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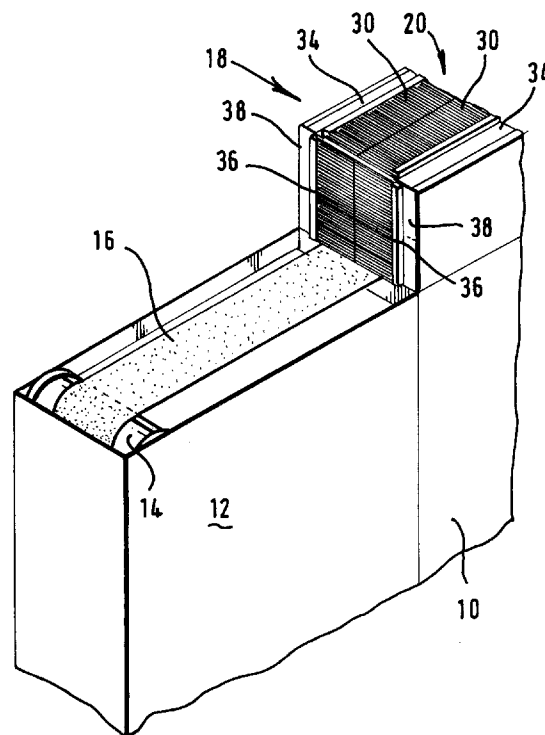
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(54) **Heat setting apparatus.**

(57) A heat setting apparatus has one or more defined paths (channels 20) through a chamber (18) to which hot (or hot and moist) air is supplied, the air being directed through air inlets (24) onto the shoes to be treated. In order to accommodate high-legged boots, each path (20) has an opening at its top through which the boot legs may project as the boot passes along the path. In order to reduce heat loss and to prevent discomfort to the operator, each such opening is closed by two cooperating elongated brush members (30). If desired, such brush members may also be used to close the front entrance and rear exit to each such path within the chamber (18).

FIG.2



Technical Field

This invention is concerned with improvements in or relating to heat setting apparatus, i.e. apparatus for use in heat setting lasted shoe uppers. The term "shoe" where used herein is to be understood as referring to outer footwear generally whether complete or in the course of manufacture and in particular as including high-legged boots.

Background Art

There is described in GB-A 2 088 195 a heat setting apparatus comprising a chamber through which shoes the uppers of which are to be treated can pass, conveyor means on which shoes can be placed and by which such shoes can be carried through the chamber, and air inlet means within the chamber for directing jets of heated air on to shoes as they pass through the chamber, wherein the ceiling of the chamber has an opening extending along the length thereof in the direction of movement of the conveyor means, through which opening the leg of a boot can project as it passes through the chamber, and wherein the opening is closed by at least one flexibly deformable closure member which is mounted at one side of the opening and allows the passage of a boot leg along the opening but otherwise serves to seal the opening. More particularly, the chamber of said apparatus has defined therein a plurality of paths along any one of which shoes can pass, each path having associated therewith conveyor means and inlet means as aforesaid, and the ceiling of the chamber having a plurality of openings, one associated with each such path. Moreover, in the particular apparatus described in said specification the or each opening in the ceiling of the chamber is closed by two cooperating flexible deformable members, one mounted on each side of the opening. Again, in the particular embodiment described in said specification each flexibly deformable member is constituted by an inflatable air bag, the air bags thus cooperating with each other to seal the opening but being able to be parted locally as the leg of a high-legged boot passes therebetween.

The apparatus as above described has enjoyed commercial success and operates satisfactorily on shoe uppers not only in terms of effective heat setting, but also in terms of protecting the operator and indeed the area immediately surrounding the apparatus by restricting significantly the escape of hot air from the apparatus during its operation. Such restriction of escape of hot air also of course serves to reduce the energy requirements of the apparatus.

The material from which the bags are made is nylon fabric and it has now been found that, when operating on certain types of shoes, there may be some tendency for the colour finish on the leg of a high-

legged boot to be removed as the boot leg passes between the air bags. The amount of removal is of course relatively insignificant but it has been found that where uppers of contrasting colours follow each other down the path between the air bags, with uppers of a particular type the small amount of finish which may be removed from one upper is then transferred to the next following upper with consequent detriment to the appearance of the finished shoe (boot).

It is believed that the transfer of the finish in this way is attributable to the relatively hard surface which the nylon fabric presents.

The Invention

It is thus the object of the present invention to provide an improved heat setting apparatus in which any tendency to remove and transfer finish from one upper to another is mitigated.

The invention thus provides, in one of its several aspects, heat setting apparatus comprising a chamber through which shoes the uppers of which are to be treated can pass, conveyor means on which shoes can be placed and by which such shoes can be carried through the chamber, and air inlet means within the chamber for directing jets of heated air on to shoes as they pass through the chamber, wherein the ceiling of the chamber has at least one opening extending along the length thereof in the direction of movement of the conveyor means, through which at least one opening the leg of a boot can project as it passes through the chamber, and wherein the or each opening is closed by at least one flexibly deformable closure member which is mounted at one side of the or each opening and allows the passage of a boot leg along the or each opening but otherwise serves to seal the or each opening, characterised in that the or each flexibly deformable closure member is constituted by an elongated brush member.

It has been found that using a brush member, the sealing of the opening(s) remains adequate to prevent discomfort to the operator or the immediately surrounding area by continuing to prevent significant escape of hot air, while at the same time by the correct selection of bristles, the risk of removing finish from one upper and transferring it to another is minimised.

Preferably the conveyor means has a shoe loading station "upstream" of the chamber and the chamber has in a front wall thereof at least one opening through which shoes placed on the conveyor means at said station pass into the chamber, the or each opening in the front wall also being closed by at least one further flexibly deformable member, such further member also preferably being constituted by an elongated brush member.

The chamber of the apparatus in accordance with

the invention may provide a single passageway or path along which shoes the uppers of which are to be treated can pass. In such a case the passageway or path is relatively narrow and the air inlet means can be arranged in opposite sidewall portions thereof. Such a single-track heat setting apparatus may find use not only for heat setting uppers but also for transferring shoes from one operation to another, e.g. from a final lasting operation to a bottom preparation operation, e.g. a roughing operation. Alternatively, however, as in the case of the apparatus described in the aforementioned specification, the chamber may be divided by internal walls into a plurality of narrow channels, each channel having its own conveyor means and its own air inlet means, or again, as is the case with other commercially available machines, a single chamber may have a plurality of paths defined therein, e.g. utilising guides or the like, and each path may either have its own conveyor means associated therewith or a common conveyor means may be provided for two or more or indeed all the individual paths. In general, however, air inlet means will be associated specifically with each such path.

The invention thus provides, in another of its several aspects, a heat setting apparatus wherein a chamber has defined therein a plurality of paths along any one of which shoes the uppers of which are to be treated can pass, each path having associated therewith conveyor means having a plurality of defined shoe loading stations, one associated with each path, at which stations shoes can be selectively placed on the conveyor means to be carried along the selected path through the chamber, and air inlet means extending along each path within the chamber for directing jets of heated air on to shoes as they pass along said path through the chamber, wherein the ceiling of the chamber has a plurality of openings, one associated with each path and each extending along the length thereof in the direction of movement of the conveyor means, through which opening the leg of a boot can project as it passes along said path through the chamber, and wherein each opening is closed by at least one flexibly deformable closure member which is mounted at one side of the opening and allows the passage of a boot leg along the opening but otherwise serves to seal the opening, characterised in that said at least one flexibly deformable closure member is constituted by an elongated brush member.

Again, in such a "multi-path" embodiment, the shoe loading stations are arranged "upstream" of the chamber and the chamber has in a front wall portion thereof a plurality of openings, one associated with each shoe loading station and with each path through the conveyor, through a selected one of which openings shoes placed at its associated loading station pass into the chamber, each such opening in the front wall also being closed by at least one further flexibly

deformable member, such further member also being constituted by an elongated brush member.

As in the apparatus of the aforementioned specification, moreover, preferably the or each opening in the front wall of the chamber is closed by two cooperating flexibly deformable members, one mounted on each side of the opening, and furthermore the or each opening in the ceiling of the chamber is also closed by two cooperating flexibly deformable members, again one mounted on each side of the opening, each such member being constituted in this case, however, by an elongated brush member.

The Drawings

Figure 1 is a front view of a multi-channel heat setting apparatus in accordance with the invention;

Figure 2 is a fragmentary perspective view of a single-channel heat setting apparatus in accordance with the invention; and

Figure 3 is a perspective view of a section of an elongated brush member used in the apparatus as shown in Figures 1 and 2.

Best Mode

Referring to Figure 1, the first, multichannel, heat setting apparatus in accordance with the invention is generally similar, except as hereinafter described, to the apparatus described in GB-A 2 088 195. Thus, this apparatus comprises a main frame 10 enclosed by sheet metal panels and having a forward extension 12 which supports a front roller 14 around which four conveyor belts 16 are guided. The conveyor belts 16 are made of a mesh material so that they are permeable to air.

The main frame 10 supports a chamber generally designated 18 which, in the particular case of the apparatus shown in Figure 1, is sub-divided into four channels generally designated 20. As can be seen from the second to the left channel in Figure 1 (from which parts have been omitted in order to disclose the construction of the channel 20), each channel 20 is defined by two sidewalls 22 having vertical portions at the bottom and top and an intermediate angled portion, so that each channel is narrower at the top than at the bottom. The overall cross-sectional shape of the channel thus matches to some extent that of a shoe S. In the intermediate portions of the sidewalls 22 are formed rows of air inlets 24 through which air is directed onto the side portions of the shoe where maximum stress has been created in the shoe. Whereas in this particular embodiment the air inlets are relatively close to the shoe, it will be appreciated that the requirement for the positioning of the air inlets is merely that they direct air towards the shoe with sufficient velocity that any surface layer of air

(which in fact acts as a barrier to the heat setting air) is broken up and dissipated, thus allowing a satisfactory heat setting operation to be performed. Thus it is possible for the jets of air to be located in the "ceiling" of the channels or indeed in any other appropriate locality.

For supplying the air to the air inlets 24, passageways (not shown but indicated by reference numeral 58 in GB-A 2 088 195) connect the inlets with a plenum chamber supplied by a pump (again not shown, but referred to in said specification by reference numerals 56 and 54 respectively). The exit velocity of the air from the air inlets 24, furthermore, is in the order of 10 to 20 m/s, and the air is heated preferably to a temperature in the order of 125°C. If desired, and this is usually the case where the uppers are made of leather, steam is added to the air supplied through the air inlets 24 and preferably the quantity of steam is such that the air thus supplied has a dew point in the order of 60°C.

For preventing the escape of significant quantities of hot (or hot and moist) air from each channel, to the discomfort of the operator and with consequential energy waste, each channel is closed at the top thereof by two cooperating flexibly deformable members in the form of elongated brush members 30. For mounting each brush member 30, an elongated bracket 32 is provided having a re-entrant groove portion extending along its length for receiving a mounting of the brush member in which the bristles of the brush member are embedded. The elongated bracket also has a securing portion 34 by which the brush member can thus be secured to the top surface of the side-walls defining the channel. The elongated brush members and the mounting brackets therefor are obtainable from DENDIX LTD, of Lower Church Street, Chepstow, Gwent NP6 5XT, under the trade name MultiStrip. By using two cooperating brush members in this way, the leg of a high-legged boot which is moving along its path through the channel 20 on the conveyor belt 16 can project upwardly out of the top of the channel, and the brush members will open sufficiently to allow such passage but without losing a significant part of their sealing effect, so that even as the boot leg passes there is no significant loss of hot air from the channel.

Similarly, the front ends of each channel may also be sealed by two elongated brush members 36, being of the same construction and being secured by the same brackets as in the case of the closure of the tops of the channels. In this case the brackets 38 are secured to the front ends of the sidewalls 22.

Although not shown, the opposite ends of the channels are similarly closed by elongated brush members.

The conveyor belts 16 are driven by a motor (not shown) such that each shoe is moved through its selected channel in a time of between 1½ and 2½ min-

utes.

With reference to Figure 2, in this case a single-channel apparatus is shown which is of the same general construction as the apparatus of Figure 1, but in this case the chamber is constituted by a single channel.

It will be appreciated that other forms of apparatus embodying the present invention may also be proposed. For example, instead of sub-dividing the chamber 18 into four distinct channels, a single chamber may be provided but with a plurality of openings in the front and rear walls thereof, so that distinct shoe loading stations for the shoes, as well as distinct paths through the chamber, are defined. If desired, moreover, such paths may be each provided with guides within the chamber so that the shoes do not "stray" during their passage therethrough. Each path is of course then provided with its own top opening which is sealed by elongated brush members as described above. In some apparatus it may be desired to provide only a single conveyor belt extending across the width of the chamber, while in others individual conveyor belts may be provided for each such defined path.

Claims

1. Heat setting apparatus comprising
 - a chamber (18) through which shoes (S) the uppers of which are to be treated can pass, conveyor means (16) on which shoes (S) can be placed and by which such shoes (S) can be carried through the chamber (18), and air inlet means (24) within the chamber for directing jets of heated air on to shoes (S) as they pass through the chamber (18), wherein the ceiling of the chamber has at least one opening extending along the length thereof in the direction of movement of the conveyor means (16), through which at least one opening the leg of a boot can project as it passes through the chamber (18), and wherein the or each opening is closed by at least one flexibly deformable closure member which is mounted at one side of the or each opening and allows the passage of a boot leg along the or each opening but otherwise serves to seal the or each opening, characterised in that the or each flexibly deformable closure member is constituted by an elongated brush member (30).
2. Apparatus according to Claim 1 wherein the conveyor means has a shoe loading station "upstream" of the chamber (18) and the chamber (18) has in a front wall thereof at least one opening through which shoes (S) placed on the con-

veyor means (16) at the station pass into the chamber (18), the or each opening in the front wall also being closed by at least one further flexibly deformable member,
characterised in that said further member is also constituted by an elongated brush member (36).

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Claims characterised in that the or each opening in the ceiling of the chamber (18) is closed by two cooperating elongated brush members (30), one mounted on each side of the opening.

3. Heat setting apparatus according to Claim 1 wherein the chamber has defined therein a plurality of paths along any one of which shoes (S) the uppers of which are to be treated can pass, each path having associated therewith

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conveyor means (16) having a plurality of defined shoe loading stations, one associated with each path, at which stations shoes (S) can be selectively placed on the conveyor means (16) to be carried along the selected path through the chamber (18), and

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air inlet means (24) extending along each path within the chamber (18) for directing jets of heated air on to shoes (S) as they pass along the path through the chamber (18),

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wherein the ceiling of the chamber (18) has a plurality of openings, one associated with each path and each extending along the length thereof in the direction of movement of the conveyor means (16), through each of which openings the leg of a boot can project as it passes along the path through the chamber (18),

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and wherein each opening is closed by at least one flexibly deformable closure member which is mounted at one side of the opening and allows the passage of a boot leg along the opening but otherwise serves to seal the opening, characterised in that said at least one flexibly deformable closure member is constituted by an elongated brush member (30).

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4. Apparatus according to Claim 3 wherein the shoe loading stations are arranged "upstream" of the chamber (18) and the chamber (18) has in a front wall portion thereof a plurality of openings, one associated with each chamber (18), through a selected one of which openings shoes (S) placed at its associated loading station pass into the chamber (18), each such opening in the front wall also being closed by at least one further flexibly deformable member,
characterised in that said further member is also constituted by an elongated brush member (36).

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5. Apparatus according to Claim 2 or Claim 4 characterised in that the or each opening in the front wall of the chamber (18) is closed by two cooperating elongated brush members (36), one mounted on each side of the opening.

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6. Apparatus according to any one of the preceding

FIG. 1

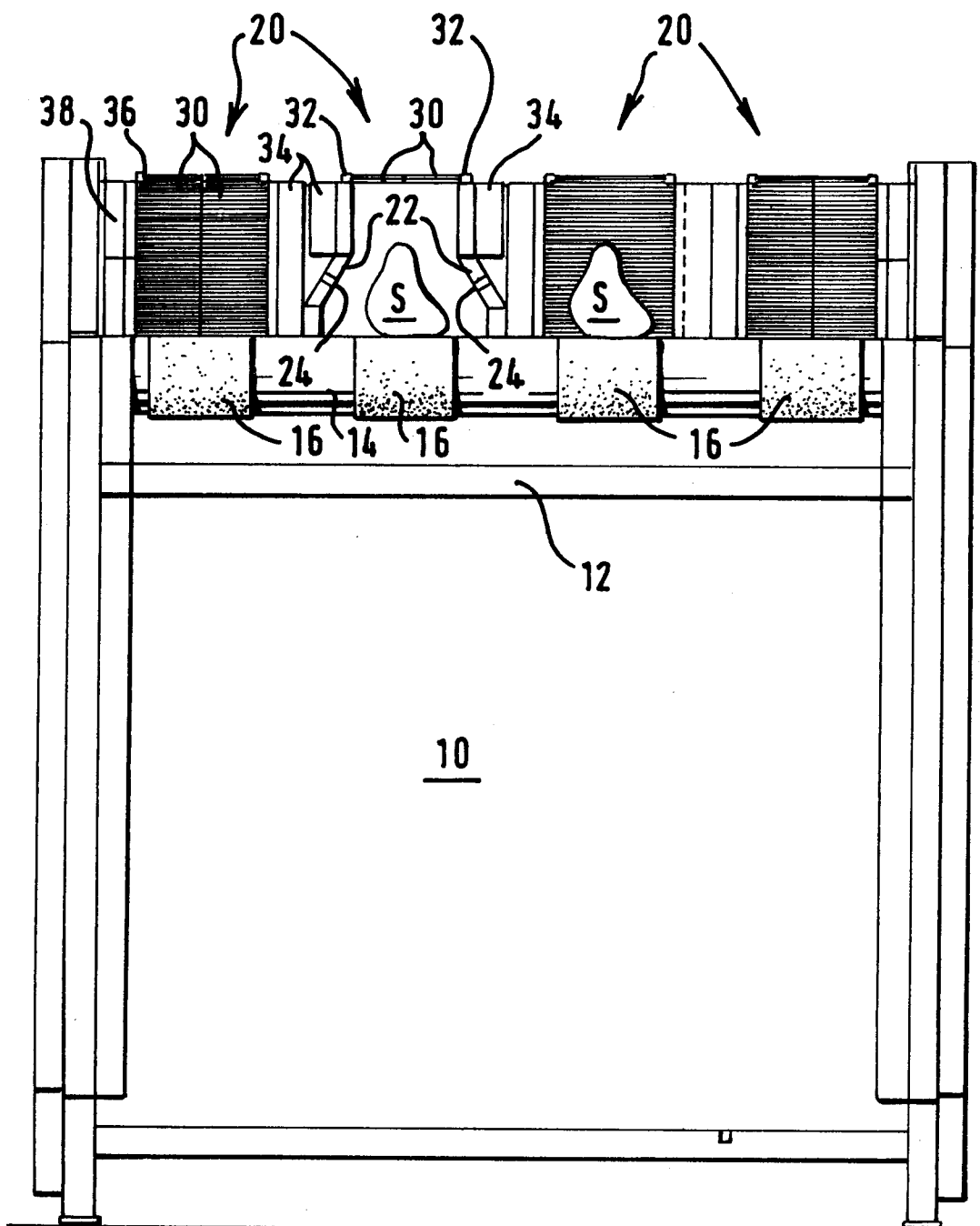


FIG. 2

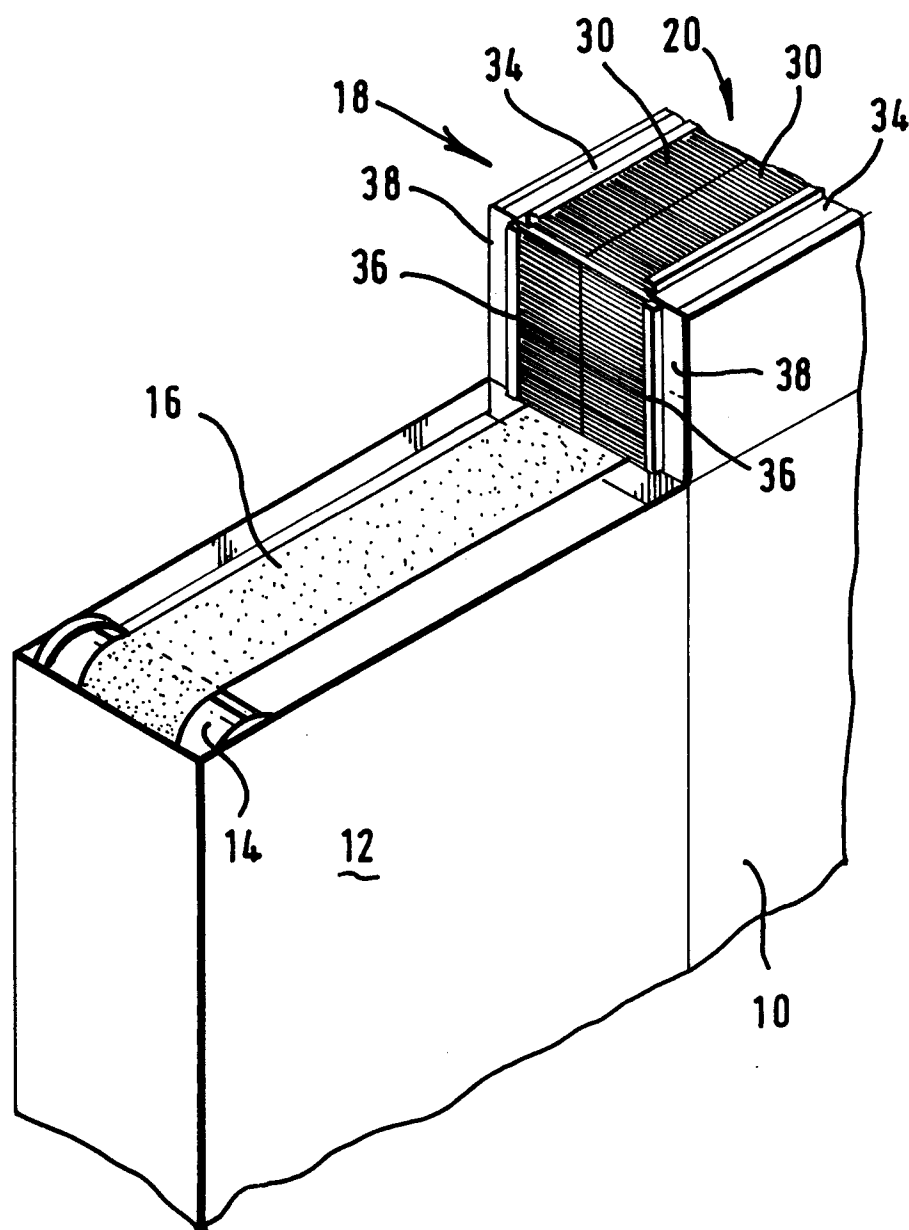
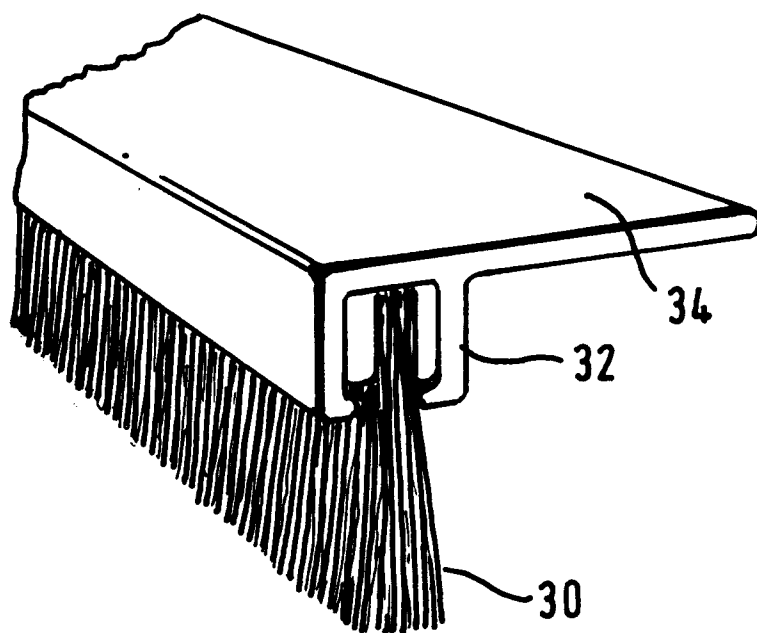


FIG.3





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 92 30 8256

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	US-A-1 647 277 (R. DAVIS) * page 2, right column, line 100 - line 125; figure 3 *	1-6	A43D95/12
A	GB-A-2 122 475 (THE BRITISH UNITED SHOE MACHINERY COMPANY LTD.)		
A	DE-A-2 022 386 (A. FREEMAN)		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A43D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 07 DECEMBER 1992	Examiner SOEDERBERG J.E.
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			

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