

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 649 330 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:

08.10.1997 Bulletin 1997/41

(21) Application number: **93915106.4**

(22) Date of filing: **07.07.1993**

(51) Int. Cl.⁶: **A63C 19/10**, E01C 13/00

(86) International application number:
PCT/SE93/00619

(87) International publication number:
WO 94/01186 (20.01.1994 Gazette 1994/03)

(54) **SLIDE**

RUTSCHE

GLISSOIRE

(84) Designated Contracting States:
**AT BE CH DE DK ES FR GB GR IE IT LI LU MC NL
PT SE**

(30) Priority: **09.07.1992 SE 9202123**
11.01.1993 SE 9302311

(43) Date of publication of application:
26.04.1995 Bulletin 1995/17

(73) Proprietor: **ÖHMAN, Clifford**
394 77 Kalmar (SE)

(72) Inventors:
• **ÖHMAN, Clifford**
S-394 77 Kalmar (SE)
• **LAUDI, Bernd**
D-2215 Gokels (DE)

(74) Representative: **Larsson, Kjell et al**
AWAPATENT AB,
Box 45086
104 30 Stockholm (SE)

(56) References cited:
EP-A- 0 502 484 **WO-A-91/10486**
WO-A-91/18651 **DE-A- 2 723 290**
DE-A- 3 445 976 **US-A- 3 726 817**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 649 330 B1

Description

The present invention relates to slides for sport or play, for example for skating or other activity requiring low friction so as to facilitate sliding or gliding.

Presently sport or play activities requiring a low friction support, for example skating, takes place on artificial skating grounds or on natural ice. Artificial ice grounds involve high investment costs, and solely the cooling plant for a conventional ice ground amounts presently to several million SEK. To this comes high operational costs which for cooling only are estimated to about half a million SEK per year. The season for a conventional artificial ice ground is often not more than about seven months, and during periods with high day-time temperatures it is often uneconomical. An artificial skating ground is furthermore restricted to a specific geographic location and is thus useful only at the site where the cooling tubes are cast into the support.

Another inconvenience with artificial ice grounds is the fact that the cooling equipment uses cooling media containing ammonia and water containing salts. The ammonia will have to be replaced at frequent intervals and the waste is considered as an environmental hazard and must be especially treated according to the environmental laws.

Furthermore, the usefulness of today's artificial ice grounds is very limited. When the outdoor temperature exceeds about 10°C artificial ice grounds function only indoors within an enclosure. This, however, results in very high operational costs. In practice an iceground can be used only if the surface of the ice has a temperature of between about -1°C and -20°C. In countries having a high average temperature skating is virtually impossible to practice.

As prior art reference is made to DE-A-3 445 976 and US-A-3,726,817 which disclose slides based on wax and polymer but which do not suggest the presence of any crack resistance-imparting mineral.

The present invention has for an object to provide slides for sport and play which involve essentially reduced investment and operational costs and furthermore are capable of operation within a much broader temperature range. Another object of the invention is to provide slides which are easy to restore and the friction coefficient and surface hardness of which can be modified according to the activity involved. Still another object of the invention is to provide slides which show improved non-cracking characteristics.

For these and other objects which will be clear from the following description the invention provides for a slide for sport or play, comprising a surface layer that has been formed by the solidification of a melted mixture based on a wax and a polymer, characterized in that said mixture comprises more than 40% by weight of said wax in the form of a natural and/or synthetic hard wax, 5-30% by weight of said polymer, and 5-40% by weight of a crack resistance-imparting mineral, said percentages being based on the weight of the total compo-

sition.

Thus, the slide according to the invention does not require energy consuming cooling and the surface may thus have the environmental temperature which can vary between wide limits, for example from -20°C to +50°C. In this manner it is possible to avoid the inconvenience caused by a cold ice surface in the form of the chill that the sport practitioners are subjected to.

The surface of the slide has suitably a hardness of from about 0 to 15 measured using needle penetration according to DIN 51579 or Norm ASTM 1321 at +20°C.

In a preferred embodiment of the invention the mixture has a melting point of from about 80 to about 180°C, preferably from about 90 to about 140°C, especially from about 100 to about 130°C.

The hard wax used in the composition or mixture according to the invention is the major component thereof, which generally means that the weight percentage thereof is greater than the weight percentage of any of the other components or ingredients of the mixture. This means that said hard wax comprises more than 40, often more than 50, % by weight of the total composition or mixture.

A multitude of hard waxes are useful in the invention, and a suitable wax can be selected among technique waxes, microwaxes, synthetic waxes, especially polyethylene waxes, and paraffin waxes, including mixtures thereof.

For the purpose of modifying the properties of the wax, especially increasing the homogeneity of binding and also increasing the hardness of the surface of the slide, the hard wax is admixed with a polymer material in an amount of 5-30% by weight.

Such polymer material is suitably in the form of powders, granulates or dust, and preferable types of materials are polyethylene, polypropylene, nylon and similar and of course mixtures thereof.

Especially in order to have a crack-resistant surface of the slide claimed the mixture contains as a third ingredient at least one mineral in an amount of 5-40% by weight.

Said mineral is preferably selected from the group consisting of talcum and mica, including mixtures thereof. For the purpose of the invention, however, said third ingredient need not necessarily be a natural mineral or inorganic compound. Rather it may well be any synthetic equivalent of such a mineral occurring in nature, such as an inorganic compound in the form of an oxide, phosphate, carbonate and/or hydrate.

In order to further reduce the friction and to improve the wear characteristics of the slide the mixture may also contain friction and wear reducing additives, especially of a lamellar molecular structure, in an amount of up to 10% by weight, preferably 0,1 - 10% by weight, especially 2 - 10% by weight, based on the total composition.

Said additives are preferably selected from the group consisting of molybden disulphide, graphite, boron nitride and cerium trifluoride.

It is preferred that the viscosity of the mixture at 140°C is from about 1000 to 100000, especially 2000 to 50000 centiStoke (cSt).

It may also be suitable to add to the mixture stabilizing additives, such as UV-stabilizers, anti-oxidants etc. Such additives are of a conventional kind and do not require further detailed description.

The advantages associated with the slide according to the present invention is the fact that the surface thereof may be easily restored by using equipment that is passed across the surface with heating to melt the uppermost surface layer, often not more than about 1 mm, of the slide. The slide according to the invention can also be used anywhere and thus also in countries having a high round-the-year temperature.

The slide according to the present invention has a versatile use and can be used i.a. as a slide for hockey, bandy, curling, and as minor playgrounds for skating. The slide according to the invention can be used also for cross-country skating, as slides for sliding, bob sleighing, tobogganing, etc.

It is preferred to use in the slide according to the invention such a composition of the mixture that the coefficient of expansion from liquid to solid form is as close to zero as possible, in order that possible cracking in the restoration of the surface by melting of the surface layer shall be eliminated.

The invention will now be further described by exemplifying embodiments, but it should be noted that the invention is not limited to these specific embodiments and that its scope is defined only in the appended patent claims.

EXAMPLES

The following four ingredients were used to prepare two different slides having properties similar to ice.

INGREDIENTS:

1. Hard wax

Synthetic wax

Manufacturer: TerHell Paraffin, Germany
 Manufacturing No: Syntervax 2010
 Melting point: about 120°C
 Penetration at 25°C ASTM D 1321 about 1
 Viscosity at 120°C ASTM D 445 about 12 cSt

2. Polymer

Polyethylene, powder

Manufacturer: NESTE Oy
 Chemicals,
 Finland
 Manufacturing No: NCPE 8683

Meltindex M1₂ g/10 min ISO 1133 Cond 44.0
 Density kg/m³ ASTM D 1928 C/D 1505 924

3. Mineral

Mica, powder

Manufacturer: Kemira Oy, Finland
 Manufacturing No. CMMP N 85
 Powder size about 40/1000 mm
 Melting point about 1200°C

4. Additive

Molybden disulphide, powder

Manufacturer Stack Germany
 Powder size about 40/1000 mm

EXAMPLE 1

The hard wax 1 is melted above 120°C. The polymer 2 as well as the mineral 3 are combined with the wax, with stirring, when the temperature reaches about 160°C. The weight percentages of 1, 2 and 3 are 55%, 20% and 25%, respectively. The stirring is maintained for at least 10 minutes. The molten mixture is poured into molds for solidification in the shape of plates. Said plates are melted together into a continuous slide having outstanding properties similar to those of ice.

EXAMPLE 2

The procedure from Example 1 is repeated while reducing the percentage of the mineral 3 to 20% and adding the additive 4 as a fourth ingredient at a percentage of 5%. The slide obtained possesses characteristics similar to those of Example 1 and with even lower friction.

Claims

1. A slide for sport or play, for example for skating or other activity requiring low friction, comprising a surface layer that has been formed by the solidification of a melted mixture based on a wax and a polymer, characterized in that said mixture comprises more than 40% by weight of said wax in the form of a natural and/or synthetic hard wax, 5-30% by weight of said polymer and 5-40% by weight of a crack resistance-imparting mineral, said percentages being based on the weight of the total composition.

2. A slide according to claim 1, characterized in that said surface layer has a hardness of about 0-15 measured with needle penetration according to DIN 51579 or Norm ASTM 1321 at +20°C.

3. A slide according to claim 1 or 2, characterized in that said mixture has a melting point of from about 80 to about 180°C, preferably about 90 to about 140°C, especially about 100 to about 130°C.

5

4. A slide according to any one of the preceding claims, characterized in that the viscosity of said mixture at 140°C is about 1000-100000 cSt, preferably 2000-50000 cSt.

10

5. A slide according to any one of the preceding claims, characterized in that said hard wax constitutes more than 50, % by weight, based on the total composition.

15

6. A slide according to any one of the preceding claims, characterized in that said hard wax comprises technique waxes, microwaxes, polyethylene waxes, and/or paraffin waxes.

20

7. A slide according to any one of the preceding claims, characterized in that said polymer comprises polyethylene, polypropylene, and/or nylon.

25

8. A slide according to any one of the preceding claims, characterized in that said mineral comprises talcum and/or mica or any synthetic equivalent thereof, such as inorganic oxide, inorganic phosphate, inorganic carbonate and/or inorganic hydrate.

30

9. A slide according to any one of the preceding claims, characterized in that said mixture additionally contains a friction and wear reducing additive in an amount of up to 10% by weight, preferably 2-10% by weight, based on the total composition.

35

10. A slide according to any one of the preceding claims, characterized in that said friction and wear reducing additive is an additive or additive mixture having a lamellar molecular structure, which preferably comprises molybden disulphide, graphite, boron nitride and/or cerium trifluoride.

40

11. A slide according to any one of the preceding claims, characterized in that said mixture additionally contains stabilizing additives, such as UV-stabilizers and antioxidants.

45

Patentansprüche

50

1. Rutsche für Sport oder Spiel, beispielsweise für Skating oder andere Aktivitäten, die geringe Reibung erfordern, mit einer Oberflächenschicht, die durch die Verfestigung eines geschmolzenen Gemisches auf der Grundlage eines Wachses und eines Polymers gebildet wurde, **dadurch gekennzeichnet**, daß das Gemisch mehr als 40 Gew.-% des Wachses in der Form eines natürlichen

55

und/oder synthetischen Hartwachses, 5 - 30 Gew.-% des Polymers und 5 - 40 Gew.-% eines Reißfestigkeit verleihenden Minerals umfaßt, wobei diese Prozentsätze auf dem Gewicht der Gesamtzusammensetzung beruhen.

2. Rutsche nach Anspruch 1, dadurch gekennzeichnet, daß die Oberflächenschicht eine Härte von etwa 0 - 15, gemessen mit Nadeleindringung gemäß DIN 51 579 oder Norm ASTM 1321 bei +20°C, hat.

3. Rutsche nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Gemisch einen Schmelzpunkt von etwa 80 bis etwa 180°C, vorzugsweise von etwa 90 bis etwa 140°C, insbesondere von etwa 100 bis etwa 130°C hat.

4. Rutsche nach einem der vorausgehenden Ansprüche, dadurch gekennzeichnet, daß die Viskosität des Gemisches bei 140°C etwa 1000 - 100000 cSt, vorzugsweise 2000 - 50000 cSt ist.

5. Rutsche nach einem der vorausgehenden Ansprüche, dadurch gekennzeichnet, daß das Hartwachs mehr als 50 Gew.-%, bezogen auf die Gesamtzusammensetzung, ausmacht.

6. Rutsche nach einem der vorausgehenden Ansprüche, dadurch gekennzeichnet, daß das Hartwachs technische Wachse, Mikrowachse, Polyethylenwachse und/oder Paraffinwachse umfaßt.

7. Rutsche nach einem der vorausgehenden Ansprüche, dadurch gekennzeichnet, daß das Polymer Polyethylen, Polypropylen und/oder Nylon umfaßt.

8. Rutsche nach einem der vorausgehenden Ansprüche, dadurch gekennzeichnet, daß das Mineral Talcum und/oder Glimmer oder ein synthetisches Äquivalent hiervon, wie ein anorganisches Oxid, anorganisches Phosphat, anorganisches Carbonat und/oder anorganisches Hydrat, umfaßt.

9. Rutsche nach einem der vorausgehenden Ansprüche, dadurch gekennzeichnet, daß das Gemisch zusätzlich ein Reibung und Verschleiß reduzierendes Additiv in einer Menge von bis zu 10 Gew.-%, vorzugsweise von 2 - 10 Gew.-%, bezogen auf die Gesamtzusammensetzung, enthält.

10. Rutsche nach einem der vorausgehenden Ansprüche, dadurch gekennzeichnet, daß das Reibung und Verschleiß reduzierende Additiv ein Additiv oder Additivgemisch mit einer lamellenförmigen Molekülstruktur ist, die vorzugsweise Molybdänsulfid, Graphit, Bornitrid und/oder Certrifluorid umfaßt.

11. Rutsche nach einem der vorausgehenden Ansprüche, dadurch gekennzeichnet, daß das Gemisch zusätzlich stabilisierende Additive, wie UV-Stabilisatoren und Antioxidationsmittel, enthält.

5

Revendications

1. Glissoire pour le sport ou le jeu, par exemple pour le patinage ou une autre activité nécessitant un faible frottement, comprenant une couche de surface qui a été formée par la solidification d'un mélange fondu à base d'une cire et d'un polymère, caractérisée en ce que ledit mélange comprend plus de 40 % en poids de ladite cire sous la forme d'une cire dure naturelle et/ou synthétique, de 5 à 30 % en poids dudit polymère et de 5 à 40 % en poids d'un minéral conférant une résistance à la fissuration, lesdits pourcentages étant donnés par rapport au poids de la composition totale. 10 15
2. Glissoire selon la revendication 1, caractérisée en ce que ladite couche de surface a une dureté d'environ 0 à 15, telle que mesurée par la pénétrabilité à l'aiguille selon la norme DIN 51579 ou la norme ASTM 1321 à +20°C. 20 25
3. Glissoire selon la revendication 1 ou 2, caractérisée en ce que ledit mélange a un point de fusion d'environ 80 à environ 180°C, de préférence d'environ 90 à environ 140°C, en particulier d'environ 100 à environ 130°C. 30
4. Glissoire selon l'une quelconque des revendications précédentes, caractérisée en ce que la viscosité dudit mélange à 140°C est d'environ 1 000 à 100 000 cSt, de préférence de 2 000 à 50 000 cSt. 35
5. Glissoire selon l'une quelconque des revendications précédentes, caractérisée en ce que ladite cire dure représente plus de 50 % en poids de la composition totale. 40
6. Glissoire selon l'une quelconque des revendications précédentes, caractérisée en ce que ladite cire dure englobe les cires techniques, les cires microcristallines, les cires de polyéthylène et/ou les cires de paraffine. 45
7. Glissoire selon l'une quelconque des revendications précédentes, caractérisée en ce que ledit polymère englobe le polyéthylène, le polypropylène et/ou le nylon. 50
8. Glissoire selon l'une quelconque des revendications précédentes, caractérisée en ce que ledit minéral englobe le talc et/ou le mica ou un quelconque équivalent synthétique de ceux-ci, tel qu'un oxyde minéral, un phosphate minéral, un carbonate minéral et/ou un hydrate minéral. 55
9. Glissoire selon l'une quelconque des revendications précédentes, caractérisée en ce que ledit mélange contient de plus un additif réduisant le frottement et l'usure en une quantité allant jusqu'à 10 % en poids et, de préférence de 2 à 10 % en poids par rapport à la composition totale.
10. Glissoire selon l'une quelconque des revendications précédentes, caractérisée en ce que ledit additif réduisant le frottement et l'usure est un additif ou un mélange d'additifs ayant une structure moléculaire lamellaire, qui englobe de préférence le disulfure de molybdène, le graphite, le nitrure de bore et/ou le trifluorure de cérium.
11. Glissoire selon l'une quelconque des revendications précédentes, caractérisée en ce que ledit mélange contient de plus des additifs stabilisants, tels que des stabilisants UV et des antioxydants.