

Dec. 7, 1971

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3,625,011

DRAINAGE SYSTEM

Filed April 15, 1970

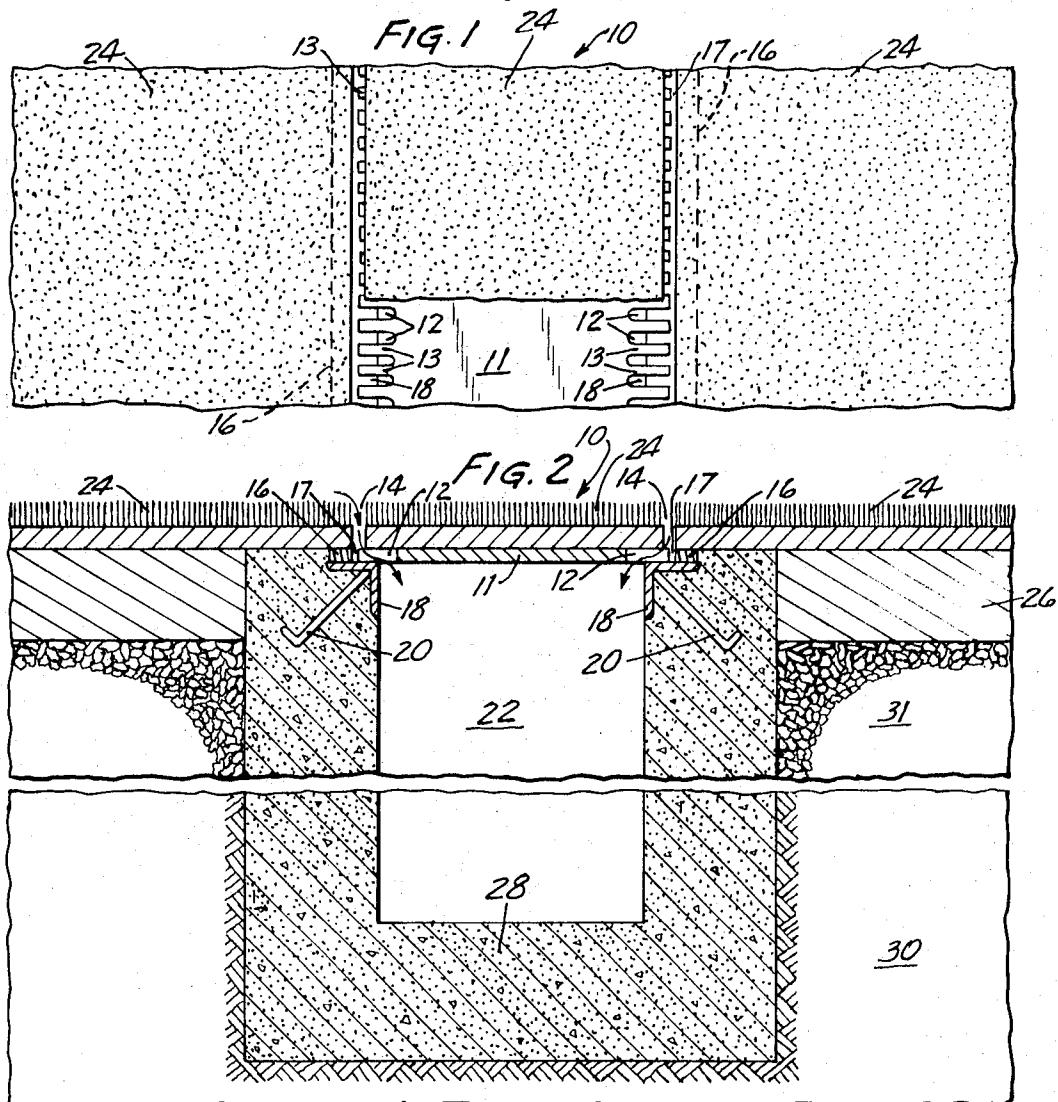


FIG. 3

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United States Patent Office

3,625,011
Patented Dec. 7, 1971

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3,625,011 DRAINAGE SYSTEM

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Filed Apr. 15, 1970, Ser. No. 28,798

Int. Cl. E02b 11/00; E01c 13/00; A63c 19/04
U.S. Cl. 61—11 8 Claims

ABSTRACT OF THE DISCLOSURE

A covered drainage system for the removal of water from an athletic playing field having an artificial surfacing thereon, comprising, in combination, drainage means below the surface of the playing field and proximate thereto for receiving and carrying water; a cover for the drainage means adapted to allow water to pass between the adjacent field and the cover and into the drainage means, the cover comprising a substrate surfaced with a sheet of artificial surfacing; and means to removably hold the cover on the drainage means, wherein the strip of artificial surfacing on the cover is adjacent to and level with the artificial surfacing of the playing field and separated only slightly therefrom to form a small space therebetween. Water, which is deposited on the playing field, passes from the field into the space between the playing field and the cover, providing a pass through of the water into the drainage means below the cover.

BACKGROUND OF THE INVENTION

The present invention relates to a drainage system for removing water from a playing field surfaced with an artificial surfacing. More particularly, the present invention relates to a drainage system located proximate the playing field and having a cover, or series of covers, adapted to allow water to pass into a drainage trench but yet providing a nearly visibly continuous surface with the playing field for athletic purposes. The cover is further adapted to prevent users of the field from falling into or stepping into the drainage trench.

At present, artificial surfacing is finding great favor in professional and amateur sports as a turf for athletic fields, particularly with football and baseball. The artificial turf has certain advantages over a natural turf, such as durability, minimal maintenance, and reduction in injuries to users of the field. One problem that exists when using artificial surfacing is the removal of moisture from the playing surface commonly caused by rain in non-covered stadiums. Where natural grass is used, most of the water is allowed to seep into the ground, along with some runoff, the remainder drying by natural processes. However, where a synthetic turf is used, the material used to hold the turf is normally impermeable and water will not pass therethrough and seep into the ground. Thus, the water must drain off the field to the peripheral areas of the field and is either collected there or removed therefrom at that point. As a result, full playability of the field is not always permitted after a rain or the like, and many ball games have had to be cancelled. Such drainage is particularly poor on baseball fields because of the low grades required.

One drainage system being used presently consists of a series of covered "manholes" located at random on the playing field and adjacent areas. After a rain the tight-fitting covers must be removed to allow drainage into these manholes and, as a result, portions of the field must be slanted toward each "man-hole" to encourage water to flow into that particular hole, which diminishes the uniformity of the field. More importantly, the field does not

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drain continuously, especially during a ball game. The field may not be used when the holes are uncovered.

At present, applicant is unaware of any drainage system which may be employed to continuously drain water from an artificially surfaced field without encumbering the use of the field.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a means to drain water from a playing field surfaced with an artificial surfacing which does not diminish the continuity of the playing field or the aesthetic properties thereof. More particularly, there is provided a drainage trench proximate an artificially surfaced athletic playing field, or located in the field itself, to continuously collect and carry away water which drains from such field and, thus maintain nearly constant playability of the field.

The drainage means of the present invention is a covered drainage system for the removal of water from an artificially surfaced field which comprises, in combination, drainage means below the surface of the playing field and proximate thereto; a cover for the drainage means comprising a generally rigid substrate surfaced with a sheet of artificial surfacing; the cover adapted to allow only a small space to exist between the adjacent playing field and the cover; and means to removably hold the cover on the drainage means so that the artificial surfacing on the adjacent field and cover are essentially level, forming a nearly visible continuous surface. Water passes from the playing field to the drainage system and into the space between the cover and the playing field and, thereafter, into the drainage means below the cover.

In a preferred embodiment, the cover for the drainage means comprises a rigid plate having notched edges and surfaced with a sheet of artificial surfacing; the edges being juxtaposed and below the adjacent artificial surfacing on the playing field, wherein the small space provided between the cover and adjacent playing field exposes a portion of the notched plate. The notches provide a pass through of the water into the drainage means.

The invention will be better understood with reference to the drawing wherein:

FIG. 1 is a top view of the drainage trench cover having a portion of the artificial surfacing removed;

FIG. 2 is a cross section of the drainage trench and cover therefor; and

FIG. 3 is a schematic end view of a football field having the trench of the present invention at the peripheral areas thereof.

Referring to the drawings, particularly FIGS. 1 and 2, one preferred embodiment of the present invention comprises, in combination, a drainage trench 28 located in the ground below and proximate the playing field and having a cover 10 (in series), comprising a rigid plate 11 having notches 12 and corresponding protrusions 13 on each side thereof, and surfaced with artificial surfacing 24 of the same kind that surfaces the remainder of the playing field and adjacent area.

Artificial surfacing may be of various types and applied by various methods, only one such method being illustrated in the drawing. The artificial surfacing is applied to a playing field by removing the earth on the field down to a desired level. The subgrade 30 is compacted. Over the subgrade is placed a layer of crushed rock base 31 over which is placed a layer of asphalt concrete 26. Finally, the artificial turf 24 is placed over the asphalt concrete 26. The drainage trench itself, as illustrated, is a concrete trench 28 fabricated under the surface of the playing field when the field is prepared and has therein a receiving area or cavity 22 of about 6 inches by 10 inches in area. The aforementioned dimensions are not critical to the drainage trench and may be varied to con-

form with various drainage needs and the size of the surfaced area. Similarly, materials other than concrete may be used to fabricate the trench, such as metals, plastic, castable resins, fiberglass, and the like.

The cover 10 for the drainage trench, comprises a metal plate 11 having a plurality of notches 12 along the sides thereof. The plate is held over the drainage trench by means of a metal brace or angle iron edging 18 mounted on the trench and which also has a small spacer 16 mounted thereon to compensate for the space taken by the metal plate 11 of the cover 10 so that the synthetic surfacing 24 will remain visibly continuous between the playing field and the trench cover and also serves to fixedly hold the edge of the adjacent artificial surfacing. There may or may not be an additional brace or anchor pin 20 attached on one end to the angle iron edging 18, embedded in the concrete trench 28 to insure the structural stability of the edging 18, and consequently, insure the stability of the cover over the trench. It is important that the angle iron edging, the anchor pin or other suitable braces are sufficient to hold the cover on the trench when weight is placed thereon to prevent injury to users of the field. Although the use of such a brace is preferred, the cover may be adapted to rest directly on the trench itself, eliminating the need for a brace.

The metal plate 11 of the cover 10 is adapted such that the edges or protrusions 13 of the metal plate may be placed on the angle iron edging 18, holding the cover in place over the trench, but providing a small space 17 between the plate and the spacer 16. The artificial surfacing is placed over the metal plate in such a way as to allow only a small space 14 to exist between the artificial surfacing on the metal plate and the artificial surfacing on the playing field, such space being only about $\frac{1}{2}$ inch wide, and exposing a portion of the notched edges. The smaller space 17 existing between the plate 11 and strip 16 allows water, which has passed through space 14, to pass through the notches 12 and into the trench 22. Space 17 is about $\frac{1}{16}$ inch so that spikes from a player's shoe will not catch therein, but yet sufficient to allow the passage of water therethrough.

The drainage system of the present invention is preferably located around the periphery of the playing field as illustrated in FIG. 3. A football field 37, as shown, has a slope 36 of about 2% from the center 35 of the playing field to the edge. Similarly, there is about a 1% slope 40 from the remainder of the field adjacent the playing field to the edge of the playing field. The drainage system 38 is preferably located at this juncture as the water can flow from both directions toward the drainage system. The drainage system of the present invention may be located at any place particularly desirable for various playing fields and may be located on the field itself as it will not encumber the use of the field. The field may be designed so that the water will be directed toward the drainage trench located anywhere it is deemed desirable.

The water drains from the playing field 37, and from the adjacent area of the field 40 toward the covered drainage trench 38. Upon reaching the trench, the water passes into space 14 between the two sections of artificial turf, and then passes into space 17 between the notched plate 11 and the spacer 16, through the notches 12 of plate 11, which separates the cover 10 and the angle iron edging 18, and into the cavity 22 of the trench 28 (as illustrated by the arrows.)

The trench may be provided with means to allow the water to flow therefrom to some area off the field such as a storm sewer (not shown). Water may also be removed from the trench 28 by means of a suitable pump system. The removal of water from a normal playing field by automatic drainage obtainable through the present invention is approximately 6 gals. of water per minute per total linear foot of surface. The cover for the drainage ditch provides a visibly continuous field surface, the only evidence of the drainage system being the two narrow slots 14. Thus, there is provided automatic, con-

tinuous means for water removal from the synthetic playing field which will permit the continual drainage of water from the field and allow the field to be in a playable condition at all times.

In the preferred embodiment, the above-described trenches are about 80 to 120 yards long and about 6 inches wide. While the trench is continuous, the cover therefor is preferably divided into about 10 foot long sections and used in series so that any particular section may be removed for cleaning the trench. The cover sections fit snugly together at their ends so that there is relatively little visible separation therebetween other than a small "seam" line. The cover is preferably about 7 inches wide so that there will be at least $\frac{1}{2}$ inch available to rest on each side of the 6 inch wide trench, but leaving a small space between the cover and the adjacent field to allow drainage into the trench. This small space may be up to 1 inch wide but preferably about $\frac{1}{2}$ inch so as not to diminish the visible continuity of the field and to avoid any hazards to the users of the field. The cover, in the above-described 10 foot sections, weighs only about 150 pounds so that the cover may be conveniently removed by no more than two people.

The notches on the plate used to fabricate the cover are preferably about $\frac{1}{4}$ inch wide and 1 inch long and present about a $\frac{1}{16}$ inch opening between the edges of the plate and the adjacent surfacing, preventing injury to players and preventing movement of the cover on the trench. The plate is preferably $\frac{1}{4}$ inch thick to provide space for the water to pass through the notches and into the trench. The plate is preferably constructed of steel as it is quite weatherable, durable, and exhibits excellent structural stability. Various other materials, however, such as wood, plastic, etc., may be used. It was found that above-described dimensions were satisfactory for most applications in that drainage of water from a field was more than adequate and no backup of water in the trench occurred.

Although the use of a trench as herein described is preferred because it may be easily constructed, easily cleaned and is relatively inexpensive, any suitable drainage conduit may be used. Examples are metal troughs or pipes located beneath a modified cover. The invention resides not in the selection of a particular drainage conduit or cover therefor, but rather is the concept of a drainage conduit covered such that water may drain thereto, the cover not diminishing the continuity of the field or presenting hazards to users of the field.

In another embodiment of the invention, the substrate or plate used to hold the artificial surfacing and form a cover, may have a plurality of small pieces depending therefrom which rest on the holding means or the trench itself. Thus, water may flow under the cover through the depending pieces and into the trench eliminating any need for notches in the plate. In yet another embodiment, the brace for holding the plate may be notched rather than the plate, so that water may pass through the notches in the brace and into the trench. In still another embodiment, there may be direct fluid communication from the space between the field and the cover to the trench, eliminating the need for notches altogether. Various modifications are possible and would be obvious to one skilled in the art. It is important only that a suitable space is provided for passage of water from the artificially surfaced field into the covered drainage system.

65 What is claimed is:

1. A covered drainage system for the continuous removal of water from an artificially surfaced field without interfering with the playability of said field, said system being easily cleanable, comprising, in combination:
 70 drainage means below the surface of said field and proximate thereto;
 a cover for said drainage means comprising a generally rigid substrate surfaced with a sheet of artificial surfacing, said cover adapted such that only a small

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space exists between the adjacent field and said cover; and means to removably hold said cover on said drainage means such that the artificial surfacing on said adjacent field and said cover are approximately level forming a nearly visible continuous surface and such that said cover is essentially immobile between said adjacent surfacing; whereby, water passes from said field to said drainage system, through said space and into said drainage means below said cover.

2. A covered drainage trench for the removal of water from an artificially surfaced field without interfering with the playability of said field, comprising, in combination:

a drainage trench below the surface of the playing field and proximate thereto for receiving and carrying water;

a cover for said trench adapted to allow water to pass from said field into said trench; said cover comprising a metal plate having notched edges and surfaced with a sheet of artificial surfacing, wherein said edges are juxtaposed and below the adjacent artificial surfacing and said sheet of artificial surfacing is adjacent to and essentially level with the artificial surfacing of said field and separated only slightly therefrom to form a small space therebetween, said space exposing a portion of said notches; and means to removably hold said cover on said trench; whereby, water passes from said field into said space,

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said notches providing a pass through of said water into said trench below said plate.

3. The covered drainage trench of claim 2 wherein said trench is concrete and said plate is steel.

4. The covered drainage trench of claim 2 wherein said plate is about $\frac{1}{4}$ inch thick and said notches are about $\frac{1}{4}$ inch wide and 1 inch long.

5. The covered drainage trench of claim 2 wherein said means to removably hold said cover is an angle iron edging mounted on said trench.

6. The covered drainage trench of claim 2 wherein said space is about $\frac{1}{2}$ inch in width.

7. The covered drainage trench of claim 2 wherein said cover is about 10 feet long and 6 inches wide.

8. The covered drainage trench of claim 2 wherein said plate is located about $\frac{1}{16}$ inch from the adjacent surfacing providing a small space therebetween for the passage of water.

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20 25 J. KARL BELL, Primary Examiner

U.S. Cl. X.R.

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