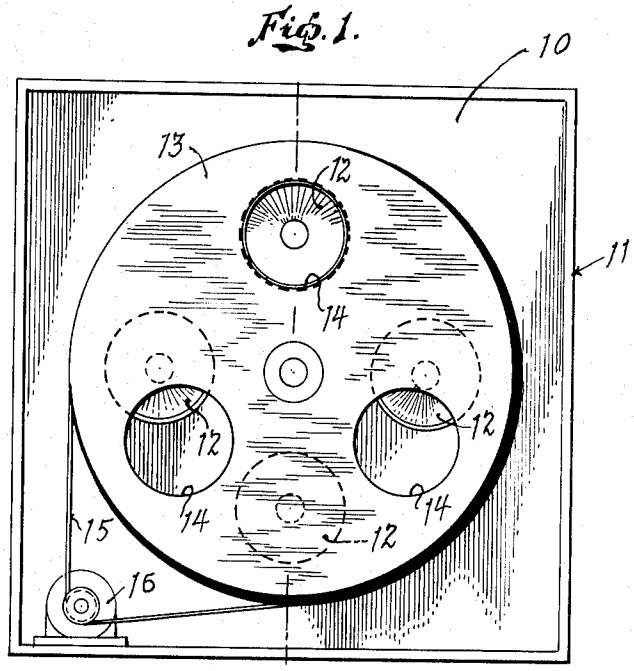
Sept. 7, 1965 H. H. HARE 3,204,722

ELECTRONIC ORGAN SPEAKER WITH TREMOLO EFFECT

Filed Dec. 29, 1964 2 Sheets-Sheet 1

Fig. 1.



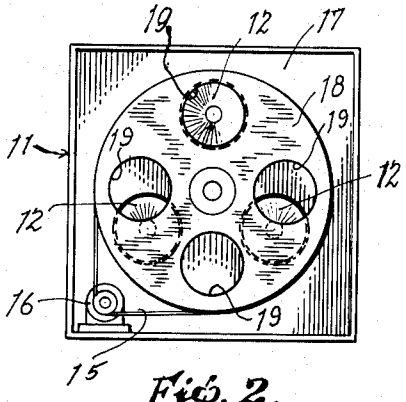


Fig. 2.

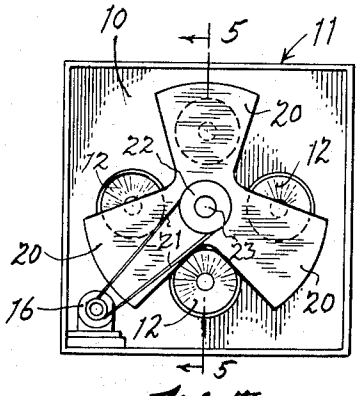


Fig. 3.

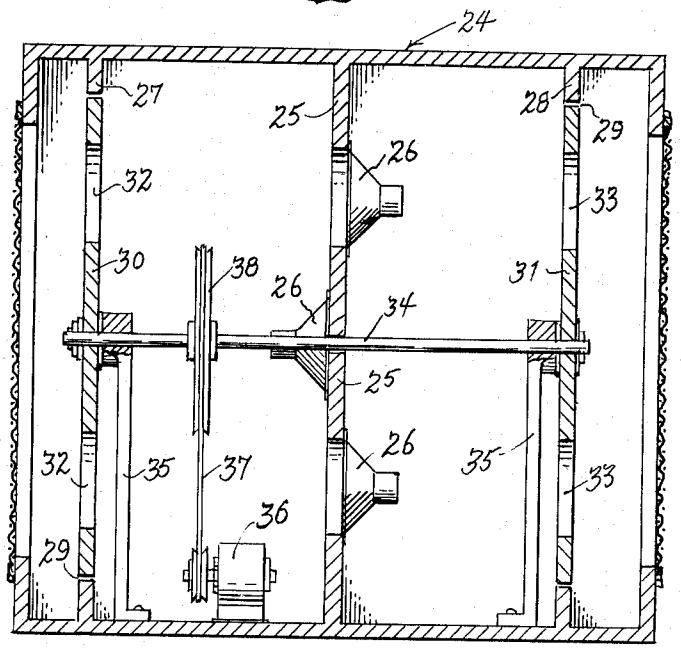
INVENTOR.
HAROLD H. HARE.
BY
W. H. Atkinson
ATTORNEY

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Filed Dec. 29, 1964 2 Sheets-Sheet 2

Fig. 4.



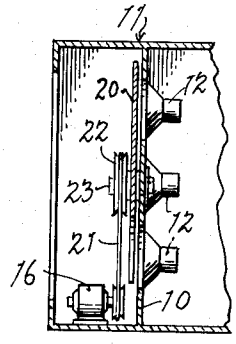


Fig. 5.

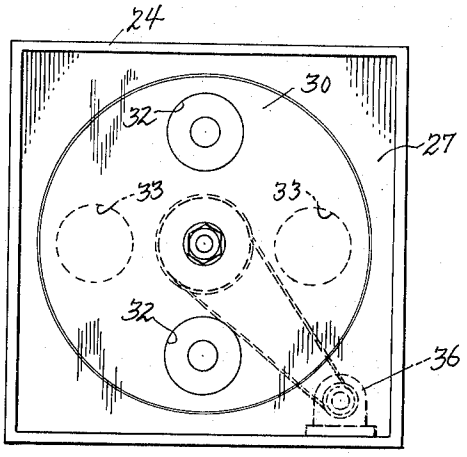


Fig. 6.

INVENTOR.
HAROLD H. HARE.
BY
Wm. H. Atkinson
ATTORNEY

United States Patent Office 3,204,722 Patented Sept. 7, 1965

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ELECTRONIC ORGAN SPEAKER WITH TREMOLO EFFECT

Harold H. Hare, 3865 Acapulco Drive, Campbell, Calif.

Filed Dec. 29, 1964, Ser. No. 421,946
5 Claims. (Cl. 181—31)

My present invention relates to new and useful improvements in sound reproducing systems and more particularly to a sound reproducing system that is adaptable for use with electric organs.

One of the objects of the invention is to provide a sound reproducing system to be used with an electric organ, that will faithfully reproduce the sound and provide a pleasing and/or tremolo effect in the upper frequency range and also in the middle and lower bass frequencies.

Another object of the invention is to provide an improved means for creating not only a tremolo effect for the notes from an electric organ, but to cause a reverberation of the music to simulate the choir effect of a pipe organ with slightly reduced reverberation of the high frequency notes and at the same time with increased brilliancy.

A further object of the invention is to provide a reverberating chamber with a plurality of dynamic speakers and a baffle means with a rotating sound deflector by which a sterephonic effect is produced in a novel manner.

Another object of the invention is to produce a sound reproducing system employing a plurality of cone type speakers that will lend brilliance to the tones and overtones that issue from the sound cabinet, and reproduce with high fidelity the notes in the high, low and lower frequencies with a tremolo effect and a reverberation that is not possible with other like sound reproducing means.

Another object of the invention is to provide a simple mechanism for carrying out the reproduction of sound, which consists primarily of a cabinet with a plurality of sound reproducing cone speakers, mounted in a conventional baffle in association with a sound wave intercepting means that will operate successively on the individual speakers and produce an overall tremolo and celeste effect.

Other objects and advantages will be in part evident to those skilled in the art and in part pointed out hereinafter in the accompanying description taken in connection with the accompanying drawing, wherein there is shown by way of illustration and not of limitation a preferred embodiment of the invention.

In the drawing:

FIGURE 1 is a front view of a cabinet with the front panel removed showing an embodiment of my invention,

FIGURES 2 and 3 are views similar to FIGURE 1 showing modified forms of the invention,

FIGURE 4 is a sectional view taken centrally along a vertical plane showing a further modified form of the invention,

FIGURE 5 is a fragmentary sectional view taken along line 5—5 of FIGURE 3, and

FIGURE 6 shows a modification of the arrangement illustrated in FIGURE 4 of the drawings.

In brief, my invention contemplates the employment of a relatively large sound reverberating chamber having a plurality of electro-magnetic and/or dynamic cone type speakers arranged in a common plane with a sound interrupting movable baffle means by which the output of the individual speakers is periodically and successively interrupted by baffle means in the form of a rotating disc having apertures through which the output of the speakers pass to produce the effect of a movement in the source of the sound. In other words, the sound emanating

from the several speakers will give the appearance of movement in the source transverse to the axis of the speaker elements which will result in a tremolo or stereophonic effect as the speakers are energized in the conventional manner through an electronic amplifier under the control of a conventional electric organ console.

In FIGURE 1 of the drawings, there is shown a modification of the invention having a vertical baffle **10** mounted within a sound confining chamber **11** of rectangular configuration with which the baffle **10** may be disposed either at one open end of the chamber **11** or at a point midway between opposite open ends thereof. The chamber **11** is preferably of a relatively large size, ranging from two to four feet in breadth and height and of a substantially equal dimension lengthwise. The chamber **11** as here shown is open at one end and as having four dynamic speakers **12** arranged in equally spaced relation about a circle. Mounted closely adjacent to baffle **10** at the output side of the speakers there is a baffle **13** in the form of a disc, having three apertures **14** through which the sound waves of the speakers will be projected successively and in modified form as the disc **13** is rotated. In this arrangement, the disc **13** carries a belt **15** that is driven by an electric motor **16**. In this showing, the uppermost speaker **12** is shown as fully exposed through one of the apertures **14** of the disc **13** while the bottom speaker is completely baffled. At the same time, the speaker at the sides in this arrangement are only partially exposed, so that when the disc is rotating clockwise, the sound emanting from the righthand side speaker at this point in time will be of a diminishing volume while the output of the speaker **12** at the left will perform with an increasing volume. Therefore, as the disc **13** rotates, it will be seen that at least one of the speakers will become completely exposed and operative while the adjacent speakers will operate with a decreasing and increasing volume and produce a doppler effect with pipe-organ quality.

In FIGURE 2 of the drawings, there is shown a similar arrangement in which the sound chamber **11** is shown with a baffle **17** that acts as a support for three of the speakers **12** that operate in conjunction with a rotating disc **18** having four apertures **19** by which a substantially similar result may be accomplished with only three of the speakers **12**.

In FIGURE 3, instead of the rotating disc **13** with its three apertures, there is a sound-blocking member having three radially extending fan-like portions **20** of such width that while the periodic blocking of speakers **12** is successfully accomplished the nature of the exposure time in the production of sound will be somewhat increased in volume as the fan-like portion **20** moves over the speaker **12**. In this arrangement the motor **16** is connected in driving relation with the fan-like extension **20** by means of a belt **21** operating over a pulley **22** carried by a shaft **23** upon which the rotating member **18** is mounted. While I have shown the cabinets **11** as fully open and without a covering thereover, it will be understood that the ends of the cabinets may be closed by a sound pervious screen or ornamental fabric in much the same manner as is more particularly shown in FIGURE 5 of the drawings. If desired, the end of the cabinet **11** may be provided with a more restricted or round opening having a diameter corresponding substantially with the outer limits of the rotating disc members. Since the speakers **12** have the characteristics of producing sound at both the front and rear of the cones, it is conceivable that in these arrangements the back or rear ends of the cabinets **11** may also be provided with a suitable opening or openings and thus provide a sound reverberating zone, at the rear sides of the speakers, which in connection with the

interruption of sound from the individual speakers, as explained, will produce a more complete utilization of the speaker output.

Reference is now made to FIGURE 4 of the drawings wherein I have shown the invention as embodied in a resonant sound-reverberating cabinet **24** having a speaker accommodation baffle with a plurality of cone-type dynamic speakers **26** mounted in pairs for projecting sound in opposite directions through the baffle **25**. Positioned outwardly at opposite sides of the speaker supporting baffle **25** there are additional baffles **27** and **28** having circular openings **29** within which rotating baffle discs **30** and **31** respectively operate to provide the stereophonic and celeste effect as contemplated by the invention. In this arrangement the rotating disc members **30** and **31** are each shown as having oppositely disposed sound-projecting openings **32** and **33** in alignment with each other but it is conceivable that these openings **32** and **33** in the rotating discs **30** and **31** may be displaced angularly with respect to each other. As shown in FIGURE 6, the sound-projecting opening **32** of the rotating disc **30** are arranged along a vertical line whereas the openings **33** of the disc **31** are located along a horizontal line. In these showings, the rotating baffle discs **30** and **31** are mounted upon the ends of a shaft **34** which is supported upon pedestal bearings **35** and driven by an electric motor **36** through a belt **37** carried by a pulley **38** upon the shaft **34**.

By placing the discs **13**, **18** and **20** close to the speakers **12** as shown in FIGURE 1, the sound is cut off abruptly and as a result the source has the appearance of jumping from one point to another. The volume of sound can be increased by providing the cabinets **11** with open backs and similar rotating baffle discs. The sound produced in this manner with the reverberating cabinet appears to have a doppler and tremolo characteristic which clearly distinguishes from the dead electronic tone as produced by an electric organ of conventional form, and the result is like a living sound with a choir or celeste effect similar to that of a pipe organ.

While I have, for the sake of clearness and in order to disclose my invention so that the same can be readily understood, described and illustrated specific forms and arrangements, I desire to have it understood that this invention is not limited to the specific forms disclosed, but may be embodied in other ways that will suggest themselves to persons skilled in the art. It is believed that this invention is new and all such changes as come within the scope of the appended claims are to be considered as part of this invention.

Having thus described my invention, what I claim and desire to secure by Letter Patent is:

1. In a sound reproducing system for electric organs, the combination of a sound reproducing speaker enclosing housing of sound resonant character having an open side, a vertically disposed speaker supporting panel spaced inwardly from the open side of said cabinet, a plurality of sound reproducing speakers mounted upon said panel and directed toward the open side of said cabinet, a rotating disc spaced from and operating in a plane parallel with said speaker supporting panel having openings corresponding in diameters with the diameters of the diaphragms of said speakers, characterized by the fact that the number of openings in said disc differ from the number of speakers carried by said panel, whereby sound from said speakers will be periodically and individually interrupted with a fading in and fading out effect as said disc is rotated, and means for rotating said disc about an axis parallel to the axis of said speakers.

2. The invention as set forth in claim **1**, characterized by the fact that the number of openings in said disc is less than the number of speakers carried by said panel.

3. The invention as set forth in claim **1**, characterized by the fact that the number of openings in said disc is greater than the number of speakers carried by said panel.

4. In a sound reproducing system for producing a tremolo effect upon sound as produced by an electric organ, the combination of, a sound reverberating cabinet of resonant material having sound transmitting openings at two opposite sides, a vertically disposed loud speaker supporting baffles located midway between the open sides of said cabinet, a plurality of dynamic speakers mounted upon said baffle and arranged in a circle to alternately project sound therefrom in opposite directions, two additional baffles having disc accommodating openings disposed substantially equidistant at each side of said speaker supporting baffle located midway between the open sides ting openings mounted in the plane of each said latter baffles and carried by a common shaft, and means for driving said shaft to rotate said discs, whereby a tremolo effect will result as the sound transmitting openings in said discs move into and out of alignment with corresponding loud speakers.

5. The invention as set forth in claim **4**, characterized by the fact that the openings in said rotating discs through which the sound is transmitted are staggered with respect to each other so that sound at the front and rear of each speaker will be alternately transmitted at opposite sides of said cabinet.

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LEO SMILOW, *Primary Examiner.*