# N° 19,710 A.D. 1899

*Date of Application, 2nd Oct., 1899*
*Complete Specification Left, 29th June, 1900—Accepted, 15th Sept., 1900*

## PROVISIONAL SPECIFICATION.

## Improvements in Wireless Telegraphy.

SIDNEY GEORGE BROWN, 22, Holland Road, Kensington, London, Electrical Engineer, do hereby declare the nature of this invention to be as follows:—

This invention relates to improvements in coherers for use in wireless telegraphy, more particularly to a type that may be capable of receiving at a high rate of speed.

The following is a description of an instrument constructed according to my invention.

A magnetic circuit, preferably laminated, and excited by an alternating or periodic current, has its poles brought within a certain distance of one another, and placed preferably in an upright position.

Between the pole faces, a quantity of filings of a magnetic body such as nickel, are placed.

If the pole pieces are sufficiently magnetized, and suitably placed, the result will be that chains of nickel filings will extend from pole to pole, allowing a current to pass while under the influence of the Hertzian waves, while the fluctuation of the magnetic field will be sufficient in most cases to decohere it instantly, or nearly so, when the waves cease.

I may coat, preferably by electrolysis, the pole faces, and some or all of the filings, with other metals such as silver or gold.

I may moreover place the pole pieces and filings in a glass tube, which may be hermetically sealed and exhausted of air.

In some cases it might be found convenient to surround the filings by oil or an electrolyte.

If the coherer was thus sealed in a tube, it would be convenient to complete the magnetic circuit through the glass and round by an outside iron yoke, which may carry the winding, through which the pole pieces are excited, and would be of such a shape to conveniently support the tube.

In another form of coherer I may excite the pole pieces by a permanent or direct current magnet, decohering by means of mechanical vibration, or by means of an alternating current magnet, acting on the filings.

In another, the coherer tube with filings may be constructed as is usual at present, the filings being mainly of magnetic material, plated or not, and arranged to be decohered by an alternating current magnet acting on the filings.

An alternating current magnet may be employed to operate and decohere a single point coherer.

To produce the alternating current, necessary to work the coherer, I may employ for convenience a direct current, an electromotor and a commutator, care being taken to prevent any sparking at the brushes by suitable use of condensors & shunts, otherwise the apparatus may be placed in a metal enclosure.

Dated this 2nd day of October 1899.

SIDNEY GEORGE BROWN.

[*Price* 8*d*.]

## COMPLETE SPECIFICATION.

### Improvements in Wireless Telegraphy.

SIDNEY GEORGE BROWN, 9, Putney Hill, Putney, London, late of 22, Holland Road, Kensington, London, Electrical Engineer, 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 improvements in coherers for use in wireless telegraphy, more particularly to a type that may be capable of receiving at a high rate of speed.

The following is a description of an instrument constructed according to my invention.

A magnetic circuit, preferably laminated, and excited by an alternating or periodic current has its poles brought within a certain distance of one another, and placed preferably in an upright position.

Between the pole faces a quantity of filings of a magnetic body such as nickel, are placed.

If the pole pieces are sufficiently magnetized, and suitably placed, the result will be that chains of nickel filings will extend from pole to pole, allowing a current to pass while under the influence of the Hertzian waves, while the fluctuation of the magnetic field will be sufficient in most cases to decohere it instantly, or nearly so, when the waves cease.

I may coat, preferably by electrolysis the pole faces, and some or all of the filings, with other metals such as silver or gold.

I may moreover place the pole pieces and filings in a glass tube which may be hermetically sealed and exhausted of air.

In some cases it might be found convenient to surround the filings by oil or an electrolyte.

If the coherer was thus sealed in a tube it would be convenient to complete the magnetic circuit through the glass and round by an outside iron yoke, which may carry the winding through which the pole pieces are excited, and would be of such a shape to conveniently support the tube.

In another form of coherer I may excite the pole pieces by a permanent or direct current magnet decohering by means of mechanical vibration or by means of an alternating current magnet acting on the filings.

In another form the coherer tube with filings may be constructed as is usual at present, the filings being mainly of magnetic material, plated or not, and arranged to be decohered by an alternating current magnet acting on the filings.

To produce the alternating current necessary to work the coherer I may employ for convenience a direct current and a motor-alternator care being taken to prevent any sparking at the brushes, by the suitable use of shunts and induction coils, otherwise the apparatus may be placed in a metal enclosure.

That my invention may be clearly understood and readily carried into effect I shall describe the same fully by aid of the accompanying drawings.

Figure 1 is a diagram of the coherer, $d\,d^1$ are the iron pole pieces between the polished faces of which the nickel filings $d^2$ are placed.

The iron pole pieces are excited by an alternating current through the windings $h\,h$.

$a\,a^1$ are the Hertz. wave collecting wires.

When Hertz. waves strike the collecting wires $a\,a^1$ they cohere the filings $d^2$ reducing the electrical resistance between the iron pole pieces $d\,d^1$, while upon

the cessation of the waves the fluctuations in the magnetic field caused by the alternating currents flowing in the windings $h\,h$ decohere the filings bringing the resistance back to its original value.

$b$ is the local coherer battery which should have its voltage reduced say by shortcircuiting through a high resistance $r^3$, the ends of the local circuit being joined to a part of the resistance as shown.

$t^1\,t^2$ are respectively the primary and secondary of a transformer; $r^1, r^2$ are resistances which may be added to join the two windings $t^1\,t^2$ to prevent the choking effect of the transformer on prolonged signals.

C is the suspended coil of a sensitive "drum relay"; D is the rotating contact drum, $b^1$ is the relay battery; K the shortcircuiting condensor and $i$ is a part of a Morse inker worked from the relay.

The windings $h\,h$ round the magnet poles of the coherer would be preferably supplied with an alternating current from a direct current source through a small motor-alternator.

The transformer $t^1\,t^2$ may be omitted or replaced if desired by a shunted condensor or magnetic shunt.

I have found that when such a system as illustrated in Figure 1 is receiving signals at a high rate of speed, the current round the local circuit fluctuates in a similar manner to the variations of current at the end of a long submarine cable, I therefore should use if necessary, every means now employed for cable telegraphy to improve the speed of signalling; providing the receiving relay with local correction for the choking action or variable zero, if any, due to the introduction of condensors, or the like, and means for curbing the local circuit currents.

In Figure 2 I have illustrated a modification of the coherer in which a spinning magnet replaces the winding $h\,h$ and alternating current of Figure 1.

As before $d\,d^1$ are the two magnetic pole pieces, $d^2$ the nickel filings between the poles, $a\,a^1$ are the Hertz. wave collecting wires.

M is a magnet inductively acting on the pole pieces $d\,d^1$.

This magnet is caused to spin by any convenient means say by a moving gut band over the pulley P.

$b$ is the battery of the local circuit $r^1\,r^2$ are resistances to reduce the voltage and W is the receiving instrument which may be, as shown, a sensitive "Weston" miliamperemeter the pointer being fitted with a broad end so that its motion may be easily followed and read.

The scale of the "Weston" may be illuminated from behind or else the end of the pointer may cover and uncover a bright patch of light.

Figure 3 illustrates a single point coherer.

P is a fixed metallic contact lightly touching a metal plate mounted on the iron diaphragm or strip $d$.

$d$ is kept in vibration, say by means of the magnet pole M excited by an alternating current flowing round the winding $h$.

$b$ is the local circuit battery; $t$ is the recording instrument which may be a telephone as shown.

P is so adjusted with regard to the vibrating plate $d$ that it introduces a considerable mean resistance to the flow of the current from the battery $b$ round the local circuit but as soon as Hertz. waves strike the collecting wires $a\,a^1$ the resistance is reduced and the telephone made to sound.

In all the foregoing figures I may find it convenient to employ other kinds of recorders than those shown for instance the recorder may be of the form as shown in Figure 4.

I is a coil of wire suspended in a magnetic field $i$ is a glass siphon attached to the coil, one end of the siphon dipping in a reservoir of ink $i^1$, the other end is kept normally just clear of the moving paper strip $i^2$ which runs over the roller $i^3$.

On the coherer sending a current I will twist on its axis and bring the end

of the siphon into contact with the paper strip marking long or short signals as the case may be.

Otherwise the siphon may be kept in vibration and move across the surface of the paper strip as in the well known siphon recorder.

The glass siphon *i*, in both cases, may be held on the coil I by frictional constraint and be so arranged as to play between limiting stops.

Figure 5 illustrates a modification of the coherer in which the magnetism on the filings is supplied from a permanent magnet, electromagnet or direct current solenoid decohering being brought about by mechanical vibration.

$d\,d^1$ are hard steel or soft iron pole pieces $d^2$ are the filings, M is a permanent magnet magnetizing $d\,d^1$ by induction.

$a\,a^1$ are the Hertz. wave collecting wires, *b* is the local battery and *l l* are the leads which would be connected to the recording instrument.

V is the hammer head of a small vibrator which may be kept constantly vibrating to decohere the tube by mechanical vibration.

Figure 6 is a modified form of alternating magnetic coherer. $d\,d^1$ are the iron pole pieces. $d^2$ is a chain of coarse nickel grains. C is the enlarged end of the pole piece *d* arranged so that the pole piece may be moved or twisted when necessary, for adjustment.

H is the winding through which the alternating current is sent to magnetize the pole pieces, the alternating current being brought to the winding by the leads K.

*h* is a small winding so as to magnetize when necessary the pole pieces by a direct current from the battery *b*.

A switch P may be arranged so that when the alternating current is to be cut off the end of the switch will move from *m* to *o* and switch on the direct current from *b*.

This arrangement will prevent the grains $d^2$ from falling away from their position and also, when thus held up by permanent magnetism, the coherer may be arranged to work a relay and bell to act as a call.

$a\,a^1$ are the Hertz. wave collecting wires and also the two leads that would be coupled to the local circuit.

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:—

Claim 1. A coherer arranged to be decohered by an alternating or fluctuating magnetic field.

Claim 2. A coherer having the filings (which should be partially or wholly of magnetic material) placed between magnetic pole pieces and excited by an alternating current, for the purpose specified.

Claim 3. A single point coherer arranged to be worked and decohered substantially as described with reference to Figure 3.

Claim 4. A coherer having the filings (which should be of magnetic material) arranged between magnetic pole pieces and to be decohered by mechanical vibration.

Claim 5. A coherer, having filings of magnetic material, placed in a magnetic field and to be decohered by mechanical vibration continually applied.

Claim 6. Coherer apparatus arranged and constructed substantially as described and illustrated in Figures 1, 2, 3, 5 and 6, for the purposes specified.

Dated this 28th day of June 1900.

SIDNEY GEORGE BROWN.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1900.

A.D. 1899. Oct. 3. N° 19,710.
BROWN'S COMPLETE SPECIFICATION.

(2 SHEETS)

SHEET 1.

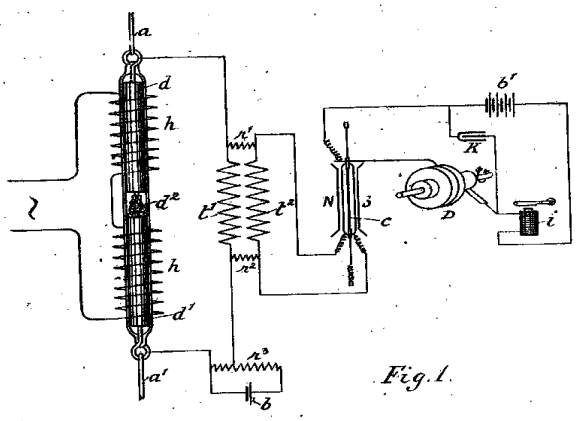


Fig. 1.

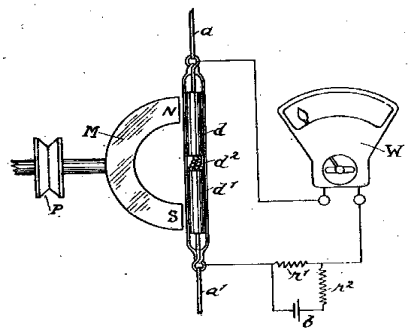


Fig. 2.

SHEET 2.

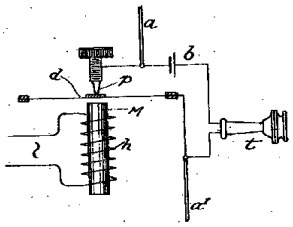


Fig. 3.

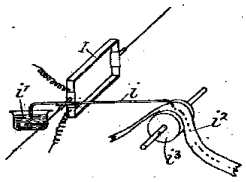


Fig. 4.

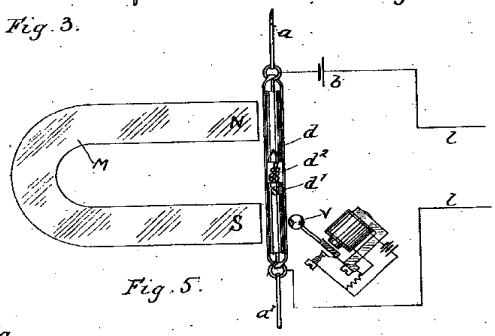


Fig. 5.

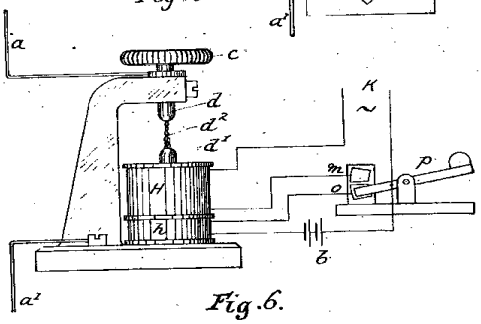


Fig. 6.

Malby&Sons, Photo-Litho.

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

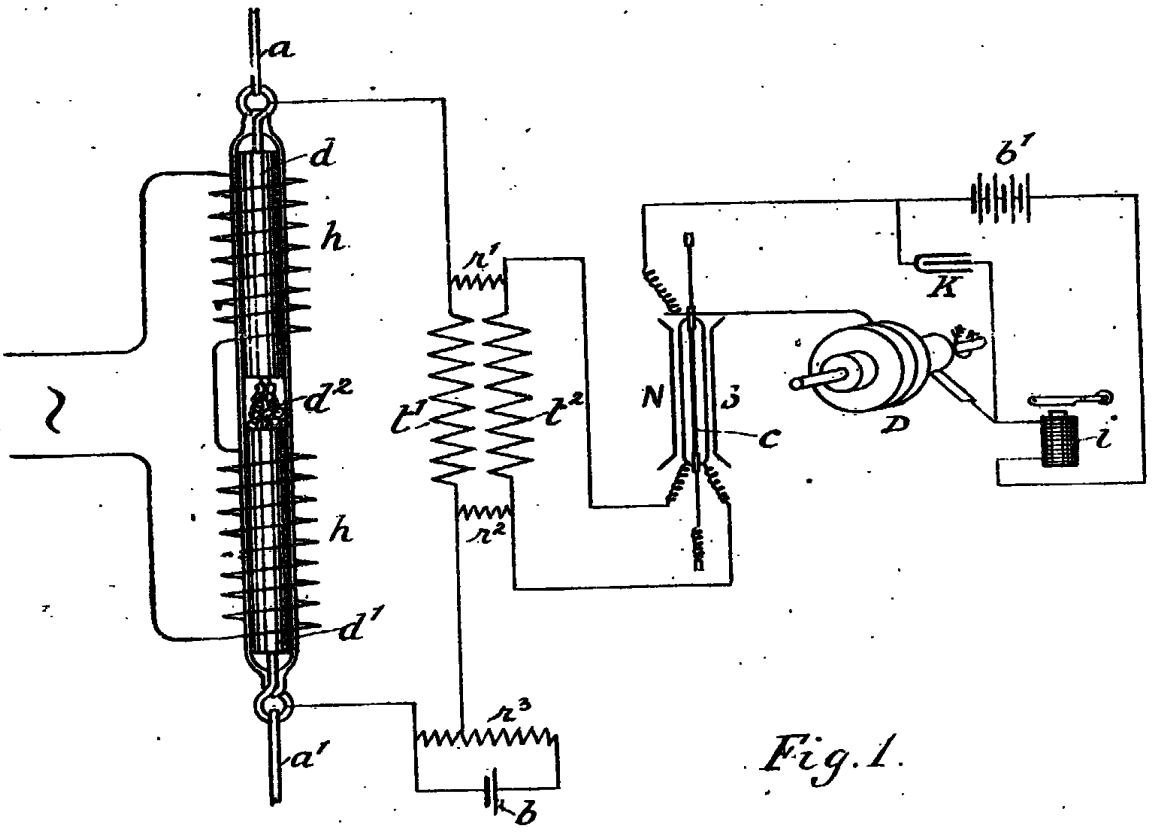


Fig. 1.

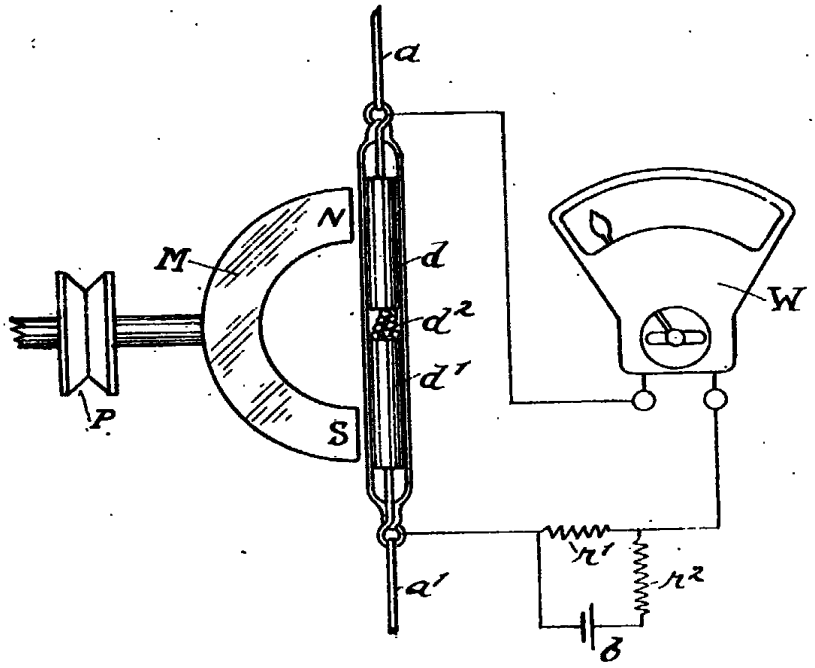


Fig. 2.

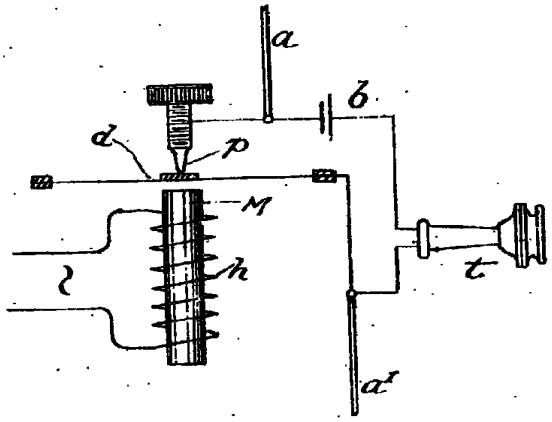


Fig. 3.

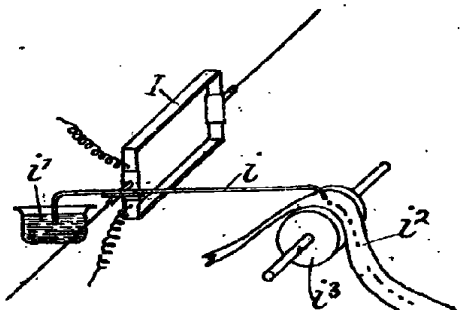


Fig. 4.

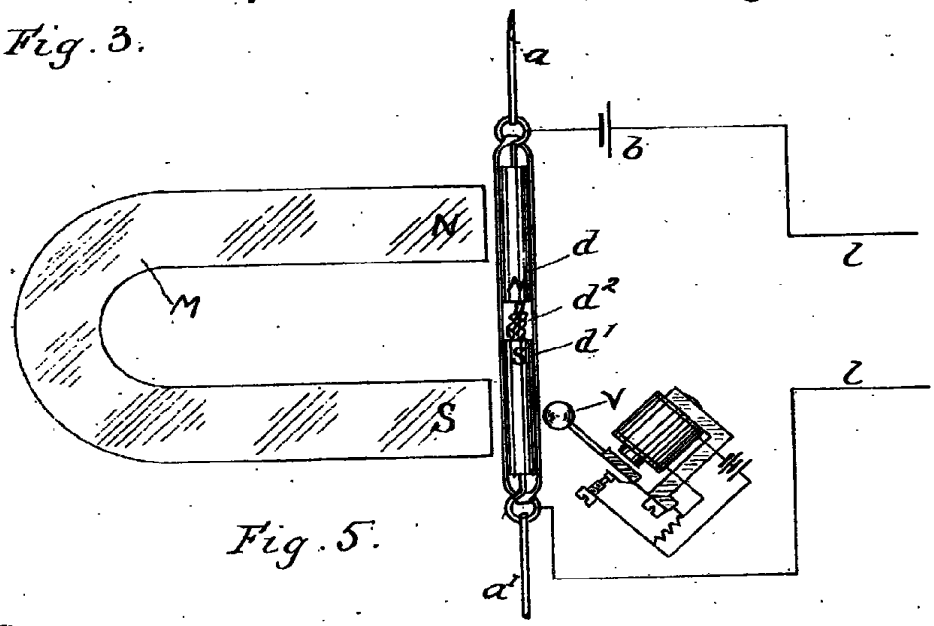


Fig. 5.

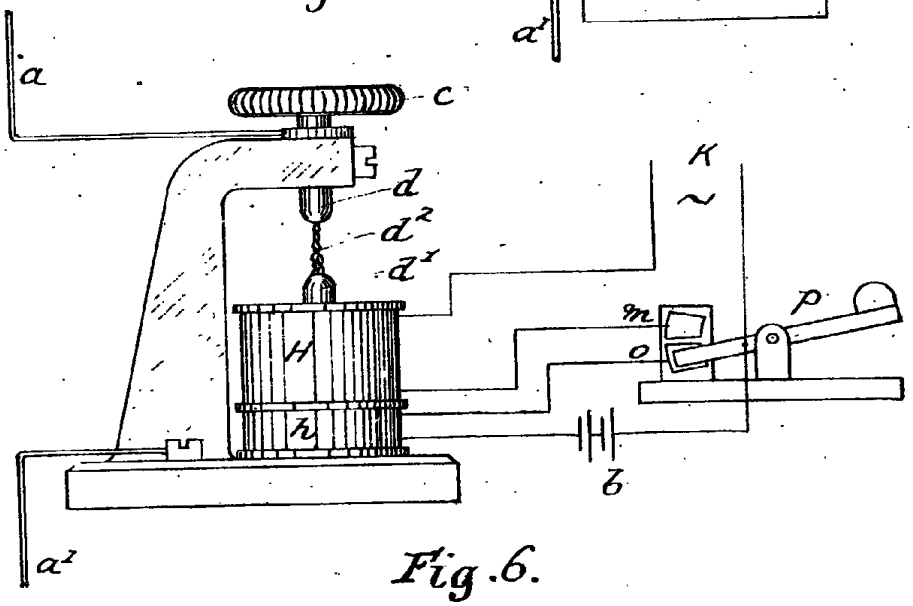


Fig. 6.

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

Malby&Sons, Photo-Litho.