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⑰ **Oven cleaner.**

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**DE-A-3 124 348
GB-A-1 478 481
GB-A-1 478 482
GB-A-1 576 454**

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submitted after the application was filed and
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Description

The present invention relates to an improved oven cleaner and to a method for removing baked on fats and greases from cooking surfaces.

5 Oven cleaners are compositions of matter used to remove baked on fats and greases from cooking surfaces. Such compositions are commonly used for cleaning ovens as the name implies but may also be used to clean other cooking surfaces on which there has been a build up of baked on fats and greases. Such surfaces include fry pans, kitchenware, barbecue equipment, cooking utensils and the like. These surfaces may be of bare metal, metal coated as with baked enamel, glazed stoneware, porcelain, glass or the like.

10 Conventional oven cleaners are based on caustic soda. It has generally been considered necessary to use a caustic alkali in order to effectively saponify the fats in the baked on material in order to enable its removal. A few oven cleaners have been based on solvents, acetate salts, amines or ammonia. The known caustic based systems suffer from the disadvantage of being quite hazardous and/or require the consumer to wear gloves during usage. These known caustic-based systems are required to carry poisons schedule
15 labelling and warning statements. The systems based on acetate salts have the disadvantage that they require temperatures of 250°C or above to activate them.

It has been proposed in the past to individually add organic solvents and inorganic builder salts to oven cleaning compositions based on alkali or nitrogen containing active cleaning ingredients. Such additions are for instance disclosed in U.S. Patent Specifications 3,829,387; 3,813,343; and 3,658,711. It has also been
20 known to use aqueous solutions of alkali metal salts to form non-stick coatings on ovens; see U.K. Patent Specifications 2,019,876, 1,523,491 and 1,576,454 and Australian Patent Specification 453,537.

GB—A—1 478 482 and GB—A—1 478 481 both provide oven cleaning compositions which include, as essential ingredients, an aliphatic compound such as glycerol having two or more hydroxy groups, and up to 2% by weight of an alkaline-acting catalyst such as an alkali metal carbonate. By incorporation of up to
25 2% of the alkaline acting catalyst, oven cleaners effective at temperatures of at least 121°C (250°F) are provided. Further GB—A—1576454 provides a similar oven cleaner utilizing an alkali metal bicarbonate, but also essentially requiring an alkali metal salt of a weak organic acid to provide a suitable oven cleaner effective at temperatures of at least 121°C (250°F).

According to the present invention, therefore, there is provided an oven cleaner comprising an
30 effective amount of a polyhydric alcohol which is a liquid and non-volatile at a temperature of at least 125°C at atmospheric pressure, and an alkali metal salt soluble therein at said temperature, said oven cleaner not containing alkali metal salts of weak organic acids and wherein the alkali metal salt is non-caustic and selected from an alkali metal carbonate or bicarbonate or sesquicarbonate, or mixtures thereof in an amount of from more than 2% by weight of the cleaner.

35 The present invention further consists of applying the oven cleaner according to this invention to a cooking surface carrying baked on fats or greases, heating the cooking surface at atmospheric pressure to at least 125°C, and preferably from 125 to 250°C, for a period of at least five minutes and washing and/or wiping the saponified fats or greases from the cooking surface.

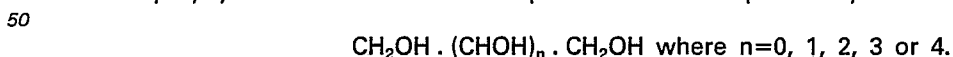
The oven cleaner according to the present invention may have a pH as low as 9 or less which allows its
40 use without rubber gloves and like protective clothing. These oven cleaners also have the advantage that surfaces of stainless steel, aluminium, and some other metals will be left with a shiny surface after cleaning rather than being left with a dull, oxidised surface as is the case with many of the prior art oven cleaning compositions.

The non-caustic alkali metal salt is most preferably sodium or potassium bicarbonate.

45 Other alkali salts which can be advantageously used include sodium or potassium sesquicarbonate. The alkaline salts preferably comprise from more than 2 to 20% by weight of the product.

The pH of the product is preferably below 11 and more preferably below 10 and most preferably 9 or below.

The polyhydric alcohol used in the present invention preferably have the general formula:



The alcohol is most preferably glycerol or includes glycerol. Other compounds in this group which may be used include mannitol, ethylene glycol and sorbitol. When the salt is a potassium salt the polyhydric
55 alcohol may with equal effectiveness be an alcohol falling outside the above general formula. This is believed to be due to the higher solubility of the potassium salts in the polyols as compared with the corresponding sodium salt. Polyhydric alcohols which work efficiently with the potassium salts include various grades of propylene glycol, diethylene glycol, polyethylene glycol, dipropylene glycol, polypropylene glycol, triethylene glycol, and 1,2,6-hexanetriol. The polyhydric alcohol preferably
60 comprises from 1 to 50% by weight of the product.

The oven cleaner according to this invention preferably includes water. The water is preferably present in an amount of at least 35% by weight.

The oven cleaner is preferably water based and preferably contains a thickener to prevent it running off vertical surfaces. Other ingredients may include a surfactant or soap, a fragrance, a pigment marker and a
65 propellant.

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The oven cleaner according to this invention may be applied in any suitable manner. These include an aerosol, a trigger or pump spray, a brush or pad.

In carrying out the method according to this invention the oven cleaner is preferably applied to a surface to be cleaned and heated to a temperature of from 125°C to 250°C for a time of from 5 minutes to 2 hours.

It is believed that oven cleaners according to this invention are effective, despite their limited alkalinity and the evaporation of the water from the cleaner, due to the continued action of the alkaline salt dissolved in the non-volatile polyhydric alcohol. The alkaline salt is maintained in a condition in which it is available for reaction with the baked on fats and greases at the required elevated temperature by being dissolved in the polyhydric alcohol. For this reason the polyhydric alcohol is required to be substantially non-volatile at the cleaning temperature.

Hereinafter given by way of example are preferred embodiments of the present invention.

Test surfaces were prepared by baking smeared dripping onto white vitreous enamel metal plates for 1 1/2 hours at 250°C. The baked-on dripping could not be removed at all by washing or wiping without a scourer.

Cleaners consisting of the formulations given below were applied to the test surfaces to be cleaned from a trigger pack after shaking well.

The test plates were then heated in an oven for 30 minutes to a final temperature of 150°C.

The test plates were then either rinsed under a fast running tap or wiped with a damp sponge and the percentage removal of baked-on dripping recorded.

Example 1		% w/w
25	Sodium Bicarbonate	6.3
	Glycerol	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum* T	1.5
	Xanthan Gum	0.05
30	Titanium Dioxide	0.5
	Water	to 100
	Product pH	8.4
	% Removal of soil	100

*Registered Trade Mark

Example 2		% w/w
40	Potassium Bicarbonate	7.5
	Glycerol	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
	Xanthan Gum	0.05
45	Titanium Dioxide	0.5
	Water	to 100
	Product pH	8.4
	% Removal of soil	100

Example 3		% w/w
50	Soda Ash (Sodium Carbonate)	4.0
	Glycerol	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
	Xanthan Gum	0.05
55	Titanium Dioxide	0.5
	Water	to 100
	Product pH	11.25
	% Removal of soil	100

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	Example 4	% w/w
	Sodium Sesquicarbonate	5.65
	Glycerol	20.0
5	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
	Xanthan Gum	0.05
	Titanium Dioxide	0.5
10	Water	to 100
	Product pH	10.1
	% Removal of soil	100
15	Example 5	% w/w
	Sodium Bicarbonate	3.15
	Potassium Bicarbonate	3.75
	Glycerol	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
20	Veegum T	1.5
	Xanthan Gum	0.05
	Titanium Dioxide	0.5
	Water	to 100
25	Product pH	8.4
	% Removal of soil	100
30	Note: Use of the bicarbonate mixture gave no improvement in performance at lower temperatures or shorter heating time intervals.	
	Example 6	% w/w
	Sodium Bicarbonate	6.3
	Sorbitol (70%)	20.0
35	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
	Xanthan Gum	0.05
	Titanium Dioxide	0.5
40	Water	to 100
	Product pH	8.4
	% Removal of soil	95
45	Example 7	% w/w
	Sodium Bicarbonate	6.3
	Ethylene Glycol	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
50	Xanthan Gum	0.05
	Titanium Dioxide	0.5
	Water	to 100
55	Product pH	8.4
	% Removal of soil	80

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Example 8	% w/w
Sodium Bicarbonate	6.3
Mannitol	20.0
Sodium Dodecyl Benzene Sulphonate	1.0
Veegum T	1.5
Xanthan Gum	0.05
Titanium Dioxide	0.5
Water	to 100
Product pH	8.4
% Removal of soil	92

Example 9	% w/w
Sodium Bicarbonate	6.3
Ethylene Glycol	8.3
Sorbitol (70%)	11.7
Sodium Dodecyl Benzene Sulphonate	1.0
Veegum T	1.5
Xanthan Gum	0.05
Titanium Dioxide	0.5
Water	to 100
Product pH	8.4
% Removal of soil	93

Note: Mixture of ethylene glycol and sorbitol matches glycerol with respect to average chain length.

Example 10

A cleaner consisting of the following formulation was applied to a test surface to be cleaned, prepared as for Examples 1—9 from an aerosol pack after shaking well. The test was then carried out in the same manner as for Examples 1—9.

	% w/w
Sodium Bicarbonate	5.67
Glycerol	18.0
Gaferic* MD	0.036
Veegum T	1.35
Xanthan Gum	0.045
Titanium Dioxide	0.45
Deionized Water	64.45
Propellant P12/114:60/40	10.0
Product pH	8.4
% Removal of soil	99

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Example 11

A cleaner consisting of the following formulation was brushed onto a test surface to be cleaned, prepared as for Examples 1—8. The test was then carried out in the same manner as for Example 1—9.

	% w/w
Sodium Bicarbonate	24.0
Glycerol	76.0
% Removal of soil	100

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	Example 12	% w/w
	Potassium Bicarbonate	7.5
	Diethylene Glycol	20.0
5	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
	Xanthan Gum	0.05
	Titanium Dioxide	0.5
	Water	to 100
10	Product pH	8.4
	% Removal of soil	100
15	Example 13	% w/w
	Potassium Bicarbonate	7.5
	Triethylene Glycol	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
20	Veegum T	1.5
	Xanthan Gum	0.05
	Titanium Dioxide	0.5
	Water	to 100
25	Product pH	8.4
	% Removal of soil	100
	Example 14	% w/w
	Potassium Bicarbonate	7.5
30	Propylene Glycol	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
	Xanthan Gum	0.05
35	Titanium Dioxide	0.5
	Water	to 100
	Product pH	8.4
40	% Removal of soil	100
	Example 15	% w/w
	Potassium Bicarbonate	7.5
	1,2,6 Hexanetriol	20.0
45	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
	Xanthan Gum	0.05
	Titanium Dioxide	0.5
	Water	to 100
50	Product pH	8.4
	% Removal of soil	100
55	Example 16	% w/w
	Potassium Bicarbonate	7.5
	Dipropylene Glycol	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
60	Xanthan Gum	0.05
	Titanium Dioxide	0.5
	Water	to 100
	Product pH	8.4
65	% Removal of soil	95

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	Example 17	% w/w
	Potassium Bicarbonate	7.5
	Polypropylene Glycol 150	20.0
5	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
	Xanthan Gum	0.05
	Titanium Dioxide	0.5
	Water	to 100
10	Product pH	8.4
	% Removal of soil	95
	Example 18	% w/w
15	Potassium Bicarbonate	7.5
	Polyethylene Glycol 200	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
20	Xanthan Gum	0.05
	Titanium Dioxide	0.5
	Water	to 100
	Product pH	8.4
25	% Removal of soil	95
	Example 19	% w/w
	Potassium Bicarbonate	7.5
30	Polyethylene Glycol 300	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
	Veegum T	1.5
	Xanthan Gum	0.05
	Titanium Dioxide	0.5
35	Water	to 100
	Product pH	8.4
	% Removal of soil	90
40	Example 20	% w/w
	Potassium Bicarbonate	7.5
	Polyethylene Glycol 600	20.0
	Sodium Dodecyl Benzene Sulphonate	1.0
45	Veegum T	1.5
	Xanthan Gum	0.05
	Titanium Dioxide	0.5
	Water	to 100
50	Product pH	8.4
	% Removal of soil	90

The performance of the composition according to Examples, for instance, 1 to 5 was equal to that of a molar equivalent active level of caustic soda in the same formulation base.

Caustic soda based products on the market when tested under identical conditions removed only 80—95% of the baked-on dripping.

A synergistic effect between the polyhydric alcohol(s) and the non-caustic alkali metal salt(s) has been demonstrated by testing glycerol and sodium bicarbonate separately alongside a mixture of both on the same prepared test plate.

Sodium bicarbonate on its own removed only 50% of the baked-on dripping and glycerol on its own removed only 30% of the baked-on dripping whereas the mixture of sodium bicarbonate and glycerol removed 100% of the baked-on dripping.

Claims

1. An oven cleaner comprising an effective amount of a polyhydric alcohol which is a liquid and non-volatile at a temperature of at least 125°C at atmospheric pressure, and an alkali metal salt soluble therein at said temperature, said oven cleaner not containing alkali metal salts of weak organic acids and wherein the alkali metal salt is non-caustic and selected from an alkali metal carbonate or bicarbonate or sesquicarbonate, or mixtures thereof in an amount of from more than 2% by weight of the cleaner.

2. An oven cleaner as claimed in Claim 1, in which the polyhydric alcohol has the general formula:—



wherein $n=0, 1, 2, 3$ or 4 .

3. An oven cleaner as claimed in Claim 1, in which the alkali metal salt is a potassium salt and in which the polyhydric alcohol is selected from propylene glycol, diethylene glycol, polyethylene glycol, dipropylene glycol, polypropylene glycol, triethylene glycol and 1,2,6 hexanetriol.

4. An oven cleaner as claimed in any preceding claim in which the oven cleaner contains at least 35% by weight of water.

5. An oven cleaner as claimed in any preceding claim in which the alkali metal salt is present in an amount of from more than 2% up to 20% by weight of the oven cleaner.

6. An oven cleaner as claimed in any of claims 1, 2, 4 and 5 in which the alkali metal salt is a sodium or potassium salt.

7. An oven cleaner as claimed in any preceding claim in which the effective amount of polyhydric alcohol is from 1% to 50% by weight of the oven cleaner.

8. An oven cleaner as claimed in any of claims 1, 2 and 4 to 7 in which the polyhydric alcohol is glycerol.

9. An oven cleaner as claimed in any preceding claim in which the oven cleaner has a pH of less than 11.

10. An oven cleaner as claimed in any of claims 1 to 8 in which the oven cleaner has a pH of less than 10.

11. An oven cleaner as claimed in any of claims 1 to 8 in which the oven cleaner has a pH of 9 or less.

12. An oven cleaner as claimed in any preceding claim in which the oven cleaner additionally contains a surfactant, a fragrance, a pigment marker, a propellant, a thickener, or a mixture of two or more of these ingredients.

13. A method for cleaning a cooking surface carrying baked on fats or greases, comprising applying an oven cleaner as claimed in any one of claims 1 to 12 to the cooking surface, heating the cooking surface to at least 125°C at atmospheric pressure for a period of at least five minutes and washing and/or wiping the saponified fats or greases from the cooking surfaces.

14. A method for cleaning a cooking surface carrying baked on fats or greases as claimed in claim 13 wherein the cleaning temperature is in the range of 125°C to 250°C at atmospheric pressure.

Patentansprüche

1. Ofenreinigungsmittel, enthaltend eine wirksame Menge eines mehrwertigen, bei mindestens 125°C und Atmosphärendruck flüssigen und nicht flüchtigen Alkohols und eines bei dieser Temperatur löslichen Alkalimetallsalzes, vorausgesetzt, daß es kein Alkalimetallsalz einer schwachen organischen Säure ist, in dem das Alkalimetallsalz nicht ätzend und ein Alkalimetallcarbonat und/oder -hydrogencarbonat und/oder -sesquicarbonat in einer Menge von über 2 Gew.-%, bezogen auf das Ofenreinigungsmittel, ist.

2. Ofenreinigungsmittel nach Anspruch 1, in dem der mehrwertige Alkohol die allgemeine Formel



hat, wobei $n=0, 1, 2, 3$ oder 4 .

3. Ofenreinigungsmittel nach Anspruch 1, in dem das Alkalimetallsalz ein Kaliumsalz ist und der mehrwertige Alkohol unter Propylenglycol, Diethylenglycol, Polyethylenglycol, Dipropylenglycol, Polypropylenglycol, Triethylenglycol und 1,2,6-Hexantriol gewählt wird.

4. Ofenreinigungsmittel nach einem der vorstehenden Ansprüche mit einem Wassergehalt von mindestens 35 Gew.-%.

5. Ofenreinigungsmittel nach einem der vorstehenden Ansprüche mit einem Gehalt an Alkalimetallsalz von über 2 bis zu 20 Gew.-%, bezogen auf das Ofenreinigungsmittel.

6. Ofenreinigungsmittel nach einem der Ansprüche 1, 2, 4 und 5, in dem das Alkalimetallsalz ein Natrium- oder Kaliumsalz ist.

7. Ofenreinigungsmittel nach einem der vorstehenden Ansprüche, in dem die wirksame Menge des mehrwertigen Alkohols von 1 bis 50 Gew.-%, bezogen auf das Ofenreinigungsmittel, beträgt.

8. Ofenreinigungsmittel nach einem der Ansprüche 1, 2 und 4 bis 7, in dem der mehrwertige Alkohol Glycerin ist.

9. Ofenreinigungsmittel nach einem der vorstehenden Ansprüche mit einem pH-Wert unter 11.

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10. Ofenreinigungsmittel nach einem der Ansprüche 1 bis 8 mit einem pH-Wert unter 10.
11. Ofenreinigungsmittel nach einem der Ansprüche 1 bis 8 mit einem pH-Wert von 9 oder darunter.
12. Ofenreinigungsmittel nach einem der vorstehenden Ansprüche mit einem zusätzlichen Gehalt an einem grenzflächenaktiven Mittel, einem Duftstoff, Markierungspigment, Treibmittel, Eindickmittel oder einem Gemisch von mindestens zwei dieser Bestandteile.
13. Verfahren zur Reinigung einer mit angebranntem Fett oder Verkrustungen verunreinigten Kochfläche, in dem ein Ofenreinigungsmittel nach einem der Ansprüche 1 bis 12 auf die Kochfläche aufgebracht wird, die Kochfläche auf mindestens 125°C bei Atmosphärendruck mindestens 5 Minuten erhitzt wird und die verseiften Fette von der Kochfläche abgewaschen und/oder abgewischt werden.
14. Verfahren zur Reinigung einer mit angebranntem Fett oder Verkrustungen verunreinigten Kochfläche nach Anspruch 13, in dem die Kochfläche auf eine Temperatur von 125 bis 250°C bei Atmosphärendruck erhitzt wird.

Revendications

1. Produit de nettoyage de four comprenant une quantité efficace d'un alcool polyhydrique qui est un liquide et non volatil à une température d'au moins 125°C à la pression atmosphérique, et d'un sel de métal alcalin qui y est soluble à ladite température, ledit produit de nettoyage de four ne contenant pas de sels de métaux alcalins d'acides organiques faibles et où le sel de métal alcalin est non caustique et choisi entre un carbonate, bicarbonate, ou sesquicarbonate de métal alcalin, ou leurs mélanges, en une quantité dépassant 2% en poids du produit de nettoyage.

2. Produit de nettoyage de four selon la revendication 1., où l'alcool polyhydrique a la formule générale:



où $n=0, 1, 2, 3$ ou 4.

3. Produit de nettoyage de four selon la revendication 1, où le sel de métal alcalin est un sel de potassium et où l'alcool polyhydrique est choisi entre le propylène-glycol, le diéthylène-glycol, le polyéthylène-glycol, le dipropylène-glycol, le polypropylène-glycol, le triéthylène-glycol et le 1,2,6-hexanetriol.

4. Produit de nettoyage de four selon l'une quelconque des revendications précédentes où le produit de nettoyage de four contient au moins 35% en poids d'eau.

5. Produit de nettoyage de four selon l'une quelconque des revendications précédentes où le sel de métal alcalin est présent en une quantité allant de plus de 2% jusqu'à 20% en poids du produit de nettoyage de four.

6. Produit de nettoyage de four selon l'une quelconque des revendications 1, 2, 4 et 5 où le sel de métal alcalin est un sel de sodium ou de potassium.

7. Produit de nettoyage de four selon l'une quelconque des revendications précédentes où la quantité efficace d'alcool polyhydrique est de 1% à 50% en poids du produit de nettoyage de four.

8. Produit de nettoyage de four selon l'une quelconque des revendications 1, 2 et 4 à 7 où l'alcool polyhydrique est le glycérol.

9. Produit de nettoyage de four selon l'une quelconque des revendications précédentes où le produit de nettoyage de four a un pH inférieur à 11.

10. Produit de nettoyage de four selon l'une quelconque des revendications 1 à 8 où le produit de nettoyage de four a un pH inférieur à 10.

11. Produit de nettoyage de four selon l'une quelconque des revendications 1 à 8 où le produit de nettoyage de four a un pH égal ou inférieur à 9.

12. Produit de nettoyage de four selon l'une quelconque des revendications précédentes où le produit de nettoyage de four contient en outre un agent tensioactif, un parfum, un marqueur pigmenté, un agent de propulsion, un épaississant ou un mélange de deux ou plusieurs de ces ingrédients.

13. Procédé pour nettoyer une surface de cuisson portant des matières grasses ou graisses cuites, dans lequel on applique un produit de nettoyage de four selon l'une quelconque des revendications 1 à 12 à la surface de cuisson, on chauffe la surface de cuisson à au moins 125°C à la pression atmosphérique pendant une période d'au moins 5 min, et on lave et/ou nettoie les matières grasses ou graisses saponifiées des surfaces de cuisson.

14. Procédé pour nettoyer une surface de cuisson portant des matières grasses ou graisses cuites, selon la revendication 13, où la température de nettoyage est dans un intervalle allant de 125°C à 250°C à la pression atmosphérique.