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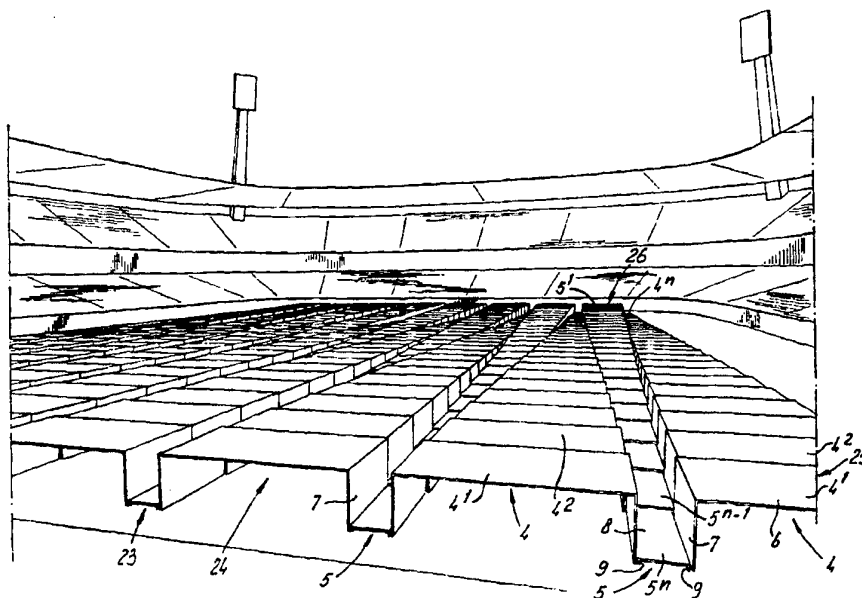
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(54) Title: SYSTEM FOR PROTECTING A PITCH OR FIELD



(57) Abstract

A system for protecting a surface, such as a sports pitch, or an agricultural field, such as an experimental field, against, for example, the effects of weather comprises mutually linked panels which are movable between a position in which they are connected together and cover the pitch or field and a position in which they are located outside the pitch or field. The panels each individually have a surface area which is appreciably smaller than that of the surface to be protected. In order to enable the system to be installed or removed quickly and easily, the panels are linked in rows (23, 24), the panels of each row (23, 24) being movable between a rest position, in which their surfaces are facing one another, and a use position, one after another in a row, which rows (2, 3) of panels (4, 5) are mutually linked to form a closed surface.

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System for protecting a pitch or field

The invention relates to a system for protecting a surface, such as a sports pitch, or an agricultural field, such as an experimental field, against, for example, the effects of weather, which system comprises mutually linked panels which are movable between a position in which they are connected together and cover the pitch or field and a position in which they are located outside the pitch or field, which panels each individually have a surface area which is appreciably smaller than that of the surface to be protected.

Sports pitches for outdoor sports such as football, hockey and the like are used intensively and, especially as part of a stadium, represent a large investment. Sports pitches of this type are frequently used for league matches. If the league is to proceed smoothly it is extremely important that the sports pitches can always be used at the planned times during the league season. As is known, weather conditions can lead to serious disruption. The sports pitches sometimes can not be used for a considerable period because of waterlogging, frost and snow, with the result that the league is disrupted.

The situation is further aggravated by the fact that the sports pitches are sometimes used intensively, for example also for international or regional matches or even world championships.

Furthermore, the sports pitches in stadia in particular can be used for large scale events, such as pop concerts. In this context it is known to protect the turf by means of a temporary cover in the form of planking or a flexible sheet material.

As is evident from the above, it would be very attractive to be able to protect sports pitches over their entire surface. In particular, the protection must also be suitable for grass surfaces such as those used for, for example, football and hockey.

In connection with this latter condition, roofing over an entire stadium, including the sports pitch, does not constitute a good solution. Firstly, the growth of the turf can

be adversely effected by complete roofing over of this type. Furthermore, in practice it has been found not to be simple to maintain the desired climate in a roofed-over area of this type when the attendance is high. Finally, roofing over of this type
5 is very expensive, in view of the length of the free span and the magnitude of the loads caused by wind and snow.

Floor protection which can be used as a gymnastics floor is disclosed in US-A-3284819. In this case panels are used which are placed on the base to be protected and are then
10 fixed to one another at their edges. Protection of this type is not suitable for larger surfaces in view of the fact that positioning of the panels and joining them to one another is time consuming.

The aim of the invention is, therefore, to provide
15 protection for large fields or pitches which is inexpensive and effective and which, moreover, can be installed and removed quickly and easily. To this end the invention relates to a system in which the panels are linked in rows, the panels of each row being movable between a rest position, in which their
20 surfaces are facing one another, and a use position, one after another in a row, which rows of panels are mutually linked to form a closed surface.

The system for protecting a pitch or field according to the invention comprises separate panels, each of which is of a
25 size such that it is easy to handle. Moreover, any surface, irrespective of its size, can be covered completely by linking the desired number of panels to one another. Each panel can be supported by its own support means or by an adjacent panel which itself is supported directly on the pitch or field. As a
30 result, the load on the pitch or field is distributed over a large number of support points. Each individual support point exerts a very small load on the pitch or field, which is extremely important in the case of turf. With turf of this type, the grass is subjected to so little pressure that it does
35 not wither. Moreover, no impressions or tracks can form in the pitch or field with this arrangement.

The cover according to the invention can consequently remain on the pitch or field for some time without any problem.

This can, for example, be for as long as is needed to protect the pitch or field against heavy rainfall or frost or against snowfall.

According to a preferred embodiment the panels are provided with support means on their longitudinal edges running in the direction of the row and both the width of each successive panel and the height of the support means thereof are smaller than the corresponding dimensions of a preceding panel, such that each successive panel can be accommodated under a preceding panel. With this arrangement all of the panels from one row can be slid under one another, as a result of which a compact block is produced which is easy to handle and which, moreover, takes up relatively little space.

According to a preferred embodiment the panels are rectangular or square. In a practical embodiment the dimensions of the panels can be chosen between, for example, 1 metre and 2.5 metres. For a field the size of a football pitch, the system has a few thousand support points. By virtue of the large number of support points, the load exerted on the turf can be very well distributed and remain very low at each individual support point.

The rows can be installed in various ways. According to a first possibility the panel having the largest dimensions from one row is always located next to the panel having the smallest dimensions from an adjacent row. With this arrangement a panel having the largest dimensions from one row and a panel having the smallest dimensions from an adjacent row can be installed alternately in a fixed position at one side of a surface. However it is also possible to install largest and smallest panels of such rows so that they are loose, such that all of the panels can be transported off the field at once when the rows have been slid together.

According to a second possibility one row of panels having the largest dimensions is installed in a fixed position at each of two opposite sides of a surface such that the one row is offset by half a panel width with respect to the other row.

Each panel can be supported by wheels, the wheel shafts

of which run transversely with respect to the longitudinal direction of the rows of panels.

In the case of a sports pitch of rectangular shape, the rows of panels are, according to a further preferred embodiment, positioned with their longitudinal direction parallel to the transverse direction of the pitch. The length of each row then corresponds to the width of the pitch, so that the rows are not too long and consequently remain easy to handle.

10 The rows of panels can be assembled in several assemblies, each of which is able to protect one part of the pitch. According to a simple embodiment, two assemblies of rows of panels can be provided which are movable to the ends of the pitch or field. As an alternative, two assemblies of rows of
15 panels can be provided which are movable to the sides of the pitch or field.

In some cases there is not a great deal of space available at the sides or ends of a sports pitch to accommodate the panels. The system according to the invention can
20 nevertheless be used even in these cases if all of the panels of a row are movably linked to one another, such that the panels can be folded against, slid into or stacked on top of one another when the row is moved off the pitch in the longitudinal direction. Furthermore, with this arrangement the
25 panels of each single row can be accommodated in a holder, which can be fixed or movable. The holders or containers can also be installed temporarily; using a lorry equipped with a hoist installation they can easily be placed in position and removed again.

30 If there is sufficient space at the ends of the pitch or field, each single row of panels can be moved to either end.

A good discharge of rainwater is obtained in case the panels from the smallest panel up to a panel defining the middle of a row have a relatively flat or concave surface in
35 transverse direction, and the other panels of said row have a convex surface sloping down in transverse direction towards at least one of the adjacent panels in an adjacent row which are relative flat or concave. Thereby, the rainwater is discharged

over the shortest possible distance towards the edge of the pitch. This flow of rainwater can be achieved due to the fact that a pitch or field always slopes down somewhat from the transverse and longitudinal centerlines. Therefore, even with
5 panels without a sloping surface such flow towards both sides or ends of the pitch or field can be obtained.

The panels can be made of all kinds of materials. Both materials which are opaque to light and materials which are transparent to light can be used. In the former case the cover
10 must be removed after a short time so as not to impede the growth of the turf. The cover can be removed quickly, as the panels can be transported off the pitch or field in large numbers at a time.

In the second case the system can cover the surface for
15 a prolonged period. In order to promote the growth of the grass (or other crop) during this period, the panels can be provided with lighting means on the side facing the surface to be protected.

With this embodiment consideration can be given in
20 particular to applications in bulb cultivation. It is customary to cover the fields intended for bulb cultivation with straw and plastic during the winter. These covering materials are removed the following spring.

High costs are incurred, both as a consequence of the
25 covering materials used and as a consequence of the labour-intensive nature of the application and removal of the covering materials. The system according to the invention can offer a more inexpensive solution in these cases too. It can remain in operation over a period of many years and the application and
30 removal of the cover are not highly labour-intensive. Thus, the system can be operated using electric winches. Consequently, little manpower is needed and the entire system can be operated by, for example, one man.

According to a further variant of the invention the
35 panels are provided with heating means. In this case the growth of the grass (or any other crop) can be promoted by supplementary heating during colder periods. The heating means can comprise tubes or hoses which are connected to a ring main

which is provided around the surface and through which a heating medium can be fed. Hot air blowers can be used as an alternative.

The system according to the invention has universal applicability, that is to say not only in cold regions but also in hot regions. It is known that in hot countries it is impossible or barely possible to maintain the turf in the correct condition, even when sprinklers are used. The water evaporates rapidly because of the high temperatures, with the result that the turf becomes a sandy surface. Evaporation can be greatly reduced when the system according to the invention is used in such cases. If sprinklers are also provided, the turf can, furthermore, be very uniformly supplied with water. However, since evaporation remains restricted, much less water can suffice.

The invention will now be explained in more detail with the aid of a few illustrative embodiments shown in the figures.

Figure 1 shows a perspective top view of a stadium provided with the installation according to the invention with the panels slid under one another.

Figure 2 shows a partial perspective view of a stadium with the installation according to the invention with the panels slid out to the full extent.

Figure 3 shows a perspective view of two panels fitting into one another.

Figure 4 shows a front view of the panels of one row, in the position where they are slid under one another.

Figure 5 shows a partial top view of a number of panels which have been slid out.

Figure 6 shows a detail from Figure 5.

Figure 7 shows a variant of the system.

The stadium shown in Figure 1 encloses a football pitch, the system according to the invention, which is designated in its entirety by 1, being shown, in the position in which the panels are slid under one another, at one of the ends of said pitch. Said system 1 comprises two rows 2, 3 of sets of panels 4 and 5 respectively, the panels of each set being slid one under the other. Of course, only the outermost

panel of each set of panels 4, 5 can be seen in each case; the other panels have been slid beneath said outermost panels.

In the view in Figure 2 said sets of panels 4 and 5 are shown in the position after they have been slid out. Each set of panels 4 comprises a largest panel 4^1 , a subsequent smaller panel 4^2 , etc down to the smallest panel 4^n . Each set of panels 5 comprises a largest panel 5^1 down to a smallest panel 5^n . The smallest panel but one is indicated by 5^{n-1} , etc.

As can clearly be seen from Figure 2, in each case a smallest panel 5^n is placed between two largest panels 4^1 ; a smallest but one panel 5^{n-1} between panels 4^2 , etc.

Furthermore, each largest panel 5^1 is accommodated between two smallest panels 4^n , whilst the largest but one panel 5^2 is accommodated between two panels 4^{n-1} , etc.

The various features mean that when all of the panels have been slid out each panel from a no. 5 set is always located tightly between two adjacent panels from a no. 4 set.

As can also clearly be seen in Figure 2, each set of panels 4, 5 forms a downward sloping path when the panels have been slid out. This means that precipitation water can be removed more easily in the direction from the largest panel towards the smallest panel. Optionally, the surface of each panel can be constructed with a gentle slope in the direction of the subsequent smaller panel, which promotes the flow.

As can also be seen in Figure 2, each panel, for example panel 4^1 , comprises a top wall 6 and side walls 7. The smallest panel 5^n also comprises a top wall 8 and side walls 9, which, incidentally, are of low height.

The panels are shown in Figure 3, but for the sake of clarity said side walls and top walls have been omitted. Overall, Figure 3 shows a panel 4^k and a subsequent smaller panel 4^{k-1} . Said panels are made up of base sections 10, which carry inwardly staggered flanges 11 on the underside. The shafts 12 with wheels 13 are accommodated in said flanges 11. The wheels concerned are wheels fitted with relatively large, soft pneumatic tyres, which have the advantage that they do not damage the turf of a football pitch.

Owing to the inwardly staggered position of the flanges

11, the ends of the shafts 12 are recessed with respect to the largest transverse dimension of the sections 10, such that the panels 4^k and 4^{k-1} are mobile relative to one another without any problem.

5 Uprights 14, which are connected at the top via the frame 15, are fitted on the base sections 10.

A top wall, which is not further shown, can be placed on top of the frame 15; the side walls can be fitted between frame 15 and base sections 10.

10 Each panel 4^k and 4^{k-1} has downward facing stops 16 and upward facing stops 21 on its end which is at the front in the direction in which it is slid out and has upward facing stops 17 and downward facing stops 22 on its end which is at the back in the direction in which it is slid out. When a smaller panel
15 4^{k-1} is slid forwards, the upward facing stops 17 thereof come to rest against the downward facing stops 16 of the subsequent larger panel 4^k . By this means each larger panel 4^k is carried along by the preceding smaller panel 4^{k-1} .

With an embodiment of this type it is sufficient if
20 only the smallest panel 4^n in each set of panels 4 is provided with a drive. Figure 4 shows that the smallest panel 4^n has a drive shaft 18, with which an electric motor 20 interacts via gear wheel transmission 19. When driven by the eclectic motor 20, the smallest panel 4^n is slid forwards, from the position
25 in which the panels were slid under one another. During this operation it carries along first of all, via stops 16, 17, the subsequent panel 4^{n-1} , etc. and finally the largest panel 4^1 .

As the smallest panel 4^n slides forwards, the front leading edge thereof comes to rest against the leading edges of
30 the adjacent largest panels 5^1 from the relevant sets of panels 5. This means that, as the smallest panels 4^n slide forwards the largest panels 5^1 are automatically carried along as well. Said panels 5^1 are also provided with downward facing stops 16 and upward facing stops 17 in the same way as the panels 4^k
35 from the sets of panels 4; see Figure 3. As soon as the largest panel 5^1 has slid out to its full extent, the subsequent smaller panel 5^2 is pulled along outwards by means of the stops 16, 17, which by this time are in contact with one another.

This means that the largest panels 5^1 do not have to be provided with their own drive; after all, they are already slid outwards by the smallest panels 4^n .

Finally, when the panels are slid back inwards, the upward facing stops 17 and 21 of each smaller panel 4^{k-1} come to rest against the downward facing stops 16 and 22 of each subsequent larger panel 4^k . For this operation as well it is sufficient to drive only the smallest panels 4^n .

In the case of the variant in Figure 5, a cross-sectional top view of three panels 4^{k-1} , 4^k and 4^{k+1} is shown. One of the base sections 10 is shown for each of said panels; wheels 13 can also be seen.

In this embodiment each panel 4^k has a front vertical edge and an inward facing stop 22 in the direction in which it is slid out and an outward facing stop 23 at its end which is at the back in the direction in which it is slid out.

In Figure 6 it can be seen that said stops 22, 23 are made up of a retaining section 24, in which a strip of self-lubricating plastic 25 is accommodated. By means of strips of this type, the side walls of the panels can slide along one another without any problem.

A good discharge of rainwater etc. can be obtained in the embodiment of the system shown in figure 7. The panels 27 thereof ranging from the smallest panel 4^1 up to the panel 28 defining the middle of a row each have a flat upper surface 31. The other panels 29 have a convexly curved upper surface 30. Thereby, a panel 27 having a flat upper surface 31 is always bordered by one of the panels 29 having a convexly curved upper surface 30.

The effect of such embodiment is that rainwater falling on the convexly curved panels 29 always discharges in transverse direction onto a flat panel 27. Subsequently, said rainwater is discharged in the longitudinal direction of panels 27, towards the smallest panel. Having regard to the fact that the pitch or field always slopes downwardly from the transverse and longitudinal centerlines, the rainwater is always discharged over the shortest distance towards the edge of the system.

To prevent ingress of rainwater, each convexly curved panel 32 adjoining an obliquely downwardly sloping panel 28 may be provided with a bulkhead 33 which leaves an opening for accomodating said panel 28.

5 Finally, it is also pointed out that the system according to the invention is suitable for many diverse applications. In addition to the applications already mentioned, the protection of race tracks for horse racing may be mentioned here. Grounds used by horses in general, for
10 example for a show jumping competition, can also be outstandingly protected using said system.

CLAIMS

1. System for protecting a surface, such as a sports pitch, or an agricultural field, such as an experimental field, against, for example, the effects of weather, which system comprises mutually linked panels ($4^1 \dots 4^n, 5^1 \dots 5^n$) which are movable between a position in which they are connected together and cover the pitch or field and a position in which they are located outside the pitch or field, which panels ($4^1 \dots 4^n, 5^1 \dots 5^n$) each individually have a surface area which is appreciably smaller than that of the surface to be protected, characterised in that the panels are linked in rows (23, 24), the panels of each row (23, 24) being movable between a rest position, in which their surfaces are facing one another, and a use position, one after another in a row, which rows of panels are mutually linked to form a closed surface.

2. System according to Claim 1, wherein the panels ($4^1 \dots 4^n, 5^1 \dots 5^n$) are rectangular or square.

3. System according to Claim 1 or 2, wherein the panels ($4^1 \dots 4^n, 5^1 \dots 5^n$) are provided with support means (12) on their longitudinal edges running in the direction of the row (23, 24) and both the width of each successive panel ($4^k, 5^k$) and the height of the support means thereof are smaller than the corresponding dimensions of a preceding panel ($4^{k-1}, 5^{k-1}$), such that each successive panel can be accommodated under a preceding panel.

4. System according to Claim 3, wherein the panel ($4^1, 5^1$) having the largest dimensions from one row (23, 24) is always located next to the panel ($4^n, 5^n$) having the smallest dimensions from an adjacent row (2, 3).

5. System according to Claim 4, wherein a panel ($4^1, 5^1$) having the largest dimensions from one row (23, 24) and a panel ($4^n, 5^n$) having the smallest dimensions from an adjacent row (23, 24) are installed alternately in a fixed position at one

side of a surface.

6. System according to Claim 4, wherein each time one series (25, 26) of panels having the largest dimensions is
5 installed in a fixed position at each of two opposite sides of a surface such that the one series (25) is offset by half a panel width with respect to the other series (26).

7. System according to one of the preceding claims,
10 wherein each panel is supported by wheels (13), the wheel shafts (12) of which run transversely with respect to the longitudinal direction of the rows (2, 3) of panels.

8. System according to one of the preceding claims,
15 wherein the sports pitch is of rectangular shape, such as a football pitch, and the rows (2, 3) of panels are positioned with their longitudinal direction parallel to the transverse direction of the pitch.

20 9. System according to one of the preceding claims, wherein one part of the sports pitch in each case can be protected by an assembly of rows (2, 3) of panels linked to one another.

25 10. System according to one of the preceding claims, wherein the panels of each single row (2, 3) can be accommodated in a holder, which can be fixed or movable.

11. System according to one of the preceding claims,
30 wherein the panels are provided on their longitudinal sides with downward facing walls (7), the wheels (12) being mounted on the underside of said walls (7).

12. System according to one of the preceding claims,
35 wherein adjacent panels from adjoining rows (2, 3) alternately possess upright edges (17) and downward facing edges (16), such that a downward facing edge (16) and an upright edge (17) can in each case be hooked behind one another.

13. System according to one of the preceding claims, wherein in each row at least a number of adjacent panels slope obliquely downwards in longitudinal direction to the smallest panel.

5

14. System according to one of the preceding claims, wherein the panels (17) from the smallest panel (4¹, 5¹) up to a panel (28) defining the middle of a row have a relatively flat or concave surface in transverse direction, and the other
10 panel (19) of said row have a convex surface sloping down in transverse direction towards at least one of the adjacent panels (17) in an adjacent row which are relative flat or concave.

15

15. System according to one of the preceding claims, wherein the panels are composed of material transparent to light.

16. System according to one of the preceding claims,
20 wherein the panels are provided with lighting means on the side facing the surface to be protected.

17. System according to one of the preceding claims, wherein the panels are provided with heating means.

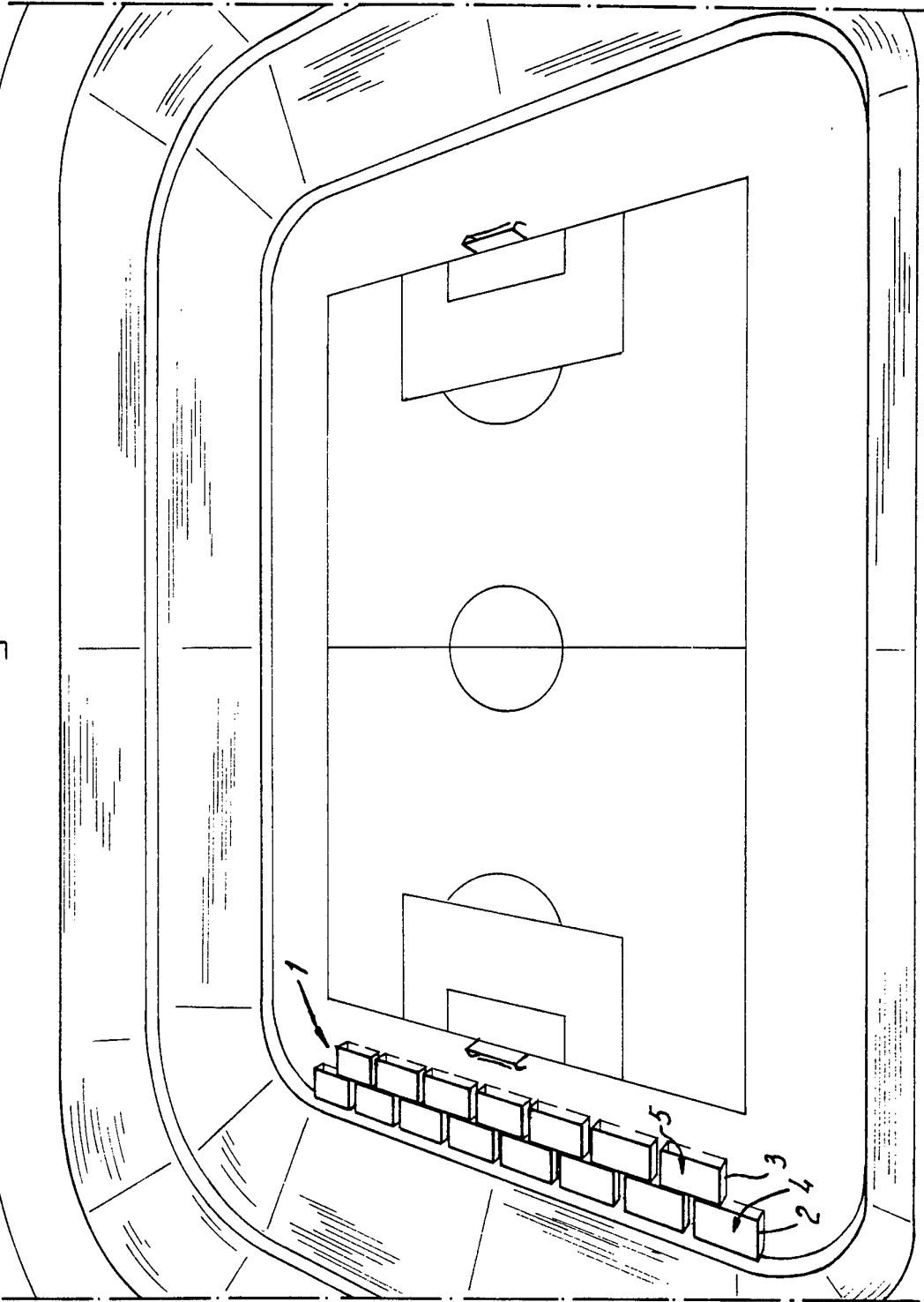
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18. System according to Claim 17, wherein the heating means comprise tubes or hoses which are connected to a ring main which is provided around the surface and through which a heating medium can be fed.

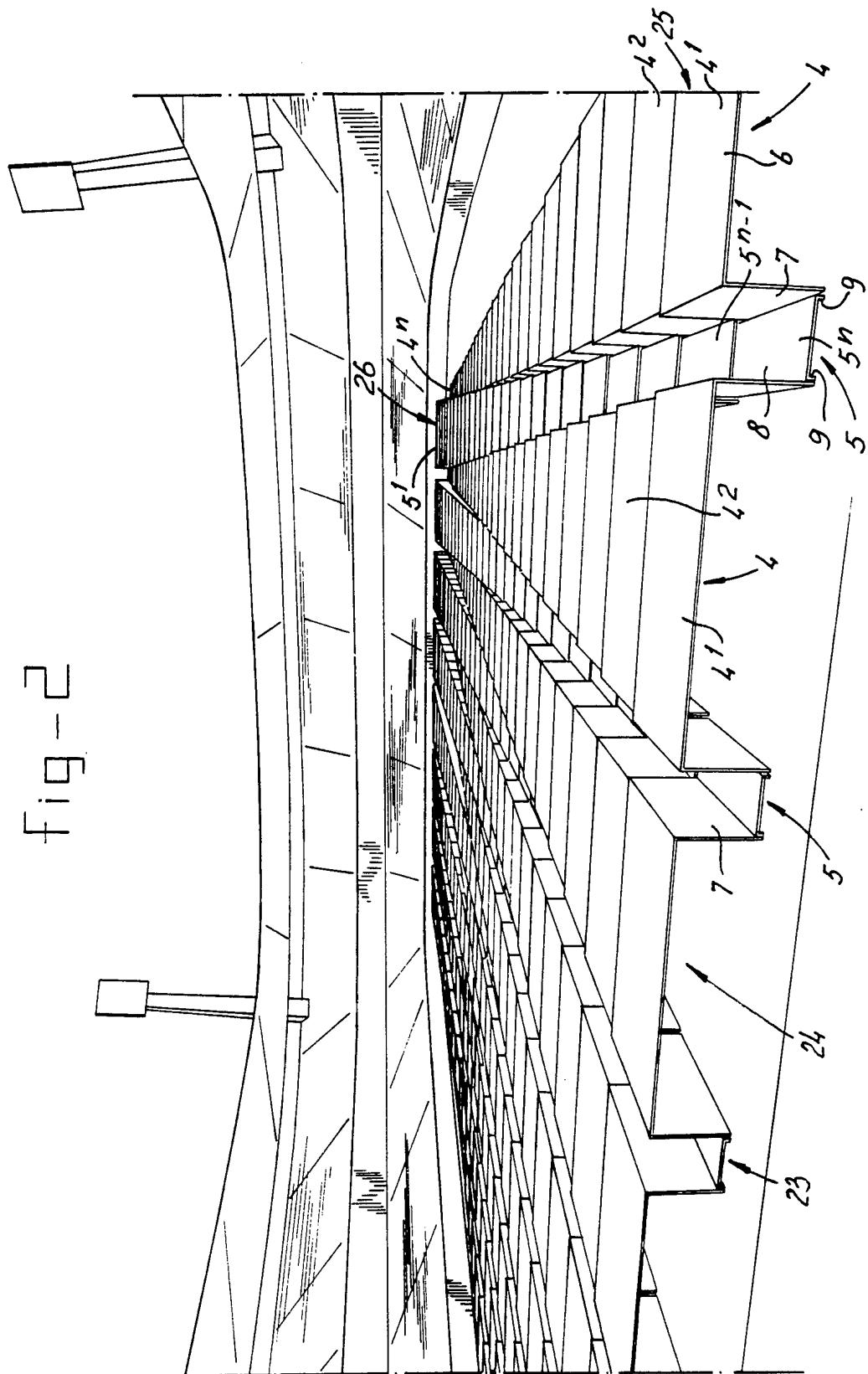
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19. System according to one of the preceding claims, wherein the panels possess sprinklers on the side facing the surface.

fig-1



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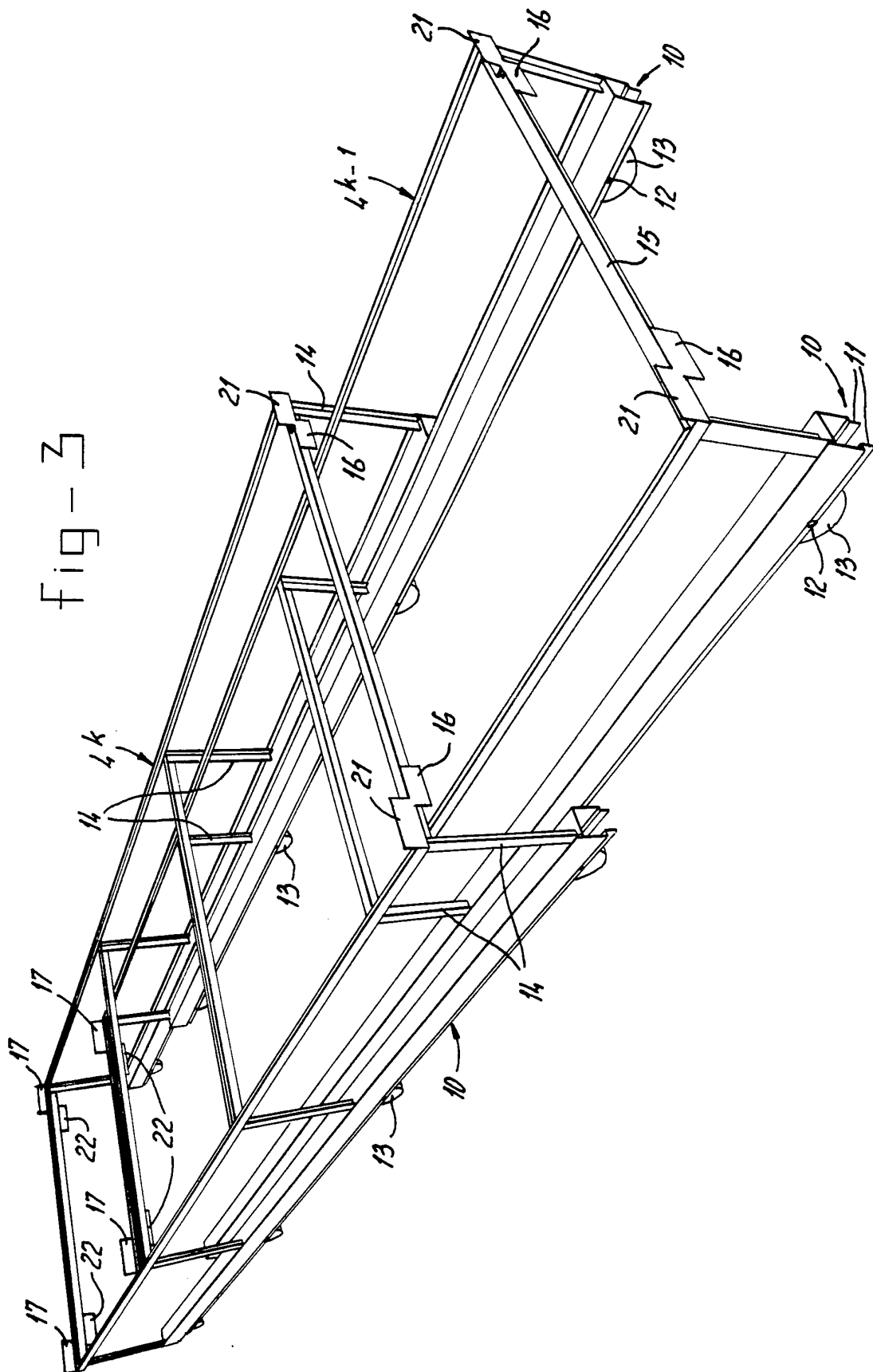


fig-4

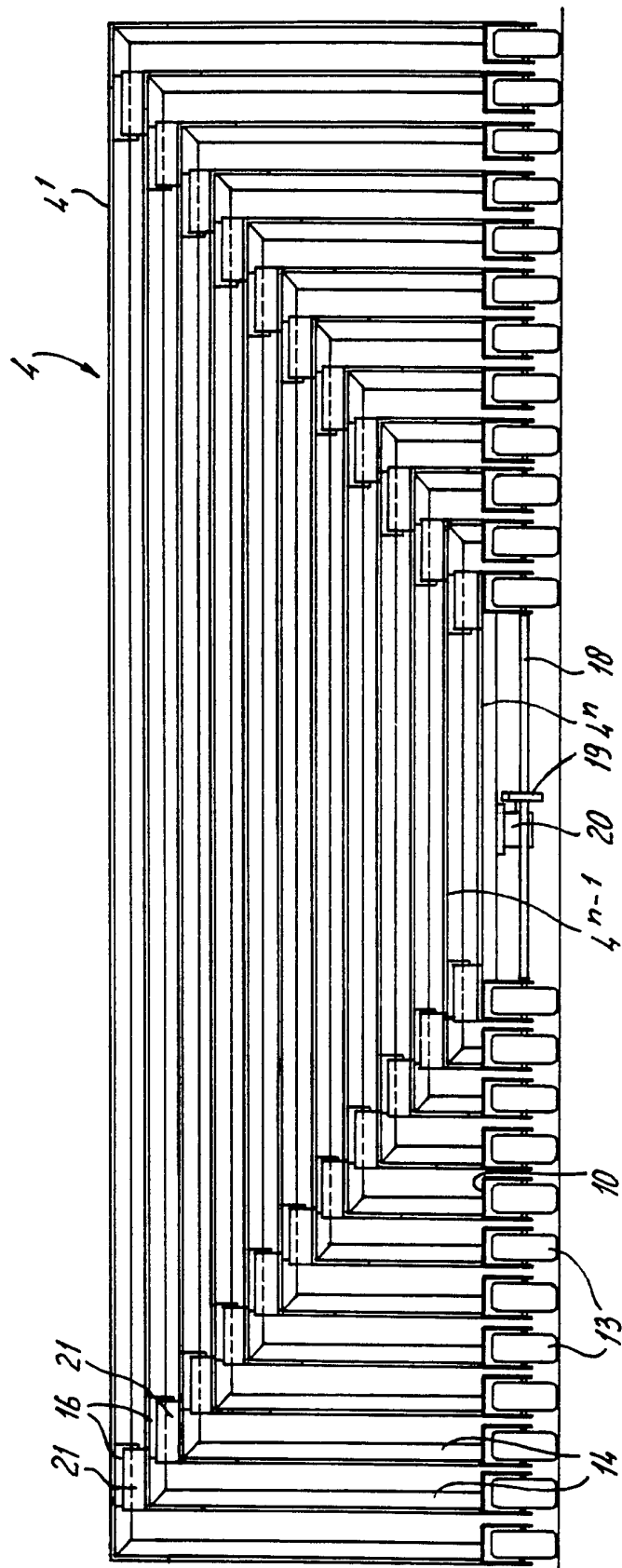


fig-5

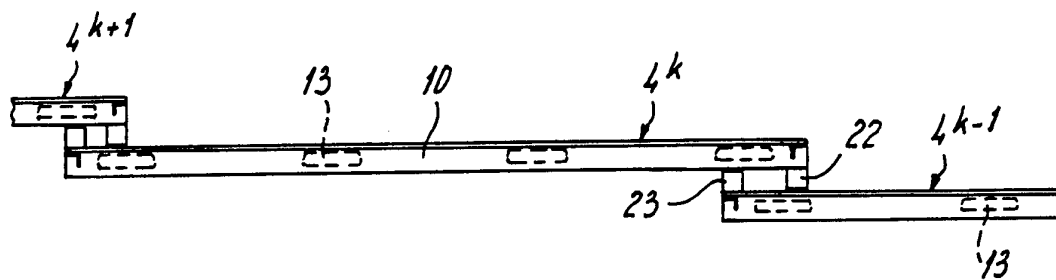


fig-6

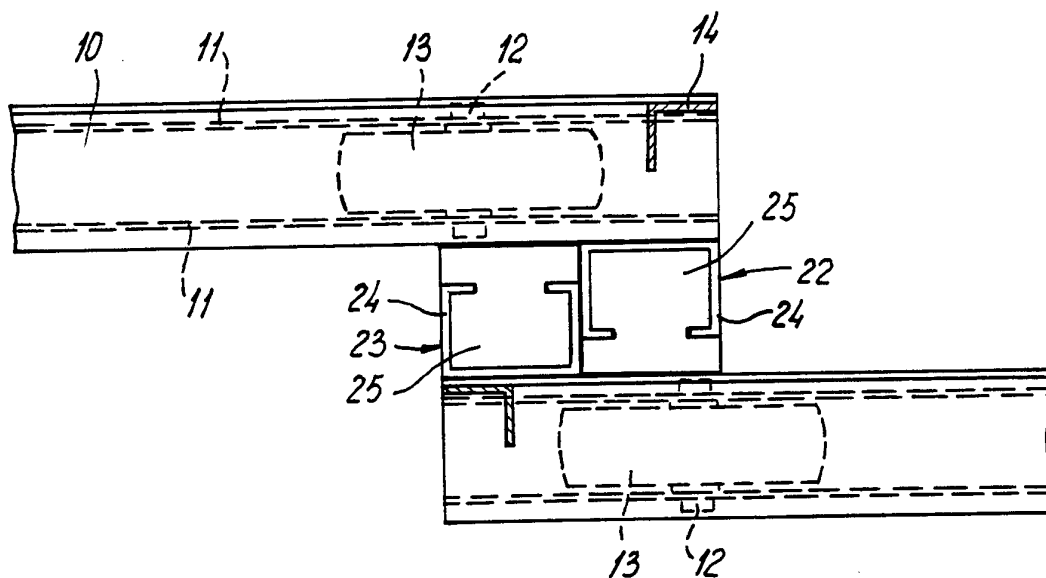


fig-7

