

(No Model.)

2 Sheets—Sheet 1.

O. P. LOOMIS.

MAGNETO ELECTRIC MACHINE.

No. 378,892.

Patented Mar. 6, 1888.

Fig. 1,

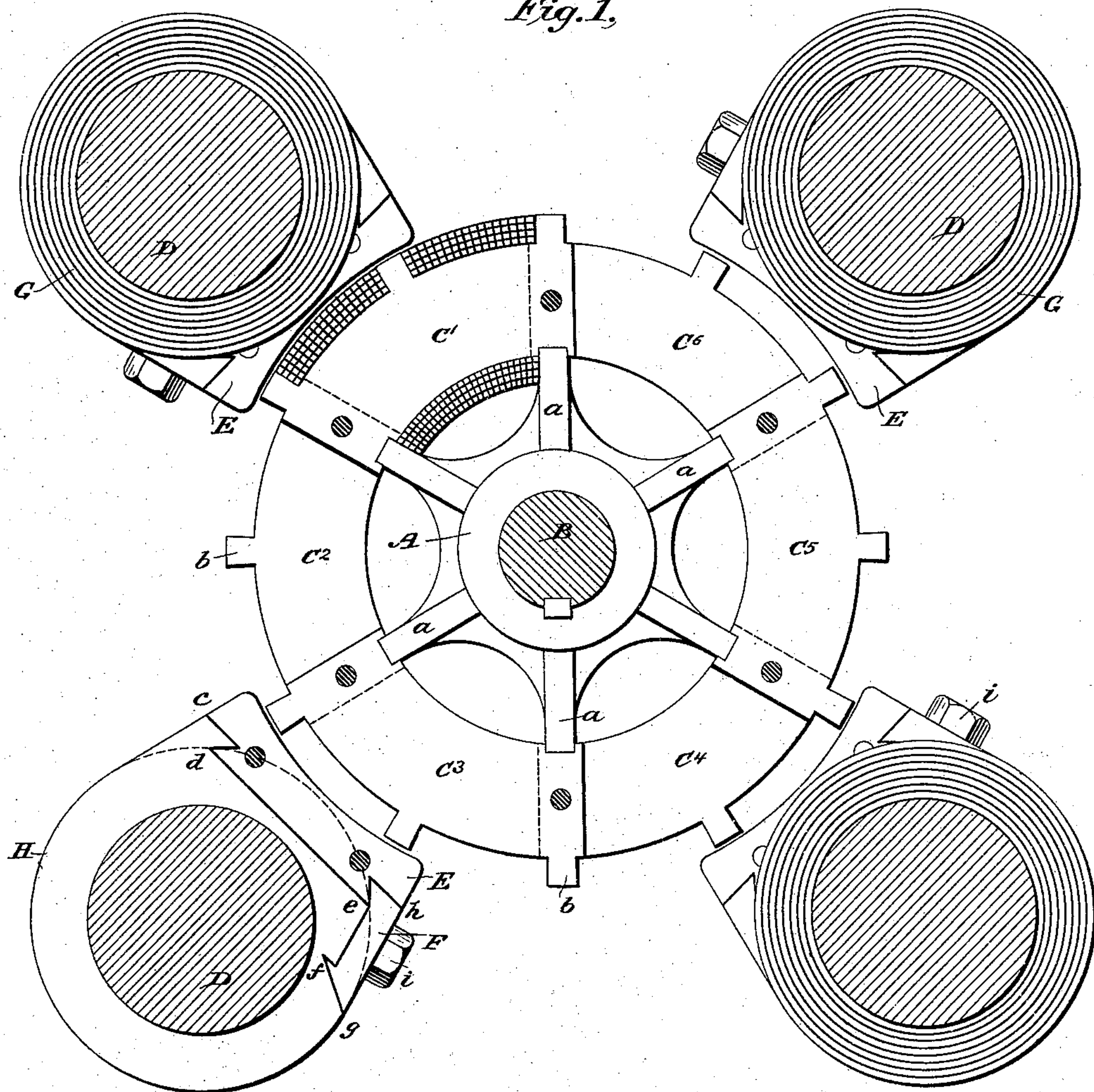
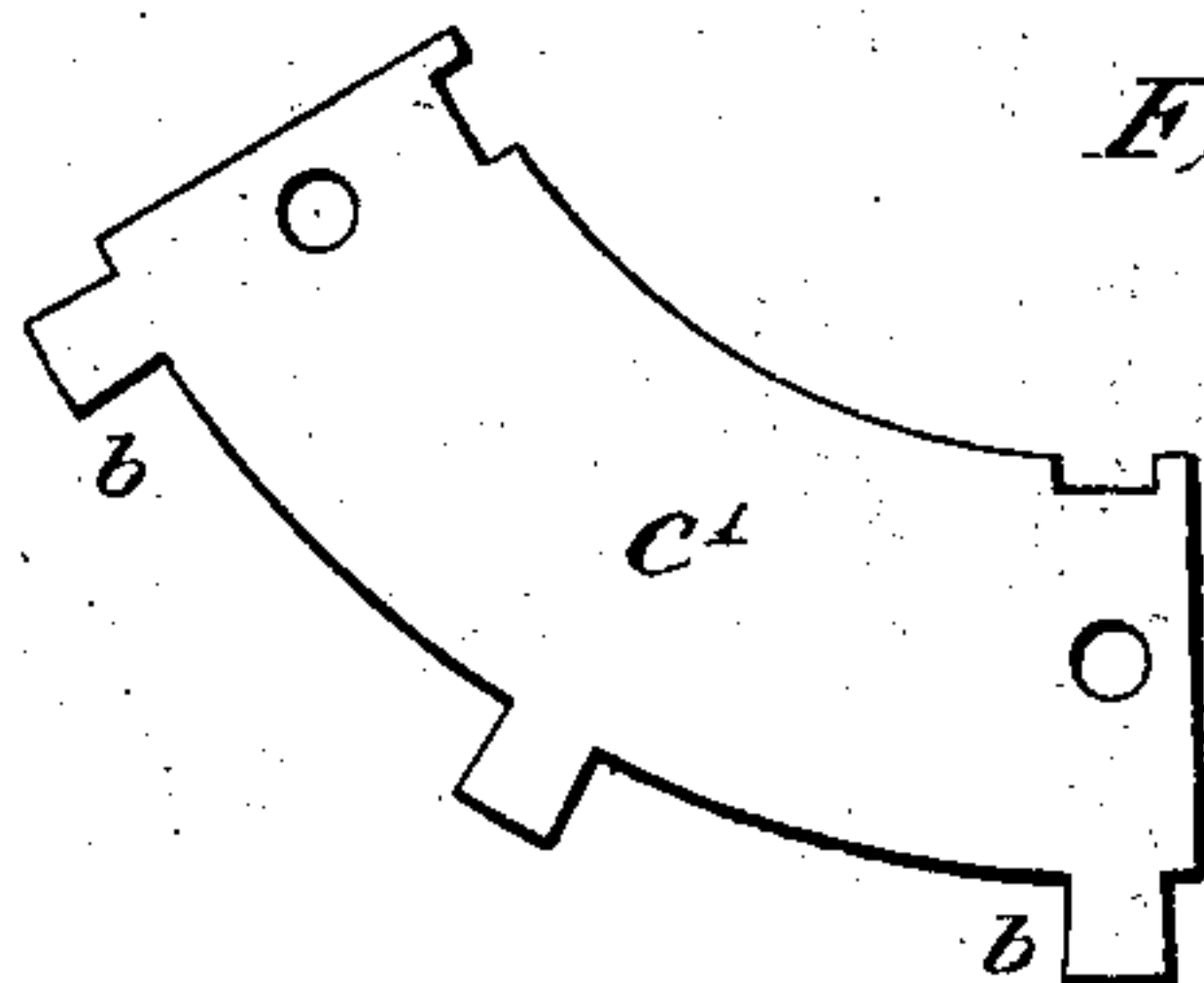


Fig. 4,



Witnesses

Geo. W. Breck.
Carrie C. Ashley

By his Attorneys

Inventor
Osborn P. Loomis
Fowler & Fowler

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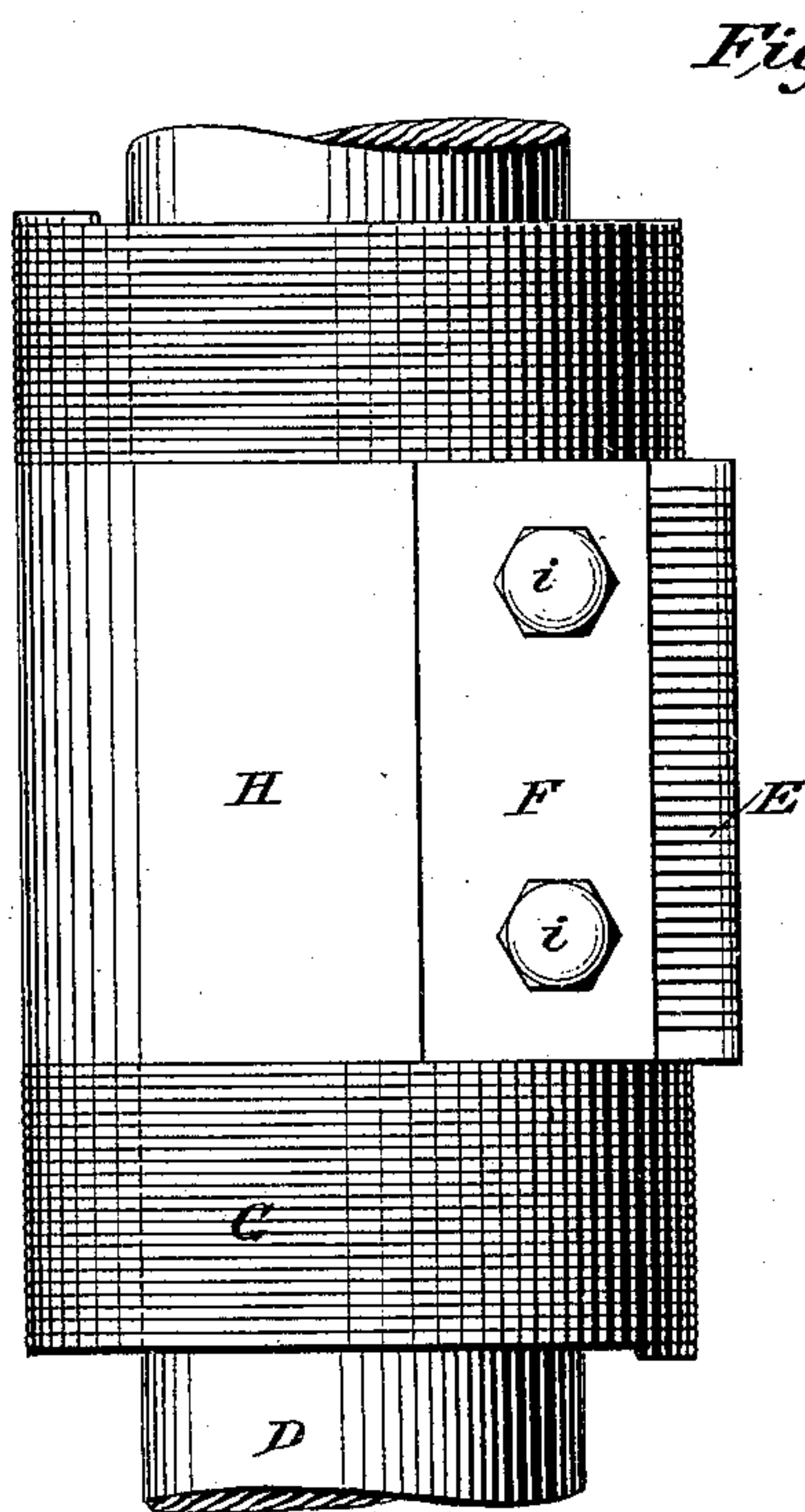
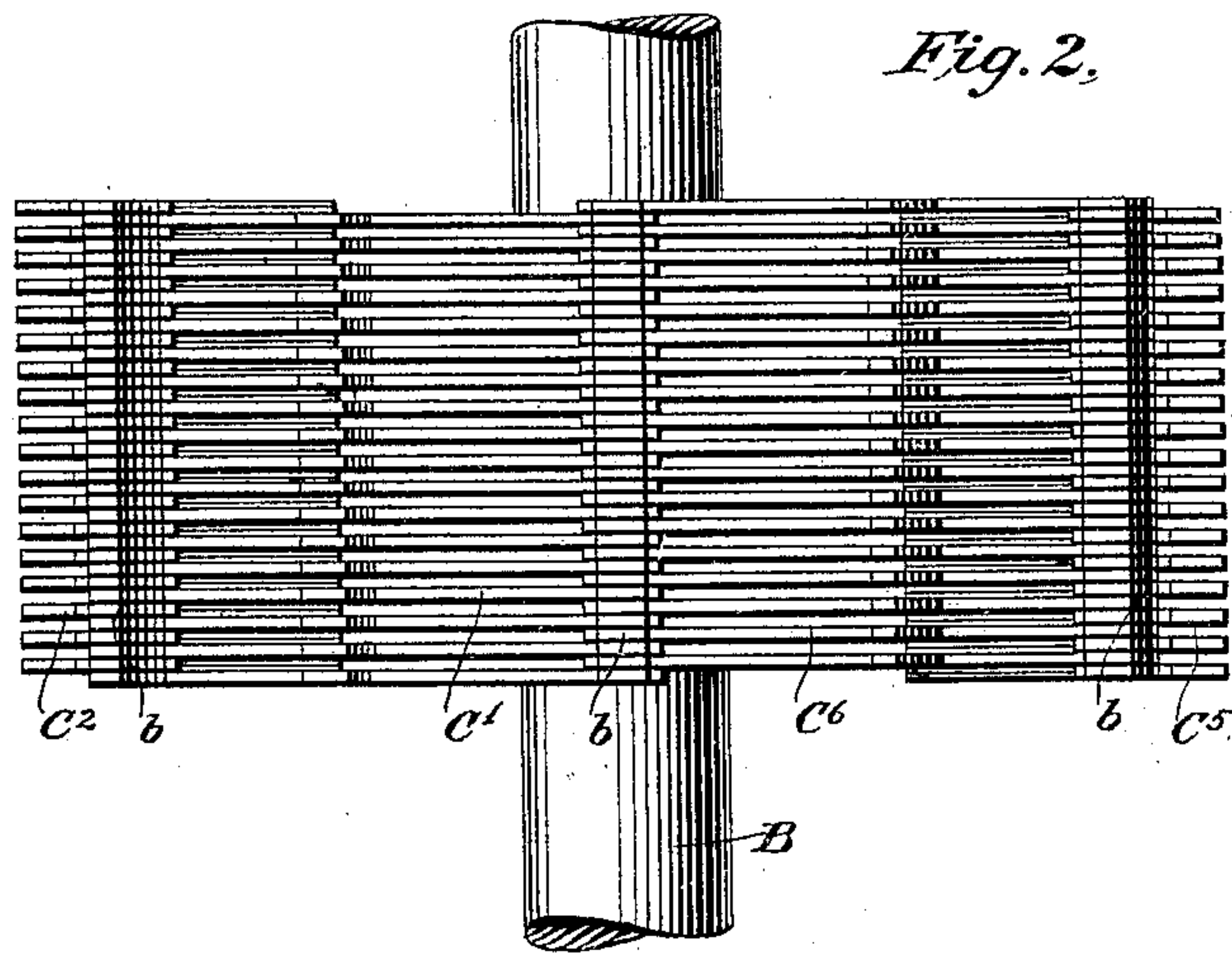
2 Sheets—Sheet 2.

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UNITED STATES PATENT OFFICE.

OSBORN P. LOOMIS, OF SOMERVILLE, MASSACHUSETTS, ASSIGNOR TO THE
LOOMIS ELECTRIC MANUFACTURING COMPANY, OF NEW YORK, N. Y.

MAGNETO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 378,892, dated March 6, 1888.

Application filed December 15, 1886. Serial No. 221,648. (No model.)

To all whom it may concern:

Be it known that I, OSBORN P. LOOMIS, a citizen of the United States, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Magneto-Electric Machines, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to improvements in the armature and pole-pieces of the above-mentioned class of machines, and is more particularly adapted for a dynamo-machine, but is not necessarily confined thereto, being applicable to electrical motors, &c.—in fact, to all machines coming within the term “magneto-electric.”

The object of my invention is to entirely obviate the so-called “Foucault” or “eddy-ing” currents that are induced or caused to flow in the pole-pieces and armature of magneto-electric machines. It is well known that these currents cause undue heating and are a great waste of energy. These currents also prevent the Pacinotti ring—the most efficient form of ring-armature, according to Sylvanus Thompson—from being more generally used. It will be evident to one skilled in this art that to laminate the pole-pieces and armature in a suitable manner and to insulate the laminations from one another would obviate these troubles to an extent depending upon the manner of doing the same. I am aware that these things have been attempted before, and that laminated pole-pieces and armature-cores are not new. Neither do I wish broadly to be understood as laying claim to the same herein. The great desideratum has been to overcome these difficulties simply and effectually. This is the prime object of my invention, which consists in a construction of apparatus and its details for attaining the above, which will now be set forth, and which will be pointed out in the claims.

Figure 1 is an end elevation, partly in section, of an apparatus embodying my invention; Fig. 2, a plan view of my armature with the coils removed, showing the laminations and construction thereof; Fig. 3, a plan view

of my improved pole-piece, and Fig. 4 a view showing one of the laminations of which the armature is built up.

The same letters of reference designate the same parts throughout the several figures of the drawings.

B represents an armature-shaft, to which is keyed, by a spline or by other means, a spider, A, of gun-metal, bronze, or of any suitable non-magnetic metal, having a webbing or arms, *a a*, &c., extending therefrom.

My armature-core is made up of curved arc-shaped pieces *C' C²*, &c., which overlap one another and together constitute a closed ring. The pieces are shaped as shown in Fig. 4, and have projections *b b* extending therefrom, and also perforations and notches punched therein. They are made of thin wrought-iron plates, and may be punched out of sheet-iron complete, as shown in Fig. 4. To build up my armature I first put in place the pieces *C' C³ C⁵*, and then *C² C⁴ C⁶*, which latter will overlap the former, the perforations in the same all registering with one another, and the notches in each engaging the webbing *a* of the spider. Having formed one ring of plates, I in the same manner put together another ring of plates, taking care to insulate each of the pieces from the other with paper or shellac, or by any other means. The perforations and notches at the overlapping portions, and also the projections *b* in each succeeding ring, are caused to register, and as many laminations provided as desired. Insulating-rods, of wood or any other insulating material, are then driven in through the perforations, so as to secure all the plates together. About the arc-shaped pieces and between the projections are wound the coils in any suitable manner, thus forming a Pacinotti ring. This arrangement can be easily manufactured, is strong, can be applied with but little expense, will not heat, and is very efficient.

My field-magnets are made up of a wrought-iron core, D, provided with my improved pole-piece, which is shod with a pole-shoe, E. About the core D is wound the field-magnet coils G, in the ordinary manner.

The pole-piece H is cast in the form shown in the drawings by Figs. 1 and 3, and has a clamping-jaw, F, which co-operates with it to hold the laminated pole-shoe E in place. The

clamping-jaw is of the form shown, and is provided with clamp-screws *i i* for clamping it in place, and when affixed to the pole-piece H it forms with it a dovetail joint for the pole-shoe. It has a hook at each end—one for engaging the pole-piece and the other for engaging the plates of the pole-shoe, and forming part of the dovetail joint.

The pole-shoe E is made up of thin wrought-iron plates, insulated from one another, punched out of sheet metal in the form shown, with perforations, all of which register and are adapted to receive insulating-rods for holding the plates together. These plates may be secured together in any other manner, if necessary. The pole-shoe E is slipped in place upon the pole-piece H, the clamp F having been previously removed. When adjusted in position, the clamping-jaw F is screwed down and made to tightly lock the parts together. The pole-shoe E and clamping-jaw F are carefully insulated from the pole-piece H and from each other, thus preventing all currents from reaching the pole-piece H.

The pole-piece H might in practice be cast with the dovetail joint complete, the part F being integral therewith and forming a part thereof, without departing from the spirit of my invention; but I prefer the arrangement shown, where the part F is made separate and is screwed tightly down upon the pole-shoe E, although in the former case means could be devised to firmly hold the same in place when this arrangement is employed.

The pole-pieces H subtend but a small arc, and a great many may be used. I claim, by using a narrow arc for the pole-pieces and employing a greater number of them, that superior results are obtained, especially so when used in connection with laminated pole-pieces.

With this laminated pole-piece I am able to use the Pacinotti ring without any serious heating, which was not possible before, a few minutes' use under the old constructions heating so much that the machine had to be stopped.

The construction and combination of parts shown and described herein are extremely efficient, and cause currents to flow nowhere but in the conductors, obviating all detrimental currents.

Having now fully set forth an apparatus embodying my invention, I desire to make it known that I do not wish to limit myself to the exact construction shown, as the same may be varied in many ways without departing from the spirit of my invention, and I reserve the right myself in practice, should I see fit, to make all those changes that come within the scope of what I now desire to claim and secure by Letters Patent, which is—

1. A ring-armature for a magneto-electric machine, made up of laminated arc-shaped pieces suitably insulated, which overlap one another, having notches at their overlapping portions, which register with one another, a spider upon which the same is mounted, the radial webbing of which engages the notches

in said arc-shaped pieces, and thereby secures the same to the armature-shaft, and coils wound about said ring.

2. An armature for a magneto-electric machine, made up of laminated arc-shaped pieces constituting a ring, which arc-shaped pieces overlap and are suitably insulated from one another, notches therein at the overlapping portions, which register with one another, means for securing the arc-shaped pieces together, a spider keyed to the armature-shaft engaging the notches in said arc-shaped pieces by its radial webbing, so as to secure the same to said shaft, projections from said arc-shaped portions, and coils wound between said projections, constituting together an armature of the Pacinotti type, all constructed and combined essentially as set forth, whereby efficiency is secured.

3. In a magneto electric machine, the combination of a pole-shoe built up of dovetailed plates suitably insulated from one another, and a correspondingly-dovetailed pole-piece, to which the same is adapted to be fastened by the engagement of said dovetailed portions, insulating devices for securing said plates together, and means for insulating said pole-shoe from said pole-pieces.

4. The combination, in a magneto-electric machine, of a pole-shoe built up of dovetailed plates insulated from one another, with insulating-rods for securing the same together, a pole-piece having an engaging projection at one side, a hooked clamping-jaw at the other side for attaching said dovetailed plates to the pole-piece, and means for insulating the pole-piece from said pole-shoe.

5. The combination, in a magneto-electric machine, of the pole-piece H, made substantially as described, the laminated dovetailed pole-shoe E, whose parts are insulated from one another and from said pole-piece, the insulated clamping-jaw F, and clamping-screws, as *i i*, all combined and operating as set forth.

6. The combination, in a magneto-electric machine, of the insulated overlapping arc-shaped pieces *C' C'*, &c., having extensions *b b*, with notches at said overlapping portions, the web *a a*, &c., of a spider engaging said notches for securing the same to the armature-shaft E, to which it is keyed, coils wound about said arc-shaped pieces between the extensions *b b*, and field-magnets co-operating therewith, each consisting of a core, D, having a coil or coils, as G, thereabout, a pole-piece, H, extending therefrom, having a laminated pole-shoe, E, insulated therefrom, and a clamping-jaw, F, also insulated from the same.

In testimony whereof I have hereunto set my hand and seal, this 8th day of December, 1886, in the presence of the two subscribing witnesses.

OSBORN P. LOOMIS. [L.S.]

Witnesses:

CHARLES A. PIERCE,
GEO. S. STEVENS.