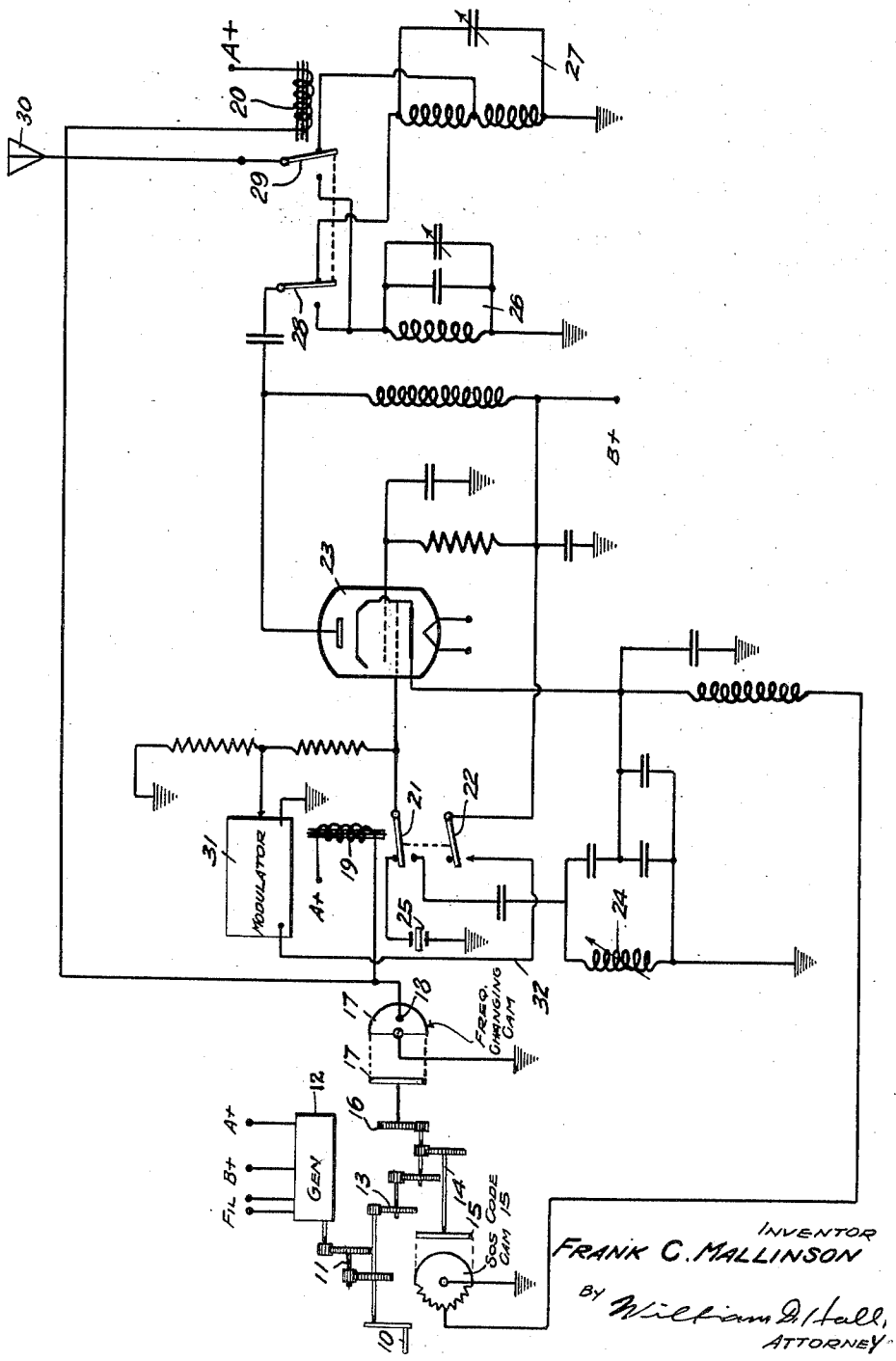
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RADIO TRANSMITTING SYSTEM

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INVENTOR
FRANK C. MALLINSON
BY William D. Hall,
ATTORNEY

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RADIO TRANSMITTING SYSTEM

Frank C. Mallinson, Alexandria, Va.

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment of any royalty thereon.

This invention relates to radio transmitting systems and more particularly to transmitters which will send out predetermined signals alternately on two different radio frequencies.

The primary object of this invention is to provide a radio transmitter which will transmit distress or other signals on two different frequencies alternately. Other objects of the invention will become apparent as this description proceeds.

Briefly speaking, the invention includes a hand driven generator for supplying filament as well as high voltage power to the transmitter. Geared to the hand driven unit is a code cam which keys the transmitter in accordance with the distress signals to be transmitted. There is also a frequency changing cam which operates certain relays, as will hereinafter appear. To shift the radio transmitter from one frequency to another, the arrangement is such that the distress signals are transmitted beginning with each change in frequency. This result is accomplished by synchronizing the distress code cam with the frequency-changing cam so that immediately upon changing of the frequency, the code cam begins the transmission of a distress signal.

The single figure of drawing is a schematic diagram of the invention.

Referring to the drawing, a hand crank 10 adapted to be rotated by the human hand operates gear train 11 which in turn drives generator 12. Generator 12 supplies both filament and high voltage direct current to the radio transmitter. Through gear train 13 a shaft 14 which carries the SOS code cam 15 is rotated. The SOS code cam keys the transmitter to send an SOS together with the call letters of the station in question. A gear train 16 is likewise driven by the gear train 13 and in turn drives frequency changing cam 17. This cam is a semi-circular contact blade with its shaft grounded. A brush 18 makes electrical contact with the cam 17 during one half of the revolutions thereof. When the brush 18 is in engagement with the cam 17, solenoids 19 and 20 are energized. When solenoid 19 is de-energized, the relay contact arm 21 connects the tube 23 for self-excited operation, the grid circuit of tube 23 including the tuned resonant circuit 24. When the relay contact arms 21 and 22 are attracted upwardly by the solenoid 19, the tube 23 has crystal 25 connected to its grid, thereby enabling crystal controlled

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operation. In actual use of my invention, which has been widespread, the crystal 25 is ground for the high frequency of 8280 kilocycles. The resonant circuit 24 is tuned to 500 kilocycles.

There are two plate circuits 26 and 27 respectively, tuned to 500 kilocycles and 8280 kilocycles. When solenoid 20 is de-energized, the relay contact arms 28 and 29 are biased to the left by suitable springs and connect the plate circuit of tube 23 as well as the antenna 30, to the resonant circuit 26 which operates at 500 kilocycles. When the solenoid circuit 20 is energized, the relay contact arms 28 and 29 rotate counterclockwise and connect the plate circuit of tube 23 as well as the antenna 30 to the resonant circuit 27, thereby providing for operation on 8280 kilocycles. The remaining portions of the schematic diagram are optional and not essential to the invention. It might be mentioned that among other things, the apparatus includes a modulator 31 which may be connected in the circuit for 500 kilocycle operation. The modulator 31 is energized only when the apparatus operates on 500 kilocycles, since the plate voltage thereto is supplied through lead 32 and this lead is charged with such high voltage only when relay contact arm 22 is in the position shown. It might be mentioned that the SOS code cam 15 is geared to cam 17 and is so synchronized therewith that immediately after each frequency change the SOS cam begins at the beginning of an SOS signal.

Heretofore, radio transmitting systems for sea rescue equipment operated on but one frequency. The frequency commonly used was the international distress frequency of 500 kcs. With the limited power output available for sea rescue equipment this frequency is operative for ranges up to approximately 100 miles, and therefore cannot be successfully used for rescue work at greater distances. On the other hand, if a single high frequency were to be used, which would have a much longer range of 3000 miles, for instance, with the same power output, it is subject to the disadvantage that precise bearings cannot be ascertained at such distances by the direction-finding equipment employed by the rescue station. Still another disadvantage is that the signal cannot be heard at all at distances of 100 miles or less due to the "skip" effect.

My invention provides a radio transmitter which will transmit distress or other signals on two different frequencies alternately, one being of low frequency and the other of high frequency. When the rescue station receives the signal at

the effective range of the high frequency transmission a bearing may be ascertained with an accuracy of 100 miles at a distance of 3000 miles. The station receiving this long range signal then transmits the information of the rough bearing so determined to a rescue station in the more immediate area of the station in distress, which is thereby able to determine the precise bearing by means of the low-frequency signal and proceed to the rescue.

I claim to have invented:

1. The combination with a radio transmitter of a hand-driven generator therefor to supply all energizing voltages thereto, said transmitter including a transmitting tube having a grid, anode and cathode, two tuned devices resonating at widely different frequencies, two tuned circuits resonating at the same frequencies as said tuned devices respectively and controlling the frequency of the transmitter dependent upon which of such circuits and devices is connected to the transmitter contact, means mechanically connected to said hand-driven generator for alternately connecting each of said tuned devices to the grid and each of said tuned circuits to the anode of said transmitter tube, and keying means for initiating and completing a predetermined code keying sequence on each transmitter frequency synchronously with each change in frequency.

2. The combination with a radio transmitter having a transmitter tube having a grid, anode and cathode, two frequency defining pairs of tuning elements each pair being connected alternately to the grid and anode of said tube for operation at widely different frequencies respectively, hand-driven generator means for supplying power to operate said transmitter, contact means mechanically coupled to said driven-means magnetic relay means controlled by said contact means for alternatingly connecting each of said tuning elements to said transmitter, a tone modulator connected to one of said relays and energized only when the transmitter is operating on one of said frequencies, and interrupter means coupled mechanically to said hand-driven means for keying the transmitter in accordance with a predetermined code, said code being initiated synchronously with each change in transmitter frequency.

3. The combination with a radio transmitter having a transmitter tube having a grid, an anode and cathode, tuning means arranged to be shifted to two different frequencies respectively, including two pairs of tuned elements, the elements of each pair being tuned to the same frequency, the pairs being connected alternately to the grid and anode of said tube respectively, hand-driven means, generator means driven by the hand-driven means for supplying power to said transmitter, contact means driven by the hand-driven means, relay means controlled by said contact means for alternately shifting the tuning means to two widely different frequencies respectively tone modulator means connected to one of said relays and energized only when the transmitter is operating on one of said frequencies, and automatic keying means whereby the transmitter repeats predetermined signals synchronously with each change in transmitter frequency.

4. The combination with a radio transmitter having a transmitter tube having a grid, anode and cathode, two sets of tuning means arranged to transmit either of two frequencies each said set including a pair of tuned elements tuned to the same frequency, said pairs being connected alternately to the grid and anode of said tube respectively, hand driven gearing means, generator means driven by said gearing for supplying power to said transmitter, interrupter means driven by said generator gearing adapted to transmit a predetermined code signal, contact means driven by said generator gearing, and magnetic switching means controlled by said contact means for shifting the transmitter alternately between two frequencies, said code signal being initiated synchronously with each shift in transmitter frequency, and a tone modulator connected to one of said magnetic switches and energized only when the transmitter is operating on one of said frequencies.

5. In a radio transmitting system, a transmitting tube having a grid, anode and cathode, first and second resonant devices tuned to first and second widely different radio frequencies respectively, a relay operable to either of first and second positions at which it respectively connects said first and second resonant devices to the grid of said tube, first and second resonant circuits tuned to frequencies respectively the same as for said first and second resonant devices, a second relay operable to either of first and second positions at which it respectively connects said first and second resonant circuits to the anode of said tube, a crank adapted to be hand-driven, generator means driven by said crank for supplying all power to said transmitter, keying means for repeating predetermined distress signals intermittently, contact means for operating said relays from their respective first and second positions to shift the transmitter alternately between said widely different frequencies synchronously with said keying means, so that the distress signals begin to be transmitted immediately after each frequency shift, and a tone modulator connected to one of said relays and energized only when said transmitter is resonating on said second frequency.

FRANK C. MALLINSON.

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