N° 15,467 A.D. 1901

Date of Application, 30th July, 1901

Complete Specification Left, 31st May, 1902—Accepted, 30th July, 1902

PROVISIONAL SPECIFICATION.

"Improvements in and connected with Wireless Telegraphy and other Signalling."

We, JAGADIS CHUNDER BOSE, Professor at the Presidency College, Calcutta, India, and SARA CHAPMAN BULL, of 168, Brattle Street, Cambridge, Massachusetts, United States of America, Widow, do hereby declare the nature of this invention to be as follows:—

This invention relates to telegraphy, and has for its object to improve the sensitiveness and quickness of response of detectors (and so-called coherers) for receiving wireless or other signals.

According to the theory on which this invention is based, the changes produced on or in the sensitive substance of the detector by Hertzian waves or other radiations or electrical disturbances is molecular distortion. It is necessary to remove this distortion for the reception of fresh signals. This distortion may be removed quickly by subjecting the tube or medium containing or carrying the sensitive substance such as iron or other filings to either a one directioned or to an oscillatory twist; in order that this may be conveniently accomplished we in one case place the substance in an elastic tube or elastic medium, and subject it to the above mentioned treatment to ensure quick recovery.

Or the mechanical means for producing recovery may be dispensed with by using certain substances in which the recovery is automatic. We find that substances which have a characteristic curve (giving the relation between and increasing impressed electro-motive force and the attendant current passing through the sensitive substance) which is not straight but either convex or concave to the axis of E.M.F. and further in which the return curve with a decreasing E.M.F. when taken slowly approximately coincides with the former curve possess the property of automatic recovery. As an example of such substances we have found that galena has such a property.

We find that the sensitiveness of the substances forming the receiver may be very much increased by subjecting them to certain forces, physical surroundings, and conditions suitably adjusted and applied, for instance:—

1. By increasing the mobility in an inter-molecular sense (*a*) by annealing, or (*b*) by mechanical treatment.

2. By increasing the irritability of the substance (*a*) by enclosing it in an atmosphere of gases or vapours, for instance in ammonia, (*b*) by the occlusion of gases in the sensitive substance.

3. By the application of heat.

4. By the proper adjustment of pressure by a micrometer screw or other means till the critical point is approached.

5. By creating a partial vacuum in the receptacle in which the sensitive substance is enclosed and adjusting the vacuum until the critical point is obtained.

6. By adjusting the E.M.F. till the critical point is reached.

Dated this 30th. day of July, 1901.

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[Price 8d.]

COMPLETE SPECIFICATION.

"Improvements in and connected with Wireless Telegraphy and other Signalling."

We, JAGADIS CHUNDER BOSE, Professor at the Presidency College, Calcutta, India, and SARA CHAPMAN BULL, of 168, Brattle Street, Cambridge, Massachusetts, United States of America, Widow, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement:—

This invention relates to wireless telegraphy and other signalling and has for its object to improve the sensitiveness and quickness of response of detectors (or so called coherers) for receiving electrical disturbances, Hertzian waves, light waves, and other radiations in wireless or other signalling.

According to the theory on which this invention is based, the changes produced on or in the sensitive substance of a detector by Hertzian waves or other radiations or electrical disturbances are due to molecular distortion. In order that the sensitive substance after it has been exposed to the distorting action of an impressed radiation shall be in proper condition for the reception of further radiations, it is necessary with the sensitive substances hitherto employed to remove the distorting effect upon said substances of the impressed radiation so as to restore the molecular structure to its original condition before the substance is exposed to further radiations.

To this end, according to one part of our invention we subject the sensitive substance of the coherer to an annealing action in order to increase its sensitiveness. In carrying out this part of the invention we may coil a platinum wire upon the tube or receptacle containing the sensitive substance and pass a current of electricity through said coil for a few seconds as and when required in the course of working. The temperature of the sensitive substance in the tube or receptacle is raised through the medium of the heat developed in the wire by the passage of the electric current; a suitable temperature may for example be from 10° to 80°. The wire and detector are then allowed to cool and it will be found that the sensitiveness of the latter is increased for some hours.

According to another part of our invention we may increase the sensitiveness of the receptive substance by creating a partial vacuum in the tube or receptacle containing the sensitive substance, and adjusting the degree of vacuum until the critical point is attained.

Another part of the present invention is based upon the discovery made by the applicant first above named that a certain class of substances exists which possess the property of self recovery from the distorting effects of an impressed radiation. These substances as a class, when subjected to an E.M.F. which is gradually increased to a maximum and then gradually and regularly diminished to the starting point, give a variation of resistance to the passage of the current which is represented by a characteristic curve (the abscissæ representing the impressed E.M.F. and the ordinates the corresponding values of the current passing through the substance), which curve is not straight but is either convex or concave to the axis of E.M.F., the return curve traced by the gradual diminution of the E.M.F. coinciding or approximately coinciding with the curve traced by the increasing E.M.F.

As an example of such substances we may mention galena.

In practice the galena or other substance of the class just described may be

employed in any ordinary or suitable detector tube such as are at present employed.

The rapidity of recovery and sensitiveness of coherers containing a sensitive substance of the class just referred to may if desired be increased by the application of any of the means hereinbefore described as capable of employment for the said purposes.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed, we declare that what we claim is;—

1. The method of increasing the sensitiveness of a coherer or detector of electrical disturbances, Hertzian waves or other radiations, which consists in subjecting the sensitive substance of said coherer or detector to an annealing action substantially as described.

2. The method of increasing the sensitiveness of a coherer or detector of electrical disturbances, Hertzian waves or other radiations, which consists in passing a current of electricity through a wire coiled around the tube or receptacle containing the sensitive substance of the coherer or detector, whereby the sensitive substance is heated to a temperature of from 10° to 80°, and then allowing it to cool, substantially as described.

3. The method of increasing the sensitiveness of a coherer or detector of electrical disturbances, Hertzian waves or other radiations, which consists in creating a partial vacuum in the tube or receptacle containing the sensitive substance of said coherer or detector, the degree of vacuum being adjusted to approach the critical point, substantially as described.

4. A coherer or detector of electrical disturbances, Hertzian waves or other radiations, comprising a sensitive receptive body of galena or other substance giving a characteristic curve of the character hereinbefore described.

Dated this 31st. day of May, 1902.

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Edehill: Printed for His Majesty's Stationery Office, by Love & Malcomson, Ltd.—1902.