No. 34,989. PATENTED APR. 15, 1862.

J. E. SMITH.

ELECTROMAGNETIC TELEGRAPH.

Fig 1

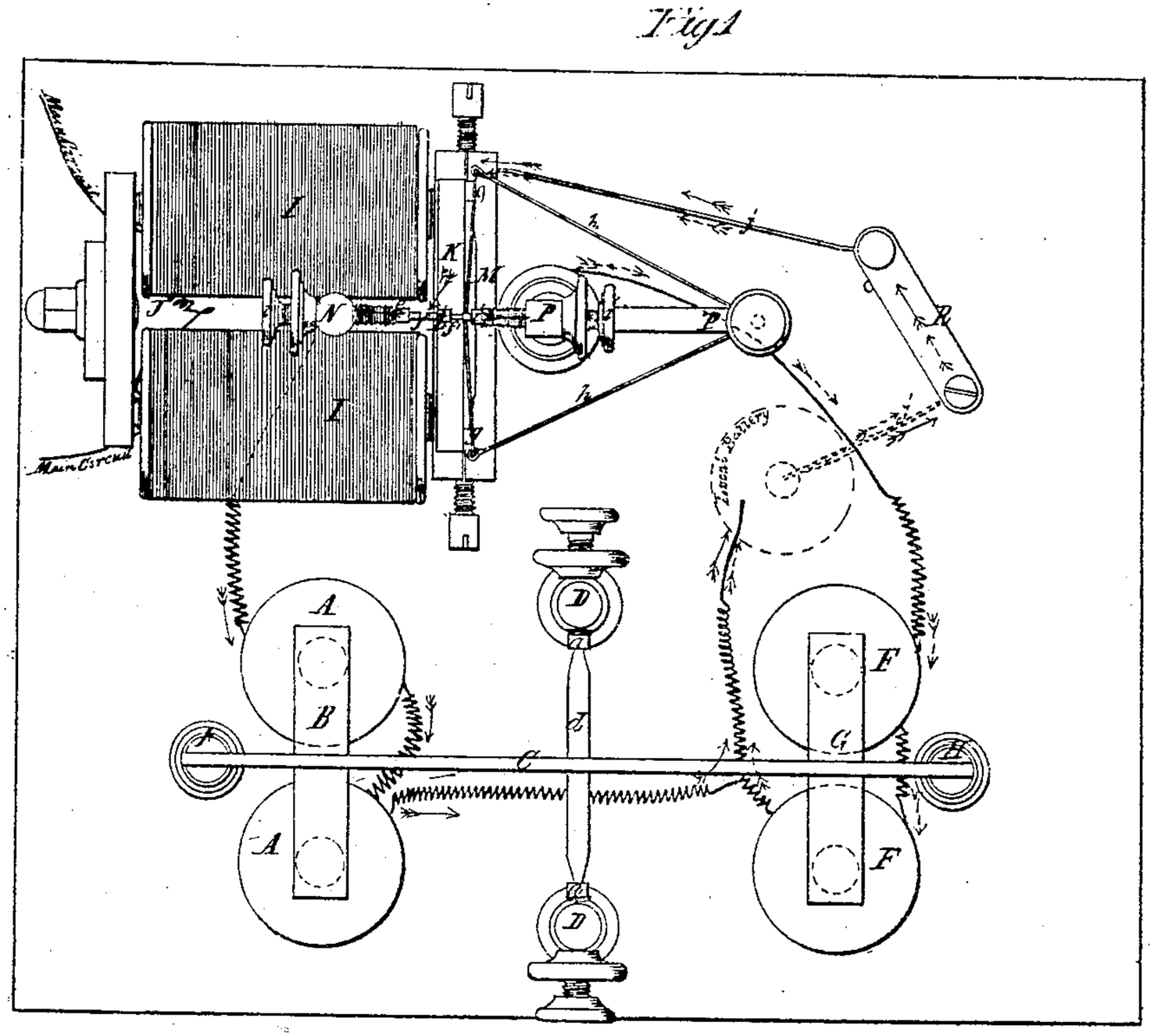
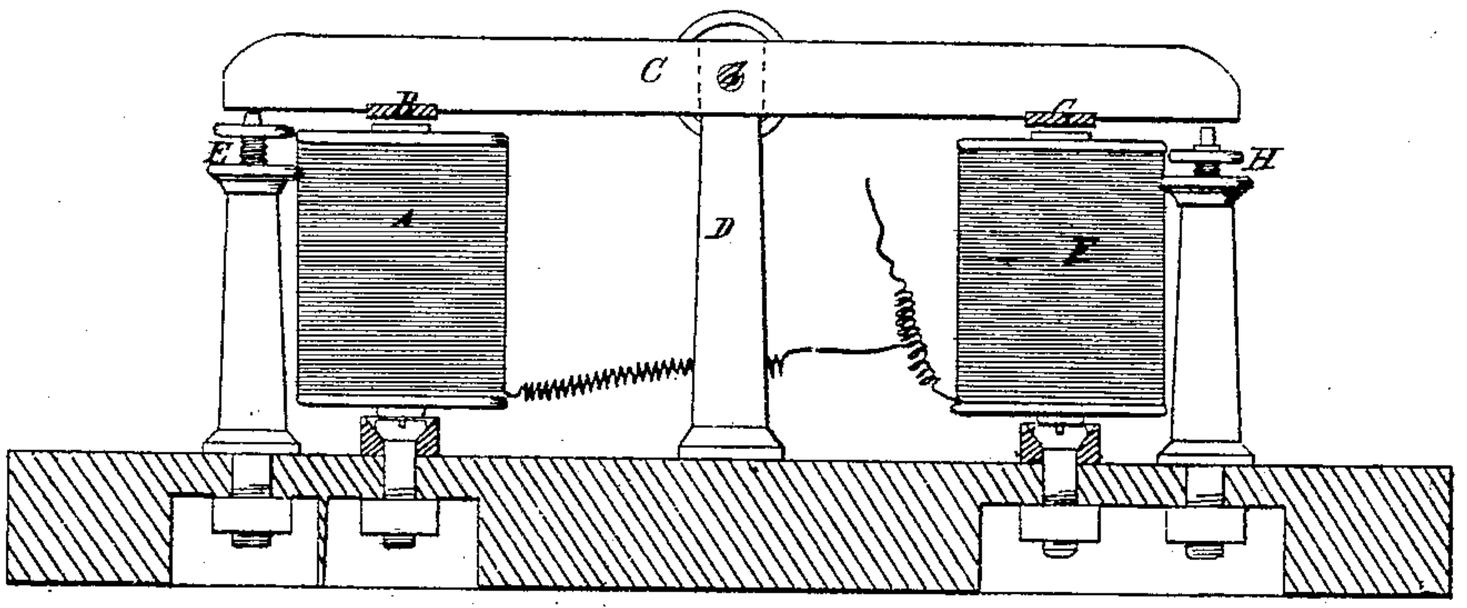


Fig 2



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IMPROVEMENT IN ELECTRO-MAGNETIC TELEGRAPHS.

Specification forming part of Letters Patent No. **34,989**, dated April 15, 1862.

To all whom it may concern:

Be it known that I, JOHN E. SMITH, of the city, county, and State of New York, have invented a new and useful Improvement in Electro-Magnetic Telegraphs; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a plan of a relay-magnet and sounder illustrating my invention. Fig. 2 is a vertical section of the sounder.

Similar letters of reference indicate corresponding parts in both figures.

This invention relates to telegraphs in which a local circuit is used. Its object is to reduce the expense of the local battery; and to this end it consists in the substitution for the spring commonly applied to the lever of the sounder or register, of an electro-magnet which is brought into operation by the recoil movement of the armature of the relay-magnet.

To enable those skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The drawings illustrate the application of my invention in connection with a simple sounder, but it is applied in precisely the same way to a register.

A A are the helices of the ordinary sounder-magnet arranged in the usual manner in the local circuit.

B is the armature of the said magnet attached to a lever, C, which is fitted with a center shaft, *d*, and which is received between center screws, *a a*, in fixed standards D D, all in the common way; and E is the screw upon which the said lever strikes when the armature B is attracted by the closing of the local circuit.

F F is the electro-magnet, which I employ in combination with the lever C as a substitute for the spring. This magnet is arranged under the opposite arm of the said lever to that under which the magnet A A is placed, and an armature, G, is attached to the said lever directly over the said magnet F F. The lever is supported between the centers *a a* at the center of its length, and is perfectly balanced—that is to say, one arm and its armature balances the other arm and its armature.

H is a screw arranged under the opposite end of the lever to the screw E, for the lever to strike upon when the armature G is attracted by the magnet F F. This screw should have its point upon which the lever strikes made of or fitted with a piece of hard vulcanized india-rubber or other substance less sonorous than metal, in order to enable the sound produced by striking it to be distinguished from that produced by striking the screw E; or other means may be adopted for obtaining such difference in the sounds produced at the two ends of the lever as to enable the alphabet to be easily read by ear, as is a common practice in telegraphing. The magnet F is arranged in a separate branch of the local circuit from that in which A A is arranged, as will be presently explained.

The relay-magnet is of ordinary construction. I I are the helices of this magnet supported by the metal standard J.

K is the armature of said magnet, attached to the lever L, which is supported in the metal standard M.

N is the post holding the screw *e*, constituting one of the usual opening and closing points of the local circuit, the other point, *f*, being in the armature-lever L. The post N and the standard M form parts of the local circuit, as usual, and the whole of the usual arrangement of the connections of this circuit and the usual arrangement of the helices A A of the sounder are retained, as may be traced by following the black arrows shown in Fig. 1, to indicate this circuit. In the above-mentioned figure the local battery is indicated by a dotted circle.

The post P, to which the recoil-spring *g* of the armature-lever L is attached by cords *h h*, and which holds the recoil-screw *i*, against which the armature-lever recoils when the main circuit is opened, forms part of that branch of the local circuit in which are placed the helices of the electro-magnet F F, such branch being, as before stated, separate from that in which the magnet A A is arranged. This branch is indicated in Fig. 1 by red arrows. The standard M forms part of this branch, as it does of the branch in which the magnet A A is placed, and the conducting-wire *j*, which connects the said standard with the battery, forms a portion of each branch of the circuit. The opening

and closing points of the branch in which the magnet F F is placed are the point of the recoil-screw *i* and the point *f'* of the armature-lever, the latter point being one end of a piece of platinum wire extending right through the lever, and the point *f* being the other end of the said wire.

The operation of the relay-magnet is the same as usual—that is to say, when the main line is closed by the key the said magnet attracts the armature K and closes the local circuit at *e f*, and when the main line is opened by the key the armature of the said segment is drawn back by its recoil-spring to the screw *i*. When the circuit is closed at *e f* the magnet A A is charged and that F F is out of circuit, and consequently only the armature B is attracted, and the said lever is brought into contact with the screw E; but when the circuit is closed at *i f'* the magnet F F is charged and A A is out of circuit, and then only the armature G is attracted and the lever is brought into contact with the screw H, and by opening and closing the key the sounder-lever is caused to strike upon the screws E and H alternately, and the sounds necessary to enable the alphabet to be distinctly read are produced.

In the above operation, owing to the absence of the spring which is commonly applied to the sounder-lever C, and which acts constantly in opposition to the magnet A A, very little local-battery power is required as compared with what is necessary when the spring is used, for before either magnet A A or F F is recharged by closing its branch of the local circuit the other one is out of circuit and the lever C, being balanced, works very easily. I have found this saving of battery power to be so great that it enables a battery of one cup to be used as effectively as a battery with three cups with the spring.

As in the use of the second magnet, F F, in combination with the lever C, the local circuit is closed at *i f'* whenever the telegraph is not in operation, I employ a circuit-breaker, R, in that branch of the local circuit in which the second magnet is placed, for the purpose of breaking the circuit during the night, or whenever the sounder is not required to be in operation, and thereby preventing unnecessary wear of the battery.

What I claim as my invention, and desire to secure by Letters Patent, is—

The employment, in combination with the lever C, of the sounder or register of a second electro-magnet, F F, which is brought into action by the recoil of the armature of the relay-magnet, substantially as and for the purpose herein specified.

J. E. SMITH.

Witnesses:

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