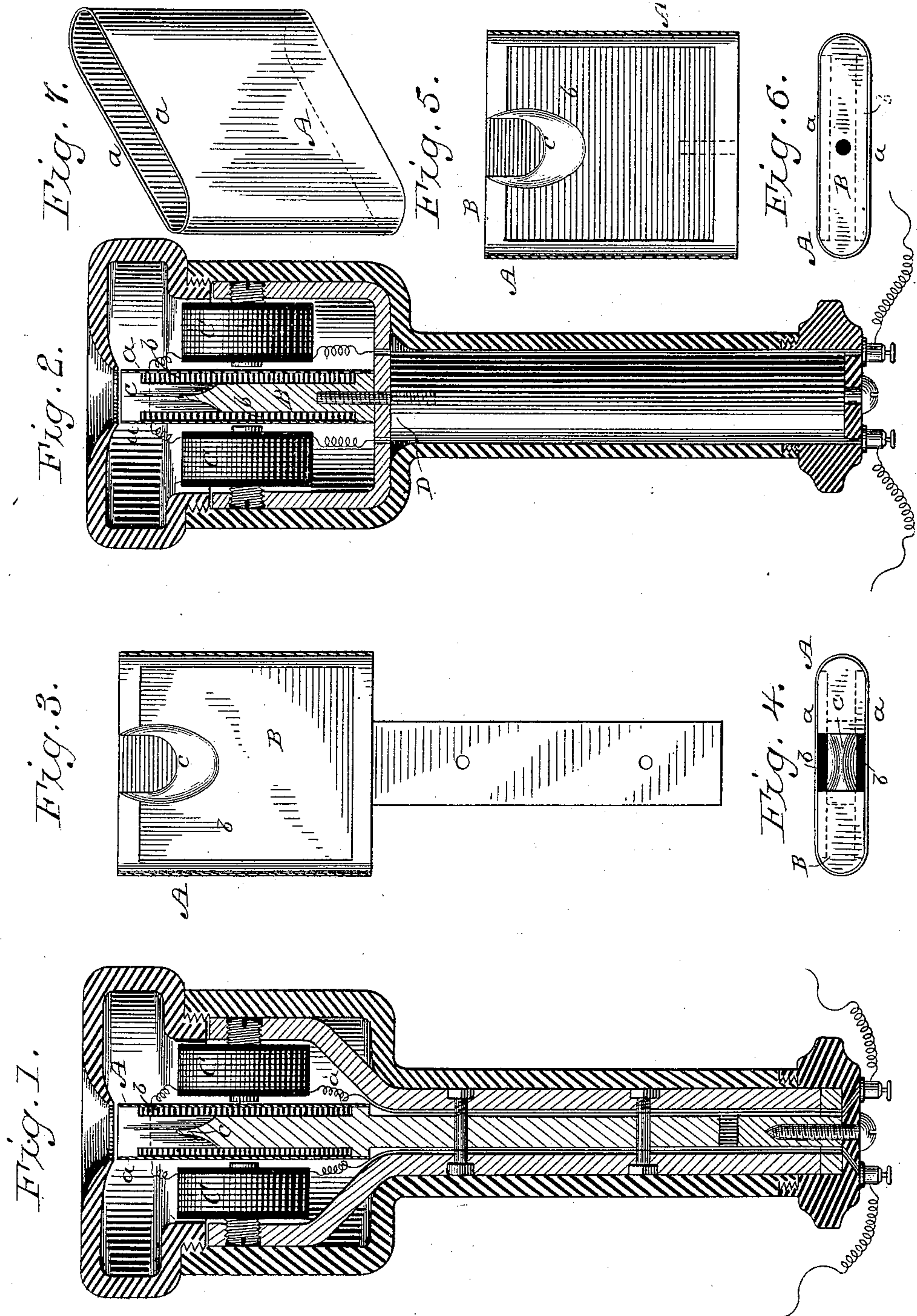


(No Model.)

W. C. TURNBULL.  
TELEPHONE RECEIVER.

No. 346,962.

Patented Aug. 10, 1886.



WITNESSES

*Ed. A. Newman.*  
*A. C. Newman.*

INVENTOR

*William C. Turnbull,*

By *his* Attorneys

*Baldwin, Hopkins & Pease.*



# UNITED STATES PATENT OFFICE.

WILLIAM C. TURNBULL, OF BALTIMORE, MARYLAND.

## TELEPHONE-RECEIVER.

SPECIFICATION forming part of Letters Patent No. 346,962, dated August 10, 1886.

Application filed February 23, 1886. Serial No. 192,916. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM C. TURNBULL, of Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Telephone-Receivers, of which the following is a specification.

The object of my invention is to improve the construction and operation of telephonic receivers; and to this end the invention primarily consists in employing a vibrating plate, preferably rectangular, and sustained at two opposite edges only, preferably under tension.

In the accompanying drawings, Figure 1 is a longitudinal section through one form of apparatus; Fig. 2, a similar section through another slightly modified form of apparatus; Fig. 3, a detail view of the vibrating-plate support, showing the edges of the vibrating plate in section. Fig. 4 is an end view of the same. Fig. 5 is a view similar to Fig. 3, showing the form of support employed in the instrument shown in Fig. 2; Fig. 6, an under end view of the same, and Fig. 7 is a perspective detail view of my improved flat tubular receiving-vibrator.

I preferably carry out my invention by employing a flat tube of inductive metal, substantially such as that shown in Fig. 7. The width of this tube relatively to its thickness and length is practically immaterial, though I prefer to make the width about equal to the length and the thickness about as illustrated in the drawings, which show a practical full-size operative structure. The flat tube A may be held in any suitable way; but I prefer to employ such an arrangement as that shown in Figs. 3 and 5, which show a support, B, of approximately the same cross-section as the flat tube A, and depressed or cut away on its opposite flat faces, so as to leave depressions or vocalizing-chambers *b* opposite the flat sides *a* of the tube A when the latter is in place on its support, as indicated in the drawings. It will be observed that by this structure each side of the flat tube A becomes a plate capable of vibrating in response to the action of a receiving electro-magnet, and I may employ one or both sides, as may be desired.

In the drawings I have shown magnets operating upon both sides of the flat tube, and I prefer so to make the instrument.

In order to maintain the flat tube under tension, the support B is made of such a size as to tightly stretch the flat sides of the tube A when the tube is forced over the support. The support B is cut away, as shown, at its upper edge on each side, so as to form passages on each side of a dividing-ridge, *c*, to the vocalizing-chambers *b b*.

In the form of instrument shown in Fig. 1, the support B, which is preferably of wood, hard rubber, or vulcanized fiber, is shown as formed with a prolongation which is clamped between the legs of two flat bar-magnets, which are bent outwardly at their upper ends, so as to afford spaces opposite the vibrating plates for the reception of suitable coils and cores, C. The instrument is inclosed in any suitable case.

In Fig. 2 I have shown a single bar-magnet, upon the upper end of which, as viewed in the drawings, is mounted a soft-iron pole-piece, D, having two upright arms which terminate opposite the inductive vibrating plates, and carry core-pieces upon which ordinary coils are arranged. The support B may be secured to the piece D in any suitable way.

The structure which has now been briefly described is practical and very efficient. Obviously, however, the invention does not depend, so far as the use of a vibrating plate secured at two edges only is concerned, upon the employment of a flat tube; and, as before remarked, one plate only may be employed instead of a flat tube; or, where a flat tube is used, only one side may be utilized. The vocalizing chambers or depressions formed in the sides of the support B, might of course be turned out so as to be circular instead of rectangular, as illustrated.

I am aware of the patent of Thompson, No. 339,500, of April 6, 1886, which shows a plate of non-magnetic material located out of the magnetic field of the telephone-magnet and confined at two opposite ends. I am also aware of the patent of Eickemeyer, No. 210,929, of December 17, 1878. I do not therefore claim any subject-matter shown in either of these cases, the features of my invention being specifically claimed below.

I claim as my invention—

1. The combination of the magnet and a vi-



brating rectangular receiving-plate of inductive metal arranged in the field of the magnet, supported at two opposite edges, and free to vibrate between said supports, substantially as and for the purpose set forth.

2. In a telephone-receiver, the combination of a receiving-magnet and a rectangular receiving-plate of inductive metal arranged in the field of said magnet, supported at two opposite edges only under tension, and being free to vibrate between said supports.

3. The combination of the flat tube of inductive metal and its support formed with the recesses or vocalizing-chambers *b*.

4. The combination of the flat tube of inductive metal and its support formed with suitable vocalizing-chambers, and cut away,

substantially as illustrated, to form passages to said chambers.

5. In a telephone-receiver, the combination, substantially as set forth, of a flat tube of inductive metal, a suitable support inserted within the open end of said tube, whereby two rectangular vibrating receiving-plates arranged in comparatively close proximity to each other are provided, and electro-magnets which act upon the flat rectangular sides of the tube.

In testimony whereof I have hereunto subscribed my name.

WILLIAM C. TURNBULL.

Witnesses:

LLOYD B. WIGHT,  
ANSON S. TAYLOR.