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(54) Means and method of preserving a snow base on a skiing slope.

(57) The invention relates to a method and means for preserving enough snow on a ski slope over the period of time between the last snow fall in the spring and the first snow fall in the autumn to provide an adequate base for the receipt of natural snow in the autumn or for receipt of man-made snow in the autumn. A conventional ski slope (2), having a layer of residual winter snow (6) substantially covering at least a portion of the slope (2), is covered with insulating sheets (10) of material. The insulating sheets (10) are of such insulating properties that, acting in combination with the residual snow (6), they will minimise melting of the residual snow (6) over the summer to such an extent that, upon removal of the insulating sheets (10) in the autumn, an adequate snow base will remain to receive natural or man-made snow. Thus, skiing on the covered part of the slope (2) may begin in advance of the time the slope (2) would be normally available had the residual snow (6) not been preserved by said means.

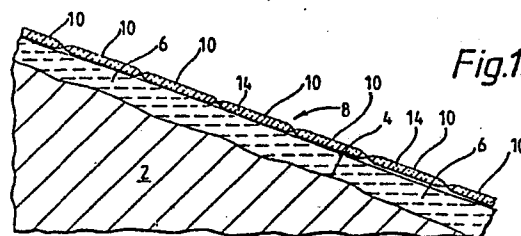


Fig.1.

MEANS AND METHOD OF PRESERVING A SNOW BASE ON A SKIING SLOPE

Skiing, both downhill or on trails, is a world wide sport. Typically at the end of the skiing season in the spring, the snow gradually melts leaving the ground bare and subject to increasing temperature over the summer. In the autumn the decreasing ambient temperature gradually cools the ground but it is rarely cold enough to hold the early fall snows. Thus before a base of snow can be built up for proper skiing conditions, several snow falls may be needed over a period of time.

Attempts to provide an early autumn base of man-made snow have been undertaken but this procedure is so expensive and generally futile that it is not used to provide a base. Man-made snow customarily is not applied to a slope or trail until after a natural base has developed and the temperature is consistently well below freezing.

As far as we are aware, nothing has been done heretofore to attempt to preserve over the summer a sufficiently thick layer of snow from the previous winter to constitute an adequate base for supporting the first natural snows of the late autumn or man-made snow applied as soon as low enough temperatures have arrived.

Thus heretofore, good skiing conditions become available only after natural snow has fallen to completely cover the slope or trail or by a combination of natural snow plus some additions of man-made snow on uncovered areas.

In the present invention it is contemplated to cover the entire slope or trail or desired parts thereof with removable sheets of insulating material of such characteristics that any melting of the snow thereunder

during the spring, summer and autumn will be so limited that come late autumn and the first snows of winter there will be present an existing snow base capable of holding the early snows as they arrive and thus putting the
5 slopes and trails in condition for use well in advance of the time that would occur had the underlying base not been preserved.

The invention contemplates the use of any presently known insulating materials and any others that
10 may appear in the future so long as they in combination with the supporting flexible sheet structure are capable of insulating the snow from the summer heat to preserve it as a base on which the autumn and winter snows may build.

15 A mechanism may be provided at the sides of the slopes and trails for quickly and easily applying the insulating sheets to positions on the snow in the spring and removing them in the autumn. Alternatively, the insulating sheets may of course be applied and removed by
20 hand. The sheets may be of any desired dimensions. Preferably the sheets whether transverse or longitudinal will be rectangular and capable of being rolled up to remain out of the way at the side or bottom of the slope over the winter.

25 In one form the means for winding the sheets in rolls may be mounted on or pulled by a truck or tractor which may be moved up the slope from one sheet to the next as they are moved in the autumn. The sheets if stored in rolled up form can be manually unrolled across the
30 slope in the spring and adjusted next to each other to completely cover the snow.

Alternatively, the insulating sheet may be in continuous form running from the top to bottom of the

ski slope. Cog railways may be installed on one or both sides of the slope with machines thereon connected by overhead means capable of rolling up the complete sheet to remove it from the snow in the autumn and to apply it in
5 the spring.

It is also contemplated that the insulating sheets may be temporarily removed to provide skiing in summer on particular occasions such as the Fourth of July or a company outing for example. It has been determined
10 that the melting that would occur during any such limited uncovered period in the summer would not materially diminish the snow volume that is to be preserved until autumn. The temporary removal and replacement of the covering can be expeditiously done by the machines
15 provided for that purpose.

The insulating sheet will usually be laid directly on the snow as such arrangement has been found adequate to preserve the snow over the summer. If greater insulating effect is needed or wanted, it may be
20 provided by spacing the insulating sheet a few inches above the snow through the use of spacers in the form of strips of foam rubber material. These strips of suitable dimensions to provide the desired spacing may be laid by hand close enough together to keep the sheet clear of the
25 snow.

On some slopes and/or trails it may be desirable or necessary to provide crossings for persons or animals. In such situations it is obvious that the crossing areas must remain uncovered during the summer
30 and therefore will lack snow cover when the insulating sheets are removed from the covered areas in the autumn. The deficiency can be overcome by locating the crossing areas adjacent places on the slope where the snow is deep

enough to provide a preserved volume of snow adequate to be spread in part over the crossing areas in the autumn thereby to provide the slope with a continuous covering of snow the same as if there had been no summer crossing areas.

5 In conditions where the snow to be covered in the spring is still quite deep, it is possible to economise on the amount of insulating material used by having the uncovered crossing areas as large, more or less, as the covered area. Then in the autumn, part of the large volume of preserved snow may be moved by machine to the adjacent then bare areas, thereby to provide the desired continuous early autumn snow base.

10 It will also be understood that some of the covered preserved snow could be located at the side of the slope or trail in a location from which it could be bulldozed onto the slope or trail after being uncovered in the autumn.

20 Thus, in another embodiment of the invention, snow is concentrated by hand or machine into a series of piles over the entire length of the slope. These piles will be high in the centre and tapering downwardly to the surrounding ground. The piles preferably will be circular. The spacing of the piles will be determined by the depth and location of the snow available.

25 The piles of snow are then covered with sheets of insulating material of such character that a major volume of the piled snow will be preserved over the summer and early autumn months. When the average ambient temperature had dropped in the autumn to a degree at which the snow will not melt away, the piles will be uncovered and the snow redistributed, by hand and/or machine over the selected areas of the slope. The depth of the

redistributed snow now covering the selected slope area will be adequate for immediate skiing and will last until the arrival of natural snow. Should the arrival of natural snow be delayed, the snow base can be augmented
5 by the application of man-made snow at the necessary locations after nighttime freezing conditions have arrived in the autumn.

The term snow as used herein is to be understood as including any other form of frozen water as may
10 be present on the covered slope such as ice, sleet and slush.

From the foregoing it will be understood that the object is to cover the snow on or in selected piles along the selected slopes or trails with insulating
15 sheets without placing any limitations on the size or shape of the sheets, the nature of the insulation forming or carried by the sheets or the method or means for positioning and removing the sheets. The sheets might be in rigid sections incapable of being rolled up but
20 stackable when not in use.

The invention will be more particularly explained in the following detailed description aided by the accompanying drawings in which

25 Fig. 1 is a vertical cross section of sloping terrain covered by snow which has an insulating cover thereover.

Fig. 2 is an enlarged vertical section of one form of cover.

30 Fig. 3 is a plan view of one type of insulating cover with one end attached to winding means.

Fig. 4 is a vertical elevation of Fig. 3 with the insulating sheet removed from the slope by the

winding means.

Fig. 5 is a plan view of Fig. 4.

Fig. 6 is a vertical cross section of modification in which there are two insulating sheets, one
5 between the ground and the snow and the other on top of the snow.

Figs. 7, 8 and 9 show the sequence of steps followed in providing the arrangement of Fig. 6, with Fig. 9 being a section taken on line 9-9 of Fig. 6.

10 Fig. 10 is a cross section of a portion of one specific type of insulating sheet drawn to enlarged scale.

Fig. 11 is a plan view of Fig. 10.

Fig. 12 is a view similar to Fig. 1 differing
15 in that a crossing area has been provided.

Fig. 13 is similar to Fig. 12 but shows the crossing area covered with snow taken from the adjacent snow covered areas after removal of the insulating sheets.

20 Fig. 14 is a plan view showing machines at the sides of the slope together supporting a rotatable shaft that extends across the slope. The machines are adopted to travel up the slope to unwind the insulating material from the shaft onto the slope from bottom to top and to
25 travel down the slope to wind the insulating material on the shaft to uncover the slope.

Fig. 15 shows spacers on the snow for holding the insulating sheet a short distance thereabove.

Fig. 16 is a side elevation of the wind up
30 mechanism to enlarged scale taken on the line 16-16 of Fig. 14.

Fig. 17 is a plan view of a snow covered ski slope in accordance with an alternate embodiment of the invention.

Fig. 18 is a vertical section on the line 18-18 of Fig. 17.

Fig. 19 is a section on the line 19-19 of Fig. 18.

5 Fig. 20 is a plan view of the ski slope of Fig. 17 with the snow thereon pushed into a plurality of piles.

Fig. 21 is a vertical section on the line 21-21 of Fig. 20.

10 Fig. 22 is a section on the line 22-22 of Fig. 21.

Fig. 23 is a plan view of the ski slope of Figs. 16 and 19 with the piled snow of Figs. 20, 21 and 22 redistributed on the slope.

15 Fig. 24 is a vertical section on the line 24-24 of Fig. 23.

Fig. 25 is a section on the line 25-25 of Fig. 24.

20 Fig. 26 is a view similar to Fig. 25 but showing the snow covering a greater area.

Fig. 27 is an enlarged view illustrating a snow pile to which man-made snow has been added.

Referring first to Fig. 1, there is shown at 2
25 a vertical cross section of terrain which represents any ski slope or ski trail. Hereafter when the term slope is used it will include a ski trail which is ordinarily flatter and narrower than a ski slope. The invention of preservation of snow is applicable to both the slope and
30 trail.

On the surface 4 of the slope is a layer of snow 6. This layer is the residual snow remaining at the time this particular slope is closed to skiing in the

spring. Since practically all ski facilities have a plurality of slopes, closing one slope where it is desired to preserve snow over the summer, does not affect continued spring skiing on the other slopes which are not to be covered. Therefore the slope that is to be closed will be closed when it still has an adequate depth of snow to last over the summer if properly protected against melting by correct insulation.

When autumn comes, there will remain a sufficient layer of this residual snow on this slope to keep the ground thereunder cold and to present a snow base capable of holding the early snow falls when they occur.

Accordingly, this residual snow on the closed slope is preserved over the summer by the application thereover of insulating covering sheets as indicated at 8. This insulating material must have the capability of keeping the sun's radiant heat and the heat of the ambient air away from the residual snow to such extent that, in spite of what melting may occur over the several warm months of summer, there will always remain in the autumn enough snow to provide the starting base for the winter's natural or man-made snows.

In one arrangement, the insulating cover may be in the form of a plurality of sheets 10 which may be laid mechanically or by hand over the snow in the spring and similarly removed in the autumn. One of the plurality of sheets 10 is shown in Fig. 3. This sheet, preferably covered top and bottom with aluminum foil is also shown in part in enlarged section in Fig. 2. The sheet may be quilted by stitching as at 12 or otherwise constructed to hold against shifting insulating material 14 such as saw dust, fiberglass, rock wool, small sheets of insulating board or any other material effective against heat

conduction that is presently available or may become available in the future.

For strength, the exterior coverings of aluminum foil may be applied to canvas or other fabrics, sheets or bubbles of plastics or other substances that may have suitable characteristics as to heat insulation, strength and waterproofness. For maximum results some experimentation may be necessary to relate the particular insulating covering to the depth of the radial snow and the average summer temperature of the geographical location of the slope.

One means for moving a sheet of insulating material from a slope is shown in Figs. 3, 4 and 5. A base 16 carries a sheet winding means comprised of bearings 18 and 20 through which extends a shaft 22 having on one end a bevel gear 24 driven by a cooperating bevel gear 26 carried by shaft 28 supported by bearing 30. Shaft 30 and its gear 26 may be turned by a hand crank 32 or a motor (not shown).

When the covering sheet 10 is to be removed, the base 16 carrying the winding means may be placed on the ground at the end of the sheet 10 by unloading it from a truck or it may be skidded along the ground to proper position or it may remain in permanent position on the truck or tractor or other conveyance. The end of sheet 10 is secured to shaft 22, the shaft is rotated by the gearing and the sheet is wound up on the shaft as illustrated in Figs. 4 and 5. Then, by removal of the bearing 18 and its support, the wound up sheet may be withdrawn from shaft 22 to be left over the winter on the adjacent ground. When the sheet 10 is to be replaced on the residual snow in the spring it is simply unrolled by hand across the slope to reassume the position shown in Figs. 1 and 3.

A modification of the invention is shown in Figs. 6, 7, 8 and 9. In Fig. 6, the sloping terrain 40 has been covered in the summer with sheets of insulating material 42. The following winter snow 44 has accumulated thereon. This slope being one on which the snow is to be preserved over the following summer is then covered in the spring with sheets of insulating material 46.

The combined insulating effects of the under and over sheets 42 and 46 on the snow 44 preserve the snow to such extent that there will remain an adequate snow base when the top sheets 46 are removed in the autumn. The bottom sheets are allowed to remain continuously in place over subsequent seasons.

The use of the bottom sheets 42 has been found desirable in locations where the terrain is warmed by heat working in laterally from the sides of the slope or by subterranean conditions beyond control.

A convenient way of bringing the arrangement of Fig. 6 into being is to obtain a roll 48 of insulating material 50 having a total length at least twice the width of the slope to be covered. During the summer, half of the material may be unrolled as in Fig. 7 to cover the bare ground 52 across the slope. During the following winter the snow 54 will cover material 50 as illustrated in Fig. 8. Then in the spring when this slope is to be closed and the snow thereon preserved, the other half of roll 48 will be unrolled on top of the snow as at 56 in Fig. 9.

While it has been pointed out above that no limitations are to be placed on the construction of the insulating sheets, it is believed desirable to make reference to one specific sheet that provides adequate insulating properties for preserving the snow layer over

the summer. Such sheet is shown in Figs. 10 and 11. It comprises two layers of aluminum foil 58 and 60 spaced about 1/4 inch between which are two layers of polyethylene bubbles 62 and 64. These flattened bubbles
5 about 3/8 inch in diameter are preferably arranged in triangular pattern, (see Fig. 11) and are bonded to themselves and to sheets 58 and 60 to form a strong sheet having the capability of substantially limiting passage of the sun's radiant heat and the heat of the ambient air
10 to the snow thereunder. The sheet may be further strengthened by a coating of clear polyethylene to both exterior sides. This sheet while light and very flexible is durable enough to be used repeatedly over the years to justify its initial cost.

15 An alternative arrangement for preserving snow over the summer is shown in Figs. 12 and 13. In Fig. 12 the snow at spaced areas 70 and 72 has been covered by the insulating sheets 74 and 76. The uncovered part of the slope 78 becomes bare as the snow thereon melts to
20 provide a crossing for persons and animals. When the time arrives in the autumn to remove the insulation, the crossing may then be covered by distributing thereon part of the preserved snow 70 and 72 from the adjacent covered areas. As shown in Fig. 13 some of the snow 70 and 72
25 has been shoveled or bulldozed onto the bare area 78 to create a continuous snow covered slope forming the desired autumn base.

Another modification falling within the scope of the invention is illustrated in Figs. 14 and 16. Fig.
30 14 is a plan view of a slope 80 on which an adequate width of snow thereon has been covered by a continuous layer of insulating material 82. Because of the size of sheet 82 which for example might be 40 feet wide and a

mile or more in length special means has been provided for laying and removing the cover. See Figs. 14 and 16. Tracks 84 and 86 have been laid on both sides of the slope. The conventional cog means (not shown) the
5 electrically or gasoline propelled machines 88 and 90 may run together up and down the steep grade. A common shaft 92 extends across the slope between machines 88 and 90. The machines include means for rotating shaft 92 so that the cover may be rolled up on or unrolled from the shaft
10 (see Fig. 16) as the machines move down or up at appropriate speed along the tracks. Suitable mechanisms such as splines or universal joints (not shown) in the shaft may be provided to compensate for non-uniform movement of the machines.

15 It is estimated that one mile of continuous insulating material one quarter inch thick would roll up into a cylinder about 10 feet in diameter requiring shaft 92 to be about 6 feet above the snow. When so rolled up the cover would be out of the way at the bottom of the
20 hill beyond the end of the ski slope. Use of the foregoing means for quickly removing and replacing the cover makes it possible for the ski slope to be used for special occasions during the summer. A company might invite its dealers and customers to a skiing party on a
25 set date in the summer. The slope for the full length could be uncovered by the foregoing described machines in the morning, the skiers could use the slope during the day and the slope could be recovered in the evening with loss of snow so slight that the major objective of pre-
30 serving the snow over the summer would not be compromised.

The dimensions of the cover and of the winding machines are suggestive only and impose no limitation on

the size, construction or capacity of any of the units or their specific modes of operation. Design of such machines is well within the scope of mechanical engineers so it is unnecessary to provide herein details of the construction.

The disclosure in Fig. 15 shows how the effectiveness of the insulating sheet may be improved. Strips of light foam rubber 94 of suitable cross sectional dimensions such as for example 2" x 3" or 4" x 4" are placed on the snow 96 prior to laying the insulating cover 98. The spacing of the strips 94 will be close enough to prevent appreciable sagging engagement of the cover with the snow. The air barrier between the cover and the snow increases the insulating effect of the cover.

Fig. 17 is intended to represent any ski slope 102 which is covered with snow 104. For help in explanation of the invention, the snow covered area of the slope is shown as having top, side and bottom boundaries indicated at 106, 108, 110 and 112.

Fig. 18 is a vertical section taken on the line 18-18 of Fig. 17 showing the ground 114 with the snow 104 covering the sloping surface 102. The upper limit of the snow with which we are concerned is at 106 and the bottom limit at 108. Fig. 18 is a section taken on the line 19-19 of Fig. 18.

It is to be understood that the representation of Figs. 17-19 is intended to include any ski slope having thereon snow (natural, natural and man-made or man-made) toward the end of the skiing season when the operator elects to close the slope.

It will be appreciated that the depth and disposition of the snow at the time the slope is closed

may vary greatly depending upon the extent of the snow fall over the past winter and the configuration of the ground surface.

The snow on the slope is pushed, preferably by
5 machines, into a plurality of piles of snow indicated at 116 in Figs. 20, 21 and 22. The location of the piles of snow on the slope will be dictated by the configuration of the slope, the depth of the snow and the judgment of the operator. The piles are made as high as possible,
10 preferably generally circular in plan and are then covered with sheets of insulating material 118 of such properties as to be capable of preserving a major portion of the snow over the summer and early autumn.

In places where the snow is deep, it may be
15 pushed into suitably sized piles without using all of the snow adjacently available. Where the snow cover is thin, it may be necessary to use all of the snow at that location to produce a large enough pile to survive the summer. In all cases the object is to preserve enough
20 snow by the piling procedure plus the insulating covering to have enough snow available in the autumn which when spread on the slope will create adequate skiing conditions. Preferably the area of the collected snow pile should be small in relation to the area from which the
25 snow was collected. In other words, a high pile on a small area is preferable to a lower pile in a larger area because the percentage loss from melting is approximately inversely proportional to the height of the pile. Snow can readily be piled by machine to a height of 20 feet or
30 more at the centre and sloping to the sides in a circular pattern. A pile of snow of this character covered with suitable insulating material will lose no more than 20 to 25% of its volume over the summer. Thus for example if

there was an average of two feet of snow on the slope when the piling commenced and all of it was pushed into the piles, enough snow would remain by autumn to cover the slope to an average depth more or less of one and one-half feet, adequate for immediate skiing.

Figs. 23, 24 and 25 are illustrative of the condition of the slope following distribution of the snow in the autumn from the piles 116 shown in Figs. 20, 21 and 22. In Fig. 23, the lines 120 and 122 suggest the somewhat reduced width of the slope if the original depth is provided, whereas Fig. 25 suggests a width of slope corresponding to boundaries 108 and 110 of Figs. 17 and 18 but with a reduced depth determined by the extent of the melting.

It has been found desirable and practical in some situations to increase the volume of the preserved pile of snow by removing the cover 118, adding man-made snow and recovering the pile as shown in Fig. 27. This procedure would be used when the residual layer of snow available in the spring was inadequate for producing the depth initially wanted in the autumn. The addition of man-made snow can be made whenever the temperature falls below freezing which condition usually begins early in the autumn. Repeated additions of man-made snow will create a pile sufficient when spread to provide skiing conditions on the selected area. Fig. 27 suggests the condition existing after man-made snow 124 has been added to the initial pile of snow 116 and the covering 118 replaced.

The process of accumulating the residual snow in piles in the spring and distributing it in the autumn will preferably proceed from the top to the bottom of the slope as the snow movement is aided by gravity but this

process may be varied under the judgement of the machine operator.

5 In the drawings, it will be understood that the thickness of the sheets in relation to the size of the piles of snow has necessarily been exaggerated for purpose of illustration.

The invention involves the following characteristics:-

10 Means as claimed in any one of claims 1 to 11, wherein the snow on the ski slope that is to be utilised for said early autumnal skiing is covered in spaced areas by the insulating sheets, the uncovered parts of the slope providing crossing areas, and the quantity of snow preserved by the insulating sheets being adequate to be spread in part over the uncovered areas after removal of
15 the insulating sheets in the autumn, thereby to provide skiing conditions over the length of the previously covered and uncovered crossing areas of the slope.

20 A method as claimed in claim 12, further comprising the step of temporarily removing the insulating material from the snow during the period when the ambient air temperature is above freezing to permit temporary use of the slope, the period of removal being so limited that the objective of preserving the snow until the autumn will not
25 be compromised.

A method as claimed in claim 12, further comprising the step of positioning a layer of insulating material on the slope when the ground is bare during the year preceding the closing of the slope, whereby, when the
30 slope is closed and the snow thereon is covered at least in part with the layer of insulating material, the snow to be preserved over the following summer will be contained between top and bottom layers of insulating material.

35 A method as claimed in claim 12, further comprising the steps of covering the slope at spaced areas to provide an intermediate uncovered area which will act as a crossing during the summer, and, upon removal of the

insulating material in the autumn, moving part of the snow from the spaced covered areas to the intermediate uncovered area, thereby to provide a continuous snow covered skiing slope.

- 5 A method as claimed in claim 12, wherein the step of covering the snow includes covering the snow over an extended longitudinal distance with a continuous layer of the insulating material of a type capable of being wound into a continuous roll, whereby the covering may be
10 removed from, and replaced thereon, by winding mechanisms.

A method as claimed in claim 12, further comprising the step of distributing the snow available in the autumn after removal of the insulating material to provide a more desirable skiing surface.

- 15 A method as claimed above, wherein the distribution step includes the utilisation of snow available in an area adjacent to the covered covered areas of the slope.

- A method as claimed in claim 13, wherein while the piles are covered, the periphery of the covering
20 insulating material is secured to the ground surrounding each pile in a manner to prevent the entrance of ambient air under the insulating material.

- A method as claimed in claim 13, wherein prior to the distribution of the piled snow in the autumn, the covering
25 of insulating material from a given pile is removed when the temperature is below freezing, a quantity of man-made snow is added to said pile, and the cover is replaced on said pile.

CLAIMS

1. Means for preserving enough snow on a ski slope over the period of time between the last snow fall in the spring and the first snow fall in the autumn to provide an adequate base for the receipt of natural snow in the autumn or for receipt of man-made snow in the autumn, said means comprising a conventional ski slope (2), a layer of residual winter snow (6) substantially covering at least a portion of the slope (2), and insulating sheets (10) of material covering the snow (6) to be preserved, the insulating sheets (10) being of such insulating properties that, acting in combination with the residual snow (6), they will minimise melting of the residual snow (6) over the summer to such an extent that, upon removal of the insulating sheets (10) in the autumn, an adequate snow base will remain to receive natural or man-made snow, whereby skiing on the covered part of the slope (2) may begin in advance of the time the slope (2) would be normally available had the residual snow (6) not be preserved by said means.
2. Means as claimed in claim 1, further comprising mechanical means (16 to 30 or 84 to 92) at the side of the slope for removing the insulating sheets (10).
3. Means as claimed in claim 2, wherein the insulating sheets (10) extend longitudinally of the slope (2), and wherein the mechanical means comprise sheet winding means (18,20) movable up and down the slope (2) for removing the sheets (10) from, or applying the sheets (10) to, the snow (6) on the slope (2).
4. Means as claimed in claim 3, wherein the mechanical means comprise cog railway tracks (84,86) on the sides of the slope (2), a first machine (88) on one track (84) movable up and down the slope (2), a second machine (90) on the other track (86) movable up and down in synchronism with the first machine (88), a shaft (92) extending across the slope (2) carried by the machines (88 and 90), and means for rotating the shaft (92) to form the sheet

winding means.

5. Means as claimed in any one of claims 1 to 4, further comprising spacer means (94) placed on the snow (96) prior to laying the insulating sheets (98) thereon, whereby the
5 sheets (98), when placed over the snow (96) will be spaced therefrom to provide an air space.

6. Means as claimed in claim 5, wherein the spacer means are in the form of lightweight strips (94) of foam rubber.

7. Means as claimed in any one of claims 1 to 6, wherein
10 the sheets (10) are relatively long in relation to their width, and are positioned transversely of the slope (2).

8. Means as claimed in claim 7 when appendant to claim 2, wherein the mechanical means is movable along the slope (2), so that it may be positioned adjacent to the end of a
15 given transverse sheet ready to remove said sheet.

9. Means as claimed in claim 2 or in any one of claims 3 to 8 when appendant to claim 2, wherein the insulating sheets (10) are made of flexible material so that they can be rolled up by the mechanical means.

20 10. Means as claimed in any one of claims 1 to 9, wherein each insulating sheet comprises a top layer (58) of aluminum foil, a bottom layer (60) of aluminum foil, and means (62, 64) between said layers (58 and 60) to minimise transmission of heat from the top layer (58) to the bottom
25 layer (60).

11. Means as claimed in claim 10, wherein said means between said layers (58 and 60) comprises means (62, 64) forming a plurality of sealed air spaces, said last named means being secured to the facing sides of the layers (58
30 and 60).

12. A method of advancing the date at which a ski slope (2) may be in condition for skiing in the autumn, the method comprising the steps of closing the slope (2) to skiing while an appreciable layer of snow (6) still
35 remains thereon, covering at least part of the slope (2) with a layer of insulating material (10) of such characteristics that, when acting in combination with the

snow (6) thereunder throughout the spring, summer and autumn months when the ambient air temperature is above freezing, the extent of melting of the snow will be so limited that, by the time of the arrival of snow in the autumn, there will remain an adequate snow base to receive and hold such initial autumnal snows to provide proper skiing conditions at a date earlier than would be the case were said snow base not present, and removing the insulating material (10) from the covered parts of the snow on the slope (2) after the ambient air temperature has dropped to a degree at which the snow will continue to be preserved as a suitable base without the aid of the insulating material.

13. A method of placing a ski slope (102) in condition for skiing early in the autumn, the method comprising the steps of collecting snow (104) that exists on the slope (102) when it is closed in the spring into one or more piles (116) of snow, covering the piles (116) with sheets (118) of insulating material thereby to preserve in the piles (116) a major portion of the covered snow through the summer and early autumn, uncovering the piles in the autumn when the ambient temperature has dropped to a degree low enough to preclude excessive melting thereafter of the preserved volume of snow, and then spreading the snow from the uncovered piles (116) over selected areas of the slope (102) to a depth satisfactory for skiing thereon.

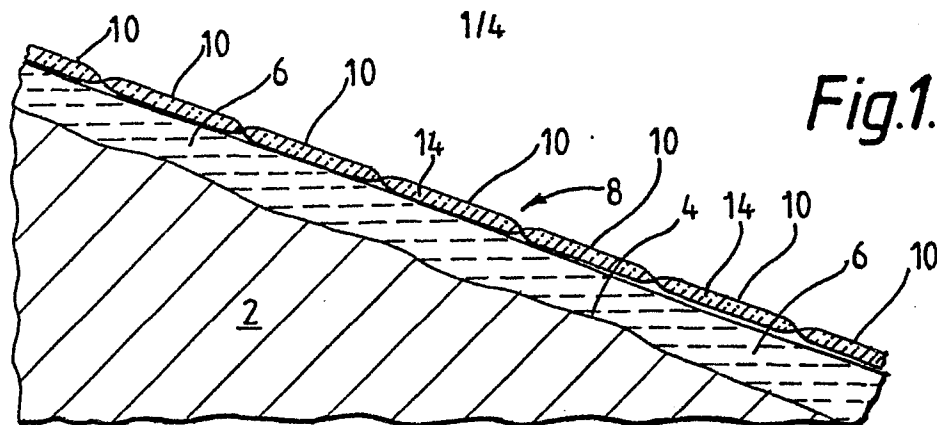


Fig.1.



Fig.2.

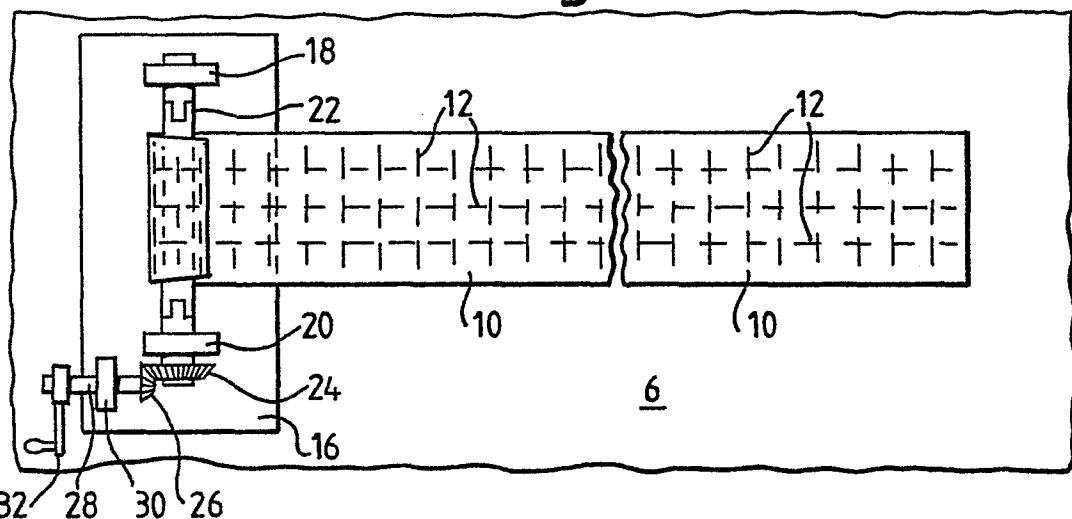


Fig.3.

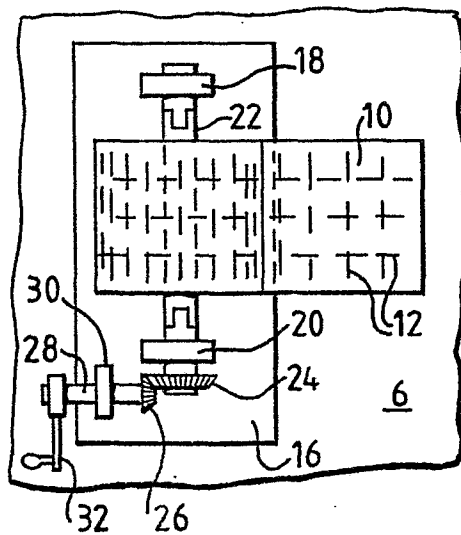


Fig.5.

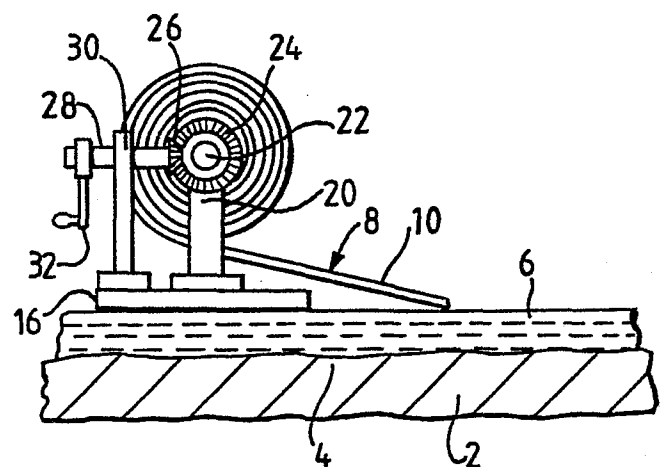


Fig.4.

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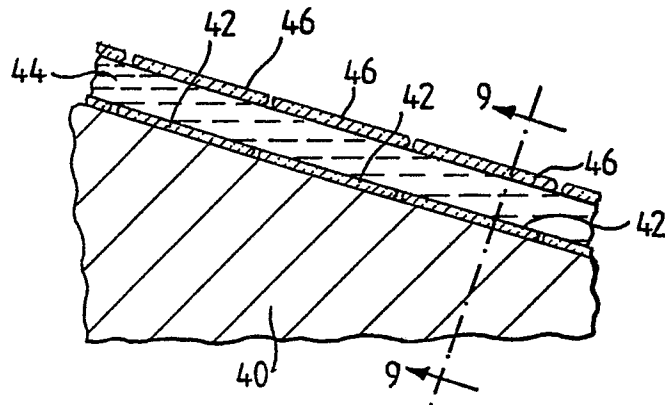


Fig. 6.

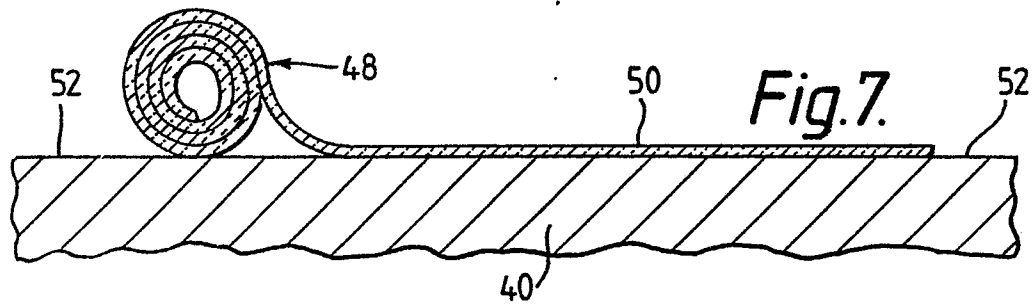


Fig. 7.

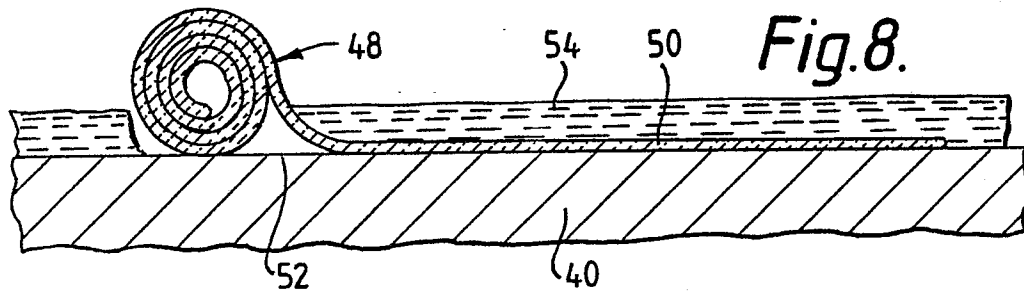


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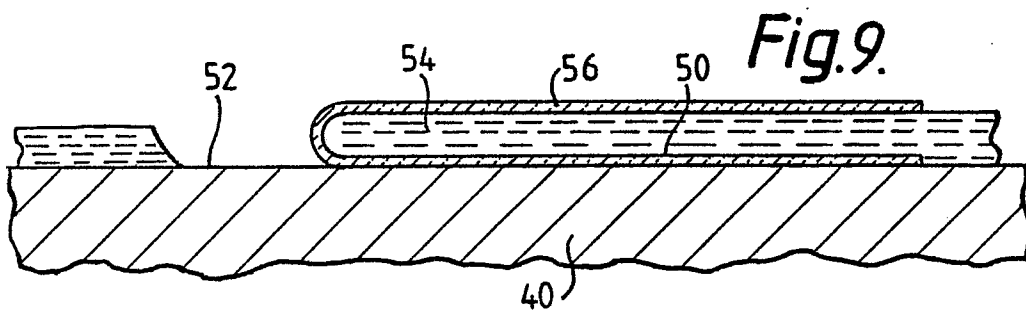


Fig. 9.

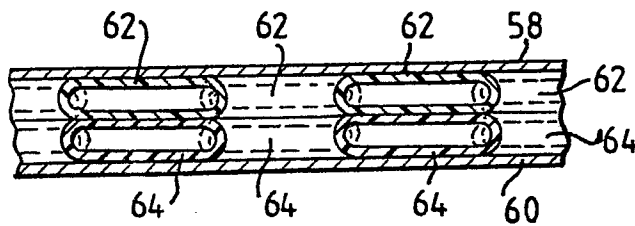


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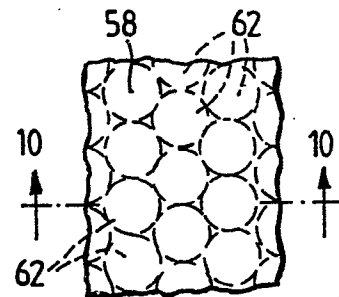


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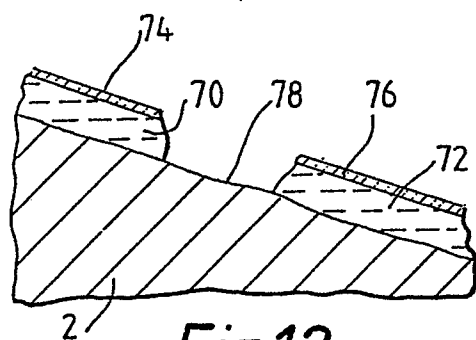


Fig. 12

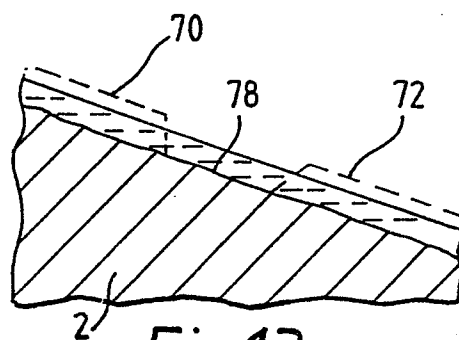


Fig. 13.

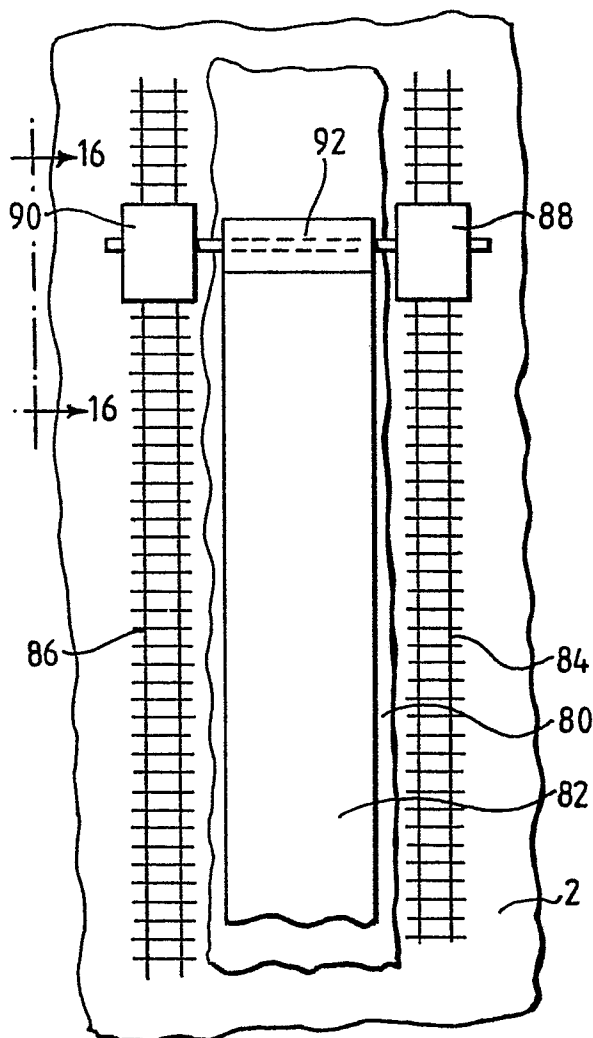


Fig. 14.

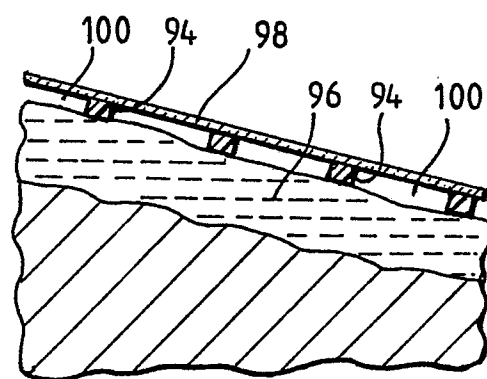


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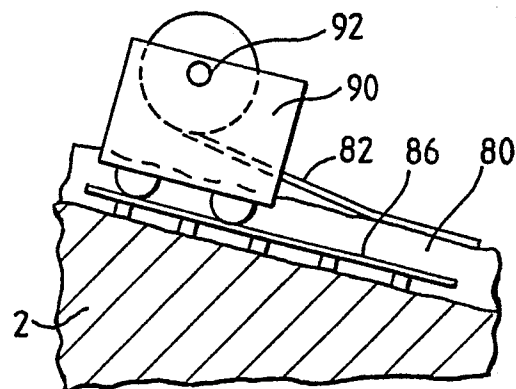


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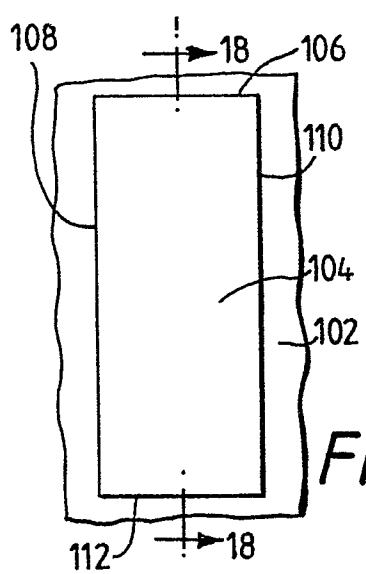


Fig. 17.

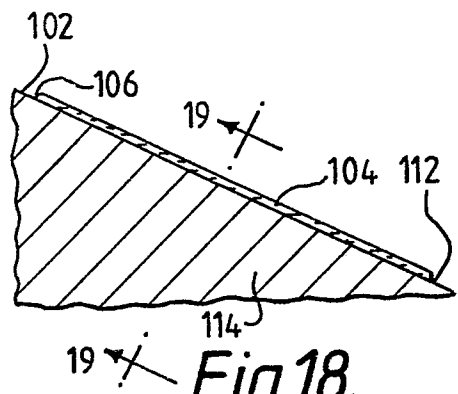


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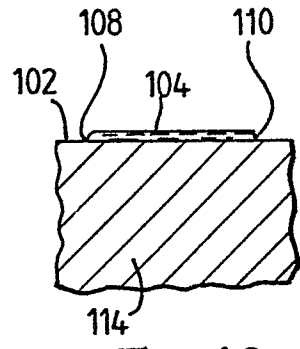


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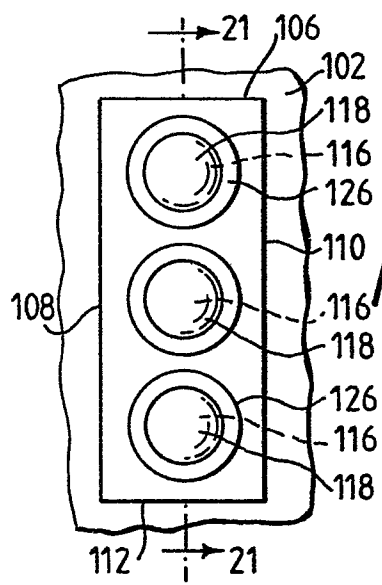


Fig. 20.

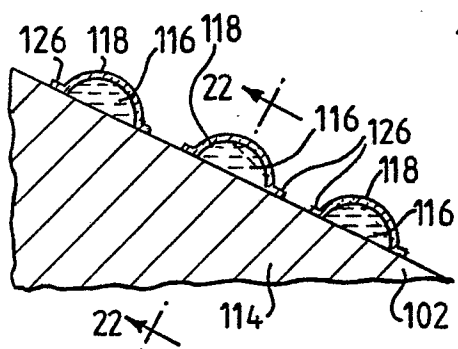


Fig. 21.

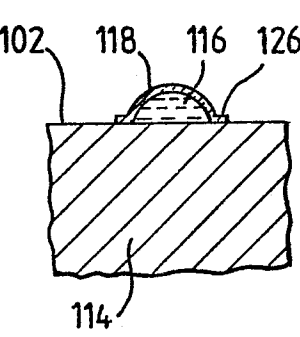


Fig. 22.

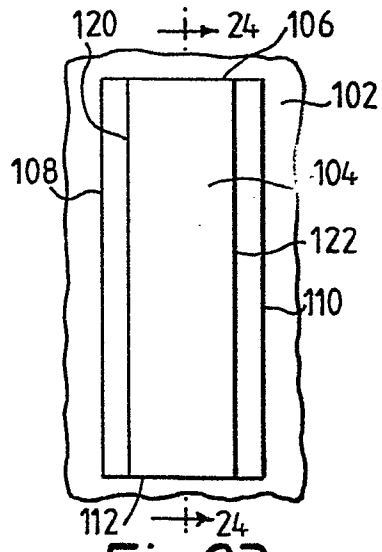


Fig. 23.

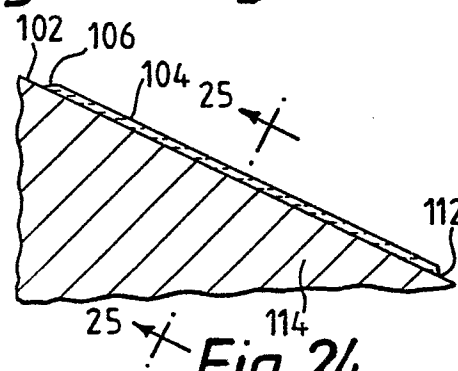


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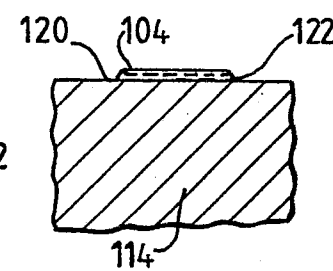


Fig. 25.

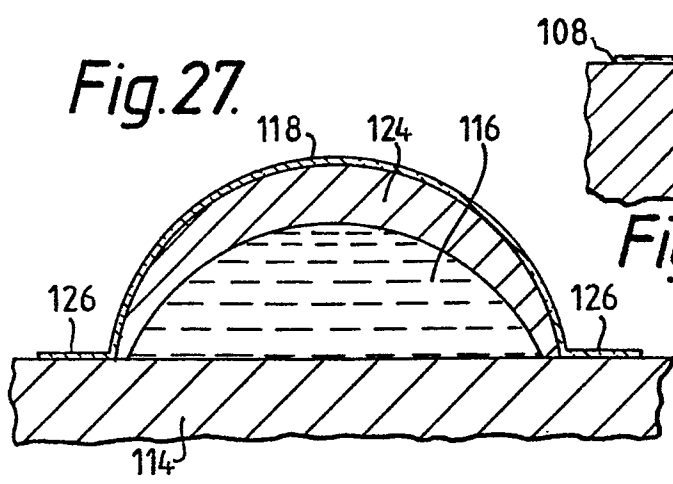


Fig. 27.

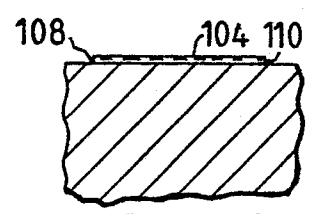


Fig. 26.



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.4)
X	US-A-4 281 802 (BURLEY) * Column 4, lines 28-53; column 5, lines 37-49; figures *	1,2,3, 7-9,10 ,12,13	A 63 C 19/12
Y	---	11	
Y	US-A-4 028 750 (GUSTAFSSON) * Abstract; figures *	11	
X	GB-A- 1 061 (TISCHLER)(A.D. 1914) * Page 1, lines 5-9; page 2, lines 12-21; figures *	1,5-7, 9	
A	---	12,13	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
X	US-A-3 870 587 (MERRELL) * Column 1, lines 14-26; figures *	1	A 63 C B 65 H E 01 H E 04 H
A	---	9-13	
A	US-A-4 466 143 (LAMB) * Column 6, lines 16-61; figures 1-3 *	1-4,8, 9	
	--- -/-		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 16-07-1986	Examiner GERMANO A.G.
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			



DOCUMENTS CONSIDERED TO BE RELEVANT			Page 2
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	FR-A-2 527 465 (COURTEVILLE) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 16-07-1986	Examiner GERMANO A.G.
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