

W. E. SAWYER.
ELECTRO-MAGNETIC ENGINE.

No. 173,561.

Patented Feb. 15, 1876.

Fig: 1.

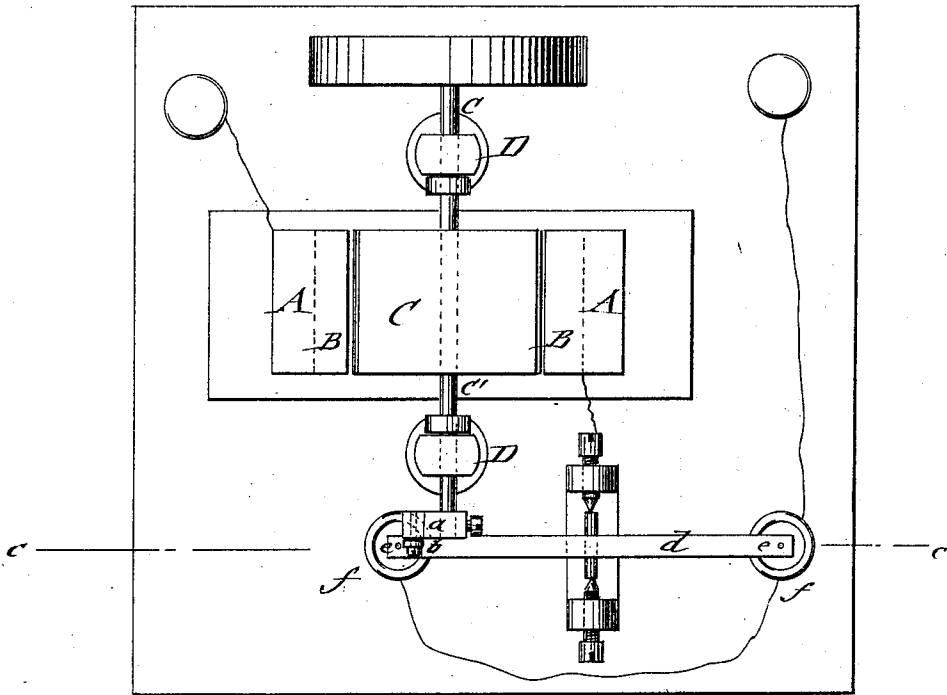
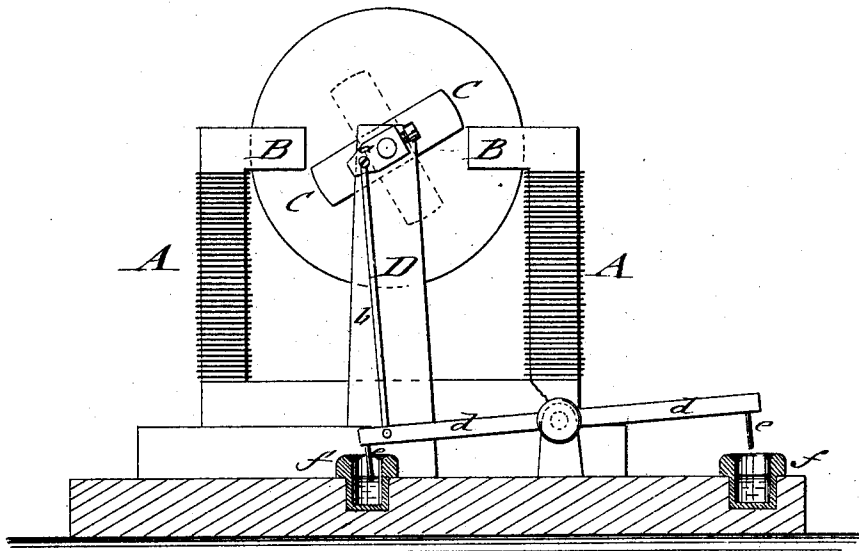


Fig: 2.



WITNESSES:

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WILLIAM E. SAWYER, OF NEW YORK, N. Y.

IMPROVEMENT IN ELECTRO-MAGNETIC ENGINES.

Specification forming part of Letters Patent No. **173,561**, dated February 15, 1876; application filed December 27, 1875.

To all whom it may concern:

Be it known that I, WILLIAM E. SAWYER, of the city, county, and State of New York, have invented a new and improved Electro-Magnetic Engine, of which the following is a specification:

In the accompanying drawing, Figure 1 represents a top view of my improved electro-magnetic engine, and, Fig. 2 a side elevation of the same, partly in section, on line *c c*, Fig. 1.

Similar letters of reference indicate corresponding parts.

My invention refers to an improved electro-magnetic engine that is made of simple construction, with a view of more fully utilizing electric force than has been accomplished in similar machines heretofore in use.

Electro-motors have, to some extent, failed to meet the anticipations, and have, therefore, not been applied to practical use in a large number of cases, mainly on account of their incomplete utilization of the force of the battery, and the comparatively high expense for running them. To reduce the running expense and utilize fully the power of the battery, and to furnish an electro-motor of superior effect, it is important to attain two ends, first, that the armature shall be placed in the electric field between the poles of the magnet; and second, that a long, narrow edge of the armature shall be presented to a long, narrow edge at the poles of the magnet. I prefer to construct the magnet of plate-iron, bent in the form shown in the drawings, but it is obvious that the shape of the magnet may be that of an incomplete circle, or horseshoe, as well. One-half of the armature is then always within the electric field, and thereby the magnetic effect upon it excited sooner than in ordinary electro-motors. A long surface or edge of the armature is presented to a long surface or edge of the magnet, so that the magnetic power is distributed, equalized, and increased.

The invention consists of an electro-magnetic engine, in which the armature revolves between pole-extensions of a fixed magnet; both the poles of the magnet and the centrifugal surface of the armature consisting of long, narrow edges running parallel to the axis of the armature. The current is interrupted

and established by points, dipping into quick-silver or other fluid conductor, and suitable connecting mechanism, but it is obvious that any other form of establishing and interrupting the electric circuit may be employed.

In the drawing, A represents an electro-magnet of U-shape, whose pole-ends are made with rectangular, curved, or other extensions, B, that are facing each other, and the symmetrical axis of the magnet, to present a long surface to the armature C, whose shaft C' turns in bearings of pillars, D. The armature C is thus placed between the poles of the magnet into the magnetic field of the same, the surface or edge of the ends of the armature being equal in length and width with the faces of the poles, but slightly curved for passing closely to the same when revolving.

A fly-wheel of the armature shaft regulates the motion of the armature, and carries the same over the dead points.

The shaft is connected at the other end by crank or eccentric *a*, or its equivalent, and a rod, *b*, with a walking beam, *d*, that is centrally fulcrumed and provided with pins *e*, at the ends, that dip alternately into cups, *f*, filled with mercury, or other fluid conductor. The cups are connected to the battery and the fulcrum to the magnet, which is excited at each dipping of the pins, the current being interrupted at the moment when the walking-beam is balanced and both points are outside of the conducting fluid. The armature faces at this moment fully the pole-ends, and is then carried by the fly-wheel away from the same to be again exposed to magnetic attraction on the dipping in of the circuit-closing point. I do not limit myself to this form of connection, as various circuit-closing devices may be employed.

A second armature may be placed on the same shaft, but at right angles to the former, a second magnet of the same construction and another circuit establisher being arranged in connection therewith to assist the first magnet and carry the shaft more fully over the dead points. In place of revolving armatures and stationary magnets, fixed armatures and revolving magnets may be employed, but I prefer the revolving armatures. The shape of the pole-ends of the magnets and armatures

may be changed, provided the armatures revolve between the poles in the magnetic field, which forms the main point of my invention, and the point of superiority over other electro-motors.

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

In an electro-magnetic engine the combination, with a fixed electro-magnet presenting long narrow edges at the poles, of an armature

revolving between the same, and presenting long narrow edges to the poles of the magnet, the axis of the armature being parallel both to the elongated edges of the poles of the magnet, and the edges of the armature presented to the poles of the magnet, substantially as shown and described.

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Witnesses:

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