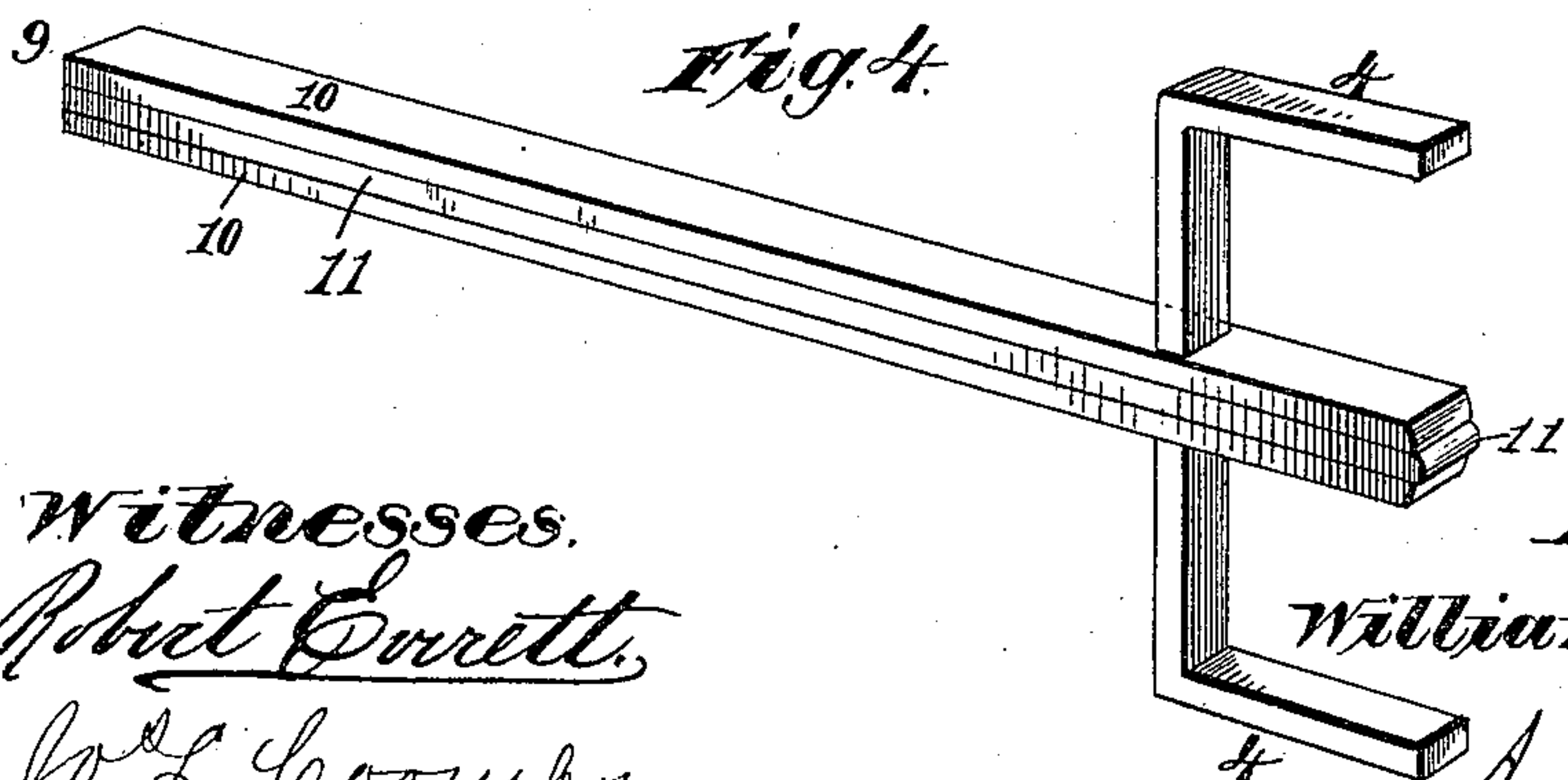
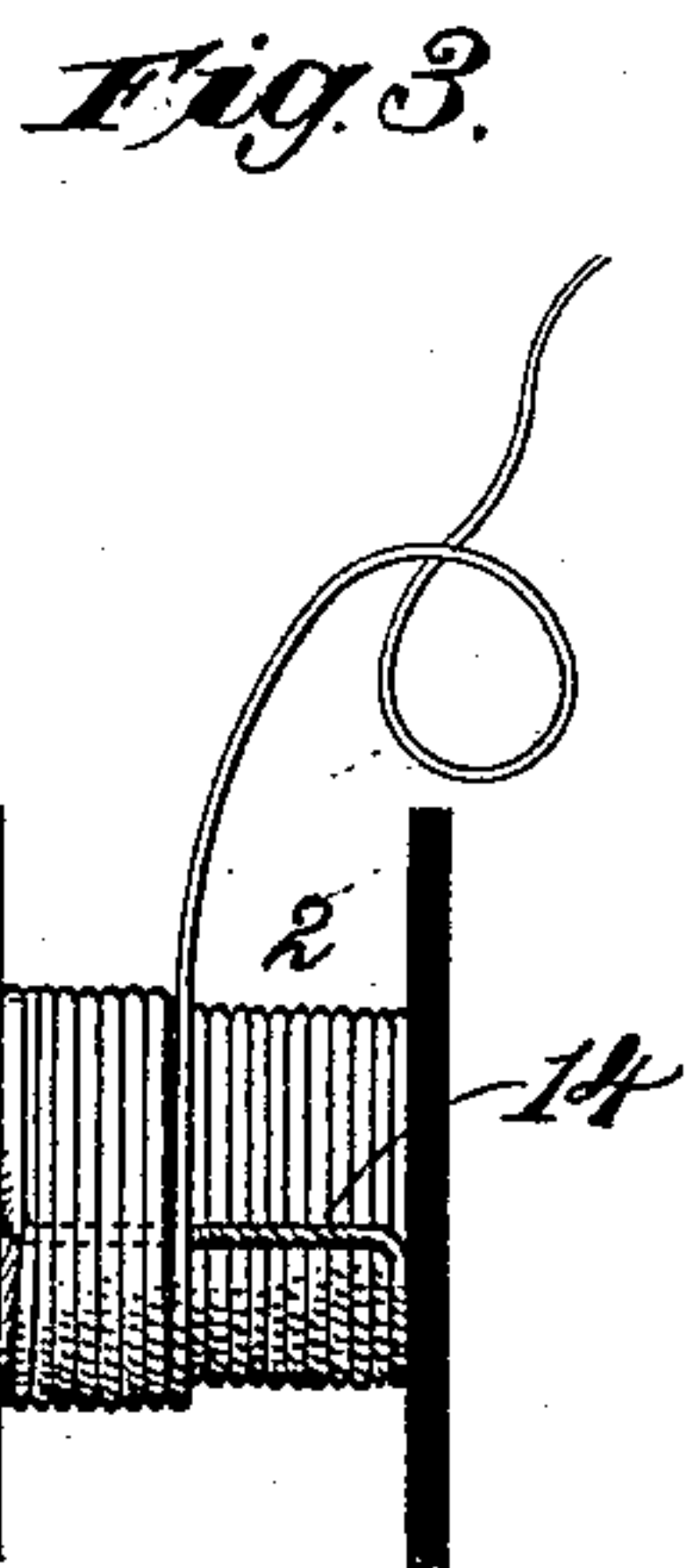
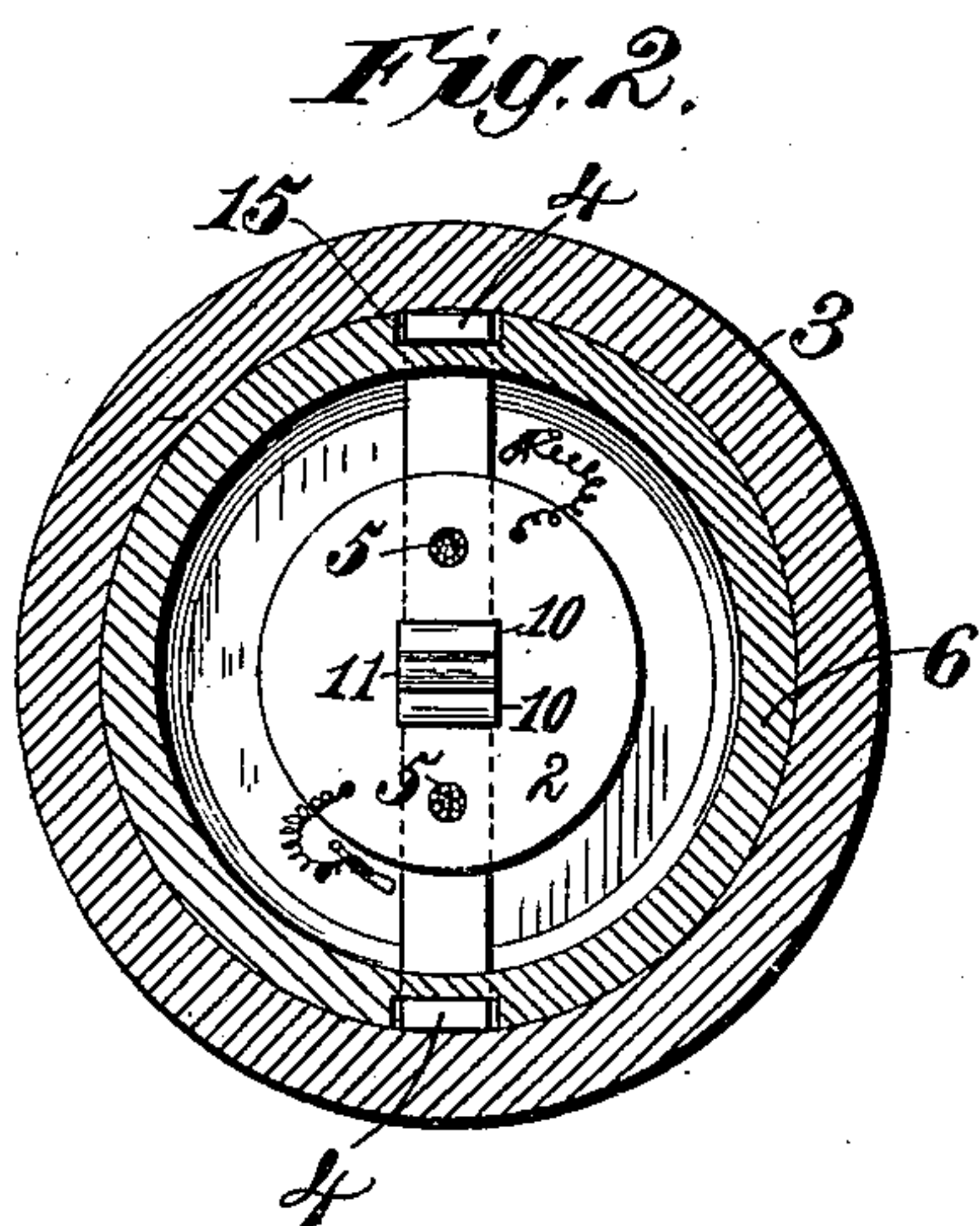
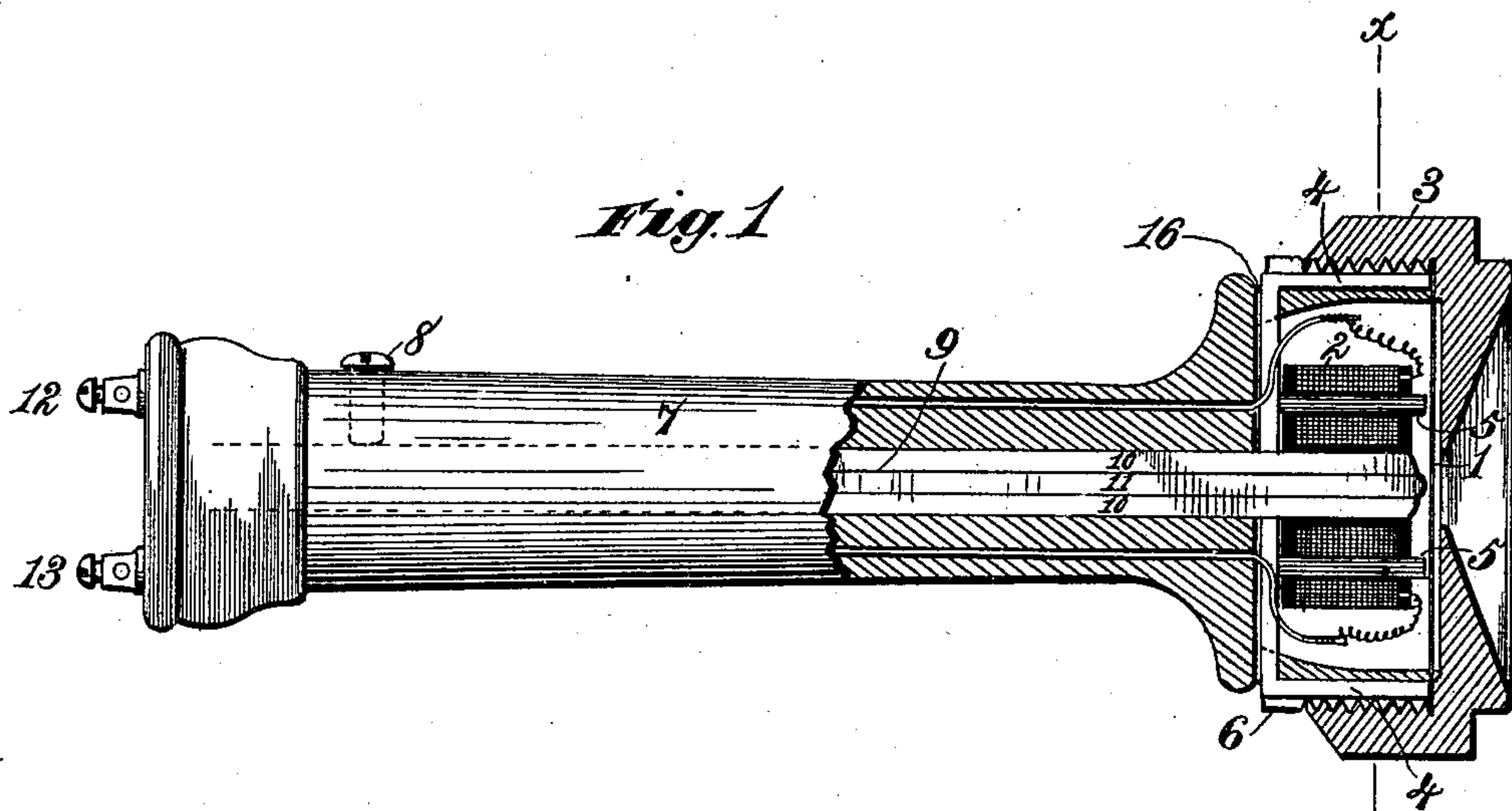


(No Model.)

W. BURNLEY.
TELEPHONIC RECEIVER.

No. 326,268.

Patented Sept. 15, 1885.



Witnesses.
Robert Everett.
J. L. Coombs.

Inventor
William Burnley.
By *James L. Norris.*
Atty.

UNITED STATES PATENT OFFICE.

WILLIAM BURNLEY, OF NORTH EAST, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO CHARLES A. HITCHCOCK, OF SAME PLACE, AND LEWIS F. WATSON, OF WARREN, PENNSYLVANIA.

TELEPHONIC RECEIVER.

SPECIFICATION forming part of Letters Patent No. 326,268, dated September 15, 1885.

Application filed September 4, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BURNLEY, a citizen of the United States, residing at North East, Erie county, Pennsylvania, have invented new and useful Improvements in Telephonic Receivers, of which the following is a specification.

My invention relates to telephone-receivers, or receivers for reproducing audibly through the medium of a magnet and a diaphragm sounds, especially articulate speech, transmitted from a distant point in an electric circuit.

Its object is to increase the sensibility of the reproducing devices, so that even the minor vibration of low tones shall affect the receiver, while the sounds reproduced shall generally be amplified and rendered more audible and distinct.

To these ends it consists in the devices and combinations of devices more particularly hereinafter described and claimed, the same being illustrated in the drawings, in which—

Figure 1 is a view, partly in section, of a telephone embodying my invention. Fig. 2 is a sectional view on the line *x x*, Fig. 1, while Figs. 3 and 4 illustrate details of construction.

7 is the ordinary handle or base of a telephone-receiver, made of hard rubber, wood, or other good insulator, within and upon which are mounted the operative or sound-reproducing devices. Seated longitudinally therein is the permanent magnet 9, which is a compound magnet composed of several laminae, in this case three, the center one of which, 11, is slightly longer at one pole than the exterior ones, 10 10. The elongated end of 11 is slightly convex, while 10 10 are slightly inclined or beveled away from 11. The leaves or laminae constituting this magnet may be secured together by pins, screws, or rivets, or they may be laid in loose and clamped together by one or more set-screws passing through the sides of the handle or case and taking against them, for which purpose such screws as 8 may be used. This construction, I find, concentrates the magnetic force of this pole of the compound magnet at the extreme and projecting end of the center

leaf, 11, causing it to act with greatly increased force.

Within the casing 6 upon the head of 7 and around the magnet 9 is placed the helix 2, whose terminals pass through 7 and connect with the binding-screws 12 13, whereby the helix may be connected in the line-circuit. This helix is of peculiar construction, as shown in Figs. 1 and 3. In winding it each successive layer is caused to commence at one end and the same end or head, instead of being wound back and forth from end to end, or head to head, as is usually the case. Commencing at one head, the wire is laid on helically until the other head is reached, when it is turned back, as at 14 in Fig. 3, to the head whence it started, and the next layer laid, and so with each layer until the winding is completed. When about one-half of the coils intended to be laid on are in position, bunches of fine wires 5 5 are secured to the helix with their axes at right angles to the convolutions of the helix and parallel with the axis thereof. The ends of these wires project through the heads of the helix, as clearly shown in Fig. 1. The winding then continues in the manner set forth until the helix is completed.

In the drawings, two bunches of wires, 5 5, of iron or other magnetic material, are shown; but it is evident that more could be used; that any desired number of such bunches could be secured within the windings of the helix, each bunch of wire then forming a magnet. This helix 2 is slipped over the end of the permanent magnet 9, which is secured within the handle 7 and case 6 by the screw 8, or in any other suitable way.

Within the case 6 are placed the L or right-angled bars of iron or other magnetic material, 4 4, with their inner ends abutting on or attached to the permanent magnet 9. Upon them also rest the bunches of wires 5 5, forming good contact therewith. The outer ends of these bars 4 4 are secured in the casing 6, so that the tops thereof and the top line of 6 are flush with each other. Upon them is laid the diaphragm 1 in contact with the outer ends of 4 4, and which is secured in position by the mouth-piece and cap 3, secured to 6 by a screw-thread, or in any other suitable manner. The

magnet 9 and helix 2 are so adjusted within the handle and case that the wires 5 5 and the outer end of the magnet 9 shall be in close proximity to the diaphragm while it is in contact with 4 4.

In order to readily slip or place the L-magnets 4 in position, grooves 15 are cut in the sides of the screw-threaded case 6 at the proper points, and grooves at right angles thereto are formed in its bottom to the aperture through which the compound bar-magnet 9 passes. At the junction of these grooves, at the lower edge of the case, holes or apertures 16 are made, through which may pass the bottom limbs of the L-magnets. Then when 6, 9, and 2 are in position, the L-magnets are slipped into place and then held in position by the cap 3.

By the method of winding described certainty is always had that the current circulates in the same direction around 9 and 5 5, invariably making the poles of all of them adjacent to 1 of the same polarity, while, from the connection between the diaphragm and the permanent magnet 9 and wires 5, (which become magnet-cores,) the diaphragm is made the other pole and always of opposite polarity to the free ends of 9 and 5 5 in proximity to it. This makes intense opposite polarities opposed to each other and in condition to have their relative attractions readily varied, so as to cause great amplitude of vibration in 1 upon marked change of condition, and minor vibration upon small change of condition.

This construction therefore forms an exceedingly delicate receiver—delicate in the sense of receiving and reproducing all sound-vibrations, magnifying them proportionately—reliable in its action, and not liable to derangement.

Having thus described my invention, what I claim is—

1. In a telephone-receiver, the combination, with a permanent magnet and a diaphragm, of a helix having bunches of wires of magnetic material, forming additional poles, placed within the helix, substantially as and for the purpose set forth.

2. In a telephone receiver, the combination of a compound permanent magnet having the center leaf extended beyond the others toward a diaphragm, right-angled magnets projecting therefrom on opposite sides and passing around a helix, a helix surrounding the end of the permanent magnet, and independent cores within the windings of the helix, substantially as and for the purpose set forth.

3. In a telephone-receiver, the combination of a diaphragm, a compound permanent bar-magnet having an extended pole in proximity thereto, a helix surrounding the end of such permanent magnet and containing independent cores formed of wires inclosed in its windings, and permanent L or right-angled magnets in contact with the bar-magnet, independent cores, and diaphragm, substantially as and for the purpose set forth.

4. In a telephone-receiver, the combination, with a permanent magnet and a diaphragm, of a helix having the windings of its successive layers starting always from the same end or head, and independent cores formed by bunches of wires secured within its windings, substantially as and for the purpose set forth.

5. In a telephone-receiver, the combination of the diaphragm 1, the compound permanent magnet 9, with central extension, 11, the helix 2, and the independent poles 5 5 within its windings, substantially as and for the purpose set forth.

6. In a telephone-receiver, the combination of the diaphragm 1, the compound permanent magnet 9, having central extension, 11, the right-angled or L magnets 4 4, the helix 2, and the independent poles 5 5 within the windings of the helix, substantially as and for the purpose set forth.

7. In a telephone-receiver, the combination of the diaphragm 1, the case 6, and right-angled magnets 4 4 in contact with the diaphragm, the bar permanent magnet 9, made of several laminae, and having the central one, 11, projecting toward the diaphragm, the helix 2, and the independent cores or poles 5 5, secured within the windings of the helix and contacting at one end with the magnets 4, substantially as and for the purpose set forth.

8. In a telephone receiver, the containing-case 6, formed with the grooves 15 upon its sides, corresponding grooves upon its bottom leading thence to the central aperture, and the apertures 16, whereby the angular or L-shaped magnets may be slipped into position and secured, the magnet 9, and angular magnetic pieces 4 4, substantially as described.

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

WILLIAM BURNLEY.

Witnesses:

J. L. GREEN,
D. D. LOOP.