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RUBBER SURFACING MATERIAL, METHOD OF PRODUCING SAME, AND COMPOSITION FOR USE THEREIN

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This invention relates to a rubber surfacing material, the method of producing the same, and a composition for use therein, more particularly to a rubber surfacing material for use on golf courses, and to the method of producing the same and a composition for use therein.

In the maintenance of golf courses, both indoor and outdoor, trouble has been experienced in certain locations, in obtaining surfaces to withstand the wear and tear of use, and more particularly in the case of the miniature golf courses both indoor and outdoor. The majority of these miniature courses as laid out, require the use of only a putter, or in some instances, a lofted club for chipping, as well as a putter. In addition to the use of ordinary soil, various compositions have been used in surfacing the tees, greens and fairways of such miniature courses, but none of the materials used has given satisfaction in all respects, and one of the main objections is that any loose surfacing material which is merely compacted, is readily distorted and broken up by being struck with clubs and more particularly by the heels of the players, thus requiring frequent smoothing and rolling of the surfaces. Also in outdoor courses of regulation length, difficulty has been experienced, both on the tees and on the greens, in maintaining the surfaces in proper playing condition. In hot and dry locations such difficulty has been had in maintaining grass greens in proper condition, that in many localities in the South, what are known as sand greens are used. Also trouble has been had in outdoor courses with the tees which are more or less elevated, and by reason of this fact, quickly dry out. Owing to their frequent use and to injury caused by the clubs of the players, it is very difficult to maintain grass on these tees and in a great many golf courses, it will be found that they are largely dusty or hard earth. In the case of tees where the earth is hard, it is difficult to insert the wooden or other forms of tees used by the players, the dust is objectionable, and if the course tees are wet, they become a mass of mud which is just as objectionable and slippery to stand upon.

An object of my invention is to provide an improved rubber surfacing material, capable of use for the tees, greens and fairways of miniature golf courses, and also capable of use for the tees and greens of the larger outdoor courses. Another object is to provide a rubber surfacing material capable of general use for flooring, mats, runways, sidewalks and paving. Another object is to provide a rubber material adaptable generally for use as a cheap cushioning material and for other purposes. Another object is to provide a method for making the material. A still further object is to provide a composition for use in carrying out the method.

The invention broadly comprises forming a mixture of comminuted vulcanized rubber, rubber in fluid form such as a water dispersion of rubber, and if desired vulcanizing material, disposing the mixture in the desired contour, compacting and if desired vulcanizing. It further consists in adhesively uniting to the surface of the smoothed mixture when desired, a loosely scattered comminuted material for the purpose of slightly deadening or slowing down the speed of an object moving across the material. It further consists in the composition used in the method.

An embodiment of the invention suitable for the surfacing of portions of a golf course will first be described, and in carrying out this embodiment scrap vulcanized rubber, such as from inner tubes, air bags, footwear, mechanical goods, whole tires, etc., or combinations of the above, is ground or comminuted in any suitable way to the desired particle size. While the size will vary depending upon the material used and the exact purpose to which it is to be put, it has been found that a suitable size is such that all the particles will pass through a screen of ¼" mesh but very little through a screen of $\frac{1}{16}$" mesh. The ground material is then preferably mixed with a water dispersion of rubber, either artificial or natural, the dispersion preferably containing vulcanizing ingredients, and the mixture is then spread in the desired contour, compacted and vulcanized. The rubber dispersion may be vulcanized or unvulcanized, creamed, concentrated or otherwise treated. A rubber cement may also be used as the binder.

As a specific example, the following formula is given:

	Parts
Vulcanized rubber scrap	450
Rubber (as normal latex)	100
Emulsion of acetaldehyde-aniline condensate condensed in acid solution	3
Sulphur	1
Zinc oxide	5
Accelerator	1
Glue	2

In preparing the mixture a water paste may be made of the acetaldehyde-aniline emulsion, the sulphur, zinc oxide, accelerator and glue. The

rubber latex may then be placed in an enclosed mixer such as a Werner-Pfleiderer, the paste added and then the ground rubber scrap. After thoroughly mixing, the product may be removed and used as needed. In the above formula, the acetaldehyde-aniline acid condensate acts as an antioxidant. Any suitable accelerator may be used, but it is preferred to use one capable of causing vulcanization at temperatures below those normally employed in hot vulcanization, for instance, tetramethyl thiuram disulphide or zinc dimethyl dithiocarbamate. The composition as prepared will keep for a reasonable time without setting up or prevulcanizing to an extent sufficient to impair its usefulness, and as withdrawn from the mixer is in a wet granular form, the individual particles being rendered more or less adhesive by the latex adhering to them. In applying the material as a surfacing, it is spread to the desired thickness and in the desired contour, and then compacted to insure adherence of the particles and allowed to thoroughly dry and set. Under ordinary conditions it may be used in one or two days after applying, and if a low temperature accelerator has been used, the composition will vulcanize in the course of several weeks. If vulcanization is desired sooner, it may be hastened by the application of heat, such as by the use of a heated roller. The thickness of the surfacing applied, will, of course, vary upon conditions, but from about ¼" up to about 1" has been found suitable for use on golf courses. In the event that an unvulcanized binder is used, such as ordinary rubber cement or an artificial dispersion or a natural latex to which no vulcanizing ingredients have been added, it is, of course, only necessary to compact the mixture after spreading it in the desired contour. If a vulcanized latex or dispersion has been used, it is also then only necessary to spread and compact.

The following example is given as illustrating the use of an artificial dispersion of rubber:

	Parts
Smoked sheet rubber	100
Rosin	12
Sodium hydroxide in water solution	1.6

The smoked sheet rubber is broken down on a mill, the rosin then milled in, the plastic mixture then placed in a closed mixer and the sodium hydroxide solution gradually added while mixing, after which water is slowly added until the mixture breaks and forms a water dispersion. This may then be diluted to the desired consistency and used with exactly the same procedure as in the first example, merely substituting 100 parts of rubber as the artificial dispersion in place of 100 parts of rubber as latex.

The above examples are merely illustrative and the ingredients and proportion may be varied to suit conditions.

In place of a dispersion of raw rubber, there may be used a dispersion of reclaimed rubber or a mixture of dispersions of reclaimed rubber and crude rubber or mixtures of either or both of these with latex.

The above surfacing may be used as laid for sidewalks, paving, flooring, mats, runners etc., and may also be used in such form for the surfacing of a golf course, more particularly for tees. However, when used as a surfacing on a golf course for greens or fairways, it may be desirable to slow down the surface to more closely approximate grass, and in this case, the finished surface of the base material may be coated with latex and then with some comminuted soft material, such as sawdust, lightly sprinkled over it and, if necessary, lightly rolled down. In place of sawdust, any other suitable top surfacing which will slow down the speed of a golf ball, may be employed, such as fairly finely ground vulcanized rubber scrap, waste tire fibre, etc. In order to simlate the appearance of grass, the top surfacing may be dyed a suitable shade of green and, if desired, green coloring may also be included in the main body of the surfacing.

The surfacing above described has been found particularly suitable for use on miniature or regulation golf courses, since it provides a surfacing material which is durable, resilient, fast, dustless, not easily chipped or marred by clubs, it will not be disturbed by the heels of players, requires a minimum of time and labor for laying, and it can be easily repaired whenever necessary by the addition of further surfacing material or by merely applying a new top surfacing of latex and the comminuted material such as sawdust. The material in its wet granular unvulcanized form can be readily molded or shaped to give any desired contour for putting greens, tees and fairways, and being substantially water proof, it quickly dries off when used in situations exposed to the weather.

The base material furnishes an excellent surfacing for floors, pavement, etc., and can be made in the form of strips for use as mats or runners, and due to the fact that it is largely composed of scrap material, its cost is relatively low. It requires no expensive or complicated equipment to put down, and as before stated, is quickly ready for use after being laid.

While a single specific embodiment has been described, it is obvious that numerous modifications may be made in the composition, in the method of applying it, and in the method and materials used for top surfacing, and it is not desired to limit the invention other than as set forth in the appended claims.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. A resilient surfacing comprising a lightly compacted body of comminuted vulcanized rubber particles loosely bound together by an in situ deposit from a water dispersion of rubber.

2. A resilient surfacing comprising a lightly compacted body of comminuted vulcanized scrap rubber particles of a size not substantially less than $\frac{1}{16}$ inch loosely bound together by the vulcanized in situ deposit from a water dispersion of rubber.

3. A resilient surfacing comprising a lightly compacted body of comminuted vulcanized rubber scrap particles loosely bound together by the vulcanized in situ deposit from rubber latex.

4. A resilient surfacing for golf greens, tees and fairways comprising lightly compacted comminuted rubber scrap loosely bound together by the vulcanized in situ deposit from rubber latex, and a top layer of loosely scattered comminuted material adhesively united thereto.

5. A method of making a resilient surfacing which comprises, forming a granular mixture of comminuted vulcanized scrap rubber and a water dispersion of rubber, disposing the mixture in the desired contour, and lightly compacting it.

6. A method of making a resilient surfacing which comprises forming a granular mixture of comminuted vulcanized rubber, a water disper-

sion of rubber and vulcanizing material, disposing the mixture in the desired contour, lightly compacting it, and vulcanizing.

7. A method of making a resilient surfacing which comprises, forming a granular mixture of comminuted vulcanized rubber, a water dispersion of rubber and vulcanizing material effective at sub-normal vulcanizing temperatures, disposing the mixture in the desired contour, lightly compacting it, and subjecting to a vulcanizing temperature.

ELMER ROBERTS.