Sept. 3, 1935. M. E. GOTTLIEB 2,013,148

ARTIFICIAL GRASS MAT

Filed Aug. 13, 1934

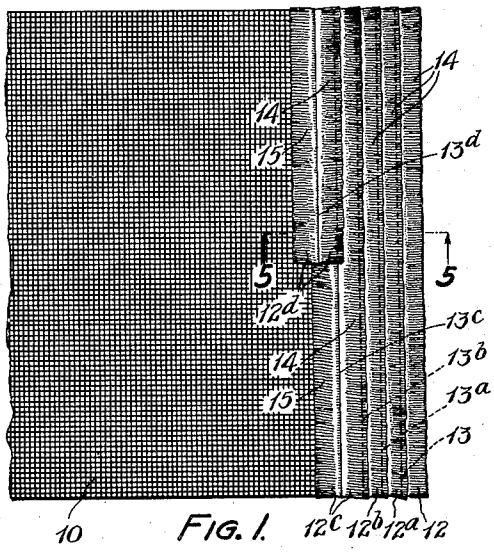


FIG. 1.

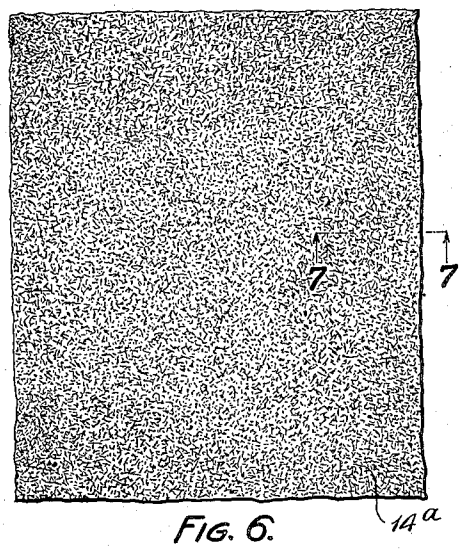


FIG. 6.



FIG. 2.

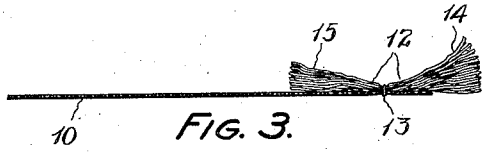


FIG. 3.

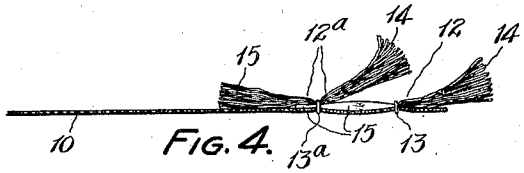


FIG. 4.

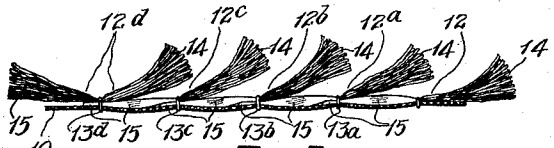


FIG. 5.

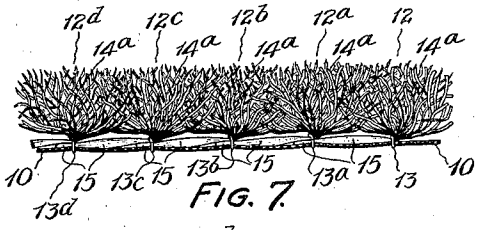


FIG. 7.

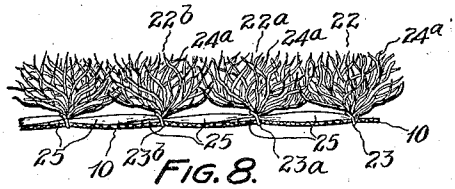


FIG. 8.

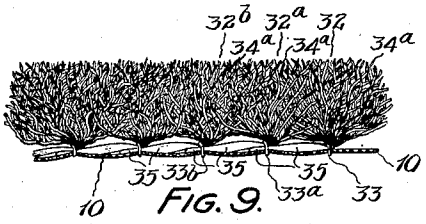


FIG. 9.

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ARTIFICIAL GRASS MAT

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4 Claims. (Cl. 2—278)

This invention relates to artificial covering materials used for decorative purposes or for concealing discordant or offensive objects from view. More particularly this invention relates to mats made artificially to simulate grass such as employed by window dressers to enhance their displays, and by stage decorators to represent grass plots, and by golf schools as indoor putting greens, and by funeral directors and cemeteries' attendants to conceal the freshly excavated earth around the grave and to make the grave appear less offensive to mourners.

Artificial mats simulating grass have been made and used for a long time. These mats usually consist of a flexible woven fabric backing member to which rows of short fibers are secured, usually by stitching, the rows being spaced from each other. The usual material used for the fibers consists of raffia or similar material. The fibers in these rows are brushed after attachment to the backing until they assume a position resembling grass, and are then dyed to simulate the color of grass, after which they are fireproofed and otherwise treated to improve their appearance and to resist the elements and wear and tear.

All of the artificial grass mats of this type in commercial use, so far as I am aware, have the rows of short fibers stitched to the backing by means of a single line of stitching running along the center of the row and have both ends of the short fibers projecting upwardly from the backing after brushing. Sometimes two layers of these rows are applied to a backing sheet, the rows in one layer running crosswise relatively to the rows in the other layer.

All the mats made as described above have the disadvantage that when the mat is bent about a relatively sharp corner, the backing, usually a coarse fabric, becomes exposed to view. This exposure of the backing fabric destroys the illusion which is intended to be effected. This difficulty is accentuated by the fact that the backing material usually takes the dye differently than the grass simulating fibers and has a different type of surface than that of the fibers thus reflecting the light differently and making the exposed backing portion correspondingly more conspicuous. All of the fibers on the above described construction are secured to the backing by means of a single stitch only and the detaching of fibers in normal use is therefore considerable, due to the insufficiency of this single stitch line type of fastening. It will also be noted that the backing, being necessarily relatively flexible easily bends sharply about a corner or an edge, thus destroying the illusion for the reason that natural sod does not bend so sharply. The short fibers in mats as heretofore constructed are normally straight when sewed to the mats and are later brushed to cause the fibers to bend so that both ends of the fibers project upwardly from the backing; these fibers naturally tend to assume their original straight position and tend to return to the original flat condition thus exposing the central seam portion of the row. All of the defects pointed out above become more pronounced with the increase in age of the mat.

It is therefore, one of the objects of this invention to produce a mat of the class described which will at no time and under no circumstances expose any of the backing material and in which, when the mat is bent, no material is exposed to view except the grass simulating fibers.

A further object of this invention is to produce a grass resembling mat in which the separate fibers will be more securely fastened to the backing member in order that they may not be detached from the backing member in normal use.

A further object of this invention is to produce a mat in which the fibers will better maintain their brushed upwardly projecting position with relation to the backing.

A further object of this invention is to produce a mat which will have a substantial body throughout its entire area and which will not bend to form a sharp corner in use.

A further object of this invention is to produce a mat of this type which will present a relatively smooth and uniformly resilient upper surface which will well adapt the mat for such uses as artificial putting greens for golf practice.

A further object of this invention is to provide a mat of this type which will be improved in appearance, economical to manufacture, and durable in use.

Further and more specific objects of this invention will become apparent from the following description and claims. This description sets forth in detail a certain construction embodying this invention, such disclosed construction constituting however, but one of the forms in which the principle of this invention may be applied.

Referring to the annexed drawing:

Fig. 1 is a plan view of my improved mat, this view showing the mat to a reduced scale, in a partially completed condition, that is, in a condition in which only a part of the rows of material which are to be applied to a backing sheet

are shown and in which that material is shown only in a partly finished state.

Fig. 2 is an enlarged detached view of a few short fibers of the material of which the rows shown in Fig. 1 are composed, these fibers being shown prior to their attachment to the backing sheet.

Fig. 3 is an enlarged transverse sectional view thru the partially completed mat disclosed in Fig. 1 but showing the mat in an earlier state of completion with but a single row of fibrous material such as illustrated in Fig. 2, applied to the backing sheet.

Fig. 4 is a view similar to Fig. 3 but showing the mat in a slightly further advanced state after the second row of fibrous material has been added to the backing sheet.

Fig. 5 is an enlarged view similar to Fig. 4 showing the mat in a still further advanced state of completion with several additional rows of fibrous material added to the backing sheet, this view actually representing a transverse section thru the partly completed mat illustrated in Fig. 1 as it appears on the plane indicated by line 5, 5 in that figure.

Fig. 6 is a plan view of my improved mat, illustrated to the same scale as Fig. 1 but showing the mat as it appears after completion.

Fig. 7 is an enlarged transverse section of the completed mat taken on the plane indicated by line 7, 7 in Figure 6 and showing the same portion of the mat as is represented by Fig. 5 after certain finishing operations have been performed.

Fig. 8 and Fig. 9 are views similar to Fig. 7 showing modified forms of this invention.

Referring to the form of my invention shown in Figures 1 to 7 of the drawing, the backing sheet which comprises the supporting member upon which my improved artificial grass is formed, is indicated at 10. This backing sheet may be made of any suitable flexible material which may be woven, felted or produced in any other manner. I prefer to use a firm burlap because of the substantial body and good wearing qualities of this material and because of its open nature which permits ventilation and prevents deterioration of the artificial mat when in storage.

I then cut long threads or fibers of suitable material into uniform short lengths. A few of these short lengths of fibers, in loose form, are shown in Fig. 2, at 11, prior to their application to the backing. The nature of this fibrous material will vary depending upon the appearance which it is desired to produce in the artificial mat. I find that raffia, which is generally used for this purpose is a very satisfactory material for the artificial grass mats having a width of blade and a texture very similar to growing grass.

These short pieces of fiber are laid upon one face of the burlap to the desired thickness and parallel to each other to form a row across the backing sheet and are then secured to the burlap by means of a stitch line. The first row of these fibers is preferably applied adjacent the edge of the sheet as shown in Fig. 3 to form a row 12, secured by a stitch line 13. In this manner a row or ribbon of fibers is formed and secured to the backing member, the individual fibers running transversely of the length of the row. The stitch line 13 is located at a predetermined desired point intermediate the ends of the fibers. The fibers in the row 12 are thus each divided into two portions by the stitch line, a right portion, as viewed in Fig. 3, shown at 14, and a left portion as shown at 15. It will be noted in the construction shown in Fig. 3, that the stitch line 13 runs substantially thru the center of the fibers and that the portions 14 and 15 are substantially of the same length.

After the first row 12 has been attached to the backing 10 as indicated in Fig. 3, additional short fibers 11 are assembled in a row and superimposed upon the portion 15 of the first row 12 as shown in Fig. 4, to form a second row 12*a*. As shown, the central portion of the row 12*a* is superimposed upon the portion 15 adjacent the outer end of the fibers but at a point located a substantial distance from the outer end of the fiber portion 15. A stitch line 13*a* is then run thru the center of row 12*a* and thru the end of the portion 15 of the fibers of row 12 and thru the burlap 10, as clearly shown in Fig. 3.

After the row 12*a* has been applied for the full distance across the burlap, additional rows of fibers are successively superimposed upon the portions 15 of the previously applied rows, placing the centers of the superimposed rows upon the ends of the portions 15 but always carefully spaced from the ends of the fiber portions 15 thus insuring the passage of the stitch line thru the end portions 15 of the previously applied rows. Several additional rows and stitch lines thus added are indicated at 12*b*, 12*c*, 12*d*, and 13*b*, 13*c*, and 13*d*, respectively, in Figures 1 and 5. It will be evident that the distance between the adjacent stitch lines is less than the length of the portion 15 which is firmly secured to the backing by the stitch lines. It will also be apparent that the portions 14 of all of the several rows of fibers are free to project upwardly from the backing.

After the entire backing sheet 10 has been completely covered with rows of fibers in the manner above set forth this mat is completed substantially as follows:

The portion 14 of the fibers is brushed in all directions by any desired means to cause these fibers to project vertically in different directions relative to the surface of the backing in order to cause these fibers to simulate the position assumed by natural grass blades. After brushing, the mat is then dyed a suitable color, such as grass green, in the event that the mat is intended to simulate grass. This dyeing is done with high pressure steam and the dye completely penetrates the fiber. Thereafter the mat is subjected to a further brushing and the fibers are preferably treated with glycerine to produce a natural velvety luster. The fibers are then chemically treated to prevent rotting and are fireproofed with calcium chloride which treatment additionally causes moisture to be attracted to the fibers thus producing a moist sensation when the fibers are touched. The steps outlined above may be modified or amplified to suit the judgment of the operator and to suit the varying requirements which have to be satisfied.

The completed mat is shown to a reduced scale in plan in Fig. 6 and in an enlarged fragmentary vertical section in Fig. 7, where the brushed fibers are indicated at 14*a*.

It will be evident that two stitch lines run thru the portion 15 of the fibers in all of the rows and that all of these fibers, being secured to the backing at two places, will be firmly anchored to the backing and that the likelihood of their becoming detached in service is thereby reduced to a minimum.

It should also be noted that in the brushing operation, the portions 15 of the fibers which are all attached to the backing by two stitch lines as

stated and by the method specifically shown in Figures 3, 4, and 5, is not brushed nor disturbed in any manner. This portion 15 remains firmly secured to the backing and substantially parallel to the backing at all times, as clearly shown in the section thru the finished mat in Fig. 7.

It will be apparent that the backing sheet of the artificial grass mat produced as stated is provided with a complete and permanent covering of fibrous material 15 which conceals the backing sheet from the face of the mat under all circumstances, and that it is not possible to determine from the face of the material what the nature of the backing is, unless the portion 15 of the fiber rows is purposely and willfully distorted or destroyed.

It will also be apparent that the number of fibers forming the portion 15 attached to the burlap by double stitching, is the same as the number of fibers in the portion 14 forming the upwardly projecting fibers of the grass mat. Due to the fact that a very substantial number of fibers are required in the upwardly projecting portion 14 to produce a satisfactory appearing grass mat a sufficiently satisfactory covering 15 is also assured to effectively conceal the backing.

It will further be evident that the combined body or substance of the backing 10 and the fibrous covering 15 is quite heavy and substantial and will not become flabby, nor will it bend sharply about square corners, to destroy the illusion of natural grass.

It will also be apparent that all of the rows of fibers are parallel to each other and that the fibers in turn are all parallel to one another and all extend in a direction transverse to the parallel spaced stitch lines when applied to the backing.

It will immediately be apparent that this construction, while requiring slightly more material to produce an equal number of upstanding grass blade resembling fibers, requires less labor to produce than other types of construction in which two layers of material are applied and in which the rows in different layers run in different directions, and which therefore require much more handling than the herein disclosed construction.

It will also be evident that if any of the upwardly projecting fibers 14 become worn or detached due to unusual wear, that the portion 15 of the fibers will come into view and, at a slight distance, it will be impossible to detect the absence of even a considerable number of upwardly projecting fibers, due to the fact that the color and the reflective index of the fibers 15, firmly fixed to the mat, are identical with the color and reflective index of the upwardly projecting fibers.

It will also be evident that the original and natural positions of the fibers are straight and that the fibers naturally tend to return to the straight position. In other mats with which I am familiar, and in which both the portions 14 and 15 are brushed upwardly from the backing sheet, the fibers are bent substantially about an angle of 180°, in the rows. The tendency urging these fibers to return to their original straight position is naturally in proportion to the amount of their deflection from their original straight position, thus tending to expose the central stitch lines and the adjacent regular and parallel appearance of fiber portions.

In the artificial grass produced by my improved method the fibers are deflected an amount averaging only 90° from the original position, as will appear from Fig. 7, and consequently will have only one half the tendency to return to the flat position as compared with those fibers in other artificial mats which are bent 180°, thus insuring a lowered tendency to expose the seam lines.

It will also be clear that the grass resembling fibers will still remain attached to the backing even tho some of the stitches are broken or torn, for the reason that if one row of stitches does not hold the fibers, the other row will.

This invention naturally lends itself to several modified constructions; for instance, I have shown in Fig. 8 a construction in which the portions 25 of the rows 22, 22*a*, and 22*b* each secured by a double row of stitch lines 23, 23*a*, and 23*b* as shown, is longer than the upwardly projecting portion of the fibers 24*a*. This modified construction may be used to advantage when less intense distribution of upwardly projecting fibers is required.

Fig. 9 shows another modification in which the portions 35 of the rows 32, 32*a*, and 32*b* each secured by double stitch lines 33, 33*a*, and 33*b*, are shorter than the upwardly projecting portions 34*a* of the fibers. This construction may advantageously be used when longer fibers or a more dense distribution of the upstanding fibers is required.

While I have described the process of forming the rows by stating that the individual short fibers are laid upon the burlap and then stitched to the burlap to form rows, I may also produce the rows separately from the burlap and then stitch the preformed rows to the burlap.

It will also be understood that the rows need not be placed parallel to one of the edges of the backing sheet. The rows might equally well be placed diagonally on the backing material thus making it more difficult for the eye to follow the original row arrangement of the mat.

While this invention has been described largely as applied to the production of an artificial grass mat, it will be understood that many other similar artificial materials might advantageously be produced by the method outlined, such as furs, moss, and the like.

Many other modifications of this invention and its application will naturally occur to those skilled in this art, and the present disclosures should therefore be considered as typical only, and I desire not to be limited to the exact construction shown and described.

What I claim is:

1. An artificial grass mat including a flexible backing sheet and a series of rows composed of individual superimposed raffia fibers, each of said fibers being secured to the backing sheet substantially at the center of the fiber and at one end of the fiber, by suitably spaced stitch lines, and projecting upwardly from the sheet at its other end, whereby the upper surface of the backing sheet between said spaced stitch lines is concealed by a layer of superimposed raffia fibers.

2. An artificial grass mat including a flexible backing sheet and a series of rows of grass simulating fibers secured to the backing sheet by stitch lines, each row consisting of a plurality of separate fibers superimposed upon each other, each of said fibers being secured to the backing sheet by two stitch lines, one of said stitch lines gripping the fibers substantially at the center line of the row and the other stitch line gripping the separate ends of said fibers at one side of said row and the fibers of the next adjacent row substantially at the center line thereof, the free ends of the fibers projecting outwardly from

the backing sheet at various angular directions relatively to each other.

3. An artificial grass mat including a flexible backing material, and a plurality of rows of raffia fibers, the rows comprised of separate fibers extending transversely of the rows and superimposed upon each other, said rows each being secured to the backing by a stitch line substantially through the central portion of the fibers, said rows being parallel to each other and the central portion of each row being superimposed upon and secured by said stitch line to the backing over and through the edge portion of a next adjacent row, whereby the said edge portion is stitched to the backing material and whereby a substantial portion of the fiber is free to project outwardly from the backing sheet, the spacing between said stitch lines being approximately equal to one half the length of the individual fibers.

4. An artificial grass mat including a flexible backing sheet, a row comprised of a multiplicity of individual relatively short superimposed raffia fibers of approximately equal length secured to the backing sheet by a stitch line passing substantially through the center of the fibers, a second row of similar individual superimposed raffia fibers laid upon the first row parallel to but offset therefrom to an extent slightly less than one half of the length of the fibers whereby the approximate central portion of the fibers in the second row contacts the ends of the fibers in the first row, and a stitch line passing substantially through the center of the fibers in the second row and through the separate ends of the fibers of the first row whereby the portion of the fibers secured between said stitch lines is substantially parallel to the backing sheet, the unsecured portion of each of the fibers in each row projecting outwardly in disordered directions relatively to the backing sheet.

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