Sept. 28, 1948. B. HARTSOUGH 2,450,139

TONE CABINET FOR ELECTRIC ORGANS

Filed Sept. 20, 1943

Fig. 1.

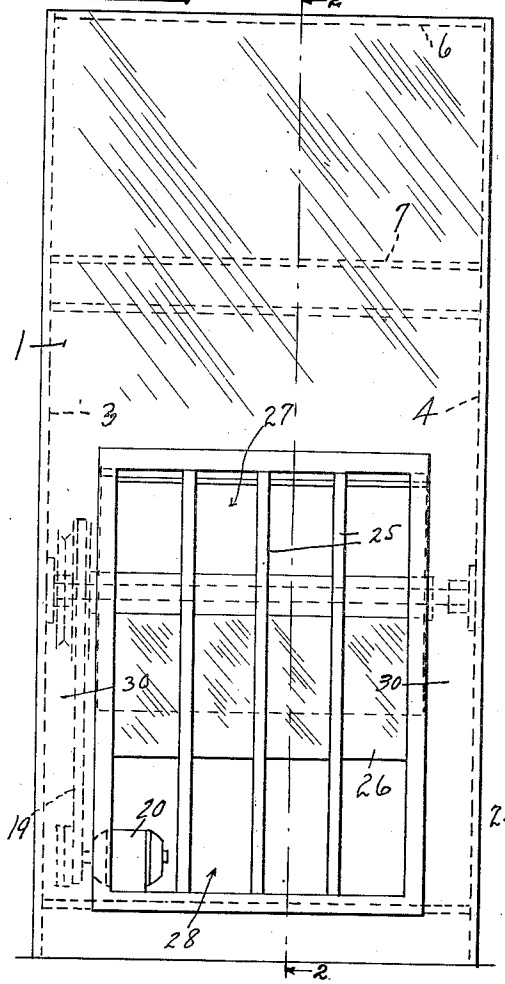


Fig. 2.

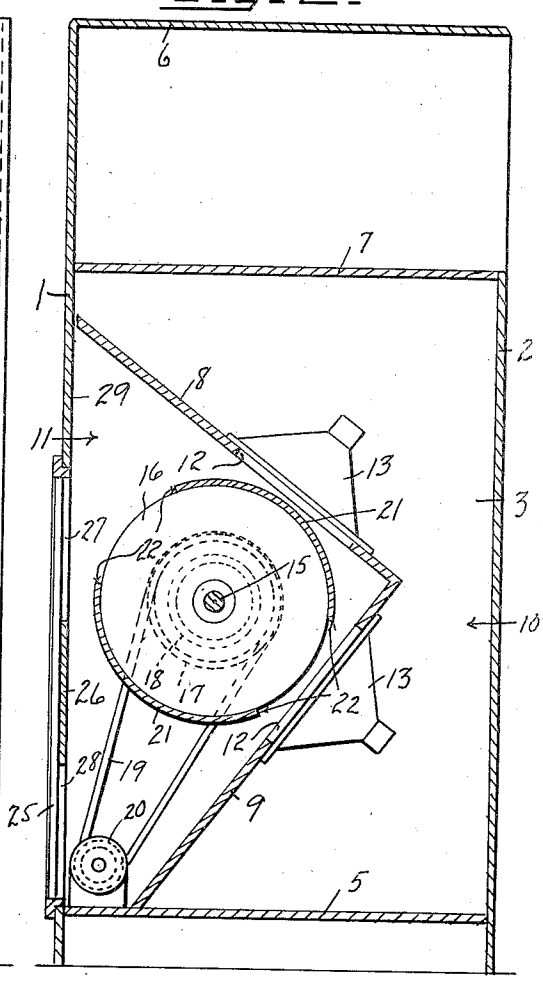
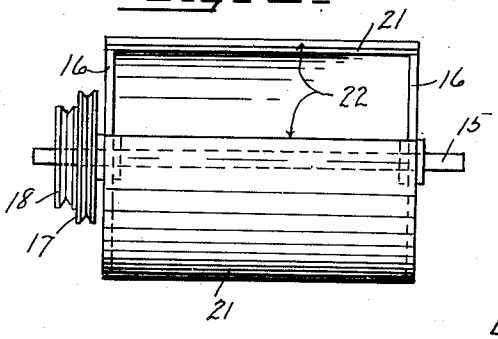


Fig. 3.



INVENTOR.
BARON HARTSOUGH

BY
Boyken, Mobley & Beckley

ATTORNEYS.

Patented Sept. 28, 1948 2,450,139

UNITED STATES PATENT OFFICE

2,450,139

TONE CABINET FOR ELECTRIC ORGANS

Baron Hartsough, San Francisco, Calif.

Application September 20, 1943, Serial No. 503,065

5 Claims. (Cl. 181—27)

1

This invention relates to a tone cabinet for an electric organ of the type in which the tones are generated electrically.

In an effort to more effectively diffuse the amplified musical notes generated by the organ, and to instill a more vibrant quality into the music, a tone cabinet has been heretofore commonly employed that includes therein a pair of cone-type dynamic speakers arranged on baffle boards so that their axes will intersect, and a rotating deflector or rotor tremulant is positioned in the paths of the sound waves generated by the speakers. Deficiencies in the results of these conventional tone cabinets have caused attempts at supplying a reverberative effect electrically, the true characteristics of the tones produced by conventional pipe organs has not been achieved by the tone cabinets of the electric organs.

One of the main objects of this invention is the provision of a tone cabinet that will effect the desired result of producing tones that far more closely simulate those produced by a conventional, high quality pipe organ than has been heretofore achieved, and which result is accomplished without attempting to supply reverberative effects electrically but by merely rearranging the baffle boards carrying the speaker units, and by slightly changing the structure of the rotor tremulant, and by modifying the proportions of the cabinet and various elements.

Other objects and advantages will appear in the description.

In the drawings,

Fig. 1 is a front elevational view of a tone cabinet constructed in accordance with this invention.

Fig. 2 is a sectional view of the cabinet as seen from line 2—2 of Fig. 1.

Fig. 3 is an elevational view of the rotor tremulant.

In detail, the cabinet is rectangular, and vertically elongated, having four lateral walls 1, 2, 3, 4 and a bottom wall 5. The wall 1 is a front wall, while wall 2 is the rear wall, and walls 3, 4 are the lateral side walls. A top wall 6 extends over the upper end of the cabinet and is supported on walls 1, 3, 4, while the rear wall 2 terminates short of the top wall, and a horizontal shelf or wall 7 extends from the upper edge of the rear wall 2 over the bottom 5, said wall 7 being secured at three of its edges to the front wall 1, and to the two lateral side walls 3, 4 as well as to the wall 2, thereby closing the upper end of the cabinet in a plane spaced below the top wall 6. An opening is thus left along the rear of the cabinet for access to the upper side of wall 7, and on this wall may be supported the tubes and circuit of a conventional power amplifier (not shown).

2

The area or space within the cabinet and below wall 7 is divided by a pair of baffle boards 8, 9 (Fig. 2) into two compartments or chambers 10, 11. The chamber 10 may be designated a tone chamber, while chamber 11 is a mixing chamber.

Baffle boards 8, 9 are of substantially the same size and extend convergently and at right angles to each other to meeting relation from lines adjacent said front wall 1 and respectively at said bottom wall 5 and adjacent said wall 7. The meeting edges of said boards are spaced from rear wall 2, and the lateral edges of both boards 8, 9 are secured to the lateral side walls 3, 4 in any suitable manner. The forward end edge of baffle 8 that is adjacent the wall 7 is spaced below said wall and slightly spaced from front wall 1, while the forward end edge of baffle 9 is secured to bottom wall 5 and is spaced from the plane of said front wall.

As will be later explained, these baffle boards carry the dynamic speaker units, and they are not sound insulated or otherwise insulated from the walls of the cabinet as occurs in conventional tone cabinets. Also, a plane bisecting the right angle between the boards 8, 9 will preferably be slightly inclined downwardly in direction away from said meeting edges of the boards, rather than being horizontal or inclined upwardly, whereas in conventional tone cabinets, the plane would extend vertically upwardly.

About centrally between their lateral edges, and equally spaced from their connected edges, the boards 8, 9 are each formed with a circular aperture 12 (Fig. 2). Coaxial with each aperture 12, and within tone chamber 10, is a cone-type dynamic speaker unit 13, each unit being secured at its large diameter end to one of the boards 8, 9 adjacent the edges of apertures 12 respectively. From this it will be seen that the axes of the speakers outwardly of their forward sides will intersect at a point in a plane bisecting the angle of the boards 8, 9, and in the mixing chamber 11.

The spacing of speaker units 13 from the meeting edges of baffle boards is such that a rotor tremulant of greater diameter than that of the larger end of the cone of each unit may extend parallel with the meeting edges of boards 8, 9 and with its outer sides relatively close to the boards 8, 9 so that the intersection of the axes of said cone speakers is substantially on the axis of rotation of said tremulant.

The rotor tremulant comprises a horizontal

shaft 15 rotatably supporting the spaced pair of circular imperforate heads 16, respectively adjacent sides 3, 4. One of the heads carried a pair of different diameter pulleys 17, 18 for a V-belt 19 that is adapted to extend over a suitable pulley on the shaft of motor 20.

Extending horizontally between the peripheries of heads 17, 18 are a pair of opposed imperforate strips 21 that transversely conform to the curvature of the heads. These strips are spaced apart thereby providing a pair of longitudinal slots 22 in opposite sides of the drum. The width of each of these slots is about two-thirds the diameter of the large end of each dynamic speaker unit. For example, assuming 12 inch cone speakers are used, the slots 22 would each be about eight inches in width, and the heads 16 would each be about sixteen inches in diameter. Thus, as the drum or rotor tremulant is revolved in one direction, the sound waves generated by vibration of the cones of the speaker units will alternately and intermittently pass freely through the slots. The waves from the speaker unit on board 8 will be directed downwardly and the waves from the speaker unit on board 9 will be directed upwardly. When the strips 21 pass across the speaker units intermittently, and successively, the sound waves generated by vibration of the cones will be deflected from the concave and from the convex sides of the strips.

The front side 1 of the cabinet is formed with a rectangular opening the side edges of which are almost even with the ends 16 of the drum. The upper edge of said opening is about level with the upper side of the rotor tremulant, while the lower edge is almost coincident with the forward edge of bottom 5.

This opening may have a row of vertical, spaced strips 25 extending thereacross, if desired, and also, there is preferably a central panel 26 extending horizontally across said opening, which panel may be of a vertical width about one-third that of the vertical dimension of the main opening, thus dividing said opening into an upper, horizontally elongated aperture 27 and a lower, horizontally elongated aperture 28.

As the forward upper edge of the baffle board 8 is substantially above the upper edge of the upper aperture 27, it is seen that a considerable portion 29 (Fig. 2) of the front wall 1 extends between said edge of board 8 and the upper edge of aperture 27. Also, the lateral edges of the main opening that is divided by panel 26 are spaced from the lateral sides 2, 3 of the cabinet, thus providing marginal portions 30 at opposite sides of said opening. This portion 29, marginal portions 30, and the panel 26, provide deflecting surfaces in the mixing chamber 11 and materially contribute to the diffusion and reverberation of sound for accomplishing the desired result. Some of the sound waves come through apertures 27, 28; others are successively deflected by the panel 26, and portion 29 of the front wall 1, while the sound waves in tone chamber 10 are transmitted to the walls 2, 3, 4, 5, 7 and to baffles 8, 9.

The motor 20 is preferably resiliently mounted to prevent vibrations therefrom being transmitted to the cabinet.

The different diameter pulleys on the rotor tremulant provide for slightly different tremolo effects, although the rotor is preferably rotated by the motor faster than the speed of the conventional rotor tremulant. Also said rotor tremulant is made of non-metallic material, such as

wood, plastic or composition material, although it may be of metal in certain installations, since the arrangement of the speaker units, and drum, and the construction of the mixing chamber contribute most noticeably to the accomplishment of the desired results. The imperforate ends of the rotor tremulant and its proportions relative to the speaker units are, however, also quite important.

Having described my invention, I claim:

1. A tone cabinet for an electric organ having a plurality of lateral side walls, a top wall and a bottom wall; one of said lateral side walls being formed with an opening therein; a pair of baffle boards extending convergently from points adjacent the upper and lower edges of said opening to meeting engagement at a point spaced from the lateral side of said cabinet that is opposite said opening; a pair of openings in said boards adjacent their engaging ends and a pair of cone-type loud speakers carried by said boards on their divergently facing sides coaxial with said openings respectively and disposed one above the other; a rotor tremulant revolvably supported within said cabinet between said opening and the said speakers and equally spaced from the latter; means for so supporting said tremulant for revolving about a horizontal axis; said speakers being directed toward said tremulant and arranged so that their axes will intersect each other at a point substantially on the axis of said tremulant, said tremulant being provided with baffles arranged for alternately deflecting the sound waves generated by said speakers upon revolving the said tremulant, and means for so revolving said tremulant.

2. A tone cabinet for an electric organ having a plurality of lateral side walls, a top wall and a bottom wall; one of said lateral side walls being formed with an opening therein; a pair of baffle boards extending convergently from points adjacent the upper and lower edges of said opening to meeting engagement at a point spaced from the lateral side of said cabinet that is opposite said opening; a pair of openings in said boards adjacent their engaging ends and a pair of cone-type loud speakers carried by said boards on their divergently facing sides coaxial with said openings respectively; a rotor tremulant revolvably supported within said cabinet between said opening and the said speakers and equally spaced from the latter; means for so supporting said tremulant for revolving about a horizontal axis; said speakers being directed toward said tremulant and arranged so that their axes will intersect each other at a point substantially on the axis of said tremulant; said tremulant being a hollow drum formed with imperforate heads coaxial with said axis and each of two of the opposed sides of the drum being formed with an elongated slot extending substantially from one head to the other whereby upon rotation of said tremulant the said slots will alternately pass the sound rays generated by the said speakers with interruption, said speakers being disposed one above the other so that the sound waves generated thereby will be directed generally upwardly and downwardly, and the diameter of said tremulant being substantially greater than the maximum diameter of either of said speakers.

3. A tone cabinet for an electric organ having a plurality of lateral side walls, a top wall and a bottom wall; one of said lateral side walls being formed with an opening therein; a pair of baffle boards extending convergently from points ad-

jacent the upper and lower edges of said opening to meeting engagement at a point spaced from the lateral side of said cabinet that is opposite said opening; a pair of openings in said boards adjacent their engaging ends and a pair of cone-type loud speakers carried by said boards on their divergently facing sides coaxial with said openings respectively; a rotor tremulant revolvably supported within said cabinet between said opening and the said speakers and equally spaced from the latter; means for so supporting said tremulant for revolving about a horizontal axis; said speakers being directed toward said tremulant and arranged so that their axes will intersect each other at a point substantially on the axis of said tremulant; the upper baffle board of said pair being spaced from the lateral wall having said opening therein, a portion of said last mentioned lateral wall being extended past the adjacent edge of said upper baffle board and positioned to intercept some of the sound waves directly generated by one of said speakers whereby said portion will vibrate under the influence of said last mentioned sound waves.

4. A tone cabinet for an electric organ having a plurality of lateral side walls, a top wall and a bottom wall; one of said lateral side walls being formed with an opening therein; a pair of baffle boards extending convergently from points adjacent the upper and lower edges of said opening to meeting engagement at a point spaced from the lateral side of said cabinet that is opposite said opening; a pair of openings in said boards adjacent their engaging ends and a pair of cone-type loud speakers carried by said boards on their divergently facing sides coaxial with said openings respectively; a rotor tremulant revolvably supported within said cabinet between said opening and the said speakers and equally spaced from the latter; means for so supporting said tremulant for revolving about a horizontal axis; said speakers being directed toward said tremulant and arranged so that their axes will intersect each other at a point substantially on the axis of said tremulant; the divergent ends of said baffle boards terminating short of the said lateral side of said cabinet in which said opening is provided, and the divergent end of the upper board of said pair terminating a substantial distance above the upper edge of said opening, whereby a portion of the lateral side wall in

which said opening is formed will intercept sound waves from said speakers for causing a vibration of said lateral side wall.

5. A rectangular, vertically elongated tone cabinet of the character described having four lateral walls, a top wall and a bottom wall; an opening provided in one of said lateral walls; a pair of baffle boards extending completely between the opposed lateral walls that are adjacent said one lateral wall, and extending convergently from points adjacent the upper and lower ends of said opening to meeting engagement at a point spaced from the lateral wall that is opposite said opening; a rotor tremulant comprising a horizontally disposed drum of rigid, non-metallic material supported for rotation on its horizontal axis and extending across said opening and between the said baffle boards adjacent their convergent ends; two opposite sides of said drum being formed with slots extending axially of the drum, and said boards being each formed with an opening adjacent their meeting ends, and a cone-type loud speaker coaxial with each of said openings directed toward said tremulant and secured to said boards on their divergently facing sides respectively, means for rotating said tremulant, said speakers being positioned relative to said tremulant so that their respective axes will extend through the axis of said tremulant whereby said slots will alternately be aligned with the axes of said respective speakers upon revolution of said tremulant.

BARON HARTSOUGH.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,915,954	Scofield	June 27, 1933
1,932,343	Holland	Oct. 24, 1933
1,988,132	Murray	Jan. 15, 1935
2,038,253	Wheeler	Apr. 21, 1936
2,062,515	Hoschke	Dec. 1, 1936
2,073,474	Glen	Mar. 9, 1937
2,160,283	Roberts	May 30, 1939

FOREIGN PATENTS

Number	Country	Date
150,559	Austria	Apr. 15, 1937