June 29, 1937. K. DANIEL 2,085,252

DEVICE FOR AUTOMATICALLY TRANSMITTING AND RECORDING MESSAGES

Filed May 13, 1933

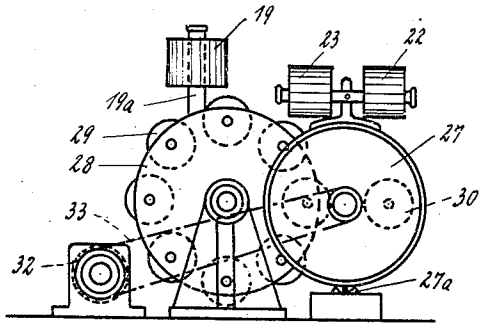

Fig.1.

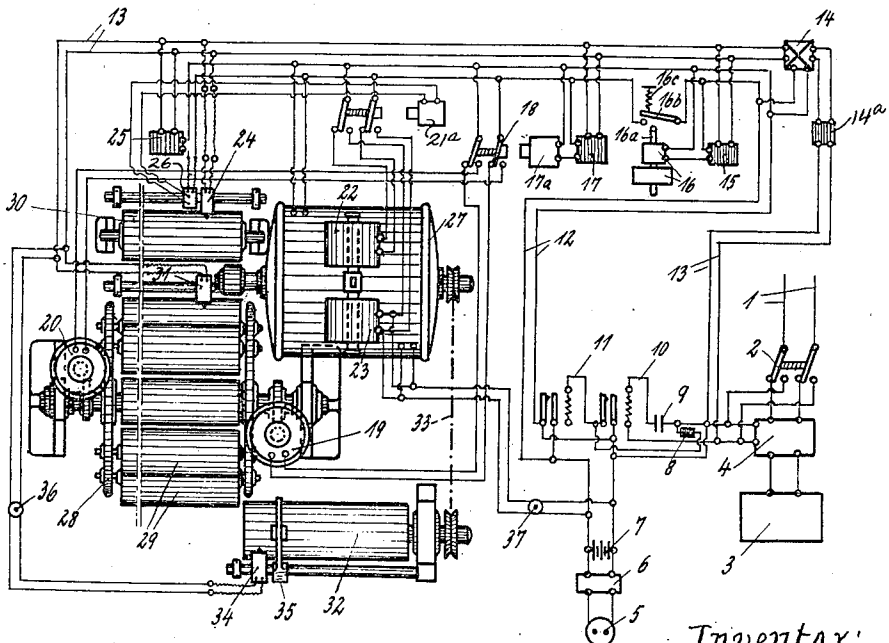

Fig.2.

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DEVICE FOR AUTOMATICALLY TRANSMITTING AND RECORDING MESSAGES

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8 Claims. (Cl. 179—6)

I have filed an application in Germany on May 21, 1932; in Great Britain on February 10, 1933; Switzerland, July 22, 1932; Italy, March 24, 1933; France, February 15, 1933; Belgium, February 22, 1933; and Austria, January 30, 1933.

The present invention relates to devices for use in telephone systems for automatically transmitting and recording messages, and more particularly to a device of this kind which is provided with a transmitting cylinder and a recording cylinder, and wherein the transmitting cylinder has a communication recorded upon it in the first place by the owner of the apparatus and is adapted to reproduce the said communication when a call takes place, whilst the recording cylinder is adapted automatically to record incoming speech, such as conversation or messages.

According to the invention the control of the switching operations in devices of this kind is considerably improved, and in particular it is rendered possible to record on the transmitting cylinder messages coming from any other substation on the telephone system, as also to listen from any other substation on the telephone system to the recorded messages, whilst in addition to this, means are provided for automatically switching out the whole device. The control of the aforesaid operations and similar operations is effected according to the invention by the transmission of acoustically generated audio frequency currents to electromagnetically operated apparatuses of a kind known per se which energize switching relays.

A preferred constructional form of the invention is illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is an end elevation of the device, and

Fig. 2 is a plan thereof together with a diagram of connections.

The mechanical part of the device comprises a transmitting cylinder **30** and a recording cylinder **29** together with their driving means. On the transmitting cylinder **30** a standard announcement or communication is recorded or engraved. Beyond this comparatively short communication the owner of the apparatus can make a speech record on the transmitting cylinder either directly or from any desired telephone at another substation on the system according to his requirements. In the former case the apparatus is switched off from the telephone system and connected to its own speech transmitting leads by means of a separate switch. In front of the transmitting cylinder a sound box **24** provided with a needle for recording or reproducing respectively is slidably arranged, which sound box serves both for recording speech on the transmitting cylinder by the owner and also for the reproduction of the communication when a call from a person other than the subscriber occurs. On the bar, on which the sound box **24** slides a contact **26** is provided, which can be brought into any desired position on the bar. The said contact **26** is connected in a circuit in which an electromagnet **21***a* actuating a switch **21** is likewise connected, which according to its position switches on or off respectively a solenoid **22** or a solenoid **23**. The said solenoids serve for coupling the motor either with the transmitting cylinder **30** or with the recording cylinder **29**. The switch **21** is operated by the sound box **24** striking against the contact **26**. On the contact **26** a device is also provided which, when the sound box strikes it, automatically switches out the latter, whereupon the sound box flies back into its initial position under the influence of the spring **24***a*.

The sound box **24** is only switched in again on the arrival of a new communication when the motor which is coupled with the recording cylinder **29** at the end of the previous communication becomes coupled with the transmitting cylinder **30** at the beginning of the new conversation. By this change over of the coupling the sound box **24** is simultaneously switched in automatically in a manner not shown on the drawing. In front of the recording cylinder a sound box **31** adapted to co-operate with the said cylinder is slidably mounted. The driving motor **37** is mounted so as to be capable of swinging on pivotal supports **27***a* and is provided with a rubber friction wheel **27***b* which, according to the connections of the circuit, is pressed through the agency of the solenoids **22** and **23** either up against the transmitting cylinder **30** or up against the recording cylinder **29**. The said cylinders may by suitable modifications of the construction be replaced by endless bands.

Besides the said cylinders a further cylinder **32** is provided which is carried on a shaft journalled at its one end and which serves for the preservation or storage of speech records of communication and the like. If it is desired to transfer a speech record to the cylinder **32** for preservation, the cylinder is set in rotation by means of a belt **33** and a sound box **34** is switched in by means of the switch **36**. After the recording operation the part which has been recorded upon may be cut off by means of a cutter **35** in order to facilitate the preservation of the speech record. For the same purpose a roller mechanism for a

narrow phonographic strip of prepared paper or the like might likewise serve, on to which strip the recorded speech could be transmitted for preservation and from which it could be listened to at any time.

The sound box 24, which is arranged in known manner so as to be movable in front of the transmitting cylinder, strikes, when a normal call occurs at the conclusion of the communication, against the contact 26. A circuit is thereby closed which energizes a magnet 21*a*, which latter causes the switch 21 to move from the position shown in the drawing towards the right. As a result of this the solenoid 22 is switched out and the solenoid 23 is switched in, whereby the motor is swung in such manner that it no longer drives the transmitting cylinder 30 but drives the recording cylinder 29 instead. At the same time by the impact of the sound box 24 on the contact 26 the sound box is switched out and a spring 24*a* is released, whereby the sound box is drawn back into its initial position.

The actuation of the device described is effected indirectly by means of local alternating current supply which is led in by means of a plug socket 5, is converted in a rectifier 6 into direct current and is transformed from the mains voltage to a lower voltage. The storage battery 7 is then supplied with current at the lower voltage and the current passes thence directly into the apparatus. The circuit is closed by means of the switches 10 and 11, which can be actuated either by energization of the magnet 10*a* or of the magnet 11*a*. In the circuit of the magnet 10*a* there is a condenser 9 which is intended to prevent the actuation of the said magnet 10*a* by the exchange battery (continuous currents). Between the exchange leads 1 and the telephone 3, in addition to the hand-manipulated change-over switch 2, a retarding relay 4 is connected, which effects the change-over of the exchange leads 1 on to the apparatus only after the expiration of a certain time in order to delay the switching in of the apparatus when the subscriber is present, in which case it is, of course, not necessary to switch in. By means of the hand operated switch 2 connected in the exchange leads 1 the incoming calling currents are conducted either directly into the apparatus or into the retarding relay 4 which only automatically switches over on to the apparatus after the lapse of a certain time. After the operation of switching over on to the apparatus has taken place the incoming calling currents energize the magnet 10*a* which switches in the two switches 10 and 11, whereby the circuit through the plug socket 5 for the local current, the rectifier 6, the interposed battery 7 and the magnet 11*a* is closed. The battery serves as a reserve which renders it possible for the device to function for a certain time entirely satisfactorily even when the local current is cut off. After the cessation of the calling current the magnet 10*a* has no current passing through it. The switches 10 and 11 are now retained by the magnet 11*b* in their closed position until in a manner hereinafter described the circuit of the mains current is interrupted for a short time.

By the switching in of the switch 10 the circuit of the speaking current leads 13 in which circuit the choking coil 8 is connected, is closed. The station audio frequency currents arriving through the leads 14 are led through the transformer 14*a* to the amplifier 14, so that a separation from the station current circuit is ensured. By closing the switches 10 and 11 the motor 27 and also the solenoid 22 are supplied with current over leads 12*a* and switch 21 respectively whereby the motor is coupled with the transmitting cylinder 30, which now gives the communication to the caller through the circuit of the sound box 24, the leads 13 and the amplifier 14. At the end of the communication the sound box 24 touches the stop contact 26, is lifted up in the manner already described and is brought back into the initial position by spring action. Previously, as a result of the striking of the sound box 24 on the contact 26, a circuit is closed, in which a magnet 21*a* is connected, which latter is thereby energized and changes over the switch 21, whereby the solenoid 22 is switched out and the solenoid 23 switched in; thereby the motor is coupled with the recording cylinder 29. This switching over from transmitting to recording is completed very rapidly. During the communication or conversation which now follows the diaphragm of the relay 15 is set in vibration electromagnetically by speech currents so that it intermittently closes the circuit of the magnet 16 which when first energized attracts the armature 16*a* the return movement of which is retarded by means of any suitable breaking device known per se. In spite of the intermittent energization the armature 16*a* remains attracted, inasmuch as it is held between the individual energizing impulses by means of the retarding mechanism.

When the conversation is ended the operation of the diaphragm of the relay 15 and consequently the intermittent energization of the magnet 16 ceases. After the action of the retarding device has ceased the armature 16*a* flies upwards under spring action, strikes against the contact lever 16*b* of the lead 12, which contact lever is controlled by the spring 16*c*, and thereby lifts up the said contact lever for a short period, until the contact lever 16*b* is again brought into the closed position by the spring 16*c*. By this short interruption of the circuit the installation is put out of action and the magnet 11*a* has no current passing through it whereby the switches 10 and 11 are opened. On the descent of the armature the lever contact 16*b* is switched in again and thus again establishes the connection for new incoming conversations. The sound box 31 recording the conversation remains located at the place at which the recorded communication had ended owing to the cutting off of the supply current.

The owner of the apparatus can listen later on to the recorded communications by means of a loud speaker or directly by means of his telephone apparatus. In this case he switches over a switch 37, whereupon the owner can commence to listen to the recorded communications. Communications of particular importance can be transmitted via switch 36 to the cylinder 32 and be detached for preservation or storage. The communications can likewise be listened to by means of this device through the medium of the amplifier 14. The duration, time of day and number of the recorded conversations can be registered by means of a clockwork device. The details of these less important auxiliary devices are not shown in the drawing as they are already known per se and will be readily comprehensible without further description.

In order to render possible the recording of speech on the transmitting cylinder from any other substation on the telephone system, an electromagnetically operated apparatus 25 of

known kind is provided which is tuned to a definite note. When the owner has heard the communication of his apparatus, i. e. the message recorded on cylinder 30, he then sounds the said note by means of a whistle, tuning fork or the like, whereupon the electromagnetically operated apparatus 25 comes into operation and closes the circuit for the magnet at the stop contact 26; thereupon the magnet lifts a lever carrying the stop lever away from the shaft. Then the sound box 24 slides forward on the guide spindle, transmitting the additional communication from the owner to the cylinder and pushing the stop contact 26 with the raised stop lever forwards in front of it. For initiating this operation it is only necessary to close the circuit once so that the sound which switches in the apparatus 25 only needs to be of short duration. The switching out operation is effected at the end of the communication through the medium of the parts 15 and 16 in similar manner to that above described with reference to the case of the reception of communications. In consequence of the opening of the circuit thereby effected the magnet in the stop contact 26 is no longer energized as a result of which the stop lever is operative again, whilst the sound box 24 flies back into its initial position under the action of a previously tensioned spring. When calls arrive in the absence of the subscriber, the sound box 24 now runs over the whole recording space for communications up to the stop contact 26 and thus communicates the whole communication to the person calling up.

If the proprietor desires to hear from any other substation on the telephone system the communications recorded in his absence then, after the announcement from cylinder 30 of his apparatus is completed, he again sounds, likewise, by means of a whistle or the like, a definite note or sound, which in this case is taken up by the electromagnetically operated diaphragm of the relay 17. This closes the circuit of the magnet 17a appertaining thereto, whereby a locking member (not shown on the drawing) in the sound box 31 is put out of action and the latter is thus disconnected from its guiding rod in similar manner to the sound box 26 and is drawn back into its initial position wherein it engages once more with the guide rod. The sound box 31 then reproduces to the calling subscriber the communications which have been received.

The amplifier 14 serves for the amplification both of incoming and also outgoing conversations. For this purpose it is provided with a change-over switch which is automatically controlled correspondingly by the incoming and outgoing currents respectively in known manner.

I claim:

1. In a device for use in telephone systems for automatically transmitting and recording messages, the combination of: an electrically controlled transmitting phonograph cylinder; means including a sound box for enabling an initial message to be recorded on said transmitting cylinder and transmitted therefrom; a plurality of electrically controlled recording cylinders for recording and reproducing messages subsequent to the recording of the initial message; means including a sound box for reproducing messages from said recording cylinders; a cylindrical cage upon which said recording cylinders are mounted parallel to one another; rack and pinion mechanisms for turning said cage to bring the cylinder into the operative position; solenoids operatively connected with said rack and pinion mechanisms to operate the latter when current is supplied to said solenoids after a given recording cylinder has run its full course; electromagnetic apparatuses which are actuated by audio frequency currents and operate switches controlling said cylinders and said sound boxes; and sources of electricity supply for said electrically controlled elements and said electromagnetic apparatuses.

2. In a device for use in telephone systems for automatically transmitting and recording messages, the combination of: an electrically controlled transmitting phonograph cylinder; means including a sound box for enabling an initial message to be recorded on said transmitting cylinder and transmitted therefrom; a plurality of electrically controlled recording cylinders for recording and reproducing messages subsequent to the recording of the initial message; means including a sound box for reproducing messages from said recording cylinders; a cylindrical cage upon which said recording cylinders are mounted parallel to one another; rack and pinion mechanisms for turning said cage to bring the cylinder into the operative position; solenoids operatively connected with said rack and pinion mechanisms to operate the latter when current is supplied to said solenoids after a given recording cylinder has run its full course; electromagnetic apparatuses which are actuated by audio frequency currents and operate switches controlling said cylinders and said sound boxes; sources of electricity supply for said electrically controlled elements and said electromagnetic apparatuses; a driving motor mounted so as to be capable of swinging; and means for swinging said motor between said transmission cylinder and the recording cylinder located in the operative position into driving engagement with one of said cylinders.

3. In a device for use in telephone systems for automatically transmitting and recording messages, a combination as specified in claim 2, wherein the means for swinging said motor comprise solenoids operatively connected to said motor.

4. In a device for use in telephone systems for automatically transmitting and recording messages, a combination as specified in claim 2, wherein the means for swinging said motor comprise solenoids operatively connected with said motor; and a rubber friction wheel on the shaft of said motor adapted to bear on the one or the other cylinder to make driving connection therewith.

5. In a device for use in telephone systems for automatically transmitting and recording messages, of the kind in which remote control is employed, the combination of: an electrically controlled transmitting phonograph cylinder; means including a controlled sound box for enabling an initial message to be recorded on said transmitting cylinder and transmitted therefrom; an electrically controlled recording cylinder for recording and reproducing messages subsequent to the recording of the initial message; means including a sound box for reproducing messages from said recording cylinders; electro-magnetic apparatuses which are operated by audio frequency currents and operate switches controlling said cylinders and said sound boxes; sources of electricity supply for said electrically controlled elements and said electro-magnetic apparatuses; all said elements being adapted to be controlled and operated from any part of an ordinary telephone mains system.

6. In a device for use in telephone systems as specified in claim 5, the provision of: a driving motor which is adapted to swing between a recording and a reproducing cylinder into the necessary operative positions to effect driving engagement with said cylinders.

7. An apparatus for use in telephone systems for automatically transmitting and recording messages, comprising in combination: a phonograph cylinder; an electrically controlled sound box for recording messages on and reproducing messages from said cylinder; a second phonograph cylinder; a second electrically controlled sound box for recording messages on and reproducing messages from said second phonograph cylinder; electrically operated means for controlling both of said sound boxes including devices set in action by audio frequency currents; a telephone electrically connected with said sound boxes and electrically operated means; and sources of electricity supply electrically connected with said sound boxes and electrically operated means; said devices set in action by audio-frequency being tuned to respond to definite sounds, whereby the apparatus is adapted to be controlled and operated from any part of an ordinary telephone system, substantially as described.

8. An apparatus for use in telephone systems for automatically transmitting and recording messages, comprising in combination: a phonograph cylinder; an electrically controlled sound box for recording messages on and reproducing messages from said cylinder; a second phonograph cylinder; a second electrically controlled sound box for recording messages on and reproducing messages from said second phonograph cylinder; a swivelling electro-motor driving said phonograph cylinders selectively; electrically operated devices for controlling both of said sound boxes set in action by audio-frequency currents; a telephone electrically connected with said sound boxes and electrically operated means, whereby messages can be transmitted to and heard from said phonograph cylinders; and sources of electricity supply electrically connected with said sound boxes and electrically operated means; said devices set in action by audio-frequency being tuned to respond to definite sounds, whereby the apparatus is adapted to be controlled and operated from any part of an ordinary telephone system, substantially as described.

KARL DANIEL.