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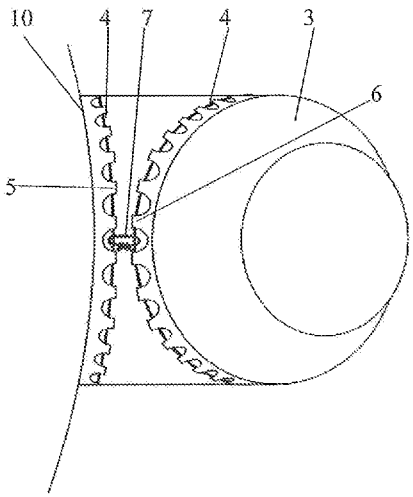
(54) Title: NOZZLE AND AIR CONDITIONING DUCT

Fig. 3



(57) Abstract: A nozzle for an air conditioning duct, the nozzle comprising an inlet opening at an inlet end (1) and an outlet opening at an outlet end, the outlet opening being for an air output, the nozzle being adapted for being attached with its inlet end to the wall (10) of the air conditioning duct and comprising on its external side a proximal circumferential area at the inlet end (1) and a distal circumferential area, spaced apart from the proximal area, wherein the nozzle is provided with an adjustment element (7), which is arranged outside of the nozzle and is attached or attachable to the proximal circumferential area and attached or attachable to the distal circumferential area and adapted for an adjustment and locking of the degree of tilting of the nozzle outlet opening plane with respect to the nozzle inlet opening plane by adjusting the length of the adjustment element (7) between its fastening to the proximal circumferential area and fastening to the distal circumferential area.

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Nozzle and air conditioning duct

Field of Art

The present invention relates to an air conditioning duct comprising textile tube having an inlet end for an air intake from an air conditioning duct and an outlet end for an air output, wherein the inlet end is adapted to be attached to a wall of the air conditioning duct and is provided with and adjustment element.

Background of the Invention

Air conditioning ducts for distribution of air are known in the art. These ducts may be made of metal or textile and are provided with openings for passing the distributed air from ducts to its surrounding.

In order to increase the reach of the distributed airflow, said openings can be provided with nozzles. The nozzles for air conditioning ducts so far known in the art have a strictly defined shape and thus also the direction of the air output. Therefore, during the use, they do not allow for change of the direction of the air.

Furthermore, nozzles with an adjustable output direction, which are provided with four spaced apart tunnels, wherein each of the tunnels extends from the inlet end of the nozzle to the outlet end of the nozzle and comprises a tightening band within, wherein the tightening band is attached on one side and exits the tunnel on the other side, are known in the art. It is therefore possible to adjust the length of the nozzle on one of its sides by sliding the tunnel along the band, thus bending it to a desired direction. The drawback of these adjustable nozzles is that the adjustment is slow and difficult, because the tunnels decrease the flexibility of the nozzle.

Summary of the Invention

The above mentioned drawbacks of the prior art are eliminated to a large extent by a nozzle for an air conditioning duct, which comprises an inlet opening for air intake from an air conditioning duct at the inlet end, and an outlet opening for air output at the outlet end, the nozzle being adapted for being attached to the wall of the air conditioning duct

by the inlet end and comprising on its external side a proximal annular circumferential area at the inlet end and a distal annular circumferential area, disposed spaced apart from the proximal area, at the outlet end, wherein the distal annular circumferential area is provided with an adjustment element, which is disposed outside of the nozzle and is fastened or fastenable to the proximal circumferential area and fastened or fastenable to the distal circumferential area, and is adapted for an adjustment and locking of the degree of tilting of the nozzle outlet end plane with respect to the nozzle inlet end plane by an adjustment of the length of the adjustment element between its fastening location to the circumferential area and its fastening location to the distal circumferential area.

The proximal circumferential area is provided with a set of proximal fastening elements for fastening of the adjustment element and/or the distal circumferential area is provided with a set of distal fastening elements for attaching the adjustment element, wherein the proximal fastening elements are made up of a set of loops, through which the annular reinforcement passes.

In another preferential embodiment, the proximal fastening elements and/or the distal fastening elements are made up of annular band with loops and an annular reinforcement, which passes through the loops.

At its outlet end, the nozzle is preferably provided with an end piece having a cross-section, the size of which is decreasing in the direction from the inlet end to the outlet end.

In a preferential embodiment, the distal area is arranged between the proximal area and the end piece.

The distal area is preferably provided with an annular reinforcement and/or the proximal area is provided with an annular reinforcement. Simultaneously, the adjustment element can be fastenable to at least one of the reinforcements for an adjustment and locking of the degree of tilting of the nozzle outlet end plane with respect to the nozzle inlet end plane.

Drawbacks of the prior art are to a large extent eliminated also by an air conditioning duct, the wall of which comprises at least one through-hole, the above described nozzle for directing the flow of air exiting the opening being adjacent to the through-hole at the outer side.

Brief description of the drawings

The invention is further described in more detail using exemplifying embodiments, which are schematically depicted in drawings, wherein Fig. 1 shows a first exemplifying arrangement of the nozzle according to the invention on the wall of the air conditioning duct, Fig. 2 shows a second exemplifying embodiment, Fig. 3 shows a third exemplifying embodiment and Figs. 4 and 5 show a fourth exemplifying embodiment.

Detailed description of exemplary embodiments

Fig. 1 shows a part of the wall 10 of the air conditioning duct, the nozzle according to the invention being attached to the wall. The nozzle comprises a cylindrical tube which has an inlet end 1, by which the nozzle is attached to the wall of the air conditioning duct 10 in such a way that it lines up with a through-hole in said wall. Furthermore, the duct has an outlet end, to which an end piece 3 is connected, the end piece having a truncated cone surface shape.

The inlet end 1 of the tube is reinforced by means of an annular reinforcement 4, which is in this exemplifying embodiment placed (removably) in a tunnel.

The air conditioning duct may be made of metal or preferably textile. The nozzle is made of a flexible material, preferably textile, for example from the same material as the wall 10 of the textile air conditioning duct.

At the inlet end 1, the nozzle wall comprises a proximal area, wherein the nozzle wall is provided on the external side with a set of three spaced apart proximal fastening elements 5.

At a distance from the inlet end 1, the nozzle wall comprises a distal area, where it is provided at the external side with a set of three spaced apart distal fastening elements 6.

The fastening elements 5, 6 can be in the form of loops, hooks, rings etc. In the case where the adjustment element 7 is fastened or made to be fastened in the proximal area directly to the wall of the nozzle, the proximal fastening elements 5 do not have to be present.

In the embodiment according to Fig. 1, the outlet end is reinforced with an annular reinforcement 4 arranged on the external side of the nozzle and attached to the nozzle using three loops, with which they together form distal fastening elements 6.

The adjustment element 7 passes through one of the proximal fastening elements 5 and an opposite distal fastening element 6, and the length of the adjustment element 7 is set in such a way that it pulls the fastening elements towards each other, thus directing the nozzle outlet opening in the desired direction. The nozzle is therefore bent to the side, to which the adjustment element 7 is attached.

In an alternative embodiment, the loops in the proximal area are replaced with openings in the external side of the nozzle wall in the area of the annular reinforcement 4, and parts of the annular reinforcement 4 thus made available act as proximal fastening elements 5.

Fig. 2 shows a further embodiment of the nozzle according to the invention. A set of proximal fastening elements 5 is formed by an annular band of loops, which is attached along the circumference of the nozzle inlet end 1, and through which the annular reinforcement 4 passes, and a set of distal fastening elements 6 is formed by an annular band of loops, which is attached along the circumference of the outlet end of the tube. An end piece 3 is attached to the tube, the end piece having the form of a shell of a truncated cone.

The adjustment element 7 passes through the proximal fastening element 5 and the opposite distal fastening element 6. Alternatively, the adjustment element 7 be arranged in such a way that it passes through the proximal fastening element 5 (a loop) and the distal fastening element 6 (a loop), which can be e.g. a distal fastening element 6 adjacent to that distal fastening element 6, which is opposite to the said proximal fastening element 5. In that case, the nozzle is not only bent by the adjustment element 7, but it is also partially twisted, which may be in some cases utilized for a precise directing of the outlet air in the desired direction.

Fig. 3 shows a further exemplifying embodiment of the nozzle, which differs from the embodiment of Fig. 2 in that the set of distal fastening elements 5 is formed not only by a loop band, but also by an annular reinforcement 4, which passes through the loops. The annular reinforcements 4 serve not only for maintaining the shape of the inlet and outlet openings of the nozzle tube, but also for fastening of the adjustment

element 7, by which these annular reinforcements 4 can be brought closer together at one side, thus bending the nozzle towards the side, on which the adjustment element 7 is located.

In yet another embodiment an alternative of the embodiment of Fig. 2 can be used, wherein the distal area comprises an annular reinforcement 4, while the proximal area, the shape of which is maintained thanks to its attachment to the air conditioning duct wall 10, does not comprise the annular reinforcement 4 and the adjustment element 7 is attached to the loop on one side and to the annular reinforcement 4 on the other side.

Figs. 4 and 5 show a further exemplifying embodiment, wherein Fig. 4 depicts a cross-section of the duct 10 with a nozzle thereon before setting the direction and Fig. 5 depicts the same after setting the direction, particularly after shortening and fixation of the length of the adjustment element 7.

In the embodiment according to the Figs. 4 and 5, the distal area of the nozzle is further provided with a covering cuff 11 for covering the loop band. This covering cuff 11 can be turned from an assembly position (Fig. 4) in which the loops as well as the annular reinforcement 4 are made accessible, to an operational position in which the loop band with an annular reinforcement are covered (Fig. 5), A similar covering cuff can be arranged in the proximal area as well, and it can enable covering of proximal fastening elements 5.

In all of the embodiments the loops can be opened for removing the annular reinforcement 4. Alternatively, the annular reinforcement can be opened or adapted to be opened to remove the reinforcement before washing the duct or the nozzle. The annular reinforcement 4 can be made of e.g. metal, plastic or composite.

The adjustment element 7 can be a lace or a band or a buckle. Eventually, the adjustment element 7 in the form of a lace or a band can be provided with a buckle, a velcro-type fastener, a hook and a slider, a cord stopper or a clip etc.

By default, the nozzle wall goes along a straight axis and the exiting air flows in a direction basically perpendicular to the air conditioning duct wall 10. The adjustment element 7 is not attached to the nozzle or it is attached in such a way that it does not pull any of the distal fastening elements 6 towards any of the proximal fastening elements 5. If another direction of the air exiting the nozzle is required, the adjustment

element 7 passes through the proximal fastening element 5 and the distal fastening element 6 (or it is hooked to them – according to the type of the fastening elements 5, 6 and the adjustment element 7) and the fastening elements 5, 6 are gradually pulled together until the desired direction of the nozzle outlet opening is set. Subsequently, the adjustment element 7 is locked – for example by tying a knot if the adjustment element is a lace or by securing using a cord stopper or a buckle etc.

Therefore, each nozzle can be quickly and individually set in such a way that the outlet air flow has the desired direction.

The nozzle may comprise a tube and an end piece 3, as depicted in the drawings, wherein the tube has an essentially constant cross-section along the entire length, while the end piece 3 has a cross-section, which continually decreases. Alternatively, the tube can continually narrow as well, in which case the end piece 3 may or may not be present. The cross-section of the tube and/or of the end piece is preferably circular, but it can have other shapes, for example a rectangular shape.

In the case when the end piece 3 is used, the distal fastening elements 6 can be attached to the end piece 3.

Nozzles according to the invention are particularly suitable for use at textile air conditioning ducts, but they can be used in metal ducts as well.

Although particularly advantageous exemplifying embodiments have been described, it is clear that a person skilled in the art could easily find further alternatives to these embodiments. Thus, the scope of protection is not limited to theses exemplifying embodiments but it is rather defined by the present patent claims.

Claims

1. A nozzle for an air conditioning duct, the nozzle comprising a textile tube, which comprises an inlet opening at an inlet end (1), the inlet opening being for an air intake from an air conditioning duct, and an outlet opening at an outlet end, the outlet opening being for an air output, the nozzle being adapted for being attached with its inlet end to the wall (10) of the air conditioning duct and comprising on its external side a proximal circumferential area at the inlet end (1) and a distal circumferential area, spaced apart from the proximal area, wherein the nozzle is provided with an adjustment element (7), which is arranged outside of the nozzle,

wherein the proximal circumferential area is provided with a set of proximal fastening elements (5) for attaching the adjustment element (7) and/or the distal circumferential area is provided with a set of distal fastening elements (6) for attaching the adjustment element (7),

characterised in that

the proximal fastening elements (5) are formed by a set of loops, through which an annular reinforcement (4) passes, and/or the distal fastening elements (6) are formed by a set of loops, through which an annular reinforcement (4) passes,

wherein the adjustment element (7) is attached or attachable to the proximal circumferential area and attached or attachable to the distal circumferential area and adapted for an adjustment and locking of a degree of tilting of the nozzle outlet opening plane with respect to the nozzle inlet opening plane by adjusting the length of the adjustment element (7) between its attachment to the proximal circumferential area and attachment to the distal circumferential area.

2. A nozzle according to claim 1, **characterised in that** the proximal fastening elements (5) and/or the distal fastening elements (6) comprise a band with loops.

3. A nozzle according to any of the preceding claims, **characterised in that** the nozzle is provided at the outlet end with an end piece (3) having a cross-section which decreases in the direction from the inlet end (1) to the outlet end (2) of the nozzle.

4. A nozzle according to claim 3, **characterised in that** the distal area is arranged between the proximal area and the end piece (3).

5. A nozzle according to any of the preceding claims, **characterised in that** the adjustment element (7) is attached or attachable to at least one reinforcement (4) and/or loop (6).

6. A nozzle according to any of the preceding claims, **characterised in that** the loops, which form part of the proximal fastening elements (5), and/or the loops, which form part of the distal fastening elements (6), may be opened for removing the annular reinforcement (4).

7. A nozzle according to any of the preceding claims, **characterized in that** the annular reinforcement (4) is opened or may be opened and/or can be removed from the loops by disjoining it.

8. An air conditioning duct, **characterised in that** its wall comprises at least one through-hole, the nozzle according to any of the preceding claims for directing the flow of the air exiting the through-hole being arranged at the outer side of the wall, the proximal area adjoining to the through-hole.

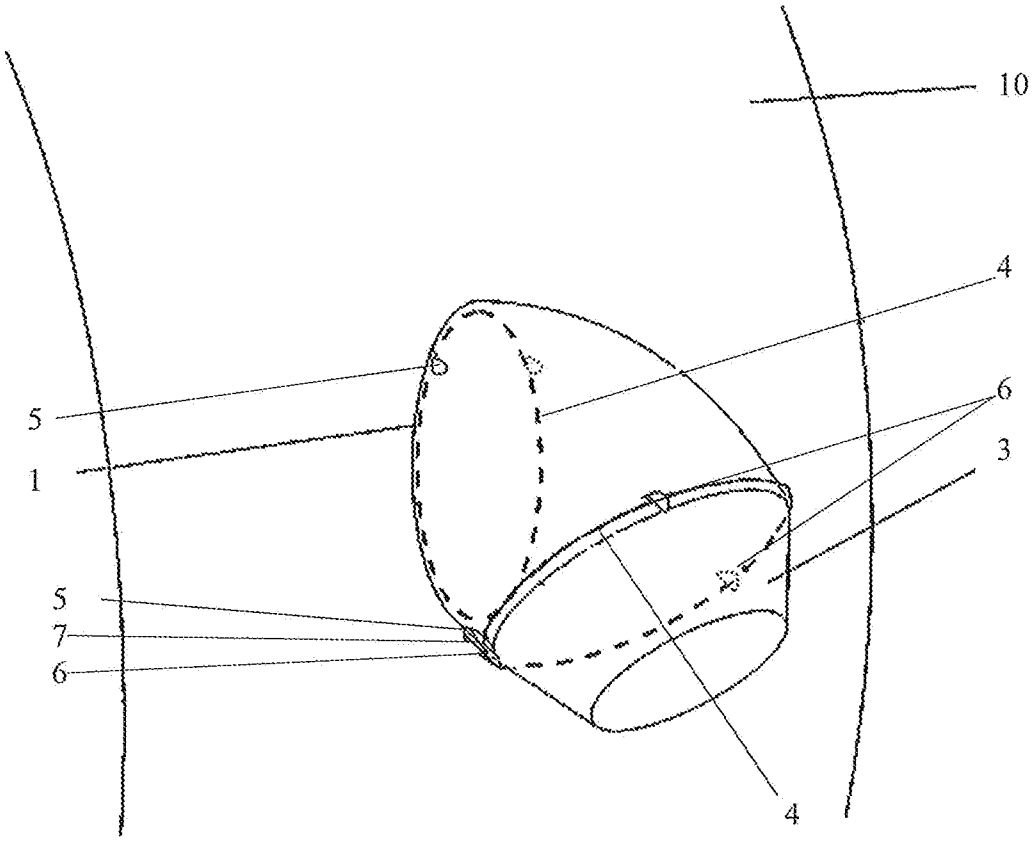


Fig. 1

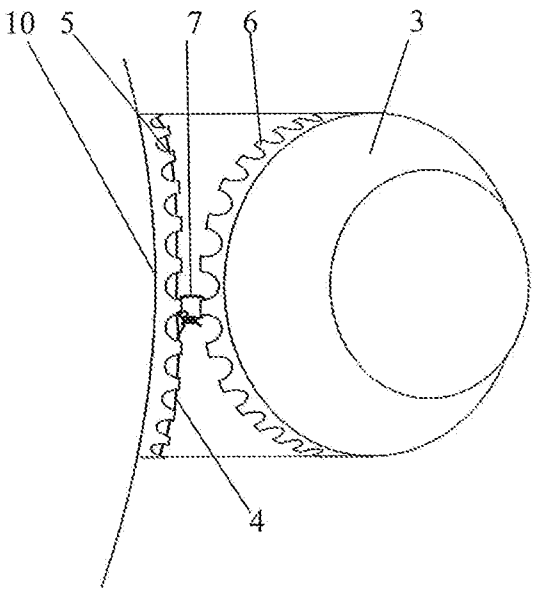


Fig. 2

Fig. 3

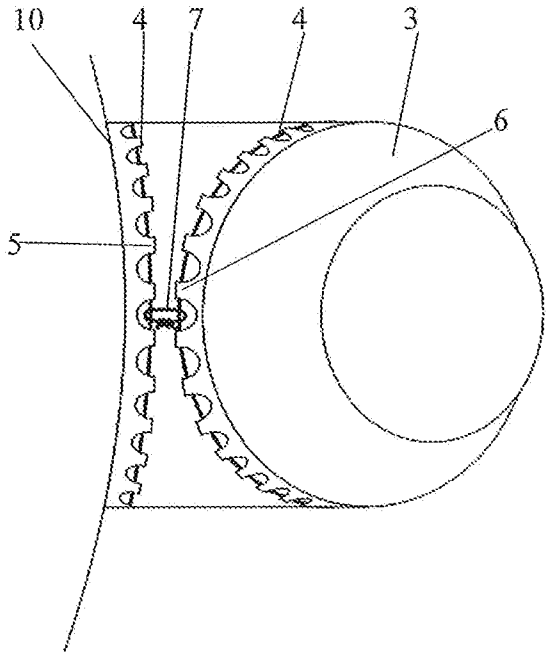


Fig. 4

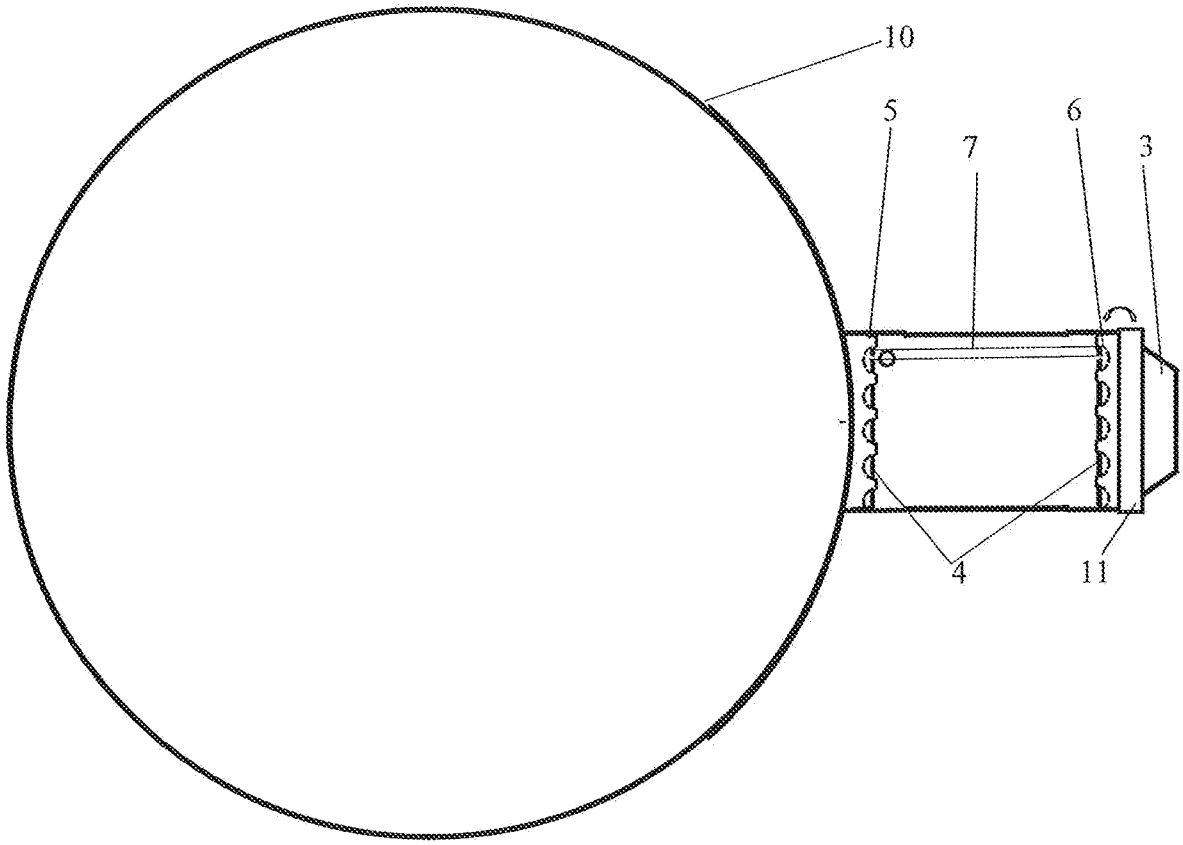
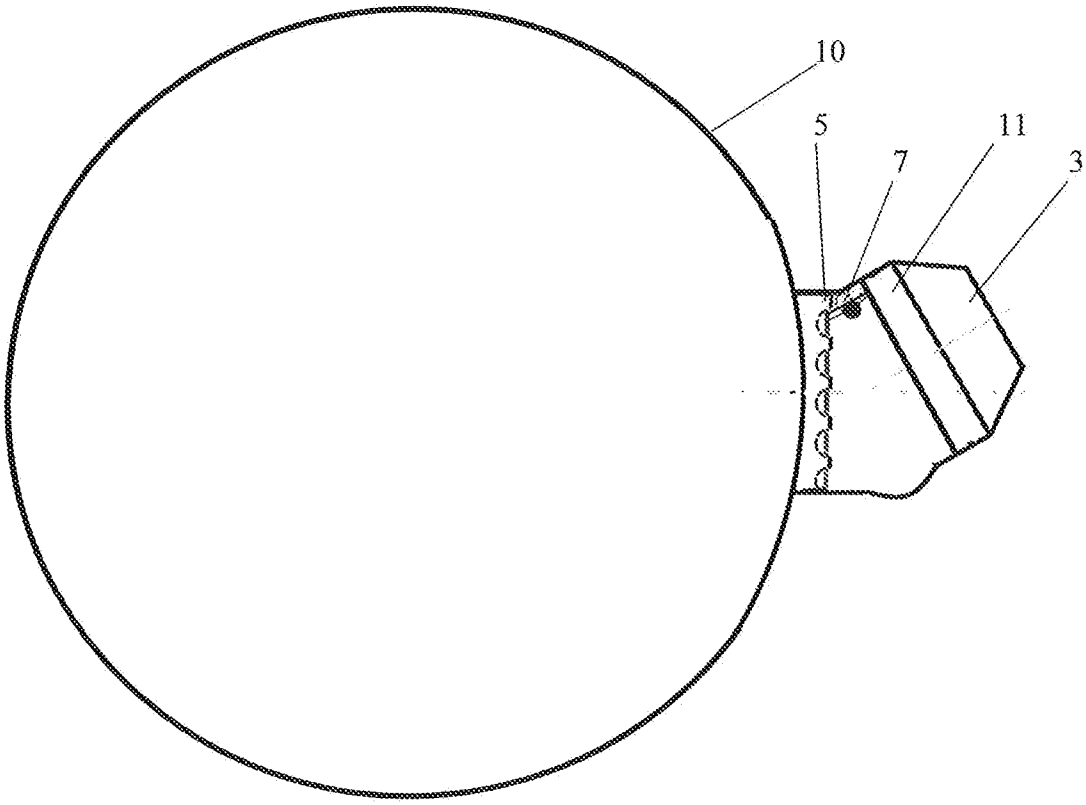


Fig. 5



INTERNATIONAL SEARCH REPORT

International application No
PCT/CZ2020/050047

A. CLASSIFICATION OF SUBJECT MATTER
INV. F24F13/065 F24F13/02
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
F24F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	EP 2 535 656 A2 (PRIHODA S R O [CZ]) 19 December 2012 (2012-12-19)	1,2,5-7
Y	the whole document	3,4

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Y	JP H11 281137 A (MATSUSHITA SEIKO KK) 15 October 1999 (1999-10-15) abstract; figures	3,4

A	JP 2008 101802 A (MATSUSHITA ELECTRIC IND CO LTD) 1 May 2008 (2008-05-01) abstract; figures	1-8

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
25 September 2020	06/10/2020

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INTERNATIONAL SEARCH REPORT

International application No
PCT/CZ2020/050047

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SE 515 828 C2 (SVEAVERKEN AGRI AB [SE]) 15 October 2001 (2001-10-15) abstract; figures -----	1-8

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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