

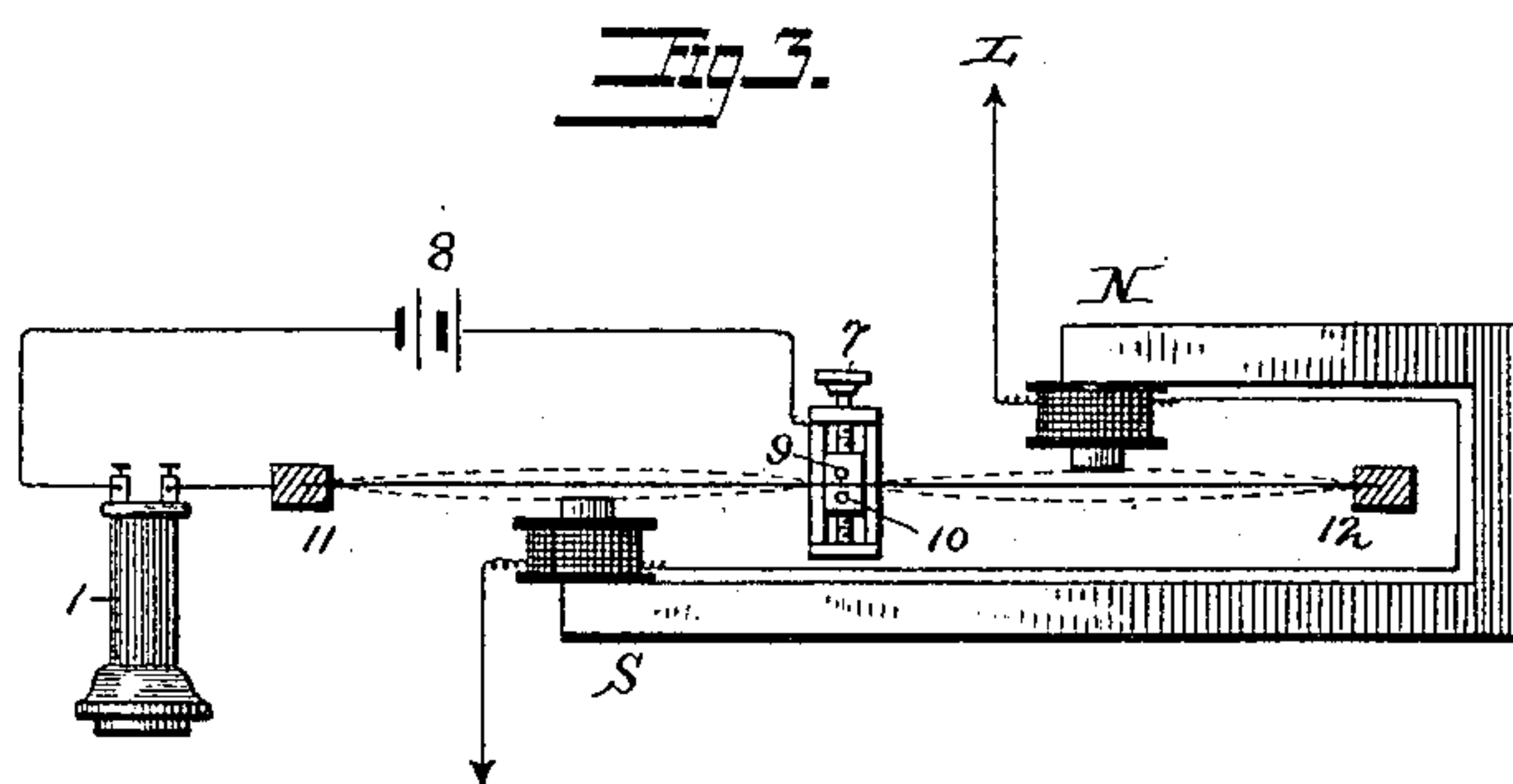
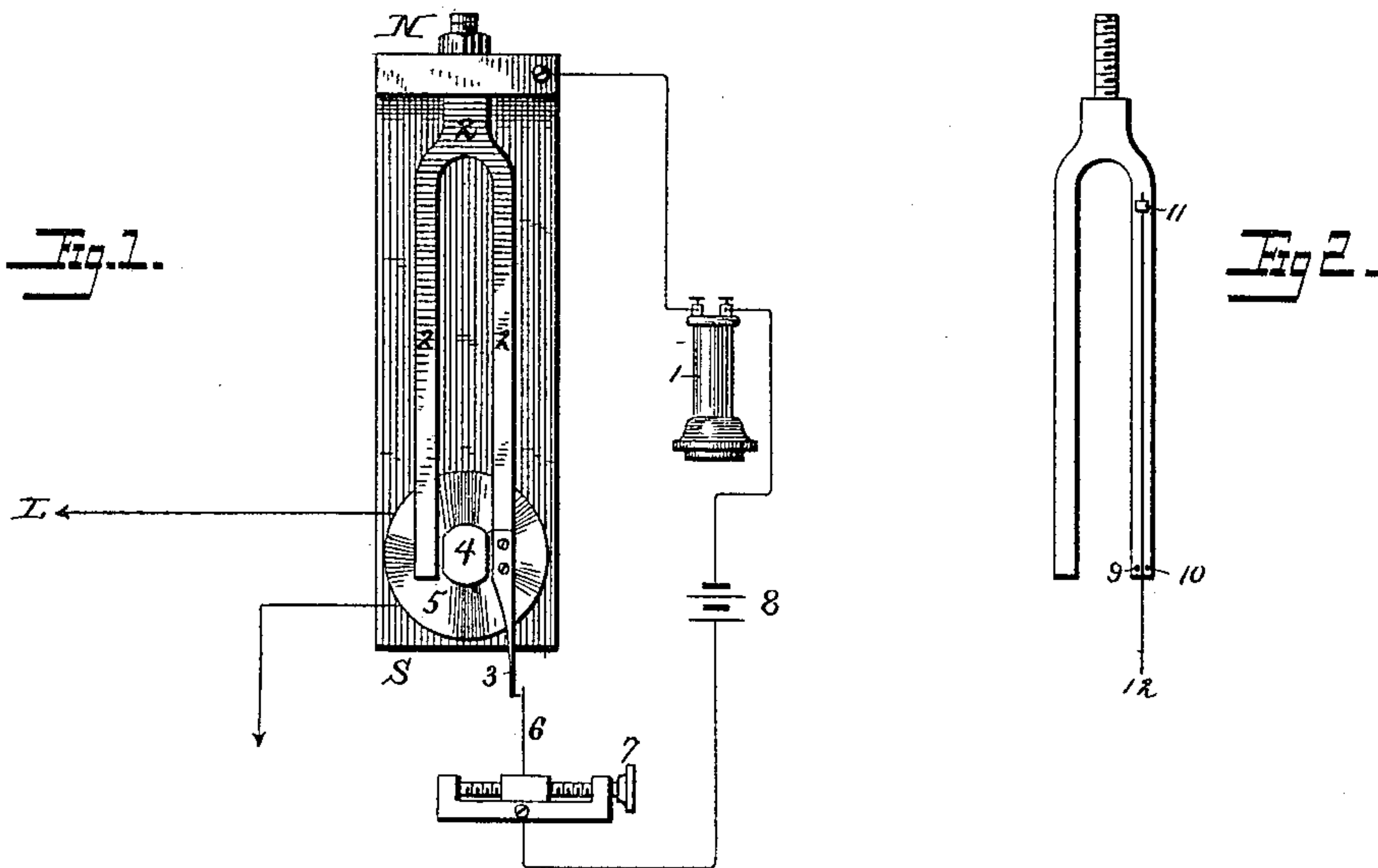
(No Model.)

F. VAN RYSSELBERGHE.

HARMONIC TELEGRAPHY.

No. 388,091.

Patented Aug. 21, 1888.



Witnesses.

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UNITED STATES PATENT OFFICE.

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HARMONIC TELEGRAPHY.

SPECIFICATION forming part of Letters Patent No. 388,091, dated August 21, 1888.

Application filed November 15, 1887. Serial No. 255,252. (No model.)

To all whom it may concern:

Be it known that I, FRANÇOIS VAN RYSELBERGHE, a citizen of Belgium, residing at Brussels, Belgium, have invented new and useful
5 Improvements in Harmonic Telegraphy, of which the following is a specification.

My invention relates to tone or harmonic telegraphy, and more especially to apparatus designed for use as receivers in connection
10 with such systems, and particularly in connection with a system such as described and patented to me in United States Patent No. 370,577. In the use of such systems of telegraphy, especially when it is desired to employ but a
15 single line-circuit for the transmission of a large number of messages and to great distances, it is necessary to have very delicate and at the same time positively-acting instruments to serve as receivers, it being understood
20 that each receiver is intended to respond to one only of a number of transmitters, which may be superimposing on or sending over the same main line varying series of electric impulses or changes of electric potential at the
25 same time.

In my former patent I described the use of magnetized tuning-forks, and my present invention relates in general to improvements in such instruments, though my present improvements need not necessarily be limited to such
30 forks or reeds.

It will be understood that the tuning-forks are tuned or adjusted to have a certain definite or fundamental rate of vibration and to be operated by electric variations in the line-circuit
35 corresponding to such rate, which cause the forks to vibrate, and while it is possible to read the signals sent on the line by the use of the tuning-fork alone it is very desirable to provide
40 local means for amplifying such signals, so that they may be more readily understood, and it is also desirable at the same time to overcome some disturbances due to induction and the like, which tend to produce false signals.
45 Various appliances have been proposed for overcoming these troubles to a greater or less extent, as by the use of various forms of amplifiers and similar devices, and I will now describe my present arrangement of devices,
50 which I have invented for these purposes, by reference to the accompanying drawings, in which—

Figure 1 is a diagrammatic representation of the receiving-instruments. Fig. 2 is a modification of the fork and attachment, and Fig. 55 3 is a diagram of another arrangement.

As in my former patent above referred to, I preferably make use of a magnetized tuning-fork, 2, the base of which is mounted in a bent end, N, of a permanent magnet, the other end, 60 S, of which supports a polarized core, 4, surrounded by the coil 5, included in the main line L, and I mount upon one of the branches or tines of the fork an extension piece or finger, 3, which is adapted to partake of the vi- 65 brations of the fork. In a suitable base is mounted a contact-making device, 6, which may be accurately adjusted with relation to the extension piece or finger 3 by means of a fine-threaded screw, 7, or other equivalent de- 70 vice. A local circuit includes the local battery 8, the finger 3, and contact-piece 6, and an ordinary telephone-receiver, 1. The operation of this arrangement of devices will be readily understood. 75

The contact-making device 6 may be adjusted so that the finger will just impinge thereon, so as to complete the local circuit only when the fork is vibrating at its full amplitude, as when it is being affected by variations 80 in the line corresponding almost exactly with its normal rate of vibration, or it may be adjusted so as normally to make good contact with the finger to be broken only when the fork vibrates to its full amplitude. In this 85 way the adjustment may be so made as to avoid all false signals due to induction and other disturbances, which, not being of the normal rate of the tuning-fork, do not produce full or regular vibrations in its branches. 90

The advantages of this combination and arrangement will be apparent when it is considered that by its use exceedingly small or weak vibrations of the fork are rendered distinctly audible, as the loudness of the sound in the 95 telephone does not depend upon the amplitude of the vibrations of the fork, but upon the strength of the local battery, and I have found that a single gravity-cell arranged in the local circuit gives sufficiently loud signals. 100

Another and very important advantage results from the use of the telephones, from the fact that all the signals are "clear cut" and distinct, and every vibration in the local cir-

cuit, caused by the rapidly-vibrating fork, is distinctly audible, whereas when the ordinary Morse or other sounder is used the various vibrations making up the signal are so rapid that the armature moves only at the commencement and ending of any signal, and, instead of the ordinary click of the armature impinging upon its front and back contact at each signal, one hears in the telephone all the variations going to make up the signal, and thus the tone or key of the signal in the receiver will be the same as the tone of the transmitting-instrument which causes the signal.

In order that the extension or finger 3 may vibrate more in harmony with the fork, it may be made flexible, and betuned in unison with the fundamental note or tone of the fork, or one or more octaves higher or lower than that note. In this way the amplitude of the vibrations may be largely increased each time the fork gives its fundamental note, while the other motions of the fork are not amplified, and this also contributes to prevent induced or other foreign currents from interfering with the signals. Further, the contact devices 6 may also be tuned in the same way and for the same reason.

In Fig. 2 I have shown a tuned extension or addition to the fork in the form of a light spring, 11 12, attached to the fork at 11 and passing through a small space left between the points or pieces 9 10. The spring is preferably proportioned and tuned in such a manner that the length between 9 and 12 will give by its own vibration the fundamental tone of the fork or a multiple or submultiple thereof, and the length between 11 and 9 should be two or three or more times longer than 9 to 12, so that at the space between the pins 9 and 11 there will occur one of the "nodes" of the vibrating spring. These principles may be embodied in various forms and constructions of devices, and in Fig. 3 I have illustrated one in which the vibrating device is a strained and tuned wire of iron or other material, which is represented in its normal strained condition by the full line and in its vibrating condition by the dotted lines. In this case the pins 9 10 form the adjustable contact device included in and controlling the local circuit of the battery 8 and telephone 1, and by properly adjusting the pins at one of the nodal points of the wire the only signals which will affect the telephone are those which, by means of the magnet N S and its attached cores and line-coils, produce the fundamental vibrations of the strained wire. It is evident that I may use in this connection

some other form of translating device than the ordinary hand-telephone, although I have found very satisfactory results from such use.

From the above the principles of my invention will be readily understood by those skilled in the art, and I do not limit myself to the construction and arrangements shown.

I am aware that the use of a tuning-fork operated by main-line currents has been suggested to control a local circuit containing a signal call-bell. I am also aware that the use of a telephone as a receiving-instrument in a telegraph system is not broadly new.

What I claim is—

1. In a tone or harmonic telegraph, the combination, with a tuning-fork operated by the main-line currents, of an extension on said fork, a local circuit controlled by the extension, and a telephone in said local circuit, substantially as described.

2. In a tone or harmonic telegraph, the combination, with a tuning-fork controlled by the main-line currents, of an extension on said fork, an adjustable contact-pin in a local circuit, and a telephone also in the local circuit, substantially as described.

3. The combination, with a tuning-fork, of an extension attached to the fork and tuned in harmony with the fork, substantially as described.

4. The combination, with a tuning-fork, of an extension attached to the fork and tuned in harmony therewith and an adjustable contact-piece included in a local circuit also tuned in harmony with the fork, substantially as described.

5. The combination, with a tuning-fork, of an extension one end of which is attached to the fork, and pins between which the free portion of the finger vibrates, the finger being tuned in harmony with the fork and the pins arranged with relation to the nodal points of the finger, substantially as set forth.

6. The combination, with a magnetized tuning-fork, of an extension attached thereto and tuned in harmony therewith, a local circuit including the extension, an adjustable contact controlling said local circuit and operated by the extension, and a telephone in said circuit, the arrangement being such that the local circuit will be varied only when the fork vibrates to its full amplitude, substantially in the manner and for the purposes set forth.

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