

March 28, 1933.

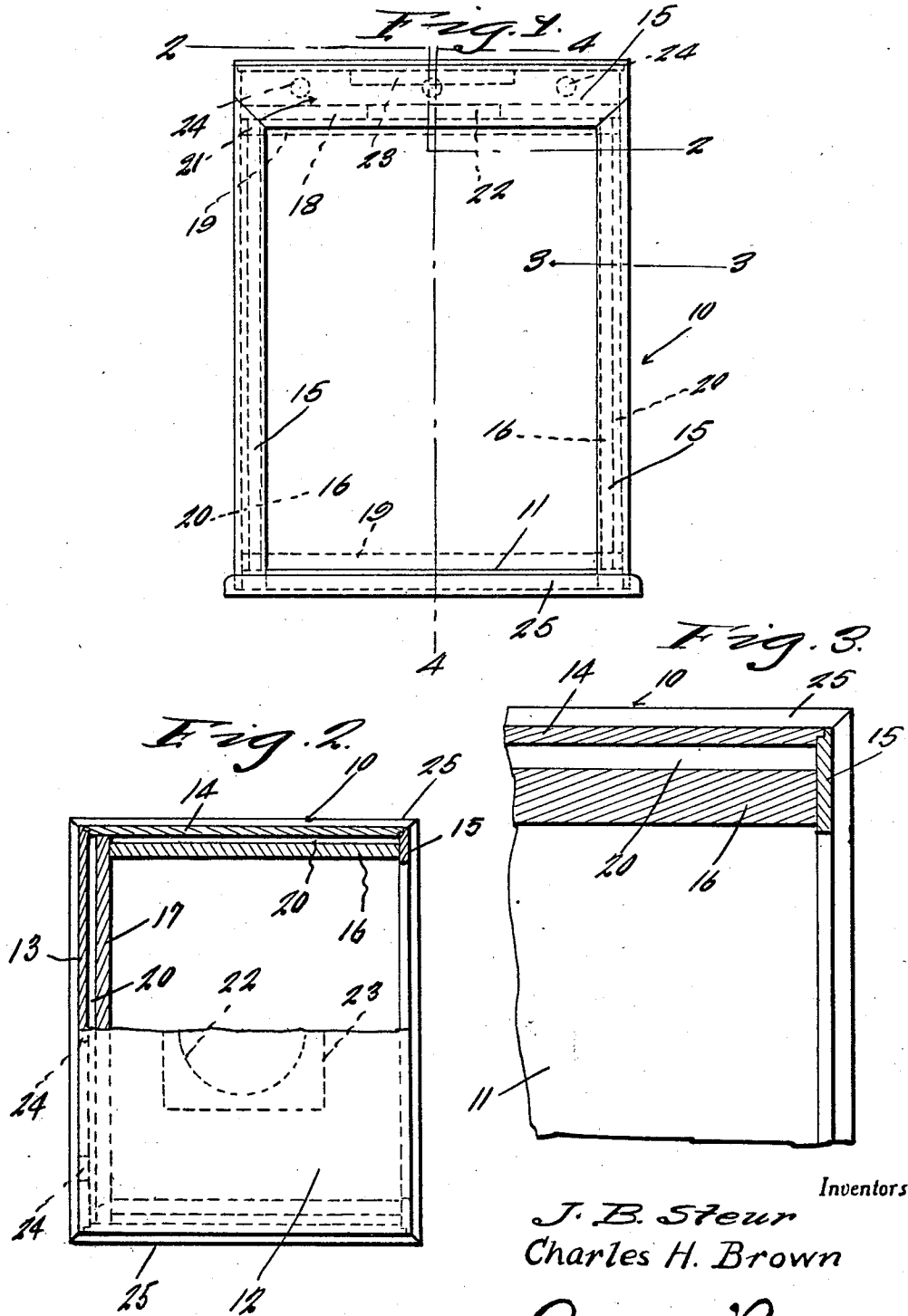
J. B. STEUR ET AL

1,903,201

SOUND MODIFYING DEVICE

Filed Sept. 8, 1932

3 Sheets-Sheet 1



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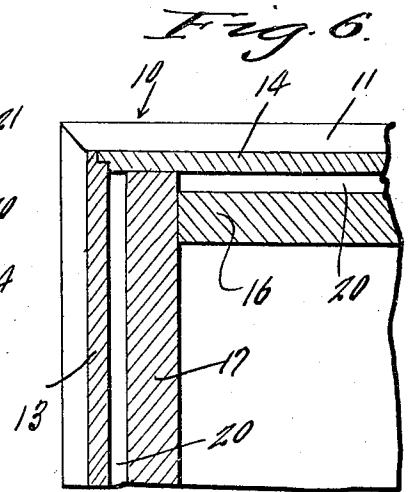
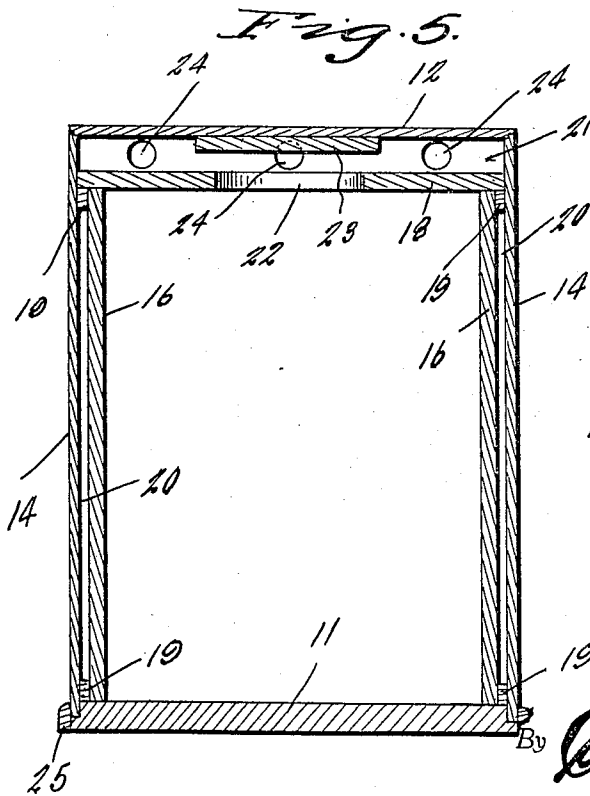
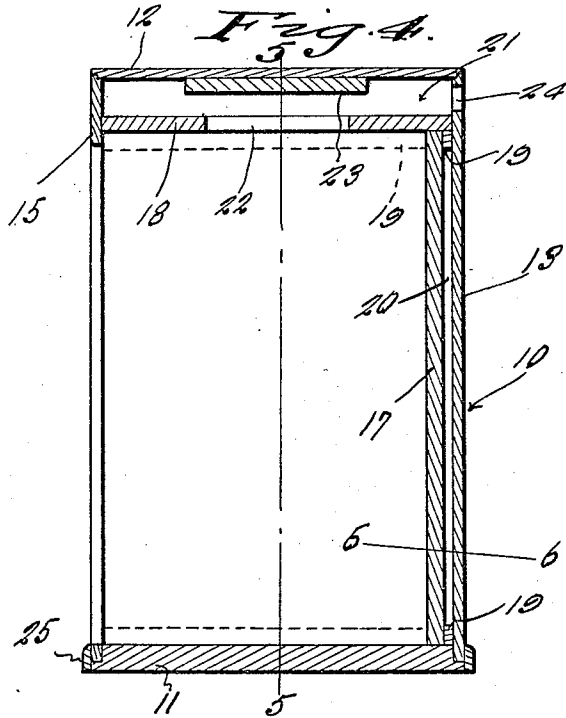
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3 Sheets-Sheet 2



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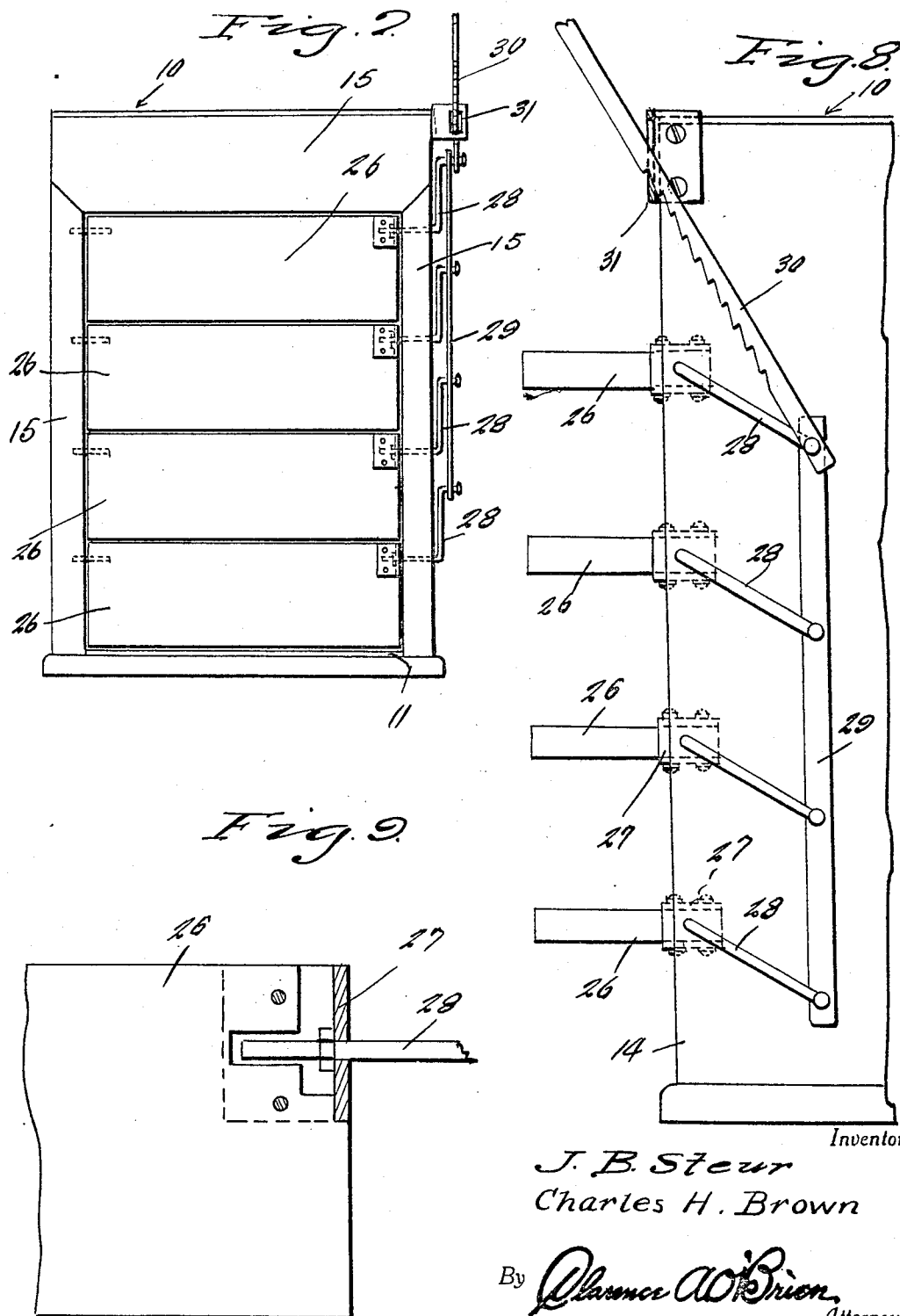
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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

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SOUND MODIFYING DEVICE

Application filed September 8, 1932. Serial No. 632,236.

This invention relates to the broad class of acoustics, and has more specific reference to a portable sound modifying structure destined to correct acoustical defects and to minimize propagation of nerve racking noises.

Stated more explicitly, the inventive conception comprehends the provision of a mechanical structure in the nature of an enclosure internally constructed to trap and absorb excessive vibratory sound waves susceptible of otherwise forming objectionable noises disastrous to the health and longevity of human beings.

During the past few years efficiency engineers and physicists have been making an intensive study of noise disturbances and their effect upon human efficiency, and have been striving to find methods to reduce the noise now prevalent in our offices, stores, and homes. Progress has been made through the perfection of quieter machines, and through the medium of sound absorbing materials applied to the walls and ceilings of rooms in our modern buildings. Both of these methods have proven beneficial in all places where they have been adopted. There are, however, thousands of people still suffering from the effects of noise disturbances, because the cost of insulating rooms with sound absorbing materials has been prohibitive.

With these facts in mind, we have been working to perfect a sound absorbing device which may be applied to each noise making unit, thereby eliminating most of the noise at the source. Reduction of the noise at each machine within a certain area or room would be far more economical than applying sound absorbing material to the walls and ceiling of this same area.

We have designed and perfected a cabinet-like appliance, which is both efficient and inexpensive. This appliance may be adapted to many small machines, and various types of sound transmitting or reproducing instruments.

Other features and advantages of the invention will become more readily apparent from the following description and the accompanying illustrative drawings.

In the drawings:

Figure 1 is a front elevational view of one embodiment of the invention disclosing the structural adaptation of the inventive conception.

Figures 2 and 3 are detail sections taken on the planes of the lines 2—2 and 3—3 respectively of Figure 1.

Figure 4 is a central vertical sectional view taken on the plane of the line 4—4 of Figure 1.

Figure 5 is a section on the plane of the vertical line 5—5 of Figure 4, observing the structure seen in Figure 4 at right angles to said figure.

Figure 6 is an enlarged horizontal detail section on the line 6—6 of Figure 4.

Figure 7 is a front view similar to Figure 1, showing a modification of the front side of the invention, affording a type of structure highly desirable for use in conjunction with radio loud speaker units.

Figure 8 is an enlarged detail view showing the multiple shutter closure and operating means therefor.

Figure 9 is a detail view of one of the shutters or louvres.

Attention is first invited to Figures 1 to 6 inclusive illustrating the structural embodiment of the invention. The invention is broadly in the form of an enclosure of appropriate proportions, being here shown in the nature of a cabinet which is open at its front. The cabinet is generally denoted by the numeral 10 and is illustrated as being of general rectangular configuration in form and embodies a bottom or base 11, a top 12, a rear wall 13, and a pair of duplicate side walls 14. The cabinet is shown as being open at its front and this front is surrounded by a plurality of facing panels 15 forming a frame.

On the interior of the enclosure we provide an insulation lining comprising a pair of side walls 16, a back wall 17, and a top wall 18, the walls 16 and 17 being spaced from the corresponding walls of the cabinet through the medium of spacing blocks 19 defining sound-proof dead air spaces 20.

The top wall is spaced down from the top of the cabinet to define a sound wave trap-

ping and relieving compartment 21. Incidentally, the top liner 18 is formed with a central opening 22 above which is a sound absorbing plate 23. The numerals 24 designate circulating openings designed for ventilation and relief of the trapped sound waves. This chamber 21 is designed to prevent the formation of echoes and undesirable reverberations such as might otherwise occur in a sound-proof box.

The sounds come into this chamber 21 by way of the top opening 22 and are absorbed by the overlying absorption plate or insulator 23. This prevents reflection of undesirable noises and sounds back into the major portion of the cabinet. The numerals 25 merely designate strips of molding at the base of the structure.

This particular style of cabinet is designed to accommodate a desk-type telephone.

The cabinet illustrated in Figures 7 to 9 inclusive is identical to that already described and the same reference characters identify the corresponding parts. The only difference here is that instead of leaving the front of the cabinet entirely open we provide it with an adjustable closure capable of regulating the effective space for the outlet of sound waves. This particular style of structure is for use in connection with radio loud speakers.

It is to be observed that the aforesaid sound escape holes 24 need not be used in this arrangement. The front of the structure is provided with a plurality of panels or shutters 26 hingedly mounted and co-operating in forming a complete closure as shown in Figure 7 or capable of being swung to open position as shown in Figure 8 for regulating the outlet of the sound waves.

The panels are provided with attaching units 27 as shown in Figure 9 to which operating cranks 28 are connected, the cranks being journaled for oscillation in appropriate bearings and connected with a common operating link 29 to permit them to be operated in unison. The actuating rack bar is distinguished by the numeral 30 and connects with the link 29 and is co-operable with an appropriate keeper bracket 31 as shown in Figure 8.

The basic principles of the invention are as follows:

1. A box-like cabinet of wood, metal, composition, or pressed fibrous material. This box has one open face and is of such dimensions as are required to accommodate the machine, or instrument with which it is to be used. Small holes are provided in either the top or the back to serve as ventilators.

2. Between the outer box and the inner lining, we have provided an air space. This space acts as further insulation and increases the efficiency of the inner lining.

3. The inner lining is of sound absorbing materials which have been placed on the two sides, the back, and the top of the box.

There are many of these materials manufactured and sold under various trade names. The most common of these are "Celotex"; "Masonite"; "Insulite" and "Johns Mansville". Any of these brands named, or any other similar material of equal physical properties and within the same price range may and no doubt will be used. However, in our preliminary experimental work, and in the construction of models we have used "Masonite" acoustic board. This material, we believe, is superior to other similar brands. First, since it is manufactured from wood pulp, it is clean and free from objectionable odors. Second, it can be cut easily and the pieces when assembled form straight, tight joints. Third, there is little or no danger of a chemical attraction for insects or rodents. Fourth, it is equal to any of the lower priced materials in sound absorption qualities.

4. The sides and the back of the inner lining are solid pieces with no perforations. The top can be either perforated, or made with a hole of sufficient size to permit sound and heat waves to pass freely through it. Also the air space on top is larger than those on the sides and back. This larger space acts as an echo chamber. We find that without this echo chamber, sounds which are being transmitted become dead, or distorted and unnatural. It is very important that this condition does not exist when the invention is used in connection with telephone, telegraph, or radio instruments, which must have all sounds clear and undistorted if they are to function properly. Any heat or vapor which may be generated by the machines, or instruments within the invention will pass up into the echo chamber and through the ventilators in the outer box.

5. The invention, when used in connection with radio loud speakers, will have an adjustable door on the front face so that the loud speaker may be regulated to the room in which it is being used. We believe that the invention will eliminate many of the distortions, an excessive vibrations which now exist in radio receiving sets.

An invention of this type may be used in connection with standard wall-type pay station telephones and in fact may be embodied in a complete public telephone booth itself. Not only does it increase the clarity of a speaker's voice, but also reduces the effect of disturbances which surround the instrument to a minimum.

The invention is usable in other fields of endeavor such as for example, as a housing for telegraph transmitting or receiving instruments, modern office machines, various types of small motors, electric refrigeration units, radio microphones and the like. Such

a wide field of usage will obviously make it necessary to utilize different sizes in the construction, but the basic principle remains the same.

5 It is thought from the foregoing description that the advantages and novel features of the invention will be readily apparent. It is to be understood that changes may be made in the construction and in the combination
10 and arrangement of the several parts provided that such changes fall within the scope of the appended claims.

We claim:

1. A sound modifying and noise minimizing device of the class described comprising a substantially open front enclosure, an interior lining for said enclosure including a plurality of sound deadening walls attached to corresponding walls of the enclosure and spaced therefrom, the top wall of the lining being spaced from the top of the enclosure and formed with a central opening to define a sound trapping chamber, said chamber being provided with air circulation and sound wave relief holes.

2. A sound modifying and noise minimizing device of the class described comprising a substantially open front enclosure, an interior lining for said enclosure including a plurality of sound deadening walls attached to corresponding walls of the enclosure and spaced therefrom, the top wall of the lining being spaced from the top of the enclosure and formed with a central opening to define a sound trapping chamber, said chamber being provided with air circulation and sound wave relief holes, the underside of the top of said enclosure being formed directly over said first-named opening with a non-reflective plate for the purposes described.

3. In a structure of the class described, a cabinet-like enclosure comprising a base, a top, a plurality of connective walls including a backwall and a pair of spaced parallel side walls joined together in cabinet forming relationship, the front of said cabinet being practically open, sound deadening lining means on the interior of said cabinet embodying a back wall and a pair of side walls attached by spacing elements to the corresponding walls of the cabinet to form dead air spaces, and a top liner spaced downwardly from the top of the cabinet and provided with a central sound wave entrance opening, a sound deadening plate attached to the underside of the top of the cabinet directly above said opening, the upper portion of the rear wall of said cabinet being formed with a plurality of sound wave discharge and air circulating holes in registry with said space.

4. In a structure of the class described, a cabinet-like enclosure comprising a base, a top, a plurality of connective walls including a backwall and a pair of spaced parallel side walls joined together in cabinet forming re-

lationship, the front of said cabinet being practically open, sound deadening lining means on the interior of said cabinet embodying a back wall and a pair of side walls attached by spacing elements to the corresponding walls of the cabinet to form dead air spaces, and a top liner spaced downwardly from the top of the cabinet and provided with a central sound wave entrance opening, a sound deadening plate attached to the underside of the top of the cabinet directly above said opening, the upper portion of the rear wall of said cabinet being formed with a plurality of sound wave discharge and air circulating holes in registry with said space, and a plurality of panels hingedly mounted in the front opening of said cabinet, together with regulating and operating means therefor, said panels serving as adjusting shutters for regulating the effective discharge of sound waves emanating from said cabinet.

5. A sound-modifying and noise minimizing device of the class described comprising a casing opened at one side, an interior lining for the casing including a plurality of sound deadening walls attached to corresponding walls of the casing and spaced therefrom, the top wall of the lining being spaced from the top of the casing and formed with a central opening to define a sound trapping chamber, and a closure for the open side of the casing including a plurality of hinged panels, and means engaged therewith for securing the panels at the desired adjustment for regulating the effective discharge of sound waves emanating from said cabinet.

In testimony whereof we affix our signatures.

JACQUES B. STEUR.
CHARLES H. BROWN.