July 9, 1940. H. NASS 2,207,263

RADIO BEACON

Filed Nov. 4, 1938

FIG. 1.

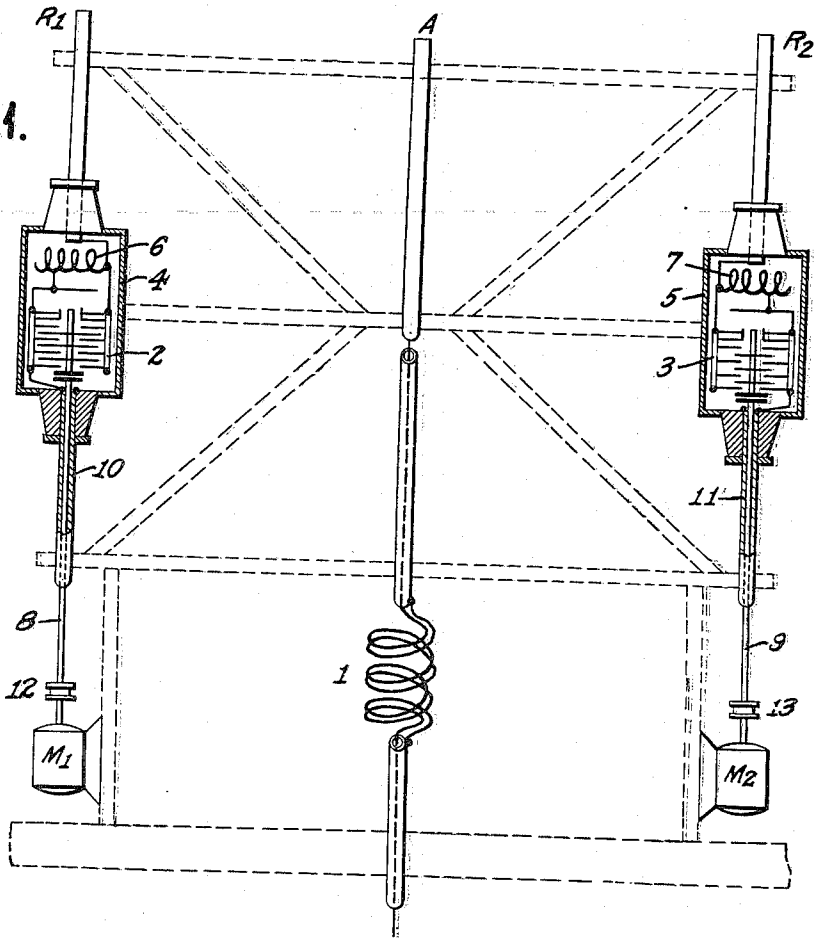


FIG. 2.

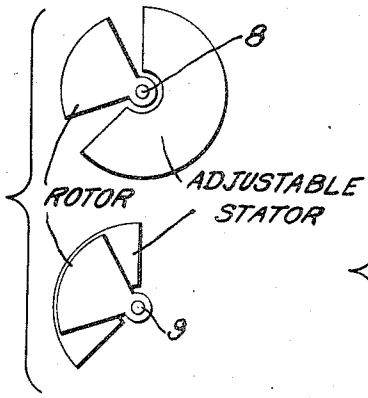


FIG. 2A.

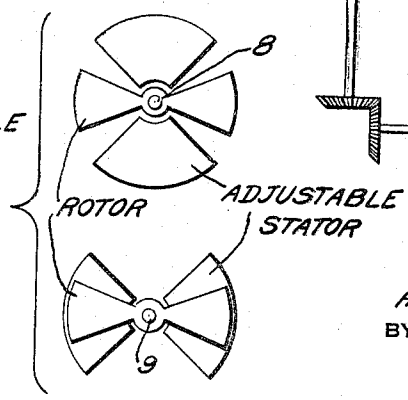
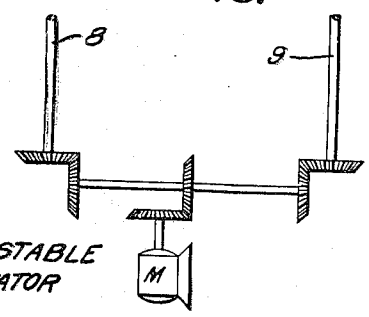


FIG. 3.



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RADIO BEACON

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7 Claims. (Cl. 250—11)

In radio beacons of the kind adapted alternately to produce two differently directed antenna fields, antenna systems are employed in which a transmitting dipole is constantly fed from a high frequency generator while reflecting antennate are keyed in a manner to render them alternately effective and ineffective. These reflectors are keyed either electrically, this is, with the aid of relays, or by mechanical engagement effected with the aid of switching shafts.

A known antenna structure of this kind comprises two reflecting antennae, located on opposite or nearly opposite sides of the continuously fed transmitting dipole, and a switching shaft mounted transversely of the antennae and adapted to influence the reflecting antennae. The requisite switching operations are effected either with the aid of contacts or by means of condensers. The keying shaft arranged transversely of the antennae entails disadvantages of electrical and also of mechanical nature, and which are experienced if it is desired to rotate the antenna system.

In order to do away with these disadvantages it has been proposed not to arrange the keying shaft transversely of the antennae but to associate with each reflector a separate shaft located in the direction thereof. Such two shafts are either mechanically interconnected underneath the antenna system or are each connected with a separate synchronous motor. This arrangement however, is still disadvantageous inasmuch as the switching shafts disposed beside the reflectors likewise entail drawbacks of both electric and mechanical nature, no simplification of the antenna structure being obtained in this way.

In accordance with the invention the keying device is such that the shafts for actuating the keying means are located within the reflectors, these comprising tubular members as a casing therefor. In this way an antenna structure is obtained which has been found to be rid of any electric or mechanic disadvantages and is adapted especially for use in connection with rotatable antenna structures.

The invention will be understood from the following description, reference being had to the accompanying drawing in which Fig. 1 shows a partially sectioned diagrammatic elevation of one embodiment thereof, Fig. 2 illustrates the arrangement of the stator and rotor condenser plates for achieving the results in accordance with this invention, Fig. 2A illustrates an arrangement of stator and rotor plates in accordance with a further feature of my invention, and Fig. 3 illustrates an arrangement for providing a common driving means for the condenser plates in each reflector antenna.

The transmitting antenna continually fed from a high frequency generator over a choke coil 1 is denoted by A while the alternately keyed reflectors, arranged on opposite sides of antenna A, are designated R1, R2. These reflectors are keyed with the aid of condensers 2, 3 located within screening boxes 4, 5. These condensers are connected in parallel with tuning coils 6, 7 likewise disposed in the boxes 4, 5. The keying is by this means effected by alternately detuning the reflector circuits in inductive and capacitive fashion.

In accordance with the invention the reflectors R1, R2 are keyed by means of shafts 8, 9 disposed in tubular members 10, 11 of the reflectors R1, R2. In the case here shown the shafts 8, 9 are rotated by synchronous motors M1, M2 which are connected with these shafts by clutches 12, 13. The arrangement may however be such that one motor is arranged to drive both shafts as shown in Fig. 3. The supporting structure of the antenna system is shown in dotted lines.

The reflectors are so keyed that one of them is ineffective whilst the other is effective. Therefore the rotor of one of the condensers 2, 3 must be so positioned as to cooperate with the stator thereof whenever the rotor of the other condenser is out of cooperation with its stator. To such end the vanes of one rotor are offset accordingly with respect to those of the other rotor in the manner illustrated in Figs. 2 and 2A. In order to achieve this to perfection the stator of each condenser can be turned in relation to the rotor thereof and then be fixed in the desired position. In this way it will be easy to provide for a precisely complementary signal keying, that is, a keying in which two kinds of signals are brought to complete each other in a manner to produce an uninterrupted signal, usually spoken of as continuous dash line. Thus, whenever through external influences the conditions are altered the condensers will be easy to readjust.

In the case of two synchronous motors M1, M2 employed for driving the shafts 8, 9 these motors may happen to start at different times. The synchronism of the two motors, it is true, will not be impaired thereby, but an angular difference between the rotors of the condenser will be produced, a complementary keying thus not being

possible. This angular difference depends upon the number of poles of the motors, amounting to 90 degrees in the case of four-polar motors. Therefore a further feature of the invention consists in providing the rotors of the condensers with auxiliary vanes which are offset with respect to the main vanes thereof by the said angular difference as shown in Fig. 2A. The rotors have two, four, eight or a similar number of vanes, this depending upon the number of poles of the motors. The signal keying can thus be effected to perfection even if the motors do not start simultaneously.

What is claimed is:

1. A radio transmitting arrangement comprising a main antennae, reflecting antennae on two opposite sides of this main antenna, tubular antenna members forming part of the reflecting antennae, keying means at each of the reflecting antennae for rendering said reflecting antennae effective and ineffective, and means which serves to alternately operate said keying means comprising rotatable shafts extending through said tubular antenna members for operating said keying means and driving means for rotating these shafts.

2. An arrangement according to claim 1, wherein said driving means comprises motors each of which is coupled to one of the shafts.

3. An arrangement according to claim 1, wherein said driving means comprises a motor common to all of the shafts.

4. An arrangement as defined in claim 1, wherein the keying means comprises rotatable plate condensers.

5. An arrangement as defined in claim 1, wherein the keying means comprises condensers having a rotor and a stator adapted to be adjusted in position with respect to this rotor.

6. An arrangement according to claim 1, wherein the keying means comprises condensers having a rotor and a stator, such rotor comprising main vanes and auxiliary vanes offset with respect to the main vanes by an angle adapted to compensate angular differences of the main vanes of each rotor in relation to those of the other rotor or rotors.

7. A radio directional transmitter comprising a continually fed radiating antenna, a tubular reflecting antenna disposed on either side and in line with the said radiating antenna, a rotatable circuit element in each of said reflecting antennae for alternately rendering the said antennae effective and ineffective, a rotatable shaft mechanically coupled with each of the said circuit elements and disposed in the center of the said tubular reflecting antennae, and driving means coupled to each of the said shafts for rotating the said circuit elements.

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