A. G. KAUFMAN & L. J. LIPPMANN.

TELEPHONE TRANSMITTER.

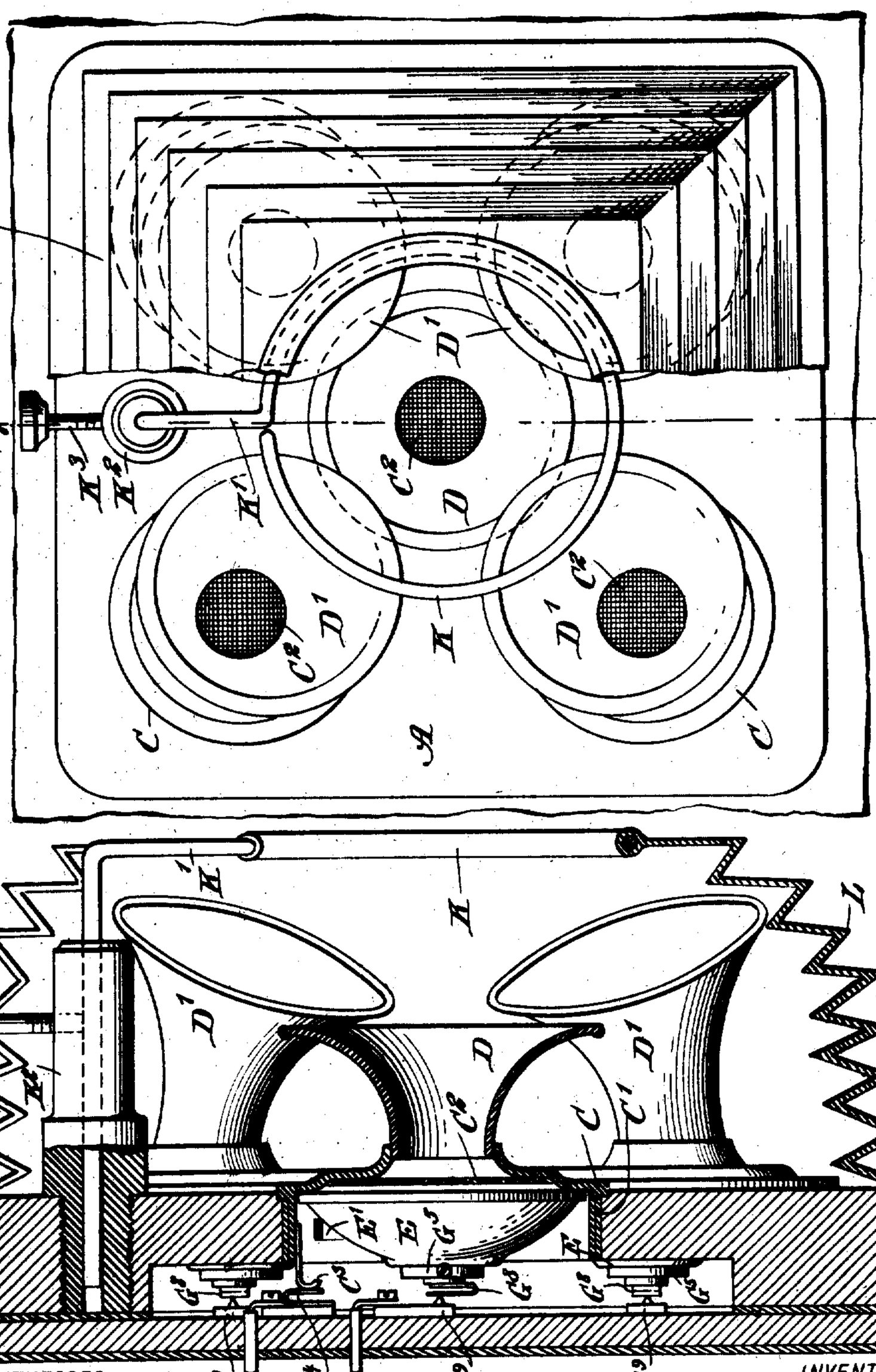
APPLICATION FILED JAN. 19, 1907.

900,386.

Patented Oct. 6, 1908.

2 SHEETS—SHEET 1.

Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

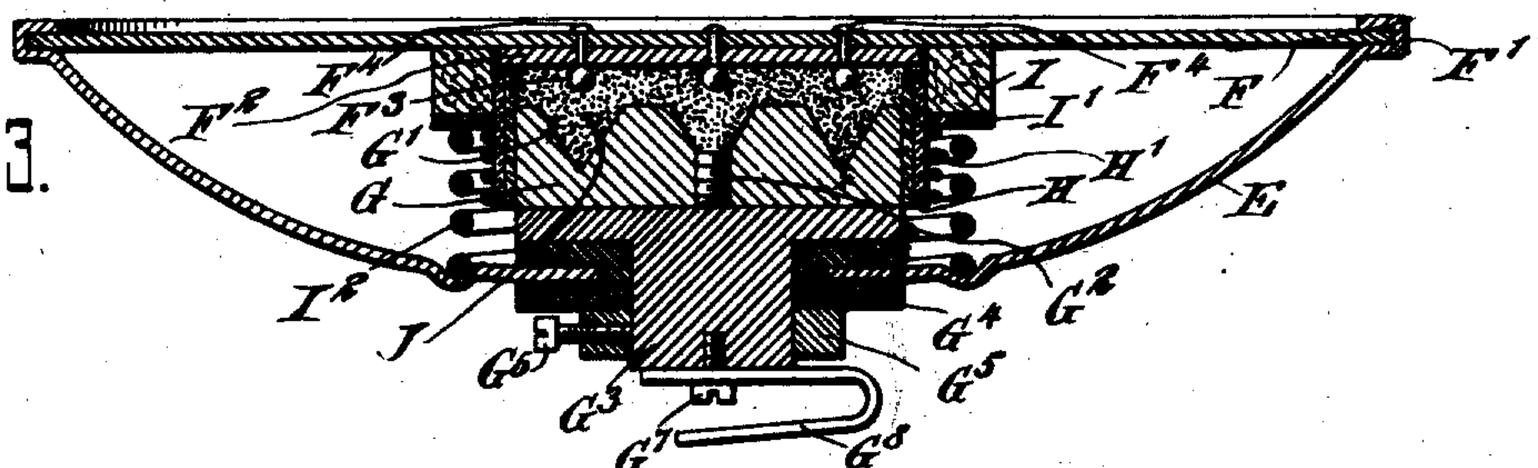


Fig. 4.

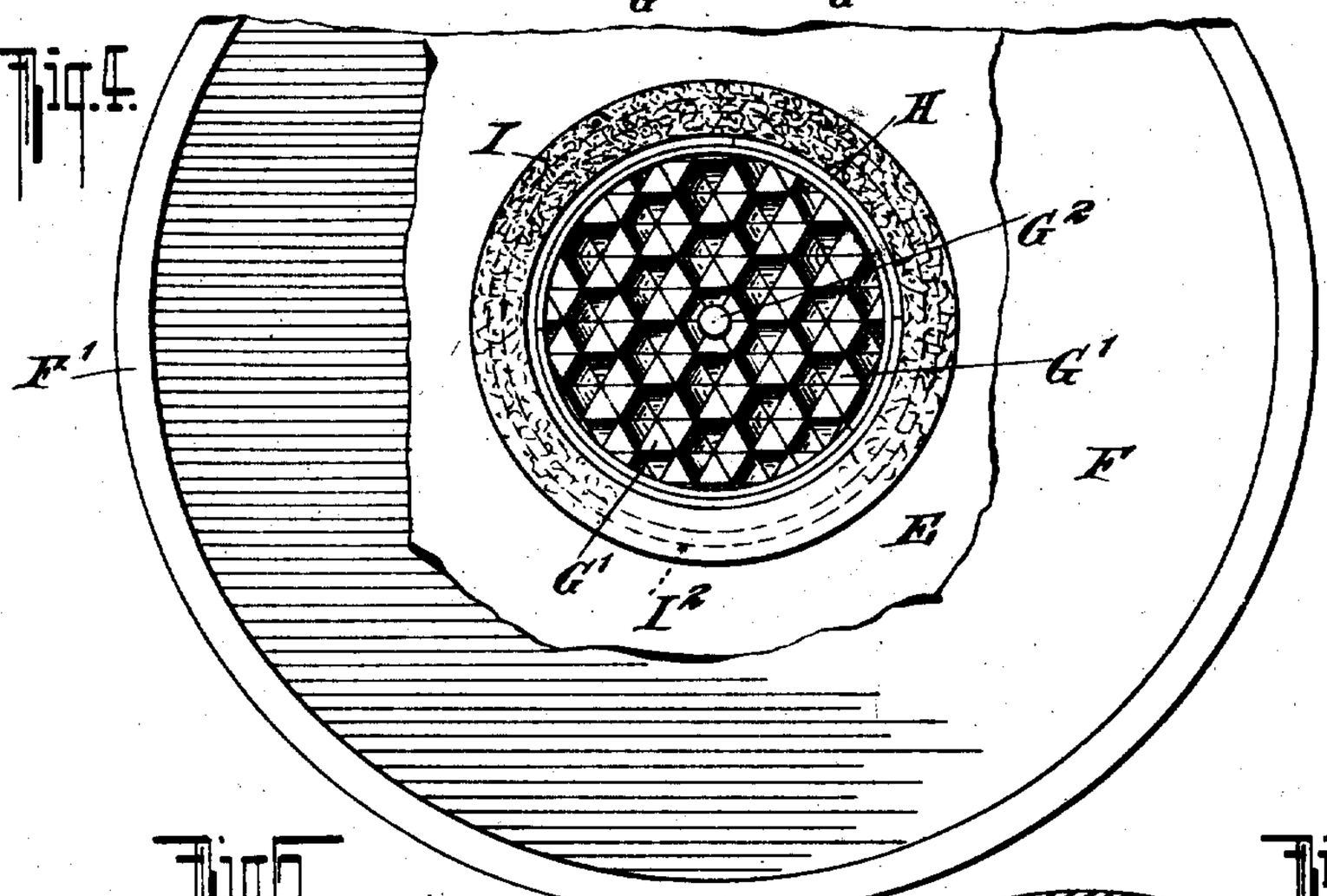


Fig. 6.

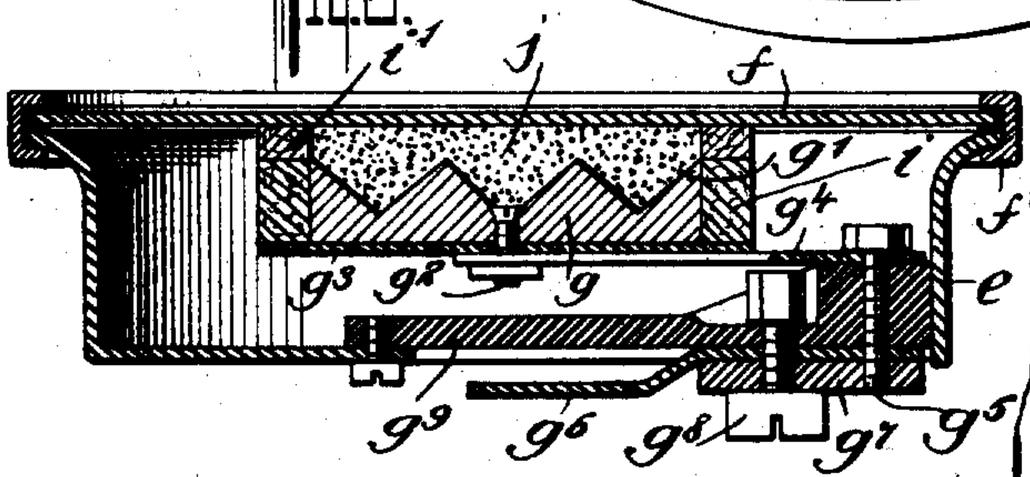


Fig. 7.

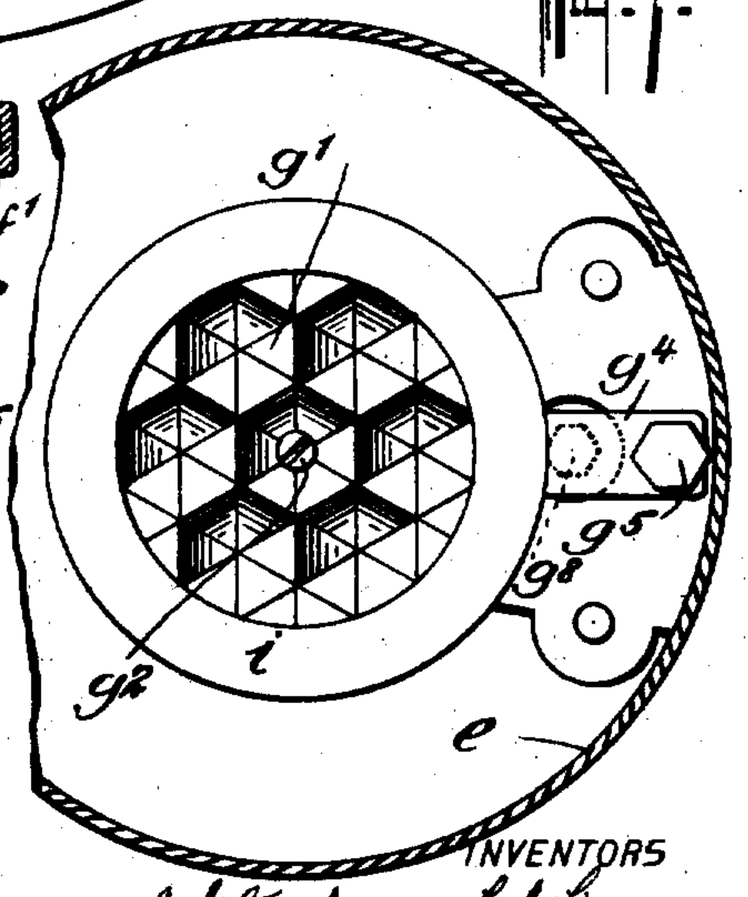
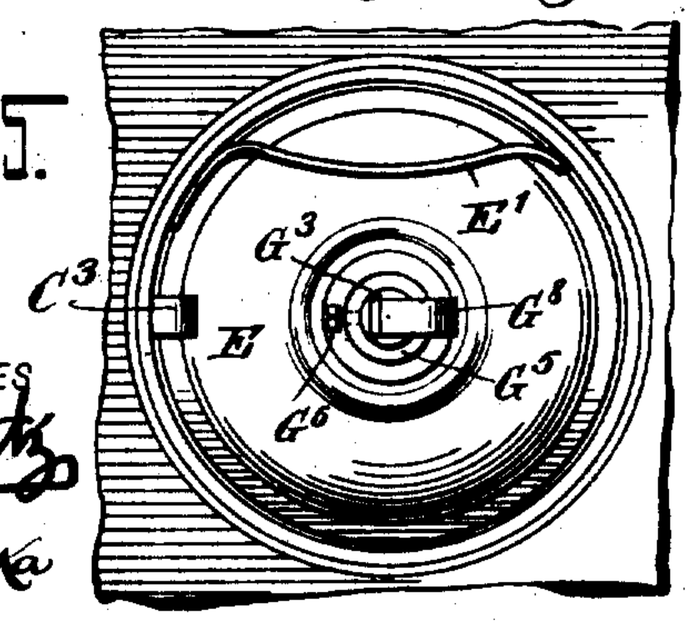


Fig. 5.



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UNITED STATES PATENT OFFICE.

ADOLPH G. KAUFMAN AND LEOPOLD J. LIPPMANN, OF NEW YORK, N. Y., ASSIGNORS TO AMERICAN CALLAPHONE COMPANY, OF NEW YORK, N. Y., A CORPORATION OF GEORGIA.

TELEPHONE-TRANSMITTER.

No. 900,386. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed January 19, 1907. Serial No. 353,004.

To all whom it may concern:

Be it known that we, ADOLPH G. KAUFMAN and LEOPOLD J. LIPPMANN, both citizens of the United States, and residents of the borough of Manhattan, city, county, and State of New York, have jointly invented certain new and useful Improvements in Telephone-Transmitters, of which the following is a specification.

Our invention relates to electric telephones, and particularly to the transmitters thereof, and has for its object to so improve the construction and arrangement of the transmitter as to secure a very great efficiency, and also to enable a plurality of receivers to receive sound waves efficiently at the same time from one speaker.

The features of construction and arrangement constituting our invention will be fully described hereinafter, and particularly pointed out in the appended claims.

Reference is to be had to the accompanying drawings, in which

Figure 1 is a vertical section taken on line 1—1 of Fig. 2, showing a group of transmitters arranged according to our invention; Fig. 2 is a front view of the same arrangement, with parts broken away; Fig. 3 is a cross-section of one of the transmitters; Fig. 4 is a partial face view of one of the transmitters, with a portion of the diaphragm broken away in order to disclose the parts lying behind it; Fig. 5 is a detail rear view of the transmitter in its carrier; Fig. 6 is a cross-section of a somewhat different form of transmitter, and Fig. 7 is a partial face view of the transmitter shown in Fig. 6, the diaphragm being removed.

Most of the features of the transmitter shown herein are reproduced from the illustration contained in our application for a patent, Serial No. 343,198, filed by us in the United States Patent Office on November 13, 1906.

Upon a suitable base or board A, which is secured to the wall-plate B, and which is provided with a number of sockets (five as shown), are set thimbles C, preferably each provided with a lining C′ to insulate it against the transmission of sounds and vibration, and also preferably provided with a screen C^2 to prevent the entrance of dust and other foreign matter. At the forward end of each thimble is located a sound-receiving trumpet or tube D, D′, the central trumpet D being straight, while the lateral trumpets D′ are curved, so that they will converge forwardly. Adjacent to the point toward which the said sound-receiving tubes converge, we locate a guide K for positioning the operator's mouth, so that the sound waves will produce the maximum effect. This (annular) guide K is preferably adjustable, being for this purpose carried by a rod K′ mounted to slide in a sleeve K^2 and secured in position after adjustment by a set screw K^3. We have found that with different persons the distance at which the ring K should be from the sound-receiving tubes D, D′, in order to secure the best results, is not the same, hence we have made provision for adjusting said ring as described. In order to better concentrate the sound waves, we may employ a sound shield or curtain L which should be extensible when the ring K is adjustable as described.

The transmitters proper are contained within the thimbles C and each of them comprises a casing E pressed forward by a spring G^8 engaging a contact point G^9 on the wall-plate B, and also steadied in the thimble if desired by a circumferential spring E′ shown in Figs. 1 and 5. This casing E may be of the concave shape shown in Figs. 1, 3 and 5.

At the forward end of the casing E is located a clamping ring F′ which holds the diaphragm F, preferably made of aluminum. The diaphragm is first placed in the ring, and then the projecting end of the ring is bent inward to the position shown in Fig. 3, in which it clamps the diaphragm. Against the inner surface of the diaphragm we secure a carbon disk F^2. From the inner surface of this disk we project contact and agitating members F^3 which in the particular form shown are ball-shaped and are secured by shanks F^4 forming at the same time fasteners for the carbon disk F^2. Within the casing is arranged a carbon body or carrier G of circular shape having pockets G′ in its forward surface; we have found that by using eccentric hollow converging pockets such for example as pyramidal pockets, as shown, very good results are obtained. With this arrangement of pockets, the forward face of the carrier or block G has a series of connected edges or ridges lying in the same plane, each pocket being thus separated from its neighbors by such ridges. As shown in

Fig. 3, the contact members F^2 are arranged in registry with the pockets G′. The carbon block is secured to the casing E by means of a screw G^2 and a metal stem G^3 which is insulated by means of a sleeve G^4 and held in position by means of a collar G^5 and set screw G^6. The block G is preferably surrounded by one or more rings H made of mica and secured by wire wrapping H′. This mica ring projects in advance of the carbon block G and is surrounded at its forward portion by a ring I of felt, cotton batting or other yielding material against which lies a metal ring I′ pressed forward, that is toward the diaphragm, by a coiled spring I^2. The carbon disk F^2 is received within the ring I. The chamber formed between the front face of the block G, the rear face of the diaphragm and the rings H, I, is filled with granulated carbon J. A screw G^7 serves to secure to the stem G^3 a spring G^8 which is adapted to engage a contact point G^9 secured to the wall-plate B and connected with one of the circuit wires, as shown in Fig. 1. The second connection is made by means of a spring tongue C^3 projected from the thimble C and engaging the other contact member or terminal C^4 secured to the wall-plate B. One connection therefore runs to the diaphragm from the contact member C^4 through the spring tongue C^3, the thimble C and the flange or clamping ring F′, and the other connection runs to the carbon block G from the contact point G^9 through the spring G^8 and the stem G^3. The spring G^8 serves not only to make an electrical connection but also to hold the transmitter casing forward against the front portion of the thimble C. The function of the mica ring is primarily to provide a non-conducting lateral support for the granular carbon so that the same may not force itself into the interstices of the felt and thus by its absence loosen the main body of the carbon remaining in place. Its further function is to provide a perfectly smooth contact with the ring of felt so that there will be as little opportunity for the production of friction as possible, during the differential movement between the felt ring and the diaphragm on the one hand and the mica ring and the conducting carrier on the other.

The construction illustrated by Figs. 6 and 7 differs slightly from that described above. The diaphragm *f* is held in a clamping ring *f′* which also receives the forward edge of the casing *e* made of substantially cylindrical form. The carbon block *g*, which may be of the same character as the one first described, is fastened in position by means of a rivet g^2 extending into one of the hollow converging pockets *g′*, to a metal plate g^3 and to a spring member g^4 having a tendency to throw the carbon block forward, that is toward the diaphragm. The block is shown surrounded by a ring *i* of felt or other yielding material and a small ring *i″* is disposed in front of the ring *i*. The chamber formed between the block *g*, the diaphragm *f* and the ring *i″* is filled with granulated carbon *j*. A screw g^5 serves to secure the spring plate g^4 to an insulating member g^6 and also serves to connect said spring plate with a conducting member g^7 having another fastening screw g^8, and with the contact spring g^9 which is adapted to engage the terminal or contact member G^9 upon the wall-plate B.

We have found by actual tests that transmitters of the kind above described are exceedingly sensitive and the particular arrangement of a set of transmitters, shown in Figs. 1 and 2, is useful when it is desired to have a message transmitted simultaneously to different places or rooms at which the respective receivers are located.

We claim:

1. A telephone transmitter comprising a casing, a diaphragm, a conducting carrier facing the diaphragm, loose conducting material between the carrier and the diaphragm, and ball-shaped contact members projecting into said loose conducting material.

2. A telephone transmitter comprising a casing, a diaphragm, a flat carbon disk on the inner face of the diaphragm clamped thereto by projecting contact members, a conducting carrier facing said disk and loose conducting material between the disk and the carrier, the said contact members projecting into the loose conducting material a sufficient distance to enable them to act as efficient agitators thereof.

3. A telephone transmitter comprising a casing, a diaphragm, a flat carbon disk on the inner face of the diaphragm, a conducting carrier facing said disk, loose conducting material between the disk and the carrier and separate spaced contact members projecting from said disk into the loose conducting material.

4. A telephone transmitter comprising a casing, a diaphragm, a flat carbon disk on the inner face of the diaphragm, a conducting carrier facing said disk, loose conducting material between the disk and the carrier and ball-shaped contact members projecting from said disk into the loose conducting material.

5. A telephone transmitter comprising a thimble provided with a sound receiving tube, a diaphragm holding member fitted into said thimble, and a spring for pressing said member toward said tube.

6. A set of telephone transmitters, each provided with an independent flaring sound-receiving trumpet, said trumpets converging forwardly.

7. A set of telephone transmitters, each provided with an independent flaring sound-

receiving trumpet, said trumpets converging forwardly, and a guide separate from said trumpets and located in advance thereof, for positioning the operator's mouth adjacent to the point toward which the trumpets converge.

8. The combination of a set of telephone transmitters provided with independent convergent sound-collecting tubes the mouths of which are inclined toward one another, and a guide for positioning the operator's mouth adjacent to the point toward which said tubes converge, said guide being adjustable toward and from said tubes.

9. The combination of a set of telephone transmitters provided with parallel diaphragms and independent convergent sound-collecting trumpets the mouths of which are inclined toward one another, and an annular guide, parallel with the said diaphragms and located in front of said trumpets, for positioning the operator's mouth adjacent to the point toward which said trumpets converge.

10. The combination of a set of telephone transmitters provided with conically independent convergent sound-collecting trumpets the mouths of which are inclined toward one another, and a perforated guide extending perpendicular to the axis of the cone of convergence, for positioning the operator's mouth adjacent to the apex of said cone.

11. The combination of a set of telephone transmitters provided with conically independent convergent sound-collecting tubes the mouths of which are inclined toward one another, and a perforated guide extending perpendicular to the axis of the cone of convergence, for positioning the operator's mouth adjacent to the apex of said cone, said guide being adjustable relatively to said tubes in a direction parallel with the cone's axis.

12. The combination of a set of telephone transmitters provided with convergent sound-receiving tubes, a guide for the operator's mouth, located adjacent to the point toward which said tubes converge, and a sound-shield or curtain extending from said guide toward the tubes and surrounding the latter.

13. The combination of a set of telephone transmitters provided with convergent ound-receiving tubes, a guide for the operator's mouth, located adjacent to the point toward which said tubes converge, said guide being adjustable toward and from said tubes, and an extensible sound-shield or curtain extending from said guide toward the tubes and surrounding the latter.

14. A telephone transmitter comprising a stationary member provided with a sound-receiving tube, a diaphragm-holding member adjacent to said stationary member, and a spring for pressing the two members together.

15. A telephone transmitter comprising a casing, an aluminum diaphragm, a flat carbon disk on the inner face of the diaphragm, a conducting carrier facing said disk, loose conducting material between the disk and the carrier and separate spaced contact members projecting from said disk into the loose conducting material.

16. A telephone transmitter comprising a vibrating diaphragm, a conducting carrier provided on the side facing the diaphragm, with pockets each of which is tapered to a point at the end farthest away from the diaphragm, and loose conducting material between the carrier and the diaphragm.

17. A telephone transmitter comprising a casing, a vibrating diaphragm, a conducting carrier located within the casing a mica sleeve projecting in advance of said carrier, but maintained out of contact with the diaphragm, retaining in position a body of loose conducting material between the carrier and diaphragm and an annular member outside of the mica sleeve for preventing the escape of the loose conducting material between the diaphragm and the mica sleeve.

18. A telephone transmitter comprising a casing, a vibrating diaphragm, a conducting carrier within the casing, an insulating sleeve surrounding said carrier and projecting in advance thereof but maintained out of contact with the diaphragm, a ring of soft yielding material surrounding said sleeve, a spring for pressing said ring against the diaphragm, and loose conducting material between the carrier and the diaphragm.

In testimony whereof, we have signed our names to this specification in the presence of two subscribing witnesses.

ADOLPH G. KAUFMAN,
LEOPOLD J. LIPPMANN.

Witnesses:
OTTO V. SCHENK,
JOHN LOTKA.