N° 26,271 A.D. 1903

Date of Application, 1st Dec., 1903—Accepted, 30th June, 1904

COMPLETE SPECIFICATION.

"Improvements in Cohering Receivers used in Space Telegraphy.

I, Frank Emuel Peters of Fort Myer in the State of Virginia, United States of America, Electrician, 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 cohering receivers used in space telegraphy, and includes among its objects, to utilize the local battery to assist in cohering the receiver; to confine the wave circuit to the receiver, by the insulation of its conductors from the conductors of the local circuit and to produce an improved receiver decohered by rotation.

These objects are effected by a construction which includes the use of electro-magnets to form the terminals of the wave circuit through the coherer, on each side of the filings gap, which magnets are energized by the local circuit upon even partial cohesion of the filings or other particles used in the imperfect contact gap. The assistance of the local circuit in overcoming the resistance produces a receiver of extreme sensitiveness. The wave circuit and local circuit are insulated throughout, and not joined before entering the coherer, as hitherto. This insures the conduction of the entire wave strength to the coherer gap. Furthermore, a rotary coherer is provided, in which decohesion is immediately accomplished on the cessation of the impulse, at the same time constantly maintaining a surplus or mass of undisturbed particles which are always in position to be effected by a wave. This permits rapidity of operation because it is not necessary to wait for the rearrangement of recovery of the coherer particles after decohesion, as hitherto; nor is it necessary to use a series of coherers operating successively, as hitherto.

In the accompanying drawings, Fig. 1 is a diagramatic elevation of the receiver; Fig. 2 is a vertical longitudinal section of the coherer; and Fig 3 is a vertical cross section through the filings gap, showing the ends of the terminals.

Referring specifically to the drawings, the coherer includes two electro-magnets placed in reverse, (that is, the poles on the two sides of the gap unlike, the north pole of one electro-magnet being opposite to the south pole of the other electro-magnet, as shown by the windings in the drawings) with the filings gap between their ends, in a glass tube indicated at 6, sealed by insulating end plates 7 secured together by binding bolts 8.

Each electro-magnet comprises a core formed of a shaft 9, which extends through the end plate, and a number of soft iron wires 10 which are placed around the shaft within the tube, and secured at the gap end by a ring of soft iron 11. A proper insulation 12 is then placed around the core, and the coil 13 of insulated wire wound thereon. The coil terminates at the gap end in a soft iron ring 14 which surrounds the ring 11 and is insulated therefrom by a ring 11^a of insulating material. The wall of the filing gap is thus formed of the ends of the core and the insulated terminal ring of the coil; as clearly shown in Fig. 3.

The coherer is capable of rotation on the shafts 9 which find bearing in the standards 15. One shaft is connected to the aerial conductor indicated at 16,

[*Price 8d.*]

through the mercury well 17 and disk wheel 18, and the other shaft is connected to earth through the wire 19, mercury well 20 and disk wheel 21.

The coils of the electro-magnets are connected to the disk wheels 22 and are in the relay or local circuit through the said wheels, the mercury wells 23 and the wire 24, the local battery being indicated at 25, relay at 26 and sounder at 27.

It will be understood that the disk wheels, referred to, dip in the mercury wells and make continuous contact during the rotation of the coherer; also that the coils of the electro-magnets are in the local circuit, and the cores in the wave circuit. The two circuits are inductively related through the electro-magnets, *i.e.*, a variation in either circuit (either the coils or the cores of the magnets) will induce a corresponding variation in the other circuit.

The filings or particles in the gap between the ends of the electro-magnets are indicated at 23, and they preferably fill about one-third of the gap, or sufficient to lap the core and coil terminals at all times. When the receiver is in motion the particles are carried upon one side with the glass forming the circumferential wall of the gap, until, elevated above the angle of repose, they break at the top and tumble to the bottom, to be carried up again in continuous repetition. Between the bottom and top of the pile of filings in the gap, is an area of indisturbed or not-cohered particles, which are always in position to be effected by a wave, notwithstanding the continuous rotation of the coherer. Furthermore, as the whole mass of filings are rolled upward, and are broken away at the top by approximately one-eight of a rotation, decohering is speedily accomplished on the cessation of a wave, by the tumbling action described.

In operation, filings in sufficient quantity having been placed in the gap, and the fluctuating point in the local circuit established, the wave or impulse entering through the core of the electro-magnet coheres the particles and closes the local circuit, the effect of which is to assist or increase the cohering action by energizing the cores. The local battery thus assists by increasing current to completely magnetize the mass and descrease the resistance, after even the faintest wave has produced the slightest cohesion and started the local battery to flow. A receiver of great sensitiveness is thus produced.

It will be seen that conductors of the wave and local circuits are completely insulated until cohesion is effected. The rotation of the coherer, as above described, produces practically instant decohesion on the cessation of a wave, without affecting the continual recovery or readiness of the coherer for ensuing waves. Rapidity and certainty of action is thereby assured.

The coherer may be rotated by any suitable means. I have shown the wheel 18 toothed to engage a driving gear.

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

1. A coherer having a continual area of decohered particles in contact with aerial and local circuit terminals insulated from each other.

2. A rotating coherer having a continual area of decohered particles in contact with aerial and local circuit terminals insulated from each other.

3. A coherer having an imperfect electrical contact, and a wave circuit and a local circuit so related, and insulated from each other except through said contact that the local current magnetizes an electro-magnet in the wave circuit.

4. A coherer having an electro-magnet actuated by the local battery according to the space impulses, to assist cohesion.

5. A coherer having an imperfect electrical contact, an electro-magnet forming a terminal thereto, and means actuated by the oscillations produced by the space impulses to energize the magnet.

6. The combination, in a coherer, of a tube, electro-magnet terminals therein having a gap between the ends thereof, metallic particles in the gap, and means

actuated by the oscillations produced by the space impulses to energize the magnets.

7. A coherer the gap terminals of which are electro-magnets whose energization is dependent upon the space impulses.

8. A coherer the gap terminals of the aerial circuit of which are electro-magnetically energized by the local circuit to assist cohesion.

9. In a coherer, in combination, a tube, electro-magnets therein the cores of which form terminals in the aerial circuit and the coils of which are in the local circuit, and an imperfect contact between the magnets.

10. A coherer having an imperfect contact, and aerial and local circuit terminals connected thereto, said terminals being insulated from each other and acting to assist each other in cohering the imperfect contact.

11. A coherer having an imperfect contact, and separate aerial circuit terminals and local circuit terminals connected thereto.

12. A coherer comprising a tube rotable axially, insulated annular space and local circuit terminals spaced apart in the tube to form a gap, and metallic particles in the gap.

13. In a receiver, in combination, a rotatable tube, spaced cores arranged axially therein, said cores being terminals in the space circuit, insulated coils around the cores, in the local circuit, and having annular terminals surrounding the adjacent ends of the cores, said ends and terminals forming the walls of a gap in the tube, and metallic particles in the gap.

14. A coherer having imperfect contact continually in condition to be cohered, and aerial and local circuits connected to said contact and insulated from each other.

15. A coherer having an area of particles continually in condition to be cohered, and aerial and local circuits connected to said particles and insulated from each other.

Dated this 30th day of November 1903.

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PETERS' Complete Specification. (1 SHEET)

Fig. 1.

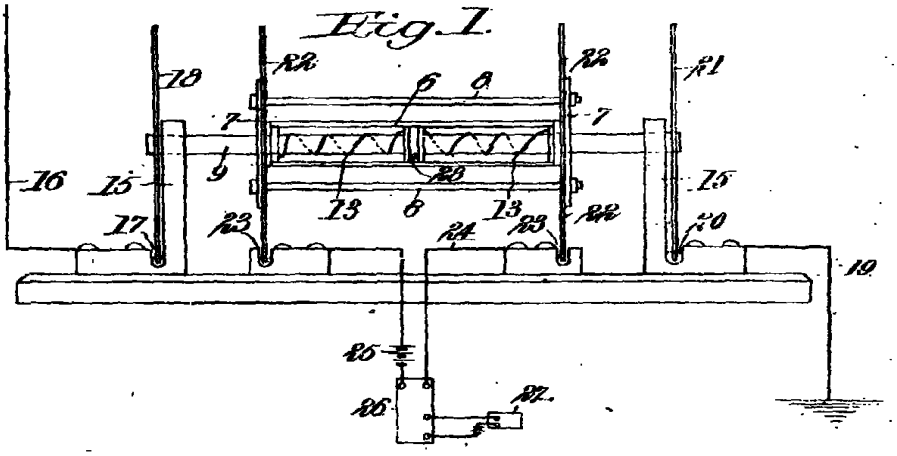


Fig. 2.

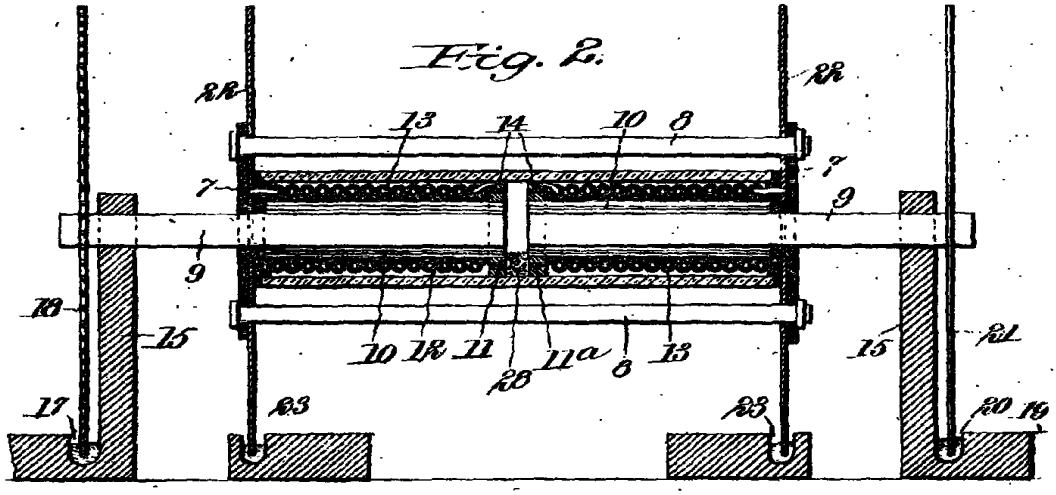
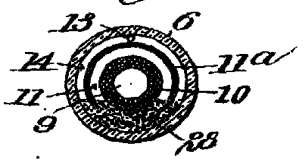


Fig. 3.



[This Drawing is a reproduction of the Original on a reduced scale.]

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