

C. ADAMS-RANDALL.  
INDUCTION COIL.  
APPLICATION FILED DEC. 22, 1903.

Fig. 1.

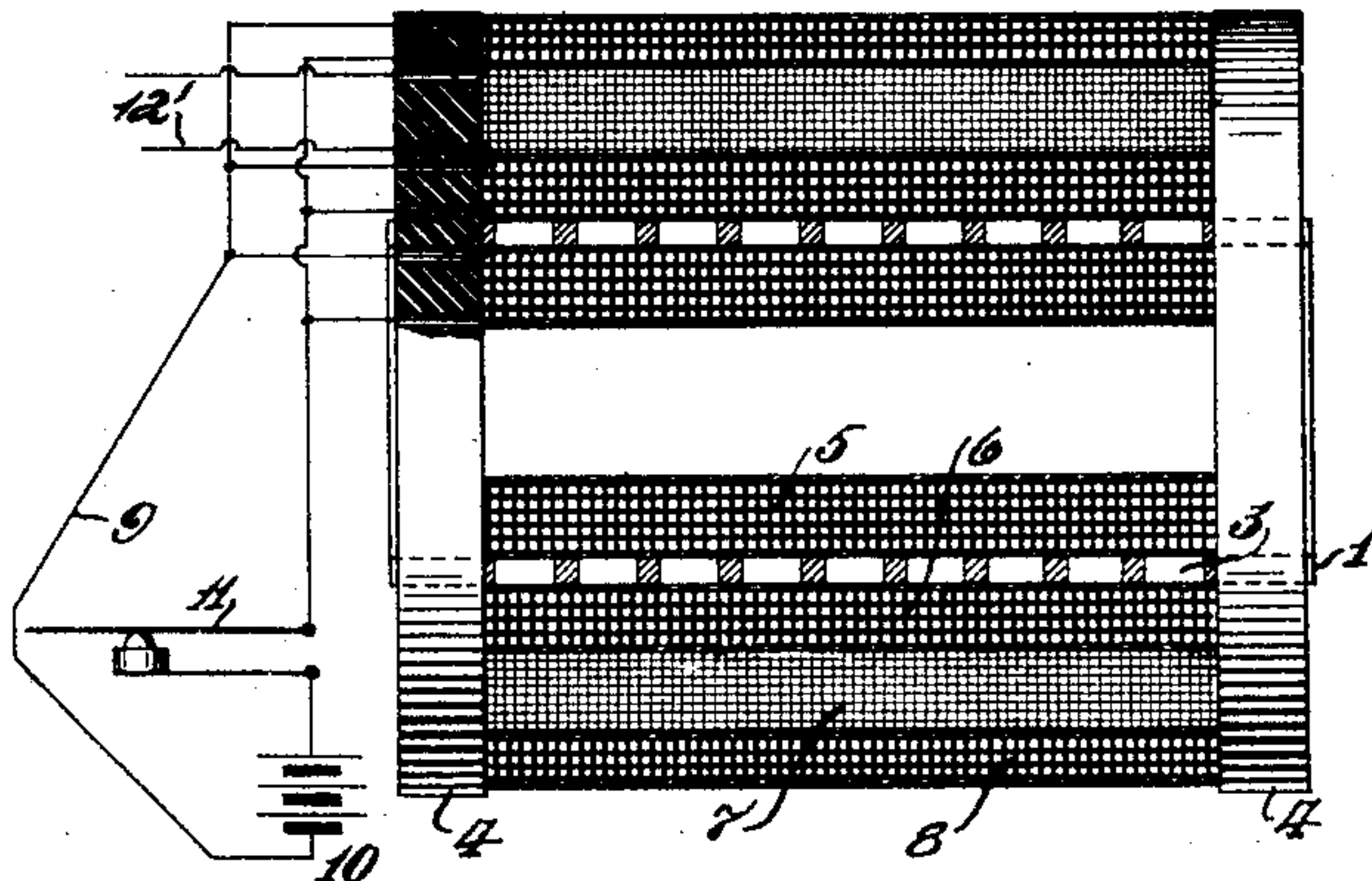


Fig. 2.

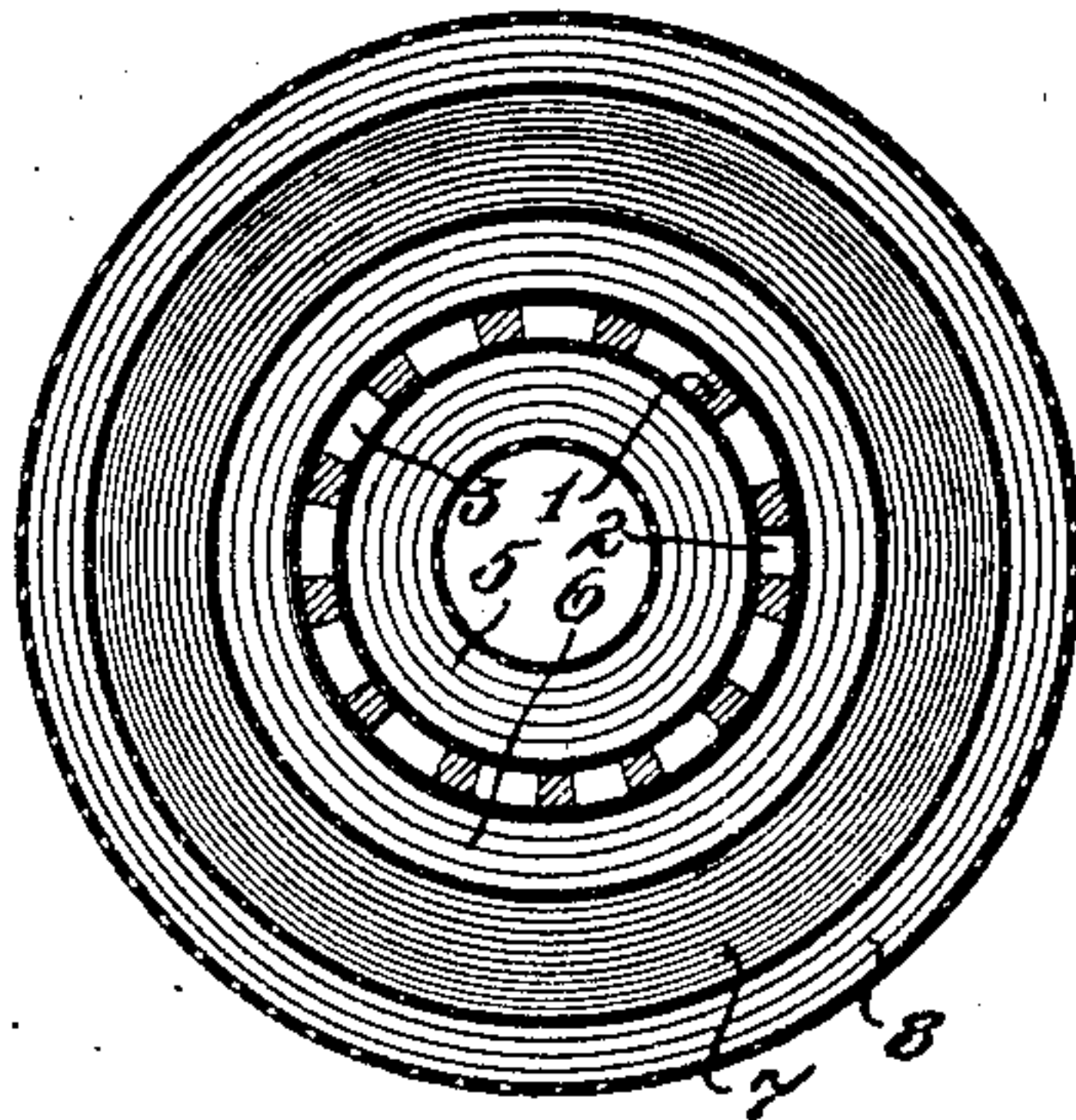


Fig. 3.

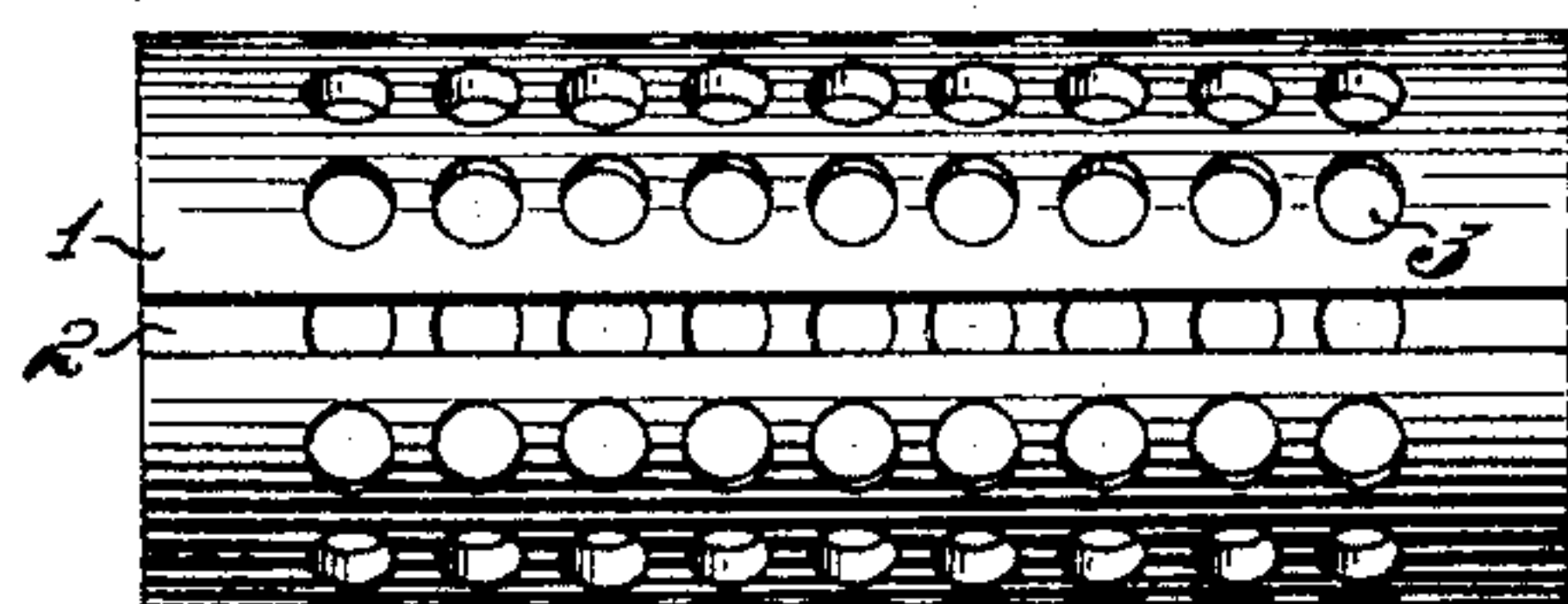


Fig. 4.

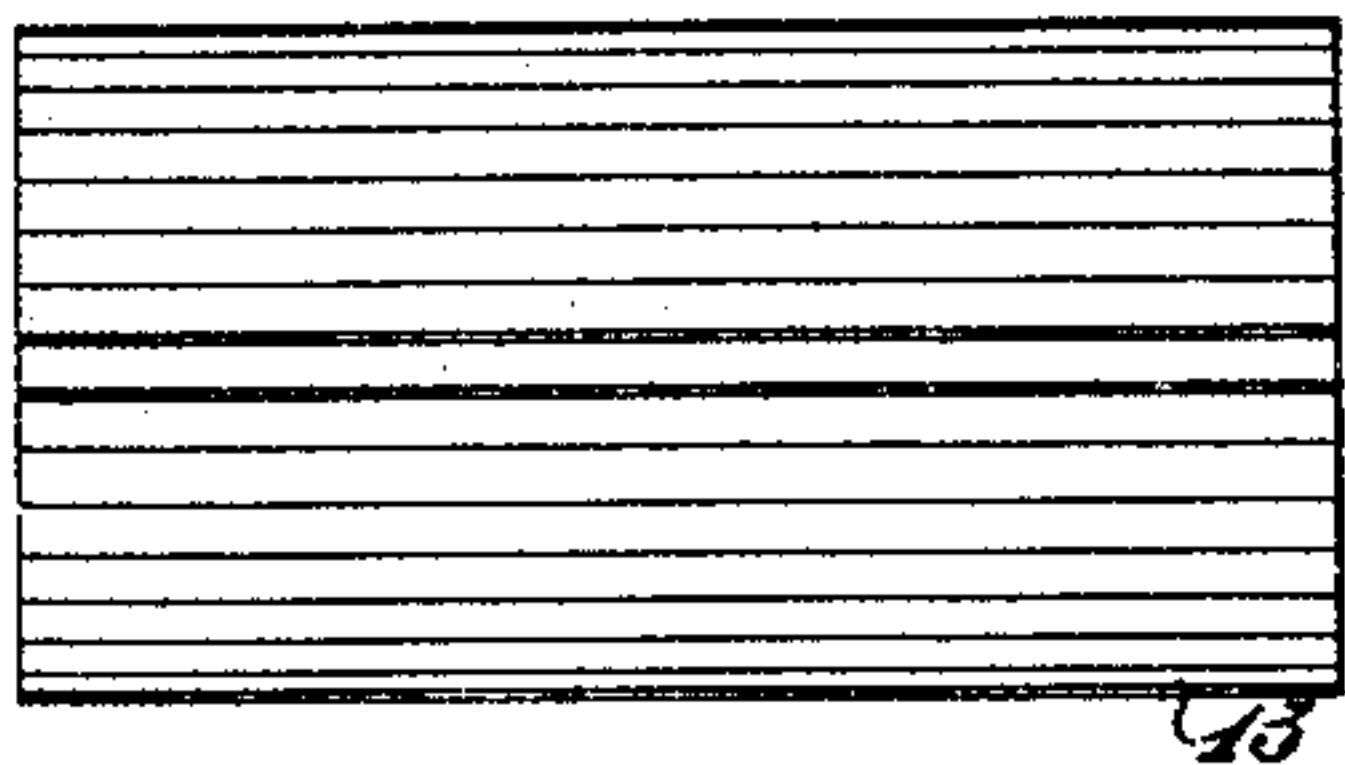


Fig. 5.

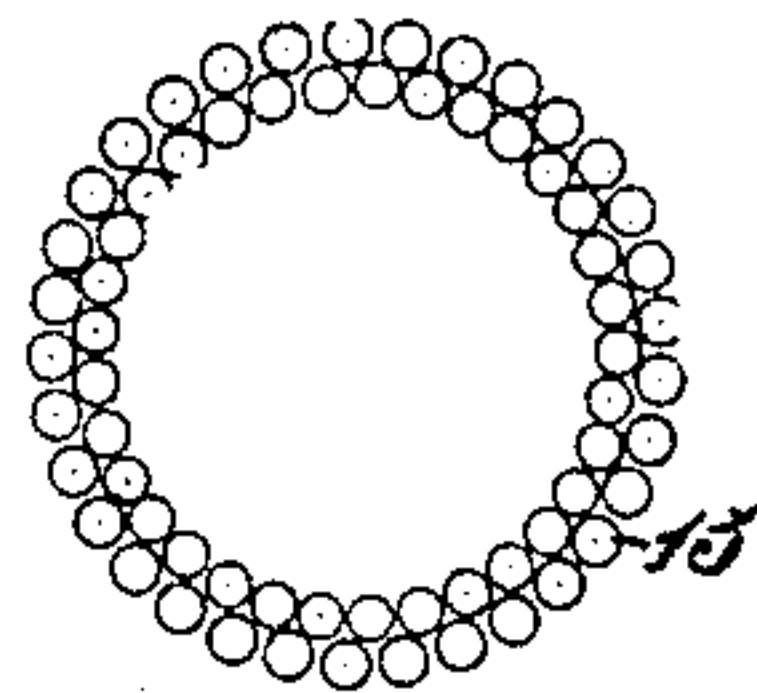


Fig. 6.

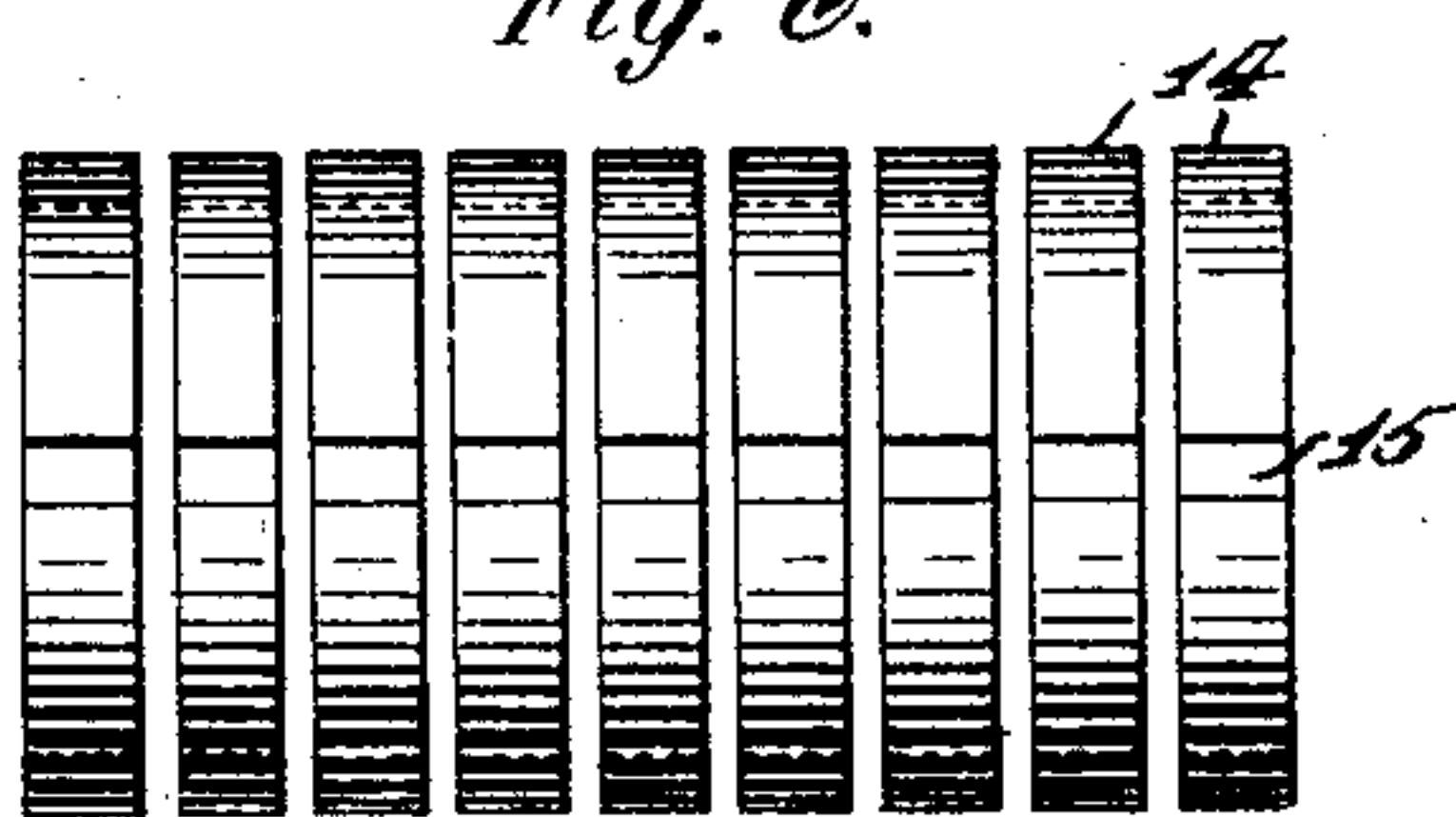
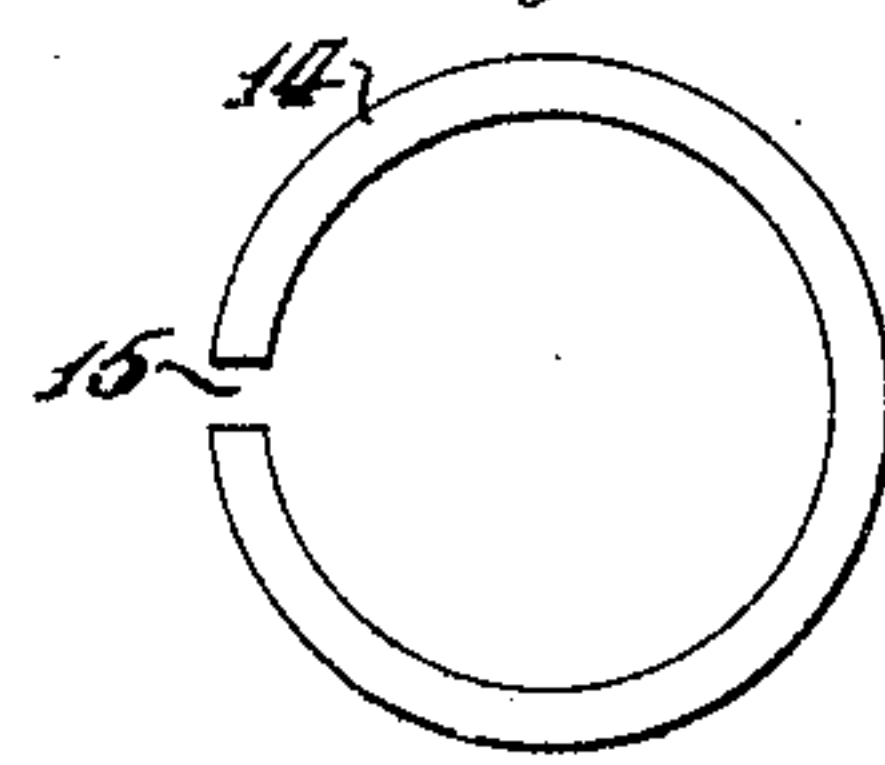


Fig. 7.



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# UNITED STATES PATENT OFFICE.

CHARLES ADAMS-RANDALL, OF NEW YORK, N. Y.

## INDUCTION-COIL.

SPECIFICATION forming part of Letters Patent No. 786,396, dated April 4, 1905.

Application filed December 22, 1903. Serial No. 186,253.

*To all whom it may concern:*

Be it known that I, CHARLES ADAMS-RANDALL, a citizen of the United States, residing in the borough of Manhattan, city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Induction-Coils, of which the following is a specification.

This invention relates to induction-coils, particularly to those employed in telephonic transmitter-circuits; and its principal object is to improve the efficiency of the induction-coil.

In the accompanying drawings, Figure 1 is a central longitudinal section of one form of induction-coil embodying my improvements. Fig. 2 is a cross-section of the same. Fig. 3 shows the preferred form of core. Figs. 4 and 5 show side and end views of a different form of core. Figs. 6 and 7 are side and end views of still another form of core.

In the several views like signs denote like parts.

In place of the usual solid core, consisting either of a single piece of iron or a bundle of iron wires, I employ an iron tube 1, which is split longitudinally, as at 2, to prevent it from acting as a closed coil, and is also provided throughout with perforations 3, sufficient metal thus being removed to give the core the form of a tubular cage. It will be observed that the core, although perforated, still has sufficient body for its purpose, while, owing to the removal of portions of the metal or to its cage-like formation, the tendency to the generation of Foucault currents, which would be present in a core having a solid body or a solid wall, is minimized or avoided. A core of this kind may be more rapidly charged and discharged, or, in other words, its magnetic condition may be more readily or easily varied or reversed. Consequently the magnetic effects are largely increased. For these reasons the core is of especial value for telephonic transmission. Moreover, when this core is used there is a stronger inductive action of the primary coil upon the secondary coil.

To the ends of the core are preferably attached the heads 4 of the induction-coil. Inclosed by the core is a primary winding or

coil 5. This coil for telephonic purposes may consist of four layers of wire and with its insulation may fit tightly within the core. The latter is in turn inclosed by a second primary coil 6, suitably insulated. Upon said coil 6 is wound a secondary or line coil 7. A third primary coil 8, also insulated, is wound upon said secondary coil. For the primary coils I prefer to use wires of such sizes as to render the resistances of said coils approximately equal. The form of core shown conduces to a greater inductive action in the secondary coil, especially from the inner primary coils 5 and 6, which are next to the core. In many cases the outer primary coil 8 may be omitted.

The primary coils, whether two or more in number, I prefer to connect in multiple in the transmitter-circuit 9, as illustrated, said circuit including a source of power 10 and a transmitter 11. By this means there is induced a greatly-increased current in the line 12, of which the coil 7 forms a part.

So far as some features of my invention are concerned, however, the primary coils can be used in independent local circuits with independent batteries in connection with a single transmitter adapted to a plurality of local circuits. In some instances each coil can be used separately.

Referring now to Figs. 4 and 5, it will be seen that a tubular core can be formed of iron wires 13, which may be suitably supported out of contact with one another, so as to form a tubular cage, although many or all of them may be in contact within the scope of certain features of my invention.

At Figs. 6 and 7 I illustrate a series of rings 14 placed edge to edge, but not in contact, so as to form another style of cage. These rings may be suitably supported, with an air-space between them, and each ring may be split, as at 15. Other forms of tubular cores may be employed to produce the effects obtained by the form shown at Figs. 1, 2, and 3.

Other variations may be resorted to within the scope of my invention, and portions of my improvements may be used without others.

Having thus described my invention, I claim—



1. An induction-coil provided with a core which consists of an iron tube provided throughout with perforations.
2. An induction-coil provided with a core in the form of an iron tube split longitudinally and provided with perforations substantially as set forth.
3. An induction-coil provided with a core having a tubular cage-like form.
- 10 4. An induction-coil provided with a core having a tubular cage-like form, and also with heads to which the ends of said core are attached.
- 15 5. An induction-coil provided with a core of iron, said core being in the form of a split tube from which sufficient metal is removed to give it the form of a cage.
6. An induction-coil having a single core in the form of a tube, which incloses a primary winding and is also inclosed by a primary winding adjacent thereto, the latter being inclosed by a single secondary coil.
- 20 7. An induction-coil having a single core in the form of a tube, which incloses a primary coil and is also inclosed by a primary coil adjacent thereto, the latter being inclosed by a single secondary coil; said primary coils having approximately equal resistances.
- 25 8. An induction-coil having a core in the form of a split tube, which incloses a primary winding and is inclosed by a primary winding adjacent thereto; the latter being inclosed by a secondary coil.
- 30 9. An induction-coil provided with a core in the form of an iron tube provided throughout with perforations, which tube incloses a primary winding.
- 35 10. An induction-coil provided with a core in the form of an iron tube split longitudinally and provided throughout with perforations, which tube incloses a primary winding.
- 40 11. An induction-coil provided with a core having tubular cage-like form and inclosing a primary winding.
- 45 12. An induction-coil provided with a core of iron, in the form of a split tube, from which sufficient metal is removed to give it the form of a cage; said core inclosing a primary winding, and being inclosed by a primary winding, and the latter being inclosed by a secondary winding.
- 50 13. An induction-coil provided with a core in the form of a tube from which metal is removed to give it the form of a cage, said core inclosing a primary coil and being inclosed by a primary coil, and the latter being inclosed by a secondary coil; said primary coils having approximately equal resistances.
- 55 14. An induction-coil having a single core in the form of a tube, which incloses a primary coil and is also inclosed by a second primary coil adjacent thereto, the latter being inclosed by a single secondary coil, and a third primary coil being wound over said secondary coil.
- 60 15. An induction-coil having a core in the form of a tube split longitudinally, said tube inclosing a primary coil and being inclosed by a second primary coil adjacent thereto, the latter being inclosed by a secondary coil, and a third primary coil being wound over said secondary coil; said primary coils having approximately equal resistances.
- 65 16. An induction-coil having a core in the form of a tube split longitudinally and provided with perforations, said tube inclosing a primary coil and being inclosed by a second primary coil, the latter being inclosed by a secondary coil, and a third primary coil being wound over said secondary coil.
- 70 75 80

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