

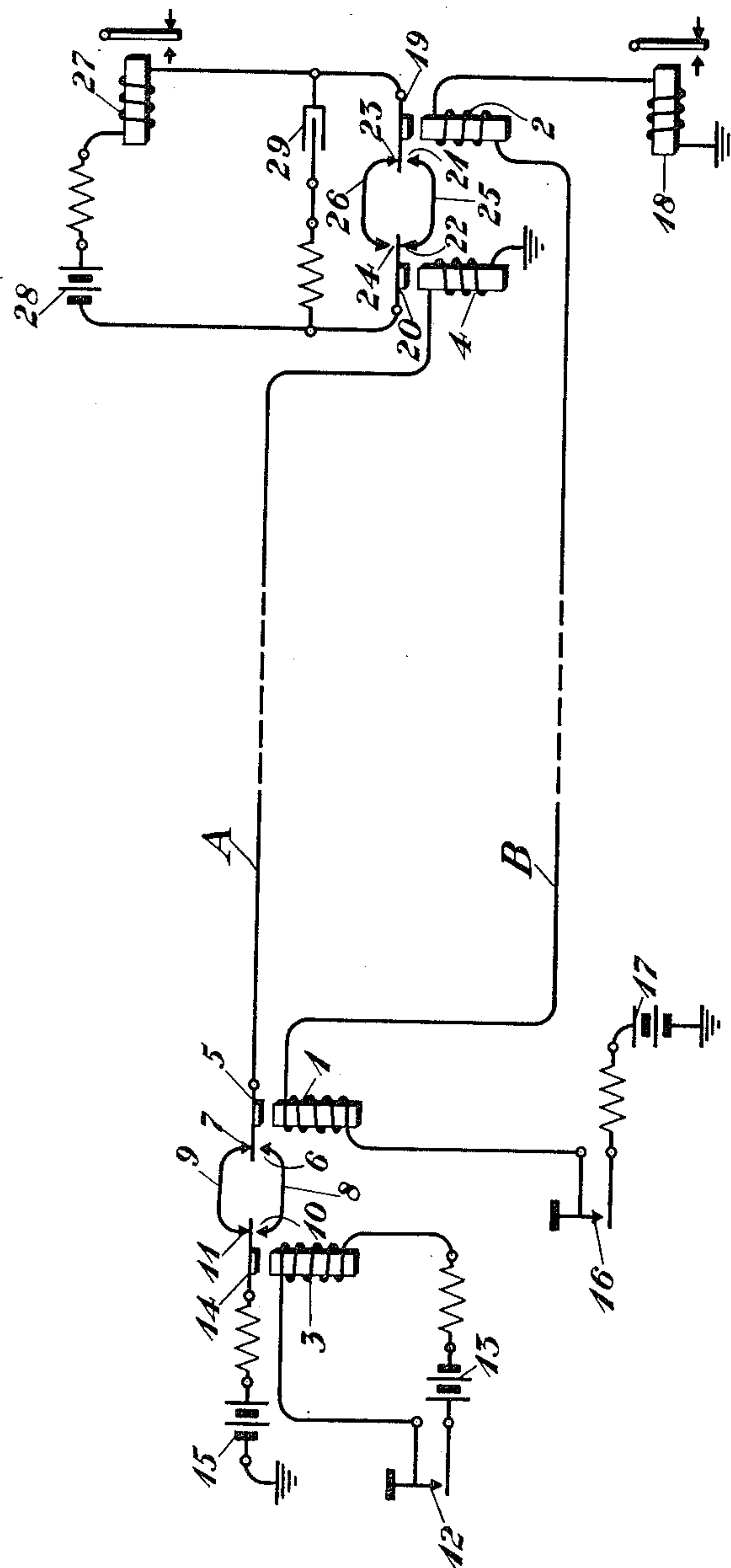
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SECRET SIGNALING SYSTEM

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SECRET SIGNALING SYSTEM.

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To all whom it may concern:

Be it known that I, DAVID E. BRANSON, residing at Danville, in the county of Hendricks and State of Indiana, have invented certain Improvements in Secret Signaling Systems, of which the following is a specification.

This invention relates to transmission system designed particularly to afford secret communication. Its object is to provide a simple and efficient system of telegraphic communication in which it will be impossible for unauthorized persons to read a message by tapping the message wire. It is here illustrated as applied to a Morse telegraph circuit, though it is not limited to that particular use.

The invention will be described in detail in connection with the accompanying drawing illustrating diagrammatically a system in which it is embodied.

A and B represent two separate telegraph circuits which are here illustrated as grounded lines, though they may, of course, be metallic circuits. The line A is the secret line. The line B is an ordinary telegraph circuit, except that it is provided with relay windings 1 and 2, in series with the line at the sending and receiving stations respectively, these relays being for the purpose of altering and restoring the message impulses transmitted over the secret line. The sending key and current source for this line are indicated by 16 and 17 respectively.

The sending end of the secret line A is connected to the armature 5 of relay 1, which is provided with front and back contacts 6 and 7. These contacts are connected by parallel and alternative conductors 8 and 9 to the front and back contacts 10 and 11 respectively of the relay 3 which is in the local sending circuit including the usual key 12 and battery 13. The armature 14 of relay 3 is connected to the other side of the line, shown as a ground return in this instance, through a suitable source of current 15. Obviously it is of no importance whether the conductors 8 and 9 run as shown or are crossed so that each back contact is connected to a front contact of the companion relay, so long as the corresponding connections at the two ends of the lines A and B are the same.

At the receiving end of the system the line

B is of course provided with the usual sounder in addition to the relay winding 2. The line A terminates in a relay winding 4 connected to ground, or the return side of the circuit. Relays 2 and 4 have armatures 19 and 20 respectively, provided with front contacts 21 and 22 and back contacts 23 and 24, the front contacts and the back contacts being united by conductors 25 and 26 as in the case of relays 1 and 3. These armatures 19 and 20 are connected in the local receiving circuit, which includes the winding of the sounder 27 and the source of current 28. A condenser 29 is preferably connected across the two armatures 19 and 20 for a purpose which will hereinafter appear.

If messages are transmitted over the line A when the line B is not in operation, they are sent and received in the ordinary manner. The relays 1 and 2 being unenergized, will leave the armatures 5 and 19 against their back contacts and the main circuit, and the local receiving circuit will, therefore, be opened and closed by the sending and receiving relays as usual. When, however, the line B is simultaneously used for sending a message the dot and dash impulses passing through the magnets 1 and 2 will open or close the main and local circuits of the line A at times when they would not otherwise be open or closed. This will obviously result in breaking up the signals being transmitted from the key 12, or cause some of them to be omitted and others inserted. For instance, the line A can only be closed when both of the keys 12 and 16 are simultaneously closed or simultaneously open. If either is open and the other closed, one of the armatures will be on its front contact and the other on its back contact, which will leave the circuit open. Manifestly the keys will not be operating in synchronism, since they will be transmitting different messages, and a dash impulse, for instance, from the key 12, may be broken up by an impulse from 16 into dots, while a dot impulse from the key 12 may be entirely obliterated by an impulse from the key 16, or two dot impulses from the key 12 might be lengthened into a dash by an intervening operation of the relay 1 under the influence of key 16. It will be clear, therefore, that the signal impulses in

the line A will be a combination or resultant of the signal impulses emanating from the two sending keys 12 and 16.

During the reception of signals in the local circuit of the line A it may be necessary to prevent the armature of the sounder 27 from falling back, while the armatures 19 and 20 move from their front contacts to the back contacts, or vice versa, and by inserting the condenser 29 as above described this may be accomplished, the condenser charging current during the interval being sufficient to prevent an improper click of the sounder.

An unauthorized person tapping the line A will receive an unintelligible series of signal impulses. In order to make anything out of them it would be necessary for him to also find and tap the line B and install an apparatus equivalent to that here shown at the receiving end of the lines.

It is important to the satisfactory operation of a system working in the manner above described that the impulses from key 16 over the lines A and B affect the magnets 4 and 2 in such a phase relation, as to take care of any existing difference in the time constants of lines A and B, so that the restoring magnet 2 may reform the impulses in the local circuit of the sounder 27 exactly as they were originated in the local circuit of the key 12. This can be taken care of by properly adjusting the relays, by the design of the magnets or by the insertion of additional relays in accordance with well known principles.

The line A here represented, with its accompanying sending and receiving apparatus, is to be taken as representing one or more lines operating in the manner here described, for it is obvious that a single magnet such as 1 in the controlling circuit B may, either directly or through appropriate relays, control any desired number of secret lines such as A; and it is also to be understood that the form of the invention described is illustrative only. Obviously modifications may be made without departing from the spirit of the invention, and within the scope of the appended claims.

What is claimed is:

1. In a signaling system, a main line, sending apparatus for transmitting all of the signal impulses of a message thereover, receiving apparatus at the opposite end of the line, a second line and means controlled by variations of current in said second line for altering the successive signal impulses to render them unintelligible and for restoring them to their original form at the receiving apparatus.

2. In a signaling system, a main line, sending apparatus for transmitting all of the signals of a given message over said line, receiving mechanism at the opposite end of

the line, mechanism at the sending end of the line for altering the successive signal impulses to render the transmitted impulses unintelligible in character, mechanism at the receiving end to restore the transmitted impulses to their original form, and a second line controlling the altering and restoring mechanism.

3. In a signaling system a transmission line including sending and receiving instruments at separated stations, a switch in said line between the sending instrument and the line, a second switch between the receiving instrument and the line and means under the control of message impulses in another line for operating said switches in synchronism and out of step with the message impulses.

4. In a signaling system a main line, a relay for opening and closing said line at the sending station to transmit signaling impulses, a second relay at the sending station, also capable of opening and closing said line, a relay in said line at the receiving station, a local circuit including a recording device controlled by said receiving station relay, a second relay at said receiving station, also arranged to open and close said local circuit and a second circuit extending between said stations for simultaneously operating said second relay at the sending station and said second relay at the receiving station.

5. In a signaling system a sending relay having front and back contacts, a second relay associated therewith also having front and back contacts, a conductor connecting the back contact of said sending relay with one of the contacts of the other relay, a second conductor connecting the front contact of said sending relay with the other contact of the other relay, a main line having one side connected to the armature of said sending relay and the other side connected to the armature of the other relay, separate mechanisms for operating said relays, means for controlling one of said mechanisms by and in accordance with a series of signal impulses, means for operating the other mechanism independently of said signal impulses and a source of current in said main line.

6. In a signaling system a local circuit including a recording device and a source of current, a relay having its winding connected in the main line and its armature connected in said local circuit, a second relay having an armature connected in said local circuit, each of said relays having a front contact and back contact, two conductors forming alternative paths terminating in the four contacts of said two relays and means independent of the main line for operating said second relay.

7. In a signaling system a local circuit

including a recording device and a source of current, a relay having its winding connected in the main line and its armature connected in said local circuit, a second relay 5 having an armature connected in said local circuit, each of said relays having a front contact and back contact, two conductors forming alternative paths terminating in the four contacts of said two relays, a condenser connected across said armatures and means 10 independent of the main line for operating said second relay.

In testimony whereof, I have signed my name to this specification this ninth day of September 1918.

DAVID E. BRANSON.