Dec. 10, 1968 J. P. HORTON ETAL 3,415,172

SKI MAT

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FIG. 1

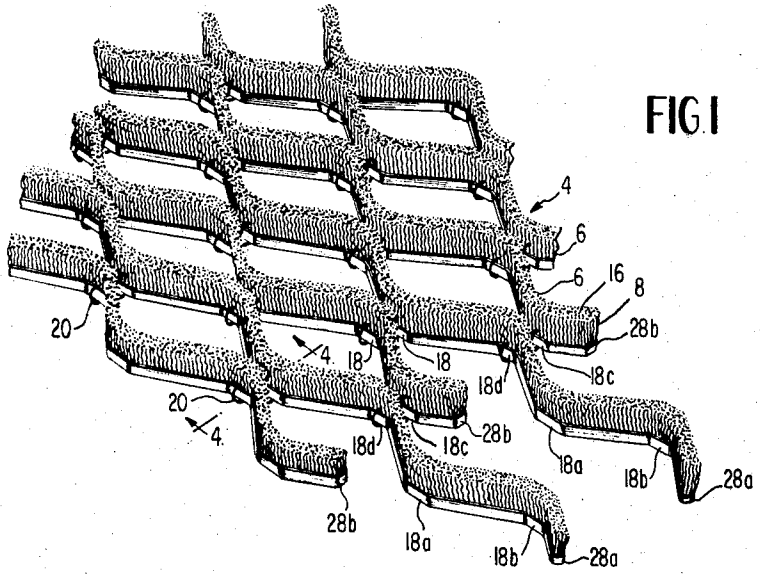
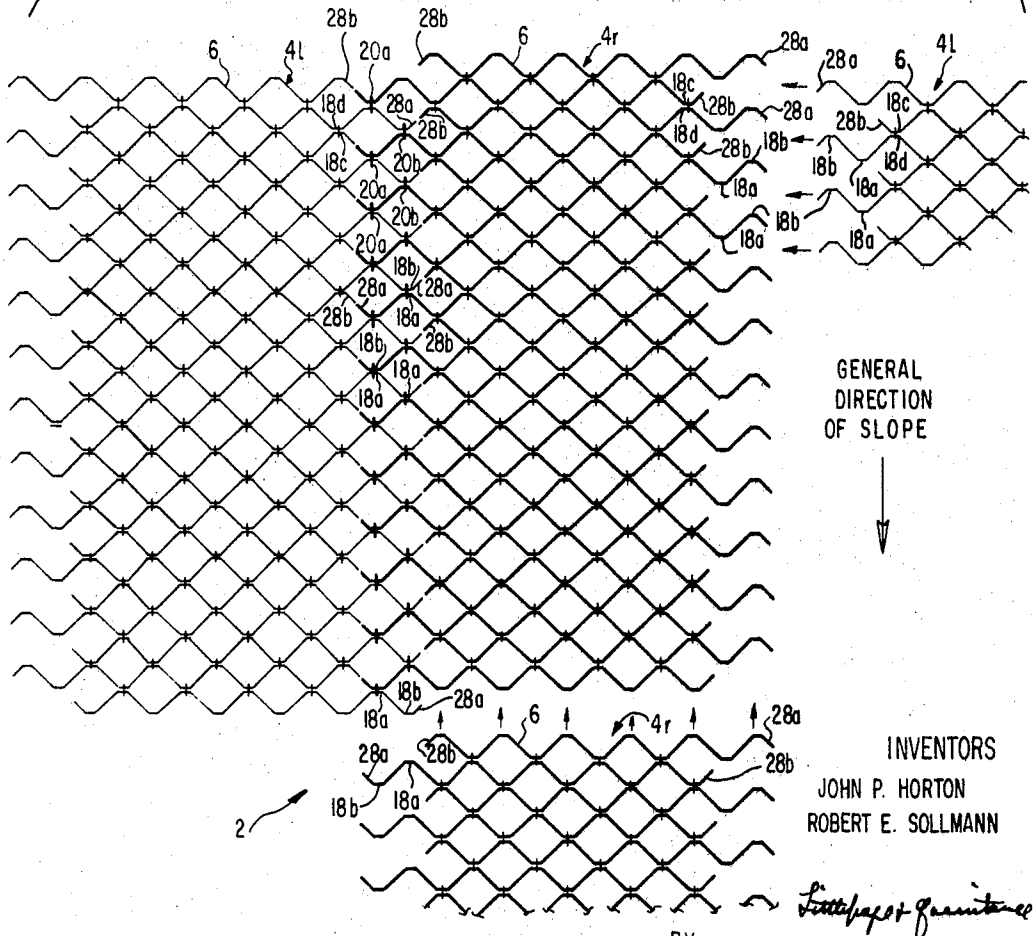


FIG. 2



GENERAL DIRECTION OF SLOPE

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FIG.3

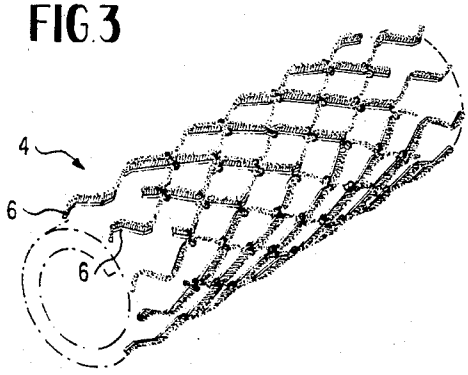


FIG.4

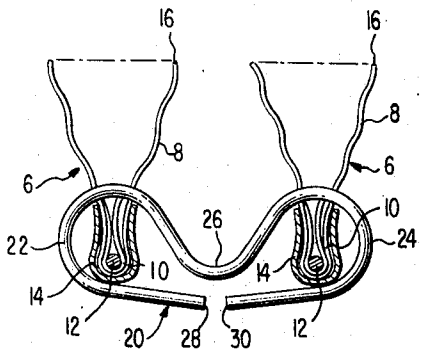


FIG.5

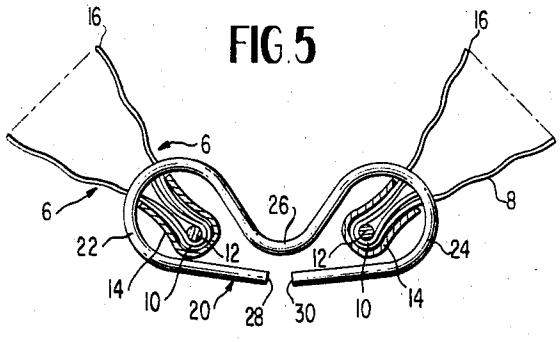
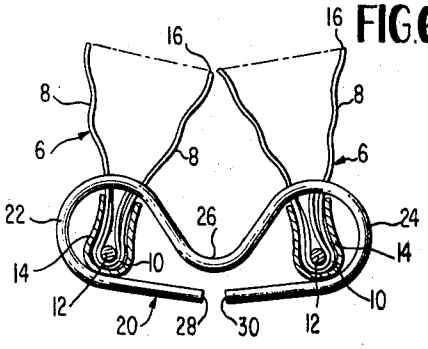


FIG.6



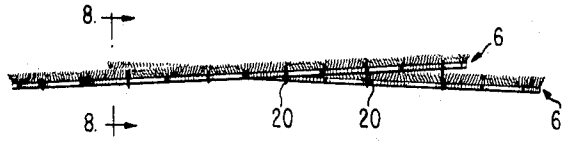
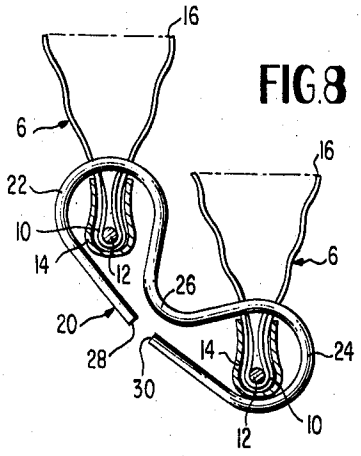


FIG.7

FIG.8



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3,415,172

SKI MAT

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1 Claim. (Cl. 94—3)

ABSTRACT OF THE DISCLOSURE

Ski mats having fasteners which space individual elements and hold the elements for free relative rotational movement and having alternating elongated and recessed longitudinal ends of elements so that laterally adjacent mats may be smoothly interfitted are described herein.

This invention relates to artificial skiing surfaces and, more particularly, to brush-like mats which are assembled in situ to form a ski track.

The primary object of this invention is to provide a ski surface composed of mats formed of generally sinusoidal brush strips having upwardly projecting bristles. The mats, when joined together, form a track along which a skier may glide, supported by the tops of the bristles, which in aggregate have much of the same ski-supporting characteristics as snow. Mats of this general type have hitherto been disclosed in the patents to Acquaderni No. 3,047,292 and Heller No. 2,254,482.

According to this invention, it is intended to provide brush-like mats which inter-engage with one another and which conform with and accommodate themselves to the hills and vales, however, small, abrupt and close together, of the terrain upon which they are disposed. Another object is to provide mats which can be rolled up and easily transported from place to place. Still another object is that resilient ski-supporting surfaces provides by this invention shall have no significant variations in density or resistance to deflection insofar as concerns their reaction to skis gliding thereover, regardless of whether the skier be moving along a straight or a curved path, or whether he be going uphill or downhill at any given instant. In other words, the subject surfaces have no hard or stiff spots or bumps, nor any significant orientation of grain such as would tend to bias the skier to move along any given path or constrain him against turning.

A more specific object is to provide mats composed of generally sinusoidal brush strips, wherein loop ends of tufts of stiff nylon or the like synthetic resin bristles are clamped within generally U-shaped metallic channels, the sinusoidal strips running generally parallel to one another and with the bays defined by the sinuous curves of one strip lying opposite to but spaced from the bays on the next adjacent strips so that the bay extremities of the successive strips approach but do not meet one another. It is particularly intended that the adjacent strip bays on the respective strips be spaced apart from one another and loosely joined by distance pieces in non-contiguous, non-tangential relationship so that the strips shall have significant freedom to twist and tip with respect to one another and so that the bristles on one strip do not lend lateral support to the bristles on adjacent strips. One novel result of this objective is that there are no local regions of greater bristle density and resultant effective stiffness. For these purposes, it is now proposed that the opposed strip bays be maintained in laterally spaced relationship by means of stiff wire clips bent to form two laterally spaced loops which somewhat loosely surround the metal channels in which the brush tufts are maintained. The freedom of the channels to turn within the clip loops plus the lateral spacing between the bay extremities of the adjacent strips result in flexibility which permits the mats to conform to the terrain and which permits individual mats to be rolled up for transportation to the site of use.

A further object in connection with the clips is that the portions thereof which lie intermediate the loops surrounding the bristle retainer channels be depressed so that they may be easily staked to the ground. Also, the freedom of motion of the bristle retainer channels with respect to the clip loops reduces the tendency of the stakes to work loose from the ground as the result of the forces applied by skis to the strips via the bristles.

Still another object is to provide an artificial skiing surface composed of brush-like mats which fits together in both the transverse and longitudinal directions of the track formed thereby so as to provide an effectively continuous track surface. For this purpose, it is intended to provide complementary mats with interdigitating brush strip at their ends, with the strips at the ends of one mat connected at the site of use by the same sort of clips which are used to maintain the bays of the individual brush strips in laterally spaced relation so that there is no appreciable disparity in ski-supporting surface characteristics at the mat joints.

These and other objects will be apparent from the following specification and drawings, in which:

FIG. 1 is a perspective view of a fragment of one mat;

FIG. 2 is a diagrammatic plan view illustrating mats in two different patterns and the manner of joining them end-to-end across the width of a ski track;

FIG. 3 is a fragmentary perspective view illustrating the manner in which a mat may be rolled up;

FIG. 4 is a transverse cross-section along the line 4—4 of FIG. 1;

FIGS. 5 and 6 are views similar to FIG. 4 but illustrating, with exaggeration beyond ordinary requirements of use, the freedom of relative movement between adjacent brush strips;

FIG. 7 is a side elevation of two adjacent brush strips, also showing with exaggeration beyond ordinary requirements of use, the manner in which adjacent brush strips may be tipped relative to one another; and,

FIG. 8 is a transverse cross-section along the line 8—8 of FIG. 7.

Referring now to the drawings, in which like reference numerals denote similar elements, the artificial ski track, a portion of which is generally designated by the reference numeral **2** in FIG. 2, is composed of brush mats **4** joined together. As explained hereinafter, mats **4** are preferably formed in two different patterns **4**–*r* and **4**–*l* so that they may be readily joined without deleterious interruptions or inconsistency at the seams. Brush mats **4** are formed of generally sinuous brush strips **6**, consisting of nylon bristles **8** having looped ends **10** bent around stiff binder wires **12** and clamped within U-shape stiff metal retainer channels **14**. The free ends **16** of bristles **8** extend well above the retainer channels **14** and constitute the supporting surfaces upon which skis glide.

The sinuous bends of the brush strips **6** form bays **18**, and strips **6**, all of the same length, are staggered so that the extremities of the bays **18** of one strip approach the extremities of the bays of the strips on either side. At the extremities of bays **18**, the brush strips are maintained in spaced-apart relationship by means of stiff wire clips **20**, each of which have two loops **22**, **24** which lie in a vertical plane and which pass between bristles **8** and around retainer channels **14**. An intermediate portion **26** which spans between loops **22**, **24** on each clip is depressed to define an upwardly open V so that it can be staked down against the ground by suitable stakes, not shown, and the free ends **28**, **30** terminate opposite one another. It is important that the embrace of loops **22**, **24** around channels **14** be sufficiently loose as to permit strips **6** to

turn relative to one another, and that the span of the clips between loops **22**, **24** be sufficiently long so as to prevent either the channels **14** or bristles **8** on adjacent brush strips **6** from closely engaging or interfering with one another. In this sense, the clips **20** constitute distance pieces. This also prevents the bristles on one brush strip from bunching up with the bristles on the most nearly adjacent strips so as to form local regions of double bristle width and consequent increased resistance to deflection where the bays **18** approach one another. The freedom on channels **14** to turn with respect to the clip loops also permits brush strips **6** to tip with respect to one another, which assures that the mats will conform to hills and vales of the terrain, this action being illustrated in FIGS. 5–8. The freedom of the retainer channels to turn within the clip loops also permits individual mats to be rolled up (FIG. 3) so that they can be easily transported.

Ordinarily, mats **4** are placed down on the ground to form a ski track **2** with the lengths of brush strips **6** extending transversely of the general direction of a slope. Assuming, for example, that the mats have an effective width of three feet in the direction of the length of the brush strips, and assuming that the ski track **2** is to be nine feet wide, then three mats would be used to span the width of the ski track. The term "effective width" is used because, in this example, the individual mats would be somewhat wider in total span than three feet, the extra width beyond three feet being taken up by interlacing the ends of the brush strips of one mat with those of the next mat. Although brush strips **6** are all of the same length, two different stagger patterns are used so as to form what are called "right hand mats" **4**–*r* and "left-hand mats" **4**–*l*. The staggering of strips **6** is such that they terminate in what may be termed "long ends" **28***a* and "short ends" **28***b*, i.e., the long ends **28***a* form two full bays **18***a* and **18***b* beyond the point to which they are clipped at the factory to the last bay **18***c* near the short end **28***b* of a nearby brush strip **6**. A short end **28***b* terminates shortly beyond the last bay **18***c* to which it is clipped at the factory to a nearby bay **18***d* of a neighboring brush strip **6**. A right hand mat **4**–*r* is similar to a left hand mat **4**–*l* except in that the short strip ends **28***b* occur at the upper left-hand and lower right-hand corners of a right hand mat and the long strip ends occur at the upper right hand and lower left hand corners as seen in FIG. 2, whereas in a left hand mat the short strip ends **28***b* occur at the upper right hand and lower left hand corners and the long strip ends occur at the upper left hand and lower right hand corners. In FIG. 2, one full right hand mat **4**–*r* and part of another right hand mat **4**–*r* are diagrammed in heavy lines so as to facilitate distinguishing them from the left hand mats which are diagrammed with lighter lines. In FIG. 2 it will be seen that by offsetting the intermediate right hand mats **4**–*r* the distance of one brush strip **6** in the general direction of the slope,

the bays **18***a* and **18***b* at long strip ends **28***a* on the right hand mats **4**–*r* will lie respectively opposite the bays **18***b* and **18***a* of the long strip ends **28***a* on the left hand mats. These oppositely lying bays are held apart by clips **20***a*, **20***b* which are similar to clips **20** but which are bent into place by a hand tool at the side of use. Although the short strip ends **28***b* are butt-ended with the long strip ends **28***a*, the connections afforded by clips **20***a* and **20***b* at two full bays **18***a* and **18***b* of mats **4**–*r* and **4**–*l* assures that there will be no discontinuity in the effective ski support at the joints between the right and left hand mats **4**–*r* and **4**–*l*, provided that the supporting terrain is not excessively uneven. As will be apparent from the lower portion of FIG. 2, the mats are joined in columns along the length of the slope by clipping the approaching bays of many mats together so as to form a ski track of desired length.

The invention is not limited to the exact details shown and described in the foregoing drawings and specification, but is intended to cover all substitutions, modifications and equivalents within the scope of the following claims.

We claim:

1. A mat for forming an artificial ski track comprising a plurality of similar generally parallel undulant brush strips, each being of greater length than width and defining a series of bays along the length thereof, the extremities of the bays on one strip being disposed laterally opposite the extremities of the bays on the next adjacent strip with free end portions of alternate strips projecting for extent of at least one bay outwardly beyond free end portions of strips disposed therebetween and means connecting extremities of the opposed bays and maintaining the same in laterally spaced relationship, the means comprising distance pieces having loops on opposite ends thereof loosely embracing respective bays of said brush strips so that the brush strips may turn therein, the loops being disposed in a vertical plane and the means having an upwardly open generally V-shaped intermediate portion, thereby providing a flexible mat with spaced bays and ends configured for interdigitation with adjacent mats.

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U.S. Cl. X.R.

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