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

(11) Publication number: **0 237 121**
A1

(12) # EUROPEAN PATENT APPLICATION

(21) Application number: **87200397.5**

(22) Date of filing: **04.03.87**

(51) Int. Cl.³: **A 63 C 19/12**
E 04 H 3/16

(30) Priority: **13.03.86 NL 8600650**

(43) Date of publication of application:
16.09.87 Bulletin 87/38

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

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(54) **Roof for artificial skating-rinks.**

(57) Means for outdoor artificial skating-rinks, consisting of a removable roof (2) over the rink with removable walls (5) which can preferably be rolled up and 50% pervious to air, extending on both sides downwards. The roof (2) is made of a material pervious to heat-radiation and is thus sloping or provided with slopes that rainwater runs down. It is supported by ridge-poles (8) and gutter (9) ledgers movable in the direction of skating. The invention compresses skating-rinks provided with such means.

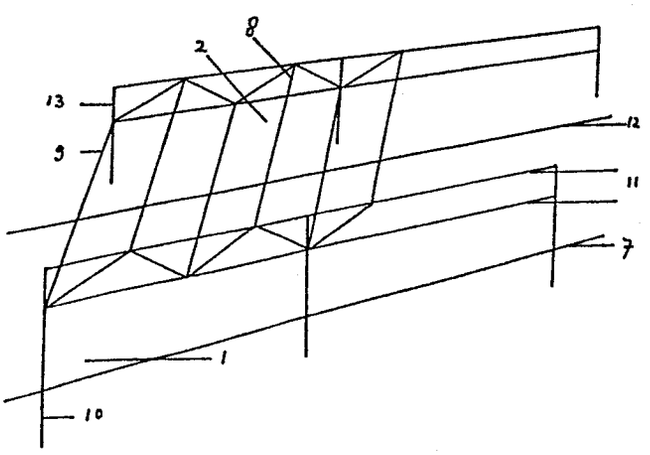

Figure 2.

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Roof for outdoor artificial skating-rinks.

The invention relates to means for outdoor artificial skating-rinks, allowing the rink to be used under bad weather conditions - wind and rain - without these weather conditions being experienced as troublesome.

The means according to the invention contain
- a removable roof over the rink, made of a material being highly pervious to heat-radiation and highly reflective for solar radiation;
- removable walls, 50% pervious to air and extending on both sides from de roof downwards.

As the roof and the sidewalls are removable, the rink may be used under both good and bad weather conditions.

The material being pervious to heat-radiation, the heat-radiation from the skating-rink into the atmosphere, which in case of outdoor artificial rinks especially takes place with a clear sky, can normally be benefited from regarding energy needed for cooling the rink. Owing to the high reflection of solar radiation the load of the rink as a result of this radiation is reduced, which leads to a decreasing need of energy. As rain and wind are kept out, the losses of cold as a result of convection are reduced too.

The side walls may extend from the roof till the ground or extend over part of the height down from the roof. As they are pervious to air for about 50%, the reduction of wind is optimal and the sensation of skating 'in the open air' yet remains for the greater part.

Preferably as material for the roof, white so-called radiation-selective sheets of synthetic material are used. By making one's choice as to the thickness of the sheet the perviousness and the reflection of the sheet can be adjusted to the need. Good results are obtained e.g. with high-density polyethylene stretched in one direction, as a result of which it turns white and obtains a high strength in the direction of stretching. Particularly if a few of such sheets of polyethylene with their directions of larger tensile strength extending perpendicularly to one another are laminated, strong thin sheets with the desired properties are obtained.

It is to be noted that such radiation selective sheets can be successfully applied as roof for green-houses in warm areas; as a

result of the radiation-selective properties the energy needed for cooling can be considerably reduced.

A further application is the one as roofing for houses in hot areas: the indoor temperature is kept at a reasonable level, whereas sufficient light is transmitted yet.

To ensure a good drainage for rain-water, it is advantageous to have the roof sloped with respect to the horizontal plane: the water can flow down to one side and be drained off. A preferred embodiment is the one in which adjacent parts of the surface of the roof show different slopes with respect to the horizontal plane, as usual for e.g. green-houses.

This last mentioned embodiment can be realised by fixing the ridge beam and the gutter girder of the roof at different levels in horizontal edge sections. These sections are arranged at the inside and outside of the rink, parallel to the direction of skating. When the roof is opened, the gutter girders and the ridge-beams move in the direction of skating via the edge sections and are grouped at regular distances. When the roof is closed, rain-water can flow to the sides of the rink via the gutter girders (the lowest girders). By making the inner height of the roof higher than the outer one, the rain-water is led to the outside of the rink and may be drained off there.

The vertical length of the sidewalls is preferably chosen to be equal to the distance from the ground till the roof, so that the top as well as the sides of the rink are sheltered. To preserve the skater's survey over the rink, the wall corresponding to the inner edge of the rink however is not completely closed, but the wall runs from the roof till 1 - 2 metres downwards e.g. The walls are preferably removable by rolling them up.

The outer wall with a perviousness of 50%, can e.g. wholly or partly, be carried out as heat-exchanger with tubes through which the refrigerant of the refrigerator flows and then acts as wind/heat barrier. Wind is retained and heat is given off.

If the inner wall does not completely run from the roof down to the ground, wind at the rink can successfully be reduced by placing a wind-screen about 1,20 m high, made of a material with a net-structure being pervious to air for 50%.

The invention will be explained more fully with reference to the

following drawings which schematically represent an embodiment of a means according to the invention.

Fig.1 shows a cross-section of the rink in a plane perpendicular to the direction of skating and

Fig.2 means according to the invention in a perspective view.

In Fig.1 the ice-floor 1 is covered with a sloping roof 2 from which an outer wall 3 and an inner wall 5 run downward. In the case drawn, the inner wall 5 only runs downward over part of the height: the wall 5 a few metres high and the wall 6 about 1,20 m high, acting as wind-screens, are pervious to air for 50% and are arranged along the entire inner edge 7 of the rink 1. Sidewall 4 at the outside joining the outer wall 3 is also about 1,20 m high serving as a windscreen too and is impervious in view of advertising purposes. Outer wall 3 again is pervious for 50%.

In Fig.2 is indicated how the roofing sheet 2 the ridge beams 8 and the gutter girders 9 are supported by uprights 10 and 13 and the edge sections 11 to provide the roof 2 with the surfaces with different slopes. The uprights 10 at the inside 7 are longer than those -13- at the outside, so that the rain-water is drained off to the outside 12 by means of the sloping gutter girders 9.

Claims

1. Means for outdoor artificial skating-rinks, containing:
- a removable roof over the rink, made of a material being highly pervious to heat radiation and highly reflective for solar radiation;
- removable walls 50% pervious to air and extending on both sides from the roof downwards.

2. Means according to claim 1, the material of the roof being a sheet of synthetic material pervious to heat radiation.

3. Means according to claim 2, the white sheet of synthetic material being high-density-polyethylene.

4. Means according to one of the preceding claims, the roof surface being sloping with respect to the horizontal plane.

5. Means according to claim 4, adjacent parts of the surface of the roof showing different slopes with respect to the horizontal plane.

6. Means according to claim 5, the roof being supported by ridge beams and gutter girders, arranged perpendicular to the direction of skating, which are arranged movably in said direction of skating by means of edge sections at the inside and outside of the rink.

7. Means according to one of the preceding claims, the vertical length of the sidewalls equalling the height of the roof over the rink on the spot and of which at least the sidewall corresponding with the inner edge of the rink can be rolled up.

8. Means according to one of the claims 1-6, the wall corresponding with the outer edge of the rink being carried out at least partly as a heat exchanger being 50% pervious to air, by means of which the cooling heat of the refrigerator is yielded to the environment.

9. Means according to one of the preceding claims, the inner edge of the rink being provided with a windscreen about 1,20 m high and with a net-structure being 50% pervious to air.

10. Outdoor artificial skating-rink, provided with means according to one of the claims 1-9.

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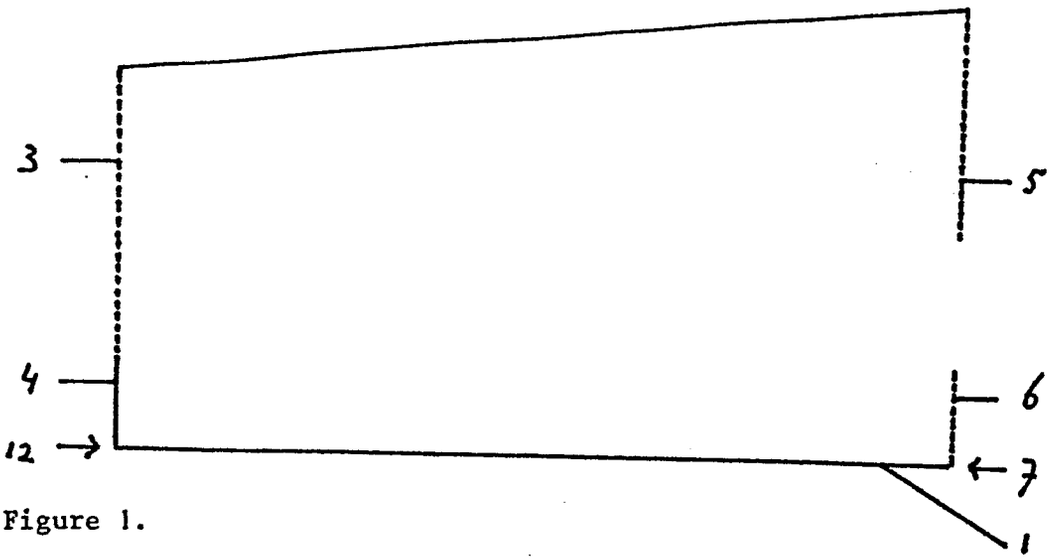

Figure 1.

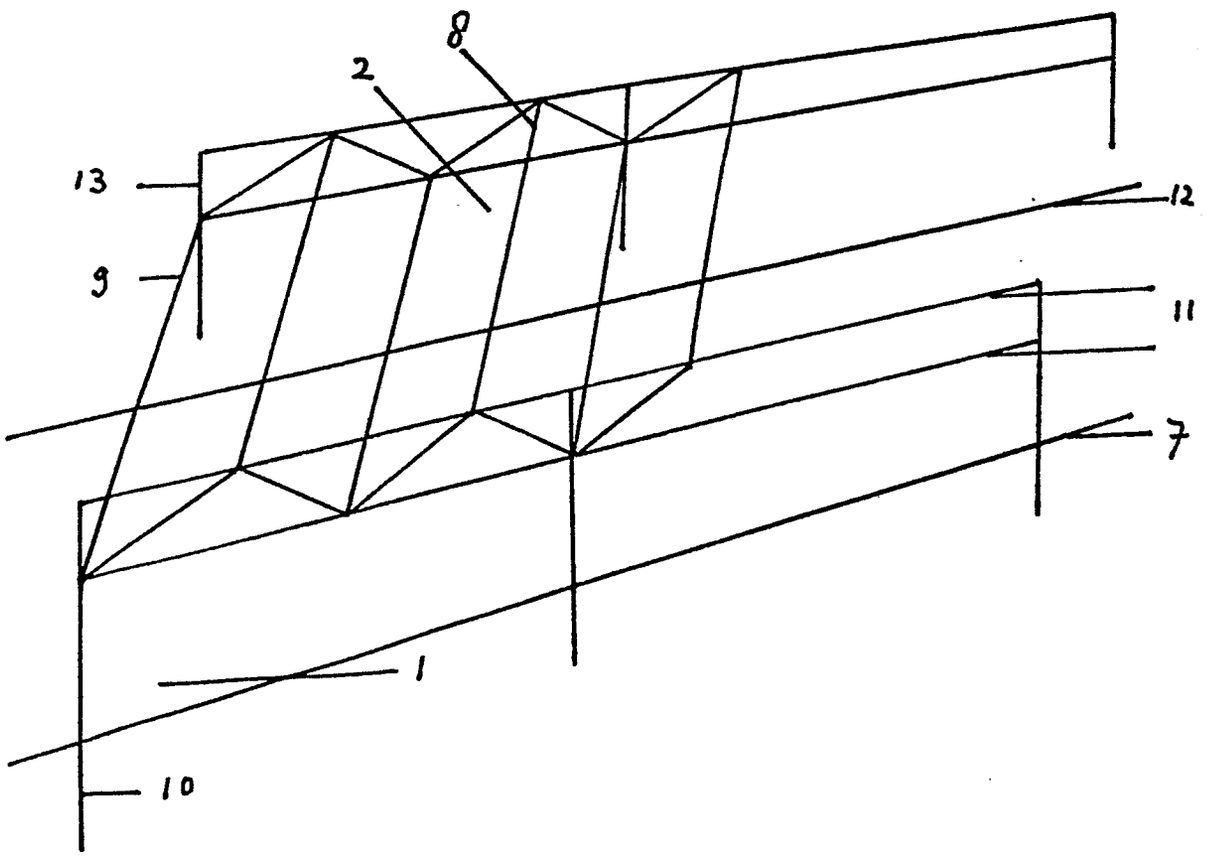

Figure 2.

European Patent Office

EUROPEAN SEARCH REPORT

Application number
0237121
EP 87 20 0397

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)
A	FR-A-2 557 184 (COUPIAC) * Page 3, line 39 - page 4, line 38; figures 1-5 *	1,4	A 63 C 19/12 E 04 H 3/16
A	US-A-4 281 802 (BURLEY) * Column 2, lines 57-68; column 3, lines 1-40; column 5, lines 13-49; figures 1-7 *	1,2	
A	GB-A-2 064 289 (PREMIER) * Page 1, lines 102-111; page 3, lines 1-65; figures 1-7 *	1	
A	FR-A-2 542 782 (COUPIAC) * Page 3, lines 30-32; page 4, lines 1-32; page 5, lines 1-26; page 6, lines 10-25; figures 1-6 *	1,7	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	US-A-3 983 713 (McCRACKEN) * Column 4, lines 37-68; column 5, lines 1-49; figure 1 *	1	E 64 H A 01 K A 63 C
A	DE-A-3 123 117 (STORK)		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15-06-1987	SCHOLS W.L.H.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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