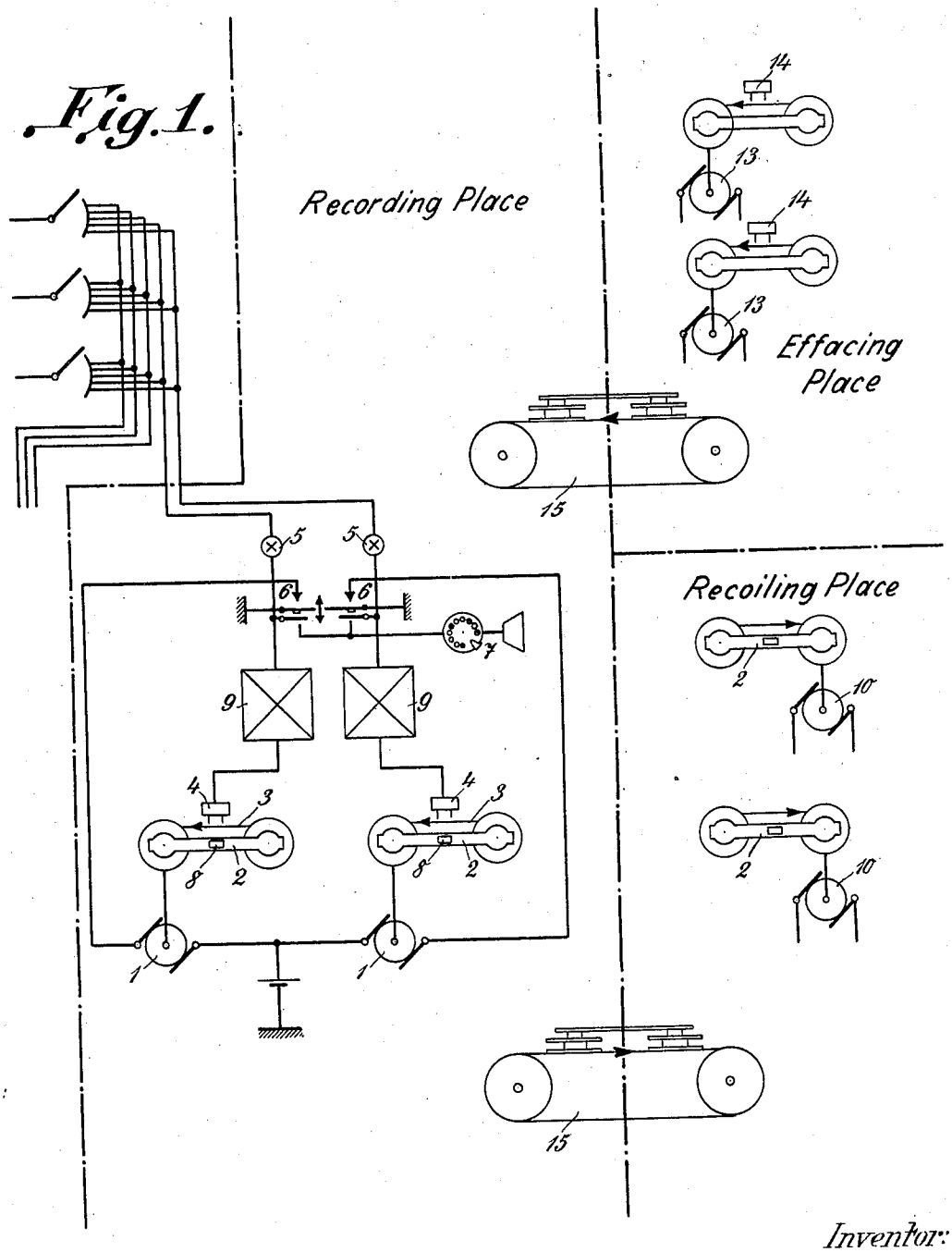
April 25, 1939. R. MILDE 2,156,094

METHOD OF REPRODUCING TELEPHONIC COMMUNICATIONS

Filed March 12, 1935 2 Sheets-Sheet 1

Fig. 1.



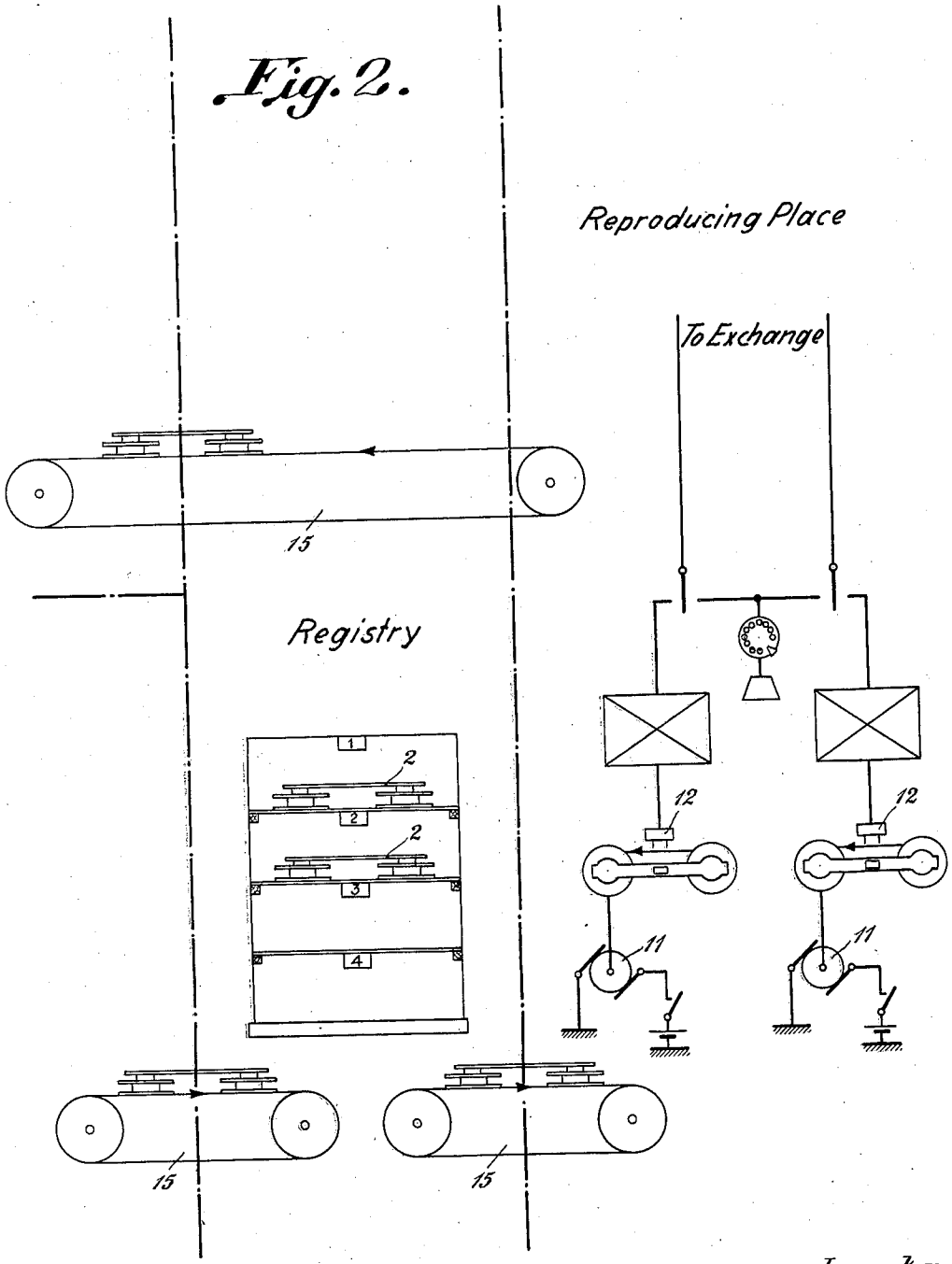
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Fig. 2.



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METHOD OF REPRODUCING TELEPHONIC COMMUNICATIONS

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4 Claims. (Cl. 179—6)

There is a special service in telephone exchanges which consists in transmitting communications from a calling subscriber to the called subscriber if the latter does not answer the call. The method heretofore adopted for this purpose is somewhat primitive. The calling subscriber gives an order to the operator in charge of this service, who either writes it down in shorthand according to his dictation or even has to keep the order in her memory, and requests her to pass the message on to its destination.

This method is limited in its adaptability and is precarious especially if employed for toll line traffic. In most cases toll line communications are of a detailed character and therefore expected to be passed on in their original wording. The subscriber's message must hence be written down in shorthand and thus takes up an operator's time while adding to the fee and from a human point of view being a great burden for the operator when much occupied. Moreover it is often unpleasant that the operator will exactly know all particulars of the communications.

The invention therefore proposes to employ in the telephone exchange sound-recording methods instead of an operator receiving the communication. The incoming communication is in this way truly recorded without the speaking person having to pay regard to time relations and may then be reproduced to the respective subscriber at a convenient time.

For effecting the invention special arrangements adapted for the purpose are required which will be described hereafter more fully.

The magnetic sound-recording method is preferably employed therefor, especially because it enables a record to be produced after another record on the record carrier has been effaced. As soon as the recorded text has been communicated to the respective subscriber, the same record carrier may be used for recording another communication. Another advantage of the magnetic sound recording is that the receipt is effected without causing any technical complication and may be reproduced at once.

One embodiment of an arrangement for recording and reproducing toll line communications is described hereafter in its main features, reference being had to the accompanying drawings which together constitute a diagrammatic representation thereof. Figs. 1 and 2 are to be placed together with Fig. 2 on the right.

The subscriber is automatically connected with the position of a free operator in charge of the recording service. This may occur in response to the deliberate calling of a special number reserved for this service. Or it may also occur as the result of calling for a subscriber whose line is connected to the recording operator's position. At the operator's position one or several recording machines are disposed.

Such a machine has a motor 1 which through a suitable gearing governs a main driving shaft. In addition there is a second shaft which is constantly acted upon by a brake. A frame or casing 2 in which the two spools fitted in a well-known manner with the record carrier 3 are mounted, is easy to place on the said driving device and to remove therefrom. The record carrier 3 is a steel wire or tape. Moreover there is a magnet head 4 for recording the communications. The record carrier 3 runs through this magnet head when the motor is in motion. The said main driving shaft causes one of the two said spools to wind up the wire or tape 3.

As soon as the operator is apprised of the call of the subscriber, for instance by a lamp 5, she enters into communication with him by manipulating the switch 6, which in the drawings is to be moved downward. By means of her equipment 7 she ascertains to which subscriber a communication is to be made, and in repeating the number of this subscriber she writes this number on a small plate fixed on the set of spools. She then sets the recording machine in motion, namely by moving the switch 6 in a direction which in the drawings is upward, and the text spoken by the subscriber is now recorded.

The recording time of such a device 2 may be made different according to the special local conditions. In most cases it will be recommendable to employ devices having a recording time of 3 or 6 minutes, since the general schedule of telephone fees is likewise based on these periods of time. The operator will usually be able to ascertain, by asking the subscriber as to the length of the intended communication, whether a 3 or a 6 minutes device is to be used.

During the recording the dictating subscriber receives a signal from the exchange, namely a sound which may be either intermittent or continuous and serves to announce to him that the machine is running and recording his dictation. Before the record stops, the dictating subscriber is given a special signal so as to know that the recording time will soon be finished. The arrangements therefor are indicated in a schematic manner at 9. It is advantageous to combine them with the recording amplifier. The signals may however be produced also by central sig-

nalling machines disposed in the exchange. The arrangements 9 then contain cam discs which govern sets of springs for controlling the signals. Furtner, the arrangement may then be such that after the recording has been finished, the connection shall be released without the operator having to intervene in any manner.

As soon as the recording machine stops, the operator removes the set of spools and sends it to a place (recoiling place) where the wire or tape 3 is by means of a special machine (motor 10) swiftly recoiled in a well-known manner until the commencement of the communication is reached. The set of spools is then in accordance with the number on its plate 8 deposited in a registry. The recorded dictation is at a convenient time communicated to the respective subscriber by the intermediary of a reproducing machine (motor 11) which is similar to the recording machine, but has a reproducing magnet head instead of the recording head. Hereupon the subscriber's number on a plate 8 is cancelled, and the set of spools is now again placed on a recoiling machine, in order that the wire or tape 3 be recoiled and the communication thereon effaced. The recoiling machines (motor 13) correspond in their construction to the recording and reproducing machines, with the difference, however, that the shaft which in the case of the recording and reproducing machines is the drawing one is in this case the one which is drawn by the wire, while the shaft which in those machines is drawn is here the drawing shaft. The effacing head is designated 14. After the recoiling and effacing has been effected, the set of spools may be placed again onto the recording machine and thus be used for a new recording.

The application of sound recording methods is in itself known with telephonic intercommunication, namely in the form of the so-called telephone-supervising machines. These are located at the subscriber's station and serve to record the conversations. In such case both the outgoing and the incoming parts thereof are recorded, i. e. the entire conversation in each event. The arrangements must be such that the subscriber may be able to effect the recoiling and hearing by means of one single machine.

The machines necessary for carrying the invention into effect are of a type different from these prior arrangements, as will appear from the foregoing description, since they have to perform only one function in each case. The machine disposed at the operator's position has to move the wire or tape in only one direction, this machine serving for recording only. There is a separate machine for recoiling, in order that the operator at the recording place need not be charged with the recoiling too. For the reproduction to the subscriber there is again a separate machine, and so on.

At first it seems that by subdividing the functions and adapting the machines to such subdivision the entire expenditure in means will be greater than otherwise. Such is not the case, however, because the attendants are occupied in a more profitable manner than heretofore, so that the novel arrangement when regarded as a whole proves to be possessed of advantages.

The recording machines as used heretofore with the subscribers' stations are also for constructional reasons not adapted for use in exchanges, their construction, requisite for the purposes they have served hitherto, being much too spacious.

The arrangements described herebefore may undergo certain modifications without departing from the spirit of the invention. Thus it is possible for instance not to time the movement of the record wire or tape in the recording place, but to render this movement dependent upon whether or not a subscriber is speaking. This may be ensured in such a manner, for instance, that a controlling voltage is derived from the talking currents over a rectifier and brought to govern the drive for the record wire or tape. As soon as the subscriber ceases to speak and the controlling voltage is dispensed with, the wire or tape is stopped. This arrangement, it is true, must operate with such a delay that the stopping shall not occur in short pauses of speaking but only in the event of pauses which are of a certain duration.

If this method is employed then the use of one set of spools for several communications is practicable. That is to say, after a communication has been finished, a certain further piece of the wire or tape is uncoiled and then the next communication recorded. This method may of course be adopted also if the limitation is timed, as stated before. It has the disadvantage, however, that the transmission of the communications to the subscriber is not quite simple if, for example, a second or third communication must be reproduced first. In such case it will be unavoidable to uncoil and recoil the wire or tape repeatedly. If, however, each communication is recorded on a separate wire or tape, as indicated herebefore, the whole operation is simpler than otherwise.

The sets of spools are brought from one working place to another by means of conveyors 15 which may be conveyor bands or the like. The loads here transported are not great, as the record carriers may be smaller than in the case of the before-mentioned telephone supervising machines and as moreover the frame or casing of the sets of spools may be cast of a light metal.

What is claimed is:

1. In a system for conveying telephone messages between subscribers in a delayed manner, a plurality of subscribers' lines extending to a central exchange, a plurality of magnetic recorders at the exchange, a plurality of flexible ferrous bodies for receiving recording from said recorders in the form of lasting magnetizations, an operator's switchboard position having a control device thereat, selective switching means for connecting any of said lines to a selected one of said recorders, connections for controlling said recorder from said device, separate reproducing mechanisms for reproducing the recordings from said bodies, means for selectively connecting said reproducing mechanism with a selected one of said lines, and effacing means for effacing the lasting magnetizations from the bodies after reproduction of the message.

2. In a system for recording and reproducing telephone messages, a plurality of telephone subscribers' lines, a central exchange, a plurality of recording mechanisms located at the exchange, switching means adapted selectively to couple any one of said lines with any one of said mechanisms, a plurality of separate reproducing mechanism for reproducing the messages recorded by the recording mechanisms, and switching means for operatively associating said reproducing mechanism with a selected one of said lines.

3. In a system for recording and reproducing

telephone messages, a plurality of removable subscribers' lines, recording apparatus, a plurality of magnetic bodies adapted to be lastingly magnetized by said apparatus whereby messages are recorded on said bodies, selective switching means for connecting any one of the lines with the recording apparatus for recording a message, separate reproducing apparatus for reproducing the messages recorded on said bodies, means for selectively associating said reproducing apparatus with any one of said lines, and means for separately identifying each of said bodies.

4. In a system for conveying telephone messages between subscribers, a plurality of lines extending to a central exchange, means at the exchange for transmitting messages from the calling subscribers to the called subscribers comprising a plurality of magnetic sound recording devices, means for associating a calling subscriber's line with one of said sound recording devices, and means controlled by speech currents over the calling wire for starting and stopping the associated sound recording devices.

RUDOLF MILDE.