Aug. 21, 1928. 1,681,208

F. D. ARNOLD

COMBINED AMPLIFYING MEGAPHONE AND REFLEX RESONATOR FOR SOUND EMITTING MACHINES

Filed Jan. 22, 1926 2 Sheets-Sheet 1

Fig. 1.

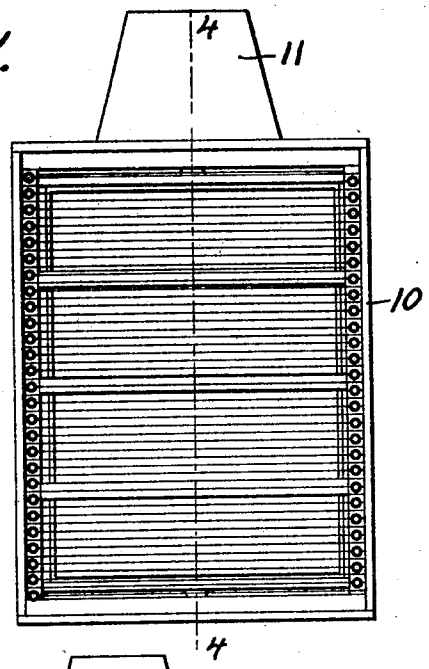
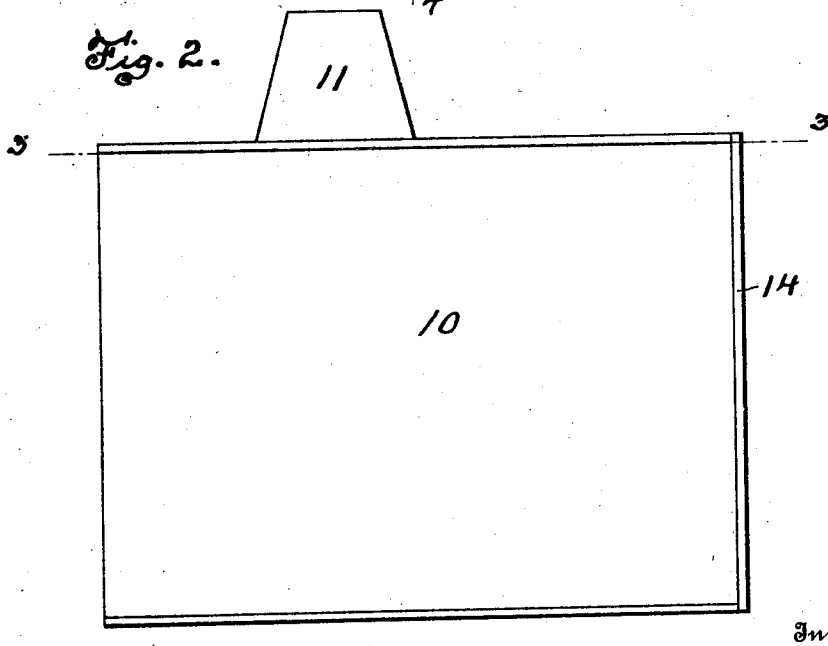


Fig. 2.



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Fig. 3.

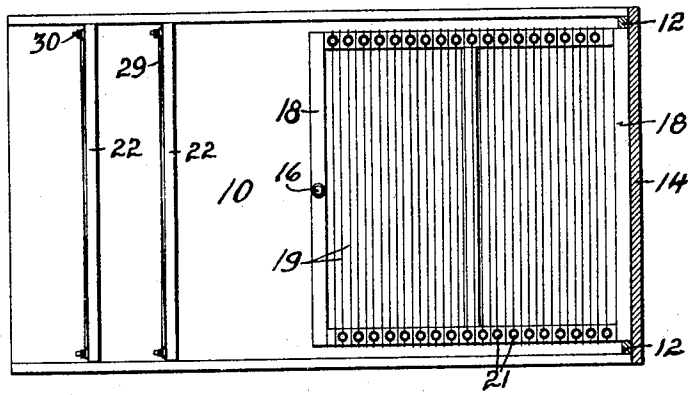


Fig. 4.

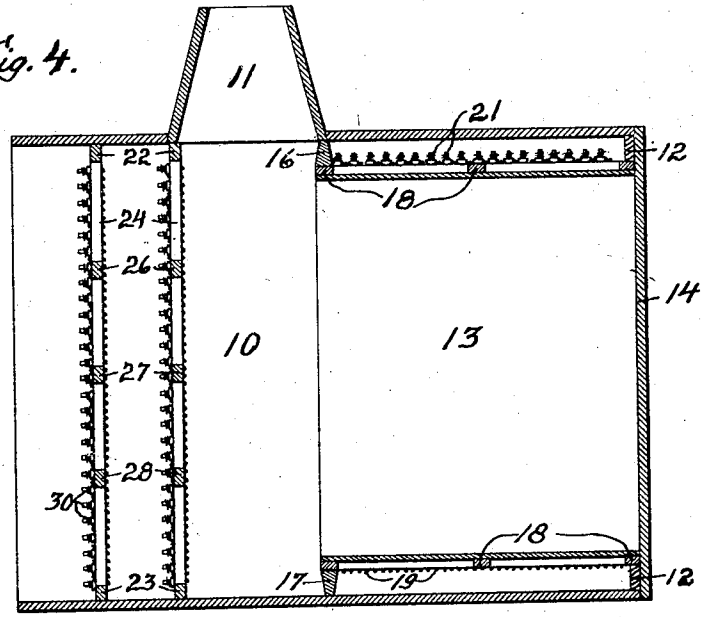


Fig. 6.

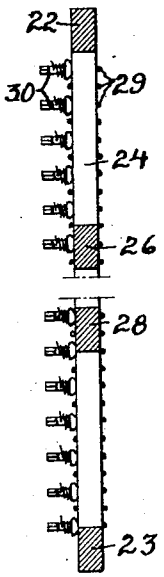


Fig. 5.

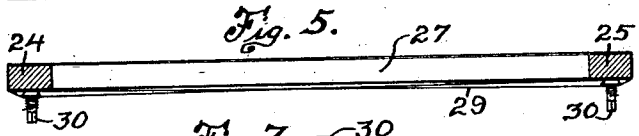
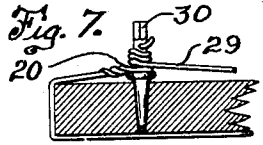


Fig. 7.



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Patented Aug. 21, 1928. 1,681,208

UNITED STATES PATENT OFFICE.

FRANK D. ARNOLD, OF HUMBOLDT, IOWA.

COMBINED AMPLIFYING MEGAPHONE AND REFLEX RESONATOR FOR SOUND-EMITTING MACHINES.

Application filed January 22, 1926. Serial No. 82,997.

An object of this invention is to provide means for amplifying, reflecting and resonating sounds emitted from a machine.

A further object of this invention is to provide means for reflecting and resonating sound to and through an amplifying device.

A further object of this invention is to provide means for receiving sound from a machine between a reflecting and resonating device and an amplifying device.

A further object of this invention is to provide an improved construction for an amplifying device.

A further object of this invention is to provide an improved construction for a secondary or supplemental amplifying and resonating device adapted to be used with a primary amplifying device in the treatment of sounds emanating from a machine.

A further object of this invention is to provide improved means for receiving sounds, emanating from a machine, within an amplifying device.

A further object of this invention is to provide an improved construction for a secondary or supplemental amplifying, reflecting and resonating device adapted to be used with a primary amplifying and resonating device in the treatment of sounds emanating from a machine.

My invention consists in the construction, arrangement and combination of elements hereinafter set forth, pointed out in the claims and illustrated by the accompanying drawing in which—

Figure 1 is a front elevation of the complete machine. Figure 2 is a side elevation of the same. Figure 3 is a horizontal section on the indicated line 3—3 of Figure 2. Figure 4 is a vertical section on the indicated line 4—4 of Figure 1. Figure 5 is a detail cross-section of one of the harps employed in the machine, on an enlarged scale. Figure 6 is a detail vertical section of one of the harps employed in the machine, on an enlarged scale. Figure 7 is a detail plane of a portion of the device illustrating the means employed to control the strings or wires.

In the construction of the machine as shown, the numeral 10 designates a housing consisting of a bottom, top, and two side walls rigidly connected, substantially rectangular in form open at its front and back and made of suitable material such as wood. The housing may be of any suitable dimensions but, for convenience, is illustrated as of a height one-third greater than its width and of a depth one-third greater than the height. An oblong hole is formed in the top of the housing 10, one side margin thereof being located substantially on the median line of said top, and a receiving device or throat member, 11, of truncated pyramidal form, is mounted on said top with its larger base opening registering with said hole. The upper, smaller opening of the receiving device or throat member is adapted to be surmounted by and receive sound from the tone-bar of a phonograph, graphophone or other sound emitting machine or instrument. The receiving device or throat member 11 preferably is made of wood and of hollow form and the rear margin thereof is spaced from the rear margin of the top of the housing a distance substantially equal to one-fourth the depth of said housing. A reinforcing strip or rim 12, preferably made of wood, is mounted on and fixed to the inner faces of the sides, top and bottom of the housing 10. A plurality of harps are mounted in and fitted snugly to the walls, top and bottom of the housing 10.

A supplemental device is constructed and arranged for use in and with the housing 10, comprising a minor housing 13 having a bottom, a top, side walls and a rear wall, or back-plate 14. The minor housing 13 is of less height and width than the housing 10 and is adapted to telescope loosely therein at the rear of the hole opening from the throat member 11. The minor housing 13 is spaced from the top, bottom and walls of the housing 10 by the rim or strip 12. The back plate 14 is of greater height and width than the minor housing 13, is rigidly secured thereto and is adapted to over-lay the rear margin of the housing 10 and be fixed, preferably by screws, to the strip or rim 12. Sound-posts 16, 17 are fixed to and extend in alinement in opposite directions from the central portion of the inner marginal portions of the top and bottom, respectively, of the minor housing 13 and are adapted to engage inner surfaces of the top and bottom respectively of the primary housing 10. The side walls, top and bottom of the minor housing 13 are rigidly joined together and are overlaid by and secured to outer frames

18 of wood so that the inner surfaces of the walls, top, bottom and back-plate shall be plane and smooth. A plurality of strings 19 are mounted in embracing relation on the frames 18 of the minor housing, independent of each other, and extend wholly around and not across the opening defined by the top, bottom, and side walls thereof of said housing. One end of each string is formed with a loop 20 which embraces a tuning pin 21 seated in the usual manner in one end portion of the top frame 18 of the minor housing 13 and the opposite end portion of said string is extended through and is adapted to be wound on said tuning pin in a common manner. The tuning pins 21 for successive strings 19 are arranged alternately at opposite ends of the top frame 18 of housing 13. The strings 19 may be made of any suitable material, such as piano wire, are adapted to be tuned, by stretching through the medium of the tuning pins 21, to desired tones in harmony with the sounds received in the housing, preferably on keys, A, D, E, G, of a musical scale and in harmony therewith so as to compass the range or pitch of sounds received.

Harps constructed as hereinafter described are mounted in number and position as desired transversely of the housing 10 and on the side of the throat member 11 away from the minor housing and similar harps may be positioned within the minor housing if desired.

All of the harps mentioned above are of the same construction and preferably vary only in size and selective tuning. Each harp comprises a top-bar 22, a bottom-bar 23, side-bars 24, 25 and cross-bars 26, 27 and 28, preferably made of wood, framed and rigidly connected. A plurality of strings 29 are wound around the harp transversely and extend across the openings therein substantially parallel with the top, bottom and cross-bars. A plurality of tuning pins 30 are provided in the side-bars 24, 25 in each harp. Each string 29 is formed with a loop on one end adapted to extend around a tuning pin and the opposite end of said string extends through and is adapted to be wound on the same pin whereby the said string may be stretched around the harp transversely and be tuned to the desired tone by said stretching. Alternate strings may be secured and controlled by tuning pins alternately arranged in the side bars 24, 25, respectively.

When the harps are mounted in the housing as shown and the minor housing is mounted in the primary housing as shown and the tone-arm is mounted on the apex of the throat member from the tone-arm into the space between the two inner harps, these sounds are received by the two harps in the minor housing 13 and thence to the strings 19 wound thereon. These sounds are transmitted to the walls, top and bottom of the primary housing 10 through the sound-posts 16, 17 and are reflected from the back plate 16 to the harps in the forward portion of the primary housing. These sounds are transmitted by vibrations of the strings of the foremost harps to the walls, top and bottom of the primary housing and are emitted or discharged from the open front of the primary housing in substantially the same volume and tone and with substantially the same delicacy, shade or timbre originally emanated by the voice or instrument of origin. Careful experiment extending over a considerable period has failed to detect any impairment or diminution in volume, tone or timbre in the use of this machine in receiving, amplifying, reflecting and resonating emanations from sound-emitting machines, as compared with the original sounds transmitted to the receiving machine.

This device or machine is applicable to receiving sets of radio apparatus, telephone and telegraph, both wired and wireless, as well as to phonographs, graphophones, gramophones and the like, and I do not desire to be understood as limiting myself in any particular as to the use or application of this machine, nor to the precise construction and arrangement set forth, since they may be modified within the scope of the appended claims.

I claim as my invention—

1. A combined amplifying megaphone and reflex resonator for sound emitting machines comprising a housing, a receiving device mounted on and communicating thru the top thereof, said receiving device being formed as a truncated pyramid adapted to receive sound at its smaller end, a minor housing mounted in the first housing, a harp surrounding the minor housing, a back plate for said minor housing and a plurality of harps selectively arranged within the first-named housing.

2. A combined amplifying megaphone and reflex resonator for sound emitting machines comprising a housing, a receiving device mounted on and communicating thru the top thereof, said receiving device being formed as a truncated pyramid adapted to receive sound at its smaller end, a minor housing mounted in the first housing, a harp surrounding the minor housing, a back plate for said minor housing and a plurality of harps selectively arranged within the first-named housing, said minor housing being spaced from the inner surface of the first housing, and sound posts fixed to and extending in alignment in opposite directions from the minor housing and engaging inner surfaces of the first-named housing.

3. In a combined amplifying megaphone

and reflex resonator for sound emitting machines, a housing formed with an opening in its top, a receiving device of truncated pyramidal form mounted on said housing and communicating at its larger open end with said opening and adapted to receive sound at its smaller open end and a plurality of independent harps selectively arranged in and transversely of said housing.

4. In a combined amplifying megaphone and reflex resonator for sound emitting machines, a housing formed with an opening at its top, a receiving device of truncated pyramidal form mounted thereon and communicating thru said opening and an independent harp mounted transversely of and substantially filling the width and height of said housing.

5. In a combined amplifying megaphone and reflex resonator for sound emitting machines, a housing, a harp formed on and covering the sides, bottom and top thereof and a back plate for said housing, together with a sound-receiving device adjacent and in position to introduce sound into the open end of said housing.

6. In a combined amplifying megaphone and reflex resonator for sound emitting machines, a housing formed with frames on its top, bottom and sides and a back plate extending across the housing and across said frames and harps mounted on said frames and surrounding the top, bottom and sides of the housing, together with a sound-receiving device adjacent and in position to introduce sound into the open end of said housing.

7. In a combined amplifying megaphone and reflex resonator for sound emitting machines, a housing having frames on its top, bottom and sides, tuning pins mounted in rows adjacent to angles of said housing, strings fixed at one end each to said housing adjacent to an angle thereof and extending around said frames to and adapted to be wound on said tuning pins, together with a sound-receiving device adjacent and in position to introduce sound into the open end of said housing.

8. In a combined amplifying magaphone and reflex resonator for sound emitting machines, a housing formed with side, top and bottom frames, tuning pins arranged in parallel rows adjacent angles of said housing and strings formed with a loop in one end each adapted to embrace a tuning pin, said strings extending around said frames and having their opposite ends attached to the same tuning pins and adapted to be wound thereon, together with a sound-receiving device adjacent and in position to introduce sound into the open end of said housing.

9. In a combined amplifying megaphone and reflex resonator for sound emitting machines, a housing formed with side, top and bottom frames, tuning pins arranged in parallel rows adjacent angles of said housing and strings formed with a loop in one end each adapted to embrace a tuning pin, said strings extending around said frames and having their opposite ends attached to the same tuning pins and adapted to be wound thereon, alternate strings being attached to pins in alternate rows, together with a sound-receiving device adjacent and in position to introduce sound into the open end of said housing.

10. In a combined amplifying megaphone and reflex resonator for sound emitting machines, a housing formed with side, top and bottom frames, tuning pins arranged in parallel rows adjacent angles of said housing and strings formed with a loop in one end each adapted to embrace a tuning pin, said strings extending around said frames and having their opposite ends attached to the same tuning pins and adapted to be wound thereon, together with a back plate for said housing and sound posts oppositely extending from front members of said top and bottom frames, and a sound-receiving device adjacent and in position to introduce sound into the open end of said housing.

11. In a combined amplifying megaphone and reflex resonator for sound emitting machines, a housing formed with side, top and bottom frames, tuning pins arranged in parallel rows adjacent angles of said housing and strings formed with a loop in one end each adapted to embrace a tuning pin, said strings extending around said frames and having their opposite ends attached to the same tuning pins and adapted to be wound thereon, alternate strings being attached to pins in alternate rows, together with a back plate for said housing and sound posts oppositely extending from front members of said top and bottom frames, and a sound-receiving device adjacent and in position to introduce sound into the open end of said housing.

12. In a combined amplifying megaphone and reflex resonator for sound emitting machines, a housing, a sound-receiving device opening through the top of said housing, a harp adapted to be removably and replaceably mounted in said housing and comprising a frame having a top bar, bottom bar, side bars and cross bars, a plurality of tuning pins mounted in parallel rows in the side bars and a plurality of strings each formed with a loop in one end adapted to extend around a tuning pin, the opposite end of each string being adapted to extend thru and wound on the same pin, said string extending around said side bars conjunctively.

13. In a combined amplifying megaphone and reflex resonator for sound emitting machines, a housing, a sound-receiving device

opening through the top of said housing, a harp adapted to be removably and replaceably mounted in said housing and comprising a frame having a top bar, bottom bar, side bars and cross bars, a plurality of tuning pins mounted in parallel rows in the side bars and a plurality of strings each formed with a loop in one end adapted to extend around a tuning pin, the opposite end of each string being adapted to extend thru and wound on the same pin, said string extending around said side bars conjunctively, alternate strings being attached to pins in alternate rows.

Signed at Humboldt, in the county of Humboldt and State of Iowa, this 25th day of May, 1925.

FRANK D. ARNOLD.