United States Patent [19]

Molenaar

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[45] Sept. 2, 1975

[54] SOUND GENERATING DEVICE

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[52] U.S. Cl. 46/189

[51] Int. Cl.[2] A63H 5/00

[58] Field of Search 46/189, 175

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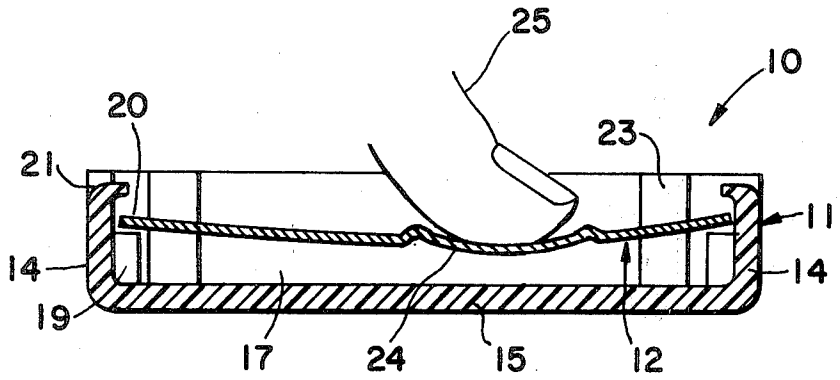
Primary Examiner—Louis G. Mancene

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[57] ABSTRACT

A sound or signal generating device of the type producing a brief sharp snap or click sound. An enclosed housing open at the front defines an acoustic chamber accessible through the front. A resilient flexure member or plate is located in the chamber having a length coextensive therewith and having ends captive therein. Digital pressure on the mid-portion of the plate causes buckling of the plate between the ends to produce an audible snap or click.

6 Claims, 5 Drawing Figures



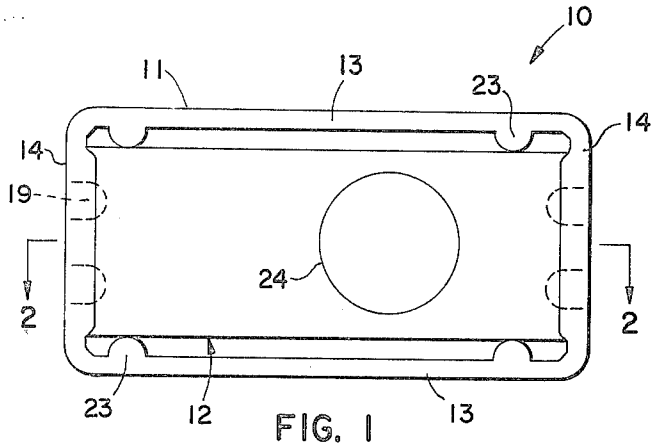


FIG. 1

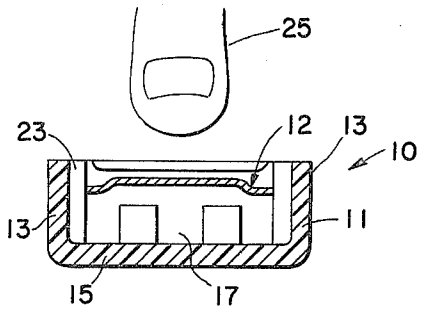


FIG. 3

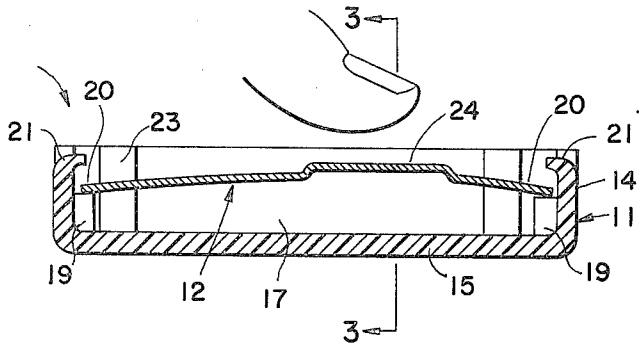


FIG. 2

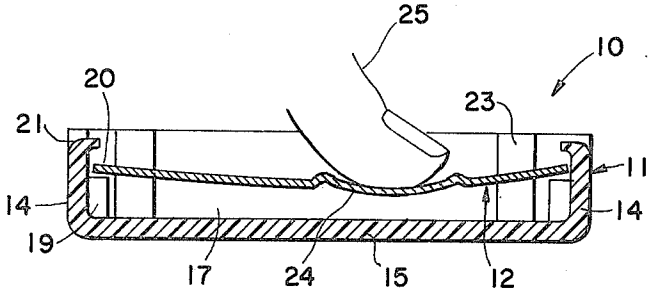


FIG. 4

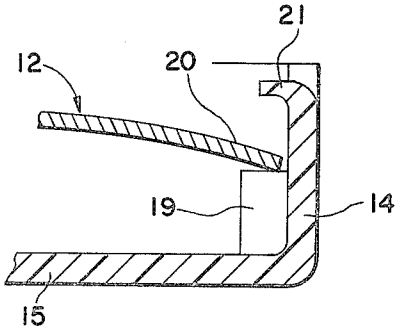


FIG. 5

SOUND GENERATING DEVICE

BACKGROUND OF THE INVENTION

Noise or sound generators are in common use as recreation devices in addition to being used to generate audio signals such as for the training of animals, or obtaining the attention of a group of individuals in an assembled meeting.

A popular form of sound generator is that type sometimes called a cricket and having a resilient plate fixed at one end to a rigid base. Upon deflection of the opposite or free end, the plate buckles producing an audible snap or click. The plate again clicks as it returns to its equilibrium or unflexed position. The plate may have an indented portion to emphasize the buckling effect. The relatively sharp edges of the free end of the plate are necessarily exposed. This produces a threat of danger to children and others. In addition, the exposed free end is vulnerable to damage.

SUMMARY OF THE INVENTION

The invention relates to a noise or signal generating device of the type employing a buckling member or plate to produce a sharp click or snap. The device includes a housing having side walls connected by end walls and a back wall to define an acoustic chamber. A resilient, flexible plate is located in the chamber and has a length coextensive with the length of the chamber. Means are provided for support of the plate ends. The plate ends are captive in the housing whereby there are no sharp, exposed edges. The plate is adapted to flex about the ends in a direction perpendicular to the plane of the back wall. Access to the plate is gained through the open front. In response to digital pressure on the mid-portion thereof, the plate buckles and produces a click or snap. Upon returning to the equilibrium position after the digital pressure is removed, the plate again clicks or snaps. The acoustical chamber accentuates the noise produced by the plate. At the same time, the housing provides a relatively strong device.

Preferably the flexure plate is provided with an indentation which inverts upon the buckling of the plate to further accentuate the noise produced thereby.

An object of the invention is to provide a sound generating device of the type described having a buckling plate without exposed edges. A second object is to provide such a device having an acoustical chamber to emphasize the sound produced by the flexure plate. A further object of the invention is to provide such a device having a housing which is strong and durable. Further objects of the invention will become apparent upon the following description.

IN THE DRAWINGS

FIG. 1 is a front elevational view of a sound generating device according to the present invention;

FIG. 2 is a sectional view of the device of FIG. 1 taken along the line 2—2 thereof;

FIG. 3 is a sectional view of the sound generating device of FIG. 2 taken along the line 2—2 thereof;

FIG. 4 is a sectional view of the sound generating device as shown in FIG. 2 but with the flexure plate in a flexed position; and

FIG. 5 is an enlarged sectional view of one corner of the device shown in FIG. 2.

DESCRIPTION OF PREFERRED EMBODIMENT

Referring to the drawings, there is shown the sound generating device of the invention, indicated generally at **10**, having a housing **11** and an elongated, flexible resilient plate **12**. Housing **11** is generally rectangular and includes integral side walls **13, 13** connected by end walls **14, 14** and a back wall **15**, defining an interior acoustic chamber **17**. The front face is open, providing access to chamber **17**. Housing **11** may conveniently be integrally constructed of molded plastic or a similar material. A pair of plate end support members **19, 19** is located at each end of chamber **17** adjacent end walls **14, 14** extending part way up end walls **14, 14**.

Flexure plate **12** is generally rectangular and spans chamber **17**, having a length coextensive with the length thereof. Flexure plate **12** is a relatively stiff but flexible, resilient member having a memory, as a leaf spring, adapted to be flexed under digital pressure and to return to the unflexed position upon the release of digital pressure.

Flexure plate **12** may be formed of spring steel or of a suitable plastic, or the like. The ends **20, 20** of flexure plate **12** are supported on support members **19, 19**. At the upper edge of each end wall **14, 14** is an inwardly directed lip **21, 21** extending over the ends **20, 20** of plate **12**. Lips **21, 21** may be formed by turning inward the upper edge of the end walls **14, 14** after plate **12** has been assembled in chamber **17**. The ends **20, 20** of plate **12** are held captive within chamber **17** by the lips **21, 21**. Flexure plate **12** is thus maintained in chamber **17** and has no exposed, potentially dangerous edges. A plurality of guide rails **23** are vertically disposed and located along the interior surfaces of side walls **13, 13** to guide the side edges of flexure plate **12** as well as to provide strength to the housing structure.

Flexure plate **12** is orientated in chamber **17** adapted to be resiliently and quickly buckled upon the application of digital pressure to thus produce a click or a snap. Upon release of the digital pressure, flexure plate **12** resiliently returns to the unflexed or unbuckled orientation and, in doing so, produces another click or snap. Located intermediately along the length of flexure plate **12** is an outwardly projected indentation **24** formed by suitable means such as a punch or a press. Indentation **24** presents a raised portion relative to the surface of flexure plate **12** and serves to accentuate the click produced by the flexure plate **12** by inverting upon the buckling of the flexure plate **12**. Indentation **24** also imparts a slight longitudinal bow in flexure plate **12** whereby flexure plate **12** passes through an over-center position upon buckling.

In the use of the sound generating device **10**, a finger **25** is placed over the flexure plate **12**, as shown in FIGS. 2 and 3, preparatory to producing a sound. Finger **25** applies digital pressure to plate **12** at indentation **24**. As shown in FIG. 4, upon the application of sufficient digital pressure, the plate **12** suddenly buckles, the indentation **24** inverting at the same time. This produces a first click. The mid-portion of plate **12** is flexed down into chamber **17** with the ends **20, 20** resting on end supports **19, 19**. The ends are contained within the chamber **17** and there are no exposed edges. Upon release of the digital pressure, flexure plate **12** snaps back to its original orientation as shown in FIG. 2, producing a second click. The inversion of indentation **24** accen-

tuates the sound produced by sound generating device **10**. Additionally, chamber **17** accentuates the sound.

The flat expanse of the back wall **15** may be used for a design, a trademark, a slogan, or other advertising.

while there is shown and described one embodiment of the invention, it will be apparent to those skilled in the art that further embodiments of the invention are obtainable without departing from the scope of the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A sound generating device comprising: a housing defining an acoustical chamber; one side of said housing being open to said chamber; a flexure plate spanning said open side and having opposite ends located in said housing; support means located in said housing loosely supporting the opposite ends of said flexure plate whereby said flexure plate is adapted to be buckled and produce an audible click upon the application of digital pressure to the mid-portion thereof; and means holding the opposite ends of said flexure plate captive in said chamber.

2. The sound generating device of claim **1** including: an outwardly extended indentation located on said flexure plate between said ends and adapted to be inverted upon the buckling of said flexure plate.

3. The sound generating device of claim **1** wherein: said housing includes a pair of side walls connected to a pair of end walls and a back wall defining said chamber, said means holding the ends of said flexure plate captive in said chamber including lips extended inward from the upper edge of the end walls.

4. The sound generating device of claim **3** wherein: said lips are constituted as a turned-in portion of said end walls.

5. The sound generating device of claim **4** wherein: said flexure plate is a rectangular elongate member composed of spring steel.

6. The sound generating device of claim **5** including: an indentation in the mid-portion of said flexure plate outwardly extended and adapted to be inverted upon buckling of the flexure plate.

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