

(Model.)

2 Sheets—Sheet 1.

H. C. SAMPLE & F. RABL.
Dynamo Electric Machine.

No. 242,561.

Patented June 7, 1881.

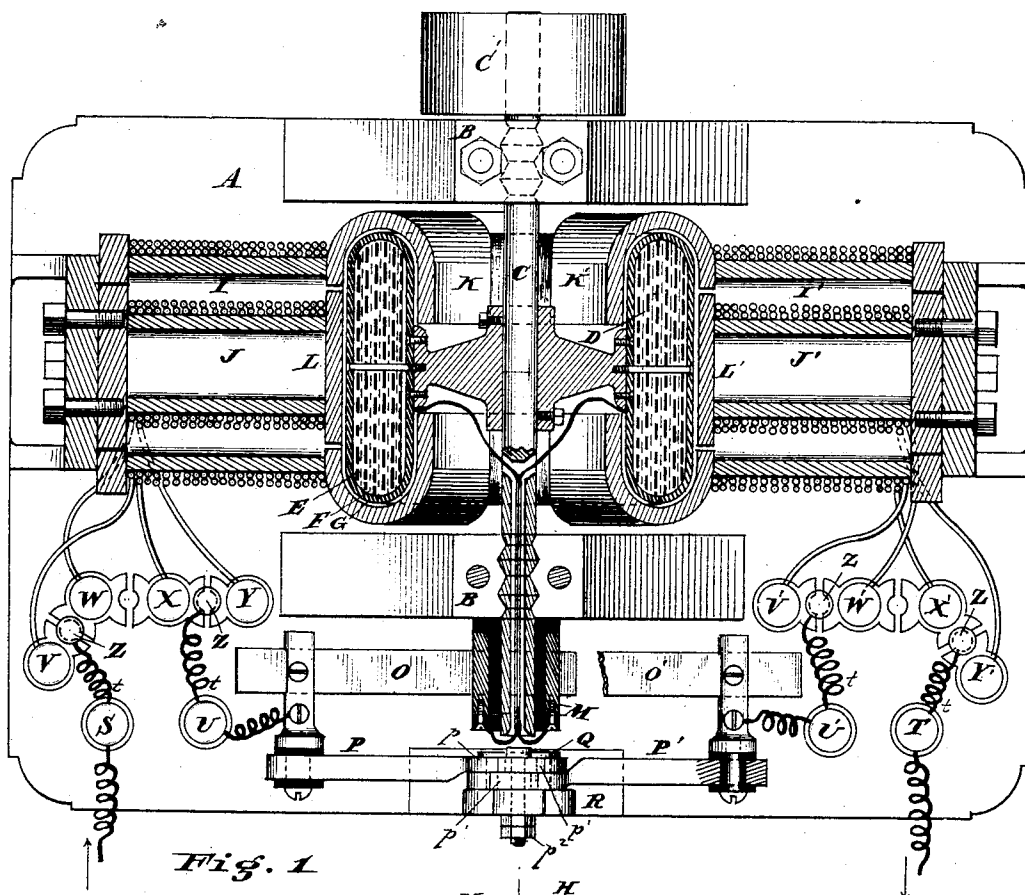


Fig. 1

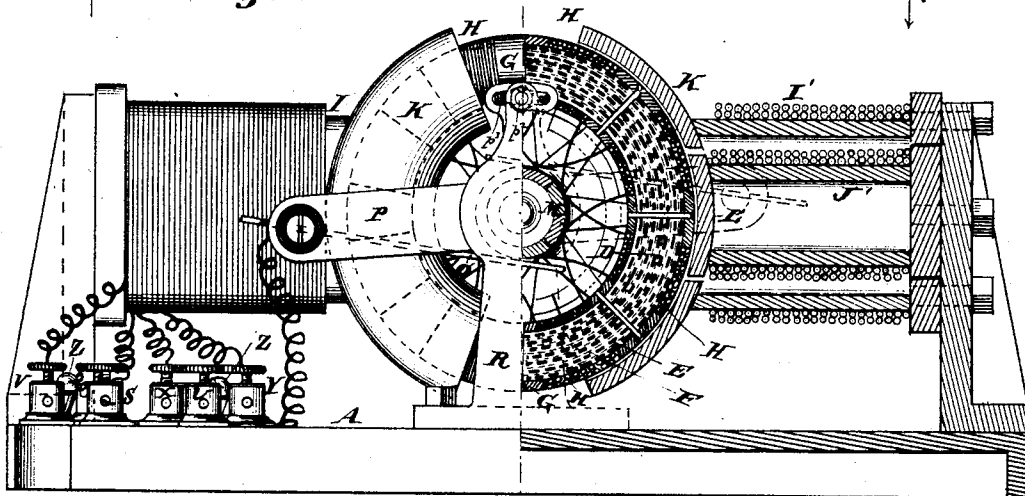


Fig. 2

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W. Williams

Inventors
Henry C. Sample and
Franz Rabl
By This atty.
[Signature]

(Model.)

2 Sheets—Sheet 2.

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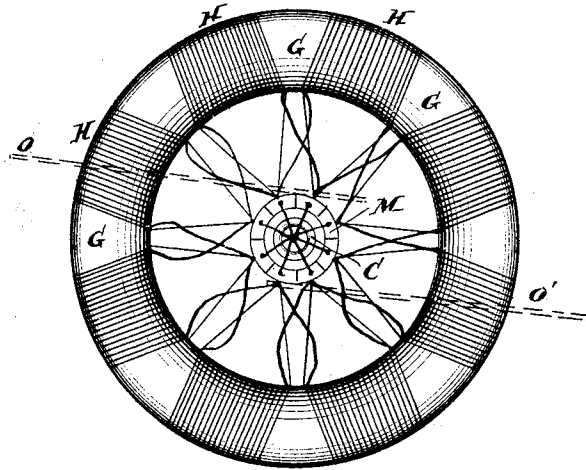


Fig. 3



Fig. 5

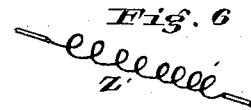


Fig. 6

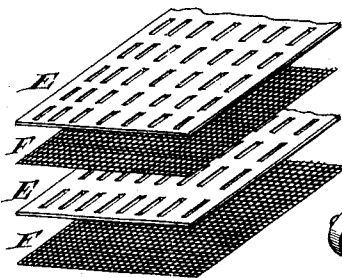


Fig. 7

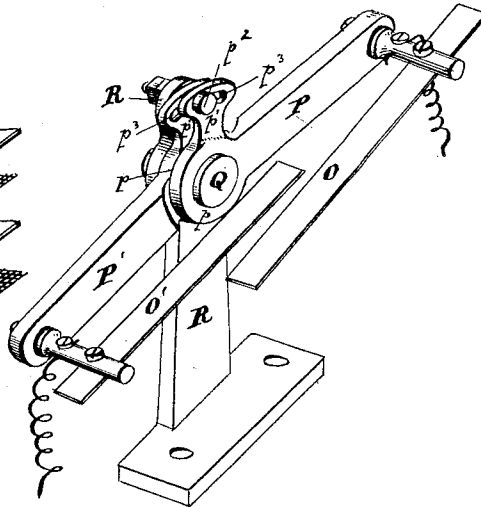


Fig. 4

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UNITED STATES PATENT OFFICE.

HENRY C. SAMPLE AND FRANZ RABL, OF PHILADELPHIA, PENNSYLVANIA.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 242,561, dated June 7, 1881.

Application filed February 21, 1881. (Model.)

To all whom it may concern:

Be it known that we, HENRY C. SAMPLE and FRANZ RABL, both of the city and county of Philadelphia, and State of Pennsylvania, have invented an Improvement in Dynamo-Electric Machines, of which the following is a specification.

Our invention relates to dynamo-electric machines in general, but more particularly to that class of machines whose field-magnets are adapted to be changed from intensity to quantity; and it consists in constructing the binding-posts in such a manner and with such a relation to each other that the wires of the inducing electro-magnets may be coupled in any manner desired; further, in the combination of a ring-armature and electro-magnets, in which the poles of the magnets almost completely encircle and inclose the said armature; further, in the construction of the armature; and, finally, in the adjustable arms carrying the brushes, all of which is more fully set forth in the following specification, and shown in the accompanying drawings.

The object of our invention is to construct a dynamo-electric machine for technical instruction purposes, as well as practical work, to be capable of changing the coupling of the electro-magnets of said machine from quantity to intensity, and to be able to readily adjust the brushes to reduce the spark, and to cheapen the construction generally.

In the drawings, Figure 1 is a sectional plan of our improved dynamo-electric machine when coupled up for quantity. Fig. 2 is an elevation of same with one-half in section. Fig. 3 is a side elevation of the armature. Fig. 4 is a perspective view of the brush-holders and their standard. Figs. 5 and 6 are views of connecting plugs and wires. Fig. 7 is a perspective view of several pieces of perforated plate and wire-gauze of which the armature-core is composed.

A is the bed-plate of the machine.

B are the bearings.

C is the armature-shaft, provided with angled bearings to prevent lateral movement, and has secured to it the driving-pulley C'.

D is the armature, and is secured to the shaft C, between the bearings B, said armature being composed of alternate rings of per-

forated sheet metal, E, and wire-gauze, F, held together by pole-pieces G, insulated from each other, and having the spaces between said pole-pieces wound with insulated wire H. The ends of the wires from the armature are connected as shown in Fig. 3, in which they are connected from the left-hand side of one pole-piece, G, and from the right-hand side of the next pole-piece, to one commutator contact-piece.

We do not confine ourselves to the particular method of coupling up the armature, for when the armature is coupled up for quantity there will be only one-half the number of contact-pieces as when coupled for intensity.

Secured to frame A, on either side of the armature D, are compound electro-magnets I J I' J'. The poles K L are of one polarity, and poles K' L' of the opposite polarity. The magnet-cores are rectangular, round, or elliptical tubes, the inner ones, J J', being of smaller diameter than the outer ones, I I', and may be made, if desired, of solid metal. The magnets I and I' have pole-pieces K K', which almost completely encircle and surround the armature, as shown in Figs. 1 and 2, and the inner poles, L L', are slightly curved vertically to conform to the curve of the armature, as shown in Fig. 2.

If desired, the armature may be round in cross-section, in which case the pole-pieces would be correspondingly modified in shape.

The cores I I' J J' may be wound with any number of coils of insulated wire desired; but, for explanation, let it be conceived that two coils are used on each core. Then the screw-cup V is connected to the inner coil on magnet I. Screw-cup W is connected with inner coil on magnet J. Screw-cup X is connected with outer coil on magnet I, and screw-cup Y is connected with outer coil on magnet J. The compound electro-magnets on the other side of the armature are connected to screw-cups V' W' X' Y', and in precisely the same manner. The screw-cups are adapted to be coupled two and two by plugs Z.

If desired, the wires which are wound about the electro-magnets may be connected from one side of the armature to the other.

The end of the shaft C is hollow, and through it the wires from the armature are passed and

connected to the contact-pieces of the commutator M, which may be of the usual construction.

The brushes O and O' are adjustable in pins secured to and insulated from the adjustable arms P P', which are provided with eye-rings *p p*, through which the stud Q passes, and is secured to the standard R. The arms P P' are also provided with arms *p'*, provided with slots *p³* in them, and through which a clamping-screw, *p²*, passes to secure them in any desired position to the standard R.

If desired, the arms *p'* may be simply clamped together by the bolt *p³*, and without clamping them to the standard, as they may be secured in place by the stud Q.

The brushes O O' are respectively electrically connected to binding-posts U and U'. There is also a binding-post, S, on one side of the machine, and T on the other. The connecting-plugs Z, having wires and ends *t*, are four in number. Those without wires are two in number. The wires Z', without plugs, are four in number.

The operation is as follows: To connect the field-magnets up for quantity, plugs Z, with wires *t*, are inserted in holes between screw-cups V W, X Y, V' W', and X' Y', and the wires *t* secured to the binding-posts S, T, U, and U', as follows: that from between screw-cups V W with post S; that from between screw-cups X Y with post U; that from between screw-cups Y' X' with post T, and that from between screw-cups V' W' with post U'. This is shown in Fig. 1. The current passes in at post S through the inner coils of magnets I and J at the same time, then through both the outer coils to post U, then through brush O, commutator, armature, back to commutator, through brush O', post U', through the inner coils of magnets I' and J', then through the outer coils of same, then to post T and to line, and back to post S. To connect for intensity, screw-cups X and W are connected together by a plug, and also the screw-cups X' and W' by another plug, and the post S with cup V by a wire, Z', post U with cup Y by a wire, Z', post U' with cup V' by a wire, Z', and post T with cup Y' by a wire, Z'. In this case the current passes in at S, and after traversing successively both coils of the magnets I it passes to magnet J, and after traversing both coils of this magnet it passes through the armature as before, and then traverses both the magnets I' and J', passing first successively through all the coils of magnet I', and then through all the coils of magnet J', then passes to line by post T, and finally ends in post S.

We do not limit ourselves to the exact means of coupling the wires or screw-cups, &c., as it

may be done in many convenient ways—as, for instance, by switches.

We do not claim anything with reference to coupling up the armature.

Having now described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a dynamo-electric machine, an armature composed of a core made up of alternate insulated layers of perforated sheet metal and wire-gauze, held by a series of pole-pieces and wrapped with a corresponding series of wire coils, the ends of which are connected to the commutator, substantially as shown and described.

2. In a dynamo-electric machine, an armature composed of a core made up of alternate insulated layers of perforated sheet metal and wire-gauze held by a series of pole-pieces and wrapped with a corresponding series of wire coils between said pole-pieces, in combination with compound magnets, the pole-pieces of which almost completely encircle and surround said armature, substantially as and for the purpose specified.

3. In a dynamo-electric machine, compound electro-magnets, consisting of two electro-magnets, one of which surrounds the other, in combination with an armature, screw-cups, and binding-posts, or equivalent means, whereby the electro-magnets of said machine may be coupled up for intensity or quantity without altering the construction of the magnets, as and for the purpose set forth.

4. In a dynamo-electric machine, a commutator, in combination with brushes and their supports, said supports being separate and pivoted on a line concentric with the commutator, and independently adjustable about said commutator, and means to secure said adjustable arms independently in any desired position rigidly to the base of the machine, or a standard secured thereon, as and for the purpose specified.

5. In a dynamo-electric machine, the combination of a commutator, M, brushes O O', held in arms P P', provided with eye-pieces *p*, and arms *p'*, provided with slots *p³*, said arms being pivoted to the standard R by stud Q, and adapted to be adjusted vertically and secured in place by bolt *p²* or its equivalent, substantially as shown and described.

In testimony of which invention we hereunto set our hands.

HENRY C. SAMPLE.
FRANZ RABL.

Witnesses:

THOS. J. HUNT,
R. A. CAVIN.