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(54) Cigarette

(57) A cigarette comprises a tobacco blend which contains wide tobacco strips in an amount of at least 40% by weight, the wide tobacco strips being tobacco strips cut to a width of at least 1.2 mm. In this cigarette, the total amount of tobacco (rod weight) can be decreased without adversely affecting the hardness of the cigarette.

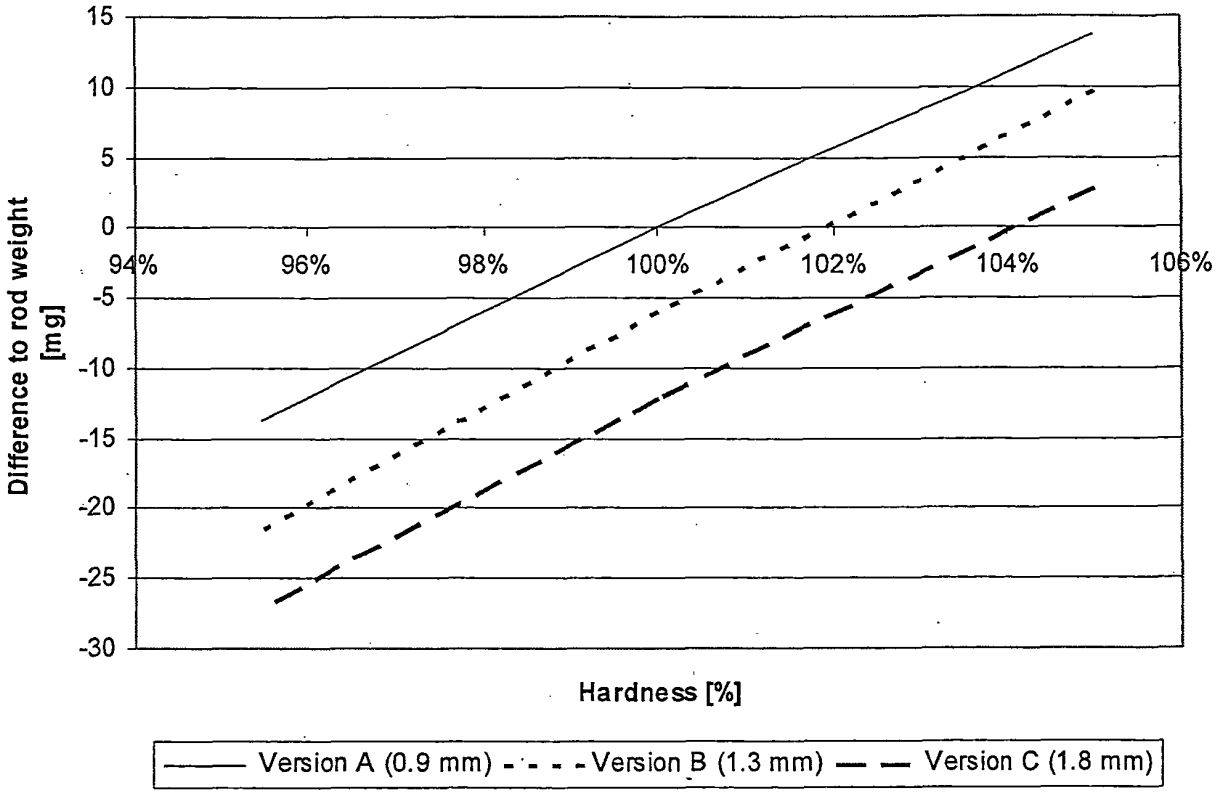

Fig. 1

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Description

[0001] The invention relates to a cigarette comprising a tobacco blend which contains widely cut (broad) tobacco strips.

[0002] Generally, the tobacco blends used for cigarettes contain cut tobacco strips, in particular cut strips of threshed tobacco leaves, which have a width of about 0.9 mm or within a small range centred at about 0.9 mm.

[0003] A smoker's impression of the quality of a cigarette is influenced by the hardness of the cigarette. A harder or firmer cigarette is usually considered to be better than a softer cigarette. The hardness of a cigarette can be defined as the decrease in thickness under a given load exerted by a stamp. A method and an apparatus for determining the hardness or stiffness of cigarettes are disclosed in EP 0 416 295 B1.

[0004] The filling capacity of tobacco corresponds to the compressibility of the tobacco. It can be defined as the volume of a given mass of tobacco, after a load in terms of a certain pressure has been acted for a given period. Since tobacco does not exhibit an elastic behaviour, the test conditions must be well defined. EP 0 416 295 B1 also discloses a method and an apparatus for determining the filling capacity of tobacco. It is expected that cigarettes having a high stiffness can be made from tobacco having a high filling capacity.

[0005] It can be desirable to reduce the weight of the tobacco within a cigarette. In this case, however, the hardness of the cigarette would decrease as well if no countermeasures are taken. Therefore, in a conventional approach to reduce tobacco weight within cigarettes, the filling capacity of the tobacco blend used for the cigarette is increased by means of highly expanded tobacco products. This, however, includes further process steps and special equipment, which is disadvantageous.

[0006] It is the object of the invention to provide a possibility in order to reduce the tobacco weight within a cigarette without adversely affecting the hardness or stiffness and other features of the cigarette and which can be easily accomplished in the manufacturing processes of the cigarette.

[0007] This object is achieved by a cigarette having the features of claim 1. Advantageous embodiments of the invention result from the dependent claims.

[0008] The cigarette according to the invention comprises a tobacco blend which contains widely cut (broad) tobacco strips in an amount of at least 40% by weight (related to the total weight of the tobacco blend in the cigarette). Herein, the expression "wide tobacco strips" is used for tobacco strips cut to a width of at least 1.2 mm.

[0009] The term "tobacco blend" is applied to the total amount of tobacco-containing material surrounded by the wrapper of the cigarette. The tobacco blend can also include expanded tobacco or reconstituted tobacco or cut stems, or it can consist of one tobacco species only. Moreover, in addition to the wide tobacco strips, the tobacco blend can contain narrow tobacco strips having a width of less than 1.2 mm, e.g., conventional tobacco strips of a width of about 0.9 mm. Preferably, the cigarette wrapper comprises a (smooth) cigarette paper made of ordinary paper or reconstituted tobacco.

[0010] The wide tobacco strips can be cut from threshed tobacco leaves (lamina tobacco). Generally, conventional cutting machines can be used in the manufacturing process because it is not very difficult to change the cutting width adjustments of such machines. For this reason, the inclusion of the wide tobacco strips in the tobacco blend of the cigarette according to the invention does not require major amendments in the manufacturing process. The length of the wide tobacco strips can be about the same as the length of conventional tobacco strips having a width in the order of 0.9 mm.

[0011] Surprisingly, in the cigarette according to the invention, the weight of the tobacco can be reduced without adversely affecting the hardness of the cigarette. The effect is not very large, but significant. Roughly, in order to end up with the same hardness, the quotient of the decrease of the tobacco rod weight (expressed in %) over the increase of the cut width (expressed in %) is in the order of 0.01. This results in significant cost savings for a large amount of cigarettes. The effect is particularly surprising since the filling capacity of the tobacco blend used in the cigarette according to the invention is not significantly changed when conventional tobacco strips having a width of about 0.9 mm are replaced by wide tobacco strips. The invention involves the recognition that the hardness of the cigarette increases with the cut width of the tobacco strips while keeping the amount of tobacco weight constant. Generally, the greater the amount of the wide tobacco strips in the total amount of the tobacco blend of the cigarette, the greater is this effect. Concerning the width of the wide tobacco strips, there is a similar correlation.

[0012] Another advantage of the cigarette according to the invention is that its sensory properties and its chemical properties and other physical properties (except for the hardness) are virtually the same as those of a conventional cigarette comprising the same kind of tobacco blend, but with a conventional width of the tobacco strips. Moreover, due to the greater cutting width, less cutting actions have to be performed in the manufacturing process which results in a reduction of cutting dust within the factory and less wear of the cutting knives. Furthermore, the wide tobacco strips have a positive effect on the cigarette ends in that they tend to keep the tobacco within the cigarettes (see below).

[0013] In advantageous embodiments of the invention, the moisture content of the tobacco blend in the cigarette is in the range of from 10% to 13%.

[0014] A preferred upper value for the width of the wide tobacco strips is 2.5 mm. In this sense, the wide tobacco strips

can have a width in the range of from 1.2 mm to 2.5 mm. This involves all specific intervals included in this range.

[0015] More specific, lists of values for the minimum width and the maximum width for embodiments of the wide tobacco strips are provided in the dependent claims. These lists allow to select any minimum width and combine it with a maximum width which is larger than this minimum width. For example, for a minimum width of 1.50 mm and a maximum width of 1.55 mm, the wide tobacco strips considered have about the same width and can be cut by adjusting the cutting machine to a pre-selected cutting width, which involves some tolerances. In another example, the minimum width is 1.25 mm and the maximum width is 2.0 mm; in this case the wide tobacco strips comprise a mixture of cut tobacco strips having different widths.

[0016] The amount of the wide tobacco strips in the tobacco blend of the cigarette is at least 40% by weight and can be up to 100%. One of the dependent claims discloses specific examples in terms of small ranges centred at values greater than 40%.

[0017] The wide tobacco strips can have a filling power of at most 4.5 cm^3/g, preferably of at most 4.0 cm^3/g. These values refer to the filling power of a tobacco consisting of the wide tobacco strips in question, wherein the filling power measurement is performed as described further below.

[0018] In an advantageous embodiment, the cigarette according to the invention is designed as a King Size cigarette, but the cigarette can also have any other format. Generally, the cigarette according to the invention preferably includes a filter, but cigarettes without a filter are conceivable as well.

[0019] In the following; the properties of the cigarette according to the invention are explained by means of some examples. The figures show in

Figure 1 a graphical representation illustrating the relation between rod weight and hardness for cigarettes containing cut tobacco strips of different widths and

Figure 2 a diagram illustrating the filling power of tobacco containing cut tobacco strips of different widths.

Example 1

[0020] Different cut widths of a tobacco blend were tested in order to evaluate the influence of the broad (wide) cut width on the cigarette hardness (stiffness).

[0021] The tobacco blend used was that of a standard King Size cigarette. The blend was a standard tobacco blend with ingredients (American Blend) and included 65% cut tobacco strips, 20% expanded tobacco and 15% cut stems (weight-%). The tobacco moisture was approximately 12%.

[0022] Three versions of a standard King Size cigarette were manufactured from this tobacco blend, the versions differing in the width of the cut tobacco strips:

Version A: 0.9 mm
Version B: 1.3 mm
Version C: 1.8 mm

[0023] In all cases, the total fraction of the cut tobacco strips was cut to the given width. Apart from the different cut widths, the blend specifications of versions A, B and C were the same.

[0024] Cigarettes of each version were manufactured with five different rod weights in steps of 25 mg. In each of these fifteen cases, the rod weight (weight of the tobacco) and the hardness of a cigarette were determined for a sample of 3 times 20 cigarettes, followed by a calculation of the mean values of the rod weight and the hardness.

[0025] The versions A, B, and C showed a significant effect with respect to rod weight reduction, i.e. in comparison to version A, version B has the same cigarette hardness with a rod weight decrease of 6 mg and version C even with 12 mg less tobacco. A graphical representation of the results is shown in Figure 1. Table 1 lists values read from the lines in Figure 1.

Table 1 Rod weight difference (in mg) to achieve the same hardness as the conventional cigarette of version A. For version A, the rod weight difference is set to 0 at a (relative) hardness of 100%.

Hardness	Version A [mg] (comparison, 0.9 mm)	Version B [mg] (1.3 mm)	Version C [mg] (1.8 mm)
105%	14	10	3
100%	0	- 6	-12
95%	-14	-22	-27

[0026] However, significant differences in the filling power of the tobacco blends in the three versions A, B and C could not be demonstrated, see Figure 2.

[0027] Within the tested range, the different cut widths did not significantly influence main analytical and chemical properties of the cigarettes, see Table 2.

Table 2 Main analytical data of cigarettes according to versions A (conventional), B and C.

Property	Norm	Unit	Version A (0.9 mm)	Version B (1.3 mm)	Version C (1.8 mm)
Puff number	ISO 4387		7	7	7
Nicotine	ISO 10315	[mg/cig.]	0.8	0.8	0.8
NFDPM (tar)	ISO 4387	[mg/cig.]	9	9	9
CO	ISO 8454	[mg/cig.]	8	8	8
Draw resistance	ISO 6565	[hPa]	9.0	8.8	9.4

[0028] In the following, the methods applied for determining the moisture of tobacco, the hardness of cigarettes and the filling power of tobacco are briefly described.

Moisture

[0029] The determination of the moisture of tobacco or cigarette samples involves a gravimetric method. The moisture is defined as the weight loss that occurs during drying of the samples for 3 hours at 82°C.

Hardness of cigarettes

[0030] In this context, the hardness of a cigarette is defined as the distance a stamp moves which compresses a sample of 20 cigarettes while an initial pre-selected minimum force of 10 N increases to a pre-selected test force of 142 N. The cigarettes are compressed by a 30 mm wide stamp at a speed of 0.2 mm/s. During the compression, the values of the force exerted by the stamp onto the cigarettes and the related path length of the stamp are measured and recorded every 0.2 s. A graphical representation of these points is fitted by means of a spline interpolation. Afterwards, the average hardness of a cigarette of the sample can be read from the interpolation curve. The result for the hardness (in mm of deformation) can be corrected with respect to the temperature and the moisture of the sample (reference values, e.g., 22°C and 12%).

[0031] The principle of this method is described in EP 0 416 295 B1.

[0032] In Example 1, the numerical values for the hardness are given as relative values related to the measured hardness of a conventional cigarette of version A with some average rod weight.

Filling power of tobacco

[0033] In this context, the filling power (filling capacity) of tobacco is defined as the volume (in cm^3) of 1 g tobacco under defined load conditions at 22°C and 12% moisture. As with the hardness determination, the measurement of the filling power is dynamic. A tobacco sample of about 400 g is filled into a cylindrical vessel having a diameter of 170 mm and a height of 220 mm. The load on the tobacco is built up by means of a moving stamp which comprises force measuring means and compresses the tobacco with a constant speed of 5 mm/s until a maximum force of 1600 N is reached. The filling power is related to a force of 500 N and can be derived by spline interpolation of the curve representing the relation between the stamp force and the height of the tobacco column in the vessel. In the set up, the moisture and the temperature of the tobacco are measured in order to correct the measured filling power for the reference values 22°C and 12% moisture.

[0034] The principle of this method is described in EP 0 416 295 B1 as well.

Example 2

[0035] Cigarettes of versions A, B and C according to Example 1 with the same hardness were tested concerning their sensory properties.

[0036] In a test extending over several days, ten panellists smoked a plurality of cigarettes of each of the versions and determined any differences in optics, haptic properties, taste, smell and strength.

[0037] No significant differences were found.

Example 3

[0038] As already mentioned, during the manufacture of the cigarettes, a broader cut width results in a smaller tobacco dust release, thus decreasing tobacco losses and tobacco waste rate (dust) in cigarette manufacturing sites.

[0039] An optical appraisal of two version of cigarette packs with cigarettes including 65% tobacco of a broader cut width (cut widths of 1.3 mm and 1.8 mm, respectively) was carried out and compared to a sample with tobacco of a regular cut width (0.9 mm) .

[0040] The percentage of packs having a visible amount of loose tobacco inside the pack was similar for all three tested versions, although the tobacco weight in the versions with broader cut width was reduced (by 6 mg and 12 mg, respectively). The same effect occurred concerning the percentage of cigarettes with recessed ends (missing tobacco at the cigarette ends) in a pack.

[0041] This demonstrates that, in spite of the reduced tobacco weight, the cigarettes including wide tobacco strips do not lose more tobacco at the cigarette ends than cigarettes having tobacco of regular cut width.

Claims

1. Cigarette, comprising a tobacco blend which contains wide tobacco strips in an amount of at least 40% by weight, the wide tobacco strips being tobacco strips cut to a width of at least 1.2 mm.

2. Cigarette according to claim 1, **characterised in that** the moisture content of the tobacco blend is in the range of from 10% to 13%.

3. Cigarette according to claim 1 or 2, **characterised in that** the width of the wide tobacco strips is at most 2.5 mm.

4. Cigarette according to anyone of claims 1 to 3, **characterised in that** the wide tobacco strips have a minimum width which is selected from the following set: 1.20 mm, 1.25 mm, 1.30 mm, 1.35 mm, 1.40 mm, 1.45 mm, 1.50 mm, 1.55 mm, 1.60 mm, 1.65 mm, 1.70 mm, 1.75 mm, 1.80 mm, 1.85 mm, 1.90 mm, 1.95 mm, 2.00 mm, 2.05 mm, 2.10 mm, 2.15 mm, 2.20 mm, 2.25 mm, 2.30 mm, 2.35 mm, 2.40 mm, 2.45 mm.

5. Cigarette according to claim 4, **characterised in that** the wide tobacco strips have a maximum width which is greater than their minimum width, the maximum width being selected from the following set: 1.25 mm, 1.30 mm, 1.35 mm, 1.40 mm, 1.45 mm, 1.50 mm, 1.55 mm, 1.60 mm, 1.65 mm, 1.70 mm, 1.75 mm, 1.80 mm, 1.85 mm, 1.90 mm, 1.95 mm, 2.00 mm, 2.05 mm, 2.10 mm, 2.15 mm, 2.20 mm, 2.25 mm, 2.30 mm, 2.35 mm, 2.40 mm, 2.45 mm, 2.50 mm.

6. Cigarette according to anyone of claims 1 to 5, **characterised in that** the tobacco blend contains wide tobacco strips in an amount, by weight, selected from the following set of ranges: 40%-45%, 45%-50%, 50%-55%, 55%-60%, 60%-65%, 65%-70%, 70%-75%, 75%-80%, 80%-85%, 85%-90%, 90%-95%, 95%-100%.

7. Cigarette according to anyone of claims 1 to 6, **characterised in that** the wide tobacco strips have a filling power of at most 4.5 cm^3/g, preferably of at most 4.0 cm^3/g.

8. Cigarette according to anyone of claims 1 to 7, **characterised in that** the cigarette is a King Size cigarette.

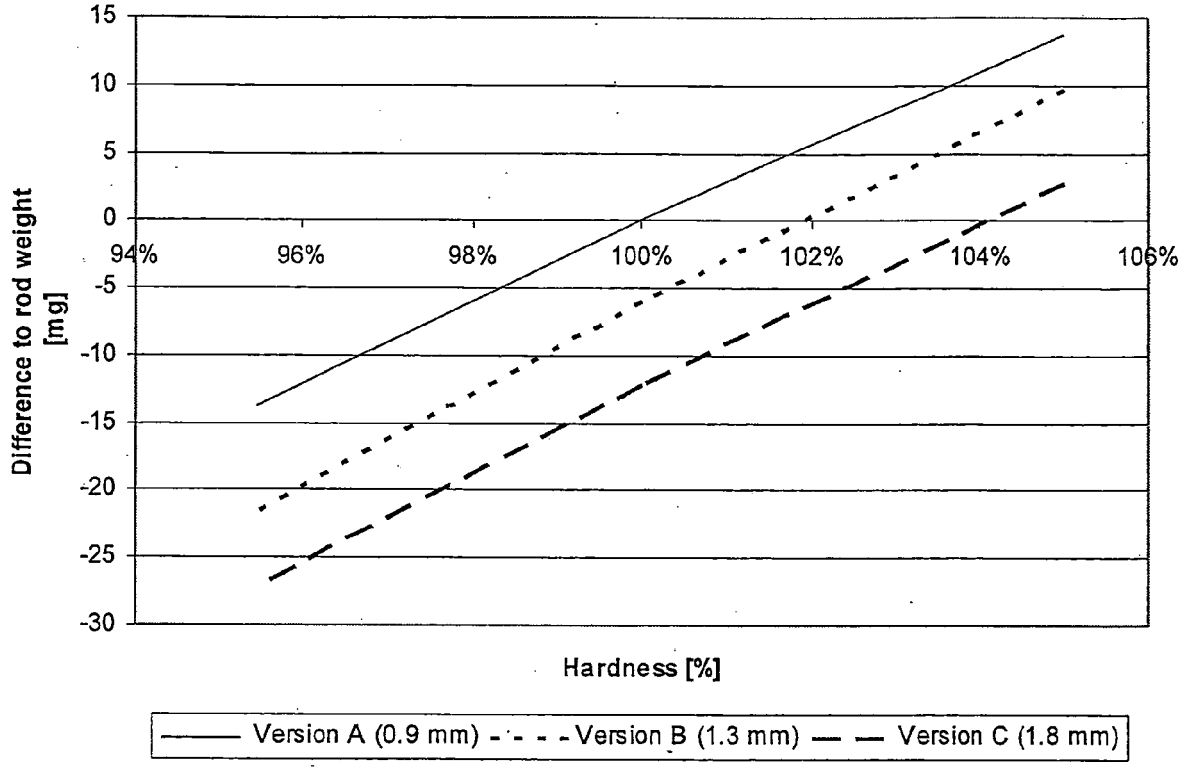
15
10
5
0
-5
-10
-15
-20
-25
-30
94%
96%
98%
100%
102%
104%
106%
Difference to rod weight [mg]
Hardness [%]
Version A (0.9 mm)
Version B (1.3 mm)
Version C (1.8 mm)

Fig. 1

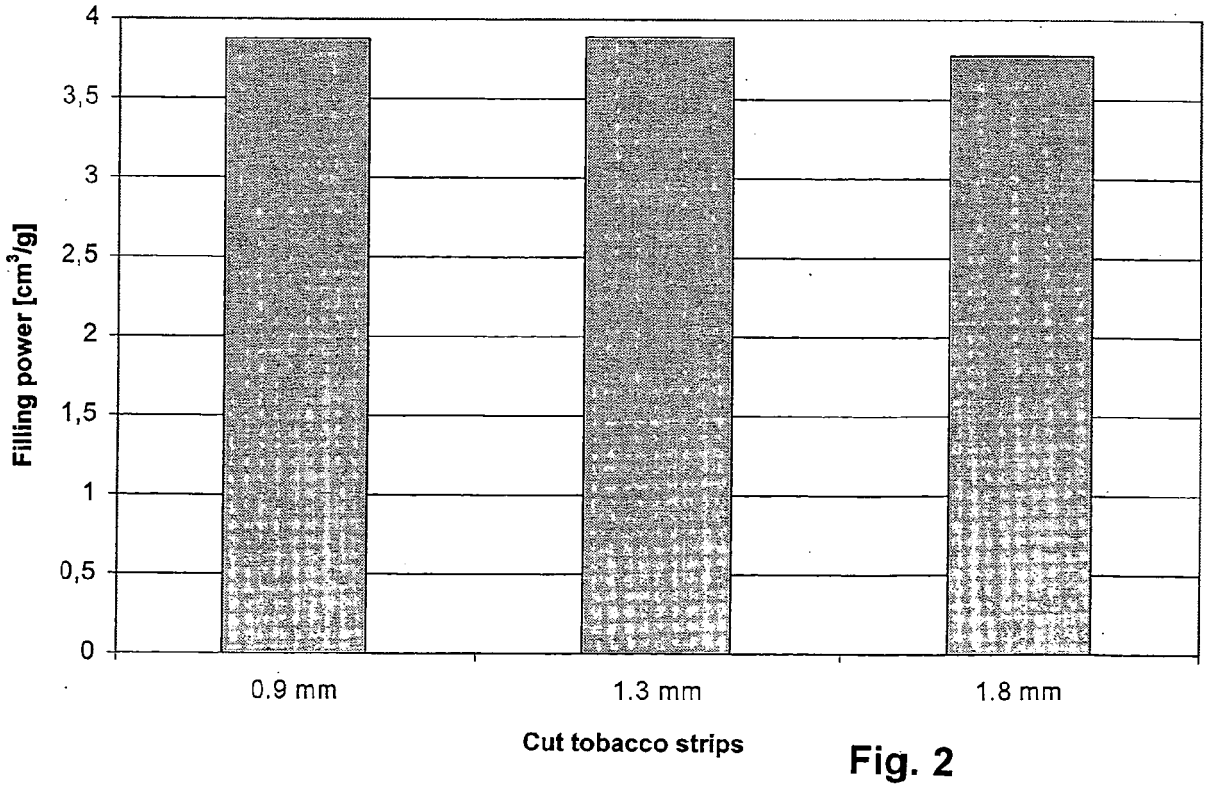
4
3,5
3
2,5
2
1,5
1
0,5
0
Filling power [cm³/g]
0.9 mm
1.3 mm
1.8 mm
Cut tobacco strips

Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 40 0016

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A24B
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	3 September 2008	Pille, Stefaan

CATEGORY OF CITED DOCUMENTS

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