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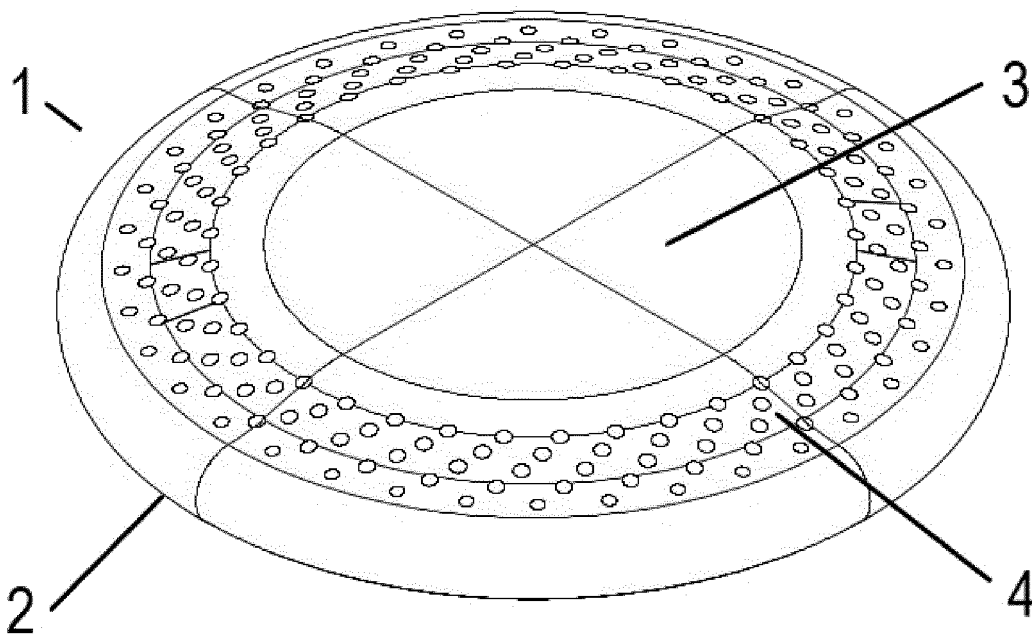
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(54) **K9-DISC C-MODEL FRISBEE DISC**

(57) A flying disc has a smaller diameter and lower profile which allow it to be more easily caught by dogs, children, and other less experienced players. The disc has an increased thickness and weight at the rim enabling the disc to travel greater distances.

The disc has gripping surfaces positioned along the top surface near the outer area of the disc. This will help a person retain better control of the disc while it is being

thrown or caught. The gripping surfaces are dimpled, uni-directional, and present a low profile. These gripping surfaces help prevent the accumulation of foreign matter that can render it difficult to grip or catch the disc and which can harm a dog's teeth when catching the disc as well as improving the flight pattern due to the huge reduction in drag.

**Figure 1 (A)****EP 3 991 819 A1**

## Description

(continued)

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 Statement Article 81: The European patent application shall designate the inventor. If the applicant is not the inventor or is not the sole inventor, the designation shall contain a statement indicating the origin of the right to the European patent.

Signature inventor: this document will be part of a procedure accepting electronic signature by means of the Smart Card that was sent by the EPO.

**[0002]** Please hereby find the request for grant of a European Patent for the canine flying disc K9-DISC C-Model.

**[0003]** The title of the invention is K9-DISC C-Model, a flying disc, also known as Frisbee®, with improved gripping surfaces and flight performance.

**[0004]** This application is filed by Van Driessche Sven, Grotestraat 66, 3540 Berbroek, Belgium, +32 496 52 65 94, [svenvandriessche@gmail.com](mailto:svenvandriessche@gmail.com).

## LIST OF DOCUMENTS

Prior filed applications:

**[0005]** To the best of my abilities, I have found none in Europe upon extensive search on 'flying disc', 'frisbee', 'dog frisbee', 'dog disc', 'latitude 64°', 'Opto bite', 'discrockers'.

**[0006]** This is a list of references used in US Patent Documents, relative to the invention.

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4255893	March 1981	Anderson et al.
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4516947	May 1985	Pircher et al.
4568297	February 1986	Duniplace
4681553	July 1987	Rodarte
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D327921	July 1992	Sobel
5531624	July 1996	Duniplace
5540610	July 1996	Sneddon

D388134	December 1997	Duniplace
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D401289	November 1998	Duniplace
D406282	March 1999	Pinguelo
D414823	October 1999	Gardner
6179737	January 2001	Adler
6540582	April 2003	Primos et al
2887119	May 2005	Hyperflite

## APPLICATION

**[0007]** The onle form EPO\_1001 will serve to file the application.

## DESCRIPTION

Technical field:

**[0008]** The invention relates to flying discs in general, and more specific flying discs with the intent for canines to be caught and humans to be thrown in the air and caught.

Background:

**[0009]** Flying discs have been around for years and are used by people of all ages. They are mainly used for recreation and you can spot them on beaches, in the parks, yards or even on the streets and squares. In addition to this recreational use, there are also competitive sports based on a flying disc in different sports like disc-golf (a golf like game where clubs and balls are substituted by discs), ultimate (a football like sport where the disc is replacing the ball), human freestyle, and some of these will be demonstration sports in the upcoming Olympics.

**[0010]** But the popularity of this flying disc is not limited to humans and extends since +/- 1975 to dogs. Since that date, more and more people have started to play with their dogs and recognize the benefits both physical as well as psychological. Tossing a disc is therefore a recreational activity which benefits both human and dog. In the meantime, this recreational use has also evolved into a competitive sport, first in the USA, and from the early 2000's the first European players also gathered to have the first competitions.

**[0011]** Now, in 2020, there are more than 5 competitive formats played globally and the number of participants continues to rise. In Europe the sport started in The Netherlands and Germany and quickly spread to Belgium, from where it was promoted throughout Europe. It's now a common activity for sporting dogs as there is flyball, agility and other canine sports. There is a full structure in place with National Championships, European Championships and World Championships.

**[0012]** A typical Frisbee® disc has a rim, formed along the perimeter of the disc, which then transitions into the flight plate. In order to enhance the grip for the thrower a set of annular ridges, separated by grooves, are formed along the edge of the flight plate. While this is an accurate description for many discs, there are also other shapes known to be designed in the past, however, the focus is on a disc with the described shape and features as also described in U.S. Patent No. 6,887,119 to Hyperflite Inc. Other shapes are described by U.S. Patent No. 4,568,297 to Dunipace, U.S. Patent No. 4,618,553 to Rodarte, U.S. Patent No. 4,906,007 to Mitchell et al., D327,921 to Sobel and D406,282 to Pinguelo.

**[0013]** As already mentioned a typical feature of a flying disc is the part along the outer edge which is referred to as the grip. In all discs available this ridge or irregular surface creates friction for the thrower, so he can grasp the flying disc with more force and release it with more control. Unfortunately, all these grip surfaces have a common problem, being the accumulation of dirt due to weather conditions as well as canine saliva, the grip will become very slippery and thus lose its effect, and also this grip will become very abrasive for the teeth of the canines. It can cause the flying disc to slip from the fingers of the thrower and create dangerous situations for the canine. The dirt can also compact in the grooves which is very difficult to clean and changes the aerodynamics of the flying disc as weight isn't distributed evenly anymore.

**[0014]** Furthermore, all types of grip surfaces currently known, are laid on top (some also are covering a part of the bottom) of the inclination from the rim towards the flight plate. Thus creating (micro-) turbulence and deviations in the flight pattern. Partially due to this turbulence and wake, the discs will descend very fast (also known as drop) towards the end of the flight pattern as rotational forces reduce due to the friction with the air, enhanced by the created turbulence.

**[0015]** In addition to both above mentioned problems, there are many discs that are by design, or used material, not fit for the use with canines. The frequently used Polyvinyl Chloride (polyvinyl, vinyl; abbreviated: PVC), is an example of a material which isn't suitable. The dogs puncture the discs with their canines and crack the rim with their molars, making holes in the flight plate or jagged edges in the rim. This will cause injury to the dog in the mouth area and is dangerous for tongue, teeth, gums and other weak parts in the rostral area.

**[0016]** It is obvious that, in order to have an equal competition setting, the flying discs used by these people are to be made out of durable and strong materials to maximize the potential of their skills and those of their canine. Reduction of punctures and cracks around the rim is a big priority when it comes to making such a flying disc, and ensuring a comfortable use for the human part and safe for the canine part are also primary concerns.

**[0017]** A need for a new generation of discs, based on a scientific and multidisciplinary approach, instead of ex-

perience from use, or descended from the flying discs engineered for other sportive activities with flying discs, is clearly there.

**[0018]** As mentioned, all previous designs are based on the original Frisbee® disc which originated as a toy for human use only. Many very experienced champions have tried to slightly modify the shape and size and experimented with the grip, but there has never been a manufacturer that combined a profound knowledge of the technical aspect of the competitive part with a profound knowledge of canine anatomy and physiology, nor are any of them experts in the field of aerodynamics. Needless to say, the margin for improvement was present.

## 15 DISCLOSURE OF THE INVENTION

**[0019]** As mentioned, the different approach to the various issues described in the background, resulted in the invention for which this grant of European Patent is requested.

**[0020]** The main features that have been examined and modified are:

the curve of the rim (a),  
the angle from the rim to the flight plate and the shape of this part (concave in many flying discs) (b),  
the grip (also in the outer area of the flying disc) (c),  
the size (d) and in consequence of the size also the weight was a criterion.

**[0021]** Each of these improvements will be described separately to create a clear view on the exact effect of these improvements.

(a) the curve of the rim was shaped in prior discs to prioritize aerodynamics. Unfortunately, when repetitively using with canines who have a full bite (taking the disc in the back of the mouth), bruises occurred in the area behind the molars where mandibula and palatum join. The rim in this invention was based on the natural curve that the mandibula and palatum have on an average canine. (due to the complicity of measurement, a select number of dogs was measured to limit the discomfort to a strict minimum, the data is therefore not to be considered as scientifically proven) But the data obtained was sufficient to adapt the curve of the rim to a measurement which would limit the possibility to an absolute minimum.

(b) the angle from the rim to the flight plate.  
As mentioned this area is concave in all other flying discs to enhance the grip for the thrower. The depression creates a comfortable feeling for the handler and provides more grip. This also implies there is no straight angle from the rim to the flight plate and therefore creating a vortex and affecting the aerodynamics of the disc causing it to lose altitude very quickly when

at the end of the flight path.

In the K9-DISC C-Model, the laws of aerodynamics presided on the comfort of the handler's feel of the flying disc, but due to the improvement of the aerodynamics, the handler needs less rotation and force to obtain the same result than with the older types of flying discs, making it also easier for new people to the sport.

Eliminating the depression also causes the invention to have a much more gradual and stable descent at the end of the flight pattern as there is way less rotation needed to keep the flying disc in flight.

This also provides the canine with more time to track and catch the flying disc. The frustration of the canine is way less as it is more successful at catching the disc, instead of apportioning the disc. This is a behavioral benefit for both human as well as canine, as in both brains, endorphins are produced after every successful throw and catch.

(c) the grip (outer area at the end of the flight plate).

To ensure there is no abrasion of the canine teeth, as mentioned in the Background a huge problem which can lead to loss of the canines, there are no structures mounted on top of the disc.

There are two reasons why the K9-DISC C-Model has the dimples where other manufacturers opted for a different way to obtain grip, using either ridges and grooves, or a pattern.

The first reason, proving the point that we took the dog as a primal inspiration and not existing flying discs, is to eliminate the abrasion of the teeth. As the dimples are assisting by shape to stop the rotation as quickly as possible, The teeth are protected by the smooth surface of the dimple and there is no superstructure which can cause the abrasion present, thus no abrasion on the teeth is possible. Dirt and saliva are easily removed and the K9-DISC C-Model can be cleaned faster than any other flying disc.

The second reason is based on aerodynamics where there is proof from other sports (golf, cycling, motorcycle helmets) that the dimple pattern is the most effective to reduce and direct drag. This enforces the effectiveness of the rotation put on the disc in order to keep in flight as controlled as possible, in combination with the earlier described improvement on the angle from the rim to the flight plate,

(d) size and weight.

The size of the K9-DISC C-Model was defined by two factors.

The first being the size of the mouth of the canine. Relative to that, the flying disc can't be too large as it would bounce off the gums.

A second reason is that such a flying disc wouldn't fly very well due to the increased platform and weight, the flight pattern will be shortened. With a too small

disc, huge rotation needs to be put on the disc by the thrower in order to stabilize the flight. It wouldn't have enough surface to glide through the air. Also when smaller than the size of the K9-DISC C-Model, the disc flies faster, making it harder for the canine to succeed in catching the flying discs. With an optimal size of 225 mm the compromise between both is optimal. The canine has the most chance to catch the flying disc when speed and direction are being controlled by the handler.

As to the weight, there is a maximum reasonable weight of 150 grams which is a general standard amongst experts in this field. Any flying object above this weight would be a possible hazard for the physical integrity of the rostral area of the canine.

**[0022]** As flying discs can be thrown with a huge amount of force by experienced handlers, the velocity with which the flying disc would hit the dog, could result in impact related injuries. The weight limit for the K9-DISC C-Model is therefore set on 145 gr.

With these optimizations in size and weight, the disc is found to travel at least 20% further than with similar flying discs and also more control over speed and direction are being reported, when thrown under the same conditions.

#### BRIEF DESCRIPTION OF DRAWINGS

**[0023]** The accompanying drawings, which are incorporated in and form a part of the specification, illustrate preferred embodiments of the present invention and, together with the description, disclose the principles of the invention. In the drawings:

FIG. 1(A) is a perspective view of the disc

FIG. 1(B) is a top view of the disc;

FIG. 1(C) is a cross-sectional side view of the disc

#### DETAILED DESCRIPTION OF DRAWINGS

**[0024]** Reference will now be made in detail to preferred embodiments of the invention, non-limiting examples of which are illustrated in the accompanying drawings.

A flying disc 1 according to a preferred embodiment of the invention is shown in FIGS. 1(A) to 1(C).

**[0025]** The flying disc 1 is comprised of a rim 2, a flight plate 3, and a transition area 4 between the rim 2 and flight plate 3. A gripping surface 5 is formed in the transition area 4 on the top of the flying disc .

As best seen in FIG. 1(C), the rim 2 has an increased thickness relative to other parts of the flying disc 1. This increased thickness at the rim 2 provides for a greater concentration of weight along the edges of the disc 1.

**[0026]** The thicker area near the rim 2 lessens the likelihood of the rim 2 breaking, such as due to flexion in the rim 2 resulting from aggressive canine catches and powerful canine jaws. The thickened rim 2 also enables the

flying disc 1 to travel greater distances. Lastly, as the weight is distributed towards the outside of the disc 1, the counteraction to the rotation induced by the thrower of the disc 1 will generate an exocentric rotation that is stopped by the rim 2 and the angle of the bottom side where the transition area 4 and the rim 2 are joining, providing more stability along the full flight pattern of the throw and making it easier for the canine to catch the disc 1 as there is a compensation of the angle of release.

**[0027]** All the above characteristics were clearly observable during multiple tests with and without canines. This is already an improvement against other flying discs 1 and provides a more stable and predictable flight pattern, making it again easier on the canine to track, and catch the disc 1 as required in competition and described as 'the purpose' in recreational play.

**[0028]** As mentioned above, the rim 1 has an increased thickness which, in part, helps reduce the likelihood of it flexing and breaking during usage. The flying disc 1 has other improvements that allow it to be stronger in key areas subjected to wear or stress failure induced by canine teeth or jaw force.

**[0029]** For example, during the pre-production phase, the thickness of the transition area 4 was increased following test results that indicated that the characteristic dimples in the gripping surface 5 were a weak point for punctures. In the preferred embodiment, the thickness of the flight plate 3 is 1.50 mm and transition area 4 is 2.00 mm, whereas the typical thickness of other canine competition discs is only 1.17 mm. This extra thickness helps the flying disc 1 travel farther while maintaining its rotational energy, enabling the disc to slow down and hover after achieving longer flights as more weight is concentrated in the outside area of the disc 1. The flying disc 1 is preferably made of a thermoplastic polyurethane (TPU), although any other suitable material may be used.

**[0030]** The flying disc 1 has a different profile than conventional flying discs. In the preferred embodiment, the disc 1 has a diameter of 225.00 mm, the rim 2 has a height of about 18.00 mm, and the height of the flight plate 3 relative to the bottom of the rim 2 is about 25.00 mm. A typical canine disc has a diameter of about 235.74 mm, has a rim with a comparable height of about 17.45 mm. The reduced diameter of the flying disc 1, in combination with the increased weight at the rim 2, and along the gripping surface 5, enables the disc 1 to be thrown greater distances with less aerodynamic drag. The increased ratio between the height of the rim 2 and the diameter of the disc 1 will trap more air in the bottom part of the disc 1 and therefore create more stability as the disc 1 can rest on a higher area of rotating air circulating at the inside of the rim 2.

**[0031]** The concept of the dimpled gripping surface 5 is derived from other sporting materials which also have a huge impact from aerodynamics. Mainly golf and time-trial cycling were an inspiration as well as the Schubert motor helmet. In all these sports, the use of dimples has already proven a reduction of drag when encountering a

headwind or having the desire to maintain stability and predictability when trying to make an object fly as far as the launcher is able to.

**[0032]** Also in empiric testing by a mix of highly qualified test persons and unexperienced throwers, the results showed that the disc 1 will fly further than any conventional disc 1, as well as remain more stable and descending slower than a traditional canine disc. It was also found to be easier to handle as there is less rotational force needed to obtain the same lift as with a conventional disc. This implies less stress on the throwers wrist area also reducing the risk on degenerative injury.

**[0033]** As already mentioned, the flying disc 1 is found to offer a number of improvements over existing flying discs. For example, the disc 1 is found to travel up to 20 percent further than other canine discs when thrown under similar conditions.

The gripping surfaces 5 is believed to contribute to the ultimate distance achieved in the throws as the dimples are not on top of the disc, thus not creating any micro-turbulence as is in other canine discs either by using a staggered grip or ridged grip. They even accelerate the rotational force instead of reducing it.

**[0034]** Also, tests of the flying disc 1 with canines confirm the strength of the disc 1 and verify that the gripping surfaces 5 do not retain grit and other foreign matter that tend to have an abrasive effect on canine teeth. In all other verified canine discs for competitive use, the gripping surface 5 will cause abrasion of mainly the dogs' canine teeth.

Not only due to the retention of grit, then due to the abrasive nature of the gripping surface itself as can be seen in the Hyperflite patent. The catch of the dog will stop the disc from rotating almost immediately, but repetitive use will indicate the importance of the 'almost'. The flying disc 1, with the characteristic dimple pattern will guide the canine teeth towards the lowest point of the dimple and stop the rotation there.

There is no abrasion reported whatsoever after extensive testing with multiple canines over a longer period of time.

**[0035]** The foregoing description of the preferred embodiments of the invention has been presented only for the purpose of illustration and description and is not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations are possible in light of the above teaching.

**[0036]** The embodiments were chosen and described in order to explain the principles of the invention and their practical application so as to enable others skilled in the art to utilize the invention and various embodiments and with various modifications as are suited to the particular use contemplated.

## INDUSTRIAL APPLICATION

**[0037]** The K9-DISC C-Model is made through a process of mould injection. This makes it industrially applicable. The base material is first mixed with the color material

(master batch) and then heated to a temperature high enough to inject it in the mould. After a fixed amount has been injected in the mould, the disc will cool inside the mold for approximately 80 seconds. When the mould opens, 4 suction caps remove the disc from the mold and put the disc on a conveyor belt to further cool down before being packed into boxes. 5

## Claims 10

1. A flying disc adapted to be thrown by humans and caught by dogs, the disc **characterized by**:

- a. a rim; 15
  - b. a flight plate;
  - c. a transition area located between the flight plate and the rim in a straight line and not concave;
  - d. a top side; 20
  - e. a bottom side;
  - f. a typical, dimpled gripping surface formed in the transition area on the top side of the disc;
  - g. the gripping surface includes a pattern of dimples indenting the disc and not on top of the disc, which doesn't form a staggered, noncontinuous segment nor a plurality of continuous annular ridges and grooves; 25
  - h. whereby the gripping surface pattern doesn't comprise a plurality of vortex generators when the disc is in flight making it more stable and easier to handle, don't generate abrasion on the dogs teeth and the dimples substantially fail to trap dirt and particulate matter. 30
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**Figure 1 (A)**

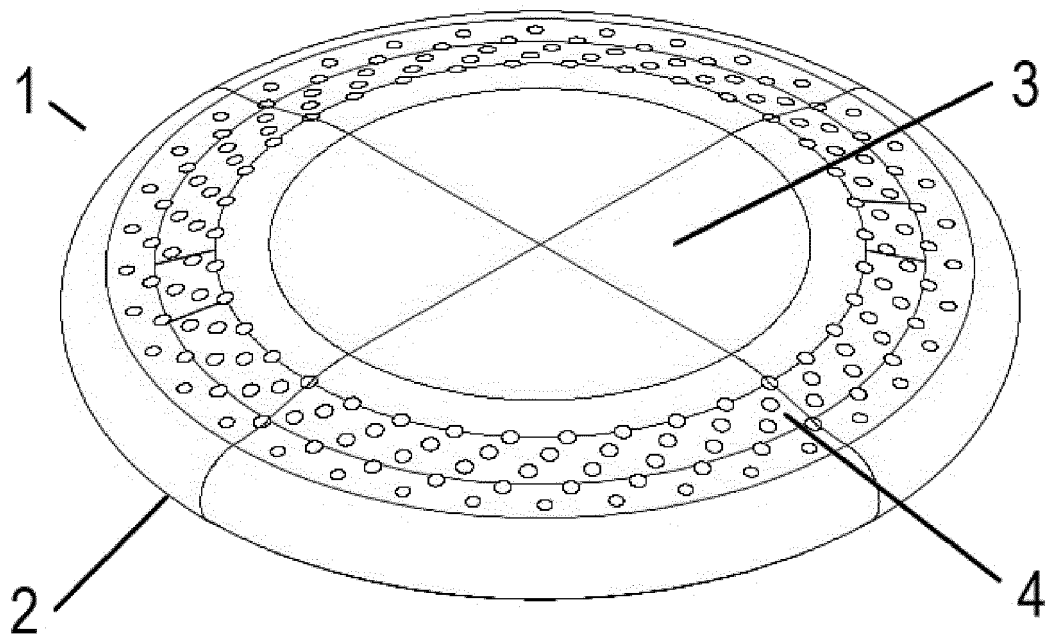
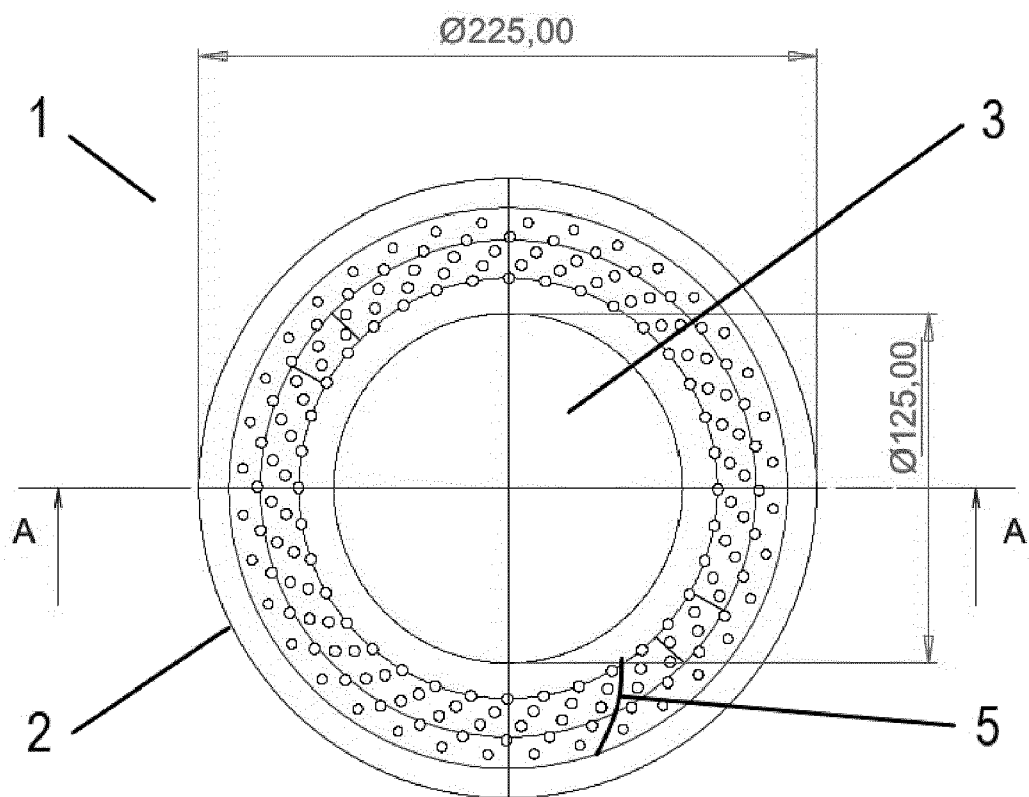
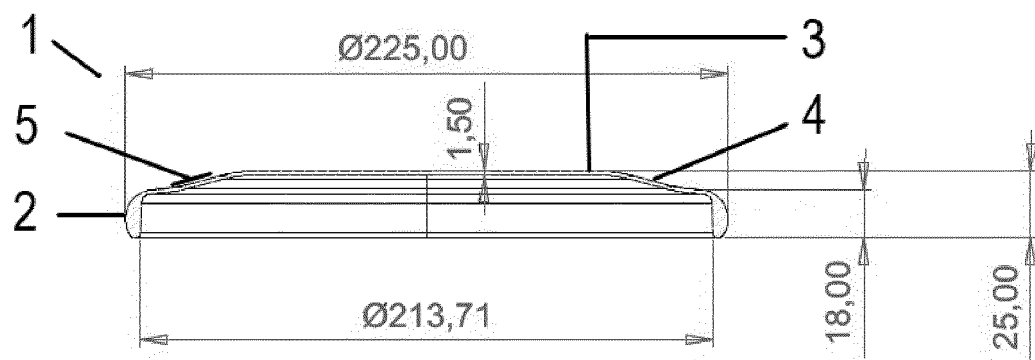


Figure 1 (B)





**Figure 1 (C)**





## EUROPEAN SEARCH REPORT

Application Number  
EP 20 20 4185

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2018/093197 A1 (TARNG MIN MING [US] ET AL) 5 April 2018 (2018-04-05) * the whole document *	1	INV. A63H33/18
X	US 2007/197318 A1 (SERRANO JUDE R [US]) 23 August 2007 (2007-08-23) * figure 1 *	1	
X	US 2013/167778 A1 (PERRY JEFFREY K [US]) 4 July 2013 (2013-07-04) * the whole document *	1	
X	US D 327 921 S (SOBEL JAN M) 14 July 1992 (1992-07-14) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			A63H A63D
The present search report has been drawn up for all claims			
Place of search <b>Munich</b>		Date of completion of the search <b>6 April 2021</b>	Examiner <b>Haller, E</b>
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 20 20 4185

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-04-2021

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US 2018093197 A1	05-04-2018	NONE	
US 2007197318 A1	23-08-2007	NONE	
US 2013167778 A1	04-07-2013	NONE	
US D327921 S	14-07-1992	NONE	

## REFERENCES CITED IN THE DESCRIPTION

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

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