Title: IMPROVEMENTS IN OR RELATING TO A FILTER

Abstract: Sheet of cigarette filter material (4) adapted to be rolled to form a cylindrical cigarette filter for use with self-rolled cigarettes. The sheet (4) may be secured to a pack (1) of cigarette paper.
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
DESCRIPTION OF INVENTION

"IMPROVEMENTS IN OR RELATING TO A FILTER"

THE PRESENT INVENTION relates to a filter, and more particularly relates to a filter for use with a cigarette.

It is known that the risk of tars from cigarette tobacco entering the lungs of a smoker may be reduced by using a filter. Filters are frequently provided on cigarettes that are factory-manufactured, but there is no commercially available filters that are self-rolled for use with self-rolled cigarettes.

The present invention seeks to provide an improved filter.

According to the invention there is provided a sheet of cigarette filter material adapted to be rolled, or to have a portion thereof rolled to form a cylindrical cigarette filter.

In one embodiment the sheet has one planar surface, and an opposed surface provided with parallel ridges.

Preferably the ridges are of 'saw-tooth' form.
In another embodiment the sheet has two opposed planar surfaces and is adapted to be rolled in a spiral manner.

Preferably one edge of the sheet is provided with a ridge.

Conveniently the ridge is of filter material and the sheet has different properties to those of the ridge.

In a further embodiment the sheet has a backing having one surface supporting a plurality of fibres that extend away from the backing.

The sheet may be made of fibrous material, or may be made of a porous material.

The sheet may be provided with tear lines or lines of mechanical weakness dividing the sheet into a plurality of regions of predetermined shape and size.

Conveniently the lines are orthogonal, lines in one direction being substantially evenly spaced apart, and in the transverse direction, comprising groups of line, the groups being spaced apart, and the lines in each group being relatively close to each other.

The sheet may be impregnated or provided with a flavouring.

In one embodiment the sheet is in combination with a pack of cigarette papers.
Thus the invention also relates to a pack of cigarette papers having one edge of a sheet of filter material as described above claims secured thereto.

The invention also provides a method of rolling a cigarette comprising the steps of taking a sheet of filter material as described above, and rolling the sheet, or part of the sheet, to form a cylindrical filter, and incorporating the filter into a cigarette.

In order that the invention may be more readily understood, and so that further features thereof may be appreciated, the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is a perspective view of a pack of cigarette rolling papers incorporating a filter material,

FIGURE 2 is a perspective view, on an enlarged scale, of part of a filter material,

FIGURE 3 is a perspective view of part of a filter made from the material of Figure 2,

FIGURE 4 is a view corresponding to Figure 2 showing an alternate form of filter material,

FIGURE 5 is a view corresponding to Figure 3 showing a filter made from the material of Figure 4,
FIGURE 6 is a view corresponding to Figure 2 showing a modified form of filter material,

FIGURE 7 is a view corresponding to Figure 3 showing a filter made from the material of Figure 6.

FIGURE 8 is a view corresponding to Figure 2 showing another alternate form of filter material,

FIGURE 9 is a view corresponding to Figure 3 showing a filter made from a material as shown in Figure 6, and

FIGURE 10 is a side view of a cigarette provided with a filter.

Referring initially to Figure 1 a pack 1 of interleaved cigarette papers, of the type commonly used by persons who roll their own cigarettes is shown, the pack having a slot 2 from which a cigarette paper is emerging.

Secured to the pack is a sheet of filter material 4. The sheet of filter material 4 is of rectangular form, and one edge 5 of the sheet is secured to the pack 1. The sheet is provided with spaced apart fold line 6, which are spaced by a distance equal to the width of the pack 1 so that the sheet of filter material 4 can be folded or pleated to form a folded stack that will lie adjacent to, and be the same size as the pack 1, so that the combination of the pack 1 and the filter material 4, when folded, can be easily handled and stored, for example in a pocket or tobacco pouch.
The sheet of filter material 4 is divided into predetermined areas by transverse lines of weakness or tear lines 7, and axially extending lines of weakness or tear lines 8, 9, 10. The tear lines facilitate the tearing of the filter material into elements of a predetermined size and shape, selected to be ideal for use in forming a cigarette filter when a cigarette is being rolled with a paper from the pack 1.

Thus the lines 7 are spaced apart by a substantial distance, and may be used to provide elements of filter material 4 of desired width. The orthogonally extending lines 8, 9 and 10 are spaced from the edges of the sheet of filter material 4, but are close together, in a group of lines. Further groups of lines, equivalent to the lines 8, 9 and 10 are provided, with the groups of lines being evenly spaced apart. An appropriate combination of intersecting lines may be selected by a person preparing a filter for a rolled cigarette, so that the element torn from the sheet has a desired length.

As will be explained below, the element of filter material that is torn from the sheet of filter material 4 is rolled to form a cylindrical filter that can easily be incorporated into a cigarette as the cigarette is rolled.

Figure 2 shows one example of a sheet of filter material 20 which may be attached to a pack 1 of the type described above. The material 20 may be porous, and may thus be of a fibre material, or may be formed from porous cork or other material. The lower surface 21 of the material is planar and the upper surface is formed with a plurality of parallel ridges 22, 23. The ridges are of 'saw tooth' form. When the sheet of material is rolled to form a cylinder 24, as shown in Figure 3, the saw-tooth ridges abut each other, and so the rolled material forms a cylindrical filter with no open gas flow path.
Figure 4 shows a sheet 30 of filter material, which again may be of a porous or fibrous nature, but the sheet 30 has planar upper and lower surfaces 31, 32. When the sheet is rolled in spiral manner to form a cylinder, such as the cylinder 34 shown in Figure 5, again a cylindrical filter is created with no open gas flow path.

Figure 6 shows a modification of the sheet 30 of Figure 4. Here, one edge of the sheet is provided with a ridge 35 which may be of semi-circular cross-section. The presence of the ridge 35 facilitates rolling the sheet into a cylinder, as shown in Figure 7, with no open gas flow path. In the embodiment of Figure 6, the ridge 35 may comprise the filter material and the rest of the sheet 30 may be of lighter gauge, or even impervious to gas.

Figure 8 shows another filter material 40, which has a backing sheet 41, which may be an impervious sheet, carrying, on one surface, a plurality of upstanding fibres 42. The structure thus resembles that of a carpet. When the filter material 40 is rolled to form a cylinder 43, as shown in Figure 9, the fibres extend radially inwardly, substantially closing any open gas flow path. The fibres provide a filtering effect.

A cylinder as shown in Figure 3, Figure 5, Figure 7 or Figure 9, may be used as a filter in a cigarette. Figure 10 shows a cigarette 50 which incorporates a cylindrical filter 51, which is one of the cylinders as described above, and tobacco 52.

The filter material may be provided in different grades, exhibiting different degrees of filtering ability. Thus the thickness of the sheet of filter material, or the density of fibres, or the porosity of the filter material may be
selected to provide filters ranging from a light gauge to a heavy gauge. The filter material may be impregnated to provide a desired flavour, such as mint.

In the present Specification “comprise” means “includes or consists of” and “comprising” means “including or consisting of”.

The features disclosed in the foregoing description, or the following Claims, or the accompanying drawings, expressed in their specific form, or terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of features, be utilised for realising the invention in diverse forms thereof.
CLAIMS:

1. A sheet of cigarette filter material adapted to be rolled, or to have a portion thereof rolled to form a cylindrical cigarette filter.

2. A sheet according to Claim 1 wherein the sheet has one planar surface, and an opposed surface provided with parallel ridges.

3. A sheet according to Claim 2 wherein the ridges are of 'saw-tooth' form.

4. A sheet according to Claim 1 wherein the sheet has two opposed planar surfaces and is adapted to be rolled in a spiral manner.

5. A sheet according to Claim 4 wherein one edge of the sheet is provided with a ridge.

6. A sheet according to Claim 5 wherein the ridge is of filter material and the sheet has different properties to those of the ridge.

7. A sheet according to Claim 1 wherein the sheet has a backing having one surface supporting a plurality of fibres that extend away from the backing.

8. A sheet according to any one of Claims 1 to 6 made of fibrous material.

9. A sheet according to any one of Claims 1 to 6 made of a porous material.
10. A sheet according to any one of the preceding Claims provided with tear lines or lines of mechanical weakness dividing the sheet into a plurality of regions of predetermined shape and size.

11. A sheet according to Claim 10 wherein the lines are orthogonal, lines in one direction being substantially evenly spaced apart, and in the transverse direction, comprising groups of line, the groups being spaced apart, and the lines in each group being relatively close to each other.

12. A sheet according to any one of the preceding Claims impregnated or provided with a flavouring.

13. A sheet according to any one of the preceding Claims in combination with a pack of cigarette papers.

14. A pack of cigarette papers having one edge of a sheet of filter material according to any one of the preceding Claims secured thereto.

15. A sheet of filter material substantially as herein described with reference to and as shown in Figure 1 of the accompanying drawings.

16. A sheet of filter material substantially as herein described with reference to and as shown in Figure 1 of the accompanying drawings, as modified by Figures 2 and 3.

17. A sheet of filter material substantially as herein described with reference to and as shown in Figure 1 of the accompanying drawings, as modified by Figures 4 and 5.
18. A sheet of filter material substantially as herein described with reference to and as shown in Figure 1 of the accompanying drawings, as modified by Figures 6 and 7.

19. A sheet of filter material substantially as herein described with reference to and as shown in Figure 1 of the accompanying drawings, as modified by Figures 8 and 9.

20. A method of rolling a cigarette comprising the steps of taking a sheet of filter material according to any one of the preceding claims, and rolling the sheet, or part of the sheet, to form a cylindrical filter, and incorporating the filter into a cigarette.

21. Any novel feature or combination of features disclosed herein.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A24C5/40 A24F17/00 A24D3/04

According to International Patent Classification (IPC) or to both national classification and IPC.

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A24C A24F A24D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched.

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, PAJ, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Further documents are listed in the continuation of box C.

* Special categories of cited documents:
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Date of the actual completion of the international search 3 June 2003

Date of mailing of the international search report

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