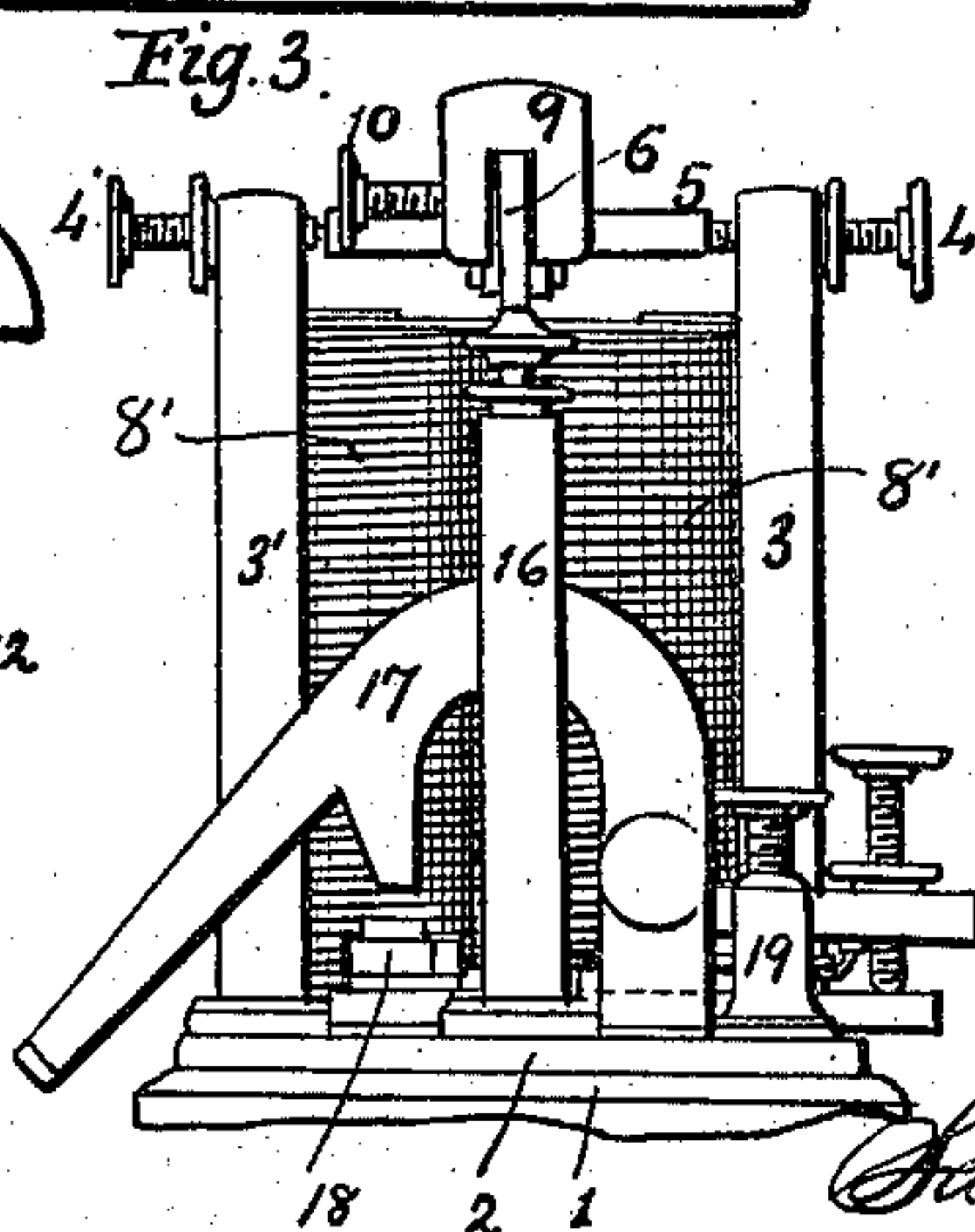
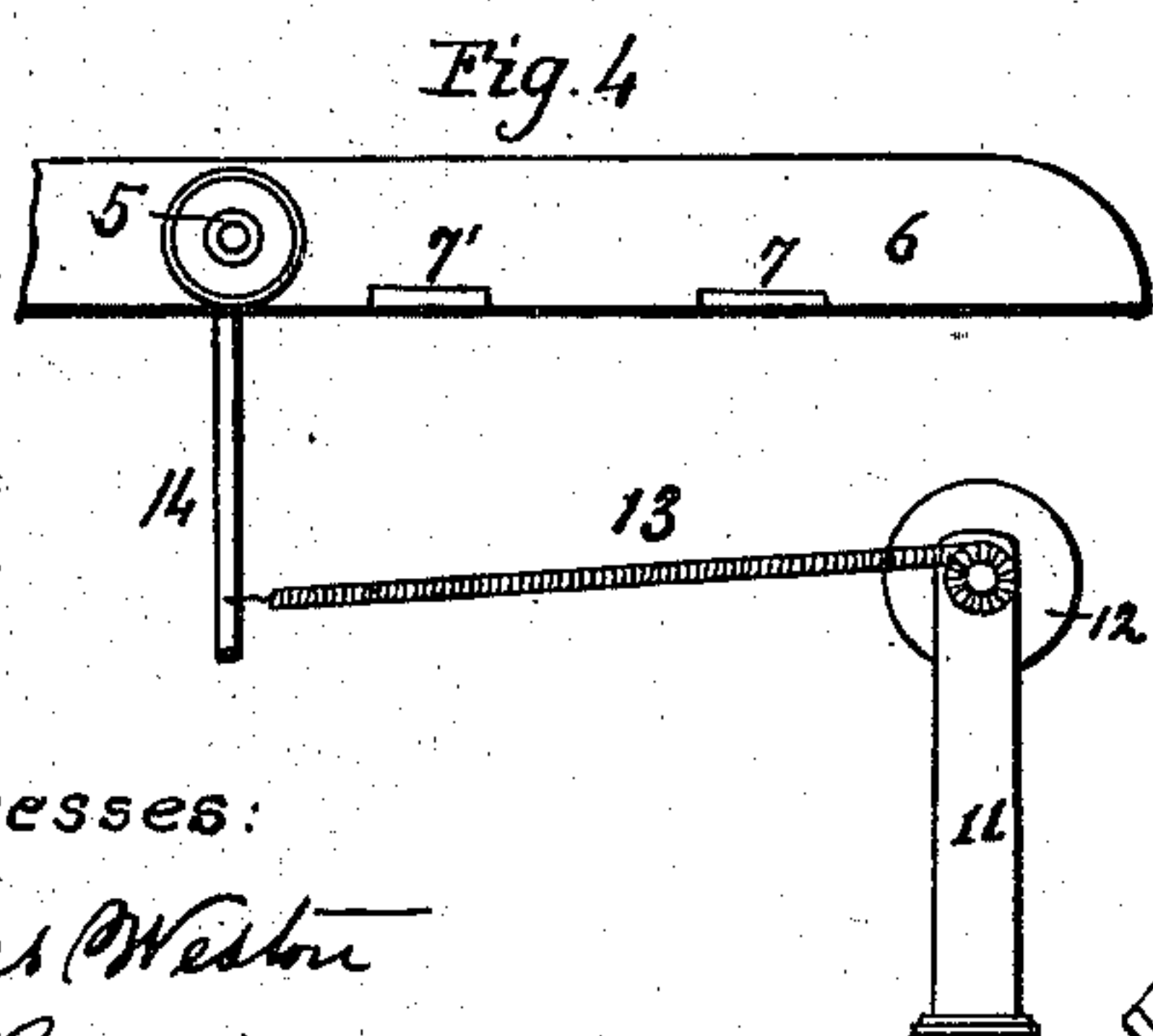
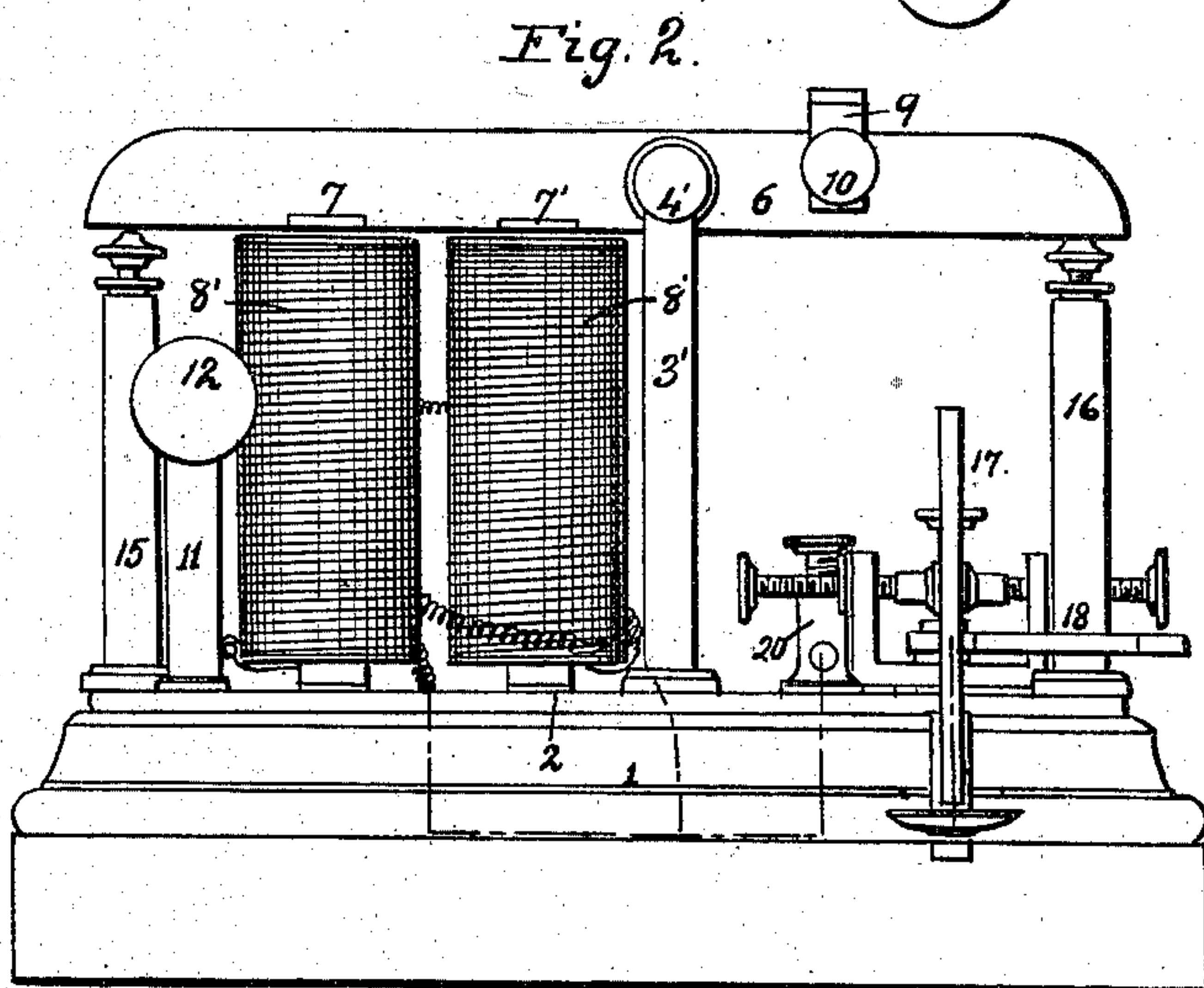
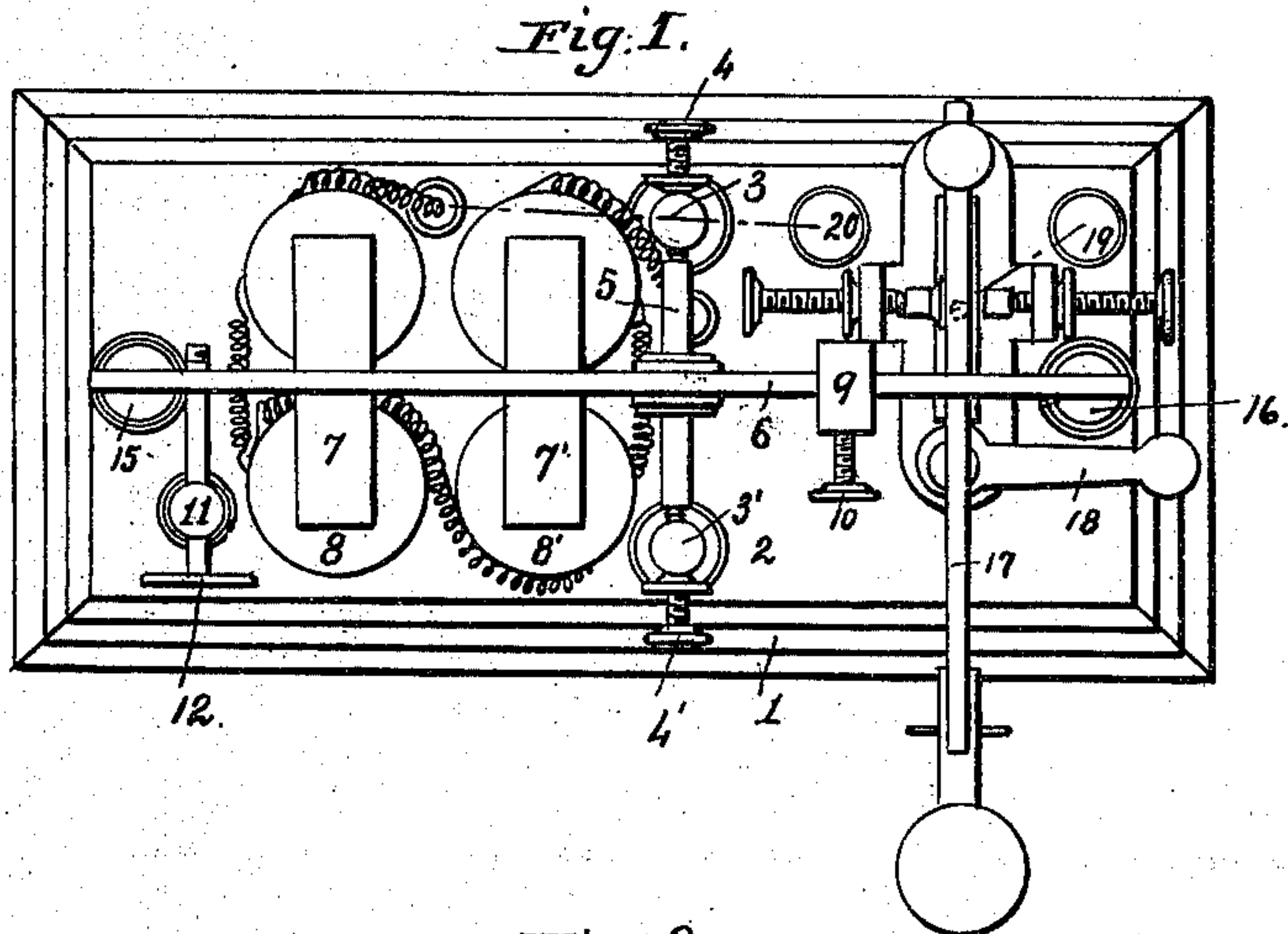


S. F. DAY.

Telegraphic-Relay Instrument.

No. 35,304.

Patented May 20, 1862.



Witnesses:  
H. James Weston  
J. L. Loring

Inventor:  
S. F. Day



# UNITED STATES PATENT OFFICE.

SAMUEL F. DAY, OF BALLSTON SPA, NEW YORK.

## IMPROVEMENT IN INSTRUMENTS FOR TELEGRAPHS.

Specification forming part of Letters Patent No. 35,304, dated May 20, 1862.

*To all whom it may concern:*

Be it known that I, SAMUEL F. DAY, of Ballston Spa, in the county of Saratoga and State of New York, have invented certain Improvements in Portable Automatic Telegraphic Instruments, the construction and operation of which I have described in the following specification, and illustrated in its accompanying drawings, with sufficient clearness to enable competent and skillful workmen, in the arts to which it pertains or is most nearly allied, to make and use my invention.

My invention consists in, first, the combination, with a sounding-lever or armature and a spiral spring, of an adjustable counterpoise or balance-weight, substantially as and for the purpose hereinafter set forth; second, the combination of a sliding counterpoise or balance-weight, sounding-lever or armature, and spring with one or more U electro-magnets, substantially as and for the purpose hereinafter described.

In the accompanying drawings, Figure 1 represents a plan of the instrument. Fig. 2 is a front elevation; Fig. 3, end elevation at the right-hand end of the instrument; Fig. 4, detail back view of the spring and its connections which is used to overcome the local electricity.

1 is the block or stand to which is attached the bed-plate 2. To this plate are fixed the upright rods 3 3', which sustain at their top ends by the pivot-screws 4 4' the shaft 5. On the center of this shaft is hung the sounding-lever 6, to which are attached the armatures 7 7' immediately over the cores and helices of the U electro-magnets 8 8'. The helices of these magnets are so wound around the cores as to form one continuous circuit. 9 is the sliding counterpoise or balance-weight, which rests on that part of the sounding-lever 6 which is on the opposite side of the shaft 5 to the magnets 8 8'.

10 is a set-screw which retains the balance-weight 9 in position when adjusted.

To the plate 2 is attached the upright rod 11, in the upper end of which is inserted the key 12. To the inner part of this key one end of the spiral spring 13 is attached, and the other end of said spring is made fast to the rod 14, which depends from the under side of the lever 6 and immediately beneath the shaft 5.

To the plate 2 is fixed the vertical rod 15, on the top of which the sounding-lever 6 strikes, thereby emitting the sounds due to a telegraphic alphabet.

At the farther end of plate 2 is the vertical rod 16, to receive the back-stroke of the lever 6 and keep same in position.

17 is the operating-key, attached as shown; 18, the connecting-switch; 19, the set-screw and cup for the positive attachment; 20, the set-screw and cup for the negative attachment.

The red lines indicate the course of the current taken from the main line.

I am aware that telegraphic instruments have heretofore been constructed independent of a battery and made to interpret messages by sound; but in such cases each and all have had an attachment of a sounding-board and tensile wires. Telegraph-operators have experienced considerable difficulty in discriminating sounds in these instruments, owing to the echo and the mingling or blending of each consecutive sound, consequent upon the vibrations caused by sound-boards and tensile wires.

The compactness of my instrument renders its portability all that could be desired, and from its peculiar construction it can be placed in working order at any point in a very short time. The sound produced by the forcible contact of the lever 6 with the top of the rod 15 is an unmistakable click, which, from the absence of vibration in the bodies producing it, is not liable to become blended with the succeeding sound, as it is liable to be when sounding-boards or other reverberators are used.

It is obvious that no sounding-lever can be so balanced in manufacture without subsequent adjustment in some way as to fit it to the varied currents to which it is liable to be subjected—as, for example, should the current be very strong the lever must be heavily balanced up against it or it will not return with sufficient promptness and certainty when the current is broken; but if, on the other hand, the current is feeble the lever must be very lightly balanced against it or it will not have sufficient force to bring the latter down strongly enough to make the blow distinctly heard. There is, also—at least at times—an uncertain and varied amount of fixed electricity, which involves to, perhaps, a greater extent the same difficulty, inasmuch as it does not depart from



the instrument, even slowly, when the current is broken.

In the usual construction of instruments of this class and their subsequent operation the adjustment to meet the changes above stated is made by changing the tension of a spring attached to an arm of the lever. This mode of adjustment is objectionable, for the reason that the delicate, prompt, and efficient action of a spring depends upon its nice adjustment at a point of tension near its normal position, and this delicacy and promptness is destroyed, or very considerably impaired, if any very heavy strain is thrown upon it. This fact is familiarly illustrated by the common spring-balance, which, when in nearly its normal position, is very sensitive and quick in its obedience to a very light weight; but if the same balance be heavily loaded its motions are sluggish and much more weight is required to change the position of the spring. This difficulty in the common instrument is obviated in mine by combining with the lever and other parts, as above described, an adjustable counterpoise, by which the lever can be balanced to correspond with the electric current which may prevail at the time, thus allowing the spring to be so adjusted as to make its elasticity available to the best advantage. The combination with a sounding-lever of two or more U-magnets placed upon the same side of the axis of said lever and at different distances from it is also an important advantage. The armature nearest the axis, and consequently nearest the magnet, is first attracted and commences the movement of the lever, bringing

the outer armature within range of its magnet, which latter, by means of its greater distance from the axis, and consequently increased leverage, completes the stroke with energy and adds great force to the blow. It is important, however, that these magnets should both be placed on the same side of the axis, as otherwise a disagreeable chattering on the axis would be produced, which would detract very materially from the value of the instrument.

A current of electricity which is at first feeble, or may become so by being dissipated in a long distance, and which would not sensibly affect other instruments without the assistance of a local battery, will in my instrument, from its accumulating power and facility of moving the sounding-lever, give the most satisfactory results.

Having thus described my instrument and its capabilities, what I claim is—

1. The combination, with the sounding-lever 6, having one or more armatures attached, and with the spring 13, of the adjustable counterpoise or balance-weight 9, substantially as and for the purpose hereinbefore set forth.

2. The combination of the adjustable counterpoise or balance-weight 9, the sounding-lever 6, having armatures 7 7' attached, and spring 13, with one or more U electro-magnets, constructed and arranged substantially as and for the purpose hereinbefore set forth.

SAML. F. DAY.

Witnesses:

H. JAMES WESTON,  
CHR. J. LONJAN.