United States Patent

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[54] **SYNTHETIC GOLF GREEN**
6 Claims, No Drawings

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[51] **Int. Cl.** **E01c 7/00**
[50] **Field of Search** 94/3, 7, 4, 25, 19; 61/35, 36; 273/176, 195

[56] **References Cited**
UNITED STATES PATENTS

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2,977,864	4/1961	Pullar	94/22 X
3,112,681	12/1963	Gessler	94/3 X
3,332,828	7/1967	Faria	94/7 UX
3,418,897	12/1968	Humalainen	94/7

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ABSTRACT: The performance characteristics, i.e., ball response and contour maintenance, of a golf green covered with a synthetic turf product are improved by stabilizing the sandy subsurface, prior to laying down the turf, with a liquid elastomer.

SYNTHETIC GOLF GREEN

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to synthetic golf greens. More particularly, this invention relates to golf greens having an artificial turf surface and a sand subsurface which is stabilized against deformation.

2. Description of the Prior Art

Recently, synthetic turf has come into prominence due to its growing use for athletic events such as football, soccer, baseball and the like. For example, U.S. Pat. No. 3,332,828 describes a synthetic turf which comprises monofilament nylon ribbons as a pile woven, tufted or knitted into a backing. This turf is described as suitable for athletic events. In the employment of any fabric-type synthetic turf for golf greens, however, there is created a problem peculiar to that sport. Since the ball response on a synthetic golf green must of necessity simulate the response on natural sod, there must be some provision for absorbing the energy in the manner that natural sod does. One approach to this problem has been the use of an energy absorbing foam backing on the artificial turf fabric. The most effective use of such a foam has been found to occur when the material is placed over a relatively nonrigid subsurface, such as sand. However, surface such as sand is easily permanently deformed and constant foot traffic in any area of the golf green soon results in the formation of undesirable gullys and/or indentations.

It is an object of this invention to provide a golf green covered with an artificial turf fabric. It is a further object of this invention to provide an artificial golf green with a sand base stabilized against permanent deformation. These and other objects will appear hereinafter.

SUMMARY OF THE INVENTION

In accordance with this invention there is provided a synthetic golf green having a sand base, said base being impregnated with a liquid elastomer to a depth of at least 0.1 inches deep over substantially the entire area, said base being covered with an artificial turf fabric. Synthetic golf greens made in accordance with this invention do not suffer the disadvantages heretofore mentioned. By impregnating the sand base with an elastomer, the characteristics of the base, with respect to ball response, are not significantly altered. On the other hand, the elastomeric impregnation, while allowing some temporary deformation under foot traffic, causes the base to revert to its original contour thus avoiding the problem of a shifting base under the turf fabric.

The term sand, as used in this disclosure, refers to natural sand such as is found near rivers and oceans as well as sand manufactured from crushed rock. The preferred size distribution is such that will pass a three-eighths inch, 98 percent will pass a No. 4 screen and 2 percent will be retained by No. 200 sieve.

Materials used to stabilize the sandy subsurfaces are dispersions or solutions of natural or synthetic elastomers. These can be applied to the surface of the sand by conventional methods such as spraying or pouring directly on the surface. A preferred elastomer is composed of a synthetic rubber latex dispersed in water and sprayed over compacted sand. After application of the stabilizer, the mass is allowed to cure under atmospheric conditions. Of course, if it is desired to affect a cure, immediately after application, and independently of climatic conditions, external heat may be supplied to the stabilizing material by means of any conventional source.

Other elastomer materials that may be used to stabilize a sandy subsurface for synthetic golf greens are; urethane elastomers, natural rubber, silicone elastomers and the like. The selection of a specific elastomer is a matter of choice based upon convenience of application, durability, ball response characteristics, economics and the like.

The actual amount of elastomer used on any given golf green will, of course, depend on the size of the green. It has been found that sufficient elastomer must be applied to the sand subsurface to result in an impregnation of at least 0.1 inch. Such a depth of elastomer is required in order that the cohesive strength be sufficient to return the subsurface to its original contour after being walked on. Generally, the maximum amount of elastomer is a question of economics. However, a depth of more than about 1 inch has not been found to result in any improvement which would justify such a large amount of elastomer. The preferred depth of impregnation is between 0.2 and 0.5 inch.

The synthetic turf textile fabric employed as the golf green surface of this invention is composed of a thermoplastic pile which is woven, knitted or tufted into a synthetic backing. While synthetic filaments of any cross section configuration may be employed it is preferred to employ monofilament ribbon, i.e., rectangular cross section, as the pile material, preferably having a denier above 300. By thermoplastic pile material is meant nylon, polyester, polyolefins and the like. The thermoplastic composition may be a copolymer or a homopolymer and may also contain additives for light, color and heat stability and the like. The synthetic backing material may be of a like composition and could also be an acrylic composition. Blends of the aforementioned may also be employed. A fabric of cut pile construction has been found to perform better as the characteristics of a cut pile ribbon fabric are closer to natural grass.

It is also within the purview of this invention to employ a foam material under the synthetic turf fabric and on top of the stabilized sand. While not necessary in all cases, it has sometimes been found that the use of such a foam improves the characteristics of the golf green so that they more closely approximate natural turf. Energy absorbing foams, such as vinyl foams are particularly suitable. The foam may either be connected to the fabric, such as with an adhesive, or the foam may be placed on top of the stabilized sand and the fabric placed on top of the foam. In any event, the fabric must be drawn taught and securely anchored at its periphery, preferably by extending the edges below the ground surface.

SPECIFIC EMBODIMENTS

The invention is further illustrated from the following example. It is to be understood that the embodiment disclosed therein merely illustrates the invention and that numerous other embodiments can be contemplated without departing from the spirit and scope of the invention.

EXAMPLE I

A synthetic grasslike fabric was made by weaving 500 denier, green colored serrated nylon ribbon in a loop pile construction into a 7's 3 cotton count polyester primary backing fabric. The resulting grasslike fabric has a pile of two different pile heights which was made by cutting the first row of loops near the tips, and applying tension to the adjacent row of filaments to pull out the cut ends of the backing layer. This technique of cutting and pulling was applied to every other row in order such that a nondirectional pile was obtained. A rubber latex was then coated on the underside of the fabric to secure the cut pile to the primary backing.

An energy-absorbing foam was cast directly upon the underside of the fabric by preparing a plastisol foam from the following recipe:

Component	Parts by Weight
97% Vinyl chloride/3% vinyl acetate copolymer	100
Butyl benzyl phthalate	40
Di-(2-ethylhexyl)phthalate	30
Epoxy type plasticizer	5
Pentachlorobiphenyl	30
Fomade B	

The above plastisol was compounded in a conventional manner by adding the resin to the blend of plasticizers while mixing in a Ross mixer. The plasticizers and resin were mixed for an hour at about 100 r.p.m. before adding the foam stabilizer, Fomade B. This stabilizer is commercially available from the R. T. Vanderbilt Company and is described in U.S. Pat. Nos. 3,301,798 and 3,288,729. The plastisol was foamed in a mechanical frothing device and cured at about 290° F. for 25 minutes.

The subsurface of the synthetic green was prepared by compacting a 4-inch layer of sand with a roller until smooth. A carboxylated styrene-butadiene polymer latex containing 55 percent solids was diluted to a 4/1 water/latex mix was sprayed on the sand to give an elastomer/sand depth of about one-fourth inches. The latex was allowed to cure for 2 days under ambient conditions. The resulting surface was smooth and retained its initial contour although it was deformed by foot traffic, golf club impact and golf-ball impact.

The subsurface was covered with the foam-coated, grasslike fabric described above and anchored by known means at the periphery. A standard golf cup was located near the center of the assembly and subsequently was used as a golf green in regulation golf.

While in the foregoing specification this invention has been set forth in considerably detail to provide an adequate disclosure, it will be apparent to those skilled in the art that numerous changes may be made without departing from the principles of the invention. Accordingly, there is no intent to limit the invention beyond the scope of the appended claims.

What I claim is:

1. An artificial golf green comprising a synthetic turf fabric covering a stabilized sand base said base having been stabilized by impregnating the base with a liquid elastomer to a depth of at least 0.1 inch and curing the elastomer.

2. The artificial golf green as described in claim 1, wherein the sand base is impregnated to a depth of between 0.1 and 1.0 inch.

3. The artificial golf green as described in claim 1, wherein the fabric is a knitted, woven or tufted pile fabric.

4. The artificial golf green as described in claim 3 wherein the pile is composed of a thermoplastic ribbon.

5. The artificial golf green as described in claim 1, comprising additionally a foam material between the fabric and the sand.

6. The artificial turf as described in claim 1, wherein the liquid elastomer comprises a carboxylated styrene-butadiene polymer latex.