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(54) Whistle

(57) A whistle (1), particularly a sports whistle, which is generally in the shape of a mandolin and has two whistle element sound chambers (2,3) arranged side-by-side and each having a cross section which is asymmetrical, preferably part-circular and part square. The sound chambers (2,3) are arranged so that the blowing pressure required to generate a sound pressure level of 90DbA and a maximum frequency of about 3.9KHz is only 0.5 p.s.i. The sound chambers (2,3) are separated from one another at each air vent (4,5) by a fin (F) of generally narrow width, and the entrance to each sound chamber is defined in part by a respective inclined inner wall (10,11) near the central longitudinal axis of the whistle.

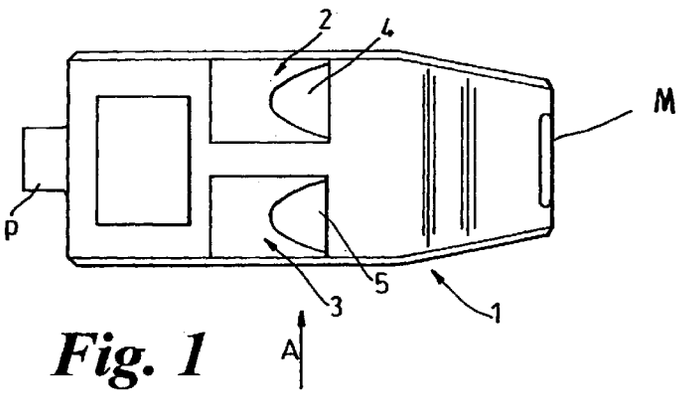

Fig. 1

EP 1 020 844 A2

Description

[0001] This invention relates to a whistle and is more particularly, but not exclusively, concerned with a sports whistle for use by a coach or referee.

[0002] Sports whistles are well known but, nevertheless, it is believed that all operating parameters have not been optimised in a single design and that there still tends to be a number of problems associated with such whistles that, as yet, have not been overcome.

[0003] For example, usually three sound chambers are provided in side-by-side relationship in order to provide a high frequency whistle. However, such designs are not as compact as they could be if fewer sound chambers were employed. Once again, such whistles require considerable lung capacity in order to blow hard enough into the whistle to produce the required high frequency sound.

[0004] Of course, many whistle users such as coaches and referees do not necessarily have a large lung capacity and yet are required to produce a loud sound when blowing the whistle. If the whistle is used as a safety whistle, children, elderly people or asthmatics or anyone who happens to be short of breath will usually need to be able to produce 90DbA sound pressure even to obtain a "gentle" blow with such known whistles. Of course, even where the sports whistle is used by a user having a reasonable lung capacity it can still be tiring to have to blow constantly at a required pressure level throughout, for example, a game of football. The majority of referees use a blowing pressure of 1.2 p.s.i. and it can be uncomfortable having to maintain this pressure where the whistle is required to be blown a large number of times during a game.

[0005] It is believed that it should be possible to produce a whistle that can be blown at a high pitched frequency at a blowing pressure which is reduced over previous designs. Furthermore, it is believed that such a whistle can be produced in a more compact form but conforming generally to the shape of a sports whistle if required. Previous designs of whistles tend to be disadvantageous in that the blowing pressure may sometimes be too high in order to produce the required high frequency, the whistle may be more bulky than need be the case and the sound created may vary to an undesirable extent as blowing pressure is increased. Once again such designs may not allow the sound to carry over a great enough distance in some circumstances.

[0006] It is an object of the present invention to provide a whistle that at least alleviates one or more of the aforementioned, or other, disadvantages associated with whistles and/or to provide a whistle which is improved in at least some respect.

[0007] According to the present invention there is provided a whistle having one or more of the following features:

(a) two whistle element sound chambers arranged side-by-side and one or more of the sound element chambers having a cross section which is asymmetrical and preferably scalloped or D-shaped or part-circular and part square,

(b) two whistle element sound chambers arranged side-by-side in such a manner that the blowing pressure required to generate a sound pressure level of 90DAB is less than 1.00 p.s.i. and preferably in the range of 0.5 p.s.i. to 1.00 p.s.i. and most preferably the blowing pressure required need only be 0.5 p.s.i.,

(c) two whistle element sound chambers arranged side by side and separated from one another at each air vent from the associated sound chamber by a fin or wall of generally narrow width (for example one tenth of an inch - .25cm and in any event less than one quarter of an inch - .64cm),

(d) a compact whistle, being a sports whistle generally in the shape of a mandolin as herein defined having two whistle element sound chambers side by side, the entrance to each sound chamber being defined in part by a respective inclined inner wall near the central longitudinal axis of the whistle,

(e) at least one whistle element sound chamber shaped in order to produce a sound frequency above 3.7 KHz and preferably at about 3.9 KHz and/or a sound pressure level above 115 DbA and preferably up to 120 DbA.

(f) at least one whistle element sound chamber shaped in order to produce a maximum frequency above 3.7 KHz (and preferably at about 3.9 KHz) at a constant blowing pressure of 0.5 p.s.i.

[0008] The term "mandolin" shape is herein defined as meaning the shape of a whistle which in some sense resembles the shape of a mandolin, in which the mouthpiece of the whistle resembles the narrow elongate neck of the mandolin in side elevation with a somewhat bulbous (normally part circular or curved) rear portion usually accommodating two whistle chamber elements, the bulbous rear portion extending downwardly to form a shaped base which is, in practice, gripped by the user of the instrument on the sides thereof.

[0009] Many advantages of the present invention will be apparent from the following description and drawings.

[0010] An embodiment of a whistle in accordance with the present invention, will now be described, by way of example only, with reference to the accompanying drawings in which:-

FIGURE 1 shows a plan view of the whistle;

FIGURE 2 shows a side view of the whistle looking in direction of Arrow "A" in FIGURE 1;

FIGURE 3 shows a view similar to FIGURE 1 of a base of the whistle but with a top of the whistle removed;

FIGURE 4 shows a cross-sectional view of the whistle taken on line IV-IV of FIGURE 3;

FIGURE 5 shows a longitudinal sectional view taken on line V-V of FIGURE 3;

FIGURE 6 shows a longitudinal sectional view taken on line VI-VI of FIGURE 3;

FIGURE 7 shows a longitudinal view taken on line VII-VII of FIGURE 3;

FIGURE 8 shows an underneath view of the whistle base shown in FIGURE 3 looking in the direction of arrow "B" in FIGURE 5;

FIGURE 9 shows a view looking in the direction of arrow "C" in FIGURE 8;

FIGURES 10 and 11 show details of the whistle base (FIGURE 11 is a sectional view taken on line XI-XI of FIGURE 3);

FIGURE 12 shows a section taken on line XII-XII of FIGURE 8;

FIGURE 13 shows an underside view of the whistle top;

FIGURE 14 shows a sectional view of the whistle top taken on line XIV-XIV in FIGURE 13;

FIGURE 15 shows a plan view of the top shown in FIGURE 13;

FIGURE 16 shows a longitudinal sectional view of the top taken on line XVI-XVI of FIGURE 15;

FIGURE 17 shows a cross-sectional view of the whistle taken on line XVII-XVII of FIGURE 15;

FIGURE 18 shows a cross-sectional view of the whistle top taken on line XVIII-XVIII of FIGURE 15;

FIGURES 19 and 20 show details of the whistle top;

FIGURE 21 shows an end view of the whistle top looking in the direction of arrow D in FIGURE 13, and

FIGURES 22 and 23 show graphs indicating frequency characteristics and sound pressure levels of a whistle in accordance with the present invention (FIGURE 22) compared with a known prior art whistle (FIGURE 23).

[0011] The FIGURES 1 to 21 of the drawings show various views of a plastics whistle 1 (including cross sectional views with and without top 7).

[0012] The general form of whistle 1 is known for example from our previous patent specification No. U.S. 5086726 (hereby referred to in full) and therefore the following description is directed towards the major differences in accordance with the present invention.

[0013] FIGURE 1 shows the top view of the whistle 1 including two whistle element sound chambers 2,3 with vents 4,5, said element sound chambers being side-by-side in the whistle in a common plane.

[0014] FIGURE 2 shows a side view of the whistle 1 looking in the direction of arrow A in FIGURE 1, said whistle having a mouth piece M and being generally of a "mandolin" shape and being a sports whistle for use by referees. Whistle 1 has a rear projection p formed with aperture a for the reception of a cord or lanyard.

[0015] The whistle 1 is formed from two interfitting parts, namely a top 7 (see FIGURES 15 to 21) and a base 6 (see FIGURES 3 to 14).

[0016] FIGURE 3 shows a plan view of the whistle 1 with top 7 removed (i.e. a plan view of the base 6), and showing sound chamber halves 4a,5a separated by central wall W_1. In practice, top 7 is welded to base 6.

[0017] FIGURE 4 shows a cross section of the whistle base 6 taken on the line IV-IV of FIGURE 3 showing a cross section of each whistle element sound chamber half 4a,5a which mates with its associated cross sectional half chamber 4b,5b in the whistle top 7 (see FIGURES 15 and 17) to form asymmetrical or scalloped shaped sound element whistle chambers 2,3. Thus, each sound chamber 2,3 has a cross section which is part circular for 270° and which has a right angle corner 4c,5c for the remaining 90°. The corners 4c,5c are formed in the base 6 and face outwardly of the top.

[0018] A very important part of the whistle 1 is the special asymmetrical shape of the internal whistle element sound chambers 2 and 3. It has been found that the asymmetrical shape can create a 4.4% increase in sound pressure level over a similar, sports whistle with standard, symmetrical (circular cross section) sound chambers. FIGURES 22 and 23 show graphs indicating frequency characteristics and sound pressure levels of a whistle with symmetrical (unscalloped) sound chambers and of a whistle in accordance with the present invention having asymmetrical (scalloped) sound chambers respectively.

[0019] The two graphs demonstrate how, at constant blowing pressure of 0.5 p.s.i., the maximum frequency generated is 3.7 KHz in the whistle used to generate the graph of FIGURE 5 and the whistle used to

generate the graph of FIGURE 6 produces 3.9 KHz. Thus, the whistle with scalloped chambers creates a 4.4% increase in sound pressure level from 115.0 DbA to 120.0 DbA. It is to be noted that every increase of 3 DbA represents a doubling up of the power of the whistle. Thus the increase demonstrated for a whistle in accordance with the present invention at a constant blowing pressure is very considerable.

[0020] As shown in FIGURES 3 and 5, director ramps 8,9 in the base 6 are angled at 68° to the vertical in order to guide air blown in the mouthpiece M into the associated sound chamber 2,3. The dashed lines in FIGURE 3 indicate V-shaped ribs (energy director ribs V - see FIGURE 10) which fit into mating grooves g (indicated by dashed lines in FIGURE 13) in the top 7. Details of the grooves g are shown in FIGURES 19 and 20. Peg 12 (see FIGURE 3) fits into circular aperture 13 (see FIGURE 13) in the top 7. Central wall W_2 (with recess R) separates chamber halves 4b,5b from each other and wall W_2 is provided with inclined faces 10a,11a in similar manner to faces 10,11 on wall W_1 (described later).

[0021] Importantly, FIGURE 15 demonstrates the division of the two whistle element sound chamber air splitter edges 2a and 3a by a fin F of thickness of about one tenth of an inch (0.25cm). The provision of the fin F and its selected dimensions is very important in the design of whistle 1 in creating a distinct well into which the air splitter edge 2a,3a is located. The fin F prevents air turbulence at the splitter edge 2a,3a, which turbulence could cause distortion of the frequency and at the same time the fin prevents interference between the two sound chambers 2 and 3 which could cause constant lack of clarity and unpredictable sound distortion. An interchangeable pad P is provided on which can be provided on appropriate Logo or information.

[0022] Thus, it is believed that the whistle 1 is appropriately shaped and dimensioned to:

1. create a loud, clear sound at a reduced blowing pressure,
2. create a compact design, within the traditional shape of a sports whistle,
3. create a sound which, even as blowing pressure is increased remains reasonably constant,
4. create a lower frequency component to the whistle to provide greater carrying distance to the sound than is generally found in such sports whistles.

[0023] By obtaining the desired frequency and sound pressure level from two sound chambers (this type of high frequency sports whistle usually has three chambers) it is possible to reduce the pressure required to generate the sound pressure level of a 90 DbA from 1.5 p.s.i. (the industry standard whistle) to 0.5 p.s.i.

[0024] Another feature which has an important effect on the production of an exceptional sound is the raising of a section at the back of the mouthpiece M of the whistle and from the air director ramps 8 and 9 (see FIGURE 3) so as to create a well, as previously mentioned, in order to enable a purer sound tone.

[0025] The relative lengths of the whistle sound chamber elements 2 and 3 is also very important to producing two individual frequencies which, when in combination, produce an overall frequency as close to 4.00 KHz as possible. The frequency of 4.00 KHz provides the high pitch necessary to catch human attention, but low enough to be audible over a distance. Most sports whistles of a similar type produce frequencies of 4.35 KHz and 4.5 KHz; these frequencies are excellent indoors but do not carry outdoors.

[0026] Thus, the whistle as aforedescribed requires far less pressure and volume throughput to blow two chambers than it does to blow three, this being an advantage of use of only two chambers.

[0027] The selected chamber lengths acting in combination with the fin F used to separate the two splitter edges 2a and 3a combined with the relative position of the two chambers 2 and 3 all combine to create the particular trill associated with this whistle at low breath pressure and the shaping of each of the whistle element chambers 2 and 3 in an asymmetrical manner enables a high maximum frequency to be generated.

[0028] Overall, therefore, the aforementioned design of whistle enables a high pitch frequency sound to be produced with much less blowing pressure and thus is much less tiring for the user.

[0029] Of additional importance is the inclined faces 10,11 (positioned at right angles to one another - see FIGURE 3) provided at the entrance to each respective sound chamber 2,3 on wall W_1 just before the associated director ramp 8 or 9. In such whistles the internal leading edge is usually parallel with the longitudinal axis of the whistle but inclining the edge as shown at approximately 45° ± 5° is also a dramatic improvement.

[0030] Overall, the whistle 1 is provided with numerous improvements any one of which would improve the general performance of the whistle, which feature when taken in combination, it is believed, provide a maximum improvement. Therefore, any permutation of such particular advantageous whistle features may be patentable. In particular, a former version of the Applicant's whistle did not include the particular asymmetrical shape of the whistle sound element chambers and said chambers were of a normal cylindrical cross section. Such a whistle was still found to work well in practice but is even better with the asymmetrical shape of chamber.

[0031] It is to be understood that the scope of the present invention is not to be unduly limited by the particular choice of terminology and that a specific term may be replaced by, or supplemented by, an equivalent or generic term. For example, the term "whistle" could be replaced by "wind instrument" or "pealess type sound chamber element". Further it is to be understood that individual features, methods or functions relating to the whistle or whistle chamber element/s might be indi-

vidually patentably inventive.

[0032] In particular, any disclosure in this specification or a range for a variable or parameter shall be taken to include a disclosure of any selectable or derivable sub-range within that range and shall be taken to include a disclosure of any value for the variable or parameter lying within or at the end of the range or sub-range. The singular may include the plural and vice versa.

Claims

1. A whistle having two whistle element sound chambers arranged side-by-side, one or both of the sound element chambers having a cross section which is asymmetrical.

2. A whistle having two whistle element sound chambers arranged side-by-side in such a manner that the blowing pressure required to generate a sound pressure level of 90 DbA is less than 1.00 p.s.i. and preferably in the range of 0.5 p.s.i. to 1.00 p.s.i. and most preferably the blowing pressure required need only be 0.5 p.s.i.

3. A whistle having two whistle element sound chambers arranged side-by-side and separated from one another at each air vent from the associated sound chamber by a fin or wall of generally narrow width (for example one tenth of an inch - .25cm and in any event less than one quarter of an inch - .64cm).

4. A compact whistle, being a sports whistle, generally in the shape of a mandolin as herein defined having two whistle element sound chambers side-by-side, the entrance to each sound chamber being defined in part by a respective inclined inner wall near the central longitudinal axis of the whistle.

5. A whistle having at least one whistle element sound chamber shaped in order to produce a sound frequency above 3.7 KHz and preferably at about 3.9 KHz and/or a sound pressure level about 115 DbA and preferably up to 120 DbA.

6. A whistle having at least one whistle element sound chamber shaped in order to produce a maximum frequency above 3.7 KHz (and preferably at about 3.9 KHz) at a constant blowing pressure of 0.5 p.s.i.

7. A whistle as claimed in any of the preceding claims in combination with any one or more of the other preceding claims.

8. A whistle as claimed in Claim 1 or Claim 7 when dependent on Claim 1 wherein the or each sound element chamber having a cross section which is asymmetrical, is scalloped or D-shaped or part-circular and part square.

9. A whistle as claimed in Claim 8 wherein each sound element chamber has a cross section which is part circular for 270° and has a right angle corner for the remaining 90°.

10. A whistle as claimed in Claim 4 wherein the said inner walls are each angled at 68° to the vertical.

11. A whistle as claimed in Claim 3 wherein the fin is arranged to divide air splitter edges of the respective said chambers and said edges are located in a well.

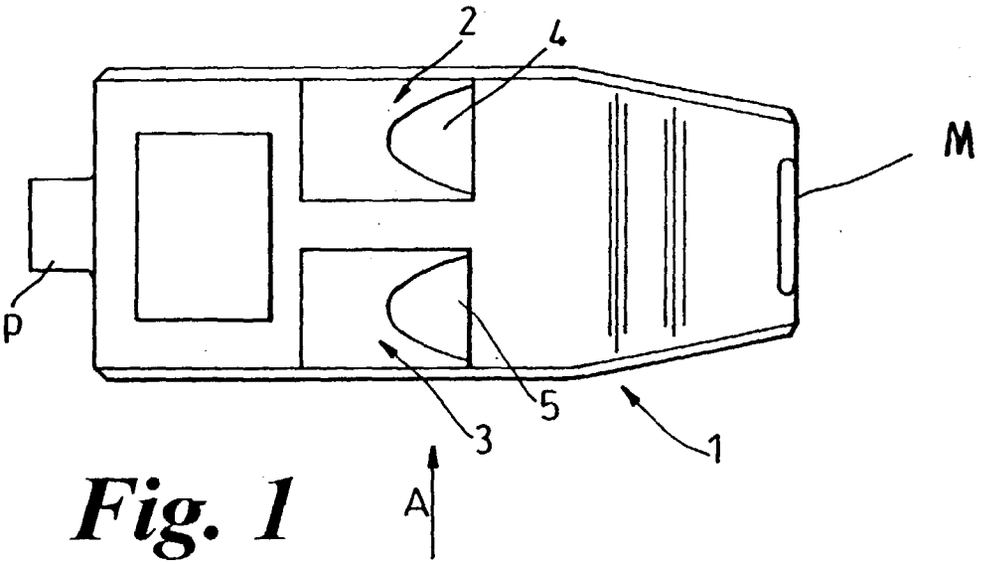

Fig. 1

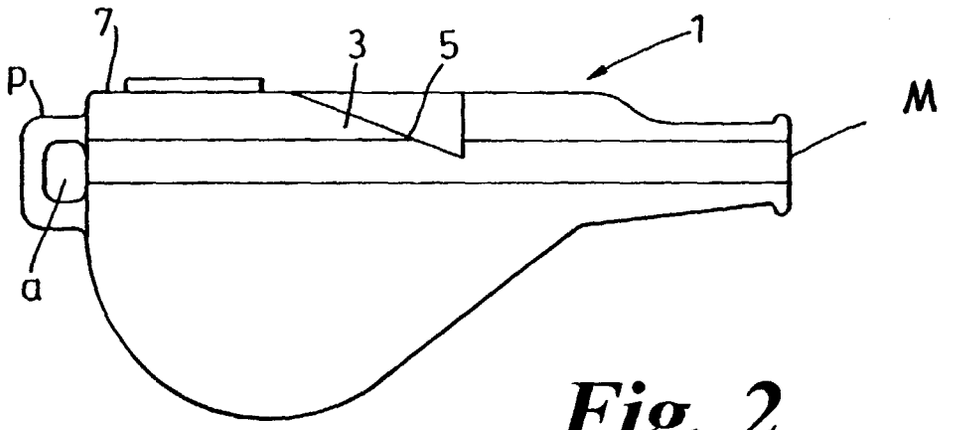

Fig. 2

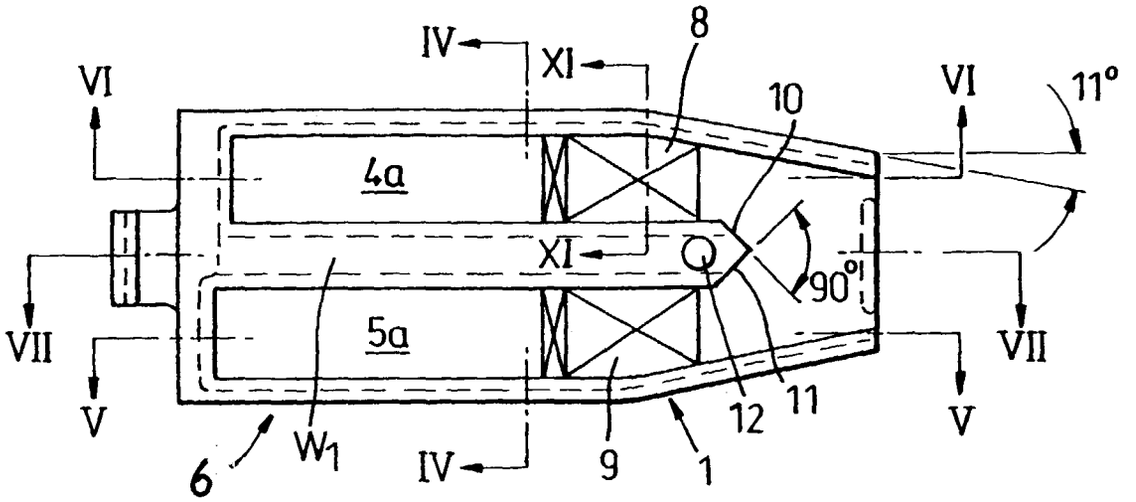

Fig. 3

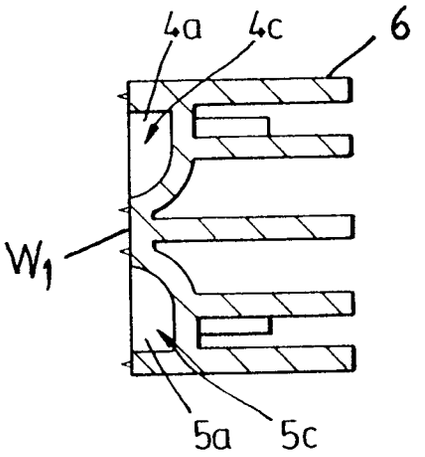

Fig. 4

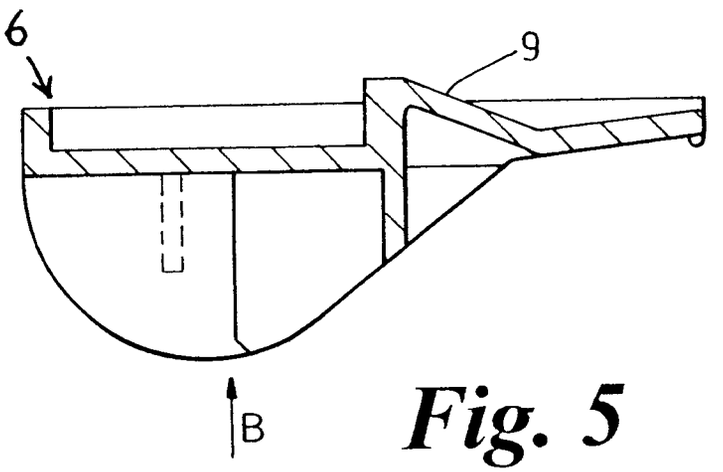

Fig. 5

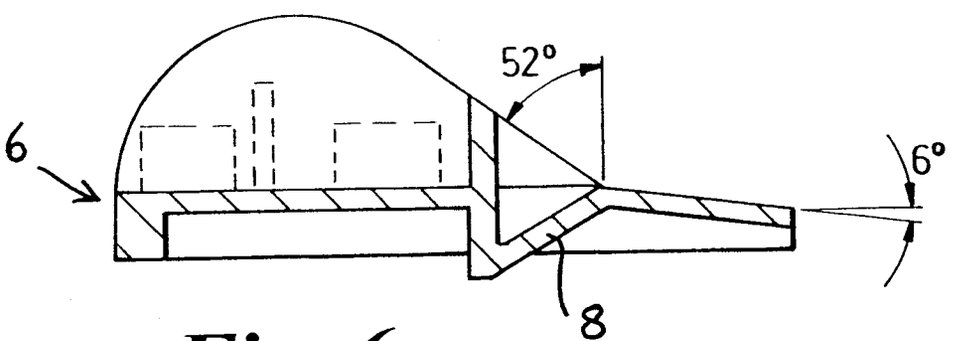

Fig. 6

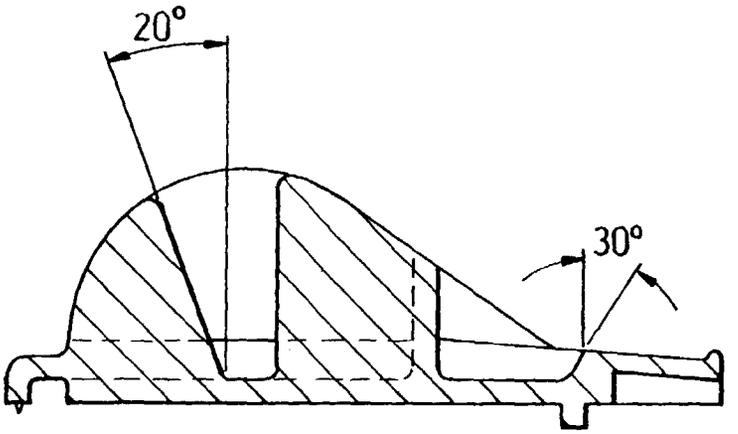

Fig. 7

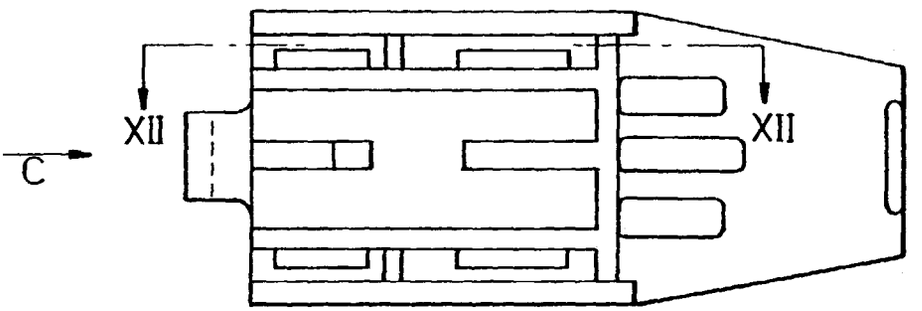

Fig. 8

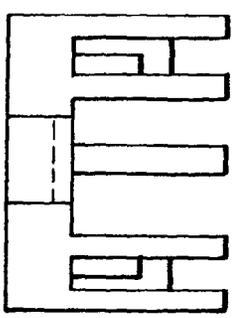

Fig. 9

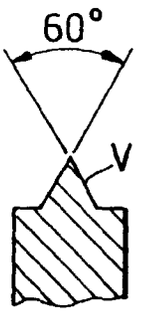

Fig. 10

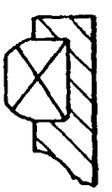

Fig. 11

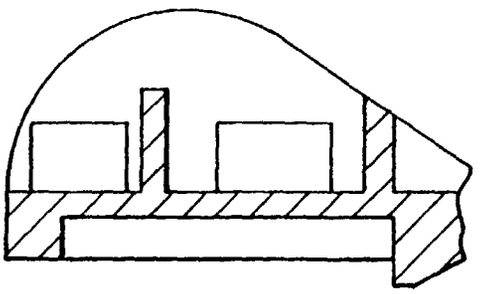

Fig. 12

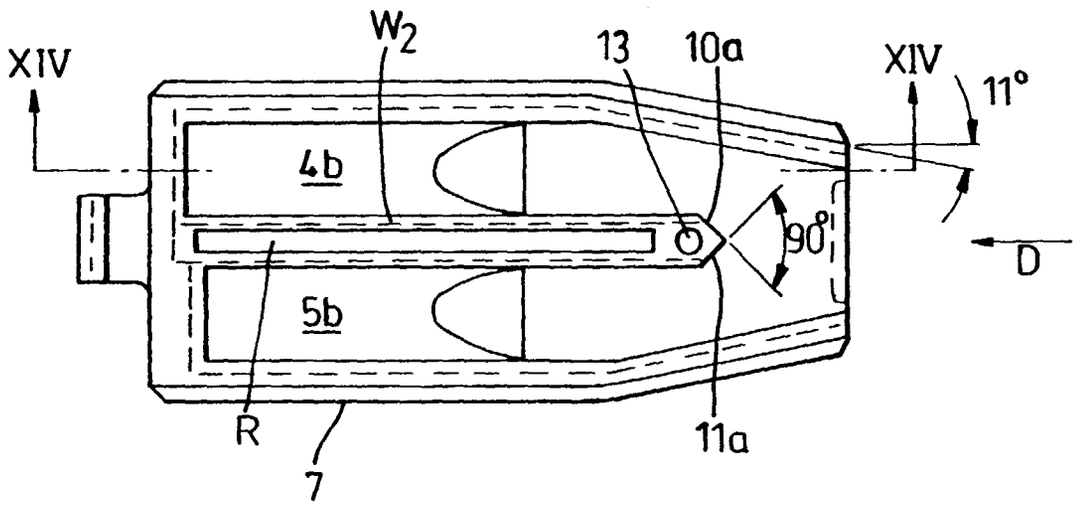

Fig. 13

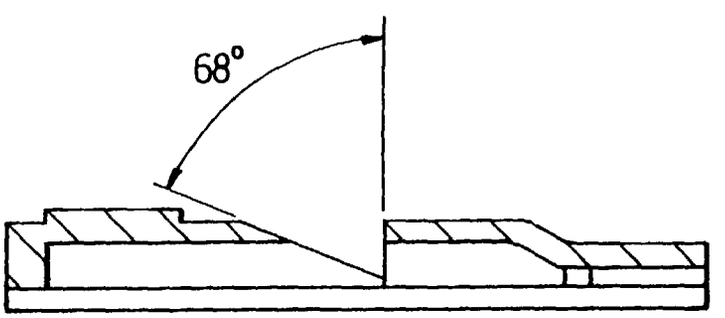

Fig. 14

Fig. 18

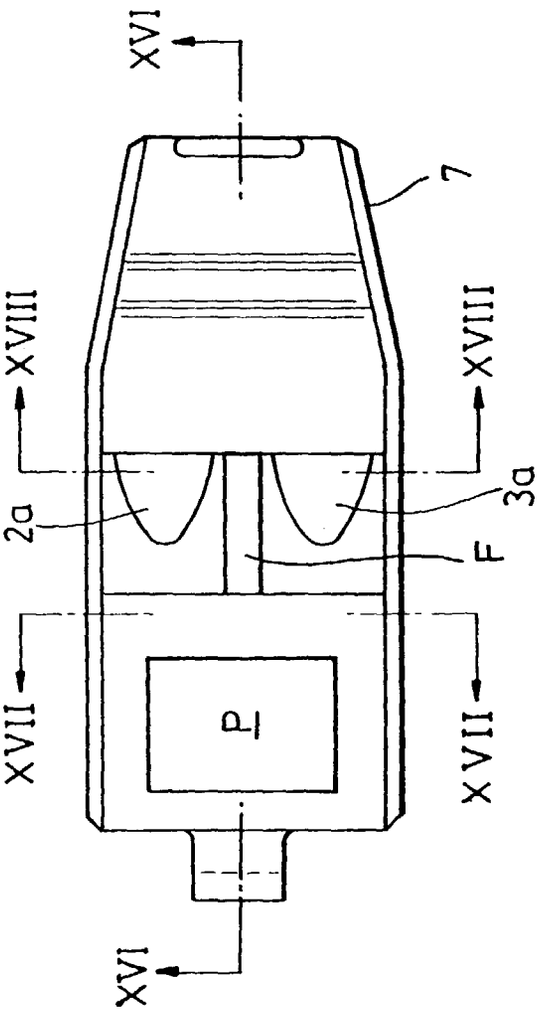

Fig. 15

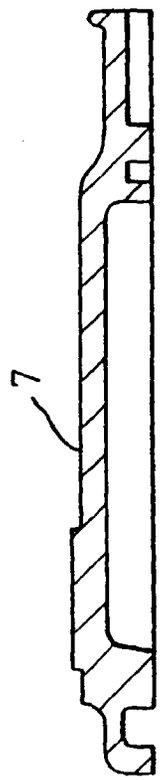

Fig. 16

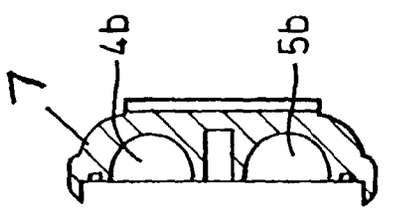

Fig. 17

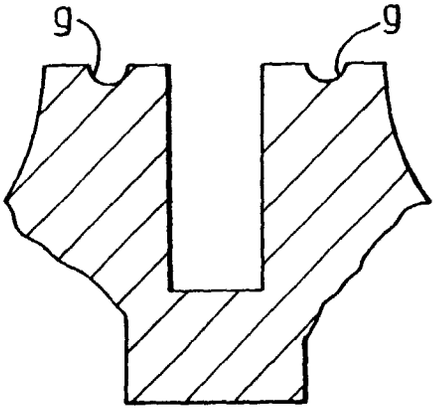

Fig. 19

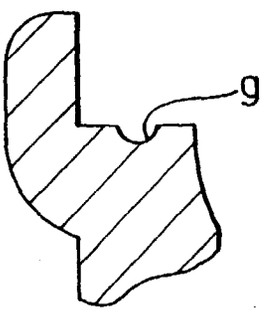

Fig. 20

Fig. 21

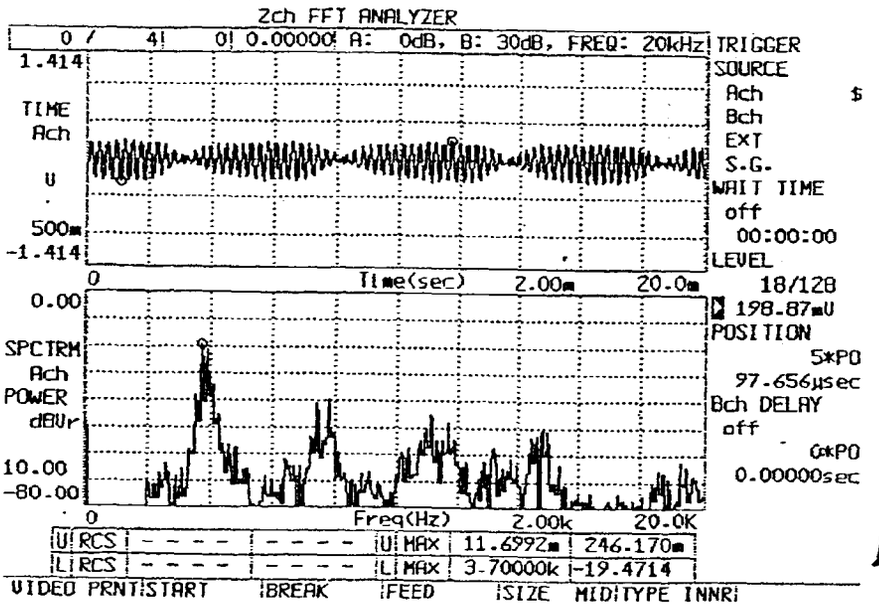
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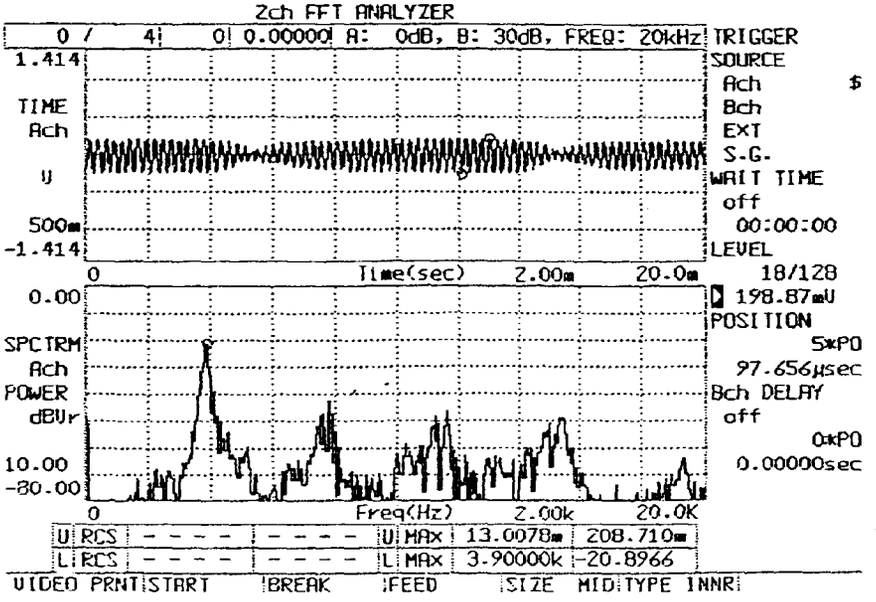
Fig. 22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2.00k
20.0K
U RCS - - - - - - - - - - U MAX 13.0078m 208.710m
L RCS - - - - - - - - - - L MAX 3.90000k -20.8966
VIDEO PRNT START BREAK FEED SIZE MID TYPE INNR

Fig. 23