This invention relates to a dry ski surface which is usable to precisely simulate actual snow skiing.

A primary purpose of the invention is a dry ski surface which provides edge control, as in actual skiing. Another purpose is a combination dry ski surface and a ski usable thereon which precisely simulates actual snow skiing.

Another purpose is an upwardly moving dry skiable surface formed and adapted to grip skis turning thereon and to provide edge control thereby. Other purposes will appear in the ensuing specification, drawings and claims.

The invention is illustrated diagrammatically in the following drawings wherein:

FIGURE 1 is a perspective view of a ski slope assembly utilizing the surface described.

FIGURE 2 is an enlarged top view of one form of my improved dry skiable surface.

FIGURE 3 is a section along plane 3-3 of FIGURE 2. FIGURES 4, 5 and 6 are sections, similar to FIGURE 3, each showing modified forms of dry skiable surfaces, and FIGURE 7 is a section laterally through a ski suitable for use on any of the surfaces described.

FIGURE 8 is an enlarged top view of another form of my improved dry skiable surface.

FIGURE 9 is an enlarged top view of still another form of my improved dry skiable surface.

FIGURE 10 is a section, similar to FIGURE 3, showing a modified form of dry skiable surface.

Reference should be made to my co-pending application Serial No. 67,279, now Patent No. 3,047,291, filed November 4, 1960, for the details of the slope structure or assembly illustrated in FIGURE 1. The present invention utilizes the slope structure of said co-pending application, with an entirely different dry skiable surface. In general, the structure shown in FIGURE 1 may include an upwardly moving belt 10 driven over an upper roller or guide and a lower roller or guide 14. The belt 10 is continuous and may be driven by a suitable motor 12, preferably a static drive motor, so that the speed of the belt remains constant as the load varies. The surface of the belt will be described hereinafter.

At the upper end of the slope structure I may provide an upper platform or ramp 16 having an outer wall 18 suitably hinged, through accordion-type connections 20, to walls 22 of the main slope structure, which may provide a lower run-off ramp 24 which has a surface similar to the surface of the belt 10 and the run-off ramp 16 so that skiers may come down off the surface 10.

The belt 10 may move over a superstructure, not shown, but illustrated in detail in the above-mentioned co-pending application. An important feature of the structure over which the belt moves is that it has a certain yielding quality as well as providing adequate support for skiers. Beneath the belt should be a packing which is formed so that it will spring back slowly, rather than rapidly, as does actual snow. A very resilient material, such as springy rubber, is not a satisfactory packing in that it returns to its original shape too rapidly. It is important to have a material that does spring back, but slowly. It is also important that the support be adequately strong to support skiers moving on the belt. A variety of different forms of supporting structures may be satisfactory. What is important in this invention is the surface on the belt 10.

In use, the belt 10 is driven in an uphill direction over a predetermined profile by means of the static drive motor, not shown. The angle of the belt or the angle of the profile may be set, or it may be varied. Not that the entire slope structure is pivoted, as at 26. The structure may be supported by a piston and cylinder arrangement so that it pivots about point 26, or any other satisfactory type of structure may be used to raise and lower the slope or to change its angle of inclination.

Of particular importance in skiing is the edge control normally given to the skier by edging his skis into the snow. In order to precisely simulate skiing on a dry skiing surface, it is necessary that means be provided for the skier to edge on the surface and control his movements. In addition to providing an edging quality the surface must be flexible, resilient and it must be slippery. Slippiness is necessary in order to allow the skier to move over the slope as in actual snow skiing.

Considering FIGURES 2 and 3, the skiing surface may include a series or plurality of projections 30 which gradually decrease in cross section from the base 32 toward the top. The projections may be in the form of pyramids, as shown in FIGURES 2 and 3, they may be in the form of cones, or they may take any other form substantially similar to that shown providing that they allow for edge control. For example, FIGURE 3 illustrates a ski edged on the surface. The ski 34 is tilted, as in skiing, and forms an angle with the upstream side 38 of the projections 30 such that the ski will bear against the opposite side or downstream side 36 of adjacent projections. In this way, the ski will be gripped or held by the surface in such a manner that the skier may control his movements. As shown in FIGURES 2 and 3, all sides of the pyramid are generally equal in area. In addition the pyramids are arranged in a predetermined regular pattern, as particularly shown in FIGURE 2. The invention is not limited to this particular configuration. Consider FIGURE 4 in which the pyramids, or cones, again have generally equal sides, but the angles the sides make with the base 36 are substantially smaller than the angles made in FIGURE 3. The pyramids 40 in FIGURE 4 may form an angle of approximately 30 degrees with the base, whereas in FIGURE 3 each of the sides of the pyramids form an angle of roughly 45 degrees.

FIGURE 5 illustrates a further form in which each of the pyramids 42 may have a downstream edge 44 at an angle of approximately 45 degrees and an upstream edge 46 forming an angle of approximately 30 degrees with the base 32. The reverse may also be true in that the leading edge may form the smaller angle and the trailing edge the larger angle. The invention is not to be limited to a four-sided pyramid as the projections, as long as they gradually decrease in cross sectional area from the base toward the top, may have any number of sides and may be arranged either in a random or regular pattern. For example, FIGURE 8 shows pyramids 56 having three sides and FIGURE 9 shows a combination of four-sided pyramids 30 and three-sided pyramids 56 arranged in random pattern on the same surface. FIGURE 6 shows a further form, substantially similar to FIGURE 5, where the tops 48 of each of the projections are slightly rounded off. Such an arrangement may be advantageous in preventing injuries to the skier. Not that it is not the precise point of the projections that provides the control for the skier.

The surfaces illustrated in FIGURES 2-6 may be made of a variety of materials. A nylon surface is satis-
factory, as is a vinyl surface. Mylar is also a satisfactory plastic for the surface. It is preferred that the surface be of some plastic which may be molded or embossed or otherwise formed, for example rolled, to take on one of the configurations shown. If a sheet material such as nylon is formed, then each one of the projections, regardless of form, will have a certain amount of natural "give" without wearing or showing wear when the ski edge bites into it. It is important that the projections be somewhat yielding so as to receive the edge of the ski and to further provide means for gripping or holding onto the edged ski as the skier manipulates on the surface. A satisfactory surface may involve an inner projection 57 of a somewhat harder material and a covering of a foam-like material 53 which provides a somewhat soft resilient surface for receiving the ski, as shown in FIGURE 10. The invention should not be limited to any particular type of material, plastic or otherwise, although nylon forms a satisfactory skiable surface.

FIGURE 7 illustrates one form of ski suitable for use on the surface described. This ski may include a body portion 50 and a bottom layer 52 formed of a suitable slippery plastic, for example, the plastic manufactured under the trade name Teflon. In addition to having a bottom surface 52 of a slippery plastic, the edges 54 should also be formed of the same material. It has been found that a ski surface formed of Teflon provides precisely the same skiing conditions when used on a nylon skiable surface.

In addition to a ski of the type described, standard skis having wood, metal or plastic bottoms may also be satisfactory. Regular skis will work providing the surface material has the necessary toughness, as well as the other characteristics described.

In some applications a dry lubricant, for example borax acid powder, may be applied to the ski surface to increase its slipperiness. The surface may form a reservoir for the lubricant and continually apply it to the ski.

To more precisely simulate actual skiing conditions, I may provide bumps or moguls, as shown in the above-mentioned co-pending application. Moguls increase the test of a skier's skill.

The use, operation and function of the invention are as follows:

This invention pertains to a dry skiable surface suitable for use as an indoor skiing medium. The invention has application in teaching beginners to ski, as a practice slope for those proficient in skiing, and as a means for experts to demonstrate their skills, whether in games or other types of skiing contests. The invention includes an upwardly moving belt having a skiable-surface formed with projections gradually decreasing in cross section from the base toward the top. The projections may be in the shape of cones, pyramids or otherwise, and are only limited to projections which decrease in cross sectional area as described.

The projections may be similar, or they may be different. They may be arranged in an irregular pattern or in a regular pattern. Different types of projections may be randomly positioned or regularly positioned on the same skiable surface. What is important is that the angles of the sides of the projections relative to the base of an edged ski are such that the ski will be gripped. In this way a skier may control his movements. It is important that the ski surface provide an edging quality. In addition to providing an edging quality the surface should be flexible, resilient and slippery. It should be sufficiently flexible or resilient to receive the ski as it is edged. The ski should be able to bite in or indent the surface of the projections. This provides additional gripping, over and above the angle gripping by the sides of the projections.

The particular material forming the projections may vary. For example, many plastic materials may be used, or plastics covered with a layer of a softer plastic to provide the resilience described. Nylon is a satisfactory material as it is slippery.

In addition to the slope assembly itself, the invention also includes a particular type of ski for use on the assembly. A ski having a bottom surface of a slippery plastic, for example Teflon, or a material having the same general coefficient of friction as Teflon is satisfactory. The combination of nylon on the slope, or a material having generally the characteristics of nylon, and a material having generally the characteristics of Teflon on the bottom of the ski, is a satisfactory combination.

Preferably the belt 10 is driven in an uphill direction and is of a width sufficient for transverse skiing. The belt has a width such that a number of skiers may simultaneously ski on it. In skiing on the belt, a skier may move transversely back and forth across it as the belt moves up. The skier may thus gradually work his way downhill or he may ski in relatively the same lateral position on the belt. The degree of edging of the skis and the direction of the skis relative to the direction of the upwardly moving belt determine the speed at which the skier will negotiate the belt and will also determine whether or not he moves down and off the belt.

When a skier places his skis in a direction generally perpendicular to the belt movement, and edges them into the belt surface, he will move upwardly with the belt. In this way the belt may function as a ski lift and in some applications it may be desirable to mark off a predetermined edge section of the belt for use as a slope for the skiers. When a skier turns his skis directly parallel with the belt movement he will generally ski down and off the belt. It is the angle of the slope and the speed of the belt combined with the particular surface material and the material on the bottom of the skis which provides precisely simulated skiing.

The surface shown, as well as the assembly and the skis, may be used in performing contests of skill. Shalom gates or other ski trails may be set up on the belt so that skilled or professional skiers may engage in contests.

Whereas the preferred form of the invention has been shown and described herein, it should be realized that there are many modifications, substitutions and alterations thereto within the scope of the following claims.

I claim:

1. A dry ski medium which is flexible, resilient and slippery and which is formed and adapted to provide edge control for skiers thereon, including an upwardly inclined continuous uninterrupted ski surface formed with a plurality of adjacent projections each of which gradually and generally uniformly decrease in cross sectional area from the base of said surface toward the top, said projections being substantially joined at their bases, each of said projections having a surface which forms an angle with the general profile of said ski medium such as to grip skis edged thereon.

2. The structure of claim 1 further characterized in that said projections are generally in the shape of a pyramid.

3. The structure of claim 2 further characterized in that the sides of said pyramid are generally equal in area.

4. The structure of claim 2 further characterized in that the sides of said pyramid are generally unequal in area.

5. The structure of claim 2 further characterized in that said pyramids have rounded tops.

6. The structure of claim 1 further characterized in that said projections are generally in the shape of pyramids, with the number of sides in the pyramids varying.

7. The structure of claim 6 further characterized in that said pyramids are randomly arranged.

8. The structure of claim 1 further characterized in that said projections are arranged in a predetermined pattern.

9. The structure of claim 1 further characterized in that said projections are generally in the shape of pyramids, with one side of the pyramid being at a greater angle than the opposite sides.

10. The structure of claim 1 further characterized by
means for moving said ski surface in an uphill direction.

11. The structure of claim 1 further characterized in that each of said projections has a covering of a material more resilient than the material forming the main portion of each projection.

12. A moving ski slope assembly adapted for snowless skiing which includes an endless belt having a ski receiving stretch substantially longer than an average ski length and being of a width sufficient to accommodate more than one skier sliding transversely on the belt, guide means at opposite ends of the belt, means for driving the belt upwardly around said guide means with its ski receiving stretch conforming generally to a predetermined inclined profile, means for supporting said ski receiving stretch generally uniformly throughout its area including a support structure which is yielding and which is generally continuous throughout its area, said belt having a surface for receiving skis which is flexible, resilient and slippery, and which is formed and adapted to provide edge control for skiers thereupon, said medium including a continuous surface formed with a plurality of adjacent projections each of which projections gradually and generally uniformly decrease in cross-sectional area upwardly from their bases, said projections being substantially joined at their bases, each of said projections having at least one upstream side surface which forms an angle which, in relation to the general profile of the belt, is adapted to grip skis edged thereon, the surface for receiving said skis having, in relation to the skis used therewith, substantially the coefficient of friction of usual skis on snow, the angle of the belt in relation to the relative coefficient of friction of the surfacing and the skis, and the rate of upward movement of the belt being such that the skier having his skis positioned substantially parallel to the direction of movement of the belt, will, due to gravity, ski down the upwardly moving belt, and the skier having the skis extending across the direction of movement of the belt and in edging contact with the projections, will be carried up toward the high end of the belt.

13. The structure of claim 12 characterized in that the projections of the surfacing are in the form generally of obtuse pyramids.

14. The structure of claim 12 characterized in that the projections of the surfacing are spaced and angled as to permit ski edges readily to engage at least an upstream surface.

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