(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 847 305 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
24.10.2007 Bulletin 2007/43

(51) Int Cl.:
A63C 11/08 *(2006.01)*

(21) Application number: **07007683.1**

(22) Date of filing: **16.04.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **14.04.2006 IT MI20060763**

(71) Applicant: **Carini, Ulisse**
29100 Piacenza (IT)

(72) Inventor: **Carini, Ulisse**
29100 Piacenza (IT)

(74) Representative: **Gislon, Gabriele et al**
Marietti, Gislon e Trupiano S.r.l.
Via Larga, 16
20122 Milano (IT)

(54) **Apparatus and method for waxing skis or the like**

(57) The present invention concerns a method and a device (1) for ski waxing. Advantageously the sole (S) and/or the ski wax (5) are heated with air to a high temperature. Scraping of the excess ski wax is performed hot on the liquid ski wax.

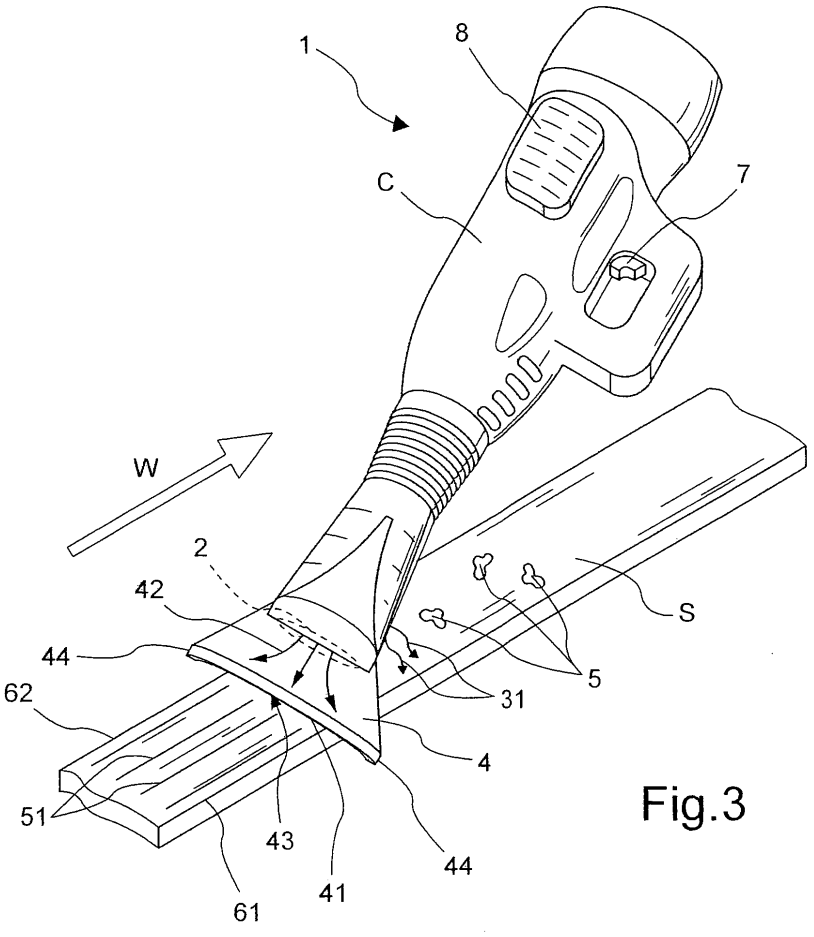


Fig.3

EP 1 847 305 A1

Description

[0001] The present invention concerns a method and a device for ski waxing skis, snowboards or similar equipment.

[0002] Ski waxing is a surface treatment usually used on winter sports equipment such as, for example, skis, snowboards, etc., and consists in applying a layer of a material known as ski wax on the surfaces that come into contact with the snow (soles or sliding surfaces). Ski wax improves the smoothness of the surface treated and, therefore, maximises performance of the equipment treated.

[0003] Ski wax is a paraffin-based material, usually obtained by mixing paraffins with different characteristics.

[0004] At present two methods exist for ski waxing, i.e. for applying a uniform layer of ski wax on the sole of the ski, snowboard, etc..

[0005] A first method consists in applying the ski wax "cold" on the sole, for example by spraying the liquid ski wax or by rubbing the solid ski wax on the sole. The ski wax adheres to the surface of the sole. Subsequent scraping removes the excess ski wax and levels the layer of ski wax on the sole.

[0006] A second method consists in applying "hot" ski wax on the sole. When the ski wax is brought to a temperature higher than the melting temperature, it is deposited on the sole, for example by dripping drops of melted ski wax on the surface of the sole and spreading the ski wax with a heated plate, or by bringing the sole into contact with a rotating roller soaked in melted ski wax. After cooling of the ski wax, the excess material is removed by scraping, for example using a spatula, as described in the case of cold application.

[0007] Ski waxing is usually performed manually by an expert technician who applies the ski wax on the sole to be treated and removes the ski wax in excess, in particular from the edges of the sports equipment.

[0008] Traditionally, the technician who performs the ski waxing uses an iron or equivalent device to spread the melted ski wax on the sole, and a spatula to remove the ski wax in excess. The temperature of the iron soleplate can reach 200°C.

[0009] The United States patent US 4,905,625 describes a device for performing hot ski waxing of skis.

[0010] The European patent EP 0367684-B1 concerns a method and a device for hot application of a thermoplastic material to the soles of skis and snowboards. The device comprises a heatable metal element, suitable for running over the sole to be treated and releasing the heat to it. The thermoplastic material is liquefied inside the heatable element and distributed on the sole by means of a plurality of channels. A spatula is fixed to the heatable element, at the level of the apertures of the thermoplastic material distribution channels, to spread said material in a liquid form on the sole.

[0011] The "hot" method provides for better results than those that can be obtained with the "cold" method. The heat released to the sole by the heatable plate maximises adhesion of the ski wax. The sole of the skis, snowboards, etc.. is made of a plastic material, the porosity of which is affected by the temperature. As the temperature increases, the pores of the sole material expand, facilitating penetration of the melted ski wax and, therefore, improving adhesion of the ski wax to the sole.

[0012] The drawback is that hot ski waxing requires time and must be performed by an expert. Furthermore a large amount of ski wax in excess is removed from the sole of the equipment. In other words, a considerable amount of ski wax is wasted in hot ski waxing, with evident drawbacks in terms of costs.

[0013] During hot ski waxing of skis, snowboards, etc., a certain amount of ski wax drips from the sole treated, creating problems with cleaning of the working environment and disposal of the waste ski wax.

[0014] The object of the present invention is to make available a method and a device for the ski waxing of soles of winter sports equipment which simply and effectively solve the drawbacks of the traditional methods and devices.

[0015] A further object of the present invention is to make available a method and a device for ski waxing soles of winter sports equipment which permit rapid application of a uniform layer of ski wax, minimising wastage of material.

[0016] These and further objects are obtained by the present invention which concerns a method for performing hot ski waxing of the sole of winter sports equipment, characterised in that it comprises a phase of heating at least one portion of said sole with one or more jets of hot air.

[0017] Advantageously, with respect to the traditional method, the sole is treated with hot air, for example having a temperature of between 50 and 500°C. The air is directed onto the surface to be treated by means of one or more nozzles. With respect to a traditional heatable plate, the air permits more rapid heating of the sole, with evident positive effects on the productivity of the ski waxing process. Furthermore the jet, or jets, of hot air can be directed to maximise uniformity of the heating, i.e. to heat the sole as evenly as possible.

[0018] Before heating the sole of the ski (or snowboard, etc.) by means of the hot air, a stick of ski wax in the solid state is wiped over the sole, or alternatively the ski wax can be dripped in liquid form onto the sole to be treated. Subsequent treatment with the hot air results in expansion of the pores of the sole material and complete melting of the ski wax which, therefore, penetrates said pores.

[0019] The jet, or jets, of hot air can be moved with respect to the sole so as to treat the entire surface. For example, a jet of air can be moved from the tip of the ski to the tail to permit ski waxing of the sole throughout its length.

[0020] Scraping of the excess ski wax can be performed traditionally, for example by hand, with a spatula,

after the ski wax on the sole has solidified due to cooling.

[0021] The method according to the present invention reduces wastage of ski wax, i.e. permits a reduction of up to 6 times in the amount of ski wax wasted with respect to the traditional methods.

[0022] Preferably, scraping of the ski wax is performed immediately after treatment of the sole with hot air, for example by running a spatula over the sole at a short distance from the jet, or jets, of hot air.

[0023] The spatula can be positioned with respect to the jets of hot air so that the air flow that comes into contact with the sole is diverted by the spatula towards the edges of the equipment treated. In this way the excess ski wax, still in the molten state during the treatment, is immediately pushed beyond the edges by the diverted flow of air. The excess ski wax can be recovered by providing a collection system at the edges, for example a recovery tank (heated to keep the ski wax in the liquid state) positioned below the edges to collect the drops of ski wax. This reduces wastage of ski wax and solves the problems of disposal of it and cleaning of the work premises.

[0024] The present invention furthermore concerns a device for performing hot ski waxing of the sole of winter sports equipment, comprising means for heating said sole and/or the ski wax present on it, characterised in that said means comprise at least one nozzle supplied with air at a high temperature.

[0025] The device, preferably of portable type, can be moved with respect to the sole to be treated. The device can be handled by the operator to perform ski waxing of the sole starting from the tip of the equipment, for example of a ski, to the tail (or vice versa, from the tail towards the tip).

[0026] The air is fed to one or more nozzles by a blower (inside or outside the device). The temperature of the air can be increased by an electrical resaistor up to the preset value.

[0027] Preferably the device is provided with one main nozzle that can be directed towards the surface of the sole to be treated. The main nozzle moves with the device along the length of the sole to perform the ski waxing. One or more secondary nozzles are provided to supply pre-heating air to the portion of the sole heated subsequently by the air coming out of the main nozzle.

[0028] The device is provided with a scraper element which has the function of separating the excess ski wax applied from the sole.

[0029] Preferably the scraper element is a spatula integral with the device and positioned at the level of the main nozzle, downstream of the same with respect to the direction in which the spatula runs over the sole.

[0030] The spatula has an arched profile and is flexible. The lateral edges of the spatula slide over the edges of the sports equipment and the central portion of the spatula, arched, is raised from the sole. When a pressure is applied on said central portion, the spatula bends and the central portion comes into contact with the sole. According to the preferred embodiment of the present invention, the spatula is positioned at the level of one edge of the main nozzle. In this way, when the device moves in relation to the sole treated, the spatula operates on the portion heated by the air coming out of the main nozzle, on the ski wax still in the molten state.

[0031] The jet of air coming out of the main nozzle also heats the spatula. In this way the ski wax that comes into contact with the spatula does not cool and does not solidify, modifying the profile of the spatula. In other words, scraping of the ski wax is also performed hot on the ski wax in the liquid phase.

[0032] Advantageously, the air coming out of the main nozzle is diverted by the spatula towards the lateral edges of the sole. This permits simple collection of the excess ski wax which is pushed beyond the lateral edges of the sole by the jet of air, with evident advantages as regards recovery of the ski wax and ski waxing costs.

[0033] The spatula is preferably made of a metal lamina, is partly flexible to follow any curves in the sole and is rounded at the edge designed to run over the sole.

[0034] The device according to the present invention permits ski waxing of skis, snowboards and equivalent articles, rapidly and with minimum wastage of ski wax.

[0035] This method offers high quality ski waxing. The heating action of the air which impacts on the sole maximises penetration of the liquid ski wax into the pores of the sole material, in a uniform manner on the surface of the sole.

[0036] According to the method and device of the present invention, the heat is released to the sole with convective type heat exchange, unlike the known technique based on a conductive heat exchange between a heated plate and the sole. The air-sole heat exchange is more uniform and effective than the plate-sole heat exchange.

[0037] By modifying the position of the spatula with respect to the main nozzle, modifying the profile of the spatula and modifying the pressure exerted by the operator on the spatula, the thickness of the layer of ski wax on the sole is adjusted.

[0038] The method and the equipment according to the present invention permit the application of ski waxes of different type on the same sole. Usually the ski wax is subject, during use of the sports equipment, to different wear and abrasion at the various points of the sole (near the edges the ski wax wears thin more quickly, in the front central and rear central part of the sole it wears out more slowly and at the other points wear is average). With the method and equipment of the present invention it is possible to apply more resistant ski wax (i.e. with better resistance to wear) at the points of the sole subject to greatest friction and less resistant ski wax at the points of the sole subject to less friction. For example, two ski waxes of different type can be coupled in one single stick. In other words one single stick of ski wax can comprise two or more mixtures having different hardness and suitable for the same snow conditions. In this way it is pos-

sible to rub the sole at the required points with the most appropriate ski wax according to requirements. The ski waxes applied will melt exactly at the established points.

[0039] Further aspects and advantages of the present invention will become clearer from the following description, provided by way of non-limiting example with reference to the accompanying schematic drawings, in which:

- figure 1 is a block diagram;
- figure 2 is a perspective view of a device according to the present invention;
- figure 2A is a frontal view of a detail of the device shown in figure 2;
- figure 3 is a perspective view of the device shown in figure 2, in use.

With reference to figure 1, according to the method of the present invention, the ski wax is brought to melting point by applying heat to the ski wax, or to the sole, by means of air at high temperature, for example between 50 and 500°C.

[0040] The ski wax is applied on the sole of the equipment to be treated. This operation is preferably performed by rubbing a piece of solid ski wax on the sole, or depositing drops of ski wax in the liquid state on the surface of the sole.

[0041] One or more jets of hot air are directed towards the sole to be treated. The air releases heat to the sole and to the ski wax. The heat causes liquefaction of the ski wax and dilates the pores of the sole material. The ski wax in liquid form penetrates into said pores.

[0042] Figure 2 shows a device 1 according to the present invention. The device 1 is provided with a main nozzle 2 supplied with air, the temperature of which can be regulated. The device 1 can be handled by the operator so that the main nozzle 2 can be positioned to direct the air onto the sole to be treated. The arrows at the mouth of the nozzle 2 indicate the outflow direction of the hot air.

[0043] The device 1 is also provided with a plurality of secondary nozzles 3 having the function of directing a flow of hot pre-heating air towards the sole to be treated.

[0044] The device 1 is furthermore provided with a scraper element 4, preferably a spatula, having the function of scraping the excess ski wax from the sole. In the embodiment shown, the spatula 4 is made of metal starting from a thin lamina. The edge 41, designed to run over the sole, has an arched profile (the profile shown in figure 2A is accentuated with respect to the line A for greater clarity), i.e. the central part of the edge 41 rests on the sole only when a pressure is applied on the spatula 4, while the edges 44 (figure 3) always rest on the edges of the sole S. Furthermore the edge 41 is preferably rounded to facilitate sliding over the ski wax. For said purpose it is useful to provide the spatula with a minimum surface roughness.

[0045] The hot air is provided by a blower positioned in the housing C of the device 1. The speed of the blower can be regulated to modify the speed of the air supplied to the nozzles 2 and 3. The device 1 furthermore comprises an electric element to heat the air, also provided in the housing C and also adjustable.

[0046] Figure 3 is a perspective view of the device 1 during its use. The arrow W indicates the direction in which the spatula 4, and therefore the device 1, runs on the sole S of a ski. The main nozzle 2 is indicated by a broken line and is between the spatula 4 and the sole S (i.e. below the spatula 4 in figure 3).

[0047] The ski wax 5 is applied cold on the sole S by running a stick of ski wax over said sole. Alternatively drops of melted ski wax 5 are applied on the sole S.

[0048] The operator moves the device 1 in the direction of the length of the sole S. The temperature and speed of the air supplied can be adjusted via a control panel 8. A switch-on key 7 allows the operator to enable-disable the device 1. The hot air, for example at 300°C, coming out of the main nozzle 2 releases heat to the ski wax 5, to the sole S and to the spatula 4, heating it. In this way hot ski waxing of the ski is performed.

[0049] The spatula 4, connected to the device 1, runs over the sole S, scraping the excess ski wax. The arrows 42 indicate the path of the air flow coming out of the main nozzle 2.

[0050] Advantageously the spatula 4 partly diverts the flow of hot air towards the edges of the sole S, i.e. towards the ski edges 61 and 62. In addition to the function of optimising the thickness of the layer of ski wax 51 applied on the sole S, the spatula 4 diverts part of the air coming out of the nozzle 2 towards the ski edges, pushing part of the liquid ski wax beyond the ski edges 61 and 62.

[0051] In other words, scraping of the ski wax 51 is performed immediately after the hot ski waxing, i.e. after the hot air has melted the ski wax 5 causing it to penetrate into the pores of the material of the sole S.

[0052] The holes 3 (figure 2) provide a pre-heating hot air flow. The air 31 coming out of the holes 3 releases heat to the sole S and to the ski wax 5, increasing the temperature thereof and accelerating the subsequent heat exchange with the air coming out of the nozzle 2.

[0053] The spatula 4 is made from a metal lamina. The edge 41 is curved, i.e. the central portion 43 is not aligned with respect to the lateral portions 44, as shown in detail in figure 2A. The lateral portions 44 run on the ski edges 61 and 62, while the central portion 43 runs on the sole S only when the pressure exerted by the operator acts on the spatula 4, thus leaving the layer 51 of ski wax. The spatula 4, bending at least partly, adapts to the surface of the sole S, leaving a layer 51 of ski wax with substantially constant thickness throughout the length of the ski.

[0054] The heating of the sole S and the ski wax 5 by the device 1 is substantially uniform, with evident advantages as regards the quality of the ski waxing performed. Advantageously, the heat exchange is of the convective type (not by contact of a hot plate with the surface S as in the traditional devices) and it is therefore not negatively

affected by any unevenness in the surface S of the sole.

[0055] Scraping is performed by the spatula 4 when the ski wax 5 is still in the liquid state. The spatula 4 is kept at a high temperature by the flow of air coming out of the nozzle 2, so as to prevent part of the ski wax solidifying in contact with the edge 41. This permits optimal control of the thickness of the layer of ski wax 51 which cools, solidifying on the sole S, after passage of the spatula 4.

[0056] The device 1 permits hot ski waxing of the sole S more rapidly than occurs with use of the traditional devices.

[0057] The amount of ski wax wasted is minimum. The ski wax scraped by the spatula 4 is directed beyond the edges 61, 62 of the ski by the air 42 coming out of the nozzle 2. The ski wax directed beyond the ski edges 61, 62 can be easily collected and re-used, for example by providing a system for recovery of the same at the level of and below the ski edges. The traditional methods and devices, on the other hand, do not allow the excess ski wax to be directed towards precise points and, therefore, the ski wax is dispersed in the surrounding environment without the possibility of its being recovered. The method and the device 1 according to the present invention therefore reduce wastage of ski wax, with evident advantages in terms of economy of the process.

[0058] It will be clear to a person skilled in the art that the device 1 can be used also without spatula 4, with traditional scraping of the excess ski wax, cold, after the ski wax 51 has solidified.

[0059] The ski waxing can be differentiated into areas on the sole S. In other words it is possible to apply ski waxes having different characteristics on the various areas of the sole. A hard ski wax can be applied cold near the ski edges 61, 62 and a "soft" ski wax can be applied on the central portion of the sole S before implementing the method according to the invention, i.e. before melting the ski waxes with hot air and proceeding with the scraping.

Claims

1. Method for hot ski waxing of the sole (S) of winter sports equipment, **characterised in that** it comprises the phase of heating at least one portion of said sole with one or more jets of hot air (31, 42).

2. Method as claimed in claim 1, **characterised in that** it furthermore comprises the phase of depositing ski wax (5) on at least one portion of the surface of said sole (S).

3. Method as claimed in claim 2, **characterised in that** said ski wax is applied cold on said sole.

4. Method as claimed in any one of the preceding claims from 2 to 3, **characterised in that** said one or more jets of hot air (31, 42) are directed onto said sole (S) and move with respect to its length to melt said ski wax (5).

5. Method as claimed in claim 4, **characterised in that** it diverts the hot air towards the lateral edges (61, 62) of said sole (S) to eliminate the excess ski wax.

6. Method as claimed in any one of the preceding claims 1-5, **characterised in that** it furthermore comprises the phase of scraping the excess ski wax from said sole (S).

7. Method as claimed in claim 6, **characterised in that** said excess ski wax is scraped when it is in the liquid state.

8. Method as claimed in any one of the preceding claims 2-6, **characterised in that** it furthermore comprises the phase of cooling said ski wax on the sole until it is solidified at least partly.

9. Method as claimed in any one of the preceding claims from 1 to 8, **characterised in that** the air has a temperature of between 50 and 500°C.

10. Device (1) for hot ski waxing of the sole (S) of winter sports equipment, comprising means for heating said sole (S) and/or the ski wax (5) present on the same, **characterised in that** said means comprise at least one nozzle (2, 3) supplied with air at a high temperature.

11. Device as claimed in claim 10, **characterised in that** it comprises a scraper element (4) for removal of part of the ski wax adhering to said sole (S).

12. Device as claimed in claim 11, **characterised in that** said scraper element is a spatula (4) suitable for running over said sole.

13. Device as claimed in claim 12, **characterised in that** said spatula (4) is positioned at the level of said at least one nozzle (2) and downstream of the same with respect to the direction in which it runs over the sole (S).

14. Device as claimed in claim 12 or claim 13, **characterised in that** said spatula (4) is flexible and has an arched profile, with a central portion (43) raised with respect to the lateral portions (44), said lateral portions sliding on the edges (61, 62) of the sole (S) and said central portion coming into contact with said sole (S) when said central portion (43) is bent following application of a pressure on the spatula (4).

15. Device as claimed in any one of the preceding claims from 12 to 14, **characterised in that** said spatula

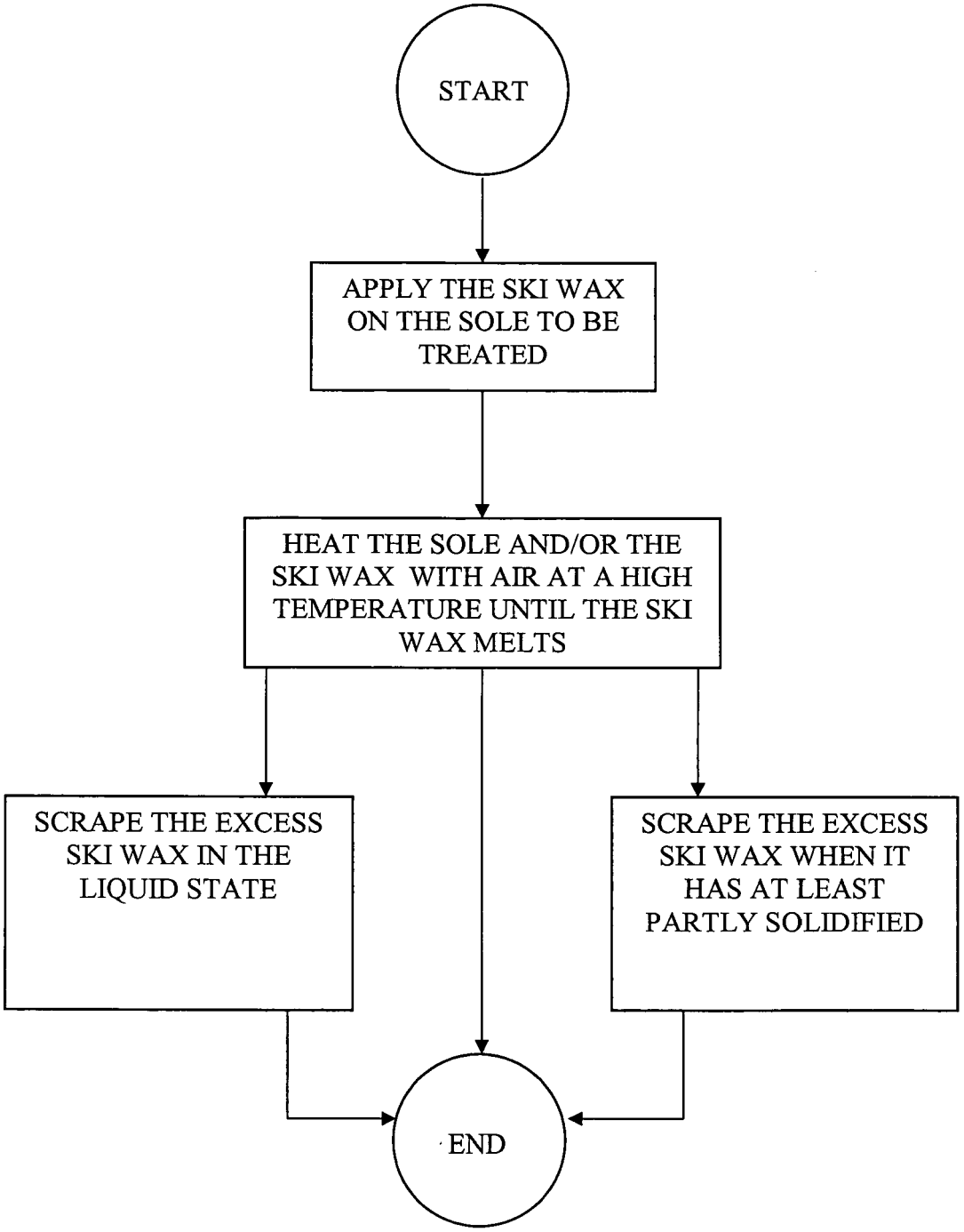
(4) diverts at least partly the air coming out of said at least one nozzle (2) towards the edges of said sole (61, 62).

16. Device as claimed in any one of the preceding claims from 10 to 15, **characterised in that** it comprises a blower to supply said at least one nozzle (2) and one or more electrical resistors to heat the air supplied.

17. Device as claimed in any one of the preceding claims from 11 to 16, **characterised in that** said scraper element (4) is heated by the air coming out of said at least one nozzle (2).

18. Device as claimed in any one of the preceding claims from 10 to 17, **characterised in that** it is portable.

19. Use of the device as claimed in any one of the preceding claims for the ski waxing of sports equipment.


START
APPLY THE SKI WAX ON THE SOLE TO BE TREATED
HEAT THE SOLE AND/OR THE SKI WAX WITH AIR AT A HIGH TEMPERATURE UNTIL THE SKI WAX MELTS
SCRAPE THE EXCESS SKI WAX IN THE LIQUID STATE
SCRAPE THE EXCESS SKI WAX WHEN IT HAS AT LEAST PARTLY SOLIDIFIED
END

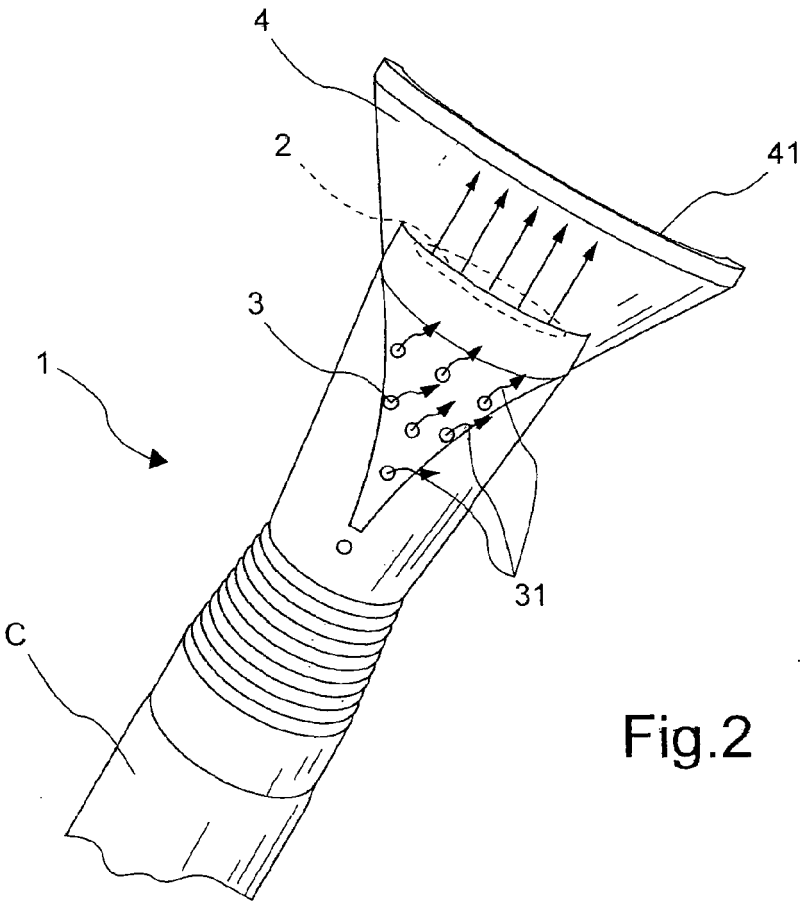
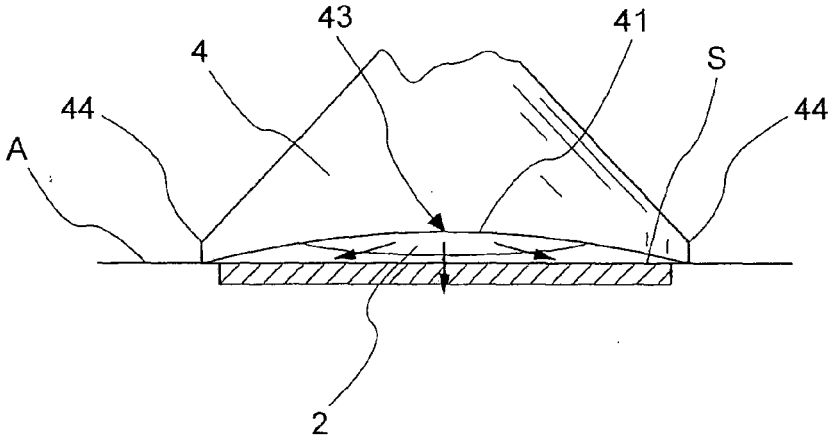


Fig.2

Fig.2A



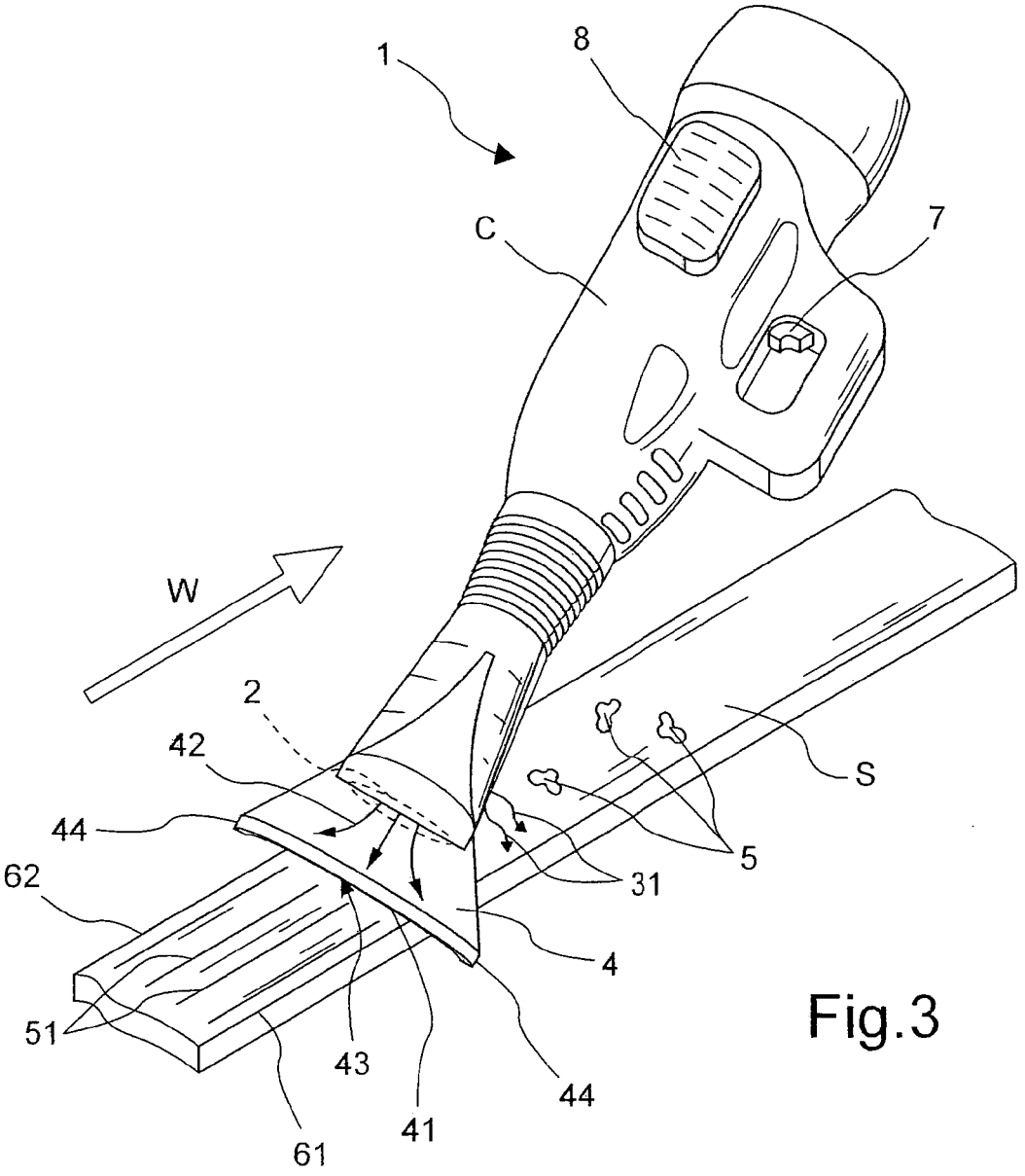


Fig.3

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 00 7683

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	FR 2 422 419 A1 (LAFRANCONI ANDREA LAF [IT]) 9 November 1979 (1979-11-09)	1,2,6,7, 9-11, 16-19	INV. A63C11/08
Y	* pages 1-3; figures 1-3 *	12,13	
Y	FR 2 021 320 A (CHALON JEAN) 24 July 1970 (1970-07-24) * figures 1-3 *	12,13	
X	DE 33 31 525 A1 (GASSNER GUSTAV) 18 April 1985 (1985-04-18) * page 5; figures 1-4 *	1,2,9, 10,16, 18,19	

TECHNICAL FIELDS SEARCHED (IPC)

A63C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	14 September 2007	Brunie, Franck

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 00 7683

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

14-09-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2422419 A1	09-11-1979	AT 363027 B	10-07-1981
		DE 2918682 A1	23-10-1980
FR 2021320 A	24-07-1970	NONE	
DE 3331525 A1	18-04-1985	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- US 4905625 A **[0009]**
- EP 0367684 B1 **[0010]**