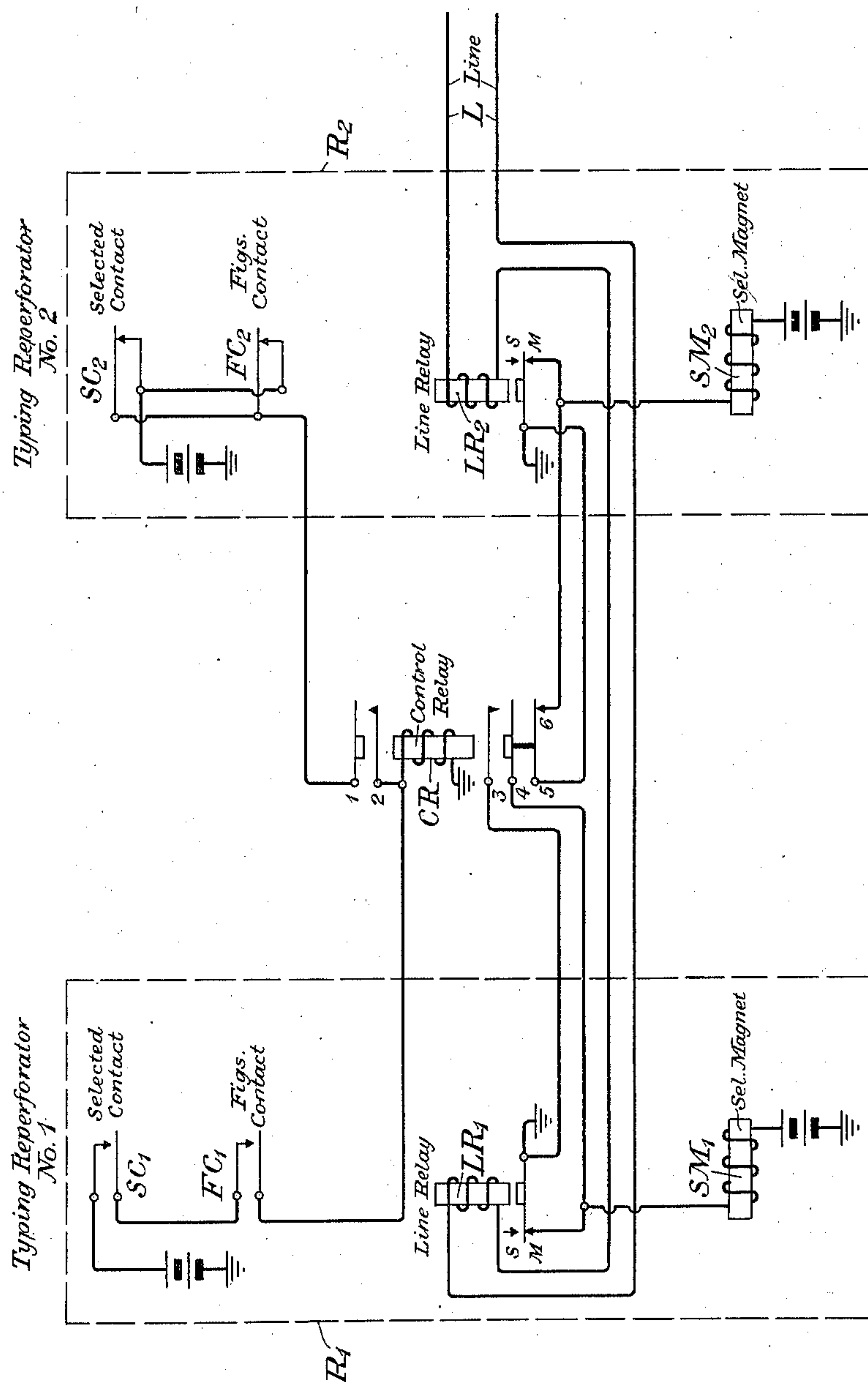


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CONTROL CIRCUIT FOR SWITCHING
TELEGRAPH FACILITIES
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CONTROL CIRCUIT FOR SWITCHING TELEGRAPH FACILITIES

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This invention relates to telegraph circuits and particularly to arrangements whereby different telegraph receiving instrumentalities may be selectively switched into receiving condition by the transmission of chosen combinations of telegraph code signals from a distant point.

In telegraph systems, and particularly in teletypewriter systems, occasions frequently arise where it is desirable that the transmitted message be received by one only of several receiving devices. Accordingly, arrangements have heretofore been devised whereby the sending operator may switch a desired receiving instrument into receiving condition. This has usually been done by transmitting certain combinations of teletype code signals to control distant switching facilities.

One of the objects of the present invention is to accomplish the results above described by arrangements which are simpler than those previously employed.

Another object of the invention is to arrange receiving devices so that when one is receiving it responds to a special code combination to operate a switching relay which disables it and switches in the other receiving device. The switching relay is then locked up over a circuit so controlled by the second receiving device that the latter unlocks the switching relay when the same or another special code combination is later received. It thereupon disables the second receiving device and switches the first back into receiving condition.

The invention will be more fully understood from the following description when read in connection with the accompanying drawing in which the figure illustrates the principles of the invention applied to the control from a distant point of the selection of either of two teletypewriter receiving mechanisms.

Referring to the drawing, a line L incoming from a distant point terminates in two line relays LR₁ and LR₂. Each of these relays operates a separate teletype receiving mechanism only certain parts of which are illustrated as these mechanisms are well known in the art. These receiving mechanisms, shown generally within the dotted line rectangles R₁ and R₂, may be page printers, tape printers, typing reperforators or other devices well known in the art.

As illustrated, the receiving instruments are typing reperforators, because such instruments are especially useful, as will appear later, where messages from a distant point are to be relayed at an intermediate point to other stations

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reached by separate routes. One of these instruments, the receiver R₁, includes a selecting magnet SM₁ operated by the contact of the line relay LR₁. This selecting magnet is used to control the selection, by means of comb bars or other well-known devices which are not illustrated, of mechanisms such as type bars for printing different characters or of "stunt" mechanisms for controlling the incidental operations of the printing mechanism. These mechanisms may also be used in a known manner to operate contacts. For further information as to how this may be accomplished, reference is made to the patents to Beattie et al., No. 2,120,235, issued June 14, 1938, and to Duncan, No. 2,321,372, issued June 8, 1943.

Ordinarily, as shown in the patents to Beattie et al. and Duncan above referred to, the contacts are operated by pull bars which actuate the type bars or stunt mechanisms and this holds true whether the receiving mechanism be a page printer, a tape printer or a typing reperforator.

In the case of the typing reperforator the selective mechanisms which are used to control the printing operations are also used to control the punching of holes in the tape in accordance with the Baudot code, so that the tape may be used to repeat or relay the message over the line to some distant point by passing the tape through a suitable transmitter (not shown). In the typing reperforator the printing mechanism is generally used to print the characters upon the same tape which is perforated in accordance with the message. This is to enable the receiving operator to readily read the message if desired before it is relayed.

The receiver R₁ includes normally open contacts SC₁ and FC₁ which are used in controlling the switching mechanism to be described hereinafter. These contacts are controlled by the selective mechanism of the receiver in a well-known manner as shown in the patents to Beattie et al. and Duncan above referred to. The contacts SC₁ and FC₁ are used to operate the control relay CR which performs the switching operation as will be described later.

In order to operate the control relay CR both contacts must be closed. The contact FC₁ is closed when the Baudot code for "figures" is received and remains closed until its release upon receiving the "letters" signal. As is well known in teletype systems, the characters and stunts are divided into two groups: (a) letters, which are usually capitals and are transmitted in the form of different Baudot code combinations, and (b) figures, punctuation marks, stunts, etc.,

which, after the "figures" code is received, are operated in response to the same Baudot codes that cause letters to be printed. When letters are to be printed, they are preceded by the so-called letters code which conditions the receiver to print letters. On the other hand, when so-called figures are to be printed, the term "figures" including also punctuation marks, stunts, etc., the figures code precedes the characters or stunts which are to be recorded in order to condition the printer for that purpose.

With the arrangement above described, when the figures contact FC_1 is operated, it then remains operated until released by the letters code as above stated. If, after the figures contact has been closed, the special selector contact SC_1 corresponding to a particular Baudot code is momentarily operated, a circuit is closed through the contacts SC_1 and FC_1 to operate the control relay CR. The manner in which the control relay CR operates will be described later.

A second receiving instrument R_2 is also provided and is arranged to be controlled by the line relay LR_2 . This second receiver is similar to the receiver R_1 and includes a selecting magnet SM_2 operated by the contact of the line relay LR_2 , and performing functions similar to those of the selecting magnet SM_1 of the receiver R_1 . The receiver R_2 also includes a figures contact FC_2 and a selective contact SC_2 similar to the corresponding contacts of relay R_1 . However, there is this difference to be noted, that whereas the contacts of the receiver R_1 are normally open, the contacts of the receiver R_2 are normally closed and in parallel. These contacts are operated in the same manner as described in connection with the corresponding contacts of receiver R_1 .

The control relay CR is provided with contacts 1—2 which when closed will complete a locking circuit whose purpose will be described later. It also has a pair of contacts 3—4, which are normally open but, when closed, short-circuit the contact of the line relay LR_1 . Likewise, it has a pair of contacts 5—6 which, however, are normally closed and when so closed, short-circuit the armature of line relay LR_2 .

It will now be evident that in the normal condition of the circuit, with the contacts SC_1 and SC_2 open and the control relay CR not actuated, the contact of the line relay LR_2 is short-circuited and therefore the receiver R_2 will not respond to signals coming in over the line L. The armature of the line relay LR_1 , however, is not short-circuited at the contacts 3—4 and any signals which come in over the line L will be received by the receiver R_1 to operate the printer through the selective magnet SM_1 . Also, if reperforating apparatus is provided, the selecting magnet will cause the reperforator to perforate the message in the tape. If the reperforating apparatus is not provided, the message will be recorded by printing either upon a tape or upon a sheet of paper, depending upon whether the printer is a tape printer or a page printer.

If the distant operator wishes to record upon the receiver R_2 , she will send the code to operate the figures contact FC_1 , unless the figures code has already been sent in connection with final characters of the message, as for example, where the final characters happen to be figures, punctuation marks, or stunt controls. In either case, when the figures contact FC_1 has been closed, it remains closed until the letters code is trans-

mitted as already described. This is, of course, the normal operation of a teletype receiver.

If now the distant operator with the figures contact FC_1 closed later sends the special code to operate the selector contact SC_1 , a circuit will be completed from battery, over said contact SC_1 and over the contact FC_1 through the winding of the relay CR to ground. This operates the relay CR. By closing its locking contacts 1 and 2, the relay CR is locked over a circuit passing over normally closed contacts SC_2 and FC_2 of receiver R_2 . When thus locked up, the control relay CR will remain actuated until the locking circuit is opened in a manner to be described later. The control relay upon being operated closes its contacts 3 and 4 and thereby disables the line relay LR_1 . Consequently, the receiver R_1 will no longer receive messages transmitted over the line L. By opening its contacts 5 and 6, the control relay CR removes a short-circuit from about the contact of the line relay LR_2 . This line relay is now in condition to operate the selector magnet SM_2 of the receiver R_2 , and consequently the receiver R_2 will receive subsequent signals from the line until the code combination for switching is again transmitted.

This code combination for switching may be the same identical combination that was used to operate the contacts SC_1 and FC_1 in the case of receiver R_1 . In other words, if while the control relay CR is locked up and the receiver R_2 is receiving, a distant operator transmits a figures code followed by a code for operating the selector contact SC_2 , both contacts FC_2 and SC_2 (which are in parallel) are operated and will open the locking circuit of the control relay CR which is released. The contacts SC_2 and FC_2 are connected in parallel so that the locking circuit will not be opened until both of these contacts are simultaneously opened.

While the use of the same code is permissible for operating contacts SC_1 and FC_1 to switch to one receiver, and for operating contacts SC_2 and FC_2 to switch back, there are certain advantages in using a different code combination to switch back, particularly in the case of the code to operate switches SC_1 and SC_2 . The use of a different code enables the sending operator to precede each message with the code combination for the receiver on which it is to be recorded, with full assurance that only the designated machine will receive the message. The operator need not remember what machine was receiving previously, as would be necessary if the same code combination were used for switching both ways.

When the relay CR releases, its contacts 5 and 6 will again be closed to disable the line relay LR_2 and hence the receiver R_2 . The closing of the contacts 3 and 4 of the control relay CR removes the short-circuit from the contact of the line relay LR_1 and the receiver R_1 is accordingly conditioned to receive. The receiver R_1 will continue to respond to signals until the special switching code is received, when the switching operations previously described will be repeated.

As already stated, the control relay with its operating and locking circuit controlled by the contacts of the two receivers may be used with either page printers or tape printers without any reperforating mechanism being provided. However, the invention is particularly useful where the receiving instruments R_1 and R_2 are typing reperforators. These instruments, as has already

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been stated, are arranged to perforate a tape in accordance with a received message and at the same time to print the message on the tape so that the receiving operator can readily read the message if necessary.

The advantage of the invention as applied to a situation where the receivers are typing reperforators arises from the fact that such reperforators are used at intermediate stations to reperforate the messages, which are then relayed by sending the tapes through senders to distant stations located on different outgoing lines. With an arrangement such as illustrated and herein described, where typing reperforators are employed, the operator at the relaying point where the reperforators are located, will know that all tape she removes from one reperforator is to be sent out over a transmitter to one particular line, whereas all tape taken from the other reperforator is to be sent out over a transmitter connected to a second outgoing line. The operator at the relaying point is thereby relieved of the burden of ascertaining by inspection of the message the line over which it is to be routed. The distant sending operator is able to control the routing of the message at the receiving station by sending the special combination of signals which switches from one reperforator to the other.

It will, of course, be understood that the receiving instruments R_1 and R_2 may be reperforators which are not arranged to type messages. This merely involves leaving out the printing mechanism. The switching contacts are of course controlled and operated by the same mechanical devices which serve in the typing reperforator to actuate the printing mechanism and also the reperforating mechanism.

While this invention has been disclosed in certain specific arrangements which are deemed desirable, it will be obvious that the general principles herein set forth may be embodied in many other organizations, widely different from those illustrated, without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. In a teletypewriter system, a pair of teletypewriter receivers at a station responsive to Baudot code signals transmitted from a distant station, a switching relay having contacts and normally conditioning one of said receivers for reception of Baudot code signals and disabling the second receiver, said receiver thus conditioned having a contact responsive to a case shift signal and another contact responsive to reception of a predetermined Baudot code signal other than a case shift signal, a circuit closed when both of said contacts are in actuated condition for actuating said switching relay, means controlled by said switching relay when actuated to lock up said switching relay, circuits in which contacts of said switching relay are interposed to disable said first receiver when said switching relay is actuated and at the same time to condition said second receiver to receive Baudot code signals, said second receiver having a contact responsive to a case shift signal and another contact responsive to reception of a predetermined Baudot code signal other than a case shift signal, and circuit means adapted to unlock said switching relay when said contacts of said second receiver are simultaneously actuated.

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2. In a teletypewriter system, a pair of teletypewriter receivers at a station responsive to Baudot code signals transmitted from a distant station, a switching relay having contacts normally conditioning one of said receivers for reception of Baudot code signals and disabling the second receiver, said receiver thus conditioned having a contact responsive to a case shift signal and another contact responsive to reception of a predetermined Baudot code signal other than a case shift signal, a circuit closed when both of said contacts are in actuated condition for actuating said switching relay, means controlled by said switching relay when actuated to lock it up, electrical circuit means including contacts actuable by said switching relay interposed in circuit and arranged to disable said first receiver when said switching relay is actuated and at the same time to condition said second receiver for reception of Baudot code signals, said second receiver having a contact responsive to a case shift signal and another contact responsive to reception of a predetermined Baudot code signal different from any of the above-mentioned Baudot code signals, and circuit means adapted to unlock said switching relay when said contacts of said second receiver are simultaneously actuated.

3. In a teletypewriter system, a pair of teletypewriter receivers at a station responsive to Baudot code signals transmitted from a distant station, a switching relay having contacts normally conditioning one of said receivers for reception of Baudot code signals and disabling the second receiver, said receiver thus conditioned having a contact responsive to a case shift signal and another contact responsive to reception of a predetermined Baudot code signal other than a case shift signal, a circuit including a series connection of said contacts adapted to be closed when both of said contacts are in actuated condition for actuating said switching relay, means controlled by said switching relay when actuated to lock it up, electrical circuit means including contacts actuable by said switching relay to disable said first receiver when said switching relay is actuated and at the same time to condition said second receiver for reception of Baudot code signals, said second receiver having a contact responsive to a case shift signal and another contact responsive to reception of a predetermined Baudot code signal different from any of the above-mentioned Baudot code signals, and a circuit including a parallel connection of said contacts of said second receiver adapted to unlock said switching relay when said last-mentioned contacts are simultaneously actuated.

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