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(54) Cartons impregnated with perfume.

(57) Packs containing cleaning powders, the inside surface of the pack being impregnated, for example by spraying, with perfumes. The packs are particularly useful for holding cleaning powders which contain components which degrade perfumes, for example chlorine bleaches and combinations of oxygen bleaches and acid bleach precursors. The packs can be cartons or drums, or any other configuration and, if desired, can be impregnated while in blank form.

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This invention relates to a pack containing a cleaning powder.

Consumers expect cleaning powders to be pleasantly perfumed and they expect this perfume to be noticeable both on opening the pack and on use of the powder. However, modern cleaning powders increasingly contain components which adversely affect the stability of perfumes, with the result that off-odours can develop and that the impact of the perfume is reduced. Examples of such components are chlorine bleaches such as sodium hypochlorite and sodium trichlorocyanurate, and oxygen bleaches such as sodium perborate and sodium percarbonate, if desired, in combination with an acid bleach precursor such as tetra-acetylethylenediamine.

One way of reducing chemical degradation of perfume is to encapsulate it in a water-soluble envelope. However, this results in a cleaning powder which is bland and unappealing to the consumer whilst it is in the pack.

We have now discovered that the desired perfume impact of cleaning powders can be maintained and off-odours reduced if, instead of incorporating all of the perfume into the powder, some or all of it is applied to the inner surface of the pack or to the material from which the blank is made. This technique is also applicable to packs containing powders which do not have a perfume-reactive component in the formulation, since it can increase the perfume impact of such powders.

Accordingly, the present invention provides a pack containing a cleaning powder, the inside surface of the pack, or part thereof, being impregnated with a perfume.

Of course, most packs containing perfumed cleaning powder which are made from absorbent material carry a small amount of perfume which has become absorbed either directly from the solid powder or from the vapour phase. In contrast to this, the packs of our invention carry relatively large amounts of perfume which has been applied to their inside surfaces from the liquid phase.

Preferably the perfume is applied to the pack in the headspace region, that is in the region of the pack vacated by the powder as it settles down due to mechanical handling after packing. Application of the perfume to this region of the pack gives the greatest opportunity for the perfume to be noticed once the pack is opened.

Normally the perfume will be applied to the packs before the packs are filled with powder, although packs to which perfume has been applied after filling are not excluded from the invention.

It is implicit in the present invention that the material from which the pack is made should be capable of absorbing perfume and of releasing it again. Cardboard and

coated cardboard normally used for carton or drum manufacture do in fact meet these criteria.

We are aware of Canadian Patent No 971,135 which relates to a carton principally designed for holding facial tissues. The carton is adapted for perfume to be deposited between the sealing flaps and for the perfume vapour to communicate with the tissues inside the carton. The object of this invention is to prevent liquid perfume from coming into contact with the tissues in order to prevent problems of allergy and skin sensitisation. In our invention these latter problems are much reduced because of the difference in mode of use between cleaning powders and toilet tissues and so our method of impregnating the pack is likely to be more effective and less expensive than the proposal in Canadian Patent No 971,135.

The problem of perfume stability to which the present invention provides a solution is most severe with fabric washing powders and abrasive cleaning powders containing chlorine bleaches. Severe problems are also encountered with fabric washing powders containing oxygen bleaches, particularly those containing bleach precursors.

The perfume may be applied to the pack, or to a blank for the pack, by any suitable method. Spraying the perfume, either neat or in solution in a suitable perfume diluent, directly onto the appropriate region of the blank is a simple and effective method of carrying the invention into effect.

The invention is particularly applicable to cartons of rectangular shape which are sealed at the top and bottom by overlapping flaps or by a so-called flip-top closure. Such cartons are generally erected by machine from flat blanks, and it is a relatively simple matter to arrange for the blanks to be sprayed with perfume at the region which will define the headspace in the filled pack. Alternatively, it is an equally simple matter to arrange for the erected but as yet unfilled carton to be sprayed.

The invention will be further described by way of example.

Example 1

Two sets of standard 3 kg cartons were taken. Each carton in the first set was filled with 3 kg of a fabric washing powder which had been sprayed with 6 gms perfume. The cartons in the other set were filled with the same fabric washing powder which had been sprayed with 5 gms perfume. The remaining 1 gm of perfume was sprayed onto the inside of the top of the cartons. In other words, 16.7% of the perfume was applied to the cartons in the second set.

The two sets of cartons containing the fabric washing powder were then sealed, divided into three groups and stored for four weeks under three different storage conditions; ambient temperature and relative humidity (RH), 28°C/70% RH and 37°C/70% RH.

The three sets of cartons containing fabric washing powder were assessed subjectively by a trained panel, and also instrumentally.

The instrumental assessment was carried out at the end of the storage period before the cartons were opened, by withdrawing 5 ml of the vapour in the headspace of the carton using a hypodermic syringe. The vapour was then injected into a Carbowax 20M (registered trade mark) chromatography column and the eluent was passed onwards to a gas-liquid chromatography column. The results of this assessment are given in Table 1.

Table 1 - instrumental assessment of cartons

Storage conditions	All perfume on powder	Perfume on powder and carton
A Not stored	Typical perfume chromatogram - low level	Typical perfume chromatogram - high level
B Ambient, 4 weeks	Different chromatogram to A	Similar to A but higher level
C 28°C/70% RH, 4 weeks	More like A samples but low level	As ambient - slightly lower level
D 37°C/70% RH, 4 weeks	High volatiles, mainly non-perfume	Very high volatiles, mainly non-perfume

As can be seen from Table 1, in each case higher levels of volatile materials were found amongst the vapour from sets for which perfume had been impregnated on the inside of the carton.

Following extraction of samples for the instrumental analysis, the cartons were assessed subjectively by a panel of trained assessors.

In a first subjective assessment experiment all the perfumed cartons were randomised and subsequently assessed. The results are shown in Table 2.

Table 2 - subjective assessment of randomised cartons - preferences

Storage conditions	All perfume on powder		Perfume on powder and carton	
	Score	Comment	Score	Comment
A Not stored	11	perfume recognisable	11	perfume recognisable
B Ambient, 4 weeks	9½	perfume recognisable	10½	perfume recognisable
C 28°C/70% RH, 4 weeks	8	perfume recognisable	9½	perfume recognisable
D 37°C/70% RH, 4 weeks	9	unpleasant malodour	8	unpleasant malodour

These results show better maintenance of perfume intensity for the cartons in accordance with the invention, since in subjective assessment of perfumes it is notoriously difficult for the assessor to maintain for the whole experiment a consistent standard against which to make a judgement.

In a second experiment, pairs consisting of one unperfumed carton containing perfume powder, and one perfumed carton containing perfumed powder which had been stored under the same conditions of temperature and relative humidity were assessed. When samples with unperfumed cartons were assessed first, ratings showed only slight preference for the perfumed cartons. However, when the order was reversed, the perfumed cartons were preferred in every case. The results are shown in Table 3.

Table 3 - panel preferences in paired comparisons

	Storage conditions	All perfume on powder	Perfume on powder and carton	No preference
A	Not stored	1	10	0
B	Ambient, 4 weeks	2	8	1
C	28°C/70% RH, 4 weeks	0	10	1
D	37°C/70% RH, 4 weeks	4	5	1

It is clear from these results that maintenance of acceptable perfume level is improved by spraying onto the carton.

Example 2

Three sets of standard 3 kg cartons were taken. Each carton in Set 1 was filled with 3 kg of a fabric washing powder which contained 8 gm of perfume capsules and which had been sprayed with 1g of the same perfume. (The capsules were gelatin-based and were prepared as described in US Patent No 2,800,458. They were 2.5 microns in diameter and consisted of approximately 60% by weight of perfume).

Each carton in Set 2 was filled with 3 kg of powder which was identical with the first powder except that it contained 9 gm of the perfume capsules and no perfume was sprayed on.

Each of the third set of cartons (Set 3) was sprayed with 1 gm of perfume and filled with 3 kg of powder which was identical with that used for Set 2 except that it contained 8 gm of perfume capsules.

Each carton was sealed and the three sets were then divided into two sub-sets. The first sub-set was stored for four weeks at ambient temperature and relative humidity, and the second sub-set was similarly stored at 37°C and 70% relative humidity.

At the end of the storage period the cartons were opened, randomised and assessed by a panel of trained assessors who stated which carton had the preferred perfume.

The results are shown in Table 4.

Table 4 - subjective assessment of randomised cartons - preferences

	Ambient temperature & relative humidity		37°C/70% relative humidity	
	Score	Comment	Score	Comment
Set 1	15	Perfume recognisable	2	Unpleasant malodour
Set 2	1½	Bland	7	Waxy 'rancid' smell
Set 3	13½	Perfume recognisable	21	Weak perfume odour detectable

The above results show a strong preference for the cartons of Set 3, especially after the high temperature and relative humidity storage experiment.

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1. A pack containing a cleaning powder, the inside surface of the pack, or part thereof, being impregnated with a perfume.

2. A pack according to claim 1, the inside surface which is impregnated defining the headspace.

3. A pack according to claim 1 or claim 2, wherein the surface has been impregnated with perfume by spraying.

4. A pack according to claim 3, wherein the perfume has been sprayed in solution.

5. A pack according to any preceding claim, which has been formed from a blank impregnated with perfume.

6. A pack according to any preceding claim, in the form of a carton or drum.

7. A pack according to any preceding claim, wherein the cleaning powder is a fabric washing powder comprising a bleach precursor and an oxygen bleach.

8. A pack according to claim 7, wherein the bleach precursor is tetraacetylethylenediamine and the oxygen bleach is sodium perborate or sodium percarbonate.

9. A pack according to any preceding claim, wherein the cleaning powder comprises a chlorine bleach.

10. A pack according to any preceding claim, wherein the cleaning powder comprises an encapsulated perfume.

11. A carton containing a cleaning powder, the inside surface of the carton, or part thereof, being impregnated with a perfume, substantially as hereinbefore described in either of Examples 1 or 2.