

(No Model.)

3 Sheets—Sheet 1.

C. WILLMS.  
INDUCTION APPARATUS.

No. 488,299.

Patented Dec. 20, 1892.

Fig. 2.

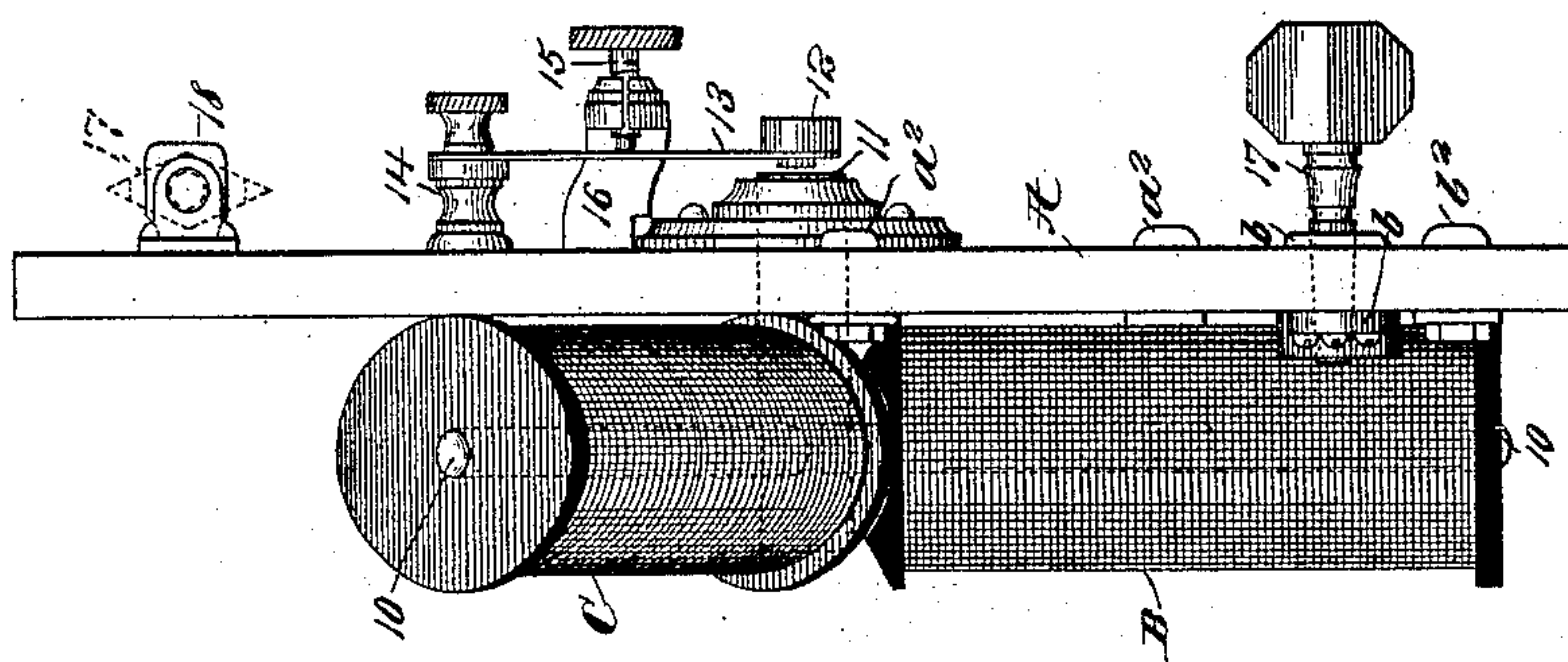
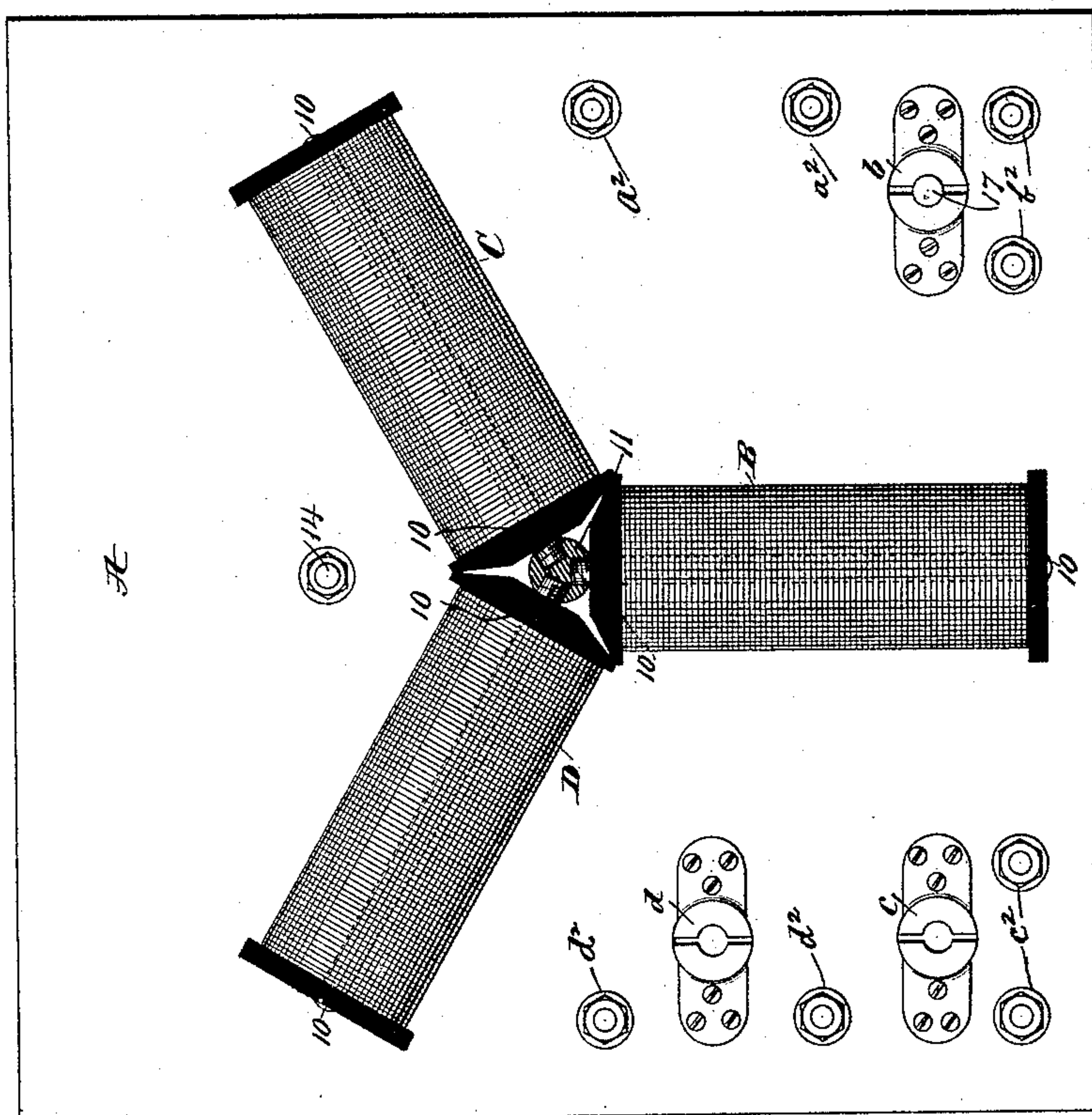


Fig. 1.



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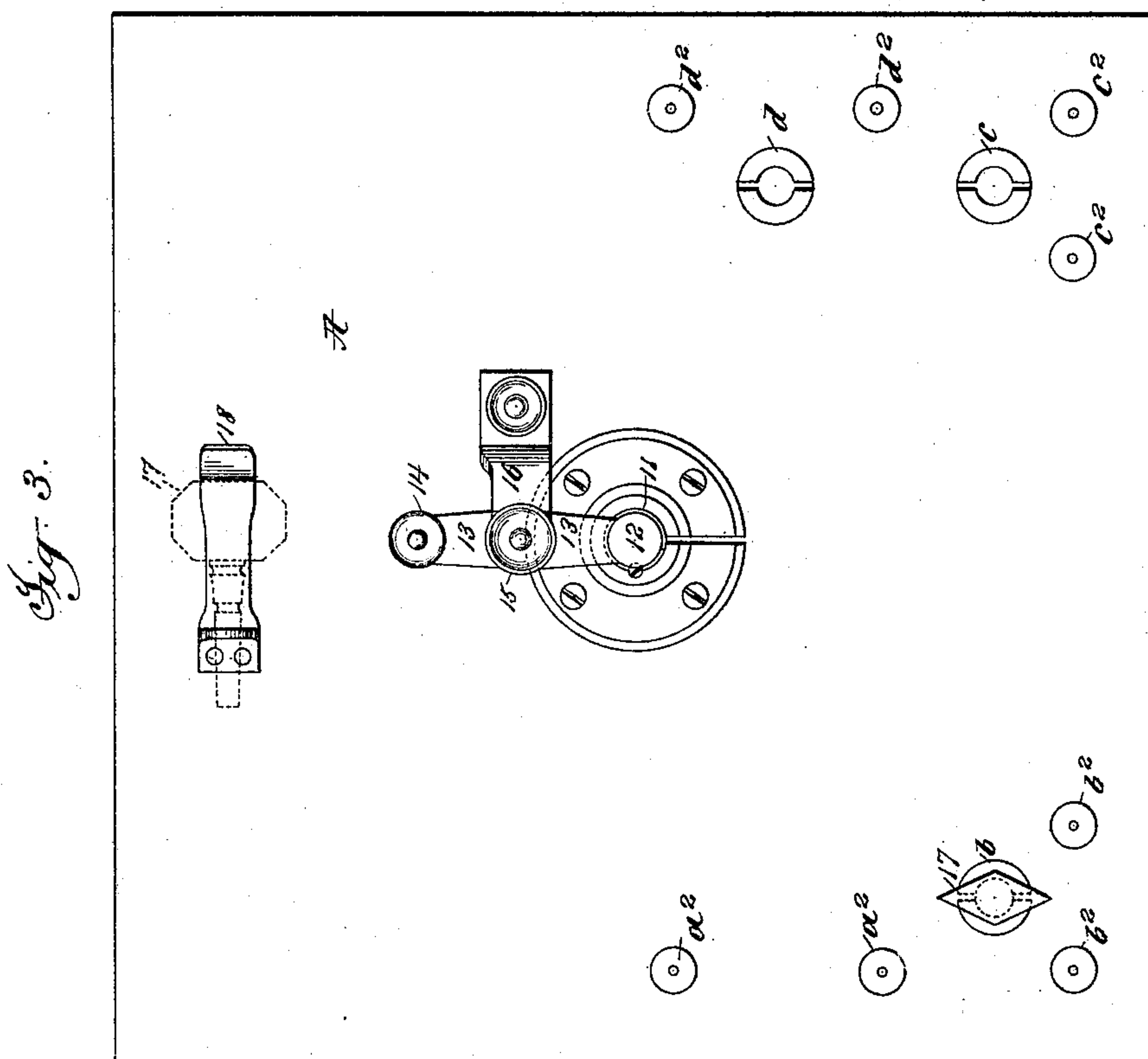
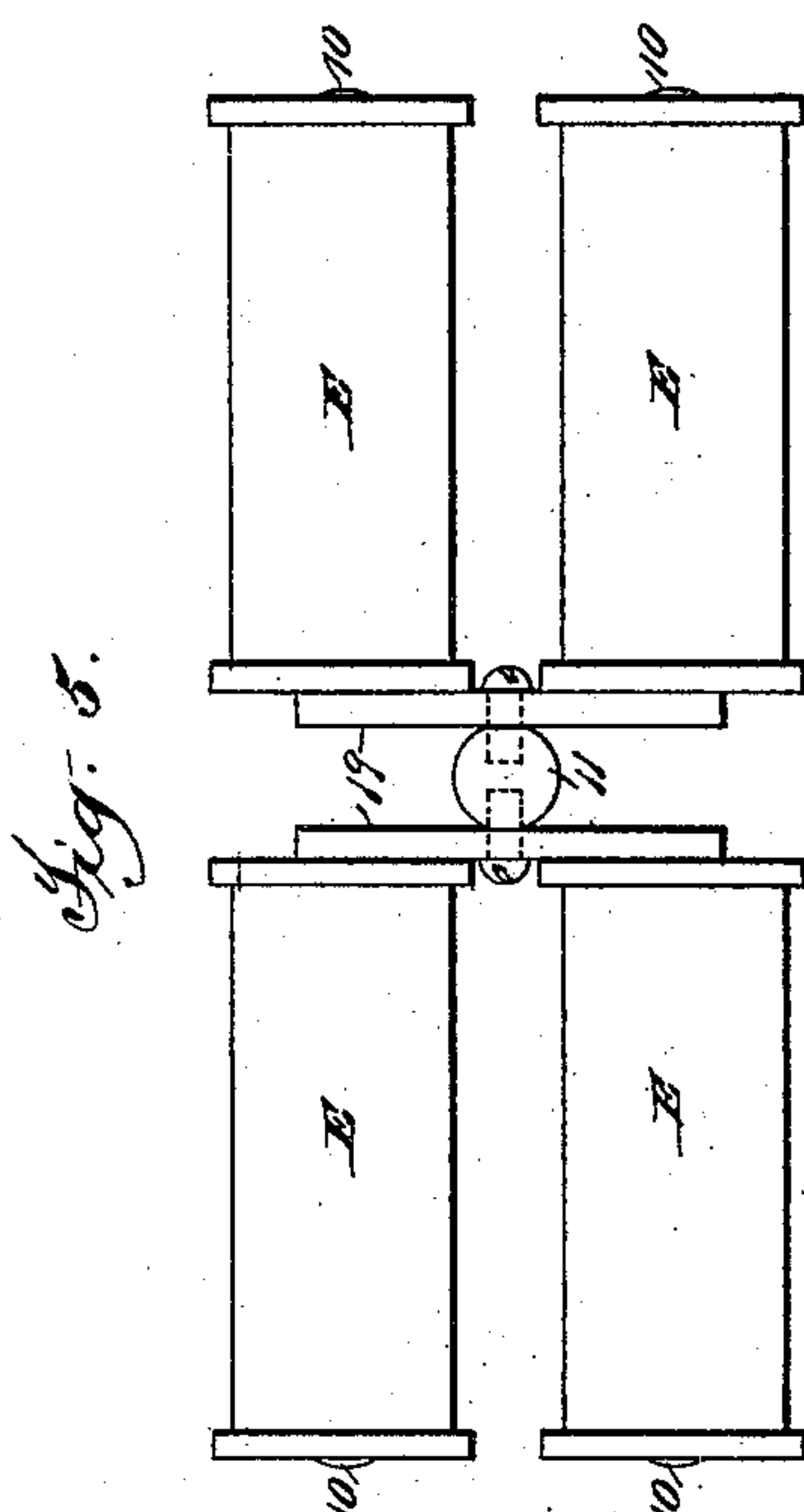
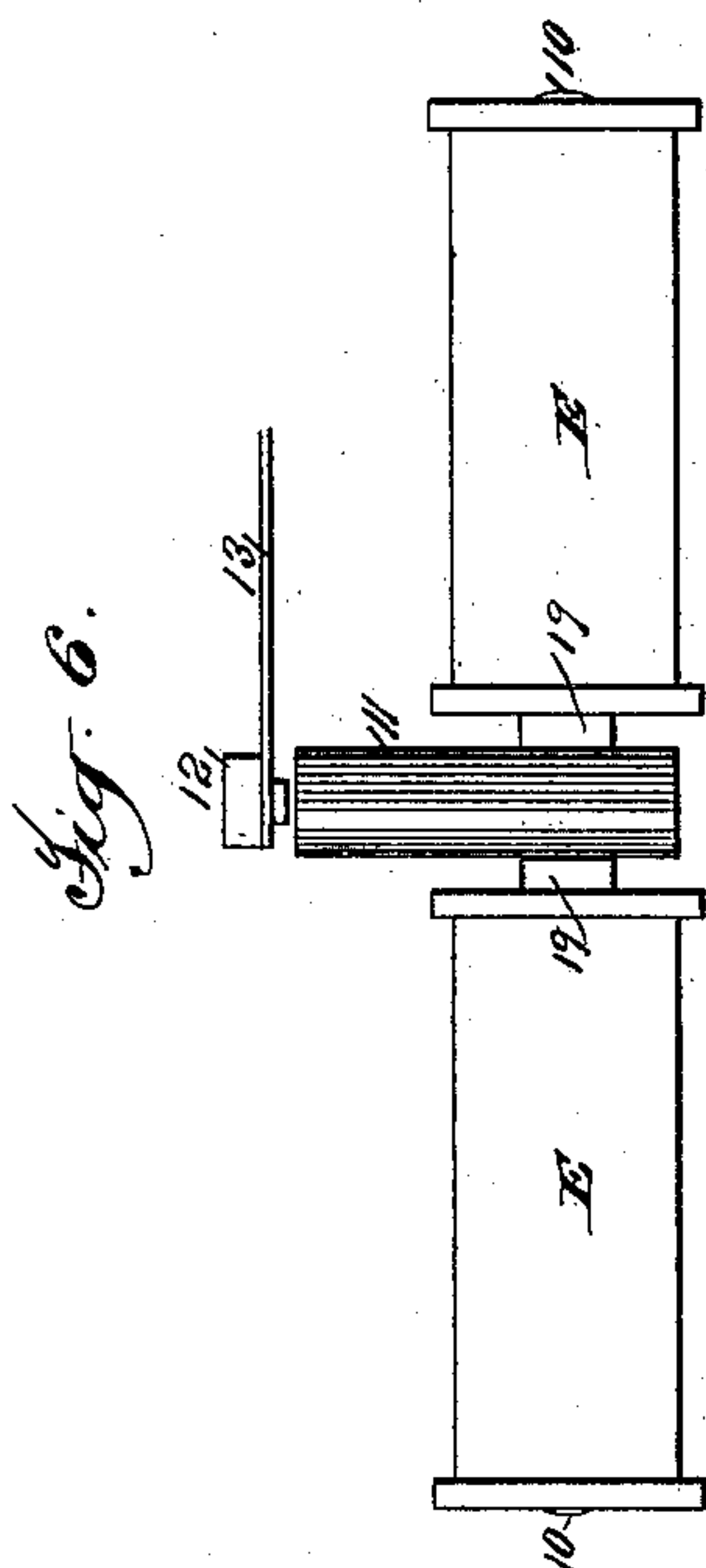
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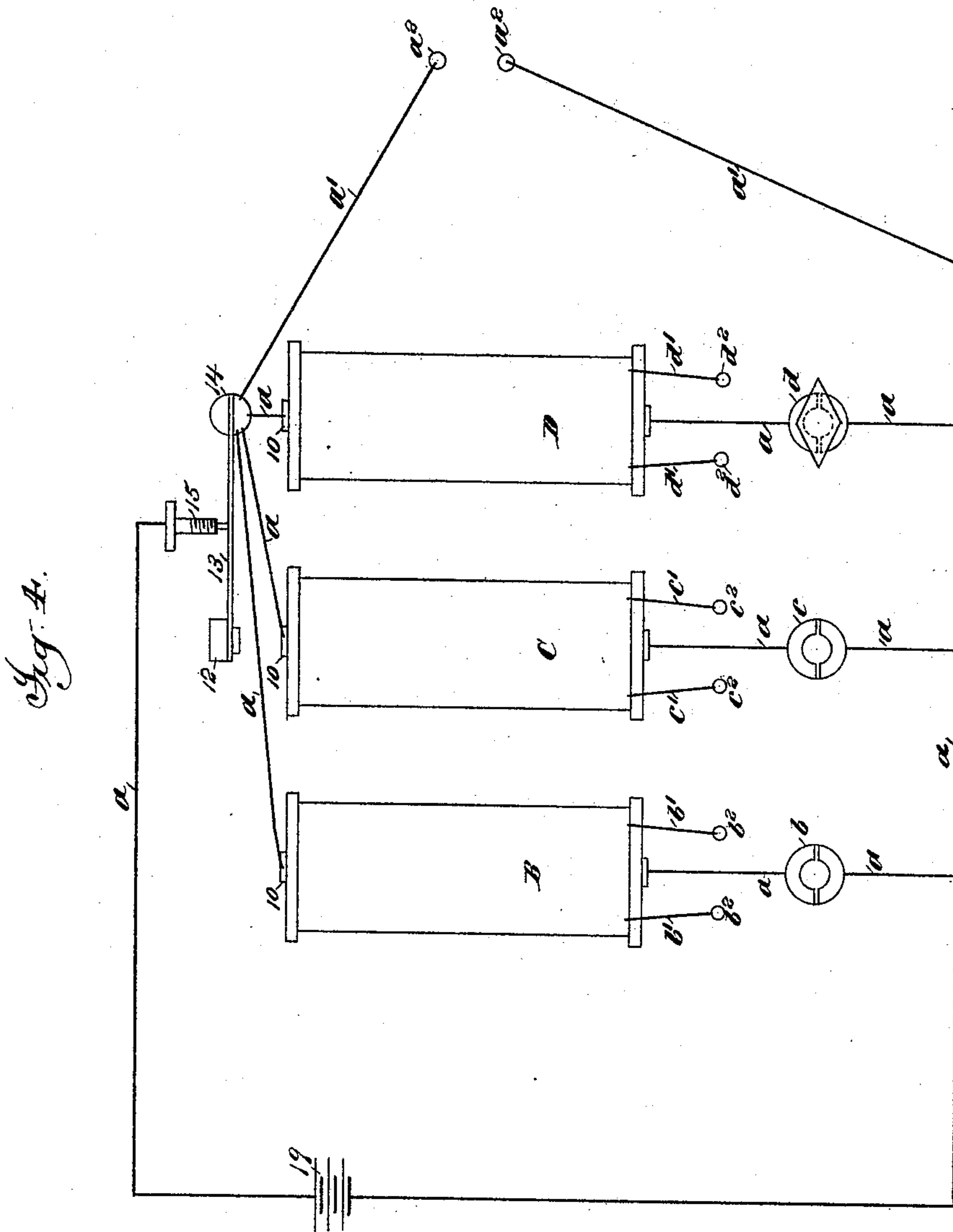
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# UNITED STATES PATENT OFFICE.

CHARLES WILLMS, OF BALTIMORE, MARYLAND.

## INDUCTION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 488,299, dated December 20, 1892.

Application filed May 7, 1892. Serial No. 432,124. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES WILLMS, a citizen of the United States, residing at the city of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Induction Apparatus, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of the present invention is to provide a simple induction apparatus for medical and similar purposes by which induced currents from different induction coils may readily be secured and applied. I attain this object by placing upon a single circuit a plurality of induction coils constructed to form induced currents of different strengths, and combining therewith a single automatic circuit breaker, so that by the simple transfer of a plug or switch induced currents from any of the coils are obtained, and my invention consists broadly in a single automatic circuit breaker, combined with a plurality of induction coils controlled thereby.

For a full understanding of my invention, a detailed description of the same will now be given, in connection with the accompanying drawings forming a part of this specification, in which I have shown an induction apparatus forming a simple, convenient, and practical embodiment of my invention, and from this illustration and description, other arrangements of induction apparatus embodying my invention may readily be made by those skilled in the art.

Referring to said drawings:—Figure 1 is a bottom plan view of my improved apparatus. Fig. 2 is a side elevation of the same. Fig. 3 is a top plan view. Fig. 4 is a diagram of the circuits. Fig. 5 is a diagrammatic plan of a modification and Fig. 6 is a diagrammatic side elevation of the same.

In the said drawings:—A is the plate or support of the induction apparatus on the under side of which are mounted three induction coils B, C, D of any suitable construction, these induction coils being formed so as to produce secondary induced currents of different strengths, and the primary coils may be so formed, if desired, as to give also primary induced currents of different strengths. The cores 10 of each of the coils

are connected to a post 11 mounted in and extending through the plate A, this post forming practically a continuation of the cores 10. The cores 10 are shown as screwed into the post 11 and the induction coils as thus supported, and this forms a convenient and efficient means of mounting the induction coils, but it will be understood that they may be mounted in any other suitable manner, it being necessary only that the cores should be so connected to the post 11 that the latter is magnetized and demagnetized as the primary circuit is made and broken. The primary circuit is made and broken by an automatic circuit breaker co-acting with the post 11. This circuit breaker may be of any suitable form, that shown being one well-known employing the armature 12 carried by spring 13 mounted on a post 14 in the plate A and closing the primary circuit against the contact screw 15 carried by bracket 16 on the plate A.

The primary circuit may be closed through any one of the induction coils B, C, D by any suitable switch or key arrangement. I have shown a simple construction in which the circuit is controlled by a key 17, each of the induction coils B, C, D, being provided with split contact pieces *b, c, d* respectively, adapted to receive the key for closing the circuit. A suitable holder 18 for the key 17 when not in use is provided on the plate A.

The circuit connections will be understood from the diagram, Fig. 4. *a* is the primary circuit through the battery 19; the current passing from the battery through the contact screw 15, spring 13, post 14 and that one of the induction coils B, C, D, through which the circuit is closed by the key 17 and back to battery. *a'* are the connections for the primary induced current of that induction coil through which the primary circuit is closed and *a<sup>2</sup>* the primary terminals. The secondary induced currents pass through the secondary induction coils, and the connections *b', c', d'* and secondary terminals *b<sup>2</sup>, c<sup>2</sup>, d<sup>2</sup>* respectively. It will be seen that by this construction the different induction coils are controlled by a single automatic circuit breaker so that induced currents of different strengths are provided by the simple shifting of a key. In the construction shown currents



of four different strengths are provided, if the primary coils be the same in each case, or if, as above suggested, the primary coils be varied, six different currents may be provided.

It is evident that the constructions shown may be varied widely without departing from my invention, that any other suitable arrangement for controlling the induction coils by a single circuit breaker may be used, and that any suitable number of induction coils may be combined together, three being shown only for the purpose of illustration. Thus it is evident that another induction coil may readily be mounted in the construction above described by extending the post 11 so as to form or receive at its end the core of another coil.

In Figs. 5 and 6, I have shown a modification in which four induction coils E are used, these induction coils being connected to and supported by post 11 by bars 19 connected to the cores of the induction coils and secured to the post 11 by screws as shown, or in any other suitable manner.

By the term "induction coils" used in the claims, I mean and intend to cover coils having separate cores, as distinguished from con-

structions in which a plurality of secondary currents are provided by mounting a primary and two or more secondary coils concentrically upon the same core, so that either of the secondary coils may be used with the primary.

What I claim is:—

1. The combination with the battery circuit and an automatic circuit breaker, of a plurality of induction coils constructed to be thrown into or out of the circuit independently of each other, and controlled by said circuit breaker, substantially as described.

2. The combination with the battery circuit and an automatic circuit breaker, of a plurality of induction coils constructed to be thrown into or out of the circuit independently of each other, and an electro magnetic post connected to the cores of each of the induction coils and co-acting with the armature of said circuit breaker, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHAS. WILLMS.

Witnesses:

W. N. WAMSLEY,  
WM. H. JONES.