(No Model.) 2 Sheets—Sheet 1.

J. L. HUBER.

APPARATUS FOR MEASURING ELECTRIC CURRENTS.

No. 338,597. Patented Mar. 23, 1886.

Fig. 1.

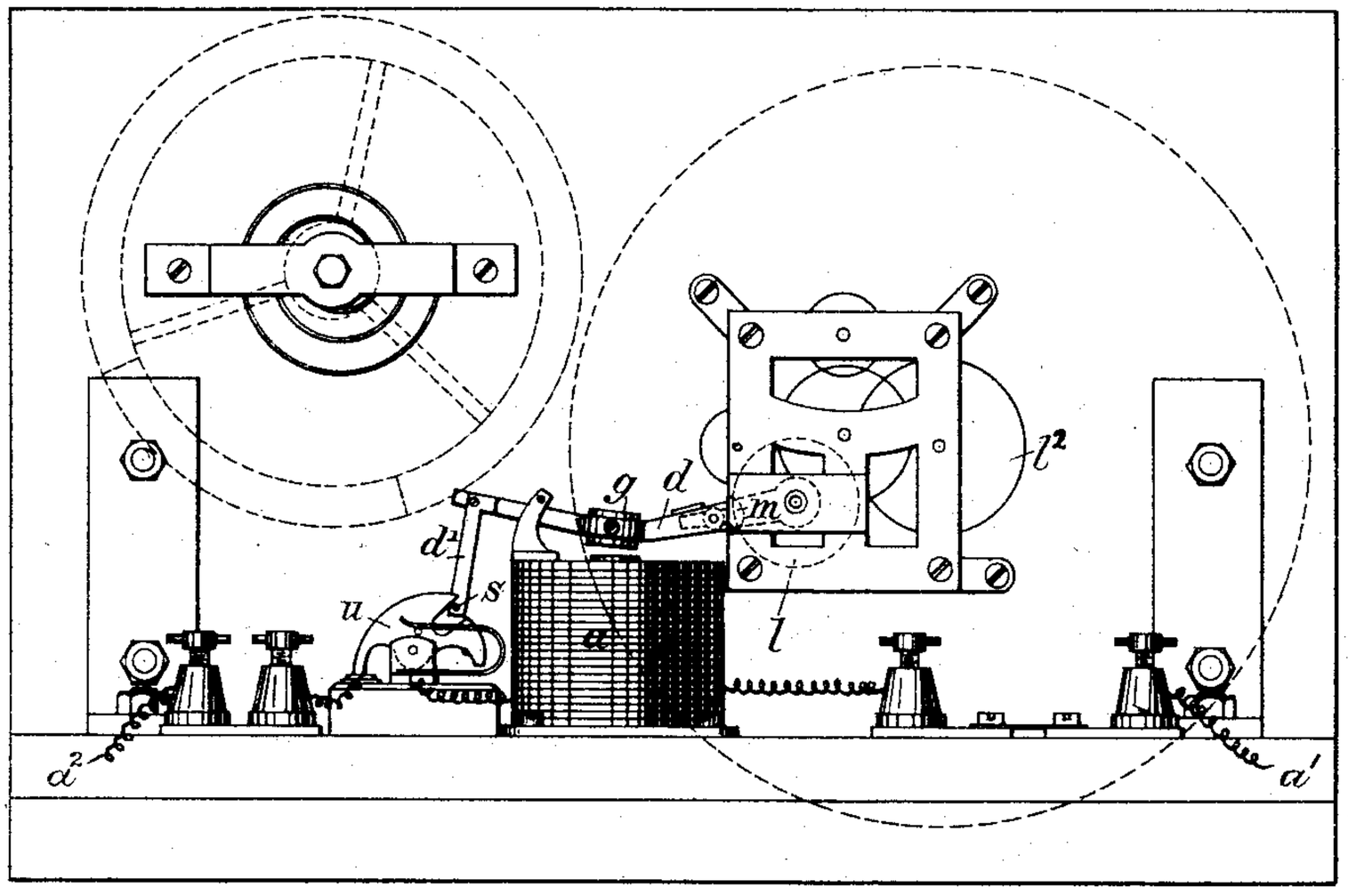
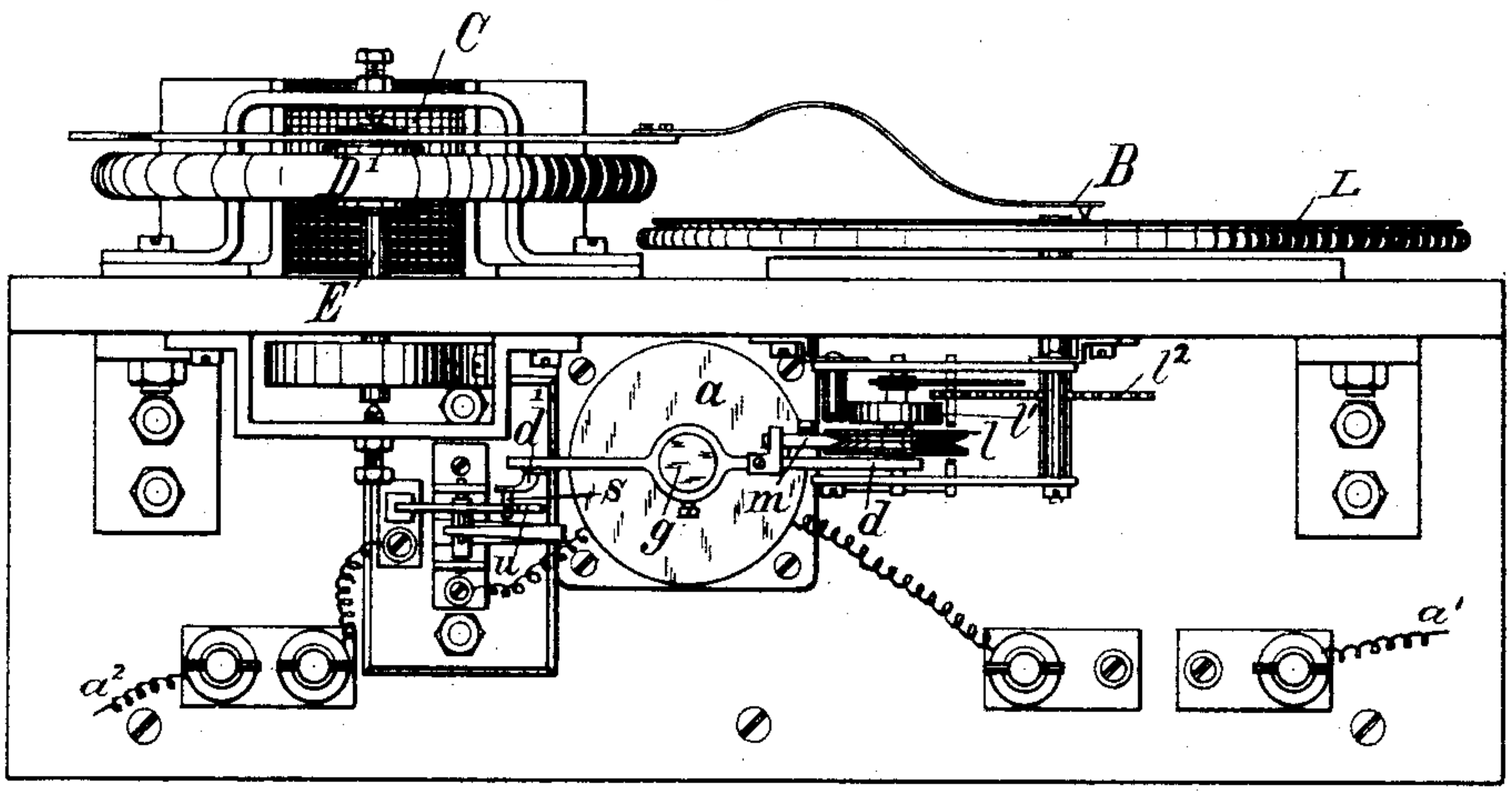


Fig. 2.



Witnesses
Geo. T. Smallwood
Jas. K. McCathran

Inventor,
Joseph L. Huber,
By Paine & Lad,
Attys.

(No Model.) 2 Sheets—Sheet 2.

J. L. HUBER.

APPARATUS FOR MEASURING ELECTRIC CURRENTS.

No. 338,597. Patented Mar. 23, 1886.

Fig. 3.

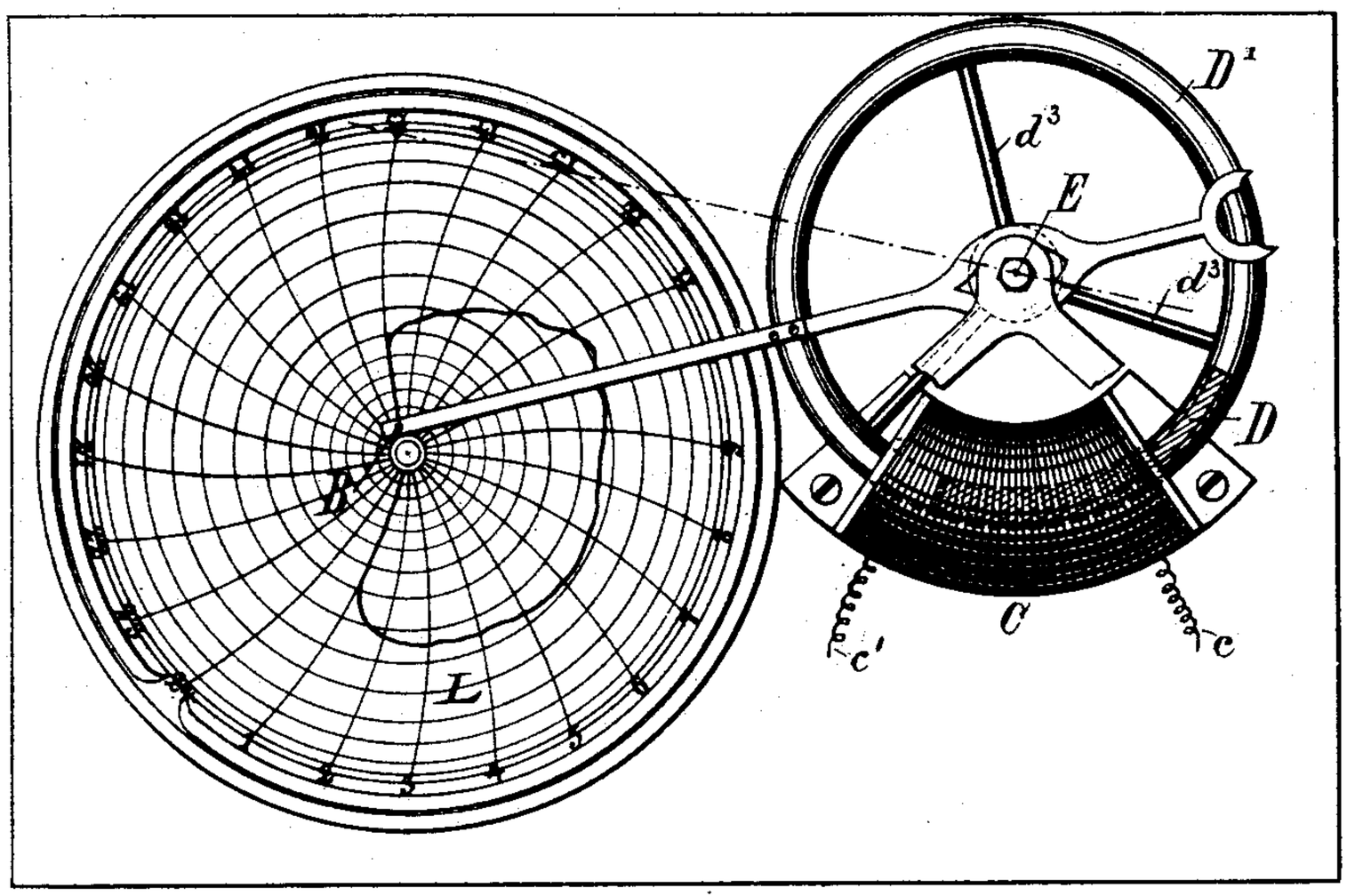
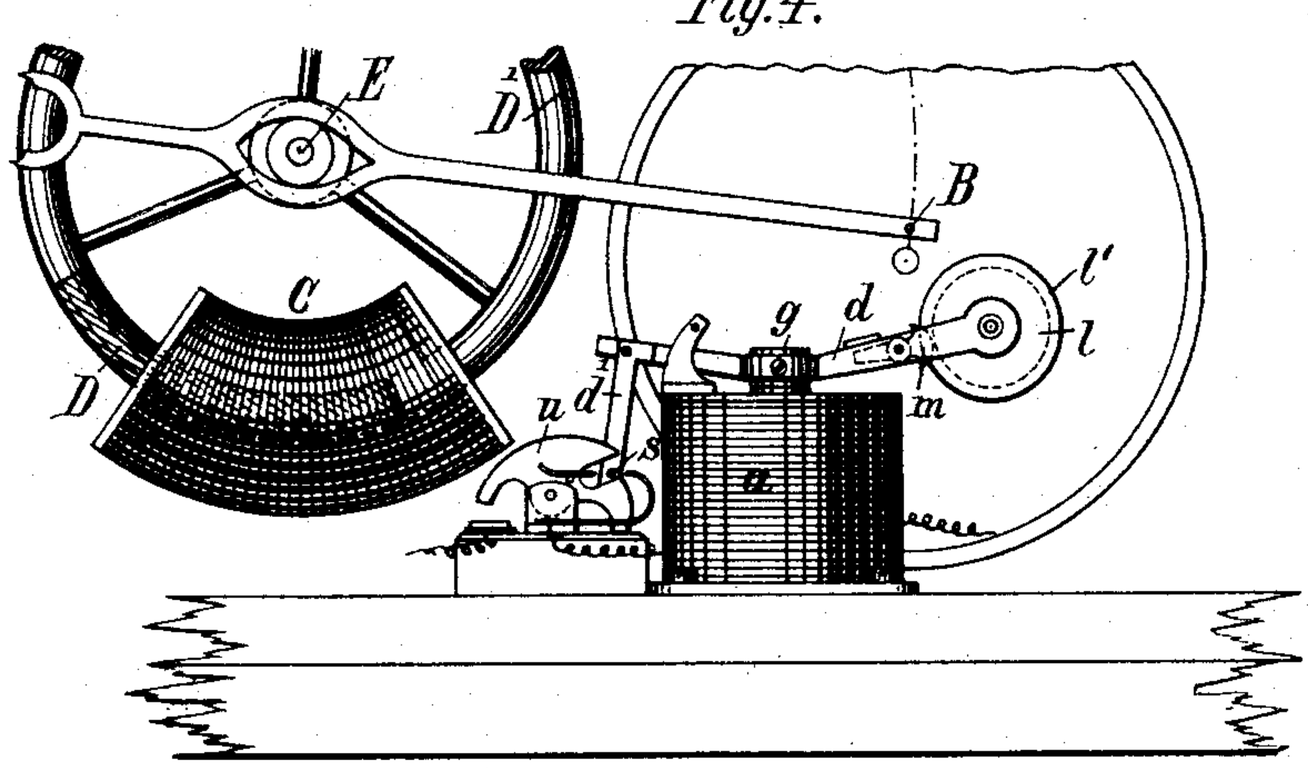


Fig. 4.



Witnesses
Geo. T. Smallwood.
Jas. K. McCathran.

Inventor
Joseph L. Huber
By Paine Lord & Co.
Attys.

UNITED STATES PATENT OFFICE.

JOSEPH LEOPOLD HUBER, OF HAMBURG, GERMANY.

APPARATUS FOR MEASURING ELECTRIC CURRENTS.

SPECIFICATION forming part of Letters Patent No. 338,597, dated March 23, 1886.

Application filed September 15, 1885. Serial No. 177,200. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH LEOPOLD HUBER, a subject of the German Emperor, and a resident of Hamburg, in the German Empire, have invented certain new and useful Improvements in Apparatus for Measuring Electric Currents, of which the following is a specification.

This invention relates to apparatus for measuring electric currents, and more particularly to the class of apparatus shown and described in my application for Letters Patent filed August 5, 1885.

This invention consists in the detailed construction and combination of the parts hereinafter fully described and claimed, by which the apparatus is made to work independent of the position in which it may be placed, and of any motions or shocks to which it may be subjected when placed in ships, railway-cars, or other vehicles.

In the accompanying drawings, Figure 1 is a rear elevation of the apparatus. Fig. 2 is a plan view looking downward from above. Fig. 3 is a front side elevation of the recording mechanism. Fig. 4 is a side view in detail of the driving and registering devices.

An electro-magnet, *a*, is provided and placed in the main circuit, or in some branch of the same, by means of the connecting-wires $a' a^2$.

Instead of moving the wheel-work of the registering-gear by means of a pivoted anchor and a separate pivoted lever, as described in the above-mentioned application for Letters Patent, I connect the anchor *g* of the electro-magnet directly to a lever, *d*, which is pivoted at one end upon the spindle of the friction or ratchet wheel *l*. The lever *d* is provided with a pawl, M, of ordinary construction, suitable for engaging with the said friction or ratchet wheel, and causing it to rotate when the lever *d* is moved back and forth. When the electric current flows through the wire from a' to a^2, the anchor *g* is drawn downward and the wheel *l* rotated. This winds up a spiral spring contained within the spring-case l', and thereby sets in motion the disk L, to which it is connected by the train of clock-work mechanism l^2. The lever *d* is further provided with the arm d' on the free end of it and carrying the pin *s*. A segment-plate, *u*, is pivoted in suitable brackets and placed in the path of the current. This plate is provided with a slot in which the pin *s* works. When the pin *s* descends, it rotates the plate *u*, breaks the connection between the said plate and the wire a^2, and the anchor *g*, being no longer attracted by the current, is raised by the tension of the spring inside the casing l'. The upward movement of the anchor and the lever *d* rotates the plate *u*, and again allows the current to pass freely from a' to a^2. The anchor is again attracted and the rotation of the disk L kept up.

C is a solenoid provided with wires *c* c', for the passage of the electric current.

D is the core of the solenoid, the ends of which are connected by the portion D′, which is made of material which cannot be magnetized.

The two parts D and D′, when connected together, form a circular ring, which is connected to a central hub by means of the spokes d^3, so that the said ring is entirely balanced in all its positions.

E is the axis upon which the said ring is pivoted.

B is an indicator, which is connected to the balanced ring, so that it partakes of its movements as actuated by the said solenoid and the electric current which passes through it. The end of the indicator carries a point, which bears upon the disk L and records thereon the force of the current.

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

1. In an apparatus for measuring and registering electric currents, the combination of an electro-magnet, a lever pivoted at one end and provided with the anchor *g* and pin *s*, the segment-plate *u*, a wheel connected to the said lever by means of a ratchet and pawl, the clock-work mechanism actuated by a spring wound up by the movement of the said wheel, a revolving disk operated by the said clock-work, and an indicator bearing upon the said disk, substantially as and for the purpose set forth.

2. In an apparatus for measuring and registering electric currents, the combination of an electro-magnet, a lever pivoted at one end

and provided with the anchor *g* and pin *s*, the segment-plate *u*, a wheel connected to the said lever by means of a ratchet and pawl, the clock-work mechanism actuated by a spring wound up by the movement of the said wheel, a revolving disk operated by the said clock-work, an indicator bearing upon the said disk, and a solenoid for actuating the said indicator, substantially as and for the purpose set forth.

3. In an apparatus for measuring and registering electric currents, the combination of a balanced ring consisting of the two parts D and D′, provided with arms and pivoted on a central axis, a solenoid for operating the said ring, an indicator connected to the said ring, and a revolving disk, substantially as and for the purpose set forth.

4. In an apparatus for measuring and registering electric currents, the combination of a balanced ring consisting of the two parts D and D′, the solenoid C, the indicator B, the disk L, intermediate clock-work mechanism provided with a spring, a ratchet and pawl, the lever *d* for winding up the said spring, and provided with the anchor *g* and pin *s*, the segment-plate *u*, and the electro-magnet *a*, substantially as and for the purpose set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 13th day of August, 1885.

JOSEPH LEOPOLD HUBER.

Witnesses:
ALEXANDER SPECHT,
CHAS. R. HOYT.