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(54) **PROCESS FOR PERMANENTLY PERFUMING SOAPNUT SHELLS, IMPROVING THEIR WASHING EFFICIENCY, AND SOAPNUT SHELL-BASED PREPARATIONS PRODUCED BY THE PROCESS**

VERFAHREN ZUR DAUERHAFTEN PARFÜMIERUNG VON SEIFENNUSSSCHALEN,
VERBESSERUNG IHRER WASCHEFFIZIENZ UND DURCH DAS VERFAHREN HERGESTELLTE
PRÄPARATE AUF SEIFENNUSSSCHALENBASIS

PROCÉDÉ DESTINÉ À PARFUMER DE MANIÈRE PERMANENTE DES COQUES DE NOIX DE
SAVON, AMÉLIORANT LEUR EFFICACITÉ DE LAVAGE, ET PRÉPARATIONS À BASE DE COQUES
DE NOIX DE SAVON PRODUITES GRÂCE AU PROCÉDÉ

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Description

[0001] The invention relates to a process for permanently perfuming soapnut shells and improving their washing efficiency, during which process the soapnut shells are treated with effective microorganisms and a perfume material.

[0002] The invention furthermore relates to preparations based on the soapnut shells produced by the process according to the invention, powdered and mixed with various substances, which preparations serve as additives to the treated soapnut shells used for washing, further improving their cleaning, colour-brightening effect, and helping to keep the washing machine clean.

[0003] Soapnut is a plant containing natural active substances, which has long been known and used for washing and cleaning. The fruit of the Indian soapnut tree (*Sapindus mukorossi*) is the most widely used, the shells of which are rich in saponin, due to their surface-active properties they are excellent for washing, cleaning purposes. Soapnut shells are commercially available, typically for washing purposes, for which soapnuts are used by the consumer by putting them in a cloth bag. The powder processing of soapnut shells has also been known, and saponin extracted from soapnuts is also available in a liquid form. The use of soapnuts for washing, cleaning is skin- and environment-friendly, antibacterial, has a good cleaning effect, and has no impact on the environment.

[0004] The reason for which soapnut does not occupy the place it deserves among environmentally conscious users is the naturally pungent vinegary smell of soapnuts, considered by many people as unpleasant, and the fact that it is not so efficient in cleaning clothes as synthetic detergents, and its use is not practical either.

[0005] Soapnuts are basically sold in two forms: either in the natural form of seedless soapnut shells (commonly referred to as: soapnuts), or in the form of saponin-containing liquid or powder preparations made from soapnuts.

[0006] In the case of liquid preparations, solutions are known for eliminating the vinegary smell of soapnuts, and for improving their washing, cleaning efficiency.

[0007] Patent US 8772222 relates to an antibacterial cleaning agent having principally natural active ingredients, including water, soap-nut-derived saponin, polysorbate 20, glycerine, a mixture of essential oils: lemon-grass, tea tree, geranium, lavender, and oregano, and extract of grapefruit seed.

[0008] Patent US 8637441 discloses a non-foaming detergent, including sodium alginate, amylum, sodium silicate, citric acid, sodium citrate, sea salt, sodium peroxoborate, TAED and borax. The non-foaming detergent further includes sodium bicarbonate and soapnut saponin.

[0009] Patent application WO 2011121468 A1 discloses a process for the preparation of solid capsules comprising flavours or fragrances. They contain an emulsion

comprising saponins, water, a flavour or fragrance, and a water-soluble biopolymer. The obtained solid capsules typically comprise: from 0.5 to 30% of a natural extract comprising saponins, from 15 to 94% of a water soluble biopolymer, from 5 to 75% of a flavour or fragrance; and from 0.5 to 10% of water.

[0010] Patent application WO 2006007741 relates to a liquid detergent based on aqueous extracts containing saponin. The saponin extract is obtained from the pericarp of *Sapindus mukorossi* or *Sapindus trifoliatus* by means of water vapour or a water bath at an extraction temperature of between 45 and 85 °C, preferably approximately 75 °C.

[0011] The known solutions typically use saponins extracted from soapnuts for the production of liquid or powdered cleaning agents/detergents, and add various essential oils and other substances to improve their efficiency.

[0012] The known solutions do not provide a solution for leaving the soapnut shells in their natural form, and thereby the value of naturalness is lost/reduced.

[0013] The aim of our invention is to develop a process for perfuming soapnut shells, with the soapnut shells left in their natural form, in such a way that they retain the perfume material permanently, for improving their washing/cleaning efficiency, and for making them more convenient to use.

[0014] A further aim is to use only natural or natural-identical substances during the process, which retain or improve the original skin- and environment-friendly, antibacterial properties of soapnuts, and improve the washing efficiency of soapnuts.

[0015] A further aim is to make the perfumed soapnuts practical and simple to use, to improve their efficiency, and to significantly increase their foaming.

[0016] A further aim is to further improve the efficiency of the soapnut shells produced by us by adding various substances to the powdered form of the produced soapnuts to produce preparations that increase the whitening, colour-brightening effect of the soapnuts produced by our process.

[0017] Still a further aim is to produce a preparation that keeps the parts of the washing machine clean to metal, due to its water softening properties protects the heating element of the washing machine, detoxifies by starting beneficial conversion processes upon entering the environment, deodorizes the drain, has a wastewater treatment effect upon entering the sewer, and prevents the growth of algae.

[0018] The idea of the invention is based on the recognition that if soapnut shells in their natural form are treated with a perfume material, then the pungent vinegary smell of soapnut shells is taken away, and a pleasant and permanent smell is added instead, leaving the clothes fresh after washing. In the beginning, however, our experiments yielded the desired results only in the short term, as after treating the soapnut shells with various essential oils, in 2 to 4 months the smell of the soap-

nut shells became rather pungent and unpleasant, the original perfume material used for treating the soapnut shells was transformed into unrecognizable smells. After many attempts came the recognition that the soapnut shells should be treated not only with a perfume material, but with microorganisms as well, as on the one hand an appropriate microorganism would help to take away the natural smell of the soapnuts and to permanently retain the added perfume material, and on the other hand, a component of the microorganisms, the dirt eating anti-oxidants would improve the cleaning efficiency of the soapnuts.

[0019] We use a known microculture, the effective microorganisms (EM), and essential oils to achieve our aim.

[0020] The mixture of effective microorganisms (EM) developed in Japan contains photosynthetic and lactic acid bacteria, yeast, actinomycetes, and various fermenting fungi in certain proportions. The mixture contains about 80 species of microorganisms, including anaerobic and aerobic bacteria, as well as fungi and actinomycetes. Initially EM was used as a soil improving preparation, for injection into the soil. Today EM is used in more and more fields, e.g. in the households, in the cosmetics industry, in medicine.

[0021] Thus, our invention relates to a process for permanently perfuming soapnut shells and improving their cleaning efficiency, during which process a mixture of effective organisms and perfume materials is added gradually, as a spray, within a relatively short time to soapnut shells placed in a mixer unit, with constant, steady, gentle mixing, so as not to break the soapnut shells, in such a way that the mixture of effective microorganisms and perfume materials covers the whole surface of the soapnut shells. After adding the mixture of effective microorganisms and perfume materials the mixing is stopped and the soapnut shells soaked with the EM-perfume material mixture are allowed to stand for a short time.

[0022] The soapnut shells soaked with the EM-perfume material mixture are placed into a storage unit, then the storage unit is hermetically sealed and allowed to stand for 28 days at room temperature.

[0023] After 28 days the storage unit is opened, and the treated soapnut shells are prepared for use. The outward appearance of the soapnut shells produced by the process is the same as that of untreated soapnut shells, but with this process we achieve the permanent perfuming of the soapnut shells, and due to the dirt eating anti-oxidants their cleaning efficiency is also improved.

[0024] During the process the fruit of the Indian soapnut tree (*Sapindus mukorossi*), and the form of the effective microorganisms commercially available under the name Balance System Regen (B. S. Regen) are used.

[0025] The perfume materials used during the process are natural-identical perfume materials, essential oils, extracts. The perfume materials are selected primarily from the group containing chamomile, rose, mango, hay, coconut and lavender, but other perfume materials may

also be used.

[0026] The soapnut shells treated according to the invention are suitable for washing in the appropriate packs without any further change, but the treated soapnut shells also form the basis of other preparations. In this case treated soapnut shell-based additives are added to the treated soapnut shells used for washing, to improve their washing efficiency.

[0027] For producing the additives the treated soapnut shells are powdered and mixed with various substances.

[0028] The equipment designed for the production of the soapnut shells treated according to the invention comprises a compressor blower unit, a mixer unit and a storage unit.

[0029] The equipment designed for the implementation of the process according to the invention is shown in detail in the following figure:

Figure 1: shows a schematic representation of the blower unit and the mixer unit of the equipment designed for the implementation of the process according to the invention.

[0030] The equipment comprises a compressor blower unit, an electric mixer unit and a storage unit.

[0031] Figure 1 shows the compressor blower unit and the mixer unit, and their connection to each other.

[0032] The main element of the mixer unit equipped with a motor is a cauldron 1, with mixing blades 5 attached to a shaft 2 connected to the bottom part thereof.

[0033] The cauldron 1 has a lid 7 equipped with a sealing 9. The lid 7 is preferably made of plexi.

[0034] There is an inlet opening 10 on the side and an output opening 11 at the bottom of the cauldron 1. The input opening 10 is equipped with rubber rings 13, to which rubber rings 13 the blowpipe 16 of a spray gun 15 is connected hermetically. A tank 18 is connected to the blowpipe 16. The spray gun 15 is connected by an electric wire 23 to a compressor 20, and the compressor 20 is connected by an electric wire 23 to the electricity network. There is a switch 21 preferably on the side of the cauldron 1.

[0035] The output opening 11 is equipped with a door 12 opened and closed by a lock 22. The cauldron 1 is equipped with wheels 24, and a support stand 25.

[0036] The compressor blower unit of the equipment comprises a compressor 20, which is connected by a pneumatic spiral 19 to a spray gun 15. A tank 18 is connected to the blowpipe 16 of the spray gun 15. The blowpipe 16 is connected to the input opening 10 equipped with rubber rings 13, which input opening 10 is on the side of the circular base cauldron 1. The cauldron 1 has mixing blades 5 attached to a shaft 2. The mixing blades 5 are preferably curved rectangular-shaped.

[0037] At the bottom of the cauldron 1 there is an output opening 11 equipped with a door 12, the door 12 is opened and closed by a lock 22. There is a switch 21 on the side of the cauldron 1, and at least two wheels 24

and a support stand 25 are connected to the bottom part thereof.

[0038] The motor of the cauldron 1, and the compressor 20 are connected by an electric wire 23 to 220 V power supply.

[0039] The third part of the equipment is a storage unit, preferably a plastic barrel, which has a capacity of 60 litres and is hermetically sealable.

[0040] During the process the soapnuts are cracked by a machine designed for this purpose, when the shells are open the seeds are removed, and only the soapnut shells are used. The soapnut shells are placed in the cauldron 1 of the mixer unit, which is closed by the lid 7 equipped with a sealing 9. The EM and the selected essential oil are mixed in an appropriate proportion, then placed into the tank 18 of the compressor blower unit. The mixer unit, the motor of which is supplied with power via an electric wire 23, is operated by turning the switch 21. Then the mixing blades 5 in the cauldron 1 start to mix the soapnut shells gently, moving from bottom to top. The mixing speed is preferably 30 rotations per minute.

[0041] Simultaneously, after starting the compressor 20, the EM-essential oil mixture in the tank 18 is sprayed on the soapnut shells through the input opening 10 by manually operating the spray gun 15.

[0042] After spraying in the EM-essential oil the mixing is stopped and the soapnut shells soaked with the EM-essential oil are allowed to stand in the cauldron for 5 minutes.

[0043] Then the soapnuts are moved from the cauldron 1 to the storage unit in such a way that upon opening the door 12 of the output opening 11 at the bottom of the cauldron 1 the soapnuts fall into the storage unit placed under the output opening 11. The soapnuts soaked with the EM-essential oil mixture are hermetically sealed in the storage unit and allowed to stand at room temperature. After 28 days the storage unit is opened, and the treated soapnut shells are prepared for use.

[0044] The mixer unit and the storage unit can be the same container, if necessary.

[0045] Our process will be described in detail by way of the following examples:

Example 1

[0046] The production of moderately perfumed soapnuts:

60 ml of Balance System Regen and 20 ml of chamomile essential oil are mixed. The resulting mixture is added to 22 kg of seedless soapnut shells with constant mixing. The mixture is added to the soapnut shells in 3 minutes. After adding the mixture the mixing is stopped, then allowed to stand for 5 minutes. Then the soapnuts are discharged into a storage unit, hermetically sealed and allowed to stand for 28 days in this state.

Example 2

[0047] The production of normally perfumed soapnuts: Similar to Example 1, with the difference that 60 ml of Balance System Regen and 40 ml of chamomile essential oil are used for the EM-essential oil mixture.

Example 3

[0048] The production of intensely perfumed soapnuts: Similar to Example 1, with the difference that 60 ml of Balance System Regen and 60 ml of chamomile essential oil are used for the EM-essential oil mixture.

[0049] The soapnuts treated by the process according to the invention can be used in several ways.

[0050] The treated soapnut shells can be used without any further change by putting 7 to 9 pieces into a cloth bag and placing them into the drum of the washing machine in the known manner.

[0051] In a preferred form of use the washing efficiency of the treated soapnut shells can be further improved by forming compact packages, so called "soapnut balls": soapnut shells mixed with sponge cubes are placed into a net, and the net is closed. Preferably 7 to 9 pieces of soapnut shells and 30 to 35 pieces of sponge cubes are placed into a compact fishnet package. This gives a ball shape to the net. The resulting soapnut ball is used by placing it into the drum of the washing machine among the clothes. The sponge cubes, which are coloured sponge cubes preferably having an edge length of 1.5 cm, facilitate foaming during the washing, thus efficiently preventing dirt from redepositing between the fibres of the clothes. After washing the compact soapnut ball package is easy to dry (there is no need to remove the soapnuts and sponge cubes from the net). Such a compact package can be used for washing 5 times.

[0052] The treated soapnut shells can also be used to produce further preparations, additives, which further improve the washing efficiency of the treated soapnut shells used for washing, improve their whitening, colour-brightening effect, and keep the washing machine clean.

[0053] The preparations according to the invention, improving the efficiency of the treated soapnut shells used for washing, are based on the treated soapnut shells, the ground (powdered) form of which is mixed with various substances.

[0054] The preparations are characterized by the fact that the soapnut shells produced by the process according to the invention are ground, and the resulting soapnut powder is mixed with various substances, depending on the effect to be achieved. The substances mixed to the soapnut powder are as follows:

sodium percarbonate, sodium carbonate, the light soda ash and heavy soda ash versions thereof, sodium bicarbonate, sodium gluconate, Zeolite P4A, and sodium metasilicate pentahydrate. From these substances the quantities necessary for the effect to be achieved are used, which are shown in Examples 4 to 8.

[0055] It is noted that for producing the above preparations two versions of sodium carbonate are used, the common names for which are heavy soda ash and light soda ash. Light soda ash is produced in the form of large-surface flakes. Its particle size (D50) is about 100 microns, its bulk density is about 0.5 kg/dm³, while heavy soda ash is a granulated product, its grain size is 3 to 500 microns and its bulk density is about 1 kg/dm³. The solubility of light soda ash is much better compared to heavy soda ash, however it is more difficult to handle due to its easily airborne dust.

[0056] The preparations used for washing will be described in detail by way of the following examples:

Example 4

[0057] The production of 1 kg of whitening detergent preparation:

[0058] The treated soapnut shells are powdered and mixed with the following substances:

- sodium percarbonate (sodium carbonate peroxyhydrate): 400g
- sodium carbonate (heavy soda ash): 100g
- sodium bicarbonate: 140g
- soapnut powder: 50g
- sodium gluconate: 150g
- Zeolite P4A: 160g

[0059] The resulting preparation is used by placing 50 ml beside the compact package of treated soapnut shells or into the detergent dispenser of the washing machine.

Example 5

[0060] The production of 1 kg of colour-brightening detergent preparation:

The treated soapnut shells are powdered and mixed with the following substances:

- sodium percarbonate (sodium carbonate peroxyhydrate): 150g
- sodium carbonate (heavy soda ash): 200g
- sodium carbonate (light soda ash): 50g
- sodium bicarbonate: 100g
- soapnut powder: 50g
- sodium gluconate: 250g

- Zeolite P4A: 150g
- sodium metasilicate pentahydrate: 50g

[0061] The resulting preparation is used by placing 50 ml beside the compact package of treated soapnut shells or into the detergent dispenser of the washing machine.

Example 6

[0062] The production of 1 kg of whitening detergent preparation for babies:

The treated soapnut shells are powdered and mixed with the following substances:

- sodium percarbonate (sodium carbonate peroxyhydrate): 280g
- sodium carbonate (heavy soda ash): 150g
- sodium bicarbonate: 250g
- soapnut powder: 70g
- sodium gluconate: 150g
- Zeolite P4A: 100g

[0063] The resulting preparation is used by placing 50 ml beside the compact package of treated soapnut shells or into the detergent dispenser of the washing machine.

Example 7

[0064] The production of 1 kg of colour-brightening detergent preparation for babies:

The treated soapnut shells are powdered and mixed with the following substances:

- sodium percarbonate (sodium carbonate peroxyhydrate): 130g
- sodium carbonate (heavy soda ash): 250g
- sodium bicarbonate: 100g
- soapnut powder: 70g
- sodium gluconate: 250g
- Zeolite P4A: 200g

[0065] The resulting preparation is used by placing 50 ml beside the compact package of treated soapnut shells or into the detergent dispenser of the washing machine.

[0066] The treated soapnut shells can also be used for the cleaning, maintenance of the washing machine. A preparation suitable for cleaning the washing machine is shown in Example 8.

Example 8

A washing machine cleaning preparation

[0067] Component 1:

- citric acid monohydrate: 100g

[0068] Component 2:

- Zeolite P4A: 50g
- sodium gluconate: 30g
- soapnut powder: 20g

[0069] Component 1 of the preparation described in Example 8, when put in the detergent dispenser of the washing machine, immediately cleans the internal piping, then, upon flowing into the drum of the washing machine and mixing with water and component 2, begins to powerfully clean the inside of the washing machine, the pipes, the rubber parts. It is highly foaming, and a short washing programme (20 or 30 minutes - without clothes) can detoxify the washing machine even at a low temperature, as a result of which the inside of the washing machine will be shining, the drum of the washing machine will be clean to metal, the rubber parts will be clean and free from bacteria.

[0070] The soapnut shells produced by the process according to the invention retain their smell for at least two years, and the clothes washed with them will have a fresh smell even if they are left in the washing machine for several hours after washing. A further advantage is that the washing efficiency of the soapnut shells treated with the process according to the invention is at least twice that of untreated soapnut shells.

Claims

1. A process for permanently perfuming soapnut shells and improving their cleaning efficiency, **characterized in that** a mixture of effective organisms (EM) containing photosynthetic and lactic acid bacteria, yeast, actinomycetes, and various fungi and natural-identical perfume materials is added to soapnut shells placed in a sealable container, with constant mixing, after adding the EM-perfume material mixture the mixing is stopped, then the container is hermetically sealed and allowed to stand for at least 28 days at room temperature.
2. The process according to claim 1, **characterized in that** the perfume materials are selected from the group containing chamomile, rose, mango, hay, coconut and lavender essential oils, extracts.
3. The process according to claims 1-2, **characterized in that** 0.9-2.72 ml of perfume material and 2.72 ml of effective microorganisms are added to 1 kg of soapnut shells.
4. The soapnut shells produced by the process according to claims 1-3 are used for washing mixed with sponge cubes.

5. A preparation produced by the process according to claims 1-3, **characterized in that** it contains the treated soapnut shells in a powdered form, furthermore it contains sodium percarbonate, sodium carbonate, sodium bicarbonate, sodium gluconate and Zeolite P4A in a mixed form.
6. The preparation according to claim 5, **characterized in that** it contains 50 to 70 g of ground soapnut shells (soapnut powder), 130 to 400 g of sodium percarbonate, 100 to 250 g of sodium carbonate (heavy soda ash), 100 to 250 g of sodium bicarbonate, 150 to 250 g of sodium gluconate and 100 to 200 g of Zeolite P4A.
7. The preparation according to claim 6, **characterized in that** it contains 50 g of sodium carbonate (light soda ash) and 50 g of sodium metasilicate pentahydrate.

Patentansprüche

1. Verfahren zur dauerhaften Parfümierung von Waschnussschalen und zur Verbesserung ihrer Wascheffizienz, **dadurch gekennzeichnet, dass** man Waschnussschalen, die sich in einem verschließbaren Behälter befinden, unter ständigem Rühren ein Gemisch von effektiven Mikroorganismen (EM), die photosynthetischen und Milchsäurebakterien, Hefe, Aktinomyzeten und verschiedene Pilze, sowie naturidentische Parfümstoffe enthalten, zugegeben wird, nach der Zugabe des EM-Parfümstoff-Gemisches das Rühren gestoppt wird, und dann der Behälter hermetisch verschlossen und mindestens 28 Tage bei Raumtemperatur stehen gelassen wird.
2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** die Parfümstoffe aus einer Gruppe ausgewählt werden, die ätherische Öle und Extrakte aus Kamille, Rose, Mango, Heu, Kokosnuss und Lavendel enthält.
3. Verfahren nach den Ansprüchen 1 bis 2, **dadurch gekennzeichnet, dass** 1 kg Waschnussschalen 0,9 bis 2,72 ml Parfümstoff und 2,72 ml effektive Mikroorganismen zugegeben werden.
4. Die nach dem Verfahren gemäß den Ansprüchen 1 bis 3 hergestellten Waschnussschalen werden mit Schwammwürfeln gemischt zum Waschen verwendet.
5. Präparat, hergestellt nach dem Verfahren gemäß den Ansprüchen 1 bis 3, **dadurch gekennzeichnet, dass** es die behandelten Waschnussschalen in pulverisierter Form enthält, ferner Natriumpercarbonat,

Natriumcarbonat, Natriumbicarbonat, Natriumgluconat und Zeolith P4A in gemischter Form enthält.

6. Präparat nach Anspruch 5, **dadurch gekennzeichnet, dass** es 50 bis 70 g gemahlene Waschnusschalen (Waschnusspulver), 130 bis 400 g Natriumpercarbonat, 100 bis 250 g Natriumcarbonat (schweres Soda), 100 bis 250 g Natriumbicarbonat, 150 bis 250 g Natriumgluconat und 100 bis 200 g Zeolith P4A enthält. 5
7. Präparat nach Anspruch 6, **dadurch gekennzeichnet, dass** es 50 g Natriumcarbonat (leichtes Soda) und 50 g Natriummetasilikat-Pentahydrat enthält. 10

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Revendications

1. Procédé destiné à parfumer de manière permanente des coques de noix de savon, améliorant leur efficacité de lavage, **caractérisé en ce qu'un** mélange d'organismes efficaces (EM) contenant des bactéries photosynthétiques et d'acide lactique, des levures, des actinomycètes et divers champignons et des matières de parfum naturel-identique est ajouté à des coques de noix de savon placées dans un récipient pouvant être fermé hermétiquement, avec un mélange constant, après l'ajout du mélange de matières de parfum EM, le mélange est arrêté, puis le récipient est fermé hermétiquement et il est laissé au repos pendant au moins 28 jours à température ambiante. 20
2. Le procédé tel que décrit dans la revendication 1, **caractérisé en ce que** les matières parfumées sont choisies dans le groupe contenant des huiles essentielles, des extraits de camomille, de rose, de mangue, de foin, de noix de coco et de lavande. 25
3. Le procédé selon les revendications 1 et 2, **caractérisé en ce que** 0,9 à 2,72 ml de matière parfumée et 2,72 ml de micro-organismes efficaces sont ajoutés à 1 kg de coques de noix de lavage. 30
4. Les coques de noix de lavage produites par le procédé selon les revendications 1 à 3 sont utilisées pour le lavage en mélange avec des cubes d'éponge. 35
5. Une préparation produite par le procédé selon les revendications 1 à 3, **caractérisée en ce qu'elle** contient les coques de noix de lavage traitées sous forme de poudre, elle contient en outre du percarbonate de sodium, du carbonate de sodium, du bicarbonate de sodium, du gluconate de sodium et de la zéolite P4A sous forme mélangée. 40
6. La préparation selon la revendication 5, **caracté-** 45

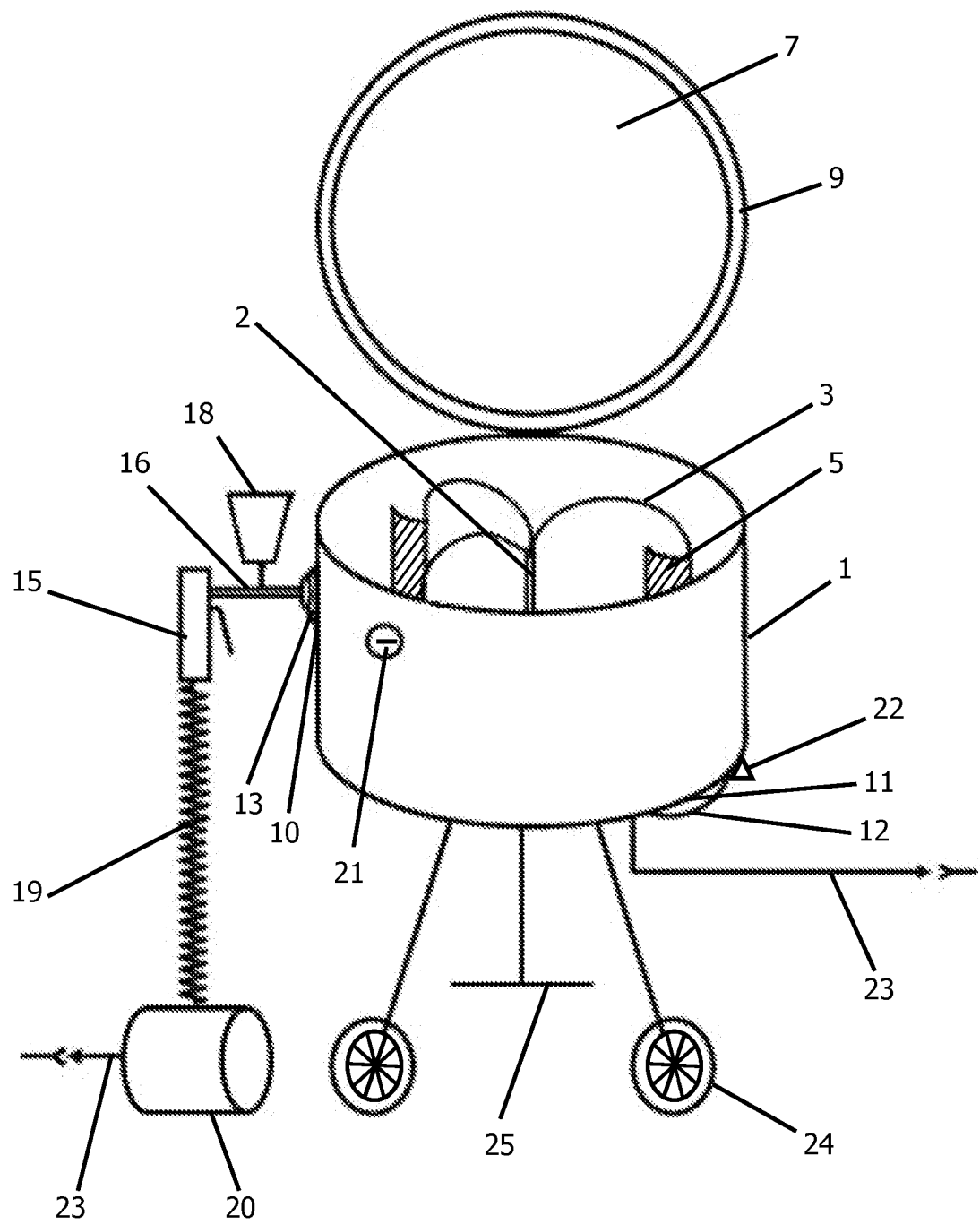


Figure 1

REFERENCES CITED IN THE DESCRIPTION

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