(No Model.)

L. G. WOOLLEY.

ELECTRIC MOTOR.

No. 407,272. Patented July 16, 1889.

Fig. 1.

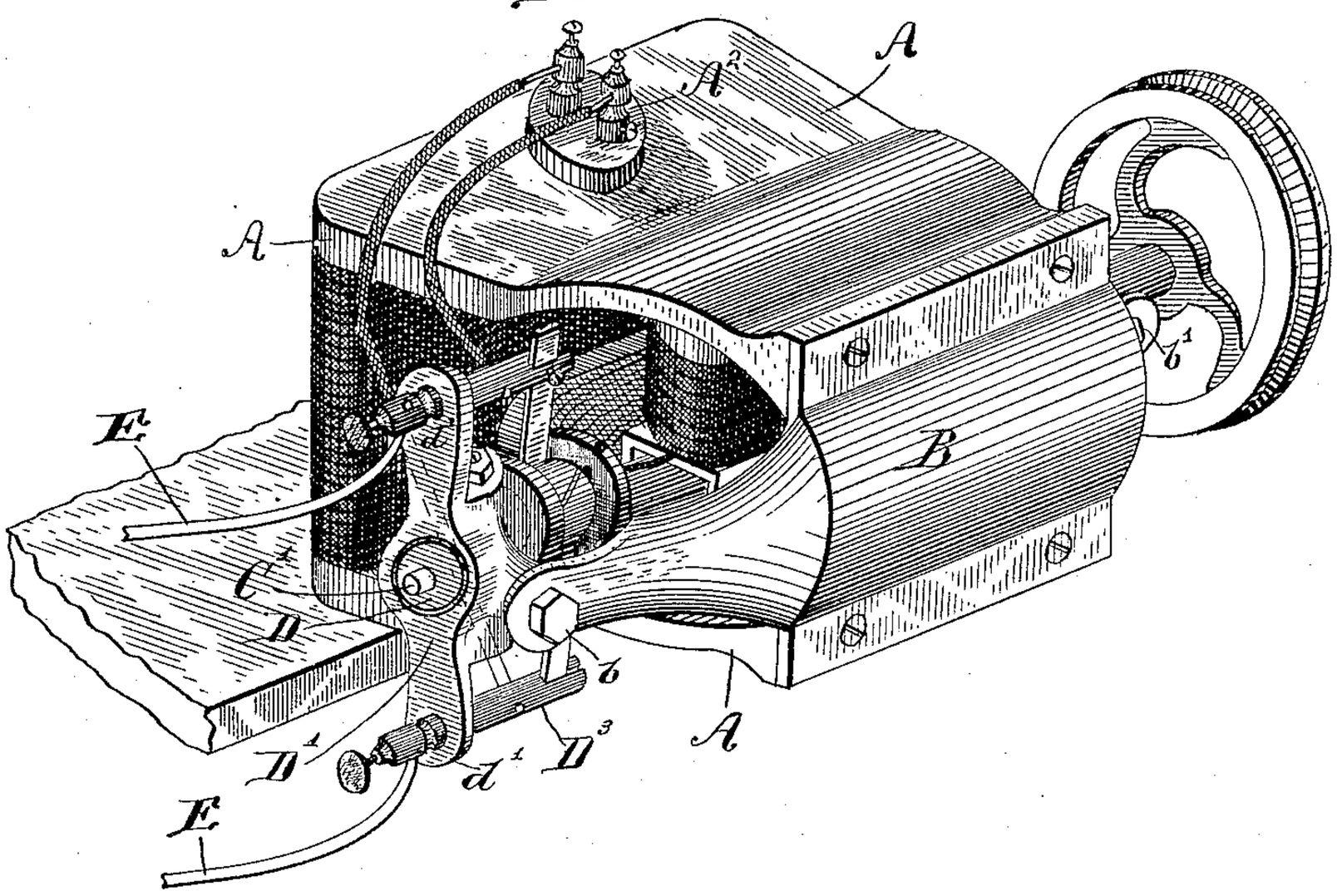


Fig. 2.

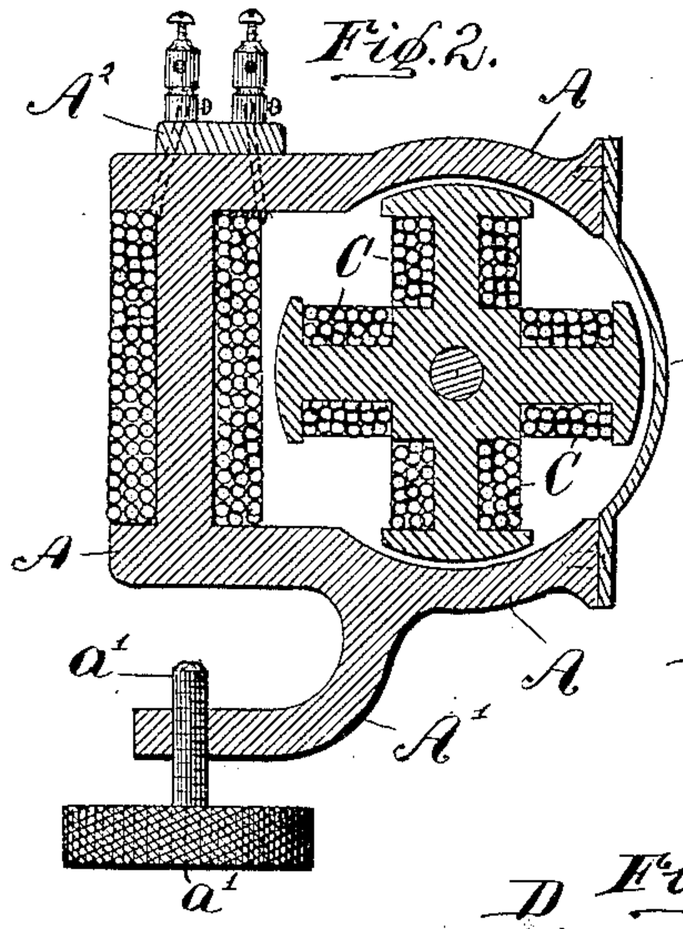


Fig. 3.

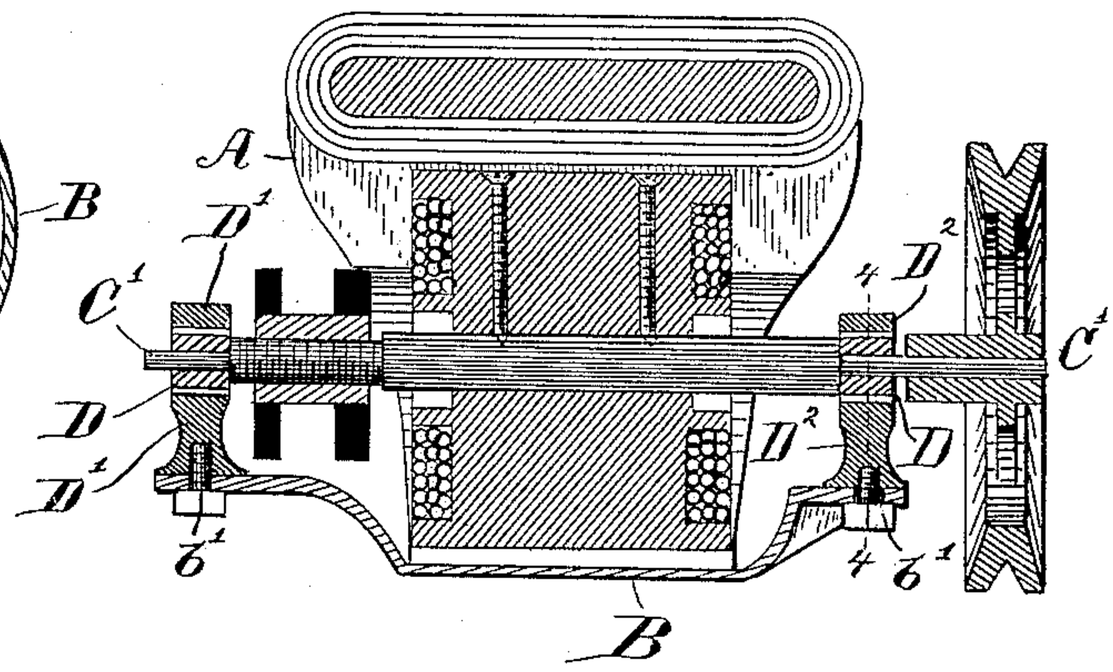
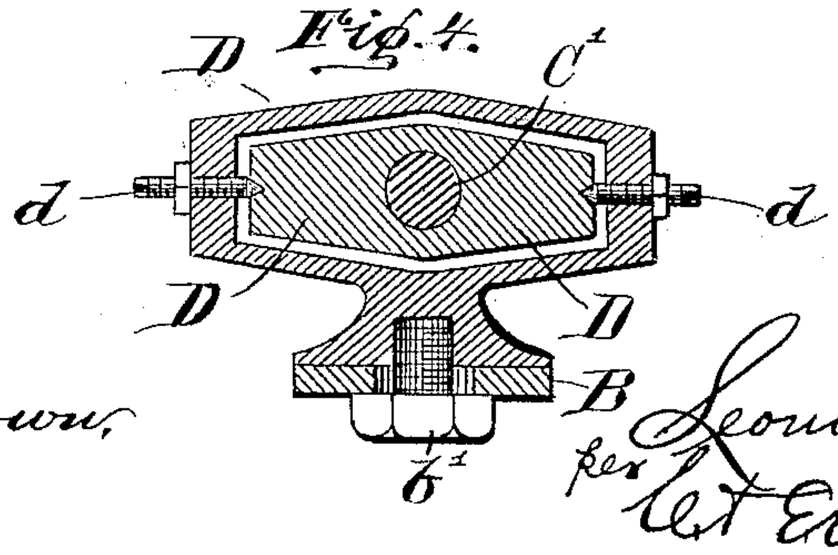


Fig. 4.



WITNESSES.

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UNITED STATES PATENT OFFICE.

LEONIDAS G. WOOLLEY, OF GRAND RAPIDS, MICHIGAN.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 407,272, dated July 16, 1889.

Application filed May 28, 1889. Serial No. 312,448. (No model.)

To all whom it may concern:

Be it known that I, LEONIDAS G. WOOLLEY, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Electric Motors, of which the following is a specification.

In making motors and dynamos as they are ordinarily constructed it has been common to first set to position the standards which carry the boxes and then bore out the pole-pieces to correspond and thus bring the shaft of the armature and the interior surface of said pole-pieces into perfect alignment. This work is tedious and expensive, and has added largely to the cost of such machines. As ordinarily constructed such machines have also had the core of the field-magnets at some distance from the armature, with the result of a considerable loss of magnetic force, this arrangement having been necessary because of the necessity of having a certain cross-sectional area of said core in proportion to the size of the machine and a certain quantity of wire thereon, which requirements could not otherwise be attained.

The object of my invention is to produce a machine which shall obviate these disadvantages, and also gain some other advantages of minor importance, as will be hereinafter more particularly described and claimed.

Referring to the accompanying drawings, which are made a part hereof, and on which similar letters of reference indicate similar parts, Figure 1 is a perspective view of an electric motor embodying my invention; Fig. 2, a transverse central vertical sectional view of the same; Fig. 3, a horizontal central sectional view; and Fig 4, a detail view through the bearing, on an enlarged scale, on the dotted line 4 4 in Fig. 3.

In said drawings, the portion marked A represents the frame of my improved machine, including the poles and the core of the field-magnet; B, the cap; C, the armature; D, the bearings for the armature-shaft; D′ D^2, the supports therefor, and E E the incoming and outgoing line-wires.

The frame A, as before stated, comprises both the pole-pieces and the core of the field-magnet. The core is made wider than the poles, so that it can be made thinner than is usual, and thus have its center comparatively near to the center of the armature while still having the required amount of metal or cross-sectional area to maintain the proper magnetic proportion of the machine. This frame narrows gradually (see particularly Fig. 3) until the pole-pieces are reached, which are of course of a corresponding size to the armature. By reason of the gradual or tapering character of this reduction in size the lines of magnetic force are not broken or dispersed, but are concentrated in the pole-pieces in proper relation to the armature, while the extra width of the core of the field-magnet not only includes the required quantity of metal with less thickness, but, having more surface, also enables the required quantity of wire to be wound thereon with less thickness than is common, and thus permits the center of said core to be brought nearer the armature than it otherwise could be. Upon the under side of this frame, and preferably cast in piece therewith, is an arm A′, carrying a clamp-screw a', by which the motor may be secured to the edge of a bench or table when desired. As a matter of convenience, a boss A^2, of insulating material, is generally secured to the upper side of this machine to serve as a base for the binding-posts. As before stated, this frame is cast all in one piece, and in this form is much less expensive than when composed of several pieces, as such machines have ordinarily been constructed.

The cap B is composed of diamagnetic metal, is all in one piece, and is firmly secured to the forward edges of the pole-pieces, preferably by machine-screws, as shown. In form it is mainly a section of a cylinder, with its ends bent down, as shown, and extended out to receive the bearings or bearing-supports for the armature-shaft. Being constructed in this form it is very stiff and strong in proportion to its thickness, and forms a rigid support for the bearings, and also holds the poles firmly to their exact position and precise distance from each other. Being constructed all in one piece it also serves as a cap or cover, inclosing one side of the machine, and protecting the armature completely from contact with anything which may be brought

against the machine, and also largely from dust and dirt. It also adds to the general appearance of the machine as a whole.

The armature C is not peculiar to this invention, and will not be further described herein, except incidentally in describing the invention; and I may here remark that the commutator and the connections generally are of an ordinary and well-known character, this motor being what is generally known as a "shunt-wound" machine.

The bearing-supports D′ D² for the armature-shaft C′ are secured firmly to the projecting ends of the cap B by means of bolts *b b′*. In placing the armature in position I lay it inside the pole-pieces with a piece of paper or other fabric of suitable thickness between it and said pole-pieces, and then draw these bearing-supports, carrying the shaft-bearings D up to position against the projecting ends of the cap by means of these bolts. The openings for said bolts in said cap ends being somewhat elongated, or in the form of slots, the bearings are permitted to be brought into proper position without any special fitting of the parts, and the paper or other interposed thin sheet (the parts of course having previously been fitted to proper size) secures the required distance between the surfaces of the armature and the pole-pieces, entirely dispensing with the ordinary tedious and expensive hand-fitting. One of these bearing-supports D′ is constructed with extended wings *d′*, which are cast in piece therewith and form the supports for the brush-holders, said brush-holders D³ being of course insulated therefrom, as is usual. The bearings D themselves are somewhat elongated, as shown in Fig. 4, and are supported by pivot-screws *d*, which permits said bearings to adjust themselves properly in one direction while the slots by which the bearing-supports are secured to the cap permit the desired adjustment in the other direction.

The wires E E are the usual incoming and outgoing line-wires to a machine of this character, and are connected thereto and to the source of electrical supply in the ordinary manner.

My improved motor, while adapted to use generally, is particularly designed for a motor for sewing-machines and other light work of this character; but I do not desire to be understood as restricting myself in this particular.

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

1. In an electric motor, the field-magnet having its core constructed wider than the pole-pieces, whereby the centers of the armature and said core may be brought closer together and the distance through which the magnetic force must travel thus reduced, while the proper quantity of metal in said core is maintained, substantially as set forth.

2. An electric motor or dynamo in which the core of the field-magnet is wider than the pole-pieces, and in which that portion leading from said core to said pole-pieces tapers gradually, whereby the lines of magnetic force are concentrated instead of being broken or dispersed, substantially as set forth.

3. The combination, in a motor or dynamo, of a single cap composed of diamagnetic metal, and bearing-supports for the armature-shaft, secured to the ends of said cap, substantially as shown and described.

4. In a motor or dynamo, a single cap constructed cup-shaped, as described, in combination with the bearing-supports secured thereto, substantially as set forth.

5. In a motor or dynamo, the combination, with the armature and its shaft, of a bearing-support having extended wings which also support the brush-holders, substantially as set forth.

6. An electric motor or dynamo in which the core of the field-magnet and the pole-pieces are cast in a single piece, said core being wider than said pole-pieces, and arranged to include the neutral part of the machine.

In witness whereof I have hereunto set my hand and seal, at Indianapolis, Indiana, this 22d day of May, A. D. 1889.

LEONIDAS G. WOOLLEY. [L. S.]

Witnesses:

C. BRADFORD,

C. W. H. BROWN.