(No Model.)

J. WENSTRÖM.

DYNAMO ELECTRIC MACHINE.

No. 515,386. Patented Feb. 27, 1894.

Fig. 1.

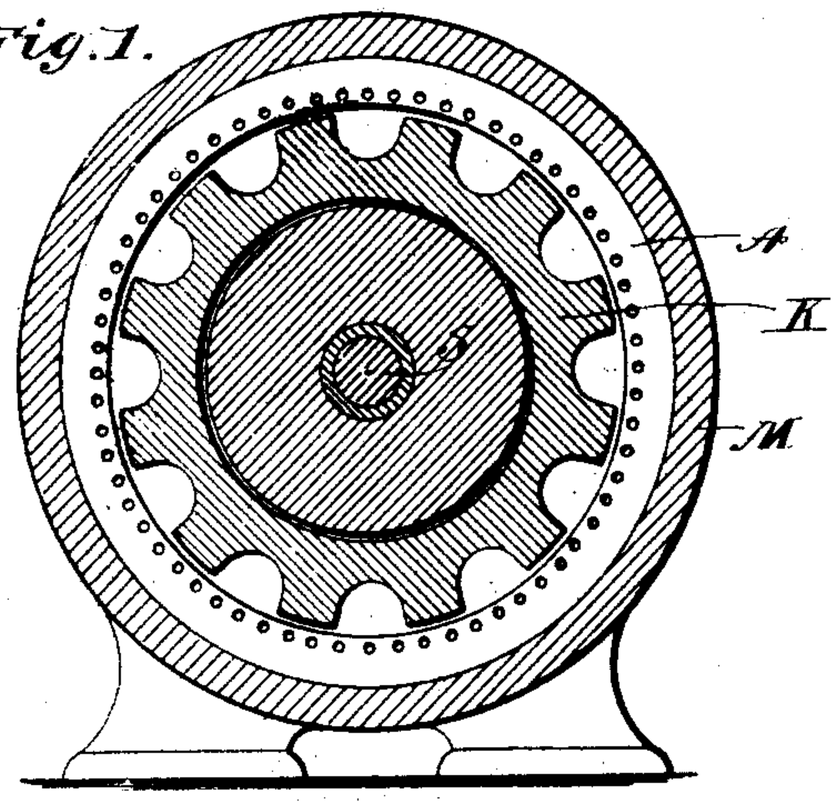


Fig. 2.

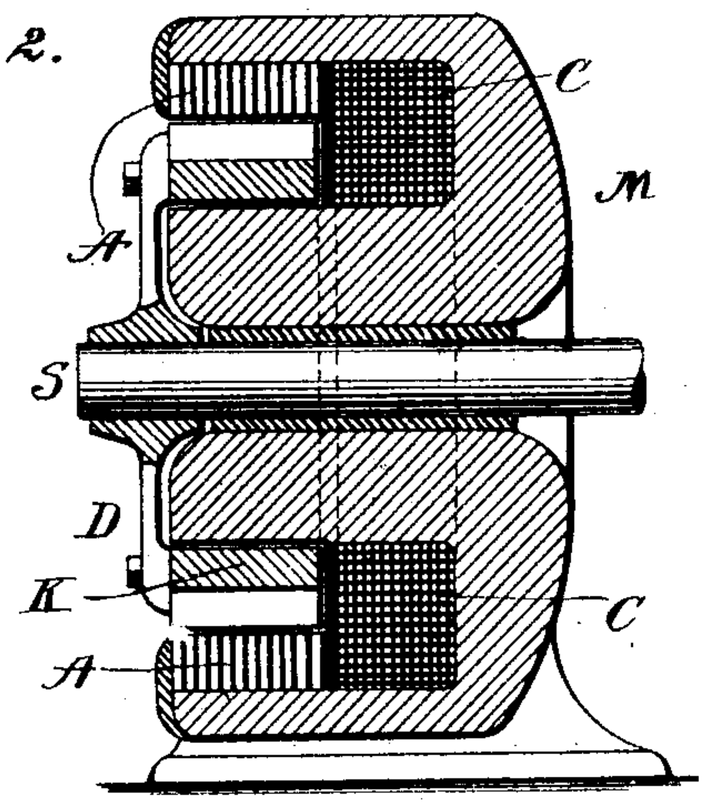


Fig. 3.

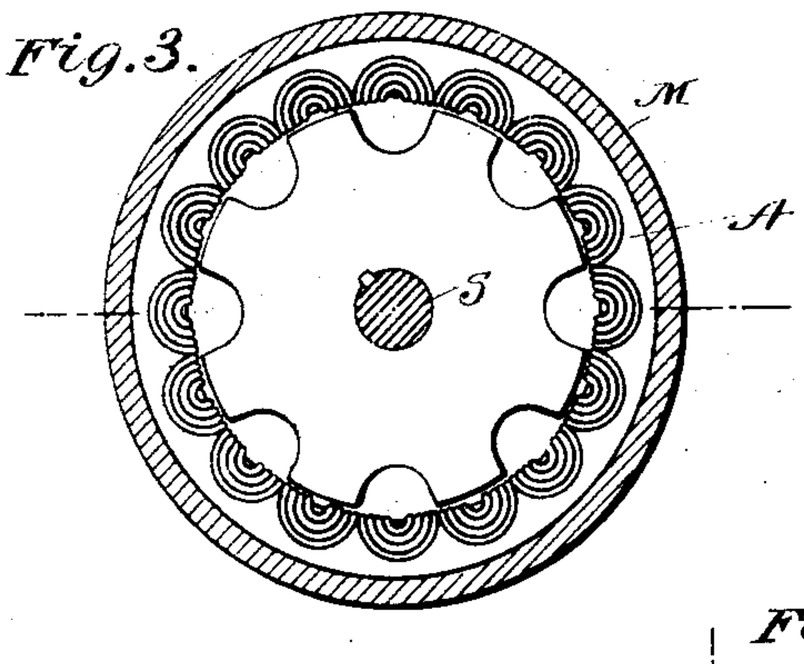


Fig. 4.

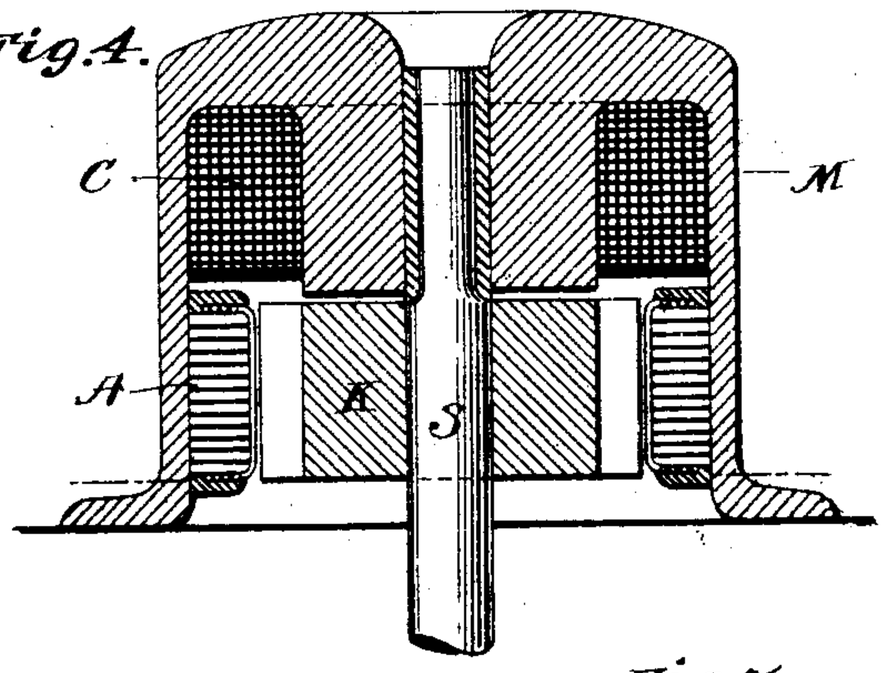


Fig. 6.

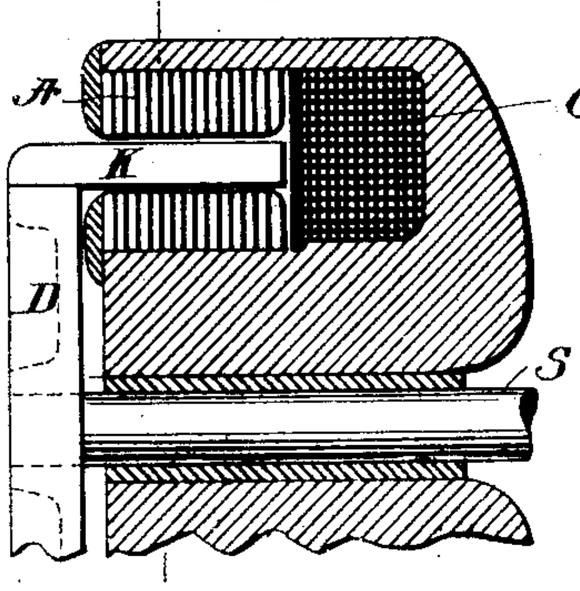


Fig. 5.

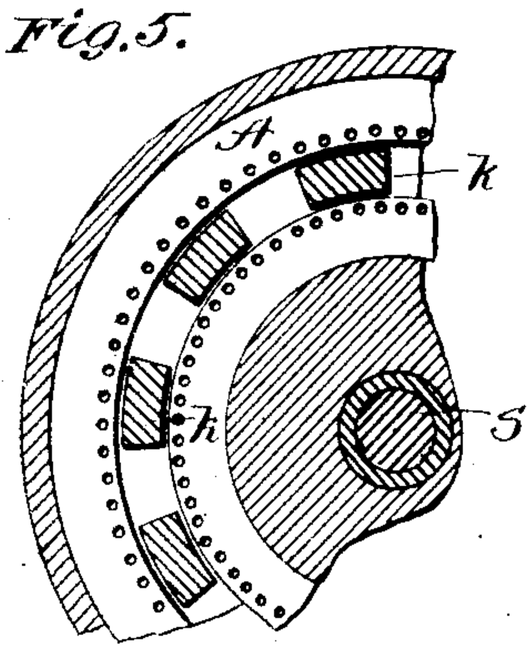


Fig. 7.

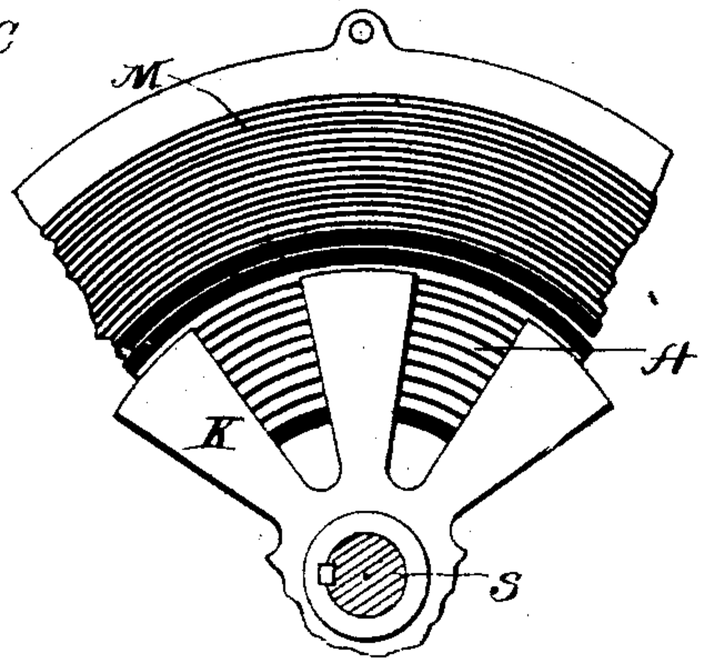
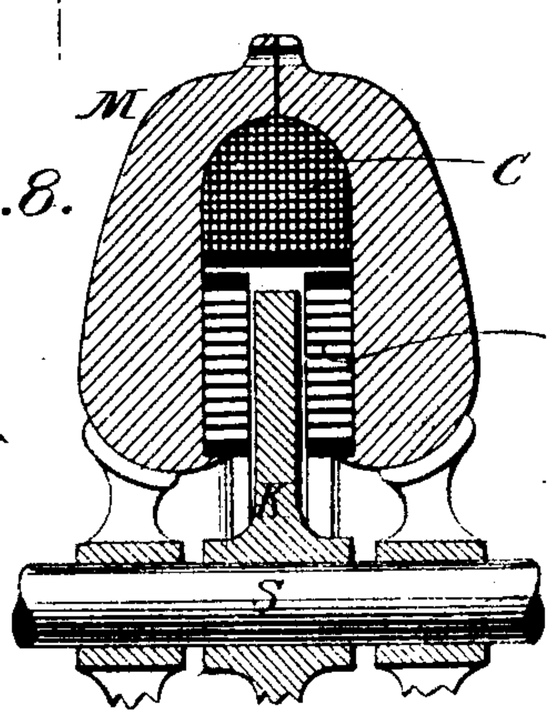


Fig. 8.



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JONAS WENSTRÖM, OF ÖREBRO, SWEDEN.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 515,386, dated February 27, 1894.

Application filed March 6, 1893. Serial No. 464,761. (No model.)

To all whom it may concern:

Be it known that I, JONAS WENSTRÖM, a subject of the King of Sweden and Norway, residing at Örebro, Sweden, have invented certain new and useful Improvements in Dynamo-Electric Machines and Motors, of which the following is a full, clear, and exact description.

My invention relates to dynamo electric machines of that particular class in which the armature, field magnet and the conductors thereon are all stationary, the rotary part being a body of iron called the "keeper." In such machines, when used as alternators, commutators, collectors, brushes, or sliding contacts of any description are avoided. The same style of machine may be used for direct currents when provided with a fixed commutator and revolving brushes. In machines of this description hitherto made, the keeper was necessarily built up of laminated iron in order to prevent excessive eddy currents caused by the varying magnetism. In the machine herein described on the contrary, the magnetism in the keeper does not vary; from which it follows, that the keeper may be solid and have a substantial and strong connection with the shaft. Thus the entire revolving part of the machine is practically in one solid piece which is a very important advantage.

My invention consists in the construction whereby I an enabled to operate a machine of this description without eddy currents, which construction consists of an armature, having a continuous surface facing the keeper. The keeper, as usual, is constructed with projections or poles facing the continuous surface of the armature and they are as little affected by eddy currents as are the pole-pieces in common alternators or direct current machines. The conductors are applied to the continuous armature surface in any of the usual ways. They may be laid on in flat coils between the armature and the keeper (in the air gap), or they may be threaded through holes or narrow recesses in the face of the armature. In the latter case the holes or recesses must be relatively many and small and evenly distributed, so that the surface may be practically continuous. All the varying magnetism (surging of the lines) there may be, is limited to the armature which is made of laminated iron, all other parts of the magnetic circuit being solid.

In the accompanying drawings, some of the principal types of machines constructed in accordance with my invention, are shown.

Figures 1 and 2, are transverse and longitudinal sections respectively of one type. Figs. 3 and 4, are a horizontal and vertical section respectively of another type, and arranged with a vertical shaft. Figs. 5 and 6, are transverse and vertical sections respectively, of another type, and Figs. 7 and 8 are similar views of still another type.

In all of the views, like parts have the same letter applied thereto.

M is the field magnet, C the field magnet coil, A the armature, K the revolving keeper, S the shaft, and D the spider or center piece supporting the keeper on the shaft.

In Figs. 1 to 6 is shown the well known bell-shaped magnet with inside and outside concentric, and the energizing coil between the cylinders. The shaft runs through the interior cylinder and carries at the polar end the crown of keeper K which is attached thereto through the spider D.

In Figs. 1 to 4 there is but one armature shown; while in Figs. 5 to 8, two armatures are shown. In the first group of figures the armature is built up of rings of iron insulated from each other, and fixed to the inside of the outside pole of the field magnet. In Figs. 1 and 2 the keeper is a ring provided with projections of one polarity pointing toward the inside of the armature and surrounding the outside of the inner pole. The clearance between the armature and the keeper as well as between the latter and the inner pole is made sufficiently large to permit the rotation of the keeper. It is obvious that this type may be arranged with the armature on the inner pole and the keeper having inward projections. It is further obvious that this type of the machine may be doubled by placing two magnets with the poles facing each other, and provided with one common armature, and one common keeper on one shaft. The outside poles would then be consequent; but those inside would be parted by the spider.

The type shown in Figs. 3 and 4 is the same as that shown in Figs. 1 and 2, except that the inner pole is shortened to make room for the keeper which is fixed directly on the shaft, and close to the interior pole; thus a resultant magnetic force is introduced parallel to the shaft, which is of use when the machine is set up above a turbine with a vertical shaft. It helps to lift the revolving parts and reduce the friction; the machine, however, may also be used with a horizontal shaft.

In Figs. 5 and 6 two armatures are provided, one arranged on the inside of the exterior pole and one on the outside of the interior pole. The keeper is reduced to a series of pieces or bars *k*, these pieces are fixed to the spider in a substantial manner, or they may form lateral projections from the solid ring, or from the center piece; either or both of the armatures may be provided with conductors.

In Figs. 7 and 8 the keeper is shown with flat radial projections, and an external field magnet with lateral poles. Armatures are arranged on both sides of the keeper, but it is clear that the apparatus may be altered so that only one armature may be used, and that located on either side.

There are obvious other forms which the machine may take, and still embody my invention; the principle of which is, an armature having a continuous and uninterrupted surface facing a solid keeper whereby an efficient and highly practical machine of this character is produced.

Having described my invention, I claim—

1. In a dynamo electric machine, the combination with the two poles of a field magnet, of an armature attached to one of said poles and having a continuous uninterrupted surface adjacent to the air gap, and a keeper of solid magnetic material, revolving in the air gap between the said armature and the other pole, substantially as described.

2. In a dynamo electric machine, the combination with the two poles of a field magnet, of a laminated armature attached to one of said poles and having a continuous and uninterrupted surface adjacent to the air gap, and a keeper of solid magnetic material revolving in the air gap between the armature and the other pole, substantially as described.

3. In a dynamo electric machine, the combination with the two poles of a field magnet, of a laminated armature attached to one of said poles and having a continuous uninterrupted surface adjacent to the air gap, and a keeper of solid magnetic material, having polar projections facing said armature and revolving in the air gap between the armature and the other pole, substantially as described.

In witness whereof I have hereunto signed my name in presence of two subscribing witnesses.

JONAS WENSTRÖM.

Witnesses:
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K. BLADIN.