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C. M. PLEASS
ARTIFICIAL SNOW
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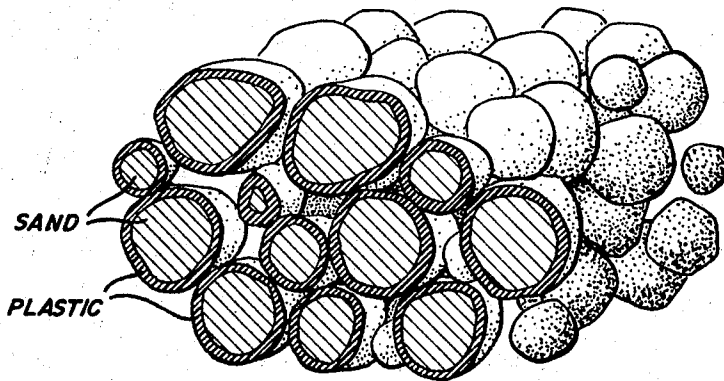
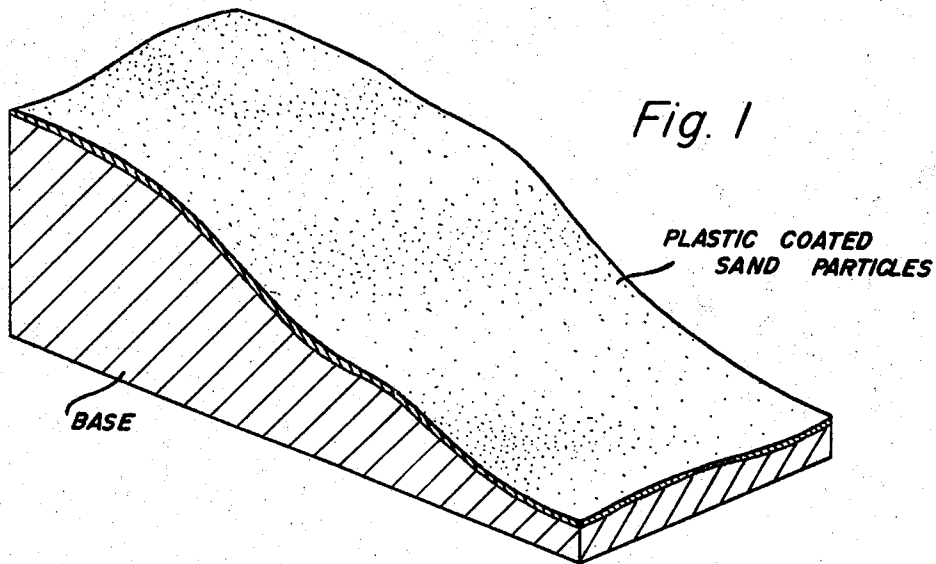


Fig. 2

INVENTOR
CHARLES M. PLEASS
BY
Richard H. Thomas
ATTORNEY

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ARTIFICIAL SNOW

Charles M. Pleass, 17 Ambar Place,
Bernardsville, N.J. 07924

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5 Claims

ABSTRACT OF THE DISCLOSURE

A synthetic skiing surface which comprises a plurality of particles such as sand, pea gravel and materials having generally the particle size distribution of corn snow, each particle being coated with a substantially continuous hardened plastic coating of the organic class known as the polyolefins, with the preferred member of this class being polyethylene, or other polymeric organic coatings having substantially the same properties as polyethylene with respect to coefficient of friction and resistance to weathering. The thickness of the coating is sufficient to render to the composite particles surface properties which are equivalent to those of the plastic chosen, particularly to provide a coefficient of friction approximating that of a film of water, and a composite particle density which approximates the density of corn snow. The depth of the particles is sufficient to pack and simulate a corn snow condition.

This invention relates to a novel and improved snow-like material for skiing particularly suitable for year round use.

It is known to employ artificial materials for skiing, and such materials as saw dust and wood pulp have been tried. Use has also been made of plastic mats, sand, plastic particles and oil coated gravel. Up to the present time, no proposed artificial surface has obtained substantial commercial acceptance.

For instance, the bulk density of plastic in powder form is too low and the powder is particularly susceptible to the action of wind. Prefabricated plastic mats normally prepared on a flexible backing lack the aesthetic appeal of natural snow, are relatively expensive to manufacture, and cannot be used under a natural covering of winter snow without receiving irreparable damage from heavy conventional snow-leveling equipment. Sand and oil coated gravel are abrasive to conventional ski equipment. Other materials used have suffered from similar problems.

Corn snow is a very common surface for skiing, and actually consists of small particles of ice. The mechanism which makes skiing on corn snow pleasant is that the pressure of the skis on the ice particles causes the formation of a thin film of water which acts as a lubricant. Otherwise, the hardness of the ice would quickly abrade the bottoms of the skis, and it is a known fact that if ambient temperatures are extremely low, too low for this formation of water, the skis hardly move.

The reason why oil coated sand probably is unsatisfactory is that the pressure of the skis on the sand probably displaces the oil film exposing the sand particle surface. As this surface has an extremely high coefficient of friction, the skis hardly move and excessive wear is experienced.

Accordingly, it is an object of the present invention to provide an inexpensive artificial snow which overcomes the disadvantages of known media, and in particular, it is an object of the invention to provide an artificial snow which packs similarly to natural snow and therefore approximates the characteristics of natural snow, in appearance, and in feel or movement in response to the pressure of ski edges.

It is further an object of the present invention to provide an artificial snow which is non-abrasive to skis and clothing.

It is a further object of the present invention to provide an artificial snow which can be left in place during winter months and which will resist the adverse sources of wear to which it may be subjected, for instance, ultra violet degradation.

In accordance with the above objects, the artificial snow of the present invention comprises a layer of particles, each particle comprising sand, pea gravel or the equivalent, coated with a plastic sufficiently thick to entirely cover the sand or gravel surface, i.e., sufficiently thick to render to the surface of the particles properties which are equivalent to those of the plastic chosen. The sand or gravel may be selected to include a range of sizes to meet packing conditions required of a specific application. For instance, steep slopes would require a higher bulk density of the layer of particles than gentle slopes. Preferably the sand or gravel size range in diameter from about 0.25 inch to about .010 inch. The thickness of the plastic may be about one tenth of the diameter of the average sand or gravel piece.

The invention and advantages thereof will become more apparent upon consideration of the following specification with reference to the drawing, in which

FIGURE 1 is a sectional view showing a ski slope covered with particles in accordance with the invention, and FIGURE 2 is a partial section view showing coated particles in accordance with the invention.

Referring to the drawing, the artificial snow of the invention covers a base, the snow comprising a large number of particles of sand or pea gravel covered with a plastic coating. Pea gravel is a well-known term used in the trade to designate natural gravel or crushed rock of a particle diameter approximately 0.25 inch. Smooth surf washed varieties form an effective embodiment of the present invention being intrinsically smooth. Pea gravel has the advantages over sand that it is less expensive to coat to a given thickness, the surface to volume ratio being low, and agglomeration is less likely. Preferably the sand is light in color with grains also rounded by natural erosion. Such sand or pea gravel can normally be found on ocean beaches and generally will have a satisfactory particle size distribution without the need for classifying. The particles will normally vary in diameter from 0.010 inch for sand and up to 0.25 inch for pea gravel. Ski slope and skiing conditions may dictate the particular ranges of particle sizes most suitable. For instance, steep slopes may require a higher bulk density to meet packing conditions and resist "skiing-off," i.e., removal of the snow covering by the combined action of gravity and movement of the skiers, whereas gentler slopes for instruction may require a less critical range of particle sizes. For the former, the heavies density finer sand may be required, whereas for the gentler slope, the lesser expensive pea gravel (i.e., less expensive to coat) may be satisfactory. In either event, the bulk density provides a superb surface which closely simulates actual packed snow, including such formed mounds known to skiers as "moguls."

Plastic coatings may be of any conventional type wherein the coefficient of friction approximates that of water on ice, for instance polyethylene or its analogues, or methacrylate or its analogues, which can be satisfactorily applied to the sand. Preferably, the coatings are white, or near white. An ultra violet absorber would normally be included in the plastic formulation. Polyethylene is particularly suitable because it is inexpensive, readily applied, wear resistant, and particularly resistant to ultra

violet degradation with such an absorber. The density of polyethylene coated sand approximates the density of particles of corn snow.

A number of coating methods are available. The coating may be applied by dissolving the plastic in a solvent, and evaporating the latter in the presence of the sand in a tumbling device (for instance a cement mixer). As another method, the polymeric plastic can be created from a suitable monomer or low molecular weight precursor by catalytic action in the presence of the sand to be coated, either with or without a solvent. Further, the coating can be accomplished by dispersion of plastic particles over the surface of the sand or pea gravel in an agitated bed (a fluid bed) held at an elevated temperature sufficient to render the plastic fluid.

All of these methods will result in a substantially uniform coating the thickness of which may be readily controlled. This thickness should be in the order of a tenth of the diameter of the average sized particle in the range selected.

The present invention has a number of substantial advantages over prior artificial skiing surfaces. The plastic coated particles of the invention are resistant to weather and sun light, including temperature extremes, and are capable of withstanding the wear from frictional contact with skis, or from the abrasion of mechanical equipment designed for leveling, packing or movement on artificial snow.

The artificial snow of the invention also is particularly suitable in that it packs similarly to natural snow (particularly corn snow) and moves in a natural way in response to the pressure of ski edges. The artificial snow also approximates the visual characteristics of natural snow and thus is aesthetically desirable.

As a further advantage, the plastic coated particles provide minimal friction when in contact with skis approximating the friction of natural snow and thus the feel obtained from natural snow.

A further advantage is that the artificial snow of the present invention presents a surface which will not injure a skier who has fallen, or cause abrasion or damage to clothes. Also the artificial snow presents a surface which will accept natural winter snow and allow free permeation or drainage of water formed during melting of the natural snow. In this respect, it is apparent that the artificial snow particles, if dispersed among natural snow, will not detract from skiing enjoyment. Should an area of a ski slope become bare of natural snow, through wind, or from excess use by skiers, the damaged area can be quickly covered with the synthetic snow of the invention. As a particular advantage, prior to winter, areas of known ice formation from springs can be covered with artificial snow. This provides a means for draining the areas, inhibiting or preventing contact between ground water and natural snow, which is the normal mechanism involved in the growth of sheet ice.

A further advantage is that, if desired, conventional mechanical cleaning equipment can be used to remove the artificial snow particles from a slope.

A further advantage is that, if necessary, mechanical cleaning equipment, functioning on the principle of cyclone separation, can be used to remove trash from the surface of the artificial snow in a slope, leaving the surface intact.

Although the invention has been described with respect to particular embodiments, variations within the scope of the following claims will be apparent to those skilled in the art.

What is claimed is:

1. A synthetic skiing surface comprising a plurality of composite free-flowing particles; each composite particle comprising

a core particle of the class consisting of sand, pea gravel, and materials having generally the particle size distribution of corn snow, said core particles having a diameter in the range of approximately 0.01 inch to approximately 0.25 inch; and

a relatively thin continuous fused layer of cured hardened plastic which is non-tacky individually and completely enclosing each of said core particles, said plastic being of the group consisting of polyethylene and polymeric organic coatings having substantially the same properties as polyethylene with respect to the coefficient of friction and resistance to weathering; said fused layer being sufficiently thick to render to the surface of said composite particles properties which are equivalent to those of the plastic chosen, but sufficiently thin such that the composite particles have a density approximating that of corn snow; said plastic further having a coefficient of friction approximating that of a film of water; the depth of the particles being sufficient to pack and simulate a corn snow skiing condition.

2. A skiing surface according to claim 1 wherein the thickness of the plastic layer is approximately one tenth of the average core particle diameter.

3. A skiing surface according to claim 2 wherein said plastic coating is white, said particles being light colored before coating.

4. A skiing surface according to claim 2 wherein said coating is of the class consisting of polyethylene, analogues of polyethylene, methacrylate, or analogues of methacrylate, in which suitable ultra violet absorbing compounds are incorporated.

5. A synthetic skiing surface comprising a plurality of composite free-flowing particles; each composite particle comprising

a core particle of the class consisting of sand and pea gravel obtained from surf washed areas wherein said particles have a particle sized distribution in the range of approximately 0.01 inch to approximately 0.25 inch without the need for classification;

a relatively thin continuous fused layer of cured hardened plastic which is non-tacky individually and completely enclosing each of said core particles, said plastic being of the group consisting of polyethylene, and polymeric organic coatings having substantially the same properties as polyethylene with respect to coefficient of friction and resistance to weathering;

said fused layer having sufficient thickness to render to the surface of said composite particles properties which are equivalent to those of the plastic chosen, but being sufficiently thin such that the composite particles have a density approximating that of corn snow;

said particles having sufficient depth to pack and simulate a mobile corn snow skiing condition.

References Cited

UNITED STATES PATENTS

2,888,418	5/1959	Albanese	260—28
3,020,811	2/1962	Lincoln et al.	94—3
3,026,938	3/1962	Huit et al.	117—100
3,066,580	12/1962	Alberti	94—3
3,091,998	6/1963	Wehr et al.	94—3
3,112,681	12/1963	Gessler et al.	94—3 X
3,148,169	9/1964	Martens et al.	117—100
3,291,486	12/1966	Applegath et al.	

JACOB L. NACKENOFF, *Primary Examiner*.

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