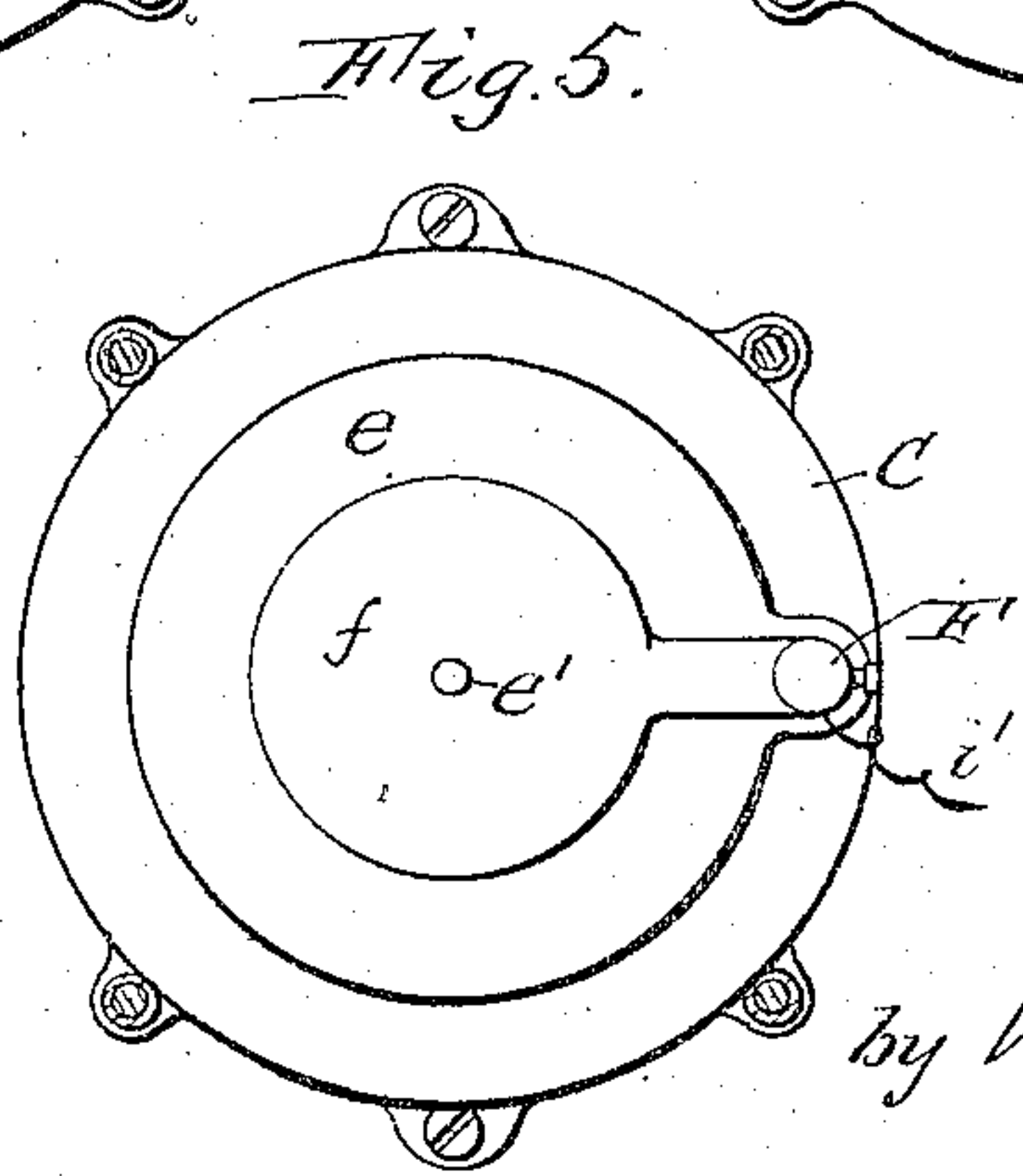
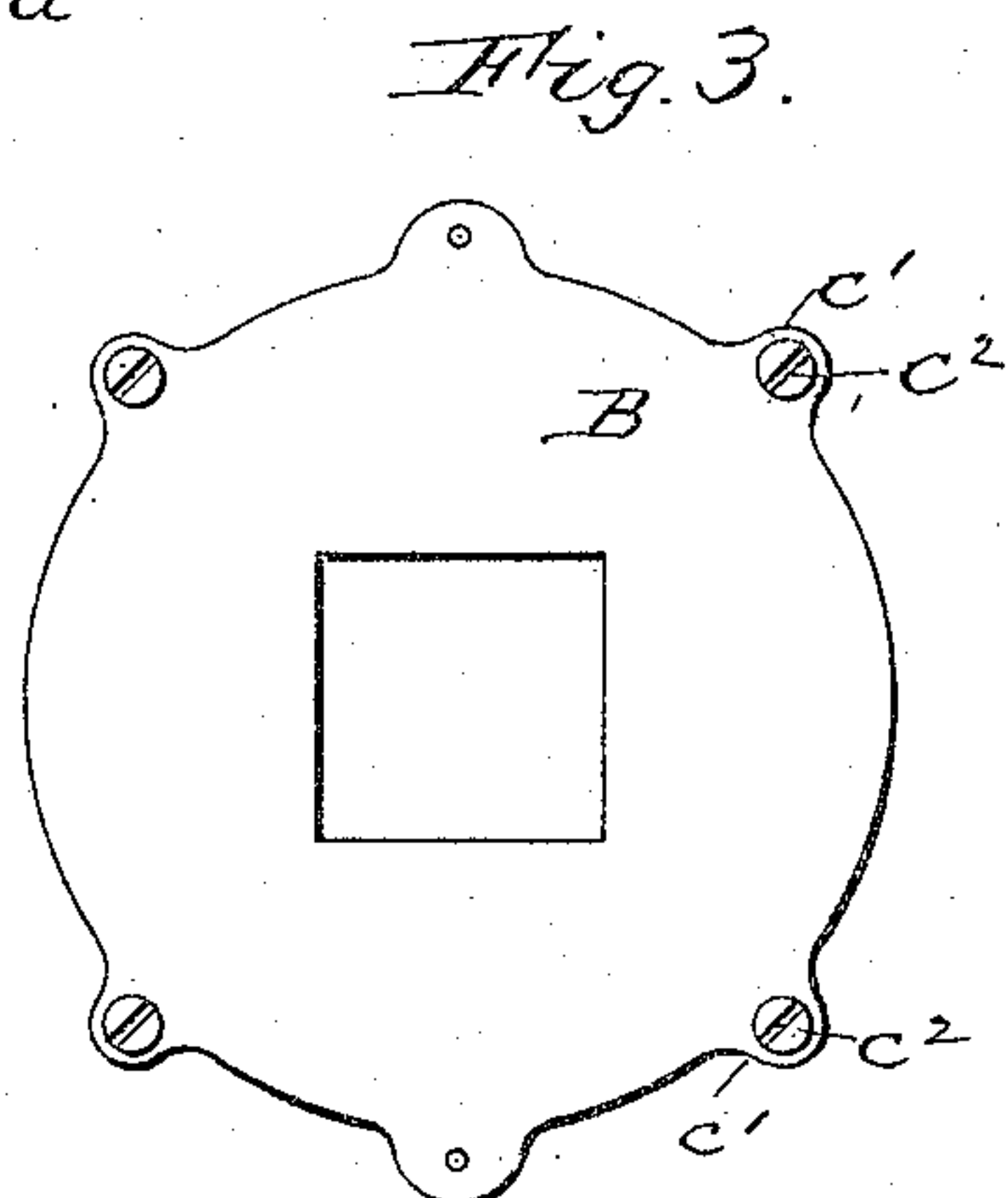
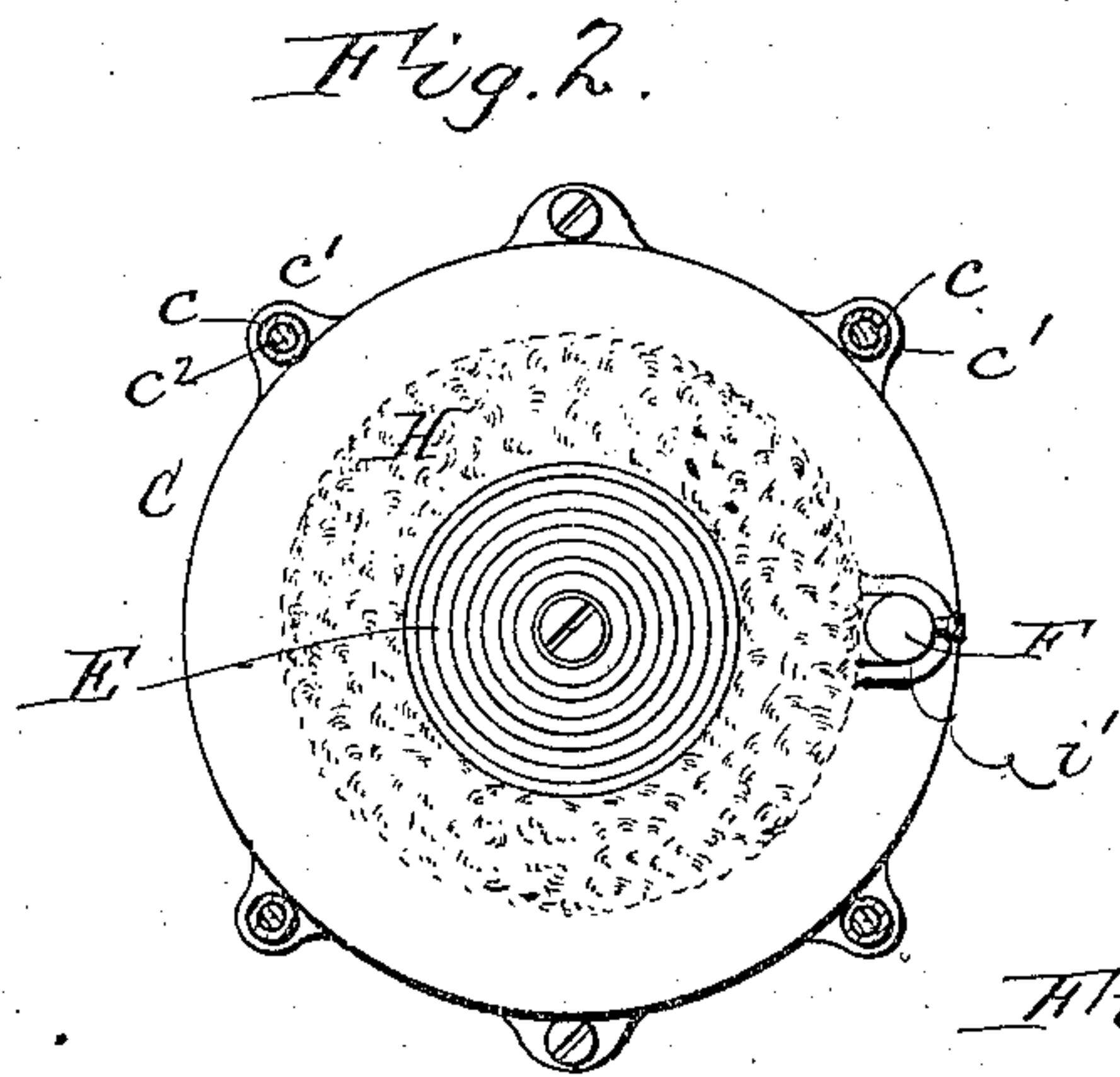
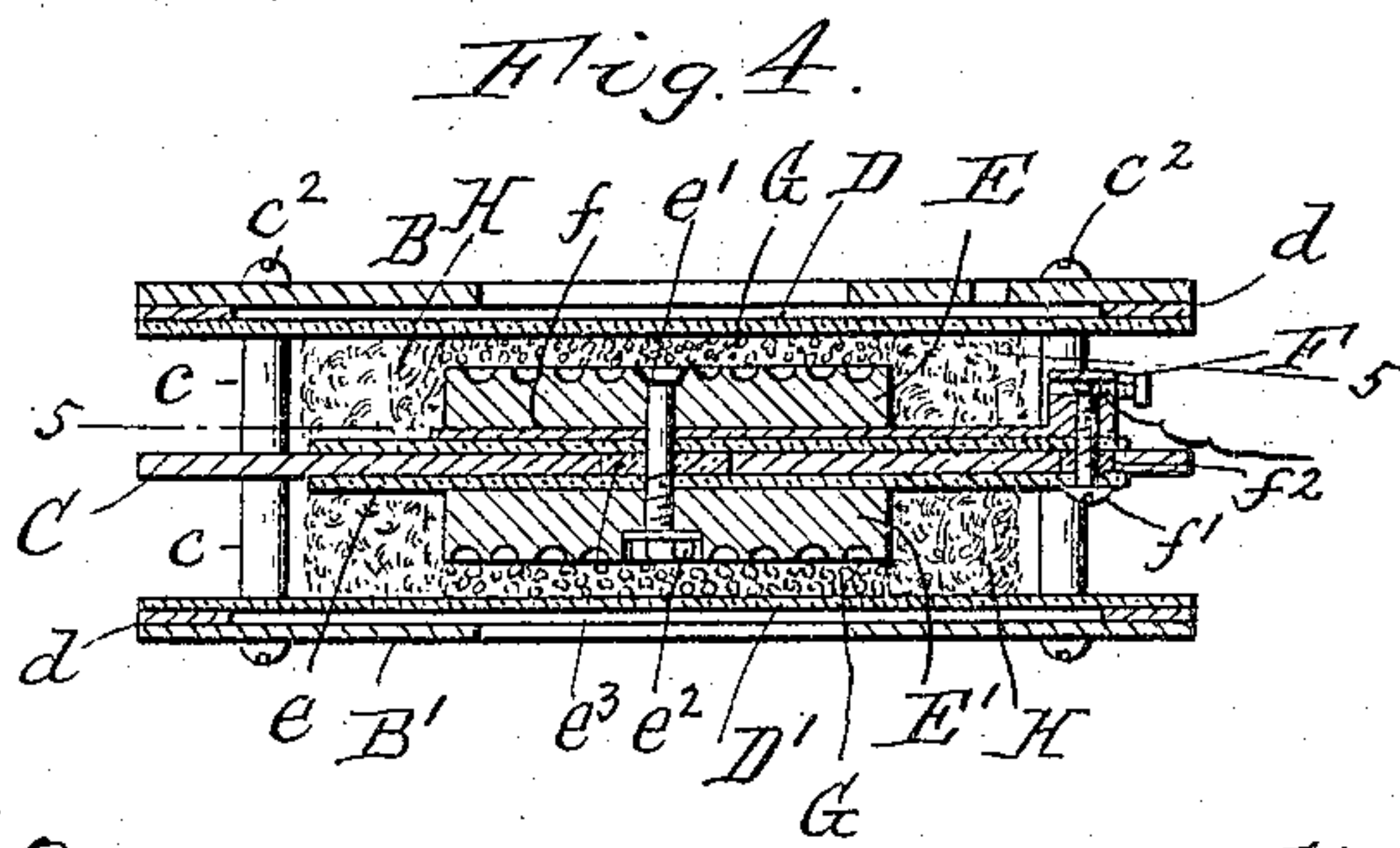
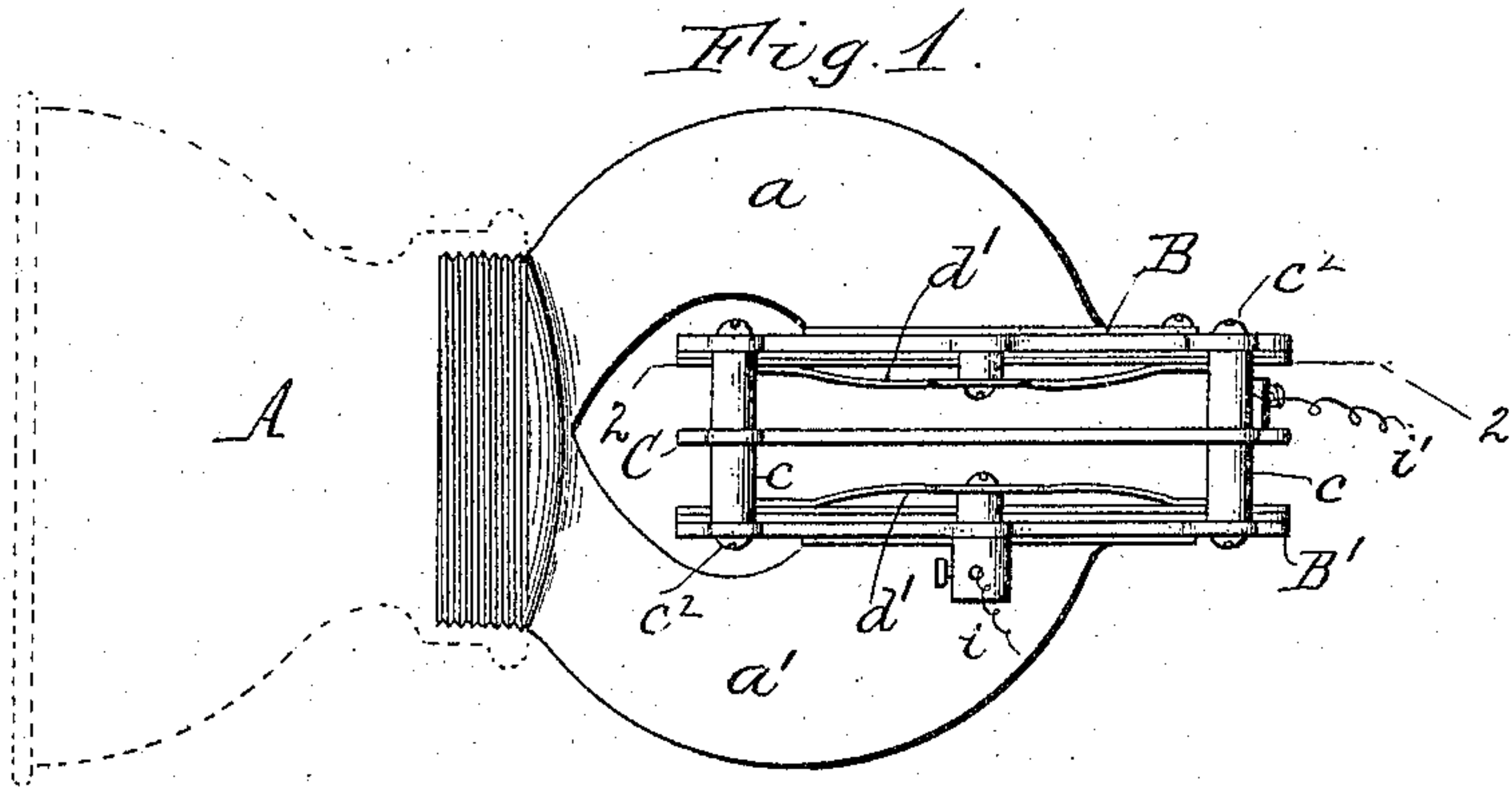


No. 790,945.

PATENTED MAY 30, 1905.

W. L. WILHELM.
TELEPHONE TRANSMITTER.
APPLICATION FILED MAR. 4, 1902.



Witnesses,
F. F. Schirmer
E. A. Volk

W. L. Wilhelm
Inventor,
by Wilhelm Bornert
Attorneys.

UNITED STATES PATENT OFFICE.

WALTER L. WILHELM, OF BUFFALO, NEW YORK.

TELEPHONE-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 790,945, dated May 30, 1905.

Application filed March 4, 1902. Serial No. 96,594.

To all whom it may concern:

Be it known that I, WALTER L. WILHELM, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Telephone-Transmitters, of which the following is a specification.

This invention relates to telephone-transmitters or microphones of that kind wherein the resistance-varying material is confined between two diaphragms against the exposed surfaces of which the sound-waves are simultaneously directed by suitable means, such as branch tubes or passages leading from a common mouthpiece.

The object of the invention is to produce a simple and efficient transmitter or microphone especially desirable for long-distance transmission by which the character of the sounds transmitted are improved and the volume increased.

In the accompanying drawings, Figure 1 is a plan view of a telephone-transmitter embodying the invention. Fig. 2 is a vertical sectional elevation through the microphone on the line 2 2, Fig. 1. Fig. 3 is an elevation of the microphone-containing frame detached. Fig. 4 is an enlarged vertical section through the microphone proper. Fig. 5 is a sectional elevation, on a reduced scale, on the line 5 5, Fig. 4.

Like letters of reference refer to like parts in the several figures.

A represents the flaring or trumpet-shaped mouthpiece, and $a a'$ two branch tubes or passages connected at their front end thereto and having their rear open ends turned toward each other and separated by an intervening space. A containing-frame for the microphone is arranged between the rear separated ends of the branch tubes $a a'$ and detachably secured thereto in any preferred manner. This containing-frame is preferably composed of two outside parallel plates or disks B and B' and an intermediate supporting plate or disk C. The three plates are arranged parallel with each other, spaced apart, and detachably connected in the said relation so as to constitute a frame or structure by suitable means, such as hollow posts or

sleeves c , arranged between and secured to marginal ears or projections c' on the several plates, as by screws c^2 .

D and D' represent two transmitting-diaphragms. They are arranged just inside of the outer frame-plates B and B' and are held away from the same at their central portions, so as to be free to vibrate, by spacing rings or annuli d , between the marginal portions of the transmitting-diaphragms and outer frame-plates. Each diaphragm is preferably secured to the adjacent frame-plate and placed in electrical connection with the containing-frame by means of a pair of springs d' , secured to diametrically opposite sides of the containing-frame and bearing at their free ends on the marginal portions of the transmitting-diaphragm.

E and E' indicate carbon buttons, arranged on opposite sides of the intermediate supporting-plate C and insulated therefrom by disks or sheets e , of insulating material, one between each button and the adjacent side of the supporting-plate. The buttons are secured to the supporting-plate and connected together electrically, so as to constitute a single electrode, preferably by means of a bolt e' , passing through central holes in the carbon buttons, the insulating-disks, and the supporting-plate and provided with a nut e^2 .

e^3 represents an insulating-bushing surrounding the bolt e' in the hole in the supporting-plate C.

One of the carbon buttons, E, is electrically connected with a binding-post F at or near the outer edge of the supporting-plate by means of a thin metallic plate f , placed between the inner face of the carbon button and the adjacent insulating-disk e . The binding-post is shown to be connected to the intermediate supporting-plate by a screw f' , passing through the insulating-disks e and through a hole in the supporting-plate provided with an insulating-bushing f^2 .

G represents the carbon granular or resistance-varying material. As shown, a mass of this material is arranged in the space left between the outer face of each carbon button and the inner surface of the adjacent transmitting-diaphragm. The granular resistance-

varying material is confined on the faces of carbon buttons by retaining-rings H H of suitable material, each surrounding one of the carbon buttons and the granular resistance-varying material in the space between the intermediate supporting-plate and the adjacent transmitting-diaphragm. The retaining-rings are preferably composed of fibrous material, which is sufficiently dense to prevent the carbon granular from working out of the space within the ring and is sufficiently elastic or yielding to permit the diaphragms to vibrate freely for influencing the carbon granular.

One terminal, z , of the local circuit is connected at any desirable point with the containing-frame or metallic parts connected therewith, and the other terminal, z' , is connected with the binding-post F, whereby the circuit is completed through the diaphragms and the interposed electrode and carbon granular.

The transmitter or microphone herein described embodies the advantages of both the double-diaphragm and the single-diaphragm solid-back microphones, for two simultaneously-vibrating diaphragms are secured, thus greatly magnifying or increasing the volume of the sounds transmitted, and at the same time the instrument constitutes, in effect, two single-diaphragm solid-back microphones connected in multiple, which is due to the rigid supporting-plate C and carbon buttons fixed thereto on opposite sides, each forming the solid back of a microphone comprising the carbon button, the cooperating diaphragm, and the interposed carbon granular.

If desired, both transmitting-diaphragms may be of carbon, which is preferred by some users owing to the purer tones due to their use, or both diaphragms may be of metal, such as ferrotype or aluminium plates, which produce louder and more metallic sounds, or one may be carbon and one ferrotype, combining the purity of the one with the volume of the other. The transmitter described is especially desirable in this respect, as diaphragms to suit the different users can be readily placed in the instrument or the diaphragms can be changed or renewed at slight cost when desired.

I claim as my invention—

1. The combination of two separated diaphragms, a rigid support arranged between and spaced and insulated from said diaphragms and carrying a fixed electrode, a resistance-varying material between each diaphragm and the adjacent portion of said electrode, connections for completing an electric circuit through said diaphragms and said electrode, and means for simultaneously directing the sound-waves against the exposed surfaces of both of said diaphragms, substantially as set forth.

2. The combination of two separated dia-

phragms, a rigid electrode fixedly supported between and insulated from said diaphragms, a resistance-varying material between each diaphragm and said electrode, connections for completing an electric circuit through said diaphragms and said electrode, and means for simultaneously directing the sound-waves against the exposed surfaces of both of said diaphragms, substantially as set forth.

3. The combination of two separated diaphragms, a rigid support between said diaphragms, carbon elements secured to opposite sides of said support and connected together and insulated from said diaphragms, granular resistance-varying material between each of said carbon elements and the adjacent diaphragms, connections for completing an electric circuit through said diaphragms and carbon elements, and means for simultaneously directing the sound-waves against the exposed surfaces of both of said diaphragms, substantially as set forth.

4. The combination of two separated diaphragms, a support between said diaphragms, a carbon element arranged on each side of said support and insulated therefrom, a connection between said carbon elements, a granular resistance-varying material between each carbon element and one of said diaphragms, and electrical connections for completing a circuit through said diaphragms and carbon elements, substantially as set forth.

5. The combination of two separated diaphragms, a rigid support arranged between and spaced and insulated from said diaphragms and carrying a fixed electrode, a granular resistance-varying material between said electrode and each diaphragm, non-conducting flexible material surrounding said granular resistance-varying material and confining the same in place, and means for simultaneously directing the sound-waves against the exposed surfaces of both of said diaphragms, substantially as set forth.

6. The combination of two separated diaphragms, a rigid supporting-plate arranged between said diaphragms, carbon elements secured to opposite sides of said plate and insulated therefrom, a granular resistance-varying material between each carbon element and the opposite diaphragm, and electrical connections completing a circuit through said carbon elements and said diaphragms, substantially as set forth.

7. The combination of two outer and an intermediate separated plates or disks, means connecting the same, a diaphragm secured to the inner side of each of the outer plates, carbon buttons secured to the opposite sides of the intermediate plate insulated therefrom and electrically connected together, a granular resistance-varying material between each carbon button and the opposite diaphragm, means for retaining the granular material in

place, and electrical connections completing a circuit through said diaphragms and carbon buttons, substantially as set forth.

8. The combination of a containing-frame, 5 two separated diaphragms secured together, a support secured thereto between said diaphragms, carbon elements on said support and insulated therefrom, a granular resistance-varying material between each carbon element 10 and one of said diaphragms, electrical connections for completing a circuit through said diaphragms and carbon elements, and means for supporting said containing-frame and directing the sound-waves to the exposed sur- 15 faces of said diaphragms, substantially as set forth.

9. The combination of a containing-frame consisting of three separated plates or disks,

and means detachably connecting the same, a diaphragm secured on the inner side of each 20 of the outer plates, carbon elements secured to and insulated from the opposite sides of the intermediate plate, a granular resistance-varying material between each carbon element and one of said diaphragms, electrical 25 connections for completing a circuit through said diaphragms and carbon elements, and means for supporting said containing-frame and to which the latter is detachably connected, substantially as set forth. 30

Witness my hand this 28th day of February, 1902.

WALTER L. WILHELM.

Witnesses:

CHAS. W. PARKER,

CLAUDIA M. BENTLEY.