C. J. B. GAUME.

Electro-Magnetic Engines.

No. 211,985. Patented Feb. 4, 1879.

Fig. 1

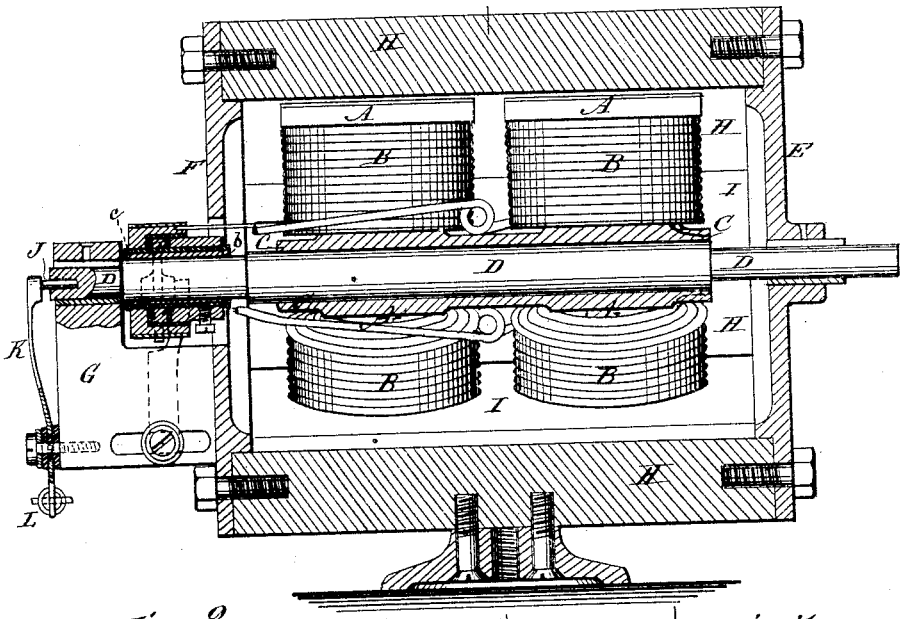


Fig. 2

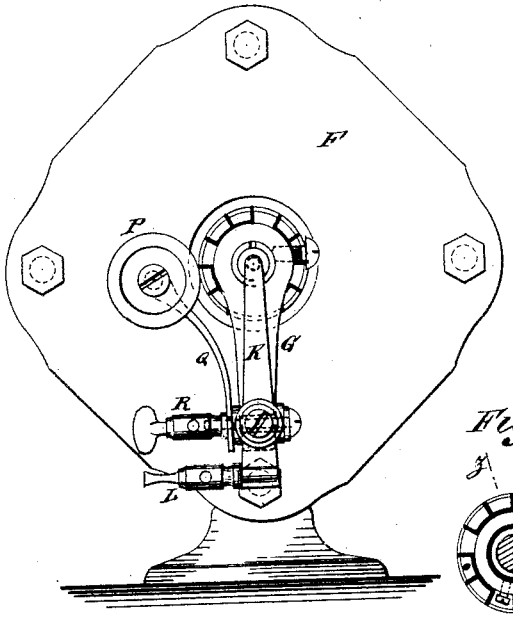


Fig. 3

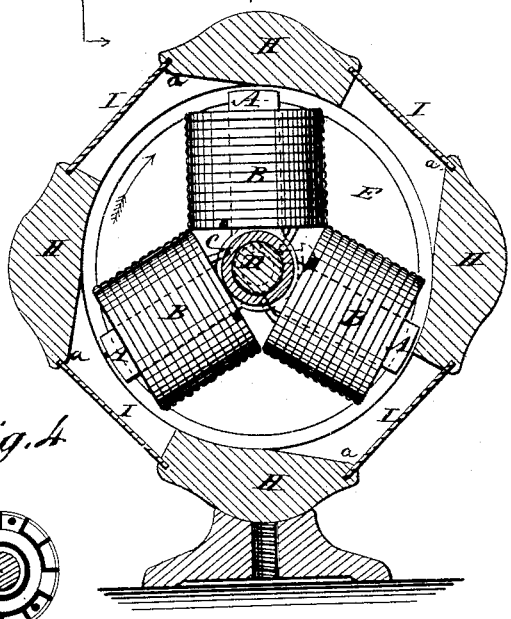


Fig. 4

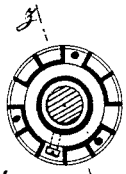
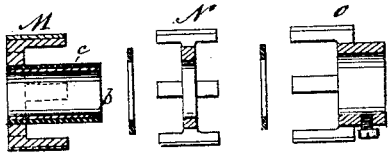


Fig. 5



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CHARLES J. B. GAUME, OF BROOKLYN, E. D., NEW YORK.

IMPROVEMENT IN ELECTRO-MAGNETIC ENGINES.

Specification forming part of Letters Patent No. **211,985**, dated February 4, 1879; application filed October 2, 1878.

To all whom it may concern:

Be it known that I, CHARLES J. B. GAUME, of Brooklyn, E. D., in the county of Kings and State of New York, have invented a new and Improved Electro-Magnetic Engine, of which the following is a specification:

Figure 1 is a vertical longitudinal section of my improved engine, taken through the line *x x*, Fig. 3. Fig. 2 is an end view of the same. Fig. 3 is a vertical cross-section of the same, taken through the line *y y*, Fig. 1. Fig. 4 is a side view of the commutator. Fig. 5 is a section of the same, taken through the line *z z*, Fig. 4, showing the parts in detail.

Similar letters of reference indicate corresponding parts.

The object of this invention is to furnish an improved electro-magnetic engine which shall be so constructed as to avoid the back pull upon the magnets, and which at the same time shall be simple in construction.

The invention relates to an improved arrangement of the armatures with reference to magnets revolving upon an axis with which one portion of each armature is concentric and another portion thereof is flat and projects in a plane tangential, or nearly so, to the circle described by the magnets.

The invention further relates to the construction of the commutator, whereby the flanged parts thereof are held rigidly in close contact, as hereinafter described.

A are three magnets, the arms of which are wound with insulated wire B in the usual way, and which are formed upon or firmly attached to the sleeve C. The sleeve C thus forms a part of the magnets, and is placed upon and secured to the shaft D.

The end of the shaft D from which power is taken to the machinery to be driven projects through and revolves in bearings in the center of the head E of the case or cylinder.

The other end of the shaft D passes through a hole in the center of the head F of the cylinder, and passes through and revolves in bearings in an arm or bracket, G, cast upon the said head F.

The cylinder is formed of the soft-iron bars or armatures H and the plates I, which close the spaces between the said armatures, and which are made of brass or other non-magnetic material. The heads E F are secured to the ends of the armatures H by screw-bolts. About half of the inner sides of the armatures H are made concave, and such concave portions are concentric with the axis D. The remaining portion of the inner side of each armature is straight and parallel to a plane which cuts a small segment of the periphery of the greatest circle described by the armatures. By this construction and arrangement of the magnets the attraction exerted on the magnets by the armatures is at first very slight, but is gradually increased till the magnets reach the center of the concave portion of the armatures, when the electric circuit is broken. I have found that I thus avoid a jerky or unequal motion and back pull of the revolving magnets, and that the energy or force of the motor is considerably greater than when the entire inner surfaces of the armatures are made concave concentrically with the axis D.

One end of the wires B is connected with the sleeve C, making the said sleeve C and the shaft D a part of the circuit. The bearings for the shaft D are lined with brass or other suitable material.

The end of the shaft D is perforated longitudinally, and in the hole thus formed is placed a copper wire, J, the end of which projects a little beyond the end of shaft D, and upon it rests the end of the connecting-arm K, which is attached to and insulated from the arm G.

To the other end of the arm K is attached the clamp L, to receive and hold the end of one of the circuit-wires.

The other ends of the helix-wires B pass out through the hole in the end plate F, and are connected with the different parts of the commutator, which is placed upon the shaft D, between the head F and the end of the arm or bracket G.

The commutator is made of an inner cylinder or bushing, *b*, of brass, a surrounding insulating-cylinder, *c*, of hard rubber, and three ring-like and flanged parts, M N O, or as many parts as there are magnets used. The part M consists of a ring-plate having arms projecting to one side formed upon its edge. The part N consists of a ring-plate having arms projecting upon both sides formed upon its edge. The part O consists of a ring-plate

formed upon the end of a sleeve or hub, and having arms projecting to one side formed upon its edge, the said arms and hub projecting in opposite directions.

The parts M N O are insulated from each other and from the bushing that fits upon the shaft D by pasteboard and hard rubber or other suitable non-conducting material.

The arms of the parts M N O are made of such a length that their ends may be in the same plane with the outer surfaces of the outer ring-plates. The number of arms of the three parts must be the same, and must be arranged in regular order.

After the parts M N O have been placed on the cylinder *c* the ends of the bushing *b* are flared, (see Fig. 1,) in order to hold said parts close together.

The wheel thus formed is faced with copper, which is sawed into strips in line with the spaces between the arms of the parts M N O, and the slits thus formed are filled with hard rubber. The face of the commutator is then turned down perfectly true and smooth for the contact-wheel P to roll upon. The contact-wheel P is pivoted to the end of the spring-arm Q, which is connected with and insulated from the arm or bracket G. The fastening-bolt of the spring-arm Q passes through a slot in the arm or bracket G, so that the position of the said arm Q may be occasionally adjusted to prevent the contact-wheel P from wearing a groove in the commutator M N O.

With the spring-arm Q is connected the clamp R, by which the end of the other circuit-wire is held.

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

1. The combination, with the series of revolving electro-magnets A, of the armatures H, which have a concave portion placed concentric with the axis of said magnets, and their forward portions *a* being straight and projecting at an angle with the circle described by the magnets, all as shown and described, for the purpose specified.

2. The commutator formed of the three flanged or armed parts M N O and the insulating-cylinder *c* and metallic bushing *b*, the ends of the latter being flared to hold the said parts together, as shown and described.

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