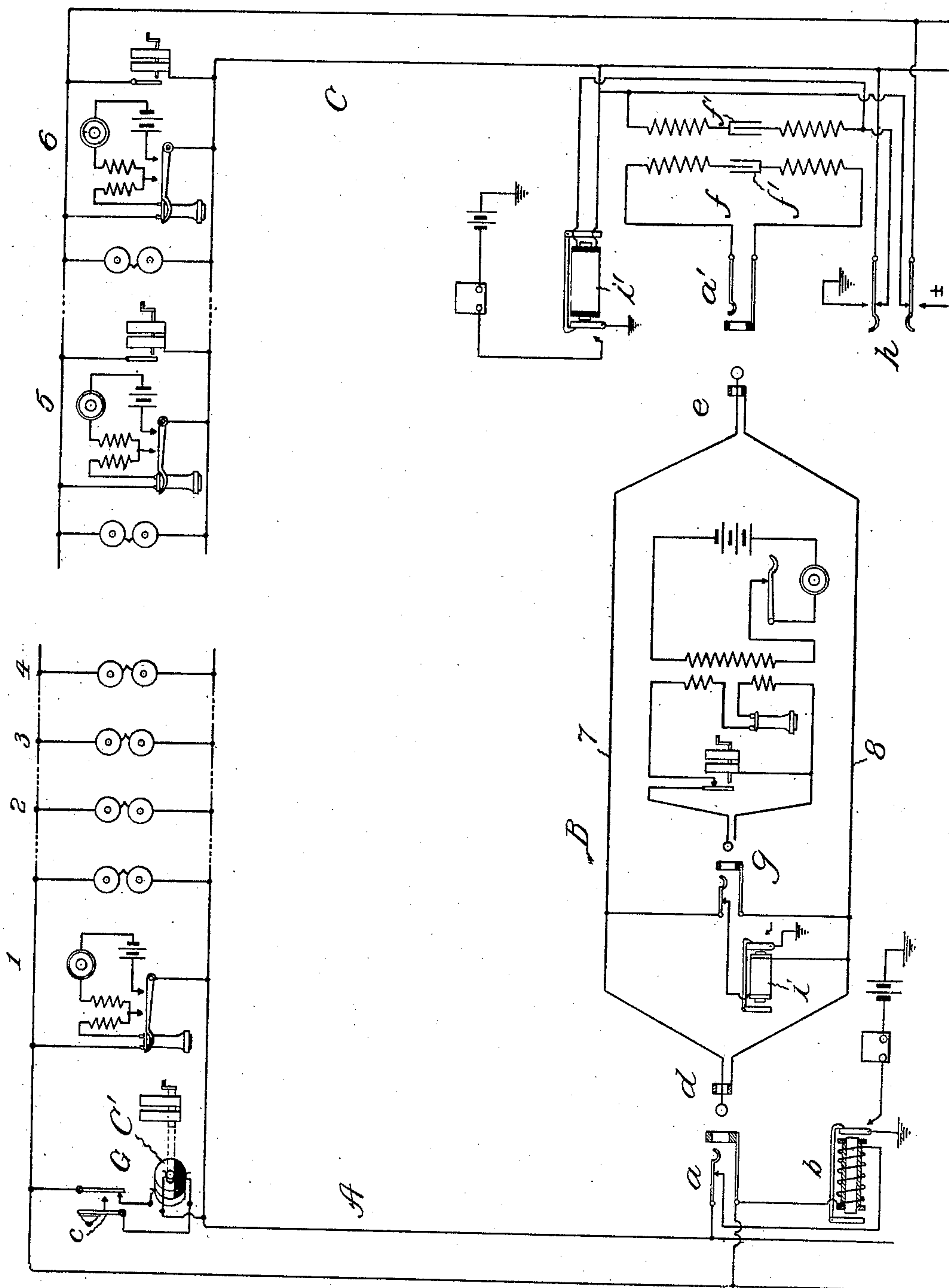


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PATENTED AUG. 7, 1906.

C. E. SCRIBNER.
TELEPHONE EXCHANGE SYSTEM.

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UNITED STATES PATENT OFFICE.

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TELEPHONE-EXCHANGE SYSTEM.

No. 828,061.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, CHARLES E. SCRIBNER, a citizen of the United States, residing at Jericho, in the county of Chittenden and State of Vermont, have invented a certain new and useful Improvement in Telephone-Exchange Systems, of which the following is a full, clear, concise, and exact description.

My invention relates to a telephone-exchange system, and has for its object to provide an improved system wherein telephone-lines on which toll is to be charged for each use may be interconnected or connected with lines of other types and the subscriber of one of the connected lines prevented from signaling the subscriber of the other line without the intervention of the central operator, so that the operator may keep an accurate check or supervision on the number of conversations which any line may have with another.

In a telephone-exchange system embodying my invention a telephone-line extends from a number of substations to a central office, a call-indicator being associated with the line at the central office. At each of the substations of the line is provided signaling mechanism adapted to signal any one of the other substations of the line without affecting the central-office call-indicator, and a device is also provided at each station adapted to cooperate with the signaling mechanism thereat to actuate the call-indicator at the central office without disturbing or signaling the other substations on the line. Another telephone-line extends from one or more substations to the central office, and the operator is provided with means for connecting the lines together for conversation. When the lines are connected by the operator, a device is interposed between them which is adapted to permit the passage of telephonic voice-currents, but to bar signaling-currents, so that while the subscribers of the connected lines may converse with one another they are not able to signal each other. The operator is provided with means for applying ringing-current directly to either line, and after a conversation is finished between the two connected lines a subscriber of one line cannot signal a subscriber on the other line and obtain another conversation without the intervention of the central-office operator, who is thus enabled to keep an accurate

check on all conversations for the purpose of charging toll.

I will describe my invention particularly by reference to the accompanying drawings, which is a diagram illustrating by means of conventional symbols a telephone-exchange system embodying my invention.

A party-line A is shown extending from a number of substations 1 2 3 4 to a central office B, where it is connected with a spring-jack *a*, a call-indicator or annunciator *b* being provided for the line in a branch from the contacts of the spring-jack *a*, said annunciator being arranged to be responsive to pulsating or direct current, while remaining inert upon the passage of alternating current there-through. At each substation is provided a ringing-generator G, adapted when operated to apply alternating current to the line to operate the bells of the different substations in accordance with the code system, such current of course being without effect upon the annunciator *b*. A switch *c* is associated with each of the generators to cause the same to apply pulsating or direct current to the line to operate the annunciator *b* without affecting the bells of the different substations. A two-part commutator C' may be mounted upon the generator-shaft, adapted when the switch *c* is depressed to convert the alternating current from the generator G into pulsating current. The telephone-line A may be a farmers' line, the substations being located at different farms. The subscribers are thus enabled to converse with one another without the intervention of the operator. For convenience of illustration I have shown the complete substation outfit at only one station—namely, station No. 1.

A telephone-line C, which may be a toll-line, is shown extending from substations 5 6, located, for example, at different towns, to the central office B. A spring-jack *a'* is provided for the line at the central office, and the operator is equipped with means for uniting the two lines through the agency of their spring-jacks, being provided with a pair of link conductors 7 8, terminating in plugs *d e*, adapted when inserted in the spring-jacks *a a'*, respectively, to unite the two lines for conversation. The spring-jack *a* and plug *d* and the spring-jack *a'* and plug *e* constitute connection-switches for uniting the link conductors 7 8 with the two

lines. A blocking device or barrier to signaling-currents is interposed between the spring-jack *a'* and the toll-line C and may comprise a repeating-coil *f* between the windings whereof are located condensers *f'* *f'*. This blocking device permits the passage of telephonic current therethrough without impairing the same, but prevents the passage of signaling or low-frequency alternating currents.

The operator is equipped with means for applying ringing-current directly to either of the two telephone-lines A C and may be provided with a connection-switch *g* for connecting a ringing-generator with the link conductors 7 8 of her plug-circuit in order to apply current from said generator directly to the line A. A telephone set is associated with the plug-circuit and may be arranged to be connected therewith by said switch *g*. The operator may also be provided with a ringing-key *h*, located between the blocking device *f* and the telephone-line C for applying current directly to such line.

A clearing-out annunciator *i* is located in a bridge of the plug-circuit to receive the disconnect-signal from the party-line, and a similar annunciator *i'* is provided in a bridge of the toll-line C between the blocking device and the substations 5 6 for receiving the disconnect-signal from either of the stations of line C.

The operation of the system may be briefly outlined as follows: As already pointed out, in case any one of the subscribers of the party-line A should desire communication with another subscriber on such line he would simply operate his ringing-generator to apply the required number of impulses to the line to signal the subscriber desired in accordance with the code system; but in case a toll connection should be desired the subscriber of the party-line actuates the switch *c* and operates his ringing-generator, thereby delivering pulsating current to the line, which actuates the central-office call-indicator *b* without disturbing the bells at the several stations. The operator at the central office observing the signal displayed by the indicator *b* inserts her plug *d* into the spring-jack *a* of the party-line, which act disconnects the call-indicator from the line. She thereupon closes her connection-switch *g* and inquires the number of the subscriber wanted. Assuming the subscriber desired to be the one at station No. 5 upon the toll-line, the operator inserts her plug *e* into the spring-jack *a'* of such line and operates her ringing-key *h* to signal the subscriber at the desired station. When the called subscriber responds, conversation may be carried on over the connected lines, the blocking device *f* in no way interfering with the passage of telephonic currents. When the subscribers finish their conversation, they operate their ringing-gen-

erators in the usual way to actuate the disconnect-signals *i i'*. If, however, after the termination of the conversation the toll subscriber No. 5 should desire another conversation, either with the party-line subscriber with whom he had just finished talking or with another subscriber on such line, or if the subscriber of the party-line who had originally called should desire a communication with the same or another subscriber of the toll-line, the blocking device *f* will prevent the party desiring the second conversation from signaling the other party and will make it necessary for him to gain the attention of the operator and obtain her assistance. The operator is thus able to keep a check upon all conversations carried on in order to charge the required toll.

I claim—

1. In a telephone-exchange system, the combination with a telephone-line extending from a number of substations to a central office, of a call-indicator associated with the line at the central office, signaling mechanism at each substation adapted to signal any other substation without affecting said call-indicator, a device at each substation adapted to cooperate with the signaling mechanism thereat to actuate said call-indicator without signaling the other stations, a second telephone-line extending from a substation to said central office, means under the control of the central-office operator for uniting said lines, a blocking device or barrier to signaling-currents interposed between said lines when united, and means under the control of the operator for applying signaling-current directly to either line.

2. In a telephone-exchange system, the combination with a telephone-line extending from a number of substations to a central office, of a call-indicator associated with the line at the central office, signaling mechanism at each substation adapted to signal any other station without affecting said call-indicator, a device at each substation adapted to cooperate with the signaling mechanism thereat to actuate said call-indicator without signaling the other stations, a second telephone-line extending from a number of stations to the central office, link conductors at the central office, connection-switches for uniting said link conductors with the lines, a device interposed between the second line and its connection-switch for preventing the passage of signaling-currents, and means under the control of the operator for applying signaling-current directly to the second line around the blocking device.

3. In a telephone-exchange system, the combination with a telephone-line extending from a number of substations to a central office, of an annunciator connected with the line at the central office, signaling mechanism at each substation adapted to operate

the bell at any other station without affecting the annunciator, a device at each station adapted to cooperate with the signaling mechanism thereat to actuate said annunciator without operating the bells at the substations, a spring-jack connected with the line at the central office, a second telephone-line extending from a number of substations to a spring-jack at the central office, plugs and a plug-circuit for connecting said lines through the medium of their spring-jacks, a repeating-coil interposed between the second line and its spring-jack and having condensers located between the windings thereof to permit the passage of telephone-currents but to bar signaling-currents, means associated with the plug-circuit for applying current directly to the first-mentioned line, and a ringing-key under the control of the operator between the said blocking device or repeating-coil and the second telephone-line.

4. In a telephone-exchange system, the combination with a party telephone-line extending from a number of substations to a central office, of an annunciator associated with the line at the central office responsive only to direct or pulsating current, a generator at each station adapted to deliver alternating current to the line to operate the bells of the different stations, a switch at each station adapted to cause the generator thereat to deliver pulsating current to the line to actuate the central-office annunciator, a spring-jack for the line at the central office, a toll-line extending from a number of substations to a spring-jack at the central office, plugs and a plug-circuit for uniting said lines through the agency of their spring-jacks, a blocking device or barrier to signaling-currents interposed in the circuit of the toll-line between the spring-jack thereof and the sub-

stations, a ringing-key associated with the plug-circuit for applying signaling-current directly to the party-line, and a ringing-key between the blocking device and the substations of the toll-line for applying signaling-current directly thereto.

5. In a telephone-exchange system, the combination with a party telephone-line extending from a number of substations to a central office, of a toll-line extending from a number of substations to the central office, means under the control of the central-office operator for connecting said lines, a blocking device or barrier to signaling-currents interposed between said lines when united, and means controlled by the operator for applying signaling-current directly to either line.

6. In a telephone-exchange system, the combination with a party telephone-line extending from a plurality of substations to a central office, of an annunciator associated with said line at the central office adapted to be operated from any one of said substations, a toll-line extending from a number of substations to the central office, link conductors at the central office, connection-switches for uniting said link conductors with the lines, a repeating-coil interposed between the toll-line and its connection-switch, and condensers located between the windings of said repeating-coil; whereby a subscriber of one line may converse with, but cannot signal a subscriber of the other line.

In witness whereof I hereunto subscribe my name this 24th day of February, A. D. 1905.

CHARLES E. SCRIBNER.

Witnesses:

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E. F. BEAUBIEN.