

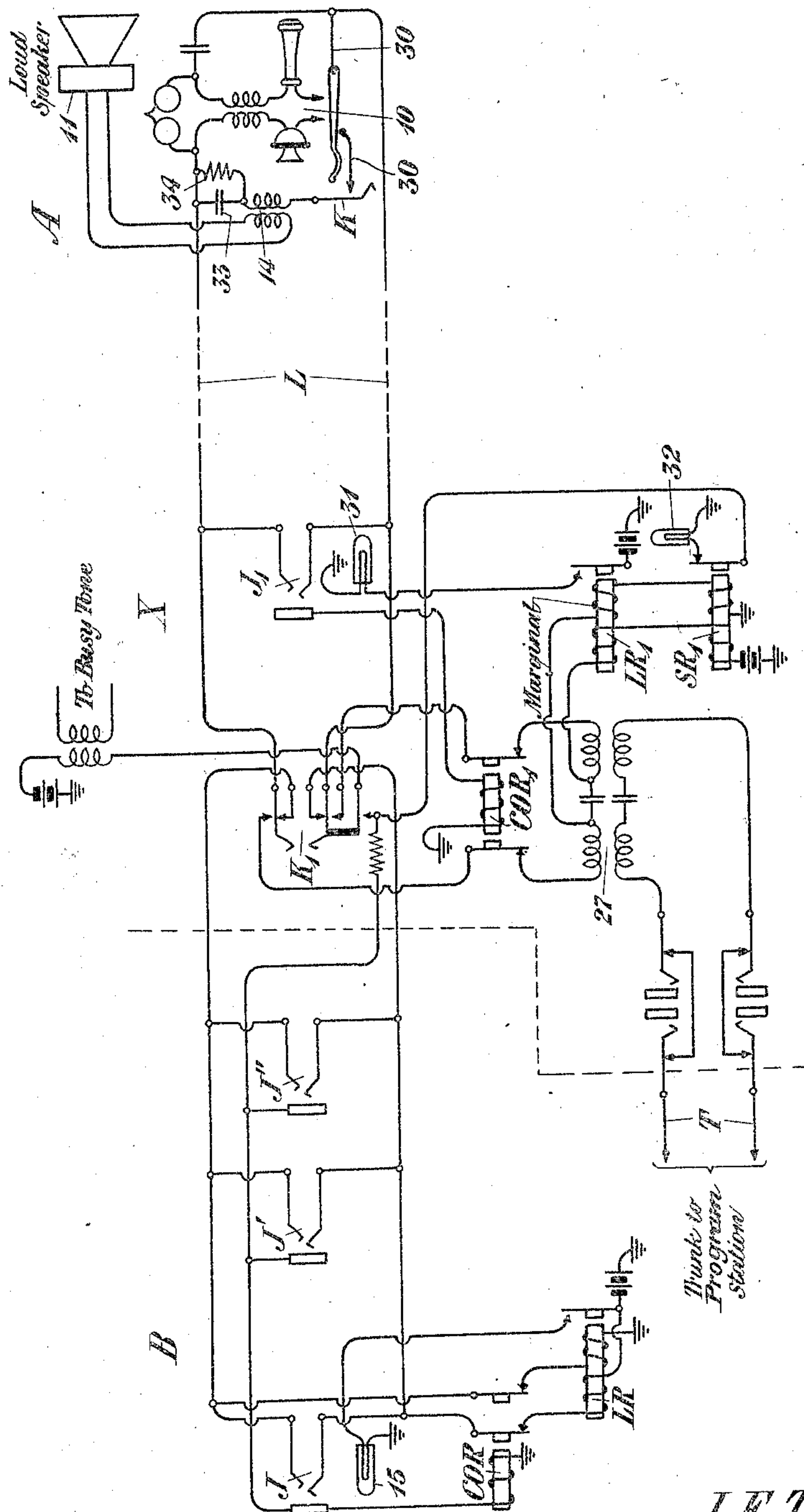
Aug. 18, 1925.

1,549,816

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PROGRAM TRANSMISSION OVER WIRES

Original Filed Nov. 11, 1922



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Patented Aug. 18, 1925.

1,549,816

UNITED STATES PATENT OFFICE.

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PROGRAM-TRANSMISSION OVER WIRES.

Application filed November 11, 1922, Serial No. 693,252. Renewed February 13, 1925.

To all whom it may concern:

Be it known that I, JOHN F. TOOMEY, residing at New York, in the county of New York and State of New York, have invented certain Improvements in Program-Transmission Over Wires, of which the following is a specification.

This invention relates to systems of communication and more particularly to systems for disseminating news, information, music or the like.

Various schemes have been proposed heretofore for program transmitting purposes. The only one of these schemes which has been exploited to any extent is radio broadcasting, that is, the dissemination of news, information or entertainment by means of radio telephone equipment, so that persons provided with suitable radio receiving sets tuned to the proper wave length may receive the distributed entertainment or the like.

This method, however, has very serious objections. In the first place, numerous broadcasting stations in the same area operate on wave lengths sufficiently close together to interfere with each other. Furthermore, radio telephonic transmission necessarily involves the use of a much wider band of the frequency spectrum than is used for wireless telegraph purposes, and in view of the fact that the number of wave lengths available for radio communication are necessarily limited it is undesirable that wave lengths necessary for commercial communication should be utilized for purposes of mere entertainment. Finally, in order to avail himself of the transmitted information or entertainment, each individual subscriber must provide himself with a radio receiving equipment which involves storing upon his premises expensive storage batteries which are constantly in need of recharging, together with a considerable amount of delicate and elaborate electrical apparatus, such as coils, detectors, amplifiers, etc., all of which involve careful maintenance. Moreover, the radio receiving set as now known is, at its best, an inherently ugly thing, absolutely out of place in the home and requiring for its operation a network of unsightly wiring.

Realizing the inherent limitations of radio broadcasting, proposals have been made to use existing wire systems, such as

telephone, telegraph or power networks for program-transmitting purposes by transmitting carrier frequencies over such existing power or communication lines. Such a method, however, would be extremely expensive as well as complicated, as it involves a very considerable reorganization of the telephone plant or power plant, and requires the use of quite complicated and expensive apparatus.

The ordinary telephone plant, however, offers unusual facilities for program transmitting purposes by the use of ordinary telephonic methods and without the employment of any high frequency or carrier methods of signaling. When it is realized that the average subscriber's telephone set is in use for telephonic purposes only during an extremely small part of the time, it becomes at once apparent that if the telephone line, during its idle periods, could be used for transmitting news, information or entertainment, the plant could be used much more economically and the information or the like could be transmitted to the subscriber in the simplest manner possible. It may further be observed that the average subscriber to a program service, particularly a service for transmitting directed entertainment, would only desire to avail himself of the service during the late afternoon or during the evening, at which times the average subscriber's telephone is only used for social purposes and is rarely or never used for business calls.

Having these circumstances in mind, it is proposed by this invention to provide simple, practical and economical arrangements by which news, information, music or other forms of entertainment may be transmitted at ordinary telephonic frequencies from a central program transmitting station over subscribers' telephone lines. It is also proposed by this invention to provide a system whereby the telephone subscriber may receive the program service without interfering in any way with the use of his line for ordinary telephone purposes. This invention also renders available a program transmitting system in which the apparatus is not only at the central station but more particularly at the subscriber's station will be extremely simple and economical and yet efficient.

The invention may now be more fully un-

derstood by reference to the following detailed description thereof when read in connection with the accompanying drawing, the figure of which discloses a circuit arrangement illustrating the principles of the invention.

Referring to the drawing, L designates an ordinary telephone subscriber's line terminating at one end at a subscriber's station A and at the other end in a central office B. At the station A, the usual form of telephone set 10 is provided for ordinary telephonic purposes and a supplemental key K is provided for associating with the line a program receiving equipment comprising a loud speaking receiver 11. The loud speaker 11 is associated with a circuit 30 by means of a transformer 14, the circuit 30 being bridged across the line under the joint control of the key K and the subscriber's switchhook.

At the central station B, the line terminates in the usual type of answering jack J, whereby telephonic communication may be established between the line L and other lines terminating at the exchange. In addition to the answering jack J, multiple jacks such as J', J'', etc., may be provided, if desired. The usual type of line relay LR is connected to the line for controlling the circuit of the line lamp 15, and the cut-off relay COR is controlled over the sleeve of the answering jack or of the multiples thereof to disconnect the line relay LR when a call is answered.

In order that the line may be used for program transmitting purposes, an auxiliary operator's position is provided at X, a jack J₁ and a key K₁ being provided at this position. By means of the key K₁, the line may be disconnected from the answering jack and its multiples and connected through a transformer 27 to a trunk T leading to a program transmitting station. A marginal line relay LR₁ and a special relay SR₁ are connected with the secondary winding of the transformer 27, so that these relays will be associated with the line when the key K₁ is actuated to connect the line to the program transmitting station. An auxiliary cut-off relay COR' may be operated over the sleeve of the jack J₁ to open the connection to the program circuit and disconnect the relays LR₁ and SR₁, the former of which controls an auxiliary line lamp 31 and the latter of which controls a disconnect lamp 32.

Further details of the invention may be understood from the operation which is as follows:

Under ordinary circumstances, with the key K₁ unactuated and the contact of the key K at the substation open, the line is directly connected to the answering jack J, and the connection to the program trans-

mitting station is open. Consequently, the line may be used for ordinary telephonic purposes in the usual way, the subscriber operating the line relay LR by taking his receiver from the switchhook and the operator effacing the line lamp 15 by plugging into the jack J and operating the cut-off relay COR. When, however, the subscriber wishes to be connected with the program service, he will remove the receiver from the hook in the same manner as making an ordinary call, and when the operator acknowledges the call will ask to be connected to the program switchboard at which the jack J₁ is located. The operator may then connect the subscriber to the auxiliary operator's position either by a trunking operation, by which the subscriber obtains direct communication with the operator at the program switchboard, or the regular operator may, by means of a call wire, inform the operator at the program switchboard that the subscriber desires a program connection. The operator at the program switchboard will then operate the key K₁ associated with the line L. The operation of this key disconnects the line L from the regular switchboard equipment involving the jack J and its multiples and connects the subscriber's line to the program circuit over the contacts of the auxiliary cut-off relay COR', transformer 27 and trunk T. The operation of the key K₁ also connects battery over its lower make contact to the sleeves of the answering jack J and its multiples, so that the line will test busy at the regular switchboard as long as it is connected with the program service.

The subscriber may now hang up his receiver and operate the key K, thus completing the bridge 30 over the back contact of the switchhook and the contact of the key K, so that the loud speaker will be operated by the program currents. It will be observed that the condenser 33 in the circuit 30 is shunted by a resistance 34, and the impedance of this circuit is so high that the marginal relay LR₁ will not be operated over the direct current circuit established by actuating the key K. The special relay SR₁ will, however, be operated and will hold open the circuit of the disconnect lamp 32.

If, now, the subscriber desires to disconnect from the program circuit, he may restore the key K to its normal position, thus disconnecting the loud speaker 11 and opening the circuit of the special relay SR₁. This relay, upon becoming deenergized, closes the circuit of the disconnect lamp 32, this circuit having been previously prepared over the lower make contact of the key K₁. The glowing of the disconnect lamp which is associated with the key K₁ indicates to the operator that the subscriber no longer desires a program connection. The oper-

ator will then restore the key K_1 to normal, thus disconnecting the line from the program transmitting equipment and restoring the connection of the line to the answering jack and associated apparatus at the regular switchboard. This arrangement of the circuit enables the line to be restored to its normal condition by the auxiliary operator as soon as the subscriber is through with the program service, so that incoming calls for his line can be completed.

If, during the time when the subscriber is connected with the program service, he wishes to originate a call, the removal of the receiver from the switchhook completes a low impedance circuit to the subscriber's set, thereby actuating both the special relay SR_1 and the marginal line relay LR_1 . The line relay LR_1 completes the circuit of the line lamp 31 at the program switchboard. The program operator upon observing the lamp will answer the call by means of the ordinary type of cord circuit in the usual manner, and if the call is for another subscriber, the auxiliary operator will complete the call through the jack J_1 in the usual manner. This causes the cut-off relay COR_1 to be operated over the sleeve circuit of the jack J_1 . The cut-off relay disconnects the line L_1 from the program circuit even though the key K_1 is actuated. At the same time the relays LR_1 and SR_1 are disconnected, and the line lamp 31 is extinguished.

It will be obvious that the general principles herein disclosed may be embodied in many 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 telephone system, a telephone line terminating at one end at a central office and at the other in a subscriber's station, a telephone set at the subscriber's station, an operator's position at the central office having jacks thereat whereby said line may be interconnected with other telephone lines for telephonic intercommunication, a program transmitting station normally disconnected from said line, a second operator's position and switching means thereat for connecting said line to said program transmitting station, and means at said second operator's position whereby when said line is connected to said program transmitting station ordinary telephone calls originating on the line may be answered at said second operator's position.

2. In a telephone system, a telephone line terminating at a central office at one end and a subscriber's station at the other, a telephone set at the subscriber's station, an operator's position at the central office, a jack at said operator's position for interconnecting said line with other telephone lines for

ordinary telephonic intercommunication, a line lamp associated with said jack to indicate to the operator that the line is calling, a program transmitting station normally disconnected from said line, a second operator's position, switching means at said second operator's position for disconnecting said line from said jack and connecting it to said program transmitting station, a second jack at said second operator's position for interconnecting said line with other telephone lines for ordinary telephone purposes if said line is connected to the program transmitting station, and a line lamp associated with said second jack for indicating to the operator at the second operator's position that the line is calling.

3. In a telephone system, a telephone line terminating at a central office at one end and a subscriber's station at the other, a telephone set at the subscriber's station, an operator's position at the central office, a jack at said operator's position for interconnecting said line with other telephone lines for ordinary telephonic intercommunication, a line lamp associated with said jack to indicate to the operator that the line is calling, a program transmitting station normally disconnected from said line, a second operator's position, switching means at said second operator's position for disconnecting said line from said jack and connecting it to said program transmitting station, a second jack at said second operator's position for interconnecting said line with other telephone lines for ordinary telephone purposes if said line is connected to the program transmitting station, a line lamp associated with said second jack for indicating to the operator at the second operator's position that the line is calling, and a cut-off relay associated with said second jack whereby the operator at the second operator's position may disconnect the line from the program transmitting station in completing a telephone call originating on said line.

4. In a telephone system, a telephone line terminating at a central office at one end and a subscriber's station at the other, a telephone set at the subscriber's station, a loud speaking receiver at the subscriber's station, an operator's position at the central office, a jack at said position for interconnecting said line with other telephone lines for telephonic intercommunication, a program transmitting station normally disconnected from said line, a second operator's position, switching means at said second operator's position for disconnecting said line from said jack and connecting it to said program transmitting station, a jack at said second operator's position for answering telephone calls originating on said line if said line is connected to the program transmitting station, a line lamp associated with

said second jack, and means associated with said program transmitting connection for operating said line lamp when the receiver of the substation set is removed from the switchhook, switching means at the subscriber's station for connecting said loud speaking receiver to the line, a disconnect lamp for indicating that the subscriber no longer desires a program transmitting connection, and means associated with said program transmitting connection for operating said disconnect lamp when the loud speaking receiver is disconnected from the line.

In testimony whereof, I have signed my name to this specification this 10th day of 15 November, 1922.

JOHN F. TOOMEY.