

No. 726,360.

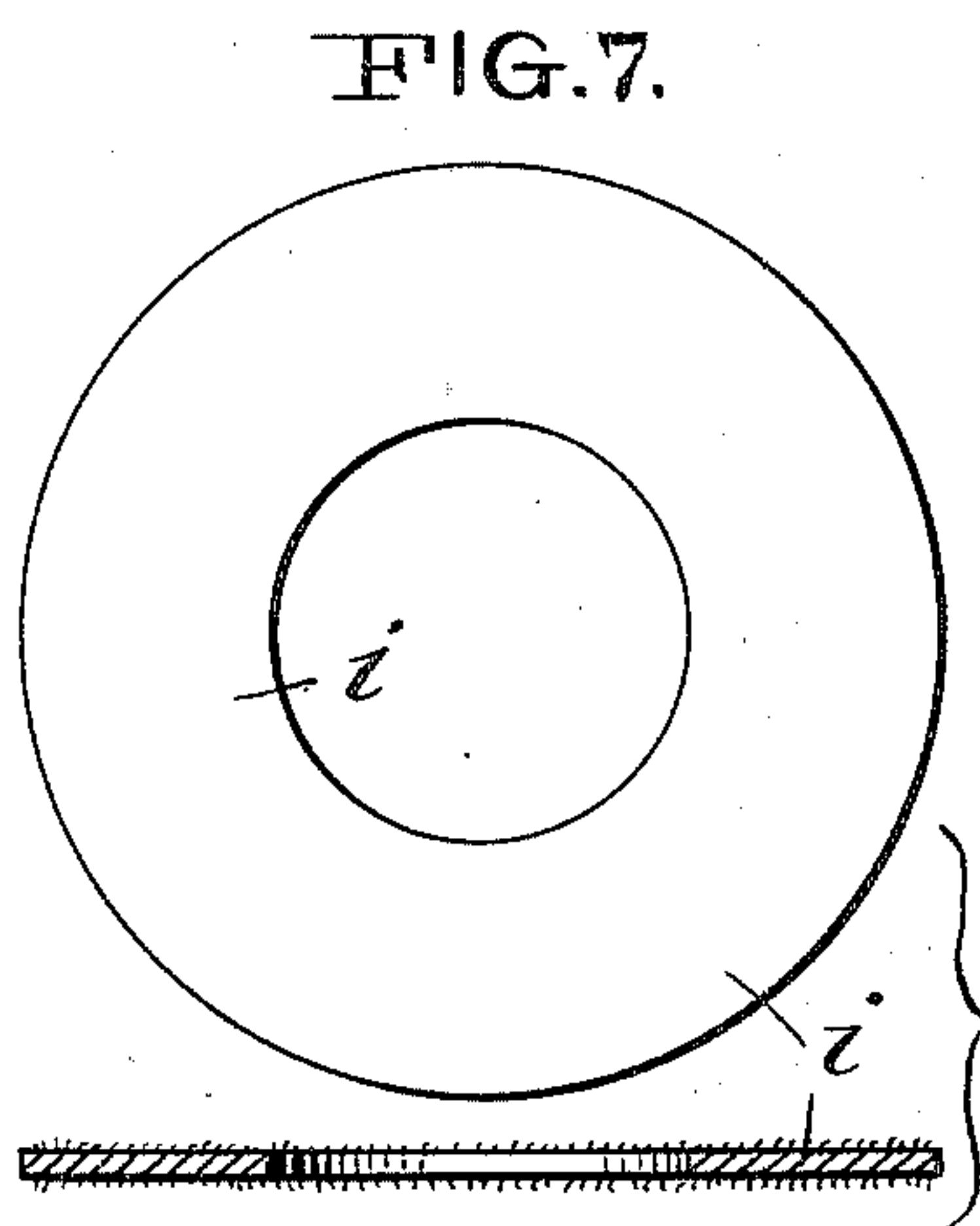
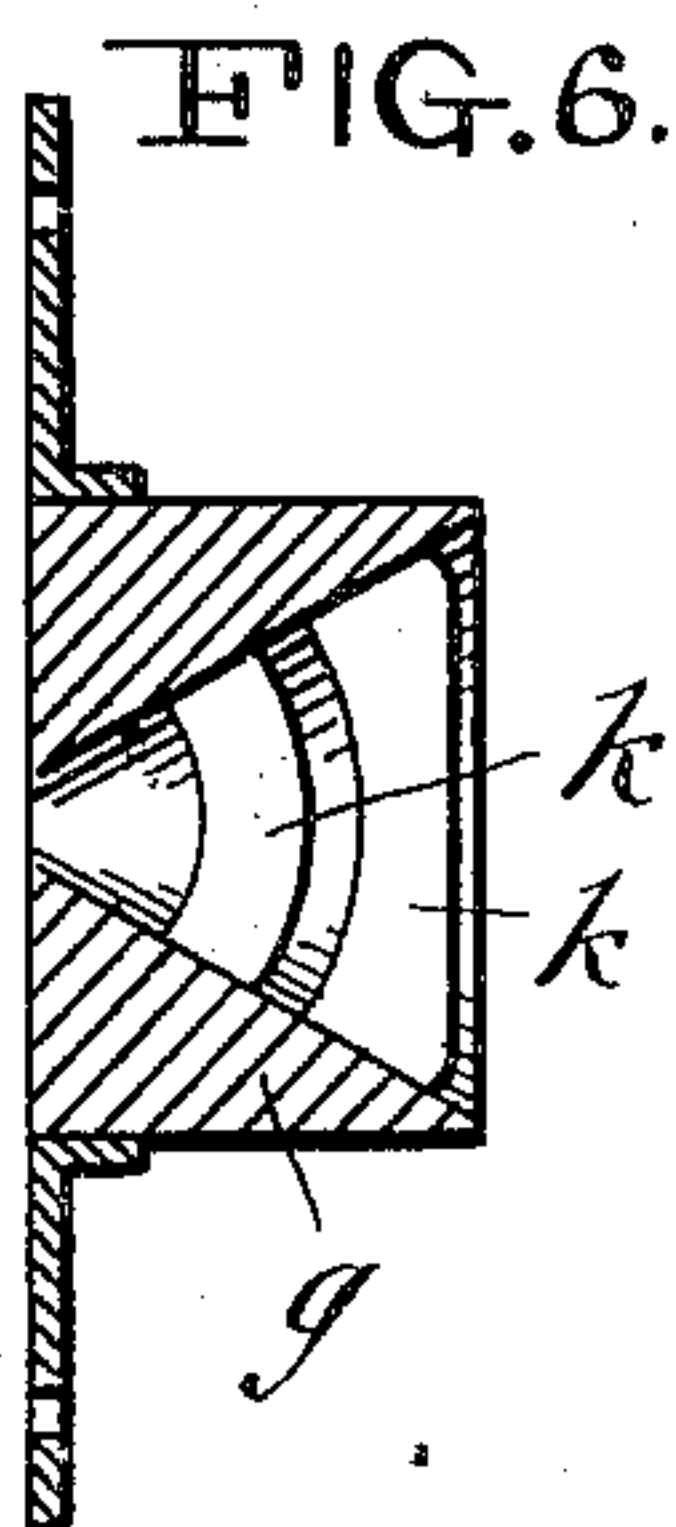
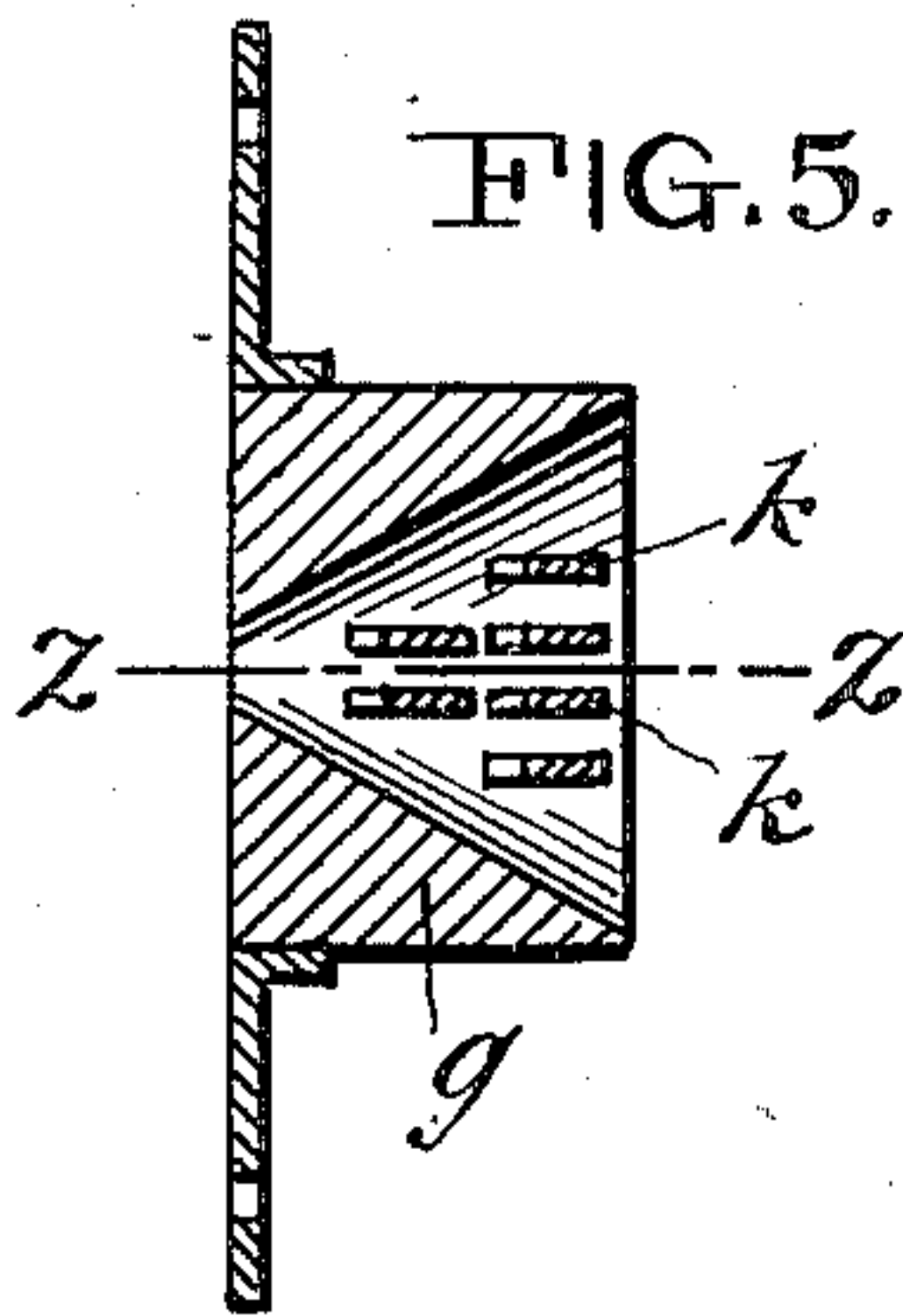
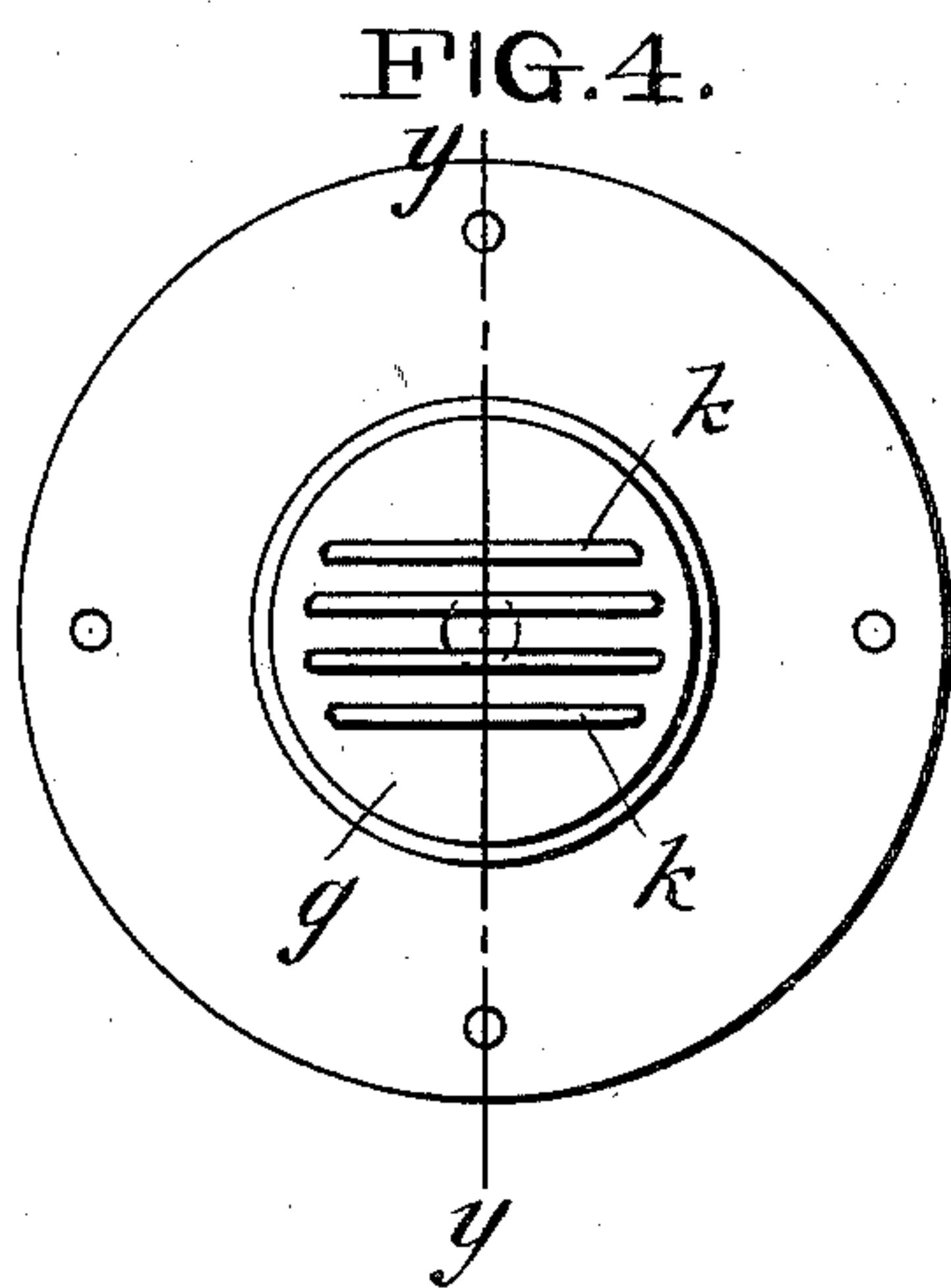
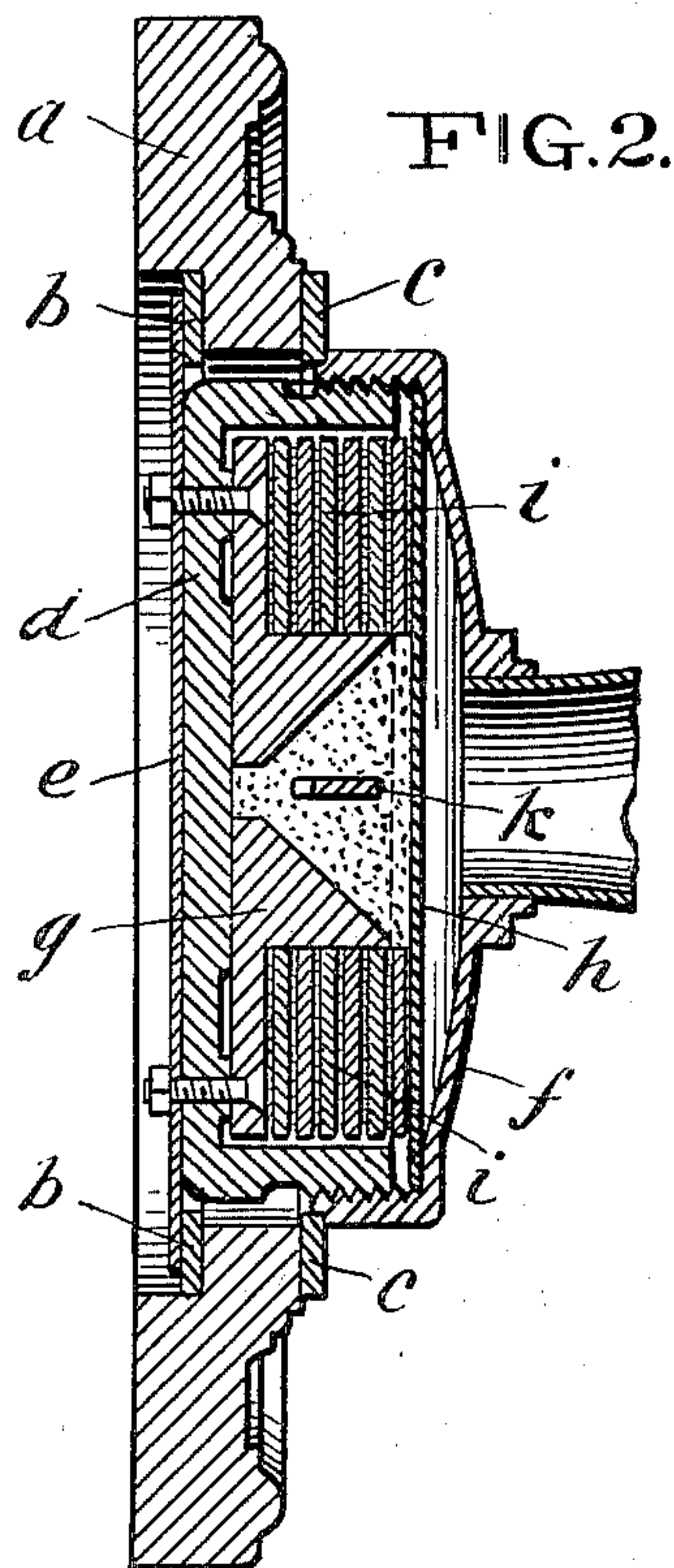
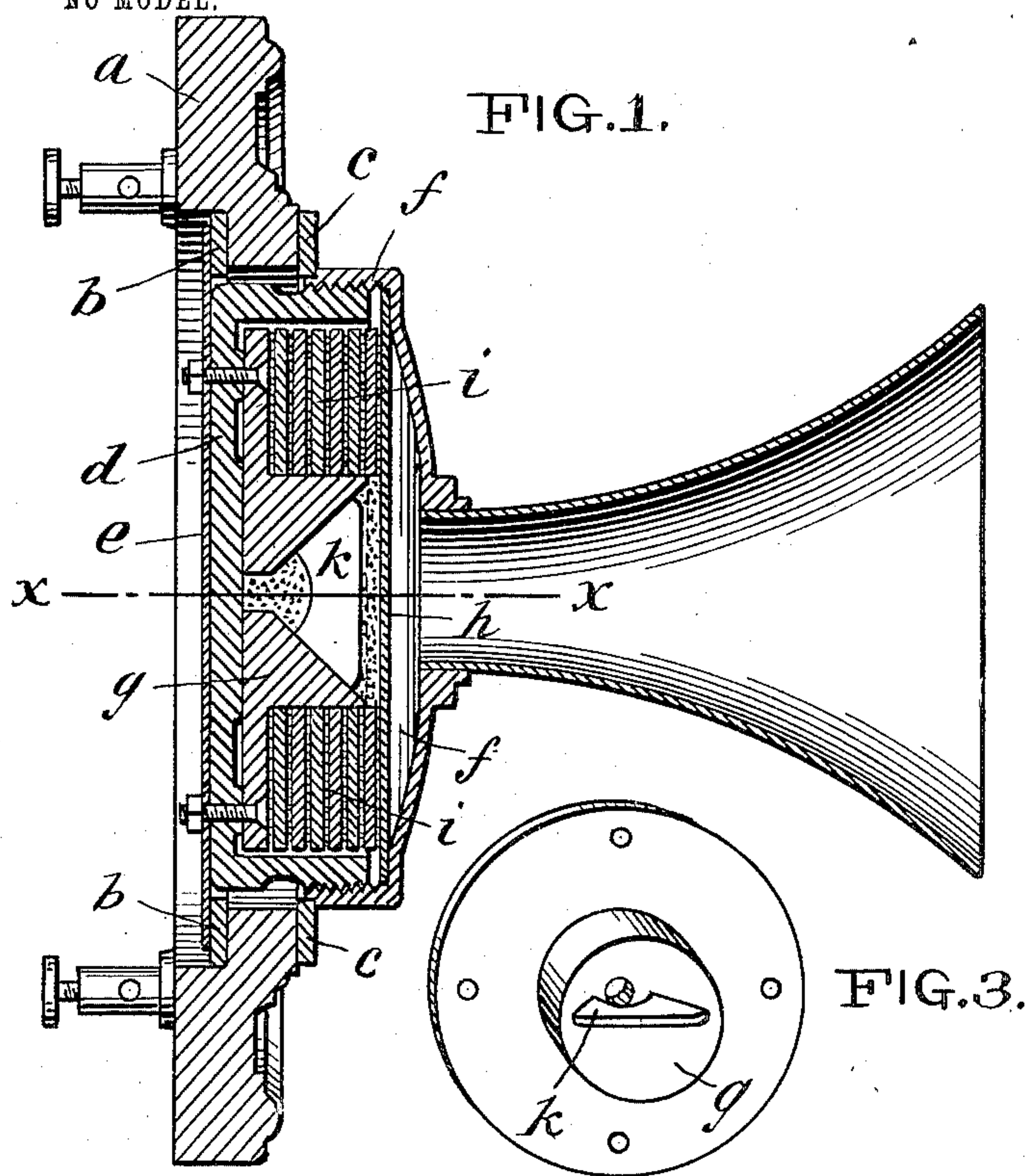
PATENTED APR. 28, 1903.

F. W. SENKBEIL.

MICROPHONE OR MICROPHONE TRANSMITTER FOR ELECTRICAL
SOUND TRANSMISSION.

APPLICATION FILED JAN. 11, 1902.

NO MODEL.



WITNESSES:

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FRIEDRICH WILHELM SENKBEIL, OF OFFENBACH-ON-THE-MAIN, GERMANY.

MICROPHONE OR MICROPHONE-TRANSMITTER FOR ELECTRICAL SOUND TRANSMISSION.

SPECIFICATION forming part of Letters Patent No. 726,360, dated April 28, 1903.

Application filed January 11, 1902. Serial No. 89,875. (No model.)

To all whom it may concern:

Be it known that I, FRIEDRICH WILHELM SENKBEIL, a subject of the German Emperor, residing in Offenbach-on-the-Main, in the Empire of Germany, (whose full postal address is 33 Taunusstrasse, Offenbach, aforesaid,) have invented certain new and useful Improvements in Microphones or Microphone-Transmitters for Electrical Sound Transmission, of which the following is a specification.

The microphone-transmitters hitherto employed for electrical sound transmission all possess a great drawback in that it is impossible by their use for sounds to be transmitted in a manner perfectly free from objection without the necessity of the receiver (telephone) being brought close to the ear of the listener. Efforts have therefore been made to produce so-called "loud-speaking" telephones, and for this purpose it is evident that in the first place improvement is necessary in the transmitter of the sound. It is thus a question above all things of reproducing the sound of the human voice loudly and clearly and free from all subsidiary or outside noises. No microphone at present produced, however, is capable of doing this, but, on the contrary, even the most improved ones, the so-called "granular" microphones, reproduce speech loudly, but mixed with many subsidiary noises.

This invention has for its object an improved granular microphone which is capable of effecting the transmission of sound in such a perfect manner that the listener is not given the impression that he is listening to a telephone, but has the source of the sound or tone directly in front of him. Granular microphones have exhibited the great disadvantage that the small granules of carbon in consequence of the vibrations of the diaphragm very often become balled and lodge between the diaphragm and the granule-holder, causing a cessation of action. Even this drawback is avoided in the present microphone by care being taken that the granules shall be caused to constantly circulate in their container. By this improved means much finer granules may be employed, thus considerably increasing the action, and, fur-

ther, the granules are prevented from balling or caking.

This improved microphone is shown in the accompanying drawings, in which—

Figure 1 is a sectional plan view of the microphone; Fig. 2, a vertical section on line $x x$ of Fig. 1; Fig. 3, a perspective view of the granule-holder and bar for producing a circulation of the granules; Fig. 4, a front view of a form of construction of the granule-holder differing from that shown in Figs. 1, 2, and 3; Fig. 5, a vertical section on line $y y$ of Fig. 4; Fig. 6, a section on line $z z$ of Fig. 5; Fig. 7, a front view and section of a damper or deadening-strip.

This improved microphone resembles in its outer aspect the ordinary granular microphones. A wood ring a carries the contact-rings b and c , within which the microphone-casing d and f is clamped by means of a spring or spring-plate e . The granule-carrier g , composed altogether of carbon, as shown in Figs. 1, 2, and 3, or of a carbon core and a metal ring, Figs. 4, 5, and 6, is located in the casing. It is screwed to the bottom d , while the transmitter-diaphragm h , which is formed of a thin carbon plate, rests against the cover f . This diaphragm is supported by a considerable number of strips i , arranged in layers one above another. These strips are intended on the one hand, to carry the diaphragm and on the other to exert a pressure thereon. In view of the peculiar nature of the diaphragm this pressure must be extremely sensitive, and therefore a material best suitable for the strips is one which is covered on its upper surface with very fine hairs in order to give a certain degree of elasticity to the whole fabric of the strips in themselves and when put up in a pile a very sensitive elasticity against the diaphragm, as is necessary for obtaining a sufficient pressure and damping action without deleteriously affecting the vibrations of the diaphragm. Flannel or the like material is found the most suitable for the purpose. Any suitable number of strips may be employed, but by inserting or removing one or more strips clearness in the transmission of sound may be varied, the strongest tones being made clearer by the insertion of strips, while for feeble tones or

low notes less strips are necessary. Usually these strips are circular and the cut-out part in the center is regulated according to the form of the granule-carrier *g*, which is also usually circular. The strips *i* also serve for holding together on the center of the diaphragm the carbon granules lying in the granule-carrier *g*. In order to prevent these granules from balling, the funnel-shaped holder is provided with a bar *k*, which is mounted horizontally approximately in the middle of the hopper or funnel and leaves the back of the same free. This bar is shown in the drawings as a broad piece extending from the front to the back of the hopper and standing edgewise in the middle plane of the microphone. One edge is straight and slightly curved at the ends, the straight part being parallel to the plane of the diaphragm. The other edge is curved, leaving a space between it and the small end of the funnel, so that the granules on both sides of the bar are in contact at the small end of the funnel, but are separated at the large end by the bar as by a partition. By this arrangement the result is obtained that the fine granules do not become balled or lodged between the diaphragm and the granule-holder, for the reason that the grains undergo a slight circulation. This circulation proceeds as follows: As soon as the microphone has been hung up in the proper manner, so that the bar *k* is in a horizontal position, or nearly so, all the grains of carbon accumulate in the lower part of the funnel. By the oscillations of the diaphragm the entire mass of the grains is then forced backward. The grains, however, rise at the rear, owing to the lower wall of the funnel rising obliquely to the rear, and force themselves gradually upward, passing through the opening left between the curved edge of the bar and the small end of the funnel.

In the arrangement shown in Figs. 1, 2, and 3 the bar *k* is formed as a simple central bar;

but it is evident that several such bars may be provided parallel to one another or one above the other, as shown in Figs. 4, 5, and 6.

I declare that what I claim is—

1. A microphone consisting of the combination of an insulating-ring *a*, contact-rings *b* and *c*, carried thereby, within which rings the microphone-casing is secured, a funnel-shaped granule-carrier *g* composed of carbon, located in said casing, and screwed to the rear *d* of said casing, a cover *f* for the casing, a diaphragm *h* bearing against said cover, which is screwed to said casing, strips *i* of hairy material arranged in layers between the base of the granule-carrier and said diaphragm, and of such thickness, that said diaphragm bears on the body of said strips, which project beyond the mouth of the granule-carrier for holding the granules within proper limits, and a partition or bar *k* extending across the funnel portion of the granule-carrier, without reaching the bottom of the funnel, in order to divide the body of the granules into approximately equal parts, but leaving them in contact at the bottom of the funnel, substantially as described.

2. In a granular microphone a funnel-shaped granule-carrier being provided with a central partition of the shape of a flat bar *k*, having the outer edge adjacent and parallel to the diaphragm, and the inner edge at a slight distance from the rear of the carrier, said inner edge being curved so as to leave a passage for the granules from one side of the bar or partition to the other side, substantially as described and for the purpose set forth.

In witness whereof I have hereunto signed my name, this 24th day of December, 1901, in the presence of two subscribing witnesses.

FRIEDRICH WILHELM SENKBEIL.

Witnesses:

JEAN GRUND,
CARL GRUND.