

Having regard to the foregoing disclosure, the patent of which this specification forms part confers, subject to the conditions prescribed in the Patent Act, 1935, the exclusive right, privilege and liberty of making, constructing, using and vending to others to be used, the invention as defined in claims submitted by the patentee as follows:-

1. A wind direction and velocity indicating radio beacon comprising a radio transmitting system of radio frequency energy and a variable frequency modulator, a wind driven propeller rotating at a rate corresponding to the wind velocity, means for controlling the frequency of the said modulator in step with said rate of rotation, connections between the said modulator and the said radio transmitting system, a directionally radiating antenna connected to said transmitting system, means for producing a directional indication along a fixed direction with respect to said antenna, and wind responsive means including a wind vane for rotating said antenna according to the wind direction for orienting said directional indication in the direction of the wind.
2. ^v In an instrument landing system, a dual frequency glide path indicating radio beacon and a field localized beacon, each of said beacons comprising a radio transmitting system of radio frequency energy having means for generating two non-modulated signals on closely adjacent frequencies, the said glide path indicating beacon including means for radiating each of said signals at different vertical angles, said signals producing an equi-potential plane at an angle with respect to a horizontal plane; and the said field localizer beacon including means for radiating its two signals

at different azimuthal directions and producing an equipotential azimuthal plane in the direction of a landing path, and a signal receiving system carried on board an aircraft, said receiving system including an oscillograph and a screen, and means for simultaneously producing on the said screen a visual image characteristic of the signal strength relationship of each of the said two signals from each of the said two beacons.

3. A dual frequency radio navigational system, including a high frequency signal generating system and an antenna system, means for periodically changing the carrier frequency of said transmitting system from one frequency to another frequency, said frequencies being fixed and predetermined and means synchronized with the first said means for changing the directivity of said antenna system, each of said carrier frequencies being transmitted in a predetermined direction and at a fixed angle with respect to the other; and a radio receiving system including an oscillograph and a screen, and means for picturing on said screen a visual image characteristic of the signal strength relationship of the said two signals.

3 4. A navigational system including, in combination, a dual-frequency radio beacon comprising two radio frequency generating systems operating on different but adjacent and fixed frequencies, each of said systems being connected to a radiating system having different directional characteristics, keying means connected to each of said systems and means for alternately operating each of said keying means at a predetermined rate; and a radio receiving system including a cathode ray oscillograph, means for producing

on said oscillograph visual images characteristic of the signal strength relationship of the said two radiating systems at any given point, and means for determining the rate of the said keying means.

5. A navigational system including a dual-frequency radio beacon comprising two radio frequency generating systems operating on different but adjacent and fixed frequencies, each of said systems being connected to a radiating system having different directional characteristics, keying means connected to each of said systems and electronic means including a periodic pulse generator for operating each of said keying means at a predetermined rate; and a radio receiver having visual means including an oscillograph and a screen, for substantially simultaneously indicating the signal strength relationship of the said fixed frequencies.

6. A dual-frequency radio beacon comprising two radio frequency generating systems operating on different but adjacent and fixed frequencies, each of said systems being connected to a radiating system having different directional characteristics, electric impulse operated keying means connected to each of said systems, a generator of periodical electric impulses and means to alternately apply said impulses to each of said keying means for alternately interrupting the operation of each of said systems.

7. A directional dual-frequency radio range beacon including a master oscillator coupled to two amplifiers and two radiating systems whose directivity patterns are oriented at a fixed angle with respect to each other, connections between each of said amplifiers and said radiating systems,

electronically operated switching means for periodically and alternately keying said amplifiers and means operating in synchronism with first said means for periodically changing the frequency of said oscillator.

8. A navigational system including a plurality of direction indicating radio transmitting beacons situated in different geographic locations, each of said beacons including two transmitting systems on non-modulated radio frequency energy, the first said systems being connected to a first directional radiating system and operating on a first fixed frequency channel, the second said transmitting system being connected to a second directional radiating system and operating on a second fixed frequency channel, said radiating systems being oriented so as to create along a predetermined line, characteristic for each beacon, signals of equal field strengths from each of said transmitting systems; and a signal receiving system having input and output circuits, a signal collector connected to said input circuit and a cathode ray oscillograph tube having a cathode ray beam generator and a screen connected to said output circuit, means for substantially simultaneously creating on the screen of said oscillograph a plurality of sets of individual deflections corresponding to a plurality of said beacons, each set comprising two deflections corresponding to the first and second of said transmitting systems of each beacon, the amplitude of said deflections being characteristic of the field strength level of each signal, said signals appearing of equal amplitude when received along said predetermined line of any of said beacons.
9. A navigational system including a direction indicating

radio beacon and a receiving system, said beacon including a transmitting system of radio frequency energy of characteristic frequency and two directional radiating systems oriented at an angle to each other, a commutator operating periodically and at a characteristic rate, means including said commutator, for periodically connecting each of said radiating systems to said transmitting system during unequal periods of time; and a signal receiving system including a signal receiving circuit and a cathode ray tube having a screen and deflecting elements, means for periodically tuning the said signal receiving system over a predetermined frequency bandwidth, means for impressing on said deflecting elements the signals received over the said bandwidth, originating from the said beacon and producing on said screen visual signals of an amplitude characteristic of the field strength of each of the signals received and of brightness corresponding to the period of duration of each signal.

10. A radio direction indicating system including a dual frequency range beacon having means for emitting signals on two closely adjacent frequencies, means for radiating each of the said signals at an angle to the other; and a signal receiving system including electronically controlled means for periodically tuning said receiving system over a predetermined frequency bandwidth, an oscillograph and a screen and means for producing on said screen a visual image characteristic of the signal strength relationship of the said two signals from the said beacon.

11. A radio direction indicating system as set forth in claim 10, comprising a plurality of said dual frequency

beacons, wherein the two frequencies of each beacon are characteristic of one single beacon and wherein the said last means produce substantially simultaneously a plurality of visual images on said screen, corresponding to a plurality of said beacons.

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