

(No Model.)

F. M. SCHMIDT.
ELECTRO MAGNET.

No. 438,780.

Patented Oct. 21, 1890.

Fig. 1

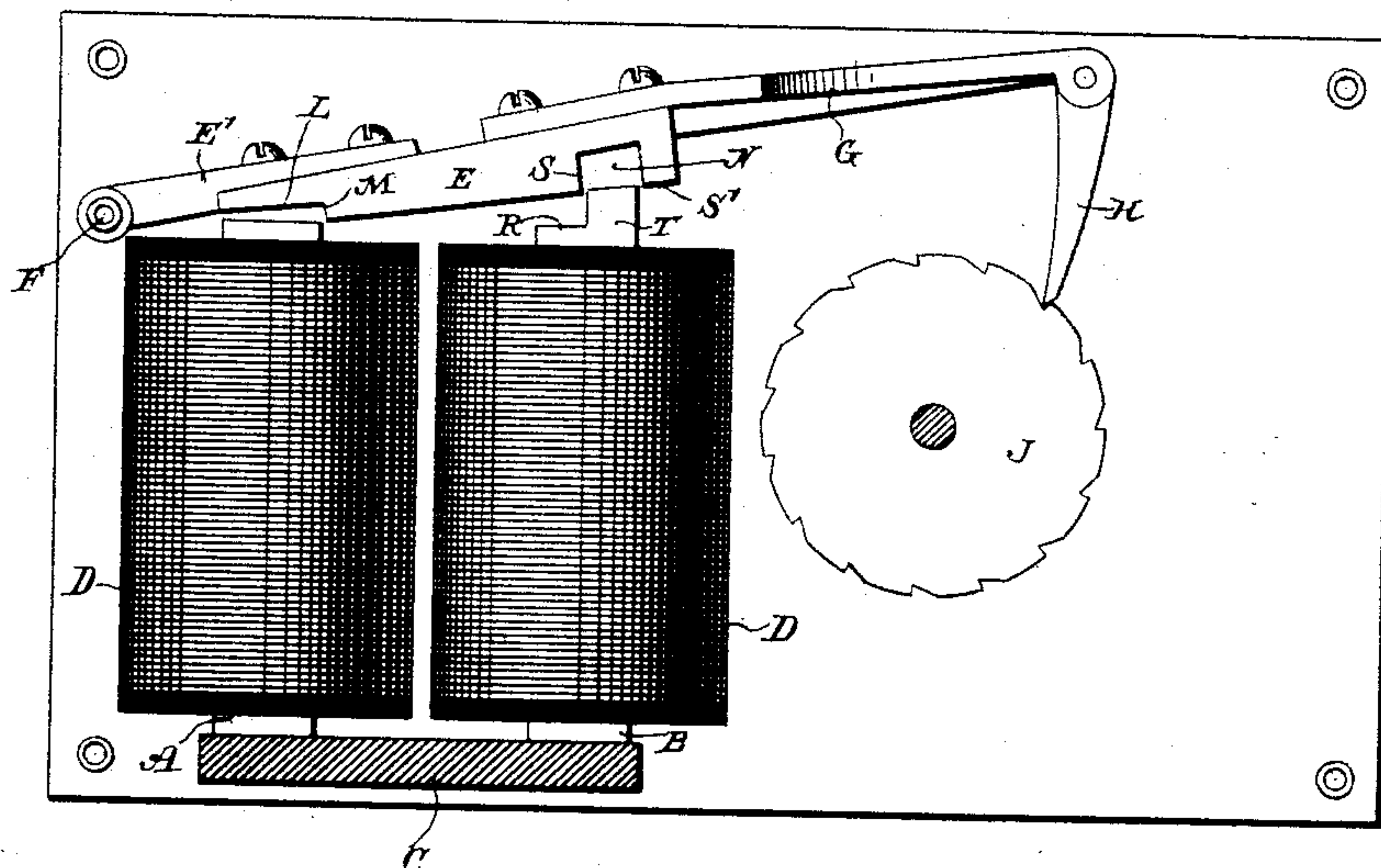
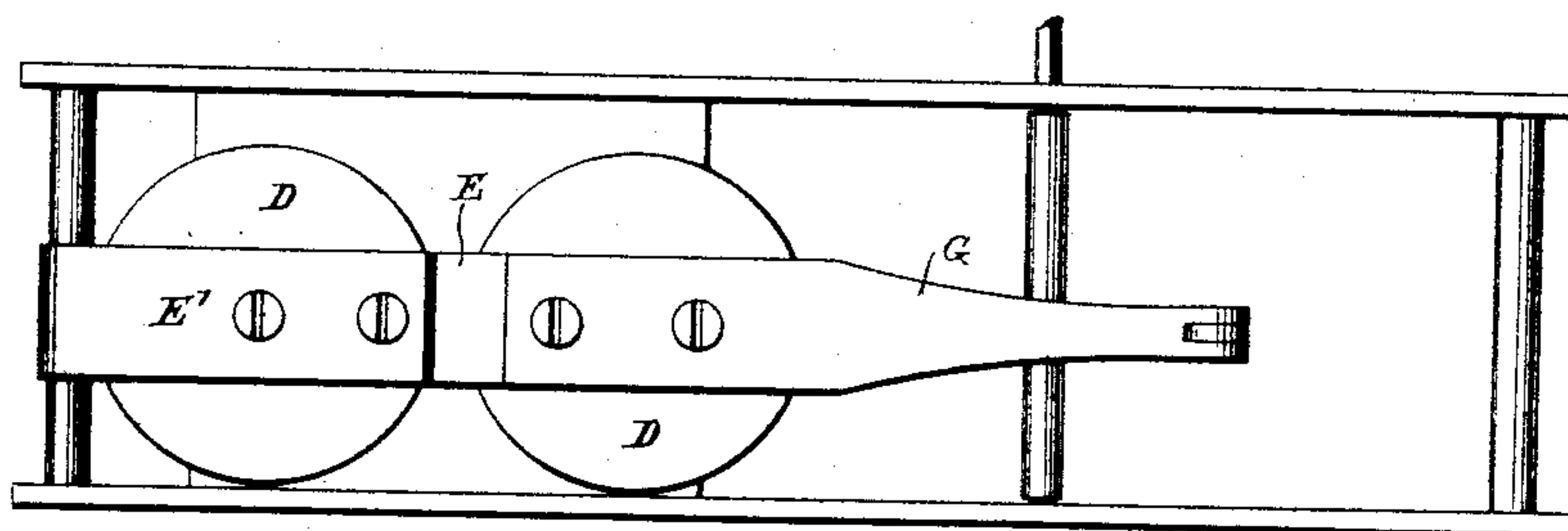


Fig. 2



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UNITED STATES PATENT OFFICE.

FREDRICK M. SCHMIDT, OF BROOKLYN, NEW YORK.

ELECTRO-MAGNET.

SPECIFICATION forming part of Letters Patent No. 438,780, dated October 21, 1890.

Application filed July 31, 1890. Serial No. 360,462. (No model.)

To all whom it may concern:

Be it known that I, FREDRICK M. SCHMIDT, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Electro-Magnets, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

This invention consists of a bipolar electro-magnet and armature of new and improved character, the device being one of those which are especially designed for performing some mechanical work—such as turning a ratchet-wheel, lifting a weight, or the like—and in which a powerful effort of the armature through a given space is called for.

My object has been to produce a simple, cheap, and effective magnet and armature of this kind, and this I have succeeded in accomplishing by the device illustrated in the accompanying drawings. The novelty of this device, being in its special features of construction, will be described by reference to said drawings.

Figure 1 is a side elevation of the magnet and armature. Fig. 2 is a top plan view of the same.

The electro-magnet is composed of the two cores of soft iron A and B, joined by the yoke C. The cores are wound with insulated coils D.

The armature E is secured to the end of a non-magnetic arm E', pivoted at one end at a point F in line with the poles of the cores and carries a non-magnetic extension G, to which is pivoted a pawl H, engaging with a ratchet-wheel J. It will be observed that the free end of the armature may be connected directly or indirectly in any other well-known way to the mechanism which is to be operated or actuated thereby, the use to which it is to be applied determining the manner in which it is to be mounted or supported and the relative dimensions of its cores and coils. This armature has the following peculiarities: It is slightly tapered from its free toward its pivotal end and is formed with a notch or step L at its pivotal end, which is formed by a thinning of the iron, leaving a shoulder M, that passes closely down the side of the core A in the movement of the armature, and a

recess N, which is just large enough to permit the entrance of the pole or end of core B. About one-half of the core B is extended above the level of the core A, and this extension T is the only part of the core B that enters the recess in the armature D. The cores may be round or rectangular in cross-section, and the recesses in the armature will be made to conform to the shape of the same.

The main feature of this device is the evenness and strength of the pull. The armature in Fig. 1 is shown as in its normal position, or when the magnet is exerting no attraction. In such position it will be observed that the corners or shoulders M and S S' are very close to the edges of the cores A and B, respectively, thus nearly closing the magnetic circuit and intensifying and concentrating the magnetic lines between these points. The first movement of the armature toward the magnet brings the recessed or notched portion L of the armature in very close proximity to the pole A, since the range of motion of this portion of the armature is very small, while at the other end the projection or extension T, entering the recess N, still further concentrates the magnetic lines and brings the edge S into close proximity to the step R of the core B.

From numerous experiments which I have made I have found the above-described device to be the best adapted for such purposes as winding a clock mechanism and the like of any of which I am aware.

The armature is not necessarily composed of a single piece of iron, but may be built up of several pieces. I have shown and described the apparatus, however, in the specific form which I have found to yield the best results.

What I claim is—

1. The combination, with a bipolar electro-magnet, of an armature having a pivotal support in the line of the poles and tapering from its free toward its pivot end and provided with a recess at or near its free end, adapted in its movement toward the magnet to receive and surround one of the poles of the same, as set forth.

2. The combination, with an electro-magnet one of the poles of which is plain, while the other is provided with an extension of

smaller cross-section than the main core, of
an armature supported by or pivoted in the
line of the poles and provided with a recess
near its free end, adapted to receive the said
5 polar extension of one of the poles, as set forth.

3. The combination, with the electro-mag-
net having one pole extended and formed
with a step R, of the tapering soft-iron arma-

ture E, carried by the pivoted arm E', secured
to its smaller end and formed with a thinned 10
part L, and a recess N near its free end, adapted
to receive the extension, as set forth.

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Witnesses:

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