E. R. GILL.

COHERER.

APPLICATION FILED FEB. 20, 1914.

1,150,111

Patented Aug. 17, 1915.

2 SHEETS—SHEET 1.

Fig. 1.

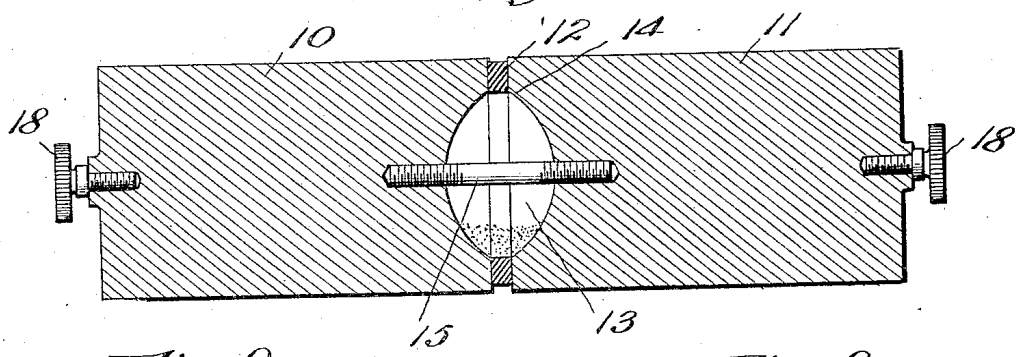


Fig. 2.

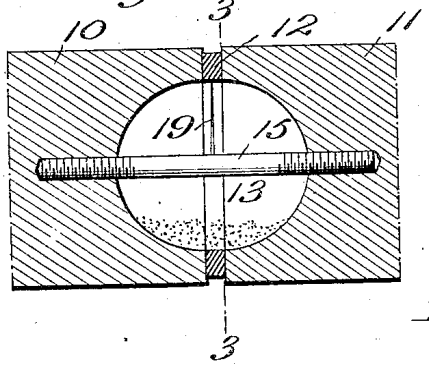


Fig. 3.

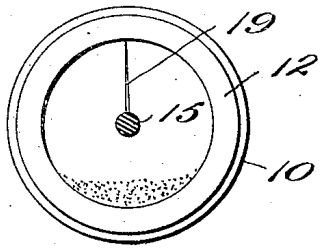


Fig. 4.

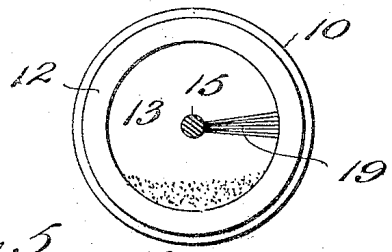
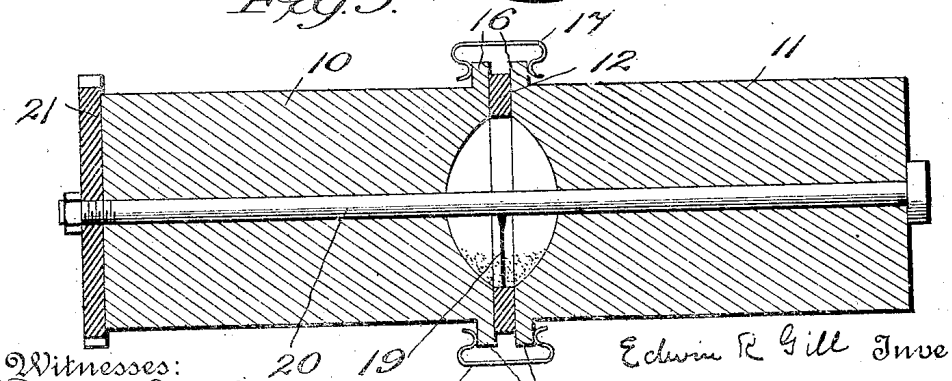


Fig. 5.



Witnesses:
C. James Cronin
Geo. A. Payne.

Edwin R. Gill Inventor

By his Attorneys
Wilkinson, Ginsta and MacKaye

E. R. GILL.

COHERER.

APPLICATION FILED FEB. 20, 1914.

1,150,111.

Patented Aug. 17, 1915.

2 SHEETS—SHEET 2.

Fig. 6.

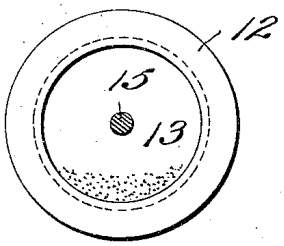


Fig. 7.

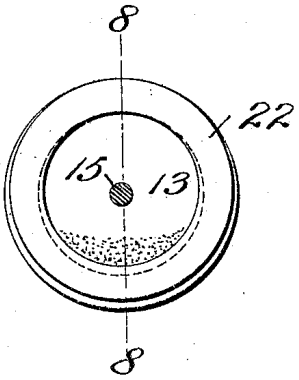
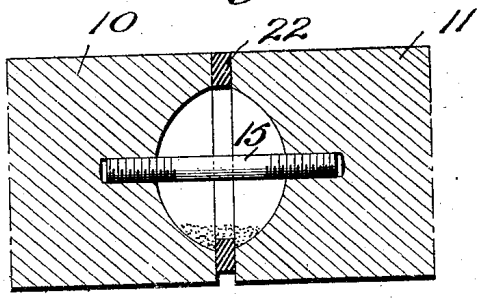


Fig. 8.



Witnesses:

C. James Cronin

Geo. H. Byrne.

Edwin R. Gill

Inventor

By his Attorneys

Wilkinson, Giusta and MacKaye

UNITED STATES PATENT OFFICE.

EDWIN R. GILL, OF YONKERS, NEW YORK, ASSIGNOR TO THERON McCAMPBELL.

COHERER.

1,150,111. Specification of Letters Patent. Patented Aug. 17, 1915.

Application filed February 20, 1914. Serial No. 819,887.

To all whom it may concern:

Be it known that I, EDWIN R. GILL, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Coherers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The ordinary type of coherer used for the purposes of wireless telegraphy consists of an insulating tube, ordinarily of glass, and two conducting terminal bodies thrust into the two ends of the tube so as to leave a very small space between them, which space is occupied by the comminuted particles whose coherence is effected by the aerial waves which traverse a suitable circuit to which the terminal bodies are connected.

One difficulty to which coherers have always been found to be subject is the uncertainty of decoherence. One reason for this is the tendency for the fine cohering particles to become interlocked or jammed between the ends of the terminal bodies, or for a long particle to form a bridge between them. Another difficulty is found in the necessity for great care in the exact shaping of the tube and the proper fitting of the terminal bodies within it to prevent the particles from finding their way into small spaces between the terminal bodies and the tube.

The present invention avoids any possibility of particles becoming jammed, and, in its preferred form makes any accurate fitting of tubes unnecessary, since no tube is used.

The invention further provides a special form and constitution of terminal bodies, as well as special means for insuring decoherence by positive action, where desirable.

My improved coherer is particularly useful in connection with wireless receiving instruments devised by me wherein the coherers are used in groups and wherein each coherer successively is introduced first into the aerial circuit, next into a certain developing circuit or circuits (preferably) and lastly into the true receiving circuit affecting a telephone, a relay, or other translating device. After this, and preferably on open circuit, each coherer is decohered, usually by causing it to turn in such a manner that the coherent particles roll over each other. In one form of my present coherer positive means are employed to break down the conducting bridge formed by coherence of the particles.

Certain preferred forms of coherer made in accordance with my invention are illustrated by way of example in the accompanying drawings wherein—

Figure 1 is a longitudinal median section of a coherer made in accordance with the invention, Fig. 2 is a similar section of part of a modified form, Fig. 3 is a cross section of the form shown in Fig. 2 taken on the plane 3—3 of Fig. 2, Fig. 4 is a similar section showing a modified form of stirring attachment, Fig. 5 is a longitudinal section of another modification, Fig. 6 is a face view of a separated coherer of another modified form, Fig. 7 is a similar view of another modification, and Fig. 8 is a longitudinal section on the plane 8—8 of Fig. 7.

Generically speaking, the coherer comprises two conducting terminal bodies 10 and 11, between the meeting ends of which there is inserted an insulating ring 12, made preferably of mica or the like. The meeting ends of the body portions are hollowed out, making cavities which match and unite to form a chamber 13 to contain the coherable particles indicated by dots in Figs. 1, 3 and 4. The inner circular edges of the ring 12 should coincide as exactly as possible with the limiting edges of the cavities in the plugs, as shown, for instance, at 14. This makes a smooth interior all about the cavity 13, thus facilitating the movements of the coherable particles. It is to be understood that the drawings exaggerate dimensions for purposes of clearness.

The body portions are pressed against the sides of the insulating ring 12 in any well known manner. In Fig. 1 they are united by an insulating post 15, threaded at both ends and screwed into the terminal bodies. In Fig. 5 annular shoulders 16 are provided on the bodies, and these are squeezed together against the washer 12 by any convenient means, as, for instance spring clips 17, covered with or made of insulating material.

Binding posts 18 may be provided where necessary.

By suitably shaping and proportioning the various parts, and by using coherable particles of such shape and size as are ca-

pable of acting mechanically to break up coherence by rolling over each other, decoherence of these devices may be accomplished with certainty by turning the coherers, particularly when this is done out of relation with any surging circuit.

The shape of the cavity 13 may be calculated for the particular ends desired. The narrower form shown in Fig. 1 will produce a deeper mass with a given number of coherable particles than where the broader cavity of Fig. 2 is used. There is a certain wedging action present which tends to aid coherence and make the coherer more sensitive. My invention covers terminal bodies of this kind whether used with tubes, as common hitherto, or with the washer 12, as shown.

I may support within the chamber 13 one or more stirring wires, springs or bristles 19 which are made to sweep through the mass of coherable particles as the coherer revolves. The normal position of these may be upright as in Figs. 2 and 3 or at any other angle (preferably out of contact with the particles during coherence however). The horizontal position is shown in Fig. 4, and here the stirrer is also shown to consist of a number of wires, springs or bristles. Any stirring element is within the invention.

In Fig. 5 is shown a form wherein the body parts 10 and 11 may remain stationary and wherein the stirring element 19 is mounted upon a revoluble shaft 20, which may be turned from without; as, for instance, by the gear wheel 21.

In the modification of my invention which is shown in Fig. 6, the insulating ring or washer 12 is so cut that its inward edge projects within the edges of the opposed cavities in the terminal bodies, which edges are shown in dotted lines in Fig. 6. This forms a raised ring-shaped ridge, whereby the particles at the bottom of the coherable mass are forced to leave the rectilinear position, and thus is avoided the danger of single needle-like particles—or permanent chains of cohering fragments—persisting in a chain across the narrow space between the plugs. This makes decoherence more certain with a given degree of sensitiveness.

In Figs. 7 and 8 is shown a particular species of the modification last above adverted to, wherein the degree of sensitiveness of a coherer may be quickly adjusted. Here the washer 22 is firmly clamped between the plugs 10 and 11, so that the opening in the washer is eccentric with respect to the edges of the opposed cavities. This forms a maximum ridge on one side and preferably no ridge at all on the other; as shown in Fig. 8, where the maximum ridge is at the bottom. Between the maximum and the minimum, the ridge decreases gradually, and, since the mass of coherable particles always rests upon the bottom of the chamber 15, it follows that the height of the ridge extending upward into the mass will depend upon the position of the coherer. Merely revolving the latter will therefore determine the extent to which the ridge lessens the maximum sensitiveness of the coherer.

Various changes may be made in this device without departing from my invention, and I do not limit myself to the details herein shown and described.

What I claim is—

1. A coherer comprising terminal bodies abutting upon an insulating ring which separates them, said bodies having opposed cavities forming a chamber into which at least a part of said ring projects, and coherable particles in said chamber, substantially as described.

2. A coherer comprising terminal bodies having opposed cavities, an insulating ring between said bodies arranged so that a portion of its inner edges projects into the chamber formed between said bodies and slopes gradually into coincidence with the edges of said cavities, and coherable particles within said chamber, substantially as described.

3. A coherer comprising terminal bodies having opposed cavities, with circular edges, a separating insulating ring between said bodies having its circular opening set eccentrically with respect to the edges of said cavities, and coherable particles within the chamber formed between said bodies, substantially as described.

4. A coherer comprising terminal bodies having opposed cavities uniting to form a chamber, an insulating ring between them, a joining post threaded and screwing into said bodies to draw them together against said ring, and coherable particles within said chamber, substantially as described.

5. A coherer comprising terminal bodies mutually insulated and separated by a space, coherable particles within said space and a stirring element connected with said terminal bodies and projecting into said space, substantially as described.

6. A coherer comprising terminal bodies having opposed cavities united to form a chamber, coherable particles within said chamber, and a stirring element connected with said terminal bodies and projecting into said chamber adapted to come into contact with said particles, substantially as described.

7. A coherer comprising terminal bodies having opposed cavities united to form a chamber, an insulating ring between them, a post for uniting said bodies passing through said chamber, a stirring device mounted radially upon said post, and coher-

able particles within said chamber with which said stirring device is adapted to be brought in contact, substantially as described.

8. A coherer comprising terminal bodies separated by a suitable space, an insulating ridge projecting into said space and a mass of coherable particles within said space in sufficient quantity to form a heap extending over said ridge, substantially as described.

9. A coherer comprising terminal bodies separated by a suitable space, coherable particles within said space, a revoluble post passing from outside into said space, a stirring element on said post adapted to come in contact with said particles, and means for causing relative rotation between said post and said bodies, substantially as described.

10. A coherer comprising mutually insulated terminal bodies of a conductive character having cavities facing each other, an insulating ring separating said cavities, a post passing through said terminal bodies and cavities, and adapted to hold the terminals together against said ring, and coherable particles between said bodies in said cavities, substantially as described.

In testimony whereof, I affix my signature, in presence of two witnesses.

EDWIN R. GILL.

Witnesses:
KATHARINE C. MEAD,
GEO. A. BYRNE.