

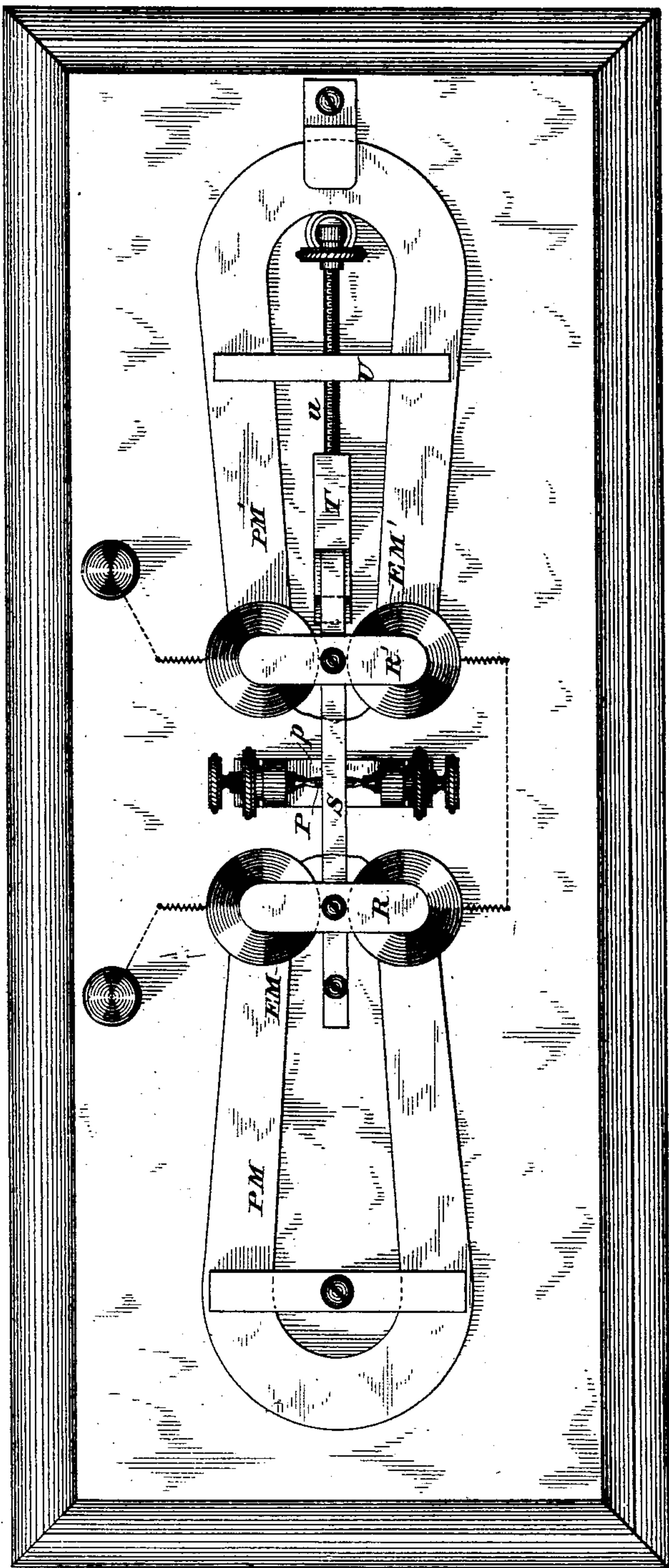
(No Model.)

H. VAN HOEVENBERGH.
Telegraph Sounder.

No. 230,013.

Patented July 13, 1880.

Fig. 1.



WITNESSES

Wm A. Shinkle.
Geo W. Bruck.

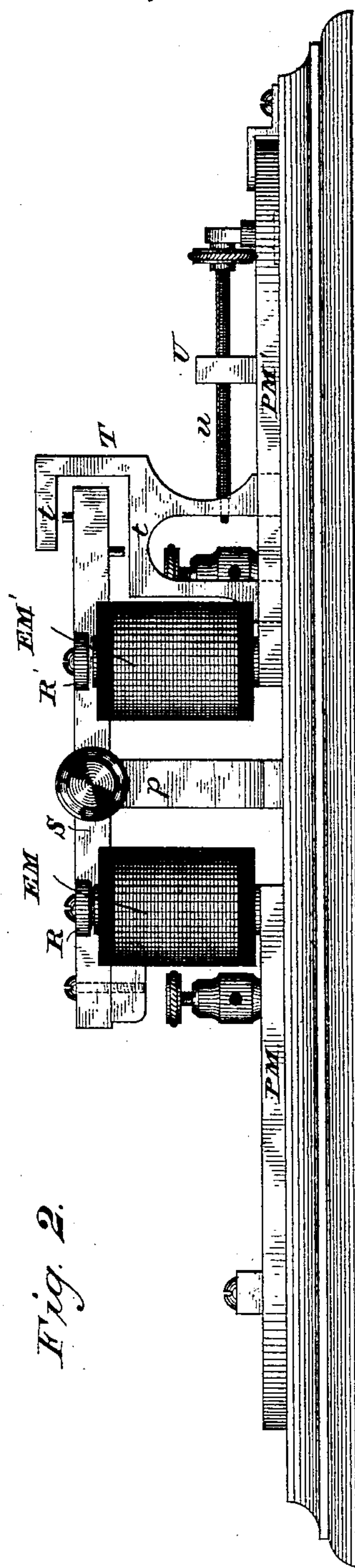


Fig. 2.

INVENTOR

Henry Van Hoevenbergh

UNITED STATES PATENT OFFICE.

HENRY VAN HOEVENBERGH, OF ELIZABETH, NEW JERSEY.

TELEGRAPH-SOUNDER.

SPECIFICATION forming part of Letters Patent No. 230,013, dated July 13, 1880.

Application filed April 17, 1880. (No model.)

To all whom it may concern:

Be it known that I, HENRY VAN HOEVENBERGH, of Elizabeth, in the county of Union and State of New Jersey, have invented a new and useful Improvement in Telegraphic Sounding-Instruments, of which the following is a specification.

In working a long line under the Morse telegraphic system it has heretofore been found impracticable to use a main battery strong enough to produce, solely by the magnetizing effect of its current at the terminal station, an audible signal. This difficulty has been obviated by employing a relay-magnet or receiving-instrument in which a lever rocking on a pivot and constituting an armature-holder is used to open and close a short or local battery-circuit, thus working with the increased power derived from the local battery an instrument so constructed as to give a sound of the loudness required.

The object of my invention is to dispense with local batteries and to render the comparatively weak current of the line-wire capable of actuating an armature-lever at the receiving-station, so as to produce distinctly audible signals by the use of the line-wire currents alone. This end I attain by a novel apparatus whose double armature, rocking on a pivot intermediate of its length, is balanced by the action of two permanent magnets, one on each side of its pivot, and yet of unequal power, which balance is disturbed to produce the signals by the line-wire currents flowing through inducing-coils, each pair of which is wound in a reverse direction from the other around the soft-iron core connected with its appropriate permanent magnet, so that when currents of opposite polarities are sent through the line they will alternately re-enforce and neutralize the action of one or the other of the permanent magnets, thus vibrating the double armature and giving the requisite signal.

The accompanying drawings represent my improved apparatus organized in the best way known to me, the details of construction of which apparatus may, however, be varied in a number of ways without departing from the spirit of my invention.

As I contemplate the use of apparatus made in the most perfect manner known at the pres-

ent day, the details of construction of which are well known, such details need not be dilated on here.

In the accompanying drawings, Figure 1 represents a plan or top view, and Fig. 2 a side elevation, of one of my improved telegraphic sounding-instruments.

S is a lever rocking on pivots P at a point intermediate of its length, which pivots are supported in the usual manner by the standard P. The lever vibrates between the jaws of a bridge-shaped frame, T, which is provided with the usual front and back stops, *tt*. Two armatures, R and R', mounted on this lever on opposite sides of its pivot, are acted on alternately, but not simultaneously, by the cores or pole-pieces of permanent magnets P M P M', likewise arranged on opposite sides of the piece of the rocking lever. These cores are encircled by the usual electro-magnetic spools or inducing-coils E M E M', the wires of each set being wound in a direction the reverse of that of the other, so that the magnetism of the permanent magnet is alternately re-enforced and neutralized by currents of different polarities flowing through the line.

It is obvious that the balance or adjustment of an instrument organized as above set forth would be disturbed by escapes or crosses on the line-wire, varying the strength or reversing the polarities of the transmitted currents. To obviate this objection, and to compensate for such variations, a keeper, U, is arranged to move longitudinally over the poles of one of the permanent magnets to vary its attraction in a well-known way, and is actuated by a traversing screw, *u*, which adjusts and holds it in the desired position.

The operation of my improved apparatus is as follows: When no current is passing through the inducing-coils E M E M' their armatures R R', being counterpoised and equally attracted by the respective poles of the permanent magnets P M P M', will remain quiescent against either stop on which they may happen to rest, a very slight disturbance of this balance, however, being sufficient to operate the sounder. The inducing-coils being wound in reverse directions the action of one set is necessarily opposed to that of the other. A positive current, for instance, will increase or re-enforce

the magnetic strength of the permanent magnet P M, and will correspondingly neutralize or diminish that of the permanent magnet P M'. The circuit-connections are such that
 5 each impulse produces this effect, thus doubling the power of a given current. The armature-lever will consequently be impelled against its stop with twice the force that a common electro-magnet will exert under similar cir-
 10 cumstances. A negative current would reverse its operations with equal force and cause the lever to strike the opposite stop. By properly varying these reversals in the well-known manner of working Morse characters
 15 will be produced.

As before remarked, the effect of an escape or cross upon the line on an instrument of the character described is sometimes to increase the strength of one of the polarities of a cur-
 20 rent and weaken the other. Such variations are compensated for by the keeper U, as above described. The permanent magnet P M' is made slightly stronger than the other, its superfluous strength being shunted, as desired
 25 and as before explained, by adjusting the keeper, which is moved to and fro until the proper balance of the line is restored. When the keeper is moved toward the pivot of the armature-lever the magnetism of the perma-
 30 nent magnet P M' is partially subdued or shunted, and the permanent magnet P M exerts a correspondingly increased influence on the armature-lever, thus compensating any increased strength in the inducing-coil E M'.
 35 When moved in the opposite direction the superior strength of the permanent magnet P

M' exerts itself, and thus counterbalances the other permanent magnet, by which mode of construction disturbance in the working-balance of the line may be readily compensated. 40

A balance-lever actuated by electro-magnets on opposite sides of its fulcrum, broadly considered, and apparatus for actuating an armature-lever by reversed currents, are dis-
 45 claimed as old.

It will be noticed that in my apparatus the ends of the cores of the permanent magnets are all four in the same plane, so as to alternately affect the lever and alternately re-en-
 50 force each other.

I claim—

1. The combination of the lever S, carrying two armatures, R and R', with two permanent magnets, P M and P M', whose cores are coiled with the line-wire in reverse order and whose
 55 ends are in the same plane, so that said permanent magnets alternately attract their respective armatures and alternately re-enforce each other, substantially as specified.

2. The combination of the lever S, carrying
 60 two armatures, with two permanent magnets of unequal power and with an adjustable regulator, u, on the stronger of said permanent magnets, substantially as herein shown
 65 and described.

In testimony whereof I have hereunto signed
 my name this 16th day of April, 1880.

HENRY VAN HOEVENBERGH.

Witnesses:

WILLIAM H. CLARKSON,
 HERMAN SULING.