No. 787,057. PATENTED APR. 11, 1905.

H. SHOEMAKER.

WIRELESS TELEGRAPH TRANSMITTER.

APPLICATION FILED JULY 29, 1904.

2 SHEETS—SHEET 1.

Fig 1.

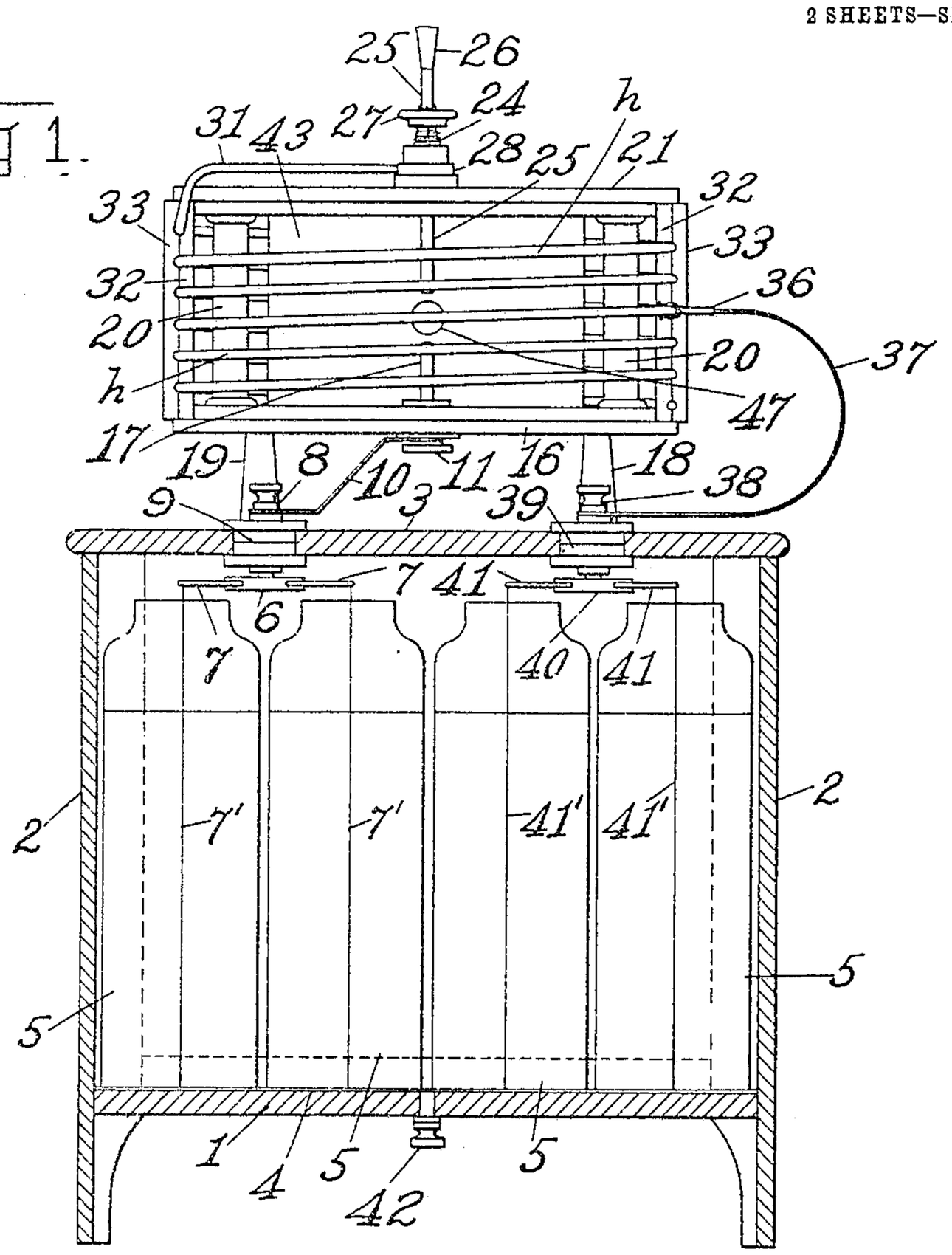

Fig 2.

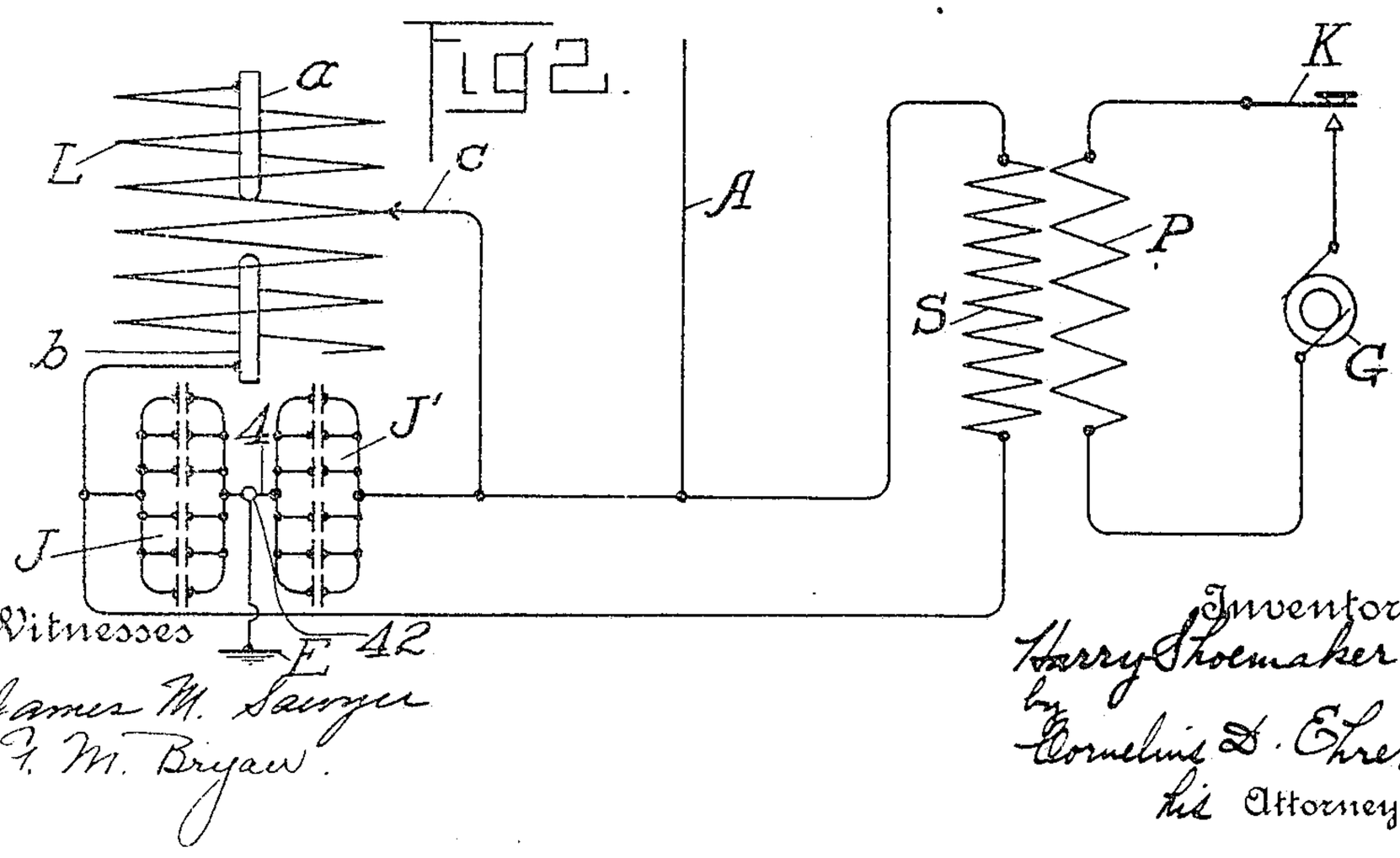

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Fig 3.

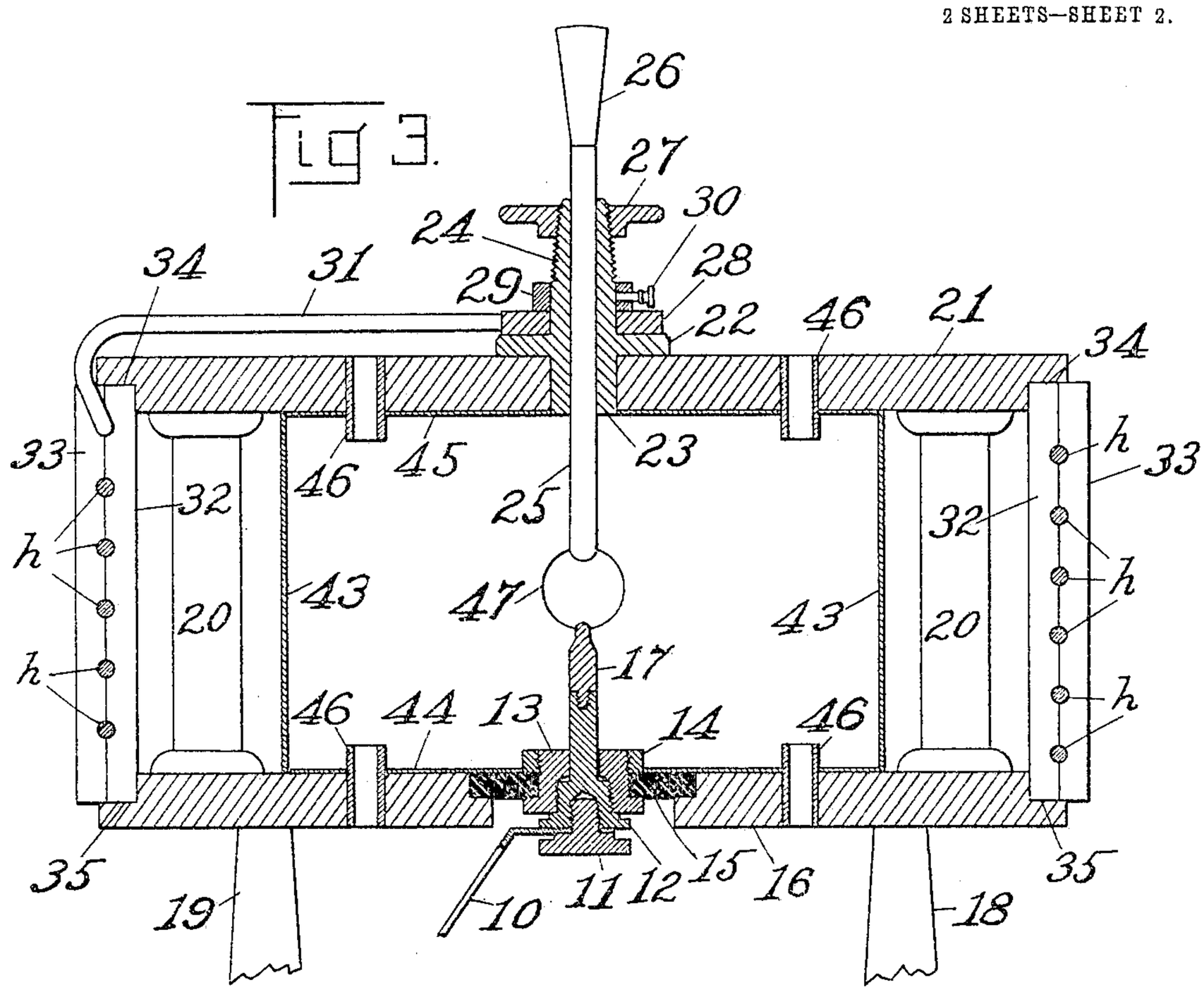


Fig 4.

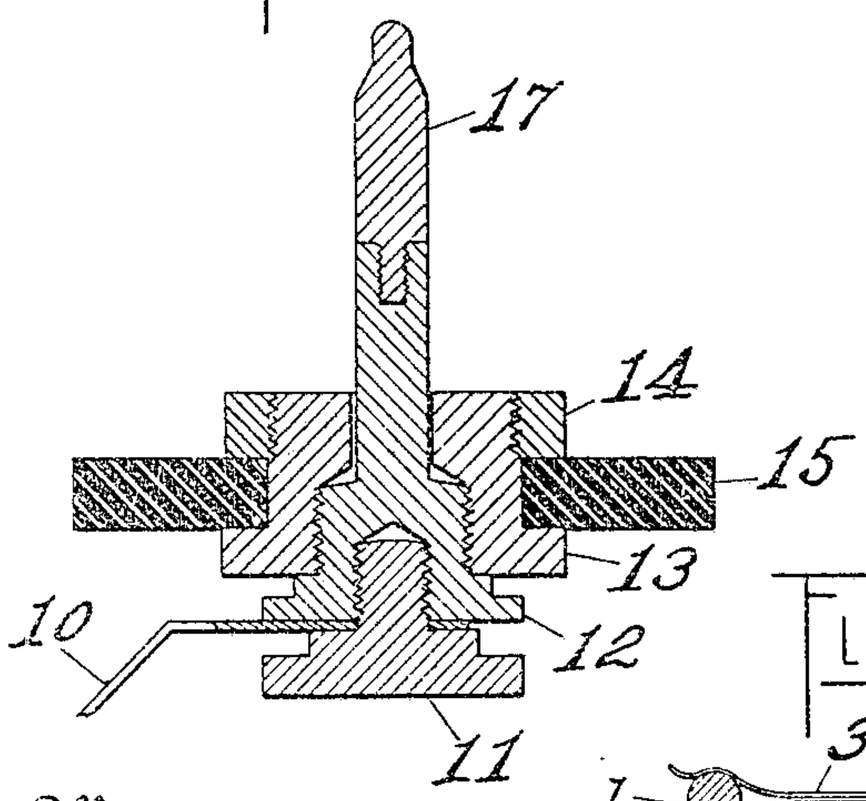


Fig 5.

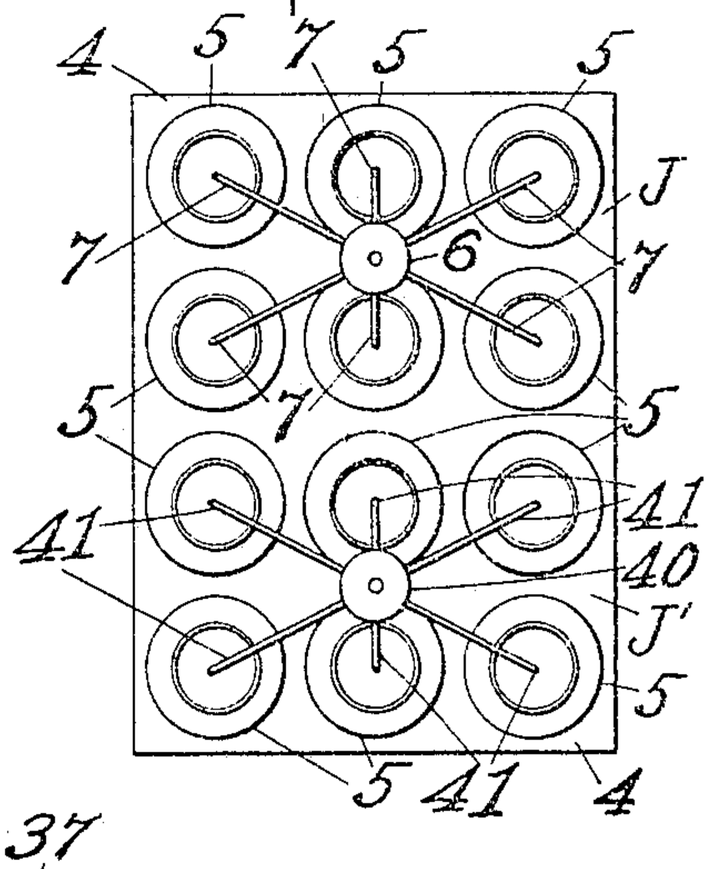
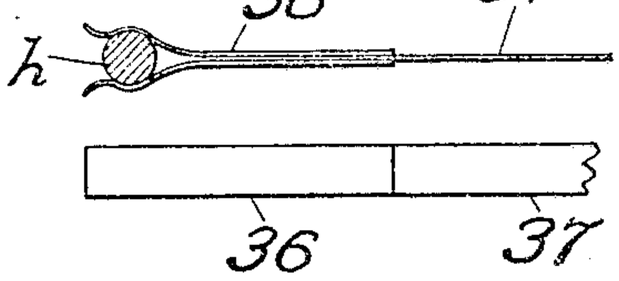


Fig 6.



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UNITED STATES PATENT OFFICE.

HARRY SHOEMAKER, OF JERSEY CITY, NEW JERSEY, ASSIGNOR TO INTERNATIONAL TELEGRAPH CONSTRUCTION COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

WIRELESS-TELEGRAPH TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 787,057, dated April 11, 1905.

Application filed July 29, 1904. Serial No. 218,596.

To all whom it may concern:

Be it known that I, HARRY SHOEMAKER, a citizen of the United States, residing at Jersey City, in the county of Hudson and State of New Jersey, have invented a new and useful Wireless-Telegraph Transmitter, of which the following is a specification.

My invention relates to apparatus for use in wireless telegraphy, more especially those systems in which the signals are represented during the transmission by electroradiant energy.

More particularly, my invention consists of transmitting apparatus so disposed and arranged that it is easily portable, compact, and capable of being quickly set up and adjusted.

My invention consists also of the parts of an oscillating circuit so combined as to occupy minimum space and be easily portable and adjustable.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a vertical elevational view, partly in section, of my apparatus. Fig. 2 is a diagrammatic view of the circuit arrangement. Fig. 3 is a vertical sectional view of the inductance and spark-gap chamber. Fig. 4 is an enlarged view of the connection to a spark-gap terminal. Fig. 5 is a top plan view of the Leyden jars. Fig. 6 shows the clip for engaging the inductance.

Referring first to Fig. 2, G represents a source of alternating currents or other suitable electrical energy. P is the primary of a transformer or induction-coil included in the circuit of G, and K is an operator's key for controlling said circuit. S is the secondary of the transformer, whose terminals are bridged by the two groups of Leyden jars J J′, these groups being connected in series with each other and each group consisting of a plurality of jars connected in parallel with each other. E is the earth connection made at a point common to the two groups of jars. L is an inductance, whose one terminal is in electrical communication with the spark-gap terminal *a* and whose other terminal connects by conductors *c* with one terminal of the group of jars J′. *b* is the other spark-gap terminal, which is in electrical communication with a terminal of the group of jars J. A is the usual aerial conductor of a wireless-telegraph system. The inductance L forms with the groups of jars J J′, along with the spark-gap terminals *a b*, an oscillating circuit whose period is extremely high—as, for example, from one hundred thousand to several millions per second. Upon depressing the key K there are radiated from A trains of electromagnetic waves, the frequency of the waves being as aforesaid. The earth connection E may, however, be made to the terminal *a*, if desired, as in my prior patent, No. 754,904.

Referring to Fig. 1, 1 is the bottom of a rack, made of wood or other insulating material, having the side portions 2 and the top 3. On the upper side of the bottom board 1 is a piece of sheet-copper or other metal 4. Upon the sheet 4 rest the Leyden jars 5, with the result that the outer coatings of all the jars are in electrical contact with each other. I prefer to employ twelve jars arranged in two groups J J′, six jars in a group, all the jars in each group being connected in parallel with each other. 6 is a disk of metal having radiating therefrom the copper rods 7, a rod 7 extending over the mouth of each jar of the group J. (See Fig. 5.) From each rod 7 there depends a chain or other electrical connection to the inner coating of a jar. 8 is a binding-post having a connection extending through the insulating-bushing 9, split horizontally, such connection secured to the disk 6. 10 is a heavy strip of copper extending from binding-post 8 and held under the screw-head 11 in electrical communication with the member 12, which in turn engages in the brass bushing 13, held by nut 14 to the member 15, supported in the circular member or head 16, made of wood or other insulating material. Screwed in the upper end of the member 12 is a spark-gap terminal 17. The member 16 is supported on the member 3 by a tripod, two of whose legs are shown at 18 and 19. Erected upon the member 16 are a plurality of members 20, of wood

or other insulating material, and to the upper ends of these is secured another member or head 21, similar to 16. The heads 16 and 21, along with the members 20, constitute a drum within which are located the spark-gap terminals. 22 is a member of brass or other suitable metal having the cylindrical portion 23 extending through 21 and having the upwardly-extending portion 24, whose outer surface is tapered and screw-threaded. Extending axially through the member 22 is the rod 25, of brass or other suitable material, and whose lower end forms the other terminal of the spark-gap. On the upper end of rod 25 is a handle 26, of hard rubber or other suitable material, by means of which the length of the spark-gap may be adjusted. To clamp the rod 25 in any desired position, the portion 24 has a plurality of radial slots extending vertically and into the bore through which extends the rod 25. This causes the portion 24 to be resilient, and when the hand-nut 27 is screwed down on the tapering member 24 the segments of 24 are forced inwardly and clamped to rod 25. 28 is a metallic disk embracing the member 24 and lying in contact with 22 and the metallic collar 29 held against 28 by forcing the screw 30 against 24. 28 is, however, loose and capable of rotation with respect to 24, though maintaining electrical contact with 24, and therefore with rod 25. 31 is a heavy copper conductor, preferably one-fourth of an inch in diameter, which is secured at its one end to the member 28 and which is then coiled into a helix, shown at *h* as supported upon a plurality of members 32, of insulating material, and held between said members 32 and the members 33, also of insulating material. This helix composed of the turns *h* constitutes the inductance L. (Shown in Fig. 2.) The other end of the helix *h* simply terminates in one of the members 32. The members 32 and 33 constitute a frame for supporting the helix, such frame being rotatable in the channels 34 and 35, cut in the members 16 and 21, respectively. This structure permits the entire helix to rotate to any desired position, electrical communication being maintained with the rod 25 by means of the member 28, as heretofore described. 36 is a spring-clip of copper or brass secured to the heavy copper strip 37, whose lower end is held under the binding-post 38. The binding-post 38 extends through the bushing 39, similar to 9, and connects with the disk 40, similar to disk 6. 41 designates a plurality of rods similar to rod 7, from which depend members 41′, engaging the inner coatings of the jars in group J′. 42 is a binding-post in electrical communication with the copper sheet 4, this binding-post being adapted to receive the earth connection, the aerial connection being made at binding-post 38, or to conform with the connections shown in my prior patent aforementioned the aerial connection may be made at 38 and the ground connection at 28. When it is desired to include more or less of the helix *h* for the purpose of including more or less inductance in the oscillating circuit, the helix is simply rotated, clip 36 being made to slide along the conductor until the desired position is reached. Included between the members 16 and 21 is a drum or cylinder 43, composed of micanite or other suitable insulating material, having the heads 44 and 45 secured to the inner sides of members 16 and 21, respectively. This forms an inclosure around the spark-gap serving to muffle the noise created by the spark. 46 represents mica or similar tubes affording means for circulation of air through the drum 43. At 47 is indicated an orifice in the cylinder 43 at a point opposite the spark-gap in order to facilitate inspection of the spark.

From the foregoing description it will be seen that I have provided a compact and portable arrangement of the elements of an oscillating circuit for use in wireless telegraphy or the like, such arrangement affording means for adjusting the wave length of the transmitted energy and for adjusting the spark-gap as well.

I do not wish to be limited to the precise arrangement of parts shown, inasmuch as numerous variations and modifications may be made without departing from the spirit and scope of my invention.

What I claim is—

1. In a wireless-telegraph transmitter, a rack, a plurality of Leyden jars mounted therein, a drum member mounted upon said rack, spark-gap terminals within said drum and mounted upon the heads thereof, and an inductance-winding surrounding said spark-gap terminals and supported by said drum.

2. In a wireless-telegraph transmitter, a rack, a plurality of Leyden jars mounted therein, spark-gap terminals mounted upon said rack, and an inductance-winding surrounding said terminals and rotatable with respect thereto and mounted upon said rack.

3. In a wireless-telegraph transmitter, a rack, a plurality of Leyden jars mounted therein, spark-gap terminals mounted within a drum, said drum being mounted upon said rack, and an inductance-winding rotatable upon said drum.

4. In a wireless-telegraph transmitter, a drum, spark-gap terminals within said drum and mounted upon the heads thereof, an inductance-winding, and a frame supporting said winding intermediate said drum-heads and rotatable with respect thereto.

5. In a wireless-telegraph transmitter, a drum, spark-gap terminals therein and supported by the heads thereof, a muffler within said drum and inclosing said spark-gap terminals, an inductance-winding surrounding said spark-gap terminals, a frame supporting said winding, and means permitting the rotation of said frame with respect to said drum.

6. In a wireless-telegraph transmitter, a drum, spark-gap terminals mounted therein and supported by the heads thereof, an inductance-winding surrounding said spark-gap terminals, and rotatable upon said drum and means for maintaining electrical communication between said winding and a spark-gap terminal.

7. In a wireless-telegraph transmitter, a condenser, a container therefor, an inductance-winding supported upon said container, and spark-gap terminals surrounded by said winding.

8. In a wireless-telegraph transmitter, a condenser, a container therefor, spark-gap terminals supported upon said container, and an inductance-winding surrounding said spark-gap terminals and rotatable with respect thereto.

9. In a wireless-telegraph transmitter, a condenser, a container therefor, an inductance supported upon said container, and means for rotating said inductance whereby the amount of inductance coöperating with said condenser may be varied.

10. In a wireless-telegraph transmitter, a condenser, a container therefor, spark-gap terminals supported upon said container, an inductance-winding surrounding said spark-gap terminals and connections for the radiating conductor and earth at terminals of said condenser.

11. In a wireless-telegraph transmitter, a plurality of condensers, a container therefor, spark-gap terminals supported upon said container, an inductance-winding surrounding said spark-gap terminals, said spark-gap, inductance-winding, and condensers being serially connected, and connections for the radiating conductor and earth at the terminals of a condenser.

12. In a wireless-telegraph transmitter, a plurality of Leyden jars in series-parallel grouping, a container therefor, spark-gap terminals supported upon said container, an inductance-winding surrounding said spark-gap terminals, and connections for radiating conductor and earth at the terminals of a group of said Leyden jars.

13. In a wireless-telegraph transmitter, a plurality of Leyden jars, a container therefor, an inductance-winding supported upon said container, and spark-gap terminals surrounded by said winding.

14. In a wireless-telegraph transmitter, a plurality of Leyden jars, a container therefor, an inductance-winding supported upon said container, spark-gap terminals surrounded by said winding, said Leyden jars, inductance-winding and spark-gap being serially connected.

15. In a wireless-telegraph transmitter, a frame, an inductance-winding supported thereon, spark-gap terminals supported by and surrounded by said inductance-winding.

16. In a wireless-telegraph transmitter, a frame, an inductance-winding supported thereon, spark-gap terminals supported thereby and surrounded by said inductance-winding, and means permitting rotation of said inductance-winding.

17. In a wireless-telegraph transmitter, a condenser, a container therefor, an inductance supported upon said container, and means for rotating said inductance, said inductance and condenser being frequency-determining elements of an oscillating circuit.

18. In a wireless-telegraph transmitter, a condenser, a container therefor, an inductance supported upon said container, spark-gap terminals supported upon said container and surrounded by said inductance, said spark-gap, inductance and condenser being serially connected.

19. In a wireless-telegraph transmitter, a condenser, a container therefor, an inductance supported upon said container, spark-gap terminals surrounded by said inductance, and a muffler surrounding said spark-gap terminals.

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