No. 782,422. PATENTED FEB. 14, 1905.

H. SHOEMAKER.

RECEIVING APPARATUS.

APPLICATION FILED SEPT. 1, 1904.

2 SHEETS—SHEET 1.

Fig 1.

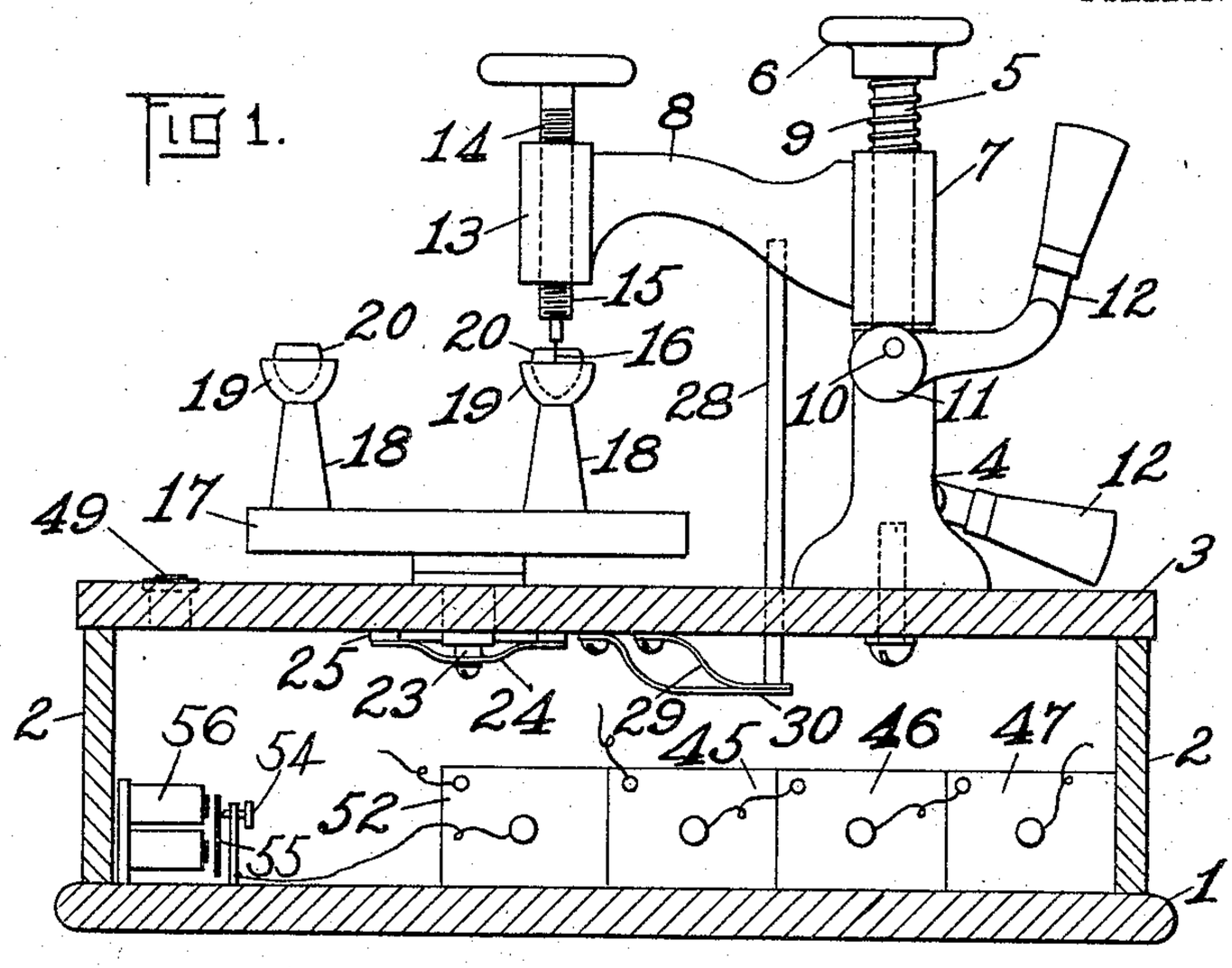
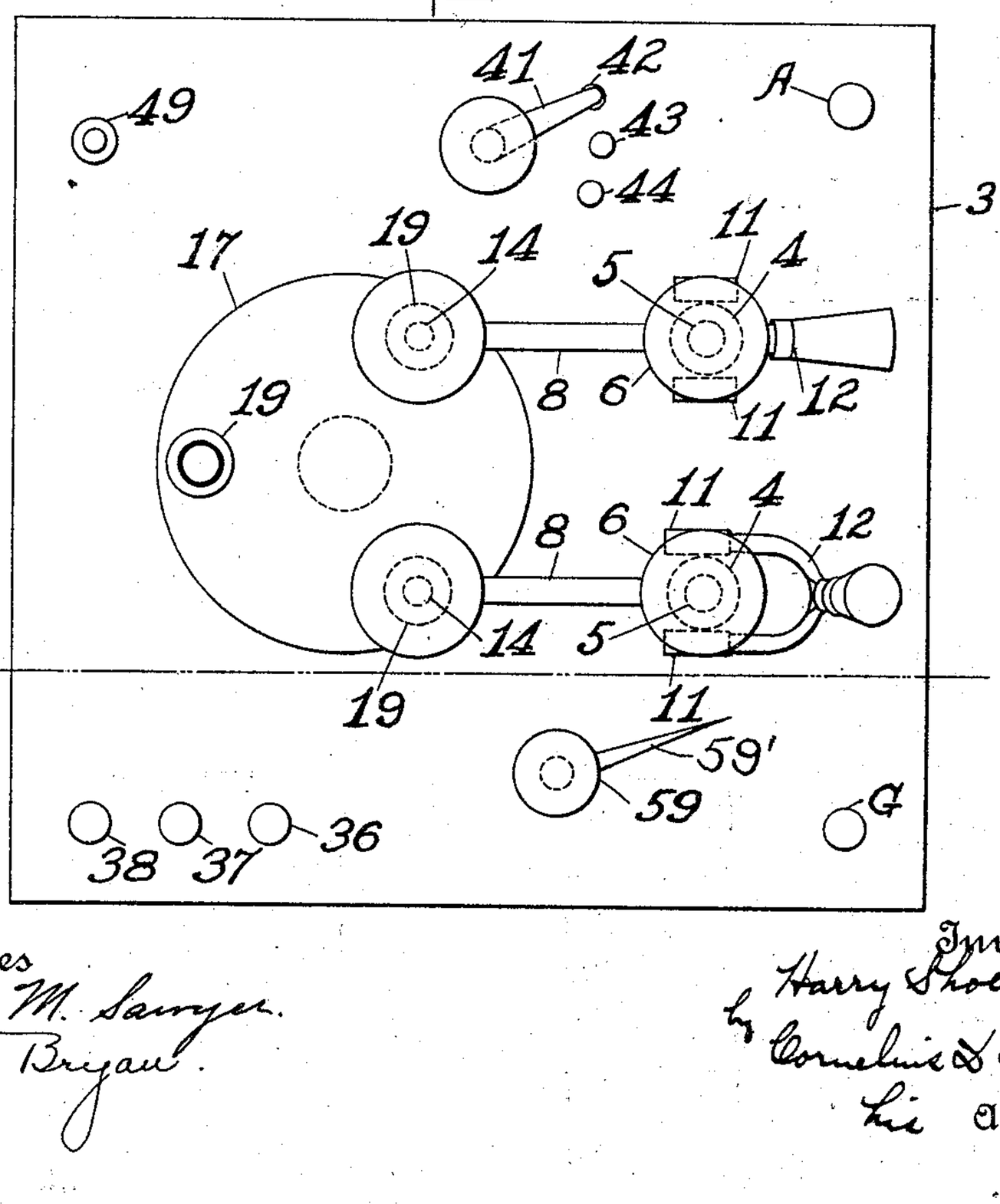


Fig 2.



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2 SHEETS—SHEET 2.

FIG 3.

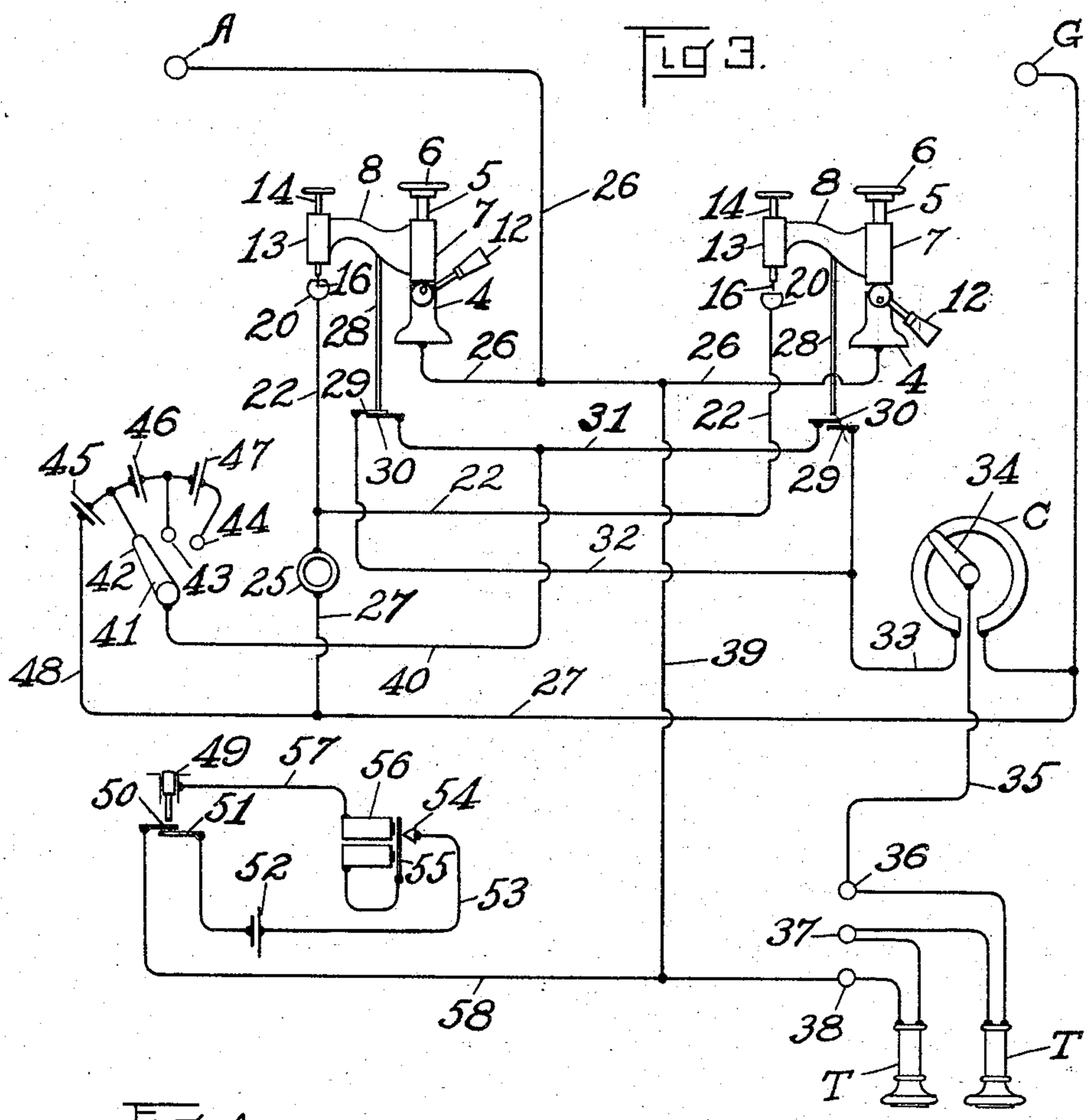


FIG 4.

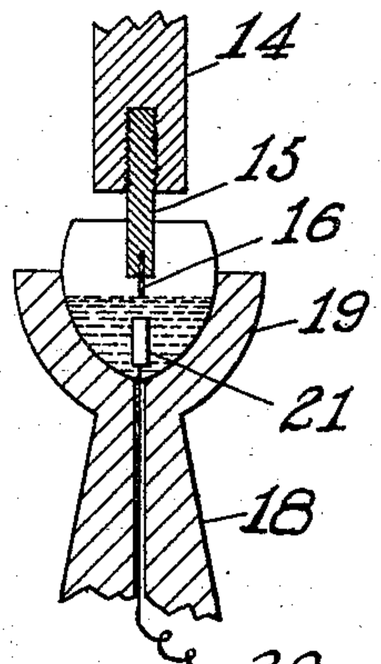
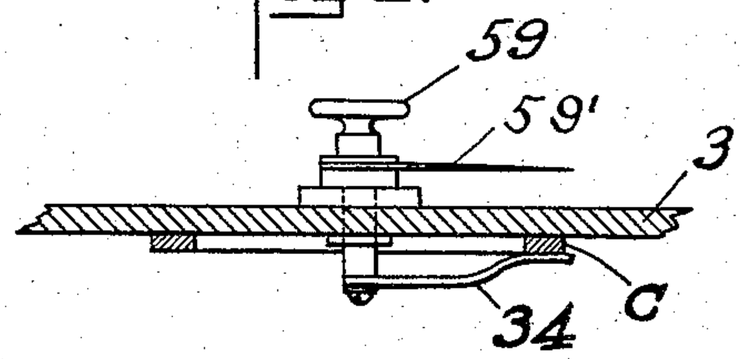


FIG 5.



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No. 782,422. Patented February 14, 1905.

UNITED STATES PATENT OFFICE.

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RECEIVING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 782,422, dated February 14, 1905.

Application filed September 1, 1904. Serial No. 222,930.

To all whom it may concern:

Be it known that I, HARRY SHOEMAKER, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Receiving Apparatus, of which the following is a specification.

My invention relates to receiving apparatus, more especially such as employed in signaling systems in which the messages are represented during the transmission by electroradiant energy.

My invention comprises receiving apparatus so arranged and disposed as to be easily portable and to occupy a minimum of space.

My invention comprises also receiving apparatus in which the wave-responsive device may be quickly replaced by another when for any reason it has become inoperative, this substitution being rendered possible without the interruption of communication.

My invention comprises, further, combined receiving apparatus and testing apparatus, whereby it may be determined in advance of the receipt of signals from the transmitting-station whether or not the wave-responsive device is in condition to respond to the transmitted signals.

My invention comprises other features to be hereinafter described and claimed.

For an illustration of one of the numerous forms which my invention may take reference is to be had to the accompanying drawings, in which—

Figure 1 is a vertical elevational view, partly in section, of the receiving apparatus. Fig. 2 is a top plan view of the receiving apparatus. Fig. 3 is a diagrammatic view, including the circuit arrangements of the receiving apparatus. Fig. 4 is a vertical sectional view, enlarged, of one of the numerous types of wave-responsive devices which may be employed in my apparatus. Fig. 5 is a vertical sectional view, partly in elevation, of the potentiometer.

Referring to Figs. 1 and 2, 1 is the bottom of a box or receptacle made of any suitable material, such as wood or the like.

At 2 2 are shown the sides, and 3 is the top of the box. Mounted upon the top 3 are shown two vertically-extending standards 4, preferably of brass. Extending down into each standard 4 is a screw-threaded rod 5, having the head 6. Embracing each member 5 is a portion 7 of a bracket 8. Surrounding each screw 5 is a spiral spring 9, engaging the top of the portion 7 and the under side of the head 6, thus tending to always force the bracket 8 vertically downward. Pivoted at 10 in each member 4 are the cam members 11, adapted to be operated by the hand-levers 12. By rotating the lever 12, Fig. 1, in a clockwise direction the cams 11 raise the bracket 8, since the portion 7 bears upon the cams 11. This upward motion is opposed by the spring 9, and when the operative lever 12 is returned to normal position the spring 9 forces the bracket 8 downwardly, such bracket coming to rest at a perfectly definite position, determined by the cams 11.

At the outer end of each bracket 8 is a portion 13, adapted to accommodate the vertically-extending screw 14. In the lower end of each screw 14 is a metallic tip 15, in which is secured the downwardly-extending very fine metallic wire 16. Having adjusted the point 16 with respect to the liquid or coöperating element by means of the screw 14, with the parts in position, as shown in Fig. 1, so that the desired adjustment of the wave-responsive device is secured, the lever 12 may be thrown downwardly, thus disassembling the wave-responsive device. By again lifting the lever 12 a wave-responsive device is again produced, and its sensitiveness is the same as when originally adjusted, because the bracket 8 comes always to a definite and certain position because of the cams 11.

17 is a disk, of hard rubber or other suitable material, upon which are erected three standards 18, symmetrically arranged. These standards may be of hard rubber or the like, terminating at their upper ends in the cups 19, in which are cemented or secured by other means the glass cups 20, containing a suitable liquid. Within such liquid is a relatively large elec-

trode 21, to which is connected the conductor 22, extending up through the post 18 and sealed through the glass of the cup 20. The conductors 22 of the three electrodes 21 are in electrical communication with each other. The disk or plate 17 is rotatable about its center, so that the different cups 20 may be presented to the points 16, carried by the several arms 8. The conductors 22 connect with the metallic rod 23, about which the disk 17 rotates, electrical communication being afforded through the metallic brush 24 with the contact-ring 25. 25 is therefore, in effect, the terminal for all the electrodes 21.

One wave-responsive device is connected in circuit at a time and remains so until it becomes inoperative, due to burning out or any other cause. When this occurs, the operator throws downwardly the lever 12 for that wave-responsive device, thus removing it from circuit, and immediately raises the other lever 12, thus bringing the other wave-responsive device into the circuit. One of the glass cups 20 may contain acid or other suitable material, so that while one wave-responsive device is in service the other may be treated and prepared—as, for example, by dissolving off the silver coating of the extremely fine platinum wires 16.

Referring to Fig. 3, A is a binding-post, to which may be connected the usual aerial receiving-conductor, and G is another binding-post, to which the usual earth connection may be made. However, the terminals of any circuit either inductively or conductively associated with the receiving-conductor may be connected with these posts A and G. From A a conductor 26 extends to each of the standards 4, electrical communication being established between the post A and each of the points 16. The electrodes in the cups 20 communicate by conductors 22 with the contact-ring 25, as previously described. From the contact-ring 25 extends the conductor 27 to the binding-post G. Thus the path of the currents produced by the received electroradiant is from binding-post A through whichever wave-responsive device may be thrown in circuit.

Extending downwardly from each bracket 8 is a rod 28, preferably of insulating material. Each rod 28 is, in effect, a push-button operated by the bracket 8 to control the spring-contacts 29 and 30. The two contact-springs 30 are connected together by the conductor 31, and the two contact-springs 29 are connected together by the conductor 32 and also by conductor 33 with one end of the potentiometer resistance C, which is preferably an incomplete ring of carbon or graphite. Adapted to bear upon and traverse the resistance C is the switch-arm 34, which is connected by conductor 35 to the binding-post 36. Two similar binding-posts 37 and 38 are provided, and between them are connected the two telephone-receivers T T. The binding-post 38 communicates through conductors 26. The contact-springs 30 communicate, through the conductor 31 and the conductor 40, with the switch-arm 41, adapted to engage the several switch-points 42 43 44, thus cutting in any desired number of cells of battery 45 46 47. A conductor 48 joins one terminal of the cell 45 with the contact-ring 25. The switches 29 30 serve to prevent the battery-cells from dissipating themselves through the resistance C when the wave-responsive devices are out of use.

49 is a suitable push-button adapted to bring the contacts 50 and 51 into engagement, as well as to close the circuit formed by the cell 52, conductor 53, contact 54, armature 55, electromagnet 56, and conductor 57. The contact 54, armature 55, and electromagnet 56 constitute an ordinary buzzer, which operates upon a depression of the push-button 49. When in operation, the contact-spring 50 places one terminal of the buzzer in communication with the conductor 39 through the conductor 58. In other words, by depressing the push-button 49 electromagnetic waves produced by the buzzer, as well understood, are communicated to either of the wave-responsive devices, thus serving as a test to determine whether or not the wave-responsive device is in operative condition.

The cells 45, 46, 47, and 52 may be inclosed in a box supporting the standards 4. The potentiometer resistance C and the buzzer may also be inclosed within said box. The switch-arm 41 and the contact-points 42 43 44 may be on the top of the box, as may also the handle 59 for operating the switch 34. The push-button 49 is also mounted in the top of the box.

The operation is as follows: Referring to Fig. 3, the bracket 8 at the left is in its lowest position, and therefore the fine wire 16 is in contact with the liquid contained in the cup 20, and the contacts 29 and 30 at the left are in engagement. At the same time the bracket 8 at the right is in its uppermost position and the contacts 29 and 30 at the right are separated. The currents due to the received electroradiant energy pass from the binding-post A through the wave-responsive device at the left to the binding-post G. The change of resistance of the wave-responsive device is manifested by clicks in the telephone-receivers T T, such clicks being due to the change in current strength in the circuit, including the cell 45, switch-arm 41, conductor 40, conductor 31, contact 30, contact 29, conductor 32, conductor 33, potentiometer resistance C, switch-arm 34, conductor 35, telephone-receivers T, conductor 39, conductor 26, to and through the wave-responsive device at the left, conductor 22, contact-ring 25, conductor 27, and conductor 48. If for any reason the wave-responsive device at the left operates unsatisfactorily, its bracket 8 may be raised, as heretofore de-

scribed, and the wave-responsive device at the right may be thrown in by lowering its bracket 8. This operation separates contacts 29 and 30 at the left and causes contacts 29 and 30 at the right to engage. The operation is then as heretofore described. It is seen also that when both brackets 8 are elevated the local circuit is interrupted by the separation of both pairs of contacts 29 and 30.

Though I have illustrated and described each wave-responsive device as consisting of a very fine platinum wire coöperating with a mass of liquid, it is to be understood that my apparatus is suitable for utilizing other types of wave-responsive devices in which one element is removable from the other—as, for example, a metallic point in contact with a conducting-surface.

What I claim is—

1. In combination, a plurality of groups of elements, the elements of each group adapted to constitute a wave-responsive device, and means for interchanging said elements among said groups.

2. In combination, a plurality of groups of elements, the elements of each group adapted to constitute a wave-responsive device, means for interchanging said elements among said groups, and means for actuating the elements of a group whereby a wave-responsive device is produced or disassembled.

3. In combination, a member carrying a plurality of elements, each element adapted for coöperation in a wave-responsive device, a plurality of complementary elements, a bracket for supporting each of said elements, a standard for supporting each of said brackets, said carrying member being movable whereby any element thereon may be brought to operative position with respect to any complementary element, and means for actuating said brackets whereby any complementary element may be actuated to produce a wave-responsive device.

4. In combination, a standard, a bracket supported thereby, an element of a wave-responsive device supported by said bracket, a switch-actuating member connected with said bracket, and means for actuating said bracket, whereby said element is moved into or out of operative position and said switch simultaneously operated.

5. In combination, a standard, a bracket supported thereby and movable thereon, an element of a wave-responsive device supported by said bracket, and a cam for operating said bracket to move said element into and out of operative position.

6. In combination, a standard, a bracket supported thereby, an element of a wave-responsive device supported by said bracket, means for adjusting said element with respect to said bracket, and a cam for operating said bracket to move said element into and out of operative position.

7. In combination, a standard, a bracket supported thereby and movable thereon, an element of a wave-responsive device supported by said bracket, means for adjusting said element with respect to said bracket, and a cam for determining the extent of movement of said bracket.

8. In combination, an element of a wave-responsive device, a supporting member therefor, means for actuating said supporting member, a source of energy having a circuit independent of the circuit including said element, a switch in the circuit of said source of energy, and a connection between said switch and said supporting member, whereby when said supporting member is actuated said element is moved into or out of operative position and said switch simultaneously operated.

9. In combination, a plurality of groups of elements, each group adapted to constitute a wave-responsive device, a local circuit, a potentiometer included in said circuit, means for inserting into or removing from said circuit each group of elements, and means controlled simultaneously with each group of elements for interrupting the current in said potentiometer.

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