

S. P. THRASHER.
ELECTROMAGNET.
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952,086.

Patented Mar. 15, 1910.

Fig. 1.

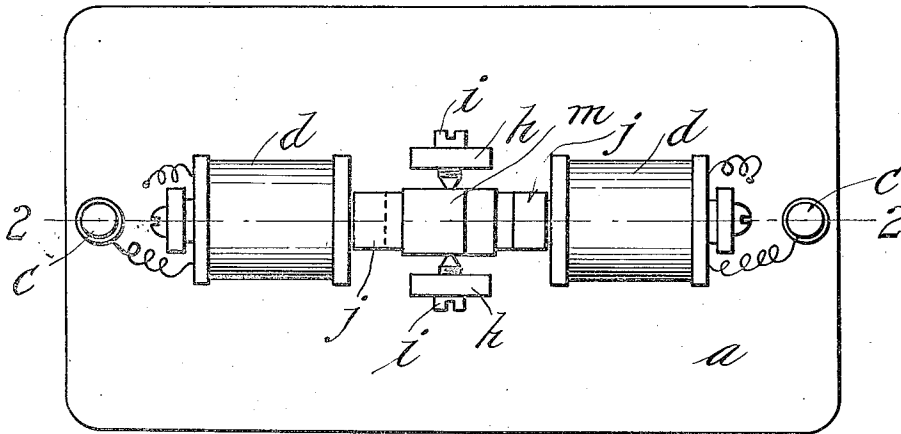
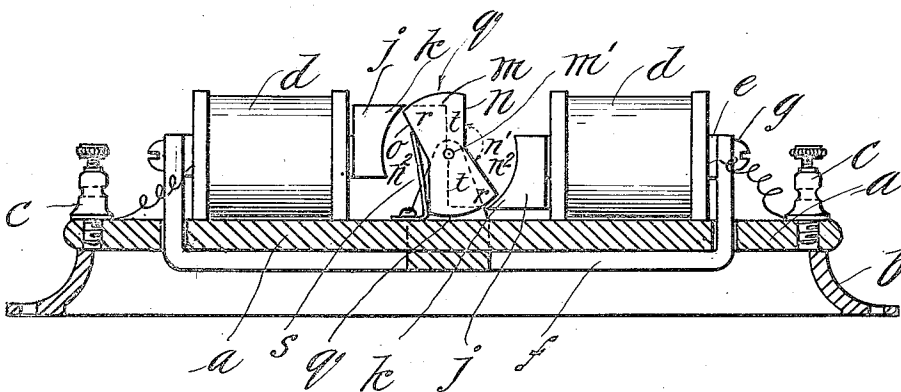


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTROMAGNET.

952,086.

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To all whom it may concern:

Be it known that I, SAMUEL P. THRASHER, a citizen of the United States of America, residing at Hartford, in the county of Hartford and State of Connecticut, have invented new and useful Improvements in Electromagnets, of which the following is a specification.

This invention relates to improvements in electro-magnets and especially in the particular formation of the pole pieces and their associated armature, so that the magnet is rendered more efficient than those in use when the same strength of current is used, and the pull exerted by the pole pieces on the armature will gradually increase in direct proportion to the degree of movement of the armature.

Broadly, the invention consists in forming the pole pieces so that the main body portions thereof are eccentric to the axis of the cores of the coil, and the armature is formed of such shape adjacent its outer portion that very little leakage of the lines of force will occur during their passage from the pole pieces to the armature across the air-gap between the armature and pole-pieces during its movement when the coils are energized.

Reference is made to the specification for a full description of the operation and nature of my invention.

In the drawings which form a part of this application,—Figure 1 is a top plan view of my improvement and Fig. 2 is a side elevation of the same, the base being shown in section to clearly indicate the construction of the yoke joining the cores of the electromagnet.

Referring to the drawings in detail, *a* designates the base piece which is provided with the supporting elements *b*, and on which are secured the binding posts *c*. The coils of the electromagnet are designated at *d*.

Attached to the core pieces *e* is the U-shaped yoke *f* by means of the screws *g*, for providing a path for the magnetic circuit from one core to the other. The ends of the yoke-shaped piece extend through openings in the base, as clearly shown in Fig. 2.

The bearing posts for pivotally supporting the armature are indicated at *h* and are provided at their upper ends with the usual V-shaped bearing points *i*, threaded there-

through. The oppositely facing inner ends of the core pieces *e* are provided with pole pieces *j*, the faces of which are curved and made concentric with the axis of the armature. It will be noticed that these pole pieces are alternately off-set from the axis of the core pieces *e* so that one is arranged above and the other below the axis of the core pieces *e*. The horn portions *k* of each pole piece are somewhat extended toward the vertical plane passing through the axis of the armature.

Referring now to the construction of the armature: The armature, which is designated by the letter *m* is pivotally mounted at the point *m*¹ and the opposite ends thereof are formed on a curve concentric to the face of the pole pieces; the length of the arc of this curve may be suitably varied as occasion requires.

The lines *n* and *o* which extend from the curved part *q* of the armature form an obtuse angle *n*¹ with each other and as a consequence of this structure there is formed a large air gap *n*² between the curved part of the pole pieces and the armature whereby the leakage of the lines of force that may occur from the pole pieces to the armature is reduced to a minimum. It will be observed that this armature normally stands so that the ends *q* are away from the curved faces of the pole pieces and that only the corners *r* are adjacent or juxtaposed to the horns *k* of the pole pieces, this position being maintained by means of a spring *s*, or other equivalent means.

When the circuit is closed, the lines of force are concentrated at the horns *k* of the pole pieces. From these points they will pass into one of the corner portions *r* of the armature, then through the armature itself and out the other corner portion *r* and into the other pole piece *j* through the cores *e* and yoke *f*. These lines of force being thus concentrated will exert a powerful pull on the armature to rotate the same because the double leverage arm *t* of the armature is long; and, for a further reason that as the armature is rotated and drawn downward into horizontal position the mass of magnetic material which is in the end portions *q* of the armature will gradually close up the air-gap *n*². This action will reduce the magnetic reluctance of the circuit with the result that the pull exerted on the armature

will be gradually increased as the armature is rotated toward the horizontal position.

What I claim is:—

1. An electromagnetic construction having in combination with the cores thereof, pole pieces provided with curved surfaces which are concentric with the axis of the armature, said pole pieces being eccentrically arranged with relation to the axis of the cores, the horn portion of each pole piece being extended toward the vertical plane passing through the axis of the armature, an armature having fan-shaped ends and normally held with a corner portion adjacent the horns of the poles, the main portion of the fan-shaped ends lying outside of the influence of the pole pieces, whereby when the electromagnet is energized the pull on the armature will gradually increase as the armature rotates toward the pole pieces.

2. In an electro-magnet having in combination with the core elements thereof pole-pieces secured to said elements and extending in opposite directions from the axis of the cores, an armature, the ends thereof being curved concentrically with relation to the pole-pieces, means for normally maintaining the armature with its ends outside of the influence of the pole-faces, the ends of the armature being fan-shape, whereby when the cores are energized and the armature rotated, the air-gap between the pole-faces and armature is gradually closed up, and whereby the torque exerted on the armature is gradually increased as the armature is rotated.

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Witnesses:

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