

(No Model.)

F. P. MEDINA.
TELEGRAPH RELAY.

No. 511,244.

Patented Dec. 19, 1893.

Fig. 1.

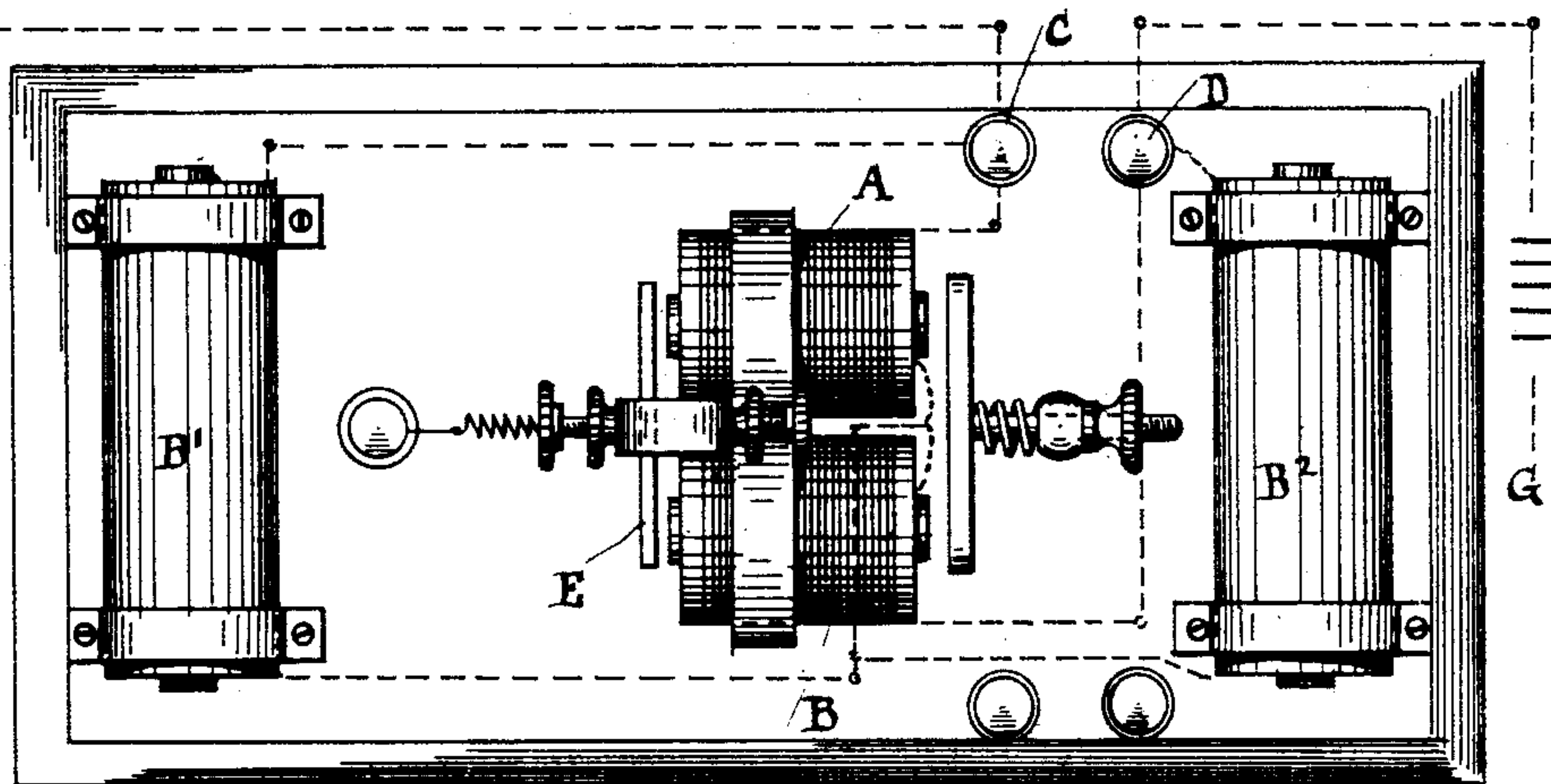
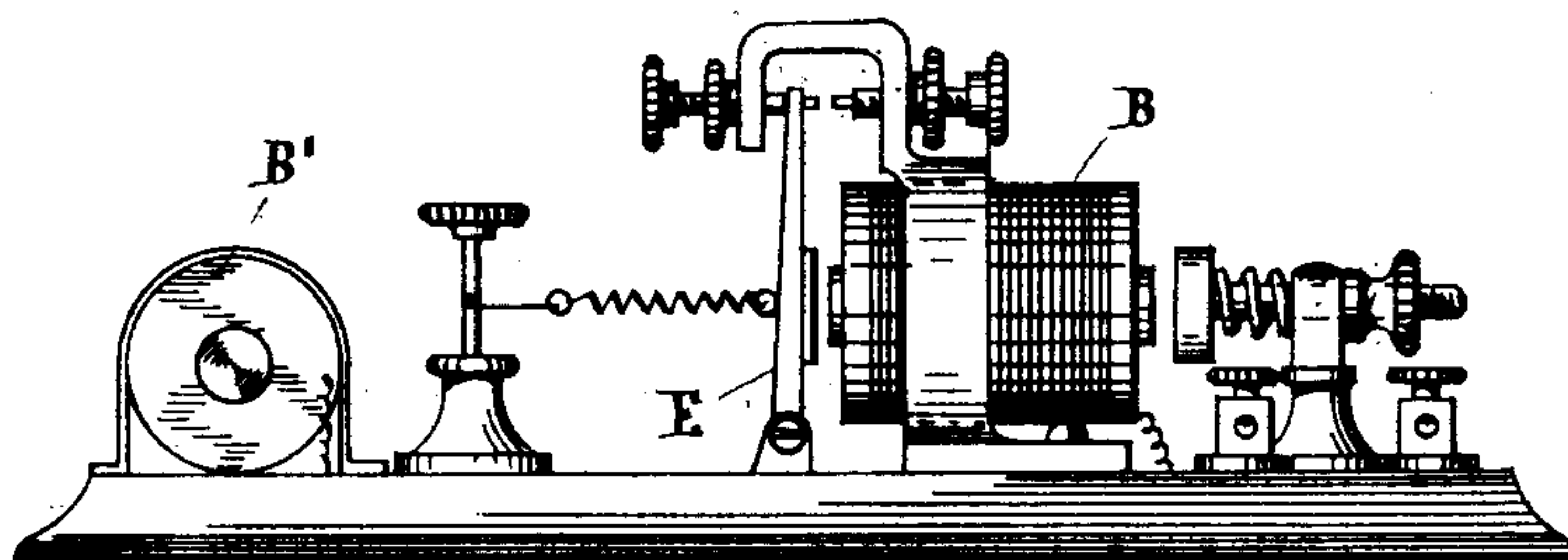
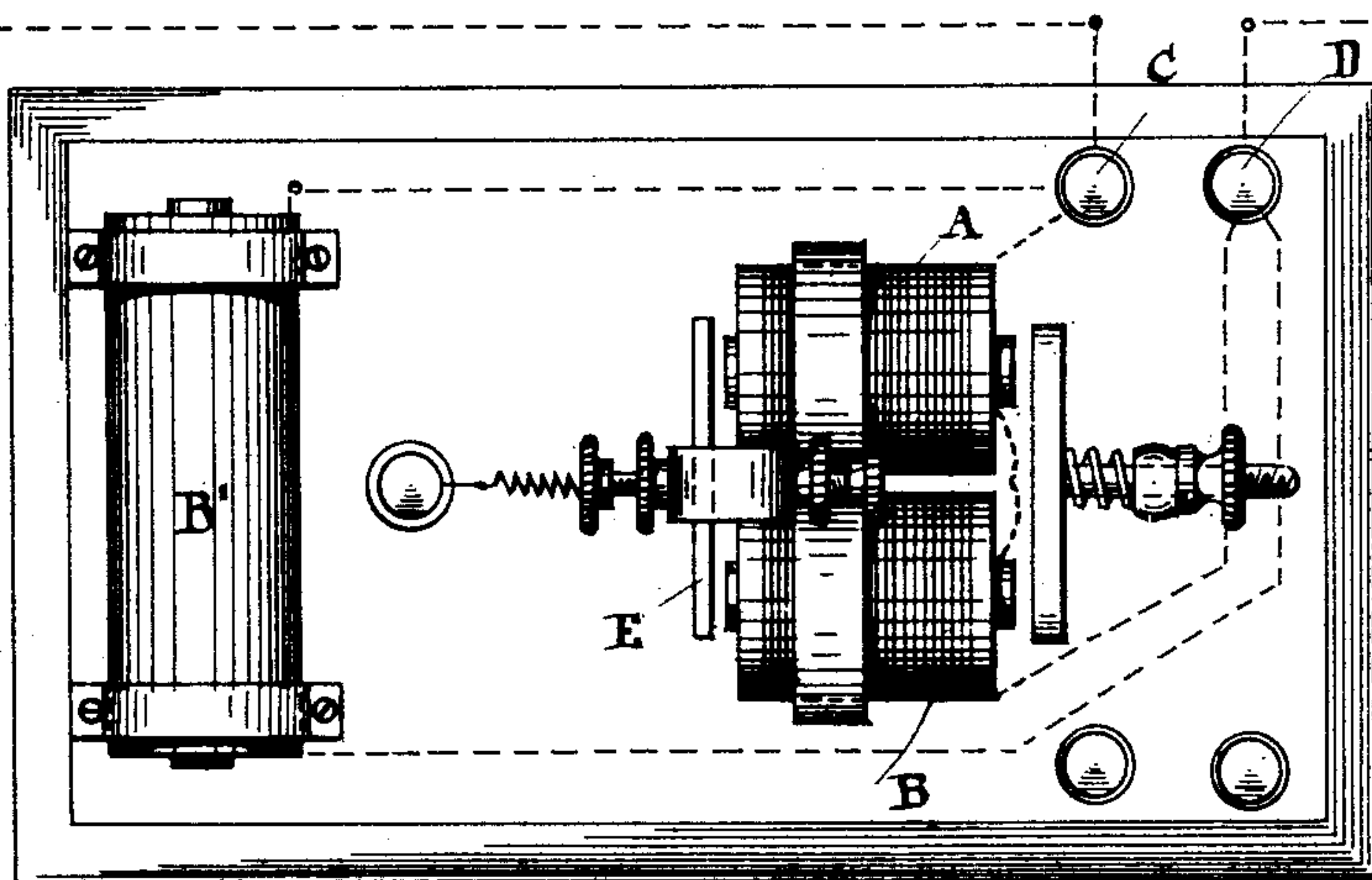


Fig. 2.



Witnesses.

H. Houtenrde.
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Fig. 3.

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UNITED STATES PATENT OFFICE.

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TELEGRAPH-RELAY.

SPECIFICATION forming part of Letters Patent No. 511,244, dated December 19, 1893.

Application filed May 4, 1891. Serial No. 391,495. (No model.)

To all whom it may concern:

Be it known that I, FRANK P. MEDINA, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Apparatus for Increasing the Efficiency of Telegraph-Relays; and I do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

It is well known that in the usual form of telegraph relays the attraction between the electro magnet and the armature, is least when the lever is on the back stop and greatest when the lever is on the front stop. The object of my invention is to reverse this and make the attraction the greatest when the lever is on the back stop and least when it is on the front stop; also to provide a means for hastening the discharge of the relay's magnetism at the end of signals.

Relays in present use are subject to the fault that their self induction tends to retard changes of current strength in their coils, and methods heretofore in use to prevent this retardation are at the sacrifice of magnetic strength. I have discovered that if the electro-magnets acting on the relay armature are constructed so as to have small self induction, and are surrounded by electro-magnetic shunt coils of relatively great self-induction, as explained more fully in detail below, there will be an added magnetic effect at the beginning of a signal and a more rapid cessation of the magnetism at the end. By the use of my invention I am further enabled to provide against or lessen the effect of leakage due to defective insulation.

For a more comprehensive understanding of my invention reference must be had to the accompanying drawings in which—

Figure 1 is a top plan view; Fig. 2 a similar view showing only one or single resistance; and Fig. 3 a view in elevation.

The letters A, B, are used to indicate the coils of a stationary electro-magnet, provided with short cores, the magnetic circuit formed by the cores in the magnets A, B, and adjustable front and back armatures E being broken by interposition of air spaces or non-magnetic

substances between the cores and armatures, as clearly shown in Fig. 1, so as to render their self induction very small, while B', B², represent the retarding resistances shunted around the magnet coils. These retarding resistances may have their self induction adjustable in well known ways.

At the beginning of a signal the relatively large time-constant of the coils B' B² turns a very large proportion of the current along the routes C A B D producing correspondingly large magnetic efforts in the coils A. B.; but as the current in the circuit approaches its steady value, more and more of it is shunted through the coils B' B² so that when the period of steady value has been reached, it divides between the electro-magnet coils A B and the retarding coils B' B² inversely as their relative ohmic resistance. Thus a weaker retractile spring can be used with this device than is ordinarily employed and relatively to the force of this retractile spring there is an increase of the attracting force of the electro-magnet. It will readily be seen that this loss of current in the electro-magnet coils is no disadvantage, since at that time the armature E is close to the cores, and can be held by a magnetic strength much weaker than that which is necessary to draw it from its back stop. At the end of a signal, the "extra current at break" due to the so called electro magnetic inertia of the retarding coil circuit flows until the iron cores are demagnetized. The direction of this current through the coils of the electro-magnet, however, is opposite to that of the current due to the distant battery, and therefore quickly depolarizes the electro-magnet cores. This effect it will be observed is due to the difference between the retarding coils and the electro-magnet coils in self induction. If this "time-constant" of both circuits were the same, the extra current would discharge to the main circuit.

As shown in Fig. 2, it is not necessary that two retarding coils be employed, but, as set forth, only one B', need be used. Neither is it necessary that the retarding coils be located upon the relay base, inasmuch as the same may be located in any desired position with equally good results.

By differentiating the electromagnets with

retarding coils, I render them capable of being used on quadruplex and duplex telegraph systems, both with or without polarized cores or armatures. In quadruplex telegraphs the use of this relay obviates the well known false signals due to reversal of a distant station battery.

Having thus described my invention, what I claim as new, and desire to secure protection in by Letters Patent of the United States, is—

1. In a relay with a circuit closing armature acted upon by the magnet of the relay, the combination of the attracting magnet B with the retarding coils B' B'' shunted around the attracting magnet as and for the purpose set forth.

2. In a relay with a circuit closing armature acted upon by the magnet of the relay, the combination of the attracting magnet B, having small self induction, with the retarding coils B' B'' having relatively large self-

induction, so as to increase the attractive force of the attracting magnet at the beginning of signals and to hasten the reversal of polarity of said attracting magnet, at the end of signals, as and for the purpose set forth.

3. In a relay with circuit closing armature, acted upon by the magnet of the relay, the combination of the attracting magnet B, with retarding resistances B' B'' connected after the manner of the arms of a Wheatstone bridge, but giving to the retarding resistances a co-efficient of self induction greater than that of the attracting magnet, as and for the purpose set forth.

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

FRANK P. MEDINA.

Witnesses:

N. A. ACKER,
LEE D. CRAIG.