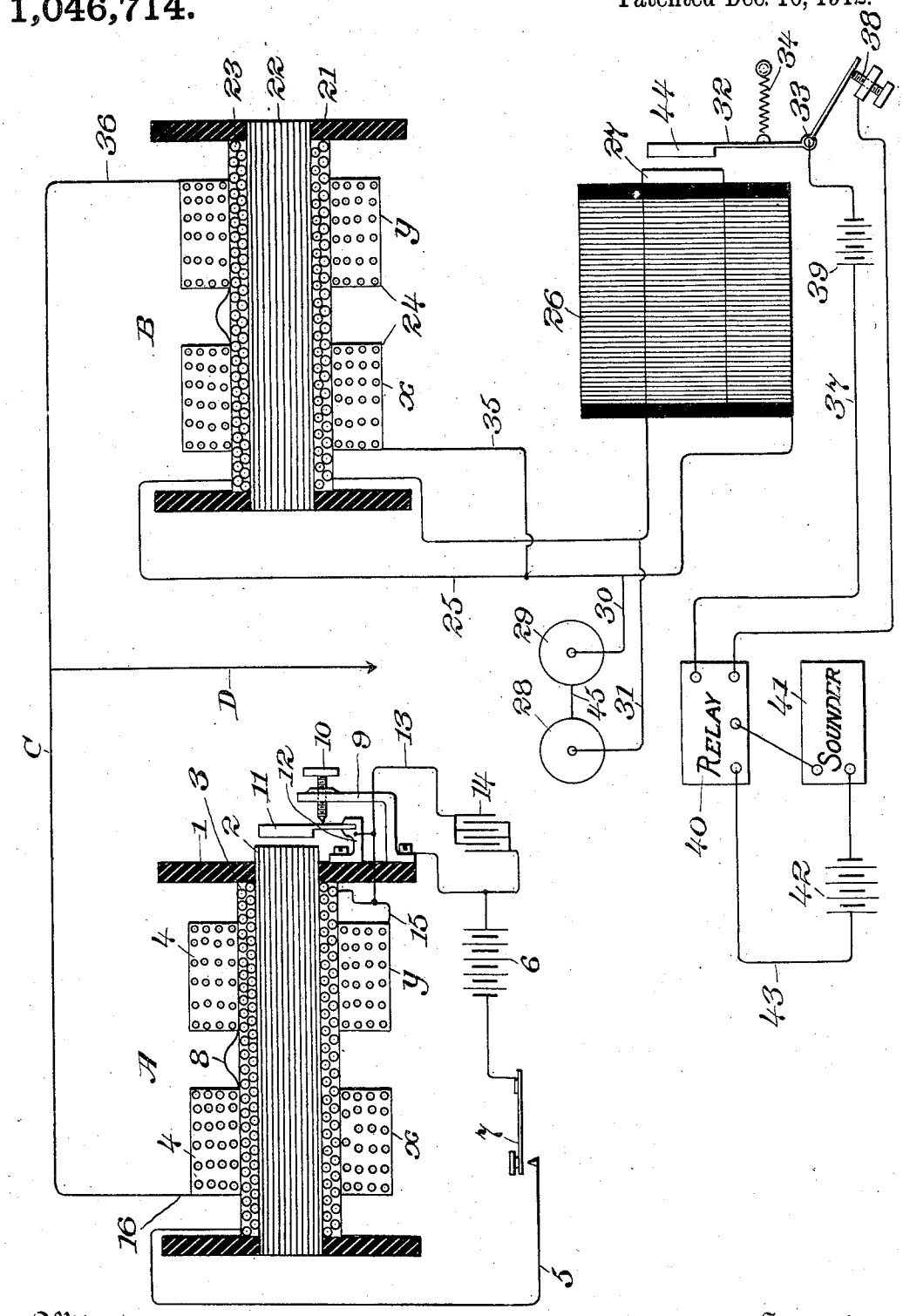
M. O. ANTHONY.

TELEGRAPHY.

APPLICATION FILED JUNE 8, 1909.

1,046,714.

Patented Dec. 10, 1912.



Witnesses:
M. G. Crawford,
N. A. Riegel.

Inventor
Marcus O. Anthony
By his Attorney
A. Parkhurst & Co

UNITED STATES PATENT OFFICE.

MARCUS O. ANTHONY, OF ENGLEWOOD, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, OF ONE-HALF TO CHARLES H. WALKER AND ONE-HALF TO DAVID I. GARRETSON, BOTH OF NEW YORK, N. Y.

TELEGRAPHY.

1,046,714. Specification of Letters Patent. Patented Dec. 10, 1912.

Application filed June 8, 1909. Serial No. 500,838.

To all whom it may concern:

Be it known that I, MARCUS O. ANTHONY, a citizen of the United States of America, residing at Englewood, county of Bergen, State of New Jersey, have invented certain new and useful Improvements in Telegraphy, of which the following is a specification.

My invention relates generally to telegraphy, and comprises an improved apparatus for making, conducting and receiving telegraphic signals.

The best form of apparatus embodying my invention at present known to me for making, conducting and receiving ordinary Morse signals, is illustrated in the accompanying drawing in which the induction coils are shown in longitudinal section and the other parts in diagram.

Generally speaking, my invention comprises a sending, or signal generating apparatus A, of peculiar construction, a signal receiving apparatus B, certain of whose features of construction are duplicates of the corresponding portions of the sending apparatus, and a system of connections for the two by line conductor C, with branches such as D if desired. By this apparatus electrical impulses or influences are generated at the sending end, transmitted over a conductor, which need not be insulated, and over which other ordinary currents may pass at the same time without interference, and received and indicated at the receiving end by an ordinary telegraph sounder or other signaling device, and all with the consumption of a comparatively small amount of electrical energy.

In the drawing, 1 represents the spool (made of ordinary insulating material, like gutta percha) of a double wound induction coil having the soft iron core 2, the inner winding 3, and the outer winding 4. The inner winding is of coarse insulated wire (say No. 18), and I usually employ two to four layers of it. The outer winding is of finer insulated wire (say No. 36) and I employ many layers of it (say 150). Of course these sizes and windings may be varied to produce effects of different degree. In order to increase the efficiency of the coil for given lengths of wire, I group the outer winding in two portions or collections of coils, x and y, connected in series as by wire 8 and wound in the same direction, that is to say, so that a current in traversing the two portions of the coil from one end to the other would travel around the core in the same direction in both portions. These two portions or collections of coils x and y are separated from one another and from the ends of the inner winding by approximately equal spaces. Preferably, the inner winding 3 and the outer winding 4 are so arranged and connected that a current from the same source of supply passing through them would travel in opposite directions around the core 2. To secure this, the windings 3 and 4, as arranged in the diagram, are wound in relatively opposite directions. I believe the apparatus works more effectively when the coils are wound in this manner, though this particular mode of winding is not essential to its operativeness.

6 is a battery or other source of electric current and 7 an ordinary telegraph key, both in the circuit 5 with the inner winding 3. Means for generating a rapidly and automatically interrupted current of electricity are provided by the vibrating armature 11, located in the field of force of the core 2 of the induction coil, coöperating with the adjustable contact screw 10 mounted in the metallic bracket 9. The armature 11 is spring mounted on the metallic bracket 12. The brackets 9 and 12 serve as terminals for the circuit 5 and around the gap so formed is the shunt circuit 13 in which is the condenser 14.

One terminal, as 15, of the outer winding 4 is connected to any convenient portion of the circuit 5 of the inner winding 3, of the induction coil of the sending instrument at A, and the other terminal 16, is connected to the line conductor C. At the receiving station B is a second and similar double wound induction coil having the spool 21, soft iron core 22; inner winding 23 of coarse wire, and outer winding 24 of fine wire, arranged in two portions x and y connected as before. The terminals of the inner winding of this coil are connected to a closed circuit 25, which includes the coils of the electromagnet 26, having a soft iron core 27. Two Leyden jars 28 and 29, have one element of each, as the inner element, connected to one side of the circuit 25, as by wires 30 and 31. The Leyden jars are preferably placed with-

in a few inches of each other, and have their other elements, as the outer one, suitably connected as by wire 45. One terminal of the outer winding of this second coil is connected to the circuit 25 of the inner winding, as by wire 35, and the other is connected to line C, as by wire 36. The free ends of the outer windings of the two coils at the sending and receiving stations are thus connected to the line conductor extending between the sending and receiving instruments.

32 is any suitable form of circuit breaker pivoted at 33 and normally held by spring 34 against the adjustable contact 38 so as to close the local circuit 37 which includes the local battery 39, or other source of current, and the reversing relay apparatus 40. This relay operates a sounder 41, through circuit 43 including battery 42. The circuit breaker 32 carries an armature 44 located within the field of force of the magnet 26, and its core 27.

Such being the construction of the preferred form of apparatus the mode of operation of my invention is as follows: The key 7 being depressed, the armature 11 is set in rapid vibration and the circuit 5 through the inner winding of the sending coil is rapidly opened and closed thereby, the spark which might otherwise be generated at contact 10 being largely absorbed by condenser 14. The electrical or inductive phenomena thus created in the sending coil transmit their influence over the line conductor C to the coil at the receiving station B, and create a responsive magnetic or electrical action in the magnet 26 which causes it to attract the armature 44, overpower the spring 34, and pull the circuit breaker 32 away from contact 38. This opens the local relay circuit 37, and through the reversed relay 40 closes circuit 43 operating sounder 41. When the key 7 is opened, the circuits 5 and 25 are deënergized, and the spring 34 closes circuit breaker 32, and circuit 37, opening circuit 43 and releasing sounder 41. When the key is opened and closed successively in a manner to form the characters of the Morse alphabet the same are repeated on sounder 41, and any desired message transmitted.

The Leyden jars 28 and 29 act to clear the line and permit the Morse characters to be sent over the line rapidly. Without them, the speed of transmission is greatly limited.

The circuit breaker 32 is arranged as shown so as to open the local circuit when magnet 26 is energized, because the pulsating current in circuit 5 produces similar vibrations in the armature 44, and if the apparatus were arranged to close the circuit 37 when key 7 is closed, an even and complete closure of circuit 37 would not be effected, and the clear action of the sounder would be affected thereby.

In practice one complete apparatus including portions A and B is usually installed at each station. The line conductor C is branched at D, and the branch D extends to as many other stations as desired, being branched at each such station into a similar sending apparatus A and receiving apparatus B. By suitable selective mechanisms of ordinary construction, any one station can then call up and talk to any other station.

Of course various changes can be made in the details of construction and arrangement of my invention without departing from the principle of operation, though such changes would modify its effectiveness. Other forms of signal responsive apparatus might be substituted for the circuit relays and sounder shown. The windings of the coils may be varied. Other means for generating a constantly varying current of electricity at the sending station may be substituted for the battery and vibratory circuit breaker shown. But all such modifications would still be within the broad scope of my invention as I understand it.

The apparatus herein described and shown is vastly more efficient than that shown in my prior Patent No. 783,604, dated February 28, 1905. The increase in efficiency seems to largely result from the connection of one terminal of the outer winding of each coil to the inner winding of that coil, instead of leaving same disconnected or blocked off, as described in my said prior patent. Each of the other changes herein described and claimed also contributes its part to the improved results now obtained.

Having, therefore, described my invention, I claim:—

1. In a telegraphic system the combination with means of generating a rapidly pulsating current, of an electromagnet whose coils are in circuit with said means, a local relay circuit, a normally closed circuit breaker in said relay circuit, and means whereby said circuit is opened when the electromagnet is energized.

2. In a telegraphic system the combination with means of generating a rapidly pulsating current, of an electromagnet whose coils are in circuit with said means, a local relay circuit, a normally closed circuit breaker in said relay circuit, a reversing relay in said circuit, and a sounder circuit controlled by said reversing relay.

MARCUS O. ANTHONY.

Witnesses:
A. PARKER SMITH,
CHAS. H. WALKER.