

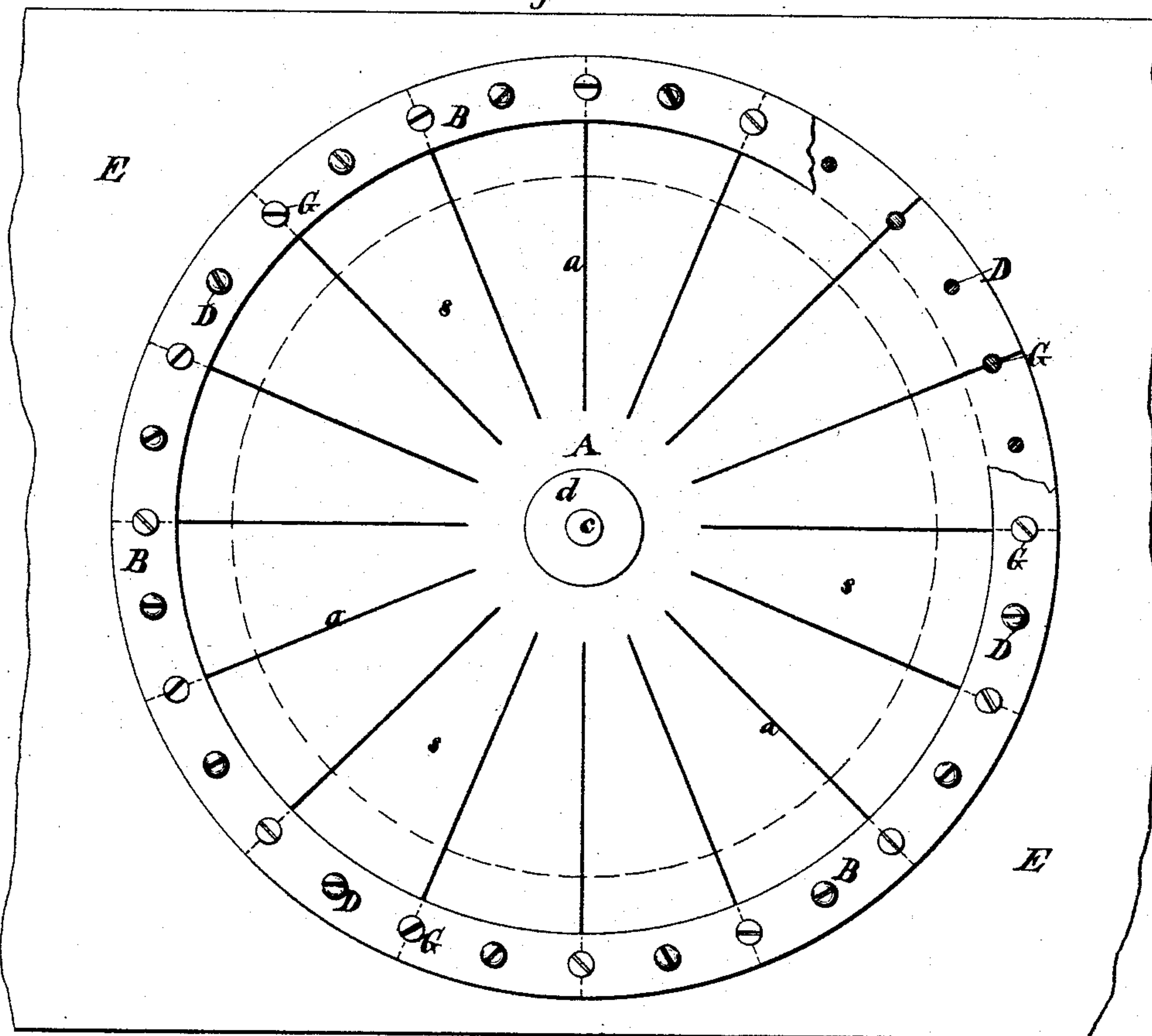
(No Model.)

A. W. HALL.  
TELEPHONE DIAPHRAGM.

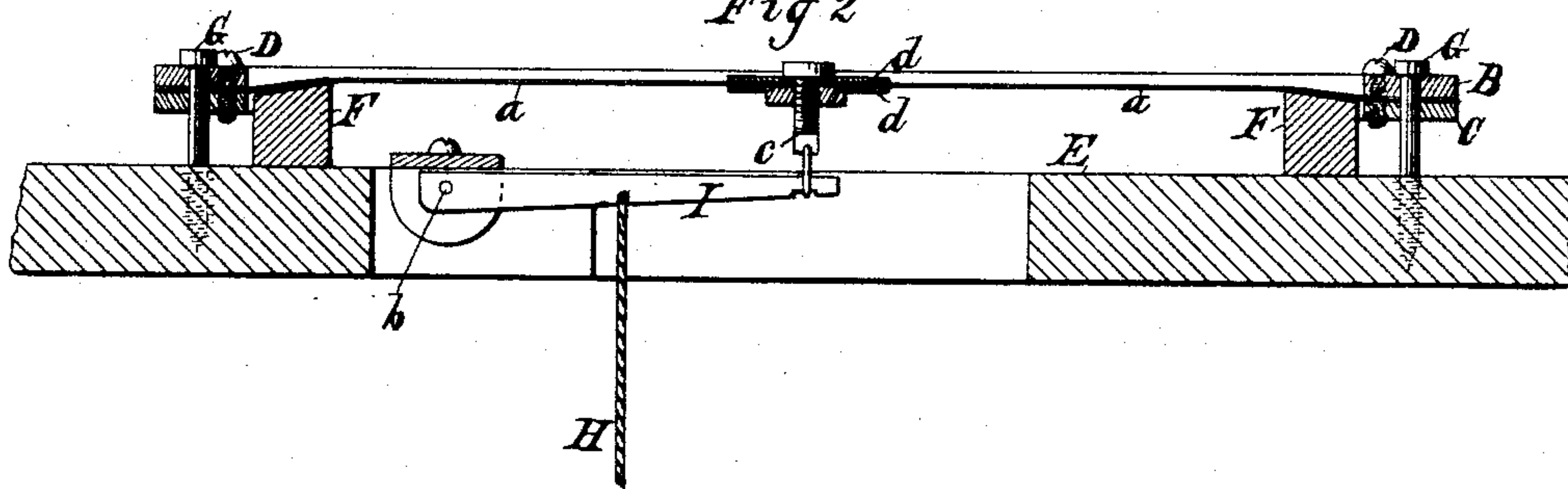
No. 413,782.

Patented Oct. 29, 1889.

*Fig. 1.*



*Fig 2*



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# UNITED STATES PATENT OFFICE.

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## TELEPHONE-DIAPHRAGM.

SPECIFICATION forming part of Letters Patent No. 413,782, dated October 29, 1889.

Application filed January 23, 1889. Serial No. 297,313. (No model.)

*To all whom it may concern:*

Be it known that I, ALEXANDER WILFORD HALL, of the city and county of New York, in the State of New York, have invented a new and useful Improvement in Diaphragms for Telephones, Phonographs, and other Instruments, of which the following is a specification, reference being had to the accompanying drawings.

10 The object of this invention is to provide for the placing of a diaphragm for a telephone, phonograph, or other instrument under tension, for the purpose of tuning it to any pitch desired.

15 The improvement will be first described with reference to the drawings, and its novelty will afterward be pointed out in a claim.

Figure 1 in the drawings is a face view of a diaphragm and adjacent parts of a mechanical telephone illustrating my invention. Fig. 20 2 represents a central section corresponding with Fig. 1.

Similar letters of reference designate corresponding parts in both the figures.

25 A designates the diaphragm, represented as composed of a circular disk in which are a series of radial cuts *a*, which extend from the periphery to a point at some distance from the center thereof, and which divides the diaphragm from the periphery to near the 30 center into a series of sections *s* of substantially a sector shape.

35 B and C designate clamping-rings, between which the marginal portions of the said disk are clamped by means of clamping-screws applied to the said rings.

E designates a board or base by which the diaphragm is supported and to which it is attached.

40 F designates a circular bearing, of wood, metal, or other material arranged and secured upon the said board or base concentric with the diaphragm and serving as a circular bearing to support the latter at a distance 45 within the circumference of the clamping-rings.

G designates tension-screws by which tension is applied to the diaphragm, the said screws passing through the two clamping-rings and screwing into the base-piece E. 50

The diaphragm is represented as having

the conducting wire or cord H connected with it by means of a lever I, which has its fulcrum on a pin *b*, supported upon the base E, the said lever being connected with the diaphragm at the center thereof by a screw *c* 55 within the clamping-disks *d*. The method of connecting the conductor, however, forms no part of this invention.

By screwing the screws G into the base E 60 the clamping-rings B C are pulled toward the base and they pull the peripheral portions of the diaphragm in the same direction, whereby the separate sections *s* have each tension separately applied to it while all the said sections 65 are simultaneously subjected to tension. The tension applied to each acts as upon a flat string, while the several sections remain so nearly in contact as virtually to constitute a single vibrating diaphragm, which, by the tension applied to it, may be tuned to a desired 70 pitch—as, for instance, to the average pitch of the conversational human voice.

A very essential advantage of this invention is the provision afforded for giving tension to soft-iron diaphragms of electro-magnetic telephones, which is not done with diaphragms of such telephones at present in use in which the diaphragms are merely clasped at their peripheries, so that they may be 80 thrown into vibration by the action of the voice. The vibration of a so-clasped diaphragm is forced, its vibrational pitch being not capable of regulation, but arbitrary, and seldom being in unisonant sympathy with the 85 human voice.

All the receiving and transmitting diaphragms in a telephone-line being constructed according to my invention and subjected to proper tension to produce a unisonant vibration corresponding with the average pitch of 90 the human voice, the effectiveness of the telephone will be greatly increased by reason of distinctiveness of enunciation, which will enable the voice, to be transmitted to a much greater distance than that to which telephones heretofore have been found practicable. 95

What I claim as my invention, and desire to secure by Letters Patent, is— 100

The combination of a diaphragm for a telephone, phonograph, or other instrument di-

vided radially into sections from the periphery toward the center, a pair of clamping-rings and screws therefor common to all the said sections, a circular bearing common to  
5 all of said sections, and tension-screws for drawing the clamping-rings over said bearing and so applying tension to all of said sections,

substantially as and for the purpose herein set forth.

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Witnesses:

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