

(No Model.)

H. B. PULLMAN.
ELECTRIC MOTOR.

No. 440,776.

Patented Nov. 18, 1890.

Fig. 1.

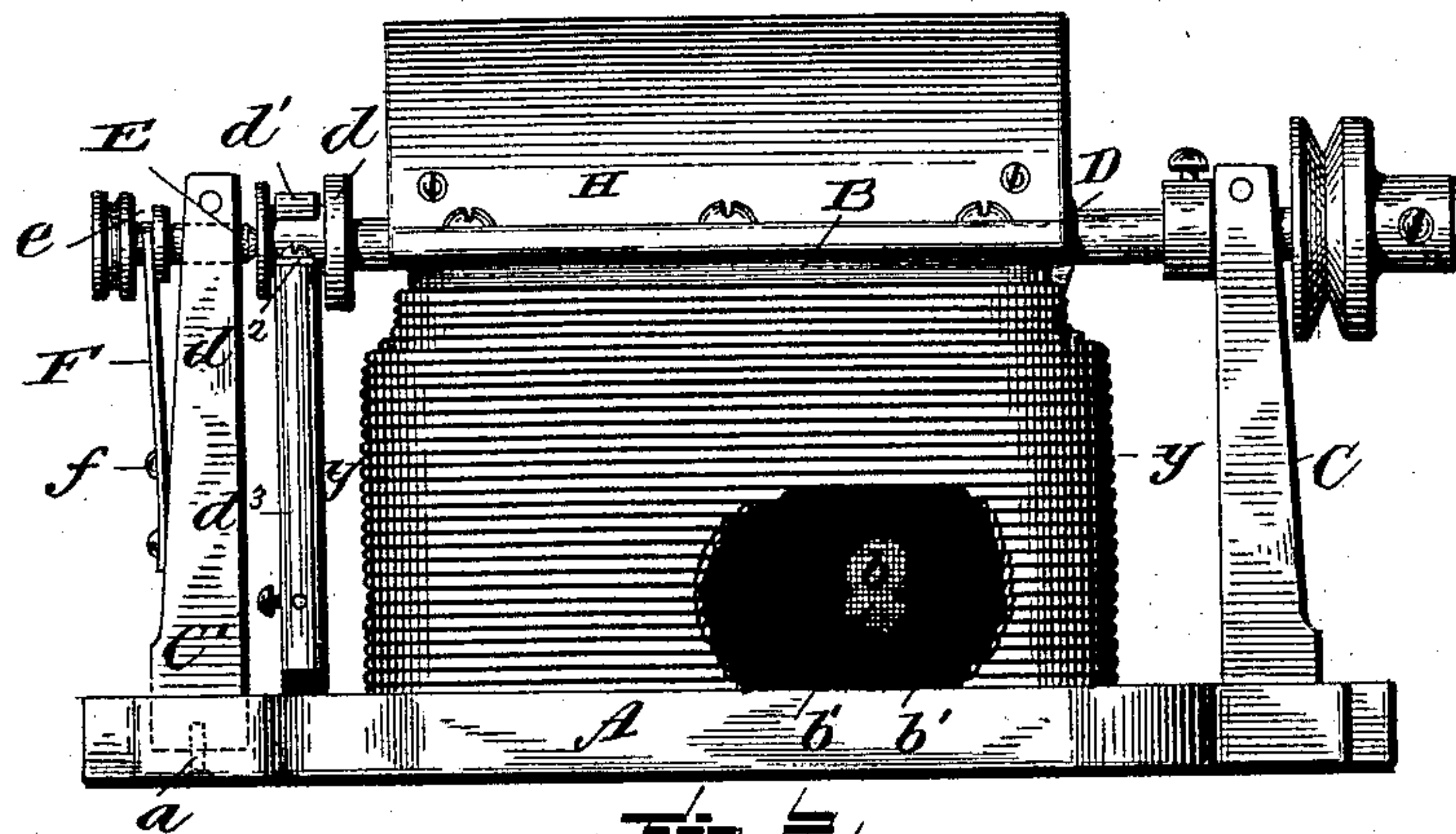


Fig. 2.

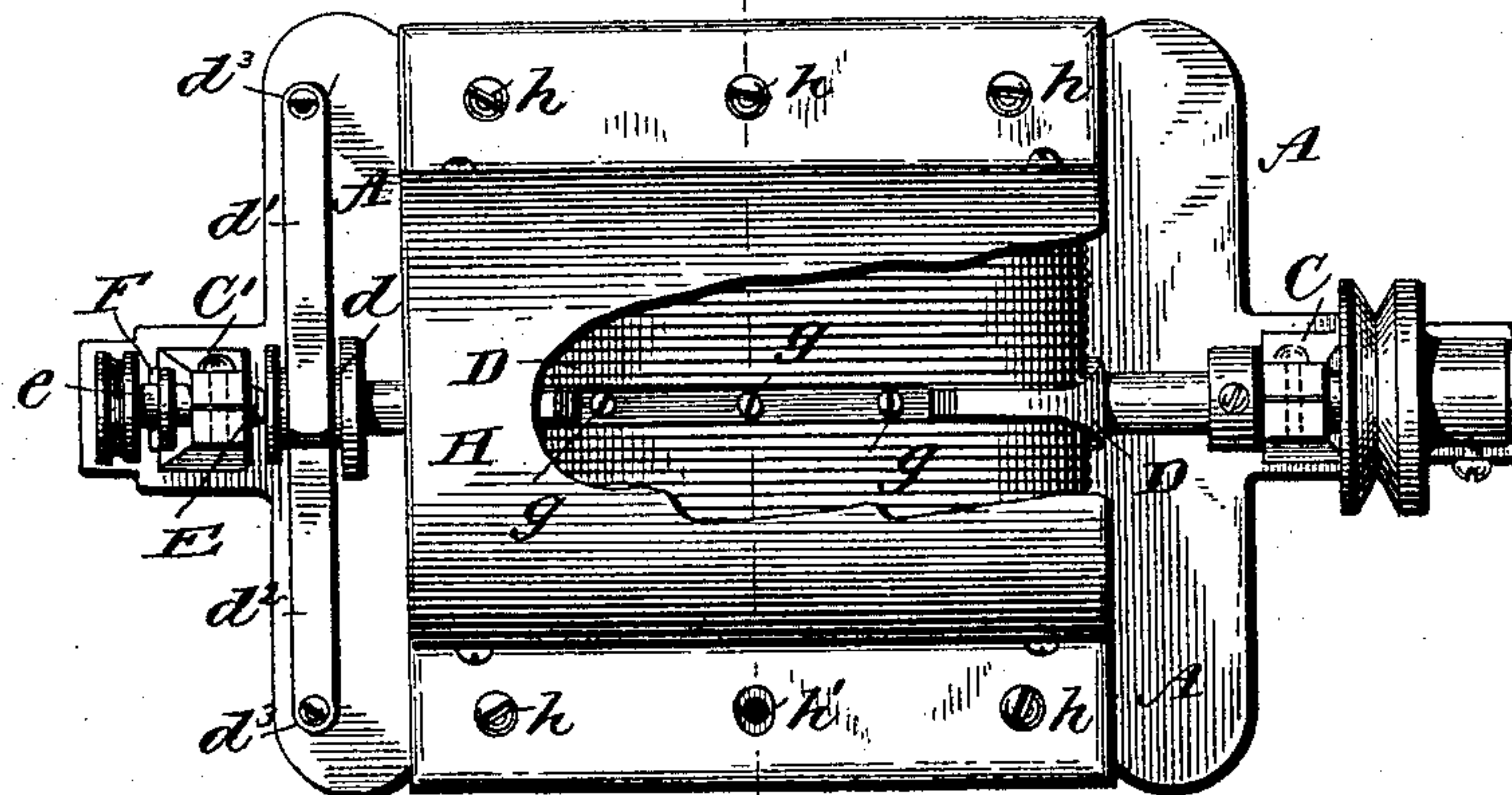
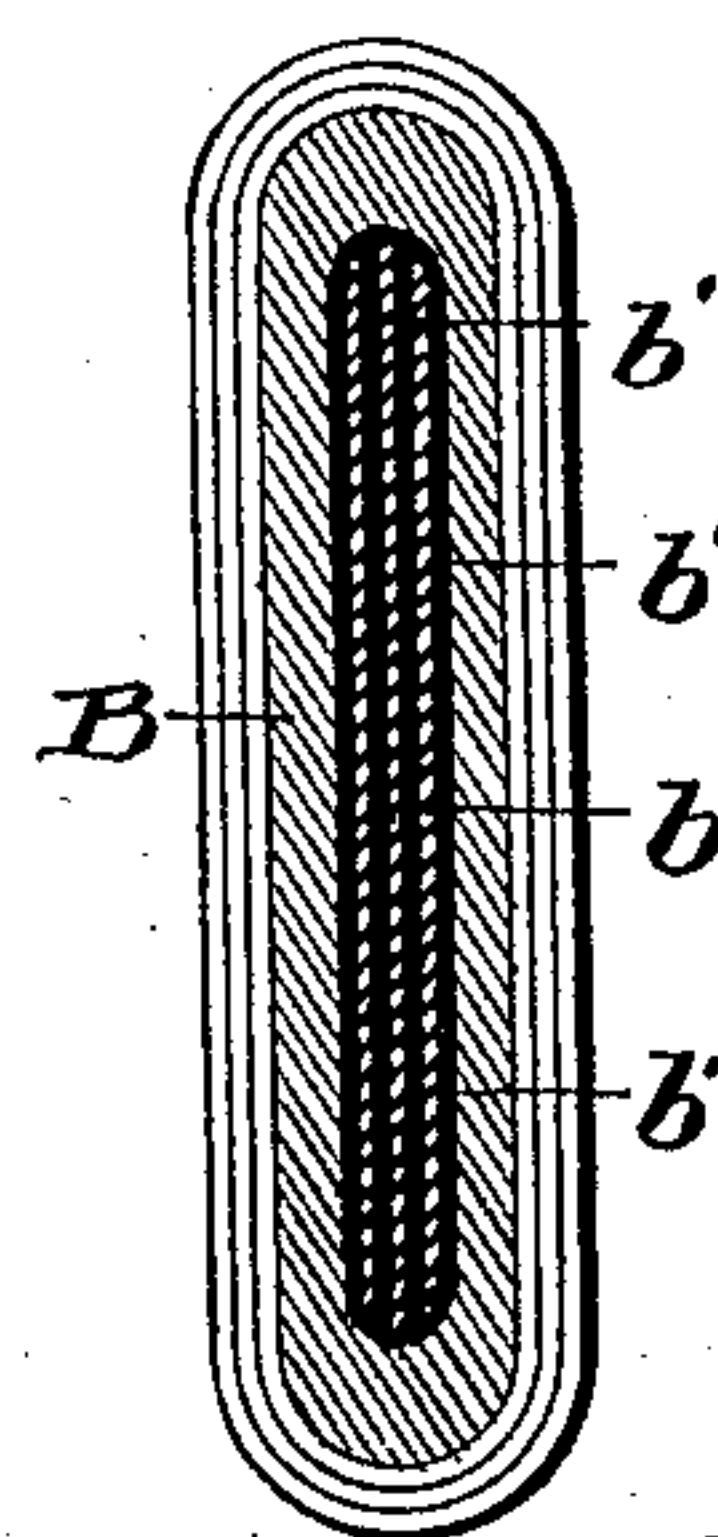
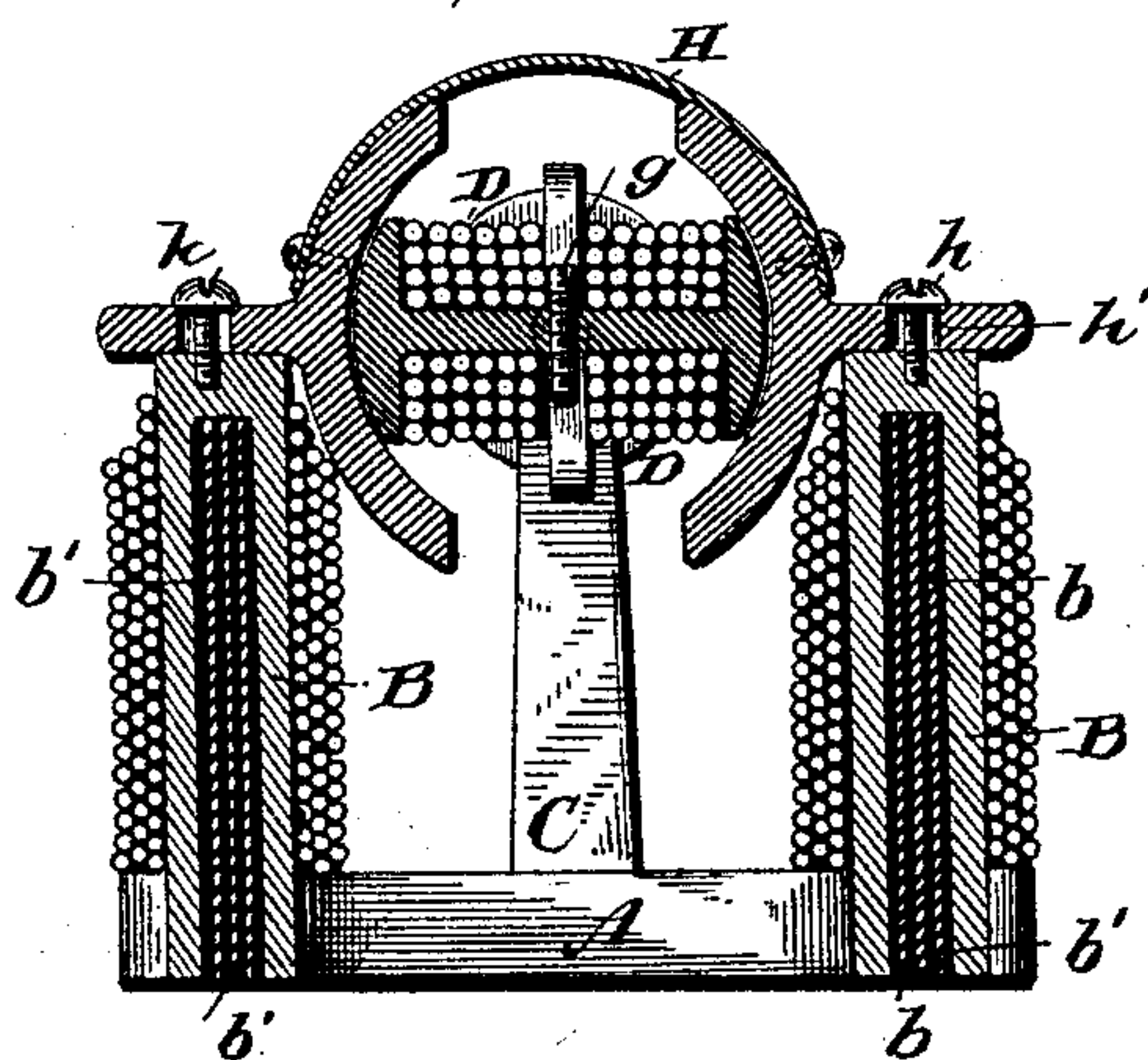


Fig. 3.

Fig. 4.



Witnesses:

L. C. Hills.
Rachel Bond.

Inventor:
Harry B. Pullman,

E. A. Bond.
Attorney.

UNITED STATES PATENT OFFICE.

HARRY B. PULLMAN, OF CAMBRIDGE, OHIO, ASSIGNOR OF THREE-FOURTHS
TO CHARLES D. ROBBINS AND HARRISON O. PATCH, BOTH OF WASH-
INGTON, PENNSYLVANIA.

ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 440,776, dated November 18, 1890.

Application filed August 16, 1890. Serial No. 362,198. (No model.)

To all whom it may concern:

Be it known that I, HARRY B. PULLMAN, a citizen of the United States, residing at Cambridge, in the county of Guernsey and State of Ohio, have invented certain new and useful Improvements in Electric Motors; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to electric motors; and it has for its object to secure an equipoise of the armature on its centers and obviate the tedious and expensive manner generally practiced for obtaining this result—to wit, dressing the sides of the armature.

A further purpose of the invention is to obtain a nicety of adjustment of the pole-sectors of the field-magnets and dispense with the cost usually entailed in finishing said pole pieces or sectors and provide for the field-magnets being machine-wound.

Still another feature of the invention is to prevent the heating of the field-magnets under the influence of alternating currents when the motor is in active service, thereby overcoming the objections attributed to the rise in temperature of such field-magnets when the machine is in operation.

The improvement consists of an adjustable counter-balance across the quarters of the armature, removable and adjustable pole pieces or sectors, cored or hollow field-magnets adapted to receive metal insulated strips, and such other novel features and peculiar construction, arrangement, and combinations of parts, as will hereinafter be more fully described and claimed, and which are shown in the accompanying drawings, in which—

Figure 1 is a side elevation, parts being broken away, of an electric motor embodying my invention. Fig 2 is a top plan view of the engine, one of the screws which serves to hold the pole-sectors on the field-magnet being removed to show the shape of the openings in

said pole-sectors through which the fastening-screws pass. Fig. 3 is a cross-section on the line $x x$ of Fig. 2. Fig. 4 is a horizontal section of one of the field-magnets on the line $y y$ of Fig. 1.

Like letters of reference indicate like parts throughout the several views.

The base A, preferably of metal, is provided at its sides with the field-magnet cores B B and at its ends with the standards C C', which form supports for the armature D. The commutator d , brushes d' and d'' , and the brush-supports d^3 are of usual construction. The field-magnets and the armature are wound after any well-known or approved fashion. The armature-shaft is journaled at one end in the standard C, and its other end is centered on the pivot E, which is mounted in the standard C', and which has a longitudinal movement therein, being pressed in by springs F to automatically take up wear and prevent endwise play of the armature on its bearings. The tension on the spring is adjustable to vary its degree of pressure on the pivot E, the spring being flat and secured at its lower end to the standard C' and having its upper end inserted in an annular groove e near the outer end of the said pivot. The standard is split, as seen in Fig. 2, the upper ends being held together by a transverse screw d^4 , as seen in Figs. 1 and 2. The adjusting-screw f , threaded in the spring F, bears on the standard and is adapted to be turned in or out to regulate the tension on the said spring, for the purposes aforesaid. The standards are let into recesses provided in the base for their reception, and are held in place by screws a , which are passed through openings in the base and screwed into the lower ends of the standards. By this construction the standards are held in proper position to preserve the axial line of the pivot and the shaft-centers of the armature.

The armature D is of well-known construction, and is balanced across quarters and brought to equipoise by an adjustable counter-balance g , which in its simplest form, as shown, consists of a threaded rod screwed transversely into the web of the armature. The

counter-balances may be provided in sufficient number to meet the requirements of the maker, a series being preferable to one, in that a greater nicety of equipoise can be obtained.

5 Obviously by adjusting the counter-balances so as to bring the mass nearer to or farther from the axis of the armature, or on one side or the other of the web of the armature, the latter can be balanced on its centers. This
10 adjustment is readily effected by turning the threaded rods in or out, as found necessary.

The cores B of the field-magnets are hollow, being cast or drilled to prevent their becoming heated when the machine is working
15 under the influence of alternating current, and to still further reduce the heating capabilities of the field-magnet cores metal strips *b*, separated from each other by insulating material *b'*, are inserted in the hollow space
20 formed in the cores.

The pole pieces or sectors G are independent of the field-magnet cores, and are adjustable thereon to and from the armature, being held on said cores B by screws *h*, which pass
25 through openings *h'* in the rear ledge of said pole-pieces. The openings *h'* are oblong to permit an adjustment of the pole-pieces when the screws or fastening devices *h* are loosened. The pole-sectors being removable admit of
30 the field-magnet cores being machine-wound, and being adjustable permit an adjustment of the said pole-pieces to the armature such as cannot be had by the ordinary manner of dressing the pole-pieces.

35 The space between the upper ends of the pole-sectors is closed by the cap H.

What I claim as new is—

1. An armature for electric motors, having a counter-balance which is adjustable on the
40 web of the armature to and from the axis of the said armature, as set forth.

2. An armature for electric motors, having

a counter-balance which is adjustable at right angles to the face of the web of the armature, as set forth.

3. An armature for electric motors, having a counter-balance which is projected through the web of the armature and adjustable therein, as set forth.

4. In an electric motor, the combination, 50 with the armature-shaft and a split standard, of an automatic adjusting device passed through the standard for taking up lost motion between the standard and shaft, as set forth.

5. In an electric motor, the combination, 55 with the armature-shaft and a split standard, of a pivot-blank supported in the standard and having a bearing on the end of the shaft and a spring on the standard exerting its influence on the pivot, as set forth.

6. In an electric motor, the combination, with the armature-shaft and a split standard, of the pivot passed through a hole in the standard between the split portions into a bearing 65 in the end of the shaft, a spring on the standard exerting its influence on the pivot, and means for regulating the tension of the spring, as set forth.

7. In an electric motor, the combination, 70 with the armature-shaft and a standard, of the spring on the standard and provided with a tension-screw and having its free end inserted in an annular groove in the pivot, the pivot passed through a hole in the standard, 75 the standard below said hole being split, and a binding-screw passed through the split end of the standard, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY B. PULLMAN.

Witnesses:

FRANKLIN BROWN,
H. ROBBINS.