

(No Model.)

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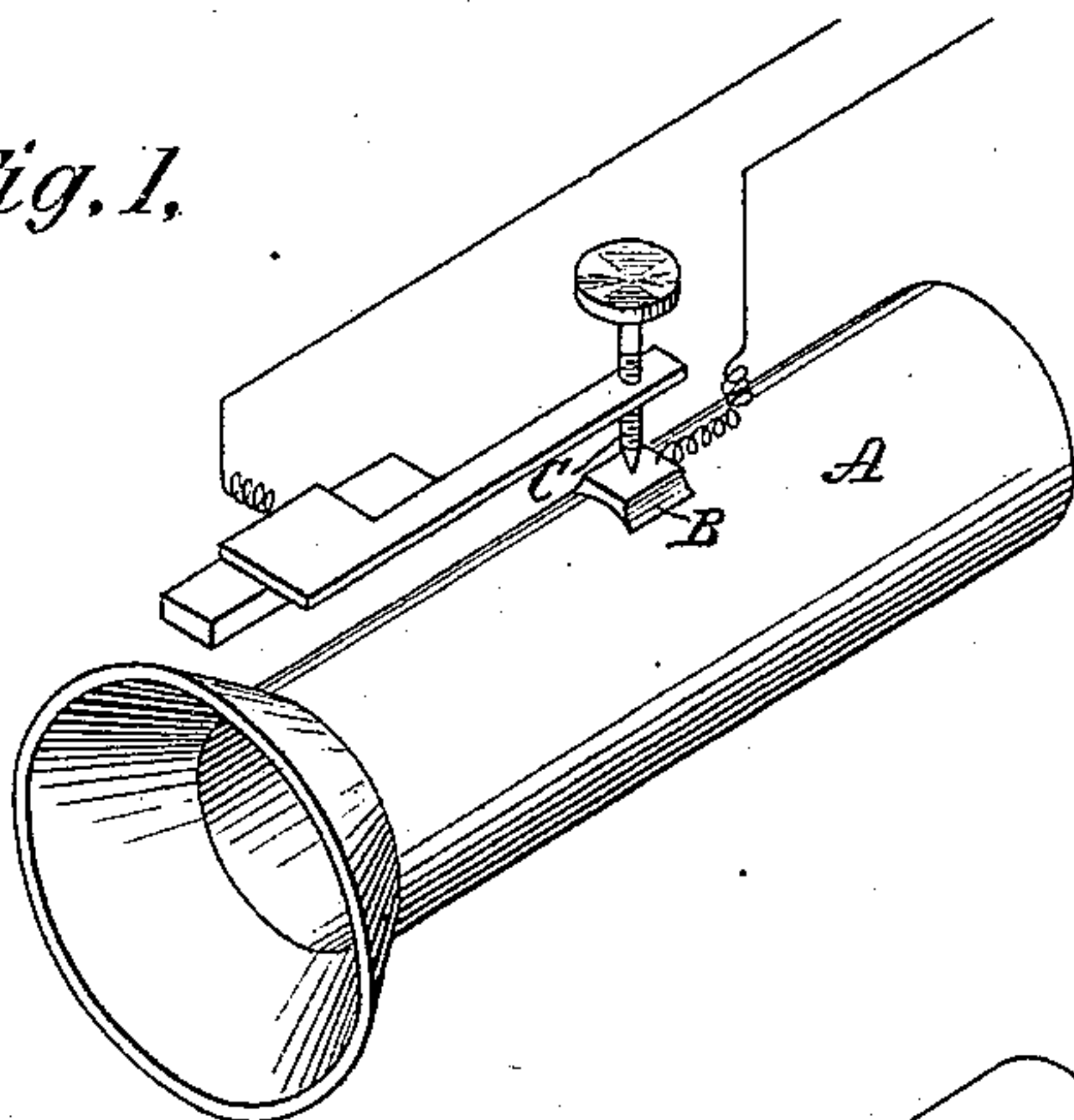
J. H. ROGERS.

SOUND TRANSMITTING APPARATUS.

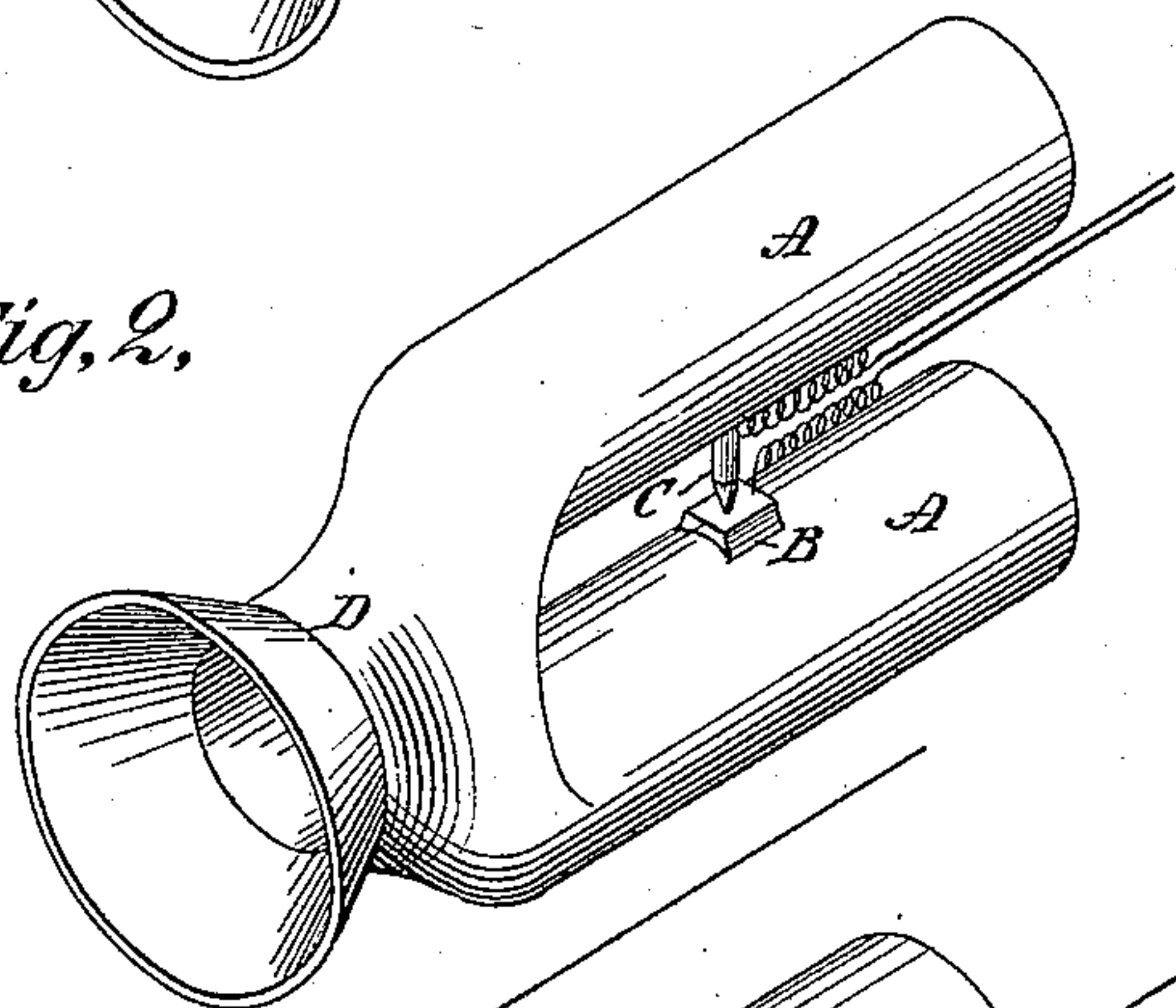
No. 287,169.

Patented Oct. 23, 1883.

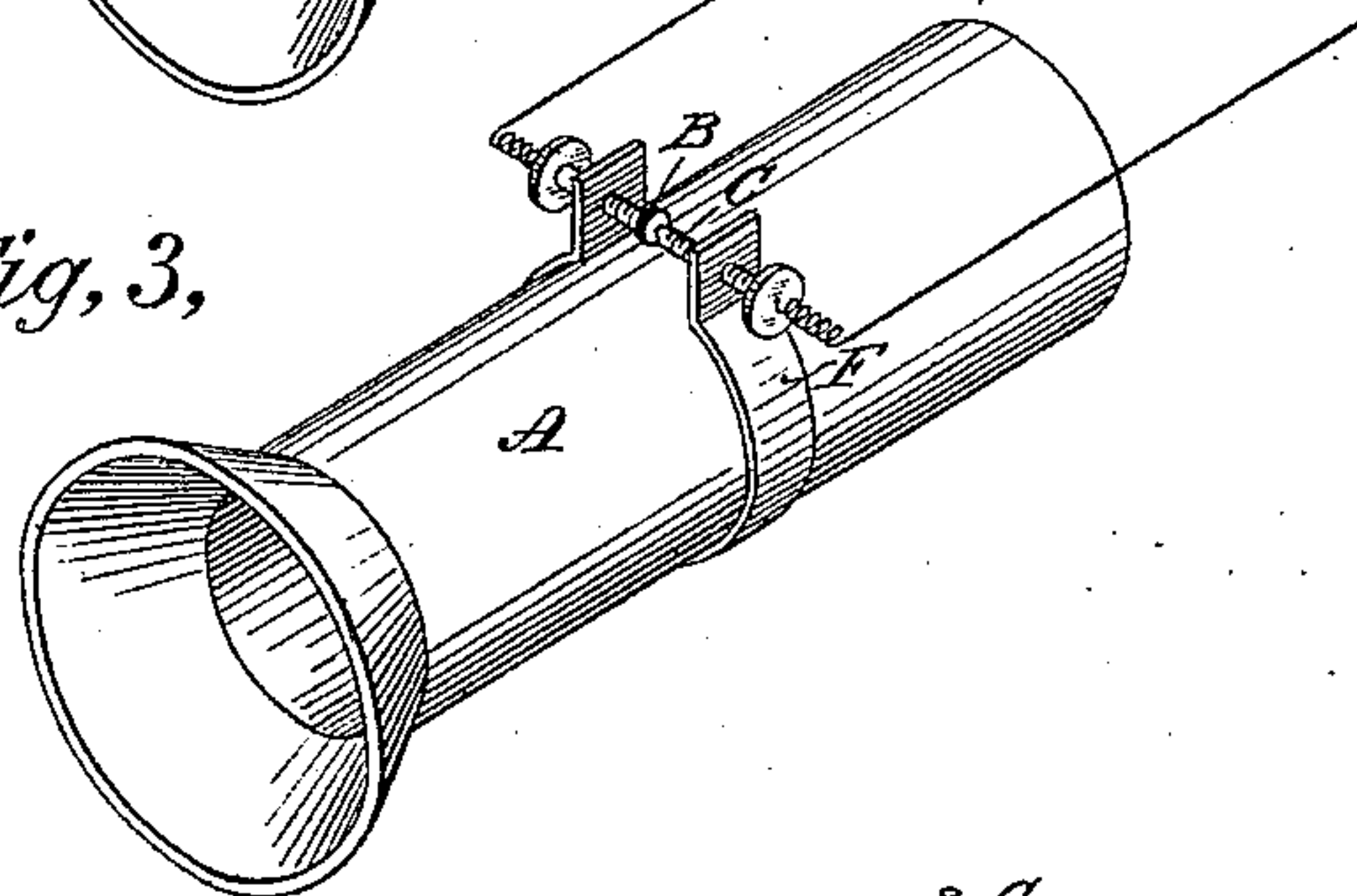
*Fig. 1,*



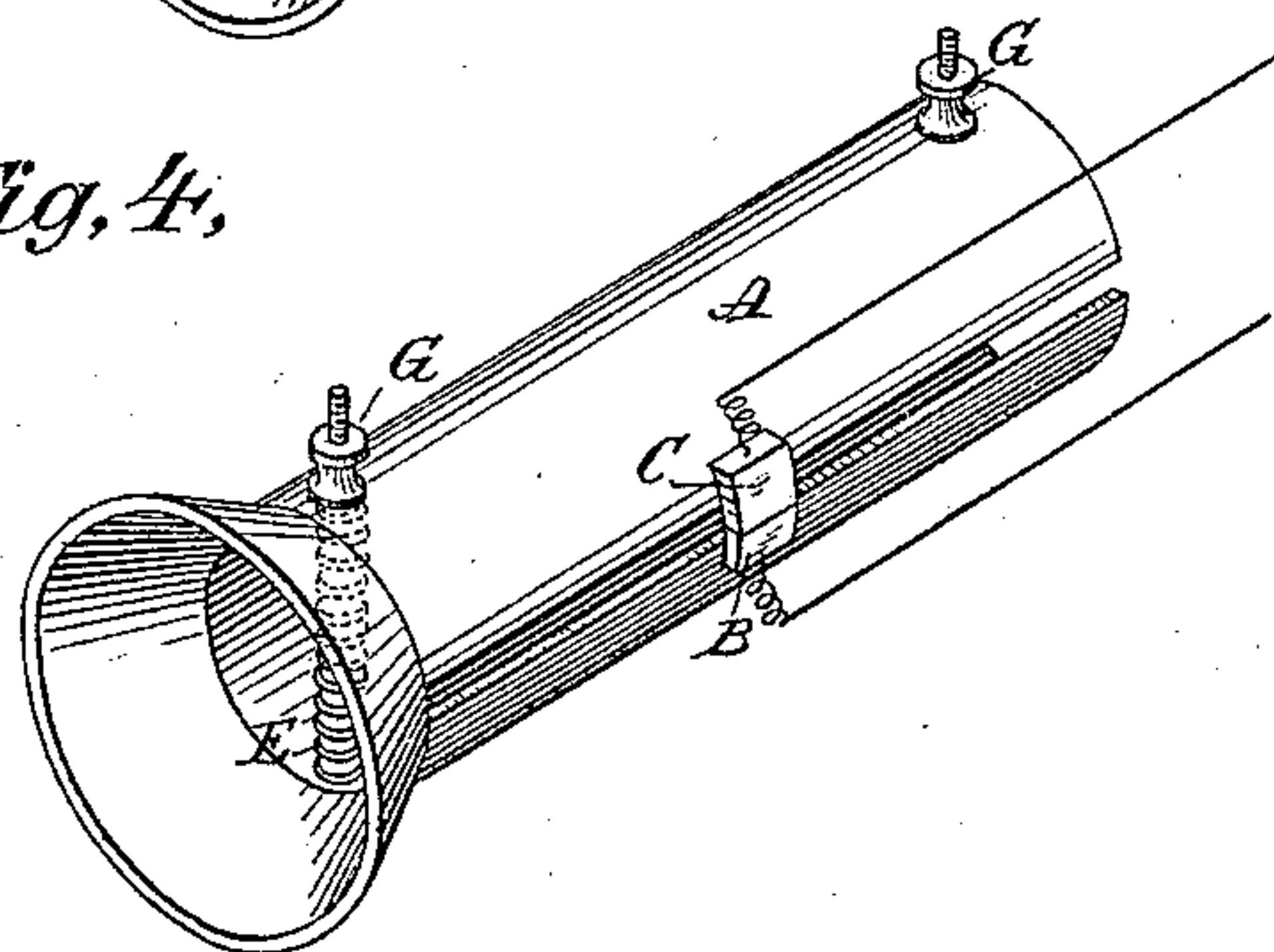
*Fig. 2,*



*Fig. 3,*



*Fig. 4,*



WITNESSES

*Ernest Abshagen*  
*Thos. J. Joney*

INVENTOR

*J. H. Rogers,*  
*By his Atty: W. C. Townsend*

(No Model.)

2 Sheets—Sheet 2.

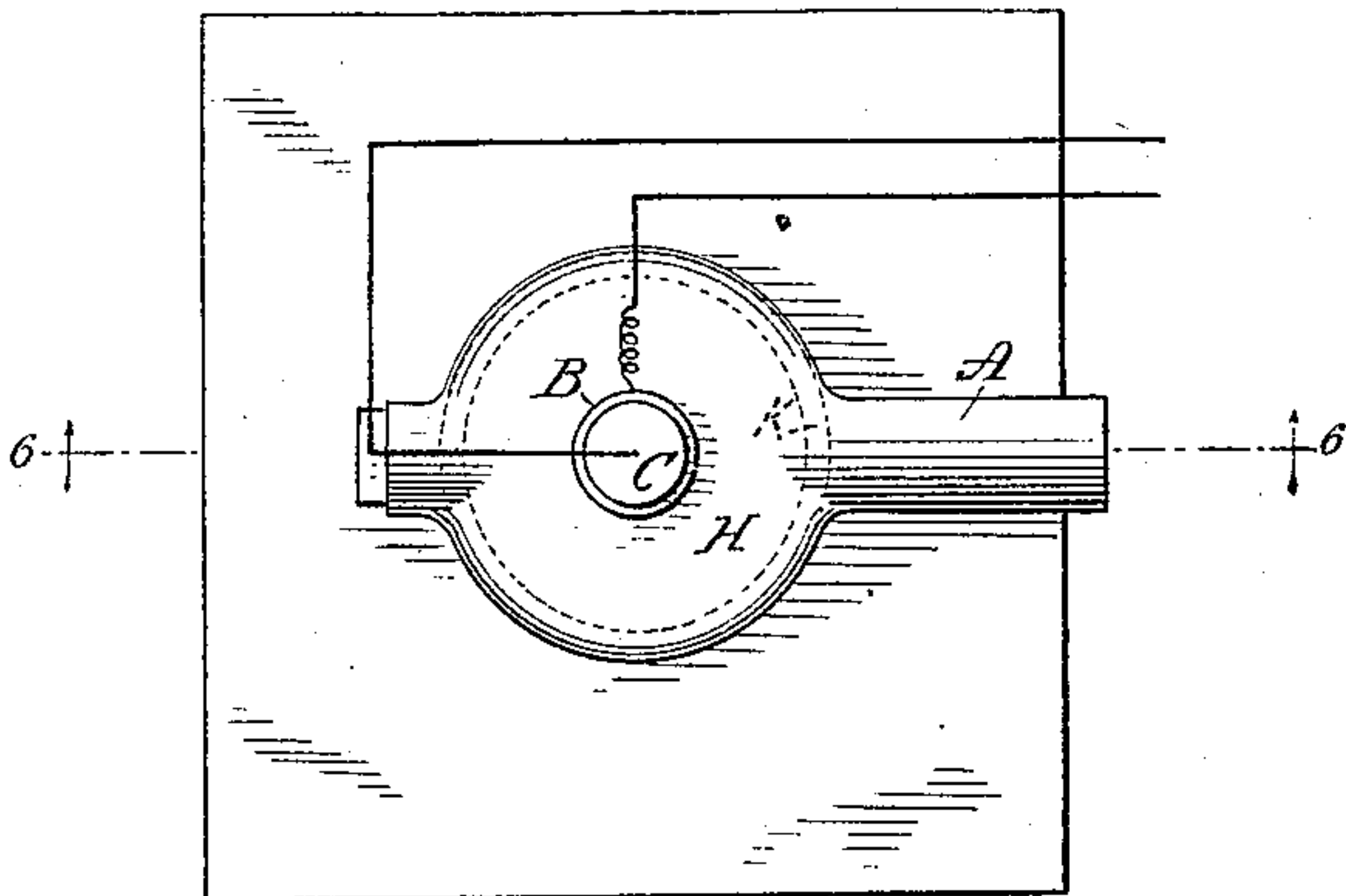
J. H. ROGERS.

SOUND TRANSMITTING APPARATUS.

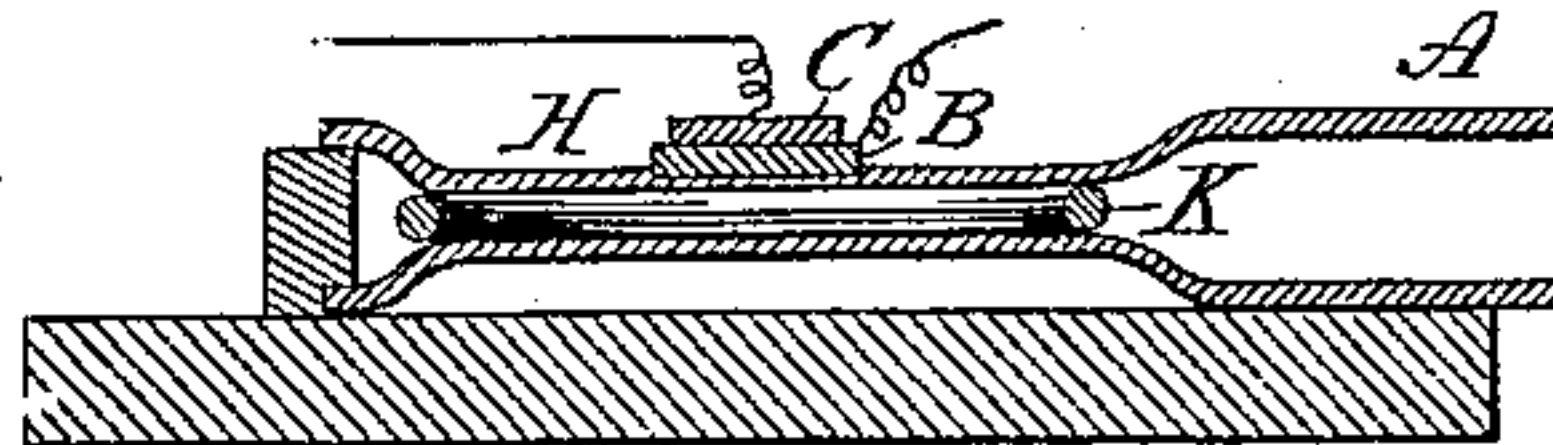
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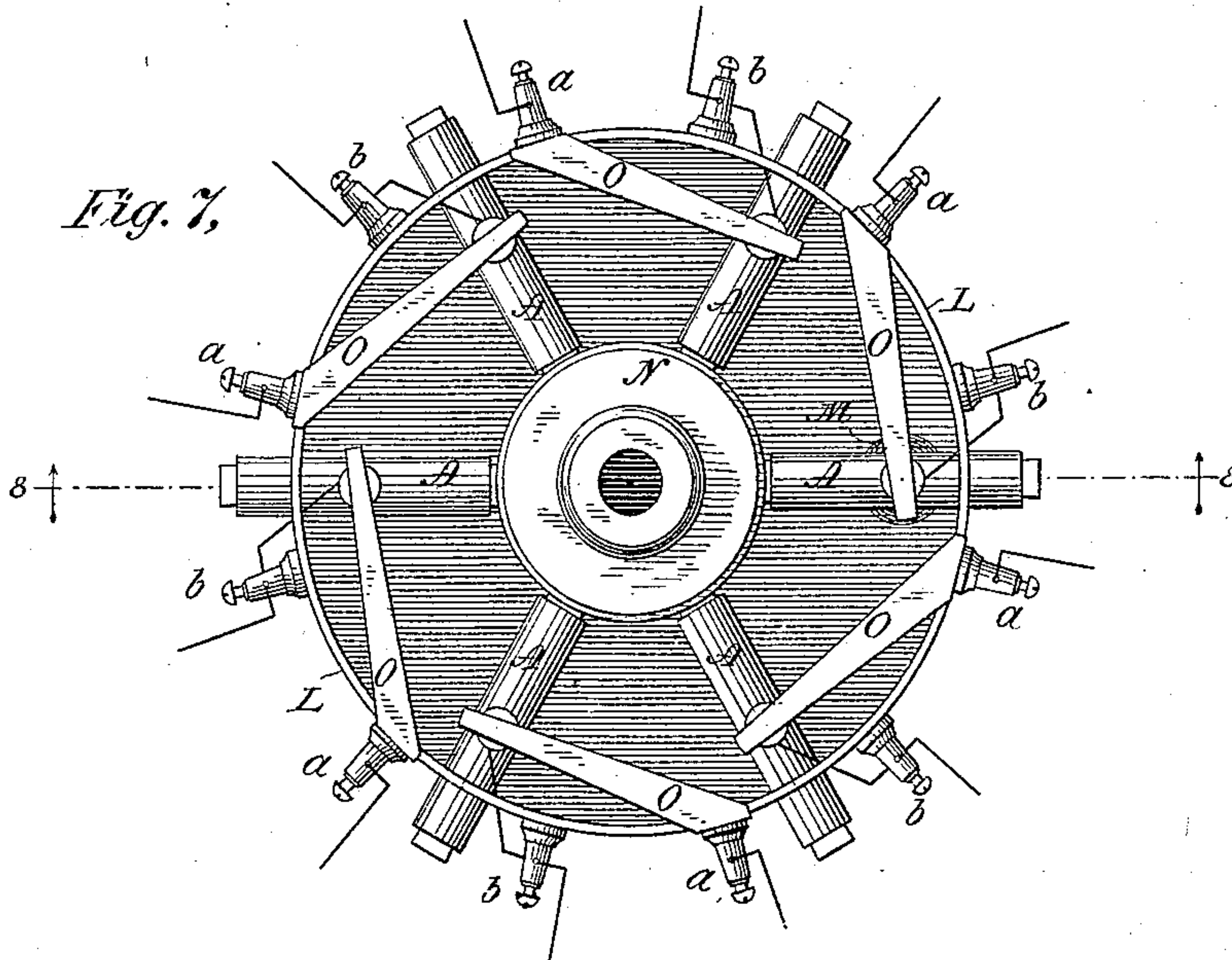
*Fig. 5,*



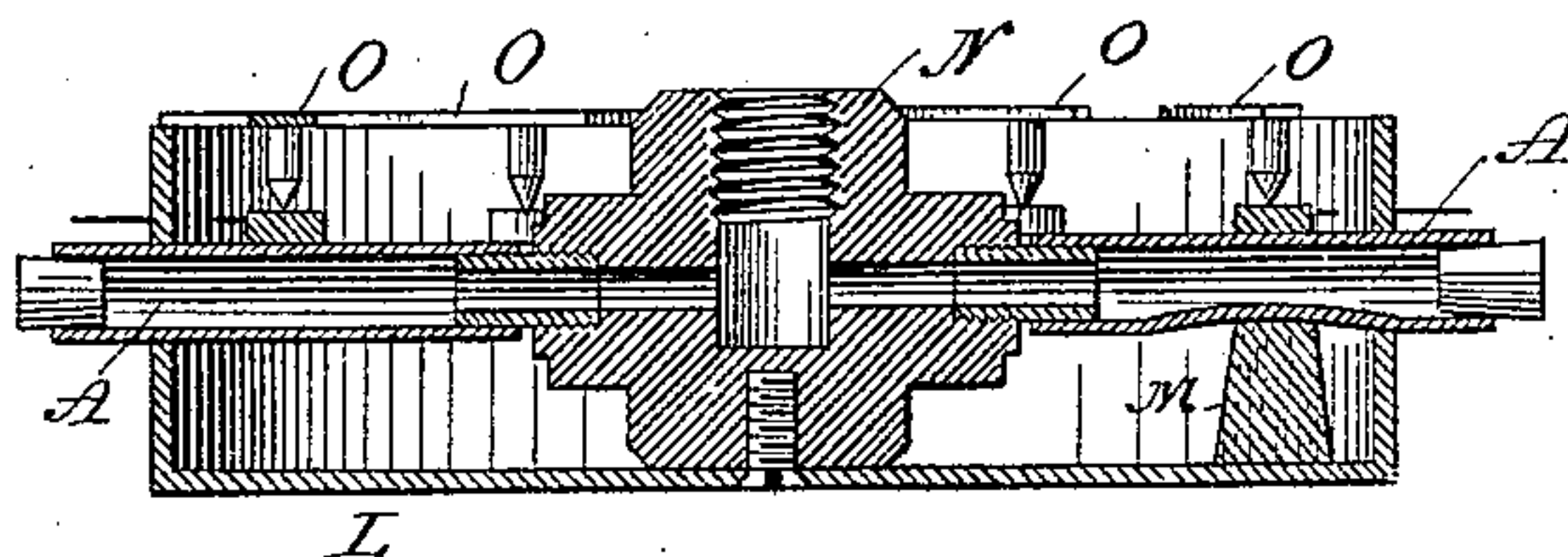
*Fig. 6,*



*Fig. 7,*



*Fig. 8,*



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# UNITED STATES PATENT OFFICE.

JAMES H. ROGERS, OF NEW YORK, N. Y., ASSIGNOR TO THE AMERICAN  
ELECTRO GAS TELEPHONE COMPANY, OF NEW JERSEY.

## SOUND-TRANSMITTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 287,169, dated October 23, 1883.

Application filed December 30, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES HARRIS ROGERS, a citizen of the United States, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Sound-Transmitting Apparatus, of which the following is a specification.

My invention relates to apparatus designed to convey articulate sounds to a distance, and especially to electric telephone-transmitters, although some of the features of my invention are applicable to speaking-tubes, speaking-trumpets, and similar apparatus, and serve, when so applied, to increase the amplitude of vibration of the air-waves and the distance to which the sounds will be conveyed.

My invention consists, first, of a novel speaking-telephone made by mounting one or both of the tension-changing electrodes of any kind suitable for electric telephonic purposes upon a tube or pipe of any convenient length, and so constructed that the mouth of the speaker may be applied thereto, and the tube may be spoken through after the manner in which a speaking-tube or speaking-trumpet is used.

My invention consists, further, in employing a tube for this purpose made of an elastic material, such as india-rubber.

My invention further consists in stretching or compressing at some point in its length the elastic tube mentioned when it is used in connection with any acoustic apparatus—such, for instance, as electric tension-changing electrodes suitably mounted and connected for transmitting sound electrically—or when it is used in connection with a speaking-tube, speaking-trumpet, or other acoustic apparatus for the purpose of increasing the amplitude of the vibrations transmitted by the acoustic apparatus.

My invention consists, further, of certain details of construction that will be described in detail, and then specified in the claims.

In the accompanying drawings, Figures 1, 2, 3, and 4 exhibit various forms of telephone embodying my invention. Fig. 5 is a plan of an instrument in which a tube stretched at a part of its length is used. Fig. 6 is a cross-section through the stretched tube. Fig. 7 is a plan of another instrument embodying my

invention, and containing, instead of the stretched elastic tube, a tube compressed at a part of its length. Fig. 8 is a central vertical section of Fig. 7.

In Fig. 1, A indicates a tube, which I prefer to make of an elastic material—such as rubber—(although this is not necessary,) and which is here supposed to be so constructed that it may be spoken into or through. Said tube is open at both ends or at one end only, as may be desired, although in the form here shown I prefer to leave it open at both ends. B is a tension-changing electrode, of carbon or other suitable material, such as is used in speaking-telephones, mounted on and secured to the tube in any suitable manner, while C is a second electrode resting in contact with the first and supported at the end of a spring, as indicated, or in any other suitable manner, the spring itself being supported either by the tube or from an independent support. The electrodes are placed in circuit with any suitable electrical apparatus, in the usual way. When the tube is spoken into or through, the current passing through the electrodes is varied; but the variations are of great amplitude, and sounds are conveyed with great loudness and distinctness.

In Fig. 2 two separate tubes A A are shown connected to a common tube or pipe, D, which is provided with a mouth-piece. One of the electrodes, as B, is mounted on one of the tubes A, and the other electrode is mounted on the other tube and rests in contact with electrode B. By this arrangement the amplitude of the variations produced is somewhat increased, owing to the fact that the effects of the two tubes A A are combined.

In Fig. 3, F indicates a strap or band, of metal or any other suitable material, which I prefer to make elastic, and which embraces and is supported by the tube A. The free ends of the strap carry the electrodes B C, which are mounted on adjusting-screws passing through the ends of the strap.

In Fig. 4 is shown a split tube or pipe, of metal or other suitable material. The electrodes B C are mounted at or near the split edge, and are secured to the tube by any suitable means. For the purpose of adjusting the contact of the electrodes B C, I employ a



spring, E, which tends to pull the two edges of the split tube together, and which is provided with an adjusting-nut or similar device, G. The elasticity of the tube in this case is such as to tend to hold the edges apart. The adjusting device may be dispensed with and the elasticity of the tube itself, when made of wood, metal, or similar material, depended upon for holding the electrodes against one another.

In Fig. 5 the tube A is shown as stretched at H. Upon the stretched portion are mounted one or both of the tension-varying electrodes, if the tube be used with electric telephone apparatus. The tube is stretched by means of an interior ring or piece, K, open at its central portion. Within the periphery of the ring I find that astonishing vibrations occur when the air within the tube is set into vibration, and that a tube thus stretched and open at both ends answers excellently as a speaking-trumpet, and when attached to a speaking-tube adds greatly to the volume of the sound as transmitted and received. One end of the tube A may be sealed, if desired, and under some conditions of use this will be found desirable.

In Fig. 7 I have shown a construction of apparatus in which a number of tubes are connected to a common pipe or tube, so as to be alike affected by sounds produced in or conveyed to said common pipe or tube. The transverse section, Fig. 8, taken longitudinally through one of the tubes, shows the manner in which the tube may be compressed instead of stretched, so as to produce the same effects in kind as one secured by stretching the tube.

L is a frame supporting the series of tubes A, conjoined in a common pipe or opening, N, which may constitute the mouth-piece of the apparatus, so that sounds conveyed into the opening N will cause vibrations of the air in all the tubes. The tubes may be used in any of the ways herein indicated, either by attachment to speaking-tubes or by providing them with tension-varying electrodes. They may each be stretched at some portion of their length, or the equivalent expedient of compressing them at some portion of their length may be adopted.

In Fig. 8 the tube A is shown with a piece, M, of cork or other material inserted under it, so as to compress the tube at that point. If the tension-varying electrodes are employed,

they are mounted on or in vibratory connection with the compressed portion, as here indicated.

The electrode C, as shown in Fig. 7, is connected, in the ordinary way, to a spring, O, which is in electrical connection with one of the binding-posts *a*, for the circuit of the two electrodes B C.

The electrode B is connected in any suitable manner with the binding-post *b*.

The ends of the tubes A, Fig. 8, may be either sealed or left open. They are here shown sealed.

Other constructions of the various parts will readily suggest themselves to skilled mechanics.

I do not limit myself to the form of tube or to any particular means of stretching or compressing the same at some part of its length.

All matter of my invention herein shown and described and not specifically claimed I have claimed in my copending application, filed March 6, 1883, serial number 87,244, or I reserve the right to claim in future applications.

What I claim as my invention is—

1. A telephone-transmitter consisting of a sound-conveying tube or pipe upon which is mounted the tension-changing electrode or electrodes.

2. A telephone-transmitter consisting of a tube of an elastic material—such as rubber—carrying one or both of the tension-changing electrodes.

3. In a telephonic or other acoustic apparatus for conveying sounds to a distance, the combination, with an elastic tube or pipe for conveying or receiving air-vibrations, and open at one or both ends, of means for stretching or compressing said tube or pipe.

4. In a telephonic apparatus, the combination, with a tube or pipe stretched or compressed at a portion of its length, of a tension-varying electrode or electrodes mounted on such stretched or compressed portion.

5. The combination, in an acoustic apparatus for conveying sounds to a distance, of a tube of elastic material and an interior stretching ring or piece, K, as and for the purpose described.

J. H. ROGERS.

Witnesses:

OCTAVIUS KNIGHT,  
J. W. ROGERS.