

(No Model.)

J. F. McLAUGHLIN.  
ELECTRIC MOTOR.

No. 375,560.

Patented Dec. 27, 1887.

FIG. 1.

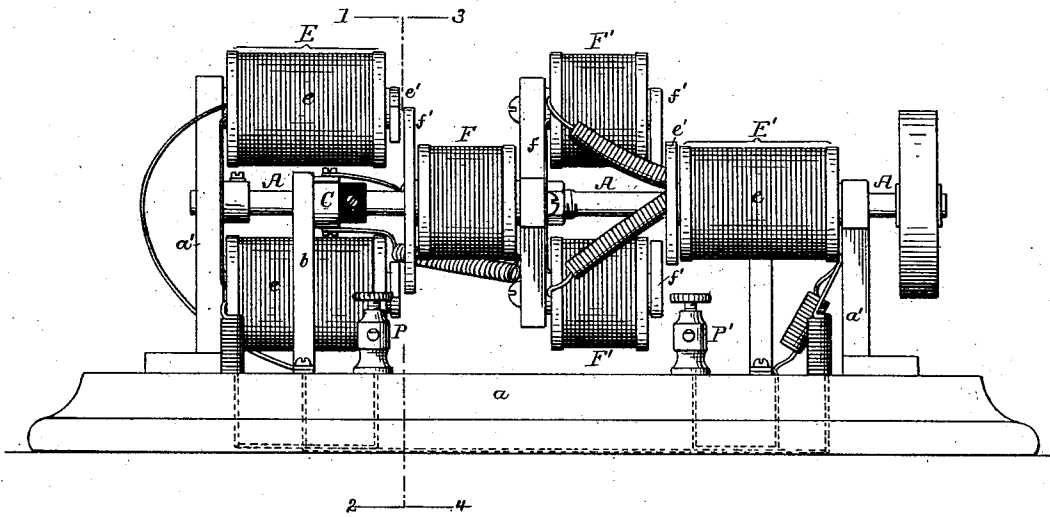


FIG. 2.

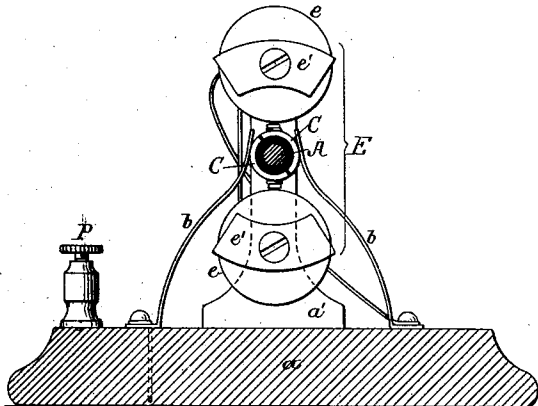


FIG. 3.

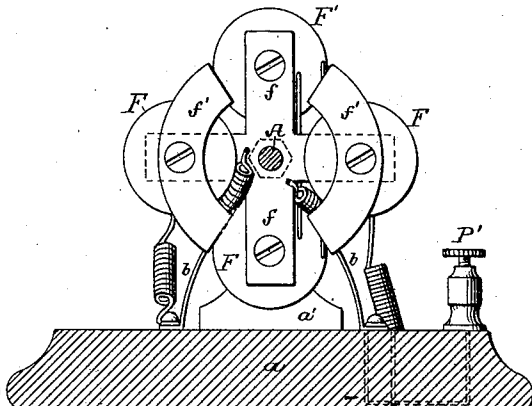
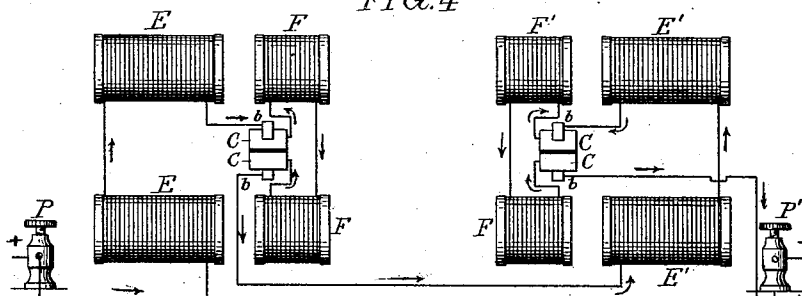


FIG. 4.



Witnesses:  
William D. Conner  
Alex. Barkoff

Inventor:  
J. McLaughlin  
by his Attorneys  
Howson & Sons

# UNITED STATES PATENT OFFICE.

JAMES F. McLAUGHLIN, OF PHILADELPHIA, PENNSYLVANIA.

## ELECTRIC MOTOR.

SPECIFICATION forming part of Letters Patent No. 375,560, dated December 27, 1887.

Application filed December 16, 1886. Serial No. 221,765. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES F. McLAUGHLIN, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Electric Motors, of which the following is a specification.

My invention consists of certain improvements in the construction of electric motors, as fully described hereinafter.

In the accompanying drawings, Figure 1 is a side view of my improved motor. Fig. 2 is a vertical section on the line 1 2, Fig. 1. Fig. 3 is a vertical section on the line 3 4, Fig. 1; and Fig. 4 is a diagram of the circuits.

My improved motor is of that construction in which armatures revolve between fixed field-magnets which are on opposite sides of the armatures.

The frame of the machine consists in the present instance of a base-plate, *a*, and end standards, *a'*, which are provided with bearings for the longitudinal shaft or axis *A*, carrying the armatures and commutators. To these standards *a'* are secured the electro magnets *E E'*, constituting the field-magnets.

Each field-magnet consists of two coils, *e*, having their cores united by the standard *a'*, or by a suitable plate of magnetic metal, so that each field-magnet consists of a horseshoe. The horseshoe field-magnet *E* is arranged in a plane at right angles to the horseshoe field-magnet *E'*, as shown in Fig. 1. I prefer to provide the field-magnets *E E'* with extended pole-pieces *e'*, carried on a radius from the axis of the armature-shaft.

Each armature consists of a pair of electro-magnets, *F F'*, secured to a cruciform metal plate, *f*, mounted on the axis *A*. This plate is of magnetic metal, so that it will form the connecting-plate for the two coils of each magnet to form a horseshoe-magnet corresponding with the horseshoe field-magnets. The two magnets are secured on opposite sides of the same plate *f*, and in planes at right angles to

each other, in order to obtain a better mechanical balance, as well as a more convenient arrangement of parts. The poles of the armatures are provided with extended pole-pieces *f'*, similar to those on the field-magnets.

The armature-shaft carries two commutators, *C*, of any convenient construction. In the present instance each commutator consists of a pair of insulated plates connected to the coils of the corresponding armature. On the periphery of each commutator bear spring commutator-brushes *b*.

The circuits will be clearly understood on reference to Fig. 4, from which it will be seen that the coils of the field-magnets and armatures are in series. Beginning at the binding-post *p*, the circuit is through the coils of the field-magnets *E*, thence to one of the commutator-brushes and armature-coils, and from the second commutator-brush to the coils of the field-magnets *E'* on the other side of the machine. The circuit, as before, is thence through the commutator, armature-coils, and commutator out through the binding-post *p'*.

I claim as my invention—

1. An electric motor having armatures revolving between two field-magnets, the field-magnets being horseshoe-magnets in planes at right angles to each other, and the armatures being also horseshoe-magnets in planes at right angles to each other.

2. The combination of the field-magnets *E* and *E'* with intermediate revolving armatures consisting of electro-magnets carried by a central cruciform plate, the pairs of electro-magnets being on opposite sides of the plate and in planes at right angles to each other.

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

JAMES F. McLAUGHLIN.

Witnesses:

WILLIAM D. CONNER,  
HARRY SMITH.