

G. H. BANGS. BEST AVAILABLE COPY  
Electric Motor.

No. 214,082.

Patented April 8, 1879.

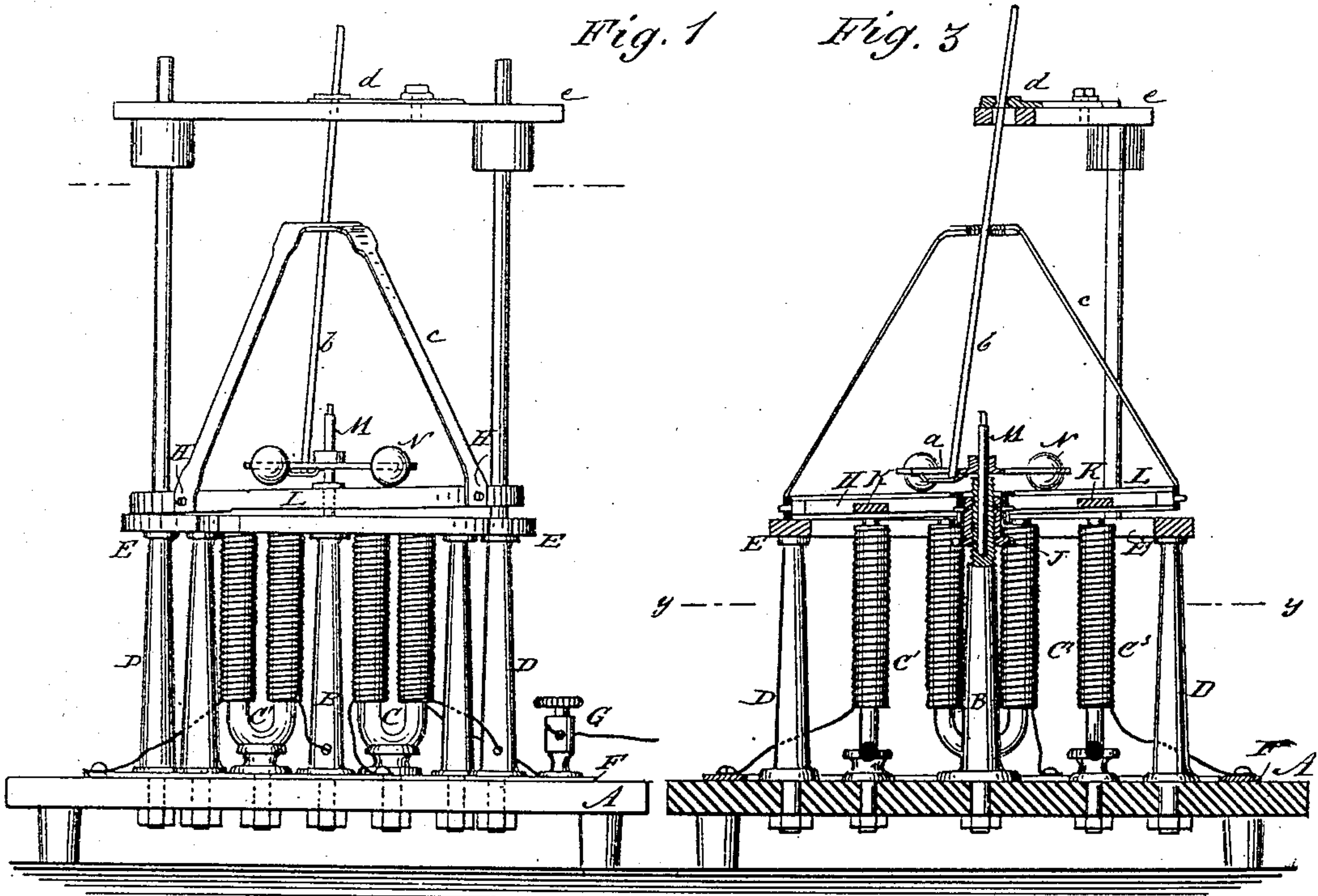
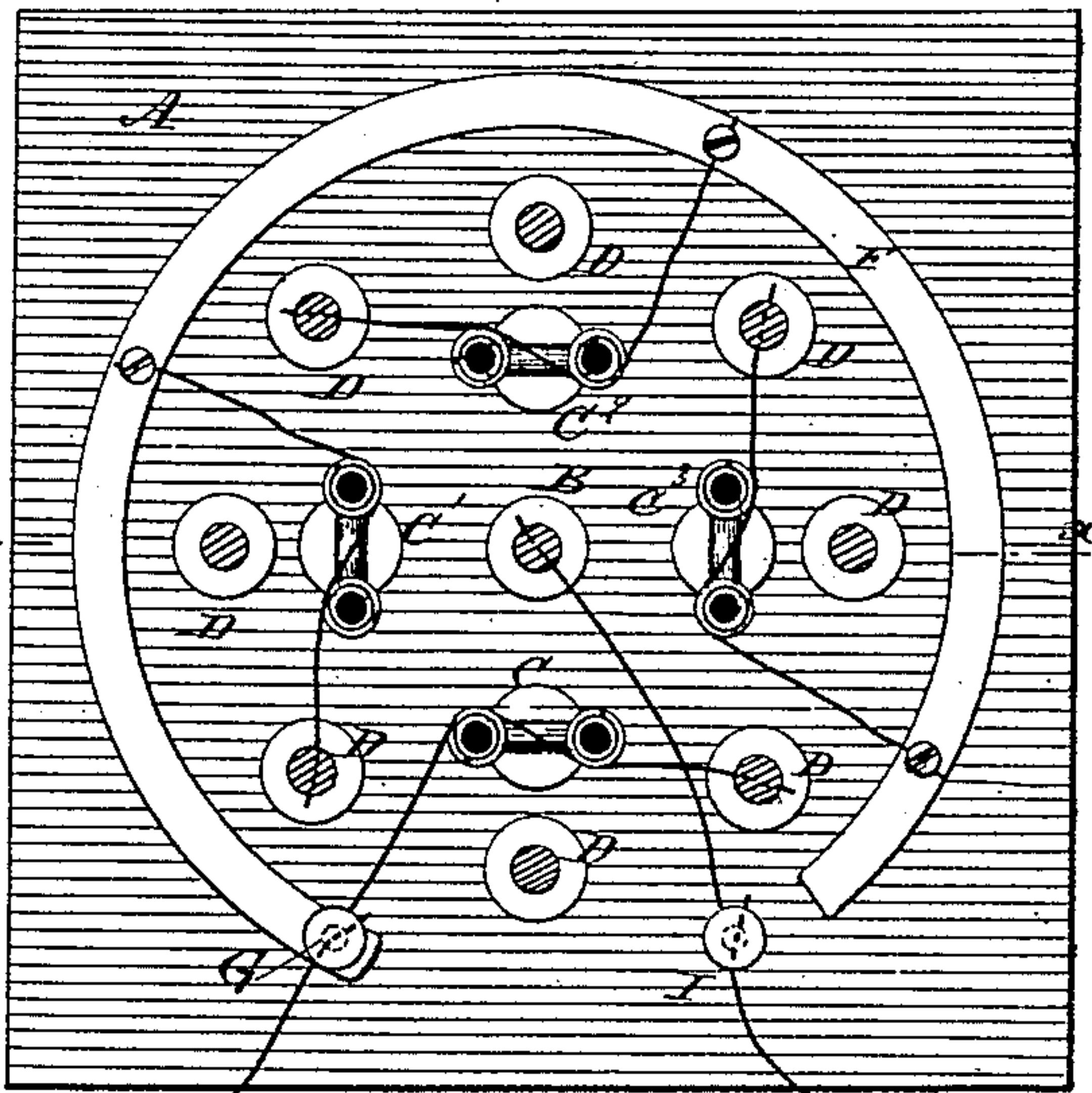
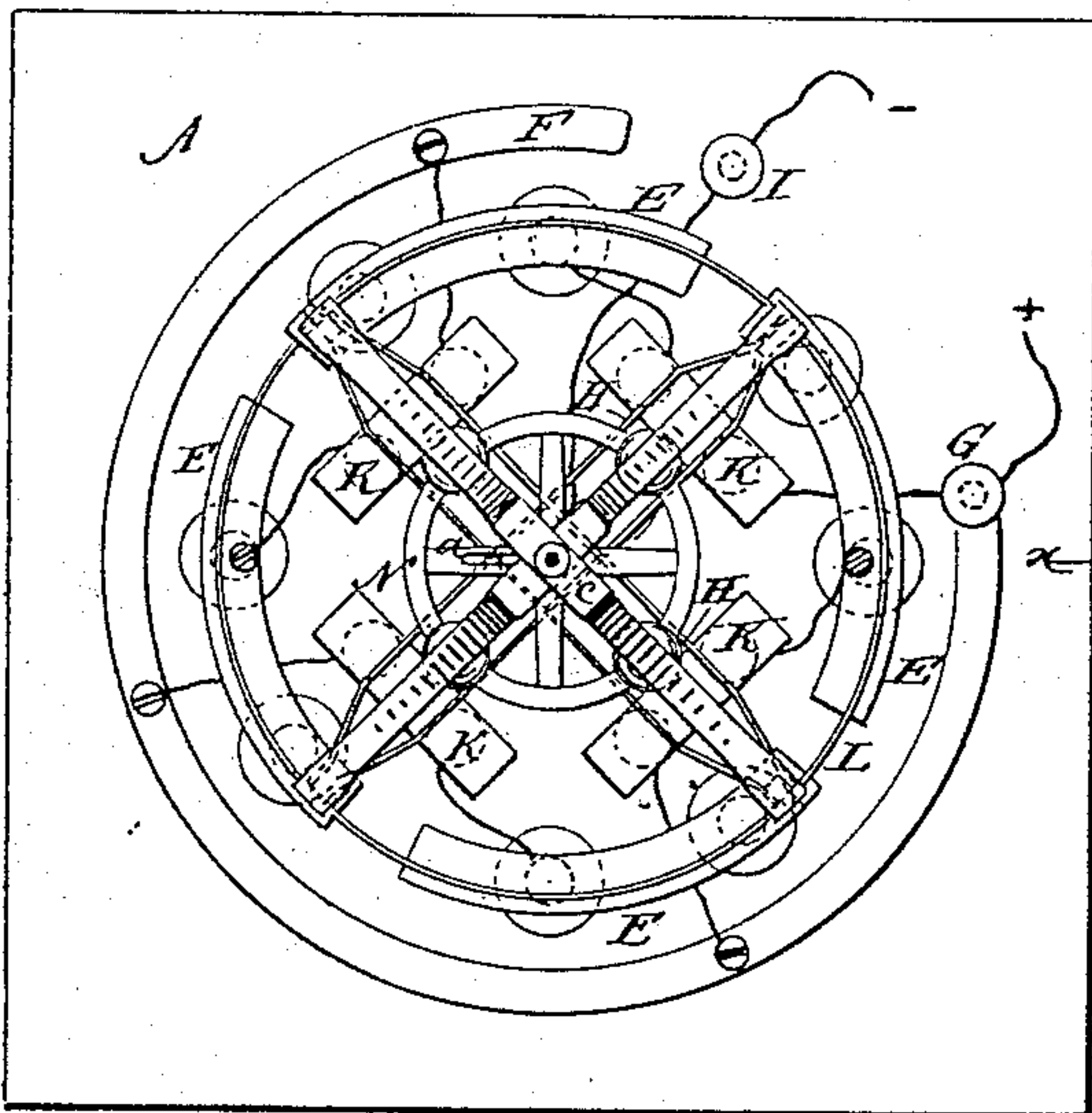


Fig. 2

Fig. 4



WITNESSES:

C. Xeroux  
C. Sidgwick

INVENTOR:

G. H. Bangs  
BY *Munn & Co.*

ATTORNEYS.



# UNITED STATES PATENT OFFICE.

GEORGE H. BANGS, OF NEW YORK, N. Y.

## IMPROVEMENT IN ELECTRIC MOTORS.

Specification forming part of Letters Patent No. 214,082, dated April 8, 1879; application filed November 25, 1878.

*To all whom it may concern:*

Be it known that I, GEORGE H. BANGS, of the city, county, and State of New York, have invented a new and Improved Electric Motor, of which the following is a specification.

Figure 1 is a side elevation of my improved motor. Fig. 2 is a sectional plan view. Fig. 3 is a central vertical section taken on line *x* in Fig. 2. Fig. 4 is a horizontal section taken on line *y y* in Fig. 3.

My invention relates to the class of motors propelled by an electric current; and it consists in the combination of the levers, the armatures, and the ring with the electro-magnets and the segments, and in the combination of the levers, the armatures, the ring, the frame, the fly-wheel, the rod, and the cross-bar with the electro-magnets, the segments, and the central standard, as hereinafter more fully described.

Similar letters of reference indicate corresponding parts.

In the drawings, A is a base-piece, in the center of which there is a vertical standard, B, around which, and at equal distances from it and from each other, are placed, in the present case, four U electro-magnets, C C<sup>1</sup> C<sup>2</sup> C<sup>3</sup>. Outside of the magnets there are standards D, which support the metallic segments E E E E, which are arranged in a circle concentric with the circle in which the U-magnets are placed. A curved copper strip, F, encircles the standards D, and is secured to the base-piece A.

A binding-post, G, is connected with one end of the copper strip F. One terminal of each magnet-wire is placed in electrical connection with the copper strip F, the other terminal being connected with one of the segmental pieces E.

A binding-post, I, is secured to the base-piece, and is placed in electrical communication with the central standard B. One end of each segment E E, &c., is opposite the middle of the space between the two arms of the adjacent electro-magnet, and the several segments are separated by a small space only.

Two split levers or working-beams, H, are pivoted at right angles to each other, and in the same plane, to a sleeve, J, that screws up or down on the standard B. These levers are

notched, so that one will not interfere with the movement of the other. Each lever H carries two armatures, K, one near each end. Each armature is thus supported in the proper relation to the magnet below it.

The ends of the levers H are rounded, and they are received by holes in a metallic ring, L, that rolls or performs a circular oscillation upon the metallic segments E E, &c.

A vertical shaft, M, is journaled in the standard B, and supports a fly-wheel, N. There is a slot, *a*, in one of the arms of the fly-wheel for receiving the lower end of a rod, *b*, that extends upward through a frame, C, secured to the ring L, and also through a guide, *d*, secured to the cross-piece *e*. The cross-piece *e* is supported by a prolongation of two of the standards D.

The ring L and the segments E E, &c., form the commutator which directs the electric current. The binding-posts G I receive the battery-wires.

The several segments E E, &c., being in electrical communication with the magnets, and the magnets being in electrical communication with the binding-post G, it follows that when the ring L, which is connected with the binding-post I, comes into contact with one of the segments E, a current is established in the wires of the magnet which is adjacent to that segment, and the armature above the magnet is drawn down, thereby moving the fly-wheel N through the medium of the ring L, frame *c*, and rod *b*. The rotary movement of the rod *b* causes the ring to roll from one segment E E, &c., to another, and thus direct the electrical current from one magnet to another in regular succession.

By this arrangement of mechanism a direct downward pull of the armatures is secured, so that the full force of the magnets is realized, and the maximum effect is produced with a minimum of battery-power.

I am aware that a disk or wheel has been arranged above a series of electro-magnets, so as to be attracted by the said magnets, thereby imparting an oscillating motion to the said disk or wheel; but

What I claim, and desire to secure by Letters Patent, is—

1. The combination of the levers H, the ar-

matures K, and the ring L with the electro-magnets C C<sup>1</sup> C<sup>2</sup> C<sup>3</sup>, and with the segments E, substantially as shown and described, and for the purpose set forth.

2. The combination of the levers H, the armatures K, the ring L, the frame c, the fly-wheel N, the rod b, and the cross-bar e with the electro-magnets C C<sup>1</sup> C<sup>2</sup> C<sup>3</sup>, the segments

E, and the central standard B, substantially as shown and described, and for the purpose set forth.

GEORGE H. BANGS.

Witnesses:

GEO. M. HOPKINS,  
C. SEDGWICK.