Abstract: The invention concerns a component of plastic material, in particular a rotor blade (17), having a fixing device which is to be particularly inexpensive and simple to produce. To attain that object it is proposed that the fixing device has the form of a neck (4) of a PET bottle (1), the neck being provided with a screwthread. In a rotor blade (17) at least a part of the surface can be formed by a portion of the wall of the PET bottle (1). Simple PET drinks bottles thus make it possible to build a functioning rotor, for example for energy generation.
Component, in particular rotor blade

Technical field

The invention concerns a component, in particular a rotor blade, having a fixing device. It further concerns a rotor having such a rotor blade.

Disclosure of Invention

The object of the invention is to provide a component, in particular a rotor blade, which is particularly inexpensive and simple to manufacture.

In accordance with the invention that object is attained in that the fixing device is a portion which is provided with a male screwthread and which corresponds to the neck of a PET bottle. The component may further comprise at least a portion of the wall of a blow moulded hollow body, for example a portion of the wall of a PET bottle. If the component is in the form of a rotor blade the surface thereof can be formed at least by a portion of the wall of the PET bottle.

The drinks industry increasingly shifts to supplying drinks in plastic bottles of polyethylene terephthalate, referred to as PET bottles. Those bottles have the advantage that they are inexpensive to manufacture and are very light. The proportion by weight of the packaging in the case of a drink in a PET bottle is only a fraction of the proportion by weight of a glass bottle. Consequently a large number of PET bottles is involved worldwide, which are mostly recycled. Walkers and hikers are increasingly taking PET bottles with them on their travels, as a drinks container, because of the low weight. Consequently PET bottles are available almost at any time and in unlimited amounts.

The present invention makes use of this fact and proposes producing from a PET bottle a utility article which can be extremely beneficially used and which can also have decorative qualities.

The shape of a PET bottle is ideally suited for forming rotors which have good aerodynamic characteristics and which have an axial flow therethrough such as for example the rotors of wind wheels or the propellers for aircraft or ship propulsion systems. In particular in practice the wall portion forming the rotor blade can be twisted so that the angle of incidence decreases with increasing distance from the fixing device. In that way it is possible to embody contours which, in the predetermined condition of operation, generate the optimum torque (in the case of a wind wheel) or produce the optimum propulsion force (in the case of a drive propeller). A rotor blade for a drive propeller for a marine craft, that is to say for a ship's
propeller, is preferably formed from the wall portion, which is curved in a dome-like configuration, of the PET bottle near the bottle neck. A ship's propeller also does not need to be of a large diameter - unlike a wind wheel - to act in the optimum fashion. A water propeller or a wind wheel can be made with a plurality of blades from a single PET bottle, wherein each rotor blade is formed from a portion of the bottle wall.

The rotor blade for a wind wheel may in contrast be formed by the total length of the PET bottle. In that case, when using bottles of a capacity of usually 1.5 litres, it is possible to produce rotors of a diameter of the order of magnitude of 0.6 m. It will be noted however that larger PET bottles are also known (for example 2 litres) and increasing the length of the rotor blades by fitting a second bottle portion is also possible so that diameters of 1 m and more can be attained. With smaller PET bottles, for example of a volume of 0.5 l, it is possible to produce smaller rotors.

In the simplest configuration the single-layer bottle wall forms the rotor blade. That is adequate for example in the case of ship's propellers. Particularly aerodynamically efficient rotor blades can be produced by the wall of the PET bottle being bent or curved in the region of the leading edge and/or the trailing edge and forming a double-wall rotor blade. In that way it is possible to implement an aerofoil contour which is of a thickness that varies over the chord length of the aerofoil and has different curvatures at the top side and the underside. In that respect the leading edge is preferably curved with a certain radius while the trailing edge is bent with a sharp edge. The wall material of the bottle can be in overlapping relationship over a certain portion at the top side or the underside of the rotor blade.

Alternatively the wall portion of the rotor blade can be in the shape of a scoop. If for example the bottle wall is cut into, near the dome-shaped end in the region of the bottle neck and near the bottom of the bottle, over half the circumference, and the ends of those semicircular cuts are joined by straight cuts along a generatrix, that gives a scoop-like rotor blade which is suitable for example for forming a water wheel in the manner of a paddle steamer or a water mill. The stabilising action of the bottom of the bottle and the neck portion provides that the water wheel can withstand the high loadings due to flowing water.

It is also possible for PET bottles to be put directly into the form of a rotor blade in a blow moulding procedure. The blow moulding tool is then to be so adapted that the wall of the PET bottle corresponds for example to the aerodynamically favourable contour of a wind rotor blade. It is admittedly to be expected that the length of such a bottle is considerably greater, in comparison with the current bottles of round cross-section. However, the fact that the bottle contour is put into the optimum form in the production thereof means that the efficiency of the rotor produced from the bottle can be increased.
It will be appreciated that the invention also concerns a rotor having at least one rotor blade of the above-described kind. Preferably in the case of that rotor the hub is also formed by a PET bottle. The rotor can have in particular a hub comprising a cylindrical body portion of a PET bottle. In that respect a very long rotor hub can be formed by a procedure whereby for example when using two PET bottles the bottoms are removed and the cylindrical bottle walls are pushed one into the other. In that way it is possible for example to produce a water wheel having a plurality of scoops in mutually juxtaposed relationship.

In practice the hub can have openings through which the PET bottle neck projects. At the inside of the cylindrical hub a screw lid is screwed on to the screwthread of the PET bottle neck and thus effectively connects the PET bottle neck to the hub. If the hub comprises a plurality of PET bottles which are pushed one into the other the PET bottle necks also join the various hub portions which are pushed one into the other. The same hole patterns are to be cut in mutually overlapping relationship into the various hub portions so that the bottle necks which are pushed therethrough and screwed fast in position join the hub portions together.

In the case of water screws or water wheels in which a plurality of vanes are formed from the wall of a single PET bottle, the bottle neck with screwthread which represents the fixing device for such a rotor forms the hub at the same time. The individual vanes are bent in such a way that they extend substantially radially relative to the axis of the bottle neck.

A preferred manner of using the rotor according to the invention is for power generation. For that purpose the hub can be fixed to a generator. The hub can be fitted in particular on to the rotor of the generator. So-called disc-type rotors are particularly suitable as generators for generating power by means of the rotor according to the invention. The generator can generate power at any opportunity, for example when camping or hiking, to operate a mobile telephone or a similar unit. If the rotor is used for propelling a vehicle its hub can be connected to an electric motor or another motor, such as for example a rubber band motor.

The rotor however can also be fixed to a shaft. Particularly if the rotor forms a ship's propeller it can be rotated by way of a suitable drive by means of a shaft. In that respect further PET bottles can be used as floats so that a complete raft for carrying people can be constructed from PET bottles. For example a crank drive with a treadle is suitable as the drive system. In the case of smaller ships a rubber band motor can also be used for a short distance, in which a twisted rubber band produces a torque.

The invention also concerns a hub having at least one orifice for receiving at least one rotor blade of the above-described kind.

Finally the invention concerns a PET bottle for the production of a rotor blade as described hereinbefore. To permit as accurate manufacture as possible of the rotor blade from
the PET bottle the contour of the rotor blade, that is to be cut out, can be marked on the bottle wall. The marking can be applied by printing but also in particular can be embossed.

Most PET bottles have a label therea round. To simplify construction of the rotor and a device including the rotor a construction plan for the device can be printed on the inside of the label.

As described hereinbefore the wall of the PET bottle can be blow moulded in the contour of the surface of the rotor blade in order to increase aerodynamic efficiency.

PET bottles are generally supplied in group units or packs, for example in boxes or in a unit formed by a packaging film with four or six PET bottles. In an advantageous embodiment such a pack can include an electrical machine, for example a motor or in particular a generator, to which a rotor as described hereinbefore can be fixed. The generator can be of a very simple structure and can be produced at low cost. It is also possible to produce a re-usable group unit or pack like a transport box for PET bottles, which can be repeatedly filled with fresh PET bottles. In that way a certain demand for drinks can be repeatedly transported for example to a campsite and power generated by means of the rotor produced from the PET bottles, with generator.

The invention also concerns a process for the production of an assembly, wherein a component of plastic material is joined to a second component by means of a portion which has a male screwthread and corresponds to the neck of a PET bottle. For that purpose, in a practical embodiment, a bar-shaped part of the second component can be fitted into the portion of the first component, that corresponds to the bottle neck. Alternatively the second component can have an aperture through which the portion, corresponding to the bottle neck, of the first component with the male screwthread is fitted, a screw lid then being screwed on to the male screwthread.

**Brief Description of Drawings**

Embodiments of the invention and instructions for the implementation thereof are described hereinafter with reference to the accompanying drawings.

Figure 1 and Figure 1a show two side views of a plurality of PET bottles which permit the manufacture of a hub.

Figure 2 shows a front view and Figure 2a shows a three-dimensional view of two PET bottles connected to form a carrier or float element.

Figures 3 and 3a show the use of a connecting strut produced from a PET bottle.

Figures 4 and 4a show the use of a connecting band produced from a PET bottle.

Figures 5 and 5a show how a plurality of PET bottles are connected together by being put together in the longitudinal direction.
Figures 6 and 6a show how a hub for a rotor is produced from PET bottles.  
Figures 6c and 6d show various views of a structure of a carrier frame of PET bottles.  
Figures 7 and 7a show a complex node for structures comprising PET bottles.  
Figures 8 and 9 show two alternative connecting procedures for PET bottles.  
Figures 10 to 13 show connecting procedures using bands produced from PET bottles.  
Figure 14 shows a three-dimensional view of a hub of a rotor produced from PET bottles.  
Figures 15 to 21 diagrammatically show the production of rotor blades according to the invention.  
Figures 22 to 24 show the steps in hub production.  
Figure 25 shows a wind wheel produced from PET bottles.  
Figure 26 shows a view in longitudinal section of a generator connected to a PET bottle rotor.  
Figure 27 shows a view in longitudinal section of a second embodiment of a generator.  
Figure 28 shows a marine craft produced from PET bottles, with air propeller propulsion.  
Figures 29 to 31 show a marine craft produced from PET bottles, with water propeller propulsion.  
Figures 32 to 35 show the steps required for the production of a water propeller.  
Figure 36 shows an alternative arrangement of PET bottles which can be used for power generation and has a rotor in the form of a water wheel.  
Figure 37 shows various production stages of a PET bottle in the form of a rotor blade.  
Figure 38 shows a rotor of enlarged diameter.  
Figures 39, 40 and 41 show two alternative embodiments for coupling a generator to a rotor according to the invention.  

Embodiments of the Invention  
The drawings show a large number of structural elements which serve for the production of useful articles, in particular employing rotors produced in accordance with the invention.  
Figures 1 and 1a show how PET bottles 1 are connected together. Only the upper neck portion of the PET bottle 1 shown in Figure 1 is to be seen here. The bottle neck 4 itself carries a male screwthread on to which a screw lid 2 is screwed. The left-hand view in Figure 1 additionally shows the anti-tamper securing ring 3 connected by way of thin webs to the screw lid, the webs tearing when the screw lid 2 is first unscrewed.
To connect two PET bottles, holes can be cut in the cylindrical wall 6 of the at least one PET bottle, the periphery of the holes being substantially identical to or somewhat larger than the periphery of the bottle neck 4. In optimum fashion, the inside diameter of the holes 5 in the bottle wall 6 identically corresponds to the outside diameter of the screwthread flights on the bottle neck 4 with the male screwthread. The bottle neck 4 with the male screwthread can be fitted through one of the holes 5 until the bottle wall 6 in which the hole 5 is provided bears against the anti-tamper securing ring 3. The screw lid 2 can then be screwed on until its free edge presses the bottle wall 5 against the anti-tamper securing ring 3. That connection is firm and durable.

It will be appreciated that, before the lid is introduced into the interior of the bottle, an opening must be cut into the bottle wall 6. For that purpose usually the bottle bottom is cut off or a fitment opening 8 (see Figures 2a and 3a) is cut into the bottle wall.

As can be seen from Figure 1a a plurality of holes 5 can be distributed in an equidistant arrangement around the periphery of the bottle wall 6. A bottle neck carrying a rotor blade according to the invention can be screwed to each of the holes. In that case the bottle wall 6 with the holes forms the hub of the rotor.

Figures 2 and 2a show another alternative form of connection with which two PET bottles 1 can be connected by means of a screw lid 2. Here the bottle necks 4 of two PET bottles with the male screwthread are cut off. The cut-off neck portions 7 form the connecting elements. They are fitted through equal-sized, mutually aligned holes of two adjacent PET bottles and then secured by screwing on the screw lids 2. For introducing the neck portions 7 of the PET bottles and the screw lids 2, the two mutually juxtaposed PET bottles have fitment openings 8 which can be covered.

The use of cut-off neck portions 7 as a connecting element also makes it possible to produce more complex structures. A complex structure of that kind is shown for example in Figures 3 and 3a. It will be seen from Figure 3 that each cut-off neck portion 7 is screwed into only one bottle wall 6. Extending between the two neck portions 7 is a connecting strut 9 which is rolled together from a wall of a PET bottle, in which the bottom portion and the neck portion have been cut off. Two mutually parallel cuts cut the central portion in the shape of a cylindrical casing member out of the PET bottle wall. An axial cut cuts that central portion open. The resulting rectangular plastic material strip can then be rolled together and fitted with its ends into the two bottle necks.

Figure 3a shows a float produced with connecting struts 9 of that kind.

Figures 4 and 4a show further structural elements for structures comprising PET bottles. In the left-hand view in Figure 4, a PET bottle is cut open in a spiral shape, resulting in
the provision of a long strong plastic band 10. If necessary the plastic band 10 can be provided with eyes 12, 12' which, for connecting two PET bottles, can be placed around the neck portion of one of the two bottles. In addition an end 11 of the plastic band 10 can be placed over the male screwthread of the bottle neck 4 and arrested there when the screw lid 2 is subsequently screwed on.

Figure 6a shows by way of example a hub of a rotor, the hub being made up from such a plastic band 10.

Figure 4a at the right shows the use of a smaller eye 12. It can be placed with a small amount of play around the bottle neck 4 and secured there by subsequently screwing on the screw lid 2.

Figure 5 shows the possibility of non-rotatably connecting two PET bottles. The bottle bottoms of usual PET bottles have tooth configurations which can be fitted one into the other. A cylindrical sleeve 13 which is cut out of a bottle wall serves for making the connection, insofar as the two PET bottles 1 are fitted with their bottle bottoms into the sleeve 13. In that case the tooth configurations provided by the bottle bottoms, as shown in Figure 5, engage into each other and prevent the two PET bottles from turning relative to each other.

The left-hand view in Figure 5a additionally shows the radial mounting of a PET bottle 1. Such a mode of construction provides a very long rotor hub.

Figures 6 and 6a in contrast show the procedure when producing a very short rotor hub. Two PET bottles 1 are shortened to different lengths. The two bottle portions with the bottle neck are fitted into each other and connected together by way of a plastic band 10 produced from a further bottle. It is also possible to see in diagrammatic form three rotor blades 17 which are described in further detail hereinafter.

Figures 6c, 6d, 7 and 7a show further structural elements for structures comprising PET bottles. The connecting procedures are essentially based on the provision of holes of the diameter of the bottle neck in the bottle wall and subsequent insertion of a bottle neck into the hole. The elements are respectively connected by screwing the screw lid on to a bottle neck. In Figures 7 and 7a the dome-shaped portions of two PET bottles, each with a respective bottle neck, are connected together. Once again they have quite short insertion portions which are cylindrical and which are connected together by being fitted together. That results in a spherical element to which holes can be secured for securing the bottle necks 4 of further PET bottles.

Figure 8 shows an alternative connecting procedure. Here, a hole 20 is cut out on both sides of a bottle wall. The diameter of the hole 20 is only immaterially smaller than the diameter of the bottle wall 6. The holes are disposed at two mutually opposite sides of the PET
bottle so that only a narrow limb consisting of the plastic material of the bottle wall remains between the two holes 20. A PET bottle 1 is then pushed transversely through the holes 20.

Finally Figure 9 shows an alternative connecting procedure. Here a rectangular strip is provided with three holes. That rectangular strip 21 is wound around two screw lids 2 which bear against each other with their closed ends, in such a way that the holes respectively leave the female screwthread of a screw lid free. The two PET bottles 1 are then screwed into the two screw lids 2, in which case they are firmly joined together by the rectangular strip 21.

Figures 10 and 10a show further structures consisting of PET bottles. This involves a float element (Figure 10a) which is held together by a plastic band 10 which was cut out of a PET bottle. Once again neck portions 7 serve as connecting elements of the plastic bands 10 which pass around the three PET bottles 1. In the present case two arrangements are assembled from three PET bottles, with two respective bottles being connected together in the longitudinal direction in the region of their bottoms. That gives a long float which can carry heavy loads.

Figures 11, 12 and 13 show how it is possible to produce rotatable connections between individual PET bottles. The screw lids 2 of the PET bottles are provided at opposite sides of their periphery with bores 25, 27 through which pass axis members 26, 28 in bar form. As can be seen from Figure 12 the end of the axis member 26 can be covered and secured by a screw lid 2 which has a bore therethrough at one side.

Rotatable mounting of the structural elements composed of PET bottles, about their longitudinal axis, is also possible. If for example two end portions of a PET bottle with bottle neck are fitted together to form the hub of a rotor, the screw lids 2 can be axially bored therethrough, at the oppositely disposed bottle necks. A longitudinal axis member 29 (see Figure 13) is fitted through the two mutually aligned bores 30 which are respectively provided in the centre of the screw lids 2. Those bores 30 can be made permanently capable of bearing a load, by a rivet 22 or other stiffening means. A metal rivet 22 also reduces the friction between the bore 30 and the axis member 29.

Figure 14 shows a rotor with a hub formed from a portion of a PET bottle, and three rotor blades 16 respectively secured by means of a bottle neck. Arranged between the screw caps 2 of the rotor blades 17 is a screw cap 2 which stabilises the rotor blades 17 in their position and stiffens the entire rotor.

Figures 15 to 21 show a process for the production of three rotor blades 17 according to the invention. Figure 15 shows three PET bottles 1 which respectively differ in terms of their rotary position. The contour of the rotor blade 17 to be cut out is marked out on the wall 6 of the PET bottles 1. The contour of the wall portion to be cut out is identified by reference 32. The contour 32 of the rotor blade can be printed or embossed on to the wall 6 of the PET bottle.
1. It can also be marked manually, as shown in Figures 16 and 17. For that purpose the label 33 which surrounds the bottle is removed and applied with its first corner 34 near the bottle neck. The label is then passed in a helical line around the bottle. The edge 35 of the label 33 can then be used as a ruler for a pen for marking an edge of the contour. The label 33 can then be fitted a second time and passed axially over the wall of the PET bottle. The second edge of the contour to be cut out can then be drawn in with a pen.

Figure 18 shows on the one hand the cut-out peripheral casing portion 38 and on the other hand the wall portion 40, forming the rotor blade 17, of the PET bottle 1. To produce rotor contours which are as uniform as possible, a cut-out contour 32 can be used as a template for the contours which are to be subsequently cut out (see Figure 18).

A fold line 41 is now drawn on the cut-out portion 40. That is shown in Figure 19. The cut-out wall portion 40 is folded along the fold line 41 as far as the tip 42 of the rotor blade.

Figure 20 shows a side portion of the rotor blade 17, a view in the axial direction on to the blade tip, and four sectional views. It will be seen that the rotor blade 17 produced has near the bottle neck (section line 44) at its leading edge 47 an angle of incidence which changes continuously and helically. Upon correct fitment of the rotor blade 17 the angle of incidence is large near the hub and reduces towards the tip of the rotor blade 17. In addition, a rotor blade with almost optimum lift can be produced by the double-wall configuration of the folded-over PET bottle wall material.

Figures 22 to 25 show the procedure in the production of a rotor comprising the rotor blades 17 according to the invention. The label 33 around the PET bottle is also used for marking the positions for producing the holes 5 for securing the rotor blades 17. The present case involves producing a wind wheel (Figure 25) which does not serve for power generation. The hub 39 comprises a long cylindrical peripheral casing portion 14 and a short cylindrical peripheral casing portion 15 of a respective PET bottle, wherein the casing portions are each of equal diameters and are pressed one into the other.

As Figure 26 shows however the rotor blades 17 can also be used to drive a generator 43. In Figure 27 the generator 44 is in the form of a disc-type rotor.

It will be appreciated that a motor can also be coupled to the rotor blades 17. In that case they act as a fan or drive propeller.

Figure 28 shows how a play-vehicle can also be constructed with the rotor blades 17 shown diagrammatically here, using further PET bottles. Two PET bottles are connected together by way of a cylindrical sleeve 13 which is cut out of the wall of a PET bottle. At least at the axial centre the bottoms of the two interconnected PET bottles 1 are removed. A rubber band 45 is arranged between the top of the front PET bottle 1 and the rotor with the rotor blades
17. The rubber band 45 can be twisted for storing energy. When the rotor with the rotor blades 17 is released it is driven in rotation by the energy stored in the rubber band 45 and propels the vehicle forwardly. Two lower PET bottle arrangements serve as floats so that this is a marine craft.

It will be appreciated that it is also possible for the marine craft to be propelled with a rotor which rotates in the water. Such an embodiment is shown in Figures 29 to 31. The central assembly comprising two PET bottles 1 is here disposed inclinably relative to the two outer PET bottle assemblies serving as floats 46. In that way the end of the central assembly at which the rotor or propeller is arranged is beneath the surface of the water. Figures 30 to 33 show the procedure involved in production of a rotor which operates in water, from a PET bottle. As water has a very much higher flow resistance than air the size of the individual vanes of the rotor is very much smaller. It is substantially sufficient to cut individual vanes 48 as rotor blades out of the bottle wall near the bottle neck, to correspondingly turn them over and fold them until the result is a suitable rotor blade geometry. In that way not just an individual rotor blade but an entire rotor with a plurality of vanes 48 is produced from a PET bottle.

The rotors set forth in the preceding examples had an axial or diagonal flow therethrough. The invention however is not restricted to a particular flow configuration and embraces rotors involving any flow directions. Figure 36 shows for example a rotor 23 in the manner of a water wheel or scoop vane wheel which has a tangential afflux flow. The rotor 23 is disposed on a float construction consisting of PET bottles, which can be secured by way of a cable 24 to the bank or to a bridge in a river current. In that case the floats are formed by the elements shown in Figure 10. The rotor blades 17 of the rotor comprise half of PET bottles, in respect of which half the body of the bottle is cut away by approximately central axially extending cuts. The rotor blades 17 are consequently of a scoop-like configuration and generate a very high level of torque.

Figure 37 shows the production process for a special form of a PET bottle which is blown directly in the shape of a rotor blade 17°. For bottle production, the blank 31' is blown up, being disposed in a blow moulding mould (not shown), the cavity of which is of the long curved shape of a rotor blade 17° of a wind rotor which has an axial flow therethrough. It is thus possible for an aerodynamically advantageous rotor shape to be already predetermined in the course of production. To achieve that shape, with the same content, the bottle must be longer and more slender than a conventional bottle of round cross-section. That may admittedly be somewhat less desirable for transport and storage, but it can be highly attractive to customers. If the bottle length which can be achieved is not sufficient to attain an optimum level of efficiency, an extension 36 can be fitted on to the end of the rotor blade 17°. The
extension 36 should be of the same contour as the end of the rotor blade 17" so that the fitment connection is stable. It will be appreciated that it is also possible to fit on an extension 36 in relation to a rotor blade which was produced from a conventional round bottle by re-shaping the bottle contour.

If the length of the rotor blade is still not sufficient, a bar-shaped rotor extension 37 can be provided in the inner region of the rotor. A rotor 23' of a rotor diameter which is enlarged in that way is shown in Figure 38. For that purpose, the cylindrical bottle wall of a cylindrical PET bottle can be separated from the bottle neck and the bottom and cut open along a generatrix. The cylindrical bottle wall is then rolled together to constitute a bar. The rotor blades 17" are disposed in the outer region of the circular area covered by the rotor 23', outside the rotor extension 37. As the radius of the circular area in that outer region is greater than inwardly, the rotor blade passes over a large area and can consequently generate a high level of output. In turn that bar-shaped rotor extension 37 can also be used in relation to a simple rotor blade 17, the casing of which is shaped by bending over the bottle wall. The individual rotor blades 17" and the rotor extensions 37 are braced by tensioning cables 49 which can be formed from thin strips of the body portion of a PET bottle.

Figures 39, 40 and 41 show two alternatives for coupling a generator 43' to the hub 39' of a rotor according to the invention. Here the hub 39' comprises a first portion of a PET bottle of large diameter, for example a 1.0 l or a 1.5 l bottle, and a portion disposed therein of a PET bottle of small diameter, for example a 0.33 l or a 0.5 l bottle. The screw lids 2 with which the rotor blades 17 are secured are clamped in position between the portions which are fitted one into the other. In the illustrated embodiments the generator 43' is in the form of a high-speed rotor and rotates considerably faster than the rotor itself. For that purpose a belt transmission is provided, a large belt pulley 54 being connected to the rotor hub 39' or its mounting and a small belt pulley 55 being connected to the rotor of the generator 43'. Two embodiments are illustrated. Figure 39 shows a side view and Figure 40 shows a front view of a rotor in which the generator 43' is fixedly connected to the hub 39' of the rotor and the large belt pulley 54 is secured to the mounting for the hub 39'. Consequently the generator 43' rotates with the hub 39' of the rotor about the axis of the hub 39'. The current generated by the generator 43' can be used for feeding light sources on the rotor, for example an LED. In this case the rotor produced serves for illumination or decorative purposes. If the power generated by the generator is intended to feed an external apparatus, for example a battery charging unit, the generator 43' may be fixedly secured to the mounting 56 of the rotor. The large belt pulley 54 is then fixed to the hub 39' of the rotor itself (see Figure 40).
List of references

1. PET bottle
2. screw lid
3. anti-tamper securing ring
4. bottle neck with male screwthread, fixing device
5. hole
6. bottle wall
7. neck portion
8. coverable fitment opening
9. connecting strut
10. plastic band
11. band end
12. 12' eye
13. cylindrical sleeve
14. long cylinder casing body portion
15. short cylinder casing body portion
16. insertion portion
17. 17', 17" rotor blade
18. dome-shaped portion
19. spherical connecting element
20. hole
21. rectangular strip
22. rivet
23. rotor
24. cable
25. horizontal bore
26. horizontal axis member
27. vertical bore
28. vertical axis member
29. longitudinal axis member
30. bore
31. blank
31' blown blank
32. contour of the wall portion to be cut out
33. label
34. corner of the label
35. edge of the label
36. extension
37. rotor extension
38. cut-away casing portion
39. 39' hub
40. rotor-forming casing portion
41. fold line
42. tip
43. 43' generator
44. disc rotor generator
45. rubber band
46. float
47. leading edge
48. vane, rotor blade
49. tensioning cable
50. large belt pulley
51. small belt pulley
52. mounting of the rotor hub
CLAIMS

1. A component (17, 17', 17", 48) of plastic material having a fixing device, characterised in that the fixing device is a portion which is provided with a male screw thread and which corresponds to the neck (4) of a PET bottle (1).

2. A component according to claim 1 characterised in that it further comprises at least a portion of the wall of a blow moulded hollow body.

3. A component according to claim 1 or claim 2 characterised in that it is in the form of a rotor blade (17, 17', 17", 48) and the rotor blade (17, 17', 17", 48) is formed at least by a portion of the wall of a PET bottle (1).

4. A rotor blade (17) according to claim 3 characterised in that the wall portion is so twisted that the angle of incidence of the rotor blade (17) decreases with increasing distance from the fixing device (4).

5. A rotor blade (17) according to claim 3 or claim 4 characterised in that the wall of the PET bottle (1) is folded or bent in the region of the leading edge and/or the trailing edge and forms a double-wall rotor blade (17).

6. A rotor blade (17') according to claim 3 characterised in that the wall portion is in the shape of a scoop.

7. A rotor blade according to one of claims 3 to 5 characterised in that the closed wall of the PET bottle extends in the shape of the surface of the rotor blade.

8. A rotor characterised by at least one rotor blade (17, 17', 17", 48) according to one of preceding claims 3 to 7.

9. A rotor according to claim 8 characterised in that it is made from a single PET bottle (1) and has a plurality of vanes (48) which are respectively produced from a portion of the wall of said PET bottle (1) and which are connected with a common fixing device (4).

10. A rotor according to claim 8 or claim 9 characterised in that it has a hub comprising a cylindrical casing body portion (14, 15) of a PET bottle.
11. A rotor according to one of claims 8 to 10 characterised in that the hub has at least one opening (5) through which the PET bottle neck (4) passes, wherein at the inside of the cylindrical hub a screw lid (2) is screwed on to the screwthread of the PET bottle neck (14).

12. A rotor according to one of claims 8 to 11 characterised in that it is connected to an electrical machine, in particular a motor or generator (43, 44).

13. A rotor according to one of claims 8 to 12 characterised in that the rotor is fixed to a shaft.

14. A hub having at least one orifice for receiving at least one rotor blade according to claims 3 to 7.

15. A PET bottle (1) for the production of a rotor blade (17, 17', 48) according to claims 3 to 7 or a rotor according to claims 8 to 13 characterised in that the contour of the rotor blade (17, 17', 48) is marked on the bottle wall.

16. A PET bottle (1) according to claim 15 characterised in that it has a label (33), on the inside of which is printed a construction plan for a device having a rotor blade (17, 17', 48) according to one of claims 1 to 4 or a rotor according to claim 5.

17. A PET bottle for the production of a rotor blade (17") according to claim 7 characterised in that the wall of the PET bottle is blow moulded in the contour of the surface of the rotor blade (17").

18. A PET bottle pack characterised in that it includes an electrical machine, in particular a motor or generator, to which a rotor according to one of claims 8 to 13 can be fixed.

19. A process for the production of a structural unit characterised in that a component (17, 17', 17", 48) of plastic material is connected to a second component by means of a portion which has a male screwthread and corresponds to the neck (4) of a PET bottle (1).

20. A process according to claim 19 characterised in that at least one component is at least partially formed by a portion of the wall of a blow moulded hollow body.
21. A process according to claim 19 or claim 20 characterised in that a bar-shaped part of the second component is inserted into the portion, corresponding to the bottle neck, of the first component.

22. A process according to claim 19 or claim 20 characterised in that the second component has an aperture, through which the portion corresponding to the bottle neck of the first component with the male screwthread is fitted, a screw lid then being screwed on to the male screwthread.