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3,621,749

SOUND PROJECTOR HORN AND SINGLE HEAD DRUM COMBINATION

Filed June 18, 1970

2 Sheets-Sheet 1

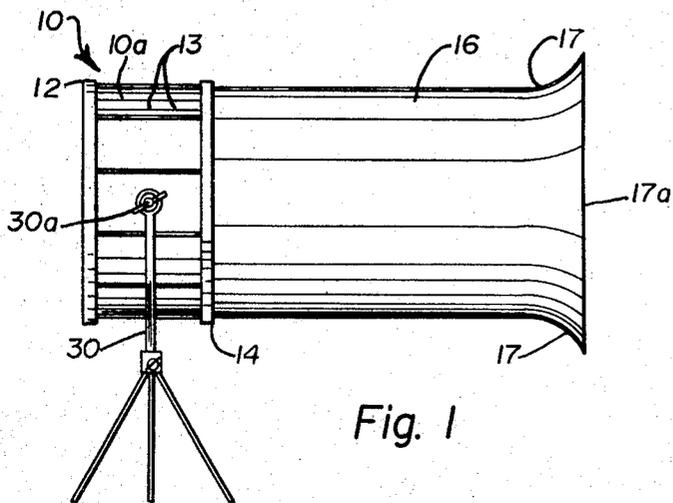


Fig. 1

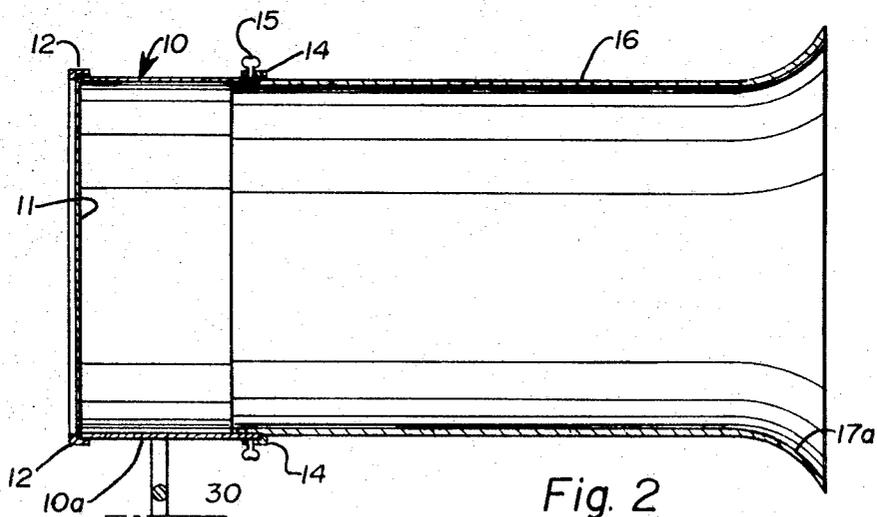


Fig. 2

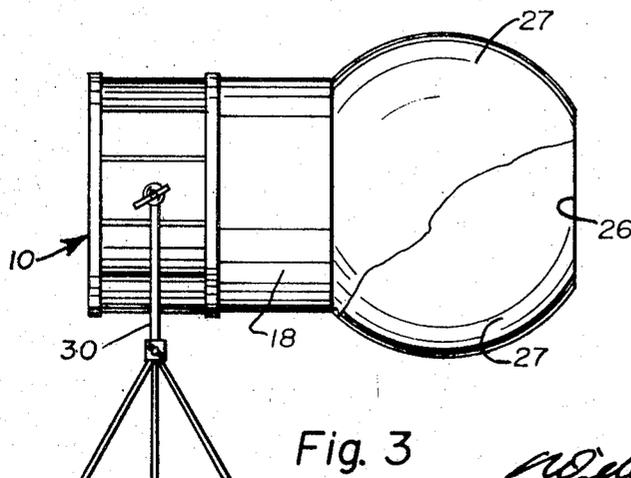


Fig. 3

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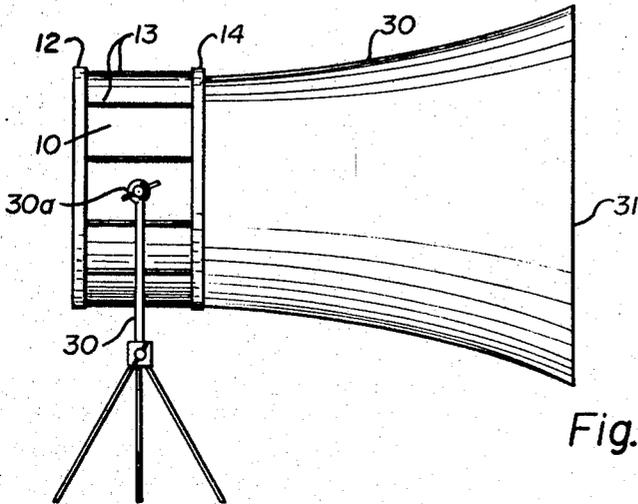


Fig. 4

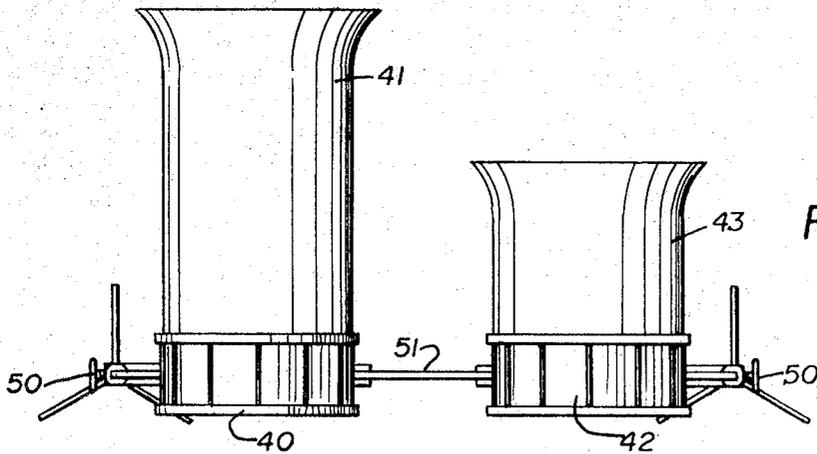


Fig. 5

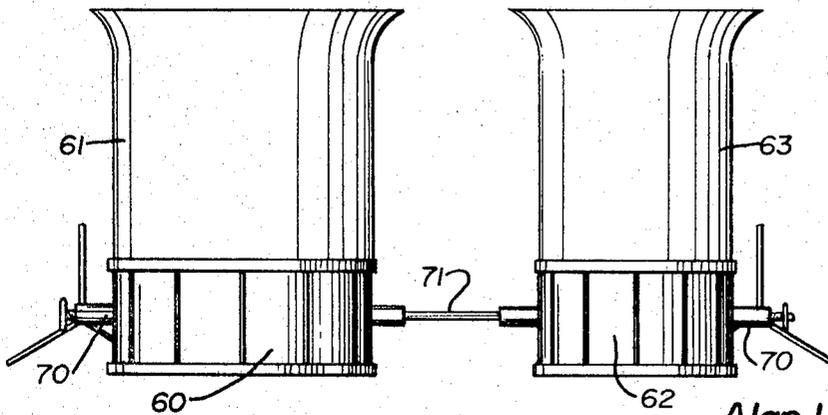


Fig. 6

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SOUND PROJECTOR HORN AND SINGLE HEAD DRUM COMBINATION

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18 Claims

ABSTRACT OF THE DISCLOSURE

A drum having a tubular-like shell with a vibratable head over an open end thereof and having another open end with a sound projecting horn thereon.

This invention relates to musical instruments, and more particularly to an orchestral drum and of the type known as tom-tom.

Musical drums have been known for a very long time. Generally, a drum structure comprises a vibratable vellum or parchment skin stretched over the opening of a tubular-like or resonant cavity, such as a cylinder of wood or a bowl-shaped metallic vessel. There are various kinds of drums. The bass drum or long drum consists of two heads oppositely disposed, and it is held laterally and played both ends. The bass drum is used principally to mark time and also to augment the fortes. The tone of a bass drum is obtained mainly by constructing a drum of large diameter or head size and of such depth as produces a bass sound. The tonal quality, to a large extent, is governed by the depth of the drum, meaning long drums produce deep tones, whereas short drums produce sharp tones. Another kind of drum is the "side-drum" which has two oppositely disposed heads which are generally smaller in diameter than bass drum heads. The upper head is played on by sticks and the lower head occasionally has strings of catgut or wire stretched across its surface. Popularly, such a drum, having strings of catgut across its lower face, is referred to as a "snare" drum. Another well-known drum is the tom-tom. This drum usually contains a relatively small head and a long cavity in order to simulate the sound of the Indian tom-tom drum.

It is apparent from the foregoing description that various types of drums are well-known, and the tone thereof is dependent principally on the head diameter size and the depth of the resonant cavity.

In orchestral use of certain drums it has been found that the carrying quality of the drum's sound is sometimes insufficient, according to the size of the place where the orchestra is playing and the acoustics thereof. In the case of a tom-tom drum, the sound is usually lost. To overcome that deficiency, I have developed a novel method of directing the sound from such a drum. I remove one of the vibratable vellums or parchment skin heads from one end of the tom-tom drum and at that headless end of the drum shell I mount a tubular sound projector extension, usually in prolongation of the drum shell.

Timbales drums have heretofore been used with only one such vibratable vellum head, but never before has there been, so far as known, a horn-like or megaphone extension extending the tubular shell of the drum from such a headless or open end, for the purpose of thereby directing the sound vibration therefrom in a desired direction. I have found, by the use of my novel sound projector horn extending from the one end of the drum having the head removed, I can mount the drum on a stand so that the horn projection extends horizontally and thereby I am able to project the drum vibration from

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that open or headless end of the drum shell outwardly in a column-like horizontal direction.

It will be understood that the cylindrical or tube-like shell body of a drum is usually constructed of wood or suitable material as a cylinder and with the vibratable drum heads at each end thereof. I provide my novel horn sound projector in extension of the drum cylinder in place of one of those heads and I make my novel horn projector of either a polished fiberglass material or other suitable hard and durable polished surface material.

I usually have the length of my novel horn projector about 1½ to 2 times the diameter of the drum cylindrical shell, so that, in the case of an 8-inch tom-tom drum, the horn extension from the headless end thereof would be about 12 to 16 inches in length and usually as a uniform tubular-like extension of the drum shell. At the end of the horn extension I flare the outer peripheral open end thereof.

The length of my horn, which I provide to direct this sound vibration from the headless end of the drum, is substantially correlated with the pitch of the drum, meaning, that the lower the sound vibration or pitch of the drum the shorter my novel directional horn need be to satisfactorily direct the sound vibration therefrom, and the higher the sound pitch the longer my horn projector may be to satisfactorily direct the sound vibration therefrom.

I usually provide my sound projector horn in the form of a cylindrical tube substantially in prolongation of the cylinder shell-like cylindrical body of the drum. However, it is to be understood, there are times when I would use a megaphone-type of a horn or sound projector at the one headless end of the drum. A megaphone-type sound projector horn, in combination with a drum, results in amplifying the sound vibrations from the drum. By using such a megaphone-type horn sound projector there is an air-type column of sound passage of cross-sectional exponentially derived in the direction of the sound flow and which, in addition to directing the sound flow, substantially greatly amplifies that sound emitting therefrom.

There are times when it is desirous of reducing the sound flow from the headless end of such a drum, and in such an event I have found it desirable to use a reduced sound directional horn in extension from the headless end of the drum. In such a case, I use a mute-like horn when necessary to reduce the sound vibration coming therefrom.

To restate, in the broad aspects of my invention, I use a sound projector horn-like extension at the headless end of a drum, such as a tom-tom drum, and with said extension being either a substantially tube-like or cylindrical extension in prolongation of the drum cylinder or shell and with an outer flared edge at the open outer end of the horn-tube extension, or with said horn extension being in the nature of a flared or megaphone-type extension to amplify the sound as well as direct it therefrom, or with said horn extension designed to reduce the sound coming therefrom in the nature of a mute-like extension.

By either of my novel horn-like sound projector extensions, from such a headless end of such a drum, I am able to project the sound vibration in a straight line from the interior of the drum cylinder in whatever desired direction the sound projector horn may be pointed.

By the use of my novel horn or tube-like sound projector extension, at the side of the cylindrical drum shell from which one vibratable head has been removed, the sound vibrations within the drum shell must pass through my tube before being exposed to the air and thereby resulting in directivity of that sound from and by that tube.

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Drum tones from a bass drum are normally of a very low pitch or frequency and thus are usually considered to be non-directional, with the result that my tube or sound projector horn used with a bass drum would be of comparatively short length and with a larger flared peripheral outer or open end, to accomplish my novel sound projection thereby and therefrom. Whereas, as mentioned, with a smaller drum, such as the tom-tom, the sound waves or pitch therefrom are of a higher frequency and thus more adaptable to be controlled in a column and so I use a comparatively longer horn or tube-like sound projector extension from the headless drum shell and thereof.

The physical phenomenon with relation to my invention is similar to that encountered in woofer-type speakers. It is well-known that if a speaker is permitted to vibrate in the air, with the front side of the diaphragm communicating directly with the back side of the diaphragm, that the tone of the speaker is attenuated to the point where no sound is transmitted and the speaker merely fans the air, because the sound waves at one side of the speaker are out of phase with the sound waves at the other side of the speaker and tend to cancel each other. For that reason, speakers are enclosed in some sort of a box-like enclosure or the front of the speaker must be separated from the back of the speaker by a wall or the like. Referring to my invention, the head of a drum functions in precisely the same manner as a speaker diaphragm. By placing my novel sound-projector horn or tube is of such a length of the drum cylindrical headless end of the shell, that sound projector tube functions in a manner similar to the just mentioned box of the speaker. The length of my novel sound-projector horn or tube is of such a length so that the sound vibrations from the inside of the drum will be in phase with the sound vibrations emanating from the outer face of the one head of the drum opposite the headless end.

It will be seen that, by my novel sound-projector horn extension from the headless ends of two identical drums, with my horns of different lengths but of uniform diameter, that different sound vibrations will be emanated from each.

The column of the air within my novel horn sound projector extension, from the shell of the drum, acts against the one vibratable drum head sound vibrations within the drum cylinder, and the vibrations leaving the open outer end of my horn sound projector can be varied according to the length of the horn at the same time while controlling the direction of those sound vibrations leaving that horn end.

My novel horn sound projector extending from the headless end of the drum must be of a hard polished surface, so as not to absorb the sound frequency vibration but to cause them to be projected therefrom.

From the foregoing general explanation of the difficulties encountered and general purposes to be accomplished it will be seen that a principal object of my invention is to provide a novel sound projector horn extension from the headless or open end of a tubular drum cylinder, so as to direct the sound vibrations thereby and therefrom in the direction and volume as may be desired, over what would be accomplished without said horn projector from the otherwise open or headless end of the drum.

Other and further objects will be apparent to those skilled in the art, from the following detailed explanation and from the drawings, in which:

FIG. 1 is a side view of a tom-tom drum mounted on a stand and having my novel sound projector horn extension from the one headless end thereof;

FIG. 2 is an enlarged vertical cross-sectional view thereof;

FIG. 3 is a view similar to the drum of FIG. 1, but with a different sound projector horn extension from the headless end thereof, in the form of a mute sound projector

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and having a partial vertical sectional view of the mute;

FIG. 4 is a view similar to the tom-tom drum shown in FIG. 1, but with a different or megaphone-type of a sound projector horn extending from the one headless end thereof;

FIG. 5 is a diagrammatical view illustrating how I use a plurality of equal diameter and size tom-tom drums, on a common stand, but with each having a different length sound projector horn extending from the headless end thereof for different sound production from each; and

FIG. 6 is another diagrammatical view of how I use a plurality of tom-tom drums of different size and diameter drum shells but with each having an equal length sound directional horn in combination therewith, for reasons to be explained.

In the preferred embodiment of my invention herein illustrated, I shall explain its use with a conventional tom-tom drum 10. The drum has a cylindrical or tubular body portion 10a, which is usually constructed of hard wood, though there are instances when it is made of other material. The drum usually has two conventional vibratable or vellum spaced apart parallel heads completely enclosing the opposing open ends of the tubular shell, by being clampingly held thereover by spaced parallel clamping rings 12 and 14. It will be understood that the rings are held in place by conventional screw-clamps 13, which draw the rings 12 and 14 together and into the desired tension of the vellum heads. I illustrate one vellum head 11, in FIG. 2, as I have removed the opposing or right-hand head therefrom, so that the drum shell 10a is completely open at the side thereof opposite from the head 11, as illustrated in FIG. 2. I pivotally mount the drum 10 on a horizontally aligned pair of pivots 30a, and so that the open or headless end of the drum shell would be opposite from the drummer, who would be on the side of the drum adjacent the one vibratable head 11 thereof. For better sound emission and directional control of the vibrations emanating from within the drum shell 10, upon the striking of the one vibratable head 11 by the drummer, I insert one of my novel sound directional horns 16 at the headless or open end of shell 13, as illustrated in the FIGS. 1 and 2, being substantially a tubular extension of the drum shell 13 on the side opposite from the head 11. I secure 16 within that end by suitable stud-screw-bolts 15, through the clamping ring 14 at that end on the drum. My novel sound projector tubular horn 16 has its open or outer end 17 flared outwardly. As previously explained, I have found that my novel sound directional horn 16 causes the sound vibrations emanating from within the drum shell 10a to be transmitted in the projected direction of the open end 17a of that horn, for greater sound transmission than would otherwise occur without the use of my novel horn placed in that one open end of the drum. The length of my novel sound projector horn 16, I have found to be substantially sufficiently in tune with the sound vibrations emanating from within the shell 10a, caused by a striking of the one head of the drum, for directional sound transmission by my said horn, if the horn 16 is substantially of a length of approximately 1½ to 2 times that of the diameter of the drum shell 10a in which the horn is inserted at the headless end thereof. However, I do not wish to be limited by that rule, as many variations may be made in the length of my sound projector horn, commensurate with the size of the drum, in terms of diameter and length thereof, as I have endeavored to illustrate in FIGS. 5 and 6, in the use of my straight tubular sound directional horn with a drum.

In FIG. 5, I have illustrated two identical drums, 40 and 42, each similar to the one shown in FIG. 1, upon a common horizontal pivotal axis 50 and 51, on a suitable stand, but with my novel tubular sound projector horn of each being of a different length. I have found in orchestral use that it is advantageous to have a different

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sound vibration and volume in the use of several tom-tom drums. Referring to FIG. 5, sound emanating from drum 40 would carry farther and thus be the louder or sharper in tone vibration, because of the longer sound projector horn 41, upon a striking of the one head of that drum 40, than would be the case upon a striking of the one drum head of the identical drum 42 of that pair, because the sound projector tube 43 leading from the drum 42 would not produce as effective or pronounced sound directional transmission because of 43 being shorter than 41.

Another variation, which I wish to emphasize, in any possible substantially multitudeness combinations of the size that my novel sound projector horn may be, with drums of the type described, I have illustrated in FIG. 6. In that figure, I have mounted two different size drums on a common stand having the horizontal axis 70 and 71, but with identical length sound projector horns coming from each, so that the drummer may alternately strike either drum 60 or 62, and though each has the same length sound projector horn, a different sound pitch and directional sound vibration will emanate from them. The larger drum 60 will produce a lower pitch sound from its horn 61 than will the smaller drum 62 from its horn 63.

As previously mentioned, there may be occasion when it will be desired to amplify the sound dispersal vibrations leaving the open end of the drum, upon the striking of the one head thereof, as in a certain position of a drum in a room which might require a lateral dispersion because of the peculiar position of the orchestra in the room and in such a case I use a megaphone type sound projector horn 30 for sound dispersal in the open or headless end of the tom-tom drum as shown in FIG. 4.

On the other hand, there may be times when it will be desirable to muffle, mute or depress the sound vibrations emanating from the open end of that type of a tom-tom drum, and in those events I have designed a sound directional and transmission horn 18, of FIG. 3, having a restricted or bulb-like outlet 27, in turn having a restricted outer end opening 26. The principle of such a mute-type sound projection is well-known and understood. Briefly, it is that the opposing concave walls of the bulb portion 27 thereof, in effect, cause a bouncing back and forth therein and therebetween of the sound vibrations and thus a depressing or limiting of those vibrations as finally emit out of opening 26 thereof. In the use of that mute-type projector horn 18, such sound as is emitted from the opening 26 thereof is, within the teachings of my invention, directed in the direction of in prolongation from that opening 26.

It will thus be seen that instead of normally mounting a drum, as usually heretofore in band or orchestral use, with the shell portions thereof so that a head thereof is uppermost and the other head lowermost, that I remove one of those heads, usually mounting the drum on horizontal pivots 30a, and in lieu of the removed head I insert my novel sound projector horn, as 16 of FIG. 1. I can then thereby point the open end of that horn in the horizontal direction where I desire the drum vibrations to be transmitted and directed and so that upon the striking of the one remaining drum head by the drummer, the sound from the drum is controlled in terms of the desired direction thereof. For normal sound transmission, I use my straight tubular sound projector transmission horn, as 16 of FIG. 2. For amplified sound transmission from a drum of the type described I use the megaphone type sound projector horn 30, as shown in FIG. 4. And, further, when desired to soften the drum sound vibrations at the same time as directing them in a certain direction, I use a mute-type of a sound projector horn, as 18 of FIG. 3, in combination with the drum.

I wish to emphasize that any number of combinations, more than I have illustrated, can be mounted for a drummer to use, either with like-size drums having different length sizes or kind of my novel sound projector

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horn therewith, or with different size drums having common length size or kind of my sound projector horns, or with my megaphone or mute sound projector horns, as may be desired and to be operated by one drummer. My novel individual sound projector horns are detachable and interchangeable as shown and explained with a drum.

While I have shown and described my invention in the use thereof with a tom-tom type drum, it is to be understood that it may be used with any type drum, substantially having an open shell body and one vibratable drum head across one side thereof and wherein my sound projector horn is adaptable for use in the side thereof opposite from the vibratable head thereof.

I therefore wish to be bound in the scope and teaching of my invention only by the hereunto appended claims.

What I claim and desire to secure by Letters Patent is:

1. In combination, a drum of the class described having a tubular-like shell having two open ends, a vibratable head mounted over one of said open ends, and a sound projector horn mounted at and extending from the other of said open ends for directing sound emanating from within the drum shell.

2. A drum combination as defined in claim 1, and further defined by the horn being a removable tubular-like prolongation of the shell of the drum.

3. A drum combination as defined in claim 2, and further defined by the horn having a diameter substantially equivalent to the diameter of the drum shell.

4. A drum combination as defined in claim 3, and with the outer end of the horn remote from the drum shell being of outwardly flared configuration.

5. A drum combination as defined in claim 1, and further defined by the sound projector horn being of a megaphone configuration extension of the drum shell.

6. A drum combination as defined in claim 5, and further having the diameter of the outermost end of the megaphone extension being greater than the diameter of the drum shell.

7. A drum combination as defined in claim 1, and further defined by the sound projector horn having an over-all mute-like configuration and having an outlet of substantially less diameter than that of the drum shell.

8. A drum combination as defined in claim 1 and characterized further by the definition of the longitudinal axis of the sound projector horn being parallel with the longitudinal axis of the tubular-like shell of the drum and said axis of the horn being at a right angle to the plane of the vibratable head of the drum.

9. A drum combination as defined in claim 8, and further by the sound projector horn being a tubular-like extension in prolongation of the shell of the drum.

10. A drum combination as defined in claim 9 and characterized further by the definition of the sound projector horn having its outermost end opposite from the vibratable head of the drum of outwardly flaring configuration.

11. A drum combination as defined in claim 9 and characterized further by the definition of the smallest part of the sound projector horn being of a diameter not less than the diameter of the drum shell.

12. A drum combination as defined in claim 8 and characterized further by the definition of the sound projector horn having the diameter of a portion thereof greater than that of the shell of the drum.

13. A drum combination as defined in claim 8 and characterized further by the definition of the sound projector horn being of a megaphone configuration extension of the drum shell.

14. A drum combination as defined in claim 8 and characterized further by the definition of the sound projector horn being of mute-like configuration having a reduced diameter outlet opening of less diameter than the diameter of the drum shell.

15. In combination, two drums of the class described mounted adjacent to each other, each drum having a

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tubular-like shell body having two open ends, each drum having a vibratable head mounted over one of its shell open ends, and each drum also having a sound projector horn extending from its other shell open end for directing the sound emanating therefrom.

16. A drum combination of a plurality of drums as defined in claim 15 and characterized further by the definition of the shell body of each drum being of equal diameter.

17. A two drum combination as defined in claim 16, and characterized further by the definition of the sound projector horn of one of the drums being longer than the sound projector horn of the other drum, for effecting a sound projection of unlike sounds emanating from the sound projector horns of the drums as a result of said horns being of uneven length.

18. A two drum combination as defined in claim 15, and characterized further by the definition of each drum having its drum shell of substantially the same length but

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with one of said drum shells being of greater diameter than that of the other, and the sound projector horn of each of said drums being substantially of equal length for thereby projecting unlike sound directional vibrations from the horns of the drums.

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U.S. Cl. X.R.

84—453

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,621,749 Dated November 23, 1971

Inventor(s) Alan Lee Aluisi

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 27, after "played" insert -- on --. Column 2, line 9, "horn projector" should read -- horn-projector --. Column 3, line 29, "sound-projector horn or tube is of such a length" should read -- tube or sound projector to extend from the one side --.

Signed and sealed this 12th day of September 1972.

(SEAL)

Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

ROBERT GOTTSCHALK
Commissioner of Patents