position. They can conveniently be held in the closed, stowed position by the same fastening which is used to hold down the aerial.

In order that the invention may be more thoroughly understood three radio rescue beacons in accordance with it will be described in some detail, by way of example, with reference to the accompanying drawings, in which:

FIGURE 1 is an isometric view of one beacon with part broken away;

FIGURE 2 is an elevation of the same, showing the aerial in the stowed position;

FIGURE 3 is a detail cross-section showing the mounting of the paddles;

FIGURE 4 is a view from the lower end of a second

beacon with circular stabilizing paddles on the lower end closure;

FIGURE 5 is an isometric view of a third beacon stabilized by an outer casing around the battery compartment; and

FIGURE 6 is a detail cross-section of the same.

The battery and the electronic components of the beacon shown in FIGURES 1 to 3 are enclosed in a cylindrical buoy 10. The buoy 10 is made in two parts. The upper part 12, comprising some two thirds of the length, houses the electronic components of a transistor transmitter-receiver, part visible at 14. The remaining space is packed with expanded polystyrene, seen at 16, to maintain buoyancy even in the event of damage to the outer skin of the cylinder. The lower part 18 of the buoy 12 forms a compartment 20 to house the battery (not shown), and so that a sea water-activated battery may be used if required the two parts are isolated from one another by a metal sealing plate 22, the leads 24 from the battery passing through glands 26, 28, in this plate.

The effect of the weight of the battery in the lower compartment 20 is to ballast the buoy 10, when it is afloat toward an upright position.

The aerial 30 is mounted on the upper end plate 13 of the cylindrical buoy 10 to swing out from a stowed position alongside the buoy to an operating position in which it projects from the upper end face of the buoy and is nearly coaxial with the buoy. For this purpose the aerial is mounted on a metal base plate 32 pivotally mounted about a shaft 34 parallel to the end surface of the buoy and is urged toward the operating position (FIGURE 1) by a helical spring 36 secured to the shaft. The shaft 34 is carried between two lugs on a plate 33 secured to a slab 35 of insulating material such as polytetrafluorethylene. The slab is in turn secured to the end plate 13.

The slab 35 serves to insulate the plate 33 electrically from the body of the beacon buoy 10. A connector pin (not shown) projects from the plate 33 through registering openings in the slab 35 and the end plate 13 to receive a connection from the coaxial cable 29 from the beacon output. The opening in the end plate 13 is sealed with an O-ring.

In the stowed position of the aerial (FIGURE 2) its base plate 32 appears against plunger 38 which opens a switch (not shown) in the power supply by way of the lead 39.

The aerial itself is in the form of a metal tube about a quarter of an inch in diameter and suitably plated to resist corrosion. The particular beacon described is housed in a buoy some twenty four inches long and for the required operating frequencies the aerial has to be about thirty inches long. So that it need not project beyond the buoy in the stowed position the last six inches or so (31) are of resilient wire and can be folded alongside the buoy.

The buoy 10 is stabilised by a pair of sheet metal paddles 40, 41 mounted diametrically opposite to one another at the level of the sealing plate 22 between the two parts at the inner end of the battery compartment 20.

The paddles are each about five inches long and they are curved about a longitudinal axis to the same curvature as that of the cylindrical buoy, in this particular example to a radius of some two and a quarter inches, tapering from an overall width of four and a half inches from a semicircular root to some three inches at the tip.

The paddles are each mounted on the sealing plate between the two parts of the buoy to swing about a transverse shaft 42 or 43 running across the root, more or less on the diameter of the semicircle, between two tabs 44, 44' or 45, 45' formed at the root of paddle. The paddles are mounted to swing upwards and out from a stowed

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position close alongside the buoy until in the fully extended position the roots abut the wall of the buoy with the paddles projecting at an angle of about 45 to 50 degrees to the axis of the buoy.

The sealing plate 22 has a downwardly extending annular flange 23 and this carries a diametrically opposed pair of plane edged projections 46, 47 which project from the buoy to provide bearing surfaces for the paddles. The shafts 42, 43 are received through opposed pairs of holes passing through the projections 46, 47 and the flange 23 on the sealing plate 22 form the bearing surfaces and a helical spring, one of which is shown at 48, is secured to a collar 50 on each shaft and is wound up to urge the paddle to the extended position.

These paddles have been found to display a very marked stabilizing effect upon the buoy. As the buoy rises on the crest of a wave they fold down towards the retracted position and offer little resistance, and as it starts to fall in a trough they open out again to resist the fall. The buoy as it were climbs out of the water. They also substantially reduce the tendency of the buoy to roll from side to side.

More than two paddles can be used with improved stabilisation at the expense of design complication.

The sealing plate 22 which forms the upper end wall of the battery compartment 20 engages an O ring seal 51 fitted in an annular groove in an lower end plate 53 of the upper part 12 of the buoy. The two parts of the buoy are secured together by six screws, two of which appear at 55, disposed outside the O ring seal. The screws 55 can be manipulated from the lower end of the battery compartment 20 before the battery is inserted and the lower end closure 19 secured in place.

The buoy is fitted with a towing cord 52 and this cord is used to hold both aerial and paddles in the stowed position when the beacon is not in use. The cord is coiled around the buoy, as shown in FIGURE 2, and held in place by a water-soluble fastening (not shown). Upon immersion the cord 52 is released to unwind from around the buoy thus in turn releasing first the aerial 30 and then the two paddles 40, 41. The cord is secured to the buoy by a bridle 54 between a top ring 56 and a ring 58 on the battery compartment 18 for stability when being towed through the water.

It would be an advantage if more paddles could be provided around the periphery of the floating beacon, since this would improve the stability, particularly as regards the rocking movement about the point of buoyancy. An example of a three-bladed stabilizer is illustrated in FIGURE 4. In this example the paddle blades 60, 61 and 62 are of circular form and are mounted at the bottom of the battery compartment 18, on the bottom closure 19. In the closed position the circular blades lie within the circumference of the buoy, but on activation they are swung out in the plane of the bottom closure by coil springs (not shown) around the shafts 64, 65, and 66 by which each blade is mounted to pivot about a point close to its circumference.

The blades 60, 61 and 62 are not only spring loaded so as to rotate about their pivot points to provide a clover leaf pattern, but also, by coil springs 68, 69 and 70 to open and close as the beacon falls into the troughs and rises onto the crests of the waves.

An alternative manner of stabilisation, illustrated in FIGURES 5 and 6, is to fit an outer casing 100 around the battery compartment 18, the annular space thus formed being open at its outer and lower end and closed at its inner and upper end except for a number of discrete openings 102 ducted down toward the lower end by deflector cowls 104. Air trapped in the annulus and downwardly ejected sea water from the cowls 104 has a similar stabilising effect to that of paddles.

If the length of the cord 52 is too great for it to be convenient to coil the cord around the buoy, as shown

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in FIGURE 2, a convenient alternative arrangement is to fit a reel, coaxially on the body of the beacon. For example, it has been found particularly convenient to deepen the lower end plate 53 and to reduce the diameter of the lower end of the upper part 12 of the buoy and to fit the reel within the recess thus formed. The reel will have its outer circumference flush with the surface of the buoy and the cord is guided through an eye carried on the sealing plate 22. It is also possible to fit the reel at the lower end of the buoy in a generally similar fashion. The reel can be made removeable so that the cord is payed out as the buoy floats away or the reel can be fixed to the buoy so that the cord is payed out from the buoy.

If the cord is not wound around the paddles 40, 41 of the beacon shown in FIGURES 1-3, some other water soluble fastening must be used. For example, the paddles can be formed with complementary pair of tabs which form the two halves of a spoon when the paddles are folded and the spoon filled with water soluble binding material.

We claim:

1. A buoyant radio rescue beacon, comprising: a battery; a beacon transmitter powered by said battery; an elongated beacon buoy housing said battery and transmitter, a substantially rigid antenna, said battery and said antenna being at opposite ends of said buoy and stabilizing means comprising at least two paddles pivotally mounted near the lower end on said buoy to swing about an axis transverse to said buoy, and so as to swing towards a closed position alongside the buoy as the same rises through water and to a fully open position projecting from the buoy as it falls.

2. A buoyant radio rescue beacon, comprising a battery; a beacon transmitter powered by said battery; an elongated beacon buoy, housing said battery and transmitter, a substantially rigid antenna, said battery and said antenna being at opposite ends of said buoy, and stabilizing means comprising at least two paddles pivotally mounted near the lower end on said buoy to swing about an axis transverse to said buoy, and so as to swing towards a closed position alongside the buoy as the same rises through water and to a fully open position projecting from the buoy as it falls, and said paddles being urged by springs towards said open position.

3. A buoyant radio rescue beacon, comprising a battery; a beacon transmitter powered by said battery; an elongated beacon buoy, housing said battery and transmitter, a substantially rigid antenna, said battery and said antenna being at opposite ends of said buoy, and stabilizing means comprising at least two paddles pivotally mounted near the lower end on said buoy to swing about an axis transverse to said buoy, and so as to swing towards a closed position alongside the buoy as the same rises through water and to a fully open position projecting from the buoy as it falls, said paddles being urged by springs towards the open position, and said paddles being mounted diametrically opposite to one another on the side of said buoy, each to swing about a transverse axis upwards and outwards from the stowed position close alongside the buoy to a fully extended position in which said paddles project at an angle to the axis of the buoy.

4. A beacon in accordance with claim 3, wherein said buoy is cylindrical and paddles are curved about their longitudinal axes to substantially the same curvature as that of the cylindrical buoy.

5. A beacon in accordance with claim 3, wherein said paddles are mounted on the inner end of the part of said buoy wherein is housed said battery.

6. A beacon in accordance with claim 2, wherein said paddle blades are mounted at the outer end of the part of said buoy wherein is housed said battery, said blades being mounted to swing out from said stowed position in which they lie substantially within the circumference of

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the buoy and spring-loaded to open and close as the
beacon falls into wave troughs and rises onto wave crests.

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10 9—8; 325—119; 340—2; 343—709