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**Improvements in blister sheets**

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(56) Related Art  
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**ABSTRACT****(Figure 1 refers)**

A blister sheet (1) is formed with an array of spaced blisters (2) arranged in parallel lines each containing four blisters. Each blister is of generally frusto-conical pyramidal shape having corrugated side walls (7). Ducts (10) interconnect the blister (2) of each line to allow air to escape from the cavity of a blister being depressed so that it offers a diminished resistance to finger depression of the blister.





IMPROVEMENTS IN BLISTER SHEETSFIELD OF THE INVENTION

THIS INVENTION relates to a blister sheet and is more specifically concerned with one which provides an array of blisters which protrude from one side. Doses of medication can be placed in cavities of respective blisters in accordance with a prescription provided by a doctor. The cavities then can be closed by a backing sheet which is attached to the side of the blister sheet opposite that from which the blisters protrude. Such blister sheets are used by pharmacists and are capable of being packaged to provide a patient with his or her prescribed medication doses which are to be taken over an extended period. The times at which the doses are to be taken coincide with the positions of the blisters on the blister sheet and these times are often denoted on packaging of which the blister sheet forms a part.

STATE OF THE ART

Blister sheets are normally transparent to enable the patient to see that the medication doses contained in a particular blister are all ejected when the blister is depressed by finger pressure. The sheet is usually vacuum formed and has to be made from a material which meets exacting requirements set by the health authorities. For example, the combination of blister sheet and backing sheet must be airtight to preserve the doses from deterioration in the individual blisters; the zones of the backing sheet behind the blisters must be capable of being readily ruptured by the finger pressure of the patient when he or she depresses the front of the blister from which the doses are to be ejected; and, the blister must be capable of being depressed without damaging the medication doses it contains.

In practice, older patients can find difficulty in depressing the front of a blister with sufficient force to eject all of the medication doses from its cavity. The force must be sufficient to rupture the backing sheet and also to buckle the upright walls of the blister sufficiently to enable the front face of the blister to be pressed down as far as the backing sheet. If the front face is only pressed down half-way, one of the medication doses can inadvertently be left in the blister, usually by being lodged behind a marginal

portion of the backing sheet which has not ruptured, and a part of the side wall which has withstood buckling.

### OBJECT OF THE INVENTION

An object of this invention is to provide an improved blister sheet.

### 5 THE INVENTION

In accordance with the present invention a blister sheet is formed with a blister having side walls and a front face which is held spaced from the back of the sheet by the side walls, the side walls being so formed that they yield gently while progressively collapsing from the front face in response to increasing finger pressure being applied to the front  
10 face.

The extent of progressive collapse of the side walls is sufficient to enable the front face of the blister to be depressed with very little finger pressure toward the back of the blister so that all of its doses are ejected.

### PREFERRED FEATURES OF THE INVENTION

15 The forming of the side walls to achieve their progressive collapse may be achieved in many different ways. It may be assisted by providing the side walls with formations such as corrugations, which allow them to be depressed easily under finger pressure. It may also be assisted by having the side walls slightly convergent towards one another or by forming the sheet from a sufficiently soft plastics material.

20 A bleed opening may also be provided to allow air to escape from the interior of the blister as it collapses inwardly under finger pressure.

The front face of the blister may be convex, concave or flat. Preferably it is surrounded by a rectangular frame pressed out of the blister sheet between the perimeter of the front face and the side walls of the blister. When the front face is in the form of a part-  
25 cylindrical convex deformation, the sides of the deformation conveniently are formed with parallel lateral part-cylindrical shoulders to assist the deformation of the front face under finger pressure.

### INTRODUCTION TO THE DRAWINGS

The invention will now be described in more detail, by way of example, with reference to the accompanying diagrammatic drawings, in which:

#### 5 IN THE DRAWINGS

5 FIGURE 1 is a plan view of a part of a blister sheet;

FIGURE 2 is a first section through the blister and taken on the line and the direction indicated by the arrows II-II in Figure 1;

10 FIGURE 3 is a second section taken on the line and in the direction indicated by the arrows III-III in Figure 1;

FIGURE 4 is a plan view of an assembled blister sheet package partly broken away and showing two ways of providing air bleed channels extending between parallel lines each of four blisters; and,

15 FIGURE 5 is a vertical section through part of Figure 4 taken on the line and in the direction indicated by the arrows V-V in Figure 4.

### DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figures 1, 2 and 3, these show a part of a transparent, vacuum-formed, plastics blister sheet 1 having a blister 2 of generally truncated pyramidal shape and protruding from one side of the blister sheet. It tapers in the direction of its protrusion. A  
20 finger-rupturable, airtight backing sheet 4, which may be a thin metal foil, is adhesively joined seal to the back of the sheet 1 around the marginal edge of the blister 2 and acts to retain prescribed medication doses (not shown) within the interior of the blister.

The blister 2 has a generally rectangular front face 5, having rounded corners 6 and held spaced from the back of the blister by four slightly convergent corrugated side-walls 7.  
25 The side walls 7 of the blister meet one another at generously-rounded corners 8 and are

formed with seven outwardly-bulging and parallel corrugations 9 extending parallel to the back of the blister.

As shown in Figures 4 and 5, the blisters 2 are arranged in seven parallel lines each containing four blisters which are interconnected by narrow bleed openings formed by  
 5 narrow ducts 10 moulded from the material of the blister sheet 1. the ducts have a cross-section of about one square millimetre and are each about four millimetres long and open at their ends into respective blisters so that air can escape from each blister when it is depressed by finger pressure, into the air reservoirs provided by the adjacent corrugated blisters 2, or to atmosphere if either or both of the adjacent blisters have had  
 10 their contents discharged from them. The corrugations permit dilation of the blister when air enters it by way of a duct 10.

#### OPERATION OF PREFERRED EMBODIMENT

In order to eject medication doses contained in a particular blister cavity 5, the patient depresses the front face 5 of the selected blister with finger pressure. The pressure is  
 15 transmitted through the medication doses, which may in the form of tablets or capsules, to the foil backing sheet 4, causing it to rupture. The front face 5 also presses down on the side walls 2 causing their corrugations 7 to yield progressively with the result that the side walls 2 suffer a progressive collapse starting with the corrugation 9 adjacent the  
 frame 5. This collapse reduces the tendency of the side walls 7, particularly their corners  
 20 8, to offer a sudden resistance to the movement of the front face of the blister towards the backing sheet 4.

In a conventional airtight blister sheet the pressure of the air created inside a blister being depressed can prevent the blister contents from engaging, simultaneously, the front face  
 5 and backing sheet 4 of the blister. As a result the air pressure may be inadequate to burst the backing sheet 4 if an elderly person is attempting to eject the blister's  
 25 contents. This problem is overcome by the use of the wall corrugations 9 of the blister which progressively collapse easily to ensure the finger pressure of an elderly person will be sufficient to allow the front face 5 to press the blister contents firmly against the backing sheet 9. The corrugations also operate to allow dilation of a blister when

receiving air from a duct, so that it does not offer resistance to air entering it from an adjacent blister being manually depressed.

The flow of air between blisters by way of the ducts 10 can be facilitated by providing twin, parallel ducts between adjacent blisters in the same row, as shown in the lower three rows of blisters in figure 4.

#### MODIFICATION OF PREFERRED EMBODIMENT

The accompanying drawings show two ways in which the resistance to depression of a blister by finger pressure can be lessened. However, there are other ways. For example, air-dilatable reservoirs may be provided between the blister sheet and the backing sheet and ducts leading from the blisters containing medication may extend into the reservoirs. It has been found that when a relatively soft plastics material is used for the blister sheet, the medication - carrying blisters can be of a conventional design as long as the reservoirs themselves are designed to dilate easily so that they offer minimum resistance to the transfer to them of air from a blister being manually depressed. The air dilation of a reservoir can be facilitated by providing it with a corrugated wall, as described above in relation to medication carrying blisters shown in the accompanying drawings.



The Claims Defining the Invention are as Follows:-

1. A blister sheet formed with a blister having side walls and a front face which is held spaced from the back of the sheet by the side walls, the side walls being so formed that they yield gently while progressively collapsing from the front face in response to  
5 increasing finger pressure being applied to the front face.
2. A blister sheet as set forth in claim 1, in which the side walls are slightly convergent towards one another as they approach the front-face of the blister.
3. A blister sheet as set forth in claim 1 or claim 2, in which the corners of the blister between adjacent convergent side walls are rounded.
- 10 4. A blister sheet as set forth in any one of the preceding claims, in which each blister has corrugations formed in the side walls, the corrugations extending parallel to the back of the blister.
- 15 5. A blister sheet as set forth in any one of the preceding claims, in which each blister is provided with an opening through which air from the cavity of the blister can escape when the blister is depressed, and which prevents ambient air entering the loaded blister prior to its contents being discharged.
6. A blister sheet as set forth in claim 5, in which the opening is provided by a duct extending from the blister to a dilatable air reservoir space located between the backing sheet and the blister sheet.
- 20 7. A blister sheet as set forth in claim 6, in which the air reservoir space is provided by a second blister.



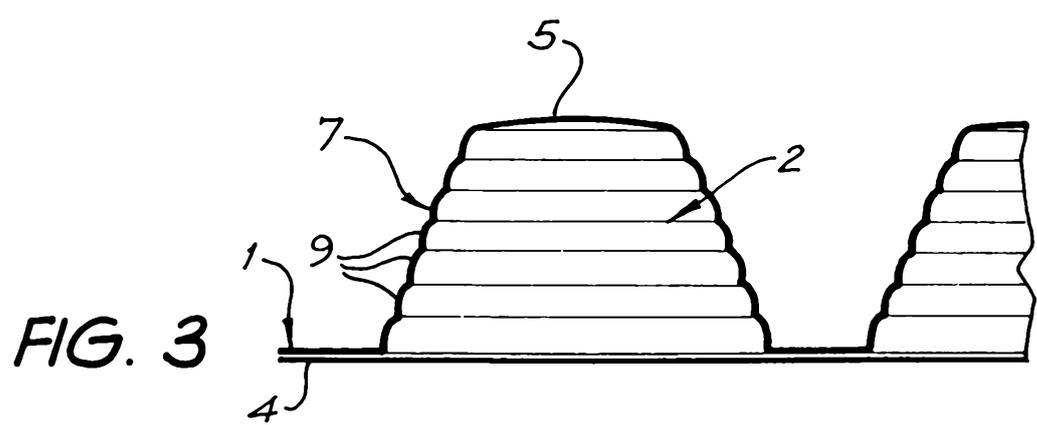
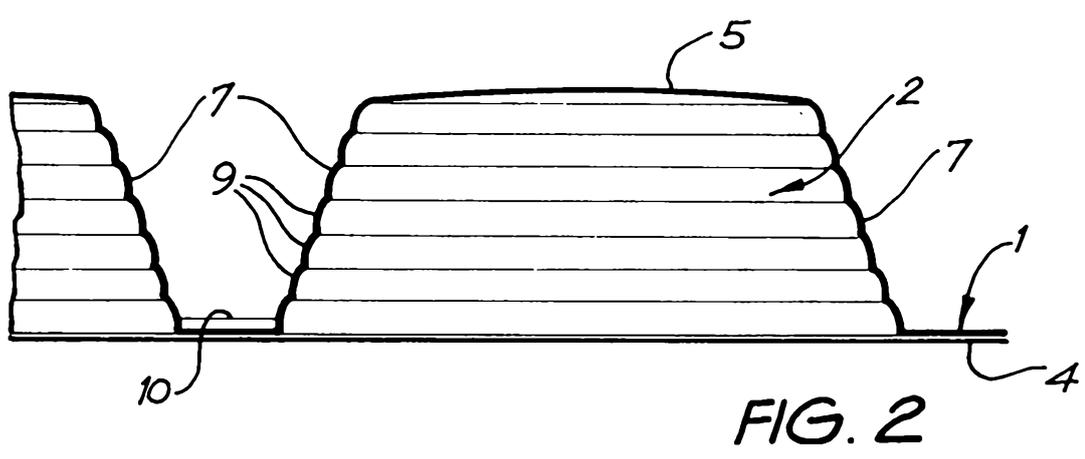
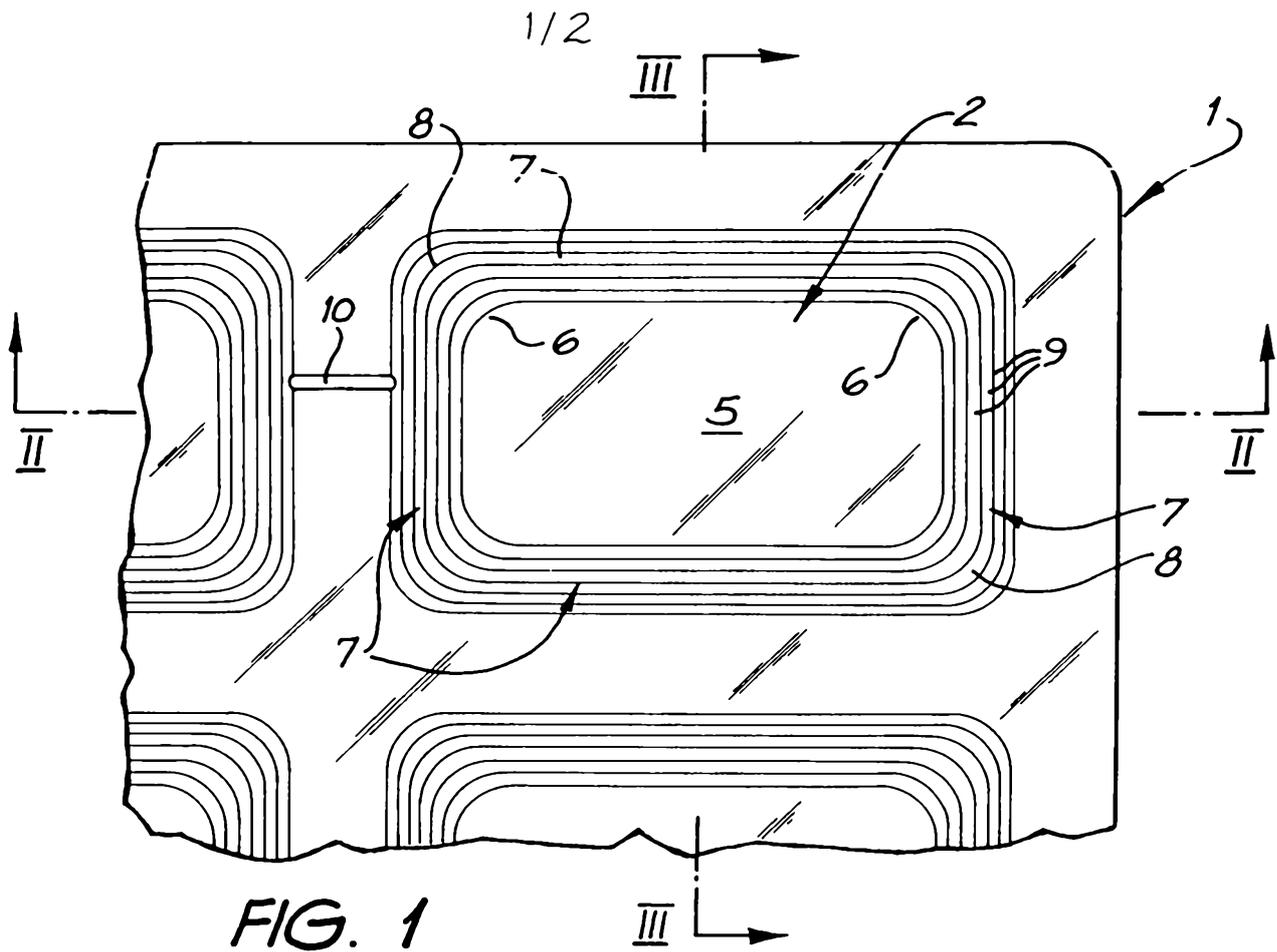
8. A blister sheet as set forth in claim 1, arranged and adapted to operate substantially as described with reference to either of the arrangements shown the accompanying drawings.

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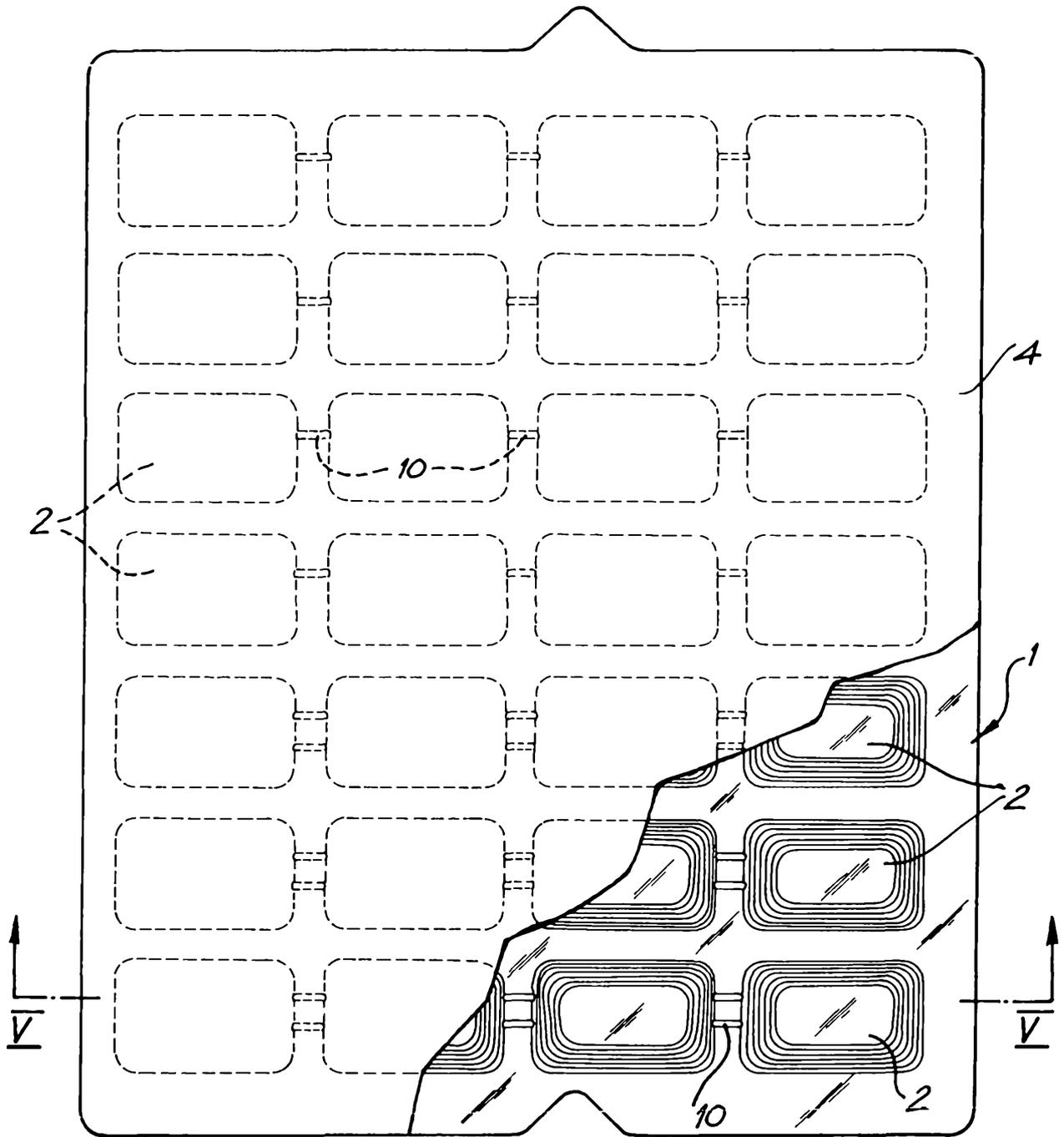


FIG. 4

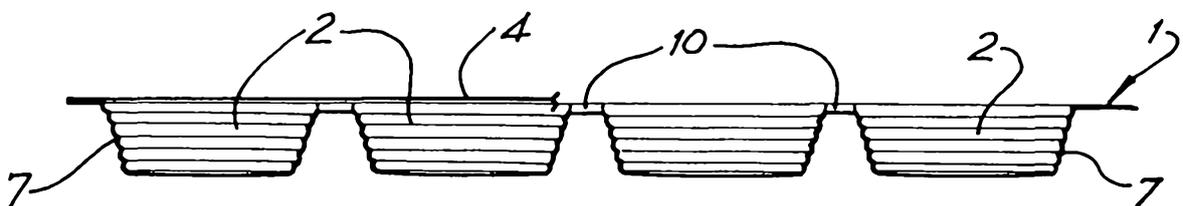


FIG. 5