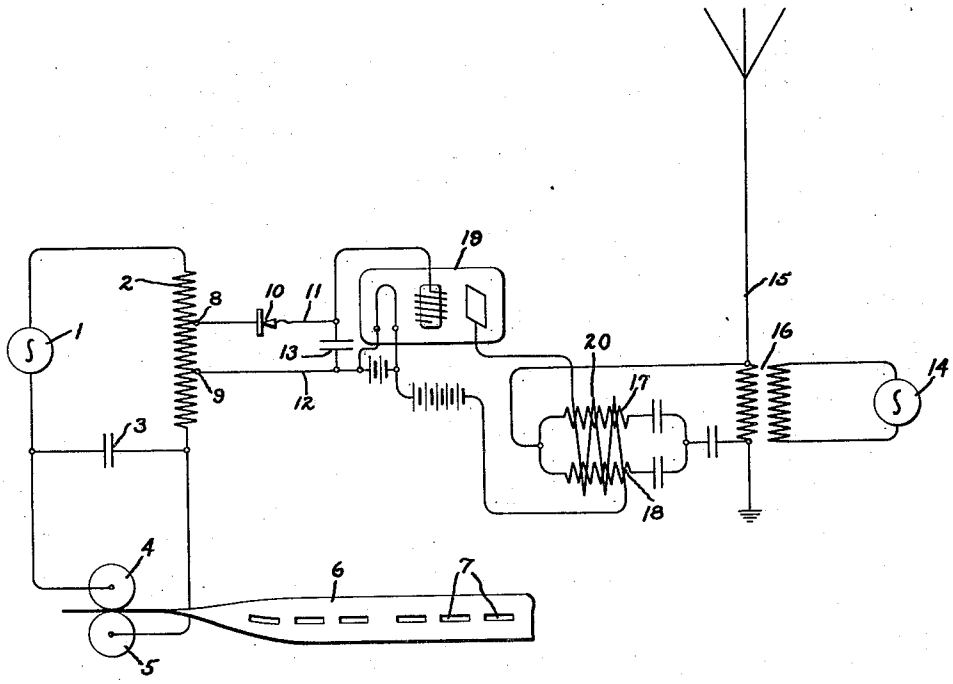
Aug. 11, 1925. 1,549,475

J. L. FINCH

AUTOMATIC TELEGRAPH TRANSMITTER

Filed Dec. 6, 1921



Inventor:
James L. Finch,
by Albert G. Davis
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UNITED STATES PATENT OFFICE.

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AUTOMATIC TELEGRAPH TRANSMITTER.

Application filed December 6, 1921. Serial No. 520,427.

To all whom it may concern:

Be it known that I, JAMES L. FINCH, a citizen of the United States, residing at Kahuku, Territory of Hawaii, have invented certain new and useful Improvements in Automatic Telegraph Transmitters, of which the following is a specification.

My present invention relates to the transmission of signals, and more particularly to an apparatus of the automatic type for transmitting telegraphic signals.

The object of my invention is to provide a simple, convenient and efficient apparatus for the high speed automatic transmission of telegraphic signals either over wires or by radio.

In carrying out my invention, I employ preferably a tape of insulating material suitably perforated to represent signals and pass this tape between two rollers. Devices of this general type, as previously employed, have depended for their operation upon the making of a contact between the two rollers whenever a perforation in the tape passes between the rollers. When it has been attempted to operate such devices at very high speeds they have not proved as reliable as desired. In order to overcome some of the difficulties attendant upon the operation of systems of this type previously employed, I impress between the two rollers a potential of such value that it will break down the air gap between the rollers when the perforation in the tape passes between them, but will be of insufficient value to break down the insulation between the rollers afforded by the tape. By providing suitable electrical connections for impressing this high potential upon the rollers one condition of current in an electric circuit may exist when the air gap between the rollers is broken down and an entirely different condition of current may exist when there is no discharge between the rollers. One convenient way in which this may be accomplished is to supply an alternating current, preferably of high frequency, to a resonant circuit, and connect the two rollers to two points in this resonant circuit, which are so chosen that the normal potential between the rollers is sufficient to break down the air gap formed by a perforation in the tape. When there is no discharge between the rollers a comparatively large current will flow in the resonant circuit. When a discharge between the rollers occurs the circuit will be detuned, and as a result the current flowing will be greatly decreased. Current variations in the resonant circuit may then be employed either for supplying a signal representing circuit directly to a telegraph line, or for controlling other apparatus for supplying either to a telegraph line or to a radio system a signal representing current.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims, my invention itself, however, both as to its organization and method of operation will best be understood by reference to the following description taken in connection with the accompanying drawing in which I have indicated diagrammatically one way in which my invention may be carried into effect.

As indicated in the drawing, a source of alternating current 1, preferably of high frequency, is connected to a resonant circuit made up of inductance 2 and capacity 3. The rollers 4 and 5 are connected to the terminals of condenser 3 and the potential of the source 1 is so chosen and the oscillating circuit so designed that the normal potential across condenser 3 will be sufficient to break down the air gap between the rollers 4 and 5. The tape 6 of insulating material is arranged in any desired manner to pass between the rollers and is provided with perforations 7 which represent the dots and dashes of the message to be transmitted in the telegraphic code employed. The transmitting circuit or apparatus for controlling the current supplied to the transmitting circuit is connected to taps 8 and 9 on the inductance 2 through a rectifier 10 of any desired form. When no discharge occurs between rollers 4 and 5 a high current will build up in the tuned circuit and this will cause a rectified current to be supplied to conductors 11, 12. The condenser 13 serves to smooth out the pulsations of this rectified current, producing a substantially steady flow of current through these conductors, which may, if desired, form the two conductors of a telegraph line. When a perforation in the tape passes between the rollers, the air gap be-

tween them breaks down detuning the resonant circuit and reducing the current supplied to the conductors 11 and 12 to a low value. It is apparent that the apparatus described will be accurate and positive in its action the only limiting features to the speed of operation will be the time required to build up the current in the resonant circuit, the lag in the telegraph line and the possible speed of the tape. If the resonant circuit is sharply tuned the time required to build up the current flowing in that circuit will of course be very small.

In case it is desired to employ this apparatus for the control of high frequency current for radio transmission, the desired control may be effected in the manner illustrated, 14 being a source of high frequency current which is connected to an antenna 15 through the usual coupling transformer 16. The amplitude of the current supplied to the antenna 15 may be controlled by means of a magnetic amplifier having high frequency windings 17, 18, connected in the manner described in Alexanderson United States Patent No. 1,328,473. The signal representing current derived from the resonant circuit 2, 3 may be supplied to the grid circuit of vacuum tube amplifier 19 and the resulting amplified signal representing current in the plate circuit of this amplifier may be supplied to the saturation winding 20 of the magnetic amplifier.

While I have shown and described only one embodiment of my invention, it is apparent that various modifications in the form and arrangement of the apparatus employed, as well as in the manner in which the signal representing current is utilized, may be made without departing from the scope of my invention as set forth in the appended claims.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. Signal transmitting means comprising a source of alternating current, a resonant circuit associated therewith, means for detuning said resonant circuit in accordance with signals, a rectifier associated with said resonant circuit, a source of high frequency signaling current, and means responsive to current derived from said rectifier for controlling the high frequency current from said source.

2. Signal transmitting means comprising a source of alternating current, a resonant circuit associated therewith, means for detuning said resonant circuit comprising a pair of rollers, a tape adapted to pass between and separate said rollers, said tape being perforated in accordance with signals, and said rollers being connected to points in said resonant circuit so chosen that the normal potential between them is sufficiently high to break down the air gap between the rollers formed by perforations in the tape.

3. Signal transmitting means comprising a source of alternating current, a resonant circuit associated therewith, means for detuning said resonant circuit comprising a pair of rollers, a tape adapted to pass between and separate said rollers, said tape being perforated in accordance with signals and said rollers being connected to points in said resonant circuit so chosen that the normal potential between them is sufficiently high to break down the air gap between the rollers formed by perforations in the tape, and a rectifier associated with said resonant circuit for deriving therefrom a substantially steady signal representing current.

4. Signal transmitting means comprising a source of high frequency current, a transmitting circuit associated therewith, a second resonant circuit supplied with high frequency current, means for detuning said resonant circuit in accordance with signals, a rectifier associated with said resonant circuit, and means responsive to current supplied by said rectifier for controlling the current supplied from said high frequency source to said transmitting circuit.

5. Signal transmitting means comprising a source of high frequency current, a transmitting circuit associated therewith, a second resonant circuit supplied with alternating current, means for detuning said resonant circuit comprising a pair of rollers, a tape of insulating material adapted to pass between and separate said rollers, said tape being perforated in accordance with signals and said rollers being connected to points in said resonant circuit so chosen that the normal potential between them is sufficiently high to break down the air gap between the rollers formed by perforations in the tape, and means responsive to current derived from said resonant circuit for controlling the current supplied from said high frequency source to said transmitting circuit.

6. Signal transmitting means comprising a source of high frequency current, a transmitting circuit associated therewith, a second resonant circuit supplied with alternating current, means for detuning said resonant circuit comprising a pair of rollers, a tape of insulating material adapted to pass between and separate said rollers, said tape being perforated in accordance with signals and said rollers being connected to points in said resonant circuit so chosen that the normal potential between them is sufficiently high to break down the air gap between the rollers formed by the perforations in the tape, a rectifier associated with said resonant circuit, and means responsive to current supplied by said rectifier for controlling the current supplied from said high

frequency source to said transmitting circuit.

7. Signal transmittitng means comprising a source of high frequency current, a transmitting circuit associated therewith, a second resonant circuit supplied with high frequency current, means for detuning said resonant circuit in accordance with signals, and means responsive to current supplied from said resonant circuit for controlling the current supplied from said high frequency source to said transmitting circuit.

8. Signal transmitting means comprising a source of alternating current, a resonant circuit associated therewith, means for detuning said resonant circuit in accordance with signals, a source of high frequency signaling current, and means responsive to current derived from said resonant circuit for controlling the flow of high frequency current from said source.

In witness whereof, I have hereunto set my hand this seventeenth day of November, 1921.

JAMES L. FINCH.