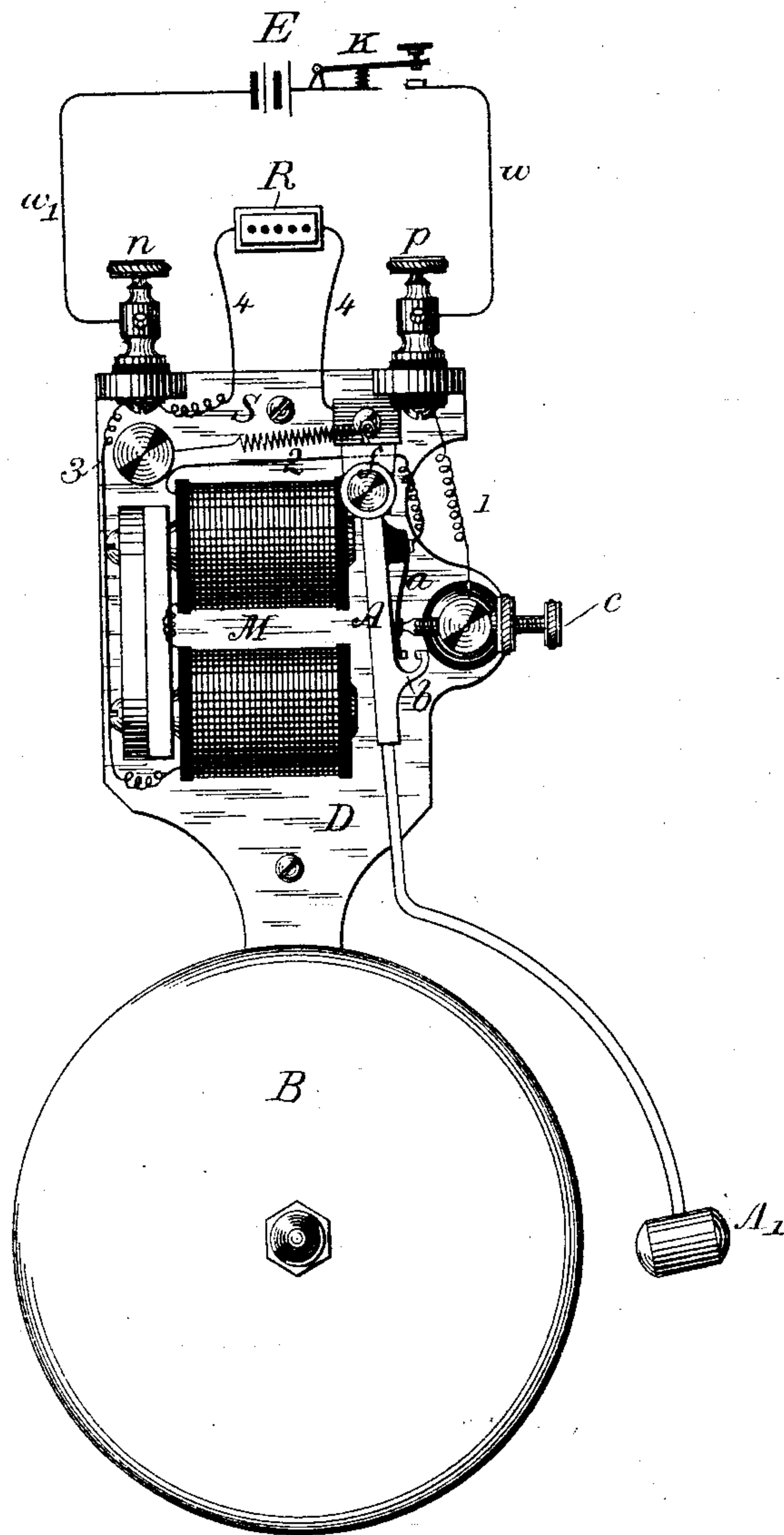


(No Model.)

F. L. POPE.
ELECTRO MAGNETIC RHEOTOME.

No. 284,480.

Patented Sept. 4, 1883.



WITNESSES

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UNITED STATES PATENT OFFICE.

FRANK L. POPE, OF ELIZABETH, NEW JERSEY.

ELECTRO-MAGNETIC RHEOTOME.

SPECIFICATION forming part of Letters Patent No. 284,480, dated September 4, 1883.

Application filed June 22, 1883. (No model.)

To all whom it may concern:

Be it known that I, FRANK L. POPE, a citizen of the United States, and a resident of Elizabeth, in the county of Union and State of New Jersey, have invented certain new and useful Improvements in Electro-Magnetic Rheotomes, of which the following is a specification.

My invention relates to certain improvements in self-acting vibratory circuit-breakers, commonly called "electro-magnetic rheotomes," which are employed for actuating continuously-ringing electric signal-bells and other similar devices.

The invention primarily has for its object the prevention of the electric spark which is produced by the self-induction of the electro-magnet at the point where the circuit is broken once in each vibration, and which rapidly oxidizes and burns away the contact-points, especially in the case of large bells, which require powerful batteries in order to operate them efficiently.

To this end my invention consists in the attachment to the vibrating armature of the rheotome of an insulated contact-spring which moves to and fro with said armature and closes the circuit of a shunt uniting the terminals of the electro-magnet at or before the instant in which the circuit between the battery and the electro-magnet is broken.

The invention further embraces the combination of an adjustable rheostat with the shunt uniting the terminals of the electro-magnet, for the purpose of controlling the rate of vibration of the armature.

The accompanying drawing is a front elevation of an electric signal-bell of the usual construction to which my invention has been applied. The battery, rheostat, and electrical connections are shown in diagram in the same figure.

The various parts of the apparatus are shown as mounted upon a suitable metallic base, D. The armature A of the electro-magnet M is pivoted at *f*, and carries a hammer, A', which, when the armature is attracted and drawn forward by the electro-magnet, impinges against the bell or gong B. The insulated contact-spring *a* is mounted upon the back of the vibrating armature A, and plays between a fixed

adjustable contact-screw, *c*, and a movable contact-stop, *b*, upon the armature A. When the apparatus is at rest, a retracting-spring, S, draws the armature A away from the poles of the electro-magnet M, and at the same time causes the contact-spring *a* to rest against the point of the contact-screw *c*, by which action it is forced away from the stop *b*, as shown in the drawing. If, now, a battery or other electric generator, E, be attached to the insulated binding-posts *n p* by means of the wires *w* and *w'*, and the normally-open key K closed, an electric current will pass through the apparatus, the course of which may be traced as follows: from the battery E, by wire *w*, binding-post *p*, and wire 1, to contact-screw *c*; thence, by contact-spring *a* and wire 2, to electro-magnet M, and thence, by wire 3, binding-post *n*, and wire *w'*, back to the battery E. This current will cause the electro-magnet M to attract its armature A; but before the armature has reached the poles of the electro-magnet the stop *b* will come in contact with the end of the contact-spring *a*, and will at the same moment, or immediately afterward, remove said contact-spring from the contact-stop *c*. The contact thus formed between the spring *a* and the stop *b* will unite the terminals of the electro-magnet M by means of the shunt-wire 4, which extends from the binding-post *n* to the armature A and stop *b*, and hence the electro-magnet M is short-circuited or closed on itself, immediately after which operation the battery-circuit is broken between the contact-spring *a* and contact-stop *c*; hence the self-induced electric current, which manifests itself within the coils of the electro-magnet the instant the battery is detached therefrom, circulates within the closed shunt, and serves the useful purpose of prolonging the action of the electro-magnet during the completion of the forward movement of the armature, after the battery has been detached, instead of being expended in producing a useless and injurious spark at the contact-points. So soon as the electro-magnet has fully discharged itself the armature will fall back by the action of the spring S, and the same operation will be repeated in the manner already described.

It will be found advisable in most cases to insert an artificial resistance, R, in the shunt-wire 4, in order to vary the rate of discharge of the electro-magnet M, and thus increase or diminish at will the rapidity of vibration of the armature A. An adjustable rheostat of the ordinary and well-known construction may be used for this purpose.

I claim as my invention—

10 1. The combination, substantially as here-
inbefore set forth, of an electro-magnet, a vi-
brating armature, a working and a resting con-
tact, an insulated contact-spring moved to and
fro between said contacts by said vibrating
15 armature, an electric generator, a conductor
connecting one pole of said generator with
said working-contact, a conductor connecting
said insulated contact-spring with one termi-
nal of the coil of said electro-magnet, and a
20 conductor connecting the other terminal of said
coil with said resting-contact.

25 2. The combination, substantially as here-
inbefore set forth, of an electro-magnet, a vi-
brating armature, a working and a resting con-
tact, an insulated contact-spring moved to and
fro between said contacts by said vibrating
armature, an electric generator, a conductor
connecting one pole of said generator with

said working-contact, a conductor connecting
said insulated contact-spring with one termi- 30
nal of the coil of said electro-magnet, and a
conductor connecting the other terminal of
said coil with said resting-contact, and also
with the remaining pole of the generator.

3. The combination, substantially as here- 35
inbefore set forth, of an electro-magnet, a vi-
brating armature, a working and a resting con-
tact, an insulated contact-spring moved to and
fro between said contacts by said vibrating
armature, an electric generator, a conductor 40
connecting one pole of said generator with said
working-contact, a conductor connecting said
insulating contact-spring with one terminal of
the coil of said electro-magnet, a conductor
connecting the other terminal of said coil with 45
the resting-contact, and also with the remain-
ing pole of the generator, and a rheostat in-
cluded in the last-named conductor.

In testimony whereof I have hereunto sub-
scribed my name this 21st day of June, A. D. 50
1883.

FRANK L. POPE.

Witnesses:

DANIEL W. EDGECOMB,
CARRIE E. DAVIDSON.