

(No Model.)

H. RABE.

ELECTRIC IMPULSION DEVICE FOR A TORSION PENDULUM.

No. 325,113.

Patented Aug. 25, 1885.

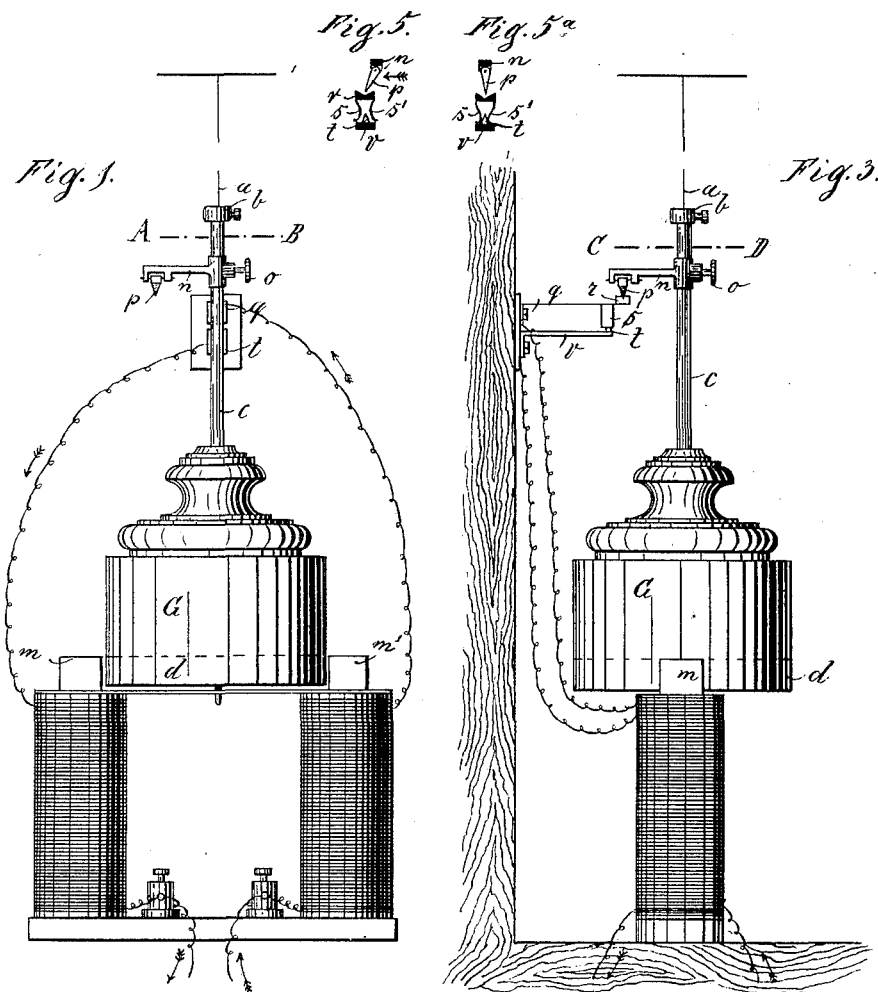


Fig. 2.

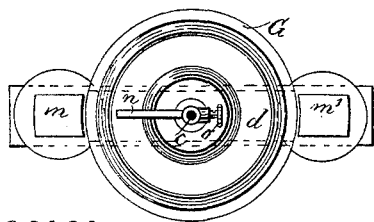
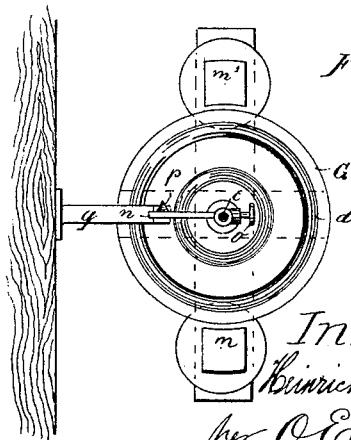


Fig. 4.



Witnesses
Leocadia Duffy
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att'y

UNITED STATES PATENT OFFICE

HEINRICH RABE, OF HANAU, PRUSSIA, GERMANY.

ELECTRIC IMPULSION DEVICE FOR A TORSION-PENDULUM.

SPECIFICATION forming part of Letters Patent No. 325,113, dated August 25, 1885.

Application filed September 24, 1884. (No model.)

To all whom it may concern:

Be it known that I, HEINRICH RABE, a subject of the King of Prussia, residing at Hanau, in the Kingdom of Prussia, have invented a new and useful Improved Torsion-Pendulum, of which the following is a specification.

The torsion-pendulum, driven by electricity and hereinafter described, is based upon this: that it receives an impulse from an electro-magnet when the angle of torsion has decreased to a certain degree, and the electro-magnet is excited when an electric circuit, deriving current from any desired source, is automatically completed.

One convenient construction for electrically driving a torsion-pendulum is shown in the accompanying drawings, in which—

Figure 1 is front view of the pendulum; Fig. 2, a section on line A B of Fig. 1; Fig. 3, a side elevation; Fig. 4, a section on line C D, Fig. 3. Figs. 5 and 5^a show details of the controlling device.

a is the torsion ribbon or strip. This consists, as is well known, of a strip of steel or other suitable material. It is suspended in the well-known manner at the top and connected with a clock-work or other mechanism requiring to be regulated. The lower end of the torsion-ribbon *a* is clamped by a clamping device, *b*, to the rod *c*, upon which latter a weight, *G*, is placed. This weight may consist of any suitable metal or stone. In the lower part of the weight *G* and in the same plane with the poles *m m'* of an electro-magnet, hereinafter mentioned, is placed an armature, *d*, (see Figs. 1, 2, 3, 4,) made of iron and let into a recess traversing the lower face of the weight *G* diametrically.

m m' are the poles of an electro-magnet, and the direction of the electric current, generated by a battery or otherwise and serving to excite the magnet, is shown by arrows, Figs. 1 and 3.

The weight *G* rotates, as already stated and with as little clearance as possible, between the poles *m m'* in such a manner that the armature *d* is in one plane with these latter, Figs. 1 and 2.

The contact device by which the completion of the circuit is effected by the pendulum itself, and automatically whenever required, is arranged as follows: On the rod *c* an arm, *n*,

is fixed, which is adjustable both vertically and horizontally, and maintained in position by a set-screw. On the forward end of this arm *n* a prismatic or wedge-shaped piece, *p*, Figs. 1, 2, 3, 4, 5, 5^a, is loosely fixed so as to be capable of turning on a hinge. This piece *p* by its own weight always tends to assume a vertical position. The conducting-wire coming from the coils of the pole *m'* of the electro-magnet is suitably connected with a spring, *q*, which on its forward end carries a small trough, the hollow part of which is preferably V shape. (See Figs. 5 and 5^a.) Two contact springs, *s s'*, are also provided on the said spring *q*, and these, when pressed downward, bear upon the oblique surfaces of a wedge, *t*. The wedge *t* is fixed on a metal angle-piece, which is electrically connected with the wire which leads to the conducting-wire.

The operation is as follows: When the angle of torsion is sufficiently large, the prismatic piece, which hangs very loosely on the arm *n*, slides over the trough *r* without depressing the trough or spring *q*, and as the contact-springs *s s'* do not touch the wedge, Fig. 5, the current is interrupted. When, however, in time the angle of torsion becomes so small that reversal of the direction of rotation of the pendulum takes place, the prismatic piece *p* presses upon the trough *r* and spring *q* by assuming the position shown in Fig. 5^a. By this means the contact-springs *s s'* touch the wedge *t*, the circuit is closed, and the poles *m m'* attract the armature *d*, thus imparting a fresh impulse to the pendulum.

Having now described my said invention, I wish it to be understood that what I claim, and desire to protect by United States Letters Patent, is—

1. In combination, a torsional pendulum, a radial arm secured thereto, a pendant loosely pivoted thereto, and a spring circuit-closer set in the path thereof and at such a relation thereto that it will be operated to close the circuit only when the pendant is in its vertical position, as set forth.

2. In combination, the torsional pendulum, the stem *c*, the radial arm *n* thereon, the pendant *p*, pivoted to said arm, the spring *q*, having trough *r* and springs *s s'*, and the wedge *t*, as and for the purpose set forth.

3. A torsional pendulum provided with an

armature, an electro-magnet having its poles in the same plane with said armature, and a circuit-closing mechanism attached to the pendulum, operative to close the circuit only in the position which the pendulum assumes at the end of a retarded stroke, whereby electrical impulse is given at that time, as set forth.

4. A torsional pendulum having a radial arm attached adjustably thereto and a circuit-

closing device pendent from said arm, whereby the time of giving the electrical impulse may be accurately adjusted, as set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

HEINRICH RAPE.

Witnesses:

A. S. HOGUE,

J. GRUND.