

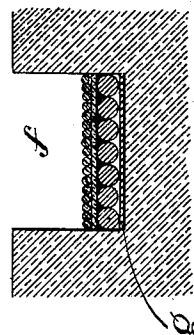
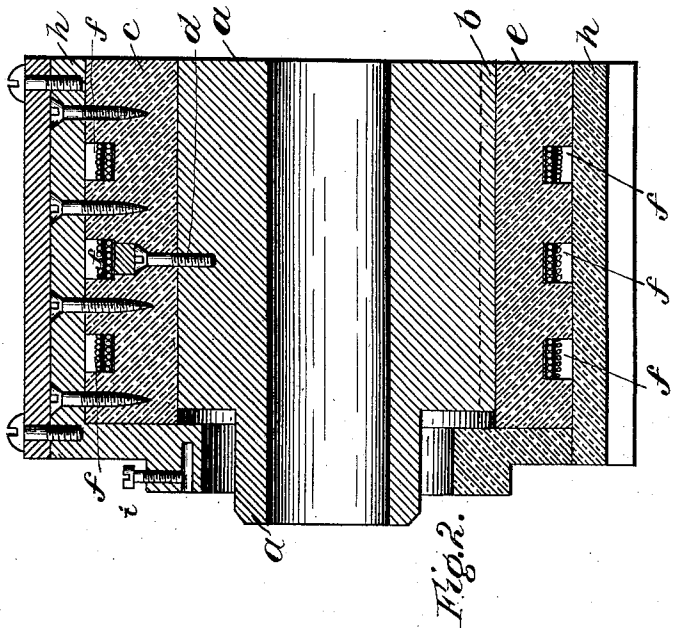
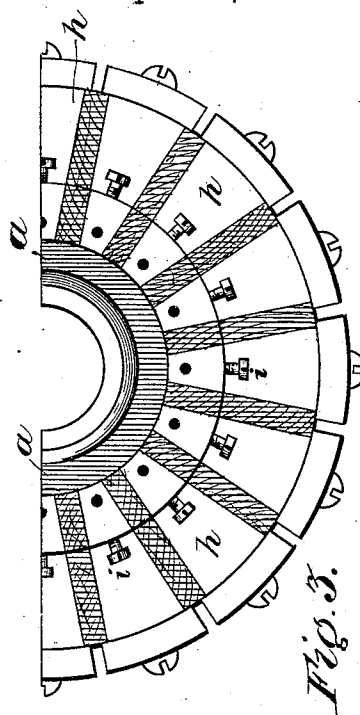
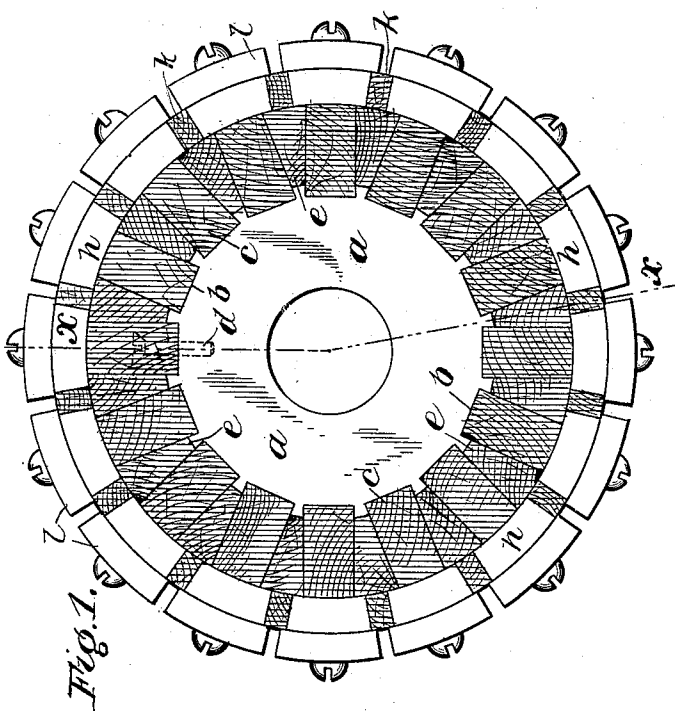
(No Model.)

E. P. WARNER.

COMMUTATOR FOR DYNAMO ELECTRIC MACHINES

No. 361,973.

Patented Apr. 26, 1887.



Witnesses:
Saml. B. Dover,
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Ernest P. Warner,
By George P. Barton
Atty.

UNITED STATES PATENT OFFICE.

ERNEST P. WARNER, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE WESTERN
ELECTRIC COMPANY, OF SAME PLACE.

COMMUTATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 361,973, dated April 26, 1887.

Application filed September 9, 1886. Serial No. 213,178. (No model.)

To all whom it may concern.

Be it known that I, ERNEST P. WARNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Commutators for Dynamo-Electric Machines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to the construction of the commutators of dynamo-electric machines; and it consists in forming the center piece or hub of metal, preferably brass, about which an insulating-ring, preferably of blocks of wood bound together, is formed. These segments are attached to the outside of the insulating-ring, as hereinafter described.

My invention will be readily understood by reference to the accompanying drawings, in which—

Figure 1 is an outside end view of the commutator removed from its shaft. Fig. 2 is a longitudinal section thereof upon line X X of Fig. 1. Fig. 3 is an inner end elevation showing the manner of attaching the wire to the segments. Fig. 4 is an enlarged sectional view of one of the bands which bind together the blocks which make up the insulating-ring.

Like parts are indicated by similar letters of reference in the different figures.

The hub or center piece, *a*, is preferably formed of brass, and is preferably provided with grooves *b*, which may be formed by means of a milling-machine. The blocks *c* are inserted in these grooves, as shown, and each secured to the hub by a screw, *d*. I have shown but one of the screws *d* in the drawings. Each screw *d* is deeply countersunk, as shown, and the space above plugged up with wood or other insulating material. After the pieces *c* are thus each secured in place the wooden wedges *e* are driven in and glued between the different blocks, so as to form a continuous insulating-ring. Other insulating material might be used instead of wood. The partially-formed commutator is then placed in a lathe, and grooves *f*, preferably three in number, are formed therein, and at the same time the outer surface is rendered truly cylindrical and prepared to receive the metal shell. I then wind a band,

g, preferably of brass, about the wood in each of the grooves, and over the metallic bands I wind tightly wire, preferably brass. The wire thus wound on under tension is soldered to the underlying bands in the different grooves. I then cover the wire with insulating-tape, and about the tape I bind strong thread. Any other suitable band or hoop might be used. A shell of metal is then slipped over the outside of the wood, and secured thereto by wood-screws. I insert the screws through the shell, so that there may be four screws in each of the blocks *c*, as shown in Fig. 2, in order that when the shell is divided into segments each segment may be firmly held in place. The shell thus placed over and secured to the insulating-ring is divided into segments, a milling-machine being used for this purpose.

The slots or divisions between the different segments *h* should be of sufficient width to insulate the segments from one another.

The wires leading from the armature may be attached to the different segments *h* of the commutator by binding-screws *i*, as shown in Figs. 2 and 3.

The slots formed by the milling-machine are filled with wooden blocks *k*, as shown, and then about the circumference I place the removable metallic segments *l*. These pieces *l* are a little wider than the underlying segments *h*. The blocks *k* are thus securely held in place.

Commutators thus constructed may be used upon different styles of dynamo-electric machines, and are of greater strength, more durable, and less liable to become impaired or injured than any commutators for dynamo-electric machines with which I am familiar.

In case the entire center is of wood, as heretofore, the commutator is almost sure to become tight upon the shaft, so that it can be removed only with great difficulty.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with the center of hub *a*, of the wooden ring formed of blocks, and the segments attached to said ring, substantially as shown and described.

2. The combination, with the center piece provided with grooves, of the blocks inserted therein, and the intervening wedges glued

thereto and bound together, and the segments supported by said insulating-ring, substantially as shown and described.

3. The combination, in a commutator, of
5 the segments *h*, separated by blocks *k*, and the external removable segments, *l*, wider than the underlying segments *h*, whereby said blocks *k* are retained in place, substantially as described.

4. In a commutator, the blocks *c*, each se-
10 cured to the hub, and the wedges *e*, glued between said blocks to form therewith a wooden insulating-ring for supporting the segments, and the bands bound tightly in grooves provided in said insulating-ring, substantially as
15 shown and described.

5. In a commutator, the insulating-ring between the hub and the segments, said ring consisting of blocks of insulating material, like wood, bound together by wires, said wires being wound in grooves and soldered together 20 and insulated from the segments, substantially as described.

In witness whereof I hereunto subscribe my name this 4th day of September, A. D. 1886.

ERNEST P. WARNER.

Witnesses:

GEORGE P. BARTON,
CHAS. A. JOSLYN, Jr.