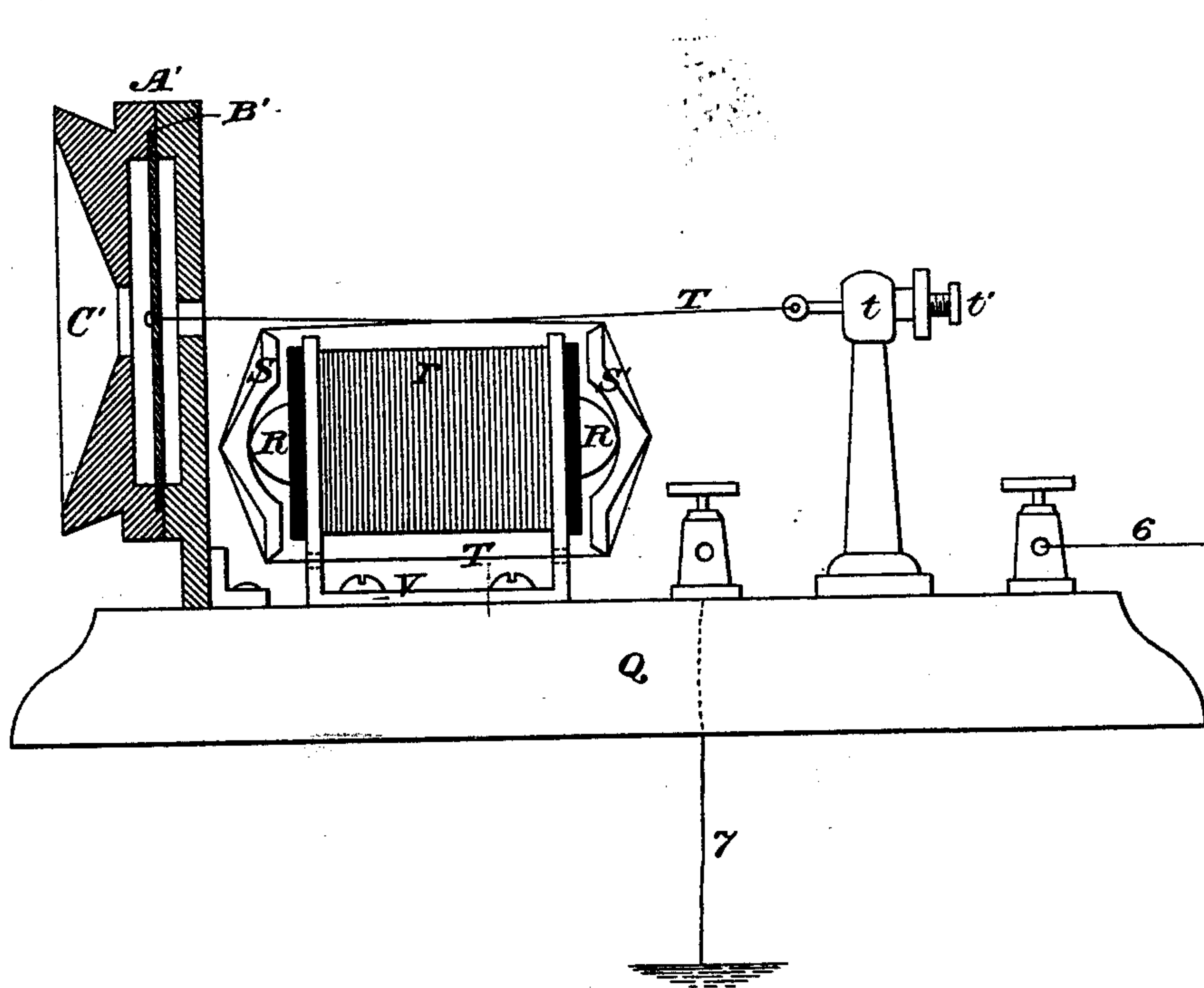


(No Model.)

S. D. FIELD.  
Telephonic Receiving Instrument.

No. 233,493.

Patented Oct. 19, 1880.



Witnesses;  
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*Mrs. F. Gockwood French.*

Inventor,  
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Attorney,



# UNITED STATES PATENT OFFICE.

STEPHEN D. FIELD, OF NEW YORK, N. Y.

## TELEPHONIC RECEIVING-INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 233,493, dated October 19, 1880.

Application filed August 2, 1880. (No model.)

*To all whom it may concern:*

Be it known that I, STEPHEN D. FIELD, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Telephonic Receiving-Instruments, of which the following is a specification.

My invention relates to apparatus for receiving rhythmical impulses, waves, or vibrations, which are sent through an electric circuit by means of any suitable transmitter adapted to that purpose, and converting them into corresponding mechanical movements of a plate or membrane, whereby the atmosphere is thrown into vibration and musical or articulate sounds produced.

My invention consists, first, in a method of producing vibrations in a resonant plate by multiplying the motion produced by the elongation and contraction of an iron bar surrounded by a coil of wire, when under the influence of an electric current of varying strength traversing said coil; second, in the combination of a bar of iron surrounded by a coil of wire, movable angular pole-pieces mounted upon or maintained in contact with one or both ends of said bar, and a wire attached at one end to a vibrating or resonating plate passing around and over said pole-pieces and attached at its other end to a rigid but adjustable support, by which device the wire is kept under a longitudinal strain, which is varied by the elongation and contraction of the bar.

The accompanying drawing represents a side elevation, partly in section, of my improved receiving-instrument.

In the drawing, R R is a straight bar of soft iron of the ordinary cylindrical form, which is surrounded by a coil or helix of insulated wire, *r*, in the usual manner. The ends of this bar which project beyond the coil, instead of being flat, as is ordinarily the case, are shaped into an obtuse knife-edge, and angular pole-pieces of metal, of the form shown at S S' in the figure, are mounted thereupon, so as to be capable of oscillating upon said knife-edge as a fulcrum.

The coil or spool of wire and its inclosed bar of iron are mounted upon a metallic support, V, which is constructed to clamp the

heads of the spool, and is secured to a suitable base, Q, which base also supports a case or frame, A', containing a resonant plate or membrane, B', clamped at its edges and free to vibrate in its central portion. One end of a wire, T, is attached to the center of the plate B', and is then carried round the outside of the pole-piece S', which it touches at only three points, thence in a similar manner around the pole-piece S, and thence to the rigid post or standard *t*, to which it is attached by an adjustable straining-screw or other similar device, as shown at *t'*, by which means the wire is kept at a constant tension.

When an electric current from a suitable rhythmical or telephonic transmitter consisting of impulses, waves, or vibrations of varying strength and rapidity of succession is made to pass through the receiving-instrument it traverses the coil *r* surrounding the iron bar R R. By a well-known law of electro-magnetic action this bar, by virtue of the molecular changes which take place among its constituent particles, becomes elongated in proportion to the strength of the current traversing the coil, and in like manner contracted when the strength of the current is decreased. This mechanical movement is communicated to the plate B' by means of the pole-pieces S S', which act as levers upon the strained wire T, and thus multiply the very slight mechanical movement of the bar R R to an extent which is sufficient to produce distinctly audible vibrations in the plate B'. These vibrations will necessarily coincide with and be, in fact, a reproduction of the vibrations originally set up by the action of the transmitter, and these will be communicated to the atmosphere and produce corresponding sounds.

I claim as my invention—

1. The hereinbefore-described method of producing vibrations in a resonant plate, which consists in multiplying the motion produced by the elongation and contraction of an iron bar surrounded by a coil of wire when under the influence of an electric current of varying strength traversing said coil.

2. The combination, substantially as herein set forth, of a bar of iron surrounded by a coil of wire, movable angular pole-pieces mounted

upon or maintained in contact with one or both  
ends of said bar, and a wire attached at one  
end to a vibrating or resonating plate passed  
around said pole-pieces and attached at its  
5 opposite extremity to a rigid adjustable sup-  
port, whereby the wire is kept under a longi-  
tudinal strain, which is increased or dimin-

ished by the elongation and contraction of the  
bar.

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