

J. GRAY.

MAGNETO-ELECTRIC MACHINE.

No. 182,273.

Patented Sept. 19, 1876.

Fig. 1.

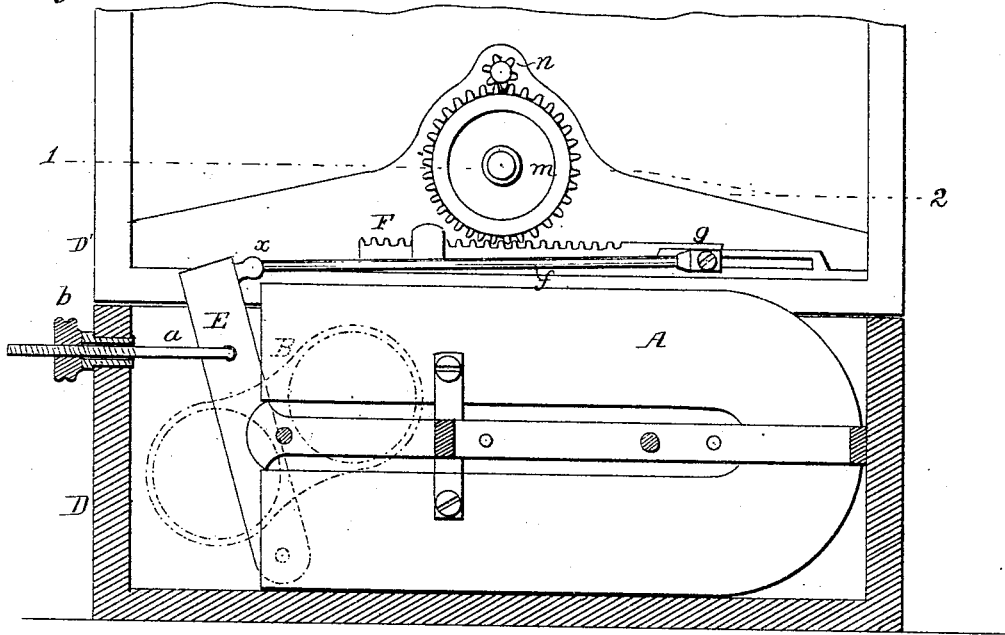
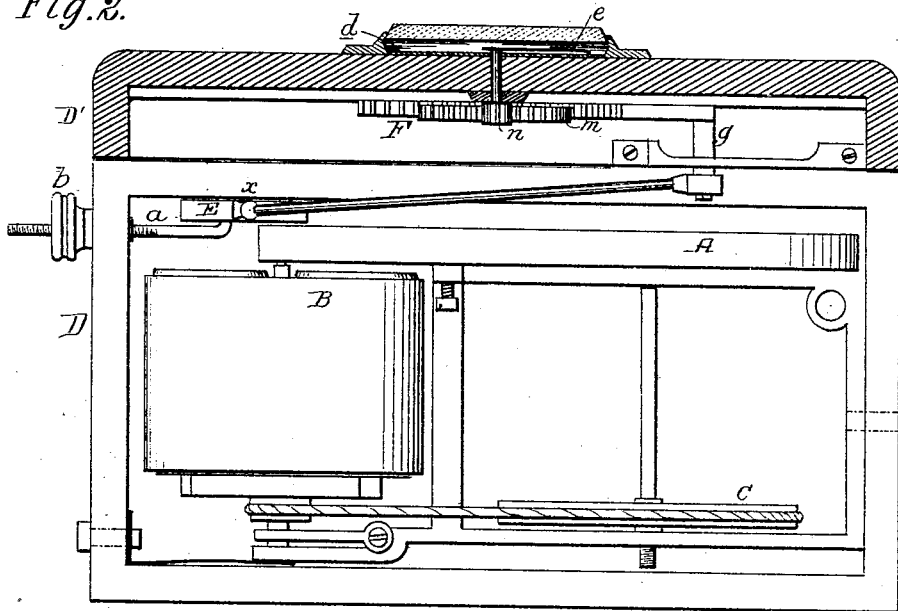
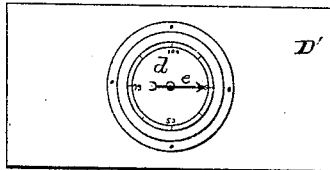


Fig. 2.



Attest: Fig. 3.

*George Thom*  
*Courtney A. Cooper*



*Joseph Gray*  
*By his atty*  
*Charles Foster*

# UNITED STATES PATENT OFFICE

JOSEPH GRAY, OF SHEFFIELD, ENGLAND.

## IMPROVEMENT IN MAGNETO-ELECTRIC MACHINES.

Specification forming part of Letters Patent No. **182,273**, dated September 19, 1876; application filed August 11, 1876.

*To all whom it may concern:*

Be it known that I, JOSEPH GRAY, of Sheffield, England, have invented Improvements in Electric Machines, of which the following is the specification:

The object of my invention is an improvement in magneto electric machines in which a revolving coil and movable keeper are used; and my invention consists in devices connected with the keeper, whereby the power of the instrument may be indicated and regulated.

In the drawing, Figure 1 is a sectional elevation of a magneto-electric machine with my improvements, the lid being raised to a vertical position. Fig. 2 is a sectional plan on the line 1 2, Fig. 1; and Fig. 3, an external plan, drawn to a reduced scale.

The permanent horseshoe-magnet A, the revolving cores B, driven by the wheel C, and the commutator s are constructed and arranged within a box, D, in the ordinary manner.

The keeper E, which is necessary to insure currents of any great compass, is pivoted to the side of the box opposite the lower prong of the magnet A, and to the upper end is jointed a threaded rod, a, which extends through the end of the box, and through a revolving nut, b, by turning which the rod may be drawn in or out, and the upper end of the keeper moved to or from the upper prong of the magnet, increasing the intensity of the current in proportion as the keeper is withdrawn.

It is of importance that those operating with such instruments for medical purposes should be able to ascertain the strength of the current, so as to insure a uniform or gradually increased or diminished current, as desired.

Heretofore it has been usual to set the keeper by the eye, regulating its position from day to day, as nearly as possible, in accordance with the strength of current desired, but without it being possible to determine with any accuracy its precise relative position. Moreover, in selling instruments for house use by the purchasers, it was not possible to define any particular adjustment.

I overcome these difficulties by combining with the keeper a graduated registering device, by which the keeper may be definitely adjusted.

Various modes of arranging the register may be employed; but I prefer that shown in the drawing, in which a glass-covered graduated plate, d, at the outside of the lid of the case, is provided with a pointer or indicator, e, operated from the keeper, the position of the latter being thus indicated without opening the case.

In order that the movement of the lid may not affect the position of the pointer, the keeper is connected by a ball-and-socket joint, x, to a rod, f, jointed to an arm, g, of a guided rack, F, sliding in the lid and operating a toothed wheel, m, which gears with a pinion, n, on the pointer-shaft. The arm g projects to such a position that the movements of the lid will carry it in a curve at all points equidistant from the joint x, so that but little, if any, motion of the rod will result from the movement of the lid.

It will be apparent that the graduated plate may be arranged within the box or at the end, and that the pointer may be connected in a different manner to the keeper.

Without, therefore, limiting myself to the precise arrangement described, I claim—

1. The combination, in a magneto-electric machine, of the magnet, revolving cores, keeper E, adjustable, as set forth, graduated plate d, and a pointer, e, connected to devices operated by the movement of the keeper, as specified.

2. The combination of the adjustable keeper, the graduated plate and pointer, carried by the lid, and the flexible connections, whereby the lid may be moved without affecting the adjustment of the pointer.

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

JOSEPH GRAY.

Witnesses:

W. W. WOODHEAD,  
W. W. HIBBERT.