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FILTERS FOR TOBACCO SMOKE

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ABSTRACT OF THE DISCLOSURE

A tobacco smoke filter having an aliphatic organo-zinc salt added to a tobacco-smoke filtering material. The zinc salt may preferably be zinc acetate, zinc acetylacetonate, zinc isobutyrate, or zinc trimethylacetate.

This invention concerns improvements relating to filters for tobacco smoke, particularly cigarette filters.

Filters for tobacco smoke are already known which remove the particulate phase of tobacco smoke by mechanical means, but may also adversely affect the taste of the filtered smoke. These filters, formed from filamentary or sheet material, have differing capacities for the removal of specific constituents which it may be desired to remove. In any case, a large proportion of the constituents which it may be desired to remove occurs, partially at least, in the form of vapours which cannot be removed by mechanical filtration, but only by absorption or adsorption on a suitable surface, or by chemical reaction.

Of these constituents, the more volatile acidic compounds, especially hydrogen sulphide, may be those which it is particularly desired to remove. An object of the present invention is to provide simple but effective means whereby these acidic compounds can be removed to a substantially increased extent from the smoke of burning tobacco.

According to the invention, fibrous, filamentary or sheet tobacco-smoke filtering material is treated with an aliphatic organo-zinc salt compound, preferably, a neutral or basic zinc salt or complex, such as, for instance, zinc acetate, zinc acetylacetonate, zinc isobutyrate or zinc trimethylacetate.

The zinc compound, or more than one such compound, may be applied to the supporting, smoke filtering material, which constitutes the bulk of the filter, as a solid in powder form by dusting, or as a liquid in solution form by dipping or spraying. This may be done before or during the formation of the filter. For practical purposes, the amount of zinc compound added will not generally exceed 50% by weight of the original weight of the supporting material. Preferably, however, the addition will not exceed 10%.

Examples of ways of carrying out the invention will now be described:

EXAMPLE I

2.5 gm. of zinc acetate dihydrate were dissolved in 100 ml. water and 4 ml. were sprayed onto a strip of open-mesh creped wadding (such for example as that known as "Myria" paper) 90 mm. wide and weighing approximately 0.8 gm., so as to give a final concentration of 10% zinc acetate, calculated as the percentage of anhydrous zinc acetate by weight of the original weight of the paper.

The treated paper was allowed to dry overnight at room temperature (20-25° C.) and was then rolled by hand to form a rod which was 90 mm. long and of cigarette diameter.

15 mm. lengths of the rod were attached as filters to cigarettes and the cigarettes were smoked by machine at

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1 puff per minute, each puff being of 2 seconds' duration and a volume of 35 ml. The smoke obtained was then analysed in comparison with that from control cigarettes to which untreated filters had been attached. The untreated filters, in this and the following examples, were prepared exactly as the treated filters, except that water was applied to the paper instead of the zinc compound.

EXAMPLE II

10 Paper filters were prepared as in Example I except that the final concentration of the zinc acetate was 5% by weight. The filters were attached to cigarettes and smoked as in Example I. Analysis of the smoke obtained from these cigarettes and from those of Example I gave the following results:

Concentration of zinc acetate (calculated as anhydrous) on the paper	Filtration efficiency (percent) for—	
	Hydrogen sulphide	Hydrogen cyanide
0	<10	15
5	26	45
10	53	61

EXAMPLE III

25 15 mm. lengths of cellulose acetate fibrous filter rods of filament denier 5 and total denier 72,000 were each impregnated with 0.25 ml. of a solution of 7 gm. of zinc acetate dihydrate in 100 ml. water and were freeze-dried to give a final concentration of 10% zinc acetate, calculated as above. The filter lengths were attached to cigarettes and smoked as in Example I.

EXAMPLE IV

35 Further lengths of cellulose acetate fibrous filter rods of filament denier 5 and total denier 72,000 were prepared as in Example III except that the final concentration of zinc acetate was 5% by weight. The filter lengths were attached to cigarettes and smoked as in Example I.

40 The result of the analysis of the smoke obtained from the cigarettes of Examples III and IV is given below:

Concentration of zinc acetate (calculated as anhydrous) on the Cellulose acetate	Filtration efficiency (percent) for—	
	Hydrogen sulphide	Hydrogen cyanide
0	<10	<10
5	57	62
10	72	72

EXAMPLE V

50 2.5 gm. of zinc acetylacetonate were mixed with 100 ml. of water and 4 ml. of the mixture were sprayed onto a strip of open-mesh creped wadding of the kind indicated in Example I to give a final concentration, after drying overnight at room-temperature, of 10% of zinc acetylacetonate. The treated paper strips were formed into filter rods 90 mm. long and of cigarette-diameter. 15 mm. lengths cut from these rods were attached to cigarettes and smoked as in Example I. Analysis of the smoke obtained showed that 61% of the hydrogen sulphide and 77% of the hydrogen cyanide had been removed.

EXAMPLE VI

65 2.5 gm. zinc isobutyrate were mixed with 100 ml. water and 4 ml. were sprayed onto creped wadding as in Example I to give, after drying, a final concentration of 10% zinc isobutyrate by weight. Filter cigarettes were prepared and smoked as previously described. Analysis of the smoke obtained showed that 61% of the hydrogen sulphide and 47% of the hydrogen cyanide had been removed.

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EXAMPLE VII

2.5 gm. of zinc trimethylacetate were mixed with 100 ml. of water and 4 ml. were sprayed onto creped wadding to give, after drying, a final concentration of 10% of zinc trimethylacetate by weight. Filter cigarettes were prepared and smoked as before. Analysis of the smoke obtained showed that 64% of the hydrogen sulphide and 53% of the hydrogen cyanide had been removed.

EXAMPLE VIII

A 6% aqueous solution of potassium zincate was sprayed onto paper filter material to give, after removal of the solvent by drying, an increase in weight of 29% of the original weight of the said material. On smoking a cigarette through a filter made from the treated material, 70-80% of the hydrogen sulphide, more than 90% of the hydrogen cyanide, and 50-60% of the other acids in the smoke which are volatile in steam were found to have been removed.

Little or no adverse effect on the taste of the smoke filtered by filters prepared in accordance with any of the above examples was observed.

We claim:

1. A filter for a burnable tobacco charge comprising tobacco-smoke filtering material having added thereto in an amount less than 50% by weight of said material, an aliphatic organo-zinc salt compound, said burnable tobacco charge being substantially free of said salt.

2. A filter as claimed in claim 1, wherein the zinc compound is zinc acetate.

3. A filter as claimed in claim 1, wherein the zinc compound is zinc acetylacetonate.

4. A filter as claimed in claim 1, wherein the zinc compound is zinc isobutyrate.

5. A filter as claimed in claim 1, wherein the zinc compound is zinc trimethylacetate.

6. A filter as claimed in claim 1, wherein the concentration of zinc compound is not more than 10% of the original weight of the said filtering material.

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