Dec. 29, 1925. 1,567,128

C. H. FETTER

WIRE PROGRAM TRANSMISSION SYSTEM

Filed Sept. 18, 1923

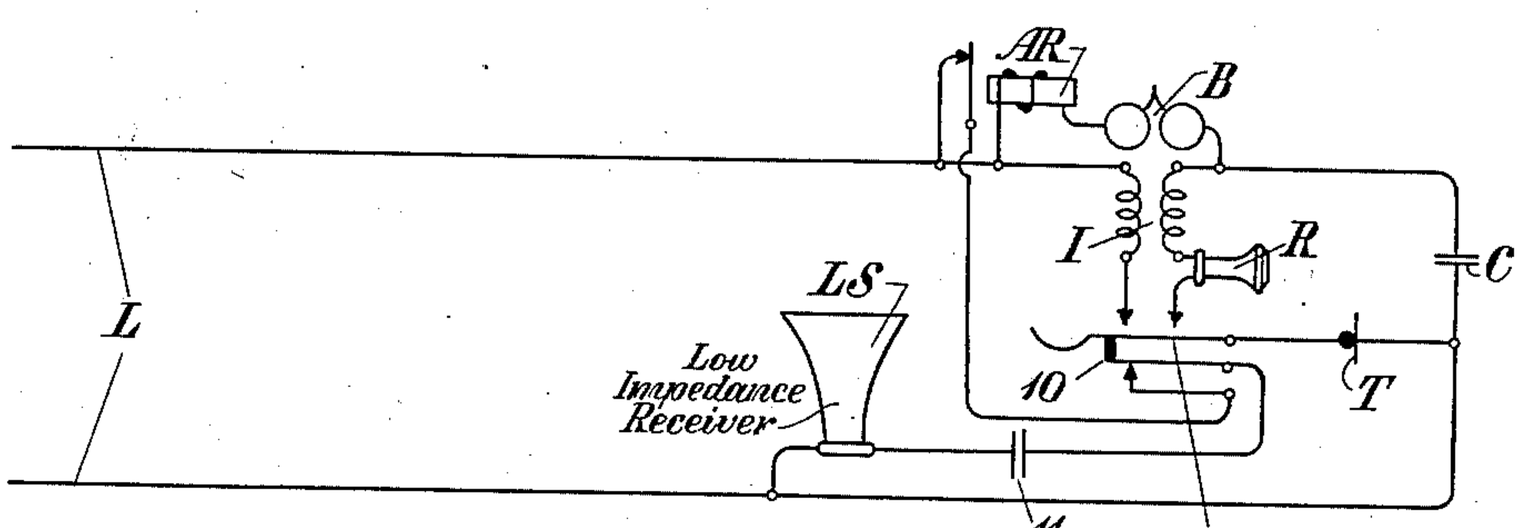

Fig. 1

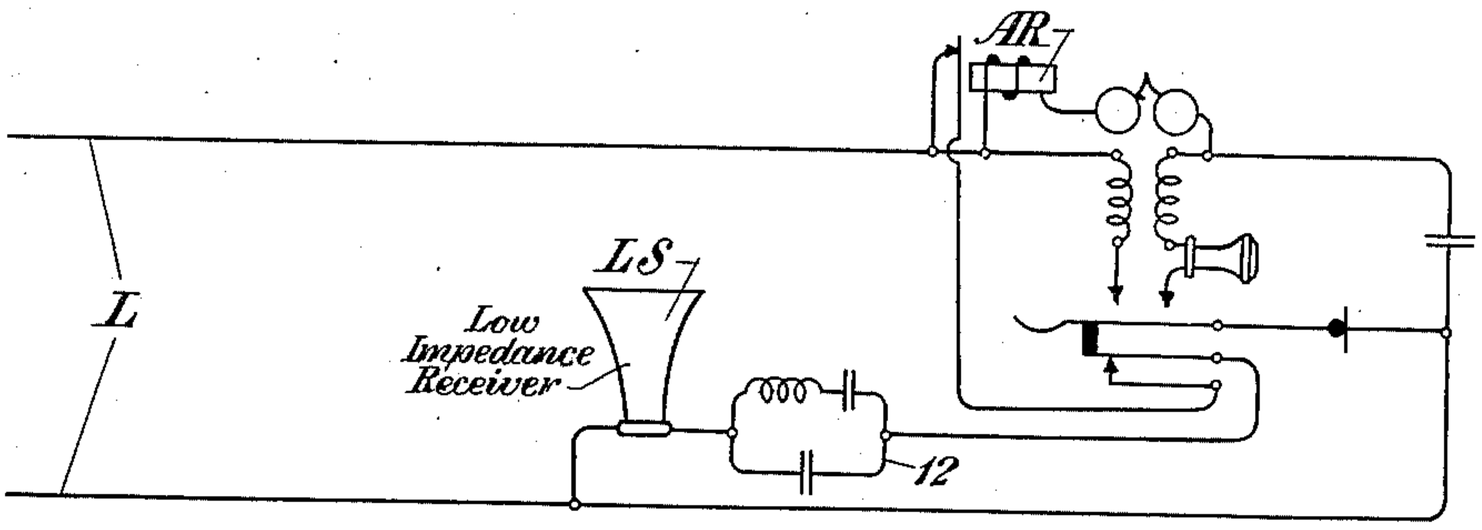

Fig. 2

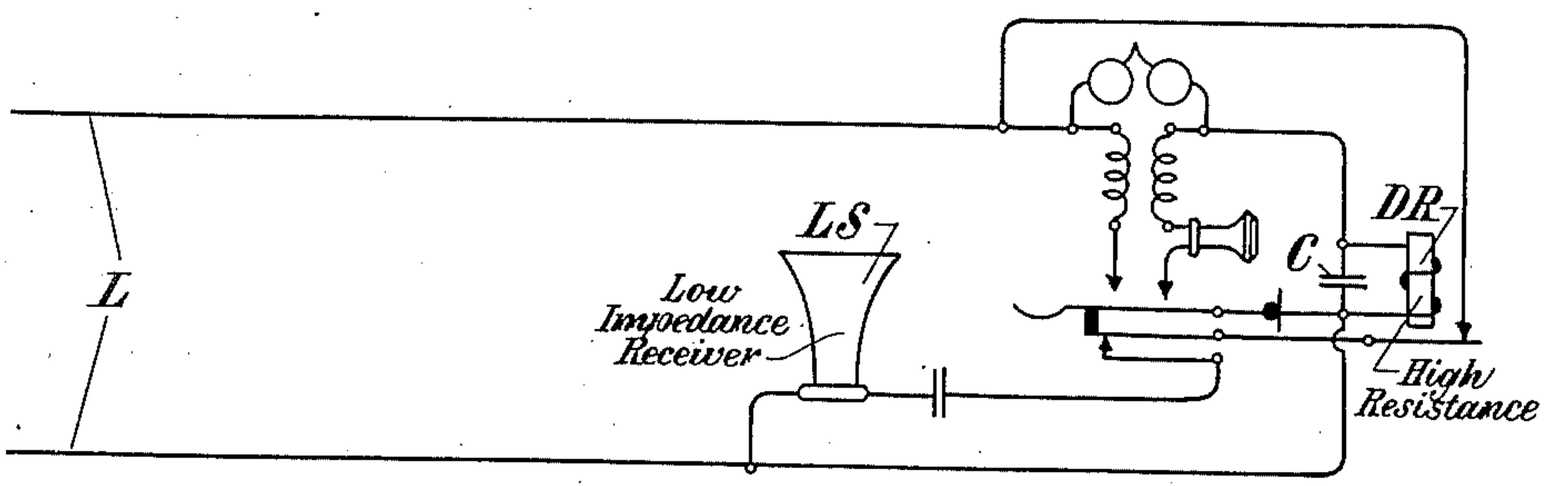

Fig. 3

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UNITED STATES PATENT OFFICE.

CHARLES H. FETTER, OF MILLBURN, NEW JERSEY, ASSIGNOR TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

WIRE PROGRAM-TRANSMISSION SYSTEM.

Application filed Septemebr 18, 1923. Serial No. 663,447.

To all whom it may concern:

Be it known that I, CHARLES H. FETTER, residing at Millburn, in the county of Essex and State of New Jersey, have invented certain Improvements in Wire Program-Transmission Systems, of which the following is a specification.

This invention relates to arrangements for transmitting music, news, information and the like over wires and more particularly to a system in which ordinary telephone subscribers' lines are employed for this purpose.

It has been proposed to use ordinary subscribers' lines for program transmission purposes at times when the line is not being used for telephonic purposes, the subscriber being supplied with a loud speaker or other form of special receiver for program reception in addition to the usual telephone set. Heretofore, in program receiving the loud speakers have been high impedance devices so that there was no possibility of operating the line relay and other apparatus at the central office when the program receiver was bridged across the line. From many points of view, however, a low impedance receiver is a more desirable arrangement to use for program reception and it is one of the objects of the present invention to provide a circuit arrangement enabling the use of a low impedance receiver for program receiving purposes without operating the line relay. Another object of the invention is to provide a circuit arrangement in which the circuit of the loud speaker or other program receiving device will be open in case ringing current is applied to the line in calling the subscriber to his telephone, thereby preventing annoying and disagreeable sounds being emitted by the loud speaker.

The invention may now be more fully understood by reference to the following description when read in connection with the accompanying drawing, Figures 1, 2 and 3 of which illustrate three different embodiments of the invention.

Referring to Fig. 1, L represents a subscriber's line terminating in the usual subscriber's set, including transmitter T, receiver R, bell or ringer B, switchhook H, induction coil I and condenser C. In order that the line may be used for the reception of program transmission a loud speaker LS is bridged across the line, its circuit being controlled by an extra back contact 10 of the switchhook H so that normally when the receiver is on the switchhook the loud speaker LS will be bridged across the line and the subscriber may hear any program which is being furnished. If he desires to use the sub-station set for ordinary telephone purposes, by merely taking the receiver off the switchhook the contact 10 is opened and the loud speaker LS disconnected so that the substation circuit will function in the usual manner for ordinary telephonic purposes.

The loud speaker, in circuits of the type heretofore proposed, has been a high impedance device to prevent the flow of sufficient current over the line to operate the line relay. It is desirable, however, to use a low impedance loud speaker and consequently the loud speaker LS in Fig. 1 is so constructed as to be of low impedance. In order to prevent the operation of the line relay by this low impedance receiver, however, a condenser 11 is inserted in circuit with the loud speaker, thereby preventing the flow of direct current.

In circuits of this type it is desirable that the ringing current should not be permitted to actuate the loud speaker as the excessive amplification of the currents will cause loud, disagreeable noises in response to a ringing signal. Accordingly, an alternating current relay AR is included in circuit with the ringer B and the condenser C so that the said relay will be actuated whenever ringing current is transmitted over the line L. The relay AR controls a contact in the circuit of loud speaker LS and whenever the relay AR is actuated in response to ringing current the circuit of the loud speaker is opened, thereby preventing a succession of loud and disagreeable noises.

Fig. 2 shows a modified arrangement in which ringing current is prevented from actuating the low impedance receiver by including an anti-resonant network 12 in circuit with the loud speaker LS. The anti-resonant circuit 12 is so designed as to be anti-resonant at the ringing frequency, thereby forming a path of very high impedance to ringing currents. The use of an anti-resonant device of this character prevents, to a large extent, the annoying click which of necessity precedes the operation of the relay AR in response to ringing current. This anti-resonant shunt has a further func-

tion in that it will limit the flow of ringing current to a value far less than the amount required to operate the tripping relay at the central office, which would prematurely cut off the ringing current before the subscriber answers the call. The circuit of the loud speaker LS may be controlled by a ringing responsive relay AR, as in the circuit shown in Fig. 1, the contact controlled by said relay forming an additional means for preventing the actuation of the loud speaker LS by ringing currents.

Fig. 3 shows an additional modification in which a direct current relay is used for opening the circuit of the loud speaker in response to ringing currents. In this case the relay DR is bridged about the condenser C in the ringing circuit and said relay DR has its contact arranged to maintain the circuit of the loud speaker LS closed when the relay is energized. The relay DR is of very high resistance so that it does not drain enough current from the central office battery to operate the line relay at the central office. The relay is so constructed, however, that the small current flowing through its winding is sufficient to attract its armature and hold the circuit of the loud speaker LS closed at all times except when the direct current is interrupted to apply the ringing current. Whenever this occurs, however, the relay DR releases its armature and opens a circuit of the loud speaker an instant before the ringing current is actually applied. The advantage of this arrangement is that the loud speaker LS is disconnected before the first pulse of ringing current is transmitted over the line.

It will be obvious that the general principles herein disclosed may be embodied in many other organizations widely different from those illustrated without departing from the spirit of the invention as defined in the following claims.

What is claimed is:

1. In a program transmission system, a subscriber's telephone line having a subscriber's telephone set at the subscriber's station and a program receiving circuit normally bridged across said line at the subscriber's station when the telephone set is not in use, said receiving circuit including a low impedance receiver for program currents and means in said circuit to prevent direct current from flowing through said circuit.

2. In a program transmission system, a subscriber's telephone line having a subscriber's telephone set at the subscriber's station and a program receiving circuit adapted to be bridged across said line at the subscriber's station, said receiving circuit including a receiver for program currents and means in said circuit to prevent ringing current from actuating said receiver comprising a network anti-resonant to the ringing frequency.

3. In a program transmission system, a subscriber's telephone line having a subscriber's telephone set at the subscriber's station and a program receiving circuit adapted to be bridged across said line at the subscriber's station, said receiving circuit including a receiver for program currents and means in said circuit to prevent ringing current from actuating said receiver comprising a contact for opening the circuit when ringing current is applied to the line.

4. In a program transmission system, a subscriber's telephone line having a subscriber's telephone set at the subscriber's station and a program receiving circuit adapted to be bridged across said line at the subscriber's station, said receiving circuit including a receiver for program currents and means comprising a relay which opens said circuit when ringing current is applied to the line.

5. In a program transmission system, a subscriber's telephone line having a subscriber's telephone set at the subscriber's station and a program receiving circuit adapted to be bridged across said line at the subscriber's station, said receiving circuit including a receiver for program currents and means comprising an alternating current relay in circuit with the ringer, said relay being responsive to ringing current to open said program receiving circuit.

In testimony whereof, I have signed my name to this specification this 17th day of September, 1923.

CHARLES H. FETTER.