

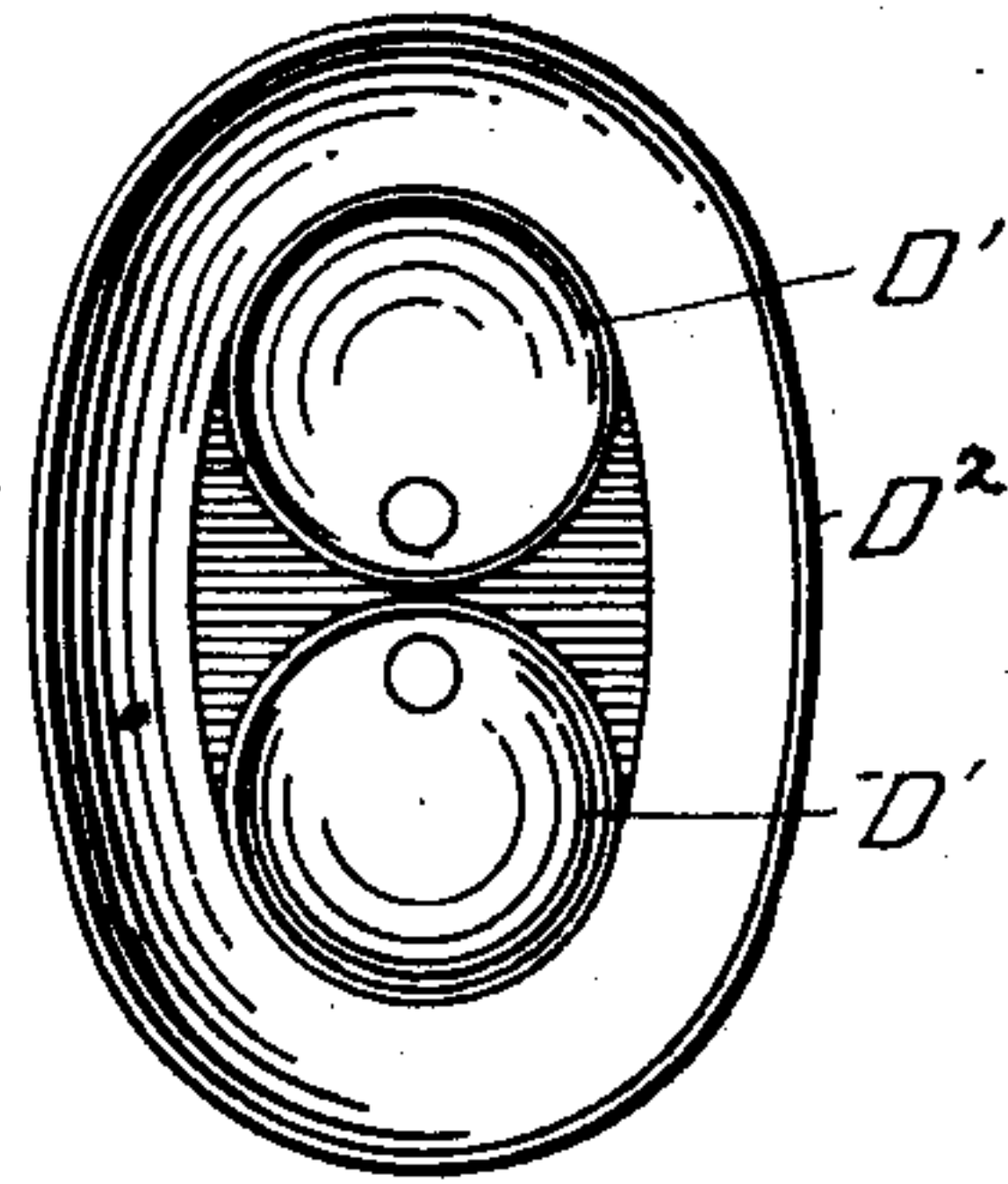
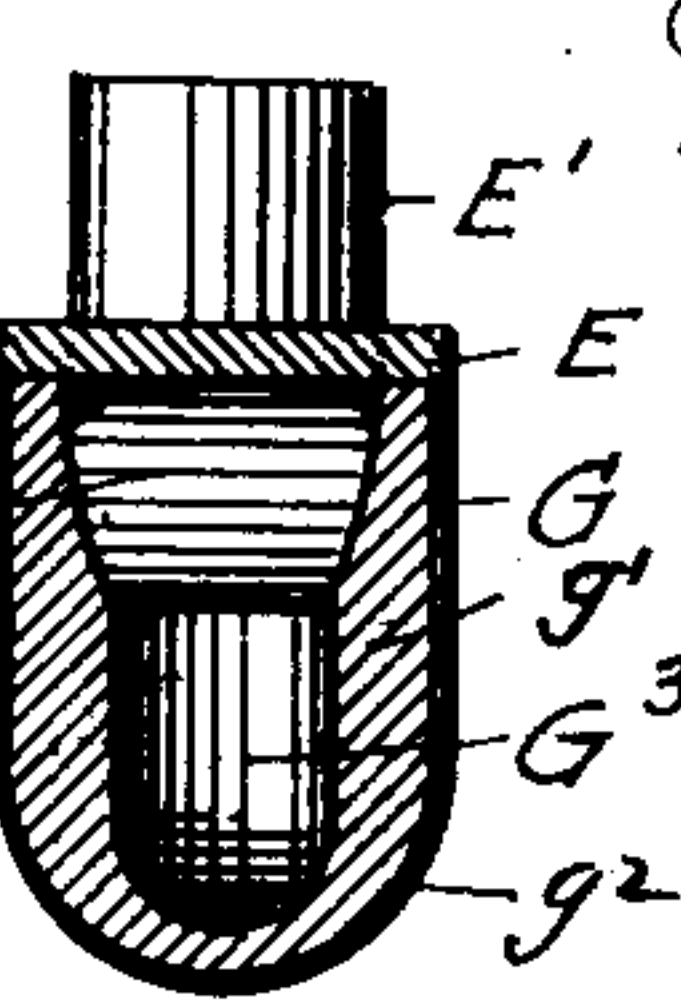
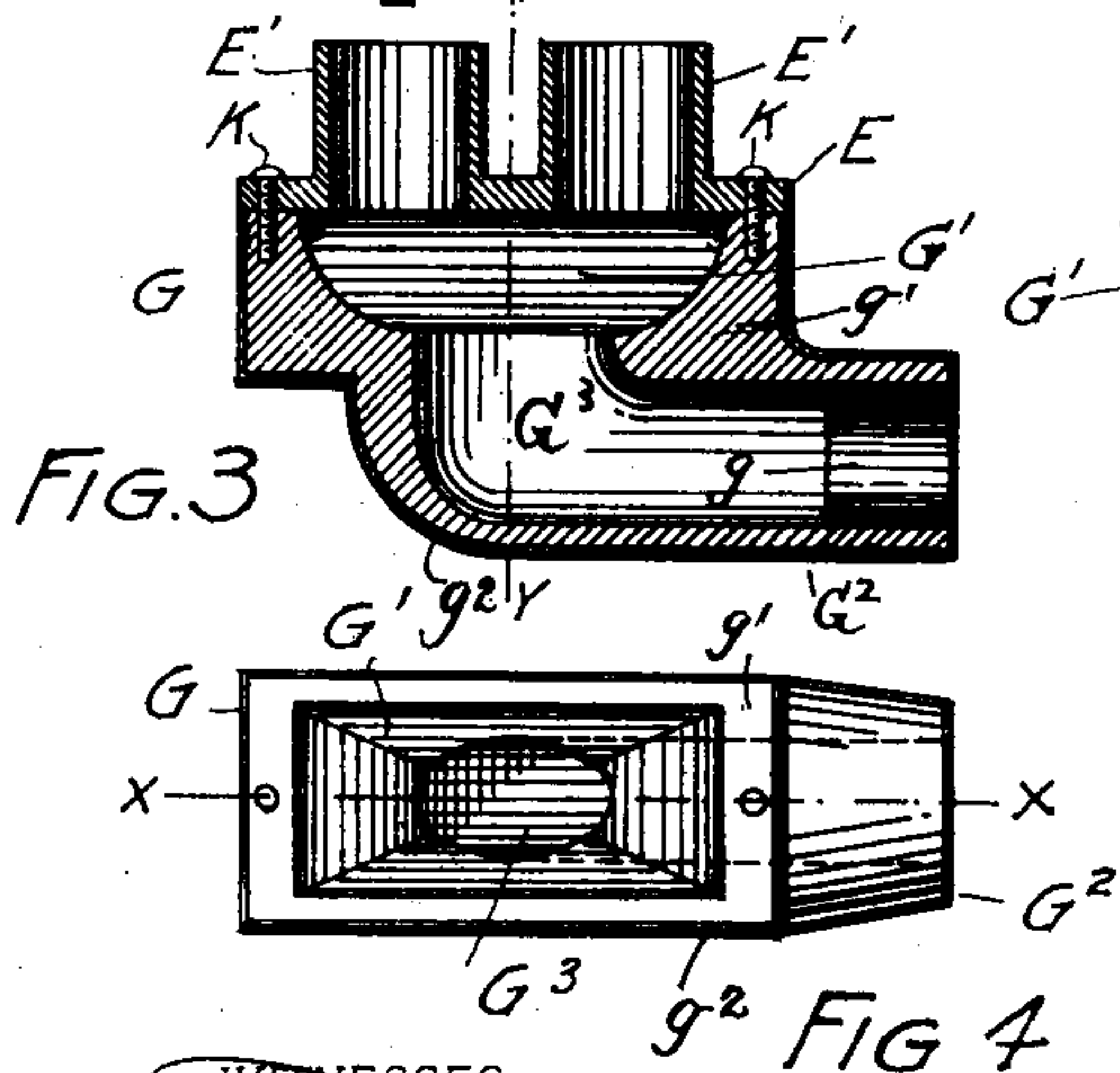
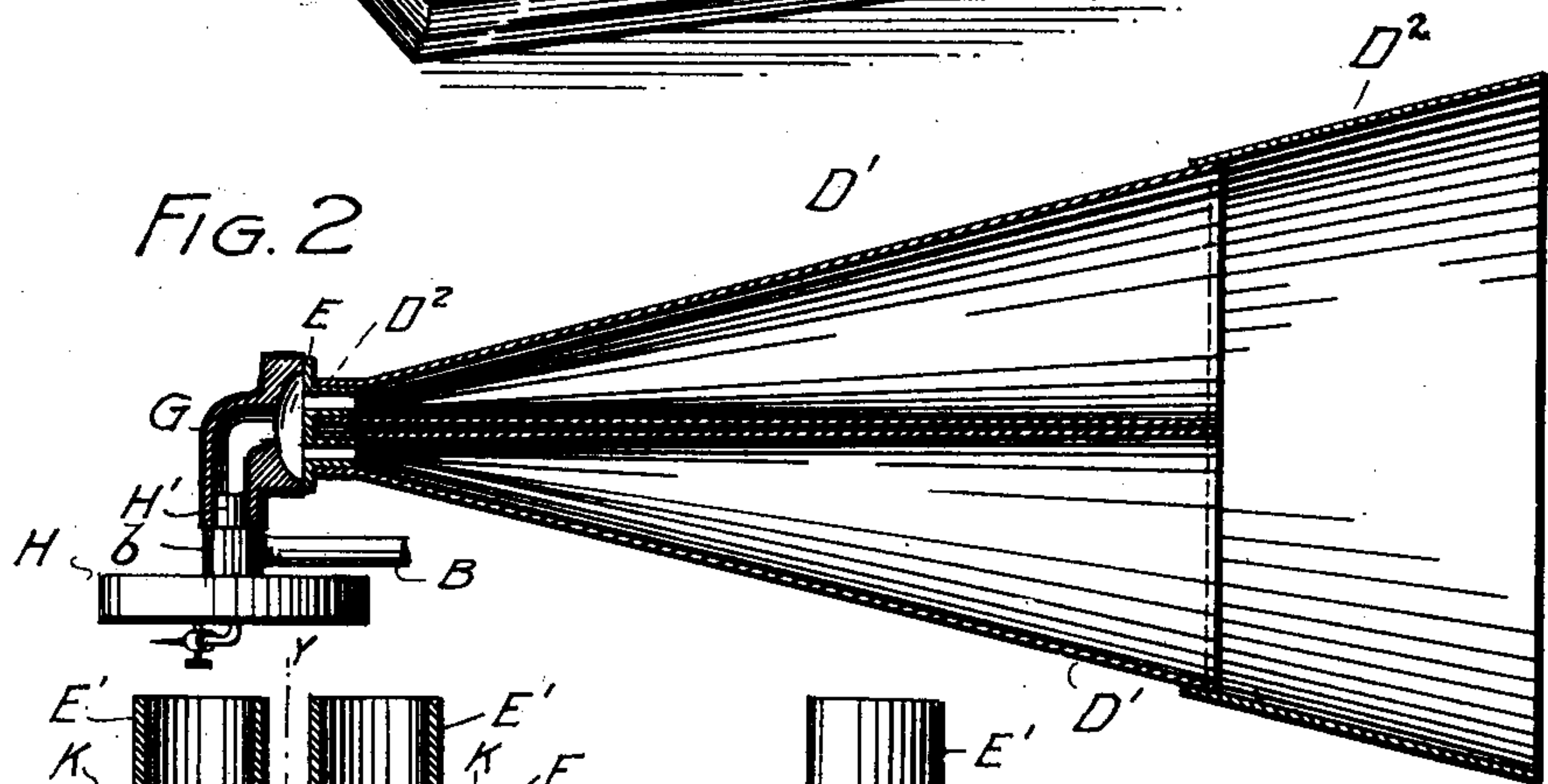
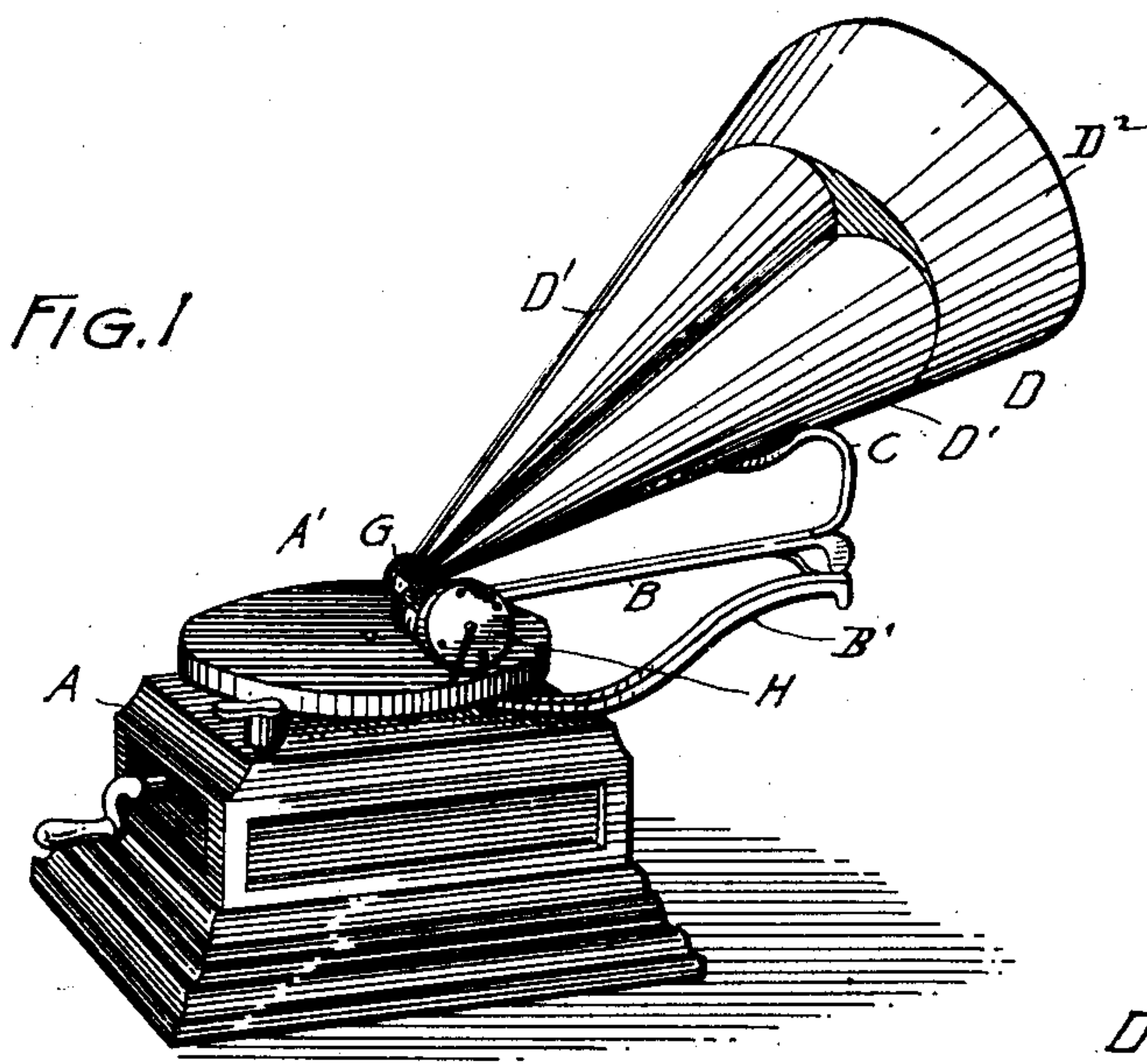
No. 685,409.

Patented Oct. 29, 1901.

G. OSTEN & W. P. SPALDING.
SOUND RECORDING AND REPRODUCING MACHINE.

(Application filed Jan. 29, 1901.)

(No Model.)



WITNESSES:
[Signature]
[Signature]

INVENTORS:
George Osten
William P. Spalding
BY *Philip H. Haws*
ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE OSTEN AND WILLIAM P. SPALDING, OF DENVER, COLORADO.

SOUND RECORDING AND REPRODUCING MACHINE.

SPECIFICATION forming part of Letters Patent No. 685,409, dated October 29, 1901.

Application filed January 29, 1901. Serial No. 45,238. (No model.)

To all whom it may concern:

Be it known that we, GEORGE OSTEN and WILLIAM P. SPALDING, residents of Denver, Colorado, have invented a new and useful Improvement in Sound Recording and Reproducing Machines, which invention is fully set forth in the following specification.

While our invention has reference generally to sound recording and reproducing machines, it relates more particularly to improvements in the horn and to a transmitting or conducting device for conveying the reproduced sounds from the reproducer to the horn, and has as its object to improve the tone quality and power of sounds reproduced from waves recorded upon sound-records, to reproduce said sounds in a perfectly natural tone and with the full power and melody of the original voice or voices or instrument or instruments used in making the original sound-records, to overcome everything foreign to the reproduction of perfect music, vocal or instrumental, and in general to reproduce with original volume, melody, and power every sound of whatever nature recorded in sound-records.

Although the improvements constituting the invention are specially adapted for employment in connection with machines of the zonophone or gramophone type, they may also be used on other types of talking-machines, such as the graphophone.

The improvements whereby we attain, at least to a maximum degree, the objects above recited will be most readily understood by reference to the accompanying drawings, illustrating the preferred embodiment of the invention.

In said drawings, Figure 1 is a perspective view illustrating the invention as applied to a machine of the zonophone type. Fig. 2 is a longitudinal sectional view through the horn and transmitter. Fig. 3 is an enlarged sectional view through the conveyer. Fig. 4 is a detail view of part of the transmitter, the cover being removed. Fig. 5 is a section on line Y Y, Fig. 3; and Fig. 6 is an end view of the horn.

Referring to the drawings, A represents the casing, which incloses the usual motor mechanism for rotating a platen A', upon which a disk sound-record is adapted to be secured. B is a swinging arm supported at its outer

end by a bracket B' in such manner that its inner end will be free to vibrate or move vertically as well as laterally. At said inner end arm B is formed with a sleeve or collar b, Fig. 2. H is a reproducer of the usual construction, having a short tubular part H', through which the reproduced sounds pass from the diaphragm-chamber. Tubular part H' fits closely in and projects from sleeve b. A horn-support C is secured at one end to arm B.

The parts as thus far described are of well-known construction and form no part of the present invention.

A single horn or bell is ordinarily used in zonophones, gramophones, and graphophones for discharging the sounds from the reproducer, the small end of the horn being connected with the short tube of the reproducer either directly or by the interposition of a rubber tube connection. It has also been proposed to use two horns communicating with opposite sides of the reproducer-diaphragm and having their discharge ends arranged side by side. Furthermore, it has been proposed to employ a plurality of independent horns mounted upon a part to which a rotary movement is imparted. Our construction of horn about to be described differs from these arrangements in material and important respects, as will be readily understood.

D represents our improved horn in its entirety, the same being made up of two hollow conical tubes (or single horns) D' D', attached together along one side in any suitable manner, (as by soldering or riveting,) and a single bell or hood D², secured to and closed in about the larger or discharge ends of both conical tubes D' D'.

Instead of having the smaller ends of the parts D' D' communicate directly with the diaphragm-chamber of the reproducer we interpose what is herein termed a "transmitter," the function of which will be referred to later.

G is the transmitter. It has an elongated sound concentrating and distributing chamber G', the walls of which curve inwardly toward the passage G' at about the middle thereof, so that the line Y Y, Fig. 3, divides the chamber (as well as the opening) into two equal parts. Immediately to the rear of cham-

ber G' passage G³ bends at right angles and extends through an arm G². The outer end of the passage through the arm G² is lined with an aluminium ring or sleeve g, preferably of a length just equal to the length of tube H', which projects from collar b. Said projecting end of tube H' fits closely and bears within said sleeve g when the parts are assembled, as clearly shown in Fig. 2, and it has been found by extensive experimentation that the interposition of the aluminium sleeve enables us to attain tone quality which it is impossible to attain without said sleeve or with a sleeve made of other metals—such as tin, brass, or iron—or of materials such as rubber, paper, or the like. The action of the transmitter may also be improved by making the same in the form of a metal shell g² and filling or coating the interior of the shell with a mixture of best glue with best cement applied in a plastic condition. This filling g' when dry is painted over with a solution of white shellac and alcohol. The surface thus formed possesses superior resonant qualities. The action of the horn and transmitter is as follows: The reproduced sounds pass from the tube H' of the reproducer into the passage G³ of the transmitter, which passage acts as does the human throat, discharging the sounds into the chamber G', which may be said to correspond in function to the human mouth. The walls of the chamber G' and of passage G³, adjacent to said chamber, act (like the roof of the mouth) as a sounding-board to increase the volume of the sound which is concentrated in chamber G', and from whence it passes in approximately equal proportions through tubes or spuds E' E' into the conical tubes D' D'. As the combined vibratory properties of the two tubes D' D' greatly exceeds the vibratory properties of a single larger conical tube of approximately the same length, the aggregate strength of the sound-vibrations emitted by the plurality of tubes will of course greatly exceed in strength and volume, and therefore in carrying power, the sound-vibrations that would be emitted by a single large tube (or horn.) Any double-sound effect that may otherwise be produced by the sounds coming from the two tubes D' D' is avoided by the action of the single bell or hood D², into which both of said tubes discharge, said ball causing the sounds coming from the separate tubes to blend together before they are finally discharged from the horn.

While we have herein shown and described what is regarded as the best practical embodi-

ment, it is to be understood that our invention is not confined to the precise construction illustrated, as modifications may be made within wide limits without departing therefrom. Thus instead of two conical tubes or small horns D' D' three or more may be employed. Furthermore, while the invention has been described with special reference to the reproduction of sounds it may also be used to great advantage in recording sounds, a recorder being substituted for the reproducer H.

What we claim as our invention is—

1. The combination with a sound reproducer or recorder, of a multiple horn consisting of a plurality of small horns all communicating at their smaller ends with one and the same reproducer or recorder and a hood or bell common to all of the small horns and into which said small horns discharge or from which they receive the sounds at their larger ends.

2. The combination with a sound reproducer or recorder, of a multiple horn comprising a plurality of small horns, and a transmitter having a chamber or mouth with which the small horns communicate at their smaller ends and a throat leading from said chamber or mouth to the diaphragm-chamber of the recorder or reproducer.

3. The combination of a sound recorder or reproducer, a multiple horn consisting of a plurality of small horns and a hood or bell embracing all of the small horns at their larger ends, and a transmitter having a chamber or mouth with which the small horns communicate at their smaller ends and a throat leading from said chamber or mouth to the diaphragm-chamber of the recorder or reproducer.

4. The combination with a reproducer or recorder and a horn, of a transmitter comprising a passage or throat and a chamber or mouth discharging into the horn, the throat leading at one end to the diaphragm-chamber of the reproducer or recorder and at its other end opening into the mouth, and a resonant covering for the walls of the throat and mouth consisting of a mixture of cement and glue.

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

GEORGE OSTEN.
WM. P. SPALDING.

Witnesses:

T. E. JENKINS,
C. A. BERDEL.