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(54) **Method for manufacturing a set of paving blocks and block paving obtained by the method**

Verfahren zur Herstellung eines Satzes von Pflastersteinen und durch das Verfahren hergestellte
Plastersteine

Méthode pour la fabrication d'un jeu d'éléments de pavage et pavage obtenu par cette méthode

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(56) References cited:
EP-A- 0 227 144 WO-A-00/15402
DE-A- 19 745 081 DE-U- 8 509 982
DE-U- 8 617 086 DE-U- 29 614 953

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Description

[0001] The invention relates to block paving.

[0002] Block paving is well known and may for example comprise a plurality of rectangular blocks which can be laid in various patterns to provide driveways or other paved areas.

[0003] Occasionally it may be desirable to create a circular effect, for example on a patio. Conventionally, rectangular blocks are used to create the circular effect by arranging a first circle of blocks spread out like a fan around a centrepiece. Subsequent rows of blocks are then fitted around the first row to provide further circles of progressively increasing radius.

[0004] One disadvantage of the present method is that as adjacent blocks are not parallel, there is a tapering gap between adjacent blocks which can be unsightly and difficult to fill. The gap becomes greater as the radius decreases towards the centre of the circle. DE-U-8617086 provides an alternative means of producing an area of circular paving employing non-rectangular blocks.

[0005] According to the invention there is provided a set of paving blocks characterised in that said set is for use in producing a sector of a circular paved area, the set including at least a first course and a second course having a different radius from the first course, wherein the blocks of one course differ in shape and configuration to the blocks of another course, and wherein each block has curved ends and has straight sides which converge, the courses being selected such that the set can be manufactured from a single mould and can then be assembled with a plurality of similar sets to produce a circular paved area.

[0006] Our invention comprises a method of manufacturing a set of paving blocks for use in producing a circular paved area, the set including at least a first course and a second course having a different radius from the first course, the courses being selected such that the set can be manufactured from a single mould and can then be assembled with a plurality of similar sets to produce a circular paved area.

[0007] The set is such that when the courses of the set are assembled in a circular manner, the sides of adjacent blocks are parallel.

[0008] The blocks of the set may for example be assembled into a sector of a circle so that when assembled with similar sets the sectors combine to provide a circular area.

[0009] The blocks for a sector may be moulded in an array in which blocks for inner courses are positioned at the ends of a group of blocks for outer courses to provide an array of sinusoidal shape.

[0010] The blocks of some of the courses may be rotated slightly with respect to the centre of the circle so that the finished pattern does not have any straight radial lines, running through the pattern.

[0011] The staggered effect produced by such rota-

tion also assists in providing a good bond.

[0012] The blocks may be provided with integral ribs to space the blocks apart slightly for grouting purposes. The term grouting is intended to include filling the joint with sand, mortar or any other suitable material.

[0013] Identification means may be provided to identify the blocks of one course from the blocks of another course.

[0014] The identification means may comprise identification lugs.

[0015] The blocks may be moulded from any desired material such as concrete, reconstituted stone, or clay.

[0016] The blocks of one course may differ in shape and configuration from the blocks of another course.

[0017] Each block may have curved ends and have straight sides which converge.

[0018] By way of example, specific embodiments of the invention will now be described, with reference to the accompanying drawings, in which :-

Figure 1 is a plan view of a circular paved area produced by one embodiment of the invention;

Figure 2 shows a set of blocks used to produce one sector of the paved area shown in Figure 1;

Figure 3 illustrates how the set of blocks of Figure 2 is produced from a single mould;

Figures 4, 5 and 6 are views similar to Figures 1, 2 and 3, but illustrating a second embodiment of the invention;

Figure 7, 8 and 9 are views similar to Figures 1, 2 and 3, but showing a third embodiment of the invention;

Figure 10 is a side view of a block illustrating identification markings;

Figure 11 is a detailed plan view showing one of the blocks which make up the inner course of the blocks of Figure 1;

Figures 12 to 16 are plan views respectively of the blocks which make up the remaining five courses of the paving shown in Figure 1; and

Figure 1 illustrates a circular paved area produced by arranging six courses 11 to 16 of paving blocks arranged around a central circular block 10. The blocks have curved inner and outer ends and converging sides such that the blocks can be closely fitted together with gaps therebetween that are no more than 5 mm wide, sufficient for the insertion of grouting or the like.

[0019] Preferably the gaps therebetween are in the

range 2 to 3 mm wide.

[0020] If an attempt is made to create such circular areas using rectangular blocks, gaps are inevitably produced which exceed 5 mm, and this is unsightly and unacceptable.

[0021] While it is relatively easy to design the necessary dimensions of the blocks shown in Figure 1, the manufacture, storage and assembly of the blocks creates problems.

[0022] It will be seen from Figure 1 and from Figures 11 to 16 that each course requires a different block. It would be possible to create one mould which produces a plurality of blocks for the first course, another mould which produces a plurality of the blocks for the second course and so on. However, this would create considerable problems in sorting the blocks afterwards. It would be necessary for a mould operative to spend considerable time selecting the requisite number of blocks of each configuration and sorting these into a pack for use in the manufacture of the circular paved area.

[0023] We have appreciated that a much more efficient arrangement is to split the circular area shown in Figure 1 up into a number of identical sectors and then create a mould which produces the blocks for each sector. Thus it is possible to stock and subsequently deliver to a customer a plurality of sets of blocks which can be assembled with similar sets to create the desired effect. Each set contains blocks of different configurations but each set contains the same number of blocks having the different configurations so that manufacture of each set is greatly facilitated. The necessary number of each type of block to create a sector is automatically provided by this novel moulding technique.

[0024] Figure 2 shows a set of blocks arranged to form one sector of the overall circular effect shown in Figure 1. Eight of these sectors are needed to make up the effect shown in Figure 1.

[0025] The blocks needed for the set shown in Figure 2 can be moulded in a generally rectangular area shown in Figure 3 by arranging inner blocks A adjacent one end of outer blocks C and arranging the other inner blocks B adjacent the other end of the blocks C.

[0026] Thus, for any given circular effect such as that shown in Figure 1, it is only necessary to manufacture and store a plurality of the sets of blocks shown in Figure 3. It is then only necessary to supply a customer with a pack containing eight of the identical sets to enable the desired circular paved area to be created.

[0027] It will be seen that although the sector shown in Figure 2 has straight radial lines at the edges, these straight lines need not necessarily be introduced into the circular effect shown in Figure 1. If it is desired to have staggered lines, then it is only necessary to rotate each alternate course of blocks when laying the blocks.

[0028] The courses in Figures 1 to 3 produce a header effect.

[0029] Figures 4 to 6 illustrate an alternative embodiment in which the blocks are shaped to provide a

stretcher effect.

[0030] Figures 7 to 9 illustrate a third embodiment in which there is a combined stretcher and header effect.

[0031] Turning now to Figures 11 to 16, there is shown in detail a plan view of each block needed to make up the six courses shown in Figure 1. Since the blocks basically vary only in dimensions, only the block shown in Figure 11 will be described in detail. This block is for use in course 11 of Figure 1. The blocks for courses 12 to 16 are shown respectively in Figures 12 to 16.

[0032] The block has an inner curved end 17 and an outer curved end 18. The sides 19 and 20 are straight, but converging. The periphery of the upper part of the block has a chamfer 20a.

[0033] The curved inner end 17 has a pair of vertical lugs 21 to provide a gap of predetermined dimensions between adjacent courses, for example for grouting purposes.

[0034] Side 19 has a vertical lug 22, and side 20 has a vertical lug 23. Lug 22 is provided quite close to the inner end 17 and lug 23 is provided quite close to the outer end 18 so that the lug 22 on the block shown and the lug 23 on an adjacent block will cooperate to space apart adjacent blocks of the same course, by a distance determined by the thickness of the lug.

[0035] Although the blocks of each course differ, they are superficially similar and if a pack accidentally became spilled, quite some time could be taken to reassemble the blocks.

[0036] To assist in identification purposes therefore, the blocks of each course are provided with a unique identification. This could for example be a predetermined number of smaller identification lugs 24, as shown on the block of Figure 10. A vertical spacing lug 23 is shown together with a smaller identification lug 24. For example, the blocks of one course may have one identification lug, the blocks of the next course two identification lugs, and so on. Possible positions for additional identification lugs are shown in dotted lines in Figure 16.

[0037] Although eight sectors are required to make up a circle in the embodiments shown, other embodiments may utilise an arrangement in which the number of blocks in each moulded sector is such that only 4, or 6, or any other desired number of sectors is needed to make up a circle.

Claims

Claims for the following Contracting State : AT, BE, CH, LI, CY, DE, DK, ES, FI, FR, GR, IE, IT, LU, MC, NL, PT, SE

1. A set of paving blocks characterised in that said set is for use in producing a sector of a circular paved area, the set including at least a first course

- (11) and a second course (12) having a different radius from the first course, wherein the blocks of one course differ in shape and configuration to the blocks of another course, and wherein each block has curved ends (17, 18) and has straight sides (19, 20) which converge, the courses being selected such that the set can be manufactured from a single mould and can then be assembled with a plurality of similar sets to produce a circular paved area.
2. A set according to claim 1, wherein the blocks are provided with integral ribs (21, 22, 23) to space the blocks apart slightly for grouting purposes.
 3. A set according to claim 1 or 2, wherein identification means are provided to identify the blocks of one course from the blocks of another course.
 4. A set according to Claim 3, wherein the identification means comprise identification lugs (24).
 5. A set according to any preceding claim, wherein the blocks are moulded from concrete, reconstituted stone, or clay.
 6. A circular paved area comprising as number of sets of paving blocks according to any of claims 1 to 5 assembled into a number of complementary sectors of a circle.
 7. A circular paved area according to claim 6 wherein some of the courses are rotated slightly with respect to the centre of the circle so that the finished pattern does not have any straight radial line running through the pattern.
 8. A circular paved area according to claim 7, wherein the rotation of the blocks produces a staggered effect which assists in providing a good bond.
 9. A method of manufacturing a set of paving blocks according to any of claims 1 to 5, wherein the set is manufactured from a single mould.
 10. A method according to claim 9, wherein the set of blocks is such that when the courses of the set are assembled in a circular manner, the adjacent sides of blocks in a course are parallel.
 11. A method according to claim 9 or 10, wherein the set comprises one or more inner courses, which include said first course, and one or more outer courses which include said second course and wherein the blocks of the set are moulded in an array in which blocks for the inner course or courses are positioned at the ends of a group of blocks for the outer course or courses to provide an array of sinusoidal shape.
 12. A circular paved area according to claim 6, the sets of paving blocks being produced by the method of any of claims 9 to 11.
 13. A circular paved area according to claim 12 wherein some of the courses are rotated slightly with respect to the centre of the circle so that the finished pattern does not have any straight radial line running through the pattern.
 14. A circular paved area according to claim 13, wherein the rotation of the blocks produces a staggered effect which assists in providing a good bond.
- Claims for the following Contracting State : GB**
1. A set of paving blocks **characterised in that** said set is for use in producing a sector of a circular paved area, the set including at least a first course (11) and a second course (12) having a different radius from the first course, wherein the blocks of one course differ in shape and configuration to the blocks of another course, and wherein each block has curved ends (17, 18) and has straight sides (19, 20) which converge, the courses being selected such that the set can be manufactured from a single mould and can then be assembled with a plurality of similar sets to produce a circular paved area.
 2. A set according to claim 1, wherein the blocks are provided with integral ribs (21, 22, 23) to space the blocks apart slightly for grouting purposes.
 3. A set according to claim 1 or 2, wherein identification means are provided to identify the blocks of one course from the blocks of another course.
 4. A set according to Claim 3, wherein the identification means comprise identification lugs (24).
 5. A set according to any preceding claim, wherein the blocks are moulded from concrete, reconstituted stone, or clay.
- Patentansprüche**
- Patentansprüche für folgende Vertragsstaaten : AT, BE, CH, LI, CY, DE, DK, ES, FI, FR, GR, IE, IT, LU, MC, NL, PT, SE**
1. Satz von Pflastersteinen, **dadurch gekennzeichnet, dass** der genannte Satz zur Verwendung für die Herstellung eines Sektors eines kreisförmigen gepflasterten Bereichs bestimmt ist, wobei der Satz mindestens eine erste Bahn (11) und eine zweite

Bahn (12) enthält, die einen anderen Radius als die erste Bahn aufweist, wobei die Pflastersteine einer Bahn sich durch die Form und die Anordnung von den Pflastersteinen der anderen Bahn unterscheiden und wobei jeder Pflasterstein abgerundete Enden (17, 18) und gerade Seiten (19, 20), die konvergieren, aufweist, wobei die Bahne derart ausgewählt werden, dass der Satz in einer einzigen Form hergestellt und dann mit mehreren ähnlichen Sätzen zur Bildung eines kreisförmigen gepflasterten Bereichs zusammengesetzt wird.

2. Satz nach Anspruch 1, bei dem die Pflastersteine mit integralen Rippen (21, 22, 23) versehen sind, um die Pflastersteine für Ausfugungszwecke leicht beabstandet voneinander zu halten.
3. Satz nach Anspruch 1 oder 2, bei dem Identifikationsmittel vorgesehen sind, um die Pflastersteine einer Bahn von den Pflastersteinen der anderen Bahn zu unterscheiden.
4. Satz nach Anspruch 3, bei dem die Identifikationsmittel Identifikationsvorsprünge (24) aufweisen.
5. Satz nach einem der vorhergehenden Ansprüche, bei dem die Pflastersteine aus Beton, Kunststein-Agglomerat oder Ton geformt werden.
6. Kreisförmiger gepflasterter Bereich, der einen Satz von Pflastersteinen nach einem der vorhergehenden Ansprüche 1 bis 5 aufweist, die in mehreren sich ergänzenden Sektoren eines Kreises zusammengesetzt sind.
7. Kreisförmiger gepflasterter Bereich nach Anspruch 6, bei dem einige der Bahne in Bezug auf den Mittelpunkt des Kreises leicht verdreht sind, so dass das fertiggestellte Muster keine gerade radiale Linie aufweist, die durch das Muster hindurchläuft.
8. Kreisförmiger gepflasterter Bereich nach Anspruch 7, bei dem das Verdrehen der Pflastersteine einen Staffelungseffekt erzeugt, der zum Erreichen einer guten Bindung beiträgt.
9. Verfahren zur Herstellung eines Satzes von Pflastersteinen nach einem der Ansprüche 1 bis 5, bei dem der Satz in einer einzigen Form hergestellt wird.
10. Verfahren nach Anspruch 9, bei dem der Satz von Pflastersteinen derart gestaltet ist, dass die jeweils benachbarten Seiten der Pflastersteine in einer Bahn parallel verlaufen, wenn die Bahne des Satzes in einem Kreis zusammengesetzt sind.
11. Verfahren nach Anspruch 9 oder 10, bei dem der

Satz eine oder mehrere innere Bahne aufweist, die die genannte erste Bahn enthalten, und eine oder mehrere äußere Bahne aufweist, die die genannte zweite Bahn enthalten, wobei die Pflastersteine des Satzes in einer Anordnung geformt werden, in der die Pflastersteine der inneren Bahn oder inneren Bahne an den Enden einer Gruppe von Pflastersteinen für die äußere Bahn oder die äußeren Bahne angeordnet sind, um eine Anordnung sinusartiger Form zu bilden.

12. Kreisförmiger gepflasterter Bereich nach Anspruch 6, bei dem der Satz von Pflastersteinen durch das verfahren nach einem der Ansprüche 9 bis 11 hergestellt wurde.
13. Kreisförmiger gepflasterter Bereich nach Anspruch 12, bei dem einige Bahne in Bezug auf den Mittelpunkt des Kreises leicht verdreht sind, so dass das fertiggestellte Muster keine gerade radiale Linie aufweist, die durch das Muster hindurchläuft.
14. Kreisförmiger gepflasterter Bereich nach Anspruch 13, bei dem das Verdrehen der Pflastersteine einen Staffelungseffekt erzeugt, der zum Erreichen einer guten Bindung beiträgt.

Patentansprüche für folgenden Vertragsstaat : GB

1. Satz von Pflastersteinen, **dadurch gekennzeichnet, dass** der genannte Satz zur Verwendung für die Herstellung eines Sektors eines kreisförmigen gepflasterten Bereichs bestimmt ist, wobei der Satz mindestens eine erste Bahn (11) und eine zweite Bahn (12) enthält, die einen anderen Radius als die erste Bahn aufweist, wobei die Pflastersteine einer Bahn sich durch die Form und die Anordnung von den Pflastersteinen der anderen Bahn unterscheiden und wobei jeder Pflasterstein abgerundete Enden (17, 18) und gerade Seiten (19, 20), die konvergieren, aufweist, wobei die Bahne derart ausgewählt werden, dass der Satz in einer einzigen Form hergestellt und dann mit mehreren ähnlichen Sätzen zur Bildung eines kreisförmigen gepflasterten Bereichs zusammengesetzt wird.
2. Satz nach Anspruch 1, bei dem die Pflastersteine mit integralen Rippen (21, 22, 23) versehen sind, um die Pflastersteine für Ausfugungszwecke leicht beabstandet voneinander zu halten.
3. Satz nach Anspruch 1 oder 2, bei dem Identifikationsmittel vorgesehen sind, um die Pflastersteine einer Bahn von den Pflastersteinen der anderen Bahn zu unterscheiden.
4. Satz nach Anspruch 3, bei dem die Identifikations-

mittel Identifikationsvorsprünge (24) aufweisen.

5. Satz nach einem der vorhergehenden Ansprüche, bei dem die Pflastersteine aus Beton, Runststein-Agglomerat oder Ton geformt werden.

Revendications

Revendications pour les Etats contractants suivants : AT, BE, CH, LI, CY, DE, DK, ES, FI, FR, GR, IE, IT, LU, MC, NL, PT, SE

1. Jeu de pavés, **caractérisé en ce que** ledit jeu est utilisé pour produire un secteur de zone circulaire pavée, le jeu comprenant au moins une première série (11) et une seconde série (12) ayant un rayon différent de la première série, les pavés d'une série différant en forme et configuration des pavés d'une autre série, chaque pavé ayant des extrémités courbes (17,18) et des côtés rectilignes (19,20) qui convergent, les séries étant sélectionnées de telle sorte que le jeu peut être fabriqué à partir d'un moule unique et peut ensuite être assemblé avec une pluralité de jeux similaires pour produire une zone circulaire pavée. 20
2. Jeu selon la revendication 1, dans lequel les pavés sont pourvus de côtes d'un seul tenant (21,22,23) pour écarter légèrement les pavés les uns des autres à des fins de jointoiment. 30
3. Jeu selon la revendication 1 ou 2, dans lequel des moyens d'identification sont prévus pour différencier les pavés d'une série des pavés d'une autre série. 35
4. Jeu selon la revendication 3, dans lequel les moyens d'identification comprennent des pattes d'identification (24). 40
5. Jeu selon l'une quelconque des revendications précédentes, dans lequel les pavés sont moulés à partir de béton, de pierre reconstituée ou d'argile. 45
6. Zone circulaire pavée comprenant un certain nombre de jeux de pavés selon l'une quelconque des revendications 1 à 5, assemblés selon un certain nombre de secteurs complémentaires de cercle. 50
7. Zone circulaire pavée selon la revendication 6, dans laquelle certaines des séries sont légèrement tournées par rapport au centre du cercle de telle sorte que le motif terminé n'a aucune ligne radiale rectiligne passant au travers du motif. 55
8. Zone circulaire pavée selon la revendication 7,

dans laquelle la rotation des pavés produit un effet de décalage qui contribue à réaliser une bonne liaison.

- 5 9. Procédé de fabrication d'un jeu de pavés selon l'une quelconque des revendications 1 à 5, dans lequel le jeu est fabriqué à partir d'un moule unique.
- 10 10. Procédé selon la revendication 9, dans lequel le jeu de pavés est tel que, lorsque les séries d'un jeu sont assemblées de façon circulaire, les côtés adjacents des pavés de la série sont parallèles.
- 11 11. Procédé selon la revendication 9 ou 10, dans lequel le jeu comprend une ou plusieurs séries intérieures, qui incluent ladite première série, et une ou plusieurs séries extérieures, qui incluent ladite seconde série, et dans lequel les pavés du jeu sont moulés selon une disposition dans laquelle les pavés de la ou des série(s) intérieure(s) sont positionnés aux extrémités d'un groupe de pavés prévus pour la ou les série(s) extérieure(s) pour réaliser une disposition de forme sinusoïdale.
- 25 12. Zone circulaire pavée selon la revendication 6, dans laquelle les jeux de pavés sont produits par le procédé selon l'une quelconque des revendications 9 à 11.
- 30 13. Zone circulaire pavée selon la revendication 12, dans laquelle certaines des séries sont légèrement tournées par rapport au centre du cercle de telle sorte que le motif terminé n'a aucune ligne radiale rectiligne passant au travers du motif.
- 35 14. Zone circulaire pavée selon la revendication 13, dans laquelle la rotation des pavés produit un effet de décalage qui contribue à réaliser une bonne liaison.

Revendications pour l'Etat contractant suivant : GB

1. Jeu de pavés, **caractérisé en ce que** ledit jeu est utilisé pour produire un secteur de zone circulaire pavée, le jeu comprenant au moins une première série (11) et une seconde série (12) ayant un rayon différent de la première série, les pavés d'une série différant en forme et configuration des pavés d'une autre série, chaque pavé ayant des extrémités courbes (17,18) et des côtés rectilignes (19,20) qui convergent, les séries étant sélectionnées de telle sorte que le jeu peut être fabriqué à partir d'un moule unique et peut ensuite être assemblé avec une pluralité de jeux similaires pour produire une zone circulaire pavée.
2. Jeu selon la revendication 1, dans lequel les pavés

sont pourvus de côtes d'un seul tenant (21,22,23) pour écarter légèrement les pavés les uns des autres à des fins de jointoiement.

3. Jeu selon la revendication 1 ou 2, dans lequel des moyens d'identification sont prévus, pour différencier les pavés d'une série des pavés d'une autre série. 5
4. Jeu selon la revendication 3, dans lequel les moyens d'identification comprennent des pattes d'identification (24). 10
5. Jeu selon l'une quelconque des revendications précédentes, dans lequel les pavés sont moulés à partir de béton, de pierre reconstituée ou d'argile. 15

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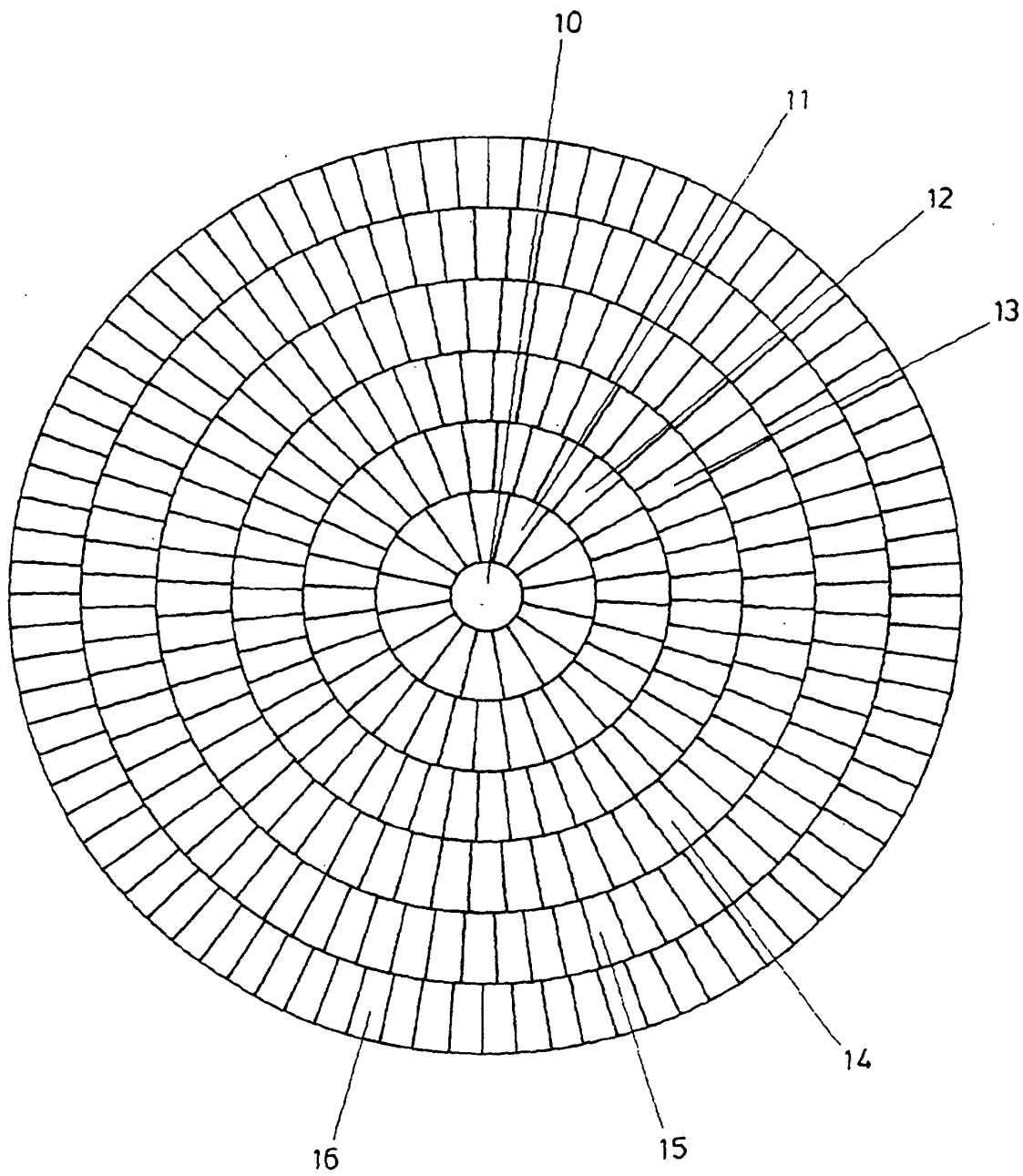


FIG. 1

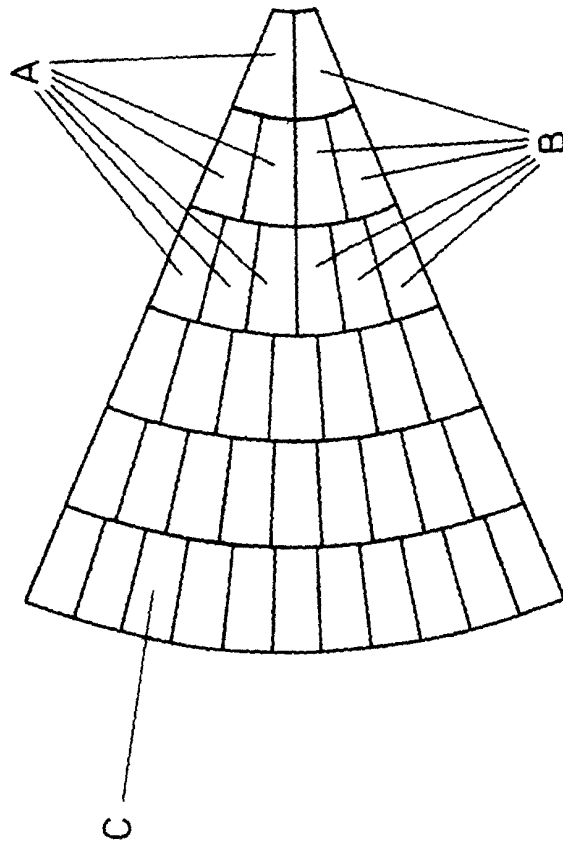


FIG. 2

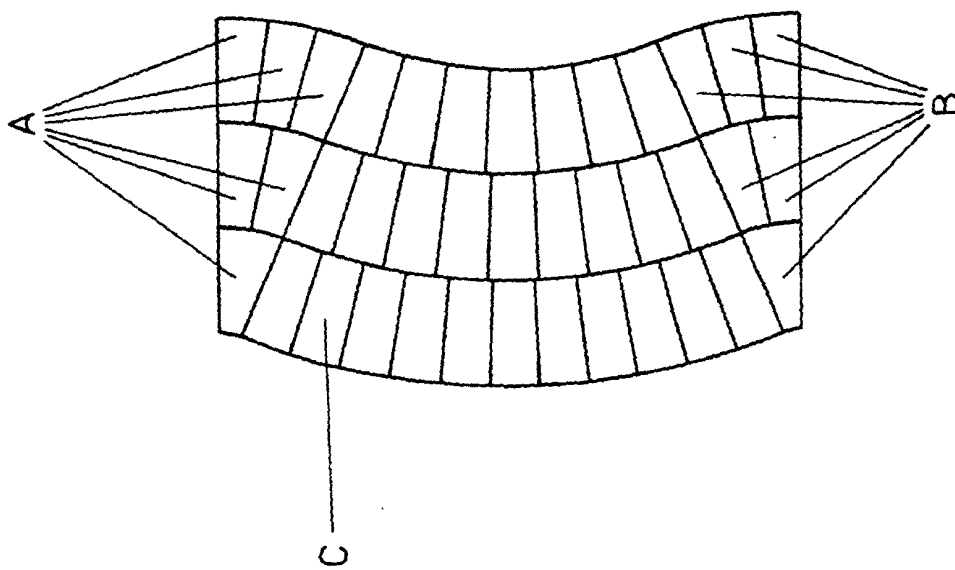


FIG. 3

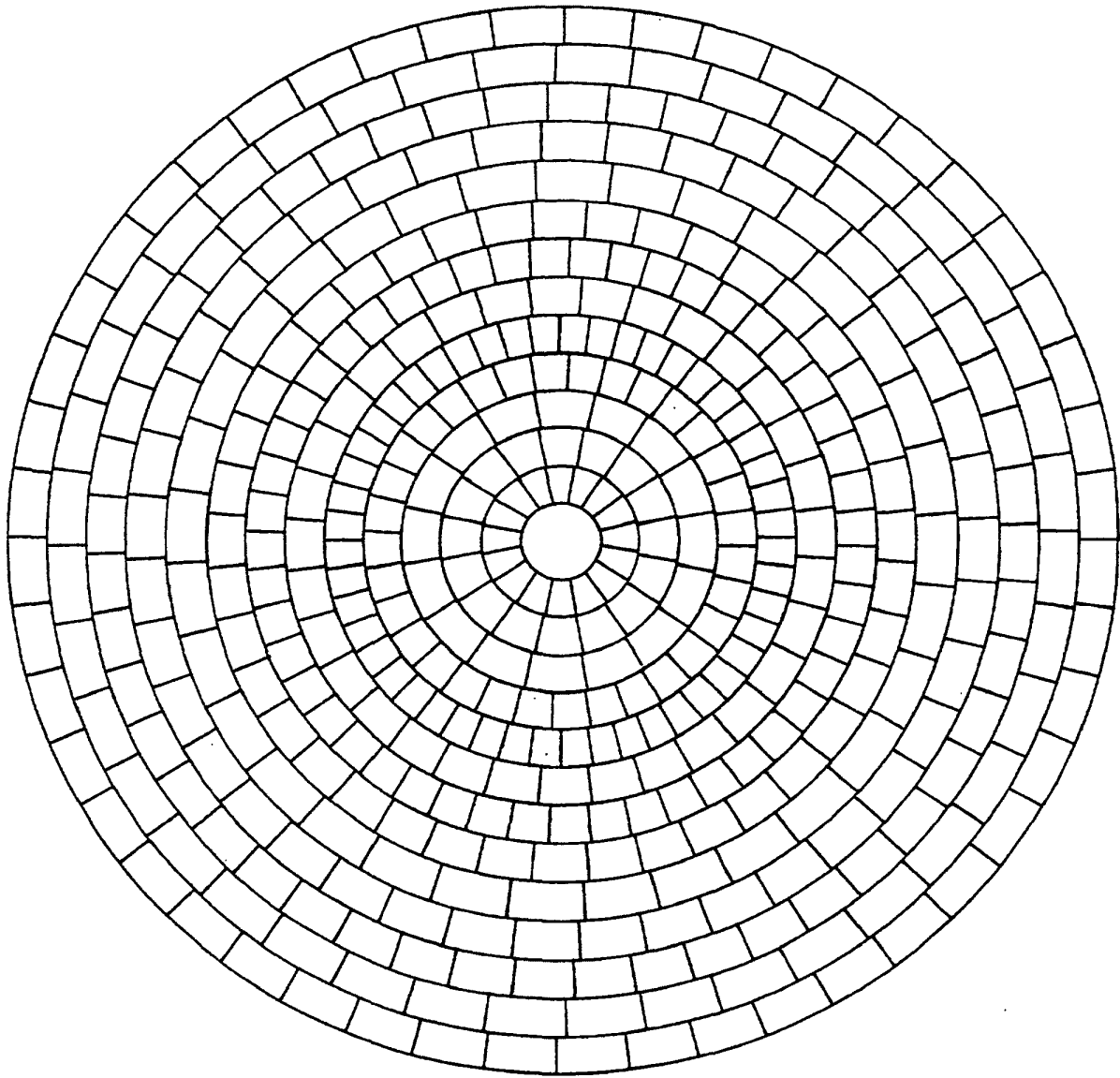


FIG. 4

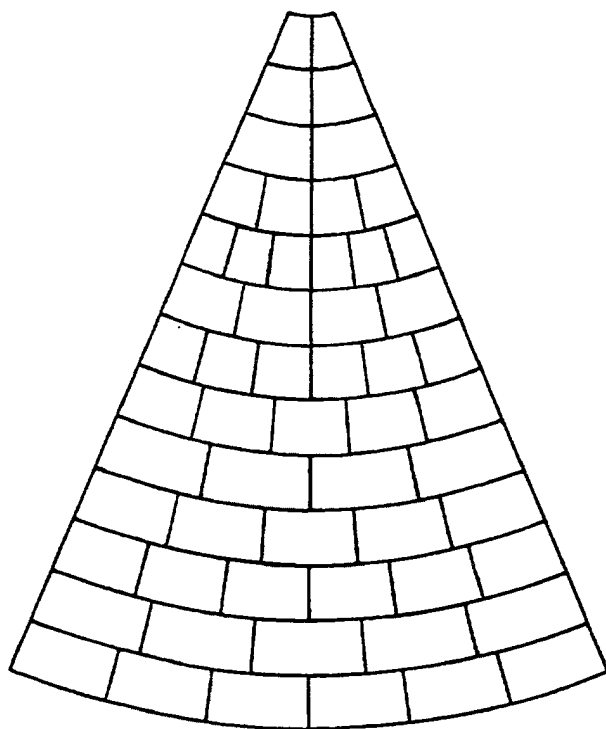


FIG. 5

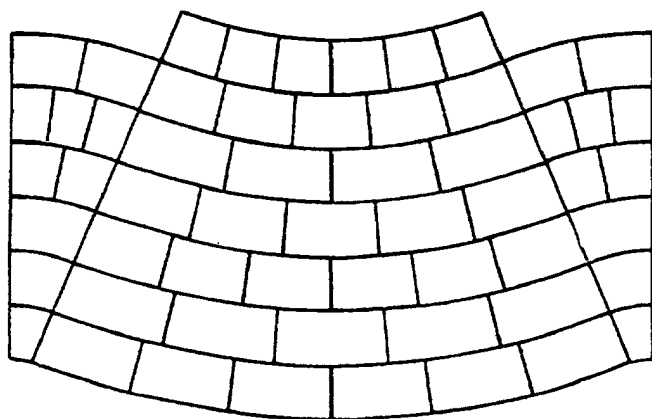


FIG. 6

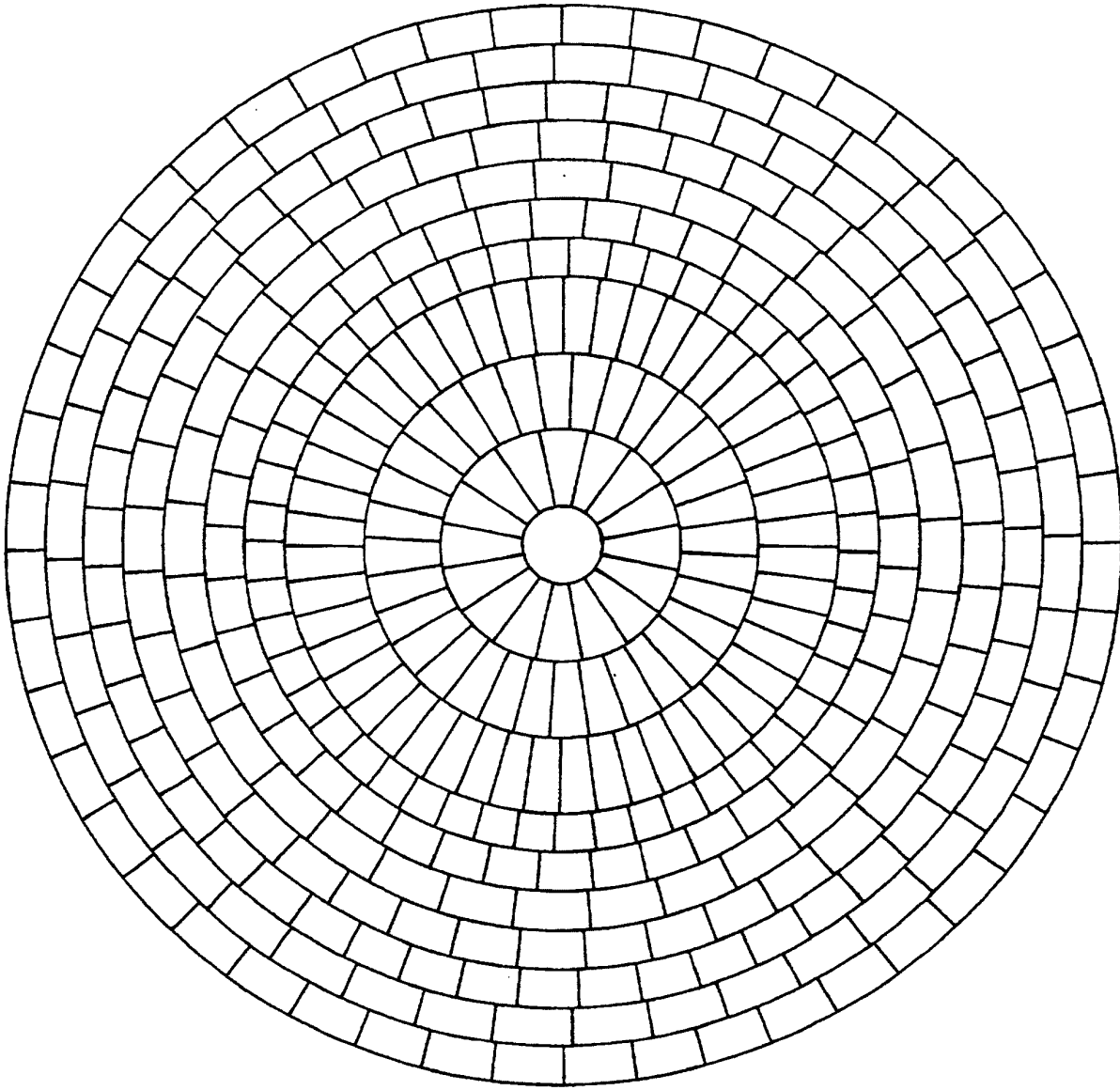


FIG. 7

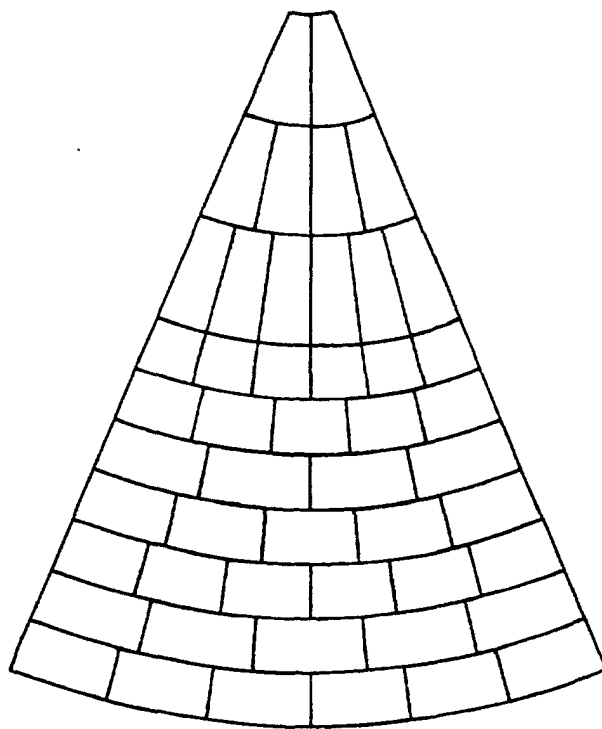


FIG. 8

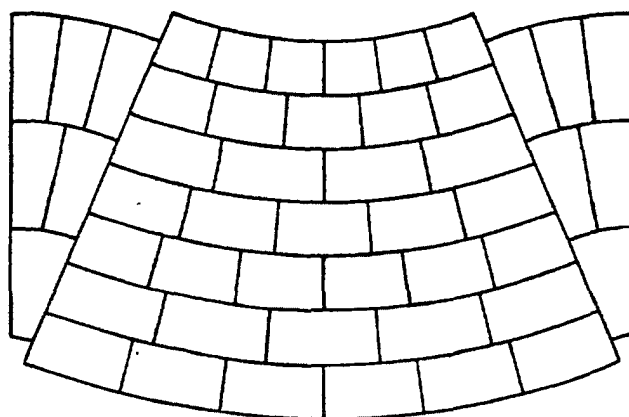


FIG. 9

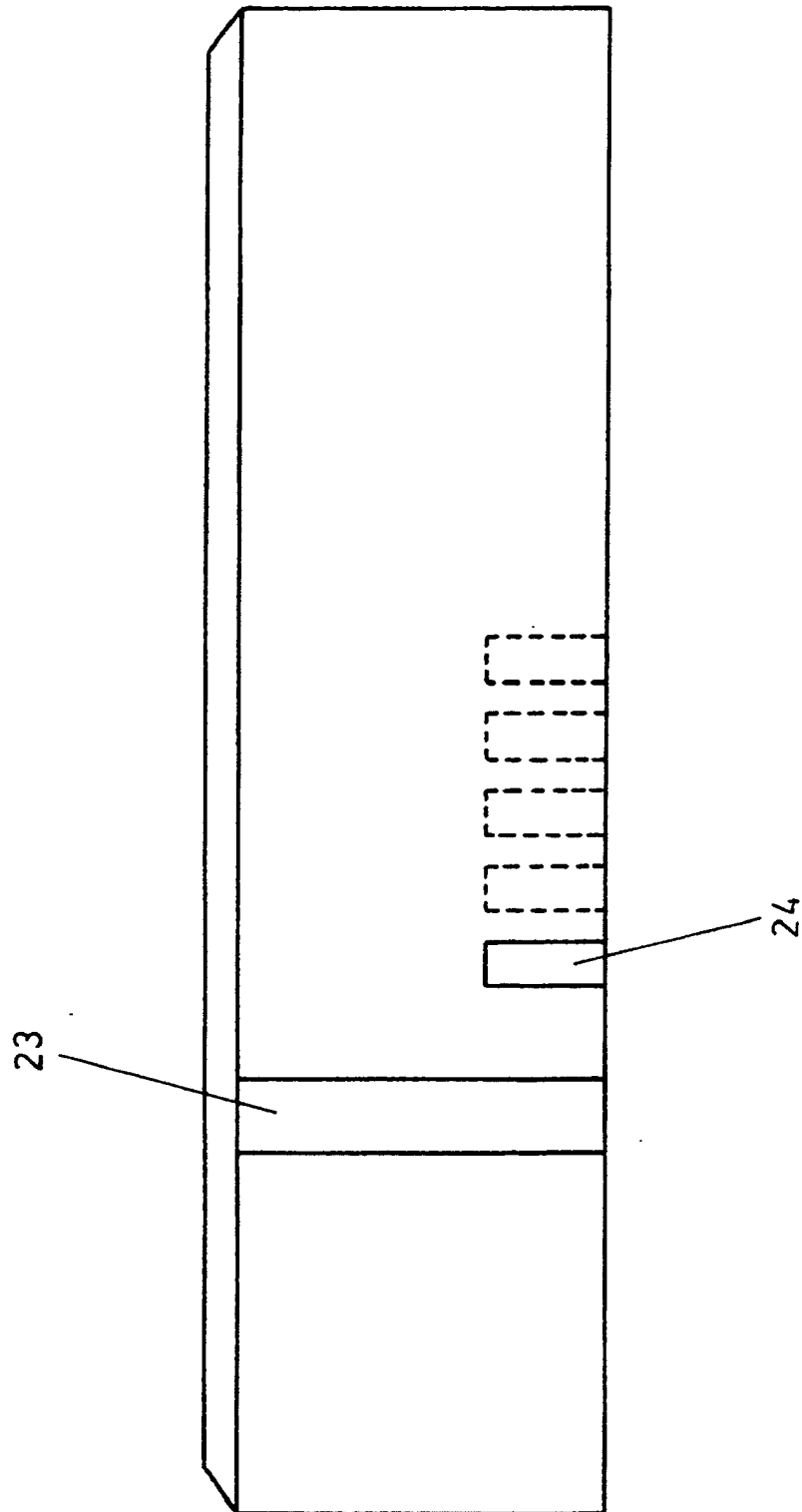


FIG. 10

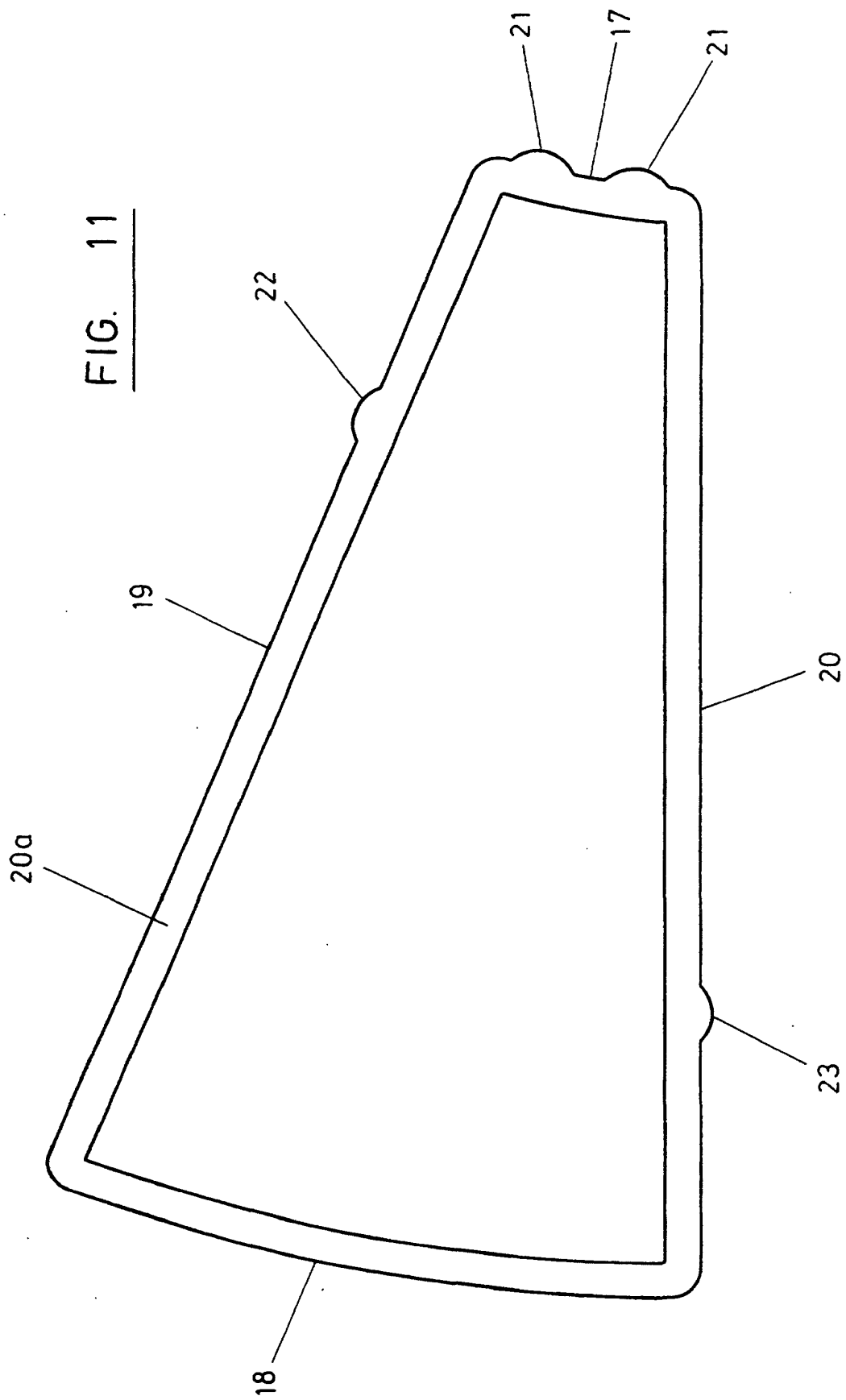


FIG. 12

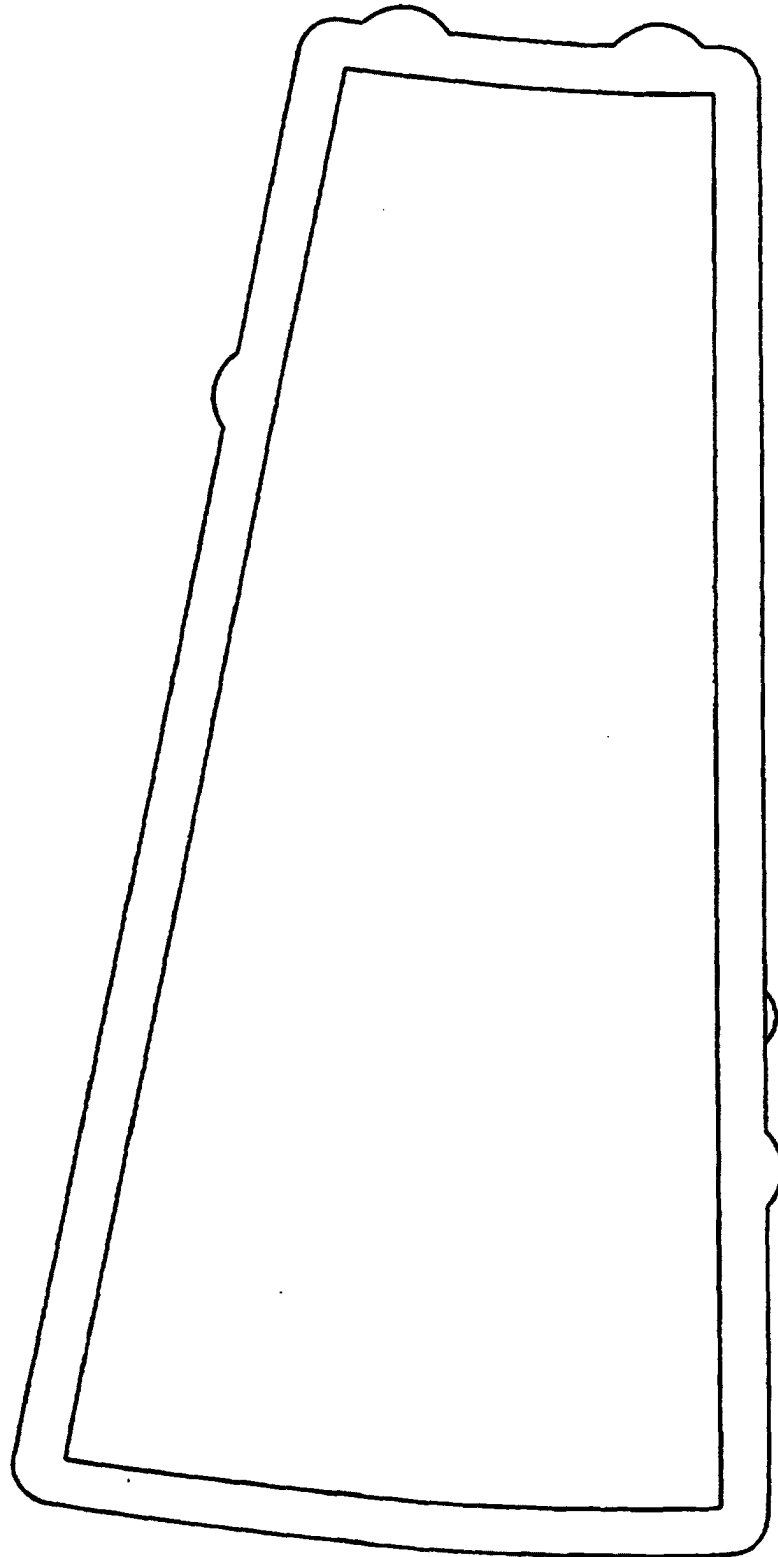


FIG. 13

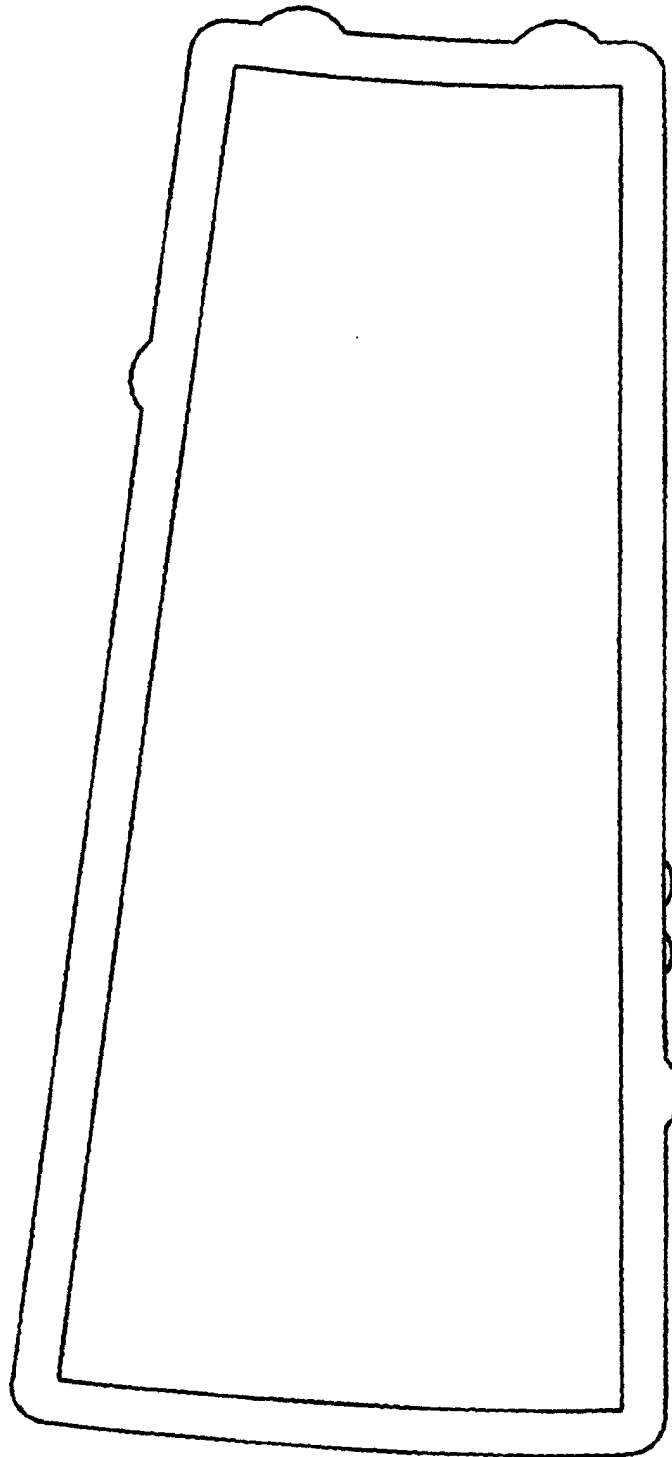


FIG. 14

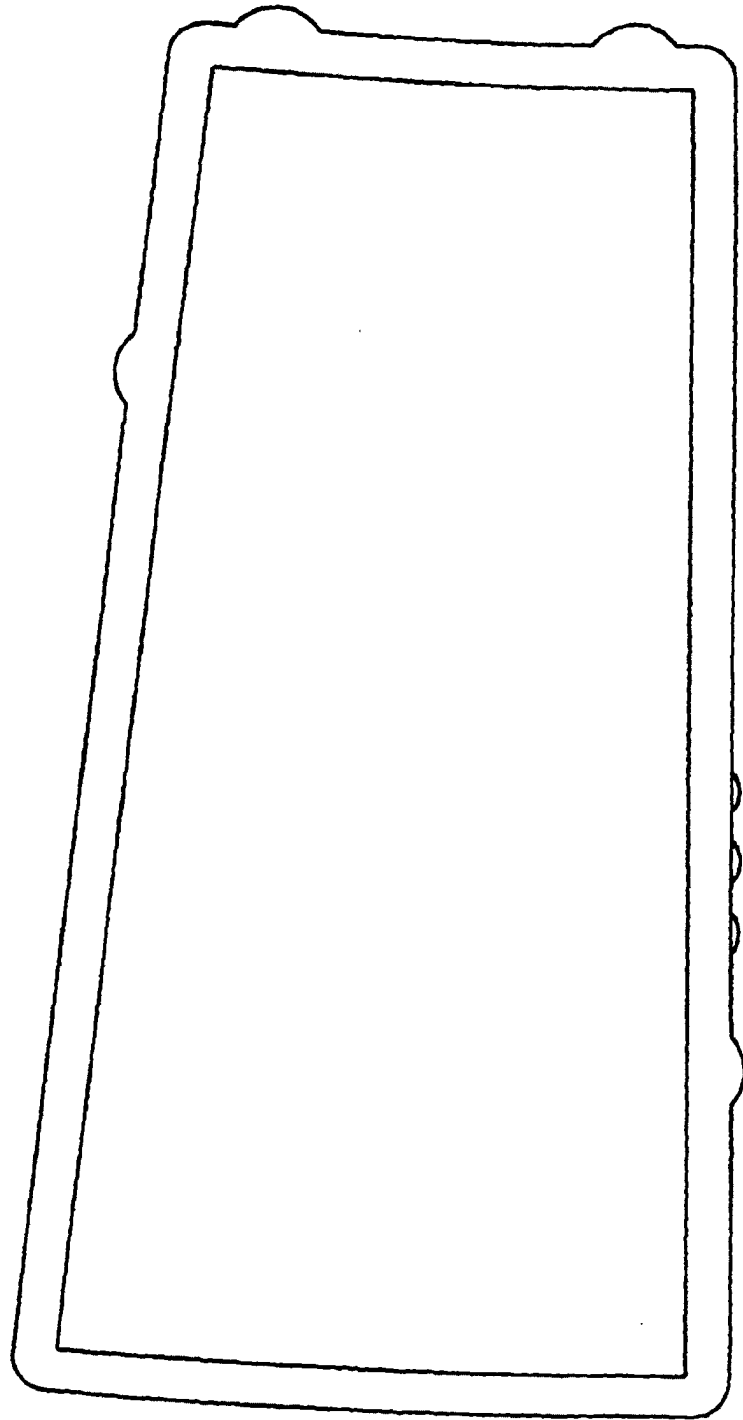


FIG. 15

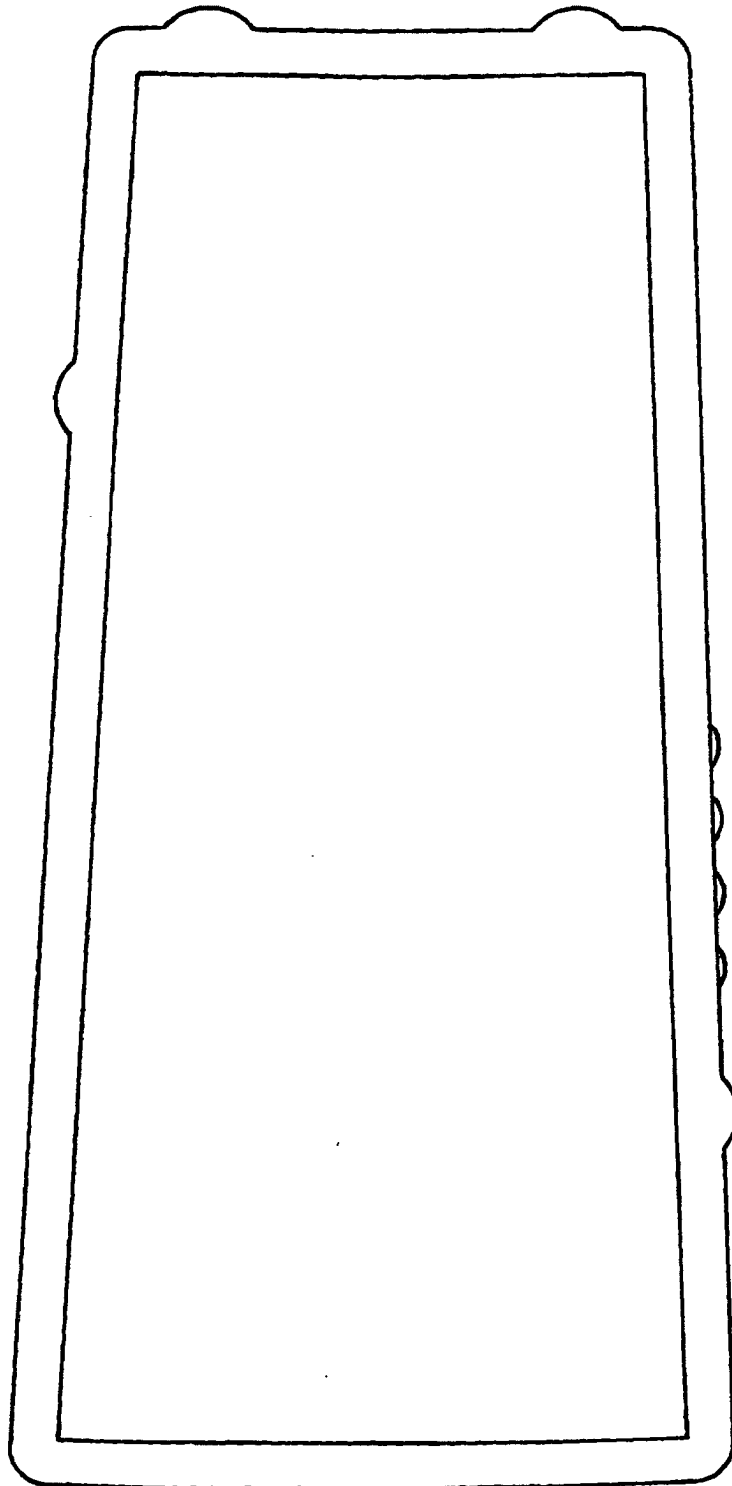


FIG. 16

