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FOXCROFT

(54) WHISTLE WITH FINGER GRIP

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(60) Provisional application No. 61/371,227, filed on Aug. 6, 2010.

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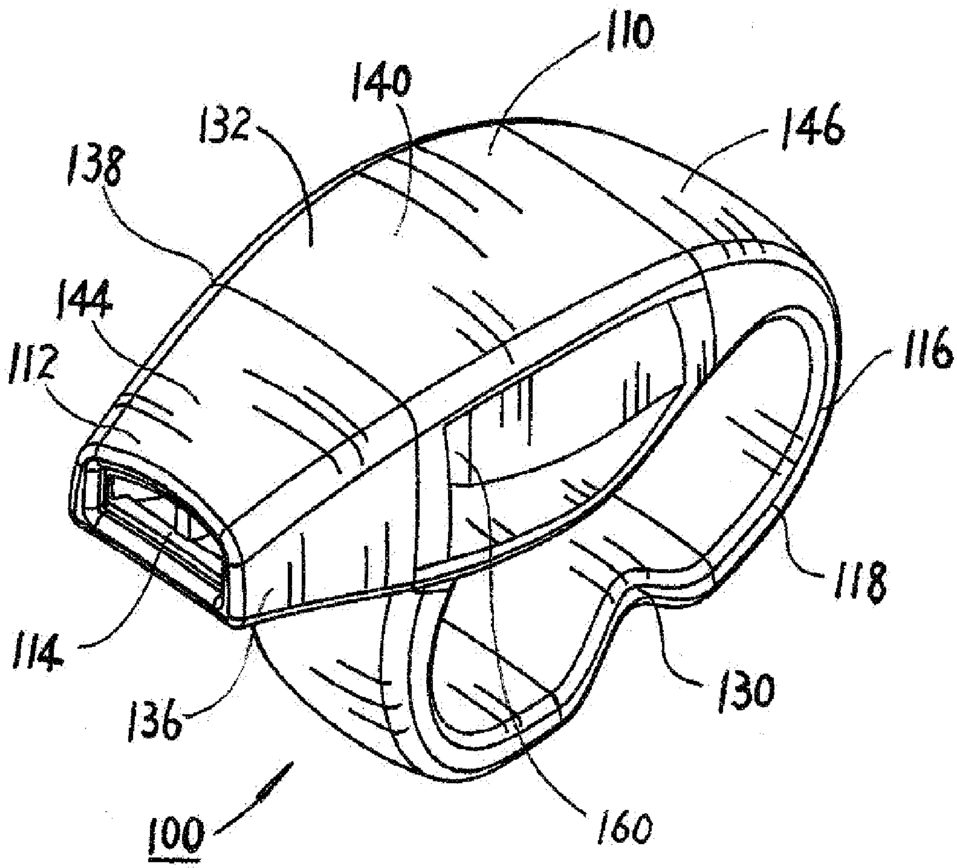
(57) ABSTRACT

A whistle for producing resonant frequencies comprising a body which includes a mouth piece having an inlet, and at least two sound chambers to which inlet air is blown from the inlet. The whistle further includes air passageways for communicating inlet air from the inlet to the sound box and sound chambers. The body further includes at least two exhaust ports in communication with the sound chambers for discharging air and sound. The two sound chambers are dimensioned to create peak principal frequencies which interactively produce a pulsating sound having a periodic pulse frequency of less than 100 hertz. The whistle preferably includes air intake ports for communicating additional port air into the sound box.



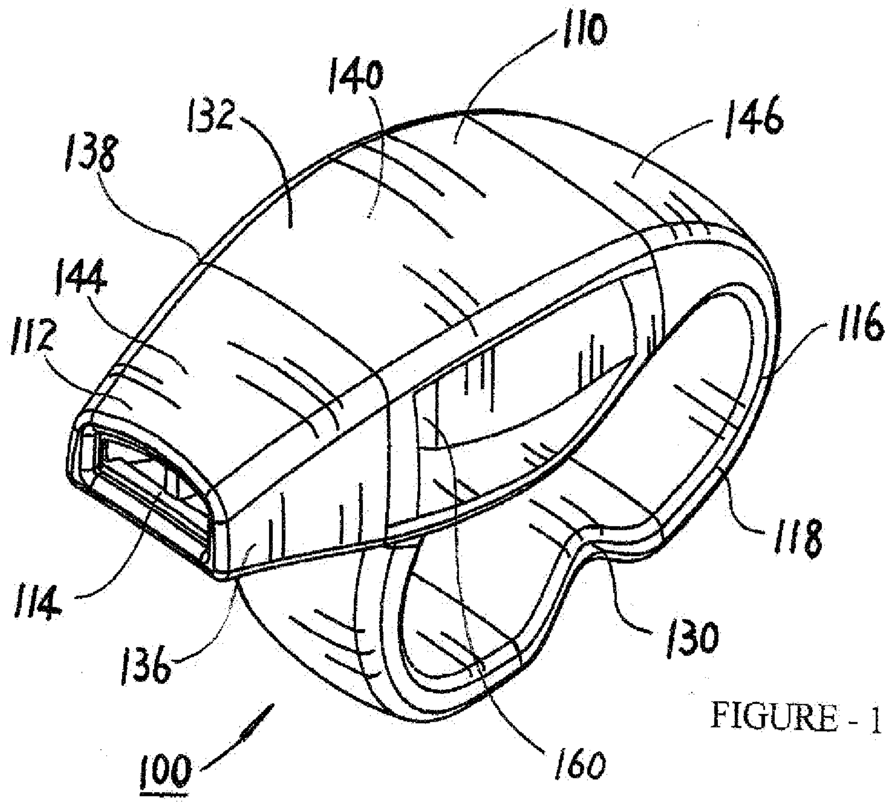


FIGURE - 1

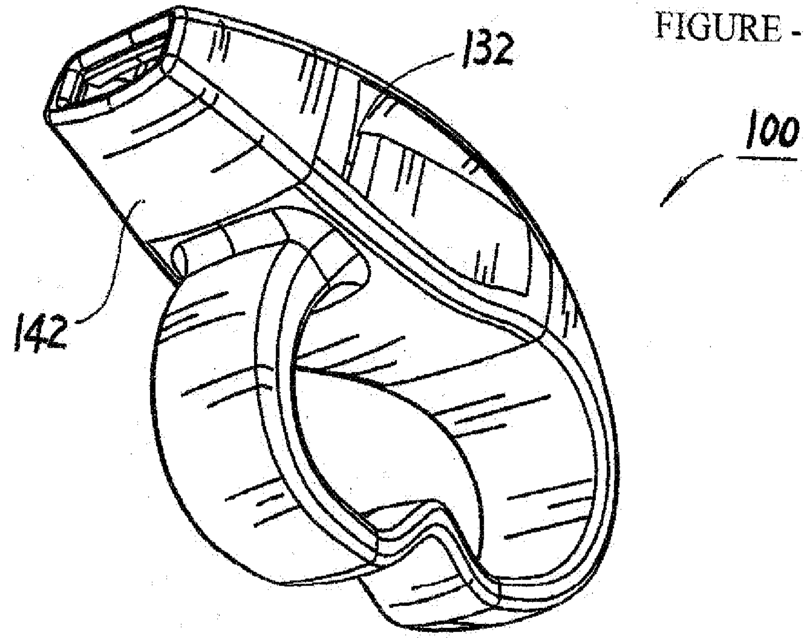


FIGURE - 2

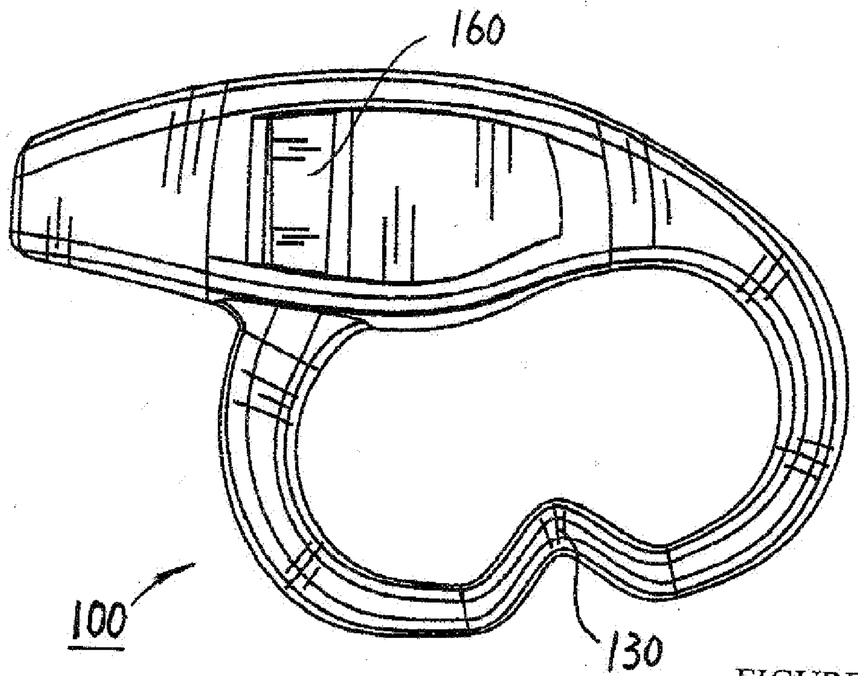


FIGURE - 3

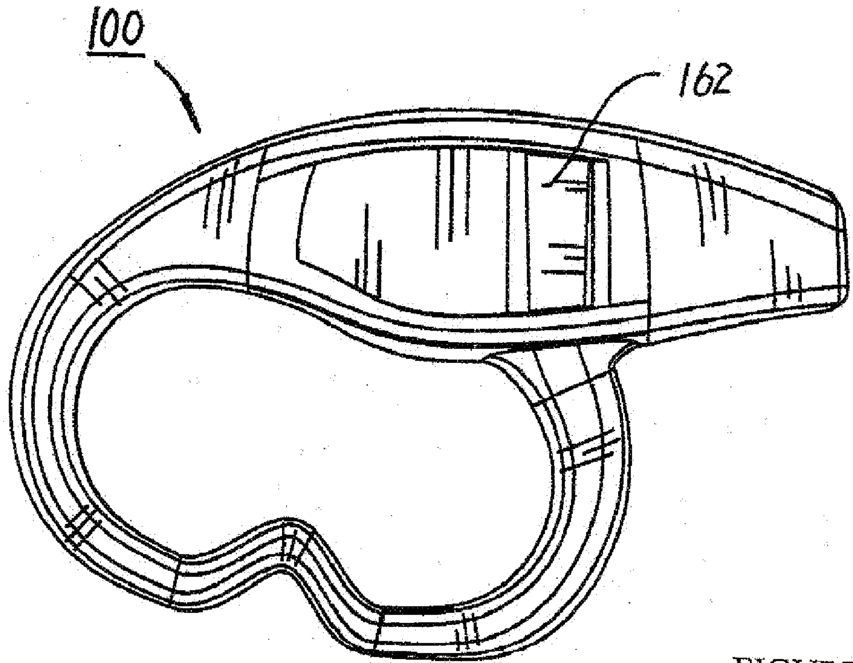


FIGURE - 4

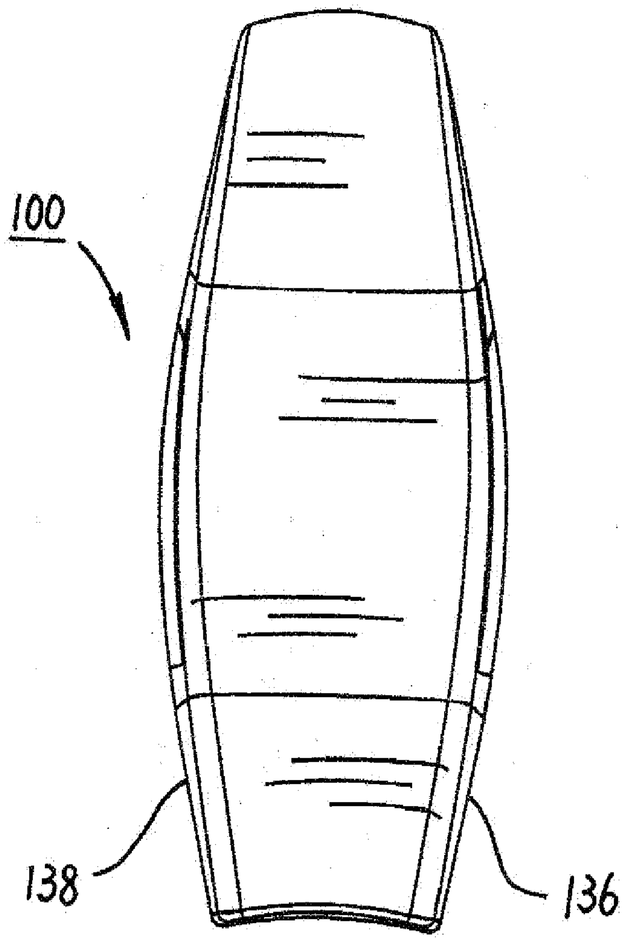


FIGURE - 5

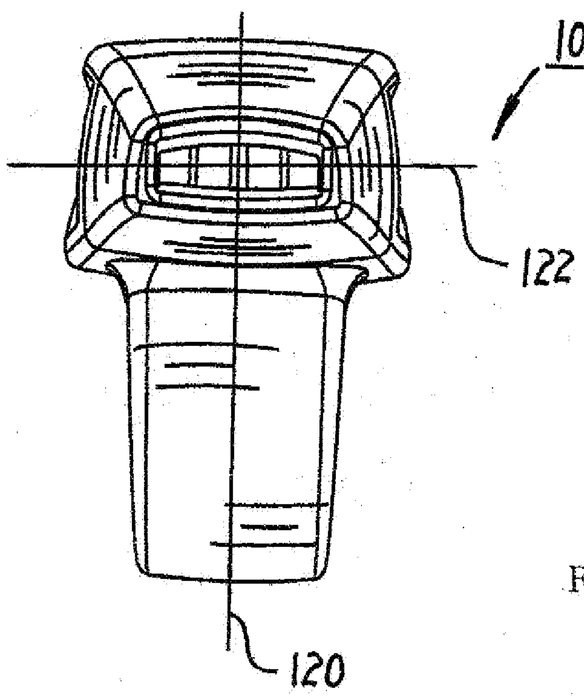


FIGURE - 6

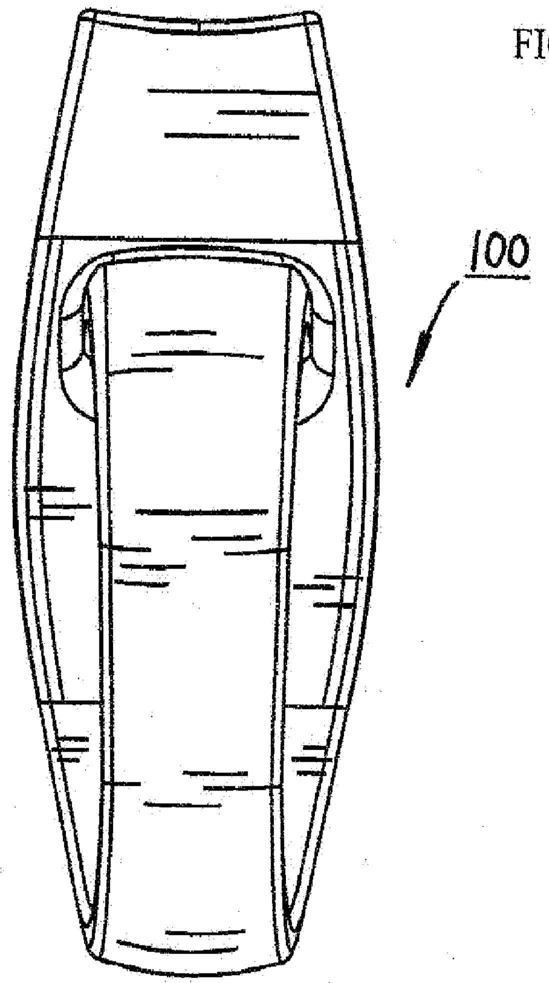


FIGURE - 7

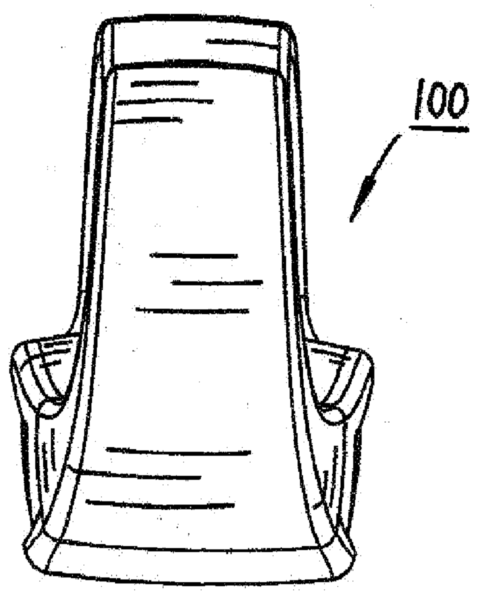


FIGURE - 8

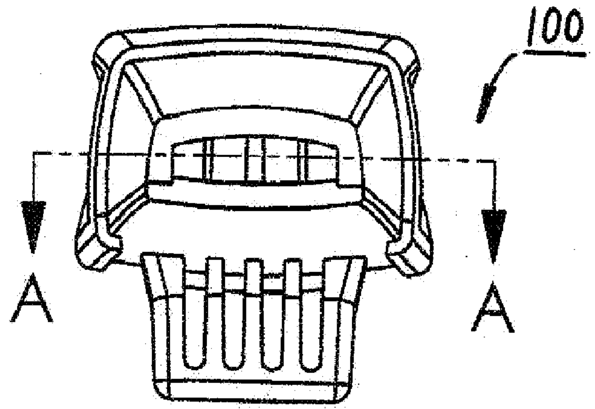


FIGURE - 9

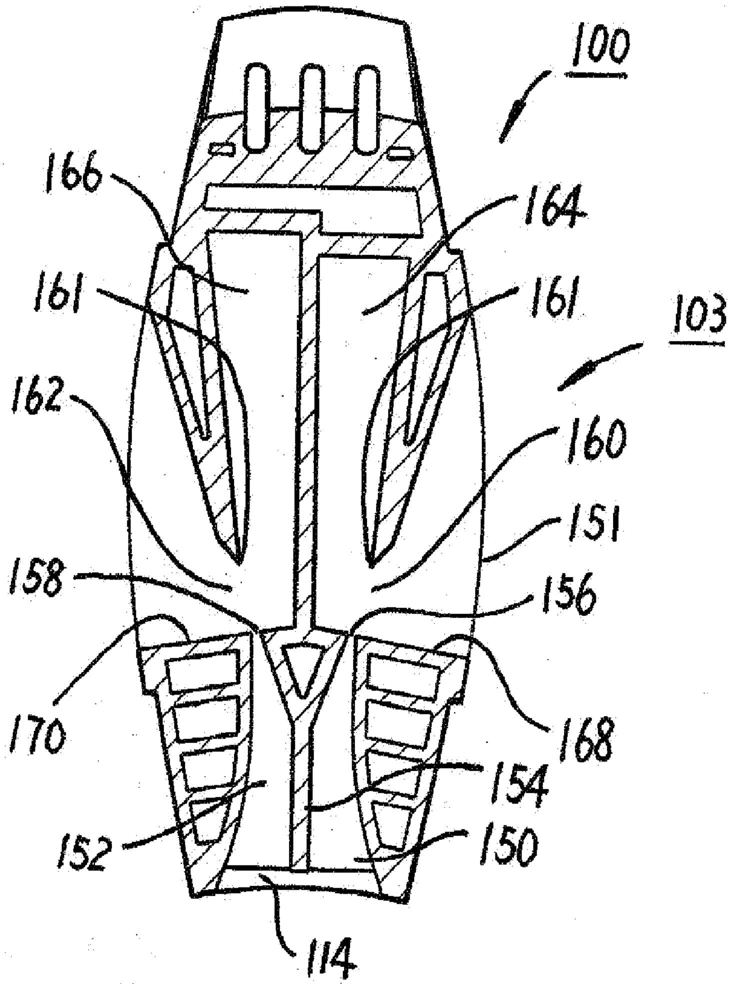


FIGURE - 10

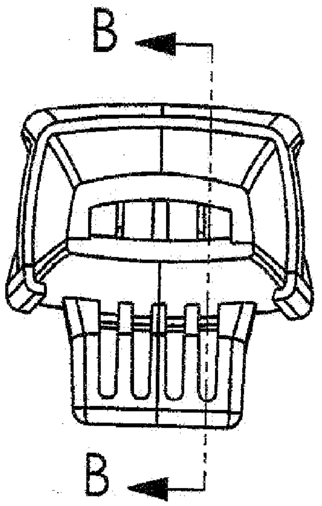


FIGURE - 11

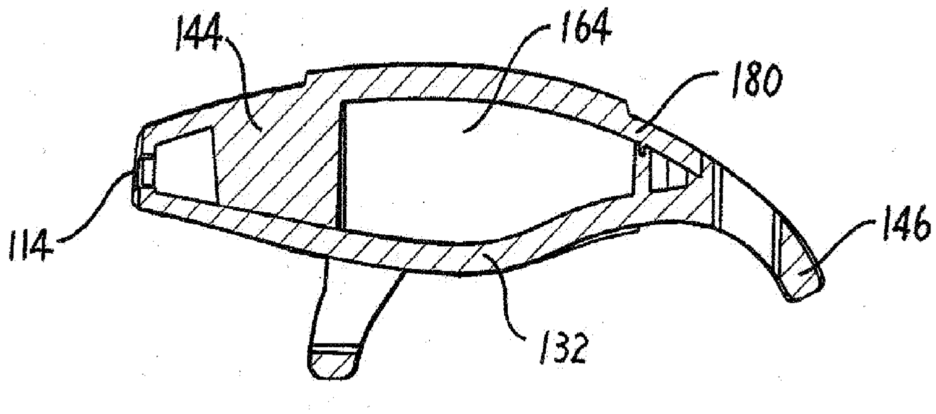


FIGURE - 12

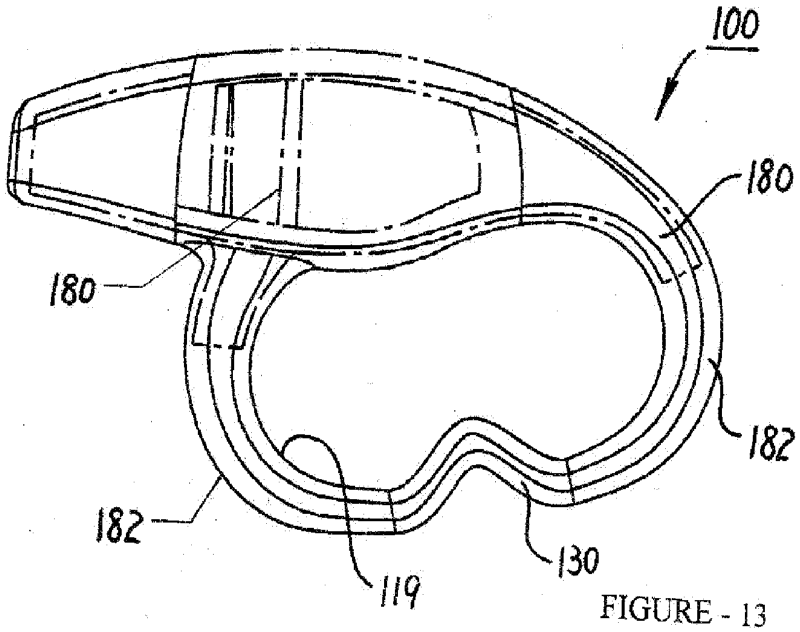


FIGURE - 13

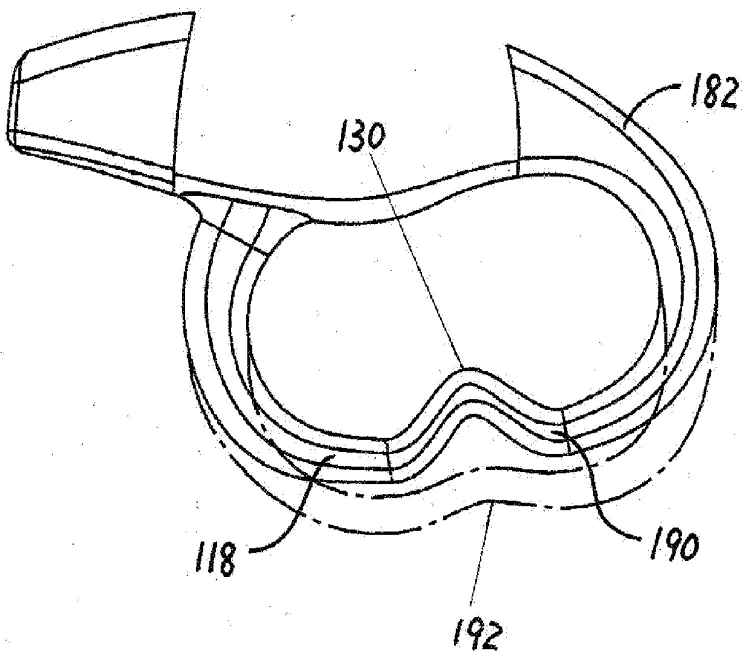


FIGURE - 14

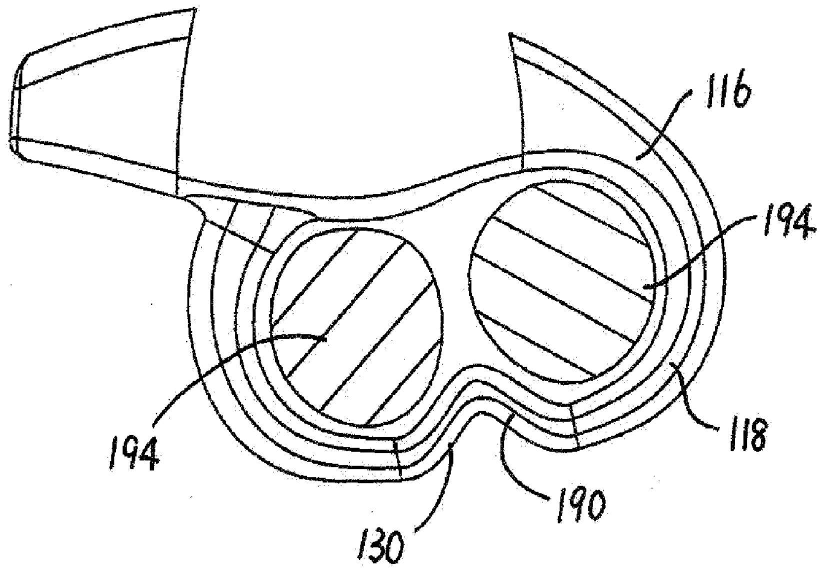


FIGURE - 15

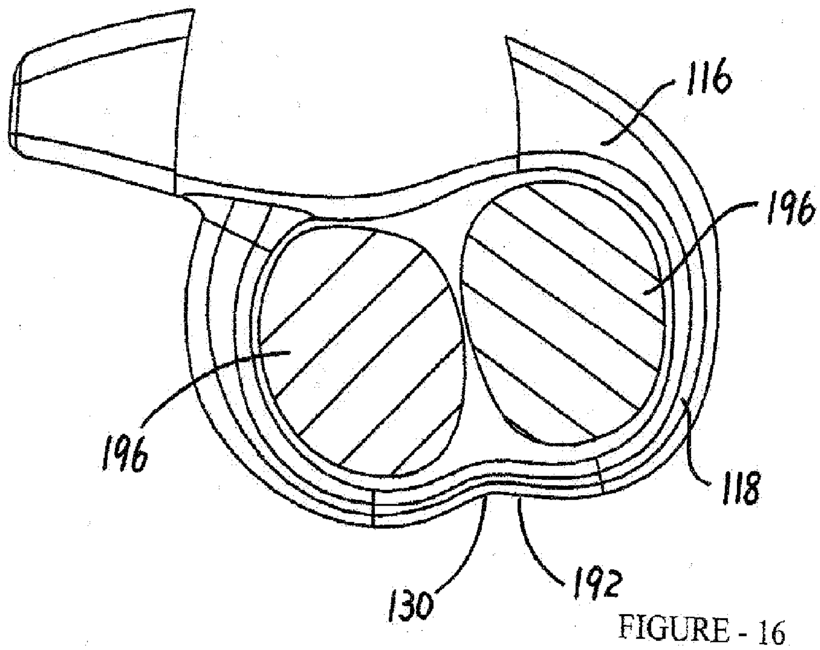


FIGURE - 16

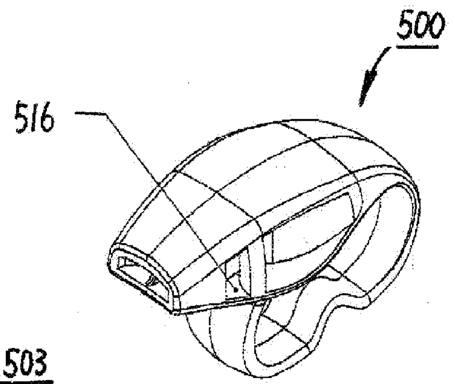
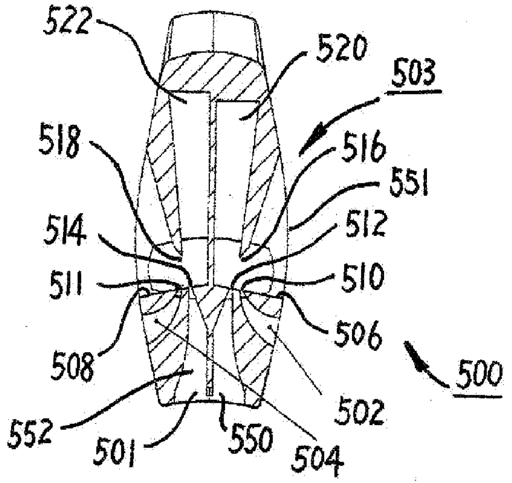


FIGURE 17

FIGURE 18



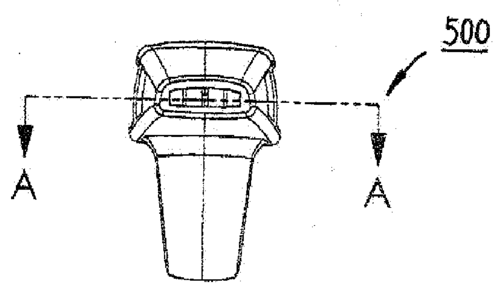
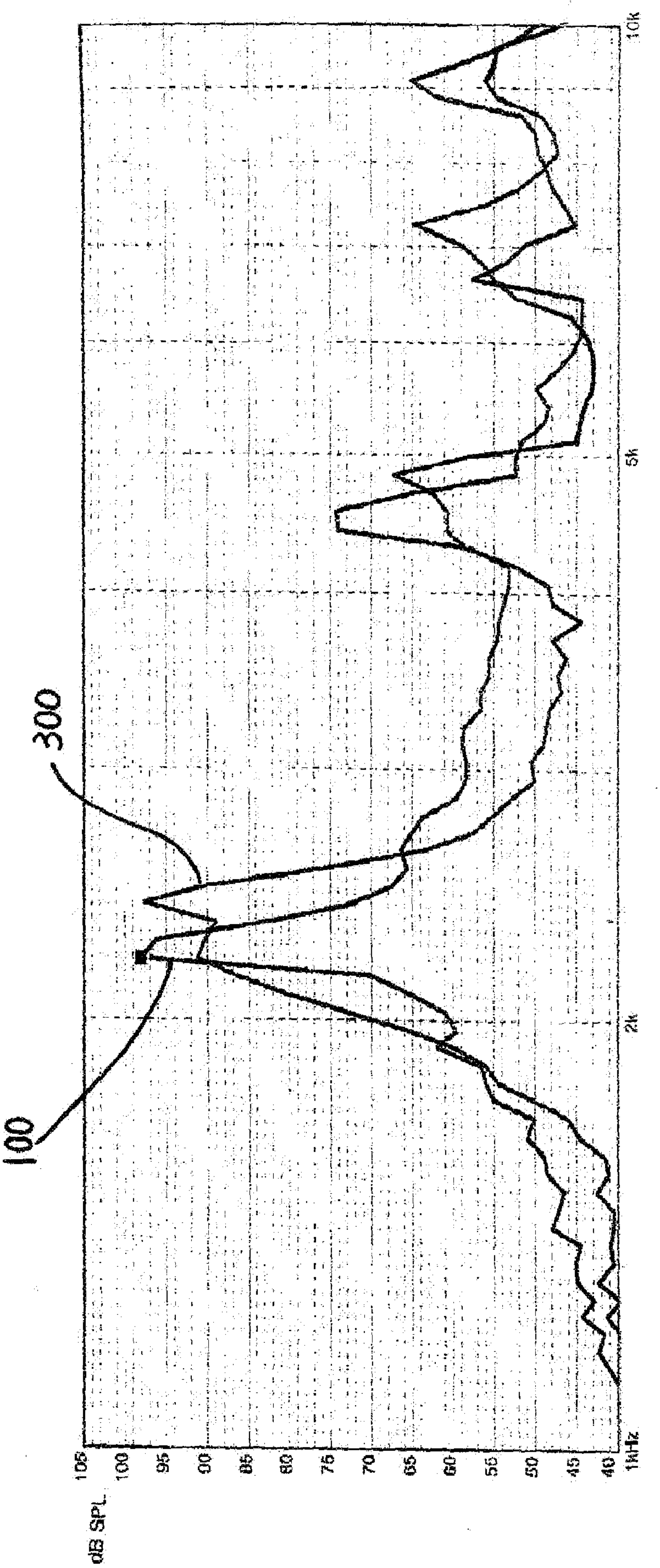


FIGURE 19

FIGURE 20



300
100
dB SPL
105
100
95
90
85
80
75
70
65
60
55
50
45
40
1kHz
2k
5k
10k

FIGURE 21

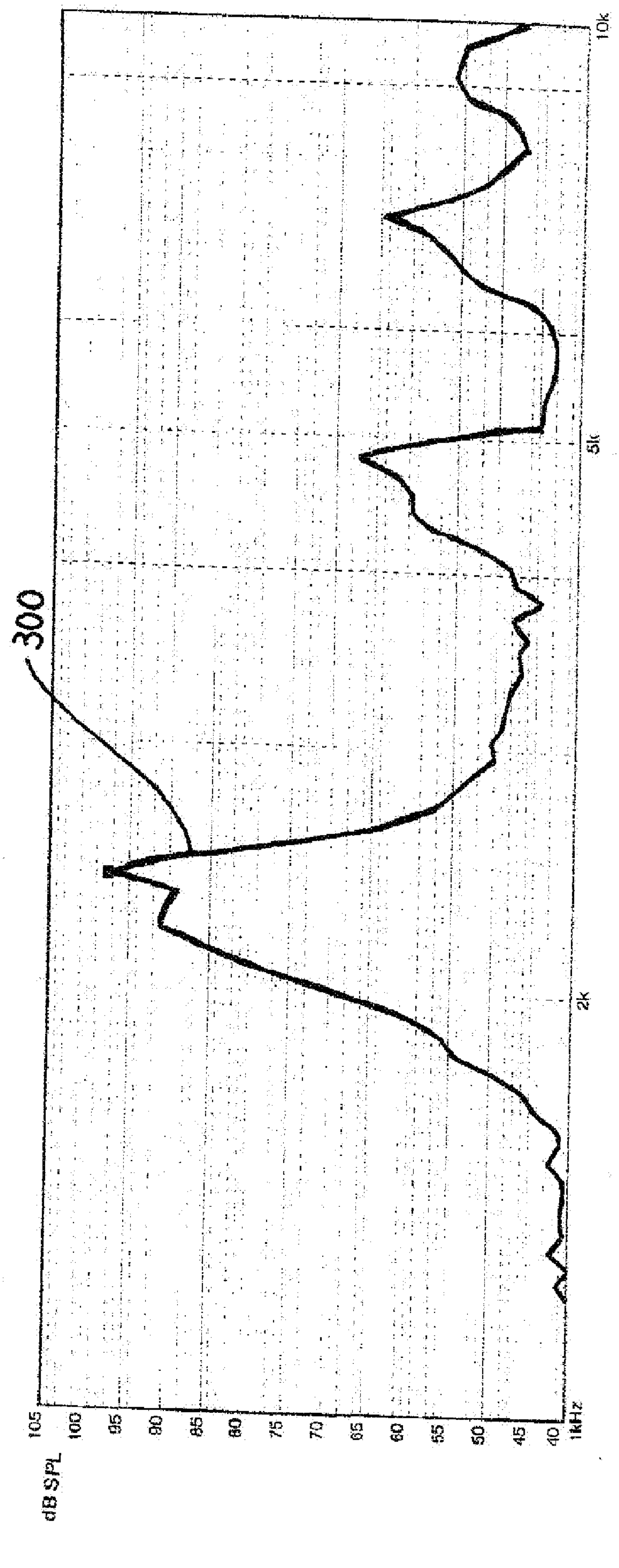


FIGURE 22

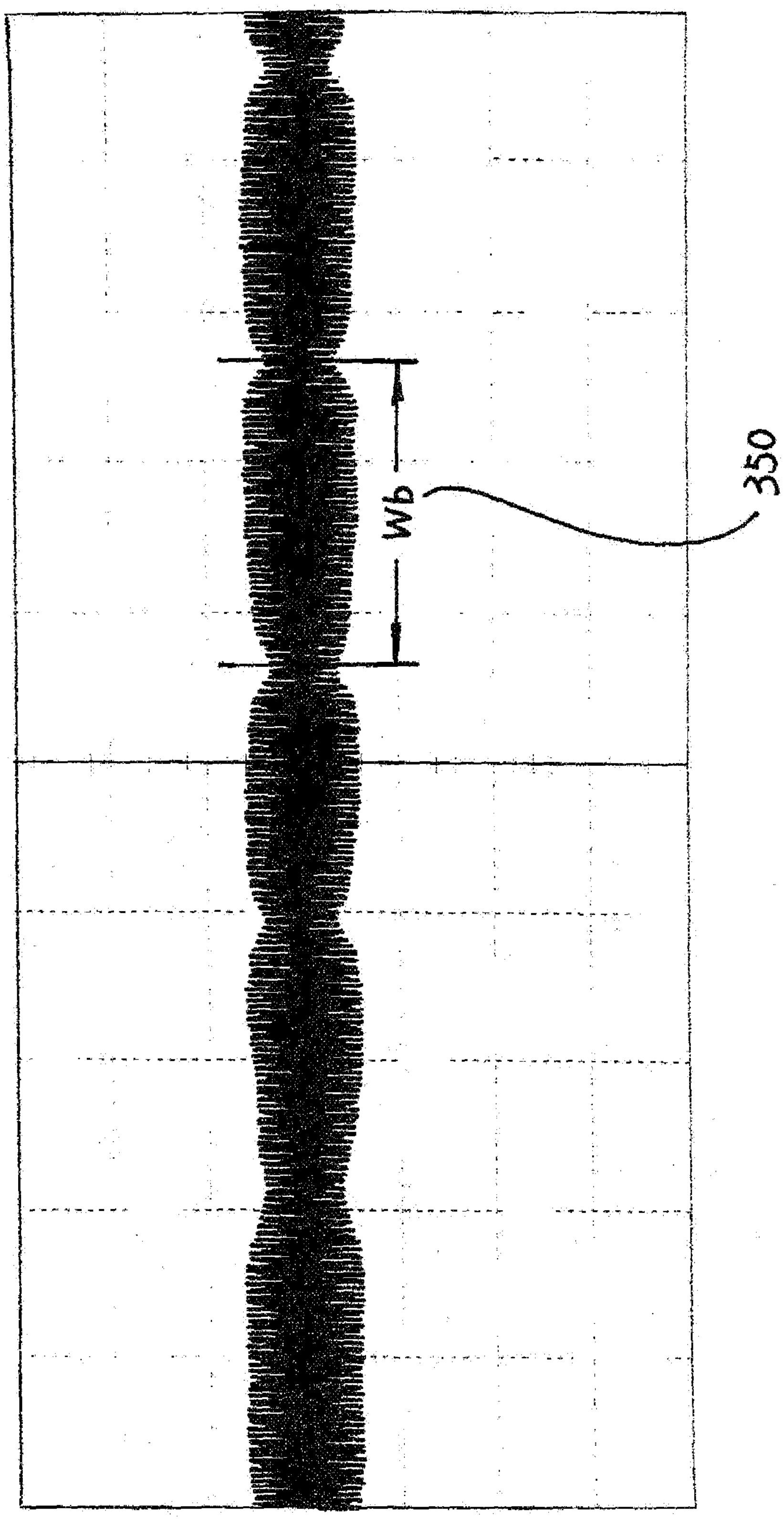


FIGURE 23

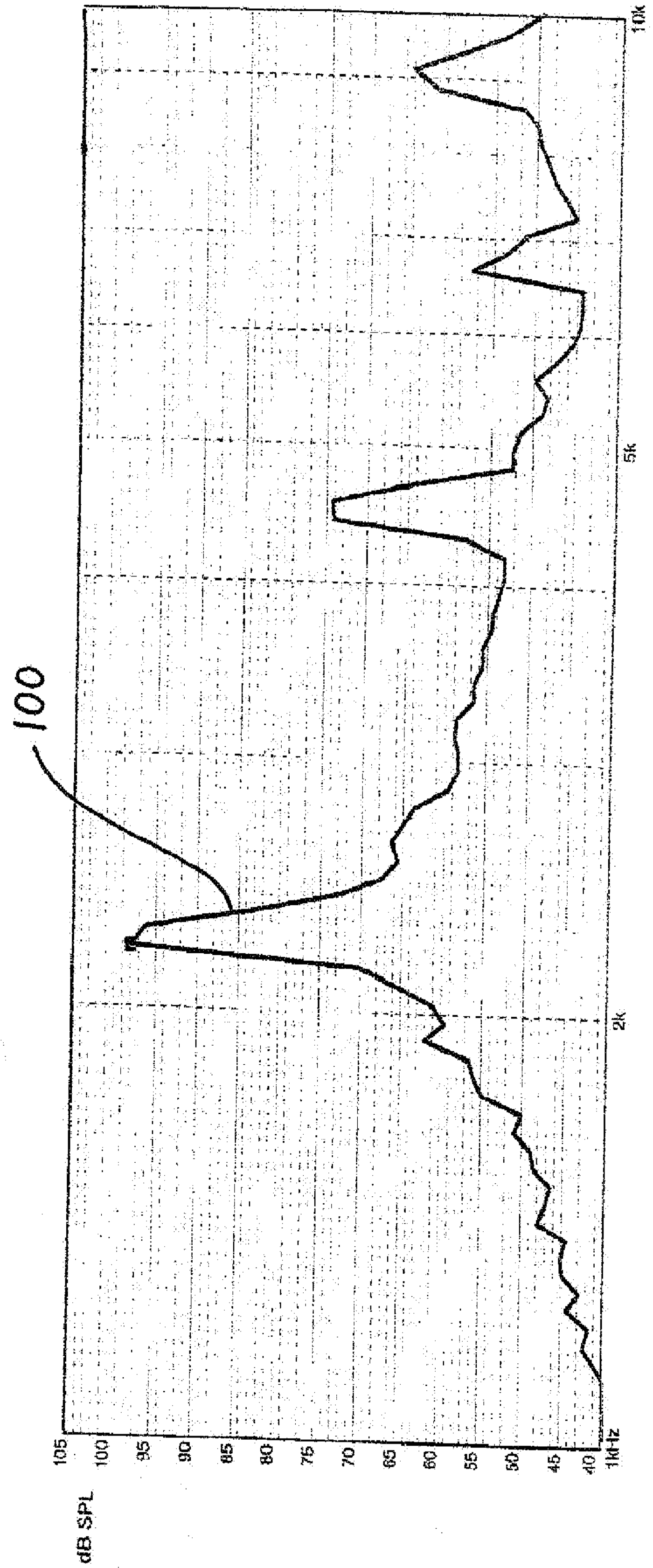


FIGURE 24

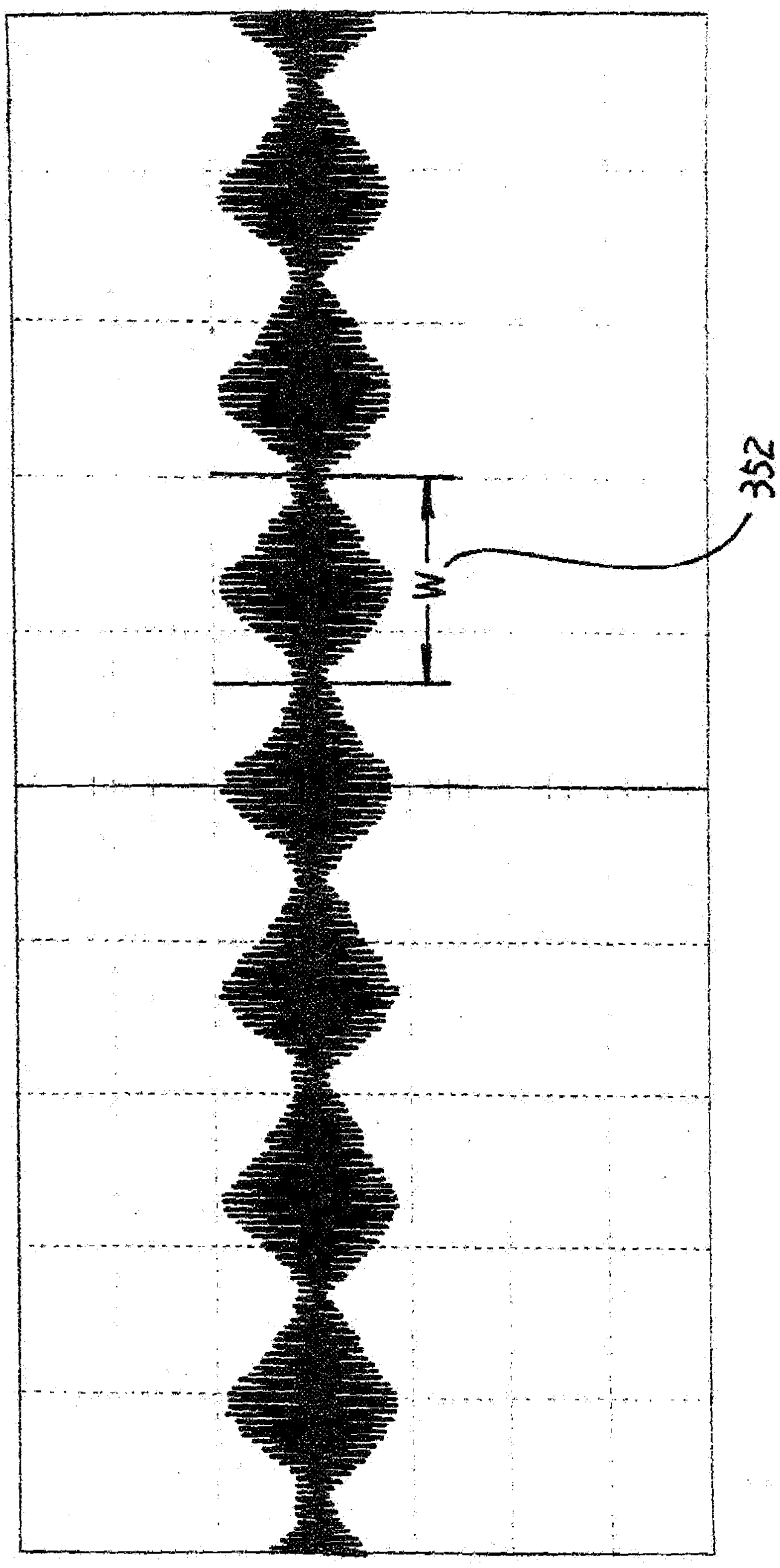
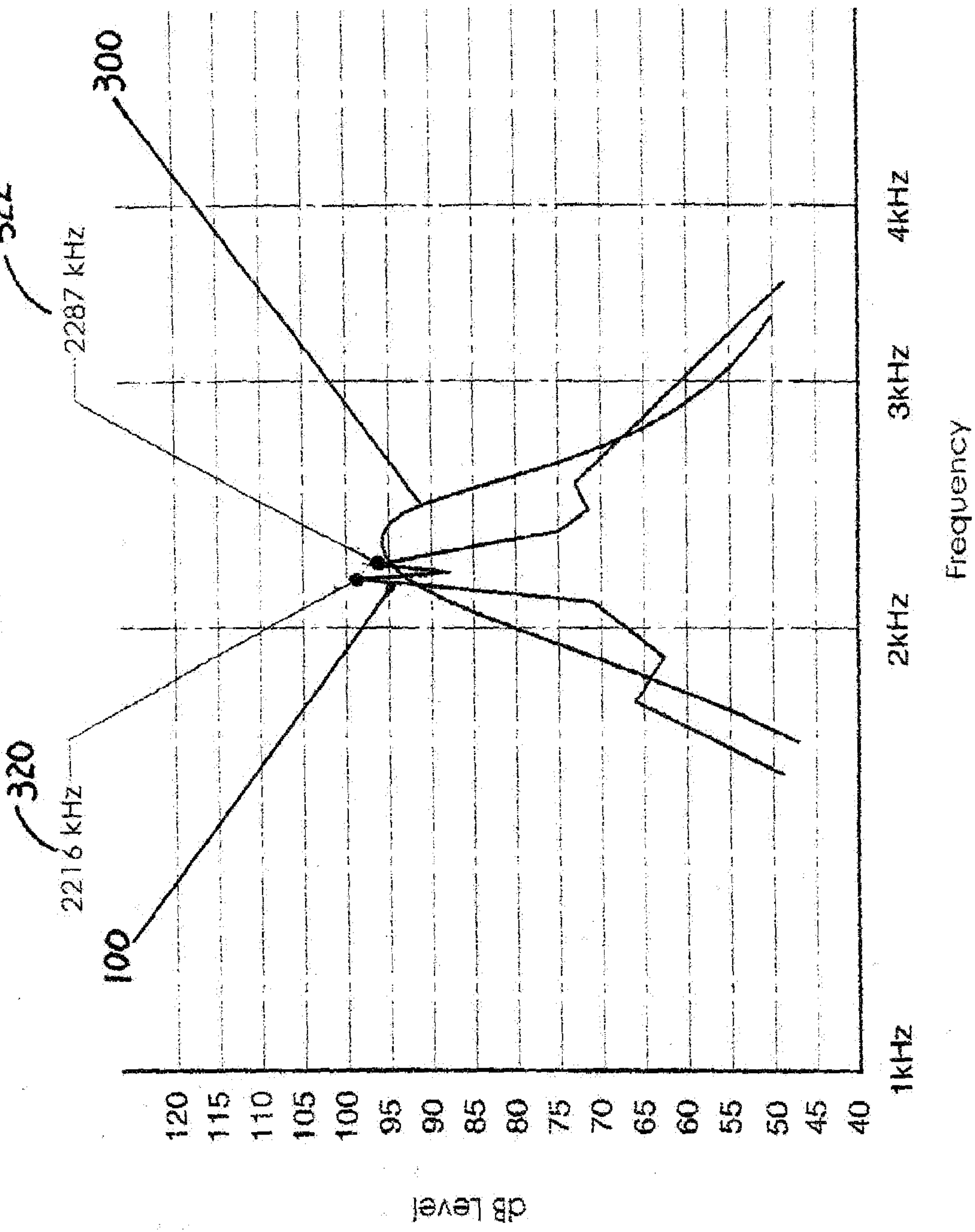


FIGURE 25



300
322
2287 kHz
320
2216 kHz
100
120
115
110
105
100
95
90
85
80
75
70
65
60
55
50
45
40
dB Level
1kHz
2kHz
3kHz
4kHz
Frequency

WHISTLE WITH FINGER GRIP

[0001] This application claims priority from US Design Application No. 29/357,139 filed on Mar. 8, 2010 by Ron Foxcroft, under the title: WHISTLE WITH FINGER GRIP and also claims priority from U.S. provisional Application No: 61/371,227 filed Aug. 6, 2010 by Ron Foxcroft under the title: WHISTLE WITH FINGER GRIP

FIELD OF THE INVENTION

[0002] The present invention relates to whistles and in particular relates to whistles providing a pre-selected pulsating sound and having a resiliency biased finger grip.

BACKGROUND OF THE INVENTION

[0003] Whistles are used for many purposes ranging from use by referees to control sports events to emergency use to attract attention. The required characteristics of whistles depend upon the intended use. For instance a professional referee needs a whistle, which responds reliably to produce a loud noise so that the referee can control a game regardless of crowd noise. In some circumstances such as in emergency situations one wants to have a whistle which produces a very loud piercing sound which will attract the attention of nearby persons that may be able to provide assistance.

[0004] In sporting events referees have come to use certain whistles, which produce a certain sound. In many cases the whistles that are being used by referees stem from historical circumstances. The use of a particular type of whistle that produces a certain sound has often become well known to both players and audience of the games alike,

[0005] Historically most of these whistles have been pea whistles meaning whistles, which contain a rotating ball within the sound or resonating chamber. More recently however there has been a shift to the use of pea-less whistles, which are whistles which do not include the use of a rotating ball or pea within the resonating and/or sound chamber. The advantages of the pea-less whistle have been discussed in numerous prior art documents including U.S. Pat. No. 5,816,816 and U.S. Pat. No. 4,821,670.

[0006] Despite the advantages of the pea-less whistle designs which are currently on the market in many instances they have not been accepted in certain sporting venues due to the differences in the sounds produced by the pea-less whistle and the conventional pea styles whistles. Referees and participants in the sporting events and spectators alike have become accustom to a certain sound which has been broadly accepted within the sporting venue and the whistle which produces that particular sound is the preferred whistle even though the technology within the whistle itself may be less than optimal.

[0007] Therefore there is a need for a whistle which can emulate as closely as possible the sound of a pea-whistle using a pea-less design by creating a whistle which is able to emulate the sound of a particular pea-whistle without the disadvantages associated with the pea-design.

[0008] In addition referees require a whistle, which is comfortable to grip with ones fingers and reliably produce a constant sound.

[0009] U.S. Pat. No. 6,837,177 discusses the possibility of producing a two-chambered whistle wherein the chambers have different resonate frequencies. In particular U.S. Pat. No. 6,837,177 calls for a first chamber having a resonate frequency of 3.4 kilohertz and a second resonate chamber having a resonate frequency of 3.7 kilohertz. This produces a beat frequency of approximately 300 hertz. U.S. Pat. No. 6,837,177 teaches that if the beat frequency is less than 100 hertz the beat is almost negligible with the result that the sound is monotonous. In other words U.S. Pat. No. 6,837,177 is teaching a beat frequency which is at least greater than 100 hertz. U.S. Pat. No. 4,709,651 also discusses the possibility of having a whistle having two sound chambers producing different resonate frequencies. In fact U.S. Pat. No. 4,709,651 teaches that the resonate frequencies of the two sound producing chambers are arranged to produce relatively high and low frequency sounds. In their preferred arrangement the sound range of the whistle namely the two sound producing chambers is such as to substantially cover the upper and lower limits of human hearing. They give the example of the frequency range of the whistle between 2 kilohertz and 8 kilohertz. This patent again teaches a very wide difference in frequencies between the two sound producing chambers namely of the order of 6 kilohertz.

[0010] U.S. Pat. No. 5,816,186 also discusses the concept of providing a whistle that produces beats through the arrangement of two resonate frequencies from two separate sound resonating chambers. This patent does not quantify or discuss how to select a certain beat frequency and/or the ability to emulate the sound of a pea-whistle using a pea-less design.

[0011] In summary the current art teaches the possibility of having two sound resonating chamber pea-less whistle creating a certain beat frequency which is typically 100 hertz and/or more in order to provide a particular beat.

[0012] The present whistle produces a pulse rather than a beat and the inventor has found in practice that it is the pulse sound and not a beat that is required in order to emulate the sound of the existing pea-whistle designs. It has also been found that the introduction of additional air through intake ports helps to emulate the sound of a pea style whistle in a pea less design.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The whistle will now be described by way of example only with reference to the following drawings in which;

[0014] FIG. **1** is a schematic front side perspective view of the whistle.

[0015] FIG. **2** is a front bottom schematic perspective view of the whistle.

[0016] FIG. **3** is the right side elevational view of the whistle.

[0017] FIG. **4** is a left side elevational view of the whistle.

[0018] FIG. **5** is a top plan view of the whistle.

[0019] FIG. **6** is a front end plan view of the whistle.

[0020] FIG. **7** is a bottom plan view of the whistle.

[0021] FIG. **8** is a rear end plan view of the whistle.

[0022] FIG. **9** is a partial front end plan view of the whistle.

[0023] FIG. **10** is a schematic cross sectional view of the whistle taken along lines AA of FIG. **9**.

[0024] FIG. **11** is a partial schematic front elevational view of the whistle.

[0025] FIG. **12** is a schematic cross sectional view of the whistle taken along lines BB of FIG. **11**.

[0026] FIG. **13** is a schematic side elevational partial cut away view of the whistle showing the hard plastic components and the rubber overlay.

[0027] FIG. **14** is a side schematic elevational view of the whistle showing only the rubber overlay portion of the whistle.

[0028] FIG. **15** is a schematic cross sectional side view of the whistle showing small lingers housed within the finger grip sleeve of the finger grip showing the V-spring in a normal position.

[0029] FIG. **16** is a side cross sectional schematic view of large fingers shown within the finger sleeve of the finger grip with the V-spring shown in the expanded position.

[0030] FIG. **17** is a top front schematic perspective view of an alternate embodiment of namely whistle **500**.

[0031] FIG. **18** is a schematic cross sectional view of whistle **500** taken along lines AA of FIG. **19**.

[0032] FIG. **19** is a schematic partial front elevational view of the alternate embodiment namely whistle **500**.

[0033] FIG. **20** is a graph depicting sound decibels on the Y-axis and frequency on the X-axis showing two frequency charts superimposed one on the other comparing a traditional ball whistle with the present whistle design.

[0034] FIG. **21** is a chart showing decibels on the Y-axis and frequency on the X-axis for a traditional ball whistle.

[0035] FIG. **22** is a graph depicting amplitude on the Y-axis and time along the X-axis showing the periodic pulse frequency of a traditional ball whistle, which is graphed in FIG. **21**.

[0036] FIG. **23** is a graph depicting decibels on the Y-axis and frequency on the X-axis showing the frequency fingerprint of the whistle made in accordance with the present design.

[0037] FIG. **24** is a chart showing amplitude on the Y axis and time on the X-axis showing the periodic pulse frequency of the present design depicted in graph form in FIG. **23**.

[0038] FIG. **25** is a schematic chart showing decibel levels on the Y-axis and frequency on the X-axis super imposing a traditional ball whistle and the present design whistle.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0039] The present device a whistle shown generally as **100** in the Figures includes the following major components namely a body **110** having a mouthpiece **112**, which defines and inlet **114**. Whistle **100** further includes a finger grip **116**, which is comprised of a finger sleeve **118** and also includes a V-spring **130**.

[0040] Whistle **100** can be oriented relative to a horizontal plane **122** and a vertical plane **120** as shown in FIG. **6**.

[0041] Whistle **100** further includes a right exhaust port **160**, a left exhaust port **162**, a right side **136**, a left side **138**, a top side **140**, a bottom side **142**, a front portion **144** and a rear portion **146**, a central portion **132** and an exterior surface **151**.

[0042] Now referring specifically to FIG. **10**, which shows in cross section the whistle **100** along lines A-A of FIG. **9** and includes the following inlet **114** which is divided into a right air passageway **150** and a left air passageway **152** with an air divider **154**. Passageways **150** and **152** terminate at right air orifice **156** and left air orifice **158** respectively and direct air into sound box **103**. The air blown typically using the mouth through inlet **114** exits through right air orifice **156** and left air orifice **158** into sound box **103** and impinges upon edges **161** and interacts with right sound chamber **164** and left sound chamber **166** and exits through right exhaust port **160** and left exhaust port **162** partially defined by right deflector **168** and left deflector **170**.

[0043] Referring now to FIG. **12** which is a cross sectional view along lines B-B of FIG. **11**, the hard plastic components of whistle **100** are shown in FIG. **12** as body core **180**.

[0044] In the moulding process the hard plastic components are generally moulded and assembled to form body core **180** and thereafter a rubber overlay as shown as **182** in FIG. **14** is moulded over top of the hard plastic body core **180**.

[0045] FIG. **14** shows the rubber overlay **182** portion of whistle **100** whereas FIG. **13** shows the hard plastic body core **180** together with the rubber overlay **182**. The reader will note that finger grip **116** is mostly made of rubber overlay material **182**. The interior **119** of finger sleeve **118** is completely made of elastomeric material which preferably is an elastomeric rubber overlay **182**, as is V-spring **130**.

[0046] FIGS. **15** and **16** show schematically small fingers **194** and large fingers **196** inserted into finger sleeve **118** of finger grip **116**. In FIG. **15** small fingers **194** are shown within finger sleeve **118** wherein V-spring **130** is in a normal position **190**. Normal position **190** V-spring **130** may be slightly expanded to resiliently bias against the exterior of fingers **194** as shown in FIG. **15**.

[0047] In FIG. **16** large fingers **196** are shown within finger sleeve **118** such that V-spring **130** is shown in the expanded position **192**. In the expanded position **192**, finger sleeve **118** can accommodate larger fingers as shown as large fingers **196** in FIG. **16** and continue to resiliently bias against the exterior of large fingers **196**.

[0048] FIGS. **17**, **18** and **19** show an alternate embodiment namely whistle **500** which includes almost all of the same components as whistle **100** with the addition of a right intake port **502** and a left intake port **504**. Right intake port **502** and left intake port **504** allow port air to enter separately from inlet air entering inlet **501**. Port air is naturally drawn in rather than blown in as is the case with inlet air entering inlet **501**. Port air is drawn into right intake port **502** and left intake port **504** through a venturi or siphoning action which occurs by placing the air orifices **512** and **514** in close proximity to right air aperture **510** and left air aperture **511**. Right air aperture **510** and left air aperture **511** exit at right deflector **506** and left deflector **508** proximate right air orifice **512** and left air orifice **514** which communicate with right sound chamber **520** and left sound chamber **522**.

[0049] Inlet **501** is divided into a right air passageway **550** and a left air passageway **552** and discharges inlet air into the sound box **503**. The passageways **550** and **552** exhaust inlet air into the sound box **503** at air orifices **512** and **514**. In practice it has been found that the use of the right intake port **502** and left intake port **504** creates a sound emanating from whistle **500** which more closely emulates the sound of the traditional pea-style whistle. In practice it is preferable to orient the air apertures **510** and **511** between the orifices and the exterior surface **551**. In other words the air apertures **510** and **511** are closer to the exterior surface than the air orifices. The sound box includes deflectors **506** and **508** for deflecting sound forwardly, and the air orifices **512** and **514**, and air apertures **510** and **511** are preferably located along the deflector.

[0050] Referring now to FIGS. **20** through to **25**, which generally are charts, which show on the Y-axis decibel sound levels and on the X-axis frequency and/or time. FIG. **20** shows the sound profile of a traditional ball whistle **300** and the present whistle **100**.

[0051] The present whistle **100** appears in FIG. **20** as having a single peak however in practice with a finer resolution of the measuring equipment in fact the peak which occurs at approximately 2250 hertz is actually a twin peak one having a peak at 2216 hertz and the other having a peak at 2287 hertz as depicted in FIG. **25**.

[0052] These frequency peaks namely the 2216 hertz peak shown as **320** and the 2287 hertz peak shown as **322** create a periodic pulse frequency of 71 hertz. The peak principal frequency of 2216 hertz corresponds to one of the sound chambers and the peak principal frequency of 2287 hertz corresponds to the other sound chamber in whistle **100**. The peak principal frequency difference causes interference of these two frequencies resonating from the two sound chambers which creates the periodic pulse frequency which preferably is in the range of 10 to 100 hertz in order to provide a pulsating sound emulating the traditional pea-type whistle.

[0053] Referring to FIG. **21** which depicts decibels in the Y-axis and frequency on the X-axis of a traditional ball whistle **300** and FIG. **22** which shows the corresponding periodic pulse period WB as shown as **350** in FIG. **22**. WB shown as **350** the pulse period in FIG. **22** is measured at 50 hertz (wb=50 hertz) which are the measurements taken from a traditional pea-style whistle.

[0054] FIG. **23** depicts decibels on the Y-axis and frequency on the X-axis and shows a peak frequency of approximately 2216 hertz. However as described above in FIG. **25** the peak is actually a twin peak having two peak frequencies of 2216 hertz and 2287 hertz. The pulse period W for the present whistle **100** is shown in FIG. **24** and is measured at 71 hertz (W=71 hertz) which is the periodic pulse frequency due to the interactions of the principle frequencies of the two sound chambers.

[0055] The reader will note that in FIG. **20** there are other smaller peaks to the right of the peak principle frequency which are called harmonic peak frequencies and/or simply harmonic frequencies which add very little to the sound being heard from the whistle.

I claim:

1. A whistle for producing resonant frequencies comprising:

a) a body which includes a front portion including a mouth piece with an inlet, and includes a rear portion including at least two sound chambers,

b) the front portion including at least two air passageways each receiving inlet air at the inlet and discharging inlet air at an orifice,

c) the body further includes a central portion separating the front portion from the rear portion, the central portion including at least two exhaust ports each for discharging air and sound and for communicating inlet air from the orifice to the sound chamber,

d) wherein the exhaust ports include deflectors in horizontally opposed relationship to the sound chambers for deflecting sound and air,

e) wherein the front portion includes additional air intake ports for communicating port air into the exhaust port at an air aperture such that the orifices and air apertures discharge air along the deflector.

2. The whistle claimed in claim **1** wherein the air apertures and orifices are located in side by side relationship along the deflector.

3. The whistle claimed in claim **2** wherein the air intake ports drawing in port air independently of the inlet.

4. The whistle claimed in claim **2** wherein the orifices discharging inlet air independently of the air apertures discharging port air.

5. The whistle claimed in claim **1** wherein the port air is drawn into exhaust port by siphoning action from the adjacent flow of inlet air exiting the orifice.

6. The whistle claimed in claim **2** wherein each intake port is located in the front portion of the body between the inlet and the deflector.

7. The whistle claimed in claim **1** wherein the two sound chambers are dimensioned to create peak principal frequencies which interactively produce a pulsating sound having a periodic pulse frequency of less than 100 hertz.

8. (canceled)

9. (canceled)

10. (canceled)

11. The whistle claimed in claim **1** wherein the two sound chambers are dimensioned to create peak principal frequencies which interactively produce a pulsating sound having a periodic pulse frequency of between 10 to 100 hertz.

12. The whistle claimed in claim **11** wherein two sound chambers are dimensioned to produce a peak principal frequency difference of between 10 hertz to 100 hertz and wherein the principal frequency is selected between 2000 and 2400 hertz.

13. A whistle for producing resonant frequencies comprising:

a) a body includes a mouth piece having an inlet, at least two sound chambers to which inlet air is blown from the inlet,

b) air passageways for communicating inlet air from the inlet to the sound chambers;

c) the body further includes at least two exhaust ports in communication with the sound chambers for discharging air and sound;

d) a finger grip which includes a contiguous finger sleeve integrally connected to the body for receiving and surrounding two fingers therein;

e) the finger sleeve includes a V shaped expansion spring for accommodating variations in finger size and gripping the fingers within the finger sleeve, the V shaped expansion spring moveable between a normal V position and an expanded position wherein the V shaped spring is substantially flat.

14. The whistle claimed in claim **13** wherein one leg of the V spring contacting one finger and the other leg of the V contacting the other finger.

15. (canceled)

16. (canceled)

17. (canceled)

18. The whistle claimed in claim **13** wherein the V shaped expansion spring made of elastomeric material.

19. The whistle claimed in claim **13** wherein an interior of the contiguous finger sleeve is made of elastomeric material.

20. A whistle for producing resonant frequencies comprising:

a) a body includes a mouth piece having an inlet, at least two sound chambers to which inlet air is blown from the inlet;
b) air passageways for communicating inlet air from the inlet to the sound box and sound chambers;
c) the body further includes at least two exhaust ports in communication with the sound chambers for discharging air and sound;
d) wherein the two sound chambers are dimensioned to create peak principal frequencies which interactively produce a pulsating sound having a periodic pulse frequency of less than 0.1 KHz.

21. The whistle claimed in claim **20** wherein two sound chambers are dimensioned to produce a pulsating sound having a periodic pulse frequency of between 0.010 KHz to 0.90 KHz hertz and wherein the principal frequency is selected between 2.0 KHz and 2.4 KHz.

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