T. N. SLOCUM.

ELECTRICAL RECEIVING APPARATUS.

APPLICATION FILED AUG. 13, 1915.

1,178,882.

Patented Apr. 11, 1916.

2 SHEETS—SHEET 1.

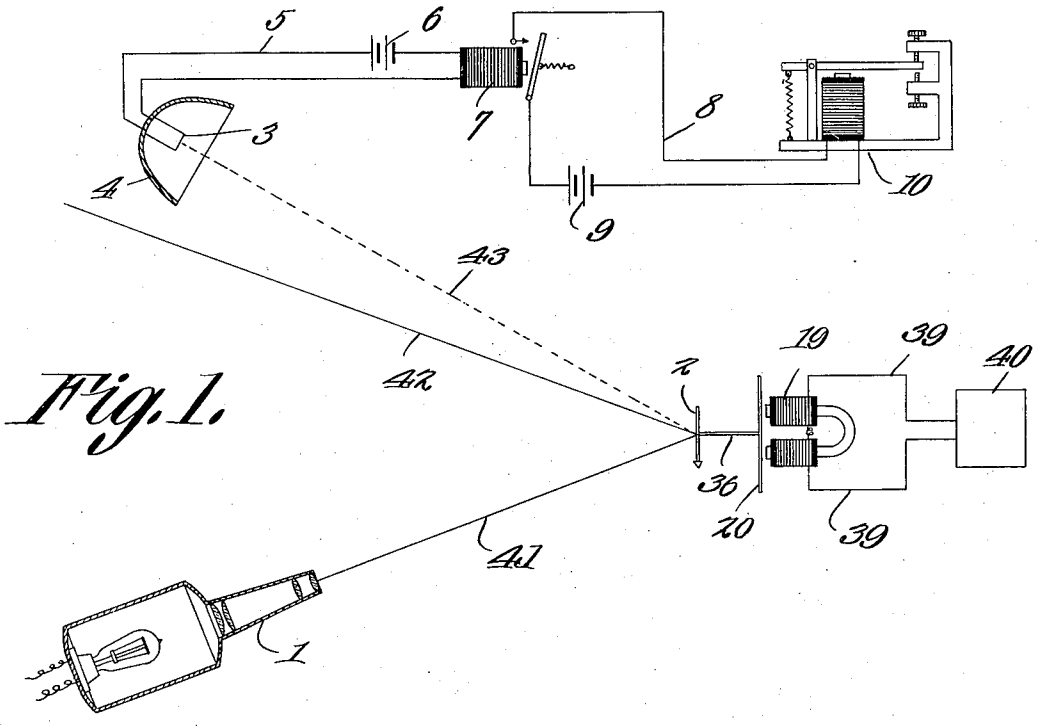
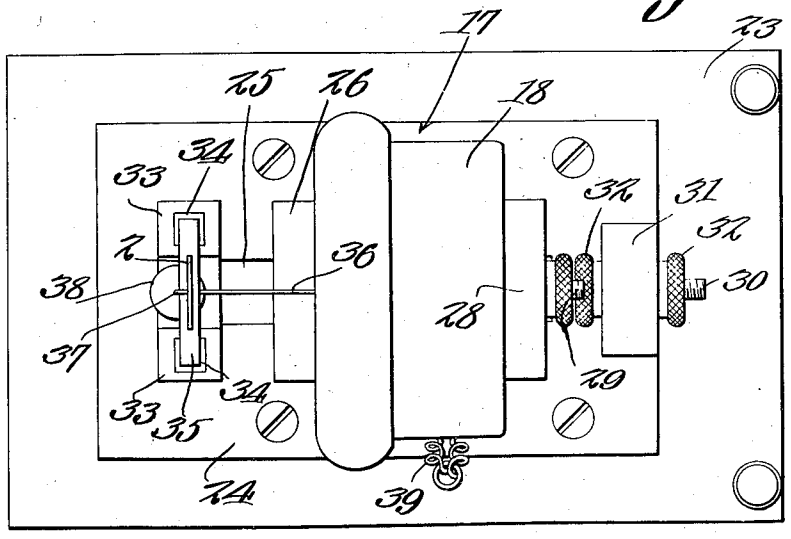


Fig. 1.

Fig. 2.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 3.

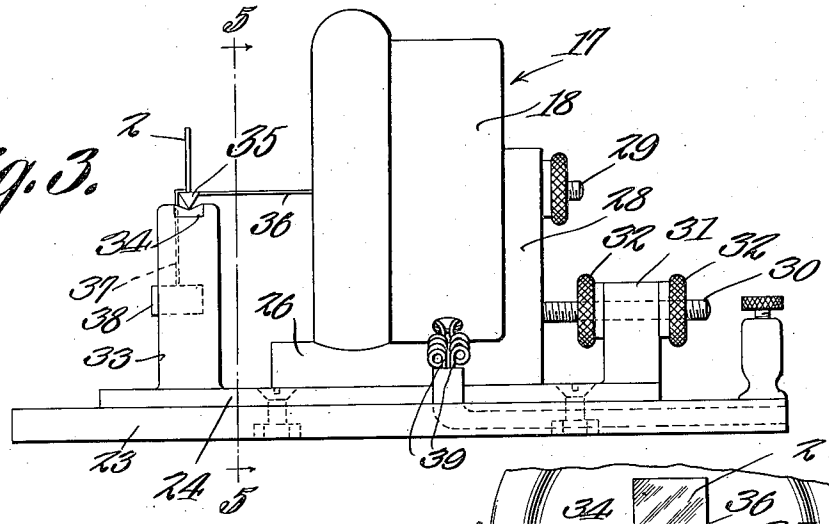


Fig. 4.

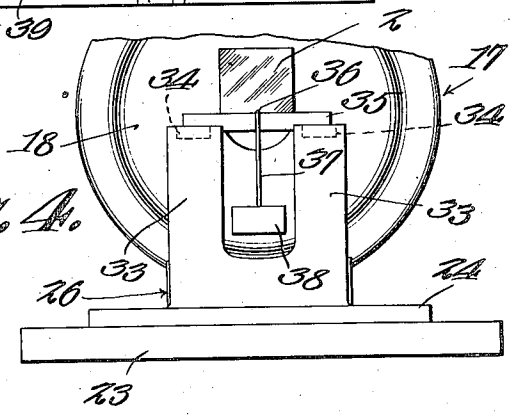
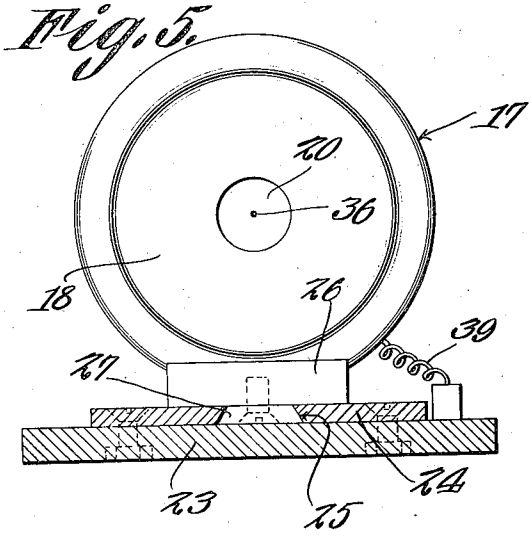


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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ELECTRICAL RECEIVING APPARATUS.

1,178,882. Specification of Letters Patent. Patented Apr. 11, 1916.

Application filed August 13, 1915. Serial No. 45,426.

To all whom it may concern:

Be it known that I, THADDEUS N. SLOCUM, a citizen of the United States, residing at Aberdeen, in the county of Chehalis and State of Washington, have invented a new and useful Electrical Receiving Apparatus, of which the following is a specification.

The present invention appertains to electrical receiving apparatus, and aims to provide a novel and improved apparatus of that character whereby weak electrical currents, disturbances or Hertzian waves may be made to effectively operate a telegraph sounder or other instrument.

The present apparatus is adapted especially for use in wireless telegraphy, in order that the Hertzian waves, even though they be comparatively weak due to a remoteness of the receiving apparatus from the sending apparatus, are made to effectively operate a telegraph sounder, recorder or other instrument employed for receiving or recording telegraphic messages, although the apparatus is also capable of use as a receiver for ocean cables, and the like, to enable the telegraph sounder or equivalent instrument to be properly operated even by weak electrical currents.

In carrying out the invention, there is employed a selenium cell interposed in an electrical circuit which controls the telegraph sounder or instrument, in combination with a movably mounted mirror or reflector for reflecting a beam of light onto the selenium cell, when the mirror is operated by a special device for that purpose, it being well known that a selenium cell which ordinarily offers considerable resistance, will under the action of a beam of light impinging thereagainst, materially reduce the resistance to the flow of electrical current therethrough, and thus allow the current to traverse the circuit for operating the telegraph sounder or instrument.

It is also the object of the invention to provide a novel and improved apparatus for mounting and operating the mirror or reflector so that said means will be sufficiently sensitive or delicate to enable the mirror to be moved or swung properly and effectively, a telephone receiver being employed in said device for operating the mirror and being arranged to conveniently and efficiently serve the office of actuating the mirror.

It is also within the scope of the invention to provide an electrical receiving apparatus having the features above noted, and which at the same time, is comparatively simple and inexpensive in construction, as well as being convenient, practical and efficacious in use.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed can be made within the scope of what is claimed without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a diagrammatical view of the apparatus. Fig. 2 is a plan view of the mirror operating device. Fig. 3 is a side elevation of said device. Fig. 4 is an end view of said device, portions being broken away. Fig. 5 is a cross section taken on the line 5—5 of Fig. 3.

In carrying out the invention, there is employed a suitable lantern or source of light 1 for directing a beam of light against a movably or swingably mounted mirror or reflector 2. A selenium cell 3 is so arranged with respect to the mirror 2 that the reflected beam of light will be made to cooperate therewith under certain conditions as will hereinafter more fully appear. The selenium cell 3 is disposed within a parabolic reflector 4 whereby a beam of light directed into the reflector 4 will be reflected to the focus in which the cell 3 lies, thus assuring the direction of the beam of light against the cell whenever the beam enters the reflector. The selenium cell 3 is interposed in an electrical circuit 5 having a suitable source of electrical energy 6 therein, and also having interposed therein, a relay 7 controlling a second electrical circuit 8 provided with a suitable source of electrical energy 9 sufficiently strong to operate a telegraph sounder, recorder or similar instrument 10 for the receiving of telegraph messages or intelligence.

The lamp 1, mirror 2 and selenium cell 3 are preferably disposed in a dark room or chamber, to prevent the interference of stray rays of light with the operation of the apparatus.

The device or mechanism which is employed for operating or controlling the mirror 2, utilizes a watch case telephone

receiver 17, the case 18 of which contains the usual electromagnets 19 and diaphragm 20 operated thereby. This diaphragm 20 is operatively connected to the mirror 2 as will hereinafter more fully appear.

As a means for mounting the case 18 of the receiver 17, there is employed a base 23 upon which is secured a plate 24 having a longitudinal slot 25 which has its edges under cut. A slide 26 is disposed for longitudinal sliding movement upon the plate 24, and a strip 27 of dove-tailed cross section is secured to the lower surface of the slide 26 and works in the slot 25 to guide the slide for longitudinal movement, and to hold the slide in place upon the base. The receiver 17 is carried by the slide 26, and to this end, the rear end of the slide 26 has a standard 28 to which the case 18 is secured by means of a bolt or other securing means 29, with the diaphragm 5 of the receiver 17 facing forwardly. In other words, the back of the case 18 is secured to the standard 28.

The slide 26 is adjusted longitudinally for adjusting the position of the receiver 17, by means of a stem or tail piece 30 projecting rearwardly from the standard 28 and passing slidably through an upstanding lug 31 carried by the rear end of the plate 24, nuts 32 being threaded upon the stem 30 in front and rear of the lug 31 to assist in adjusting the slide 26 and enable said slide to be held at any position to which it is adjusted, for obvious reasons.

The mirror 2 is mounted for oscillation in front of the receiver 17, and to this end the forward end of the plate 24 has a pair of spaced upstanding standards 33 having notched bearings 34 of glass or other suitable material sunk or embedded in and cemented to the standards or uprights 33. A transverse rocking or oscillating member 35 of steel or other equivalent material and of triangular cross section, has its lower corner seated upon the bearings 34, to provide a knife edge pivot. The mirror or reflector 2 is cemented or otherwise secured upon the upper surface of the member 35, and a silk thread or equivalent flexible element 36 is also cemented or otherwise secured upon the upper surface of the member 35. The thread 36 projects rearwardly in the plane of the upper surface of the member 35 and is attached to the central portion of the diaphragm 20. The thread 36 has a portion 37 depending from the forward upper edge of the member 35, and a suitable weight 38 is attached to the depending portion 37.

The telephone receiver 17 with its attendant parts are thus utilized as a reflecting galvanometer, the electromagnets 19 of which are connected by conductors 39 with the detector 40 which is used for the detection of Hertzian waves, so that the said waves will result in the energization of the electromagnets 19.

In operation, when a Hertzian wave operates the detector 40, the electromagnets 19 of the galvanometer are energized, thereby attracting the diaphragm 20. This will pull the thread or element 36 with the diaphragm 20, and due to the attachment of the thread 36 with the member or rocker 35, said member 35 will be pulled rearwardly, it being noted that the pivot of the member is below the point of attachment of the thread 36 therewith. When the member 35 is swung in this manner, the depending portion 37 is raised slightly, thereby raising the weight 38, and furthermore, the mirror 2 is swung rearwardly into a different plane. Ordinarily, the beam of light 41 focused from the lamp 1 against the mirror 2 is reflected along the line 42 by the mirror 2 at one side of the reflector 4. Now, when the mirror 2 is swung under the influence of the diaphragm 20, the beam of light is reflected approximately along the line 43, into the reflector 4, and the beam of light is thus directed against the selenium cell 3. As a consequence, the resistance offered by the selenium cell will be lowered materially, allowing the current from the battery or source of energy 6 to flow through the selenium cell and relay 7. The relay 7 is thus energized to attract its armature, which will close the circuit 9, thus operating the telegraph sounder or instrument 10. As soon as the electromagnets 19 are deënergized, the diaphragm 20 is released and will spring back to normal position, and the weight 38 will quickly pull the member 35 to normal position to restore the mirror 2 to its original position, withdrawing the beam of light from the selenium cell and causing the selenium cell to again offer sufficient resistance in the circuit 9 to prevent the flow of current through said circuit sufficient to operate the relay 7. Thus, when the diaphram 20 is vibrated by the successive impulses created by the Hertzian waves, the beam of light reflected by the mirror is oscillated back and forth into and out of the reflector carrying the selenium cell to make and break the circuit operating the sounder or receiving instrument. Since the diaphragm 20 is attracted by the electromagnets 19 by even the weakest currents, the galvanometer is sufficiently sensitive to operate the mirror 2 by the weak currents, and the mirror being operated can control the beam of light without any additional effort, resulting in the control of the telegraph sounder or instrument through the medium of the selenium cell.

The present apparatus may not only be employed for receiving wireless telegraph messages or intelligence, but may also be

used for receiving cable messages, it being well known that the currents of ocean cables are generally very weak and require delicate receiving apparatus. By connecting the conductors 39 to the conductors of the cable, the weak currents will sufficiently energize the electromagnets 19 for operating the diaphragm 20 with the results above noted.

With the present apparatus, the inconvenience of receiving wireless telegraph messages by the aid of a telephone receiver applied to the ear, is obviated, and a telegraph sounder, recorder, or similar instrument is made to respond quickly to the Hertzian wave. Instead of a telegraph sounder being used, a recorder or register may be used to provide a permanent record, the same as is done in ordinary telegraphy. Beside operating the telegraph sounder or instrument, the circuit controlled by the selenium cell can be made to operate a bell, lamp, motor, mine or in fact any other mechanism or device, thus rendering the scope of use of the invention wide.

By adjusting the slide or carriage 26, the receiver 17 is slid to render the thread 36 taut under normal conditions, whereby the mirror 2 will be properly operated by even the slightest movement of the diaphragm 20 when attracted by the electromagnets 19, and as soon as the diaphragm is released, the weight 38 will quickly return the mirror to normal position, without danger of the mirror rebounding or vibrating. The mirror is thus brought to a quick stop when returned to initial position. The adjustment of the receiver 17 also enables the thread 36 to be pulled backwardly sufficiently to properly position the mirror 2 under normal conditions, so that the reflected beam of light will enter the reflector 4 when the mirror is swung by the diaphragm 20.

The selenium cell is preferably inclosed in a bulb or globe of glass from which the air has been exhausted to render the action of the selenium cell more positive. It is also possible to arrange a series of selenium cells in a path to be traversed by the reflected beam of light when said beam of light is swung from its normal position by the action of the reflecting galvanometer, and the various selenium cells could be made to control one or more electrical circuits in the manner above indicated.

Having thus described the invention, what is claimed as new is:

1. In an electrical receiving apparatus, a rocking member carrying a mirror, a thread connected thereto, electromagnetically operated means for pulling said thread, and a weight connected to said member for returning it to initial position.

2. In an electrical receiving apparatus, a rocking member of triangular cross section, bearings upon which the lower edge of said member is seated, an upstanding mirror secured to the upper surface of said member, a thread secured upon the upper surface of said member and having a portion depending from one upper edge of said member, a weight attached to said depending portion, a diaphragm to which said thread is secured whereby the movement of the diaphragm rocks said member, and electromagnetic means for operating said diaphragm.

3. In an electrical receiving apparatus, a base, bearings carried thereby, a rocking member supported by said bearings and having a mirror, a slide adjustably mounted upon said base, a receiver carried by said slide including a diaphragm and an electromagnet for operating said diaphragm, a thread connecting said member and diaphragm, and means for returning said member to normal position.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

THADDEUS N. SLOCUM.

Witnesses:
H. E. PALMETER,
G. W. ELZETT.