

(No Model.)

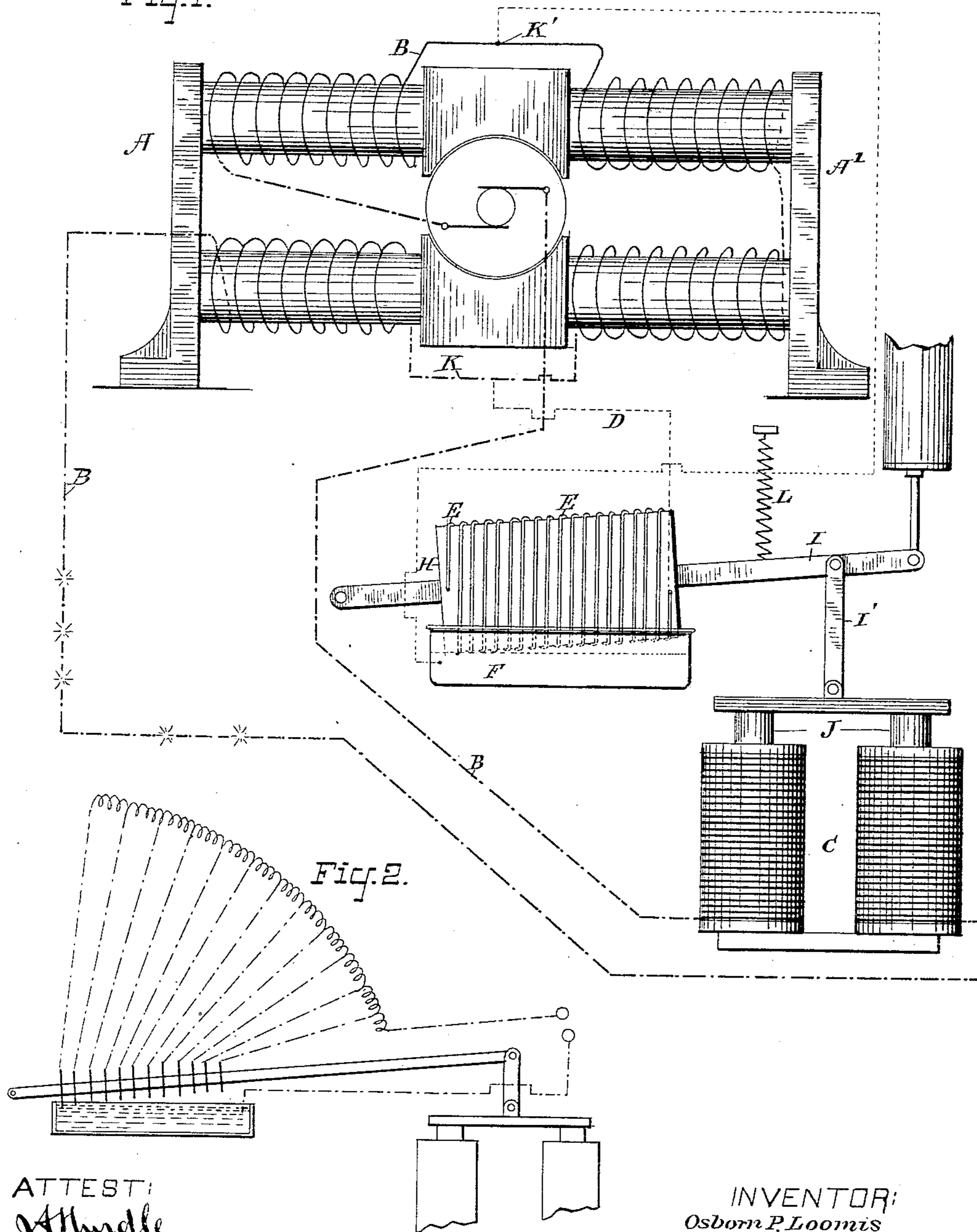
O. P. LOOMIS & H. W. COOLEY.

REGULATOR FOR DYNAMO ELECTRIC MACHINES.

No. 350,754.

Patented Oct. 12, 1886.

Fig. 1.



ATTEST:

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UNITED STATES PATENT OFFICE.

OSBORN P. LOOMIS AND HENRY W. COOLEY, OF LYNN, MASSACHUSETTS.

REGULATOR FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 350,754, dated October 12, 1886.

Application filed December 7, 1885. Serial No 184,911. (No model.)

To all whom it may concern:

Be it known that we, OSBORN P. LOOMIS and HENRY W. COOLEY, citizens of the United States, and residents of Lynn, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Current-Regulation, described, claimed, and shown in the following specification, claims, and drawings.

The invention relates to valuable and patentable features in the form, combination, and disposition of the several elements composing the invention and necessary to its operation.

Our invention more particularly relates to self-regulating dynamos comprising a variable resistance in a shunt.

Its object is to so locate this shunt and variable resistance that the magnetic field is regulated through a greater range and very gradually.

Our invention consists in general in placing a variable resistance in a shunt-circuit whose terminals are also the common terminals of both of the coils of the field-magnets of a dynamo-electric generator.

In order to illustrate the practical manner of carrying out the invention, drawings are hereunto annexed and described, in which similar letters of reference represent corresponding elements, and in which each part referred to is designated by a single letter.

Figure 1 shows the invention in general, while Fig. 2 shows a modification.

The device embodying means for generating and regulating electric currents consists of the combination of field-magnets A and A', a main or working circuit, B, solenoids C in said circuit, a shunt-circuit, D, to the field-magnet A', a helical coil, E, in said shunt-circuit, a bath, F, of mercury located beneath said coils and in circuit with one or more of said coils, a pivoted support, H, for said coils, and gearing consisting of levers I and I', connecting said support to the cores J of said solenoids.

Some of the details of construction are as follows: The support for the coils in practice is at a slighter angle than represented in the drawings, for the purpose of necessitating as little movement of the cores J as possible.

The cores are preferably made of German-sil-

ver wire on account of its high specific resistance, and the said wire, of course, should be bare. The terminals of the shunt-circuit around field-magnet A' are at K and K', which points are the common terminals of the two field-magnets A and A'. A retractile spring, L, is provided for the pivoted support.

The *modus operandi* of the device is as follows: When the resistance of the external or working circuit increases, the magnetic field tends to diminish; but the solenoids, thereby receiving less current, allow the pivoted support to rise. In turn, more turns of the coil are thrown into the shunt-circuit, thereby increasing the resistance of the shunt. Consequently more current passes through the field-magnets and the working-circuit.

The invention is not limited to the precise construction hereinbefore described and shown, as it is evident that many modifications may be made therein without departing from the spirit of the invention. For instance, the variable resistance may be modified as shown in Fig. 2. There are a series of resistance-coils, each having terminals mounted upon a pivoted support, which is geared to the solenoid-cores. A bath of mercury is provided beneath the terminals. The circuit which corresponds to the shunt-circuit D may be varied by varying the inclination of the support. A dash-pot, N, may be provided to the support, for serving the usual purposes of that article.

By shunting the two opposite arms of the field-magnets of a dynamo-electric machine the decrease of the electro-motive force is very gradual and not sudden—an effect to be taken advantage of in the construction of the shunting apparatus. Another advantage in this mode of arrangement is that the electro-motive force at the two terminals of the two arms of the said magnets is one-half the electro-motive force of the terminals of the four field-magnets according to the formula $E = C \times R$.

Having now stated the object of the said invention, having described its practical realization by reference to the accompanying drawings, and having particularly ascertained the manner in which the same operates to accomplish the said object, what we consider to be novel and original, and therefore claim as our

invention, secured to us by the hereinbefore-in-part-recited application for Letters Patent of the United States, is—

1. In a dynamo-electric generator, the combination of field-magnets and a variable resistance located in a shunt to one of said field-magnets, substantially as and for the purpose specified.

2. In a dynamo-electric machine, the combination of field-magnets, a main or working circuit, solenoids in said circuit, a shunt-circuit to one of said field-magnets, a helical coil in said shunt-circuit, a bath of mercury lo-

cated beneath said coils and in circuit with one or more of said coils, a pivoted support for said coils, and gearing connecting said support and the cores of said solenoids, substantially as and for the purpose set forth.

In testimony whereof we hereby sign our names, in the presence of two subscribing witnesses, this 24th day of November, 1885.

OSBORN P. LOOMIS.

HENRY W. COOLEY.

Witnesses:

GEORGE D. BANCROFT,
AUSTIN E. RICHARDSON.