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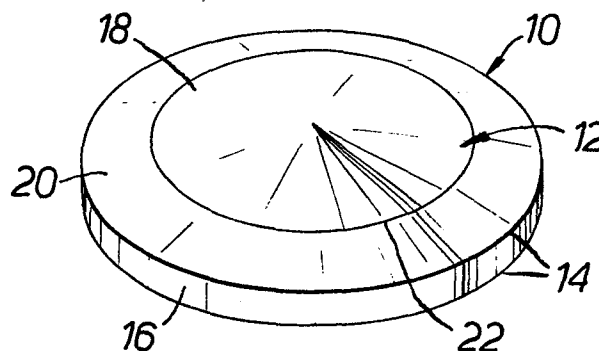
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⑤④ **Convex tablet, a sealed package containing the same, and the production of such a tablet.**

⑤⑦ A tablet is disclosed which possesses an improved outer shape which can reduce packaging costs, by reducing the size and thickness of packaging materials when the tablet is sealably packaged between two sheets of packaging material. The tablet defines at least one and preferably two convex broad outer surfaces (12), each convex surface (12) including a peripheral convex region (20) that is preferably beveled, and a central and/or intermediate convex region (18) that may be conical or pyramidal in shape. The outer surfaces of the peripheral convex region (20) and the central and/or intermediate convex region (18) may define between them an obtuse angle, and at their junction define further a continuous ridge (22).

The convex table configuration als increases the surface area of the tablet, in the instance where it is to be dissolved in a liquid, and reduces the incidence of tablet «shingling» that obstructs tablet packaging.



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'CONVEX TABLET, A SEALED PACKAGE CONTAINING  
THE SAME, AND THE PRODUCTION OF SUCH A TABLET'

This invention relates to convex tablets, to the production of such tablets, and to packages in which  
5 tablets are sealed in pouches defined by opposed sheets of material.

Most tablets, whether for medicinal purposes or otherwise, are manufactured with essentially the same basic shape of essentially flat broad surfaces. In  
10 many instances, such as when the tablets contain some active chemical agent, they are desirably vacuum sealed within sheet-like packaging in sandwich relationship, in such manner that the sheets converge to form a pouch about the tablet defining a perimeter generally  
15 corresponding to a circle.

Conventional tablet shape is defined in cross-section by essentially flat, parallel broad surfaces, sometimes defining at the circumferential periphery a slight bevel, provided primarily to minimize tablet edge  
20 fracture.

The high cost of raw materials, including packaging materials, has prompted consideration of ways to reduce incidental costs to keep down the ultimate cost of the packaged tablet product. Consideration has therefore  
25 recently been given to a reduction in the packaging material requirements for tablets, and a review of the prior art packaged tablet discloses a substantial amount of unused space in the package pouch.

In particular, the unused space, which corresponds to wastage, is most apparent when the tablet is relatively thick, the latter to ensure sufficient tablet strength during manufacture and transportation.

5 Also, in the instance where the tablet is relatively thick and is packaged by sealing within pouches formed by parallel sheet materials, the conventional cylindrical tablet configuration has been found to exert a strain on the package that causes the seals between the

10 package sheets to rupture, with the result that product shelf life may be reduced and spoilage may occur.

Another problem that has existed concerns the packaging of the tablets. Generally, tablet packaging is performed by the adhesive bonding of parallel sheets

15 of packaging material, with non-bonded areas defined periodically on the sheets to provide pouches to retain the tablets. The tablets are usually conveyed while resting on their broad surfaces, and reach a chute, where the tablets drop vertically downward and are then

20 conveyed between the package sheets as they are brought together to seal off the pouch area.

During the foregoing procedure, the tablets occasionally tend to stack or ride upon each other in the course of the vertical drop into position between

25 the package sheets. This occurrence, known as "shimming", is undesirable and can cause jamming of the packaging machinery, so that the machinery must be shut down to remove the extra tablets from the pouch. Naturally, such difficulties are time consuming and add

30 to manufacturing expense.

There is therefore a need to reduce or eliminate the difficulties recognized in the prior art, by providing a tablet that reduces packaging costs, by reducing both the size and thickness of the packaging

35 materials, as well as a reduction in the incidence of package failure. Also, it would be desirable to prepare a tablet that reduces or eliminates the occurrence

of "shimming" during packaging.

According to one aspect of the present invention, there is provided a tablet comprising: two broad outer surfaces which are generally opposed to each other,  
5 are generally spaced apart from each other, and terminate in spaced-apart surface perimeters; and a continuous rim extending transversely between the surface perimeters; wherein at least one of the broad outer surfaces is distended convexly away from the other and comprises a  
10 central or intermediate convex region and a peripheral convex region disposed adjacent thereto.

Preferably a tablet in accordance with the present invention, having an improved configuration for more economical sealable packaging and reduced spoilage,  
15 comprises paired broad outer surfaces extending radially outward generally opposed to each other and terminating in spaced apart surface perimeters, which are optionally parallel. At least one of the surfaces extends convexly away from the other and defines a central or intermediate  
20 convex region and an adjacent peripheral convex region which may be annular. A continuous rim extends transversely between the surface perimeters and preferably defines a cylinder. In a preferred embodiment, both broad outer surfaces extend convexly and cooperate  
25 to define a bi-convex configuration.

The tablet of the present invention preferably comprises broad outer surfaces that extend convexly away from each other, optionally as a pair, with each outer surface having respective convex regions defining exterior  
30 surfaces disposed at an obtuse angle with respect to each other. A continuous ridge is preferably defined on the exterior of the broad outer surfaces at the junction of the central or intermediate convex region and peripheral convex region, and this peripheral convex region defines  
35 the tablet point bend, i.e. the point at which the walls of the pouch containing the tablet are drawn towards adhesive contact with each other. Preferably, the walls,

and also the outer surfaces of the peripheral convex regions, subtend between them an acute angle, which more preferably is less than  $45^{\circ}$ .

5 The invention also relates to a sealably packaged tablet which comprises, in combination, a tablet package prepared from opposed package sheets peripherally adhered to each other and defining an air-tight tablet pouch containing a tablet of the present invention as described above. The present  
10 packaged tablet utilizes a pouch that can be reduced in size compared with those of the prior art while retaining the capability for holding a tablet having equivalent weight and content to those of the prior art. The package may include a plurality of spaced apart pouches each  
15 containing a tablet.

The present invention also includes a method of preparing a tablet, comprising compressing the material to be prepared in tablet form within a tablet die defining broad outer surfaces of which at least one and  
20 preferably two are concave in configuration in a peripheral region and in a central or intermediate region, and thereby adapted to form a tablet having at least one broad outer surface of convex shape. Preferably, both broad surfaces of the die are concave, and a tablet having  
25 bi-convex configuration is formed. Further, the die may be configured to correspond in shape to the tablet configurations set forth above.

Tablets prepared in accordance with the present invention permit packaging material to be reduced in  
30 amount by as much as 20 to 25% in area, while package sheet thickness may be reduced as much as 30%. Also, tablets of the present configuration resist breakage and spalling during manufacture and shipping, and the packaging machinery jamming is reduced due to a  
35 corresponding reduction in the incidence of "shimming".

The present invention is applicable to tablets for a variety of uses extending from medicinal compounds

to household goods. The exact angulation and size of individual tablets will be governed by the materials being formed, although the basic convex configuration is utilized in each instance.

5           For a better understanding of the present invention and to show how the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings, in which :-

10           Figure 1 is a perspective view of one embodiment of tablet in accordance with the present invention;

          Figure 2 is a side view illustrating the tablet of Figure 1;

          Figure 3A is a vertical section through a known tablet enclosed in a sealed package;

15           Figure 3B is a vertical section through a tablet similar to that of Figure 1, enclosed in a sealed package;

20           Figure 4A is a plan view, partly in phantom, illustrating the packaged, known tablet shown in Figure 3A;

          Figure 4B is a plan view, partly in phantom, illustrating the packaged tablet of Figure 3B;

25           Figures 5 and 6 are side views illustrating different embodiments of tablets in accordance with the present invention;

          Figure 7 is a vertical section through a further embodiment of tablet in accordance with the present invention, sealed within a package; and

30           Figures 8,9 and 10 are perspective views of yet further embodiments of tablets in accordance with the present invention.

          Referring to the drawings, wherein like numerals designate like parts, and referring first to Figures 1 and 2, a tablet 10 comprises paired broad outer  
35           surfaces 12 that extend radially outward generally opposed to each other, and terminate in parallel spaced-apart surface perimeters 14. A continuous rim 16 extends transversely between surface perimeters 14 as shown, and may preferably define a circular cylinder as

shown in Figures 1 and 2.

As shown in Figures 1 and 2, both broad surfaces 12 may be convexly extended; however, the invention includes the instance where only one broad surface 12 is convex, and this will be described with reference to Figure 7, later on.

The broad surfaces 12, when convexly extended as shown, comprise a central convex region 18 and a peripheral convex region 20 that is located annularly adjacent to it. Preferably, regions 18 and 20 are integral with each other, and may, as shown in Figures 6 and 7, extend continuously with each other.

Alternatively, the convex regions 18 and 20, as shown in Figures 1 and 2, may define exterior surfaces that are disposed at an angle with respect to each other that is preferably obtuse. In particular, and with reference to Figure 2, an angle  $\alpha$  is shown that is defined by the exterior surfaces of convex regions 18 and 20.

In some embodiments of the present invention, the convex region 20 may define a bevelled surface that conforms to the frustum of a cone, in the instance where the tablet 10 is circular in shape. Similarly, the convex region 18, while graduated at a differing angle of inclination than that of the region 20, may define in one embodiment an essentially conical configuration. The shape of respective convex regions 18 and 20 may accordingly vary, and, for example, as illustrated in Figure 8, convex region 18<sup>1</sup> may define a shape that is essentially pyramidal, in combination with the essentially frustoconical shape of region 20<sup>1</sup>. The invention contemplates a variety of shape combinations within its scope, and should not be limited to specific combinations illustrated herein.

Referring further to Figures 1 and 2, where the convex regions 18 and 20 differ in slope as shown, they define at their junction a continuous ridge 22.

which, in the illustrations herein, may comprise a circle, as in Figure 1. Naturally, the specific shape of ridge 22 will depend upon the shape of the tablet 10, and the present invention includes ridges having oval, square, rectangular, and other shapes within its scope.

One of the important features of the present invention relates to the configuration of the peripheral convex region 20. In particular, and with reference to Figures 2 and 3B, one of the advantages of the present configuration is that it reduces the strain on the packaging material in the instance where the tablet is sealably packaged within two originally parallel package sheets, and permits reductions in both packaging sheet gauge and size, as will be more particularly explained.

Referring to Figure 3B, a packaged tablet is shown which comprises a tablet 10 disposed within a package 24 consisting of paired, opposed packaged sheets 26 that have been peripherally bonded to each other, and, in their non-bonded area, define a package pouch 28 to hold the tablet. Correspondingly, Figure 3A illustrates a packaged tablet in accordance with the prior art, and tablet 30 illustrated therein is thus enclosed within a tablet package 32 prepared from paired sheets 34 likewise peripherally bonded to define a central package pouch 36.

The differences between the novel and known packages include certain visual distinctions that are readily apparent. For example, tablet 30 utilizes essentially flat broad outer surfaces. Both packages utilize an identical angle of taper of the package sheets to the point of sealable engagement. In each instance, an acute angle, labelled  $\beta$  is defined between respective sheets 26 in Figure 3B, and 34 in Figure 3A. Referring back to Figure 2, the exterior

surfaces of peripheral convex region 20 preferably define an acute angle corresponding to angle  $\beta$  and are therefore labelled identically, to facilitate the reduction in the size of pouch 28.

5           More specifically, the taper of sheets 26 and 34, respectively, begins at the tablet point bends 38 and 40, which mark the point at which the taper of the packaging sheets is set to occur. In both instances, the identical angle of taper is utilized, and it can be  
10   seen that the tablet of the present invention permits the taper to commence nearer to the centre of the tablet, thereby permitting the pouch 28 to be defined within a smaller area, and correspondingly to define a reduced volume. The configuration of tablet 10  
15   permits the same amount of tablet material to be contained within this smaller pouch, as that contained within pouch 36 holding tablet 30. Referring now to Figures 4A and 4B, comprising plan views partly in phantom of the corresponding Figures 3A and 3B, it can  
20   be seen that the pouch 28 is reduced in area from that of pouch 36 and a corresponding reduction is possible in the overall size of sheet 26 from that of sheet 34. It should be noted that this reduction in packaging material is possible without the requirement of a  
25   decrease in the diameter of the respective tablets. Thus, the surface perimeter 14 of tablet 10 is equal in size to the surface perimeter 42 of tablet 30, with the difference in the size and location of the respective tablet point point bends 38 and 40, accounting for  
30   the decrease in the size of pouch 28 over pouch 36.

          In addition to the reduction in the size of the packaging material, it has been found that the sheet material itself may be reduced in gauge, as the overall convexity of the outer surfaces 12 reduces the strain on  
35   the sheet materials that is normally imposed at the tablet point bend in the instance where the tablet is

flat-faced, as illustrated in Figures 3A and 4A. The size of the obtuse angle that is subtended by the central and peripheral convex regions, determined with the tablet point bend 38 as its apex, is thus less than the corresponding obtuse angle that is disposed with tablet point bend 40 as its apex, in Figure 3A. The package sheet 26 is therefore less likely to rupture than corresponding package sheet 34, due to the configuration of respective tablets 10 and 30. Thus, while package sheet 34 has conventionally been prepared to a thickness of 0.001 inch gauge(0.0025 cm), package sheet 26 may be utilized at a reduced thickness of 0.0007 inch gauge(0.00178 cm gauge) and provides sufficient package strength and integrity, to resist rupture and premature package leakage.

Several other advantages have also been found with the employment of the tablets of the present invention. The problem referred to earlier with respect to tablet packaging, comprising the tendency of tablets to stack or "shim" during conveyance to the package pouch, has been virtually eliminated by the provision of the tapered surfaces of the convex broad outer surfaces 12. The tapered surfaces of the tablets allow them to slide apart from each other so that individual tablets may be efficiently packaged without jamming package machinery.

Also, the outer shape of the tablets confers a further unexpected advantage, in the instance where the tablet includes a cleansing composition that operates when the tablet is dissolved to form a cleansing solution, such as in the instance where denture cleansers, toilet bowl cleaners and the like are prepared. When the tablet is dropped into a solvent, the tendency is generally for the tablet to come to rest at the bottom of the container, resting on one of its broad surfaces. In the instance where the broad

surfaces are flat, the surface area of the tablet available for interaction with the liquid in the container is limited, as the surface in contact with the bottom of the container is effectively unexposed.

5 In contrast, the present tablet configuration presents tapered broad surfaces, that would extend away from the bottom of the container and permit the liquid in the container to make surface contact to accelerate the disintegration of the tablet.

10 The method of preparing the tablet of the present invention comprises the use of tablet dies defining at least one concave broad surface that corresponds in shape to the convex broad outer surface desired in the tablet. Thus, either one or both of the  
15 broad outer surfaces may be defined in corresponding concavities within the tablet die, so that the appropriately configured tablets may be prepared. In other respects, tablet preparation does not differ from that of the prior art, as conventional tableting  
20 agents may be employed, and conventional forming pressures, etc. may be utilized. It is advisable to prepare the tablets of the present invention with essentially flat rims 16, as this prevents the occurrence of "shingling" that comprises the  
25 surface discontinuities that sometimes are formed when the tablet edge is rounded.

The tablets of the present invention may vary widely in exact shape, so long as at least one of the broad outer surfaces is convexly extended as described.  
30 Preferably, the broad outer surfaces are symmetrically convex. The exact size of central convex region 18 and/or the intermediate convex region may vary considerably, and may range in size from 20% to 80% as a radial dimension, of the total radial dimension  
35 of the broad outer surface 12. Preferably, the central and/or intermediate convex region is in the range from 30 to 70% of the total radial dimension, and more

preferably is in the range from 50% to 65%. The term radial dimension will correspond to the radius when the tablet has a circular plan, and will be the dimension from the axis of the tablet to the periphery in other cases. Also, in the instance where the tablet possesses a configuration similar to that of Figure 1, with a continuous ridge 22, the location of ridge 22 naturally may vary, depending upon the size of the central convex region.

Referring now to Figure 5, the variation in the size of the respective convex region is illustrated, as peripheral convex region 20 appears larger than that in Figure 2, while the central convex region 18 is reduced. In Figure 6, a variant tablet 44 is shown which utilizes broad surfaces 46 that taper in convexity, so that the central convex region and the peripheral convex region are continuous with each other. All of the above variations are within the scope of the present invention.

A further embodiment is illustrated in Figure 7, wherein a tablet 48 is prepared which utilizes a single convex broad outer surface 50. This embodiment is specifically utilized in the instance where a package such as package 52 is employed. In such package, only one of the sheets is expanded and forms a pouch, and thus a flat sheet 54 has adhesively bound thereto a convexly expanded sheet 56, which defines the recess forming the tablet pouch 58. In this instance, it is desirable to provide a flat lower broad outer surface as shown; however the advantages noted above with respect to the bi-convex tablet also obtain in the instance where the single convex surface is employed, although perhaps to a different extent.

Figure 8 of the drawings shows an embodiment somewhat similar to that shown in Figure 1, in which the tablet 10<sup>1</sup> has two identical broad outer surfaces,

with a cylindrical rim 16' extending between their peripheries. A peripheral convex region 20' is frusto-conical in shape, like region 20 in Figure 1. In contrast, the central convex region 18' is substantially pyramidal in shape.

Figures 9 and 10 illustrate further embodiments, wherein the tablet is essentially rectangular in shape. Referring to Figure 9, tablet 10" defines paired broad outer surfaces 12", which can be seen to be convex, in similar fashion to surfaces 12 of Figure 1. Thus, broad outer surfaces 12" are comprised of intermediate convex regions 18", and peripheral convex regions 20" lying adjacent thereto. The separating ridge 22" may vary in configuration from that of a circle, illustrated as 22 in Figure 1 and as 22" in Figure 9, to that of a rectangle 22" in Figure 10 following essentially in parallel fashion a surface perimeter 14" in Figure 10. In the case of the embodiment of Figure 9, the peripheral convex region 20" appears as four triangular subsections equally distributed in the corners of the rectangular perimeter 14", while in Figure 10, peripheral convex region 20" is essentially rectangular and surrounds the intermediate rectangular convex region 18".

The tablets of Figures 9 and 10 differ further in the configuration of the rim 16", as it can be seen to vary in thickness from a minimal thickness at the corners of the tablet, to a maximum thickness at the points centrally intermediate the corners. The provision of a tablet in rectangular configuration as shown can be appreciated to make further economic use of the package pouch, as, in the instance where the pouch is rectangular, the shape of the tablet assures efficient utilization of defined space. The other advantages discussed above with respect to the tablet of the present invention are equally demonstrated by this

further embodiment, as the convex distention of the broad outer surfaces 12" reduces the strain that is normally imposed upon the package pouch.

5 As noted earlier, the tablets prepared in accordance with the present invention may contain a variety of ingredients for various uses, including household and medicinal application. The present tablet configurations are particularly useful in the instance where tablets are prepared for use as,  
10 for instance, denture cleansers and toilet bowl cleaners. In such instances, the tablet-forming material may include active ingredients such as cleansers or pharmaceutical compositions, again depending upon the particular utility of the tablet.

CLAIMS

1. A tablet comprising: two broad outer surfaces which are generally opposed to each other, are generally spaced apart from each other, and  
5 terminate in spaced-apart surface perimeters; and a continuous rim extending transversely between the surface perimeters; wherein at least one of the broad outer surfaces is distended convexly away from the other and comprises a central or intermediate convex region  
10 and a peripheral convex region disposed adjacent thereto.
2. A tablet according to Claim 1, wherein both of the broad outer surfaces are distended convexly away from each other thereby defining a tablet having a bi-convex configuration.
- 15 3. A tablet according to Claim 2, wherein the broad surfaces are symmetrically convexly distended.
4. A tablet according to Claim 1, 2 or 3, wherein the continuous rim defines a cylindrical surface which is circular or non-circular.
- 20 5. A tablet according to any preceding claim, wherein the convex regions of the or each broad outer surface are integral and continuous with each other.
6. A tablet according to any one of Claims 1 to 4, wherein the convex regions of the or each broad  
25 outer surface define exterior surfaces disposed at an obtuse angle with respect to each other.
7. A tablet according to any one of Claims 1 to 4 and 6, which also include a continuous ridge defined on the exterior of the or each convexly distended broad  
30 outer surface at the junction of the central or intermediate convex region and the peripheral convex region.
8. A tablet according to any one of Claims 1 to 7, wherein the central convex region of the or each broad  
35 outer surface defines an essentially conical shape.

9. A tablet according to any one of Claims 1 to 7, wherein the central convex region of the or each broad outer surface defines an essentially pyrimidal shape.

5 10. A tablet according to any one of Claims 1 to 7, wherein the intermediate region of the or each broad outer surface defines an essentially frusto-conical shape.

10 11. A tablet according to any one of Claims 1 to 7, wherein the intermediate region of the or each broad outer surface defines an essentially frusto-pyramidal shape.

15 12. A tablet according to Claim 10 or 11, wherein, centrally of the or each intermediate region, is a planar central region.

13. A tablet according to any preceding claim, wherein the peripheral convex region of the or each broad outer surface defines an essentially frustoconical shape.

20 14. A tablet according to any preceding claim, wherein the surfaces of the peripheral regions of the opposed broad outer surfaces subtend between them an acute angle.

25 15. A tablet according to Claim 14, wherein the acute angle is less than  $45^{\circ}$ .

16. A tablet according to any preceding claim, wherein the radial dimension<sup>of the</sup>/central and/or intermediate convex region is in the range from 20% to 80% of the total radial dimension of the broad outer surface.

30 17. A tablet according to Claim 16, wherein the radial dimension of the central and/or intermediate convex region is in the range from 30% to 70% of the total radial dimension of the broad outer surface.

35 18. A tablet according to Claim 16, wherein the radial dimension of the central and/or intermediate convex region is in the range from 50% to 65% of the

total radial dimension of the broad outer surface.

19. A tablet according to any preceding claim and constituted at least partially by a household cleaning composition.

5 20. A tablet according to any one of Claims 1 to 18 and constituted at least partially by a medicinal compound.

21. A sealably packaged tablet comprising, in combination:

10 a tablet package comprising opposed package sheets peripherally adhered to each other, and defining centrally between them an air-tight tablet pouch; and

a tablet according to any preceding claim, located in the tablet pouch.

15 22. A combination according to Claim 21, wherein the package sheets are formed of a material comprising aluminium foil.

20 23. A combination according to Claim 22, wherein the foil has a thickness of the order of 0.0007" gauge (0.00178 cm gauge).

24. A method of making a tablet according to any one of Claims 1 to 20, which method comprises:

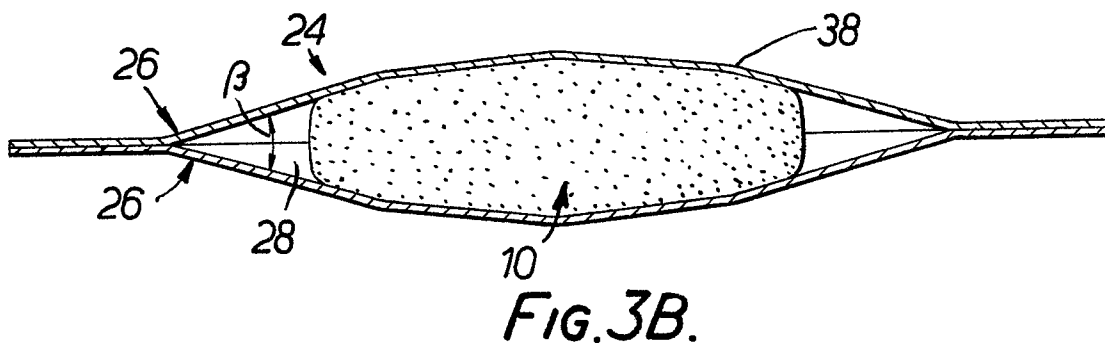
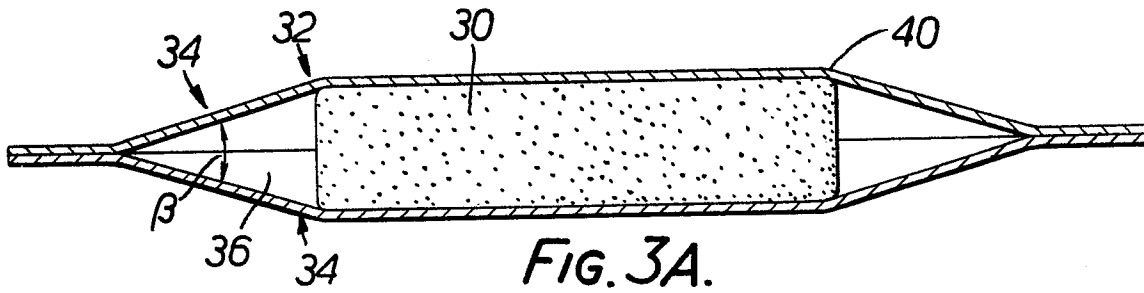
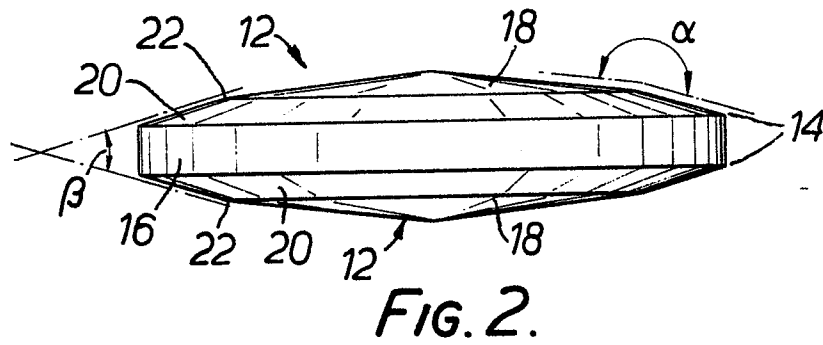
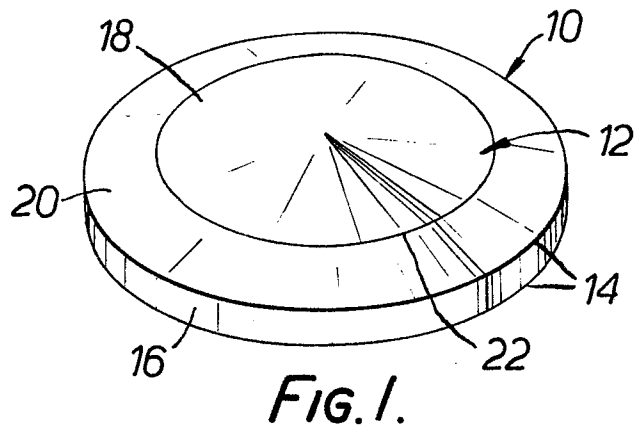
25 providing a tablet die having at least one broad surface thereof of concave configuration in a peripheral region and in a central or intermediate region,

loading the tablet die with tablet-forming material, and compressing the tablet-forming material within the tablet die to form a tablet having the desired configuration.

30 25. A method according to Claim 24, wherein the die defines concavities on both broad surfaces thereof, and

the tablet-forming material is compressed to form a tablet having two opposed, convex broad outer surfaces.

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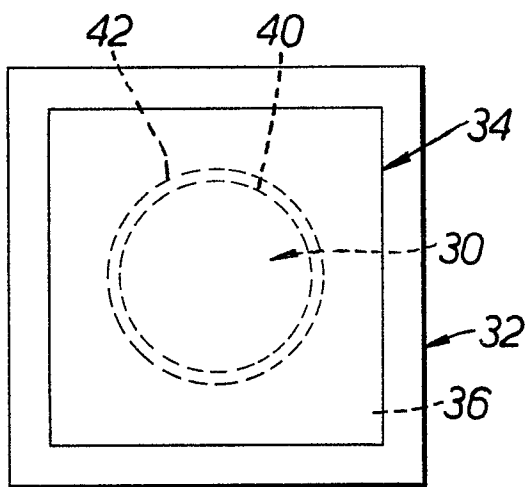


FIG. 4A.

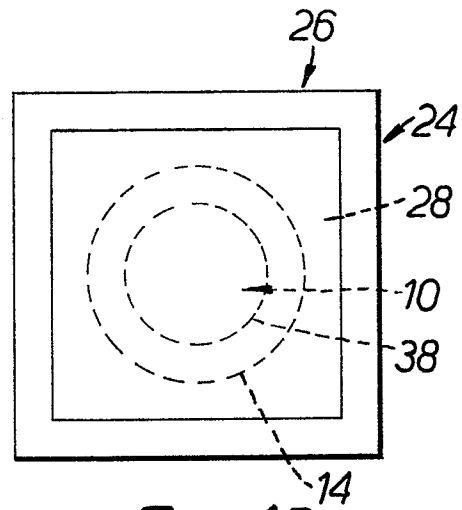


FIG. 4B.

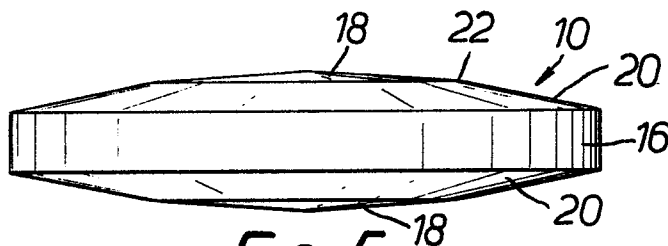


FIG. 5.

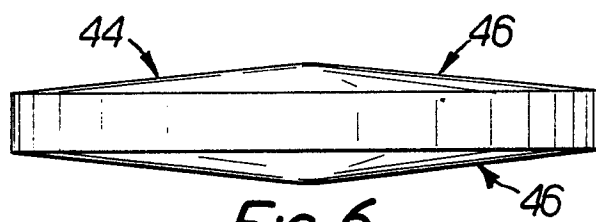


FIG. 6.

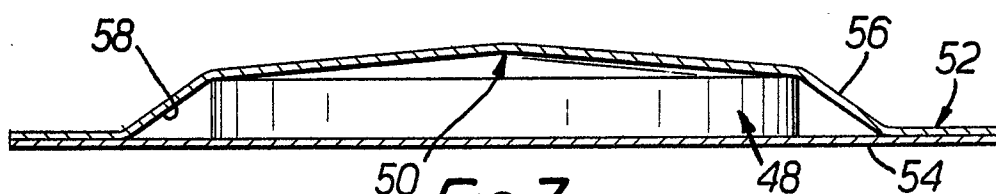


FIG. 7.

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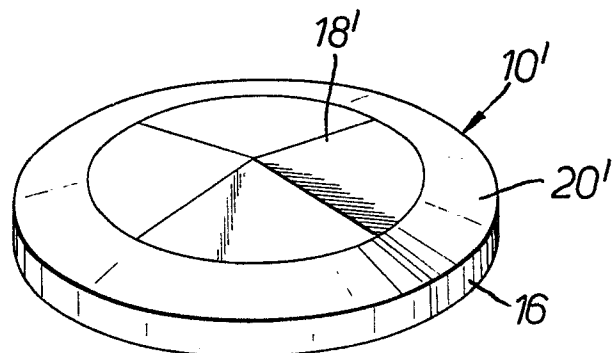


FIG. 8.

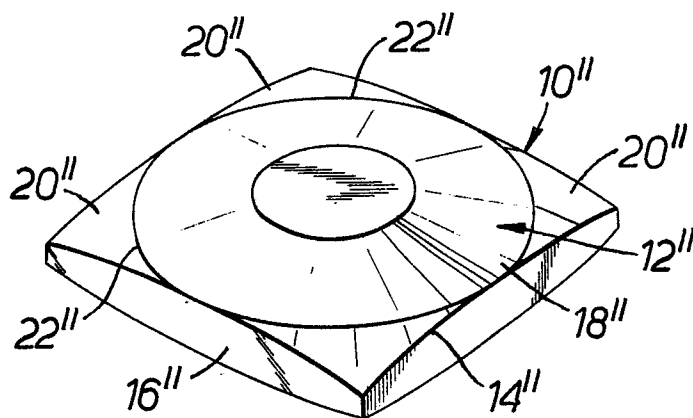


FIG. 9.

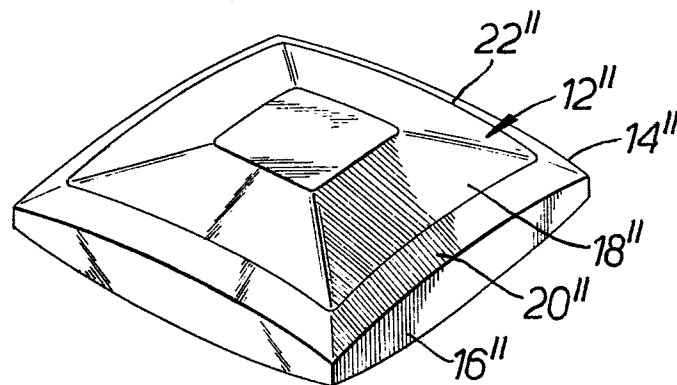


FIG. 10.



European Patent  
Office

# EUROPEAN SEARCH REPORT

0070720

Application number

EP 82 30 3769

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Y	WO-A-8 201 818 (G.D. TOVEY)  * Page 1, lines 3-5, 22-25; page 3, lines 22-27; page 5, lines 16-36; page 7, lines 18-20; page 8, lines 22-25; page 9, lines 9-12; page 10, lines 1-5; claims 1-4, 7, 21-23, 26, 27; figures 8-8B, 16-16B, 21-21B, 26-26B, 30-30A * & GB - A - 8 038 993 (04-12-1980) & GB - A - 8 112 987 (28-04-1981)	1-18, 20-25	A 61 J 3/10
Y	BE-A- 779 427 (ASPRO)  * Page 1; page 2, lines 1-10, 30-33; page 3, lines 1-16; page 4, lines 18-24; page 5, lines 21-26; page 6, lines 9-16; page 7, lines 4-11; page 8, lines 17-19, 32, 33; page 9, lines 1-8; figures 1-6 *	1-18, 20-25	
			TECHNICAL FIELDS SEARCHED (Int. Cl. 3)
A	GB-A-2 048 158 (M.D. BOCK) * Claims 1-6; figures 2-4 *	24, 25	A 61 J A 61 K B 29 D B 65 D
A	HAGERS HANDBUCH DER PHARMAZEUTISCHEN PRAXIS, vol. 7, 1971, pages 690, 691, Springer Verlag, New York, USA * Pages 690, 691; figures 387, 388a-f *	1-25	
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12-10-1982	Examiner ENGELBRECHT E
<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>			