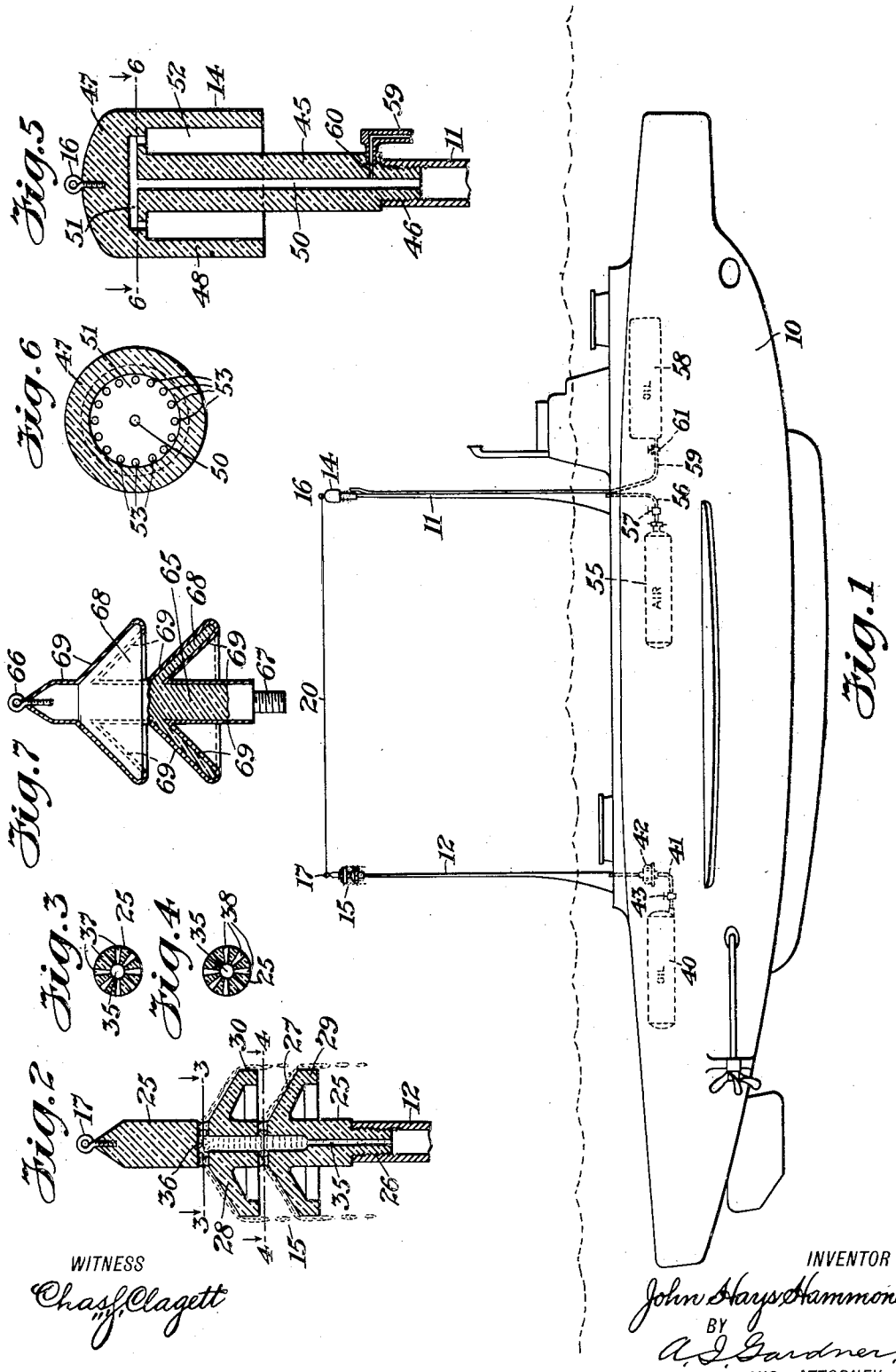
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ELECTRICAL INSULATOR AND METHOD OF ELECTRICAL INSULATION

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WITNESS

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ELECTRICAL INSULATOR AND METHOD OF ELECTRICAL INSULATION.

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To all whom it may concern:

Be it known that I, JOHN HAYS HAMMOND, Jr., a citizen of the United States, and a resident of Gloucester, county of Essex, State of Massachusetts, have invented certain new and useful Improvements in Electrical Insulators and in Methods of Electrical Insulation, of which the following is a specification.

Some of the objects of this invention are to provide an improved insulator particularly adapted to be used for insulating an antenna upon a submarine vessel, and which will not be rendered ineffective by the action of water in the form of spray or rain or in the form of a film of water with which an insulator upon a submarine vessel would ordinarily be coated as a result of its having been submerged; to provide an improved method of electrical insulation particularly adapted for use in connection with the insulation of an antenna upon a submarine vessel and whereby an antenna may be maintained in insulated condition when elevated at a suitable distance above the surface of the body of water in which the submarine vessel may be traveling; and to provide other improvements as will appear hereinafter.

In the accompanying drawings Fig. 1 is a side elevation of a submarine vessel provided with insulating means constructed in accordance with this invention and operated in accordance with the methods of this invention; Fig. 2 is an enlarged longitudinal central section of one form of insulator constructed in accordance with this invention; Fig. 3 a transverse section on line 3—3 of Fig. 2; Fig. 4 a transverse section on line 4—4 of Fig. 2; Fig. 5 an enlarged longitudinal central section of a modified form of insulator constructed in accordance with this invention; Fig. 6 a transverse section on line 6—6 of Fig. 5; and Fig. 7 a side elevation partly in longitudinal central section of another modified form of this invention.

In the drawings this invention is shown as applied to a submarine vessel 10 which is provided with two vertical hollow rigid masts 11 and 12, preferably made of mild steel, rigidly secured thereto and projecting upwardly therefrom. Threaded into the upper ends of these two masts 11 and 12 respectively are two insulators 14 and 15, into the upper ends of which respectively are threaded eyes 16 and 17, to which is terminally secured a normally substantially horizontal antenna 20 adapted to respond to electro-radiant energy. This antenna 20 may be connected in any well known or suitable manner to any well known or suitable receiving apparatus (not shown) for receiving radiant energy. In the form of this invention shown in Figs. 2, 3 and 4, and at 15 in Fig. 1, the improved insulator constructed in accordance with this invention comprises an elongated substantially vertical, substantially cylindrical body portion 25, made of porcelain or glass or any other well known or suitable insulating material. The lower end of this body portion 25 is reduced in diameter and externally threaded as at 26 so that it may be threaded into the upper end of a hollow mast, for instance as shown in Fig. 1, where it is securely threaded into the upper end of the hollow mast 12.

Coaxial and integral with the body portion 25 are two vertically spaced, downwardly flaring, substantially conical flanges 27 and 28, which are provided respectively with downwardly depending, substantially cylindrical rims 29 and 30, which are coaxial therewith.

For conveying oil or other fluid-insulating means, a substantially cylindrical passageway 35 extends longitudinally and coaxially of the hollow body portion 25, from the lower end thereof upwardly to a point 36 slightly above the upper flange 28, and communicates at its upper end with a plurality of transversely extending radial outwardly flaring apertures 37, extending through the body portion 25 and opening just above the upper surface of the upper flange 28. The longitudinal passageway 35 also communicates at a point slightly above the lower conical flange 27 with a plurality of transverse radial outwardly flaring apertures 38 extending through the body portion 25 of the insulator and opening just above the upper surface of the lower conical flange 27. The upper portion of the longitudinal passageway 35 is preferably enlarged as shown in Fig. 2 to provide a uniform flow through the transverse apertures 37 and 38. For supplying the longitudinal passageway 35 with a uniform flow of oil, or other electrically insulating liquid which

has the property of displacing or shedding any water which might otherwise gather upon and remain upon the insulator, a tank 40 or other suitable source of supply of oil is arranged in the submarine vessel 10 and is connected to one end of a pipe 41 which extends from the tank 40 upwardly through the mast 12, and which communicates through the mast 12 with the longitudinal passageway 35 through the insulator. The oil may be forced from the tank 40 upwardly through the pipe 41 and slowly through the passageway 35 of the insulator by means of compressed air in the tank 40, or by means of any suitable pump 42, the pipe 41 being preferably controlled by a globe valve 43, or other suitable adjustable valve whereby the flow of oil upwardly through the insulator may be regulated.

In the operation of the form of insulator shown at 15 in Fig. 1 and enlarged in Figs. 2, 3 and 4, a constant but small supply of oil is forced upwardly through the pipe 41 and mast 12, and through the longitudinal passageway 35 of the insulator, from which it spreads out through the radial apertures 37 and 38 and covers and flows downwardly over the conical flanges 28 and 27 and drips over the marginal rims 30 and 29. This movement of the oil over the flanges 27 and 28 clears the surfaces of these flanges of any water which may have settled thereon before the initiation of the flow of oil, and also maintains an insulating film of oil over the entire upper surfaces of the flanges 27 and 28 and the outer cylindrical surfaces of the rims 29 and 30 and prevents the insulator from being rendered ineffective by the action of any spray thrown up by the submarine vessel as it passes through the water, or by the action of rain.

In the modified form of this invention shown in Figs. 5 and 6, and also at 14 in Fig. 1, the improved insulator constructed in accordance with this invention comprises an elongated, substantially vertical, substantially cylindrical body portion 45 which is made of porcelain or glass, or any other suitable insulating material, and which is reduced in diameter at its lower end and threaded as at 46 to permit it to be threaded into the upper end of a hollow mast 11 as shown in Fig. 1.

Integral with the upper end of the cylindrical body portion 45 is an enlarged head 47 which is substantially cylindrical in transverse section and which is provided with a cylindrical flange or rim 48 integral therewith and depending downwardly therefrom and which is coaxial with the body portion 45. For supplying compressed air or other compressed fluid and insulating oil or liquid to the insulator, the body portion 45 is provided with a passageway 50, extending longitudinally and axially thereof from the lower end of the body portion to a point within the head 47 where it communicates with a shallow, substantially cylindrical recess or chamber 51 provided therefor in the head, and which is of a diameter slightly greater than the external diameter of the body portion 45 and which communicates with the annular, downwardly opening recess 52, between the flange 48 and the body portion 45, through a series of vertical apertures 53 provided therefor in the head 47 and equi-spaced in a circle the center of which is contained in the longitudinal axis of the body portion 45.

For supplying the passageway 50 with compressed air or other compressed fluid, a tank 55 or other source of compressed air or fluid is arranged within the submarine vessel 10 and is connected to one end of a pipe 56 which extends upwardly through the mast 11 and which communicates through the mast 11 with the lower end of the passageway 50, the pipe 56 being preferably controlled by a globe valve 57, or other suitable valve, whereby the passage of air through the pipe 56 may be regulated.

For supplying the insulator 14 with oil or other liquid insulating means, a tank 58 or other suitable source of supply of oil or other liquid insulating means is arranged within the submarine vessel 10 and is connected to one end of a pipe 59 which extends upwardly either through or outside of the mast 11, and which communicates at its upper end with the upper end of a radial passage 60 which is provided therefor in the body portion 45 of the insulator, and through which the upper end of the pipe 59 communicates with the longitudinal passageway 50. The pipe 59 is preferably controlled by a globe valve 61 or other suitable valve, whereby the flow of oil through the pipe 59 may be regulated. The oil may be forced from the tank 58 through the pipe 59 in a well known manner by compressed air in the upper portion of the tank 58, or by a suitable pump as shown at 42.

In the operation of the form of this invention shown in Figs. 5 and 6, and at 14 in Fig. 1, a constant supply of air is permitted to flow from the tank 55 through the pipe 56 and upwardly through the longitudinal passage 50, and a constant flow of oil from the tank 58 is forced upwardly through the pipe 59 and through the radial passage 60 where it emerges into and is taken up by the current of air flowing upwardly through the longitudinal passageway 50. The mixture of air and fine globules of oil is thus forced upwardly through the longitudinal passageway 50 and into the cylindrical chamber 51, from which it is delivered downwardly through the apertures 53 and is expanded into the annular downwardly opening recess 52, where

the oil is forced against and completely covers the inner cylindrical surface of the flange 48 and is also forced against and completely covers the exterior cylindrical surface of the body portion 45, thus displacing any water which may have gathered upon these surfaces, and maintaining these surfaces in a constant state of insulation, thus keeping the corresponding end of the antenna 20 in a constant condition of insulation.

In the modified form of this invention shown in Fig. 7, the insulator comprises a substantially cylindrical body portion 65, which is arranged substantially vertically when in operation and which is provided at its upper end with an eye 66 or other suitable means secured thereto for the attachment of an antenna or conductor. The lower end of the body portion 65 is reduced in diameter and threaded as at 67 for conveniently securing the insulator to the upper end of a mast. The body portion 65 is formed of porcelain or any other suitable electrical insulating material and integral and coaxial with the body portion 65 and flaring downwardly therefrom are a plurality of conical flanges 68 which are spaced longitudinally of the body portion, and which act to shed spray or rain and to protect the regions of the body portion 65 enclosed thereby from being rendered ineffective by the action of the spray or rain. As a further protection against the action of water or moisture, the surface of the body portion 65 and the inner and outer surfaces of the conical flanges 68 are entirely coated with and covered by thick layers 69 of grease or other insulating material which will shed water quickly and with a high degree of efficiency.

While in Fig. 1 the one mast 11 is shown provided with one form of insulator 14 and the other mast 12 is provided with a modified form of insulator 15, it is to be understood that both masts would in practice ordinarily be provided with the same form of insulator, which might be any one of the three forms described herein or which might be of any other suitable form made in accordance with this invention.

Although only a few of the forms in which this invention may be embodied have been shown herein, it is to be understood that the invention is not limited to any specific construction but might be embodied in various forms without departing from the spirit of the invention or the scope of the appended claims.

Having thus fully described the invention, I claim:

1. The combination with an insulator, of means for causing a mixture of compressed air and an insulating liquid to be delivered over a surface of said insulator.

2. The combination with an insulator, of means for causing a mixture of compressed fluid and an insulating liquid to be continually delivered over a portion of said insulator.

3. In a system of insulation the combination with an insulating device, of a source of insulating liquid and a source of fluid under pressure operatively connected to said device, said system being provided with two passage ways communicating with said sources respectively and arranged to cause a mixture of said insulating liquid and said fluid under pressure to be delivered over the surface of said insulating device.

4. In a system of insulation the combination with an insulating device, of a source of insulating liquid and a source of gas under pressure operatively connected to said device, said system being provided with two passage ways communicating with said sources respectively and arranged to cause a mixture of said insulating liquid and said gas under pressure to be delivered over the surface of said insulating device.

Signed at Gloucester, in the county of Essex and State of Massachusetts, this 24th day of July, A. D. 1916.

JOHN HAYS HAMMOND, Jr.

Witnesses:

LESLIE BUSWELL,

WILLIAM E. KERR.