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**EUROPEAN PATENT APPLICATION**

21 Application number: **87305072.8**

51 Int. Cl.<sup>4</sup>: **D 06 F 39/02**  
**C 11 D 17/04**

22 Date of filing: **09.06.87**

30 Priority: **11.06.86 GB 8614233**

43 Date of publication of application:  
**16.12.87 Bulletin 87/51**

84 Designated Contracting States:  
**CH DE ES FR GB IT LI NL SE**

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84 Designated Contracting States: **GB**

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84 Designated Contracting States:  
**CH DE ES FR IT LI NL SE**

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54 **Sachet product.**

57 A sachet of flexible sheet material containing a composition, for example, for treating fabrics in a washing machine, so shaped and dimensioned that when immersed in water in the absence of the treatment composition its thickness at at least one point is at least 1 cm. The thickness of the sachet thus remains at least 1 cm after delivery of its contents, so that passage of the sachet between the inner and outer drums of an automatic washing machine is prevented or substantially reduced.

**Description**SACHET PRODUCT FOR TREATING FABRICS IN A WASHING MACHINETECHNICAL FIELD OF INVENTION

5 This invention relates to sachets containing materials for treating fabrics in a washing machine.

BACKGROUND AND PRIOR ART

Sachets containing detergents and other treatment materials are well known in the washing art, for example, from EP 11 500B and EP 163 417A (Unilever). These sachets of flexible sheet material may be water-permeable and deliver their contents by leaching out, or they may be designed so as to open during the wash cycle.

10 It has been found that both opening and non-opening sachets used in drum-type washing machines can undergo 'posting', that is to say, the sachet passes between the inner, rotating drum and the outer, stationary drum of the machine. The 'posted' sachet can then disrupt the normal functioning of the machine by, for example, blocking the pump inlet. Furthermore, full delivery of the sachet contents will not take place if 'posting' occurs early in the wash cycle. It is an object of the invention to provide a sachet having a substantially reduced incidence of 'posting'.

A study of the use of simple non-opening sachets in washing machines revealed that only 1-2% of such sachets underwent 'posting'. Further study showed, however, that not all machines were equally liable to 'post' sachets. 'Posting' was not found in some makes of machine whereas in others 'posting' occurred in 50% of trials. Other small objects, such as socks, are rarely found to undergo 'posting', perhaps because of their flexibility.

A study of the motion of a sachet in a front-loading automatic washing machine revealed that 'posting' tends to occur when the sachet has moved to the front of the machine, comes into contact with the door-window, and slides down into the gap between the drums. 'Posting' is more frequent towards the end of the wash cycle than at the start because the sachet contents have been exhausted and the empty sachet tends to be very thin, but can also occur much earlier.

It has now been found that posting can be eliminated or at least substantially reduced by making sure that, throughout the entire wash cycle, at least part of the sachet is sufficiently large that it cannot pass through the gap between the drums.

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SUMMARY OF INVENTION

The present invention provides a sachet of flexible sheet material for a treatment composition, the sachet being so shaped and dimensioned that when immersed in water in the absence of the treatment composition the thickness of the sachet at least one point is at least 1 cm, whereby passage of the sachet between inner and outer drums of a drum-type automatic washing machine is prevented, or substantially reduced.

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DETAILED DESCRIPTION OF THE INVENTION

Embodiments of the present invention fall into two major classes: sachets which in the dry state and in the absence of the treatment composition have a thickness at at least one point of at least 1 cm (the first embodiment) and those which are thinner than 1 cm in the dry state in the absence of the treatment composition but acquire such a minimum dimension on immersion in water (the second embodiment). Sachets according to both embodiments may either be of the non-opening type, which deliver their contents by leaching out through a water-permeable wall, or the opening type which is provided with a seal which opens in the washing machine environment.

40 A simple, but effective, example of the first embodiment of the invention is a conventional, non-opening sachet containing in addition to the treatment composition an insoluble granular material, such as beads of plastics material, for example, polystyrene, in an amount such that the sachet has a thickness of at least 1 cm in the absence of the treatment composition. The beads prevent the sachet from being 'posted' by increasing its thickness: its shape is changed from planar to cushion shaped.

50 Another simple example of the first embodiment, applicable to both opening and a non-opening sachets, is a sachet through which is passed, or to which is attached, a relatively rigid stud large enough to increase the smallest dimension of the sachet to 1 cm or more.

A third method of ensuring that the sachet in the dry state is sufficiently bulky to avoid posting is to construct it such that opposing walls are of different sizes, the smallest one being stretched before assembly of the sachet, so that the empty sachet is forced into a bent or curved configuration having an effective thickness of at least 1 cm.

60 All of the above embodiments, although very satisfactory as non-posting sachets, do suffer from the minor disadvantage that they are somewhat more bulky than other sachets, leading to increased storage space requirements and packaging costs. This problem is avoided with the second embodiment of the invention, according to which the sachet in the dry state has, in the absence of the treatment material, a thickness smaller than 1 cm but on immersion in water increases in bulk whereby the thickness of the wet sachet at at least one point is at least 1 cm. This is conveniently achieved by including in the sachet a water swellable material which increases in bulk whereby the sachet then has a thickness at at least one point of at least 1 cm

after immersion in water. This material is conveniently in the form of a small object or "insert". In a non-opening sachet the insert may simply be loose, while if the sachet is of the opening variety it will, of course, be necessary to secure the insert and the sachet together, for example, by glueing. If secured, the insert could if desired be on the outside of the sachet.

A preferred insert is a small piece of the compressed sponge material sold under the Trade Mark 'Spontex'. This material is especially useful in that it can be compressed to a state in which, on wetting, it expands rapidly in one dimension to at least five times the compressed size while remaining substantially unchanged in the other two dimensions. Thus a 2 cm square of this material having a thickness of 0.2 cm will expand rapidly on wetting to a thickness of 1.5-2 cm to give a cuboid of approximate dimensions  $2 \times 2 \times (1.5-2)$  cm, i.e. the thickness increases dramatically while the other dimensions are unchanged. Such an insert can be packed flat in a sachet which is thus conveniently thin in the dry state, but will swell up quickly when the sachet encounters the water of the washing machine. The insert can be of any shape: square, rectangular, or especially triangular inserts are preferred as they may be cut from the bulk material with minimal wastage.

Other materials may, of course, also be used to impart water-swellability to the sachet. In a closed sachet the material need not be a discrete insert but may take the form of balls, beads, granules or powder. Certain water-swellable polymers, for example, the starch and cellulose derivatives used as "superabsorbents", may be suitable provided that the swelling is not too sensitive to temperature.

It is preferred that the water-swellable material should swell before all the sachet contents have been delivered: in practice most sponge materials will swell almost instantaneously.

#### NATURE OF THE SACHET WALLS

The construction of the sachet itself is not critical. Preferably the sachet walls, which are of flexible sheet material, comprise paper, woven fabric, non-woven fabric, or plastics film, or laminates of these materials. The sachet walls must of course be compatible with the treatment composition to be contained in the sachet.

The seams or seals of the sachet may be formed by any method, heat-sealing or glueing being preferred. One or more of the seals can be of the type which open during washing. If the sachet walls are water-impermeable at least one seam or seal must open during the wash cycle to release the treatment composition. If the sachet has one or more opening seals it is essential that the insert be attached directly or indirectly to the sachet walls to ensure that the insert is not lost during the wash cycle.

#### NATURE OF TREATMENT COMPOSITION

The sachet is intended to contain any treatment composition useful for treating fabrics in the washing machine. Examples of such compositions include fully formulated detergents, bleaches, bleach activators, fabric conditioners, and other detergent ingredients or combinations thereof.

Alternatively the sachet may contain materials useful for treating the washing machine itself. An example of such a treatment would be the removal of an accumulated calcium- or phosphate-containing scale. If the machine treatment material is neutral or alkaline, for example, a salt of EDTA, then the treatment may be carried out at the same time as the fabric washing. If the machine treatment material is acidic, for example, citric acid or adipic acid, then it is preferred that the machine treatment be carried out as a separate operation.

According to one especially preferred embodiment of the invention, the sachet is intended as a bleach adjunct for use in conjunction with a detergent powder, and contains sodium perborate and an activator therefor: a closed sachet of this type is described and claimed in EP 163 417A (Unilever). It is especially preferred that the sodium perborate be in monohydrate form and that the activator be tetraacetylene-diamine (TAED).

The sachet may also be employed in other aqueous environments, for example in swimming pools.

The invention will be illustrated by reference to the following non-limiting Examples.

#### EXAMPLE 1

Sachet products in accordance with the invention were prepared from a porous nonwoven fabric, of average pore size  $70 \mu\text{m}$ , consisting of 40% polyester fibres and 60% viscose fibres, coated on one side (the inside of the sachet) with a polyamide heat-seal finish. Each sachet was square and had dimensions of  $10 \text{ cm} \times 10 \text{ cm}$ . Three sides of the each sachet were sealed together by heat-sealing, and it was filled with the following bleaching composition:

Sodium perborate monohydrate (ex Degussa, particle  
size substantially 100-700  $\mu\text{m}$ ) 9.7 g

5 TAED granules (300-2000  $\mu\text{m}$ ) (65.3% TAED, 32% phosphates,  
2.7% water) 13.9 g

10 Perfume 0.3 g

15 Fluorescer (CBSX ex CIBA-Geigy) 0.12 g

20 A small square of compressed 'Spontex' (ex Spontex, 24 Rue de Jeuneurs, 75002 Paris) sponge material  
having dimensions of 2 cm  $\times$  2 cm and a thickness of 0.2 cm was placed flat inside each sachet with the  
bleaching composition, and the fourth side of the sachet was closed by heat-sealing.

#### EXAMPLE 2

25 A sachet similar to that described in Example 1 was prepared by the same method. However, the sachet  
contained a piece of 'Spontex' 1.5 cm square which is capable of expanding to a height of 1.6 cm on wetting.

#### EXAMPLE 3

As Example 2 but containing a 'Spontex' insert of 1  $\times$  2 cm.

#### 30 EXAMPLE 4

As Example 2 but containing a 'Spontex' insert of 2 cm square, which was capable of expanding to a height  
of 2.1 cm on wetting.

#### EXAMPLE 5

35 As Example 5 but containing a circular 'Spontex' insert of 2 cm diameter.

#### EXAMPLE 6

A similar sachet to that described in Example 1 was prepared by the same method. The sachet, however,  
contained a cube of uncompressed sponge material having a 1.5 cm side instead of 'Spontex'.

#### 40 EXAMPLE 7

A similar sachet to that described in Example 1 was prepared by the same method. The sachet contained a  
hollow polyethylene ball of 2 cm diameter instead of 'Spontex'.

#### 45 EXAMPLE 8

A similar sachet to that described in Example 1 was prepared by the same method. The sachet did not  
however, contain an insert. A stud of plastics material 1.3 cm diameter and 1.3 cm tall was secured through the  
sachet walls.

#### 50 Comparative Example A

A similar sachet to that described in Example 1 was prepared by the same method. The sachet did not  
contain an insert or an external protrusion.

#### POSTING TESTS

55 The sachets of Examples 1-8 and Comparative Example A were tested in a range of washing machines. A  
similar wash load and cycle were used for each test of a particular machine. The results are set out in the table.

It is clear from the table that sachets of the invention did not undergo 'posting' whereas conventional  
sachets were prone to 'posting'; in one case in more the half the trials the conventional sachets tested  
underwent posting.

#### 60 EXAMPLE 9

A square piece of the non-woven fabric described in Example 1 having dimensions 10 cm  $\times$  10 cm was  
taken. A second, rectangular, piece of dimensions 12 cm  $\times$  10 cm was also taken. Two opposing edges of the  
square piece were heat sealed to the two short edges of the rectangular piece, to give an article having a  
D-shaped cross section. The article was then stretched to flatten the cross-section, and one further edge

sealed to give a pouch. The pouch was filled with the composition described in Example 1 and then stretched again. The final open seam was then heat-sealed. The sachet was not prone to posting.

TABLE

	Miele* W753	Miele* W 753	Laden* 585	Philips* 921	Zanussi* SL27T
	No. tested	No. posted	No. tested	No. posted	No. tested
Example A (comparative)	30	4	-	-	200
Example 1	36	0	9	0	14
Example 2	20	0	-	-	-
Example 3	15	0	-	-	-
Example 4	36	0	9	0	14

Miele\* W753      Miele\* W 753      Laden\* 585      Philips\* 921      Zanussi\* SL27T

	No.	No.	No.	No.	No.	No.	No.	No.	No.
	tested	posted	tested	posted	tested	posted	tested	posted	tested
Example 5	36	0	9	0	32	0	14	0	
Example 6	-	-	-	-	-	-	-	10	0
Example 7	-	-	-	-	-	-	-	25	0
Example 8	-	-	-	-	-	-	-	25	0

Gap between inner and outer drums : the difference in the gaps between the drums is due to manufacturing tolerances.

5-13 mm\*      8-11 mm      5-10 mm      5-12mm

\* Trade Mark

## Claims

1. A sachet of flexible sheet material for a treatment composition characterised in that the sachet is so shaped and dimensioned that when immersed in water in the absence of the treatment composition the thickness of the sachet at at least one point is at least 1 cm, whereby passage of the sachet between inner and outer drums of a drum-type automatic washing machine is prevented, or substantially reduced. 5
2. A sachet as claimed in Claim 1, which is a non-opening sachet consisting at least partially of water-permeable material and containing, a water-insoluble granular material in an amount such that the sachet has a thickness at at least one point of at least 1 cm in the absence of the treatment composition. 10
3. A sachet as claimed in Claim 1, which has attached thereto a relatively rigid stud having at least one dimension of 1 cm or more.
4. A sachet as claimed in Claim 1, which has at least two opposing walls of different dimensions whereby the sachet is forced into a non-planar configuration having a thickness at at least one point of at least 1 cm. 15
5. A sachet as claimed in Claim 1, which contains a water-insoluble ball so dimensioned that the sachet in the absence of the treatment composition has a thickness at at least one point of at least 1 cm.
6. A sachet as claimed in Claim 1, which in the dry state has a thickness smaller than 1 cm but on immersion in water increases in bulk whereby the thickness of the wet sachet at at least one point is at least 1 cm. 20
7. A sachet as claimed in Claim 2, which has contained therein a water-swellaable material which on immersion in water increases in bulk whereby the sachet then has a thickness at at least one point of at least 1 cm. 25
8. A sachet as claimed in Claim 3, wherein the water-swellaable material is in the form of a piece of compressed sponge material.

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