F. G. SARGENT.

WAVE RECEIVING DEVICE.

APPLICATION FILED JULY 8, 1908.

**959,967.** Patented May 31, 1910.

Fig. 1.

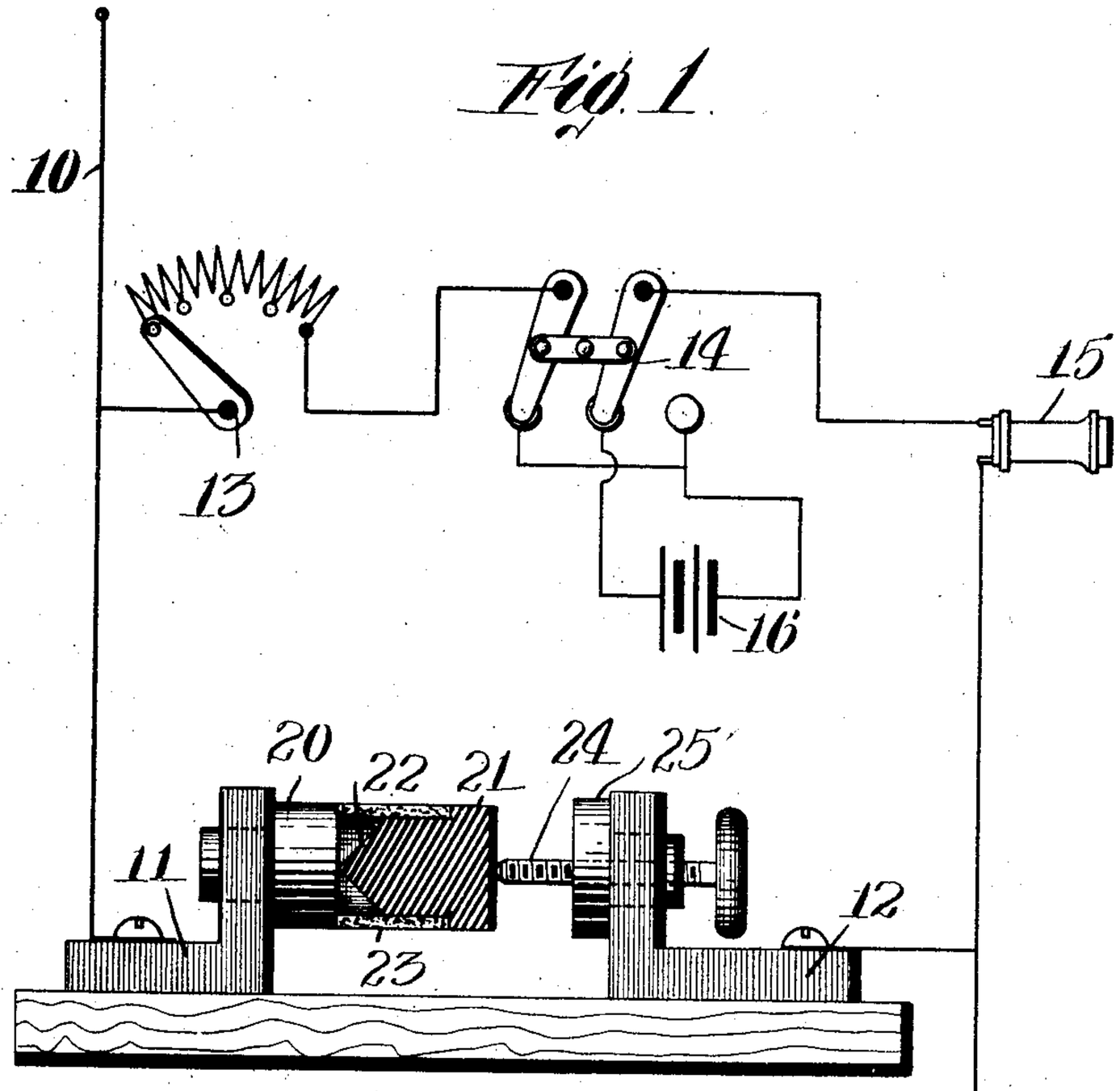
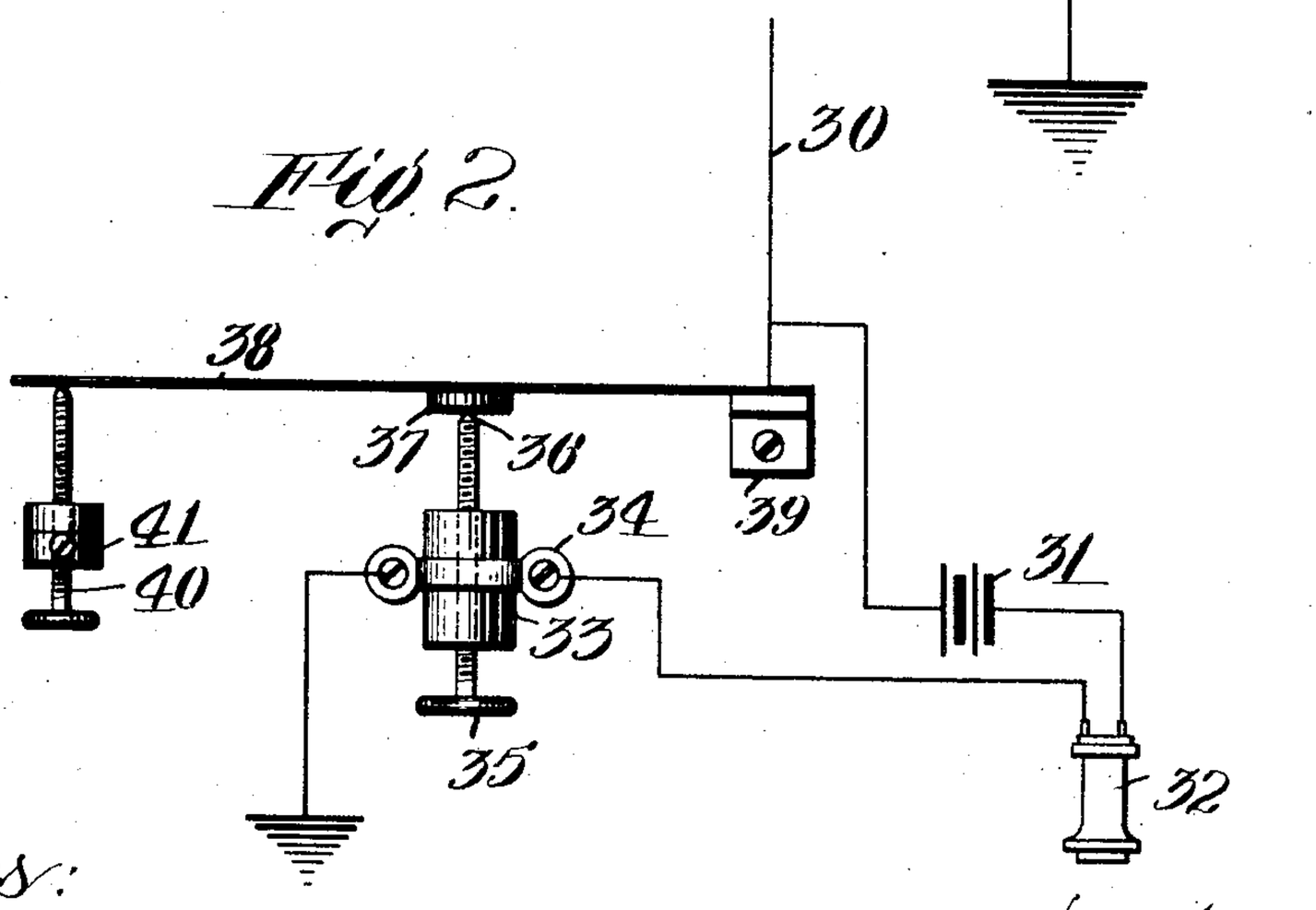



Fig. 2.

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# UNITED STATES PATENT OFFICE.

FREDERICK G. SARGENT, OF WESTFORD, MASSACHUSETTS.

## WAVE-RECEIVING DEVICE.

959,967. Specification of Letters Patent. Patented May 31, 1910.

Application filed July 8, 1908. Serial No. 442,487.

*To all whom it may concern:*

Be it known that I, FREDERICK G. SARGENT, a citizen of the United States, residing at Westford, in the county of Middlesex and State of Massachusetts, have invented a new and useful Wave-Receiving Device, of which the following is a specification.

This invention relates to the transmission of intelligence by so-called wireless means in which a cohering device or the like is affected by wave action so as to change the resistance in the circuit.

The principal objects of the invention are to provide means whereby when the action appears to become feeble after use, the instrument may be caused to act with more energy without renewing the battery or otherwise replacing any of the parts; also to provide an improved form of cohering device in which the granular cohering material may be entirely dispensed with if desired and to provide an improved form of means for adjusting the electrodes and connecting them with the line comprising in itself a cohering device which can be used if desired without any coherer in the ordinary sense of the word and which is capable of use as a rheostat. These results are brought about by certain improved forms of construction which also constitute a feature of this invention.

Further objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which,

Figure 1 is a view partly diagrammatic in form of a portion of the mechanism of a wireless telephone system involving the principles of this invention, and Fig. 2 is a similar view showing a modified form.

Referring to the drawings a form of wave telephone system is shown having an aerial wire 10 which is connected with a supporting conducting bracket 11 which with a conducting bracket 12 supports a coherer which will be described hereinafter, the latter bracket being grounded. The wire 10 is also connected with a rheostat 13 and with a pole changing device 14 and telephone, telegraph or other signaling apparatus 15. The pole changing device is connected with a battery 16 as is well understood. I have found in practice that when some forms of coherers are employed they become feeble after a while and appear to have lost their power of cohering and especially of decohering under the influence of the Hertz waves. I have discovered also that this can be overcome in a very simple manner by reversing the direction of the current through the coherer. This is the office of the pole changer 14 which may obviously be of any ordinary or desired character. It is also necessary at times in order to get proper results to change the strength of the current and even this will some times affect the action of the coherer apparently, simply by the sudden change of the strength of the current employed. For this purpose a rheostat is used which may be of any ordinary or desired character.

The coherer, in the form shown in Fig. 1, is made with a disk or electrode 20 of a conducting metalloid, perferably hard carbon, supported in stationary position by the stand or bracket 11 and a metallic electrode 21. This metallic electrode is preferably made of zinc and I have found that on account probably of the dissimilarity of these two materials, the end of the zinc electrode will be caused to cohere to the carbon electrode and to decohere by the Hertz waves and there is substantially no tendency for these electrodes to permanently cohere as is the case with many other kinds which are employed. It is also possible when using carbon and zinc in this way to form the zinc electrode with a conical end 22 so that it touches the carbon only in a single point. With this construction no granular particles are required between the electrodes.

In order to normally hold the electrodes in loose contact a yielding means, shown in the form of an elastic tube 23 is employed. This may be of rubber, felt or any other non-conducting substance which has some elasticity, or if made of conducting material such as a coil of wire, it is insulated from one or both of the electrodes. One of the electrodes is also preferably adjustably held in loose contact against the other in opposition to the resistance of the tube 23 and connected with the line by an adjustable means which in the present instance is shown in the form of a metallic screw 24 and a dissimilar sleeve 25 which is preferably made of hard carbon and has a passage therethrough for the screw, said passage being screw-threaded so as not to fit the screw tightly but to form a loose contact therewith. The sleeve 25 is supported by the stand or bracket 12 and I have found that

on account of the loose contact of the dissimilar materials of the elements 24 and 25 there will be a second cohering and de-cohering action at this point which increases the efficiency of the cohering device as a whole. The screw 24 may be of zinc or any other metal but is preferably zinc for the reasons above mentioned in describing the electrode 21. It will be understood of course, that the screw can be adjusted so as to give the proper contact between the two terminals 20 and 22. The Hertz waves act not only between the two electrodes 20 and 22 but also between the large number of contacts of the threads on the screw and the threads on the sleeve so that the whole action both in the coherer proper and in this adjusting device depends upon the varying contact of two dissimilar materials.

Some of the above mentioned principles are also embodied in Fig. 2 which shows another form of the invention. In this case the matter is shown in a simplified form and it can be combined with everything shown in Fig. 1. Here the aerial 30 is connected through the battery 31 with the instrument 32 and with the sleeve 33 which is grounded. This sleeve is preferably made of carbon and is similar to the sleeve 25 and accomplishes substantially the same purpose. It is held in stationary position by being mounted on a stand 34. A metallic screw 35 with which it is provided, passes through the disk 33 in the same way as the screw 24 and is preferably provided with a conical end 36 which engages a carbon disk 37 that is mounted on a metallic spring 38 secured to a stand 39 which is connected with the aerial wire. Another adjusting screw 40 is shown as mounted on a stand 41 and engaging the spring 38 for the purpose of getting a finer adjustment than can be obtained simply by means of a screw 35. In this case the invention is shown in a form in which the carbon disk and metallic screw taken with the disk 37 constitute the entire coherer. The screw fits the sleeve 33 loosely, therefore it gives many variable contacts therewith which are affected by the Hertz waves. Also the point of the screw and the carbon disk 37 gives another light contact which is similarly affected by wave action and it will give a corresponding variation in contact and therefore in current. It will be understood of course that while the sleeve and screw device is shown in both figures as connected with another variable contact or coherer, these parts may be, under certain circumstances, used alone as a coherer. This device may also be used as a rheostat as the harder the carbon 37 rests on the end of the screw, the harder each thread of the screw will press upon the threads in the sleeve which will give more current. A rheostat of this form is useful for light or weak currents. Under some circumstances the screw may be made of carbon but I prefer to make it of metal (as for example zinc) so as to have it of dissimilar material. The sleeve also may be made of other materials but I prefer that mentioned.

While I have illustrated and described two forms of the invention, I am aware that many modifications may be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to all the details shown and described, but

What I do claim is:—

1. A coherer having a pointed zinc electrode, and a conducting metalloid electrode having a flat surface in position to be engaged by the zinc electrode.

2. A coherer having a pointed zinc electrode, a conducting metalloid electrode having a flat surface in position to be engaged by the zinc electrode, and resilient means for holding said electrodes in loose contact.

3. A coherer having a zinc electrode, and a carbon electrode.

4. A coherer having a stationary electrode, a movable electrode, resilient means for normally holding the movable electrode away from the stationary electrode, and adjustable means for moving the movable electrode toward the stationary electrode, said adjustable means being capable of being affected by wave action.

5. In a coherer, the combination of a carbon electrode, a zinc electrode adapted to engage it, a metallic screw for holding the zinc electrode in position, and a carbon sleeve for said screw in which the screw loosely fits, whereby there will be a second cohering and decohering action between the screw and sleeve.

6. In a cohering device, the combination of a pair of electrodes, and means for connecting one of said electrodes with the line, comprising two members in loose contact with each other, whereby said contact will be affected by wave action, one being stationary and the other adjustable, the adjustable member being in contact with one electrode.

7. In a cohering device, the combination of a pair of electrodes, and means for connecting one of said electrodes with the line comprising two members of dis-similar material, one having a passage therethrough and adapted to be affected by wave action.

8. In a cohering device, the combination of a pair of electrodes, and means for connecting one of said electrodes with the line comprising a non-metallic member having a screw-threaded passage therethrough, and a metal screw in loose contact with said passage so as to furnish a second cohering and decohering couple and engaging one of said electrodes.

9. In a cohering device, the combination of a pair of electrodes, and means for connecting one of said electrodes with the line comprising a carbon sleeve, and a metal screw passing through said sleeve and engaging one of said electrodes.

10. A coherer comprising a hard carbon sleeve having a screw-threaded passage therein, and a metallic screw in loose contact with and projecting from said passage and adapted to be adjusted therein.

11. In an electrical instrument of the class described the combination of a sleeve having a passage therein, and a conducting member loosely held in said passage and having numerous points of contact therewith the conductivity of the contact between said sleeve and member being affected by wave action.

In testimony whereof I have hereunto set my hand, in the presence of two subscribing witnesses.

FREDERICK G. SARGENT.

Witnesses:

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OSBORN H. CILLEY.