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April 27, 1926. 1,582,695

B. ROSENBAUM

RADIO COMMUNICATION SYSTEM

Filed Sept. 2, 1921

Fig. 1.

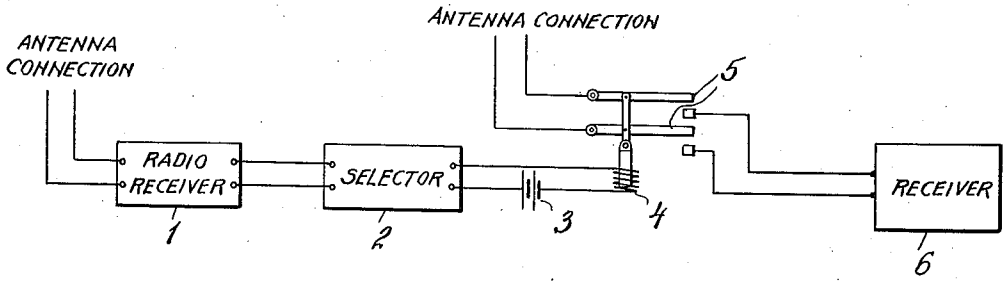
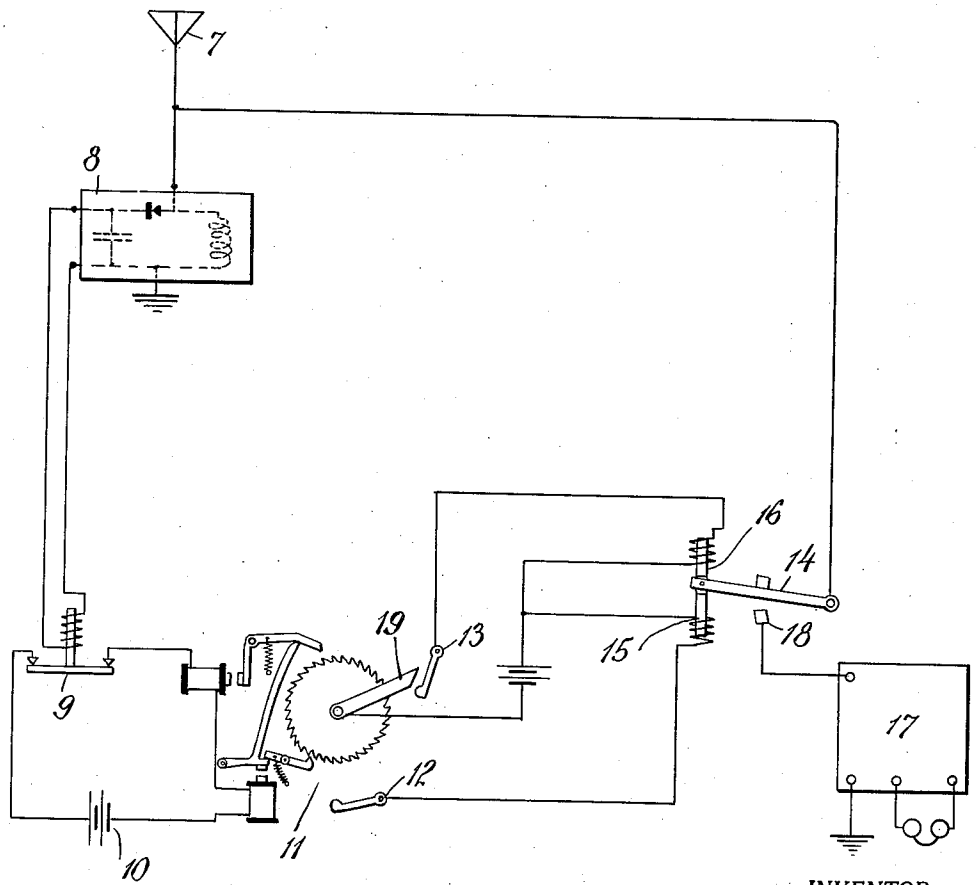


Fig. 2



INVENTOR
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his ATTORNEYS

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UNITED STATES PATENT OFFICE.

BRUNO ROSENBAUM, OF BERLIN, GERMANY, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

RADIO COMMUNICATION SYSTEM.

Application filed September 2, 1921. Serial No. 498,182.

To all whom it may concern:

Be it known that I, BRUNO ROSENBAUM, a citizen of the German Republic, residing at Berlin, Germany, have invented certain new and useful Improvements in Radio Communication Systems (for which I have filed an application for patent in Germany, March 3, 1920, No. 80,266), of which the following is a specification.

Signals which are electrically transmitted without wire or along wires or upon wires can be received by any suitable receiving device possessing a more or less accurate tuning. They can therefore be received by unauthorized receiving stations, or if such unauthorized catching up of signals is not purported they may bring about troubles in the operation of receiving stations intended to correspond with sending stations having a tune approaching the tuning of the station sending out the signals in question. Processes have already been recommended contemplating the use of clocks or other devices whereby the receiving appliances of a station were released for operation at a certain definite time of the day. Under such circumstances the station thus equipped could not receive signals unless during a certain period of time and at a certain definite time of the day. Such arrangement has proved in practice very inconvenient because it is difficult to arrange matters in such a manner that signals are transmitted just at the appointed time.

This invention strikes out along an entirely new course and consists in an arrangement whereby receiving stations intended for a certain wave length are released for operation for a certain definite time upon the sending out of a definite calling signal. Through this signal which acts on opening keys, the station in question is enabled to receive signals during a certain time, and after the expiration of the appointed time the station automatically stops operating. It is however possible to send out immediately a second call signal, which releases again for operation the station in question for a similar period of time, etc. By the arrangement contemplated in this invention it becomes possible to transmit signals or news to a certain individual station at any time of the day and for any duration of time because as explained above the station may be reopened for communication over and over again in succession. It is also possible to arrange matters in such a manner that after the station has been opened it remains so indefinitely until closed by the giving out from the sending station of a special closing signal.

If it is desired to communicate the same news to other stations, two different courses may be followed in the application of this invention. The first course consists in letting out these stations for the same call signal, namely, to cause these stations to be released for operation or their receiving equipment to be switched in by the same signal. Another course consists in having each station laid out for a particular call signal, all these call stations, however, to be arranged in such a manner as to be capable of being combined in a single call signal, upon the sending out of which from the sending station the entire group of receiving stations considered is released for operation or switched in. Such a call signal would be made up according to a special call, and may consist of a series of dots or parts, in which the first part would constitute the own call signal of one station, the first part plus the second the own call signal of another station, the last part by itself the own call signal of a third station, etc. This code signal should be merely a combination signal and should not represent any particular word. It should be merely made up of a sequence of longer or shorter impulses allowing of bringing forth the corresponding releasing action in the station intended to be influenced.

The invention may be applied not only in wireless systems but also in systems making use of wires. In ordinary telegraphy the invention would bring about the result that the signals transmitted are not received by all the individual apparatus connected with the line but only by such apparatuses for which the news is intended. This invention may find application in practice for the transmission of weather reports, stock exchange news items, press news, etc. It may be used in particular for the transmission of news to subscribers. Wherever two stations are connected in such a manner that payment is made not on the basis of the number of words transmitted from one station to the other, but on the basis of the time during which transmission is effected, it becomes

possible by the simplest arrangements to arrange matters in such a manner that the transmission of news may be continued during such length of time as may be desired by simply causing the appointed time interval to be repeated over and over again. For instance one may arrange for time units of 5 minutes, in which case the transmission of news would be paid for on a 5 minute time basis. By adopting the arrangement contemplated in this invention, it would become possible to transmit news at any time of the day and during any length of time, and not merely during a 5 minute period, as the invention affords the means of several individual time units being added together.

The advantages offered by this invention are self-evident. It is practically very difficult upon the number of the receiving stations increasing to operate with different wave lengths to avoid the news being received by unauthorized stations without bringing about disturbances in all the receiving stations. By this invention whereby the receiving stations are switched in by a special call signal sent out by the sending station, either for a definite period of time or until the closing signal is sent out by such sending station, an absolute security is obtained that signals of a certain wave length are not received by an unauthorized station without the knowledge of the sending station. By having the apparatus sealed or locked, one may guard against a violation of the arrangement and against the adjustment of the wave length without the calling signal having been sent out by the sending station. According to this invention the call signal brings into play a relay which connects the member intended for receiving the incoming signal with the receiver, and connects a telephone or a recording appliance of any kind whatsoever with the receiver. The relay may however bring about also a change in the tuning of the receiving station in so far as the call signal is sent out with a wave length different from the wave length of the following signals intended to convey the news to be transmitted, the signals arriving with a different wave length bringing about a change in the tuning of the receiving station. At the same time the relay may bring into play an alarm device, warning the operator, if any, to keep himself in readiness for the beginning of the news transmission either by going to the telephone or by making such arrangements as are necessary for the receiving of the news. The closing signal may consist in a different arrangement of signs which, as in the first case, brings into play a relay existing in the receiving station, which relay switches out and locks the receiving members or otherwise displaces the receiving equipment, or in any other manner brings about that further signals of the wave length in question can no longer be received. It would be theoretically possible to use the same signal as calling and closing signal and to make use of a two-way switch. However, in such an arrangement there is always the danger that upon the calling relay failing to operate, wrong adjustments are made. The relay, reacting upon the call signal or upon the closing signal may also be arranged in such a manner as to switch in any amplifying device, for instance, the current of a glowing cathode tube, there being thereby obtained the setting in readiness of the station and furthermore the giving out of an optical signal in the form of glowing electrodes. The relay may likewise bring into play a time recording device operating mechanically or electrically, which device brings about when the time agreed upon is over, the switching out, the disconnecting and the locking of the receiving apparatus, and at the same time sets in readiness the relay for the receiving of a further call signal which may arrive immediately after the closing of the first period if it is desired to continue the conversation, or after any period of time whatsoever. By means of a call signal, agreed upon, there will also be released for operation a sending station in such a manner as to cause this sending station to announce to the calling station that the desired call has been received or that a communication between the two stations is going to be started.

In order to illustrate the method provided by this invention, representative receiving systems have been illustrated in the accompanying drawings and discussed in the following description of those drawings. In the drawings,

Fig. 1 is a diagrammatic representation of a radio receiving system in which a calling signal is adapted to operate a switch for connecting the receiver to the antenna;

Fig. 2 is a diagrammatic showing of a modification of the system shown in Fig. 1.

Referring now to Fig. 1, a radio receiver of any desired type is represented by the rectangle 1, the receiver preferably being tuned to a fixed wave length. This receiver will be referred to for convenience as the primary receiver. The input of this receiver may be permanently connected to an antenna and the output to a selector mechanism of any of the well-known types, for example the selector shown in U. S. Letters Patent No. 1,131,673, granted to G. Brown. This selector mechanism, which is represented by the rectangle 2, is adapted to close a circuit through a local source of energy 3 and a solenoid 4 to throw the switch 5 from the open to the closed position. One set of terminals of the switch 5 may be permanently connect-

ed to an antenna, and the other set of terminals to a receiver of any desired type. The receiver is represented by rectangle 6, and will be referred to for convenience as the secondary receiver.

This system operates as previously outlined. In its operative position the antenna is disconnected from the receiver 6, but is connected to the receiver 1. The calling signal is received by the receiver 1 and operates the selector mechanism represented at 2 to actuate the switch 5 through its solenoid 4. This connects the receiver 6 with the antenna, and it is desirable that the signals received by the receiver 6 be transmitted at a wave length different from the wave length of the calling signal.

In Fig. 2 there is illustrated a modification of the system just described, in which a relay 9 is interposed between the primary receiver denoted by 8 and the selector mechanism 11. This selector mechanism may be of any of the usual types, the one illustrated being the same as that shown in U. S. Letters Patent No. 1,131,673, granted to G. Brown. The selector mechanism is provided with two contacts 12 and 13, the first of which cooperates with the arm 19 to close the circuit through solenoid 15, thus closing the antenna switch 14, and the second of which cooperates with the contact 19 to close the circuit through solenoid 16 to open the antenna switch 14. The antenna 7 is permanently connected to primary receiver 8 and to one terminal of the antenna switch 14. The other terminal of the antenna switch is connected to the secondary receiver 17, which may be of any convenient form. In this embodiment the wiring has been simplified by showing the ground connection by the conventional symbol. The radio receiver 8, which may be of any desired type, is shown as a crystal receiver, the connections being already well known. When signals of a given sequence are sent out by a sending station and received by the antenna 7, the receiver 8 rectifies them and thus operates relay 9 in accordance with the sequence of the transmitted signals. This relay 9 closes contacts through the electromagnets of the selector mechanism 11, and causes this selector to move the contact arm 19 to the desired position. The structure and operation of this mechanism is already well known, and will not be further explained here. However, when impulses of a certain sequence act upon this selector, the contact arm 19 may be moved around so as to engage with the contact 12 and thus operate the solenoid 15 and connect the antenna 7 to the secondary receiver 17. The messages transmitted by the sending station will then be received by the receiver 17. Upon the conclusion of the transmitting of the message another signal may be sent out by the transmitting station, which operates the selector mechanism as previously outlined and moves the contact arm 19 to engage with contact 13, thus closing a circuit through the solenoid 16 and operating the antenna switch 14 to disconnect the secondary receiver 17 from the antenna 7.

I claim:

In a radio communication system, the method of remotely and selectively controlling a plurality of receiving stations which comprises transmitting a different series of signals of predetermined sequence for each of said receiving stations to be controlled, receiving said signals at each of said receiving stations, impressing said received signals on a selector operative only by means of one sequence of signals, and operating said selector to operatively connect a radio receiving set.

In testimony whereof I affix my signature.

BRUNO ROSENBAUM.