(No Model.) 2 Sheets—Sheet 1.

F. V. ANDERSEN & J. O. GIRDLESTONE.

DYNAMO ELECTRIC MACHINE AND MOTOR.

No. 440,908. Patented Nov. 18, 1890.

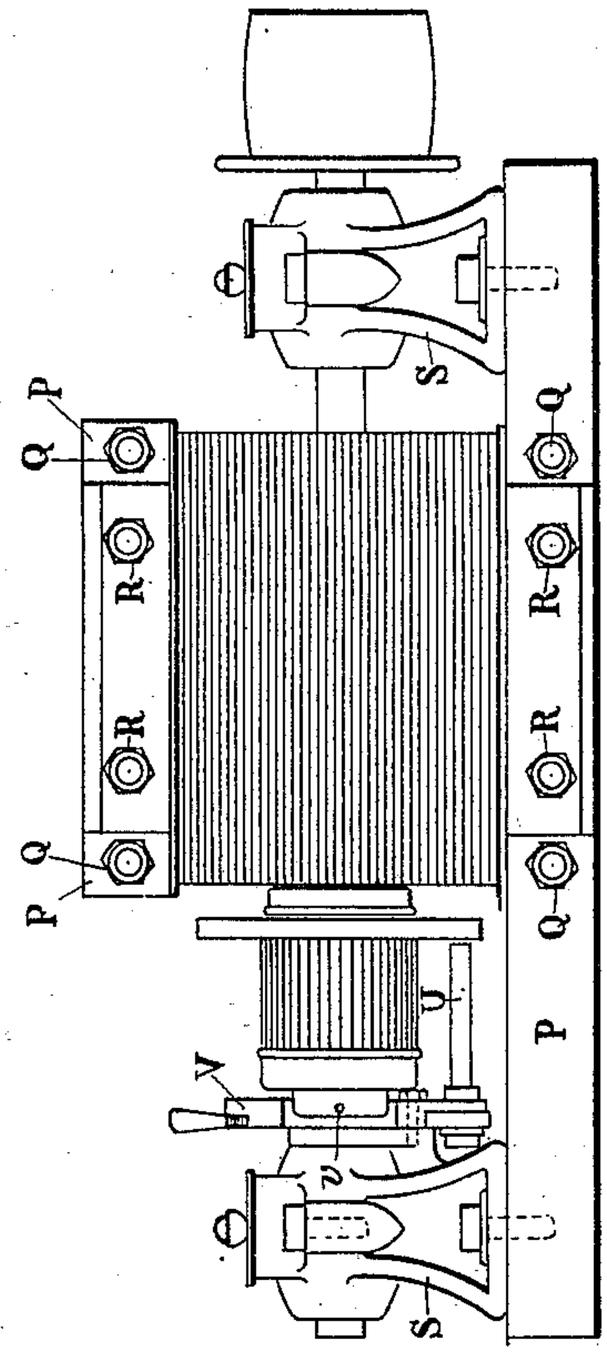


FIG. 2.

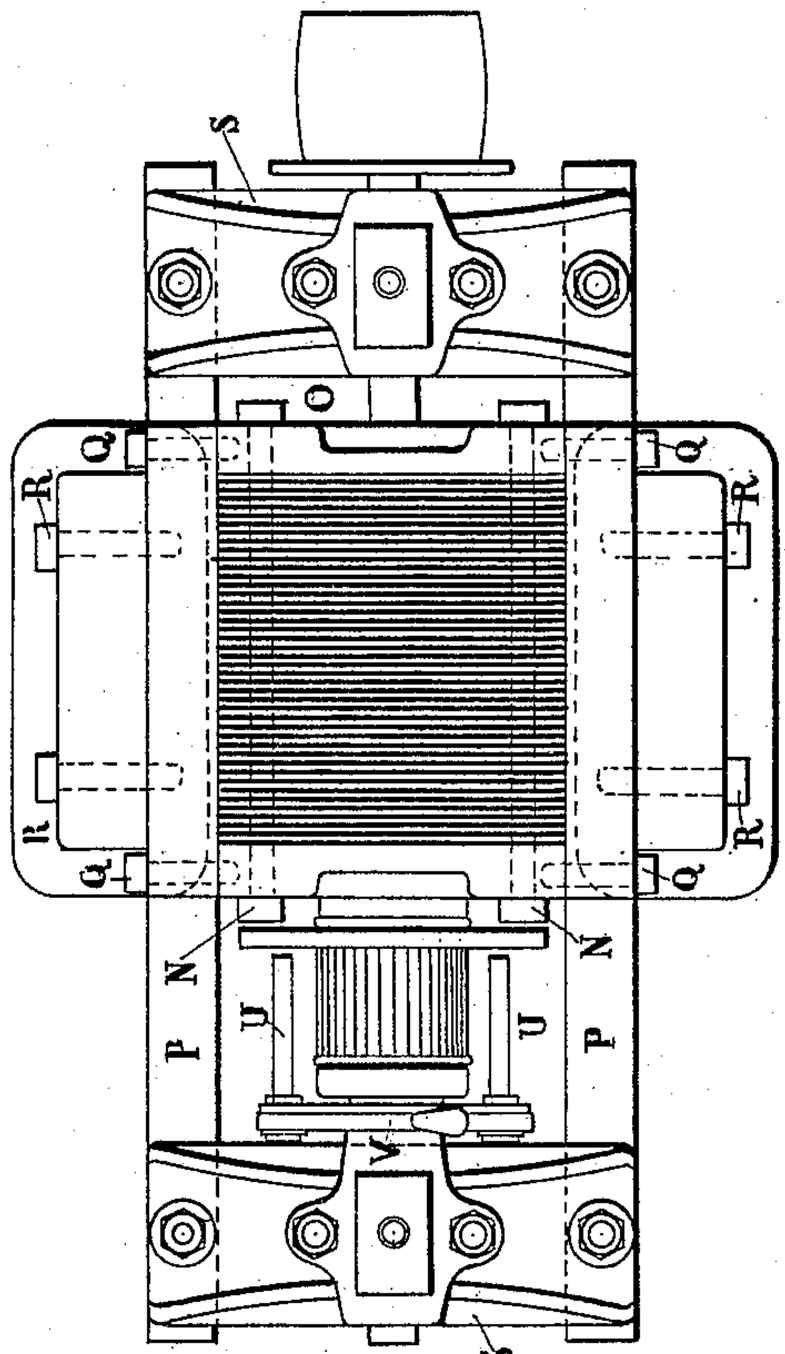
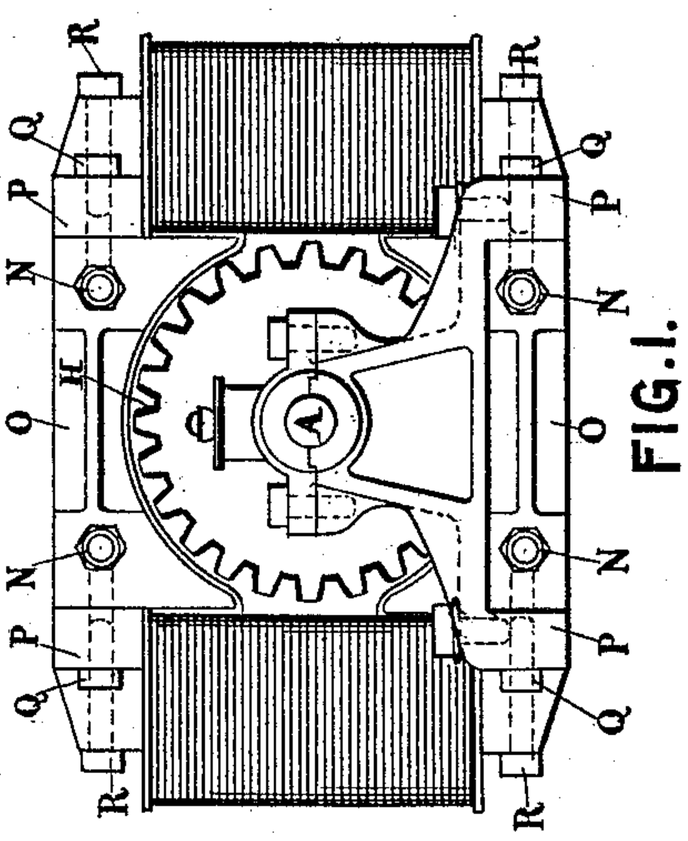


FIG. 4.



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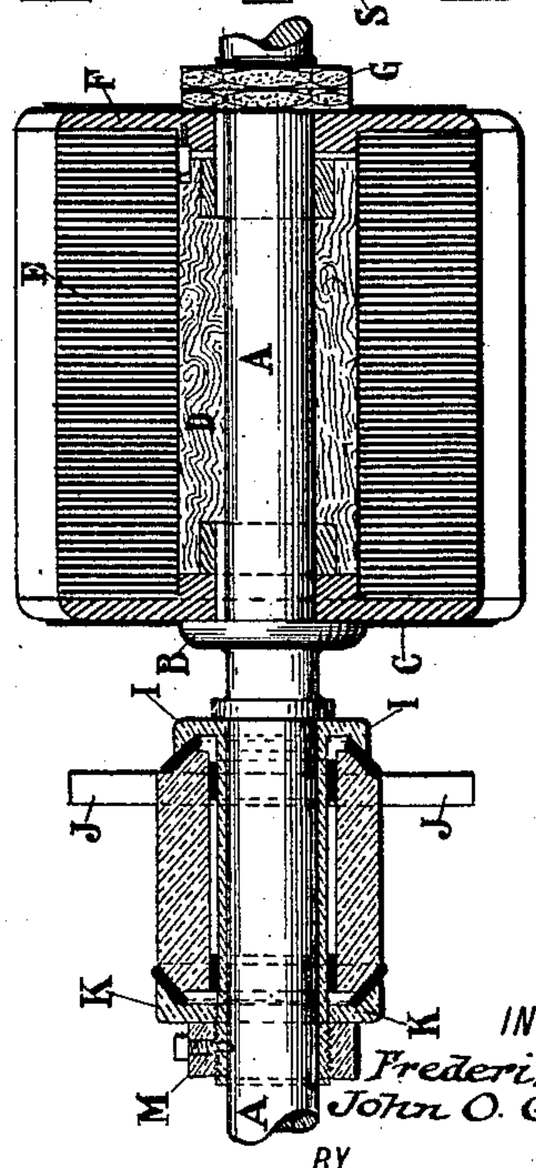

FIG. 3.

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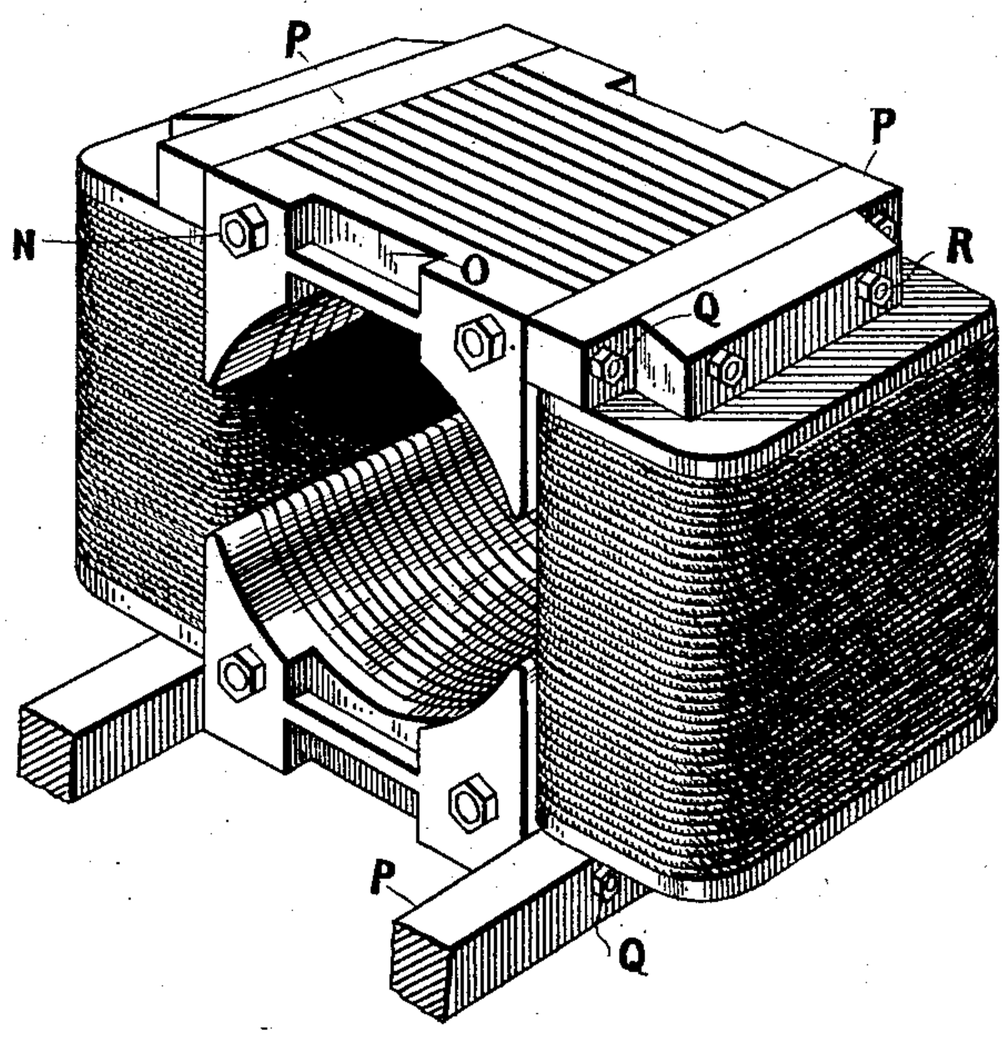
FIG. 5.



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UNITED STATES PATENT OFFICE.

FREDERIK VILHELM ANDERSEN AND JOHN OWEN GIRDLESTONE, OF LONDON, ENGLAND.

DYNAMO-ELECTRIC MACHINE AND MOTOR.

SPECIFICATION forming part of Letters Patent No. 440,908, dated November 18, 1890.

Application filed May 13, 1890. Serial No. 351,621. (No model.) Patented in England August 16, 1889, No. 12,815, and March 24, 1890, No. 4,557.

To all whom it may concern:

Be it known that we, FREDERIK VILHELM ANDERSEN and JOHN OWEN GIRDLESTONE, both citizens of the United Kingdom of Great Britain and Ireland, and residents of London, in the county of Middlesex, England, have invented certain new and useful Improvements in Dynamos and Electric Motors, (patented in Great Britain August 16, 1889, No. 12,815, and March 24, 1890, No. 4,557,) of which the following is a specification.

This invention relates to the construction of dynamo-electric and electro-dynamic machines; and it has for its object to insure greater economy and simplicity in their construction, to reduce the magnetic resistance of the air-spaces around the armature to a minimum, to arrange and dispose the iron in the field-magnets in the most effective and economical manner, and to reduce the weight of the machines.

We will describe our invention with reference to the accompanying drawings, in which—

Figure 1 is an end elevation; Fig. 2, a side elevation; Fig. 3, a longitudinal section of the armature and commutator; Fig. 4, a plan of the machine; and Fig. 5 is a perspective of the field-magnet structure of the machine.

The armature.—Upon the armature-spindle A there is a fast collar B, a disk C, and a wooden frame or sleeve D. Over the sleeve D there is placed a series of thin wrought-iron disks or washers E, between each of which there is a thin sheet of shellacked paper or other suitable insulator. (Represented by the heavy lines in Fig. 3.) The core of the armature is completed by a second disk F, beyond which the armature-spindle is screw-threaded and provided with the lock-nuts G, by means of which the core may be compressed between the disks and be firmly held upon the spindle. Each of the disks and of the core-plates has formed in its periphery a suitable number of grooves or slots narrowing toward the bottom, as shown in Fig. 1. There are thus formed a series of equidistant longitudinal channels or grooves H in the periphery of the core to contain the coils of wire with which the armature is to be wound. In each of the channels H there is inserted before winding a well-shellacked lining of water-proofed card-board, thick paper, or some other similar and suitable insulator, and at each end there is placed over the disks C F a disk of similar insulator, while the nuts G and those parts of the spindle A with which the winding-wires might come into contact are served with a strong covering of insulating-cloth or similar material. The ends of the grooves where the wires enter and leave should be rounded to prevent risk of cutting through the insulation. The winding is effected on the well-known drum or Siemens system, and should be well insulated or secured, as in the winding of other armatures of a similar class. The commutator is built up independently of the spindle on a gun-metal sleeve I. Each section of the commutator has a lug J, and the outer end of each of these lugs is constructed of a forked shape. At each end of each commutator-section a conical projection is formed, as represented in Fig. 3. The gun-metal sleeve I has formed upon its inner end a flange having an angular return, and upon its outer end there is fixed a washer K, also having an angular return. The outer end of the sleeve is screw-threaded and fitted with a nut or nuts M. The sections of the commutator are insulated from the sleeve and from the washer by rings of vulcanized fiber or similar material (shown in solid black) and from each other by mica. The angular return parts of the sleeve and washer engage with the corresponding conical projections on the commutator-sections and hold them firmly in position. The commutator is held laterally on the spindle by a set-screw passing through nut M and the sleeve into the spindle, and independent rotation is further prevented by a pin *v*, fitting into the collar or spindle. The ends of the wires from the armature-coils are brought into the forks in the lugs J, where they are soldered.

The details of the winding of the armature and of the field-magnet coils and other particulars of the machine will vary under dif-

ferent circumstances, and must, as in ordinary machines of a similar type, be calculated and determined according to the condition of the case. The winding of the armature is covered by a continuous layer of soft charcoal iron wire wound on at right angles to the grooves containing the conductors.

Field-magnets.—We employ laminated pole-pieces by preference, in order to avoid loss of energy through heating. In constructing the pole-pieces we employ thin iron plates, which are preferably produced at the same time and from the same sheets as the armature-core disks. For this purpose we take rectangular sheets of wrought-iron of a suitable size, in which four holes are punched—one near to each corner—for the passage of the holding-bolts N N. The core-plates having been cut out of the centers of these sheets, pieces are left having each the shape of the cross-section of the pole-piece, two pole-plates and one core-plate being thus produced from each sheet of iron. By this means the customary waste of metal in forming the core-plates is avoided, and practically the whole of the metal may be utilized. The plates of the pole-pieces are insulated from each other by varnish and paper or by other suitable means, and they are held together between the clamping-plates O, which may be constructed of cast-iron or other suitable material by means of the holding-bolts N N. Four connecting-bars P P, having, preferably, a rectangular cross-section, are secured to the pole-pieces by means of the screws Q Q and to the magnet-cores by means of the screws R R, which pass through the cores into the connecting-bars P P. The lower pair of connecting-bars carries the bearing-brackets S S. The field-magnet coils are preferably wound upon bobbins provided with a brass collar at each end. These bobbins are insulated from the winding by means of vulcanized fiber, celluvert, or similar material, or by shellacked paper or other suitable insulator.

Brush-gear.—The collecting-brushes may be constructed in the ordinary manner and be mounted upon brush-holders carried on two spindles U U, which are fixed on insulated collets in a movable ring V, provided with a handle and a locking-screw.

Having now described our invention, we declare that what we claim is—

In a dynamo-electric machine or motor, a frame consisting of four string-pieces, two above and two below, in combination with the magnet-cores and pole-pieces, the cores being bolted to the string-pieces and the string-pieces bolted to the pole-pieces, whereby all are secured solidly together.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of two witnesses, this 9th day of April, 1890.

FREDERIK VILHELM ANDERSEN.
JOHN OWEN GIRDLESTONE.

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