No. 703,712. Patented July 1, 1902.

H. SHOEMAKER.

WIRELESS TELEGRAPHY.

(Application filed Feb. 12, 1901.)

(No Model.)

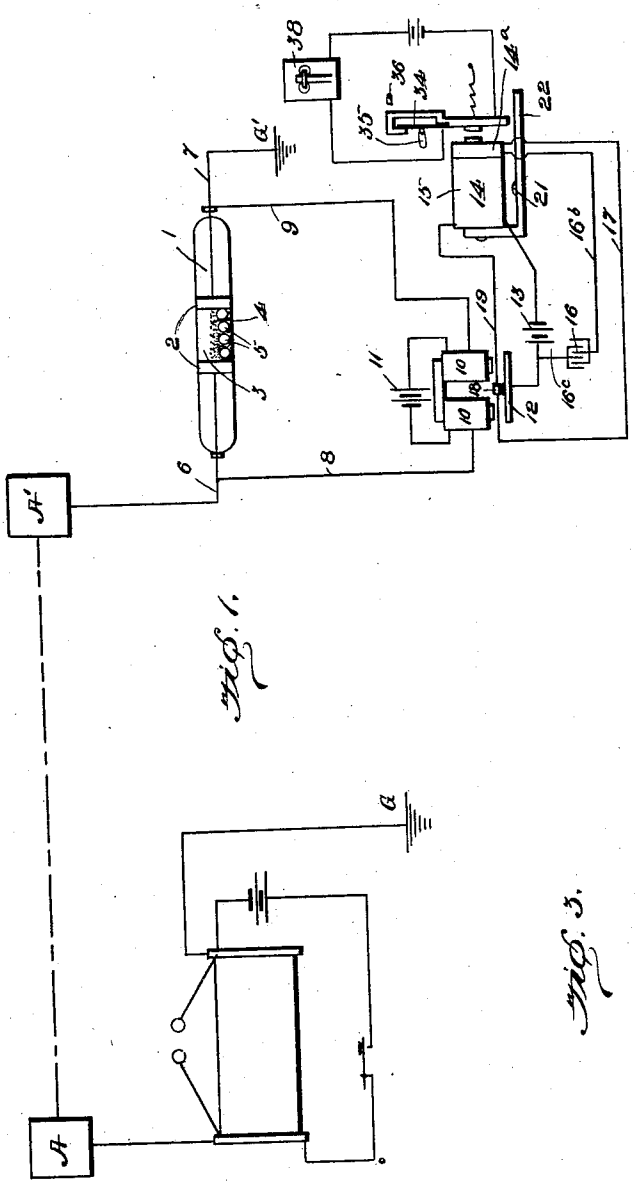

Fig. 1.

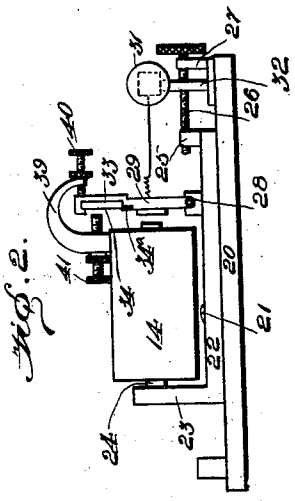

Fig. 2.

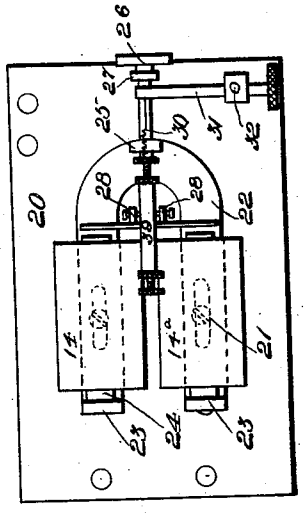

Fig. 3.

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WIRELESS TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 703,712, dated July 1, 1902.

Application filed February 12, 1901. Serial No. 46,985. (No model.)

To all whom it may concern:

Be it known that I, HARRY SHOEMAKER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Wireless Telegraphy, of which the following is a specification.

My invention relates to improvements in wireless telegraphy and has special reference to the receiving apparatus thereof.

The main object of the invention is the provision of a coherer which dispenses with a decoherer and also a relay which is so constructed as to receive and transmit a dash when transmitted.

The relay above mentioned is fully set forth and claimed in a divisional application filed by me the Letters Patent of which were issued November 5, 1901, No. 686,007, and also the coherer above mentioned was fully set forth and claimed in a divisional application filed by me the Letters Patent of which were issued May 20, 1902, No. 700,708.

To attain the desired objects, my invention consists of a wireless-telegraph system embodying novel features of construction and arrangement of parts, substantially as disclosed herein.

In the drawings, Figure 1 is a diagrammatic view of a wireless-telegraph system. Fig. 2 is a side view of my improved relay, and Fig. 3 is a top plan view thereof.

Referring by numerals to the drawings, 1 designates a coherer-tube, which has mounted therein carbon or silver plugs 2, whose ends are parallel with each other and form a straight walled pocket 3 to receive the granulated particles of carbon 4 and the steel balls 5. By the employment of the carbon particles and the steel balls no decoherer is necessary, as the carbon and steel contacts have the property of restoring themselves without the use of a tapping or shaking device. These steel balls must be so placed as not to contact each other, but to contact carbon particles, this being done by making the balls stationary and allowing the carbon to be loose. Wires 6 and 7 are connected to the plugs and also to the air and ground plates A′ and G′. In shunt to the wave-responsive device 1 is a circuit including the conductors 8 and 9, relay-magnets 10, and source of energy 11. The armature 12 of the relay connects with a source of energy 13, which in turn connects with the winding 15 of the electromagnet, the winding 15 remaining end being connected through conductor 19 to the contact-post 18. Upon the energization of magnets 10 the circuit just described is closed between the armature 12 and contact 18. Upon deënergization the circuit is open at this point, and bridging the gap between 12 and 18 is the circuit embracing the condenser 16, which connects through conductor 16^b through winding 14^a to conductor 17, to contact 18. When the circuit is open at 12 and 18, the battery 13 charges the condenser through conductor 16^b, coils 14^a, conductor 17, conductor 19, and coil 15, and upon closure of the contacts at 12 and 18 the condenser discharges through coil 14^a, conductor 16^b, conductor 16^c, and conductor 17. The windings 14 and 14^a may be wound upon the same core, as shown in Fig. 1, or each winding upon a separate core, as shown in Fig. 3, the same result being attained by either method. This electromagnet 15 consists of the base 20, upon which is slidably mounted, by means of screws 21, the permanent magnet 22, whose right-angle arms 23 are connected with the cores 24 of the windings 14 and 14^a. Formed upon the upper forward part of this permanent magnet is the threaded lug 25, which is adapted to be engaged by the adjusting-screw 26, journaled in the bearings 27 on the base. Pivoted in the bearings 28 is the arm of lever 29, which is adapted to be returned when released by the permanent magnet by the coil-spring 30, whose tension is adjusted by means of the spindle or screw 31, mounted in the standard or post 32. This lever consists of a hook 33 and has connected to it a spring-plate 34, which is insulated therefrom by the insulator 34^a, and whose tension is outward, the post 36 limiting the movement of the lever and allowing a circuit to be made through said plate 34, lever 29, battery 37, and operating a sounder 38. A post 35 is employed to contact the spring-plate 34 and break the circuit by disconnecting the free end of the

plate from engagement with the hooked end of the lever 29. The electromagnet in this case is used as a relay.

In Figs. 2 and 3 I have shown the relay more in detail, and instead of employing stationary points 35 and 36 an anvil 39, provided with an adjusting-screw 40 to limit the backward movement of the lever, is used, and the adjusting-screw 41 limits the forward movement thereof.

From this description, taken in connection with the drawings, the operation of my new system is readily understood, but, briefly stated, it is as follows: An impulse is sent by the transmitting-station and is received by the air and ground plates A′ G′ from the receiving apparatus. A coherer, by reason of the slight contact-surface of the steel balls, causes a quick response. As the coherer is energized the choking-coils 10 become magnetized. In receiving a dash the armature 12 makes and breaks several times. This would cause the armature 29 of the relay 14 to tremble or vibrate in step with 12; but the condenser 16 being bridged across the break and in circuit with the extra coil 14^a causes a slight discharge to take place through said coil 14^a while the other current is falling. Thus it gives two impulses instead of one to the lever 29. A permanent magnet is used because it is easier to influence a magnetic field already established than it is to build up a new one and also because a field produced by an electromagnet does not always fall to the same point. Hence it is hard to keep the armature in proper adjustment; but having the permanent field it always falls to the strength of the permanent magnet. The advantage obtained by this second relay-coil is that it gives a complete dash by converting a series of dots into a dash, the permanent magnetic field being weakened by the short impulses in the solenoid around the poles of the permanent magnet. This allows the armature to be drawn back by the tractile spring, and thus it makes intelligible and accurate signals which could not otherwise be obtained. The spaces between the dots determine whether a dot or dash is transmitted, and if those spaces are not definite or made in very close succession by the transmitting-key a dash is transmitted to the sounder by the second relay, as the permanent magnet does not have time to build up its field at the poles.

It is evident I provide a very simple system, dispensing with the decoherer device and also producing a relay which permits dots or dashes to be readily transmitted to the sounder.

I claim—

1. A wireless-telegraph system comprising a transmitting apparatus and receiving apparatus; said receiving apparatus consisting of air and ground plates, a wave-responsive device connected therewith, a choking-relay in circuit with said wave-responsive device, another relay having two windings and circuit-controlled by said choking-relay, a condenser-circuit connected with one of the windings of said relay, a permanent magnet connected with the cores of said relay, an independent circuit operated by said relay and a sounder in said circuit.

2. A wireless-telegraph system comprising a transmitting-station and a receiving-station; said receiving-station consisting of a wave-responsive device and a choking-relay in circuit together; batteries, and a relay in circuit together adapted to be operated by the choking-relay, said last-mentioned relay consisting of two cores and their windings and a permanent magnet connected with said cores; a condenser-circuit connected with one of the windings of the relay; and a sounder-circuit operated by said last-mentioned relay.

3. In a receiver for electrical oscillations, the combination of a wave-responsive device, a choking-relay in circuit with said device, a relay having two cores and two separate windings controlled by said choking-relay, a hold-over-circuit connected to one of the windings of the relay having a condenser therein to be charged so as to energize one of the relay's cores, and a recording instrument controlled by the energization of the relay's cores.

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

HARRY SHOEMAKER.

Witnesses:
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