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TOBACCO SMOKE FILTERS COMPRISING PERLITE

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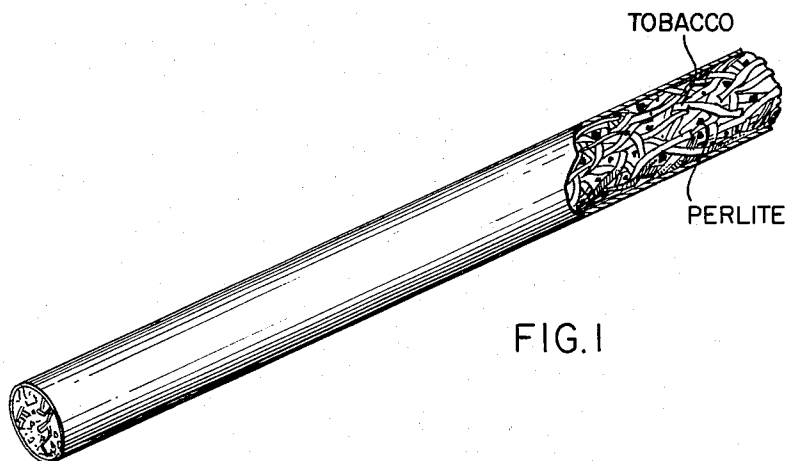


FIG. 1

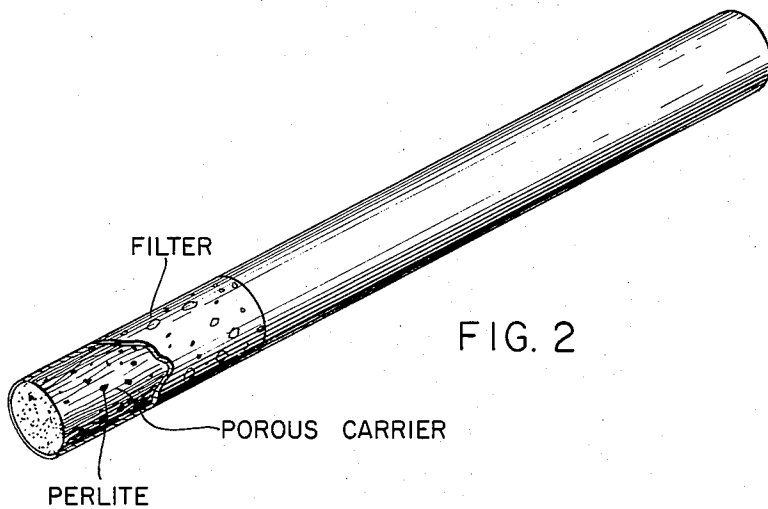


FIG. 2

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TOBACCO SMOKE FILTERS COMPRISING PERLITE

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4 Claims. (Cl. 131-208)

The present invention is concerned with smoking elements and compositions and more particularly with improved methods and filters for treating the smoke from such elements and compositions.

One object of the present invention is to provide improved filtering means for smoking elements, compositions, etc.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention accordingly comprises the several steps and the relation and order of one or more of such steps with respect to each of the others, and the product possessing the features, properties and the relation of elements which are exemplified in the following detailed disclosure, and the scope of the application of which will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description.

At the present time, smoking elements having filtering means, therein, for removing contaminants e.g., tars, nicotine etc., from the smoke, comprise a substantial portion of the smoking market. Materials, such for example as cellulose tow, cotton, porous paper, asbestos, polyanionic polymers, polycationic polymers, diatomaceous earth, fullers earth, aluminum gels, silica gels, zirconium salts, charcoal etc., have been used as filters with various degrees of success.

It has been found in the present invention that substantially improved filtration of tobacco smoke may be achieved by bringing such smoke, at some point between combustion and the time it enters the smoker's mouth, into intimate contact with expanded perlite.

The perlite, which is used in the processes, products and compositions of the present invention, is a glassy rock which, when heated to its softening point, expands to form a light fluffy porous material. Usually the initial perlite, before expansion, comprises about 65 to 75% silicon dioxide, 10 to 20% aluminum oxide, 2 to 5% water and smaller amounts of soda, potash and lime.

The filtering means of the present invention are widely useful on smoking elements in general. Usually such elements comprise conduit means which are adapted (1) to hold the tobacco and (2) convey the smoke to the mouth. Generally one end of the conduit is adapted so that combustion of the tobacco may take place and the second end is adapted to be held in the smoker's mouth. The conduit means may be combustible as, for example, in cigarettes, cigars, etc., noncombustible as in pipes, or a combination of the two, as when cigar or cigarette holders are used.

In the smoking elements of the present invention, the expanded perlite is placed somewhere between the end adapted for combustion and the end adapted to be received in the smoker's mouth. In one of the preferred embodiments of the present invention, the expanded perlite is placed in a filter which is adapted to lie in back of the tobacco holding portion of the conduit means. Such a filter may, for example, be attached to the end of a cigar or cigarette or it may be inserted, for example, in the stem of a pipe or cigarette holder. In one such embodiment, the filter may comprise a porous compressed pellet of expanded perlite. In especially useful embodiments of the present invention, filters comprising the ex-

panded perlite on porous carriers are employed. The porous carriers may be inert or, when desired, may have filtering properties of their own. As examples of such carriers, mention may be made of asbestos, paper, cotton, fibers of cellulose derivatives e.g., cellulose esters, cellulose ethers and carboxy-substituted celluloses e.g., carboxymethyl cellulose; etc. Especially good results have been obtained when the expanded perlite was used on a porous carrier comprising fibers of a cellulose derivative.

The filters of this invention may be prepared, for example, by simply sprinkling or spraying the expanded perlite on the porous carrier and forming said carrier into small filaments by known methods. When desired, static charges, adhesives, plasticizers, etc., may be used to improve the adhesion of the perlite to the porous carrier. The perlite may comprise the sole filter means on the porous carrier or it may be used in combination with other materials known to have filtering properties e.g., charcoal, polyanionic polymers, polycationic polymers, silica gel, diatomaceous earth, fullers earth, bentonite clay, etc.

In another preferred embodiment of the present invention, the perlite is added directly to the tobacco itself and the combination is used in cigarettes, cigars, pipes, etc. Such an embodiment is especially desirable in that it eliminates the need for manufacturing costly filters. As in the embodiments set forth above, the perlite may comprise the sole filter means or it may be used in combination with other filters and filter materials.

It should be understood in the embodiments wherein the perlite is added directly to the tobacco, that the heat of combustion may be used in certain instances e.g., when the combustion temperature is hot enough to bring about expansion of the perlite. In such instances, the perlite may be used in unexpanded form.

Usually the amount of perlite used may be varied to suit particular needs. Good results have been obtained using about 2½% perlite based on the weight of the tobacco. Especially good results have been obtained using about 5%.

The filtering action of the present invention, at least in part, involves a surface phenomenon. Thus it will be understood that the perlite should preferably be finely ground so as to provide a large area. Usually a particle size between about 10 to about 300 on the U.S. standard screen test will provide useful results.

The following nonlimiting examples illustrate the effectiveness of the filtering means of the present invention.

Example 1

Filtered cigarettes were prepared using the tobacco from four commercially available, unfiltered cigarettes, A, B, C and D. The filters comprised 2½ and 5% (based on the weight of tobacco) of expanded finely divided, perlite dispersed throughout a cellulose acetate tow filter medium. The cigarettes thus prepared, along with the commercial cigarettes, were vacuum smoked, at about a constant pressure, until about 2 inches of their length was smoked. The contaminants, e.g., tars, nicotine, etc., in the smoke emerging from the cigarettes were trapped on filter paper and weighed. The following results were obtained: (weights given in milligrams of contaminants)

Tobacco	Unfiltered	2½% Perlite	5% Perlite
A.....	22	2.8	2.5
B.....	23.3	3.4	1.1
C.....	34.8	4.1	2.8
D.....	17.7	3.2	2.0

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Example 2

Cigarettes were prepared using the tobacco from commercially available cigarette C of Example 1 above. The cigarettes contained 2½ and 5% (based on the weight of tobacco) of finely ground expanded perlite dispersed throughout the tobacco. The cigarettes, along with a control, were vacuum smoked as in Example 1 and the following results were obtained:

Cigarette:	Milligrams of contaminant	
C	-----	34.3
C+2½% perlite	-----	7.7
C+5% perlite	-----	4.8

Example 3

Filtered cigarettes were prepared, using the tobacco from 4 of the best, commercially available, filtered cigarettes, E, F, G and H.

The filters were prepared as in Example 1, i.e., 2½ and 5% perlite (based on the weight of tobacco) on a cellulose acetate fiber filter. The cigarettes, thus prepared, along with the controls, were vacuum smoked with the following results: (in milligrams of contaminants)

Tobacco	Commer- cial Filter	2½% Per- lite	5% Perlite
E	6.2	2.3	1.7
F	14.8	3.8	1.4
G	18.4	2.8	1.7
H	8.1	2.3	1.7

When desired the perlite may also be used in the conduit means itself e.g., in the paper, binders, wrappers, etc.

In the accompanying drawing, FIG. 1 illustrates an embodiment wherein the perlite is incorporated in the tobacco and FIG. 2 illustrates an embodiment wherein it is placed in a filter.

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Since certain changes may be made in the above products and processes without departing from the scope of the invention herein involved, it is intended that all matter contained in the above description shall be interpreted as illustrative and not in a limiting sense.

What is claimed is:

1. A smoking element, comprising conduit means, at least a portion of said conduit means having tobacco therein, one end of said conduit means being adapted for the burning of said tobacco, the second end of said conduit means being adapted to deliver the smoke to a smoker's mouth, said conduit means having therein, at least, at one point along its length between said ends, expanded perlite as a filter means.

2. A smoking element as defined in claim 1 wherein said expanded perlite is dispersed in said tobacco.

3. A smoking element as defined in claim 2, wherein the perlite is initially present in unexpanded form and the heat of combustion transforms said perlite into the expanded form.

4. A smoking element as defined in claim 1 wherein a filter comprising said expanded perlite lies in a portion of said conduit means.

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