(No Model.)

F. H. BEERS.

ARMATURE FOR MAGNETO ELECTRIC MACHINES.

No. 257,432. Patented May 2, 1882.

Fig. 1.

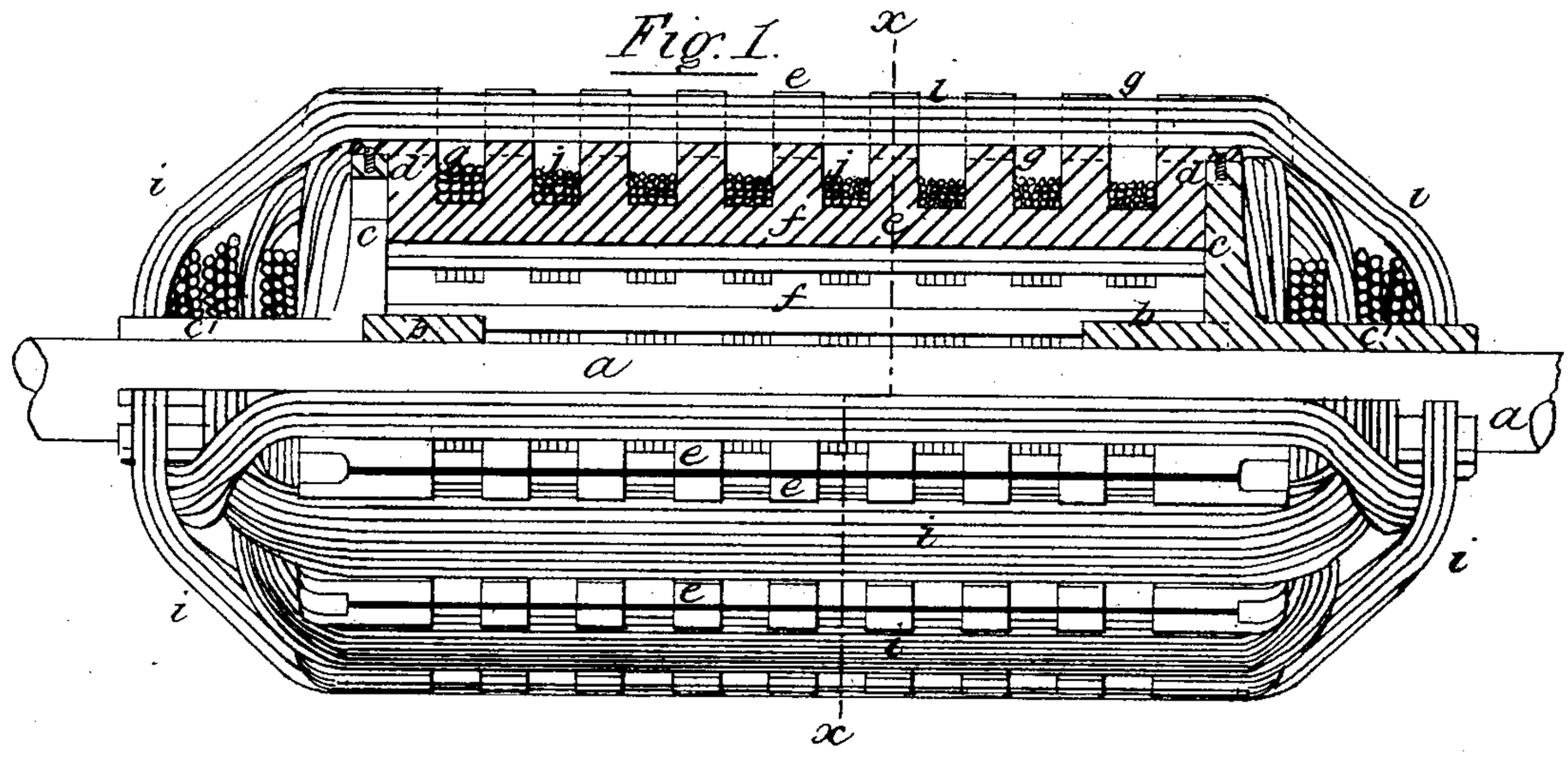


Fig. 2.

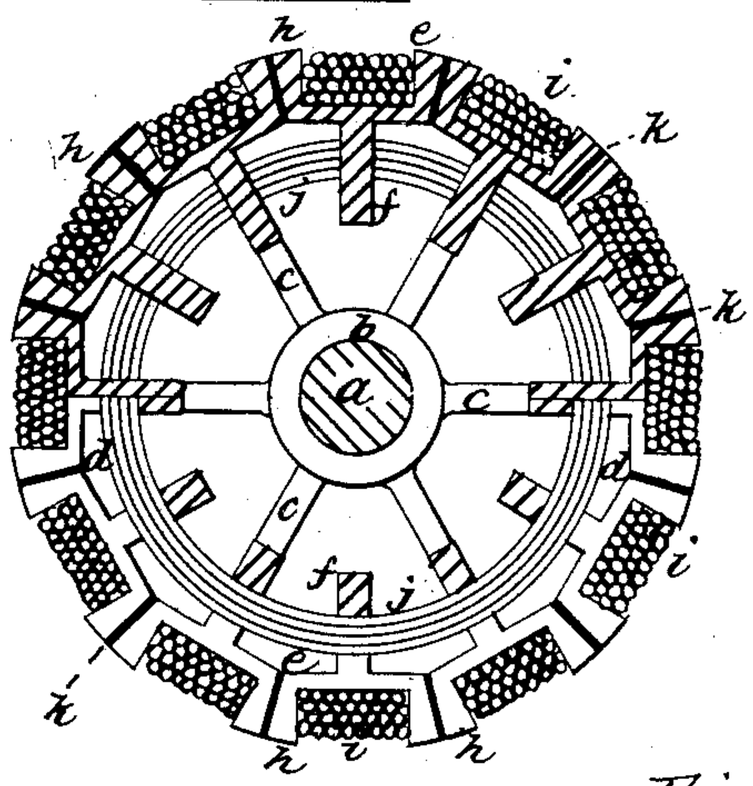


Fig. 3.

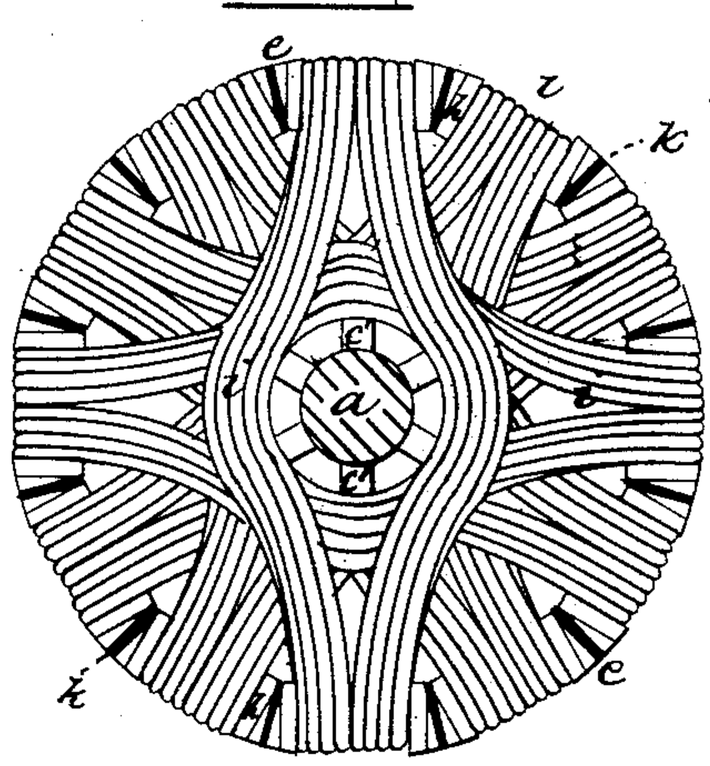


Fig. 4.

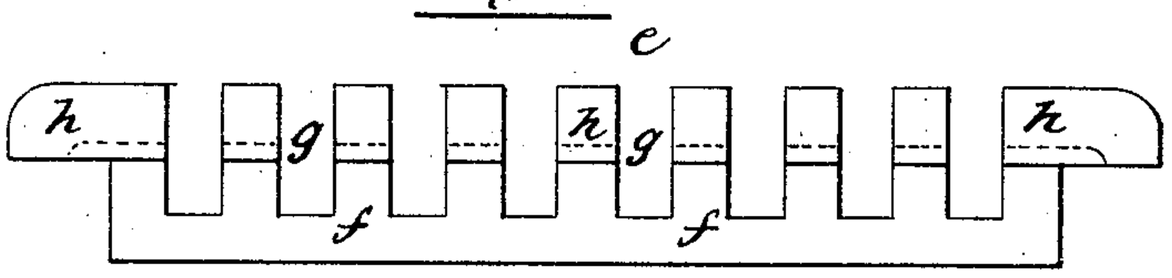
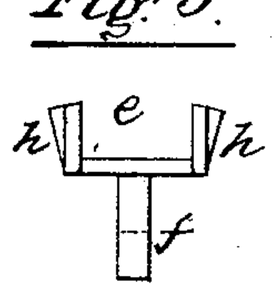


Fig. 5.



Witnesses.
H. D. Williams
E. G. Baker.

Franklin H. Beers
Inventor.
per Alfred Theobald
Atty.

UNITED STATES PATENT OFFICE.

FRANKLIN H. BEERS, OF NEWARK, NEW JERSEY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE METROPOLITAN ELECTRIC LIGHT AND POWER COMPANY OF THE UNITED STATES, OF NEW YORK.

ARMATURE FOR MAGNETO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 257,432, dated May 2, 1882.

Application filed January 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, FRANKLIN H. BEERS, of Newark, Essex county, State of New Jersey, have invented certain new and useful Improvements in Armatures for Magneto-Electric Machines, of which the following is a specification.

This invention relates to the construction of the paramagnetic bodies of armatures for magneto-electric machines, and has for its object to reduce and eliminate the heat generated in the same and in the induction-wire wound thereon, and to increase the effectiveness of said machine.

My invention is principally applicable to armatures of Siemens's type; and it consists in making the body of the same in longitudinal sections, provided with channels for the reception of the insulated induction-wire and transverse grooves in which is wound soft-iron wire, said iron wire forming the only magnetic connection between the sections. The sections at their ends are secured to two open diamagnetic end pieces, which are provided with ribs so shaped as to lie along the shaft, and over which the ends of the longitudinal insulated-wire bobbins are wound, the spaces between said ribs forming air-passages, so as to allow a free circulation of air through and between the ends of the bobbins and longitudinally through the body of the armature. The transverse slots in the channeled sections also allow the air to circulate through the periphery of the armature.

Figure 1 of the accompanying drawings represents an armature constructed according to my invention, partly in section and partly in elevation. Fig. 2 is a transverse sectional view of the same, cut through the line *x x*. Fig. 3 is an end view. Fig. 4 is a side elevation of one of the paramagnetic sections, and Fig. 5 is an end elevation of the same.

To the shaft *a* are secured the two end pieces of the diamagnetic material, composed of the hub *b*, radial arms *c c*, and flange *d*. These radial arms *c c* extend outward, as at *c' c'*, to lie along the shaft *a*.

The paramagnetic part of the armature is composed of the channeled sections *e*, having flanges *f* at their under sides. Transverse slots *g g* extend through the sides *h h* and partly through the flange *f*. The channels in which the insulated-wire bobbins *i i* are wound are rectangular; but the outside of the sides *h h* are inclined to such an extent as to leave a small space between the adjacent sides of the sections when they are secured to the flanges *d* of the end pieces by means of screws, which pass through the bottom of the sections into said flanges. The sides *h h* project beyond the end pieces to form guides for the wire-bobbins *i i*. After the sections *e* are secured to the flanges *d* of the end pieces soft-iron wire *j j* is wound in the transverse slots *g g*, leaving spaces between the top of said winding and the bottom of the channels, as shown. This soft-iron wire wound in the slots *g g* forms the only magnetic connections between the channeled sections *e*, and between their adjacent sides I propose to place strip *k k* of heat-insulating material, so as to prevent as much as possible the conduction of heat from one section to another, as I have found in practice that in armatures of this class some parts will heat much more quickly than others. I have also found that the greater part of the heat appears to be generated in the parts of the wire of the induction-bobbins which cross over the end of the cylinder, and it is to eliminate this heat that the radial arms *c* of the end pieces are extended along the shaft *a*, the wire of bobbins *i i* being wound, as shown at Fig. 3, over said extensions *c'*, so that plenty of air-space is formed through and between the ends of the various bobbins *i i*, thus providing means for the radiation of the heat, and also for a free circulation of air through the body of the armature. The air also circulates over the iron wire *j* and through the periphery by the slots *g g*.

The channeled sections *e* are cast in one piece of metal, of the shape shown and described, either of cast or malleable iron or cast-steel. Cast steel of the kind known as "decarbonized steel" I have found to be of such a nature as to readily assume and give up magnetic properties, and to answer better than other kinds of cast paramagnetic metal in some respects for armatures of magneto-electric machines.

It is obvious that the end pieces having the extended ribs *c' c'* may be used in combination

with cylindrical armatures in which the paramagnetic parts are constructed differently to what is here described, and also that my improvements in the construction of the paramagnetic parts may be used with other forms of end pieces.

The manner of connecting up the bobbins of this kind of armature and the relation thereof to the exciting or field magnets of the machine are so well known that I have omitted showing the same in the drawings, restricting myself to a description of what I claim and desire to secure by Letters Patent, viz:

1. An armature composed of channeled sections for the reception of the induction-wire, secured at their ends to end pieces and provided with transverse grooves, in combination with sections of iron wire wound in said transverse grooves, substantially as and for the purpose set forth.

2. In an armature of the Siemens type, radial ribs extending from the end pieces along the shaft thereof, in combination with the bobbins of insulated induction-wire, substantially as and for the purpose set forth.

3. In combination, the channeled sections *e e*, secured at their ends to end pieces and provided with the transverse grooves *g g*, the iron wire *j j*, and strip *k k* of heat-insulating material, substantially as and for the purpose set forth.

4. In combination, the shaft *a*, end pieces composed of hub *b*, flange *d*, end ribs, *c c'*, channeled sections *e e*, and bobbins *i i* of insulated wire, substantially as set forth.

5. In combination, the sections *e e*, formed substantially as shown, the iron wire *j j*, the end pieces, *b c c' d*, and shaft *a*, as set forth.

In witness whereof I have hereunto set my hand, at New York, county and State of New York, this 10th day of January, A. D. 1882.

FRANKLIN H. BEERS.

In presence of—
WILLIAM S. BIGBY,
ALFRED SHEDLOCK.