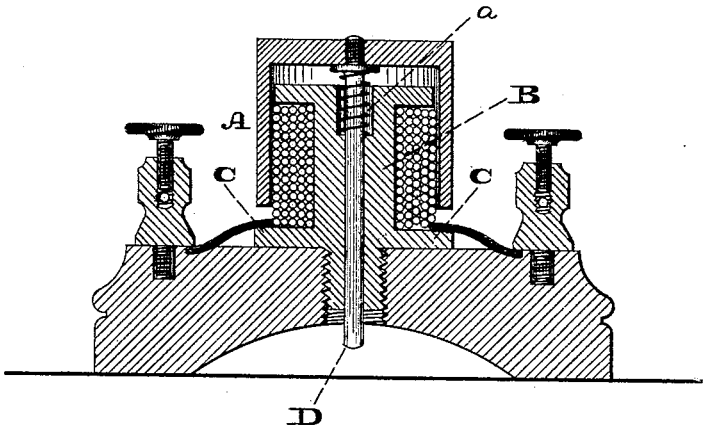
H. M. PAINE.

Electro-Magnet.

No. 203,492. Patented May 7, 1878.



Witnesses:

A. P. Grant,

W. F. Kircher

Inventor:

H. M. Paine,

by Paul Wiedersheim

ATTORNEY.

UNITED STATES PATENT OFFICE.

HENRY M. PAINE, OF NEWARK, NEW JERSEY, ASSIGNOR TO DANIEL S. ROBESON, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN ELECTRO-MAGNETS.

Specification forming part of Letters Patent No. **203,492**, dated May 7, 1878; application filed February 19, 1878.

To all whom it may concern:

Be it known that I, HENRY M. PAINE, of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Electro-Magnets, which improvement is fully set forth in the following specification and accompanying drawing, in which the figure represents a central vertical section.

My invention consists of an armature inclosing an electro-magnetic bobbin in such a manner that both poles of the bobbin may be utilized.

Referring to the drawings, A represents an armature, which is of the form of a hollow cylinder, closed at one end or top; and B represents an electro-magnetic bobbin or core, which is fitted on and incloses the armature A, and its base C projects beyond the diameter of the surrounding wire coil equal to the thickness of the walls of the armature. To the center of the top of the armature is secured a guide-rod, D, which projects inwardly and traverses the axis of the bobbin.

The top and bottom of the armature are so spaced as to be equidistant from the top and bottom of the bobbin, and a coiled spring, *a*, fitted on the rod D, and entering a recess in the top of the bobbin, serves to keep the armature-poles at the required distance from the poles of the bobbin.

It will be seen that the top of the bobbin being N and the bottom S, the top of the armature will be S and the bottom N, by magnetic induction, and the opposite ends or poles of the bobbin will exert an attractive influence in one direction on the poles of the armature, and the currents moving around the bobbin will, by their close proximity to the walls of the armature, intensify the induced polarity.

If the outside of the armature is wound with insulated wire in the opposite direction to that in the bobbin, and in circuit with it, an increased sensitiveness of action will result.

I find that the best results are attained when the hollow armature is a cylinder without solution of continuity, supposing the bobbin to be cylindrical. If the bobbin is rectangular or any other form, the requirement is that the hollow armature conform generally to the form of the bobbin or core which it incloses.

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

1. An armature inclosing the bobbin and its surrounding coil, and so spaced at top and bottom, in relation to the top and bottom of the bobbin, that both poles of the bobbin may be utilized, substantially as set forth.

2. The bobbin with projecting base C, in combination with the inclosing armature A, substantially as and for the purpose set forth.

3. The bobbin B and armature A, in combination with the guide-rod D, substantially as and for the purpose set forth.

HENRY M. PAINE.

Witnesses:
C. R. LANE,
EDWIN L. PAINE.