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Bitumen or asphalt for producing a road topping, road topping and method for the production of bitumen or asphalt

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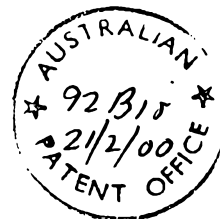
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(54) Title: BITUMEN OR ASPHALT FOR PRODUCING A ROAD TOPPING, ROAD TOPPING AND METHOD FOR THE PRODUCTION OF BITUMEN OR ASPHALT (54) Bezeichnung: BITUMEN ODER ASPHALT ZUR HERSTELLUNG VON STRASSENBELAG, STRASSENBELAG, VERFAHREN ZUR HERSTELLUNG VON BITUMEN ODER ASPHALT (57) Abstract The invention relates to bitumen or asphalt for producing a road topping, whereby said bitumen or asphalt contains a proportion of paraffin obtained by Fischer-Tropsch synthesis (FT paraffin). The invention also relates to a road topping with said bitumen and to a method for producing a corresponding road topping or roadway covering using said bitumen. (57) Zusammenfassung Die Erfindung betrifft Bitumen oder Asphalt zur Herstellung von Straßenbelag, wobei darauf abgestellt ist, daß das Bitumen oder Asphalt einen Anteil von durch eine Fischer-Tropsch-Synthese gewonnenem Paraffin (FT-Paraffin) enthält. Weiter betrifft die Erfindung auch einen Straßenbelag mit einem solchen Bitumen und ein Verfahren zur Herstellung eines entsprechenden Straßenbelages bzw. einer Straßendecke unter Verwendung eines solchen Bitumens.			



**BITUMEN OR ASPHALT FOR THE PRODUCTION OF ROAD SURFACES,
ROAD SURFACES, AND METHOD FOR THE PREPARATION
OF BITUMEN OR ASPHALT**

- 5 The invention firstly relates to bitumen or asphalt for the production of road surfaces.

Road surfaces are very widely produced in the form of asphalt or a mixture of bitumen with aggregates, such as sand, gravel, grit (round or crushed) or the like.

- 10 One aim in a road surface is to achieve high wear resistance. Furthermore, the deformation tendency should be low in order that unevenness, such as wheel tracks or the like, if possible does not occur, is slight or only occurs after a long period of use.

The invention is concerned with the technical problem of providing an improved bitumen or asphalt, in particular for the production of road surfaces.

- 15 The discussion of the background to the invention herein is included to explain the context of the invention. This is not to be taken as an admission that any of the material referred to was published, known or part of the common general knowledge in Australia as at the priority date of any of the claims.

- 20 This technical problem is firstly and substantially resolved in the subject-matter of Claim 1, in which the bitumen or asphalt contains a proportion of paraffin obtained by a Fischer-Tropsch synthesis (FT paraffin). FT paraffins principally consist only of normal paraffins. More than 90% are usually n-alkanes. The remainder consists of iso-alkanes. The chain length is from C30 to about C100, with a gradation (solidification point, SP) from about 68 to about 105°C. The proportion
25 of FT paraffin is preferably 0.5% or more, based on a bitumen content of the asphalt or based on bitumen as such. In practice, these percentages are based on the weight. However, they can also be per cent by volume. Surprisingly it has been found that a road surface produced using bitumen or asphalt modified in this way is significantly more durable. The formation of wheel tracks under the usual loads occurring in road traffic due



to motor vehicles is significantly reduced compared with conventional road surfaces based on bitumen or asphalt. The strength of a road surface is dependent on various interdependent factors, in particular, inter alia, on the degree of compaction. Surprisingly, it has been found here that the addition of FT paraffin facilitates significantly greater compaction. Although the FT paraffins ultimately result in a harder form of the road surface, in the liquid state they simultaneously reduce the viscosity of the "binding material", i.e. the bitumen. They act as it were as "fluidizers". The grit used, round or crushed, is also of importance with respect to the strength of the road surface. In the case of crushed grit, high strengths can be achieved, attributable to the intermeshing of the individual grit particles. However, better compaction can be achieved in the case of uncrushed, round grit or gravel. In this connection too, the addition of FT paraffins has advantageous effects. The adherence of bitumen to the stone, such as precisely this grit or gravel, is improved. A particularly significant improvement can be achieved if - at least partially - oxidized FT paraffins are employed. Although this causes the solidification point to drop by about 5° compared with non-oxidized FT paraffins, the abovementioned adherence is significantly improved, enabling the use of round gravel or grit, at least to a certain proportion, without reductions in strength having to be accepted. The advantageous effect of oxidized FT paraffins is attributed to the functional groups (polarity) which they thereby provide.

30

In practice, the proportion of FT paraffins is in the range from 0.5 to 10 per cent by weight, preferably in the range from 2.5 to 7.5 per cent by weight, and further preferably about 4 to 5 per cent by weight, based on the bitumen.

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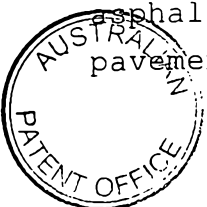
Regarding the FT paraffins, a preferred range of use is those having a solidification point from 90 to about 105°C.



Whereas standard asphalt, in the form of rolling asphalt, contains about 3 to 8% of bitumen, so-called mastic asphalt, which contains about 6.5 to 8.5% of bitumen, is also prepared. Bitumen grades of B45 or higher are usually employed here. In order to prevent settling of the mineral constituents during transport of mastic asphalt, it is necessary to effect constant stirring until final processing. In order to keep the viscosity low for this stirring, the mastic asphalt is kept at a relatively high temperature, namely at 200 to 250°C. Surprisingly, the addition of FT paraffins, as explained above, in an approximately equal ratio to the mastic asphalt (or the bitumen of the mastic asphalt) results in it being possible significantly to lower the temperature which is necessary to keep the mixture stirrable. Whereas temperatures of at least 220 to 250°C were hitherto necessary, a reduction of 30°C is possible on addition of FT paraffins. This lowering in the temperatures is at the same time accompanied by the considerable advantage that release of harmful substances is reduced.

In asphalt, such as mastic asphalt or even rolling asphalt, it has also been found that a significantly longer time is available for working or processing the asphalt. Surprisingly, it has been found that the processing of this asphalt was also possible at lower temperatures than hitherto. Besides the reduction in viscosity described above, this effect is also attributed to a latent heat storage effect of the paraffin. On phase conversion of the paraffin, heat liberation takes place without a reduction in temperature.

Furthermore, the invention also relates to a road surface consisting of a lower layer of sand/gravel (frost protection layer), a bituminous sub-base on top of the sand/gravel layer, an asphalt binder layer and an asphalt/concrete layer, more generally known as an asphalt pavement. With respect to a road surface of this type, the



invention is concerned with the technical problem of achieving greater durability, in particular with respect to deformation resistance.

5 This technical problem is firstly and substantially resolved in respect of the road surface in that the bitumen of the asphalt pavement layer and/or of the bituminous sub-base contains a proportion of FT paraffins. The proportion of FT paraffins is preferably in the range from 0.5 to 10%
10 by weight, further preferably 2.5 to 7.5% by weight. However, volume percentages can also be used here.

Although not always regarded as necessary, it is also within the scope of the invention, as stated, to modify the
15 upper pavement layer, i.e. the asphalt pavement, by addition of FT paraffins. In fact, it has even been found that addition of from 1 to 3% of FT paraffins to the asphalt pavement allows greater strength to be achieved, in particular owing to the greater potential for compaction.
20 More recent knowledge even indicates that the addition of FT paraffins to the asphalt pavement layer is the most important factor with respect to the individual layers of a road surface.

25 The FT paraffins in this connection are FT paraffins having an SP from 68 to 105°C, preferably in chain lengths from C30 to C100 or even C105. The above comments, in particular also with respect to oxidized FT paraffins, apply in the same way here.

30

The invention is also concerned with a method for the production of a road surface with regard to the technical problem of achieving greater durability.

35 In this respect, the invention proposes admixing an asphalt mixture for the production of a bituminous sub-base and/or an asphalt binder layer and/or an asphalt pavement in road-building with bitumen containing a proportion from 0.5 to



10%, preferably 2.5 to 7.5%, further preferably 4.5% - 5%, suitably in per cent by weight, of FT paraffins. The FT paraffins are preferably added to the liquid bitumen or to the asphalt in solid or liquid form. In respect of a solid
5 form, the FT paraffins here can be, for example, in the form of granules, powder, flakes or pellets. In the flake form, a flake-like substrate is involved. The admixing with the bitumen or asphalt is further preferably carried out at a bitumen temperature from about 160 to 170°C. The
10 aggregate, such as stone, gravel or grit, is then added to the bitumen modified in this way.

Overall, it has been found that a bitumen of this type has a higher softening point, with lower penetration. Indeed,
15 the penetration is slightly lower than would have been expected. The softening point rises more quickly than the penetration drops. There was no evidence of separation. The bitumen modified in this way has an advantageously long shelf-life. In addition, the adhesion behavior is improved
20 for approximately the same breaking point compared with conventional bitumen. A corresponding improvement also arises, as also mentioned, in the asphalt mixture produced using this bitumen. Surprisingly, the low-temperature behavior is not impaired. Instead, it is determined by the
25 base bitumen used.

The invention also relates to a method for the production of a road surface containing proportions of used asphalt from a scraped-off road surface and proportions of fresh
30 asphalt, in which the used asphalt is firstly warmed to a temperature which is lower than the temperature of the fresh asphalt, and the proportions of used asphalt and fresh asphalt are then mixed. In a method of this type, the invention proposes the addition of FT paraffin to the fresh
35 asphalt, or if desired to the used asphalt. Surprisingly, this allows better break-up of the used asphalt to be achieved. The used asphalt is only warmed sufficiently that liquefaction does not take place. Instead, the liquefaction



and mixing with the fresh asphalt only occur due to the addition of the fresh asphalt and the significantly higher temperature of the fresh asphalt. The fact that FT paraffin is added to the fresh asphalt causes the fresh asphalt to
5 liquefy to a greater extent, resulting in more intimate mixing and thus faster temperature-wise breaking-up of the used asphalt. In this connection, the FT paraffins are preferably added in a proportion from 0.1 to 0.5%, in an example carried out in a proportion of about 0.25%, in each
10 case suitably in per cent by weight based on the amount of fresh asphalt employed.

Examples:

15 Example 1:

Road-building bitumen B 100 was prepared with 2.5%, 5% and 7.5% by volume of FT paraffins. The FT paraffins were stirred into the bitumen using a paddle stirrer at 160°C.

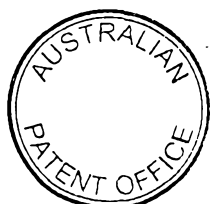


The following values were obtained here:

	Units	B100	B100+2.5% FT paraffin	B100+5.0% FT paraffin	B100+7.5% FT paraffin
Softening point	°C Bath liquid	44.5 Water	75.5 Water	94.5 Glycerol	101.0 Glycerol
Penetration at 25°C	mm/10	89	57	44	41
Fraass breaking point	°C	-14.5	-13.0	-12.0	-10.0
Thermal stability	°C	0.5	1.5	1.5	1.0

5 Adhesive behavior (Austrian Standard B3682) +40°C storage in water, covering of the surface

Dolomitic limestone					
24 hours	%	100	100	100	100
48 hours	%	100	100	100	100
Dolomite 24 hours	%	95	100	100	100
48 hours	%	95	100	100	100
Granulite 24 hours	%	100	100	100	100
48 hours	%	95	100	100	100
Granite 24 hours	%	90	100	100	100
48 hours	%	85	100	100	100
Change in weight after RTFOT (ASTM D2872-88)	%	<0.1	<0.1	<0.1	<0.1
Ring-and-ball softening point after RTFOT	°C Bath liquid	43.5 Water	73.0 Water	97.5 Glycerol	102.0 Glycerol
Reduction in R&BSP	%	2.2	3.3	-	-
Increase in R&BSP	%	-	-	3.2	1.0
Penetration at 25°C after RTFOT	mm/10	62	37	28	26
Reduction in penetration	%	30.3	35.1	36.4	36.6



The following explanations apply to the table:

5 The softening point was determined using a ring and ball in accordance with Austrian Standard C9212. The penetration was determined in accordance with Austrian Standard C9214. The Fraass breaking point was determined in accordance with Austrian Standard C9213. The thermal stability (tube test) was tested in accordance with TL-Pmb, Part 1 (1991) at +180°C and 72 hours. The adhesive behavior was tested in 10 accordance with Austrian Standard B3682 on the following stones:

EBK 8/11 dolomitic limestone (Bad Deutsch Altenburg); EBK 8/11 dolomite (Gaaden); EBK 8/11 granulite (Meiding); EBK 15 8/11 granite (Niederschrems).

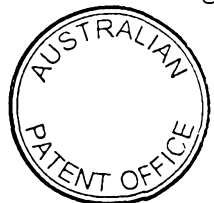
The "rolling thin film oven test" heating test was carried out in accordance with ASTM D 2872-88 at 163°C, and the weight change, the change in ring-and-ball softening point and the penetration were determined at 25°C. 20

The results show that the addition of FT paraffin results in an increase in the softening point and a reduction in the penetration. The adhesive behavior is improved by 25 addition of FT paraffin in respect of aggregate of various particle size (0-32), such as granite, granulite or dolomitic limestone.

The added FT paraffin was an FT paraffin having the usual 30 chain-length distribution with a maximum of C40 to about C60 obtained from the Fischer-Tropsch synthesis.

Example 2:

35 A road surface consisting of a pavement layer and an asphalt binder layer was produced. The asphalt layer contained 2-3% - based on the bitumen - of FT paraffins of



usual chain length as obtained from the Fischer-Tropsch synthesis.

5 A significant extension of the possible compaction time of the bituminous sub-base from the 0.5 hour usual hitherto to more than 2 hours was evident owing to improved flow behavior due to the addition of FT paraffins. Processing was still possible at outside temperatures of below 3°C. The degree of compaction in the bituminous sub-base and in
10 the pavement layer also increased. For example, degrees of compaction of 97% were usual hitherto. Here, a degree of compaction of more than 100% was achieved. A significant increase in durability with a considerable reduction in the tendency to form wheel tracks was obtained.

15

Example 3:

Mastic asphalt was prepared with a bitumen content of 7.5%. FT paraffins were added to the bitumen in a proportion of
20 5%, based on the weight of the bitumen. A reduction in the hitherto usual processing temperature (stirring temperature) from 250 to 220°C was obtained. In spite of the reduced processing temperature, the addition of FT paraffins resulted in an improvement in the flow behavior,
25 which resulted in a longer processing life for the mastic asphalt. A significant reduction in the emission values on application of the mastic asphalt was observed owing to the temperature reduction. Overall, more square metres were achieved per time unit during processing since it was
30 possible to process greater amounts of asphalt without having to fear a reduction below the minimum processing temperature necessary.

Example 4:

35

The track formation on grit mastic asphalt 0/11 S, B 65, was measured. The designation "0/11" here represents a stone size of from 0 to 11 mm. The results shown in the



following table were achieved. The FT paraffin content is based on the bitumen employed (% by weight).

FT paraffin content [%]	Track depth [mm], 20,000 traverses	
	40°C	50°C
0	3.0	5.7
2	1.5	2.7
3	1.2	2.2

5

Example 5:

Comparative experiments were carried out using bitumen B80 and 0% by weight, 1.5% by weight, 3.0% by weight and 4.5% by weight, based on the original binder B80. The results achieved here are shown in the table below.

Binder	Proportion of FT paraffin in per cent by wt.			
	B80 + 0	B80 + 1.5	B80 + 3.0	B80 + 4.5
R&B softening point °C	48	52	76	96
Penetration 1/10mm	71	48	37	42
Fraass breaking point °C	-7.5	-7.5	-6.5	-7.5
Ash Content %	0.18	0.16	0.15	0.19
Ductility, 25°C cm	>100	>100	95	>100
Density, 25°C g/cm ³	1.0228	1.0233	1.214	1.216
After heating in a rotating flask, 165°C				
Weight change %	-0.05	0.05	0.1	0.2
Rise in R&B softening point °C	3.5	9.5	5.5	0.5
Drop in Penetration %	-25.4	-24.6	-16.2	-21.4
Ductility, 25°C cm	>100	>100	90	>100
Viscosity				
110°C	2300	2119	1713	1593
130°C	750	600	50.4	480
180°C	95	72	74	64
EVT 100°C	178°C	170°C	166°C	165°C



Example 6:

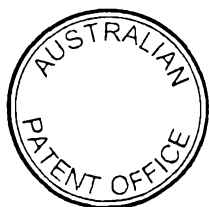
Further experiments were carried out using B45, B65 and B80, in each case with 4 or 6% of FT paraffin, again in %
5 by weight, based on the starting binder. In addition, corresponding values for a polymer-modified bitumen (PmB45A) and a bitumen B45 containing 30% by weight of Trinidad Epuré were determined for comparison. The results are shown in the table below.

10

Basically, the following general results were obtained here.

15

FT paraffin can be stirred homogeneously into bitumen at temperatures of 150°C. The transition from the solid state to the liquid state, defined by the R&B softening point, is raised very considerably by the added FT paraffin. If the softening points of the starting bitumen are in the range from 50 to 60°C, they increase to 85 to 95°C due to the
20 addition of 4% by weight of FT paraffin. By contrast, the penetration only drops slightly. An increase in viscosity in the region of 2 binder grades (B80 to B45) occurs. The behavior at low temperatures changes only very slightly on determination of the Fraass breaking point and shifts by a
25 maximum of 1 binder grade. This thus gives rise to a considerable increase in the plasticity range. It is furthermore evident that the changes are more pronounced, the softer the starting binder selected.



	R&B softening point	Needle penetra- tion	Fraass breaking point	ΔT	Plasticity range		
	[°C]	[0.1 mm]	[°C]		[°K]	Increase	
						comp. w. bit. or FT p. [%]	comp. w. PmB45A [%]
B45	58.5	33	-12	70.5	-	-	
B45+4% FT p.	87.5	25	-10	97.5	38	37	
B45+6% FT p.	93.5	21	-6	99.5	41	40	
B65	51.0	48	-8	59	-	-	
B65+4% FT p.	91.0	25	-9	100	69	41	
B65+6% FT p.	93.5	25	-7	110.5	70	42	
B80	45.5	83	-11	56.5	-	-	
B80+4% FT p.	83.5	50	-11	94.5	67	33	
B80+6% FT p.	92.0	45	-8	100	77	41	
PmB45A	58.0	38	-13	71	-	-	
B45+ Trinidad	66.0	21	-8	74	-	-	

The invention is also explained below in particular with respect to the production of a road surface with reference to the attached drawing, which, however, only shows illustrative embodiments. In the drawing:

Fig. 1 shows in diagrammatic manner, a sectional view through a road surface;

Fig. 2 shows a diagrammatic view of the preparation of asphalt;

Fig. 3 shows in diagrammatic manner, a sectional view through a further road surface;



Fig. 4 shows a diagrammatic view of the production of a road surface using a mixture of used asphalt and fresh asphalt.

5 With reference to Fig. 1, the following may be explained.

The road surface 1 consists of an upper asphalt concrete layer, also referred to as asphalt pavement 2, a middle bituminous sub-base 3 and a lower frost-protection layer 4.

10 The frost-protection layer 4 consists of a mixture of sand and gravel. It has a depth h_1 of about 40 cm. The bituminous sub-base 3 above the frost-protection layer has a depth h_2 of from 6 to 20 cm, and the asphalt pavement 2 has a depth h_3 of from about 2 to 4 cm.

15

The bituminous sub-base 3 is produced using a bitumen containing about 5 per cent by weight of FT paraffins. The FT paraffin has a melting point of about 100°C and has been obtained by the Fischer-Tropsch synthesis.

20

The bituminous sub-base 3 in the stated composition has significantly greater durability. Since the durability of the bituminous sub-base is responsible for the deformation behavior of the road surface, in particular wheel track formation, a significantly longer service-life overall is achieved by this.

25

In Fig. 2, there is shown in diagrammatic form, a tank 5 for the preparation of a mixture for a bituminous sub-base.

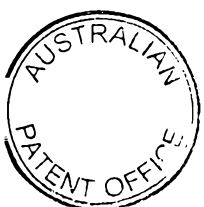
30

The tank 5 can be heated by way of a heating device 6.

Aggregates, such as gravel and sand 10, or other stones of various particle size, bitumen 11 and FT paraffins 12 are introduced into the tank 5 by way of chutes 7, 8 and 9.

35

These constituents are stirred with one another, as likewise show diagrammatically, by means of a stirrer consisting of two contra-rotating screws 13, 14. The composition prepared in this way can be discharged from the



tank by way of an outflow 15. The stirring is carried out at a temperature of about 160°C.

The mixture consists of about 95% of stone and 5% of bitumen. To this is added 5% of FT paraffin, based on the 5 per cent bitumen content.

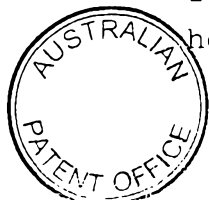
The term "FT paraffin" is occasionally also replaced by the term "hydrogenated wax" or "hydrogenated paraffin". For the purposes of the present application, reference is made to paraffin obtained by the Fischer-Tropsch synthesis, which is occasionally also referred to as macrocrystalline paraffin. This preferably consists of long-chain hydrocarbons having chain lengths in the range from C30 to C80, C90 or C100.

Referring now to Fig. 3, a road surface 13 is shown which consists of an asphalt pavement 2, an asphalt binder layer 14 beneath the pavement, a bituminous sub-base 3 and a lower frost-protection layer 4.

Whereas the asphalt pavement 2, the bituminous sub-base 3 and the frost-protection layer 4 have a structure as also explained above under Fig. 1, the asphalt binder layer 14 has a depth h_4 of from 4 to 8 cm.

Referring now to Fig. 4, the scraping-off of a used road layer with recovery of used asphalt 15 and the formation of a new road surface 16 containing a fraction of fresh asphalt 17 and used asphalt 15 is shown diagrammatically.

Firstly, the old road surface 18 is heated, in the illustrative embodiment by flames from burners 19. Further tanks 20, 21 are provided by means of which fresh asphalt is prepared. Fresh asphalt has usual temperatures in the range from 200 to 250°. The heating of the old road surface 18 can also be carried out using exhaust heat from the heating of the fresh asphalt.



Furthermore, the old road surface 18 is scraped off using a milling cutter 22, producing lumps of used asphalt 15. The used asphalt 15 is fed to a mixing unit 23, into which
5 fresh asphalt 17 is also introduced. In addition, the asphalt 17' can also be added after the mixing unit 23.

Furthermore, FT paraffin is added, either already to the fresh asphalt in a tank 20 or by way of its own addition
10 device 24, for addition in the mixing unit 23. The asphalt 25 finally obtained is applied to the base to form the new road pavement 16.

All features disclosed are pertinent to the invention. The
15 disclosure content of the associated/attached priority documents (copy of the prior application) is hereby also incorporated in full into the disclosure content of application, also for the purpose of incorporating features from these documents into claims of the present
20 application.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. Bitumen or asphalt for the production of road surfaces, characterized by a content of paraffin obtained by a Fischer-Tropsch synthesis (FT paraffin).
2. Bitumen according to claim 1 or in particular according thereto, wherein the
5 proportion of FT paraffin is 0.5% to 10%.
3. Bitumen according to one or more of the preceding claims or in particular according thereto, wherein the FT paraffin has a melting point (solidification point) from about 68 to 105°C.
4. Bitumen according to one or more of the preceding claims or in particular
10 according thereto, wherein the FT paraffin at least partly comprises oxidized FT paraffin.
5. Road surface consisting of a lower sand/gravel layer, a bituminous sub-base over the sand/gravel layer, and an upper asphalt/concrete layer or pavement, wherein the bitumen of the bituminous sub-base has a content of
15 paraffin obtained by Fischer-Tropsch synthesis (FT paraffin).
6. Road surface according to claim 5 or in particular according thereto, wherein the proportion of FT paraffin is 0.5 to 10% (based on the bitumen).
7. Road surface according to one or more of the preceding claims 5 to 6 or in particular according thereto, wherein the pavement layer has a content of FT
20 paraffin.
8. Road surface according to one or more of the preceding Claims 5 to 6 or in particular according thereto, where a binder layer is provided, wherein the binder layer has a content of FT paraffin.
9. Road surface according to one or more of the preceding Claims 5 to 8 or in particular according thereto, wherein the content of FT paraffin in the
25 pavement layer is 0.5 to 10% (based on the bitumen).



10. Road surface according to one or more of the preceding Claims 5 to 9 or in particular according thereto, wherein the FT paraffin has a melting point (solidification point) from about 68 to about 105°C.
- 5 11. Road surface according to one or more of the preceding Claims 5 to 10 or in particular according thereto, wherein the FT paraffin at least partly comprises oxidized FT paraffin.
- 10 12. Method for the production of a road surface, wherein, in order to form a bituminous sub-base in roadbuilding, an asphalt-containing bitumen is admixed with a paraffin obtained from a Fischer-Tropsch synthesis (FT paraffin), where the FT paraffin has a content from 0.5 to 10%, preferably from 2.5 to 7.5%, based on the bitumen content.
- 15 13. Method according to claim 12 or in particular according thereto, wherein, in order to form a pavement layer in roadbuilding, an asphalt-containing bitumen is admixed with FT paraffin in a proportion from 0.5 to 5% (based on the bitumen).
- 20 14. Method according to one of Claims 12 or 13, where a binder layer is provided, wherein, in order to form the binder layer, an asphalt-containing bitumen is admixed with FT paraffin in a proportion from 0.5 to 5% (based on the bitumen).
- 25 15. Method according to one of Claims 12 to 14 or in particular according thereto, wherein the FT paraffin is added to the liquid bitumen in solid form.
16. Method according to one of Claims 12 to 15 or in particular according thereto, wherein the FT paraffin is admixed in the form of granules, powder, flakes or pellets or in liquid form.
17. Method according to one of Claims 12 to 16 or in particular according thereto, wherein the FT paraffin at least partly comprises oxidized FT paraffin.

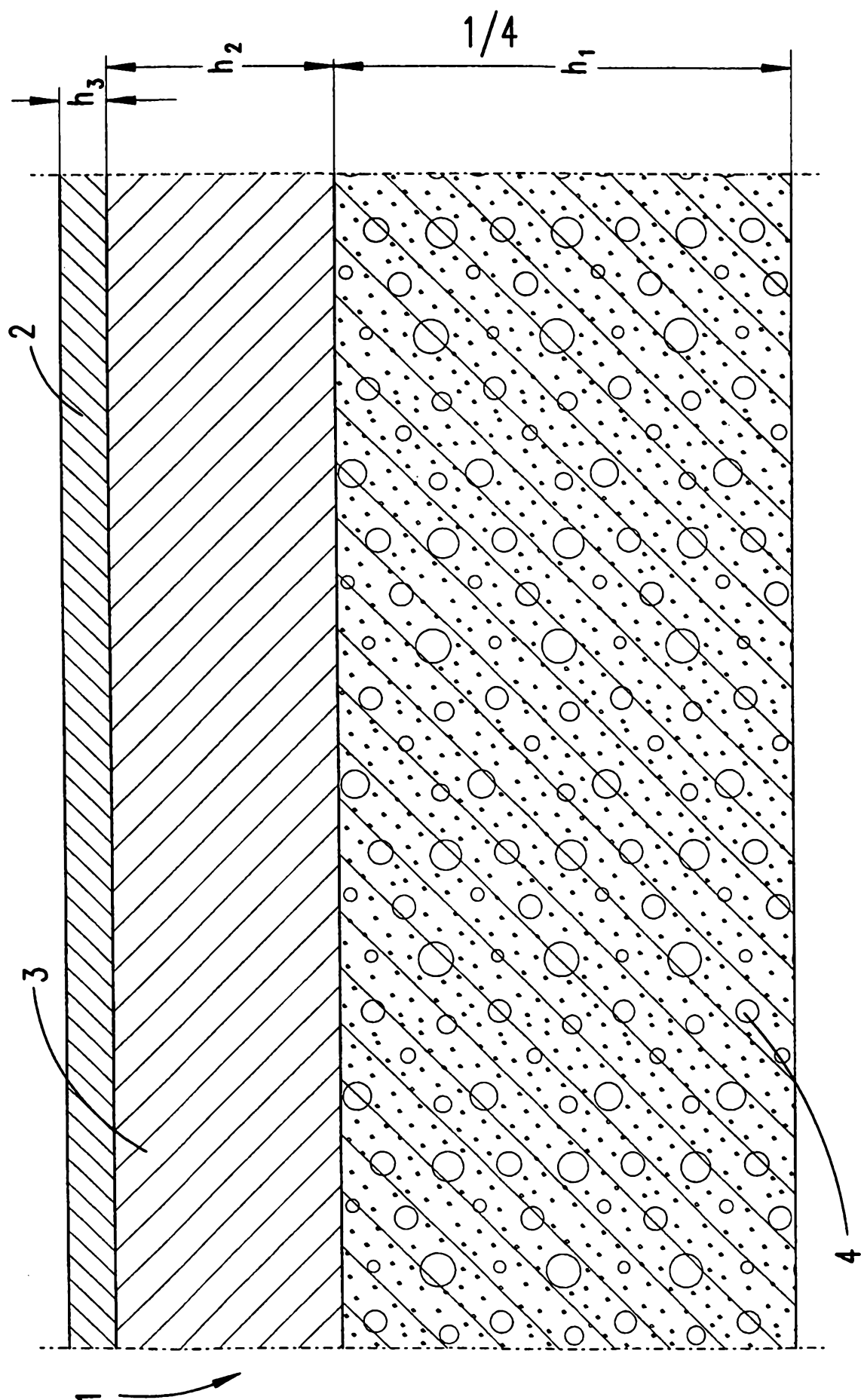


18. Use of mastic asphalt to which FT paraffin has been added, for screeds, bridge surfaces and mastics and asphalt layers of all types.
19. Method for the formation of a road surface containing used asphalt from a scraped-off road surface and containing fresh asphalt, where the used asphalt is initially heated to a temperature which is lower than the temperature of the fresh asphalt, and the used asphalt and fresh asphalt components are then mixed, wherein FT paraffin is added to the fresh asphalt or, optionally, to the used asphalt.
20. Process according to Claim 19 or in particular according thereto, wherein the FT paraffin is added in a proportion from 0.1 to 0.5%, based on the amount of fresh asphalt employed.
21. A road surface produced by a method according to any one of claims 12-17, 19 or 20.
22. Bitumen or asphalt according to claim 1 substantially as hereinbefore described with reference to any of the examples.
23. A method according to claim 12 or 19, substantially as hereinbefore described.

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**Fig. 1**

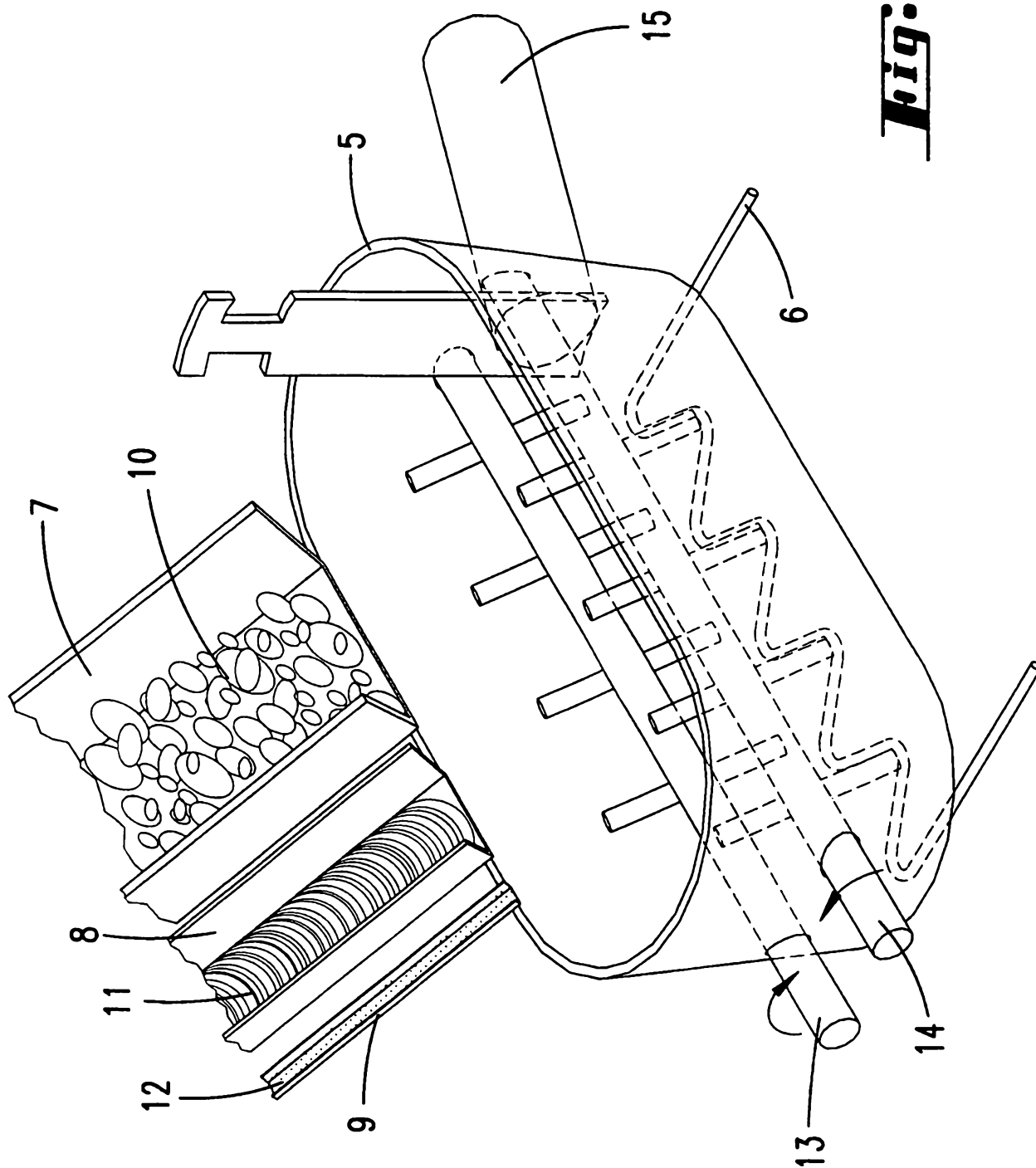


Fig. 2

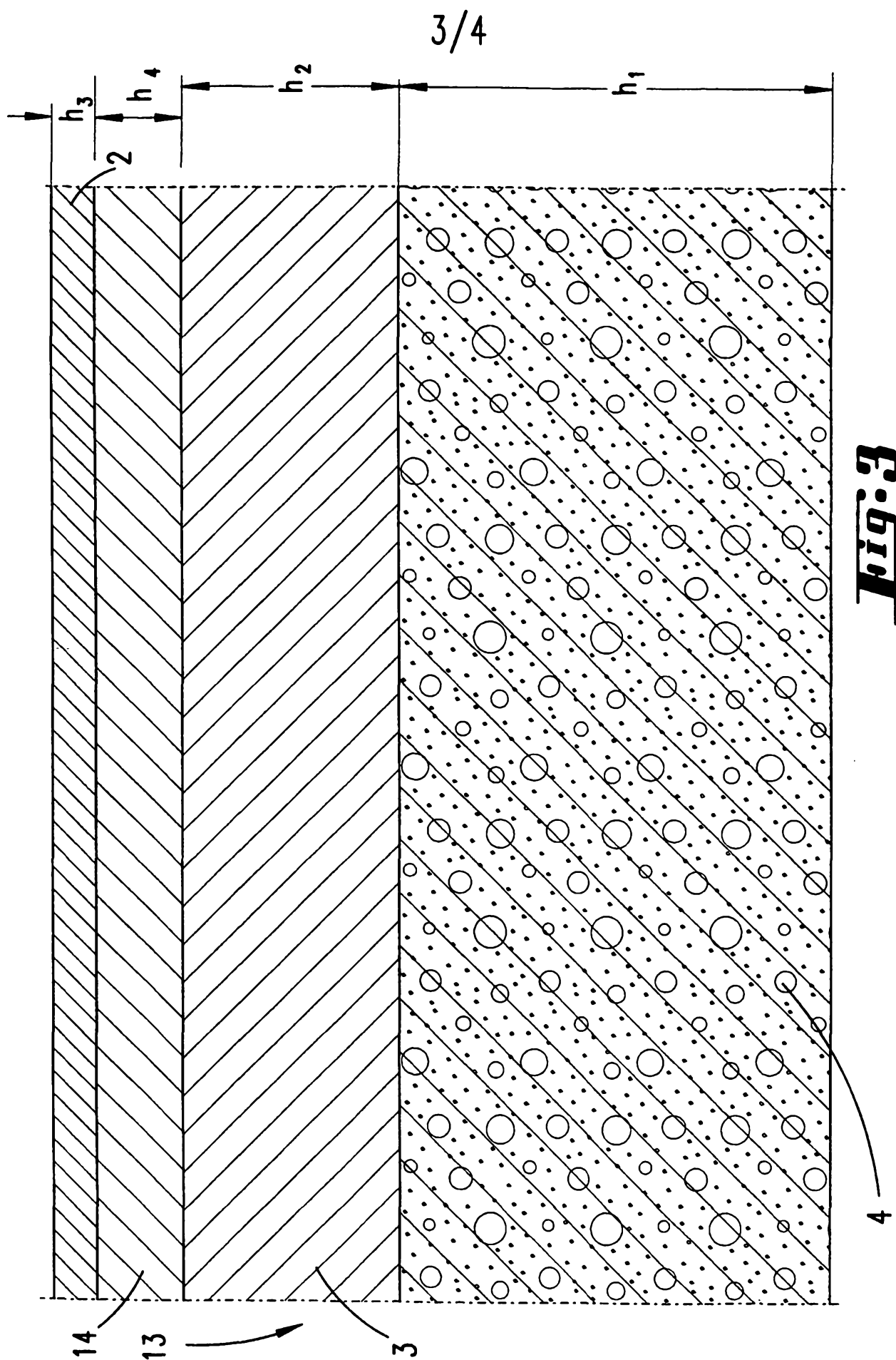


Fig. 3

