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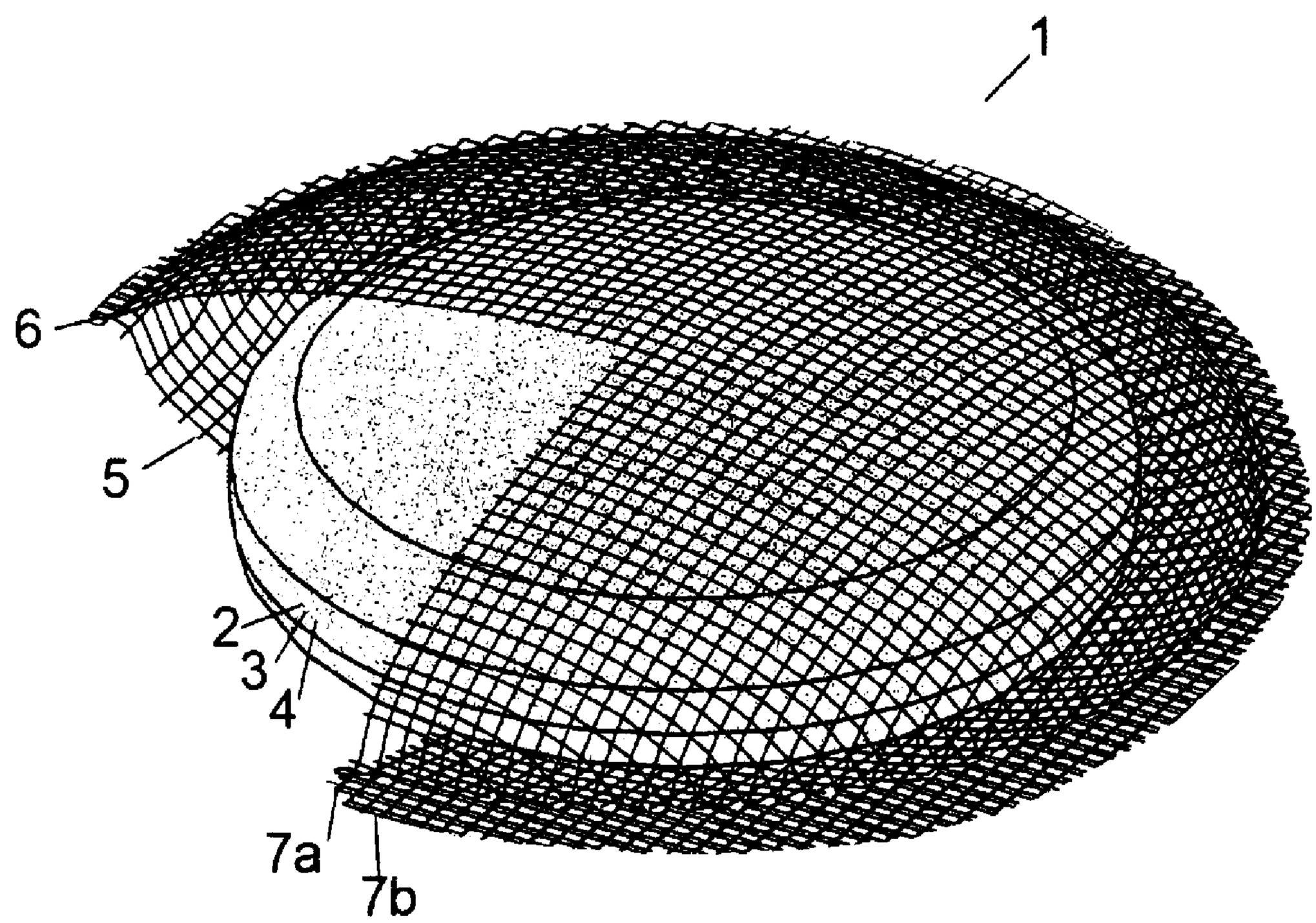
(54) **Titre : SYSTEME POUR DISSOLUTION D'UNE PASTILLE OU D'UN GRANULE DANS UN COURANT D'EAU**
(54) **Title: SYSTEM FOR DISSOLUTION OF A TABLET OR GRANULATE IN A STREAM OF WATER**



(57) **Abrégé/Abstract:**
The application discloses a discus-shaped unit of a tablet or granulates which contain abrasive media, to be dissolved into a stream of water. Tablet or granulates are encased in a flexible, but inherently stable mesh of filaments for to enhance dissolution, avoid clogging nozzles and ease disposal of residues.

ABSTRACT

The application discloses a discus-shaped unit of a tablet or granulates which contain abrasive media, to be dissolved into a stream of water. Tablet or granulates are encased in a flexible, but inherently stable mesh of filaments for to enhance dissolution, avoid clogging nozzles and ease disposal of residues.

SYSTEM FOR DISSOLUTION OF A TABLET OR GRANULATE IN A STREAM OF WATER

FIELD OF THE INVENTION

The invention relates to a water jet system, wherein media, containing abrasive ingredients, is encased in a mesh of wire or plastic filaments, so to enhance uniform dissolution and avoid re-conglomerations that might clog filters and nozzles.

PROBLEM TO BE SOLVED

For quite a few applications tablets, powders or granulates are used to load water jets or streams with suitable ingredients for cleaning or gardening purposes. Usually mixing chambers are used to hold the tablets or powders, through which a stream of water is directed, that gradually dissolves the media and directs the resulting suspension into a spray nozzle or the like.

There are, however, some drawbacks in most of these systems:

> The dissolution usually tends to be rather irregular. Depending of flow scheme and particular eddies that are difficult to anticipate, tablets ablate differently on their outskirts and powders adhere to some resulting dead sector of the mixing chamber. This demands an augmented volume of water to be injected for total dissolution, which periodically would only inherit at low concentration of the matter. Moreover, the chamber has to be cleaned after use, which is an unpleasant job.

> Partly dissolved ingredients tend to re-agglomerate and might clog filters and nozzles or orifices. This demands a careful selection of the constituent parts and often prohibits a required concentration of matter.

> Abrasive media, which tends to be the most compact part within the mixtures, particularly agglomerate and clog in boundaries of constrictions as a result of their higher density and therefore stronger centrifugal momentum in turbulences and because of their coarser surface.

PRIOR ART

There are quite a few propositions known how to mix ingredients, and particularly abrasive media, into a stream of water. In most cases this is achieved by injecting it into the water stream with gases under pressure, or injecting it under pressure into a mixing chamber as in DE 3742466 A1, DE 4002787 A1 , or DE 102007047478 A1, or using other injecting agents, as in US 5.362.472 or foaming additives, as usual in tablets for washing machines (which does not work so well for the heavier abrasive components).

For the dissolution of tablets, some disclosed ideas simply refer to holders of tablets in a water stream (as DE 199 35 728 C2 or EP 95304115.9), which may happen sequentially as to the program of washing machines in DE 97 308 388.4.

Others refer to dispensers, wherein a powder or granulate is gradually released into a stream of water by gravity, as in US 5.849.253, or a tablet is in solution in a periodically flushed secondary reservoir, as in US 6.048.501 and US 7.462.289 B2, or in a gyratory floating dispenser, as in US 6.301.733 B1 and EP 0628652 (A1).
Whereas the first one might be feasible for abrasive media, but quite critical in its handling, the latter require soluble media and the third one is only applicable in rotating drums, like in washing machines.

In statical mixing chambers, as proposed in WO 2008/046580 and DE 3322716 (A1), we particularly found the above mentioned drawbacks of residues in dead sectors and behind constrictions.

A constant decomposition of tablets, powders and granluates containing abrasive matter in mixing chambers therefore had so far not been feasible without serious drawbacks in their possible composition - so to be retraced in application DE 10 2010 051 226.5.

INVENTIVE STEP

Within a suite of studies on performance of abrasive media for dental cleaning, it had been realized, that packing these tablets or powders into a mesh of adequate size can solve the problem:

Firstly it had been recognized, that the mesh provokes a system of small, but equally distributed turbulences in the stream of water around it, thus enhancing the dissolution of the substance quite uniformly, as long as there is adequate space between the tablet or the surface of the powder and the mesh, which was found optimal at approximately 1/10 of the diameter of the tablet or powder surface.
This results from a close correlation between particle size of the abrasive medium, the distance and the mesh size. The studies show, that a mesh size of 0.3 mm result in good dissolution behavior, if particle sizes are between 4 and 6 mils, while the tablet is 30 millimeter in diameter and 6 mm thick, whereas clearence between mesh and tablet on the upside is 3.0 Millimeter.

Furthermore the voids within the mesh let small particle of the abrasive media pass easily, whereas larger particle agglomerations cannot enter the stream of slurry.

Deduced from this finding was the solution, that residual materials, as firmly cemented abrasive particles, may be kept within the mesh and can easily be disposed with it after use.

SUMMARY OF THE INVENTION

Assessing the aforementioned findings, the invention refers to a tablet or granulate comprising abrasive media, encased in a flexible, but sufficiently stiff mesh and exposed to a water stream, that would dissolve soluble components and carry away the detached abrasive particles in a stream of slurry, whereas inevitably cemented residues can be disposed with the mesh.

In a broad aspect, the present invention relates to:

[1] A system for dissolution of a dental cleaning tablet (1) or dental cleaning granulate in a stream of water, wherein the dental cleaning tablet (1) or dental cleaning granulate are fully encased in a flexible, but inherently stable and disposable mesh (5, 6, 7).

[2] A system for dissolution of a tablet or granulate as described in [1], wherein the tablet (1) or granulate comprises abrasive media.

[3] A system for dissolution of a tablet or granulate as described in [1], wherein the mesh (5, 6, 7) is formed like a discus.

[4] A system for dissolution of a tablet or granulate as described in [1] or [3], wherein the mesh (5, 6, 7) is welded to form a rimlike bearing around the discus.

[5] A system for dissolution of a tablet or granulate as described in [1], [3] or [4], that has a clearance of between 1/20th and 1/10th of the tablet or granulate's diameter between the tablet's face or the granulate and the mesh (5, 6, 7).

[6] A system for dissolution of a tablet or granulate as described in [1], wherein the natural resonance of the mesh (5, 6, 7), submersed in water, is between 60 and 500 Hz.

[7] A system for dissolution of a tablet or granulate as described in [1], wherein the mesh size does not exceed 0.3 mm.

[8] A system for dissolution of a tablet or granulate as described in [7], wherein the filament diameter is between 0.12 mm and 0.25 mm.

[9] A system for dissolution of a tablet or granulate as described in [1], wherein the mesh (5, 6, 7) is made of Nylon.

[10] A system for dissolution of a tablet or granulate as described in [1], wherein the mesh (5, 6, 7) is made of bio-plastics.

[11] A system for dissolution of a tablet or granulates as described in [10], wherein said bio-plastics are cellulosic acid esters or lactic acids.

[12] A system for dissolution of a tablet or granulate as described in [1], wherein the multiplicity of the voids within the mesh (5, 6, 7) is adapted to provoke multiple turbulence.

[13] A system for dissolution of a tablet or granulate as described in [1] or [2], wherein the throughput of a stream of water results in vibrations of the mesh (5, 6, 7) and the tablet or the granulate, that enhance the dissolution and the output of the abrasive media into an outflowing slurry.

[14] A system for dissolution of a tablet or granulate as described in [1], wherein the size of the voids of the mesh (5, 6, 7) is adapted to cause a continuous delivery of abrasive media into the water, so to result in a homogeneous stream of slurry.

PREFERRED EMBODIMENT

The dissolution works particularly well, as long as the mesh is kept in some distance from pressed tablets, or if granulates are kept sufficiently loose within the mesh.
As an optimal form a disk-like mesh structure could be found, wherein a tablet can float in a vertical water stream without turning and aligning to the stream.

Therefore, with respect to easy manufacturing, a preferable embodiment of the invention is a disc-like mesh, that results from a double layer of mesh with a tablet or small heap of Granulate

disposed in between, that is circumferentially welded together to form a rim of a few millimeter width, which is used as bearing area.

The continuous delivery of the abrasive component creates a suspension flow wherein particle agglomerates do not exceed a size of 0.3 mm. That remains quite constant within the period of the dissolution, as long as sufficient abrasive particles are present within the mesh.

Secondly, re-agglomerations that occur are held within the mesh and tend to dissolve again in the current, before they can clog filters and orifices. This helps to provide a rather uniform concentration of media within the stream of water, particularly after the substance is reduced at the end - it then typically is forming a cloud of media in the mesh, that finally is carried away quite abruptly.

A suspension stream, thus controlled by the mesh will pass through curved nozzles (30° curvature at the nozzle point) without clogging it, due to the continuous flow pattern of the suspension.

Residues that cannot dissolve and adhering agglomerations need not to be removed by scratching it out of the mixing chamber, but can easily be disposed by simply opening and tilting the unit to let the mesh with all residues fall off.

DESCRIPTION OF THE DRAWING

Fig1 shows - in a cut-off view - a tablet 1 containing abrasive particles 2-4, encased in mesh, that consists of two dish-like cups 5 and 6, which are formed by welding a rim 7a and 7b between two meshes.

What is claimed is:

1. A system for dissolution of a dental cleaning tablet (1) or dental cleaning granulate in a stream of water, wherein the dental cleaning tablet (1) or dental cleaning granulate are fully encased in a flexible, but inherently stable and disposable mesh (5, 6, 7).

2. A system for dissolution of a tablet or granulate as described in claim 1, wherein the tablet (1) or granulate comprises abrasive media.

3. A system for dissolution of a tablet or granulate as described in claim 1, wherein the mesh (5, 6, 7) is formed like a discus.

4. A system for dissolution of a tablet or granulate as described in claim 1 or 3, wherein the mesh (5, 6, 7) is welded to form a rimlike bearing around the discus.

5. A system for dissolution of a tablet or granulate as described in claim 1, 3 or 4, that has a clearance of between 1/20th and 1/10th of the tablet or granulate's diameter between the tablet's face or the granulate and the mesh (5, 6, 7).

6. A system for dissolution of a tablet or granulate as described in claim 1, wherein the natural resonance of the mesh (5, 6, 7), submersed in water, is between 60 and 500 Hz.

7. A system for dissolution of a tablet or granulate as described in claim 1, wherein the mesh size does not exceed 0.3 mm.

8. A system for dissolution of a tablet or granulate as described in claim 7, wherein the filament diameter is between 0.12 mm and 0.25 mm.

9. A system for dissolution of a tablet or granulate as described in claim 1, wherein the mesh (5, 6, 7) is made of Nylon.

10. A system for dissolution of a tablet or granulate as described in claim 1, wherein the mesh (5, 6, 7) is made of bio-plastics.

11. A system for dissolution of a tablet or granulates as described in claim 10, wherein said bio-plastics are cellulosic acid esters or lactic acids.

12. A system for dissolution of a tablet or granulate as described in claim 1, wherein the multiplicity of the voids within the mesh (5, 6, 7) is adapted to provoke multiple turbulence.

13. A system for dissolution of a tablet or granulate as described in claim 1 or 2, wherein the throughput of a stream of water results in vibrations of the mesh (5, 6, 7) and the tablet or the granulate, that enhance the dissolution and the output of the abrasive media into an outflowing slurry.

14. A system for dissolution of a tablet or granulate as described in claim 1, wherein the size of the voids of the mesh (5, 6, 7) is adapted to cause a continuous delivery of abrasive media into the water, so to result in a homogeneous stream of slurry.

Fig. 1

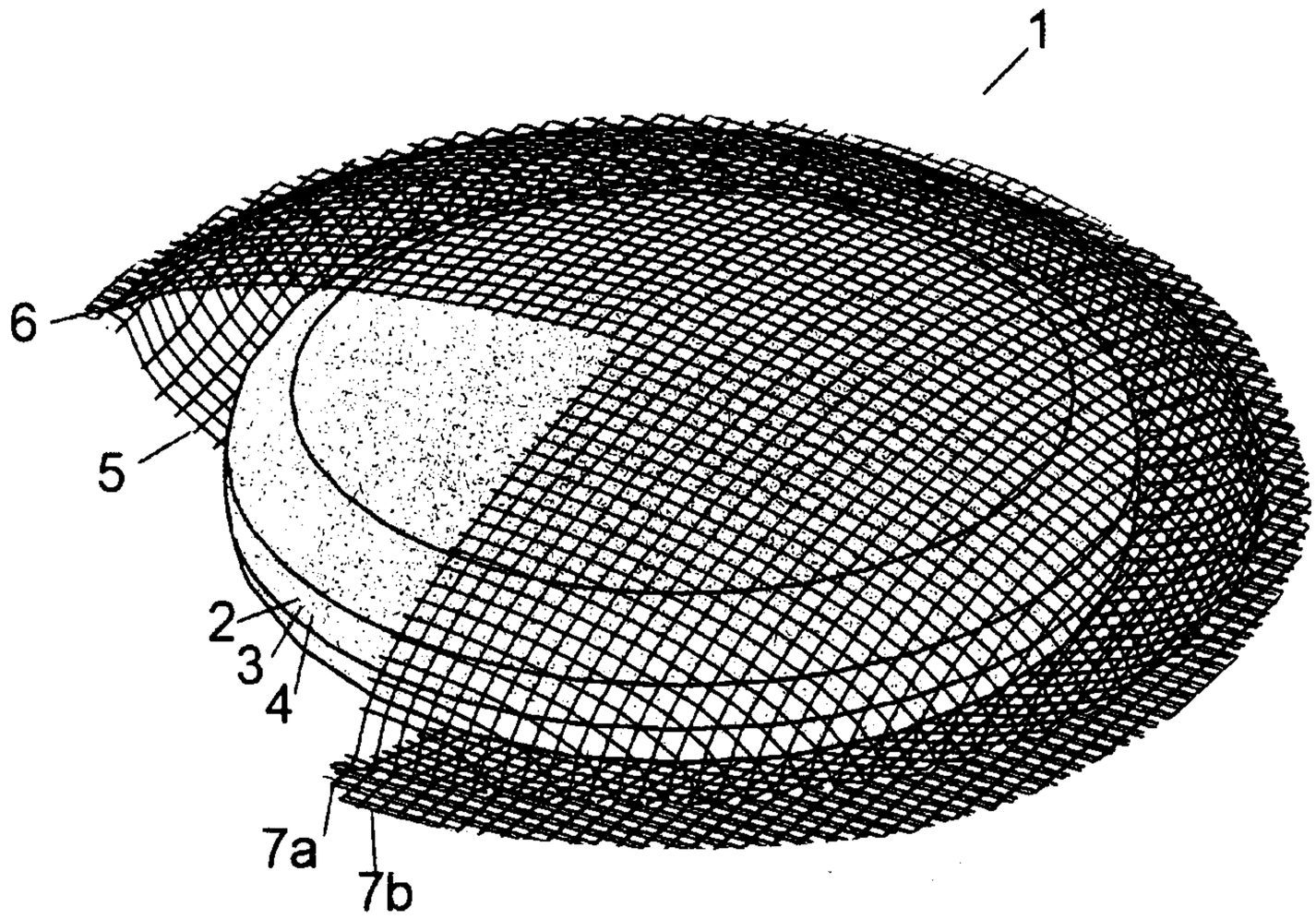


Fig. 1