W. W. GRISCOM.

Electro-Magnetic Motor.

No. 227,623. Patented May 18, 1880.

Fig. 1.

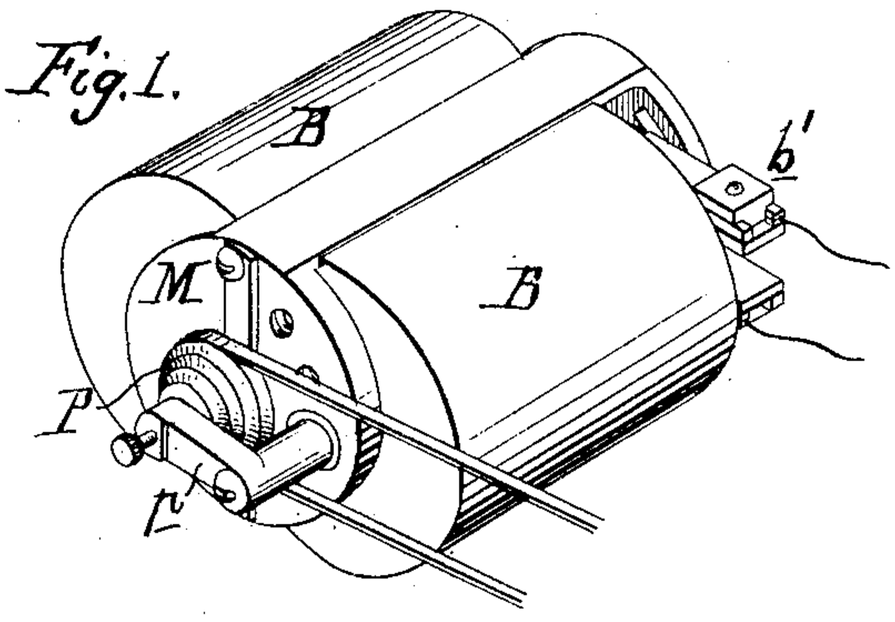



Fig. 2

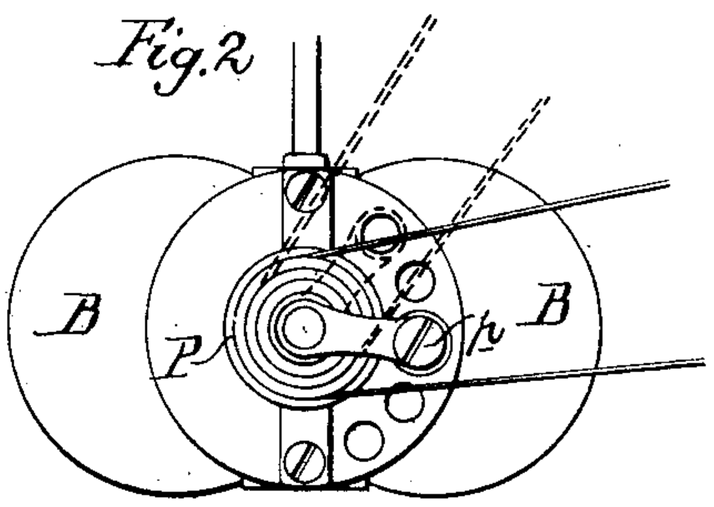



Fig. 3.

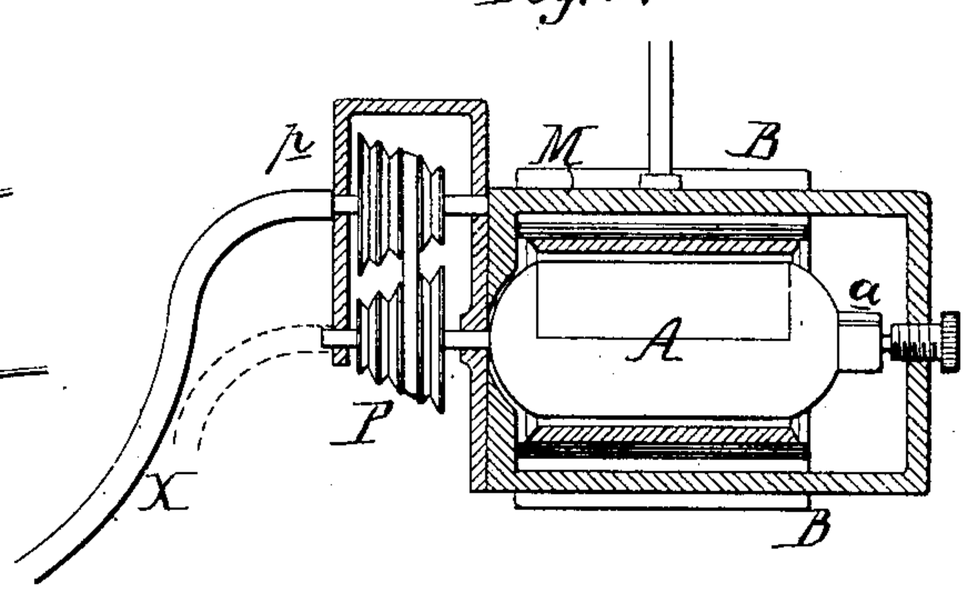



Fig. 4


Fig. 5

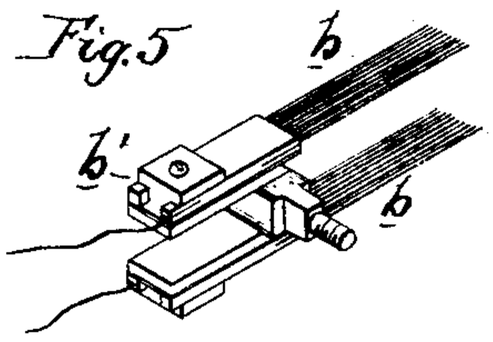
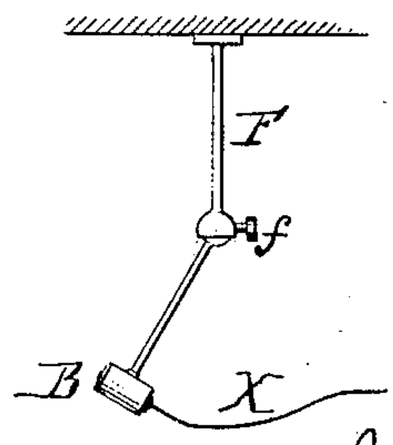



Fig. 6




Witnesses

Henry Howson Jr.

Harry Smith.

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# UNITED STATES PATENT OFFICE.

WILLIAM W. GRISCOM, OF PHILADELPHIA, PENNSYLVANIA.

## ELECTRO-MAGNETIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 227,623, dated May 18, 1880.

Application filed October 21, 1879.

*To all whom it may concern:*

Be it known that I, WILLIAM W. GRISCOM, of Philadelphia, Pennsylvania, have invented new and useful Improvements in Electro-Magnetic Motors, of which the following is a specification.

This invention relates to certain improvements in the construction of electro-magnetic motors or dynamo-electric machines, the objects of the invention being to improve the construction of the cylindrical armature and to construct the bearings of the pulley so that the belt may be arranged at any angle.

The invention also relates to other improvements in the motor and its means of support, as more fully described hereinafter, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of the motor; Fig. 2, an end view; Fig. 3, a longitudinal section; Fig. 4, a sectional view of the improved armature; Fig. 5, a perspective view of the brushes, and Fig. 6 a view showing a method of suspending the motor.

The general construction of the motor is similar to that shown and described in an application for Letters Patent filed by me on the same date as this, there being a rotary armature, A, commutator *a*, and commutator-brushes *b*, combined with electro-magnets B B. The construction and arrangement of the magnets and connections, however, form no part of the present application.

Instead of forming the armature of a bar of iron with two opposite rectangular grooves, as in the ordinary Siemens armature, the bar has two V-shaped grooves cut in it, so as to form a bar Z-shaped in section, as shown in Fig. 4, wire being wrapped in these grooves, as usual. In some cases the wire wrapping may be dispensed with. The object of making the bar of this shape is to provide a gradually-increasing attraction on the part of the armature for the magnet when the machine is in operation.

The rib which connects the poles of the armature may, if desired, be made of one or more separate plates, round which the wires may be wrapped.

In order to secure the wires in place and prevent them from flying out by the centrifugal force, the bundle of wires is covered with cement, preferably consisting of asbestus and silicate of soda, so as to resist any heat which may be generated in the coils. The wires of the magnets are also preferably covered with similar cement.

On the end of the shaft of the armature is secured a grooved cone-pulley, P, instead of the usual single-grooved pulley, the outer end of the shaft being supported in a bracket, *p*, which is secured to the frame M by a screw. A number of threaded openings are provided in the frame, so that the bracket may be adjusted to different positions, as indicated by dotted lines, according to the position of the belt, in order to allow the latter to be readily slipped on or off the pulley.

The object of employing a cone-pulley is to permit the motor to be maintained at that normal speed which is found to give the best results, no matter what may be the actual load on the motor.

I have found by experiment that when the load becomes too great for an electro-magnetic motor with an ordinary single pulley the speed and work actually done decrease in a ratio vastly greater than the increase of the load. Where, in the case of an ordinary motor, such as a steam-engine, doubling the load would only decrease the speed one-half, in the case of an electric motor the speed would be diminished in a much greater ratio. For instance, where, with a one-size pulley, the electric motor is capable of lifting ten pounds eighty feet per minute, eighty pounds would not be lifted ten feet per minute, but would stop the motor entirely, and forty pounds, instead of being raised at the rate of twenty feet per minute, would only be raised at the rate of five feet per minute. In such a case, by employing a cone-pulley the speed of rotation of the motor may be brought up to its normal standard by removing the belt toward the smaller end of the pulley, and the somewhat curious result is attained of increasing the speed of the driven pulley by thus decreasing the size or leverage of the driving-pulley.

Instead of a cone-pulley, gear-wheels or an adjustable crank may be employed for the same purpose.

The wire brushes *b b* of the commutator are

electrically connected to the holder *b'* by slotting the latter, Fig. 5, then inserting the brushes in the slot, and finally forcing the jaws together so as to gripe the brushes, this method being safer than the usual method of fastening the brushes by solder, which injures the electrical contact, or a screw, which will at times jar loose or cut the wires.

The above-described motor, being comparatively light and compact, is especially adapted for driving dental tools and similar devices, and for this purpose it is suspended, by means of an adjustable arm, wire, chain, or cord, from the ceiling or a suitable bracket, so that the motor is free to be moved about, and its driving-shaft moved in any direction to accommodate itself to the movements given to the tool, the latter being driven from the motor through the medium of flexible shafting X, Fig. 3, secured to a shaft, Y, in a bracket on the motor-frame, and having a cone-pulley corresponding with the pulley on the shaft of the armature; or, if desired, the flexible shafting may be connected directly to the end of the armature-shaft. In some cases it may be desirable to connect the tool directly to the shaft of the motor without the use of flexible shafting, in which case the motor should be balanced.

In Fig. 6 I have shown the motor as suspended from the ceiling by a jointed arm, F, having a ball-and-socket or other universal joint, *f*, so that the lower portion of the arm carrying the motor may be adjusted to various positions, and secured, if desired, by a set-screw.

I am aware that it has been proposed to support electric pens by means of a yielding spring; but for motors of the character shown in the present case it is important to support them by inelastic, though in some cases flexible, suspension devices, so that the support may not yield in a downward direction.

I claim as my invention—

1. In an electro-magnetic motor or dynamo-electric machine, the combination of magnets with a rotary armature whose bar or bars are Z-shaped in section, as and for the purpose described.

2. The combination of the motor-frame and the rotary armature having a pulley and belt with the adjustable bracket.

3. The combination of wire commutator-brushes with a slotted metallic holder, electric contact between the brushes and holder being secured by forcing the jaws of the latter together over the wires of the brush without screw or solder, as set forth.

4. The combination of the motor with inelastic devices, substantially as described, for suspending the same, whereby the said motor may be moved in any desired direction, but without yielding in a downward direction.

5. The combination of the wire covering of an armature or magnet with a cement capable of resisting heat, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. W. GRISCOM.

Witnesses:

ALEXANDER PATTERSON,
HARRY SMITH.