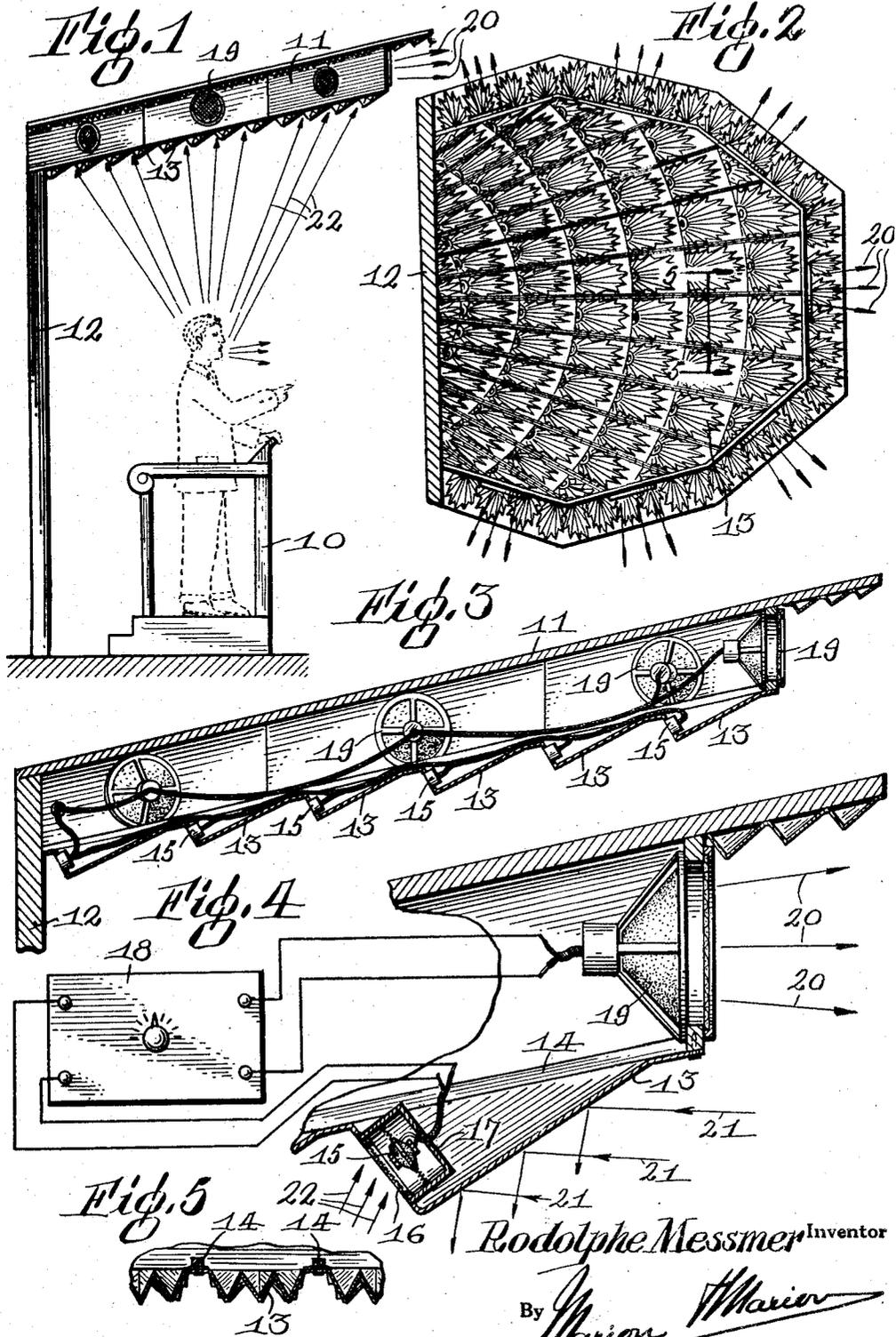


Dec. 13, 1932.

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MICROPHONE AND LOUD SPEAKER SYSTEM FOR  
CHURCHES, PUBLIC HALLS, AND THE LIKE  
Filed June 27, 1932

1,890,742



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## MICROPHONE AND LOUD-SPEAKER SYSTEM FOR CHURCHES, PUBLIC HALLS AND THE LIKE

Application filed June 27, 1932. Serial No. 619,478.

The present invention relates to a sound amplifying system, and pertains more particularly to a type adapted to be used in churches, public halls and the like.

Nowadays, it is common to use loud-speakers, in halls and churches for the purpose of amplifying the voice of the speaker, for example, to render the same intelligible to all present.

Inasmuch as a microphone is disposed directly in front of the speaker, to pick up the sounds, it is imperative that the loud-speakers be disposed at a certain distance from said microphone, to avoid feed-back or "howling". Furthermore, the output from said microphone being limited, as a further aid against howling, it is necessary for the speaker to face the said microphone at all times and to remain with a restricted field therefrom.

This restricted field for the speaker is in itself a serious drawback since a temperamental orator generally moves about and gesticulates more or less according to his subject. Consequently, a speech delivered under these conditions is generally flat and lifeless, due to the fact that the speaker has to limit his movements, and refrain from moving his head a great deal.

Possibly the greatest drawback of this system, from the speaker's standpoint, is due to the echo of his own voice which occurs generally a fraction of a second after he has uttered the corresponding sounds; this lag is the more accrued as the loud-speakers are installed farther from the speaker himself.

The present invention, on the other hand, remedies the above defects of an amplifying system, and provides unlimited possibilities for the most enthusiastic speaker who can move freely about his platform without in the least affecting the output of the sound-reproducers.

Therefore, the primary object of the invention is a sound reproducing system for halls and the like, wherein the speaker is not hampered by any visible apparatus, and which is furthermore free from sound-lag, as taken from the speaker's viewpoint.

As an example, and for purposes of illustration, a preferred example of the invention

is shown in the attached drawing wherein similar reference numerals designate corresponding parts throughout the same.

In the drawing,

Fig. 1 is an elevation of a pulpit according to the invention, and showing the relation between the speaker and the pulpit canopy.

Fig. 2 is a plan view of the under face of the canopy,

Fig. 3 is a longitudinal section through said canopy, and illustrating the arrangement of microphones and loud-speakers,

Fig. 4 is an enlarged view of the microphone-loud-speaker arrangement, and

Fig. 5 is a view taken on line 5—5 of Fig. 2. Referring to the drawing, the numeral 10 generally indicates a pulpit or the like having a canopy 11 supported by a standard 12, or even a wall.

The canopy may preferably be set at an angle from the horizontal for various reasons, and principally to meet acoustic laws of sound diffusion.

The under face of the canopy has secured thereto a great number of diaphragms or plates 13, embossed to affect a leaf-like shape, and somewhat conical when viewed longitudinally. These diaphragms form the subject matter of my U. S. Patent No. 1,795,178 issued March 3rd, 1931, and a more detailed explanation of their use may be found therein.

Apart from the excellent diffusion properties of these diaphragms or plates when used in ordinary pulpits, these plates are adapted for the purpose of the invention for a reason to be described later.

The method of assembling and securing these plates 13 to the canopy 11 is shown in Fig. 5, as an example, or soldering may be resorted to. As an aid for properly fastening the edges of the plates in place, and for canopy-bracing purposes, a series of transverse bars 14 are provided to which the plates are nailed. (Figs. 4 and 5.)

After the canopy is completely covered with the plates, the sectional line defined by the outer surface of said plates is substantially as shown in Fig. 3. Each plate comprises a long side and a shorter side angularly disposed with respect to the former.

As shown to advantage in Fig. 4, a microphone 15 is disposed in an aperture provided in the short side of each plate 13, and serves to pick the sounds or speech uttered by the speaker below. This microphone is best supported by springs 16 and further enclosed, on the inner side of the plate, inside a sound-proof box 17 of soft material, or preferably of wood-fibre, cane sugar fibre or other pressed board.

The output from the microphones 15 is suitably amplified by means of an amplifier 18, wherein the output of all microphones is suitably mixed, and thereafter fed to a plurality of loud-speakers 19 disposed on the outside peripheral margin of the canopy.

Thus, the sound impulses picked up by the microphones are amplified and reproduced faithfully by the reproducers.

Due to the great number of the microphones, the movements of the orator below are not noticeable in the delivered output which remains constant, no matter in which direction the speaker may move, since the mean total from the battery of microphones is always constant as long as the speaker moves within the field thereof.

Inasmuch as the field covered by the microphones is considerable, and may even exceed the available space in the pulpit, no trouble is experienced in this direction; the speaker is quite free from any visible apparatus and may give the full measure of his talent quite naturally.

Furthermore, due to the closeness of the loud-speakers to the orator, the time lag is so small as to be entirely unnoticeable by the speaker himself.

As already pointed out, the choice of the leaf-shaped plates 13, aside from their natural sound-diffusion qualities, has been motivated by another consideration. Considering Fig. 4, it will be seen that the greatest percentage of the sound issuing from the reproducer 19 is directed according to the arrows 20, directly into space. However, reflections and echoes being always present in any building, disturbing sound impulses reflected back to the sound source may be expected. These reflections are encountered in practice and are mainly the cause of howling or feed-back, since engineers generally take great pains to insure that microphones are not disposed in the path of the direct output from loud-speakers.

The problem of these reflections is successfully met in the present case, due to the particular arrangement of the microphones with respect to the loud-speakers. This is shown in Fig. 4, wherein arrows 21, indicative of reflections from the walls of the building, are deflected by the plates 13 away from the microphone 15. Said microphone is thus left undisturbed by the reflected sound, and is

acted upon by the sound from the speaker only, as shown by the arrows 22.

Other constructive features of the system include the spring suspension of the microphones to dampen vibrations existing in the canopy structure, and the sound-proof box 17 around the microphones shutting off the sound waves issuing from the inside surface of the loud-speaker diaphragm, when a cone speaker is used. Incidentally, although a loud-speaker of the cone type has been illustrated, it is evident that a horn or exponential reproducer can be used as well, the more so when directional properties are required in the system.

From the foregoing, it will be apparent that the present arrangement constitutes a most satisfactory solution to the problem of public address systems, when used in halls, churches or the like wherein the acoustic properties of the building are not all that can be desired.

It is to be understood that various changes as to arrangement and substitution of parts can be resorted to without departing from the spirit of the invention and the scope of the subjoined claims.

Having thus described my invention, I claim:—

1. A sound reproducing system, comprising sound operated microphones, means to amplify the electrical impulses from the microphones, sound reproducing devices operated by the amplifying means, and means between the sound reproducers and microphones to deflect the sound waves issued from the sound reproducers away from the field of the microphones.

2. In a sound reproducing system, microphones disposed in one plane, amplifying means for the microphones, sound reproducers fed from the amplifying means and disposed slightly above the plane of the microphones, and angular means between the reproducers and microphones to deflect the sound waves issued from the reproducers away from the microphones.

3. The invention as defined in claim 2, wherein the deflecting means between microphones and reproducers comprise a plurality of plates of corrugated surface and of angular formation.

4. A sound reproducing system, comprising a plurality of microphones disposed in a plane above a speaker, sound reproducers slightly above the plane of said microphones and around the peripheral margin defining said plane, means to feed said reproducers from impulses picked up by the microphones, and a plurality of plates in the same plane of the microphones, whereby sound issued from the reproducers is deflected away from the microphones.

5. A sound reproducing system comprising in combination with the canopy of a pulpit,

a plurality of sound-diffusing plates covering the under side of the canopy, microphones suitably disposed in apertures provided in said plates, audio amplifier means to step up  
5 the electrical impulses produced by the microphones, and loud speakers disposed on the peripheral margin of the canopy and fed from the audio amplifier.

6. In a sound reproducing system as  
10 claimed in claim 5, sound-diffusing plates comprising a diaphragm-like plate having a leaf-like embossing thereon, of angular cross-section whereby a long and a short side is provided and means in the short side to receive a  
15 microphone, the long side being directed away from the microphone to effectively deflect downwardly sound waves reflected from bodies surrounding the canopy.

In witness whereof I have hereunto set my  
20 hand.

RODOLPHE MESSMER.

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