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(54) Title: NOVEL DETERGENT BARS

(57) Abstract: A detergent bar comprising: a. a first major side, an opposed second major side, a first minor side, an opposed second minor side, a first end and an opposed second end; b. wherein the first major side has a centrally disposed concave area separated from each of the opposed first and second ends by a flattened region; and c. wherein the concave area has a plurality of dimples.



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NOVEL DETERGENT BARS

FIELD OF INVENTION

5 The present invention relates to detergent bars, more particularly to personal wash detergent bars.

The invention has been developed primarily for use in personal wash detergent bars and will be described
10 hereinafter with reference to this application. However, it will be appreciated that the invention is not limited to this particular field of use.

BACKGROUND AND RELEVANT ART

15 Any discussion of the prior art throughout the specification should in no way be considered as an admission that such prior art is widely known or forms part of the common general knowledge in the field.

20 Personal wash bars based on soap (alkali metal salts of fatty acids) are commonly used for cleansing the human body. A wide variety of additives have been suggested for inclusion in toilet bars to enhance the physical properties
25 of the bar, inter-alia; hardness, wear-rate, reduction in mush, and in-use and post-use properties. Among all the properties, lather has always been one of the most important properties, and several attempts have been made in the prior art to improve the quality of lather i.e. more creamier
30 lather, and/or to increase the amount of lather.

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Enhancement of lather has been achieved in several ways.

First, soaps derived from shorter chain length fatty acids such as coconut fatty acids are known to produce a much creamier lather than soaps produced from longer chain length fatty acids such as tallow fatty acids. It has been common practice in toilet bar manufacture to add up to about 50% coconut fatty acid to the tallow fatty acid feed stock used to make the soap. Second, super fatting agents such as free coconut fatty acid are also known to improve the volume and richness of the lather produced by a toilet bar when it is added to the bars at levels of up to about 10%. The addition of polymeric materials such as cationic guar gum to soap bars have also shown beneficial effect on bar lathering characteristics without deleteriously affecting other desirable properties.

US 2005/0276828 (Unilever) is one example of a patent in which a soap composition is used along with a scrubber having a fibrous network of bonded fibres. This arrangement is said to create substantial lather during its use.

It would be desirable to increase the lather of soap bars without necessarily including sponges or other scrubbers, or without incorporating costly actives in the formulation, specifically for increased lather. Amongst other drawbacks, sponges when used with a soap bar cause some amount of scrubbing action, which is not preferred by many individuals.

Thus there exists the need for a detergent bar, more specifically a soap bar that would provide significantly

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enhanced lather profile during use, without necessarily using any special additives or sponge in the bar.

OBJECT OF THE INVENTION

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It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art.

10 It is an object of the present invention to provide a detergent bar, more specifically a personal wash bar that would provide enhanced lather in use.

The present inventors have surprisingly found that the
15 lather profile of detergent bars, more specifically personal wash bars is significantly enhanced when the soap bar contains certain structural features.

Bars having peculiar structural features have also been
20 described in the past.

WO 1991/013970 (O'ROURKE, Peter, William) and WO 1996/014390 (GEORGIADIS DEMETRIOS) each describe a soap bar having a concave surface provided with plurality of indentations or
25 dents or stepped grooves, which is provided primarily to accommodate a piece of remnant (left over) soap which otherwise becomes practically unusable because of its small and irregular size. The indentations/dents are provided so that the remnant soap piece can snugly or tightly fit into
30 the cavity with the aid of the dents, which are adapted to inter-fit with the complementary surface of the remnant

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piece of soap. While these patents describe soap bars having peculiar structural features, before the first use of the principal bar, the user is required to insert the remnant piece of soap into the cavity.

5

While the above-mentioned patent applications describe soap bars with peculiar shape and features, the user would never experience the benefits of the features, as the features would be covered-up or concealed with the remnant soap.

10

SUMMARY OF THE INVENTION

According to an aspect of the invention there is provided a detergent bar having a concave surface wherein said surface has a plurality of dimples.

15

Preferably the concave surface is on a major face of the bar.

20

Preferably the dimples are circular, elliptical, ellipsoidal or oval in plan view.

Preferably the dimples are disposed so as to define an elliptical, ellipsoidal, circular or oval pattern on said concave surface. In another aspect of the invention, the dimples are preferably arranged in a concentric pattern.

25

Preferably the depth of the dimples is from 0.5 mm to 10 mm.

30

According to another aspect of the invention there is provided a toilet bar including but not limited to

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a. a first major side, an opposed second major side, a first minor side, an opposed second minor side, a first end and an opposed second end;

b. wherein the first major side has a centrally disposed concave area separated from each of the opposed first and second ends by a flattened region; and

c. wherein the concave area has a plurality of dimples.

Preferably the concave surface is immediately adjacent to both the first minor side and the second minor side.

Preferably the second major side has a centrally disposed flattened area immediately adjacent to both opposed ends and both opposed minor sides of the toilet bar.

Preferably there is a depressed area adjacent to said centrally disposed flattened area and each of the opposed ends of the bar on the second major side of the toilet bar.

Preferably there is a channel peripherally disposed within the centrally disposed flattened area of the second major side of the toilet bar.

According to another aspect of the invention, there is provided a process for making a detergent bar comprising a step of moulding a detergent bar using a mould having inner surface complementary to the surface of the bar.

According to another aspect of the invention there is provided a process for making a detergent bar comprising a step of stamping a moulded or extruded detergent bar using a

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pair of stamping dies, having inner surfaces complementary to the surface of the bar.

According to another aspect of the invention there is
5 provided a mould for making a detergent bar comprising a pair of dies which upon engagement define a cavity complementary to the shape of the bar.

According to another aspect of the invention there is
10 provided a stamping die for making a detergent bar comprising a pair of dies which upon engagement define a cavity complementary to the shape of the bar.

According to another aspect of the invention there is
15 provided a method of cleansing the skin with a detergent bar, comprising the steps of:
a. providing a detergent bar having a first major side, an opposed second major side, a first end and an opposed second end, wherein the first major side has a concave area having
20 a plurality of dimples that are disposed between the first end and the second end;
b. wetting the concave area with water; and
c. rubbing the skin with the concave area to simultaneously clean the skin and generate lather.

25 According to another aspect of the invention there is provided the use of a detergent bar according to the principal aspect of the invention.

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DETAILED DESCRIPTION

The shape of a detergent bar, especially personal wash bar (also known as toilet soap) is an important feature. It is often made attractive and aesthetically and visually appealing so that this feature can be used to promote the sales of the product. In addition to making the bar attractive, certain peculiarly shaped bars have also been linked to functional benefits. An example of functional shaped bar is a "massage bar" which has a plurality of projections. The present inventors have found that detergent bars, more specifically personal wash bars that have a concave surface having a plurality of dimples, surprisingly provide significantly enhanced lather as compared to bars which are devoid of said features.

Although the present invention is primarily directed towards personal wash bars (i.e. toilet soaps), other type of detergent bars such as "soap based" fabric washing bars, a well known example of which is SUNLIGHT™, and surfactant based fabric washing bars, an example of which is RIN™ bar. Further, the invention can also be useful in dish-wash bars.

In the case of personal wash bars, the bars could be made by the well known process of milling and plodding, followed by stamping with the help of appropriately shaped stamping dies, or by the process of obtaining a soap-melt, casting in moulds, followed by cooling, to obtain bars which are well known in the art as cast-bars or framed-bars. In this case, the appropriate moulds may be used to get the desired shape

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of the bars. Further the bars could be single-phase or multi-phase bars.

Without wishing to be bound by theory, it is believed that
5 the presence of dimples on the concave surface of the bar facilitates better aeration during rubbing of the bar on skin or other substrates. Further, it is believed that the shear of rubbing experienced by the trapped air helps to disintegrate the trapped air continuum into smaller air
10 bubbles to generate substantial volume of creamier lather.

It is preferred that concave surface is on the major face of the bar, i.e. the surface forms either the top or bottom face of the bar. In case of bars with a cube-like shape, or
15 rectangular bars, the concavity can be on more than one face. The minor face in case of rectangular tablet shaped bars, also known as billets, is defined by the lateral sides, which dictates the thickness of the bars.

20 It is preferred that the depth of the concavity of the concave surface is from 1% to 50% of the thickness of the bar. It is further preferred that this depth is from 10-25%. Preferably the concave surface occupies from 20% to 95% of the area of the major face. This means that the concavity
25 extends across the length and breadth of the bar to the extent specified, leaving respectively approximately 80 to 5% non-concave or flat portions. It is further preferred that the concave surface occupies from 60 to 90% of the area of the major face.

30

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While it is envisaged that the bar can have any known shape, such as ovoid or rectangular, circular or cube-like, it is more preferred that the bar is saddle shaped. These can be fully rectangular, rectangular with rounded edges, or a
5 saddle shape with rounded edges. A saddle shape is a shape where the soap bar, along its major axis is convex on one side and concave on the other side.

It is preferred that the dimples are circular, elliptical,
10 ellipsoidal or oval in plan view. However, the dimples can be of other known shapes such as rectangular, octagonal, triangular, square, trapezoidal or hexagonal. It is further preferred that the dimples are disposed so as to define an elliptical, ellipsoidal, circular or oval pattern on the
15 concave surface of the bar. However, the pattern could be of other known shapes such as rectangular, octagonal, triangular, square, trapezoidal or hexagonal.

The dimples preferably occupy from 10% to 90% area of the
20 concave surface and more preferably from 20 to 70% area. The depth of the dimples is from 0.5 mm to 10 mm, more preferably from 1 mm to 4 mm. It is preferred that the ratio between the depth of the dimples to the thickness of the bar is from 0.005 to 0.5. It is further preferred that this
25 ratio is from 0.02 to 0.3, most preferably this ratio is from 0.06 to 0.2 for optimum benefits in terms of lather profile.

The thickness of the bar is preferably between 10 mm and 40
30 mm.

- 10 -

The dimples present on the concave surface may also be known by the equivalent terms depressions, dents or indentations.

In the detergent compositions of the present invention, it
5 is preferred that the soap content is from 20 to 80 % by weight, more preferably from 40-75 by weight%. Where %'s of compositions are described herein, unless other specified the %'s are by weight.

10 The predominant wash-active agent in the detergent composition of the present invention could be any conventional soap, otherwise referred to as fatty acid salt. The soap may be derived from one or a mixture of C₈-C₂₂, preferably C₁₂-C₁₈ straight or branched chain, saturated or
15 unsaturated monocarboxylic acids, of natural or synthetic origin. Natural sources, e. g. animal, marine or vegetable fats and oils, almost always yield mixtures of these fatty acids, all of which may be employed.

20 Examples thereof include the fatty acids derived from coconut oil, olive oil, palm kernel oil, tall oil, soy bean oil, cottonseed oil, peanut oil, safflower oil, sunflower seed oil, corn oil, fish oils, tallow, and the like.

Illustratively, individual fatty acids include capric,
25 lauric, myristic, stearic, oleic, palmitic, palmitoleic, ricinoleic, linoleic, and linolenic acid and the like. The fatty acids may also be derived synthetically by paraffin oxidation, oxo-synthesis, or the like. The cation or salt portion of the soap is preferably an alkali metal such as
30 potassium and, especially, sodium, but may alternatively be an alkaline earth metal such as calcium or magnesium, or

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ammonium, substituted ammonium, or organic amine such as a lower alkylamine or a lower alkanolamine.

- Tallow fatty acids can be derived from various animal
- 5 sources and generally comprise about 1-8% myristic acid, about 21-32 % palmitic acid, about 14-31% stearic acid, about 0-4% palmitoleic acid, about 36-50% oleic acid and about 0-5% linoleic acid. A typical distribution is 2.5 % myristic acid, 29% palmitic acid, 23% stearic acid, 2%
- 10 palmitoleic acid, 41.5% oleic acid, and 3 % linoleic acid. Other similar mixtures, such as those from palm oil and those derived from various animal tallow and lard are also included.
- 15 Coconut oil refers to fatty acid mixtures having an approximate carbon chain length distribution of 8% C₈, 7% C₁₀, 48% C₁₂, 17 % C₁₄, 8% C₁₆, 2% C₁₈, 7% oleic and 2% linoleic acids (the first six fatty acids listed being). Coconut oil employed for the soap may be substituted in whole or in part
- 20 by other "high-lauric" oils, that is, oils or fats wherein at least 50% of the total fatty acids are composed of lauric or myristic acids and mixtures thereof. These oils are generally exemplified by the tropical nut oils of the coconut oil class. For instance, they include palm kernel
- 25 oil, babassu oil, ouricuri oil, tucum oil, cohune nut oil, murumuru oil, jaboty kernel oil, khakan kernel oil, dika nut oil, and ucuhuba butter.

- A preferred soap is a mixture of about 30% to about 40%
- 30 coconut oil and about 60% to about 70% tallow. Mixtures may also contain higher amounts of tallow, for example, 0.01% to

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20% coconut and remaining tallow. The soaps may contain unsaturation in accordance with commercially acceptable standards. Excessive unsaturation is normally avoided.

It is preferred that the detergent composition comprises 0.5

5 % to 5 %, more preferably from 0.5 % to 2% by weight surfactant selected from anionic, non-ionic, amphoteric, betaines or zwitterionic surfactants. Cationic surfactants are not generally suited for the present invention, as they tend not to be compatible with the predominantly anionic
10 atmosphere of the composition, due to the relatively large proportion of fatty acid soaps. It is however stated that traces of cationic surfactants, when present in the composition as impurity, or when otherwise added, do not cause any notable undesirable effect.

15

The synthetic detergents contemplated as surfactants under this invention are compounds other than soap whose deterative properties, like soap, are due to the presence of a hydrophilic and a hydrophobic group in the molecule.

20

Optional Ingredients

In addition to the above essential ingredients, the detergent composition of the present invention could also
25 comprise any or all of the following ingredients used for example to increase its shelf life, aesthetics or functionality.

30

Vitamins such as vitamin A and E, and vitamin alkyl esters such as vitamin C alkyl esters; lipids such as cholesterol, cholesterol esters, lanolin, ceramides, sucrose esters, and

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pseudo-ceramides; liposome forming materials such as phospholipids, and suitable amphiphilic molecules having two long hydrocarbon chains; essential fatty acids, poly unsaturated fatty acids, and sources of these materials;

5 triglycerides of unsaturated fatty acids such as sunflower oil, primrose oil, avocado oil, almond oil; vegetable butters formed from mixtures of saturated and unsaturated fatty acids such as shea butter; mineral such as sources of zinc, magnesium, and iron; skin conditioners such

10 as silicone oils, gums and modifications thereof such as linear and cyclic polydimethylsiloxanes, amino, alkyl, and alkylaryl silicone oils; hydrocarbons such as liquid paraffins, petrolatum, VASELINE™, microcrystalline wax, ceresin, squalene, pristan, paraffin wax and mineral oil;

15 conditioning proteins such as milk proteins, silk proteins and glutins; cationic polymers as conditioners which may be used include Quatrisoft LM-200 Polyquaternium-24, Merquat Plus 3330--Polyquaternium 39; and Jaguar® type conditioners. Humectants such as glycerol, sorbitol, and urea emollients

20 such as esters of long chain fatty acids, such as isopropyl palmitate and cetyl lactate.

In addition to the above, the composition may also include a deep cleansing agent. These are defined here as ingredients

25 that can either increase the sense of refreshment immediately after cleansing or can provide a sustained effect on skin problems that are associated with incomplete cleansing. Deep cleansing agents include antimicrobials such as 2-hydroxy-4,2',4'-trichlorodiphenylether (DP300™), 2,6-

30 dimethyl-4-hydroxychlorobenzene (PCMX), 3,4,4'-trichlorocarbanilide (TCC), 3-trifluoromethyl-4,4'-

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dichlorocarbanilide (TFC), benzoyl peroxide, zinc salts, and tea tree oil.

Further optional agents include anti-acne agents such as
5 salicylic acid, lactic acid, glycolic acid, and citric acid,
and benzoyl peroxide (also an anti-microbial agent); oil
control agents including sebum suppressants, mattifiers such
as silica, titanium dioxide, oil absorbers, such as
microsponges; astringents including tannins, zinc and
10 aluminium sales, plant extracts such as from green tea and
Witchhazel (Hammailes); scrub and ex-foliating particles,
such as polyethylene spheres, agglomerated silica, sugar,
ground pits, seeds, and husks such as from walnuts, peach,
avocado, and oats, salts; cooling agents such as menthol and
15 its various derivatives and lower alcohols; fruit and herbal
extracts; skin calming agents such as aloe vera; essential
oils such as mentha, jasmine, camphor, white cedar, bitter
orange peel, ryu, turpentine, cinnamon, bergamot, citrus
unshiu, calamus, pine, lavender, bay, clove, hiba,
20 eucalyptus, lemon, starflower, thyme, peppermint, rose,
sage, menthol, cineole, eugenol, citral, citronelle,
borneol, linalool, geranoil, evening primrose, camphor,
thymol, spirantol, penene, limonene and terpenoid oils;
Sun-screens such as 4-tertiary butyl-4'-methoxy
25 dibenzoylmethane (available under the trade name PARSOL
1789™ from Givaudan) and/or 2-ethyl hexyl methoxy cinnamate
(available under the trade name PARSOL MCX from Givaudan) or
other UV-A and UV-B sun-screens may also be incorporated.

30 Other benefit agents that can be employed include anti-
ageing compounds and skin lightening agents, antioxidants

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such as, for example, butylated hydroxytoluene (BHT) may be used advantageously in amounts of about 0.01% or higher if appropriate.

- 5 Other ingredients which may be included are physical exfoliants such as polyoxyethylene beads, walnut shells and apricot seeds. Incorporation of such physical exfoliants can give added benefits over and above the chemical exfoliation provided by alpha-hydroxy acids. Such added benefits are
- 10 highly desired by the consumers. The particle size of the ex-foliants preferably lies between 50 microns to 1000 microns, more preferably 100 microns to 500 microns, most preferably 100 to 200 microns.
- 15 A final group of optional ingredients is optical modifiers which are defined as materials that modify the optical texture or introduce a pattern to increase the distinctiveness of the bar. Examples of suitable optical modifiers include speckles/bits such as ground fruit pits,
- 20 seeds, polyethylene beads, mineral agglomerates, and loofha; reflective plate-like particles such as mica; pearlizing agents such as coated micas, and certain waxes; wax/plastic slivers that resemble for example fruits slices; vegetable or fruit slivers, mattefiers such as TiO₂ and mixtures of
- 25 the above.

Further, the bar composition of the invention may include 0 to 25 % by weight of crystalline or amorphous aluminium hydroxide. The said aluminium hydroxide can be generated in-

30 situ by reacting fatty acids and/or non-fatty mono- or polycarboxylic acids with sodium aluminate, or can be

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prepared separately by reacting fatty acids and/or non-fatty mono- or polycarboxylic acids with sodium aluminate and adding the reaction product to the soap. Another class of hardening agents are insoluble inorganic or mineral solids that can structure the discontinuous phase by network formation or space-filling. These include fumed, precipitated or modified silica, alumina, calcium carbonate, kaolin, and talc. Alumino-silicate clays especially synthetic or natural hectorites can also be used. In addition to the benefit agents, suitable bar structurants that provide integrity to the bar could also be used. Water insoluble structurants also have a melting point in the range 40-100°C, more preferably at least 50°C, notably 50°C to 90°C.

Suitable materials which are particularly envisaged are fatty acids, particularly those having a carbon chain of 12 to 24 carbon atoms. Examples are lauric, myristic, palmitic, stearic, arachidic and behenic acids and mixtures thereof.

Sources of these fatty acids are coconut, topped coconut, palm, palm kernel, babassu and tallow fatty acids and partially or fully hardened fatty acids or distilled fatty acids. Other suitable water insoluble structurants include alkanols of 8 to 20 carbon atoms, particularly cetyl alcohol. These materials generally have a water solubility of less than 5 g/litre at 20°C. Other structurants may include particulate solids such as talc, starch (e.g., maltodextrin) or clay. The relative proportions of the water soluble structurants and water insoluble structurants govern the rate at which the bar wears during use. The presence of the water-insoluble structurant tends to delay dissolution

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of the bar when exposed to water during use and hence retard the rate of wear.

Further, the composition can be made multi-coloured, e.g.,
5 striped, through the judicious use of dye as is well known in the art.

The benefit agents generally comprises about 0-25% by wt. of the composition, preferably 5-20%, and most preferably
10 between 2 and 10%.

Water

Finally, bar compositions of the invention generally
15 comprise about 1 to 30%, preferably 2 to 25%, more preferably 3 to 12% by wt. water. Bar compositions of the invention typically have pH of about 6 to 11, preferably above 7. The amount of water could differ in the case of cast bars.

20

Process, mould and stamping dies for making the bars

In the case of melt-cast bars, the process includes a step of moulding a detergent bar using a mould having inner
25 surface complementary to the surface of the bar. All other stages of making the bar and the formulations thereof are known to a person skilled in the art.

In the case of milled and plodded bars or extruded bars, the
30 process for making the bars includes a step of stamping a moulded or extruded detergent bar using a pair of stamping

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dies, having inner surface complementary to the surface of the bar.

According to another aspect, the invention relates to a
5 mould for making a detergent bar comprising a pair of dies which upon engagement define a cavity complementary to the shape of said bar.

According to another aspect, the invention relates to a
10 stamping die for making a detergent bar comprising a pair of dies which upon engagement define a cavity complementary to the shape of said bar.

In yet another aspect, the invention relates to the use of
15 the detergent bar.

The mould or stamping die generally includes a pair of dies adapted to be fitted to each other. The dies are manufactured preferably from any rigid material with high
20 thermal conductivity preferably metals such as aluminium and its alloys. Each die is provided with an internal surface, the size and shape of which may vary depending on form of the detergent bar. The dies when in engagement along the rim define a cavity complementary to the shape of the detergent
25 bar. Typically for soap tablet of 15g to 150g the volume of the total cavity would range from 10 to 170 ml and the shape may be circular, oval, square, rectangular or any other form as desired.

30 At least one inside surface of the cavity is convex which gives the concavity to the detergent bars during moulding.

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Preferably, the inside surface of the cavity is coated with a material having a lower surface energy than the moulded detergent bar. That is, the cavity defining surfaces of the dies are coated with a material having lower surface energy than the cast article. The inside surface of the cavity is optionally provided with mirror images of inscriptions such as lettering or figures desired on the surface of the detergent bar, either as projections or depressions. To ensure easy detachment of the article from the mould without distortion or damage to the inscription on the article, the inscription is preferably designed such that the rim of the mirror images of the inscription is not exactly perpendicular to the die surface, but is appropriately bevelled. To further prevent distortion or damage to the inscription, the mirror image of the inscription on the inner die surface should be free from burrs and blemishes, and preferably be carefully polished.

20 BRIEF DESCRIPTION OF THE DRAWINGS

Preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

25

Figure-1 shows the bottom plan view of an embodiment of a soap bar 10 in accordance with the invention.

30

Figure-2 shows the longitudinal sectional view of the embodiment of Figure-1 taken along line 2-2.

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Figure-3 shows the isometric view of the embodiment of Figure-1.

Figure-4 shows the bottom plan view of another embodiment of
5 a soap bar 20 in accordance with the invention.

Figure-5 shows the longitudinal sectional view of the embodiment of Figure-4 taken along line 5-5.

10 Figure-6 shows the isometric view of the embodiment of Figure-4.

Figure-7 shows the longitudinal sectional view of the embodiment of Figure-4 taken along line 7-7.

15 Figure-8 shows the longitudinal sectional view of the embodiment of Figure-1 taken along line 8-8.

Figure-9 shows the top perspective view of the embodiments
20 of Figures 1 and 4.

Figure-10 shows the top plan view of the embodiments of Figures 1 and 4.

25 Figure-11 shows the right end elevational view of the embodiments of Figures 1 and 4, the opposite left end elevational view being identical.

Figure-12 shows the front side elevational view of the
30 embodiments of Figures 1 and 4, the opposite rear side elevational view being identical.

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DETAILED DESCRIPTION OF THE DRAWINGS

5 As seen in Figure-1, soap bar 10 has a major (bottom) face 8 having concave surface 1 and flat surfaces 2 and 3. The surface 1 has plurality of circular, oval, elliptical and ellipsoidal shaped dimples (which have been represented by numeral 4). These dimples 4 are disposed so as to define an
10 elliptical pattern on the concave surface 1.

Referring to Figure-2, which shows the longitudinal sectional view taken through an imaginary line along 2-2, the dimples 4 can be seen in this view disposed on the
15 concave surface 1, which can be better seen in this view. In addition the depth of some of the dimples 4 can also be seen. The minor side 5 which is one of the two opposed minor sides of the bar 10 can also be seen.

20 Turning now to Figure-3, which is the isometric view of the bar 10, the major face 8 having concave surface 1 is bounded or flanked on both sides by flat surfaces 2 and 3 and opposed minor ends 6. A plurality of dimples 4 can be seen on the surface 1. In addition, opposed minor sides 5 can
25 also be seen. Minor side 5 represents the length of the bar along its major axis, while side or end 6 represents the thickness of the bar as measured along a line normal to major face 8. Each side 5 and end 6 also represents a minor face of the bar.

30

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Referring now to Figure-4, soap bar 20 has a major (bottom) face 12 having concave surface 1 and flat surfaces 2 and 3. The surface 1 has four roughly triangular shaped dimples 7 and elliptical dimples 4 arranged in a concentric pattern.

5

Referring to Figure-5, which shows the longitudinal sectional view taken through an imaginary line along 5-5, the triangular shaped dimples 7 can be seen in this view disposed on the concave surface 1, which can be better seen in this view. In addition the depth of some of the triangular dimples 7 can also be visualised. Minor side 5 which represents the length of the bar is also seen. This is one of the minor faces of the bar.

10

Turning now to Figure-6, which is the isometric view of the bar 20, major face 12 having concave surface 1 is flanked on both sides by flat surfaces 2 and 3. A plurality of dimples 4 and 7 can be seen on the surface 1. In addition, the sides 5 and ends 6 can also be seen. Side 5 represents the length of the bar, while end 6 represents the thickness of the bar as measured along a line normal to major face 12. Each side 5 and end 6 represents a minor face of the bar.

20

Referring now to Figure 7, which shows the longitudinal sectional view taken through an imaginary line 7-7 of the bar depicted in Figure 5, some of the dimples 4 and 7 can be seen in this view disposed on the concave surface 1. In addition the depth of certain dimples 4 and 7 can also be seen.

25

30

- 23 -

Referring now to Figure 8, which shows the longitudinal sectional view taken through an imaginary line along 8-8 of the bar depicted in Figure 2, some of the dimples 4 can be seen in this view disposed on the concave surface 1. In addition the depth of certain dimples 4 can also be seen.

Now referring to Figure 9 which shows the top perspective view of the bar 10 showing major side or face 40, one end 6 and one minor side 5. This is the same for bar 20 in a preferred embodiment. Also shown is centrally disposed generally flattened area 30 disposed adjacent to opposed minor sides 5 and opposed ends 6. Depressed areas 36 and flattened areas 38 are disposed on face 40 and are situated adjacent to and outside flattened area 30. Channel 32 surrounded by shelf 34 are disposed inside and on the periphery of generally flattened area 30.

Referring now to Figure 10 which shows the top plan view of bar 10 showing major side or face 40, opposed ends 6 and opposed minor sides 5, this is the same for bar 20 in a preferred embodiment. Also shown is centrally disposed generally flattened area 30 disposed adjacent to opposed minor sides 5 and opposed ends 6. Depressed areas 36 and flattened areas 38 are disposed on face 40 and are situated adjacent to and outside flattened area 30. Channel 32 surrounded by shelf 34 are disposed inside and on the periphery of generally flattened area 30.

Now referring to Figure 11, what is shown is an end elevational view of bar 10 with end 6 bounded by top major face 40, bottom major face 8 and opposed minor sides 5. Bar

- 24 -

20 is identical but having face 12 instead of face 8 in a preferred embodiment.

Now referring to Figure 12, what is shown is an elevational
5 view of bar 10 with minor side 5 bounded by top major face 40, bottom major face 8 and opposed ends 6. Bar 20 is identical but having face 12 instead of face 8 in a preferred embodiment.

10 A series of experiments were carried out to assess the performance attributes of the bars of Figure-1 and Figure-2. The invention will now be explained with specific reference to the following non-limiting examples.

15 **Lather assessment**

Lather assessment of the bars was done using 24 °FH and 4 °FH water using a plain rectangular soap bar i.e. plain surfaces on all sides (as Control bar) and soap bars according to the
20 invention as described in Figure-1 and Figure-4. The formulations of all these soap bars were kept the same to avoid any influence of formulation on bar attributes. The percentage rate of wear was also assessed. The results were reported as Lather ROW (Rate of Wear) Index too, for the
25 three bars. The formulation of the soap bars is given in Table 1 below, and the results of all the tests conducted are summarised in Table 2 below.

Table 1

- 25 -

Ingredients	Wt %
Anhydrous Soap 15 Coconut oil	74.52
Hydrated Magnesium Silicate	8.0
Titanium di oxide	0.3
Glycerine	2.0
Trichlorocarbanilide	0.2
Perfume	0.7
Sodium chloride	0.7
Water and other minors	Up to 100

Table 2

Bar Attributes	Control bar	Figure 1	Figure 4
% wear	17.31	13.25	13.25
Residual Mush in Tray (Score on 0-4 scale)	2.67	2.0	2.0
24 °FH Lather Volume (ml)	228	270	277
24 °FH Tablet Wear	9.67	7.0	8.33
24 °FH Lather ROW Index	2369	3857	3329
4 °FH Lather Volume (ml)	333	332	340
4 °FH Tablet Wear	9.67	6.67	7.33
4 °FH Lather ROW Index	3459	5004	4658

5

The above table clearly indicates that the bars according to the invention provided significantly enhanced lather volume, lesser tablet wear, thus leading to enhanced lather ROW index. This result is consistent at both the levels of water hardness in which the bar attributes were assessed. It can also be seen that the residual mush is much lower in the bars according to the invention. In the scale of 0 to 4, 0 represented lowest mush, while 4 represented highest mush.

15

Procedure for the assessment of % wear:

- 26 -

It is reported as the loss in the weight of bars as a percentage of initial weight of the bar. A stipulated wash-down procedure was carried out 6 times per day for four consecutive days. After the last wash-down (in the afternoon of the 4th day), all soap trays were rinsed and dried and each tablet was placed on its respective tray. On the afternoon of the 5th day, all samples (bars) were inverted and kept in the trays so that they could dry on both sides. On the 8th day, the bars were weighed again.

$$\text{Wear (\%)} = \frac{(\text{Initial Weight} - \text{Final Weight}) \times 100}{(\text{Initial Weight})}$$

Assessment of residual mush in the trays

The residual mush in the drained tray was recorded on a scale of 0-4. The scores indicated the following conditions:

- 0 Nil mush
- 1 Trace mush
- 2 Slight mush
- 3 Moderate mush, and
- 4 Considerable mush

Lather volume test

Lather was generated by trained technicians following standard protocol. Test tablets were washed down at least 10 minutes before starting the test sequence. This was best

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done by twisting them about 20 times through 180° under running water. 5 l of water of known hardness was taken in a bowl which was kept at a specified temperature reflecting local conditions. In this test, the average temperature of
5 water was 30°C and the average relative humidity was maintained at 51% at 31°C. The tablets were dipped in water and then removed. Tablets were twisted 15 times between the hands through 180° and then placed on soap dishes. Lather was generated while holding the bars and by rubbing one hand on
10 the other 10 times with both hands moving in the same direction. The right hand was gripped with left hand, or vice versa, forcing the lather to the tips of the fingers.

This operation was repeated five times. The lather was
15 placed in a tall cylindrical graduated beaker. The whole procedure of lather generation as described above was repeated two more times and all the lather from each bar were combined in the respective beakers. The combined lather was gently stirred to release large pockets of air. The
20 volume of lather was read and recorded. The data obtained consisted of six results for each bar under test. Data analysis was carried out by two way analysis of variance followed by Turkey's Test.

25 The lather ROW Index was calculated based on lather volume and the tablet wear. This denotes the effective performance of the bars in terms of lathering as it takes into account the amount of tablet wear too.

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It will therefore be apparent from the foregoing examples that the bars in accordance with the invention provide enhanced lather volume, lower wear-rate and significantly lower mush.

5

It will be appreciated that the illustrated examples provide for a detergent bar, more specifically a personal wash bar that gives enhanced in-use lather.

- 10 Although the invention has been described with reference to specific embodiments, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

CLAIMS

1. A detergent bar comprising:
 - 5 a. a first major side, an opposed second major side,
a first minor side, an opposed second minor side,
a first end and an opposed second end;
 - 10 b. wherein the first major side has a centrally
disposed concave area separated from each of the
opposed first and second ends by a flattened
region; and
 - c. wherein the concave area has a plurality of
dimples.
- 15 2. The detergent bar as claimed in claim 1 wherein the
concave surface is immediately adjacent to both the
first minor side and the second minor side.
- 20 3. A detergent bar as claimed in claim 1 or claim 2
wherein the depth of concavity of the surface is from
1% to 50% of the thickness of the bar.
- 25 4. A detergent bar as claimed in any one of the preceding
claims wherein the concave surface occupies from 20% to
95% area of the major face.
5. A detergent bar as claimed in any one of the preceding
claims wherein the bar is saddle shaped.
- 30 6. A detergent bar as claimed in any one of the preceding
claims wherein the dimples are circular, elliptical,
ellipsoidal or oval in plan view.

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7. A detergent bar as claimed in any one of the preceding claims wherein the dimples are disposed so as to define an elliptical, ellipsoidal, circular or oval pattern on the concave surface.

5

8. A detergent bar as claimed in any one of the preceding claims wherein the dimples are arranged in a concentric pattern.

10 9. A detergent bar as claimed in any one of the preceding claims wherein the dimples occupy from 10% to 90% of the area of the concave surface.

15 10. A detergent bar as claimed in any one of the preceding claims wherein the depth of the dimples is from 0.5 mm to 10 mm.

20 11. A detergent bar as claimed in any one of the preceding claims wherein the thickness of the bar is from 10 mm to 40 mm.

25 12. A detergent bar as claimed in any one of the preceding claims wherein the second major side has a centrally disposed flattened area immediately adjacent to both ends and both minor sides.

30 13. A detergent bar as claimed in claim 12 further comprising a depressed area adjacent to the flattened area and each of the ends of the bar on the second major side.

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14. A detergent bar as claimed in claims 12 to 13 having an inside channel concentrically disposed within the flattened area of the second major side.

5 15. A process for making a detergent bar as claimed in any one of claims 1 to 14 comprising a step of moulding a detergent bar using a mould having an inner surface complementary to the surface of the bar.

10 16. A process for making a detergent bar as claimed in any one of claims 1 to 14 comprising a step of stamping a moulded or extruded detergent bar using a pair of stamping dies, having inner surface complementary to the surface of the bar.

15

17. A mould for making a detergent bar as claimed in any one of claims 1 to 14 comprising a pair of dies which upon engagement define a cavity complementary to the shape of the bar.

20

18. A stamping die for making a detergent bar as claimed in any one of claims 1 to 14 comprising a pair of dies which upon engagement define a cavity complementary to the shape of the bar.

25

19. Use of a detergent bar as claimed in claim 1.

20. A method of cleansing the skin with a detergent bar, comprising the steps of:

30

a. providing a detergent bar having a first major side, an opposed second major side, a first end

- 32 -

and an opposed second end, wherein the first major side has a concave area having a plurality of dimples that are disposed between the first end and the second end;

- 5 b. wetting the concave area with water; and
 c. rubbing the skin with the concave area to simultaneously clean the skin and generate lather.

10 21. A detergent bar substantially as herein described with reference to the accompanying examples.

15 22. A process for making a detergent bar substantially as herein described with reference to the accompanying examples.

20 23. A mould for making a detergent bar substantially as herein described with reference to the accompanying examples.

25 24. A stamping die for making a detergent bar substantially as herein described with reference to the accompanying examples.

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FIG. 1

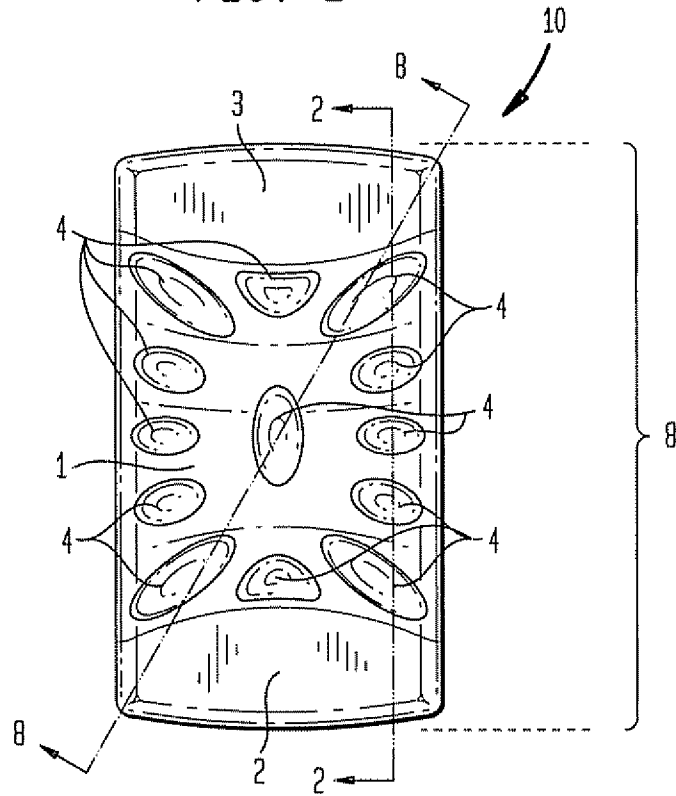
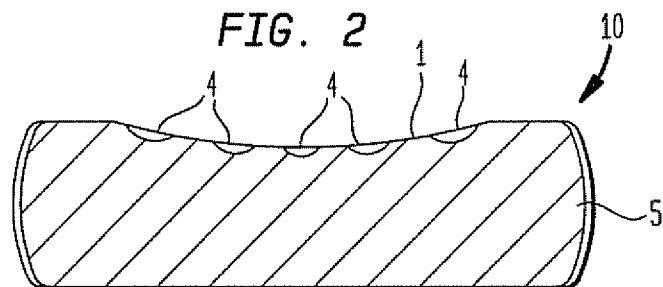


FIG. 2



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FIG. 3

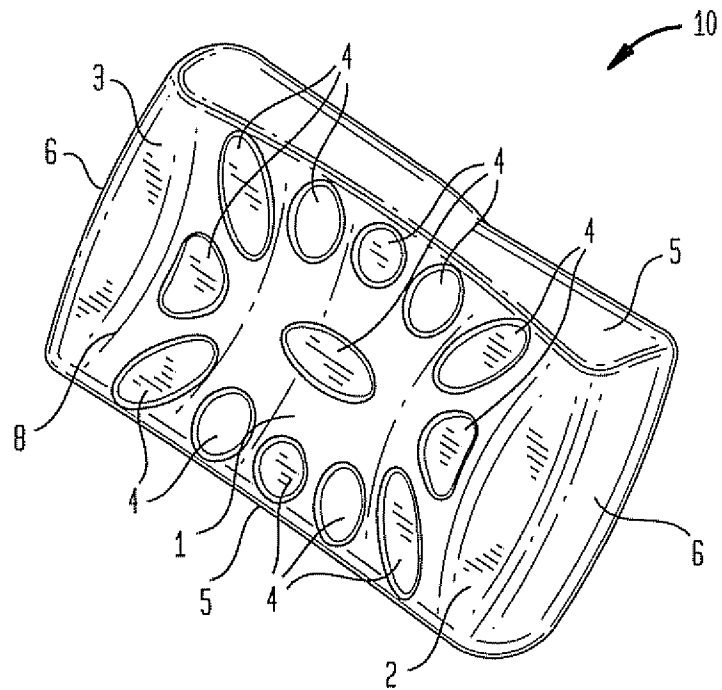
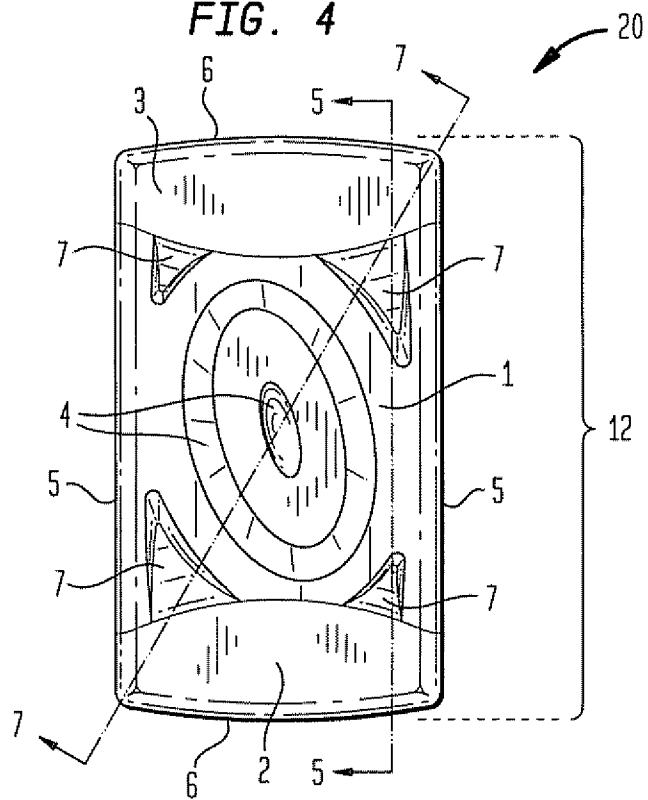


FIG. 4



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FIG. 5

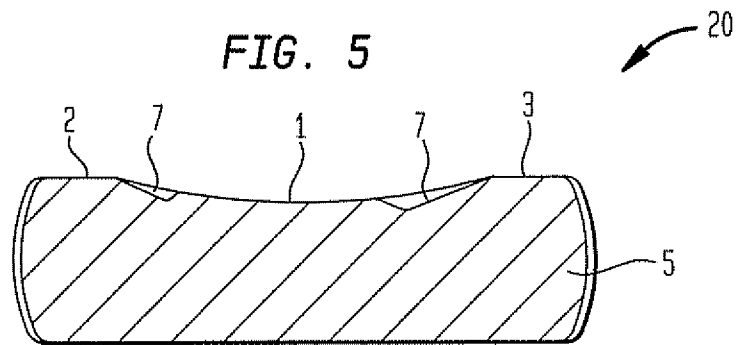
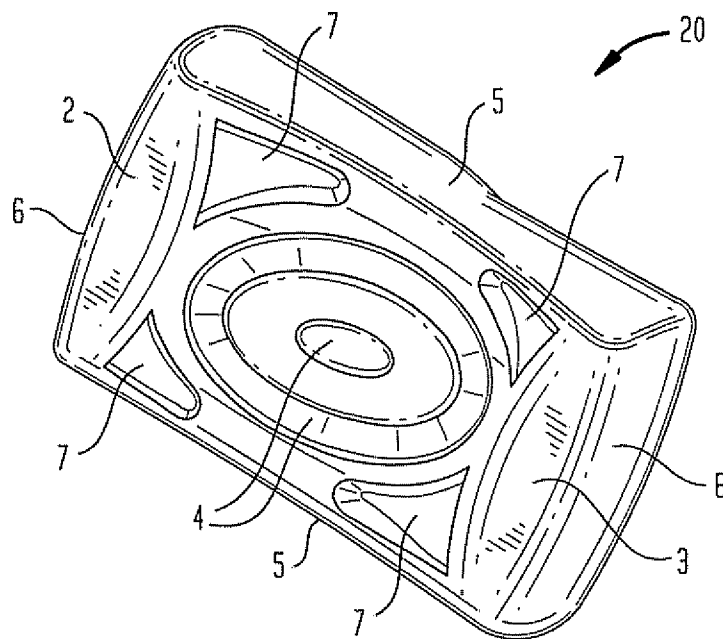
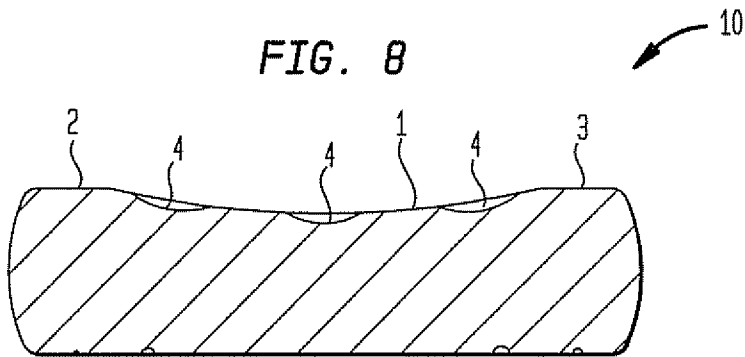
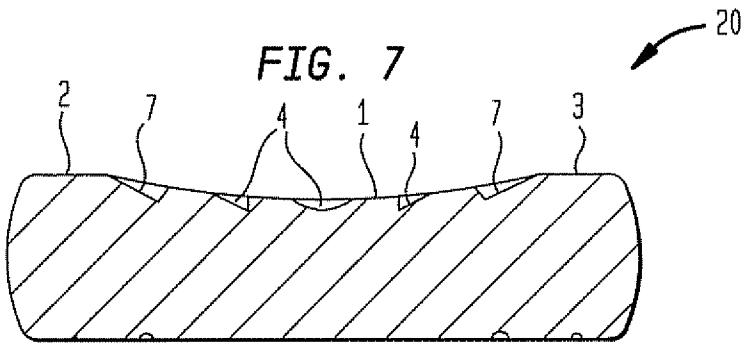


FIG. 6





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FIG. 9

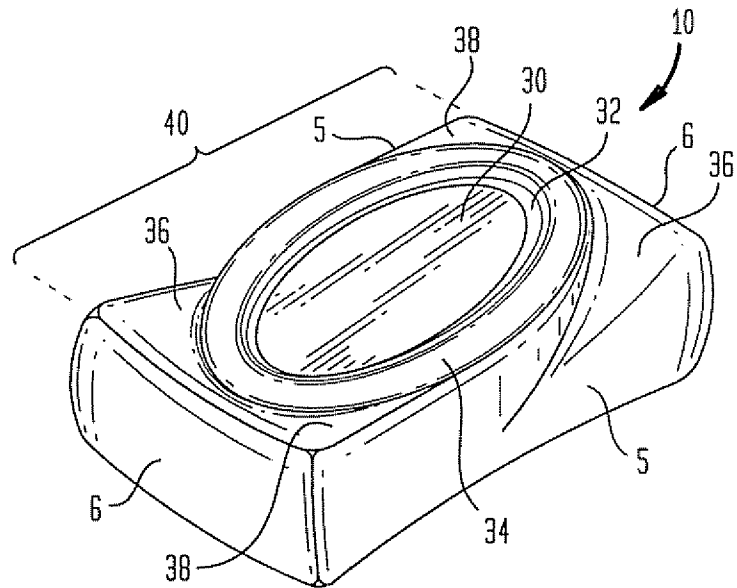
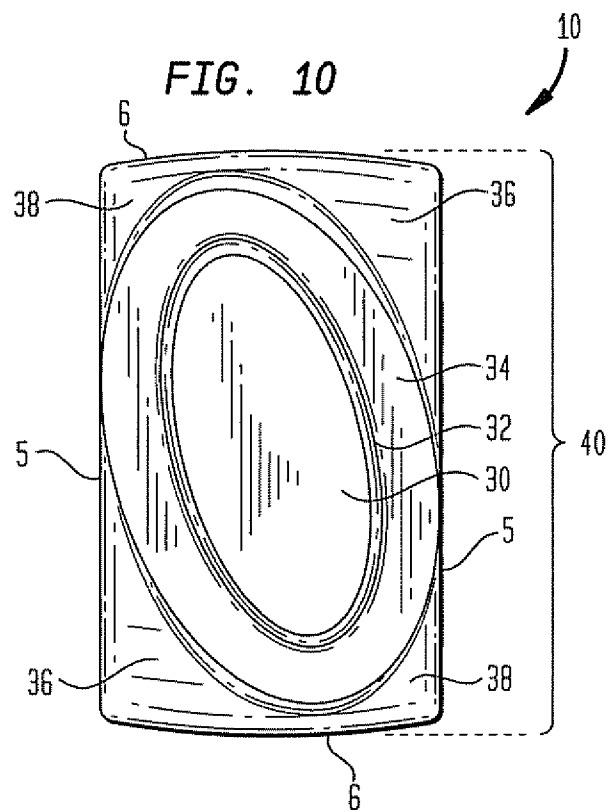


FIG. 10



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FIG. 11

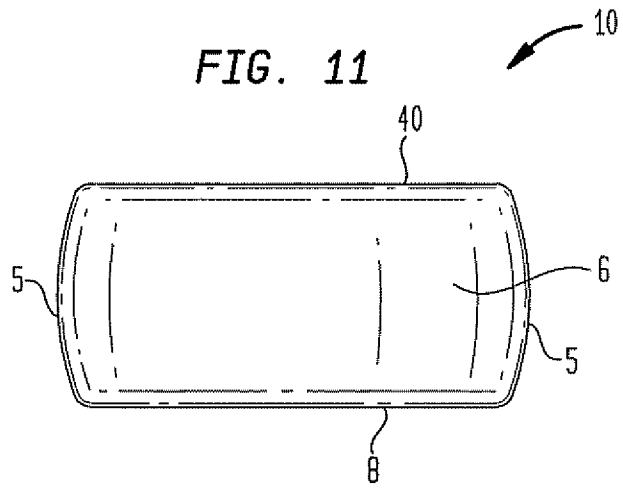


FIG. 12

