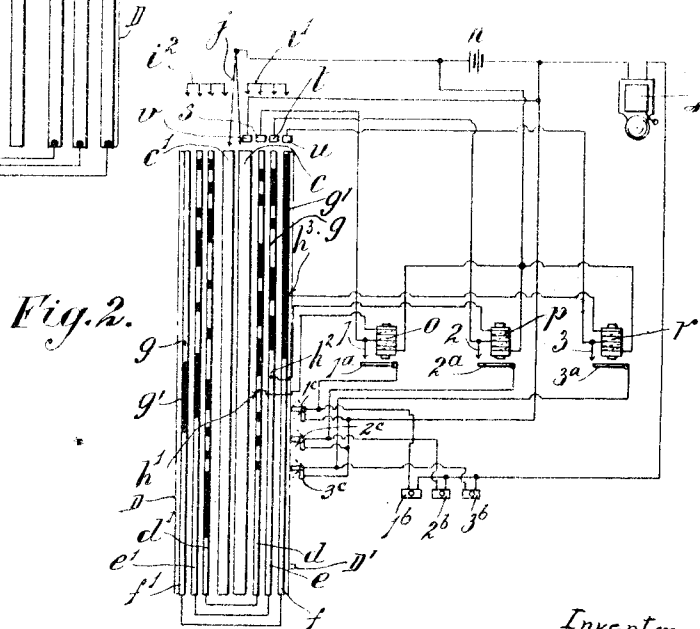


1,193,807.

Fig. 3.
i¹ s. t. u. v.



A. C. Bridges

Inventor
William Joseph Lyon
By Davis & Davis
Attorneys

UNITED STATES PATENT OFFICE.

WILLIAM JOSEPH LYONS, OF DUBLIN, IRELAND.

ELECTRIC-TELEGRAPH RECEIVING APPARATUS OF THE SELECTIVE TYPE.

1,193,807.

Specification of Letters Patent.

Patented Aug. 8, 1916.

Application filed June 26, 1914. Serial No. 847,431.

To all whom it may concern:

Be it known that I, WILLIAM JOSEPH LYONS, a subject of the King of Great Britain and Ireland, residing at Dublin, Ireland, have invented Improvements in Electric-Telegraph Receiving Apparatus of the Selective Type, of which the following is a specification.

In the complete specification for British Letters Patent No. 10911 of 1912, and also in my co-pending U. S. application Serial No. 765,560 I have described electric telegraph receiving apparatus of the selective type wherein the call or other device to be operated only upon the transmission and reception of an electric signal according to a pre-arranged code, and the means for bringing such call or other device into operation, are controlled by an arm arranged to be moved either directly, or indirectly through a relay, by the received electric signal, and a surface arranged to be moved at right angles, or substantially so, to that of the motion of the operative end of the arm on the receipt of a signal, and which after being started, continues its motion independently of the arm, the said surface being so formed or constituted in relation to the movement of the arm with respect thereto, that the call or other device will be operated only in the event of the said arm avoiding contact with certain parts of the said surface, which parts the said arm will not touch if moved in accordance with the electric signal to which the apparatus is designed to respond.

Apparatus constructed and operated as described can be used to effect selective operation of a calling device in response to signals of the type consisting of a definite number of electric impulses of the same duration of activity separated by pre-arranged intervals of total inactivity; to signals of the type consisting of electric impulses—short and long, as in the Morse system—of a prearranged number, sequence and rate, and to signals which might consist of single electric impulses of prearranged duration of activity, that is to say, corresponding to a prolonged dash as in the case of wireless transmission, or to a continuous train of predetermined duration; or of combinations of such impulses of prearranged number and sequence, but the call device designed to be brought into operation by a particular signal, will not be

brought into operation by or during the reception of other electric impulses which, in part, involves the aforesaid particular signal for which the apparatus is arranged.

The construction and arrangement of the controlling arm and movable surface may be such that when the apparatus is in action, the arm will close an electric circuit during the movement of the surface, so long as the signal being received corresponds to the prearranged code and is not followed within a given time by any other effective impulses; or it may be such that the arm will be prevented from closing an electric circuit during the movement of the surface so long as the signal being received corresponds to the prearranged code and is not followed within a given time by any other effective impulses. For this purpose the arm may, for example, be adapted to form a contact arm and be arranged to oscillate across an endwise movable surface provided with conducting and insulating material, the part of the surface upon which the arm travels while subject to the electric signal to which the apparatus is designed to respond, being arranged lengthwise of the surface and composed either of conducting material, or of insulating material, or it may be of insulated material (hereinafter included in the term insulating material) and having adjacent thereto in the one case insulating material and in the other case conducting material so that the electric circuit controlling the call device will either be kept closed, or be kept open, as the case may be, while the electric signal being received corresponds to the prearranged code signal, but will either be opened or be closed respectively by the arm moving on to the insulating material, or on to the conducting material, as the case may be, in the event of a different signal being received.

Now the present invention relates to improvements in or modifications of apparatus of the kind described in my said former specification whereby a single apparatus provided with a single movable arm arranged to be moved either directly or indirectly through a relay by the electric signal received, is adapted to selectively respond to any one of two or more special signals or messages and bring about the operation of a bell, or a particular bell, and also it may be an indicator, after the complete receipt of the special signal or message. The appara-

tus is also adapted to effect the selective operation of other devices as for example steering gear for balloons, torpedoes, and other bodies by wireless transmission, or to effect the operation of printing telegraphs by wireless or other electric transmission. For this purpose, according to the present invention, the surface arranged to be moved at right angles, or substantially so, to that of the motion of the operative end of the arm on the receipt of a signal is provided with a number of paths or traces formed of insulating and conducting material arranged to correspond to a number of specific signals to which the apparatus is designed to respond the whole being arranged to move relatively to the contact arm beneath fixed contact brushes which are intermittently connected to the arm, upon displacement thereof, in such manner that the apparatus can, by means of the single movable arm respond to any one of the number of specific signals but to no other signals. The paths or traces may be arranged on the periphery of a drum or the like so as to rotate past and bear against relatively stationary contact brushes which are intermittently placed in connection with the single movable arm that is moved in accordance with the signal being received. the said arm and the conducting material in each of the paths or traces being connected to the opposite poles of an electric battery through devices controlling means that determine whether the signal being received shall bring the call or other device into operation or not according as the signal corresponds to one or other of the specific signals for which the apparatus is designed to respond and is not followed within a predetermined period by any other electric impulses corresponding to a different signal, or does not correspond to any one of such specific signals.

Multiple selective apparatus of the kind set forth can be constructed in various forms.

In the accompanying illustrative drawings, Figure 1 shows diagrammatically, in developed plan view, one arrangement of such apparatus. Fig. 2 shows diagrammatically an alternative arrangement and Fig. 3 is a detail view of part thereof.

In this example, a and b are insulated metal stops for use in starting and stopping the motion of a surface, such as that of the periphery of a drum, on which they are mounted as described in the said former specification.

c, c^1 are two insulated centrally and circumferentially arranged conducting paths on said surface. Arranged at opposite sides of the said conducting paths are two, three or more pairs of circumferential paths or traces, three are shown, viz., d, d^1, e, e^1 and f, f^1 , of pieces of metal g suitably disposed

to correspond to three different signals to which the apparatus is to respond. The pieces of metal g in the two corresponding paths d, d^1 are all electrically connected together and to a slip ring and brush indicated at h^1 . Similarly for the contacts in the traces e, e^1 and f, f^1 there are slip rings and brushes at h^2 and h^3 respectively. In the example, the traces d, d^1 consist of metal contacts g separated by insulating surfaces g^1 , these being arranged to correspond to the signal S O S on the Morse code. The pieces of metal g in each path or trace may be connected together by forming them of one piece of metal having recesses therein to hold the pieces of insulating material g^1 . The two strips of metal constituting the two paths or traces are, in each case, shown connected together by a conductor c^2, d^2 or e^2 . Similarly, the traces e, e^1 consist of metal contacts g separated by insulating surfaces g^1 arranged to correspond to the signal R M on the Morse code, while the traces f, f^1 consist of metal contacts g and insulating surfaces g^1 arranged to correspond to a prolonged signal in the case of wireless transmission or to a continuous train of waves of a predetermined length and representing any desired signal or call.

i^1, i^2 are two fixed sets of contact brushes so arranged that during the movement of the drum they put the central metal strips c, c^1 into contact with the circumferential paths $d, e, f; d^1, e^1, f^1$, and thus at times, depending on the path traced by the end of the movable arm j , which is subject to the control of the electric impulses received, the said arm either makes electric connection with or avoids connection with the slip rings h^1, h^2, h^3 . In this example, the means for operating the call device or for closing the final circuit, comprises arms k^1, k^2, k^3 that are normally caused by spring controlled guides l^1 to bear respectively on projecting pins l^2, l^3 , fixed on a shaft l which is caused to rotate when the drum carrying the said traces rotates and thus raises the arms k^1, k^2, k^3 , until they respectively reach positions where they close the circuits k^3 controlling the call or other devices k^3 to be selectively operated in a manner that will be readily understood and as explained for example in my said former specification, separate indicators k^1 being provided to show which of the three signals has been received.

m^1, m^2 or m^3 are electromagnets connected respectively to the brushes h^1, h^2, h^3 and arranged between such brushes and one pole of an electric battery n the other pole of which is connected to the movable arm j . Each of the said electromagnets on being energized acts to pull the corresponding arm k^1, k^2 or k^3 against the action of the corresponding spring controlled guide l^1

and thus cause it to leave the corresponding projecting pin l^1 , l^2 or l^3 and return to its inoperative and initial position as will be understood by reference to my said former British specification No. 10911 of 1912. It will be understood from the connections shown in Fig. 1, that the arm k^1 will remain on the pin l^1 and eventually cause a bell or other device to ring or otherwise operate, on closing the circuit thereof, only on condition that the free end of the arm j moves in accordance with the predetermined signal — — — — — or S O S on the Morse code, and does not make connection with any of the metal contacts g in the pair of traces d , d^1 on the moving drum. If any other signal is received, or if the signal S O S is immediately followed by other signals, the arm j will be connected through the fixed brushes i^1 or i^2 to a metal contact piece g in the path or trace d or d^1 and thus to the slip ring h^1 so that the electromagnet m^1 will be energized and the lever arm k^1 removed from the pin l^1 and returned to its inoperative and initial position without producing a call. The call or other device controlled by the arm k^2 will similarly respond only to a signal corresponding to — — — — — or R M on the Morse code, and that controlled by the arm k^3 will respond only to a signal consisting of a single prolonged dash of predetermined duration but not for a dash of shorter or longer duration.

It will be obvious that the alternative methods described in my said former British specification for preventing the final operation of the call or other device, in the event of the arm j deviating from the proper path and thus closing an electric circuit, can be applied to the present method of effecting selectivity for several signals. Fig. 2 shows diagrammatically one of such alternative methods. Fig. 3 being a view of a detail thereof hereinafter referred to. In this example, the conducting paths c , c^1 , paths or traces d , d^1 , e , e^1 and f , f^1 and sets of stationary contacts i^1 , i^2 are arranged as in Fig. 1 and the traces or paths d , d^1 , e , e^1 , and f , f^1 are arranged to correspond as before to the signals S O S, R M, and a dash of predetermined duration. For operating the call or other device, the slip rings and brushes h^1 , h^2 , h^3 are respectively connected to one end of the winding of one or other of three holding-in electromagnets o , p and r the other ends of which are connected to one pole, say the positive pole, of an electric battery n to which the movable arm j is also connected. The middle points of the said windings are respectively connected to three conducting pieces s , t , u which are insulated from the drum and may conveniently be placed outside and independently thereof as shown in Fig. 3. v is another

conducting piece also insulated from the drum and conveniently placed outside and independently thereof and which is connected to the opposite or negative pole of the battery n . The middle points of the several windings are also respectively connected to insulated stationary contacts 1, 2 and 3 arranged above movable armature contacts 1^a , 2^a , and 3^a controlled by the holding in electromagnets o , p , r , these armature contacts being respectively connected in series with indicating devices 1^b , 2^b , and 3^b that are collectively connected in circuit with a bell or call device 4 connected to the same pole of the battery n as the stationary contact v .

1^c , 2^c and 3^c are switches arranged in shunt to the separate portions of the circuits including the indicators 1^b , 2^b and 3^b and bell 4, the said switches being arranged to be each tripped or opened by a pin D^1 on the drum D or otherwise, after the due reception of the corresponding signal and to thereby cause the current that normally passes through the contact 1, 1^a , 2, 2^a and 3, and the switches 1^c , 2^c and 3^c to the negative pole of the battery n to pass through and start the continuous or other ringing bell 4 or other device and operate the corresponding indicator 1^b , 2^b , or 3^b . The working of this arrangement is as follows: On the reception of the first electric impulse and the consequent movement of the arm j and release of the clockwork driven drum D in known way the set of contact brushes i^1 on the right are made to momentarily engage the conducting pieces s , t , u and v the number of which will depend on the number of messages for which selectivity is to be arranged. In this case the contact of the brushes i^1 with the said conducting pieces may be made by an insulating projection 5 on the drum acting to lift the set of brushes i^1 so as to touch the pieces s , t , u and v as is shown in Fig. 3. The electric connections being as shown in the diagram, the several holding-in electromagnets o , p , r will be thus energized and will attract their armatures 1^a , 2^a and 3^a and, through the contacts 1, 2, and 3, will complete the circuits of the magnets through the switches 1^c , 2^c , 3^c so that the lower halves of the windings of such magnets will continue to be traversed by a current. During the reception of the subsequent electric impulses, the arm j moves backward and forward across the conducting path c , c^1 and if the circumferential paths d , d^1 have their metallic spaces suitably arranged for a particular message, then the sequence and number of the signals or impulses corresponding to this message will be such that during its complete reception, the end of j will not be connected through the brushes i^1 or i^2 at any time to the corresponding slip ring h^1 . The corresponding

electromagnet *o* will thus continue to be energized and finally after the complete reception of the message, it may be arranged that the corresponding switch *1^c* will be automatically opened, either mechanically or otherwise, and the current through the electro-magnet *o* made to pass to the call bell *4* or other device through its particular indicator *1^b*. A message other than the particular one would, during its reception, necessarily put the end of the arm *j* through the brushes *z¹* or *z²*, in connection with the slip ring and brush *h¹* and thus energize the upper half of the winding of the electro-magnet *o*, thus neutralizing the action of the magnet and breaking connection between contacts *1*, *1^a*, thereby putting the apparatus into an inoperative condition. Similar actions will take place in respect of signals or impulses corresponding or not to the paths or traces *e*, *e¹* and *f*, *f¹*.

It will be understood that in multiple selective apparatus according to the present invention the end of the arm *j* need not be arranged to touch the moving surface of the drum in which case the conducting strips *e*, *e¹* on the surface thereof may be omitted. In this case the arm would be arranged to make contact only with the fixed brushes *z¹*, *z²* alternately, or with two fixed contacts connected to such fixed brushes, in the same manner in which it makes contact with the conducting strips *e*, *e¹* under the action of the signals being received, so that as the drum surface moves under the brushes *z¹*, *z²*, the end of the arm *j* moves into definite positions under the control of the electric impulses received and thus substantially executes a prearranged movement relative to the drum surface.

What I claim is:—

1. Electric telegraphic receiving apparatus of the kind herein referred to comprising a contact arm adapted to be moved on the receipt of an electric impulse, a surface arranged to move substantially at right angles to that of the motion of the operative

end of said contact arm on the receipt of a signal, a number of paths or traces carried by said surface and formed of insulating and conducting material arranged to correspond to a number of specific signals to which the apparatus is designed to respond and a number of fixed brushes against which said paths or traces move, said brushes being arranged to be intermittently connected to the said arm upon displacement thereof whereby the apparatus can, by means of the single movable arm, respond to any one of a number of specific signals but to no other signals.

2. Electric telegraphic receiving apparatus of the kind herein referred to comprising a single contact arm adapted to be moved on the receipt of a signal, a movable drum, a number of circumferentially arranged paths or traces formed of insulating and conducting material arranged on said drum so as to correspond to a number of specific signals to which the apparatus is designed to respond, a set of brushes against which said paths or traces are arranged to bear and rotate, said set of brushes being arranged to be intermittently placed in communication with said contact arm, a call or other responsive device, a source of electric energy to the opposite poles of which said arm and the conducting material in each of the paths or traces are connected, and devices controlling means for determining whether the signal being received shall bring the call or other device into operation or not according as the signal corresponds to one or other of those for which the apparatus is designed to respond or does not correspond to any one of such signals.

Signed at 9 Leicester street, Dublin, Ireland, this seventeenth day of June, 1914.

WILLIAM JOSEPH LYONS.

Witnesses:

JOHN F. CLAFFEY,
E. L. ADAMS, Jr.