Sept. 3, 1929. L. L. E. CHAUVEAU 1,726,947

DISTANT CONTROL DEVICE FOR USE OVER TELEPHONE LINES

Filed April 23, 1925

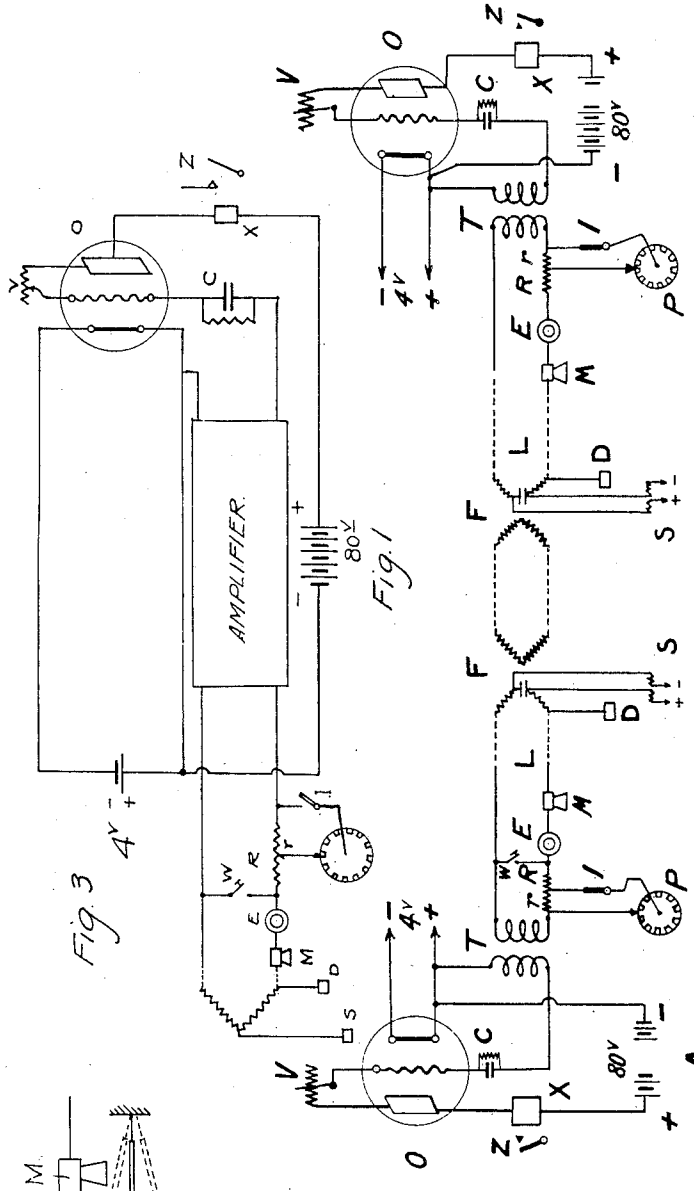


Fig. 1

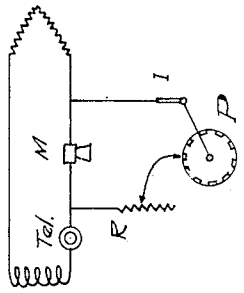


Fig. 2

Fig. 3

Fig. 4

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Patented Sept. 3, 1929. 1,726,947

UNITED STATES PATENT OFFICE.

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DISTANT CONTROL DEVICE FOR USE OVER TELEPHONE LINES.

Application filed April 23, 1925, Serial No. 25,373, and in France April 28, 1924.

The present device purposes to permit actuating an electric relay from a distance, controlling the same by use of telephone lines of public systems.

It is known that, at present, when two stations belonging to different central stations are placed in communication, the line between these two stations shows a break in continuity of the result of placing translators or condensers in said line which interfere with the use of direct current for the distance-control on these lines.

In order to allow of distance control of electric relays on lines of this type, different methods have been proposed, such as control by means of a high frequency current or the use of an alternating current of sufficiently high power. These different methods are disadvantageous in that they necessitate sending over the line a current apt to disturb the normal organs placed in telephone circuits, (signal-, supervisory relays or the like) and to produce induction phenomena which disturb the conversations over adjacent lines. Besides, it is sometimes necessary, when using these methods, to modify the constitution of the telephone circuits by the addition of condensers, for instance, to strengthen the flow of the control-current.

The present device permits of distance control of an electric relay by using the lines of a public telephone system without modifying the electric constitution of these lines, without causing any disruption of the normal organs installed in the lines and without interference with neighboring lines.

The method employed for this purpose consists in using the normal microphonic current of ordinary conversation (audio frequency current) or of an analogous current to effect the control on the sending station and to provide the receiving station with a rectifier which rectifies this telephonic current and transforms it into a continuous current adapted to actuate an electric sensitive relay, said rectifier being supplied with current either directly by the line or through a suitable amplifier.

The description hereinafter given relates by way of example to one method of practical application of this invention; this description is accompanied by a drawing in which Fig. 1 is a diagram of connections of the two stations equipped to allow distance control in both directions. Fig. 2 is a diagram showing a simplified form of sender; Fig. 3 is a diagram in which the detector device is shown replaced by an assembled amplifier-detector. Fig. 4 is a detail showing a modification of Fig. 2.

Each of the two stations A and B is connected to its telephone central by a line L in which are cut in microphone M and receivers E which constitute one of the usual assemblies used in telephony when the installation has a central battery, the supply of current for the conversation being delivered by a storage battery to the multiple line to which the line of the subscriber is connected. Connected in series with the microphone and the receivers is the primary of a transformer T and a resistance R, the part *r* of which may be periodically short-circuited by a periodic contact P.

The sender or control device comprises the resistance R and periodic interrupter P. The circuit connecting the periodic interrupter P with the resistance is controlled by a switch I, in consequence closing the switch I causes periodic variation of resistance R. The frequency of the periodic interrupter conforms to the frequencies of speech, the variations of R are therefore analogous to the variations of a microphone during a conversation. As a result thereof the current serving the control is of the same kind as the normal current of conversation and in consequence it does not disturb the line.

The sender may moreover be simplified by making the periodic contact act directly on the microphone M, this contact being likewise utilized in connecting a resistance in parallel with the microphone (see Fig. 2). An equivalent sending device may be obtained by placing a sonorous generator before a microphone. The sonorous generator may comprise a tuning fork, whistle or the like. This construction of the sending device is particularly practical when rapid impulses are used to control the distant relay, as for the control of printing machines. This modification is shown in Fig. 4 where M designates the microphone and G the sonorous generator. It is preferable in such case to eliminate the microphone which is an unstable instrument and apt to be disturbed by external shocks. For this reason it is preferable to utilize a resistance equivalent to the microphone and to short-circuit the microphone while sending the control impulses.

Consequently the periodic variation of the resistance of the sending circuit may be ef-

fected by using a rotary interrupter P, see Figures 1 and 2, by placing a sonorous generator G before the microphone M in said circuit, see Figure 4, or by any other equivalent or suitable device.

The receiving unit comprises a rectifier, for instance, a lamp with three electrodes supplied with current by the secondary of the transformer T, this transformer being suitable for telephone current, the secondary is connected with the grid by a shunt capacity and to the positive of the supply line of the filament of the lamp O. It is also possible to use any other equivalent detection device. In the plate circuit of said lamp is cut in a relay X controlling a contact Z.

The values given to capacity C and its shunt are determined in a manner to assure good rectification of the microphone current and in conformity with its frequency. In addition, a variable resistance V is mounted between the plate and grid of the lamp in order to facilitate the discharge from the condenser C and to permit relay X to follow rapid impulses whatever may be the intensity of the signals received. As a matter of fact, in installations of this type a certain retardation in operation is noticeable when the incoming signals are very strong.

In most cases the above described installation permits of inter-communicating control between two stations, however, when the line is long, the signals may be very weak. In such case it is necessary to cut in one or more amplification stages between line and rectifier, see Fig. 3. Communication between the two stations is effected in exactly the same manner as that between two ordinary telephone stations.

Supposing station A wishes to communicate with station B, it takes the telephone off the hook and moves its tension relay D to the multiple to which it is connected. The operator of this multiple switchboard connects station A with B in the same manner as for a telephone conversation. Current is supplied to the two stations by means of the cords of the switch-board across the supervisory relays S which are placed in the central station to indicate to the operator that the line is occupied.

The stations are then in telephone communication across transformers F. In case resistance R and the primary of transformer T weaken the voices, these members may be short-circuited and cut out of the circuit during the conversation by closing a suitable switch W.

When the periodic interruptors P are operating, station A will only have to act on its interruptor P to send impulses over the line. At that moment the microphones M can be short-circuited in order to make the impulses clearer. However, this is not absolutely necessary.

Station A acting on its interruptor I sends impulses of microphonic current through the line, these impulses passing through the primary of the transformer T of station B are transmitted to the secondary and rectified by lamp O of station B. The result thereof is that on each of the impulses relay X of station B will be excited and will act on its contact Z, which contact may be used for call signals.

It will be noticed that, the impulses acting on the transformer of station A, will also actuate relay X of station A. Station A therefore likewise has a means of controlling its traffic.

If, during transmission from A to B, station B closes switch I, it may in turn send at will impulses from B to A. These impulses will be superposed on those sent by station A and station B may by holding the switch closed for an extended time produce a long impulse which will inform A that B desires to give some signal. It is to be noted that as long as interrupter I is not closed the stations may have telephone conversation. At the end of a communication, when the telephone apparatus are again hung on the hook, everything happens just as it does after an ordinary conversation, the supervisory relays S function and inform the operator of the close of the conversation.

The description given above relates to telephone installations with central batteries. In case one or both stations have a local battery, resistance R and periodic interruptor P may be placed in the primary circuit comprising the local battery, microphone and the primary of the local telephone induction coil.

A device of this type may be used for distance control on telephone lines of electric motors, light circuits, for all mechanical distance controls and in particular for the control of printing machines, system Baudot, teletypes, etc., which permit of adding a printing telegraph to the telephone.

What I claim is:—

1. In a telephone transmission system of the character described, a transmission line, a central battery feeding this line, a resistance associated with the transmission line and traversed by the central battery current, a local station at each extremity of the transmission line, each station comprising a telephone and a microphone in series with the transmission line, a rotating contact arranged in parallel with said resistance and adapted to short-circuit it periodically, a rectifier in the receiving station for rectifying current impulses produced by short-circuiting the resistance in the transmitting station, and a relay actuated by the rectified current.

2. In a telephone transmission system of the character described, a transmission line, a central battery feeding this line, a resistance associated with the transmission line and

traversed by the central battery current, a local station at each extremity of said transmission line comprising a telephone and a microphone in series with the transmission line, a rotating contact arranged in parallel with said resistance and adapted to short-circuit it periodically in cadence with an audio frequency, a rectifier in one local station for rectifying current impulses produced by short-circuiting the resistance in the other local station, and a relay actuated by the rectified current.

3. In a telephone transmission system of the character described, a transmission line, a central battery feeding this line, a local station at each extremity of the transmission line, each station comprising a telephone, a microphone and a resistance in series with the transmission line, a rotating contact arranged in parallel with said resistance and adapted to short-circuit it periodically, a rectifier in the receiving station for rectifying current impulses produced by short-circuiting the resistance in the transmitting station, and a relay actuated by the rectified current.

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