

C. M. HECK.
SOUND CONTROLLING MACHINE.
APPLICATION FILED DEC. 10, 1914.

1,283,510.

Patented Nov. 5, 1918.
2 SHEETS—SHEET 1.

Fig. 1.

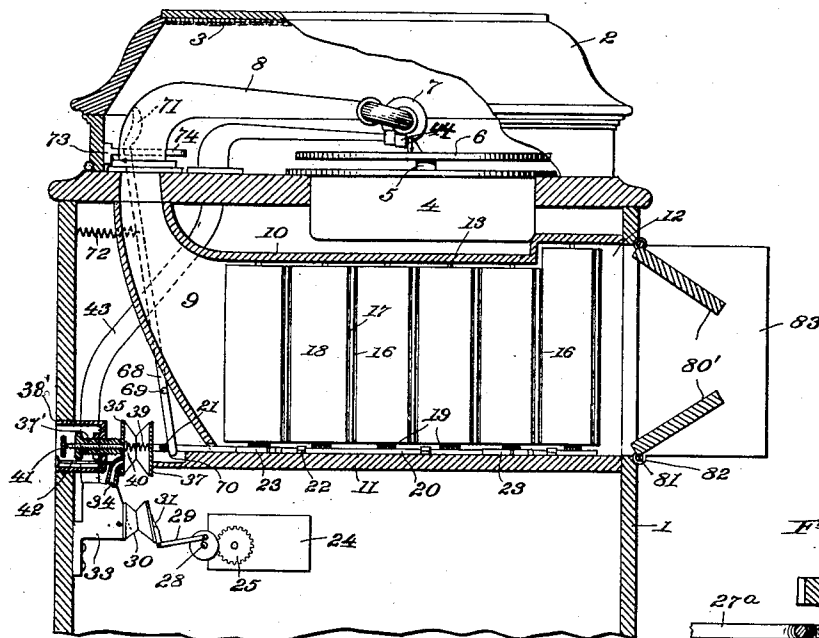


Fig. 10.

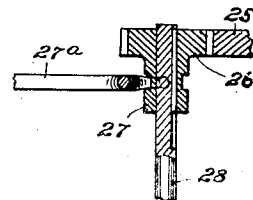
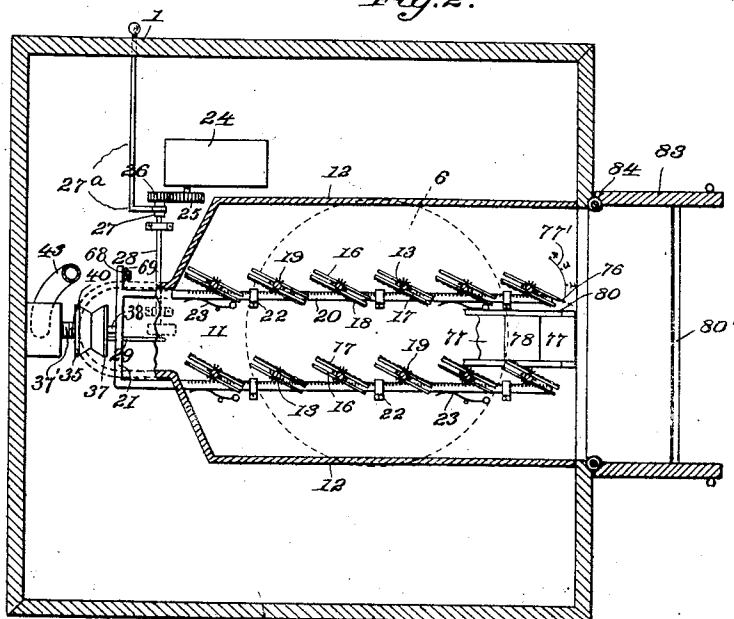


Fig. 2.



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Fig. 6.

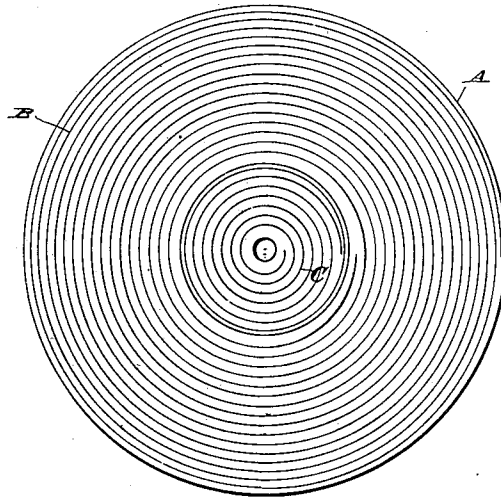


Fig. 9.

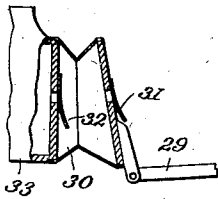


Fig. 8.

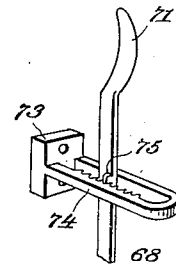


Fig. 7.

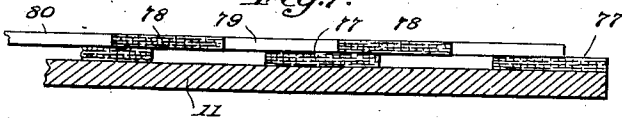


Fig. 4.

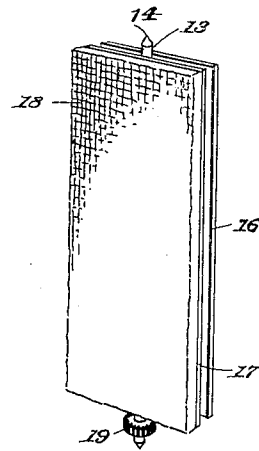


Fig. 3.

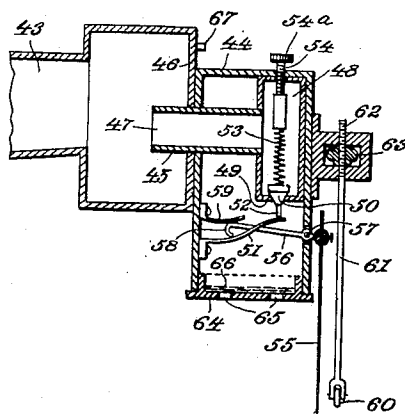
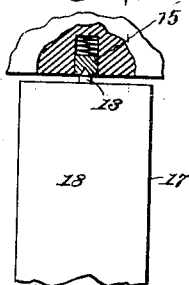


Fig. 5.



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UNITED STATES PATENT OFFICE.

CHARLES M. HECK, OF RALEIGH, NORTH CAROLINA.

SOUND-CONTROLLING MACHINE.

1,283,510.

Specification of Letters Patent.

Patented Nov. 5, 1918.

Application filed December 10, 1914. Serial No. 876,467.

To all whom it may concern:

Be it known that I, CHARLES M. HECK, a citizen of the United States, residing at Raleigh, in the county of Wake and State of North Carolina, have invented certain new and useful Improvements in Sound-Controlling Machines, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to sound controlling machines, designed more especially for improving tone qualities.

One of the primary objects of the present invention is to provide a resonance chamber of improved construction, adapted to deaden undesirable overtones, and to amplify the desirable tones.

The invention further embraces novel means whereby the resonance properties of the usual megaphone or sound amplifying horn, in sound producing machines may be accurately varied during the operation of the machine.

A further object of the invention is to provide means whereby the resonance properties of the sound producing machine may be automatically adjusted, varied, and controlled by means operatively associated with a record surface, to the end that the sounds as emitted to the audience will be clear and free from unnaturalness, intensified and softened as required, and otherwise more nearly approach the natural sound desired to be reproduced.

Further, the invention includes a sound amplifying device or megaphone having therewithin adjustable sound absorption surfaces, and means for adjusting said surfaces to modify the sounds.

The invention also includes means for lengthwise adjusting the area or capacity of the resonance chamber, and in carrying out this feature of the invention, advantage is preferably taken of a novel construction and arrangement of doors for the outlet end of said resonance chamber.

Other and further improvements and novel details in the construction and arrangement of the various parts of my invention will be appreciated from the description to follow, which for a clear understanding thereof, should be considered in connection with the accompanying drawings, forming a part hereof, and wherein is disclosed, for the

purpose of illustration, a convenient and satisfactory embodiment of the invention, as applied to sound reproducing instruments.

It is to be understood in this connection, however, that many minor changes may be made without departing from the spirit or contemplation of the invention, and it is also to be understood that the resonance variations and softening of sounds as contemplated by me are equally applicable in the receiving of sounds for recording or in the reproduction of sounds after recording.

Figure 1 is a vertical section of a sound producing apparatus with my improvements applied, certain parts being shown in elevation;

Fig. 2 is a horizontal section;

Fig. 3 is an enlarged section of the valve mechanism;

Fig. 4 is a detail perspective of one of the adjustable wings for the resonance chamber, enlarged;

Fig. 5 is a detail of the same, cut away, and illustrating the yieldable connection therefor;

Fig. 6 is an enlarged plan view of a record disk;

Fig. 7 is an enlarged detail view of the adjustable felted surfaces;

Fig. 8 is an enlarged perspective of parts of the hand operating means;

Fig. 9 is an enlarged detail view of the bellows pump, and

Fig. 10 is an enlarged detail view of parts of the releasing mechanism for the motor drive.

With more particular reference to the drawings, wherein like reference numerals refer to corresponding parts throughout the several views, 1 is a cabinet or casing which may be of any approved design and has a swinging top 2, as usual in the class of instruments under consideration. The inner surface of this top as well as other of the surfaces of the casing and frame parts, wherever convenient, may be provided with sound softening strips, as felted net work 3. Positioned within the casing is a suitable motor, 4, of any desired character, the said motor being adapted to actuate through the medium of the rotatable spindle 5, a record supporting disk 6.

The sound box is generally indicated by the numeral 7, and connects with a tubular

member 8, which latter terminates in an enlarged portion 9, projecting horizontally below the motor and opening at the front of the casing, the said member 9 constituting the sound amplifying device, horn, or megaphone proper.

The resonance chamber provided by the part 9 is preferably of substantially rectangular shape, as illustrated in Fig. 2 of the drawings, the inclosing wall comprising a top, 10, bottom, 11, and sides, 12. In order to intensify, soften or otherwise clarify the tones emitted from the resonance chamber, I preferably provide within the same, a plurality of adjustable surfaces, the said surfaces being of a character to adjust the area of the resonance chamber, as well as to adjust the amount of sound softening surface exposed to the sound waves. The adjustable surfaces just referred to preferably take the form of shutters or blades, arranged in series, thereby constituting in effect auxiliary vertical sides spaced inwardly from the sides 12 of the resonance chamber. These shutters are preferably constructed and arranged, as follows:—

13 is a shaft having pointed terminals 14, adapted to loosely engage in tapered recesses in the top and bottom walls of the resonance chamber. In order to provide a snug fit between the shaft 13 and the receiving recesses, and thereby overcome any unnecessary vibration or noise, in the movement of the same, I conveniently provide on one or on both of the top and bottom walls, or on both of these walls, spring pressed blocks 15, having recesses to engage the pointed terminals at one end of the shafts.

Positioned upon one side of the shaft and secured thereto is a strip 16, of wood or any other suitable relatively hard material, and secured to the opposite side thereof is a similar strip 17, having upon the exposed surface thereof, a layer of relatively soft material, such as felted net work, 18. In this way each of the shutters is provided with a tone softening surface 18, and a relatively hard surface 16, and the shutters being mounted for rotatable movement, either side may be presented innermost within the path of the sound waves, to suit the required conditions.

Positioned upon the shafts 13, adjacent one end thereof, are suitable pinions, 19, adapted to be engaged by a reciprocating rack bar 20, there being a rack bar for each series of shutters, and the rack bars being conveniently connected together, as by a cross bar 21, arranged at a point rearwardly of the resonance chamber and adapted for connection with suitable adjusting devices about to be described.

Suitable guides 22 may be provided for the rack bars, and spring members 23 of any approved type may be utilized to normally

maintain the same in contact with the pinions 19, whereby to prevent any unnecessary play and objectionable noise between these parts in operation.

While various means may be employed to adjust the rack bars and to in turn adjust the felt surfaced shutters, this means is preferably automatically controlled by the operation of the machine, and through the medium of means operatively associated with the record which is being reproduced,—that is to say, the record is preferably of a character to have provided thereon, or in operative association therewith, suitable guide grooves or members adapted to actuate suitable means connected with the rack bars to adjust the tone changing shutters of the resonance chamber, and thereby intensify, or soften and otherwise clarify the various portions of the reproduction.

With a view to automatically controlling the position of the adjustable shutters, in the manner referred to, a convenient form of record having thereon means for controlling the automatic adjustment of the shutters is illustrated in Fig. 6 of the drawings, in which A designates the record disk, B the record groove or grooves, and C a guide groove or grooves, of variable depth, adapted to be engaged by and control the operation of the actuating mechanism for the shutters, it being understood that as the depth of the grooves varies, so also will the position of the shutters.

The guide grooves C are so arranged with respect to the record grooves that in the reproduction, those portions of the guide grooves designed to soften or accentuate as the case may be, any particular part of the record, will be brought in registration with the shutter adjusting means, substantially simultaneously with the registration of the sounding needle with that particular part of the record grooves.

A motor 24 of any desired construction is provided, the same having projecting therefrom a suitable drive gear 25, adapted to mesh with a suitable pinion 26, mounted upon a sleeve 27, keyed to the shaft 28, and adapted for slidable movement thereon, as through the medium of an arm 27^a, which may project without the casing for convenient access, and in the operation thereof, adapted to bring the pinion 26 into and out of contact with the gear wheel 25, as desired.

The shaft 28 is supported in any desired manner, not shown, and terminates at one end in a crank support adapted to impart movement to a pitman rod or crank 29, connected to a suitable bellows pump 30. The bellows pump 30 preferably has spring held flaps 31—32, and is adapted for connection with a suitable vacuum chamber formed by the casing 33. The motor 24 with the bellows pump and associated parts constitutes

the vacuum creating means for the vacuum chamber, which said chamber has communication through the duct 34 with a power pneumatic, preferably of bellows construction, 35. The power pneumatic has a movable wall 37 connected in any desired manner, as by a rod 38, with the cross bar 21 of the racks 20.

Obviously a pump and piston arrangement may be substituted in lieu of the power pneumatic, if desired.

The normal position of the power pneumatic 35 may be regulated as desired, through the medium of a threaded extension 37', on the fixed wall thereof, adapted to engage a threaded aperture in a suitable guide member 38'. Positioned between the opposite walls of the bellows 35 and tending to push them apart is a spring 39, the said spring being adapted, at one end, to engage the movable wall of said bellows, and at its opposite end to engage a suitable disk 40, having a threaded extension or stem 41, passing through the extension 37', and having screw threaded engagement therewith, to the end that the compression of the spring may be regulated, as desired.

A suitable relief or pressure valve 42 is provided, the same having a stem leading to the outside, and adjustable at will. 43 is a tubular conduit adapted to establish communication between the vacuum chamber casing 34 and the valve mechanism, which latter engages the guide grooves C of the record disk and is preferably constructed, substantially as follows:—

44 is a suitable valve casing, the same having a laterally extending tubular part 45, slidably mounted on one wall 46 of the closed end of the conduit 43, the tubular part 45 forming a bearing to permit of rotation of the valve casing into and out of operative position relatively to the record, and also permitting of any necessary relative lateral play between the valve casing and the conduit 43.

The tubular part 45 is open at its outer end, as indicated at 47, and at its inner end communicates with a suitable air chamber 48, the bottom wall 49 of which has a suitable air inlet opening adapted to be normally closed by a valve 50. This valve 50 is preferably balanced by opposing springs, the spring 51 being in the form of a leaf spring secured to a projecting end 52 of the valve, tending to draw the valve downwardly into closed position, whereas the spring 53, preferably of the coil type, is secured to the upper surface of the valve and tends to open the same. The tension of the spring 53 may be adjusted as desired, through the medium of the threaded bolt 54, projecting without the casing and terminating in a thumb nut 54^a.

When properly adjusted the valve 50 will

be lightly closed, and the pressure of air or reduction of pressure of air, within the tubular conduit 43 (dependent upon whether the pressure or suction is used) is adapted to be controlled by the valve 50, in the following manner:—

55 is a needle adapted to be clamped in any desired manner to the outer end of a lever 56, pivoted at 57 to the valve casing 44, and said lever has at its opposite end a return bent portion 58 adapted to engage at one side the spring member 51, and at its opposite side a spring guide 59. The spring guide 59 tends to press the end of the lever 56 against the spring member 51. A suitable guide to engage the record whereby to properly position the needle 55 with regard thereto, preferably takes the form of a roller bearing 60, at the lower end of a stem 61, adjustably connected in any desired manner to the valve casing 44, said stem conveniently being threaded at its upper end 62, to be engaged by an adjusting nut 63, of any desired construction.

At the lower end of the valve casing is positioned a detachable closure 64, having one or more inlet openings 65, a suitable filtering cloth or the like 66, overlying said openings. If desired, a suitable felt lining may be provided for the valve casing 44, and also for the tubular member 43, and other associated parts. A suitable stop 67 is provided to limit the swinging movement of the valve casing 44, and hold the same in elevated position.

The operation of the parts thus far described may be reviewed as follows:—

The action of the motor is to withdraw air continuously from the pneumatic system and lower the pressure of the air therein. The action of the valve 50 as acted on by the outside pressure of the atmosphere is to permit air continually to pass into the pneumatic system when the air therein has reached a certain diminished pressure. It thus prevents the motor from producing more than a given reduction of pressure in the pneumatic system, which reduction amounts to enough to open the valve enough to make the rate of entrance of the air into the system equal to the rate at which it is being withdrawn. In detail the action is as follows,—

Upon a reduction of pressure in the conduit 43 the valve 50 tends to open, and any upward motion of the needle 55, due to its engagement with the shallow portion of the groove C of the record disk tends to stiffen the spring 51 and make the reduction of pressure in the conduit 43, which is necessary to open the valve 52, greater. Assuming that the guide grooves C for the needle 55 have a series of rises and depressions, the effect will be a corresponding increase and decrease of the amount of pressure in the

conduit 43, which is necessary to open the valve 50.

The depth of the groove controls the pressure which the needle lever has upon the spring 51 of the valve 50. Thus for every new depth of the needle the valve is set to open at a new pressure. The motor 24 begins to create a reduced pressure in the power pneumatic or bellows 35 which causes the outside pressure to push the movable face of the bellows 35 until the spring 40 equalizes the forces. The pressure decreases to the point where it opens the valve 50. Beyond this, the pressure cannot be reduced unless the needle point in its motion runs over a shallower place in the groove. Therefore, since a certain depth of groove represents a certain pressure in the system, and a certain pressure represents a certain contraction of the power bellows face, the face and groove change correspondingly, which in turn adjusts the rack bars 20, to vary the position of the sound modifying shutters or wings heretofore described.

Many obvious changes may be made in the various parts of the pneumatic control just described, and somewhat diagrammatically illustrated in the drawings.

Again, it may be desired, at times, to operate the adjustable shutters within the resonance chamber manually, as distinguished from the automatic arrangement heretofore referred to, and I have shown diagrammatically a means for this purpose, the same including an elongated lever 68, pivoted at 69, in any desired manner to a portion of the framework of the machine, said lever having at its lower end a loose connection 70 with the connecting bar 21, of the adjusting racks. The upper end of the lever 68 terminates in a hand engaging part 71, and a suitable spring 72 is designed to normally retain the lever in position against a stop 73 in a suitable guide member 74. This spring, however, is not of sufficient strength to interfere with the movement of the adjusting racks 20 in the automatic adjustment thereof.

The guide way 73 is preferably provided with any suitable means for retaining the lever in adjusted positions, when the same is operated manually, and for purpose of illustration, this retaining means conveniently takes the form of a serrated edge on one wall of the guide 73 adapted to be engaged by a suitable projecting part 75, on the lever 68.

Through the medium of the hand adjusting mechanism just described, it will be appreciated that the resonance properties of the megaphone or sound amplifying device may be adjusted at any time during the reproduction of the record, or if desired, the shutters may be adjusted at the start of any particular record and retained in this ad-

justed position. In this connection, a suitable indicator may be positioned on one of the shutters, as illustrated at 76, the indicator being movable over a suitable scale 77, visible at the front of the machine through the open end of the resonance chamber. Preferably the guide grooves C of the records for the first revolutions are of a construction so as to make the automatic control maintain the shutters or wings at a determined position, indicated on the scale 77. If on starting the instrument, it is found that the indicator is not at its desired position, adjustment of nut 63 will adjust the pressure valve for the given groove depth and the pressure will bring the shutters into the desired position.

For manual control the records may conveniently have placed thereon some indication whereby to guide the operator in the adjustment of the shutters to the proper position best adapted to the record to be reproduced.

When the hand lever 68 is brought into play, it is desirable to detach the vacuum creating means for the pneumatic system, and with this in view, while any suitable means may be employed for this purpose, I preferably take advantage of the slidable pinion 26 which may be moved out of operative position through the medium of the lever operated collar 27 heretofore described.

The motor for operating the pneumatic control for the shutters is preferably of the coil spring type and connection may conveniently be provided for winding the same by the same crank mechanism that winds the record moving motor, and likewise the first mentioned motor may be set into operation by the same means employed to release the record motor. For the purpose of the present invention, it is perhaps preferable to have the releasing means for the bellows actuating motor of a character not to be released at each operation of the releasing means for the record moving motor so that the first mentioned motor will not be actuated with the incident wear on the parts when it is desired to utilize and hand adjusting means previously described.

Suitable sound absorbing strips, as of felt, may be positioned upon the walls 10 and 11, or all of the walls of the resonance chamber, and for purpose of illustration, I show these strips upon the bottom wall 11 thereof. In the form illustrated, the strips 77 are preferably stationary and overlying said strips I preferably provide a series of strips 78 separated from one another by an intervening space 79, and connected through the medium of a bar or the like 80, adjustable at the front of the machine, whereby to expose a variable quantity of the felted surface to the interior of the chamber.

By adjusting the strips 78 it will be seen

that the same may, in one position, overlie the strips 77 to the end that the felt surface will not be greater than the width of the strips 77. By further adjustment the strips 78 will overlie to any desired extent the space intermediate the strips 77 and in one position will bridge said space to the end that substantially the entire exposed surface of the bottom wall will be covered with the felted surface.

It is customary in instruments of this kind to have a pair of pivoted doors at the outlet end of the megaphone, which doors may be partially closed to soften the tone, and one of the features of my invention resides in providing in coöperation with the usual pivoted doors adapted to swing upon a vertical axis a coöperating pair of doors adapted to swing on a horizontal axis, the doors overlapping at their edges, and adapted in the open position thereof to provide a substantially closed extension for the resonance chamber. The doors 80' at their pivotal connection 81 preferably have coil spring members 82, adapted to normally exert outward pressure on the doors to open the same, whereas the doors 83 have at their pivotal connection suitable springs 84 tending to draw the doors 83 into a closed position. In this way, the doors being in contact, the springs of the respective pairs of doors act in opposition, one to the other, and tend to maintain the doors in adjusted position to vary the outlet opening at the end of the resonance chamber. The doors 83, when in closed position, will overlie the doors 80, as illustrated.

It is to be borne in mind that the means for actuating the valve 50 of the pneumatic system may be positioned in any desired manner upon the record disk, for instance, as illustrated in the drawings, or upon the reverse side of the record, or in case a cylinder record is utilized, the guiding grooves may be positioned thereon. Then again, an entirely separate disk or cylinder having grooves or actuating means thereon for the valve may be utilized.

Also, while I have illustrated the so-called "hill" and "valley" type of guide groove in the record, the improvements with slight variations may be applied to other equally well known types of grooves.

It will be observed that when the shutters or wings of the resonance chamber are closed they provide substantially auxiliary walls for the resonance chamber, thereby reducing the cross sectional area thereof. As the leaves of the shutters are opened small orifices therebetween are made and inclined in such a direction as to interfere least with the ordinary resonance qualities. As they are opened farther, the inclination of shutters increases with the result that a greater portion of sound waves is thereby de-

flected. Further, as the opening continues, more and more of the felted surfaces of the leaves becomes exposed. This will have the effect of taking out the harmful overtones or screeching of the reproduction and also soften the reflective character of the surfaces exposed by the shutter itself.

In the claims wherein the terms "felt" or "felted" are employed, the same are to be construed as of sufficient breadth to include other similar material having tone softening or poor sound reflecting qualities.

I claim:—

1. In a sound controlling machine having a resonance chamber the combination of adjustable means within the chamber for changing the resonance properties thereof, and motor means acting automatically at predetermined unequal intervals for making and maintaining the adjustment of said adjustable means.

2. In combination, means forming a resonance chamber, and record controlled means modifying the resonance properties of said chamber.

3. In combination with means adapted to be vibrated by the configurations in a groove of a moving record, means controlled by said record for varying the tonal effect of the vibrations of the first said means.

4. In combination, a sound amplifying horn, internal means for adjusting the resonance properties thereof, and a motor means for making and maintaining the adjustment of said adjusting means.

5. In combination, a resonance chamber, adjustable means therefor, a rotatable disk having a guide groove therein, and controlling means for said adjustable means adapted to engage said guide groove.

6. In combination with a record body, means adapted to be vibrated by the configurations of said body, and a second means operated by configurations of said body for varying the tonal effect of the first said means.

7. In a sound controlling machine, a sound amplifying device comprising an outer surrounding wall, and an inner wall spaced from the outer wall and substantially coextensive therewith, said inner wall comprising a plurality of movably connected sections, and means for simultaneously adjusting said sections.

8. In a sound controlling machine of the character described, a sound amplifying device having outer inclosing walls, and an inner wall extending substantially parallel with one of the surrounding walls, said inner wall having a felted surface and being adjustable to vary the sound producing qualities of the device.

9. In combination, a sound amplifying device having outer inclosing walls, and an inner wall extending substantially parallel

to one of the surrounding walls, said inner wall comprising pivotally connected sections, and a common actuating means therefor.

5 10. In combination, a sound amplifying device, having outer inclosing walls, and an inner wall extending longitudinally of one of the surrounding walls, said inner wall comprising one or more pivotally mounted
10 sections.

11. In combination, a sound amplifying device having outer inclosing walls, an inner wall extending longitudinally of one of the surrounding walls, said inner wall comprising a plurality of pivotally mounted sections, and means for simultaneously moving said sections about their pivotal supports.

12. In combination, a sound amplifying device having outer inclosing walls, and an inner wall extending longitudinally of one of the surrounding walls, said inner wall comprising a plurality of sections, said sections being rotatably mounted whereby the same may be reversed.

13. In combination, a sound amplifying device having outer inclosing walls, and an inner wall, said inner wall comprising a plurality of movable sections having portions thereof of different sound reflecting properties relative to other portions thereof.

14. In combination, a sound amplifying device having outer inclosing walls, and an inner wall, said inner wall comprising a plurality of sections having a felted surface and a hard surface and means for adjusting said sections whereby to vary the position relative to one another of said surfaces in the sound passage.

15. In combination, a sound amplifying device having outer inclosing walls, and an inner wall, said inner wall comprising one or more sections having on one surface a layer of material such as felt, and having a relatively hard opposite surface, said sections being reversible whereby to expose either the felted surface or the opposite relatively hard surface to the sound waves.

16. In combination, a sound amplifying device having oppositely disposed outer side walls, and oppositely disposed inner side walls spaced laterally from the outer side walls, said inner side walls being adjustable to vary the sound producing qualities.

17. In combination, a sound amplifying device having oppositely disposed outer side walls, oppositely disposed inner side walls spaced laterally from the outer side walls, said inner side walls being adjustable to vary the sound producing qualities, and means for simultaneously adjusting said inner side walls.

18. In combination, a sound amplifying device having outer side walls, inner side walls spaced laterally therefrom and each having a shutter or wing, and means for

simultaneously adjusting the wings of each section.

19. In combination, a sound amplifying device having outer side walls, inner side walls spaced laterally therefrom and each having a shutter or wing, and means acting automatically for simultaneously adjusting the wings of each section.

20. In combination, a sound amplifying device having top, bottom and side walls, and an adjustable felted surface, for one or more of said walls.

21. In combination, a sound amplifying device having top, bottom and side walls, an adjustable felted surface for one or more of said walls, and an inner wall spaced laterally from one of said walls and extending longitudinally thereof, said inner wall having movable sections with a felted surface.

22. In combination with a phonograph record and a phonograph therefor having means for adjusting its tone qualities, of a control for said means operated by said record.

23. In combination with a phonograph record having a sound record and a control configuration, a phonograph having sound producing means operated by said sound record and sound adjusting means controlled by said configuration.

24. In combination with a phonograph record body having a sound record track and a control track, a phonograph having sound producing means operated by said sound record track and self-adjusting means controlled by said control track.

25. In combination with a phonograph record body having a sound record groove and a variable control track therein, a phonograph having means for reproducing sounds from said record groove and means controlled by variations in said track for producing a series of adjustments in the operation of said phonograph.

26. In combination, a sound record, a control record, and a phonograph having means for moving said records and reproducing sounds from said sound record and means controlled by said control record for producing a series of adjustments in said phonograph.

27. In combination with a sound producing device, a sound amplifying device, a record and means acting automatically under the control of said record for adjusting the resonance qualities of said amplifying device in unison with variations in the sounds produced by said sound producing device.

28. In a machine of the character described having means for moving a record surface to be reproduced, a sound amplifying device, and means governed by the movement of said record to automatically vary the resonance properties of said device.

29. In a machine of the character described adapted to reproduce a record, a sound amplifying device or horn, and means associated with the record for varying the resonance properties of the device.

30. In combination, a sound amplifying device, and means governed and controlled by the movement of a sound record to vary the tone producing qualities of the device.

31. In combination, a sound amplifying device, a sound record having thereon governing means, and means actuated and controlled by said governing means to automatically vary the resonance qualities of the device.

32. In combination, a sound amplifying device having movable parts, and automatically controlled pneumatic means for adjusting said movable parts to vary the resonance properties of the device.

33. In combination, a sound amplifying device, having movable parts to vary the resonance properties thereof, automatic means for adjusting said parts, and associated means whereby the parts may be adjusted manually as desired.

34. In combination, a sound amplifying device, having movable parts to vary the resonance properties thereof, automatic means for adjusting said parts, associated means whereby the parts may be adjusted manually as desired, and means for rendering inoperative one of said adjusting means, as desired.

35. In combination, a sound amplifying device having adjustable walls, pneumatic means for adjusting said walls, associated manual means for adjusting said walls, and means for rendering the pneumatic means inoperative without interfering with the operation of the manual means.

36. In combination, sound reproducing means, adjustable tone modulating means therefor, and means for adjusting said modulating means controlled by the movement of an element of said adjusting means in synchronism with said reproducing means.

37. In combination with a resonance chamber having adjustable surfaces disposed oppositely on each side of the normal path of sounds through said chamber, means for adjusting said surfaces to change the resonance properties of said chamber, and air pressure means for actuating said first mentioned means.

38. In a device having a resonance chamber, adjustable means for changing the resonance properties thereof, air pressure means for actuating said first mentioned means, and means governed by the movement of the record for regulating said pressure.

39. In a machine having a resonance chamber, adjustable members in the chamber for changing the resonance properties thereof, a vacuum chamber casing, means for creat-

ing a vacuum, a power pneumatic operatively connected with said adjustable members, and a connection between the power pneumatic and vacuum chamber.

40. In a machine having a resonance chamber, adjustable members in the chamber for changing the resonance properties thereof, a vacuum chamber casing, means for creating a vacuum, a power pneumatic operatively connected with said adjustable members, a connection between the power pneumatic and vacuum chamber, an air inlet duct communicating with the vacuum chamber, a valve for said duct, and means for actuating said valve.

41. In a machine having a resonance chamber, adjustable members in the chamber for changing the resonance properties thereof, a vacuum chamber casing, means for creating a vacuum, a power pneumatic operatively connected with said adjustable members, a connection between the power pneumatic and vacuum chamber, an air inlet duct communicating with the vacuum chamber, and a valve for said duct, said valve having a projection adapted to engage a record disk or the like, whereby to automatically operate in the operation of the latter.

42. In combination, a sound amplifying device having a plurality of movable members, each member having surfaces having different reflecting qualities, and means for correspondingly varying simultaneously the exposure of the surfaces of the respective members to sounds caused to pass through said device.

43. In combination, a sound producing device, a conduit conveying the sounds produced by said device, and adjustable wall forming panels for said conduit, said panels being constructed and arranged whereby in the adjustment thereof the reflecting qualities of the walls formed by said panels may be varied.

44. In combination, means operated by a motor for modifying tone qualities, a disk having guiding means thereon, means for rotating said disk, and controlling means for said motor adapted to engage and be actuated by said guiding means.

45. In combination, a sound producing device including a record member, and means controlled by the configuration of the record member for modifying tone producing qualities of said device.

46. In a sound controlling device, an amplifier having an extended sound reflecting surface composed of a plurality of reversible panels, each panel having one hard side and a softer side, and means reversing all of said panels simultaneously or maintaining in any position taken in reversing, to produce simultaneously a variation of the amount of soft reflecting surface exposed to the interior of the amplifier and variations

in the openings through said extended surface made between said panels in positions taken in reversing.

47. In a sound producing machine, sound
5 modifying means, motor mechanism for operating the same, and a record having thereon means for governing the operation of said operating means.

48. In combination, a sound producing device
10 having a chamber through which sounds pass, a partition within said chamber having means forming variable openings there-through, pneumatic means for operating said means, and a motor drive for said pneumatic
15 means.

49. In combination, a sound modifying device, pneumatic means for operating said device, a motor drive for said pneumatic means, a record having a guide surface, and
20 controlling means for the pneumatic means adapted to engage said guide surface.

50. In combination, a resonance chamber or the like, adjusting means for the resonance chamber, said means including a pneumatic system, a rotatable disk having a
25 guide surface, and controlling means for said adjusting means adapted to engage said guide surface.

51. In a machine adapted to reproduce
30 sounds from a record, sound modifying means including a pneumatic control, a record surface having guiding means thereon, and means for regulating the pressure in the pneumatic control adapted to be actuated
35 by said guiding means.

52. In a machine adapted to reproduce sounds from a record, sound modifying means including a pneumatic control, a record surface having a groove, and means operatively connected with said control and
40 adapted to engage the groove whereby the variations of the groove will produce variations in the movement of said control.

53. In a machine adapted to reproduce
45 sounds from a record, sound modifying means including a pneumatic control, a valve for the control, a record having a groove, and said valve having a needle to engage said groove.

54. In a machine adapted to reproduce
50 sounds from a record, sound modifying means including a pneumatic control, a valve for the control, a record having a groove, said valve having a needle to engage said
55 groove, and spring retaining means for the valve, said needle operating in passing along the groove to change the tension of the spring on said valve.

55. In a sound producing machine, a record having a guiding surface, and a tone
60 modifying means operated by a source of power, said source being controlled by the guiding surface of the record.

56. In a resonance chamber, a plurality
65 of elongated strips adapted for rotatable

movement about axes placed in a row extending lengthwise within the chamber, said strips being constructed and arranged whereby in one position of rotation to form
70 a substantially imperforate wall.

57. In a resonance chamber, a plurality
70 of elongated strips adapted for rotatable movement about axes placed in a row, one side of each strip being of poorer sound reflecting material than the other side of said
75 strip, and means for simultaneously producing the same inclination of all of the sides of the strips having poorer reflecting qualities, said inclination being with respect to the direction of the passage of sounds
80 through said chamber.

58. In combination, a surrounding wall forming a resonance chamber and tone modifying means within the chamber, including a plurality of connected elongated
85 supports adapted for rotatable movement, and oppositely disposed strips secured at opposite sides of said supports, one set of said strips having layers of tone softening material, such as felt.
90

59. In a resonance chamber, a plurality of elongated strips adapted for rotatable movement about axes in a row, one side of each strip being of poorer sound reflecting material than the other side of said strip,
95 said strips being constructed and arranged whereby to form in one position of rotation a substantially imperforate wall.

60. In combination, a sound amplifying device having therein an adjustable side
100 wall, and a motor for adjusting said wall.

61. In combination, a sound amplifying device, oppositely disposed means within said device for varying the travel of sound
105 within said device, and a motor for actuating said means.

62. In combination, a sound amplifying device having end openings, and means within said device at points spaced from said openings to vary the resonance properties of said device, and an automatic control for said means.
110

63. In a machine of the character described, a resonance chamber, one of the walls of said chamber having a lengthwise
115 adjustable felted surface.

64. In a machine of the character described, a resonance chamber, one of the walls of said chamber having separated strips of felt, and a lengthwise adjustable
120 series of felted strips cooperating with the first mentioned strips.

65. In a device of the character described, a sound modifying device including adjustable sound absorbing surfaces, and means
125 for adjusting said surfaces to vary the exposure thereof to sounds passing through the device, and pneumatic means for operating said means.

66. In a device of the character described, 130

a sound modifying device including adjustable sound absorbing surfaces, and means for adjusting said surfaces to vary the exposure thereof to sounds passing through the device, pneumatic means for operating said means, and a motor drive for said pneumatic means.

67. In a sound controlling device, including a record element, an adjustable surface, and means acting under the control of the record element to adjust said surface to vary the reflections of sounds passing through said device.

68. In combination, a sound amplifying device, and adjustable means disposed on opposite sides of the axis of said device for

deflecting in a direction away from said axis part of the sound waves passing through said device.

69. In combination, a resonance chamber, adjustable means therefor, a disk having a guide groove therein, means for rotating said disk, and controlling means for said adjustable means adapted to engage said guide groove.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

CHARLES M. HECK.

Witnesses:

J. D. BRISBALLE,
JOHN D. BERRY.