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(54) **Musical pacifier.**

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Description

Background of the Invention

Field of the Invention

The present invention relates to a musical pacifier having a casing detachably secured to the mouth-guard of the pacifier on the opposite side of the nipple element and which casing houses an electronic programmed circuit which is switchable to produce a musical tune or programmed sound.

Description of Prior Art

Various types of amusement devices have been provided whereby to occupy an infant. Such known devices comprise various types of noise makers such as, handheld structures which produce sounds when shaken or compressible toys which generate sounds when air is compressed out of the toy or admitted into the toy. Other types of devices are known wherein an electronic circuit is actuated by a mechanical switch element to activate the circuit. Such arrangement is theoretically described in Canadian Patent No. 1,191,490 issued on August 6, 1985. All these devices have the advantages of keeping an infant amused for long periods of time, when left alone.

EP-A-88 219 discloses a nipple for the stimulation of buccal motions of nursing infants comprising a device capable of producing an emission perceptible by the nursing infant. That emission may be of any type: visual, olfactive, gustatory or auditive. The device is activated by an electric switch and can be engaged or disengaged under the action of buccal motions, said switch consisting of a flexible bar.

An electric switch is further disclosed in WO-A-83/02664 which refers to a measuring device in the form of a nipple. The switch comprises a conductive membrane which is activated by exposing the nipple body to sucking influence whereby the pressure in the nipple body decreases and causes the membrane to bend into contact with a metallic body and, consequently, provide electrical connection between conductors. The cavity of the nipple body is preferably vented by means of a small hole or bore.

Summary of the Invention

It is a feature of the present invention to provide a novel noise maker for infants and this is achieved by a musical pacifier wherein a casing is detachably secured to the mouth-guard of the pacifier and houses an electronic programmed circuit which is switched "on" by the displacement of air effected by compressing the nipple element, whereby to produce a musical tune.

Another feature of the present invention is to provide a musical pacifier having additional mechanical switch means on a housing thereof to switch in or switch out an electronic programmed circuit capable of generating signals to produce a musical tune or programmed sound.

Another feature of the present invention is to provide a musical pacifier having a casing housing an electronic programmed circuit which is detachably secured by novel connecting means to permit the nipple portion to be sterilized in boiling water or by other means while preventing the circuit and its connections and contacts from being exposed to the sterilizing medium.

According to the above features, from a broad aspect, the present invention provides a musical pacifier comprising a mouthpiece having a nipple portion. A casing is secured to the mouthpiece and houses an electronic programmed circuit capable of generating signals to produce a programmed sound. Sound generating means is associated with the circuit to audibly reproduce the signals. A switch is provided with a displaceable switch contact element for actuating the circuit. The contact element is actuated by air displacement within the nipple portion.

Description of the Drawings

A preferred embodiment of the present invention will now be described with reference to the examples thereof as illustrated in the accompanying drawings, in which:

FIGURE 1 is a perspective view of the musical pacifier of the present invention;

FIGURE 2 is an exploded view of Figure I;

FIGURE 3 is a partly fragmented enlarged section view of the pacifier as shown in Figures 1 and 2;

FIGURE 4 is a partly fragmented side view of the musical pacifier;

FIGURE 5 is a block diagram of the electronic programmed circuit;

FIGURE 6 is a side view of another example of the construction of the musical pacifier;

FIGURE 7 is a fragmented enlarged section view of the pacifier illustrating a preferred construction of the switch means;

FIGURE 8 is an enlarged fragmented section view of the conical shaped diaphragm constituting the displaceable switch contact element and shown in its open position; and

FIGURE 9 is an enlarged fragmented section view showing the displaceable switch contact element in its closed position.

Description of preferred Embodiments

Referring to the drawings and more particularly to Figures 1 and 2, there is shown generally at 10 the musical pacifier of the present invention. The pacifier comprises essentially a mouthpiece 11 consisting of a mouth-guard 12 to which a nipple element 13 is secured and extends from a front side 14 thereof. A detachable casing 15 which also constitutes a hand-holdable member is detachably secured to the rear side of the mouth-guard. The casing 15 houses an electronic programmed circuit 16 which is mounted on a circuit board and which is fed by a power cell battery 17 of the type commonly found in wrist watches having a very low voltage and amperage capacity. A sound generating means, herein a sound generating element 18, is also secured to the casing 15 on one of its faces whereby to audibly reproduce the

programmed signals generated by the circuit 16. A cover 19 retains the circuit 16 captive within the casing 15. A sound generating element, such as at 18, could also be provided instead of the cover 19 whereby to generate sounds from both sides of the casing 15.

In order to activate the electronic programmed circuit switch means is provided. Various forms of switch means will be described herein. With particular reference to Figure 3, there is shown one form of the switch means which is housed within a switch housing 20 which is detachably secured to a female coupler 22 secured to the rear face 21 of the mouth-guard. The nipple element 13 also has a hollow securable open end 23 which is secured in an opening 25 in the mouth-guard 12 and extends within the female coupler 22. A hollow retention plug 24 fits securely in the open end 23 and tightly within an opening 25 to immovably retain the securable end 23 captive within the opening 25. Thus, the nipple can be collapsed in the direction of arrows 26 by releasing the air therein through the hollow plug 24 and can be expanded by admitting air through that hollow space.

The switch housing 20 has a passage defined therethrough whereby to evacuate or admit air along the path, as shown by arrows 27, from or to the inside of the nipple element 13. In the path of this air flow, there is mounted a movable switch arm contact 28 secured at one end and opposed stationary contact points 29 spaced on both sides of the free end of the movable contact 28. Thus, as air is expelled from the nipple element 13 or admitted to the nipple element 13, it will displace the contact 28 to touch the stationary contact points 29, thus effecting a switch closure.

The stationary contact points 29 may also have weak magnetic properties whereby to retain the free end portion of the movable contact 28 engaged for a short predetermined time period to maintain the circuit 16 activated. The contact arm 28 is formed as a flat metal strip.

As shown in Figure 5, when the switch contact 28 effects a closure, the power cell or battery 17 is connected to the electronic programmed circuit 16 to activate the circuit to produce signals which are generated by the speaker element 18. Thus, it can be seen that the electronic programmed circuit is switched "on" and "off" by the infant compressing the nipple element 13 which is the natural action that an infant performs when sucking or chewing on the nipple element. Thus, the child becomes conscious that he activates an audible sound and continues to suck or bite on the nipple element to produce these sounds.

A time delay shorting circuit 30 may also be connected across the switch contact 28 whereby once a single switch closure is made the switch is automatically shorted out and the dry cell battery 17 activates the electronic programmed circuit for a predetermined period of time. This predetermined period of time is calculated to permit the programmed circuit to produce signals of a complete musical tune or programmed sound. After the predetermined time delay, the shorting circuit deactivates itself. However, if the switch element is again closed, it will again activate itself and again cause the programmed circuit to generate a complete musical tune or programmed sound.

Referring again to Figure 2, the construction of the switch housing 20 will be described. The housing 20 is provided with holes 31 extending through a rear wall 32 thereof for the air to move out and into the switch housing. Also, as herein shown, the casing 15 is detachably securable to the switch housing 20 through a pivot connection 33. The connection 33 comprises a T-bar connector 34 which is integrally formed with the casing 15 and has electrical contact points 35 in each end of its transverse connecting arm 36. The transverse arm 36 is retained between a pair of opposed shoulders 37, each provided with an inner facing cavity 38 having electrical contact points 39 therein whereby to complete the electrical connection between the switch contact arm 28 and the stationary contacts 29 from the battery 17 to the circuit 16. These circuit contacts are shown more clearly in Figure 3 where there is shown a printed circuit wire leading to terminal points 28′ and 29′. The speaker element 18 may be provided with a central opening 40 through which the sound emanates. However, in the embodiment of Figure 8 the speaker element 62 is constructed differently and does not have an opening therein.

When it is necessary to sterilize the mouthpiece 11, the switch housing 20 and the casing 15 are disconnected from the mouth-guard 12 by pushing the switch housing 20 inwardly into the mouth-guard and rotating the switch housing 20 into the direction of arrow 41 whereby to disconnect the lock mechanism which is infant proof. The lock mechanism is comprised of a plurality, at least two, spaced apart posts 42 extending outwardly on a cylindrical end portion 43 or male coupler of the switch housing 20. A plurality of coinciding, at least two spaced apart channels 44 are disposed on the inner cylindrical wall of the female coupler 22 and receive an associated one of the posts 42 therein as the cylindrical end portion 43 is pushed into the cylindrical female coupler 22. The outer face of the cylindrical end portion 43 is provided with a thin wall flange portion 45 which flexes against the pointed outer end 24′ of the hollow plug 24 to provide flexing of the flange portion 45 to constitute spring means whereby to urge the posts 42 into engagement in a transverse locking end portion 46 of the channels 44 to provide the infant-proof lock to prevent the switch housing and casing from being detached by an infant. Thus, it can be seen that by pushing the casing 15 towards the mouth-guard 12, the flexible flange 45 will bend permitting the post 42 to move out of the securable ends 46 and then by rotating the switch housing in the direction of arrow 41, it is detached from the mouth-guard. No electrical or metal post is left attached to the mouth-guard permitting it to be sterilized in boiling water without damage to the electrical parts. Also, this connection permits a standard

ring member (not shown) to be connected to the mouth-guard to connect it to an ordinary pacifier.

As shown in Figure 4, the hinge connection 33 permits the casing 15 to be displaced over an arc of 180 degrees to provide a safety feature so that if the infant falls asleep with the pacifier in his mouth and turns his face onto a pillow or mattress, the casing will bend and not offer resistance against this movement and hurt the child's mouth.

Referring now to Figure 6, there is shown a further example of the preferred embodiment of the present invention wherein the casing 15' is constructed differently but houses the same electronic programmed circuit 16 and speaker 18. The switch means is herein provided by conventional mechanical toggle switch 47 mounted on a face of the casing 15' and actuatable by an adult whereby to switch on the programmed circuit to generate music or a programmed sound. When it is necessary to switch off the music, usually after the infant is asleep, the adult simply displaces the switch 47 to its "off" position. The connection between the casing and the mouth-guard is the same as with an ordinary ring connection and the casing is also displaceable about the connector 33'. The switch 47 may also be permanently provided on the casing 15 of Figure 1, whereby to permanently switch out the dry cell battery 17 to deactivate the automatically activatable air current switch.

Referring now to Figures 7 to 9, there is shown a preferred construction of the air-activated switch means. As herein shown, the casing 20 is secured to the rear wall of the mouth-guard 12 in a cylindrical sleeve 55 having a plurality of female connecting slots 56 whereby to receive therein prongs 57 associated with the casing 20. By twisting the casing 20 within the cylindrical sleeve 55, the casing is locked to the rear wall of the mouth-guard 12.

Housed within the casing 20 is a wafer-like circuit board 58 on which is conveniently mounted the electronic programmed circuit. This wafer board is supported adjacent the rear wall 59 of the casing on spacing shoulders 60 and held in position by a movable contact support member 61. This member rests between the circuit board 58 and the enlarged bead portion 23' of the nipple which is held captive on the rear side of the mouth-guard 12 adjacent the opening 25 by means of the hollow plug 24'. As herein shown, the hollow plug has a small air passage 24'' therein.

The sound generating means is herein constituted by a disc-shaped resonator 62 supported behind the circuit board 58 and the resonator is activated by the closing of the air-activated switch which is herein constituted by a movable contact 68 supported on a diaphragm 63 of conical shape and which is supported in a conical cavity 64 formed in an abutment end wall portion 65 of the switch diaphragm support member 61. Stationary contacts 69 are disposed in alignment with the movable contact and located on the circuit board 58 to complete the switch. An air passage 66 is provided in the support member 61 and extends from a bottom end of the cavity 64 in alignment with the air passage 24'' provided in the hollow plug 24' whereby to communicate air from the hollow space within the nipple element 13. to the bottom end of the conical cavity 64.

As better shown in Figures 8 and 9, the diaphragm has a displaceable wall portion 67 disposed in the path of the air conduit 66. An electrically conductive disc, such as a carbon disc 68, is secured on the displaceable wall portion 67 on the side facing the circuit board 58. The circuit board is provided with etched stationary contact 69 and disposed on the outer surface 58' thereof in alignment with the electrically conductive disc 68. The diaphragm 63 has a cone-shaped side wall 70 and a circumferential shoulder portion 71 which is retained captive between the shoulder portin 65' of the support member 61 and the outer surface 58' of the circuit board.

When the nipple element 13 is compressed, air pressure is applied through the conduit 24'' and 66 whereby, to displace the bottom wall 67 of the diaphragm forwardly against the circuit board 58. Thus, the conductive disc 68 is positioned across the stationary contact 69 and closes the switch whereby to connect the battery 17 to the electronic circuit thus causing it to generate an audible sound for a predetermined period of time, as previously described. The air conduit 66 is substantially sealed so that the diaphragm is activated or displaced by air pressure from the nipple element 13 and returns to its conical shape by air suction caused by the restoring force exerted by the nipple element.

A push button mechanical switch 47' may be secured to the casing 20 whereby to mechanically switch in or switch out the electronically programmed circuit. The diaphragm 63 is herein shown as constructed of a suitable rubber material capable of retaining its shape and the movable carbon contact disc 68 is glued to the bottom wall 67 of the diaphragm. A ring 72 is hingedly connected to the rear wall of the casing 20 for hand support of the musical pacifier 10.

It is within the ambit of the present invention to cover any obvious modifications of the examples of the preferred embodiment described herein, provided such modifications fall within the scope of the appended claims. For example, the musical pacifier can be constructed on a smaller scale for use with toy dolls.

Claims

1. A musical pacifier (10) comprising mouthpiece (11) with a hollow nipple portion (13) having an impervious outer surface, a casing (15, 20) secured to said mouthpiece and housing an electronic programmed circuit (16) capable of generating signals to produce a programmed sound, sound generating means (18) associated with said circuit to audibly reproduce said signals, a switch having a displaceable switch contact

element (28, 68) for actuating said circuit (16), characterized in that said switch contact element (28, 68) is actuated by air displacement within said nipple portion generated by compressing the nipple portion (13).

2. A musical pacifier as claimed in claim 1 characterized in that said mouthpiece (11) has a mouth-guard (12) to which said nipple element (13) is secured, said casing (15, 20) is connected to said mouth-guard on a side thereof opposite to said nipple element.

3. A musical pacifier as claimed in claim 1 characterized in that there is further provided a time delay shorting circuit (30) connected across stationary contacts (29, 69) of said switch whereby to by-pass said switch to connect a battery (17) to said electronic programmed circuit (16) for a predetermined period of time upon being activated by a switch closure by said displaceable switch contact (28, 68).

4. A musical pacifier as claimed in claim 1 characterized in that said nipple element (13) has a securable open end (23) which is secured in a bore 25 in said mouth-guard (12) by a hollow connector (24, 24'), said connector 5 having passage means (24'') therein to form an air passage from said hollow space within said nipple element (13) to a space in which said displaceable switch contact (28, 68) is located.

5. A musical pacifier as claimed in claim 4 characterized in that said displaceable contact (28) has a free end portion extending into said space where there is created an air current by said nipple element, said air current causing said free end portion to be displaced and contact said stationary contact (29) to effect a switch closure.

6. A musical pacifier as claimed in claim 5 characterized in that said displaceable contact (28) is a flat metal strip having said free end portion thereof disposed intermediate opposed metal contacts (29) interconnected together and constituting said stationary contact.

7. A musical pacifier as claimed in claim 5 characterized in that evacuation ports (31) are communicated with said air passage to evacuate air from said passage when said hollow nipple element (13) is collapsed and to admit air by suction created by said nipple element when restoring its initial shape after being compressed.

8. A musical pacifier as claimed in claim 4 characterized in that said housing (20) is removably secured to said mouth-guard (12) through a lock mechanism (42, 44, 56, 57) which is infant-proof.

9. A musical pacifier as claimed in claim 8 characterized in that said lock mechanism comprises two cylindrical parts (22, 43), one of said parts (43) having at least two spaced apart posts (42) extending diametrically outward of a cylindrical outer surface thereof, the other of said parts having at least two spaced apart channels (46) corresponding to the spacing of said posts and disposed in an inner surface thereof to permit passage of said posts therein and to overlap a portion of said outer surface of said one part when advanced thereover, said channels (46) having a locking end to receive an associated one of said posts therein against the pressure of spring means when said other part is rotated in a predetermined direction, said posts being retained at said locking end by said pressure.

10. A musical pacifier as claimed in claim 3 characterized in that there is further provided a mechanical switch (47, 47') secured to said casing (15' 20) and actuatable from an outside wall thereof whereby to place said electronic programmed circuit (16) in an activatable or inactive state.

11. A musical pacifier as claimed in claim 1 characterized in that said displaceable switch contact element is a diaphragm (63) having a displaceable wall portion (67) disposed across an air conduit (66), an electrically conductive disc (68) secured to said displaceable wall portion (67), and stationary switch contacts (69) disposed in alignment with said conductive disc (68) whereby said air displacement will move said displaceable portion to position said conductive disc (68) against said stationary contacts (69).

12. A musical pacifier as claimed in claim 11 characterized in that said diaphragm (63) is a conical shaped diaphragm having a cone-shaped side wall (70), a flat bottom wall (67) and a circumferential shoulder portion (71), said conductive disc (68) being secured inwardly of said conical shape over said bottom wall (67).

13. A musical pacifier as claimed in claim 12 characterized in that said diaphragm (63) is received within a conical cavity (64) formed in an abutment end wall portion (65, 71) of a switch diaphragm support member (61), an air passage (66) in said support member (61) extending from a bottom end of said cavity (64) to an air passage (24'') communicating with a hollow space within said nipple (13).

14. A musical pacifier as claimed in claim 13 characterized in that said stationary switch contacts (69) are secured to a stationary circuit board (58) and aligned, with said cavity (64) so that said abutment end wall portions (65, 71) extend thereabout in contact with said board (58).

15. A musical pacifier as claimed in claim 14 characterized in that said circuit board (58) is a wafer board supported in said casing (20), said switch diaphragm support member (61) being held in support alignment in said casing between said wafer board (58) and a peripheral bead portion (23') about an open end of said nipple element (13), said open end being secured in a bore (25) in said mouth-guard (12) by a hollow connector (24') having an air passage (24'') aligned with said air passage (66) in said switch diaphragm support member (61), said air passages (24'', 66) being substantially sealed passages communicating the space within said nipple element with said bottom wall (67) of said diaphragm (63).

Patentansprüche

1. Beruhigungssauger mit Musik (10), bestehend aus einem Mundstück (II) mit einem hohlen Saugelement (13), das eine undurchlässige Aussenfläche aufweist, einem Gehäuse (15, 20), das am Mundstück bestigt ist und das eine elektronisch programmierte Schaltung (16) enthält, die in der Lage ist, Signale zur Erzeugung eines programmierten Tons zu generieren, einem der Schaltung zugeordneten Tongenerator (18) zur hörbaren Reproduktion dieser Signale, einem Schalter mit einem verschiebbaren Schaltkontaktelement (28, 68) zur Aktivierung dieser Schaltung (16), dadurch gekennzeichnet, dass das Schaltkontaktelement (28, 68) durch Luftverschiebung innerhalb des Saugelements, verursacht durch Zusammenpressen des Saugelements, aktivierbar ist.

2. Beruhigungssauger mit Musik nach Anspruch 1, dadurch gekennzeichnet, dass das Mundstück (II) eine Mundsicherung (12) aufweist, an dem das Saugelement (13) befestigt ist, wobei das Gehäuse (15, 20) mit der Mundsicherung auf der dem Saugelement genüberliegenden Seite verbunden ist.

3. Beruhigungssauger mit Musik nach Anspruch 1, dadurch gekennzeichnet, dass eine Zeitverzögerungsschaltung (30) vorhanden ist, die über stationäre Kontakte (29, 69) des Schalters angeschlossen ist, wobei zum Anschliessen einer Batterie (17) an die elektronisch programmierte Schaltung (16) für einen vorbestimmten Zeitabschnitt beim Aktivieren durch einen Schalterschluss durch den verschiebbaren Schaltkontakt der Schalter überbrückbar ist.

4. Beruhigungssauger mit Musik nach Anspruch 1, dadurch gekennzeichnet, dass das Saugelement (13) ein offenes Ende (23) aufweist, das in einer Oeffnung (25) der Mundsicherung (12) durch einen hohlen Verbinder (24, 24') befestigt ist, der einen Durchlass aufweist zur Bildung eines Luftkanals vom Hohlraum des Saugelements (13) zu einem Raum, in dem das verschiebbare Schaltkontaktelement (28, 68) angeordnet ist.

5. Beruhigungssauger mit Musik nach Anspruch 4, dadurch gekennzeichnet, dass der verschiebbare Kontakt (28) einen freien Endabschnitt aufweist, der sich in den Raum erstreckt, wo durch das Saugelement ein Luftstrom erzeugt wird, wobei das freie Ende durch den Luftstrom verschiebbar ist und den stationären Kontakt (29) zur Erzeugung eines Schalterschlusses berührt.

6. Beruhigungssauger mit Musik nach Anspruch 5, dadurch gekennzeichnet, dass der verschiebbare Kontakt (28) ein flacher Metallstreifen ist, dessen freier Endabschnitt zwischen gegenüberliegenden Metallkontakten (29) angeordnet ist, die miteinander verbunden sind und die den stationären Kontakt bilden.

7. Beruhigungssauger mit Musik nach Anspruch 5, dadurch gekennzeichnet, dass Entlastungsöffnungen (31) mit dem Luftdurchlass verbunden sind, um Luft aus dem Durchlass entweichen zu lassen, wenn das hohle Saugelement (13) zusammengepresst wird und um Luft durch Saugwirkung ein zulassen, welche entsteht, wenn das Saugelement nach dem Zusammenpressen seine ursprüngliche Form einnimmt.

8. Beruhigungssauger mit Musik nach Anspruch 4, dadurch gekennzeichnet, dass das Gehäuse (20) durch einen kindersicheren Verschlussmechanismum (42, 44, 56, 57) lösbar an der Mundsicherung (12) befestigt ist.

9. Beruhigungssauger mit Musik nach Anspruch 8, dadurch gekennzeichnet, dass der Verschlussmechanismus zwei zylindrische Teile (22, 43) enthält, von denen eines (43) wenigstens zwei im Abstand angeordnete, sich von der zylindrischen Aussenfläche diametral nach aussen erstrekkende Nocken (42) aufweist, und dass andere der Teile wenigstens zwei in einem Abstand angeordnete Nuten (46) aufweist, der dem Abstand der Nocken entspricht und welche an einer Innenfläche angeordnet sind, um den Durchgang der Nocken zu erlauben und um einen Teil der Aussenfläche des einen Teils beim Ueberschieben zu über lappen, wobei die Nuten (46) ein Verschlussende aufweisen, um einen zugeordneten Nocken gegen den Druck einer Federvorrichtung darin aufzunahmen, wenn das andere Teil in einer vorbestimmten Richtung gedreht wird, wobei die Nocken durch die Verschlussenden infolge des Druckes gehalten werden.

10. Beruhigungssauer mit Musik nach Anspruch 3, dadurch gekennzeichnet, dass ein mechanischer Schalter (47, 47') vorhanden ist, der am Gehäuse (15', 20) befestigt ist und der an einer Aussenwand aktivierbar ist, um die elektronisch programmierte Schaltung (16) in einen aktiven oder in einen inaktiven Zustand zu bringen.

11. Beruhigungssauer mit Musik nach Anspruch 1, dadurch gekennzeichnet, dass das verschiebbare Schaltkontaktelement ein Diaphragma (63) ist, das einen verschiebbaren Wandabschnitt (67) aufweist, der über einem Luftdurchlass (66) angeordnet ist, dass eine elektrisch leitfähige Scheibe (68) am verschiebbaren Wandabschnitt (67) befestigt ist, und dass stationäre Schaltkontakte (69) in Uebereinstimmung mit der leitenden Scheibe (68) angeordnet sind, wobei die Luftverschiebung den verschiebbaren Abschnitt bewegt, um die leitende Scheibe (68) gegen die stationären Kontakte (69) zu positionieren.

12. Beruhigungssauer mit Musik nach Anspruch 11, dadurch gekennzeichnet, dass das Diaphragma (63) ein konisch geformtes Diaphragma ist, das eine konisch geformte Seitenwand (70), eine flache Bodenwand (67) und einen umlaufenden Schulterabschnitt (71) aufweist, wobei die leitende Scheibe (68) innerhalb des Konus über der Bodenwand (67) angeordnet ist.

13. Beruhigungssauger mit Musik nach Anspruch 12, dadurch gekennzeichnet, dass das Diaphragma (63) in einer konischen Kavität (64) aufgenommen wird, die in einem angrenzenden Endwandabschnitt (65, 71) eines Schaltdia-

phragma-Stützelements (61) angeordnet ist, und dass ein Luft durchlass (66) im Stützelement (61) sich vom Boden der Kavität (65) zu einem Luftdurchlass (24'') erstreckt, der mit einem Hohlraum innerhalb des Saugelements (13) kommuniziert.

14. Beruhigungssauger mit Musik nach Anspruch 13, dadurch gekennzeichnet, dass die stationären Schaltkontakte (69) an einer stationären Schaltplatine (58) auf die Kavität (64) ausgerichtet befestigt sind, sodass dieser Endwandabschnitt (65, 71) an der Platine (58) anliegt.

15. Beruhigungssauger mit Musik nach Anspruch 14, dadurch gekennzeichnet, dass die Schaltplatine (58) eine scheibenförmige Platine ist, die im Gehäuse (20) gehalten ist, dass das Schaltdiaphragma-Stützelement (61) im Gehäuse zwischen der scheibenförmigen Platine (58) und einem umlaufenden Stützwulst (23') über einem offenen Ende des Saugelements (13) gehalten ist, wobei das offene Ende in einer Oeffnung (25) in der Mundsicherung (12) durch einen hohlen Verbinder (24') gehalten ist, der einen Luftdurchlass (24'') aufweist, der auf den Luftdurchlass (66) im Schaltdiaphragma-Stützelement (61) ausgerichtet ist, wobei die Luftdurchlässe (24'', 66) abgedichtete Durch lässe sind, die den Raum innerhalb des Saugelements mit der Bodenwand (67) des Diaphragmas (63) verbinden.

Revendications

1. Sucette musicale (10) comprenant une embouchure (11) comportant une partie de tétine creuse (13) dont la surface externe est imperméable, un boîtier (15, 20) fixé à ladite embouchure et abritant un circuit électronique programmé (16) capable d'engendrer des signaux pour produire un son programmé, des moyens générateurs de sons (18) associés audit circuit pour reproduire de manière audible lesdits signaux, un commutateur comportant un élément de contact de commutateur mobile (28, 68) pour activer ledit circuit (16), caractérisée en ce que ledit élément de contact de commutateur (28, 68) est activé par un déplacement d'air à l'intérieur de la partie de tétine, engendré par la compression de la partie de tétine (13).

2. Sucette musicale selon la revendication 1, caractérisée en ce que ladite embouchure (11) comporte un garde-bouche (12) auquel est fixé ledit élément de tétine (13), ledit boîtier (15, 20) étant relié audit garde-bouche sur la face de celui-ci opposée audit élément de tétine.

3. Sucette musicale selon la revendication 1, caractérisée en ce qu'il est en outre prévu un circuit de court-circuitage à retard (30) relié aux bornes de contacts fixes (29, 69) dudit commutateur pour court-circuiter ce commutateur et relier une pile (17) audit circuit électronique programmé (16) pendant une période de temps prédéterminée lors de son activation par une fermeture du commutateur par ledit contact de commutateur mobile (28, 68).

4. Sucette musicale selon la revendication 1, caractérisée en ce que ledit élément de tétine (13) comporte une extrémité ouverte verrouillable (23) qui est fixée dans un alésage (25) dudit garde-bouche (12) par un connecteur creux (24, 24'). ledit connecteur comportant dans sa partie intérieure des moyens de passage (24'') pour constituer un passage pour l'air depuis ledit espace creux formé dans ledit élément de tétine (13) jusqu'à un espace dans lequel se trouve ledit contact de commutateur mobile (28, 68).

5. Sucette musicale selon la revendication 4, caractérisée en ce que ledit contact mobile (28) comporte une partie d'extrémité libre s'étendant à l'intérieur dudit espace dans lequel un courant d'air est créé par ledit élément de tétine, ledit courant d'air entraînant le déplacement de ladite partie d'extrémité libre et sa mise en contact avec ledit contact fixe (29) pour effectuer une fermeture du commutateur.

6. Sucette musicale selon la revendication 5, caractérisée en ce que ledit contact mobile (28) est une lame métallique plate dont ladite partie d'extrémité libre est disposée entre des contacts métalliques opposés (29) reliés ensemble et constituant ledit contact fixe.

7. Sucette musicale selon la revendication 5, caractérisée en ce que des orifices d'évacuation (31) sont en communication avec ledit passage d'air pour évacuer l'air dudit passage lorsque ledit élément de tétine creux (13) est écrasé et pour admettre l'air par l'aspiration créée par ledit élément de tétine lorsqu'il reprend sa forme initiale après avoir été comprimé.

8. Sucette musicale selon la revendication 4, caractérisée en ce que ledit boîtier (20) est verrouillé de manière libérable sur ledit garde-bouche (12) par l'intermédiaire d'un mécanisme de verrouillage (42, 44, 56, 57) qui est à l'épreuve des manipulations d'enfants en bas âge.

9. Sucette musicale selon la revendication 8, caractérisée en ce que ledit mécanisme de verrouillage comprend deux parties cylindriques (22, 43), l'une de ces parties (43) comportant au moins deux plots espacés l'un de l'autre (42) faisant saillie diamétralement hors de sa surface externe cylindrique, la seconde partie comportant au moins deux rainures espacées l'une de l'autre (46) correspondant à l'espacement desdits plots et disposées dans sa surface interne pour permettre le passage desdits plots dans celles-ci et pour recouvrir une partie de ladite surface externe de ladite première partie lorsqu'elle est engagée au-dessus de celle-ci, lesdites rainures (46) comportant une extrémité de verrouillage pour recevoir un plot correspondant parmi lesdits plots contre la pression de moyens de ressort, lorsque l'on fait tourner ladite seconde partie dans un sens prédéterminé, lesdits plots étant retenus au niveau de ladite extrémité de verrouillage par ladite pression.

10. Sucette musicale selon la revendication 3, caractérisée en ce qu'il est en outre prévu un commutateur mécanique (47, 47') fixé audit boîtier (15', 20) et apte à être actionné depuis une paroi externe de ce dernier afin de mettre le

circuit électronique programmé (16) dans un état activable ou dans un état désactivé.

11. Sucette musicale selon la revendication 1, caractérisée en ce que ledit élément de contact de commutateur mobile est un diaphragme (63) comportant une partie de paroi mobile (67) disposée en travers d'un conduit d'air (66), un disque électriquement conducteur (68) fixé à ladite partie de paroi mobile (67), et des contacts de commutateur fixes (69) disposés dans l'alignement dudit disque conducteur (68) si bien que le déplacement d'air entraîne un mouvement de ladite partie mobile qui positionne ledit disque conducteur (68) contre lesdits contacts fixes (69).

12. Sucette musicale selon la revendication 11, caractérisée en ce que ledit diaphragme (63) est un diaphragme de forme conique comportant une paroi latérale en forme de cone (70), une paroi de fond plate (67) et une partie d'épaulement circonférentielle (71), ledit disque conducteur (68) étant fixé à l'intérieur de ladite forme conique sur ladite paroi de fond (67).

13, Sucette musicale selon la revendication 12, caractérisée en ce que ledit diaphragme (63) est reçu à l'intérieur d'une cavité conique (64) formée dans une partie de paroi d'extrémité de butée (65, 71) d'un élément de support de diaphragme de commutateur (61), un passage d'air (66) dans ledit élément de support (61) s'étendant depuis une extrémité de fond de ladite cavité (64) jusqu'à un passage d'air (24'') communiquant avec un espace creux à l'intérieur de ladite tétine (13).

14. Sucette musicale selon la revendication 13. caractérisée en ce que lesdits contacts de commutateur fixes (69) sont fixés à une carte de circuits fixe (58) et alignés avec ladite cavité (64) pour que lesdites parties de paroi d'extrémité de butée (65, 71) s'étendent autour d'eux en contact avec ladite carte (58).

15. Sucette musicale selon la revendication 14, caractérisée en ce que ladite carte de circuit (58) est une carte en forme de pastille supportée dans ledit boîtier (20), ledit élément de support de diaphragme de commutateur (61) étant supporté suivant une disposition alignée dans le boîtier entre ladite carte en forme de pastille (58) et une partie de rebord périphérique (23') autour d'une extrémité ouverte dudit élément de tétine (13), ladite extrémité ouverte étant maintenue en place dans un alésage (25) dudit garde-bouche (12) par un connecteur creux (24') comportant un passage d'air (24'') aligné avec ledit passage d'air (66) dans ledit élément de support de diaphragme de commutateur (61), lesdits passages d'air (24'', 66) étant essentiellement des passages étanches mettant en communication l'espace formé dans ledit élément de tétine avec ladite paroi de fond (67) dudit diaphragme (63).

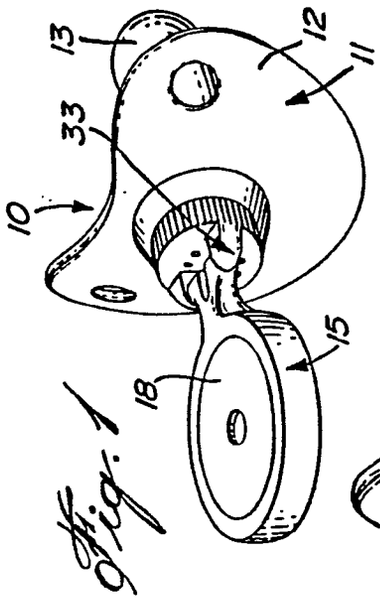

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Fig. 1

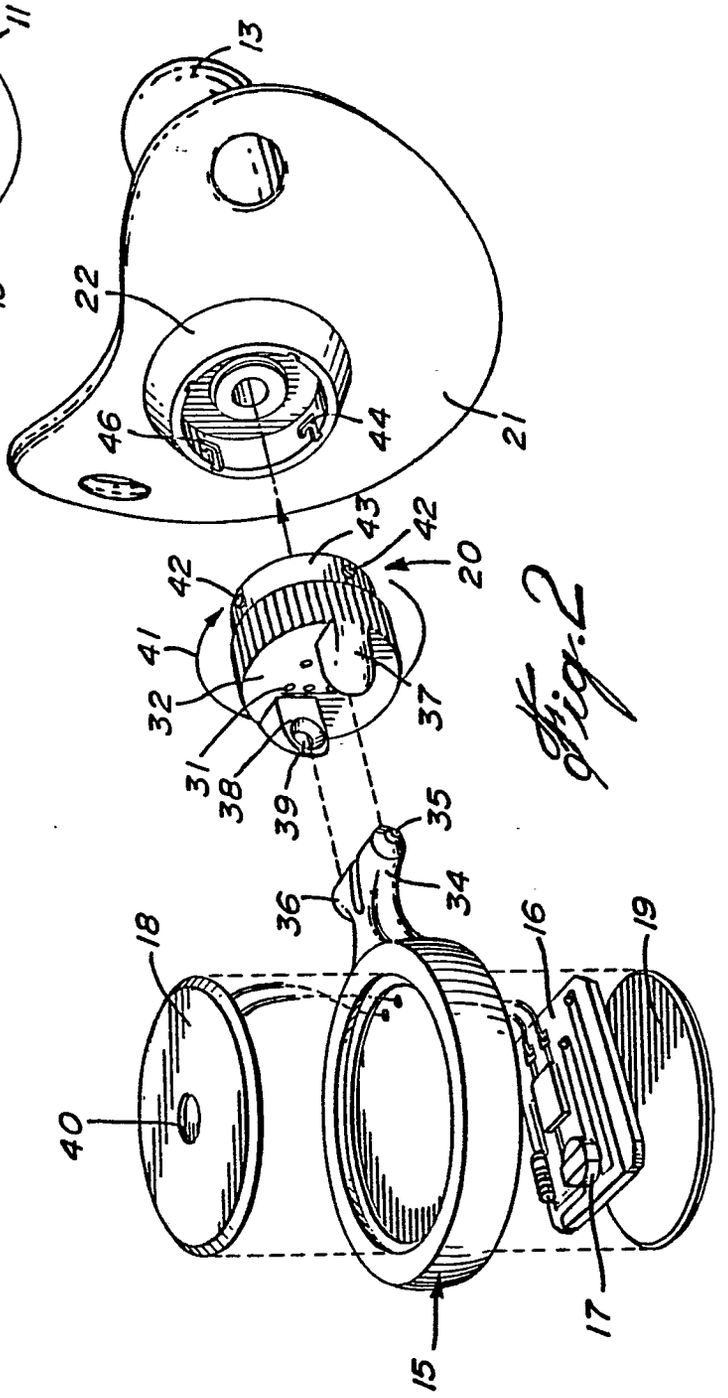

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Fig. 2

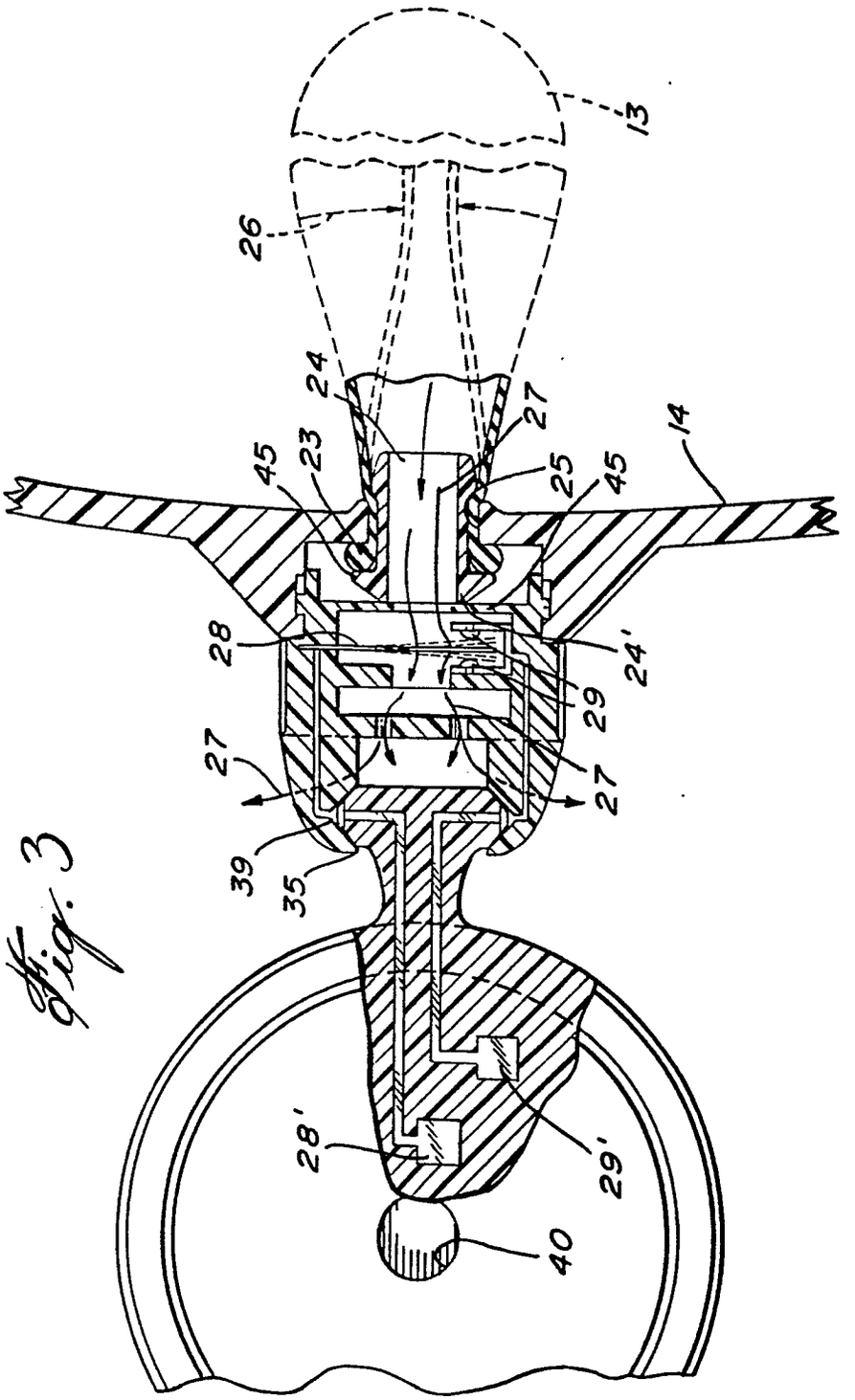
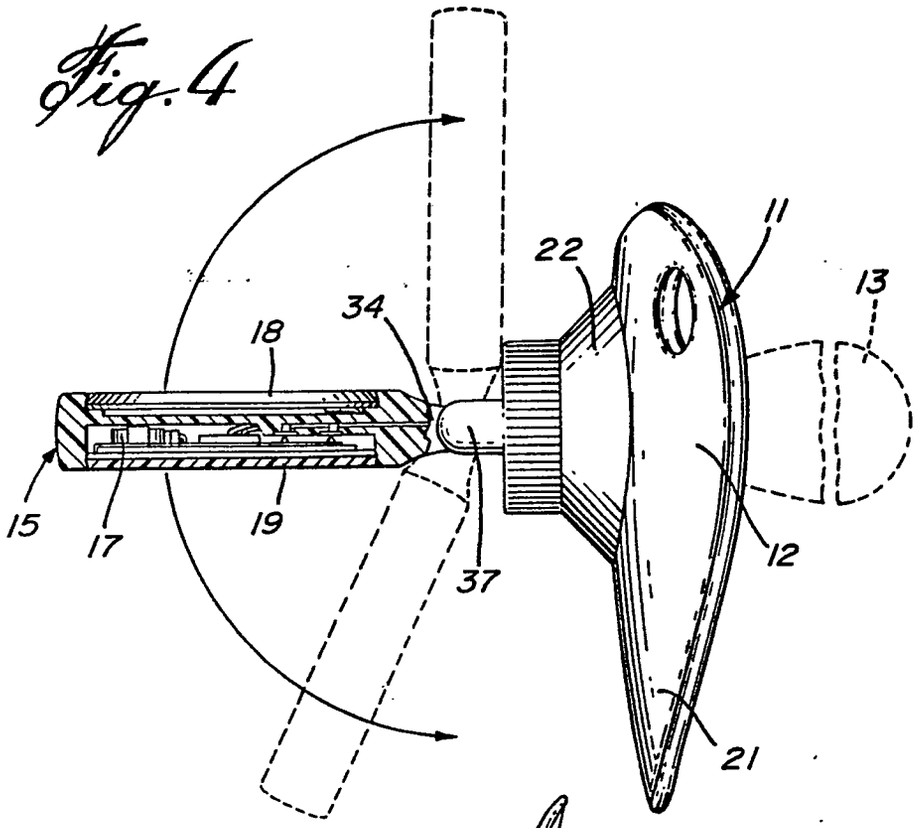


Fig. 3

Fig. 4



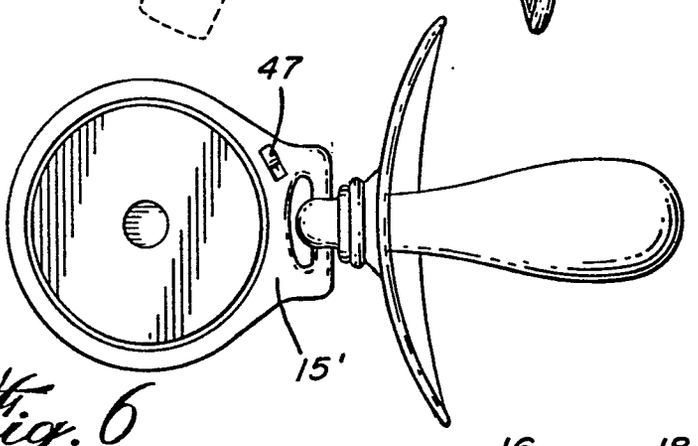


Fig. 6

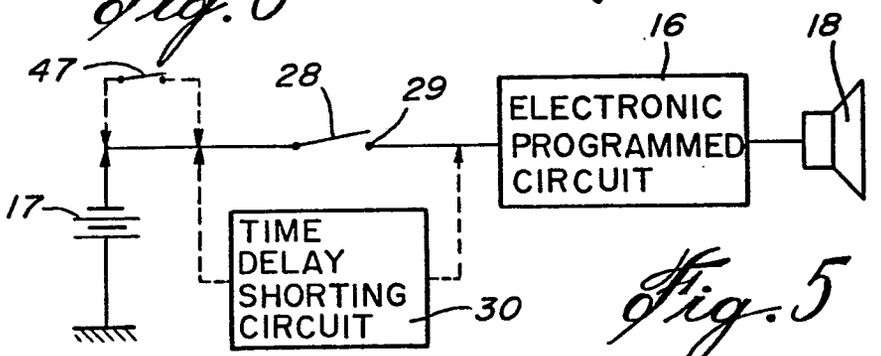


Fig. 5

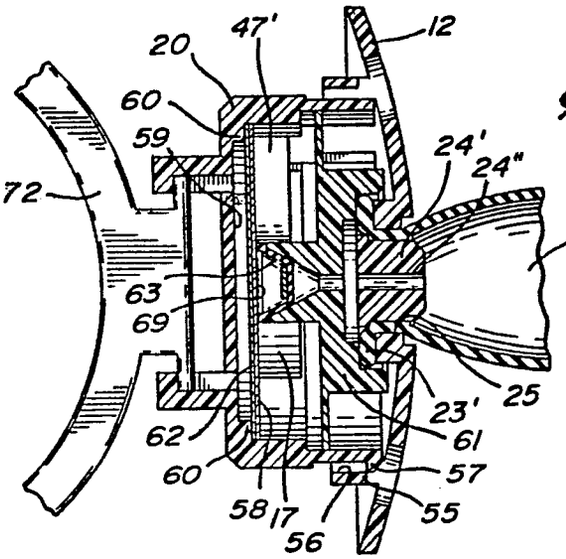


Fig. 7

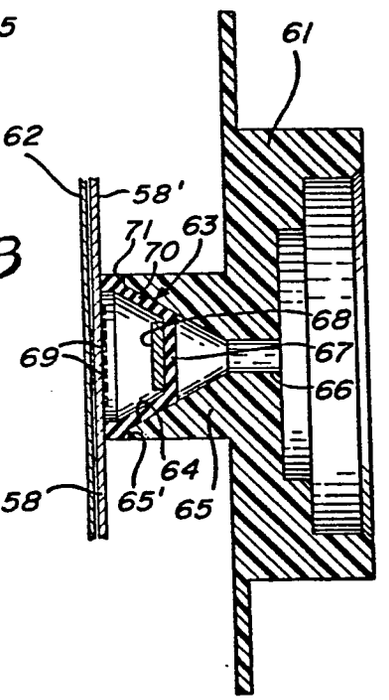


Fig. 8

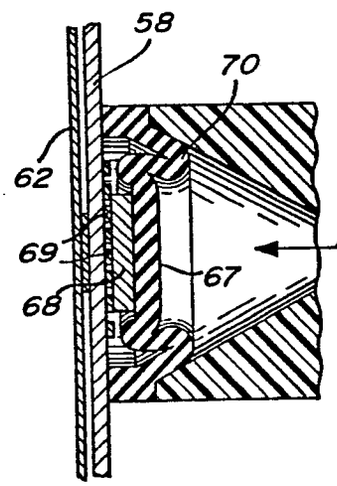


Fig. 9