

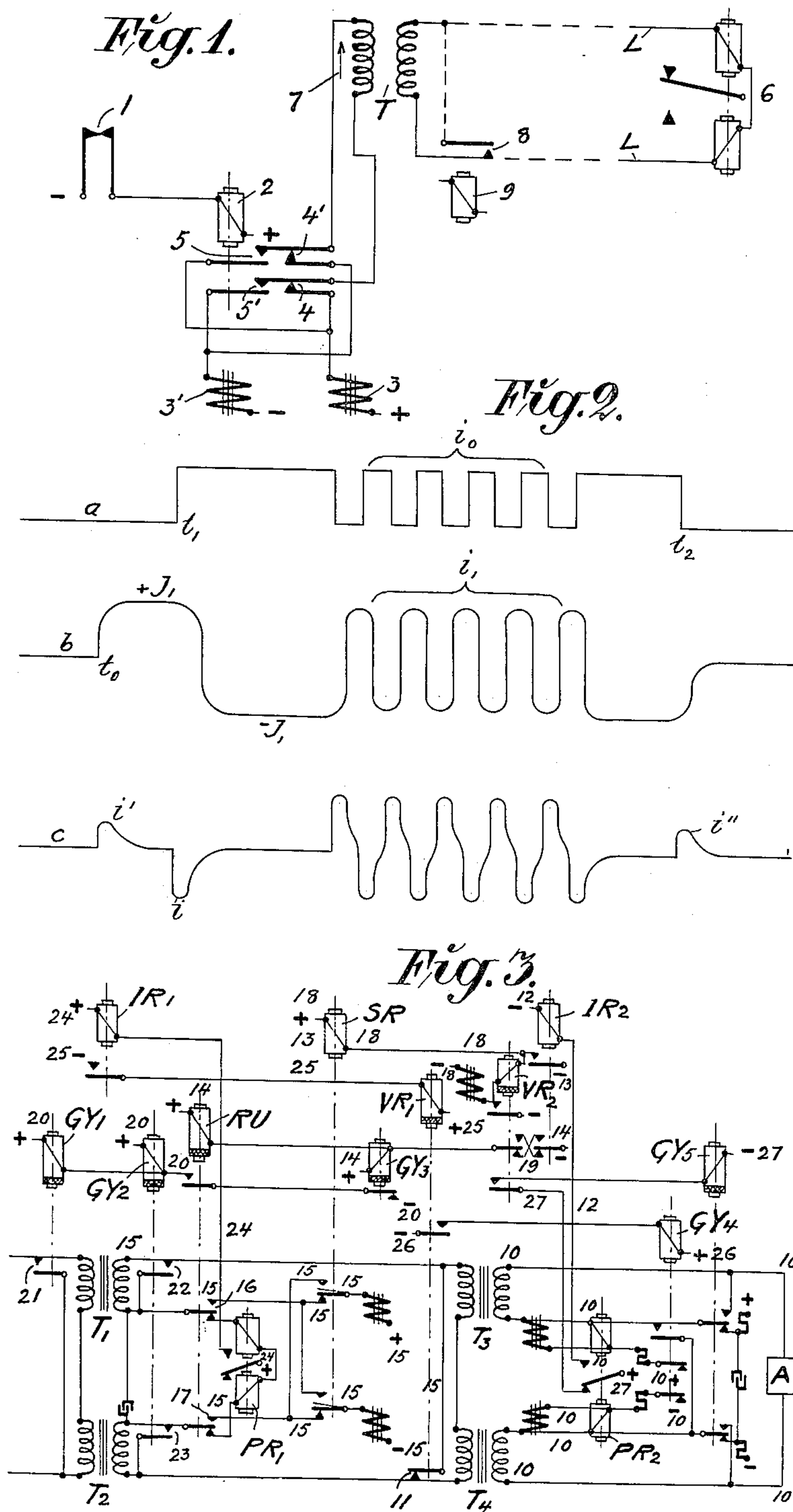
May 9, 1933.

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1,908,574

IMPULSE TRANSMITTING ARRANGEMENT

Filed Feb. 8, 1932



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IMPULSE TRANSMITTING ARRANGEMENT

Application filed February 8, 1932, Serial No. 591,741, and in Sweden February 11, 1931.

The present invention refers to arrangements for the transmission of impulses over long lines. More particularly the invention refers to plants in which the impulses on the transmission line are generated through reversals of the direction of the current in a local impulse circuit which is inductively connected to the line. The current in the local impulse circuit is thus subjected to variations which are equal to the double current amplitude, said current variations in turn causing inductive current impulses on the line. In impulse transmitting plants of the kind in question at least two impulses are generated in addition to the impulses belonging to the impulse series, namely one impulse when the intermediate impulse circuit is energized and another impulse when said intermediate circuit is deenergized. Said extra impulses may in some cases be used for different purposes, but in other cases they are less desirable. The present invention has for its object to provide a method for the elimination of said current impulses or other impulses which are not desirable and consists therein, that the transmission line is in one or more places provided with arrangements for suppressing certain impulses.

The invention will be more closely described with reference to the accompanying drawing, in which

Figure 1 illustrates diagrammatically the principle of the invention,

Figure 2 is a current diagram, and

Figure 3 illustrates an application of the invention.

In Figure 1 the reference numeral 1 designates the impulse contact of an impulse sender, for instance a finger disc. The impulse contact 1 is connected in series with the winding 2 of a contact relay the contact set of which is arranged as a current reverser or pole changer in a local intermediate circuit including the primary winding of a transformer T the secondary winding of which is connected to the telephone line L. Similarly to the impulse circuit proper the said intermediate circuit is interrupted when a conversation is not going on. When the intermediate circuit is closed the positive pole of

the appertaining impulse battery is connected to one terminal of the transformer T by means of a choke coil 3 and a normally closed contact 4 belonging to the contact set of the relay 2, and the negative pole is connected to the other terminal by means of a choke coil 3' and a normally closed contact 4' of the relay. The primary winding of the transformer T is then passed by a current in the direction of the arrow 7. When the relay 2 attracts its armature the contacts 4, 4' are opened and the poles of the battery are instead connected to the transformer by means of the normally open contacts 5, 5', the direction of the current in the primary winding of the transformer being then reversed. In accordance with the invention the secondary winding of the transformer may be arranged to be short-circuited by means of the contact 8 of a relay 9. Said relay is intended to be actuated only when not desirable currents appear on the line.

Before starting the impulse sending, for instance when the subscriber lifts off his microtelephone, the intermediate impulse circuit including the primary winding of the transformer T is closed. At the moment in question, which in Figure 2b is designated with t_0 , the current in the local circuit thus begins to increase in a positive direction and will after a certain short time reach its full value $+I_1$. The closing of the impulse circuit proper, which circuit includes the relay winding 2, may, if desired, also be effected when the microtelephone of the subscriber is lifted off but is delayed somewhat by a suitable mechanical or electromagnetical delaying arrangement and therefore takes place first at the point of time t_1 (Figure 2a) when the current in the primary circuit of the transformer has already reached its full value. When the current was closed in the intermediate circuit a current impulse i' (Figure 2c) was, however, sent out on the line which current impulse may serve to set the polarized relay 6 in its starting position in case the relay does not already take up this position.

When at the moment t_1 the relay 2 attracts its armature the current in the intermediate

impulse circuit is reversed by means of the contact set in the above described manner and is thus subjected to a variation equal to $2I_1$. On account of the reversal of the current in the primary winding of the transformer a second impulse i is sent out on the line which impulse has twice as great an amplitude as the first impulse. Said impulse may serve to start the selecting operation, for instance by letting the polarized relay, upon being shifted, actuate a pre-selector or searcher. When the subscriber thereafter actuates his impulse sender, thereby bringing about at the contact 1 repeated current interruptions and current closing i_0 of short duration, a series of corresponding current reversals are caused in the intermediate circuit, in Figure 2b designated with i_1 , and a corresponding series of alternate positive and negative impulses i (Figure 2c) are sent out on the line, said current impulses shifting the armature of the polarized relay 6 between its two positions. The polarized impulse relay then in turn sends out corresponding selector impulses.

When after completed conversation the subscriber hooks up his microtelephone the impulse circuit proper as well as the intermediate impulse circuit are interrupted simultaneously at the moment t_2 , a final impulse i'' being then sent out on the line through which impulse the polarized relay if required is returned to its starting position.

If it is instead desired to suppress the impulses i' , i and i'' the relay 9 is according to the invention controlled in such a manner, that the secondary winding of the transformer T is short-circuited each time any of said impulses appears in the same.

In the application of the invention illustrated in Figure 3 only parts of the plant necessary for explaining the invention are shown. A designates, for instance, a subscriber's set or the impulse sender of an operator. The impulses are sent through transformers T_3 , T_4 and T_1 , T_2 to or from a station not shown on the drawing, it being assumed in the following that the impulses are sent from the subscriber's position A. When the subscriber lifts off his microtelephone a circuit 10 is closed through the subscriber's set, the primary windings of the transformers T_3 and T_4 , and the polarized relay PR_2 . The current impulse is not transmitted over the line because the secondary windings of the transformers are short-circuited through a contact 11 of a relay VR_1 . On account of the current impulse the relay PR_2 throws over its armature, then forming a circuit 12 for the relay IR_2 which attracts its armature and in turn closes a circuit 13 for a relay SR which attracts its armature and prepares an impulse sending circuit 15. When attracting its armature the relay IR_2

also closes a circuit 14 for the relays GY_3

and RU , the relay GY_3 attracting its armature first and then the relay RU . By means of its normally open contacts 16 and 17 the latter relay now closes the impulse circuit 15 through the primary windings of the transformers T_1 , T_2 , a call signal being then sent over the line to the called station. At this time the relay VR_2 attracts its armature, said relay being slow-acting when energized over the circuit 18, and interrupts at its contact 19 the circuit 14 for the relays GY_3 and RU . Said relays are then deenergized in the following order. First the relay GY_3 is deenergized, forming a circuit 20 for the relays GY_1 and GY_2 . After some time the relay RU is deenergized, interrupting the call signal. The impulse induced through the current variation at the interruption is, however, suppressed thereby, that the short-circuit of the windings of the transformers T_1 , T_2 is maintained by means of the contacts 21, 22, 23 of the slow-acting relays GY_1 , GY_2 even for some time after the relay RU has been deenergized. The times of operation of the relays GY_1 and GY_2 are determined so that the subscriber may start the impulse sending immediately. The relays PR_2 , IR_2 and SR then pulsate in a predetermined sequence. During the entire impulse series the relays RU and GY_3 keep their armature attracted and the current impulses are therefore, through the intermedium of the impulse circuit 15, sent through the transformers T_1 and T_2 to the called station. Also the relay GY_5 is during the impulse series maintained energized through the intermittently closed circuit 47. Hereby the primary windings of the transformers T_3 , T_4 are short-circuited and the impulse sending is improved. The extra impulse i'' occurring after each impulse series is suppressed in the above described manner thereby, that the relay GY_3 is deenergized previously to the relay RU , the former relay then closing the circuit for the relays GY_1 and GY_2 . If it is now assumed that the wanted subscriber has been called and lifts off his microtelephone an inductive impulse is sent through the transformers T_1 and T_2 which impulse shifts the armature of the relay PR_1 and closes a circuit 24 for the relay IR_1 . Said latter relay is energized and closes a circuit 25 through the relay VR_1 . This relay attracts its armature and removes the short-circuit of the secondary winding of the transformers T_3 and T_4 , which are thereby prepared for receiving the speech, and closes a circuit 26 for the relay GY_4 which attracts its armature and closes a speaking circuit for the subscriber A, said circuit having a small resistance. The two subscribers may now start the conversation.

I claim:

1. In an arrangement for transmitting electric switching impulses, a telephone line,

a transformer, a direct current circuit connected to the said telephone line by means of the said transformer, an impulse relay controlling the said direct current circuit and an auxiliary relay set adapted in cooperation with the said impulse relay to suppress extra impulses generated at the transmission.

2. An arrangement as claimed in claim 1, in which the auxiliary relay set is adapted to prevent a current interruption in the direct current circuit following upon a current closing in said circuit from causing impulse generation in the telephone line.

3. In an arrangement for transmitting electric switching impulses, a telephone line, a transformer, a direct current circuit connected to the said telephone line by means of the said transformer, an impulse relay controlling the said direct current circuit, an auxiliary relay set adapted in cooperation with the said impulse relay to suppress extra impulses generated at the transmission and to effect a current closing of short duration in the direct current circuit so as to bring about such an alteration in the circuit during the time interval between the current closing and the subsequent current interruption that the influence of the current interruption on the telephone line is neutralized.

4. An arrangement as claimed in claim 3, in which the secondary winding of the transformer is adapted to be short-circuited in the time interval between the current closing and the current interruption in the direct current circuit.

5. In an arrangement for transmitting electric switching impulses, a telephone line, a transformer, a direct current circuit connected to the said telephone line by means of the said transformer, an impulse relay controlling the said direct current circuit and adapted to effect a reversion of the direction of the current in the direct current circuit each time said relay attracts or drops its armature respectively, and an auxiliary relay set adapted in cooperation with the said impulse relay to suppress extra impulses generated at the transmission.

6. In an arrangement for transmitting electric switching impulses, a telephone line, a transformer, a direct current circuit connected to the said telephone line by means of the said transformer, an impulse relay controlling the said direct current circuit, an auxiliary relay set adapted in cooperation with the said impulse relay to suppress extra impulses generated at the transmission and comprising two mutually cooperating slow-acting relays one of which is adapted to effect a closing of short duration of the direct current circuit when the impulse relay attracts its armature whereas the other relay is adapted to short-circuit the secondary

winding of the transformer which short-circuit lasts until the direct current circuit is interrupted.

In testimony whereof I affix my signature.

ROMAN TRECHCINSKI.

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