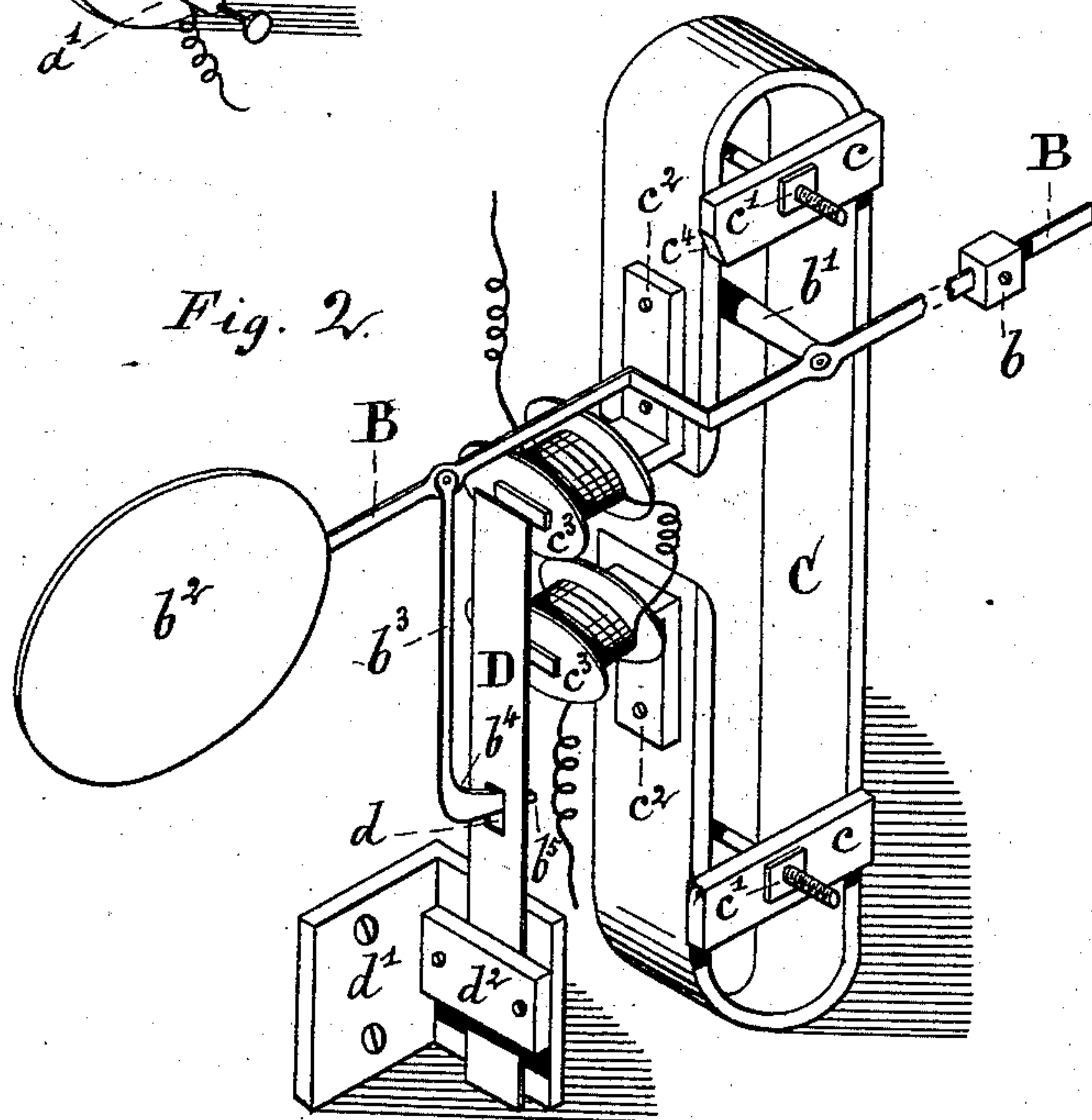
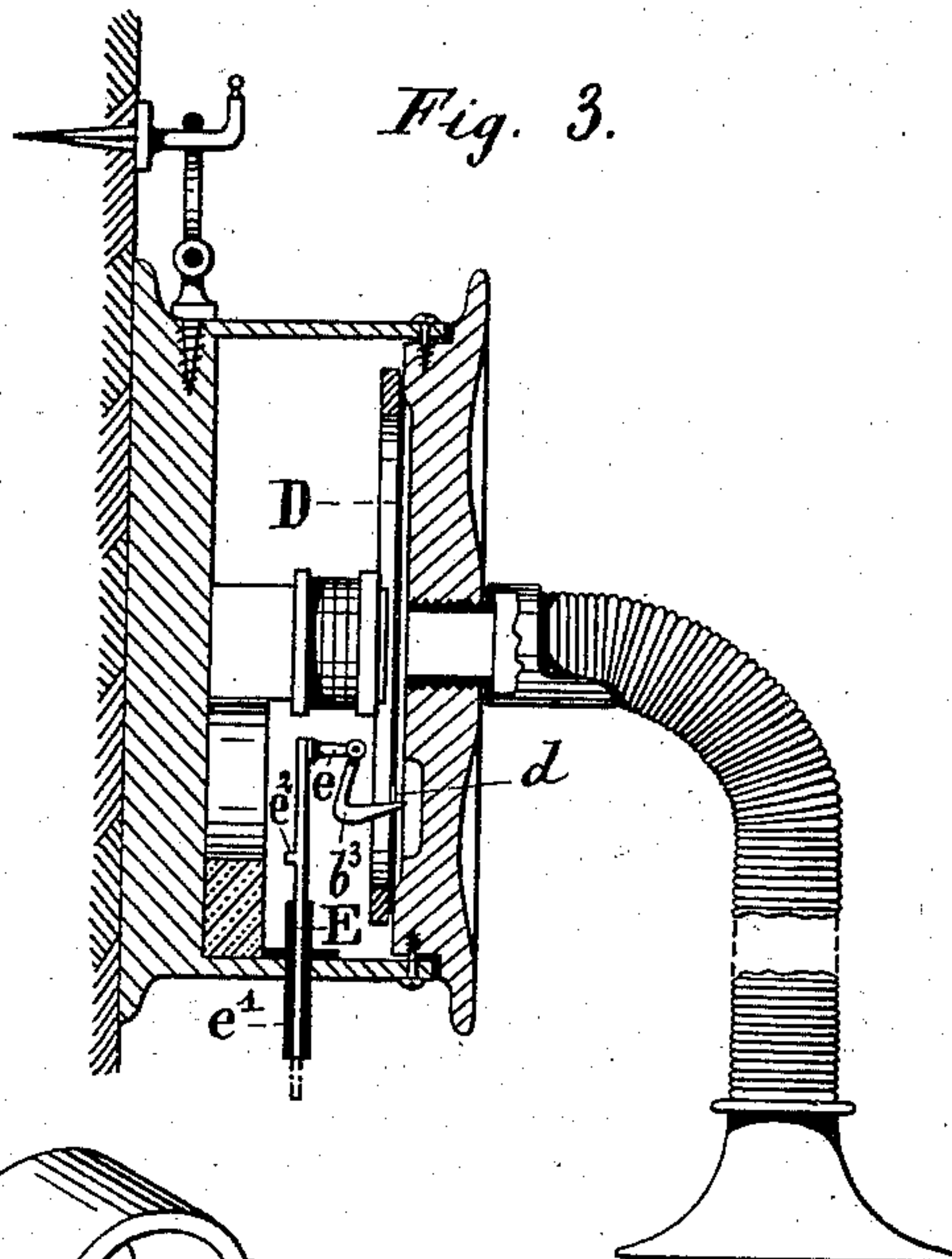
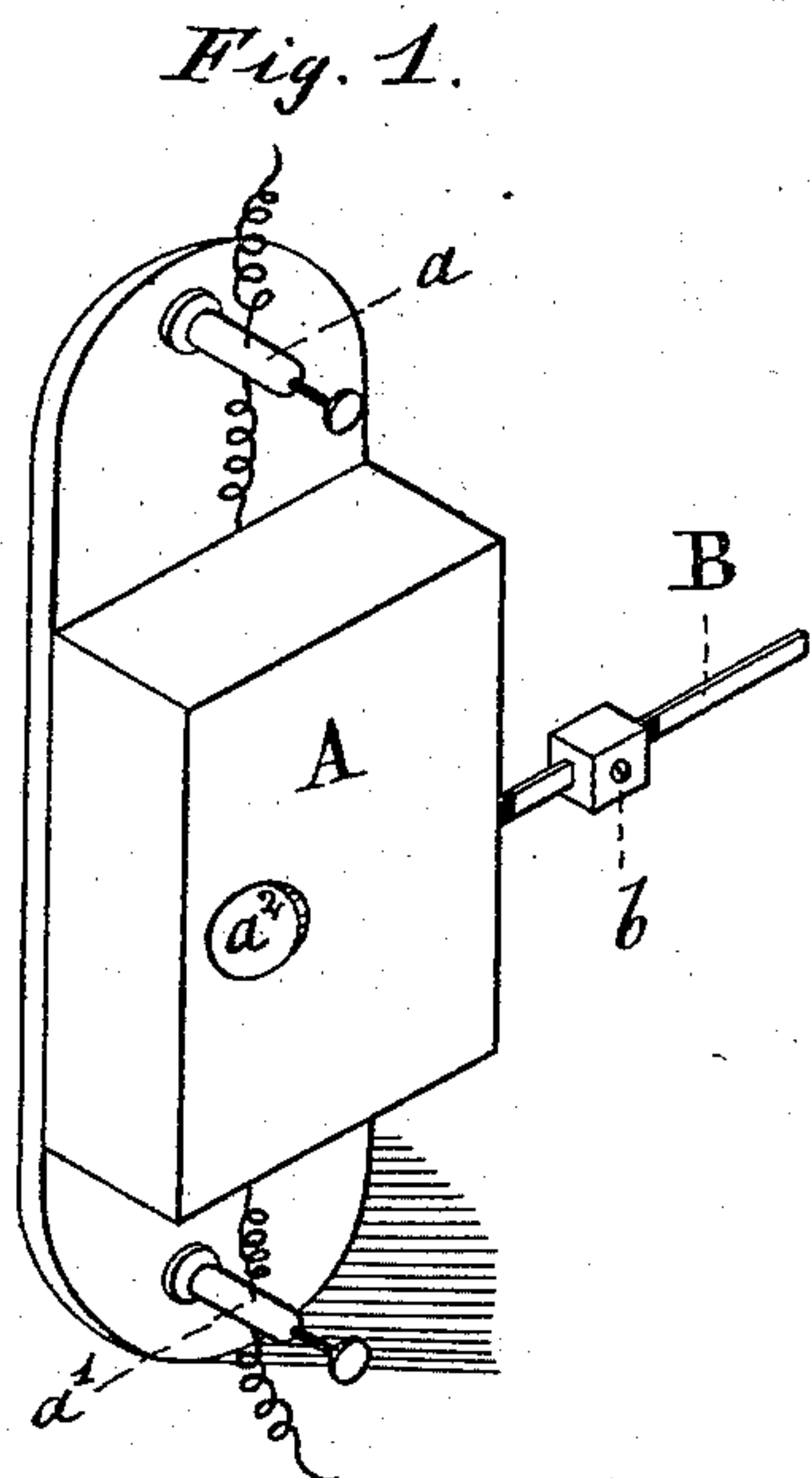


C. ADER.  
Visible Signal for Telephones.

No. 222,119.

Patented Dec. 2, 1879.



Witnesses:

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# UNITED STATES PATENT OFFICE.

CLÉMENT ADER, OF PARIS, FRANCE.

## IMPROVEMENT IN VISIBLE SIGNALS FOR TELEPHONES.

Specification forming part of Letters Patent No. **222,119**, dated December 2, 1879; application filed October 1, 1879.

*To all whom it may concern:*

Be it known that I, CLÉMENT ADER, of Paris, in the Republic of France, have invented certain new and useful Improvements in Telephones, of which the following is a specification.

The signals—such as electric bells, annunciator-disks, &c.—commonly used in connection with telephones require for operation a current of considerable tension or strength, which is furnished by a battery or magneto-electric machine of sufficient power. Moreover, for signals heretofore known, or at least for all visible signals, electro-magnets and armatures independent of the bobbins and diaphragm of the receiving-telephone are necessary.

This invention relates to a visible signal capable of operation, without a battery or special magneto-machine, by means of feeble currents, such as may be generated by the vibratory plate or diaphragm of a telephone of ordinary or suitable construction. Instead of requiring an independent electro-magnet and armature, it is adapted to be connected with and operated by the diaphragm of a telephone. Instruments independent of the telephones, and connected in the circuit in the ordinary way, may, however, be employed. A disk or other device is connected with a vibratory strip or plate, and adapted to be operated by successive vibrations of said plate, of which no one vibration would produce that effect. The connection with the plate or strip is made by a catch or jointed arm, which retains the disk in position by engagement with the plate or strip. When the catch is released the disk or other device moves under the influence of a weight or spring, or similar power. An inclined plane on the catch or vibratory plate is the means, in connection with the weight or spring, for causing the effective operation of the vibrations to be in one direction—that is, in a direction to disengage and release the catch.

The following description will enable those skilled in the art to which it appertains to make and use my invention, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 is an isometrical perspective view of an apparatus constructed in accordance with

my invention; Fig. 2, a similar view, on an enlarged scale, of the mechanism contained in the outer case of the apparatus shown in Fig. 1; and Fig. 3, a view, in section, of a telephone having combined with the diaphragm thereof my new signal.

The same letters refer to like parts in all the figures when they occur.

A, Fig. 1, represents a box or case, the back of which, being prolonged at the top and bottom, serves for fixing it against a wall, for example, and for carrying, at the same time, the binding posts  $a$   $a'$ , to which the wires of the telephone-circuit are attached. In the face of this box is an aperture,  $a^2$ , for observing the signal device, which is or may be a white disk, and in the side is a slot, (not shown,) through which the lever B projects. The lever B carries on its projecting end an adjustable counterpoise,  $b$ . It is bent, as shown in Fig. 2, and is pivoted to the support  $b'$ , fixed to the back of the box A. At the end opposite the counterpoise  $b$  is a white signal-disk,  $b^2$ , and at a point intermediate the arm or catch  $b^3$  is jointed thereto.

C is a curved magnet, held in position by means of the cross-pieces  $c$  and the nuts  $c'$ . Upon the poles of this magnet are mounted the right-angled pieces  $c^2$ , which form the magnetic cores of the bobbins  $c^3$ .

D is a vibratory strip or plate, in which is an aperture,  $d$ . In Fig. 2 this strip, as shown, is very thin and flexible. It is secured at one end by the cross-piece  $d^2$  to the right-angled piece  $d'$ , so that its free end extends across the ends of the cores of the bobbins  $c^3$  in close proximity thereto. The piece  $d'$  is secured to the back of the case.

The jointed arm or catch  $b^3$  at its free end is bent, as shown, and presents from  $b^4$  to  $b^5$  a plane slightly inclined with reference to that of the aperture  $d$ , into which latter it projects, as shown, when the lever B is in proper position for operation.

In operating with the apparatus shown in Figs. 1 and 2, and hereinbefore more particularly described, one signal is located at the transmitting and one at the receiving station. They are placed near the telephones or combined therewith, and connected in the circuit in any ordinary or suitable way. The coun-



terpoise  $b$  is adjusted so that it tends to lift the disk  $b^2$ , and the lever  $B$  is raised by means of the end projecting from the case till the end of the catch  $b^3$  engages in the aperture  $d$  in the vibratory strip  $D$ . The disk  $b^2$  then appears through its opening  $a^2$ , Fig. 1.

In order to cause a signal to be made, a strong blow with the hand is given on the mouth-piece of the telephone at the calling-station, (this has been practically demonstrated to be sufficient,) or a call is shouted in the same mouth-piece in a high key. The strip  $D$  is thrown in vibration by means of currents passing through the coils of the bobbins  $c^3$ , and at each vibration the inclined plane  $b^4 b^5$  moves outward a small distance from the upper edge of the aperture  $d$  until it escapes altogether from said edge, and the lever  $B$  being released, the disk  $b^2$ , under the action of the counterpoise  $b$ , disappears from behind the opening  $a^2$ . The lever  $B$  is brought to rest by contact of the bent portion thereof with the upper cross-piece,  $c$ , which is cut away at  $c^4$  for that purpose.

In order to set the apparatus for another signal the projecting end of the lever  $B$  is raised, as before described.

Particular attention is called to the following point, which constitutes the leading feature in my invention: It is that the bent end of the catch or arm  $b^3$  in operating, as before described, moving in one direction, without the possibility of returning in the opposite direction, is only released from the aperture  $d$  by the accumulation of a series of small actions resulting from the vibrations of the strip  $D$ , and the disengagement is more rapid as the rapidity of the vibrations increases.

Without entering into theoretical considerations which would be here out of place, I would remark that the arm  $b^3$  is acted upon, during the vibrations of the strip  $D$ , by a mechanical force tending to draw it away, and due to the counter-weight  $b$ ; and, second, by the magneto-electro force changing in polarity at each movement, which produces the vibrations of the strip or plate  $D$ .

During a half-vibration the vibratory strip or plate will carry with it the catch  $b^3$ . During another half-vibration, the complement of the first, the catch will not be affected, and the counterpoise  $b$ , which tends to draw it away, will keep it in the position already acquired, and so on for each vibration.

I will now describe the disposition preferably adopted in applying my signal to a telephone, referring to Fig. 3. The telephone shown is what is called the "chronometer-telephone," the invention of F. A. Gower, patented August 26, 1879, No. 218,873; but one of any ordinary or suitable construction may be used in place thereof. It is represented as suspended against the wall by a ring fixed to the telephone-case. In this case the vibratory plate  $D$  serves as the diaphragm of the telephone also.

The arm or catch  $b^3$ , the end of which engages with the aperture  $d$ , is jointed at its upper end to the horizontal arm  $e$ , fixed to the sliding plate or rod  $E$ , which is movable in guides in the piece  $e'$ , and which takes the place of the counterweighted lever before described. A stop or projection,  $e^2$ , limits the movement downward of the plate or rod  $E$ .

The several parts having been arranged as shown in the figure, if the vibratory plate or diaphragm  $D$  be thrown into vibration by currents in the coils of the telephone, the arm or catch  $b^3$  will be acted upon by a mechanical force tending to make it descend, and due to the weight of the piece  $E$ , and by a magneto-electrical force which produces the vibrations of the diaphragm or vibratory plate alternately in opposite directions.

It should be here noticed that, on account of the difference of direction of the mechanical force from what it is in the disposition first described, the inclined plane is placed on the opposite side of the arm or catch  $b^3$  to that represented in Fig. 2.

It will be readily understood from what has already been said how the catch  $b^3$  will in the end be disengaged from the opening  $d$ , and, together with the piece  $E$ , will fall until the stop  $e^2$  comes into contact with the upper end of the piece  $e'$ .

As the piece  $E$  descends its lower end, which may be painted white, will project below the piece  $e'$ , as shown in dotted lines, and thus furnish the visible signal desired. To reset the device, it is sufficient to lift the piece until the catch  $b^3$  engages in the aperture  $d$ .

Many modifications may be made in carrying my invention into effect from what has been before described.

It is evident that a drop, as shown in Fig. 3, might be used in connection with an apparatus in other respects similar to that shown in Figs. 1 and 2, and also that a counterpoised lever with a catch might be used in combination with a telephone-diaphragm. The vibratory plate or strip could carry the inclined plane in place of an aperture, this latter being conversely placed on the said arm or catch.

Instead of setting the signal by hand, the inclined plane could be engaged with the opening by means of a system of returning apparatus of any ordinary or suitable construction. In like manner the weights or counterpoises could be replaced by springs, and also the lever  $B$  or piece  $E$  could, instead of, or in addition to, giving the visible signal aforesaid, put into motion an electric bell, cause a hammer to strike a gong, or produce other effects.

The signal can be very effectually given by telephones provided with the pneumatic or musical signal of F. A. Gower. This latter consists, in general, of a reed or musical instrument fixed to the vibratory plate or diaphragm of a telephone, so that when sounded its vibrations are communicated directly thereto. In connection with these or similar instru-



ments it is preferable to regulate the length of the vibratory strip of my signal, so that its vibrations shall be synchronous with those of the reed or musical instrument.

The form, dimensions, materials employed, and accessory devices for carrying out my invention may be varied, if required.

Having thus fully described my said invention and the manner in which the same is or may be carried into effect, what I claim, and desire to secure by Letters Patent, is—

1. An electric or telephone signal, substantially as described, having a disk or other device connected with a vibratory plate or strip, and adapted to be operated by successive vibrations of said plate or strip, of which vibrations no one would effect the operation.

2. The combination of a signal device, a vibratory plate or strip, a catch connected with aforesaid device by a pivot or hinged joint, and adapted to engage directly with said plate or strip, and means for moving the signal device when the catch is disengaged by the vibrations of the strip or plate, substantially as described.

3. The combination, with a disk or other signal device, of an electro-magnet, a vibratory plate or strip located in front of the poles of said magnet, and means, substantially as specified, for connecting the said disk or device with the vibratory plate or strip through the medium of an inclined plane, whereby,

through successive vibrations of said plate, the disk or other device is disconnected or released to give the required signal, as set forth.

4. The combination, with the vibratory plate or diaphragm, of a telephone of otherwise ordinary or suitable construction, of a signal disk or device, and a catch, substantially as described, the said disk or device being held in position by the engagement of the catch with the vibratory plate or diaphragm, and released to give the signal by the disengagement of said catch through the vibrations of said plate or diaphragm, as set forth.

5. The combination of a sliding plate or rod, or its specified equivalent, and a bent arm or catch pivoted thereto, and having at its end an inclined plane, with a vibratory plate or strip provided with an aperture, the said sliding piece or equivalent being sustained against its weight by the engagement of the said inclined plane with an edge of the aperture dropping on the disengagement thereof, substantially as described.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

C. ADER.

Witnesses:

EMILE BARRAULT,  
FREDERIC A. GOWER.