Jan. 10, 1950 S. E. LEVY 2,494,134

REENTRANT HORN ASSEMBLY

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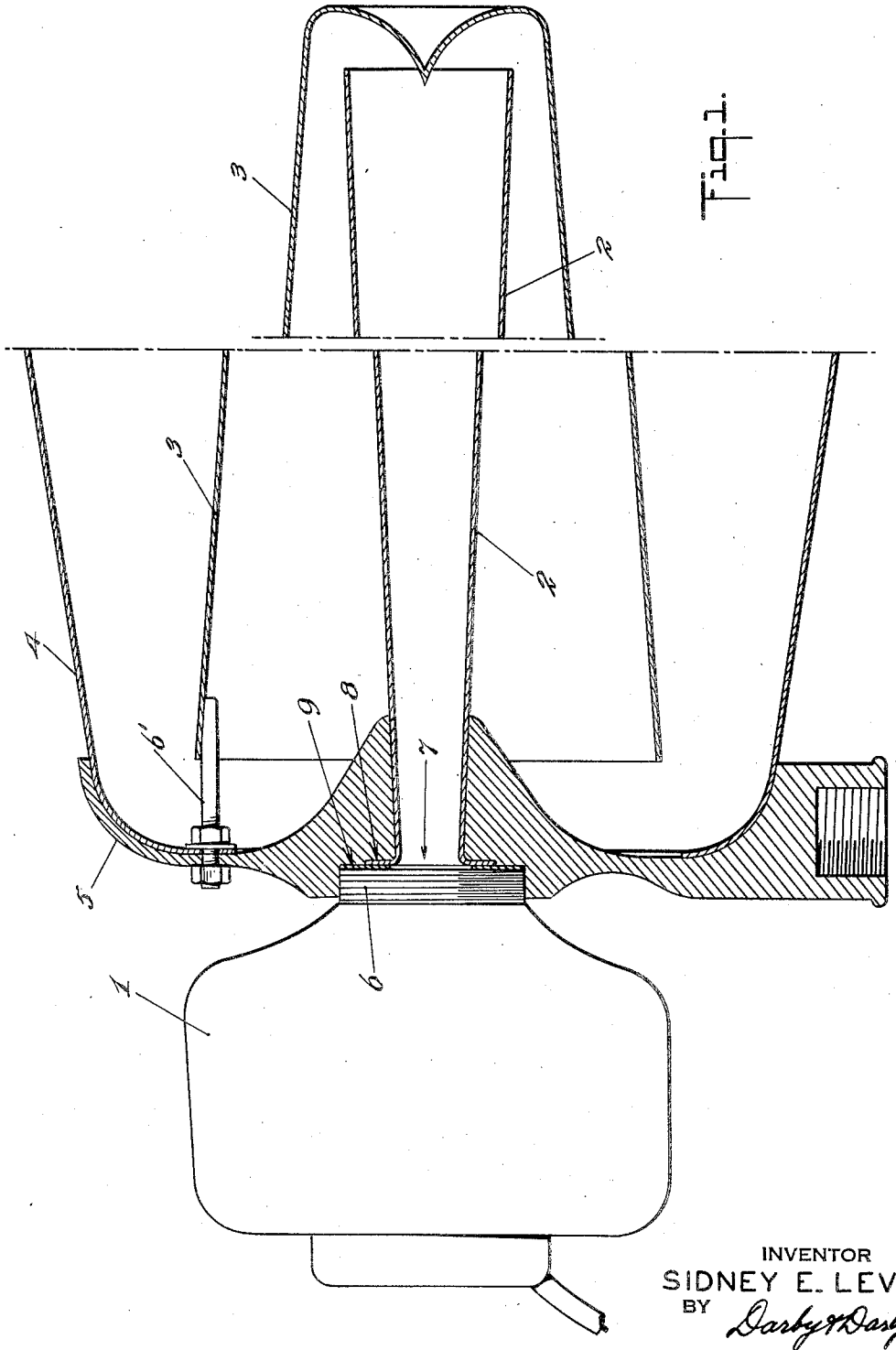


Fig. 1.

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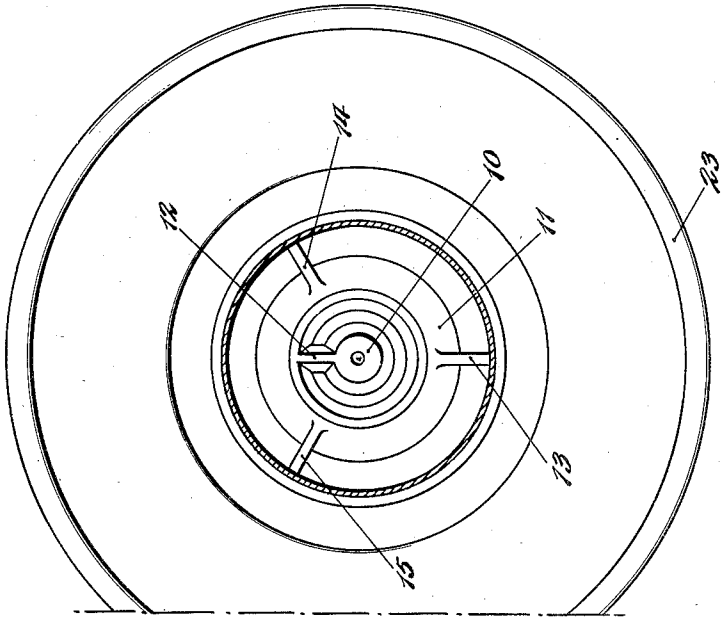


Fig. 2.

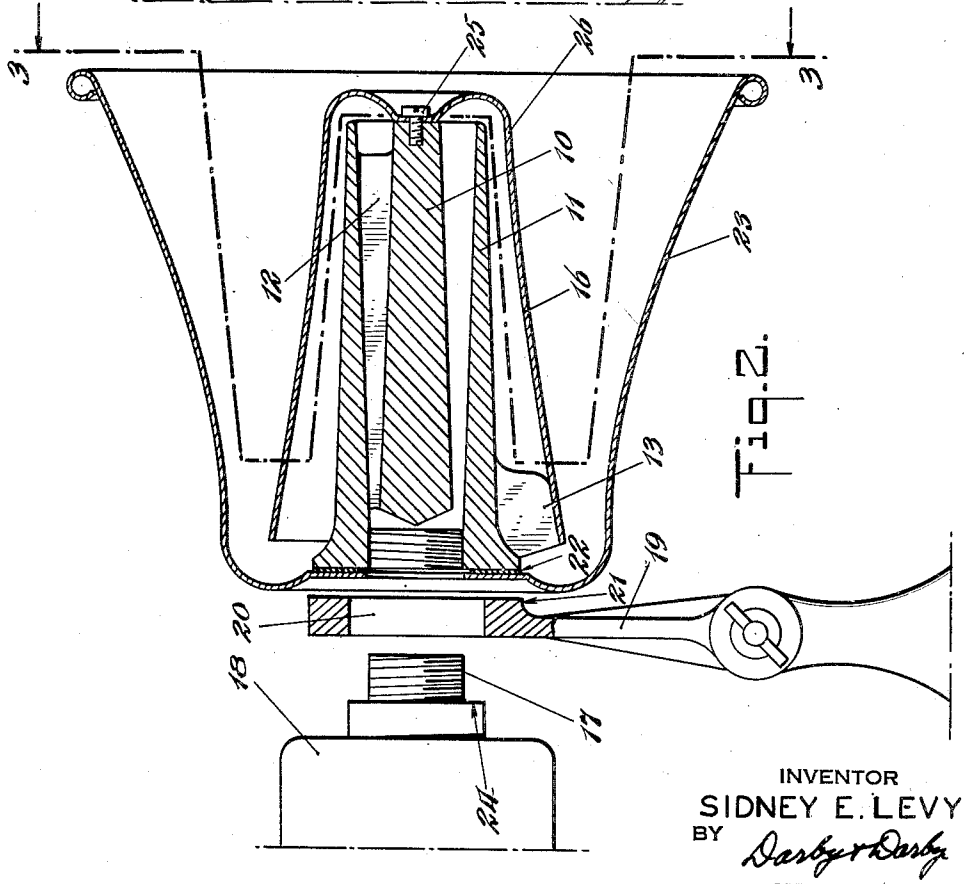


Fig. 2.

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Fig. 5.

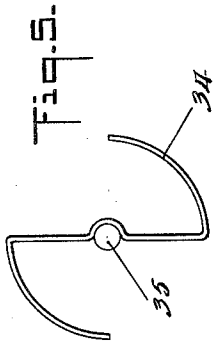


Fig. 4.

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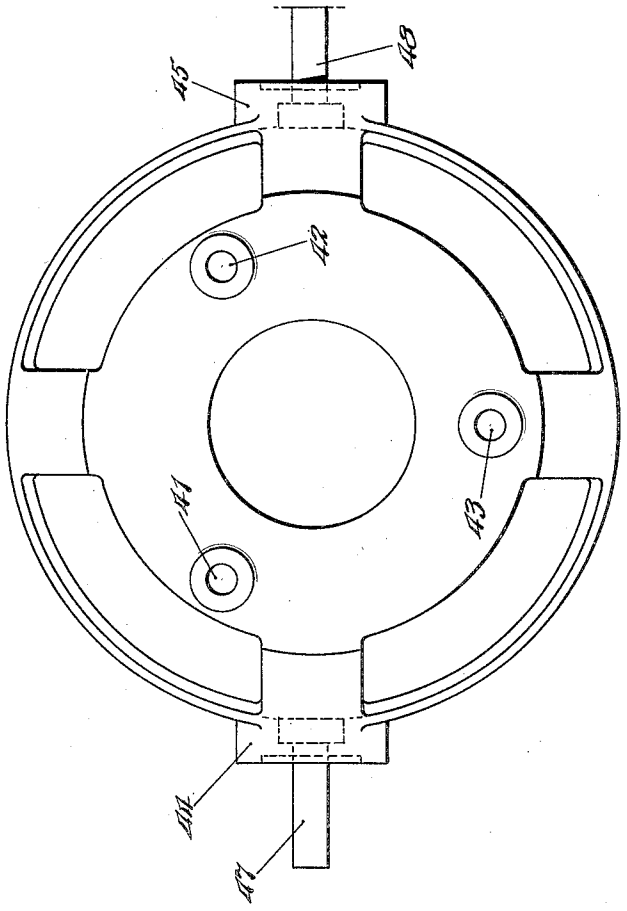


Fig. 7.

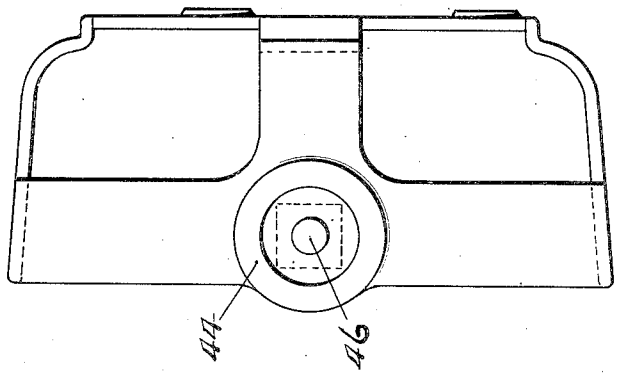


Fig. 6.

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UNITED STATES PATENT OFFICE

2,494,134

REENTRANT HORN ASSEMBLY

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Application May 2, 1946, Serial No. 666,586

2 Claims. (Cl. 181—27)

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The object of my invention is to provide a loud speaker of the reflex air column horn design in which there are fewer parts, there is less machining necessary with no sacrifice of precision, and in which assembly is facilitated and performance improved.

A feature of my invention is the provision of a cylindrical plug having therein a tone arm and to which a driving unit, reflector, bell and mounting bracket may all be secured.

Another feature of my invention is the prosision of such a cylindrical plug permitting a bell section, and also a mounting bracket if desired, to be assembled in a loud speaker by compression between a shoulder of the driving unit and the bottom of a sleeve which is unitary with such plug.

Another feature of my invention is the provision of such a plug to which a reflector may be attached by simple means.

Another feature of my invention is the provision of a mounting unit to which a tone arm, reflector, driving unit and bell may all be secured.

Another feature of my invention is the provision of a mounting basket which will serve to secure a bell section to a mounting unit and which provides for the simple and economical attachment of a mounting bracket.

In the drawings—

Figure 1 is a view partly in section of a reflex air column loud speaker of conventional type which is used for the purpose of explanation;

Figure 2 is a view partly in section of a reflex air column loud speaker of small size in accordance with the present invention;

Figure 3 is a section along the lines 3—3 of Figure 2;

Figure 4 is a view partly in section of a reflex air column loud speaker in accordance with my invention, of larger size than that shown in Figure 2;

Figure 5 is a view of a detail of the structure of Figure 4;

Figure 6 is a side view of a basket which may be substituted for the basket 37 of Figure 4; and

Figure 7 is a plan view of the basket of Figure 6.

In a reflex air column loud speaker the parts, as is well known, must be made and assembled with high precision, if a good acoustic result is to be obtained. In Figure 1 the conventional unit there shown comprises a driving unit 1, a tone arm 2, a reflector 3, a bell section 4, and a mounting flange 5 having mounted therein studs 6 to retain and position the reflector 3. The mounting flange 5 has therein a tapped opening within which is screwed the threaded projection 6 of the driving unit 1. It is necessary to provide on the mounting flange 5 a shoulder at the interior end of the tapped opening against

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which the end of the driving unit presses tightly to make an air tight fit between the tone arm 2 and the driving unit 1 at the throat 7 of the tone arm. The tone arm is commonly force fitted into the mounting flange and its end spun over into the shoulder 8.

In Figure 2 the loud speaker of my invention has a cylindrical plug 10 which is integral with a sleeve 11, defining a tone arm between the plug and sleeve. The plug and sleeve are preferably made as a single unitary piece, for example by an attachment 12 which is a part of the casting. Also part of the casting are three ears 13, 14 and 15 (see also Fig. 3) which support and position the reflector 16. The sleeve 11 is tapped as shown to permit screwing into position the threaded throat 17 of a driving unit 18. A mounting bracket 19 may be used which has an opening 20 and a shoulder 21.

In assembling the unit a washer 22 may be placed on the sleeve 11, the bell section 23 placed in position as shown, the mounting bracket 19 placed against the bell section 23 in the position as indicated in the drawing, and the driving unit 18 screwed into position within the sleeve 11. A shoulder 24 on the driving unit will then engage the shoulder 21 on the mounting bracket pressing it firmly into position against the bell 23 and holding the mounting bracket, tone arm, and bell all securely together.

The plug 10 has in its upper end a tapped opening within which may be screwed a bolt 25 to hold a reflector 26 in position. This completes the assembly.

It is to be noted that the assembly of the complete unit, including a mounting bracket therefor, involves only placing the parts in proper position and screwing the driving unit 18 and bolt 25 into place.

It is to be further noted that the plug 10 permits the sleeve 11 to be considerably larger at its lower end than is the lower end or shoulder 7 of the tone arm 2 in Figure 1 without, however, increasing the area of the air column at this point. It is therefore possible with my invention to eliminate a press fit between the throat of the driving unit and a mounting member, as in Figure 1, and, instead, to provide pressure between a shoulder 24 on the driving unit and the sleeve 11 to assure an airtight junction with the throat of the air column.

It will also be noted that my construction provides a more rapidly expanding air column conduit for the tone arm without increasing the volume of air more rapidly than the cut-off frequency dictates. Such construction permits the bending of this type of air column in a shorter plane than would be permissible without the plug 10, giving the advantage of minimizing phase cancellation at the higher frequencies. As the

plug 10 is a heavy rigid structure the reflector 26 is positively retained in fixed position with great accuracy, thus improving the acoustical performance.

Because of the loss of quality which is occasioned by any minute variation in the position of the parts of a loud speaker assembly it has heretofore been necessary to assemble a reflex air column type of speaker completely at the factory before shipping it to assure accurate positioning of the parts. This is not only an expensive procedure but also requires very elaborate and expensive packaging to avoid shocks in transit. With the loud speakers of my invention as disclosed herein, the assembly is so simple and the positioning of the parts is so accurate and sure that the parts may be assembled by anyone without the necessity for any final adjustment. It is therefore possible to ship my loud speakers knocked down and assemble them with unskilled personnel after delivery, thus effecting large savings.

In Figures 4 and 5 I have shown a construction which may be used for a larger size of loud speaker than that of Figures 2 and 3 in which many of the advantages are retained. Speakers of the size referred to are those which are too large for a plug such as plug 10 of Figure 2 to be practicable because of its size and weight.

In Figure 4 there is a driving unit 27, a mounting member 28, a tone arm 29, a reflector 30, and a bell 31. The mounting member 28 has a tapped opening within which is screwed a driving unit holding the flange end of the tone arm 29 securely between the driving unit and a washer 32. The mounting member 28 has three projections 33 for holding and positioning the reflector 30. Within the upper end of the tone arm 29 is a spider 34 (see also Fig. 5) rigidly secured thereto as by welding. The spider 34 has a bolt 35 affixed thereto as by welding. A cap 36, which may be a casting with a tapped opening therein, may be screwed into position on the bolt 35 fixedly positioning the tone arm, reflector and cap with respect to one another, rigidly holding the reflector in position. The cap 36 will have its interior surface accurately made and finished to provide the exact dimensions necessary for reflecting the sound wave from the tone arm into the reflector. This is one of the most critical dimensions in a reflex air column loud speaker and the provision of the cap 36 which accurately and rigidly positions the members and holds them in fixed position makes it possible in this construction, as in the construction of Figure 4, again to ship the unit knocked down and assemble it upon delivery.

A basket 37 has therein three holes through which bolts 38 may be projected for threaded engagement with the mounting unit 28 to hold the bell 31 in position by pressure between the basket 37 and the mounting member 28. An ear having therein a hole 39, and a tapped opening 40 may be provided for mounting the unit as may be desired.

In Figures 6 and 7 I have illustrated a form of basket which may be substituted for the basket 37 of Figure 4. This basket has three holes 41, 42 and 43 through which the bolts 38 may be passed for threaded engagement with the mounting unit 28 to hold the bell 31 in position. The

basket also has projections 44 and 45 with holes therein such as 46, within which two bolts 47 and 48 may be placed before the basket is placed in position in the assembly of the unit. These bolts 47 and 48 then provide mounting members on which a bracket may be mounted for supporting the unit in any desired position.

The use of a basket such as that shown in Figure 4 or in Figures 6 and 7 eliminates the drilling of three holes in the bell as in Figure 1. The holes 41, 42, 43, Figure 7, may be cast therein. The basket of Figures 6 and 7 also avoids the necessity of drilling two holes for mounting as is required in the case of the basket of Figure 4. It also permits the use of a U-shaped bracket for mounting without any drilling in the basket as the holes 46 may be cast therein.

It will be obvious to those skilled in the art that my invention is capable of various modifications and I do not desire therefore to be restricted to the particular details shown and described but only within the scope of the appended claims.

What is claimed is:

1. A doubly folded loudspeaker comprising a tone arm consisting of a generally cylindrical sleeve, a plug within said sleeve and integral therewith, a sound reflecting member encompassing said sleeve, said reflecting member being secured to said plug at one end thereof, said sleeve being threaded at its opposite end and receiving a driver unit, a bell member for reflecting sound from said reflector, said bell member having an open mouth at the end opposite said driver unit and an aperture in the end adjacent said driver unit, and a shoulder on said driver unit, said shoulder serving to secure said bell member rigidly between said sleeve and said driver unit.

2. A doubly folded loudspeaker comprising a tone arm consisting of a generally cylindrical sleeve, a plug within said sleeve and integral therewith, a sound reflector having a closed end secured to said plug at one end thereof, said reflector substantially encompassing said sleeve, a driver unit, said unit being threadedly mounted in the end of said sleeve opposite the point of securing said reflector to said plug, a shoulder on said driver unit, a bell member for reflecting sound from said reflector, said bell member encompassing said reflector and being open adjacent the closed end of said reflector, said bell member having an aperture in its opposite closed end, and a mounting bracket having an aperture therein, said bell member and said mounting bracket being rigidly held in position between said shoulder and said sleeve upon assembly of said driver unit with the threaded end thereof extending through said bell and bracket apertures.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,597,611	Mazanek	Aug. 24, 1926
1,625,325	MaCartney et al.	Apr. 19, 1927
1,628,010	Taylor	May 10, 1927
1,727,105	Hawley	Sept. 3, 1929
1,772,645	Steven	Aug. 12, 1930
2,194,070	Giannini	Mar. 19, 1940