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(54) **SWIMMING POOL CLEANER COMPONENT**

ELEMENT EINES SCHWIMMBECKENREINIGUNGSGERÄTES

ELEMENT DESTINE A UN DISPOSITIF DE NETTOYAGE DE PISCINE

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(73) Proprietor: **Zodiac Pool Care Europe**
Société par Actions Simplifiée
92130 Issy les Moulineaux (FR)

(72) Inventor: **ATKINS, David, Seagrave**
Gauteng Province 2041 (ZA)

(74) Representative:
Cabinet BARRE LAFORGUE & associés
95, rue des Amidonniers
31000 Toulouse (FR)

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US-A- 5 617 606

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Description

FIELD OF THE INVENTION

[0001] This invention relates to a component for a suction operated automatic swimming pool cleaner as particularly disclosed in US-4193156.

BACKGROUND OF THE INVENTION

[0002] Several kinds of swimming pool cleaners have been developed which operate on suction generated by the swimming pool filtration plant. Usually these cleaners require a flexible disc to hold the cleaner against the surface being cleaned and a wear resistant foot which runs over the surface. The foot is moulded to have a stepped configuration so that water can pass under the disc and foot carrying detritus into the cleaner body and thence to be caught in a collection trap or the pool filter.

[0003] The foot is firmly resiliently engaged on the body and the disc engaged in a peripheral recess around the foot so that it can rotate around the foot. The components are made of different materials and are costly components of the cleaner.

OBJECT OF THE INVENTION

[0004] The Applicant has monitored the wear and tear on many cleaners and the object of this invention is to provide a component which will materially reduce the cost of manufacture of the pool cleaner while in no way reducing its efficacy in use.

SUMMARY OF THE INVENTION

[0005] According to this invention there is provided a swimming pool cleaner component comprising a foot and flexible disc moulded as an integral unit, and as defined in claim 1.

[0006] Further features of this invention provide for the foot to be rotatable on and supported by the body of the pool cleaner, for the shape of the foot to generally conform to a truncated conical shape and for the inner edges of the surface engaging parts of the foot to be more rigid than the outer edges.

[0007] The invention also provides for the disc to have a ring of reduced thickness around the foot and to have radially extending ribs of reduced thickness and a series of venturi openings spaced apart from the foot symmetrically there around. The surface of material around the openings in contact in use with a surface being cleaned will preferably be dished to ensure a very thin suction at the opening.

[0008] The invention also provides for the upper surface of the foot to provide a series of sand traps facilitating the transport of sand cleaned from the pool through the cleaner.

[0009] The outer edge of the disc will preferably be of

serrated shape with short upward projections extending from the peaks of the serrations.

[0010] It is a feature of this invention that the component can be moulded from a polyvinyl chloride composition.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] These and other features of this invention will become apparent from the following description of two examples illustrated in the accompanying drawings in which:

- Fig. 1 is a plan view of the cleaner component in accordance with a first embodiment of the invention;
- Fig. 2 is a diametral section through the central part of the component;
- Fig. 3 is a plan view of a second embodiment of the invention;
- Fig. 4 is an underneath view of the second embodiment;
- Fig. 5 is a diametral sectional elevation on section C-C;
- Fig. 6 is an enlarged partial diametral sectional elevation on section B-B;
- Fig. 7 is an enlarged diametral section through the central part on section C-C;
- Fig. 8 is an enlarged diametral section through the central point on section B-B;
- Fig. 9 is a partial sectional elevation showing a hinge detail; and
- Fig. 10 is a plan view showing a detail of venturi holes.

DETAILED DESCRIPTION OF THE DRAWINGS

[0012] As shown the component 1 for a swimming pool cleaner is preferably moulded of polyvinyl chloride material. This material is chosen to be cross-linkable to enable wear resistance characteristics to be varied to predetermined degrees. The component is designed so that this material can be used without distorting hoop stresses developing in the component during curing. This is achieved by the construction described below.

[0013] The component 1 consists of a peripheral annular disc part 2 integrally moulded with a central boss part forming a foot 3 for the pool cleaner. The foot is of truncated conical shape as indicated at 4. This gives a stability to the structure while allowing the base 5 of the foot 3 to be flexible around its outer edges. The conical section emphasises the ability of the foot to deform at the surface being cleaned and so tend to cling to projections and corners formed, for example, by steps on the surface to be cleaned. The normally circular opening into the foot can be given different elongated shapes to assist the facility. Gussets 6 are provided symmetrically spaced around the foot 3 extending between the central

and horizontal sections.

[0014] An annular inwardly facing rim 7 is provided to rotatably engage in a groove provided around the bottom of a pool cleaner body (not shown).

[0015] The base of the foot 3 is of stepped configuration with the lower sections 8 providing the parts of the foot engaging the surface being cleaned during use of the pool cleaner. The indented stepped sections 9 on the bottom surface provide flow openings into the body of the pool cleaner from underneath the foot and disc. The outer part of the surface engaging sections is more flexible than the smaller diameter inner sections.

[0016] Further openings 10 through the wall of the base part of the foot 3 allow flow of water above the disc into the pool cleaner body.

[0017] The foot 3 is joined to the flexible annular disc 2 by a ring 12 of thin sectioned material which provide great flexibility of the disc 2 relative to the foot 3.

[0018] Radially extending upstanding hinge sections 13 of reduced section material are symmetrically distributed across the upper surface of the disc 2 providing both flexibility to the disc and guide paths for sand and other detritus over the top surface of the disc towards the pockets formed between the stepped sections of the foot 3. These hinge sections also enable the effects of hoop stresses occurring during moulding and curing to be overcome. Escape holes 14 are provided through the walls of the pockets not providing flow openings 10 into the body of the cleaner. The intention is to allow escape of sand which may otherwise accumulate.

[0019] These hinge sections 13 and the ring 12 of reduced sectioned material ensure a flexibility to the dish which enables it to move over or around obstacles encountered during cleaning of a pool and substantially prevents the cleaner from becoming jammed.

[0020] The edge 15 of the disc 2 is serrated and short upstanding and outwardly projecting fins 16 extend from the apices of the serrations.

[0021] Venturi shaped holes 17 are provided through the disc at spaced intervals. The disc below these holes 17 is dished as indicated at 18 to provide thin edges around the periphery of the holes. These holes improve the flow characteristics of the water over the surface of the disc into the body of the pool cleaner.

[0022] It will be appreciated that the construction described above results in a highly flexible and efficient disc and foot combination which has a central part providing adequate support to hold the body of a pool cleaner properly orientated during use. It further provides substantial cost savings in the manufacture of the components by reduction both in the amount of material required and in the kind of material that can be used in the moulding of the combined components.

[0023] Referring to Figures 3 to 10, many features are the same as are shown in Figures 1 and 2 and the same reference numerals for these features are used. The description of Figures 1 and 2 is referred to. No escape holes 14 are provided in this second embodiment. They

are not important to have. The venturi shaped holes 17 are so called because they provide a narrowing passage for the radially inward flow of water through the holes, accelerating this flow. Hence the comment that they improve the flow characteristics of the water over the disc into the body of the pool cleaner.

[0024] The view of Figure 4 of the underneath of the disc shows a circle 20 which is the position at which the thickness of the disc 2 commences to reduce radially outwardly to the edge 15. Radially inwardly of the circle 20 the thickness of the disc remains constant.

Claims

1. For a swimming pool cleaner which consists of a body which has first structure for connection to a flexible suction pipe, second structure for intermittent interruption of a flow of water into the suction pipe and third structure for connection to a foot and flexible disc, a component (1) **characterized in that** it comprises:

- a foot (3) and a flexible disc (2) moulded as an integral unit, a central boss part forming said foot (3) with a peripheral base (5),
- the boss part (3) having an inwardly facing upper rim (7) for connection to the third structure of the body part, and
- the disc (2) being formed as an integral outer annular part extending from the peripheral base (5) of the central boss part (3),
- openings (10) through the wall of the boss part (3) above the integral disc (2) to allow flow of water above the disc into the body of the pool cleaner.

2. A component (1) for a swimming pool cleaner as claimed in claim 1, in which the foot (3) has a truncated conical shape and the rim (7) is inwardly facing.

3. A component (1) for a swimming pool cleaner as claimed in claim 1, in which the boss has indented stepped sections (9) which provide flow openings into the body of the pool cleaner from underneath the integral foot (3) and disc (2).

4. A component (1) for a swimming pool cleaner as claimed in claim 1, in which gussets (6) are provided symmetrically spaced around the boss of the foot (3) and the inner part of the foot is less flexible than the outer part of the foot (3).

5. A component (1) for a swimming pool cleaner as claimed in claim 1, which comprises a ring (12) of reduced sectional material which provides flexibility of the disc (2) relative to the foot (3).

6. A component (1) for a swimming pool cleaner as claimed in claim 1, in which the disc (2) comprises radially extending upstanding hinge sections (13) of reduced sectional material symmetrically distributed across the upper surface of the disc (2), providing flexibility to the disc and guide paths for sand and other detritus. 5
7. A component (1) for a swimming pool cleaner as claimed in claim 1, in which the outer edge (15) of the disc (2) is serrated and short upstanding and outwardly projecting fins (16) extend from the apices of the serrations. 10
8. A component (1) for a swimming pool as claimed in claim 1, in which tapering holes (17) are provided in the disc (2) at spaced intervals and the material of the disc (2) is dished (18) around the holes (17) to provide thin edges around the periphery of the holes (17). 15 20

Patentansprüche

1. Komponente (1) für einen Schwimmbeckenreiniger, der aus einem Körper besteht, der eine erste Konstruktion für den Anschluss an ein flexibles Saugrohr, eine zweite Konstruktion für eine intermittierende Unterbrechung eines Stroms von Wasser in das Saugrohr und eine dritte Konstruktion für den Anschluss an einen Fuß und eine flexible Scheibe umfasst, **dadurch gekennzeichnet, dass** sie Folgendes umfasst: 25 30
- einen Fuß (3) und eine flexible Scheibe (2), die als einstückige Einheit geformt sind, wobei ein mittlerer Nabenteil den genannten Fuß (3) mit einer peripheren Basis (5) ausbildet, 35
 - wobei der Nabenteil (3) einen nach innen weisenden oberen Rand (7) für den Anschluss an die dritte Konstruktion des Körperteils aufweist, und 40
 - wobei die Scheibe (2) als einstückiger äußerer ringförmiger Teil ausgebildet ist, der von der peripheren Basis (5) des mittleren Nabenteils (3) verläuft, 45
 - Öffnungen (10) durch die Wand des Nabenteils (3) oberhalb der integrierten Scheibe (2), damit Wasser oberhalb der Scheibe in den Körper des Beckenreinigers fließen kann. 50
2. Komponente (1) für einen Schwimmbeckenreiniger nach Anspruch 1, wobei der Fuß (3) eine kegelförmige Gestalt hat und der Rand (7) nach innen weist. 55
3. Komponente (1) für einen Schwimmbeckenreiniger nach Anspruch 1, wobei die Nabe gestufte Vertiefungsabschnitte (9) aufweist, die Strömungsöffnungen in den Körper des Beckenreinigers von unterhalb der einstückigen Einheit aus Fuß (3) und Scheibe (2) bildet.

4. Komponente (1) für einen Schwimmbeckenreiniger nach Anspruch 1, in der Keile (6) vorgesehen sind, die symmetrisch um die Nabe des Fußes (3) beabstandet sind, und der innere Teil des Fußes weniger flexibel ist als der äußere Teil des Fußes (3).
5. Komponente (1) für einen Schwimmbeckenreiniger nach Anspruch 1, die einen Ring (12) aus einem Material mit reduziertem Querschnitt umfasst, der Flexibilität für die Scheibe (2) relativ zu dem Fuß (3) bietet.
6. Komponente (1) für einen Schwimmbeckenreiniger nach Anspruch 1, wobei die Scheibe (2) radial verlaufende aufrecht stehende Gelenkabschnitte (13) aus Material mit reduziertem Querschnitt umfasst, das symmetrisch über die Oberfläche der Scheibe (2) verteilt ist, so dass Flexibilität für die Scheibe und die Leitwege für Sand und andere Schmutzstoffe entsteht.
7. Komponente (1) für einen Schwimmbeckenreiniger nach Anspruch 1, wobei der äußere Rand (15) der Scheibe (2) sägezahnförmig ausgebildet ist und kurze, aufrecht stehende und nach außen vorstehende Rippen (16) von den Scheitelpunkten der Sägezähne verlaufen.
8. Komponente (1) für ein Schwimmbecken nach Anspruch 1, in dem konisch zulaufende Löcher (17) in der Scheibe (2) in beabstandeten Intervallen vorgesehen sind und das Material der Scheibe (2) um die Löcher (17) schüsselförmig (18) ausgebildet ist, so dass dünne Kanten um die Peripherie der Löcher (17) entstehen.

Revendications

1. Pour un dispositif de nettoyage de piscine consistant en un corps ayant une première structure pour la connexion à un tuyau d'aspiration flexible, une seconde structure pour l'interruption intermittente d'un écoulement d'eau dans le tuyau d'aspiration et une troisième structure pour la connexion à un socle et un disque flexible, un composant (1) **caractérisé en ce qu'il** comprend :
- un socle (3) et un disque flexible (2) moulés d'une seule pièce, une partie centrale en forme de bosse formant ledit socle (3) avec une base périphérique (5),
 - la partie centrale en forme de bosse (3) ayant

un bord supérieur (7) orienté vers l'intérieur de manière à se connecter à la troisième structure du corps, et

- le disque (2) étant formé d'une pièce unique en forme d'anneau extérieur s'étendant à partir de la base périphérique (5) de la partie centrale en forme de bosse (3), 5
- des ouvertures (10) à travers la paroi de la partie centrale en forme de bosse (3) au-dessus du disque formé d'une pièce unique (2) pour permettre l'écoulement de l'eau au-dessus du disque dans le corps de nettoyage de piscine. 10

et dans lequel le matériau du disque (2) est incurvé (18) autour desdits trous (17) pour former des bords fins à la périphérie des trous (17).

2. Élément (1) destiné à un dispositif de nettoyage de piscine selon la revendication 1, dans lequel le socle (3) a une forme conique tronquée et le bord (7) est orienté vers l'intérieur. 15
3. Élément (1) destiné à un dispositif de nettoyage de piscine selon la revendication 1, dans lequel la bosse a des sections à segments dentelés (9) qui ménagent des orifices d'écoulement dans le corps de nettoyage de piscine, sous le socle (3) formé d'une pièce unique et du disque (2). 20
25
4. Élément (1) destiné à un dispositif de nettoyage de piscine selon la revendication 1, dans lequel sont ménagés des goussets (6) espacés de façon symétrique autour de la bosse du socle (3) et dans lequel la partie intérieure du socle est moins flexible que sa partie extérieure. 30
5. Élément (1) destiné à un dispositif de nettoyage de piscine selon la revendication 1, qui comprend un anneau (12) en un matériau de section réduite procurant une flexibilité du disque (2) par rapport au socle (3). 35
6. Élément (1) destiné à un dispositif de nettoyage de piscine selon la revendication 1, dans lequel le disque (2) comprend des charnières (13) s'étendant radialement vers le haut, faites en un matériau de section réduite et réparties autour de la surface supérieure du disque (2) de façon symétrique, conférant au disque une flexibilité ainsi que des passages pour le guidage du sable et autres débris. 40
45
7. Élément (1) destiné à un dispositif de nettoyage de piscine selon la revendication 1, dans lequel la bordure extérieure (15) du disque (2) est crantée et s'étendant vers le haut, courte, et dans lequel des ailettes (16) saillantes vers l'extérieur s'étendent à partir des sommets des crans. 50
8. Élément (1) destiné à un dispositif de nettoyage de piscine selon la revendication 1, dans lequel des trous de forme allant en se rétrécissant (17) sont ménagés dans le disque (2) à intervalles réguliers, 55

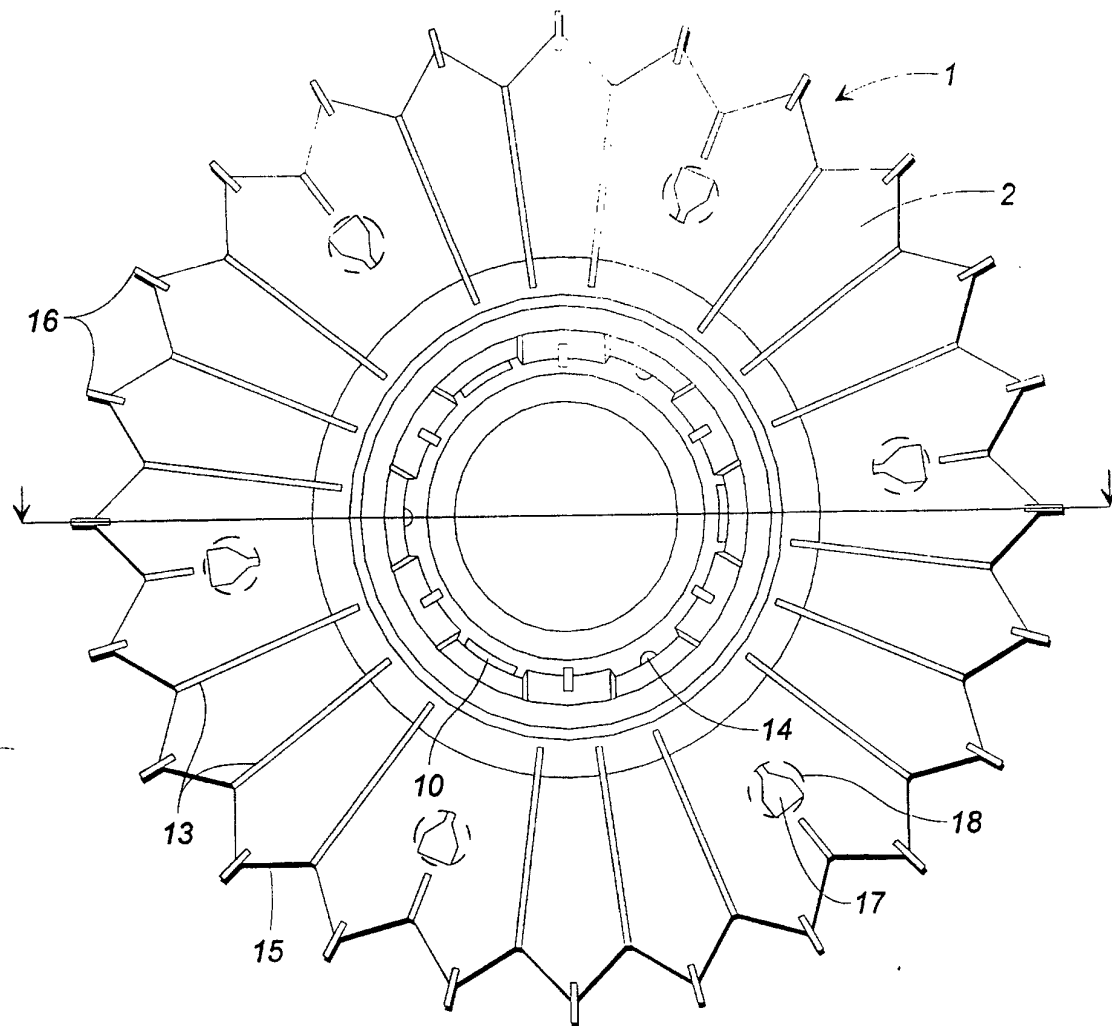


FIG. 1

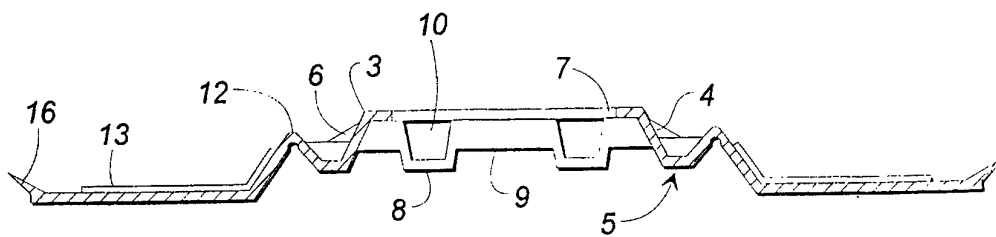


FIG. 2

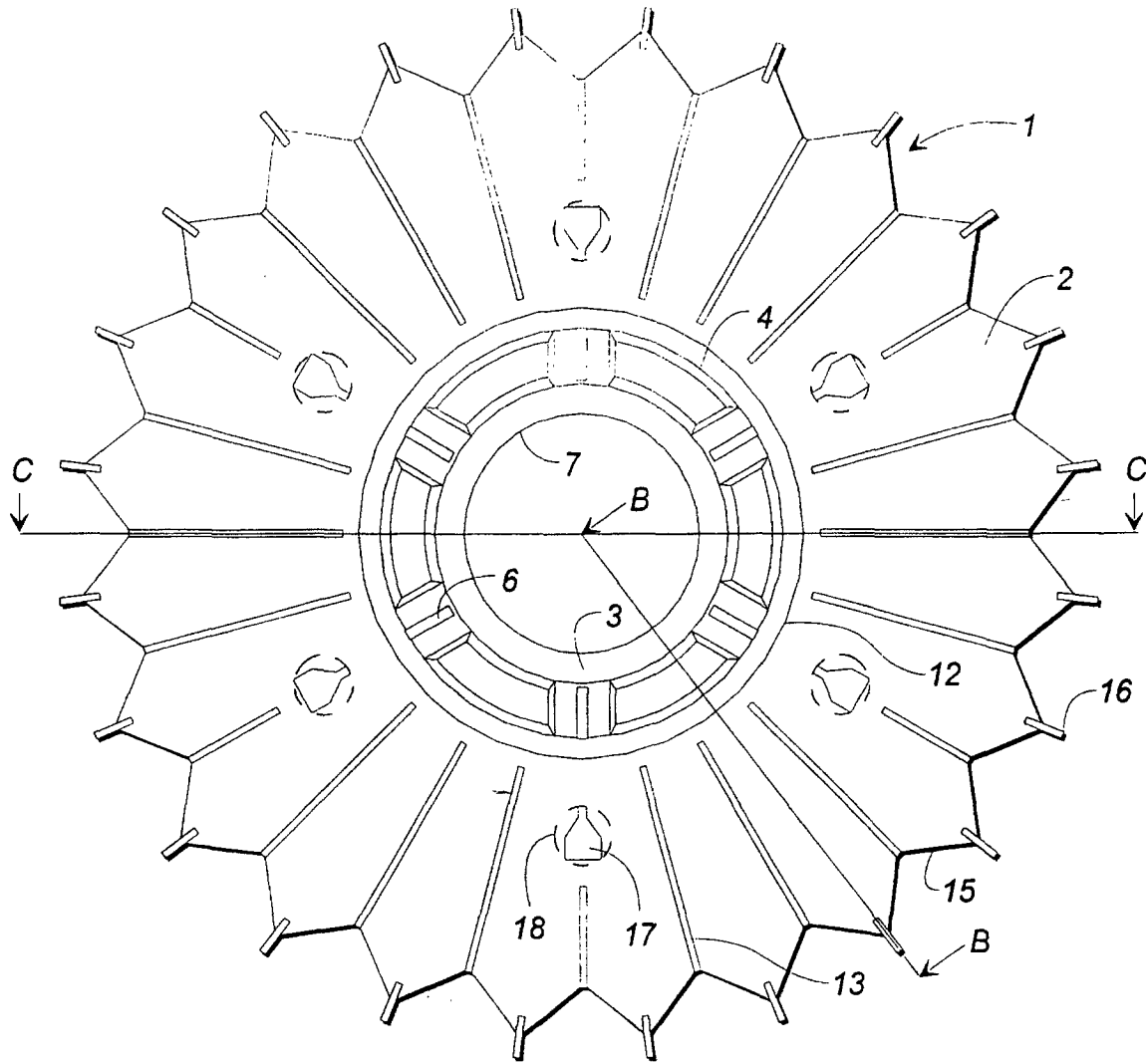


FIG. 3

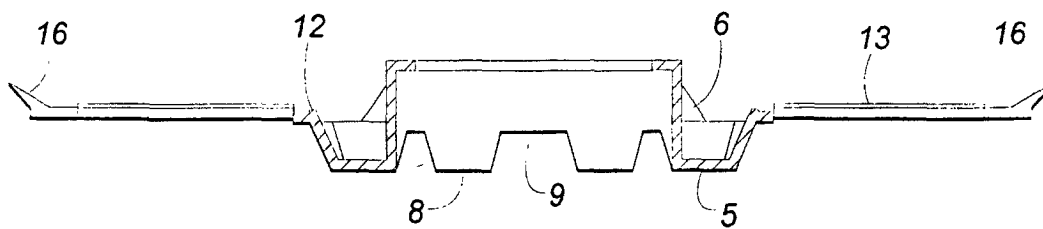


FIG. 5

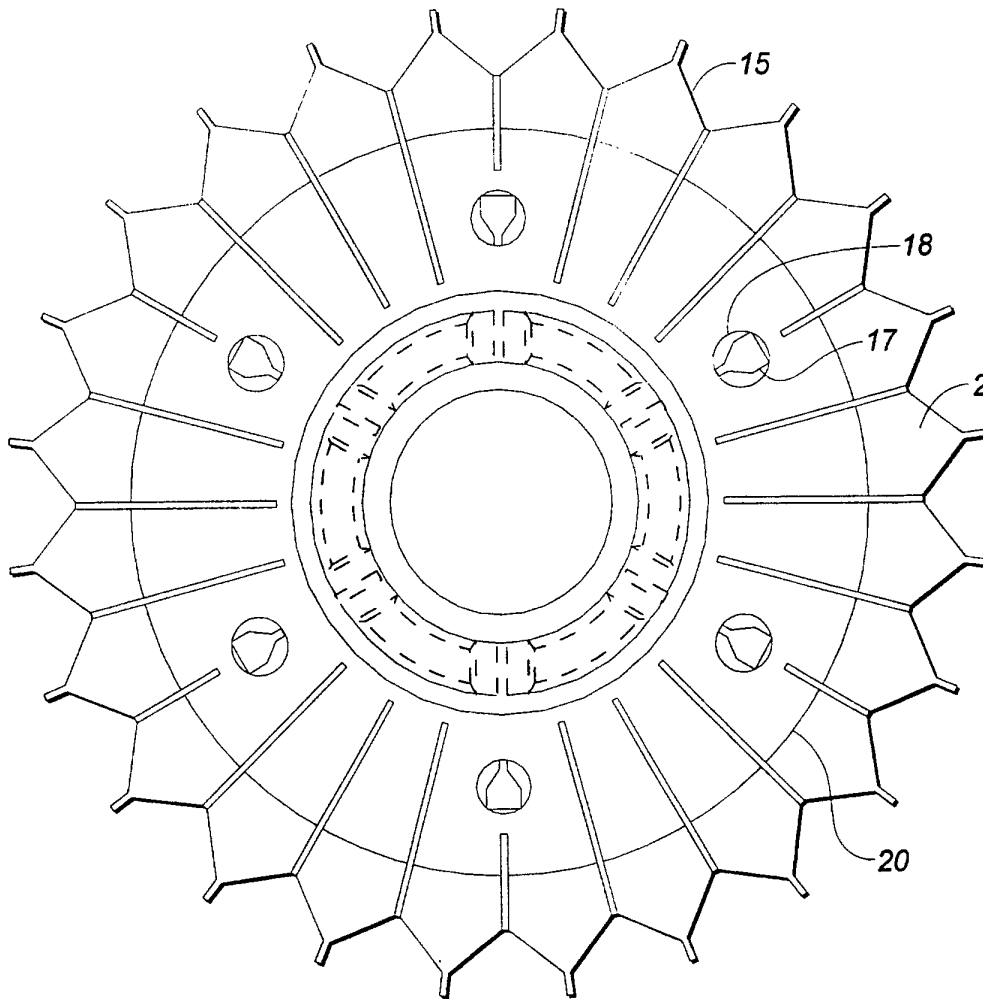


FIG. 4

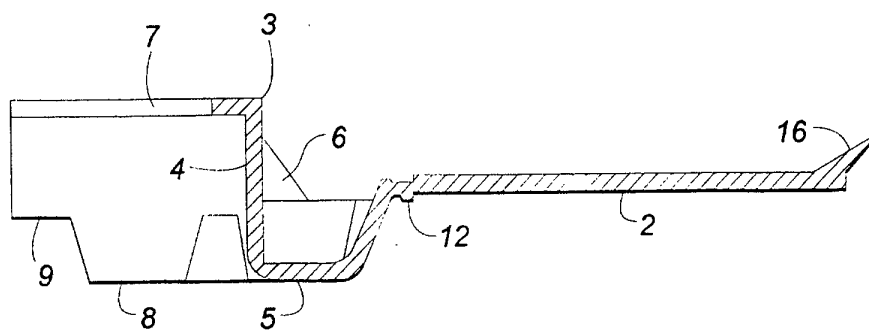


FIG. 6

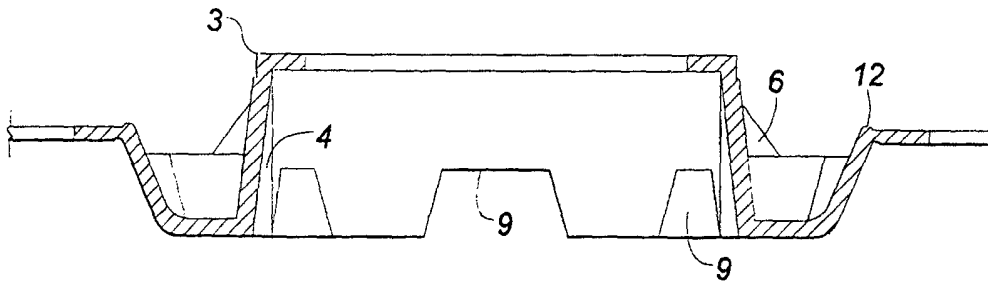


FIG. 7

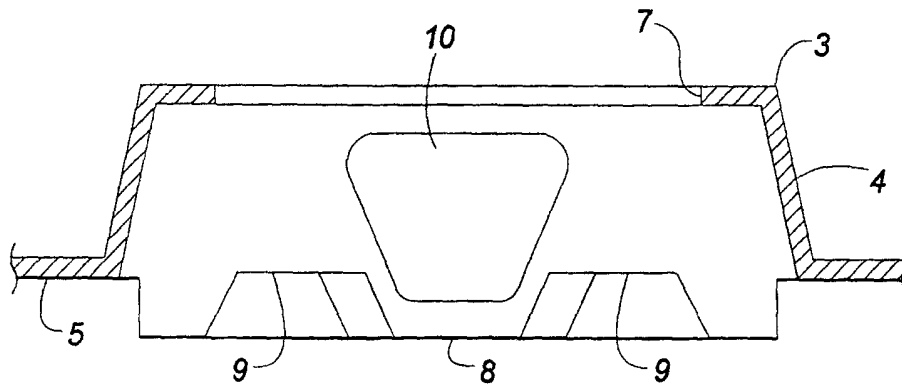


FIG. 8

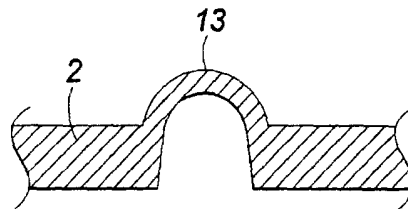


FIG. 9

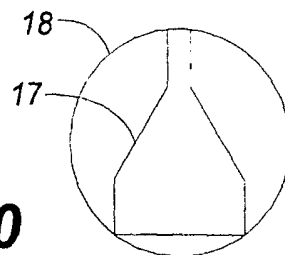


FIG. 10