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COURSE AND DISTANCE INDICATOR

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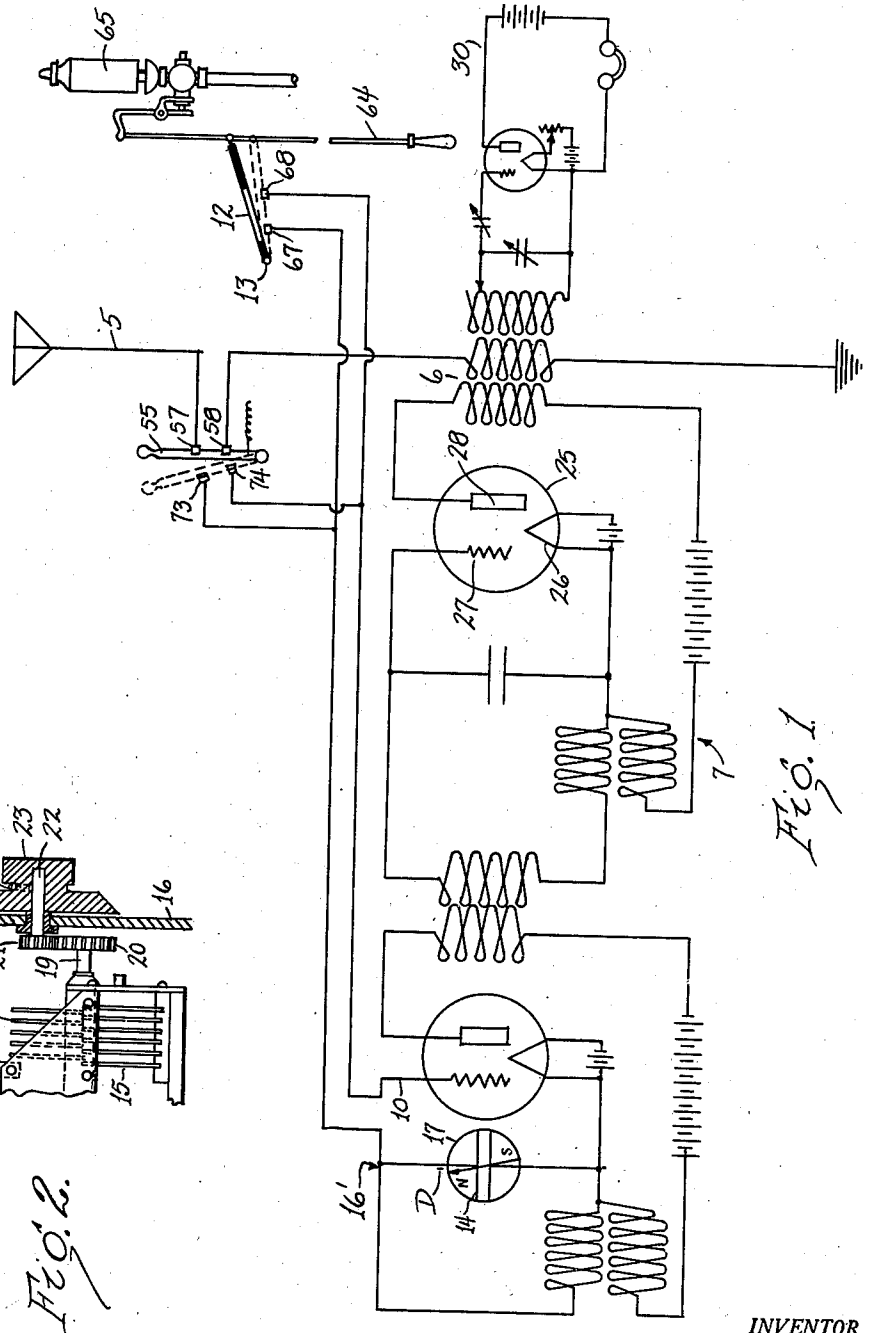

FIG. 1.

FIG. 2.

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COURSE AND DISTANCE INDICATOR

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7 Claims. (Cl. 177—352)

The invention relates to apparatus for indicating the course being steered by a vessel which has been obscured from view by fog or other causes.

The object of the invention is to provide a practical means for one vessel indicating to another nearby vessel the course that it is steering and, thereby obviating the possibility of collision.

A further object is to make known the distance between the two vessels and thus facilitate in steering.

With the foregoing object in view, together with such other objects and advantages as may subsequently appear, this invention resides in the construction and arrangement of parts hereinafter described and claimed, and illustrated in the accompanying drawing which has been set forth in the conventional symbols representing the various parts of the circuits embodied therein.

Figure 1 is a diagram of apparatus employed in my invention; and

Figure 2 is an enlarged detail of part of the apparatus employed.

For the safety of ships according to my invention, each ship is equipped with the apparatus hereinafter described, and also with a separate radio receiving set 30.

In accordance with the principles of my invention, a low-power continuous wave transmitter 7, of any suitable construction and including the vacuum tube 25 with the filament 26, the grid 27, and the plate 28, and their respective circuits well known in the art and the aerial 5 with the coupling 6, is employed to emit a carrier wave. By means of a suitable form of audio frequency modulator, indicated generally at 16', a musical note is impressed on the grid circuit of the high frequency oscillator 7, causing a wave of a frequency corresponding to the note, to be broadcast from the ship's aerial 5. The audio frequency modulator may be of any usual or preferred type other than that shown, and also may be of the same construction as the radio frequency oscillator 7.

The variation in the tone is accomplished by the manipulation of a variable condenser 14 (see Figure 1) or course indicator disposed in the modulator circuit, as shown fragmentarily in Figure 2, which comprises stator plates 15, rotor plates 18, mounted on a rotatable shaft 19. On the end of this shaft is mounted a gear wheel 20, which meshes with another gear 21, mounted on the end of a shaft 22, which passes through the panel 16 of the modulator casing and is fixed into a disc 23 by means of a set screw 24. The disc, has the conventional dial of a compass marked thereon, and in Figure 1, I indicate the dial by the circle 17 and the lubber line is indicated by the mark D.

The gear ratio between the wheels 20 and 21 is for the purpose of making possible one complete revolution of the compass dial 17 (Figure 1), while the rotor plates 18 (Figure 2) have described a half circle, which necessarily is the maximum movement attainable in the latter.

When the compass dial 17 is in position with respect to the lubber line D, as shown in Figure 1, or as it would be were the vessel steering due north, let it be assumed that a wave of a frequency corresponding to the key of C will be sounded upon actuating the modulator by either closing the switch 12, which is pivoted at 13, and actuated by pulling the whistle cord 64 downward, or by closing the switch 55 across the terminals 73 and 74, which would also actuate the modulator.

The tones increase in frequency as the condenser dial 17, is moved in a clockwise direction from "north" by the manipulation of the knob 23, and therefore a higher note is produced when the dial 17 indicates "north-northwest", and still a higher note when it indicates "West", etcetra, until it reaches a point just before again pointing "north", at which point further clockwise movement is arrested. Of course an actual tone is not broadcast, but a wave of a frequency corresponding to a certain tone is sent out by the apparatus.

In order to explain more clearly the operation of the apparatus of my invention, let it be assumed that the apparatus illustrated in Figure 1, which includes a radio receiving apparatus, both be placed on board two vessels which are in close proximity to one another, but which are obscured from view by fog. These two ships, for the sake of illustration, shall be designated as vessel A and vessel B.

The pilot on vessel A notes the course being steered by his vessel and adjusts the compass dial 17 to correspond with the reading of the ship's compass.

At that moment the whistle cord 64 operating the whistle 65 is pulled downward, closing the switch 12, which is pivoted at 13, so that it is placed in the position shown by the dotted lines, thus completing the circuit across the terminals 67—68, closing the grid circuit 10 of the modulator, and causing a wave frequency corresponding to the desired note to be broadcast from the ship's aerial 5, simultaneously with the blowing

of the ship's whistle. This note is heard by the pilot on vessel B, as well as by the pilot of vessel A, through their respective radio receiving sets.

The pilot on board vessel B, immediately upon receipt of this radio signal pulls the switch 55 on his set, back to the position shown by the dotted lines, This completes the grid circuit 10 by bridging the contacts 73 and 74, but, however, without blowing the whistle or broadcasting the radio signal.

He then manipulates the knob 23, until a note identical to that which he received by radio is heard through his own receiving set. The reading thus obtained on the dial 17, indicates the exact course being steered by vessel A.

The oscillations caused by this reproducing process are not sent out on the aerial from vessel B, since the switch 55, at that time being in the dotted line position, leaves the aerial circuit open between the contacts 57 and 58. However, they are heard by the pilot on vessel B, as his receiving set 30 is placed in inductive relation to the power tube circuit 7.

The interval of time between receipt of the radio signal, which is in effect instantaneous, and the sound of the whistle from vessel A, enables the pilot on vessel B to ascertain the approximate distance between his ship and vessel A, calculating on the basis of sound waves traveling at a velocity of about 1,080 feet per second. Thus, he is always in a position to know when the other vessel is dangerously close at hand.

While I have described one embodiment of my invention, modifications thereof may be readily devised without departing from the spirit of my invention, and it is to be understood that such modifications come within the scope of the appended claims.

I claim:

1. In combination, a dirigible craft having a radio transmitter including an oscillator and an aerial, and a modulator oscillator inductively coupled with the transmitter, said modulator having a variable condenser connected to the modulator in such a way that a variation of the condenser will vary the frequency of oscillations of the modulator, a course indicator operatively connected to the condenser to serve as a manipulating element for the same and a switch for closing the modulator oscillator circuit; a second dirigible craft having a second radio transmitter, including an oscillator, a second modulator oscillator inductively coupled therewith, a receiving set inductively coupled with the second transmitter, a broadcasting aerial for the second transmitter, a second switch for simultaneously opening the aerial circuit of the second transmitter and for closing the circuit of the second modulator oscillator, this being manually accomplished when a signal from the first transmitter is being received by the receiving set, said second modulator having a second variable condenser and a second course indicator operatively connected thereto, both of said modulators producing the same frequency when both course indicators are in corresponding positions, said second course indicator being manually operable for causing the second modulator and a transmitter to give off a signal corresponding to the one given off by the first transmitter, and received in the receiving set.

2. A signalling apparatus for two dirigible craft comprising on one of the craft an oscillator for producing a carrier wave and having an aerial associated therewith, a modulator oscillator including a variable tuning element for impressing characteristics on the carrier wave, and a switch for closing the modulator oscillator circuit, and on the other craft a receiving set, an oscillator identical to the first oscillator for producing a carrier wave, a modulator oscillator identical to the first modulator and a second switch for closing the second modulator oscillator circuit, said modulator having a variable tuning element allowing the operator to reproduce the same tone as that received, each tuning element having identical indicating means comprising a relatively movable scale and a pointer associated therewith, whereby the tuning element of the receiving station is brought into the same position as the tuning element of the sending station.

3. In combination, two dirigible crafts, each having identical transmitters including aerials, identical oscillating modulators inductively coupled to the transmitter and each having identical variable tuning elements functioning as course indicators, and identical receiving sets inductively coupled to the aerials and transmitters, whereby a carrier wave modulated at a tone frequency for indicating direction can be broadcast from the aerial of one craft upon closing the modulator circuit of the craft, and such carrier wave will be received by the receiving sets of both craft, and the variable tuning element of the modulator of the second craft can be manipulated to indicate the same direction as that indicated by the first craft when the second modulator circuit is closed and a similar signal to that received from the first craft is reproduced by the modulator on the second craft and is compared to the signal received through its own receiving set.

4. In combination, a sending and a receiving dirigible craft, each having a radio transmitter including an oscillator and a modulator oscillator, a receiving set, and an aerial inductively connected to the oscillator; a variable condenser in the modulator circuit for varying the oscillation frequency when the condenser is varied, both dirigible craft having a course indicator operatively connected to its respective variable condenser for causing both modulators to produce the same frequency when the two course indicators are in corresponding positions; both dirigible craft also having an audible signal; separate means on each craft for simultaneously sounding the signal and for closing the modulator switch for causing the latter to broadcast a wave frequency corresponding to the position of the course indicator; and a second switch for opening the aerial circuit and for closing the modulator circuit; whereby the sending craft can by actuating said means, simultaneously send out an audible signal and a radio signal, the radio signal being received by the receiving set of the receiving craft and giving the course of the sending craft, and the receiving craft can determine the course of the sending craft by closing its modulator circuit with the second switch, thus cutting out its aerial and by actuating its course indicator until a wave frequency corresponding to the broadcasted wave is produced; and the receiving craft can also determine the distance of the sending craft by noting the time elapsing between the receiving of the radio and the audible signals.

5. In combination, a dirigible craft having a radio transmitter including an oscillator and an aerial, and a modulator oscillator inductively coupled with the transmitter, said modu-

lator having a variable condenser connected to the modulator in such a way that a variation of the condenser will vary the frequency of oscillations of the modulator, a course indicator operatively connected to the condenser to serve as a manipulating element for the same, a switch for closing the modulator oscillator circuit, and a receiving set inductively coupled with the transmitter whereby frequencies emanating from a second similarly equipped dirigible craft may be received in the receiving set and similar frequencies produced in the transmitter by operation of the course indicator for causing the latter to correspond in position to the course indicator of the second dirigible craft.

6. A signalling apparatus for a dirigible draft comprising an oscillator for producing a carrier wave and having an aerial associated therewith, a modulator oscillator including a variable tuning element for impressing characteristics on the carrier wave, a switch for closing the modulator oscillator circuit and a receiving set, the tuning element allowing the operator to reproduce a tone equivalent to one received in the receiving set from a similarly equipped second dirigible craft and the tuning element having an indicating means comprising a relatively movable scale and a pointer associated therewith adapted to be brought into the same relative position as a similar tuning element on the second craft when the received tone is reproduced.

7. In combination, a dirigible craft having a radio transmitter including an oscillator and a modulator oscillator, a receiving set and an aerial inductively connected to the oscillator, a variable condenser in the modulator circuit for varying the oscillation frequency when the condenser is varied, a course indicator connected to the condenser, an audibile signal, means for simultaneously sounding the signal and for closing the modulator switch for broadcasting a wave frequency corresponding to the position of the course indicator, and a second switch for opening the aerial circuit and closing the modulator circuit whereby the operator after receiving a frequency, may disconnect the aerial and reproduce the same frequency by operation of the course indicator for bringing the latter in the same position as the course indicator of a second craft sending out the frequency and at the same time may determine the distance of a sending craft by noting the time elapsing between the receiving of the radio and the audible signals.

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