No. 694,778. Patented Mar. 4, 1902.

D. PERRET.

ELECTROMAGNET APPARATUS.

(Application filed Oct. 16, 1901.)

(No Model.)

Fig. 1.

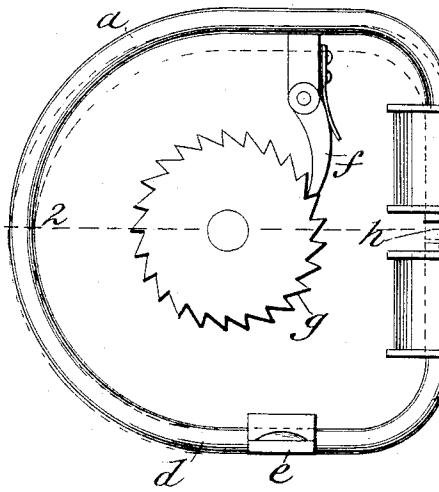


Fig. 3.

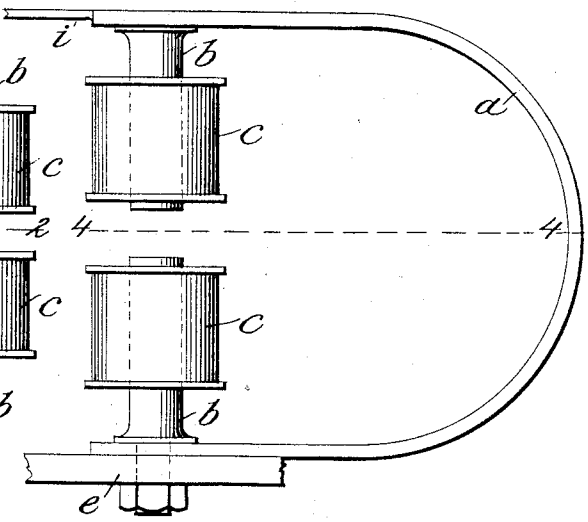


Fig. 2.

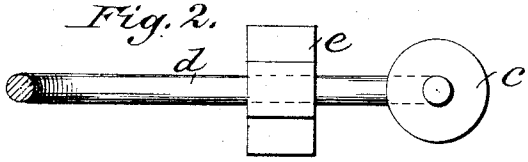


Fig. 4.

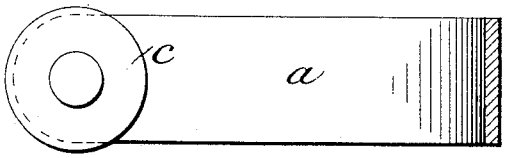


Fig. 7.

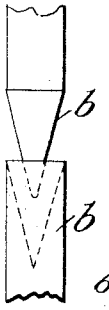


Fig. 5.

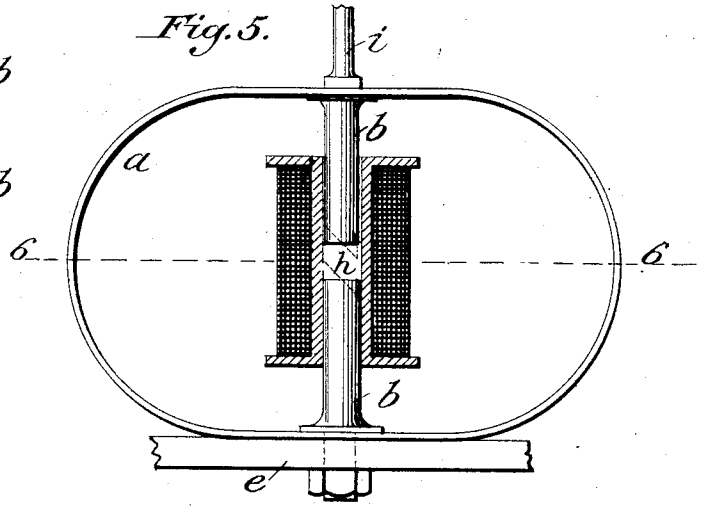
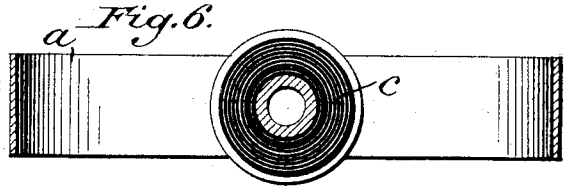


Fig. 6.



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UNITED STATES PATENT OFFICE.

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ELECTROMAGNET APPARATUS.

SPECIFICATION forming part of Letters Patent No. 694,778, dated March 4, 1902.

Application filed October 16, 1901. Serial No. 78,824. (No model.)

To all whom it may concern:

Be it known that I, DAVID PERRET, a citizen of Switzerland, residing at Fabrique d'Horlogerie du Plan, Neufchâtel, in the Republic of Switzerland, have invented certain new and useful Improvements in Electromagnet Apparatus, (patent applied for in Switzerland January 28, 1901; in Germany February 13, 1901, and in England September 18, 1901;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

In the electromagnet apparatus forming the object of the present invention the lines-of-force circuit between two magnet-poles situated opposite one another is formed by a stirrup of flexible material which is without break and connects the said two poles together in such a manner that as the electric circuit is alternately closed and opened these magnet-poles, or, rather, one of them, is caused to vibrate in the same manner as a contact-breaker oscillates.

In the annexed drawings, Figures 1, 3, and 5 are elevations showing various forms of the device. Figs. 2, 4, and 6 are central horizontal sections of Figs. 1, 3, and 5, respectively; and Fig. 7 is a detail view showing a modified form of the pole-surfaces.

In the form of construction shown in Figs. 1 and 2 the flexible stirrup *a*, connecting the two magnet-poles *b*, is made of round iron, and each pole *b* carries an exciter-coil *c*. The stirrup *a* is fixed by one of its arms *d* at *e*, while to its other free arm a pawl *f* is pivoted, this latter engaging with the ratchet-wheel *g* and partially revolving the same at each excitation of the electromagnet. The air-gap is referred to with the letter *h*. This apparatus can be so arranged that instead of the approaching movement of both the poles *b* their opposite (receding) motion can be employed to actuate the ratchet-wheel *g*, or both motions may be made use of for this purpose. The flexible stirrup may also be secured at its arch and both arms of the same provided with motion-transmitting gear.

In the modification according to Figs. 3 and 4 the flexible stirrup is made of flat iron, the poles *b*, carrying the exciter-coils *c*, being, however, of round iron. This stirrup *a* is fastened by one of its arms at *e*, while on a prolongation of the other free arm the motion-transmitting-gear pawl or the like is mounted.

In the modification according to Figs. 5 and 6 the stirrup *a* forms a full ring, the said ring being made of flat iron and set symmetrically to the axis of the pole-pieces *b*, of round iron, which are secured to the inside of the ring and arranged diametrically opposite to one another and to the axis of the exciter-coil *c*. This latter can be fastened either to one of the pole-pieces *b* or to a special support. The flexible ring *a* is secured at *e*, and the motion-transmitting-gear pawl or the like, and in certain cases the working element itself, such as a hammer, punch, or the like, can be secured to the prolongation *i*. In this modification the motion of the pole-piece *b* is exactly rectilineal, and the symmetrical shape of the flexible ring *a* forms a most efficient magnetic circuit for the lines of force. The pole-surfaces may be at any angle to the direction of motion, as shown dotted in Fig. 5. They may also be conically shaped, as shown in Fig. 7.

This electromagnetic apparatus may be used for a source of motive power—as, for example, for driving clock mechanism, as well as for electric disengaging-gear, for example, in door-locks and the like; also, as relays for closing circuits, and, if constructed of suitable dimensions, may be used even for ramming mechanism, punches, shears, stamps, and similar apparatus. In these larger sizes of the apparatus, in order to avoid Foucault currents, the flexible stirrup or ring may be formed of insulated laminations, wires, or the like.

Having now particularly described and as-

certained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

1. In an electromagnetic device, the combination with a complete magnetic circuit of elastic magnetic material, of an exciter-coil connected to said magnetic material.

2. In an electromagnetic apparatus, the combination with a flexible loop of magnetic material forming a complete magnetic circuit, of pole-pieces projecting from opposite portions of said loop toward each other, and an exciter-coil surrounding said pole-pieces.

In testimony whereof I affix my signature in presence of two witnesses.

DAVID PERRET.

Witnesses:
EDUARD VON WALDKIRCH,
ADOLF FEDERER.