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(54) **MINI-GOLF COURSE.**

(57) A mini-golf course wherein golf similar to a formal golf can be played in an area smaller than a formal golf course. The mini-golf course is constituted of a plurality of tee grounds and a plurality of putting greens having holes corresponding to the tee grounds. In each of respective golf courses, there are a long course, a middle course and a short course. Each of the courses can be used as an out-

course, an in-course or a center course a plurality of times. Golf balls are formed so as to have shorter flying distances. Score cards each have score write-in columns corresponding to reference stroke count columns, and, a plurality of score write-in columns are provided so that each of the courses can be used as an out-course, in-course or center course.

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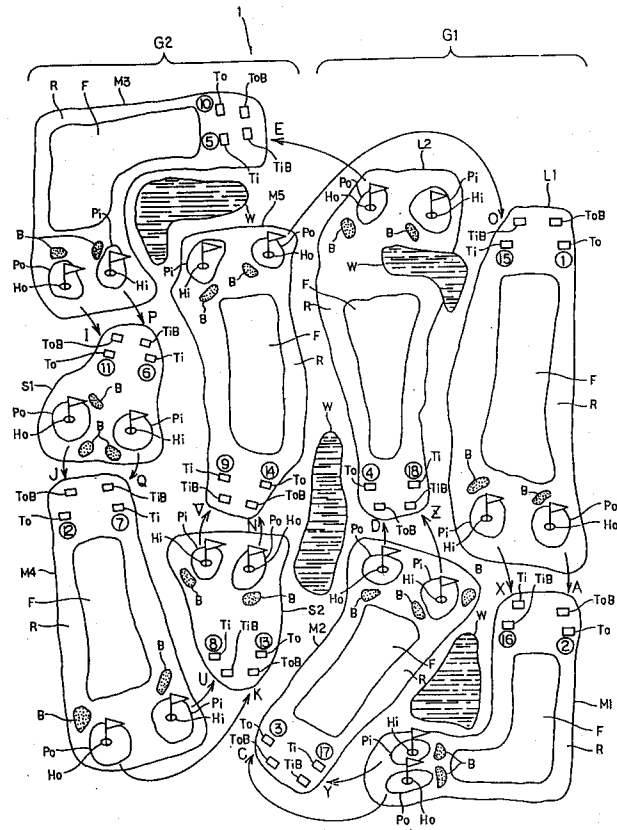


Fig. 1

## Field of the Invention

The present invention relates to miniature golf links, more specifically to miniature golf links used for enjoying playing golf in an area smaller than formal golf links.

## Description of the Invention

Formal golf links extend a large tract of land prescribed as a formal golf game mainly with a series of 18 or 27 holes spaced far apart. For example, a course comprising a 9 holes (half of formal 18 holes) is usually configured to finish a game in about 108 minutes without any special consideration of long, middle, or short hole. Accordingly, in an ordinary 9-hole course, players can enjoy only a simple 9-hole game, and when the first player group start the game in the first hole, no players are playing in the following 8 holes. So there are many holes not in use until the first player group reach the last ninth hole. Likewise, there are as many holes not in use until the last player group reach the last hole, thereby offering the problem of an uneconomical use of golf links, that is, a poor profitability. This has caused the necessity of a 18-hole course for a 18-hole game, requiring a large tract of land of about 594,000 m<sup>2</sup> and a large amount of expense for constructing formal golf links. This is the reason for the deficiency of golf links, exceedingly high charge for a game, and a long queue of players, etc., and has long prevented a nice sport golf from being popular among public people. Besides, some golf links have recently caused the problem of water pollution by applying harmful agricultural chemicals on the large area of their grass links, developing a severe social problem of polluting adjacent river and underground water as well as the links themselves. They used agricultural chemicals to protect their large grass links against diseases and bad insects with no alternative means.

## Summary of the Present Invention

The principal object of the present invention is to provide miniature golf links for enjoy playing golf in links smaller than formal golf links.

It also is an object to provide miniature golf links for a formal golf game using a fewer holes.

It also is an object to provide miniature golf links that facilitate the construction and establishment of golf links.

Another object is to provide miniature golf links for playing a pseudo-formal-golf game with a golf ball of smaller flight distance in an area smaller than formal golf links.

The present invention refers to a plurality of

golf courses comprising a plurality of teeing grounds and a plurality of the corresponding putting green, wherein each golf course is made of long, middle, and short holes, used for multiple times as an outer-, inner-, and central-courses, prepares score cards based on the predetermined numbers of strokes, wherein each of the score cards are prepared so that holes can be used as outer-, inner-, or central-courses.

All objects of the present invention are clearly shown in the following figures:

## Brief Description of the Drawings

Figure 1 is a plan view of miniature golf links applied with the present invention.

Figure 2 is an explanatory diagram for indicating the time required to finish a game on each course shown in Figure 1.

Figure 3 is a plan view of miniature golf links comprising 6 courses applied with the present invention.

Figure 4 is an explanatory diagram indicating the time required to finish a game on each course shown in Figure 3.

Figure 5 is an explanatory diagram indicating the difference of the size required for golf links between using a ball of normal flight distance and a ball of half normal flight distance.

Figure 6 is a plan view of miniature golf links comprising 3 courses applied with the present invention.

Figure 7 is an explanatory diagram indicating the time required to finish a game on each course shown in Figure 6.

Figure 8 is a plan view of miniature golf links comprising 4 courses applied with the present invention.

Figure 9 is an explanatory diagram indicating the time required to finish a game on each course shown in Figure 8.

Figure 10 is an oblique profile of artificial grass sheet used for a putting green of the miniature golf links applied with the present invention.

Figure 11 is a profile of a putting green.

Figure 12 is a plan view of a putting green.

Figure 13 is a plan view of another embodiment of a putting green.

Figure 14 is a profile of a hole.

Figure 15 is an oblique profile of a hole cover.

Figure 16 is a plan view of the positions of holes in a putting green.

Figure 17 is a plan view of the positions of holes in another putting green.

Figure 18 is a profile of recoverable material of artificial grass shown in Figure 10.

Figure 19 is a profile of the state of the recoverable material provided with external pressure in

the thickness direction;

Figure 20 is a profile of the state of a ball bouncing on a putting green of miniature golf links applied with the present invention.

Figure 21 is a profile of the state of a ball bouncing on ordinary artificial grass.

Figure 22 is a oblique plan view of another embodiment of a putting green.

Figure 23 is a profile of the putting green shown in Figure 22.

Figure 24 is a plan view of of the putting green shown in Figure 22.

Figure 25 is a plan view of another embodiment of a putting green.

Figure 26 is an oblique profile of an embodiment of hazard in miniature golf links applied with the present invention.

Figure 27 is a profile of the hazard shown in Figure 26.

Figure 28 is an oblique profile of the ground appropriate for miniature golf links applied with the present invention.

Figure 29 is a general profile around the surface portion of the ground shown in Figure 28.

Figure 30 is an oblique view of the foundation of the ground shown in Figure 28.

Figure 31 is a general profile around the surface portion of another embodiment of a golf ground.

Figure 32 is an enlarged profile around the surface portion of the ground shown in Figure 31.

Figure 33 is a profile of a desirable plug provided in a hole in a putting green of miniature golf links applied with the present invention.

Figure 34 is a plan view of the plug in use for the embodiment shown in Figure 33.

Figure 35 is an analytic profile of the plug shown in 33.

Figure 36 is a profile of a cover plug to be used instead of the plug shown in Figure 33.

Figure 37 is a plan view of the cover plug shown in Figure 36.

Figure 38 is an analytic profile of the cover plug shown in Figure 36.

Figure 39 is an oblique view of the handle of the cover plug shown in Figure 36.

Figure 40 is an oblique view of the putting green provided with the plug shown in Figure 33 and the cover plug shown in 36.

Figure 41 is a general oblique view of another embodiment of a putting green.

Figure 42 is a plan view of the putting green around a hole.

Figure 43 is a profile of the putting green around the hole shown in Figure 42.

Figure 44 is a profile of a hole not in use in the putting green shown in Figure 41.

Figure 45 is a side view of a golf ball appro-

priately used in miniature golf links applied with the present invention.

Figure 46 is a partial inner view for explaining the inner composition of the golf ball shown in Figure 45.

Figures 47 is a profile of the golf ball shown in Figure 46 along the line A-A.

Figure 48 is a profile of the golf ball shown in Figure 46 along the line B-B.

Figure 49 is a profile of a golf ball on a tee.

Figure 50 is a view for explaining the difference of flight distance of a golf ball shown in Figure 45 from a formal golf ball when shot by a full swing.

Figure 51 is a view for explaining the movement of the padded ball.

Figure 52 is a partial inner view of another golf ball.

Figure 53 is a partial inner view of another golf ball.

Figure 54 is a profile of the golf ball shown in Figure 53.

Figure 55 is a view for explaining the state of a golf ball floating on water when shot into water.

Figure 56 is a profile for explaining the relationship between a club and a ball when shot by a full swing.

Figure 57 is a profile for explaining the relationship between a club and a padded ball.

Figure 58 is a front view of another golf ball.

Figure 59 is a profile of the golf ball shown in Figure 58.

Figure 60 is a partial inner view of the golf ball shown in Figure 58.

Figure 61 is a general view of a golf ball applied with the present invention.

Figure 62 is an enlarged front view of the dimples of the golf ball shown in Figure 61.

Figure 63 is an oblique view of the dimple shown in Figure 62.

Figure 64 is a general view of a golf ball of another embodiment applied with the present invention.

Figure 65 is an enlarged front view of the golf ball dimple shown in Figure 64.

Figure 66 is an oblique view of the dimple shown in Figure 65.

Figure 67 is an enlarged front view of another dimple.

Figure 68 is an oblique view of the dimple shown in Figure 67.

Figure 69 is a general view of another embodiment of a golf ball applied with the present invention.

Figure 70 is an enlarged front view of the dimple of the golf ball shown in Figure 69.

Figure 71 is an oblique view of the dimple of a golf ball shown in Figure 70.

Figure 72 is a general view of another embodiment of a golf ball applied with the present invention.

Figure 73 is an enlarged front view of the dimple of the golf ball shown in Figure 72.

Figure 74 is an oblique view of the dimple shown in Figure 73.

Figure 75 is a general view of another embodiment of a golf ball applied with the present invention.

Figure 76 is an enlarged front view of the golf ball shown in Figure 75.

Figure 77 is an oblique view of the dimple shown in Figure 76.

Figure 78 is a front view of another golf ball.

Figure 79 is a back view of the golf ball shown in Figure 78.

Figure 80 is a front view of the golf ball shown in Figure 78.

Figure 81 is a bottom view of the golf ball shown in Figure 78.

Figure 82 is a left side view of the golf ball shown in Figure 78.

Figure 83 is a right side view of the golf ball shown in Figure 78.

Figure 84 is a profile of the golf ball shown in Figure 78 along the line A-A.

Figure 85 is a front view of another golf ball.

Figure 86 is a back view of the golf ball shown in Figure 85.

Figure 87 is a plan view of the golf ball shown in Figure 85.

Figure 88 is a bottom view of the golf ball shown in Figure 85.

Figure 89 is a left side view of the golf ball shown in Figure 85.

Figure 90 is a right side view of the golf ball shown in Figure 85.

Figure 91 is a profile of the golf ball shown in Figure 85 along the line A-A.

Figure 92 is a front view of another golf ball.

Figure 93 is a back view of the golf ball shown in Figure 92.

Figure 94 is a plan view of the golf ball shown in Figure 92.

Figure 95 is a bottom view of the golf ball shown in Figure 92.

Figure 96 is a left side view of the golf ball shown in Figure 92.

Figure 97 is a right side view of the golf ball shown in Figure 92.

Figure 98 is a profile of the golf ball shown in Figure 92 along the line A-A.

Figure 99 is a front view of another golf ball.

Figure 100 is a back view of the golf ball shown in Figure 99.

Figure 101 is a front view of the golf ball shown in Figure 99.

Figure 102 is a bottom view of the golf ball shown in Figure 99.

Figure 103 is a left side view of the golf ball shown in Figure 99.

Figure 104 is a right side view of the golf ball shown in Figure 99.

Figure 105 is a profile of the golf ball shown in Figure 99 along the line A-A.

Figure 106 is a partial plan view of another golf ball.

Figure 107 is a profile of the golf ball shown in Figure 106 along the line A-A.

Figure 108 is a partial plan view of another golf ball.

Figure 109 is a profile of the golf ball shown in Figure 108 along the line A-A.

Figure 110 is a partial plan view of another golf ball.

Figure 111 is a profile of the golf ball shown in Figure 110 along the line A-A.

Figure 112 is a partial plan view of another golf ball.

Figure 113 is a profile of the golf ball shown in Figure 112 along the line A-A.

Figure 114 is a front view of another embodiment of a golf ball applied with the present invention.

Figure 115 is a plan view of the golf ball shown in Figure 114.

Figure 116 is a front view of another golf ball.

Figure 117 is a plan view of the golf ball shown in Figure 116.

Figure 118 is a plan view of another golf ball.

Figure 119 is a plan view of the golf ball shown in Figure 118.

Figure 120 is a plan view of another golf ball.

Figure 121 is a plan view of the golf ball shown in Figure 120.

Figure 122 is a front view of another golf ball.

Figure 123 is a plan view of the golf ball shown in Figure 122.

Figure 124 is a plan view of another golf ball.

Figure 125 is a plan view of the golf ball shown in Figure 124.

Figure 126 is a plan view of another golf ball.

Figure 127 is a plan view of the golf ball shown in Figure 126:

Figure 128 is a front view of another golf ball.

Figure 129 is a plan view of the golf ball shown in Figure 128.

Figure 130 is a front view of another golf ball.

Figure 131 is a plan view of the golf ball shown in Figure 130.

Figure 132 is a front view of another golf ball.

Figure 133 is a plan view of the golf ball shown in Figure 132.

Figure 134 shows a score card to be used in miniature golf links applied with the present in-

vention.

Figure 135 is the first example of other score cards.

Figure 136 shows the second example of other score cards.

Figure 137 shows the third example of other score cards.

Figure 138 shows the fourth example of other score cards.

Figure 139 shows the fifth example of other score cards.

Figure 140 shows the sixth example of other score cards.

Figure 141 shows the seventh example of other score cards.

Figure 142 shows the eighth example of other score cards.

Figure 143 is an explanatory view of the first example of the form of segmented score columns.

Figure 144 is an explanatory view of the second example of the form of segmented score columns.

Figure 145 is an explanatory view of the third example of the form of segmented score columns.

Figure 146 is an explanatory view of the fourth example of the form of segmented score columns.

Figure 147 is an explanatory view of the fifth example of the form of segmented score columns.

#### Description of the Preferred Embodiments

Figure 1 is a plan view of miniature golf links applied with the present invention. The illustrated golf links comprising 9 holes are divided into 2 groups; the first group comprises 4 holes of 2 long holes and 2 middle holes, and the second group comprises 5 holes of 3 middle holes and 2 short holes. Each hole is provided with two teeing grounds and two corresponding putting greens with respective holes, each of them for an inner- and an outer-course. As shown in Figure 1, golf links 1 comprise the first group G1 of 4 holes and the second group G2 of 5 holes. More precisely, the first group G1 comprises two long holes L1 and L2 and two middle holes M1 and M2, and is configured to play starting with L1, M1, M2, and finishing with L2. In formal golf links, a long hole is designed to extend about 460 - 480 m for par 5, and a middle hole about 320 - 340 m for par 4. In the case of soft-ball golf links where the golf ball is designed to have half flight distance of formal golf ball, a long hole is designed to extend about 220 - 240 m for par 5, and a middle hole about 140 - 155 m for par 4.

The second group G2 comprises three middle holes M3, M4, and M5, and two short holes S1 and S2, and is configured to play starting with M3, S1, M4, S2, and finishing with M5. In formal golf links, a middle hole is designed as described above for par 4, and a short hole is designed to extend about 130 - 140 m for par 3. In the case of soft-ball golf links, a short hole is designed to extend 75 - 85 m for par 3.

Each hole is provided with two teeing grounds Ti and To (including a back teeing ground TiB and ToB) and two corresponding putting greens Pi and Po with respective holes Hi and Ho, each of them for an in-and an outer-course.

Each hole is designed with a fairway F, bunkers B, pond W, rough R, trees, and slopes to make differences both in view and golfing technique between the inner-course and outer-course even though these courses are designed on the same hole.

Figure 2 indicates the time required to finish a game through the above mentioned hole.

In the first group G1, the first long hole L1 for par 5 requires 15 minutes, the first middle hole M1 and the second middle hole M2 each for par 4 require 12 minutes, the second long hole L2 for par 5 requires 15 minutes.

In the second group G2, the third middle hole M3 for par 4 requires 12 minutes, the first short hole S1 for par 3 requires 9 minutes, the fourth middle hole M4 for par 4 requires 12 minutes, the second short hole S2 for par 3 requires 9 minutes, the fifth middle hole M5 for par 4 requires 12 minutes.

Accordingly, the total minutes required to finish playing golf through all holes of the first group G1 are 54 minutes, equal to the value required by the second group G2. Thus, the time periods required by the first group G1 and the second group G2 match exactly.

Next, the usage of the golf links 1 is described as follows. The first player group of the first hole group G1 start at 1 on the teeing ground To 1 of the long hole L1 of the first hole group G1, taking the outer-course. At the same time, the first player group of the second hole group G2 start at 10 on the teeing ground To of the middle hole M3 of the second hole group G2, taking the outer-course.

The first player group start their game at the teeing ground To, and play through the fairway F, putting green Po, and hole Ho, finishing the first long hole L1. Then they enter the first middle hole M1 as indicated by the arrow A in Figure 1, and start their game there at 2 on the teeing ground To, and play through the putting green Po and hole Ho, finishing the first middle hole M1. Then they enter the second middle hole M2 as indicated by the arrow C in Figure 1, and start their game there at 3

on the teeing ground To, and play through the putting green Po and hole Ho, finishing the second middle hole M2. Then they enter the second long hole L2 as indicated by the arrow D, and they start their game there at 4 on the teeing ground To, and play through the putting green Po and hole Ho, finishing the second long hole L2. That is the whole course of the first hole group G1, and the time required to finish the course (from the first long hole L1 to the second long hole L2) is 54 minutes. Next, The first player group proceed to the third middle hole M3 of the second hole group G2 as indicated by the arrow E in Figure 1.

While the first player group of the first hole group G1 enjoy their game from the first long hole L1 to the second long hole L2 of the first hole group G1, the first player group of the second hole group G2 start their game at 10 on the teeing ground To of the third middle hole, and play through the putting green Po and hole Ho, finishing the game there. Then they enter the first short hole S1 as indicated by the arrow I, and proceed to the fourth middle hole M4 as shown by the arrow J, the second short hole S2, and the fifth middle hole M5, finishing the whole course in the second hole group G2 in 54 minutes. Then (at 54 minutes from the very beginning) first player group of the second hole group G2 start their game at 15 on the teeing ground Ti of the first long hole L1 of the first hole group G1 as indicated by the arrow O in Figure 2.

Thus, the first player group take the outer-course in the first and second hole groups G1 and G2, finish their game there, change the course and take the inner-course as indicated by the arrows E and O, and use the tees 5, 6, 7, 8, and 9, finishing a total of 9 hole course in the total of 108 minutes.

Another first player group who finish the second hole group first and proceed to the first long hole L1 as indicated by the arrow O in Figure 1 take the inner-course indicated by the arrows X, Y, and Z and use the tees 15, 16, 17, and 18, finishing a total of 9 hole course in the total of 108 minutes.

The arrangements of courses described above enable each player group to start a game every 6th minute at 1 on the teeing ground of the long hole L1 of the first hole group G1. Likewise, each player group can start a game every 6th minute at 10 on the teeing ground To of the second hole group G2. Therefore, when the first player group of the first hole group G1 finish playing in the second long hole L2 in 54 minutes, that is, 6 minutes after the ninth player group start at 10 on the teeing ground To of the second hole group G2, 5 on the teeing ground Ti of the third middle hole M3 is already available. Then the ninth player group last starting at 10 on the teeing ground To are on the fairway F of the third middle hole M3, and the first player

group proceeding from the first hole group G1 following the arrow E now can start their game at 5 on the teeing ground Ti.

Likewise, at 54 minutes after the first player group of the second hole group G2 start at 10 on the teeing ground To, the group can start their game at 15 on the teeing ground Ti of the first long hole of the first hole group G1. That is, the ninth player group last starting at 1 on the teeing ground To of the first long hole L1 of the first hole group G1 is already on the fairway F of the first long hole L1, and permitted to start at 15 on the teeing ground Ti.

If each player group after finishing the whole course of each hole group G1 or G2 take a break before proceeding to another hole group as indicated by the arrow E or O in Figure 1, the maximum of 10 player groups each in the hole group G1 and G2 can be admitted in this arrangement.

Therefore, with 9 player groups starting every 6th minute respectively from the first hole group G1 and simultaneously playing in the holes there, another 9 player groups can start every 6th minutes respectively from the second hole group G2, and play games simultaneously. Accordingly, in the whole golf links, player groups start their game every 3rd minute, obtaining double profitability of ordinary golf links.

Besides, players can enjoy different views and techniques between starting at the teeing grounds To and Ti even in the same hole. Similarly, different technical consideration is required on the the same putting green between holing out in Po and Pi, providing players with variety.

Although the description above is made based on the size of ordinary formal golf links, it is not limited to such large golf links, but can be adopted in smaller links.

In the golf links shown in Figure 1, the first and second groups can be used simultaneously, reducing the number of holes not in use around the start and end of business hours, admitting double number of players per hour of ordinary golf links, thus providing the golf links applied with the present invention with double profitability. Additionally, golf links can be made smaller, reducing the playing charge, and making a golf game more popular among public people. Another effect of the present invention is that when players take the inner-course, they use exclusively inner-course teeing grounds, putting greens, and holes. likewise in outer-course, they use exclusively outer-course teeing grounds, putting greens, and holes. Therefore, fairways and putting greens can be viewed from different direction, making players enjoy the variety in their game as if they were playing in a 18 different hole course.

An embodiment shown in Figure 3 shows golf links 2 comprising a total of 6 holes. The links are divided into two groups; the first hole group and the second hole group each comprising 3 courses. In the first hole group G1 comprises the first long hole L1, the first middle hole M1, and the first short hole S1. Players start their game with the first short hole, proceeds to the first middle hole, and finish with the first long hole. In the formal golf links, a long hole extends 460 - 480 m for par 5, a middle hole 320 - 340 m for par 4, and a short hole 130 - 140 m for par 3.

If a golf ball of half flight distance of an ordinary golf ball is used, golf links are designed with a long hole of 220 - 240 m for par 5, a middle hole of 140 - 155 m for par 4, and a short hole of 75 - 85 m for par 3.

The second hole group G2 comprises the second long hole L2, the second middle hole M2, and the second short hole S2. Players start with their game at the second middle hole M2, proceeds to the second short hole S2, and finish with the second long hole L2. The size of each hole is almost equal to each of the first group holes.

Each hole is provided with three teeing grounds (the first, second, and third grounds T1, T2, and T3), and the corresponding first, second, and third holes H1, H2, and H3 in the first, second, and third putting greens P1, P2, and P3.

Each hole is provided appropriately with fairway, bunkers B, ponds P, rough R, trees (not shown in Figure 3), and slopes to make differences in view and golfing technique among the first, second, and third teeing ground even though these courses are designed on the same hole.

The time required to finish a game in the first hole group G1 and the second hole group G2 in ordinary formal golf links is 15 minutes for a long hole for par 5, 12 minutes for a middle hole for par 4, 9 minutes for a short hole for par 3.

Accordingly, the time required to finish all holes in the first hole group G1 is 36 minutes, an addition of all the required time for the above three holes. Likewise in the second hole group G2, the time required to finish all holes there are 36 minutes. Thus, the time periods required by the first hole group and the second hole group match exactly (Figure 4).

The usage of the golf links above is described as follows. The first player group of the first hole group G1 start their game at 1 on the teeing ground T1 of the first short hole S1, and at the same time the first group player of the second hole group G2 start their game at 4 on the teeing ground T2 of the middle hole M2.

The first player group of the first hole group G1 start their game at 1 on the teeing ground T1, and play through the fairway F, the first putting green

P1, and the first hole H1, finishing the first short hole S1. Then they enter the first middle hole M1 as indicated by the arrow A. After finishing the game there, they proceed to the first long hole as indicated by the arrow A1, thus finishing all holes in the first hole group G1 in 36 minutes. Next, the first player group of the first hole group proceed to the second middle hole M2 of the second hole group G2 as indicated by the arrow C in Figure 3.

While the first player group start their game with the first short hole S1 of the first hole group G1 and finish with the first long hole L1, the first player group of the second hole group G2 start their game with the second middle hole M2, proceed to the second short hole S2, and finish with the second long hole L2 as indicated by the arrows D and E, thus finishing all holes in the second hole group G2 in 36 minutes. Then the first player group of the second hole group G2 start at 7 on the third teeing ground T3 of the first short hole S1 of the first hole group G1 as indicated by the arrow G in Figure 3 at 36 minutes after the beginning of their game.

Thus each of the first player groups start at the first and second hole groups G1 and G2 respectively, proceed to the second hole group G2, exchange the hole groups as indicated by the arrows C and G, and proceed to 4, 5, and 6 on the second teeing ground of the second hole group G2 as indicated by the arrows D and E, or to 7, 8, and 9 on the third teeing ground of the first hole group G1 as indicated by the arrows I and J. Again, each of the first player groups exchange the hole groups as indicated by the arrows K and G, proceed to 7, 8, and 9 on the third teeing ground of the first hole group G1, or to 10, 11, and 12 on the third teeing ground of the second hole group G2 as indicated by the arrows N and O. When both first player group finish their games as described above, they re-exchange the hole groups as indicated by the arrows K and Q, and proceed to 13, 14, and 15 on the second teeing ground of the first hole group G1 as indicated by the arrows U and V, or to 10, 11, and 12 on the third teeing ground of the second hole group G2 as indicated by the arrows N and O. After finishing the above courses, each of the groups exchange the hole groups as indicated by the arrow Q and Q1, and proceed to 13, 14, and 15 on the second teeing ground of the first hole group G1 as indicated by the arrows U and V, or to 16, 17, and 18 on the first teeing ground of the second hole group G2 as indicated by the arrows X and Y. Then again, each group exchange the hole groups as indicated by the arrows W and Z, and proceed to 1, 2, and 3 on the first teeing ground of the first hole group G1 as indicated by the arrows A and A1, or to 16, 17, and 18 on the first teeing ground of the second hole group G2 as indicated by the



arrows X and Y, finishing the whole course in these golf links.

Thus, playing golf in these 6 holes for 3 times each actually completes a 18-hole game, and the time required to finish a game is equally 144 minutes for two first groups starting from the first and second hole groups G1 and G2.

By arranging the course as described above, player groups starting from both the first and second hole groups G1 and G2 can start their game every 6th minute. Accordingly, at 36 minutes after the first player group of the first hole group G1 finish their game in the first long hole L1, the tee 4 on the teeing ground T2 of the second middle hole M2 is already available. Thus, in the golf links shown in Figure 3, at least 6 player groups can start their games simultaneously, that is, one player group can start their game every 3rd minute in the whole golf links, providing double profitability of ordinary golf links.

Besides, changing the course from the inner-course to the outer-course and vice versa also changes the teeing ground and putting green, requiring different golfing technology and providing players with variety of the course.

Additionally, as an ordinary 18-hole game can be performed in 6 holes in this arrangement, the utilization of land is tripled.

The above explanation is made in comparison with the size of formal golf links. However, this course arrangement is not limited to such ordinary formal golf links.

As described later, when a golf ball of half flight distance of a formal golf ball is used in this course arrangement, the size of a hole may be a half of an ordinary hole in proportion to the flight distance of the ball, and the width of the hole can be two-thirds of an ordinary golf hole. To sum up, as shown in Figure 5, if the flight distance of a formal golf ball is "a", the length of the hole of a formal golf hole I1 must be larger than "a", and its width W1 must be also larger than "a". However, if a ball of half flight distance of a formal golf ball is used, the length of the hole I2 may be a little more than a half of "a", and its width W2 may be two-thirds of "a" sufficiently.

Thus, the size of the golf links where a golf ball of smaller flight distance is used can be half in length I1 and two-thirds in width W2 of ordinary golf links, reducing the total area into one-third of an ordinary one. Additionally, as the golf links 2 shown in Figure 3 comprise 6 holes, one third of an ordinary one, the total area can be also one-third of ordinary golf links even using an ordinary golf ball. If a ball of half flight distance of an ordinary golf ball is used in this economical golf course arrangement, the total area can be one-ninth only. As ordinary golf links are about 594,000 m<sup>2</sup> in area,

the golf links 1 shown in Figure 3 can be about 198,000 m<sup>2</sup> or even reduced to about 66,000 m<sup>2</sup>.

The above embodiment is designed to enjoy playing 18-hole game in a fewer holes. In this embodiment, 9-hole games can be performed in three courses. These embodiments are shown in Figure 6.

In Figure 6, the golf links 3 comprise a long hole L, middle hole M, and short hole S, and players are to play games in this order. In formal golf links, a long hole extends 460 m - 480 m for par 5, a middle hole 320 m - 340 m for par 4, and a short hole 130 m - 140 m for par 3. In golf links applied with a golf ball of half flight distance of a formal golf ball described later, a long hole extends 220 m - 240 m, a middle hole 140 m - 155 m for par 4, and a short hole 75 m - 85 m for par 3.

Each hole is provided with 3 teeing grounds, that is, T1 on the first teeing ground, T2 on the second teeing ground, and T3 on the third teeing ground, and corresponding holes H1 (the first hole), H2 (the second hole), and H3 (the third hole) in the first putting green P1, second putting green P2, and third putting green P3 respectively.

Each hole is also provided with fairway, bunkers B, ponds W, roughs R, trees (not shown in Figure 6), and slopes. All of them are designed to require different golfing techniques and provide players variety in view from starting at T1 on the first teeing ground, proceeding to T2 on the second teeing ground, and finishing after T3 on the third teeing ground.

The time required to finish a game in above 3 holes in formal golf links as shown in Figure 7 is: 12 minutes for a long hole for par 5, 10 minutes for a middle hole for par 4, and 7 minutes for a short hole for par 3, adding up to 29 minutes for finishing all 3 holes.

In the golf links 1, the first player group start their game at 1 on the first teeing ground T1 of the long hole L, play through the fairway F, the first putting green P1, and the first hole H1, and finish the long hole L. Next, they enter the middle hole M as indicated by the arrow A, start at 2 on the first teeing ground T1 of the middle hole M, play through the first putting green P1 and the first hole H1, and finish the game in the middle hole M. They then enter the short hole S as indicated by the arrow B1, start at 3 on the first teeing ground T1, play through the putting green P1 and the first hole H1, and finish the short hole S at 29 minutes after their start at the long hole L. Then the first player group enter the long hole L again as indicated by the arrow C, start at 4 on the second teeing ground T2, play through the second putting green P2 and the second hole H2, and finish the long hole L. Next, they enter the middle hole M again, start at 5 on the second teeing ground T2 of the middle hole

M, play through the second putting green P2 and the second hole H2, and finishing the middle hole M. Then they enter the short hole S again as indicated by the arrow E, start at 6 on the second teeing ground T2, and play through the second putting green P2 and the second hole H2, finishing the short hole at 58 minutes after the very beginning.

Next, they proceed to the long hole L again as indicated by the arrow F, start at 7 on the third teeing ground T3 of the long hole L, and play through the third putting green P3 and the third hole H3, finishing the long hole L. Then they enter the middle hole M as indicated by the arrow G, and the short hole S as indicated by the arrow H, completing the whole game at 87 minutes after they begin the game at the long hole for the first time.

Thus, players enjoy their 9-hole game by using three holes for three times each, finishing the game in 87 minutes, or 90 minutes with 1 additional minute for each course change.

In the golf links 3 as described above, at 24 minutes after the first player group start their game followed by each player group starting every 6th minute, all holes are occupied by players and at least 5 player groups can be playing simultaneously, improving the profitability of the golf links.

In the golf links shown in Figure 6, players can perform a 9-hole game in 3 holes, tripling the utilization of land. Compared with formal golf links equipped with 18 holes, the golf links 3 above comprise 3 holes, one-sixth in the number of holes, requiring only one-sixth of the area of formal golf links, and only one-eighteenth of it if a golf ball of half flight distance of a formal golf ball. As most typical golf links extend about 594,000 m<sup>2</sup>, the golf links shown in Figure 6 can be about 99,000 m<sup>2</sup> if applied with a formal golf ball, and reduced down to about 33,000 m<sup>2</sup> if applied with a golf ball of half flight distance of a formal golf ball.

In the golf links 3 above, players can play a 9-hole game in a total of only 3 holes.

An embodiment shown in Figure 8 indicates golf links where players can enjoy a 9-hole game in 4 holes.

In Figure 8, the golf links 4 are designed in a rectangular area of 160 m in length, 280 m in width, and about 44,800 m<sup>2</sup> in total site area. The whole site comprises 4 holes 5, 6, 7, and 8. The holes 5, 6, and 7 are located along the width of the links 4, and 8 in the shape of L extending in the length to the width direction. Each hole is provided with teeing ground 9 and putting green 10. The longest hole 5 in these holes is located almost straight along the width of the site, and the teeing ground 9 and the putting green of this hole are located around the corner of the rectangular site,

forming a long hole of about 280 m (distance for male players) from the teeing ground 9 to the putting green 10. The first middle hole 6 is located adjacent to that long hole 5 followed by the second middle hole 7. These 2 holes 6 and 7 are equal in length (about 170 m distance for male players), but the teeing grounds 9 and the putting greens 10 are placed back to front to each other. The third middle hole 8 is located adjacent to these two middle holes 6 and 7 in the shape of L. One end of the hole 8 extends to the center of the hole 7, and is provided with the first teeing ground 9. The hole 7 bends obtusely around the center toward both ends.

Each hole of the above golf links is provided with a plurality of teeing grounds 9 and putting greens 10 so that they make variety of views and techniques. For example, using teeing grounds 9 and putting greens 10 of the long hole 5, the first middle hole 6, and the second middle hole 7 for two times each makes up a 6-hole game. The third middle hole 8 is provided with two teeing grounds 9 and putting greens 10 respectively by additionally locating a teeing ground 9a and putting green 10a around the central part of this hole. The teeing ground 9 of the third middle hole 8 refers to the first and second teeing grounds 9 and 9a, and likewise the putting green 10 of the third middle hole 8 the first and second putting greens 10 and 10a. These two teeing grounds 9 and 9a and two putting greens 10 and 10a can make up a 3-hole game. For example, playing from the first teeing ground 9 to the second putting green 10a (a short hole), from the second teeing ground 9a to the first putting green 10 (a short hole), and from the first teeing ground 9 to the first putting green 10 (a middle hole) makes a 3-hole game.

Thus adding up all holes in the links makes a 9-hole game; the first 5 holes making the outer-course, and the last 4 holes the inner-course.

Now the time required to finish a game in the golf course above is described as follows:

Figure 9 is a diagram of the time required to finish a game in the golf course applied with the present invention.

In Figure 9, the time required to finish a game in the long hole 5 is about 12 minutes, and about 10 minutes each for the first and second middle holes 6 and 7. At the third and final middle hole 8, in the case of split holes 8a and 8b, two short holes require 7 minutes each. If the middle hole 8 is used as one middle hole, it requires about 10 minutes to finish a game there. That is, proper arrangement of these 4 holes makes up a 9-hole game; the first 5 holes making the outer-course requires 46 minutes, and the last 4 holes making the inner-course requires 42 minutes.

In each of above embodiments, links can be of

grass, but as grass links consume a large amount of cost and labor at the initial construction, and cannot be practically used until the planted grass get rooted, they require a long construction period and a larger cost in maintenance. Besides, as they are poor in permeability, players are subject to interruption by rain. Additionally, in winter plays often cannot be performed as snow-removing work in winter will damage grass.

Now artificial grass for covering golf links can replace natural grass having such demerits. However, artificial grass links have the demerit that a golf ball will exceedingly bounce on them if they are used "as is", especially on a putting green where a ball must be controlled the most carefully. Figures 10 and 11 show embodiments of putting greens of artificial grass for replacing the demerits of natural grass. Figure 10 shows artificial grass 11 comprising:

a grass sheet 12 with grass planted on a permeable sheet,

a recoverable material 13 made in a permeable structure of foam resin which slowly recovers its original form after deformed immediately when external force is added in the direction of its thickness, and

a synthetic fiber mat 14, a permeable and corrosion-resistant base structure under the recoverable material.

Figure 11 shows a putting green comprising:

a catchment area under the artificial grass described above for containing water which permeates through the artificial grass, and

a drainage pipe for connecting the catchment areas and external drainage ditches.

The grass sheet 12 comprises a permeable sheet 12b and grass 12a planted on the sheet. The grass is formed of a fine strip, colored in green, and looks just like natural grass. The artificial grass is normally about 20 mm in length, and can be modified to longer or shorter size depending on the usage and the site condition. It can be made of, for example, nylon, polypropylene, etc.

The sheet 12b is a thin plate synthetic rubber of about 3 mm in thickness.

The sheet is provided with a number of drain holes (not shown in Figure 11) for drainage through which rain and sprinkled water on the surface of the grass sheet 12 permeates to the lower structure.

The recoverable material 13 is foam resin 13a laid in the net pattern (Figure 10) under the grass sheet 12.

The foam resin is a cable type polyethylene foam resin (Figure 18) and slowly recovers its original form after deformed immediately when external force is added in the thickness direction as shown in Figure 19.

The foam resin net reduces the bounce of a ball fallen on the grass sheet 12, reducing the anticipated force on players limbs and waists.

The foam resin is laid in the net pattern as shown in Figure 10 so that water permeating through the drain holes among the grass 12 may further get down to the lower structure.

The thickness t1 of the recoverable material 13 is about 10 mm when used as putting greens 15 of golf links as shown in this embodiment. However, it is not limited to that thickness, but modified to desirable value depending on the resiliency of a ball or the nature of a game.

For example, the thickness of about 3 mm is recommended as the flooring for badminton and athletic sports where no balls are used, and the thickness of about 5 mm for baseball and rugby where a ball has low resiliency.

The synthetic fiber mat 14 is a thin plate laid under the above mentioned recoverable material 13, and is made of permeable and corrosion-resistant non-woven nylon fabric of about 10 mm in thickness t2. Therefore, the water permeating from the surface of the grass sheet 12 and recoverable material 13 can get further down to the lower structure, preventing the material from corroding by a soak in water for a long time.

As shown in Figure 11, the putting green 15 comprises a catchment area 16 under the above mentioned artificial grass 11, and a drainage pipe 17 connected to the catchment area.

Surface 18 of the grass sheet comprises the artificial grass 11 and makes a downward slope to a catchment area to drain water. As a plurality of the catchment areas are provided under the putting green 15, the back of the surface 18 is inclined downward to the nearest catchment area 16. The slope  $\theta$  is set to about  $2^\circ$  -  $4^\circ$ . The thickness of the surface 18 is set to about 40 mm. The sidewalk may be of soil or pavement.

Collars 19 surround the edges of the surface 18 as shown in Figure 11, 12, and 13, and the width of collars are set to 500 mm - 1000 mm. The collar comprises artificial grass 11 longer (about 30 mm) than the surface 18 (about 30 mm).

Next, the catchment area 16 comprises a vertical hole 16a in the profile of a U character, sand 16b filled in the upper part of the vertical hole, and pebbles 16c filled in the lower part of the vertical hole. A plurality of these vertical holes are provided under the putting green 15 as described above and shown in Figures 12 and 13.

The drainage pipe 17 connects the bottom of each catchment area 16 and an external drainage ditch 20. The drainage pipe 17 can be for example of vinyl chloride resin. The external drainage ditch 20 is designed for draining water in the drainage pipe further outside and leading it to common

sewerage (not shown in Figures).

A hole 21 comprises a bottom part 22 and cover part 23 as shown in Figure 14. The bottom part 22 is formed of a cylinder with the top open and bottom closed. A flag supporting hole 22a is provided at the center of the bottom to hold a flag. The inner diameter d1 of the bottom part is 107.9 mm, and the depth at least 101.6 mm. The material of the bottom part is, for example, synthetic resin, metal such as aluminum, stainless steel, etc.

The cover part 23 is formed of a cylinder as shown in Figure 15 and the cover is covered with the artificial grass 11. A small hole 23c is provided at the center of the cover part. The central part of the bottom is raised in a cylindrical form, and a small hole 23d is provided at the center of the cylinder top. The cover part is about 95 mm in outer diameter d2, and about 98 mm in height. Therefore, the cover part 23 is loosely contained in the bottom part 22.

When the hole is used in a game with the cover part 23 removed, a hanging pole 25 is inserted into the small hole 23c in the center of the top of the cover part 23, and further into the hole 23d to lift up the whole cover part:

A plurality of holes 21 are made in the putting green 15 as shown in Figures 16 and 17. Examples of the hole arrangements are shown in Figure 16 of a square putting green and Figure 17 of a triangle putting green.

Based on the above configuration, polyethylene foam resin 13a used as the recoverable material 13 contains a number of foam 13b as shown in Figure 18, absorbs external force by deforming immediately after the force is added in the thickness direction, recovers its original form slowly (in several minutes) after the material is released from the external force. Accordingly, the recoverable material can absorb kinetic energy of the ball fallen on the grass sheet 12 of the artificial grass 11 by changing it into heat energy, and then diverge it, reducing the bounce of the ball. Thus the height h1 of the golf ball 26 fallen on the artificial grass 11 is exceedingly smaller than the height h2 of the golf ball 26 fallen on ordinary artificial grass, that is, the artificial grass 11 hardly makes a golf ball bounce.

As the recoverable material 13 absorbs external force, it also absorbs the anticipated force on players limbs and waists on the artificial grass. Additionally, the recoverable material can protect players from being injured by a fracture, etc. when they fall on the ground.

Accordingly, a golf ball little bounces on the putting ground, only drops on natural grass, and can be carried on the putting ground at the target position. Water on the surface 18 permeates through the grass sheet 12 of the artificial grass, the recoverable material 13, and the synthetic fiber

mat 15 as shown by the arrow A in Figure 11. The water further gets down to the catchment area 16 along the slope of the surface as shown by the arrow A, and finally drained to the external drainage ditch 20 through the catchment areas and drainage pipes 17.

Among a plurality of holes 21 provided in the putting green, the cover parts 23 of the holes to be used in a game are removed, and the cover parts 23 of the holes not to be used are kept in position.

When a hole configuration is changed, the cover parts can be removed by the hanging pole 25 according to a new hole configuration.

The above embodiments of putting greens are those to be mounted permanently. On the other hand, removable putting greens are shown in Figures 22 - 25 which serve as putting greens more easily in a shorter period than ordinary putting greens.

As shown in Figures 23 and 25, a putting green 28 comprises a center part 29 and slope forming part 30. The configuration of these parts can be designed freely.

The center part 29 comprises a cup hole 29a at the center, and a flag supporting small hole 29b under the cup hole on the concentric circle with the cup hole. The small hole is made in a cylindrical form to keep the predetermined depth with wood, aluminum alloy, or iron material, etc. A plane part 29c of the predetermined area is laid surrounding the cup hole 29a and the flag supporting small hole 29b. On the surface of the plane part, the artificial grass is laid. The artificial grass can be provided on the surface of the plane part 29c of the center part 29 at the initial construction of the putting green.

In mounting the slope forming part 30, the center part 29 must be made the highest; the slope 30a is made of the same material as the center part, and inclines downward in the outer direction of the concentric circle; the slope 30a comprises four parts in the embodiment shown in Figure 23 so as to compactly surround the center part 29; and The slope 30a is covered with the artificial grass 31. At one end 30b of the slope forming part 30, a projecting part 30c to connecting the adjacent slope forming part 30. At the corresponding position of the facing end 30d of the adjacent slope forming part 30, a tapped hole 30e is provided to interlock with the projecting part 30c. The slope 30a can be covered with the artificial grass 31 at the initial construction of the putting green. The inclination of the slope 30a can be made steeper or gentler depending on the size of the putting green 28 or the choice by players. The slope can be provided with artificial convex and concave to give variety of natural putting green 28.

A pole 32a of a flag 32 is inserted and kept in

the flag supporting hole 29b in the center part 29; a round artificial grass sheet 31 in appropriate size is laid around the putting green 28; thus forming a large putting green 28.

In the putting green of the golf links shown in Figure 25, the center part 29 is formed round like the above embodiment, but the slope forming part 30 is formed rectangular with four corners rounded, split in half and connected to the center part 29, thereby creating a different putting green 33 from the embodiment shown in Figure 22 in the point of approaching technique to the hole. Otherwise, the embodiment shown in Figure 25 is identical to the embodiment shown in Figure 25, and so it is assigned the same numbers to the identical parts and the description is skipped.

In mounting the putting greens 28 and 33 with the said parts, the projecting parts 30c of the slope forming part 30 is interlocked with the tapped holes 30e of the adjacent slope forming part 30 as indicated by the arrow A, with the center part 29 built in the center as indicated by the arrow B. If the artificial grass sheet 31 is not applied yet, it must be applied now on the center part 29 and the slope forming part 30, thus easily completing the core of the putting green. If the artificial grass sheet is applied beforehand both on the center part 29 and the slope forming part 30, the core of a putting green is completed easily only by putting them together. Now a putting green of golf links is completed by laying appropriate size of artificial grass sheet 31 around the core comprising the slope forming part 30 and the center part 29 as indicated by the arrow B.

Thus, the appropriate size of the plane part 29c is laid around the cup hole 29a with an appropriate slope 30a formed by the slope forming part 30, thereby providing players with a putting green just like a natural putting green both in appearance and function.

The above mentioned putting greens 28 and 33 can be used even on rainy days because they are weatherproof, or little affected by weather conditions.

These putting greens can be removed by the inverse order of the building procedure. That is, the slope forming part 30 is broken up first, and the center part 29 is removed, thus easily removing the putting green completely within a short time. It is also easy to relocate the putting green to another position.

An embodiment of a hazard in golf links is shown in Figures 26 and 27. Hazards of this type can be easily mounted within a short time at any position. A hazard 34 comprises a bank part 36 made of sandbags 35 heaped up in the form of loop, an artificial grass sheet 37 laid on the outer side 36a and inner side 36b of the bank part, and a

concave part 38. Various objects M can be placed in the concave part easily if necessary.

If sand S is filled as object M in the concave part 38, it is made up as a bunker. If water W is filled there, it becomes a pond. Then a pond must be laid with a waterproof sheet as the bottom material,

The sandbags 35 can build bank parts 36 of any shape by arranging the width, height, and loop form. As such bunkers and ponds can be easily provided as described above, hazards can be mounted quite easily at any position within a short time,

Accordingly, any playgrounds can be transformed to golf links full of variety with bunkers and ponds, providing public people with neighborhood golf links at a much lower cost than ordinary links.

Figures 28 through 32 show a configuration for easily making and removing golf links and other sports grounds. These links and sports grounds 39 comprise a supporting material laid on the ground, a foam object 40 comprising continuous foam applied between the supporting object and another supporting object, and sand or an artificial grass sheet laid on the foam object and the supporting object.

In Figures 28 and 29, the foam object 40 is laid under the artificial grass sheet 41. On the flat ground, for example, a flat-form foam object 40 is used. This foam object 40 is formed in the thickness in the range from a few centimeters to a few meters of continuous foam, thereby providing permeability and corrosion-resistance. With these properties of the foam object, water on the surface of the artificial grass sheet 41 permeates the foam object, and is drained to the lower structure. Therefore, the foam object is corrosion-resistant even after soaked in water for a long time. If the foam object is of polyurethane foamed on site, the polyurethane foaming liquid is directly sprayed or poured on the ground to be a target sports ground 39 and quickly forms the foundation. Then the artificial grass sheet 41 is laid on the foundation comprising the foam object. The sports ground 39 to be formed flat can be formed in a frame of flat wood boards. If the sports ground 39 must be provided with some convex and concave portions, raw material of the foam object is poured profiling the convex and concave surface of the ground.

The artificial grass sheet 41 comprises a permeable sheet 41a and a number of grass 41b planted on the sheet. The grass 41b is created after natural grass, formed of a fine strip and colored in green. The length 41b of the grass is normally about 20 mm, and can be set to longer or shorter size depending on the usage and site conditions. The material of the grass can be nylon, polypropylene, etc. The sheet 41a is formed of a

thin rubber plate, and about 3 mm in thickness. The sheet 41a is provided with a number of drain holes (not shown in Figures ) for permeability, where through rain water or water sprinkled on the surface of the artificial grass sheet 41 permeates down to the lower structure of the ground.

Figure 29 is a general profile indicating a sports ground of the present embodiment. In this figure, the foam object 40 forms the foundation on the ground, the artificial grass sheet 41 is laid on the foundation, completing a sports ground 39. In forming the foundation of the foam object 40, the thickness can be modified appropriately by adjusting the amount of raw material to be used. The polyurethane foamed on site can form the foundation quickly because the raw material is mixed and formed into the foam object in about 20 seconds. The artificial grass sheet 41 is laid on this foundation, thus completing all parts of the sports ground 39. Now the ground is ready to start a game immediately.

Figure 30 is an oblique view of the foundation of the sports ground applied with this embodiment.

A supporting object 42 is formed as the foundation in a rectangular shape. The supporting object 42 is made of wood, stone, metal, rubber, plastic, or other materials, with a pair of facing sides (left and right sides in Figure 30) bent inward around the center. On the other hand, another pair of facing sides (front and back sides in Figure 30) are bending outward around the center. The remaining pair of planes (top and bottom) are formed flat. The supporting object 42 formed by the above mentioned outline planes is hollow, and can comprise sides only. The supporting object 42 comprises veneer boards, for example, formed as described above, and stuck together firmly.

The predetermined number of the supporting objects 42 in Figures 31 and 32 are mounted on the sports ground 39 directly or in a shallow hole in the ground. Then the foam object 40 is poured into the space among the supporting objects. Base objects 43 such as wood boards, plates of synthetic resin, thin plates of concrete, etc. are laid on these supporting objects 42. Then the artificial grass sheet 41 is laid over the base objects 43, thus completing a sporting ground 39. That is, a sports ground 39 can be completed quite easily by piling on the ground the supporting object 42, base objects 43, and artificial grass sheet 41. Accordingly, a sports ground 39 can be completed within a short construction period and its layout be easily modified.

The same form of the foam object 40 can replace the above supporting object 42 between the ground of the sports ground and the artificial grass sheet 41.

If sports grounds 39 thus completed are used

as a teeing ground of golf links where a game starts, the supporting objects 42 are mounted on the flat ground with predetermined space to one another, and the foam object 40 is poured among a plurality of the supporting objects 42. Natural grass or the artificial grass sheet is laid on these supporting objects 42 and foam object 40. In forming a fairway, the supporting objects 42 and foam object 40 are placed to make a generally flat ground with gentle curves appropriately. Grass is laid on these supporting objects 42 and foam object 40. In forming a putting green, the supporting objects 42 are placed over the ground with concave and convex portions, and then the foam object 40 is poured up to the height of the supporting objects 42.

Natural grass of the artificial grass sheet 41 is laid on the supporting objects 42 and foam object 40, thereby completing the putting green.

In golf links constructed over a wild land (from a teeing ground to a putting green) and completed as described above, the supporting objects 42 are mounted along the wild ground, the foam object 40 is poured among those supporting objects to smooth the surface of the ground, and natural grass or the artificial grass sheet 41 is laid over these supporting objects 42 and foam object, completing golf links easily and quickly. Thus, golf links can be completed within a very short construction period from the commencement to the completion of the construction.

The construction method can be also applied to the ground for motorcycle cross-country. The motorcycle cross-country ground is covered with soil, and the whole course is equipped with a combination of a number of ups and downs, waving road having sharp curves, jumping points, etc.

This motorcycle cross-country ground can be temporarily modified to a baseball or other sports ground because waving road and jumping points are formed with the easily-removable supporting objects 42 formed in the shape of waving road and mounted in position, with the foam object 40 poured among the supporting objects 42, and with sand laid over the supporting objects 42 and the foam object 40. The amount of the sand required in this embodiment can be only as much as the amount that makes a driver pass smoothly with natural reaction on a motorcycle through the waving road. A jumping point can also be formed with the minimum amount of sand over the supporting objects 42 and the foam object 40.

As described above, the amount of sand required to construct a motorcycle cross-country ground is exceedingly reduced if the supporting objects 42 and the foam object 40 are used, whereby the labor and construction period are also reduced amazingly.

A sports ground applied with the present inven-

tion is used for all kinds of sports in addition to golf and motorcycle cross-country.

A putting green shown in the above mentioned embodiment is made with a hole of equal cup size to a formal golf course. Therefore, a player group occupy the putting green after a ball is carried on the putting green until they all hole out even though the golf links comprise shorter holes than formal golf links. They are often caught by the following player group waiting until the putting green is available for them. Such a problem is not desirable to the management of the golf links in the point of better service to players and profitability in consideration of the number of players per time unit.

Since a hole cup is provided by cutting out a part of the surface of the green in ordinary putting greens, frequent relocation of a hole cup is not possible to protect the grass. Additionally on the putting green, a nervous action has often caused an abnormal accident by player's extraordinary stress generated by trying to successfully putting a ball into a small hole.

Therefore, to eliminate the problem above, an OK zone plug is provided for indicating the zone free of the final stroke into a hole. This zone is formed round in the predetermined diameter.

The OK zone plug 44 applied with the present invention as shown in Figures 33 through 35 comprises:

a main body 46 of a small resilient material (having equal resiliency to natural grass to reduce the bounce of a golf ball when fallen on the ground) in the predetermined thickness,

a cup 47 comprising a hole 47a fixed in the center of the main body and a flag supporting hole 47b,

a cover part 48 fixed as covering the bottom part of the main body 46, and

an artificial grass sheet 49 fixed as covering the top part of the main body 46.

The main body 46 is made of synthetic resin powder or grain, wood sawdust, soil, or a porous material such as sponge, foam resin, etc. or the combination of them.

The main body is about 30 - 60 cm in diameter d6, the inner diameter d5 of a cup container 46a is about 11 cm and equal to or a little larger than an outer diameter d3 of the cup 47, and the height h1 is 15 - 30 cm.

The cup 47 fixed at the center of the main body 46 is made of a metal or synthetic resin material.

The inner diameter d4 of the hole 47a of the cup 47 is determined according to the rule of the formal golf when playing a formal golf game, and otherwise determined according to the corresponding rules. The outer diameter d3 of the cup 47 is

determined by the inner diameter d4 and the thickness of the material of the cup. The cover part 48 is made of a metal or synthetic resin material and comprises a bottom part 48a for forming the bottom part of the main body and the cup saucer 48b welded to the cup 47. The thickness t1 of the bottom part 48a of the cover part 48 is determined based on the total weight of the materials of the parts forming the OK zone plug 44 such as the main body 46, cup 47, and artificial grass sheet 49. The diameter d9 is equal to the diameter d6 of the main body 46, and the outer diameter d8 of the cup saucer 48b is equal to the outer diameter d3 of the cup 47.

The artificial grass sheet 49 fixed as covering the surface of the main body 46 is formed of a flat sheet comprising a sheet 49 of synthetic rubber, etc. and a number of grass 49a planted on the sheet. The grass looks like natural grass formed of fine strips and colored in green. The length of the grass is normally about 20 mm, but can be modified depending on the usage and the site condition. The material of the grass is nylon, polypropylene, etc. The diameter d2 of the artificial grass sheet is equal to the diameter d6 of the main body 46, and has a hole 49c in the center in diameter d1 of equal size to the outer diameter d3 of the cup 47.

A hanging pole 50 for hanging an OK zone plug comprises a main body 50a of metal or synthetic resin, a handle 50b coated with the same material as the main body or other kind of synthetic resin material, and a hooked tip 50c for hanging the bottom part of the flag supporting hole 47b. The hanging pole is about 45 - 100 cm in length and the diameter of the main body varies depending on the material, but about 5 - 10 mm if it is of metal.

The saucer 51 is made of molded metal, synthetic resin or concrete, and set buried in the putting green. The inner diameter of the saucer 51 is about 30 - 60 cm, equal to the diameter d6 of the main body 46 of the OK zone plug 44, and the burying depth D of the saucer equals the total of the height of the main body 46, thickness of the cover part 48, and thickness of the artificial grass sheet 49. However, the brim 51a of the saucer 51 is about 10 - 25 cm, a little less than the depth D. The concave part 51b in the center is about 11 - 30 cm in inner diameter, and about 3 - 15 cm in depth.

Figures 36 through 39 show a cover plug 53 comprising a main body 54 in the prescribed thickness of the material having resiliency not bouncing a golf ball strong when it falls on the ground (having similar resiliency to natural grass), a case 56 equipped with a pair of handles 55 provided on both sides on the top along the circumference, a cover part 57 fixed for covering the bottom part of the main body 54, and the artificial grass sheet 58

fixed as covering the surface of the main body 54.

The main body 54 is made of synthetic resin powder or grain, wood sawdust, soil, or a porous material such as sponge, foam resin, etc. or the combination of them.

The diameter d12 of main body 54 of the cover plug is designed about 30 - 60 cm, equal to the diameter d6 of the main body 46 of the OK zone plug, so that the cover plug can be replaced with the OK zone plug. Likewise, the height H4 is about 15 - 30 cm, equal to the height H1 of the main body 46 of the OK zone plug. The main body has a concave part 54 for containing a pair of handles 55 provided on both sides of the top along the circumference, the width b4 is equal to the outer width b3 of the case 56, and the length in the circumference direction equals the sum of the inner length L1 of the case 56 and the total thickness of both sides of the case (Figure 39).

The case 56 described above is made of a metal or synthetic resin material provided with a space 56a for containing a pair of handles 55 on both sides on the top along the circumference. The inner width b2 of the case 56 is about 10 - 15 cm, the length L1 about 10 - 20 cm, and the height about 10 - 25 cm a little lower than the height H4 of the main body 54. The outer width b3 is equal to the width b4 in the diameter direction of the concave part 54 in the main body 54.

The cover part 57 is made of a metal or synthetic resin material, and has a bottom part 57a for covering the bottom part of the main body 54. On the surface of the main body, a case 56 and a pair of handles 55 are mounted by welding, etc. The thickness t2 of the cover part 57 of the cover part 48 is determined based on the total weight of the materials forming the cover plug 53 such as the main body 54, case 56, handles 55, and artificial grass sheet 58, etc. The diameter d13 is equal to the diameter d12 of the main body 54. The handles 55 are made of metal or synthetic resin pole, about 10 - 20 mm in diameter, about 10 - 25 cm in height, a little lower than the height H4 of the main body 54, and about 8 - 18 cm in the inner width of the parts welded to the cover top, a little smaller than the inner length L1 of the case 56. The case 56 must contain sand, etc. 59.

The artificial grass sheet 58 fixed as covering the surface of the main body 54 is formed of a flat sheet comprising a sheet 58b of synthetic rubber, etc., and a number of grass 58a. The shape, dimension, and material, etc. are same as the artificial grass sheet 49 used for the OK zone plug 44. The diameter d10 of the artificial grass sheet 58 is equal to the diameter d12 of the main body 54. A pair of openings 54 are provided on both sides on the top along the circumference. The width b1 in the diameter direction of the openings 54 is about

8 - 13 cm, smaller than the inner width b3 of the case 56, and the length in the circumference direction is about 8 - 18 cm, a little smaller than the inner length L1 of the case 56.

The number of handles 53 of the cover plug 53 described above are not limited to two, but a single handle will do if it is provided in the center, and if the cover plug 53 is too heavy, a plurality of handle can share its weight.

A putting green having the OK zone described above is configured as shown in Figure 40 and used as follows:

Around the OK zone plug 44 of the putting green 52 in Figure 34, the OK zone indicator line 44a can be found on the concentric circle with the hole 47. The rule of the OK zone is: when a player putts a ball in the OK zone 44 as indicated by the arrow A, he is judged to hole out OK (successfully hole out the ball), exempted from the final stroke. Therefore, the OK judge is made fair and objectively by the OK zone, not requiring the agreements of other three players of the group. Besides, as the OK zone is not such a small area, it does not force players into excessive stress at the final phase of putting a ball, protecting players against abnormal accidents caused by earnestly trying to hole out a ball.

Additionally, since each player completes his putting when judged OK as putting his ball in the OK zone, the whole game completes within a shorter time, improving the profitability on the management side.

If a player earnestly insists on completing his game formally, he is free to actually hole out his ball.

As the OK zone plug and the main body of the cover plug are made of comparatively small resilient material, they prevent a golf ball 45 fallen on the artificial grass sheet from bouncing strong, causing the ball to bounce as if it is on natural grass. Additionally, as they are used in combination with the artificial grass 49 and 58, players can feel the touch of natural grass when putting and walking on the putting green.

As at least one cover plug of diameter equal to the OK zone plug can optionally replace the OK zone plug, the position of a hole cup can be changed to give players the variety of technique on the putting green without the trouble of cutting the grass and making a hole in the putting green.

Since the main bodies of the OK zone plugs and cover plugs are big in the embodiments shown in Figures 33 through 40, it is troublesome to mount them in the putting green or to change the position of holes. To simplify the above troublesome work, the embodiments shown in Figures 41 through 44 have been made using improved OK zones and covers.



Figure 41 is a general oblique view of a putting green. In this figure, a putting green 60 (hereinafter referred to simply as a green 60) has a substructure 60a and is formed oval for example. The green is provided with a plurality of OK zones 61 having an OK zone 62 in the center. Figure 41 shows an example of a flag 63 standing in one of these OK zones. Other holes are closed with covers and show the same appearances as the surface of the green 60. The substructure 60a is made of powder or grain of synthetic resin, wood sawdust, soil, sponge, a porous material such as foam resin, etc., and a single material such as rubber or a composite of rubber, etc. If the substructure 60a is made of soil, it is difficult to discriminate the substructure 60a from earth, and the substructure 60a is equal to earth. If the substructure is a mixture of soil, synthetic resin powder, and sawdust, the upper part laid on earth is referred to as the substructure 60a. The surface of the green 60 is covered with the artificial grass sheet, and each OK zone is colored in different color from that of the surface of the substructure 60a for discrimination. Likewise, the OK zone 61 and the substructure 60a can be colored in different colors; and some of the OK zones can be colored in the same color while other OK zones are colored in different colors from the substructure, and the substructure 60a can be colored in the quite different color.

Figure 42 is a plan view of the OK zone.

In this figure, an OK zone 61 is a circle on the substructure 60a. The hole 62 in the center is about 108 mm in diameter and about 100 mm in depth. The diameter of the OK zone 61 is set to about 800 mm. The OK zone and the substructure 60a can be formed together or separately. If they are formed separately, they can be made of the same material. The surface of the OK zone 61 is covered with the artificial grass sheet.

Thus, a golf ball 64 on the green 60 outside of the OK zone 61 is put toward a hole 3 by a putter in the direction shown by the arrow A when a game is performed on the green 60 provided with an OK zone 61. If the ball 64 stops without holing out within the OK zone 61 indicated by the two-dots and broken line, "the OK golf rule" adds one stroke and completes the score of the present hole.

Figure 43 is a profile of Figure 42 along the line A-A. In this figure, a hole 62 comprises a cylinder 62a and a can 62b. The cylinder 62a has a bottom plate 62c from the center of which a small cylinder 62d extends downwards. The cylinder 62a and the can 62b are made of metal or synthetic resin. The can 62b is fixed at the bottom of the hole of the substructure 60a. The cylinder 62a is placed on the can 62b. With this configuration, the outer circumferential walls of the cylinder 62a and can 62b are fixed as surrounded by the hole in the

substructure.

The cylinder 62a can be easily removed from the hole in the substructure 60a by inserting the hooked-tip pole 65 into the small cylinder 62d, moving the hooked-tip pole 65 to hang the brim of the small cylinder 62d, and pulling the hooked-tip pole 65. Thus, the cylinder 62a can be easily mounted and removed.

Figure 43 shows the hole 62 in use for a game. Holes 62 not in use in a game are described as follows:

Figure 44 is a profile of a hole not in use for a game. In this figure, the hole 62 not in use for a game is closed by a cover 66 which replaces the cylinder 62a on the can 62b. The cover 66 is formed of an equal diameter to the cylinder 62a to just fit on the can 62b. The cover 66 is made of the same material as the substructure 60a, and can be formed of a rubber column, for example. The cover 66 is provided with a narrow hole 67 in the center, and covered with the artificial grass sheet 68. Therefore, the artificial grass sheet 68 on the cover 66 looks just like the artificial grass sheet 69 on the OK zone. The diameter of the narrow hole 67 provided in the cover 66 is made smaller than the diameter of a golf ball.

The artificial grass can be formed as indicated in Figure 10.

Hereafter, the golf links applied with the putting green 60 above are described.

Before starting a game, one OK zone is selected among a plurality of OK zones, and then the cover 66 of a hole 62 in the selected OK zone is removed, and a flag set up. Next, each player is informed of the color of the selected OK zone, and he starts a game aiming at the OK zone and hole.

When a game goes on and a ball is carried near a green 61, a flag set on the hole of the selected OK zone clearly shows the target to each player. Then the game proceeds to the green 61, the color of the OK zone around the target hole 62 can be clearly recognized from the green. The game for the hole is completed when a ball comes either in the selected OK zone or in the hole there as indicated by the arrow A. When proceeding to the next hole, the finished hole is closed by the cover, and the cover of the next hole in another OK zone is removed, which can be easily done by one person because the diameter of the cover is only about 10 cm.

In the above golf links, a golf ball of smaller flight distance is desirable.

Figures 45 through 49 show a golf ball of half flight distance (about 100 m) of a formal golf ball by a full swing with an ordinary golf club such as a driver, etc. The ball is made in equal diameter and weight to a formal golf ball, divided into 3 layers and made gradually softer to an inner layer. The

approaching and putting steps can be performed similarly to the formal golf ball. A golf ball 70 shown in Figure 46 is designed in the ordinary range of 41.15 - 41.67 mm in diameter, and the weight 44.50 - 45.92 also in the ordinary range. It is divided into three parts: a surface part 70a, intermediate part 70b, and core 70c. The surface part 70a is made of the same material as a formal golf ball including rubber and filler, the intermediate part 70b is made of a material of larger gravity and softer property, and the core is formed hollow.

To obtain the same reaction from this ball as the formal ball at the approaching and putting steps, the weight of the surface part 70a must be the total weight of the intermediate part 70b and the core 70c. Therefore, the gravity of the composite of the intermediate part 70b must be much larger than the surface part 70b because the core is hollow and zero in gravity.

Additionally, as the golf ball 70 is set in the range of the diameter and weight of a formal golf ball, and made hollow at the core 70c, the whole weight is concentrated to the surface part 70a and the intermediate part 70b. Therefore, the weight is the same as a formal golf ball, but the moment of inertia is larger.

A golf ball 70 has a tee hole 70d in the surface part 70a and the intermediate part 70b in the diameter direction. As shown in Figure 49, the ball is placed on a tee 72 set up on the grass 71 with the top tip of the tee set into the tee hole 70d. The desirable tee hole 70d is 4 - 8 mm in depth and 3 - 5 mm in diameter. As a golf ball can be set stable on a tee by inserting a top tip 72a of a tee into the tee hole 70d of the ball, the configuration of the tee hole 70d and the top tip 72a can be applied to the golf ball of normal flight distance.

The surface part 70a of the above mentioned golf ball is made of the same composite as a formal solid golf ball comprising rubber and filler, and the intermediate part 70b of softer and larger gravity composite than the surface part composite. Therefore, the ball is gradually softer from the surface part 70a through the intermediate part 70b to the core 70c. With this property, the ball 73 cannot absorb the impact only in the surface part 70a when shot by a golf club 73 as shown in Figure 50, but is affected up to the intermediate part 70b and the core 70c, thereby deforming the ball much more than the formal golf ball to absorb the impact by a full swing, reducing the ball speed down to half. As shown in the Figure 50, the maximum flight distance L by a full swing is about 100 m, a half of the maximum value about 200 m attained by a formal golf ball 10.

When the ball is pitched by an iron No.9, for example, the impact is not so large that most of the impact is absorbed at the surface part 70a. There-

fore, players can pitch the ball with the similar touch to a formal golf ball 74.

As shown in Figure 51, when the golf ball 70 is put by a putter 75 on a putting green (not shown in this figure), the impact is further smaller than by pitching and so can be absorbed only at the surface part 70a, causing a player to put the ball with the touch to a formal golf ball. Accordingly, players can enjoy their games using this ball with the touch to a formal on a green without feeling any disagreeable difference from a formal golf ball. Putting the ball 70 with an equal strength to a formal ball 74 can attain a shorter carried distance  $l$  to the extent that the ball 70 is totally softer than the formal ball 74, causing no problem at all practically. On the other hand, as the golf ball 70 generates larger kinetic energy while rolling on a green to the extent that it has a larger moment of inertia, the total carried distance  $l$  of the ball 70 can possibly be equal to that of the formal golf ball 74.

The golf ball shown in Figure 46 is formed hollow at the core, while Figure 52 shows an embodiment indicating a non-hollow ball at the core. In this figure, a golf ball 76 has a diameter and weight of a formal golf ball in the range from 41.15 mm to 42.67 mm and from 44.50 g to 45.92 g, and divided into 3 parts: a surface part 76a, an intermediate part 76b, and a core 76c. The surface part 76a of the above mentioned golf ball is made of the same composite as a formal golf ball comprising rubber and filler, and the intermediate part 76b of softer and smaller gravity composite than the surface part 76a composite. The core 76c comprises a harder and larger gravity composite than the composite of the surface part 76a such as iron, lead, etc.

The golf ball above has half flight distance of a formal golf ball when shot by a full swing as the ball shown in Figures 46.

As the above golf ball has the equal diameter and weight to a formal golf ball, its average gravity is above 1. Therefore, it will sink in water like a formal golf ball when shot into a pond, judged as a lost ball, causing the trouble of taking it out of water both on the parts of players' and golf link managements. Additionally, as this kind of balls are used in golf links having smaller and shallower ponds, lost balls are easily seen sunk in water, ruining the views of the links.

Figures 53 and 54 show an embodiment of a golf ball designed to float on water.

In these figures a golf ball 77 is a sphere having a diameter of a formal golf ball in the range of from 41.15 mm to 42.67 mm. The sphere is divided into three parts: a surface part 77a, an intermediate part 77b, and a core 77c. The surface part 77a is made of the same composite as a formal golf ball comprising rubber and filler, the

intermediate part 77b of a softer and smaller gravity composite than the surface part 77a (for example, foam object, foam polyethylene, foam polyurethane, etc.). The core 77c is made of a softer and smaller gravity composite than the intermediate part 77b. Therefore, the golf ball 77 is designed to be gradually softer and lighter to the inner part. The average gravity of the golf ball 77 is less than 1.0, that is, the ball 77 is set to 30 - 36 g to float on water.

As the golf ball 77 described above is gradually softer and lighter to the inner part, the impact given to the ball by a full swing reaches the core 77c and absorbs the impact more gently than a formal golf ball, shortening the flight distance of the ball 77. However, a smaller impact by a putter, etc. is absorbed at the surface part 77a, and the ball 77 can be carried with the touch to a formal golf ball.

As shown in Figure 56, when the golf ball 77 is shot by a full swing of a golf club as indicated by the arrow A, the impact cannot be absorbed only at the surface part 77a, but reaches the intermediate part 77b and the core 77c, thereby deforming the golf ball 77 much more than a formal golf ball to absorb the impact by a full swing and reducing the initial ball speed down to a half of a formal golf ball.

When the ball 77 is shot by an iron No. 9, for example, the impact is not so large that most of the impact can be absorbed at the surface part 77a and the intermediate part 77b, carrying the ball with the touch of pitching a formal golf ball.

As shown in Figure 57, when the golf ball 77 is put by a putter as indicated by the arrow B on a putting green (not shown in the figure), the impact is further smaller than by pitching, and it is completely absorbed at the surface part 77a. As a result, the ball 77 can be put with the touch to a formal golf ball.

As the golf ball 77 has the average gravity less than 1, the ball floats on water W as shown in Figure 55 when it is shot into the water W of a pond 80, and can be easily taken out of the pond 80 by only waiting for the ball coming ashore on the wind or by catching it with a pole or something. Therefore, neither players nor golf link managements have the trouble of taking out a mass of the golf balls 77 sunk at the bottom of ponds 80. Thanks to this property of the golf ball 77, the loss from lost balls and from ruining the views of the golf links can be eliminated.

The golf ball shown in Figures 58 through 60 is designed to have a shorter flight distance by providing a narrow hole in the ball. In these figures, the golf ball 81 has a diameter in the range larger than small (English size 4.1) and smaller than large (American size 4.3), and it weighs less than 1.6 ounces (46 g). These values are almost equal to a

formal golf ball. The golf ball 81 has narrow holes 82 in three diametrical axes which cross orthogonally to one another at the core. Therefore, there are 6 openings of the narrow holes 82 on the surface of the golf ball 81.

The sphere of the golf ball 81 is made of an intermediate part 84 covered by a surface part 83, and the inner part to the intermediate part 84 is made hollow. The surface part 83 is made of the same hard plastics as a formal golf ball. The intermediate part 84 is made of a material such as rubber and soft plastics of larger gravity, and the narrow holes 82 are formed to taper off from the core 85 to the surface 83. The intermediate part above can comprise a plurality of layers.

In the above design, the air in the core 85 of the golf ball 81 is enclosed firmly keeping constant pressure against the air rapidly passing over the surface of the golf ball 81 during its flight by a full swing of a golf club (hereinafter referred to as high-pressure air). The hemi-sphere facing forward during the flight will include at least one hole of the 6 narrow holes 82 of the golf ball 81. Therefore, the difference of the pressure between the high-pressure air around the flying golf ball 81 and the air at the core of it causes the high-pressure air to flow into the golf ball 81 through the narrow holes 82. The golf ball 81 is filled with the high-pressure air flowed into it and compressed, and then the high-pressure air is blown out of the golf ball 81 through narrow holes 82 other than the holes that led in the high-pressure air. During this process of the high-pressure air flowing into the ball and blown out of it, the golf ball will lose its kinetic energy, thereby shortening its flight distance.

The above golf ball 81 can be carried with the touch to a formal golf ball by a full swing of a wood club on a teeing ground or an iron club on a fair way because the weight of the golf ball 81 is almost equal to a formal golf ball. However, its flight distance can be shortened by the composite of its intermediate part and the configuration of the narrow holes. The touch of the golf ball 81 and the carrying distance by a putter on a green are similar to a formal golf ball.

The flight distance of a golf ball can be shortened by providing the surface of a ball with dimples in the appropriate form. That is, the ball comprises a sphere surface whereon a prescribed number of concaves are provided with an optional bottom shape. The bottom is surrounded by the side as extending from the surface of the ball. The profile of the dimple is formed of a trapezoid generally.

Figures 61 through 63 show an embodiment the above golf ball. The surface 87 of a golf ball 86 comprises a dimple 88 (concave part) having a plan view of a right circle of about 4 mm in

diameter, and the bottom 89 of the dimple 88 is formed of a right circle of about 2.5 mm in diameter. The bottom 89 of the dimple 88 is formed of a plane or a curved plate having an equal curvature to the surface 82 of the golf ball 86. Between the outline of the dimple 88 along the surface and the bottom 89, a curve side 90 is built like a bowl. The curve side 90 can be formed of a plane or a curved plate. A plurality of the above dimples are provided over the surface of the golf ball. Figures 64 through 66 show other embodiments. In a dimple 93 having a hexagonal outline, two opposite sides are about 4 mm apart. The bottom shape (hereinafter referred to as the bottom 94) of the dimple 93 is also formed of a hexagon with two opposite sides about 2.5 mm apart. The bottom 94 of the dimple 94 is formed of a plane or a curved plate having an equal curvature of the surface 92 of the golf ball 91. Between the outline of the dimple 93 along the surface and the bottom 94, a curve side 95 is built like a bowl. This side 95 is formed with a plane or a curved plate.

A plurality of the above dimples 93 are formed over the surface of the golf ball.

The dimples 93 formed of concaves over the surface of the golf ball 91 can be formed of an octagon and other polygons as indicated in Figures 67 and 68.

Figures 69 through 71 show other embodiments of dimples. In these figures, a dimple 98 having a plan view outline of a right circle is formed in about 4 mm diameter. Both the top plane and the outline of the dimple 98 are formed of a right circle, with the top plane diameter formed in about 2.5 mm diameter.

The top plane 99 of the dimple 98 is formed of a plane or a curved plate having an equal curvature to the surface 97 of the golf ball 96.

Between the outline of the dimple 98 along the surface and the top plane 99, a cylindrical side 100 is built. The side plane 100 is formed with a plane or a curved plate.

In Figures 72 through 74, a dimple 103 having a hexagonal outline formed over the surface 102 of the golf ball 101 has two opposite sides about 4 mm apart, and the top plane shape (hereinafter referred to as top plane 104) is also formed of a hexagon, with two opposite sides of the top plane 104 about 2.5 mm apart. The top plane of the dimple 104 is formed of a plane or a curved plate having an equal curvature to the surface 102 of the golf ball 101. Between the outline of the dimple 103 along the surface and the top plane 104, six side planes 105 are built at the prescribed obliqueness.

In Figures 75 through 77, a dimple 108 having an octagonal outline formed over the surface 107 of the golf ball 106 is formed with two opposite sides about 4 mm apart, and the top plane shape

(hereinafter referred to as top plane 109) is also formed of an octagon with two opposite sides of the top plane 109 about 2.5 mm apart. The top plane 109 of the dimple 108 is formed of a plane or a curve plate having an equal curvature of the surface 107 of the golf ball 106. Between the outline of the dimple 108 along the surface and the top plane 109, eight sides 110 are built at the prescribed obliqueness.

The plan view of the outline of the dimples 88, 93, 98, 103, and 108 can be of any polygon such as a triangle, pentagon, etc.

Each golf ball 86, 91, 96, 101, and 106 indicated in the above embodiments can be provided on its surface with a combination of dimples of concave and convex forms.

Dimples enlarge the surface of each of the above golf balls by their bottom and top planes, increasing the resistance of air and reducing the flight distance of a golf ball.

The above described dimples of the golf ball can be formed by the groove over the surface of a ball. A golf ball can be easily identified by modifying the groove pattern, and the pattern is not easily erased by wear-out.

A golf ball 111 shown in Figures 78 through 84 is a sphere of 41.15 - 42.67 mm in diameter and 44.50 - 45.92 g in weight. The golf ball 111 is made of soft rubber, plastics, foam polyurethane, etc. On the surface of this golf ball 111, curved groove pattern 112 is provided (hereinafter referred to as a pattern 112).

As shown in Figure 78 indicating the front view of the golf ball 111, the groove forming the pattern 112 curves counterclockwise along the circular outline of the golf ball 111, crosses around the center to right, then curves clockwise along the circular outline, thus drawing a letter S. In the plan view, the pattern 112 looks like a balloon swelling to right (  $\bowtie$  ) (Figure 80). In the left side view, the pattern 112 shows three curves turning before the center of the circular outline of the ball at 60 degrees apart from one another (Figure 82). In the back view, the pattern 112 is symmetry of itself in the front view (Figure 79). In the bottom view, the pattern 112 is symmetry of itself in the plan view (Figure 81).

The pattern 112 in the side and left views is symmetric on the basis of the central point of the circular outline of the ball (Figures 82 and 83).

The profile (Figure 84) of the golf ball along the line A-A of Figure 78 shows that the groove of the pattern 112 makes a concave on the surface of the golf ball 111. The golf ball 111 in the profile is made of a uniform material, but can be a combination of layers of a plastic surface part and a foam polyurethane core. Such a combination is designed to reduce the flight distance of the golf ball 111.

This generates the synergetic effect with the air resistance caused by the groove of the pattern 112 to reduce the flight distance of the golf ball 111. Therefore, this golf ball 111 cannot be carried so far compared with an ordinary golf ball even when it is shot by a full swing with a golf club.

The pattern 114 of the golf ball 113 shown in Figures 85 through 91 looks like a numeric character 3 (Figure 85). Therefore, as shown in Figure 87, the pattern 114 in the plan view looks almost identical to the pattern 114 in the front view. In Figure 89, the pattern 114 in the left side view shows four arcs at the top, bottom, right, and left of the circular outline of the ball.

The profile in Figure 91 clearly shows two grooves of the pattern 114 each on the top, bottom, right, and left of the circular outline of the ball. As shown in Figure 86, the pattern 114 in the back view is symmetry of that in the front view, and the pattern 114 in the bottom view is symmetry of that of the plan view (Figure 88). The pattern 114 in the right side view is identical to the pattern 114 of the left side view when turned about 90 degrees right or left (Figures 89 and 90).

In Figures 92 through 98, the pattern 116 on the golf ball 115 show three lines waving from top to bottom. In the front view in Figure 92 the central part of the waving lines show convexes facing right. The waving parts up and down this central waving parts show convexes facing left. The pattern 116 in the plan view looks almost identical to the pattern 116 in the front view (Figure 94).

The pattern 116 in the left view shows a circle projecting outside at the up, down, right, and left parts (Figure 96). As shown in Figure 97, the pattern 116 in the right side view looks almost identical to the pattern 116 in the left side view when turned about 45 degrees in either direction. As shown in Figure 98, the profile shows concaves made by eight grooves along the circular outline of the golf ball.

As shown in Figures 99 through 105, the pattern 118 in the front view of the golf ball 117 is formed like an alphabetical character S, and the pattern in the plan view shows a character U as turned 90 degrees counterclockwise around the center of the circular outline of the golf ball (Figures 99 and 101). The pattern 118 in the left side view shows three arcs of grooves at about 60 degrees apart from one another based on the center of the circular outline of the golf ball 117 (Figure 103). The pattern 118 in the back and bottom views shows symmetry of that in the front and plan views (Figures 100 and 102), and the pattern 118 in the right side view shows a 180 degree symmetry of that in the left side view on the basis of the central point (Figure 104). The pattern in the profile shown in Figure 105 shows 6 concaves of grooves along

the circular outline of the golf ball.

The above described pattern can be designed optionally as long as the pattern of the golf ball can be identified from every direction. The flight distance of the golf ball can be adjusted by modifying the depth of the grooves.

Figures 106 through 113 show a golf ball made of soft rubber, soft plastics, foam polyurethane, or other materials, and formed of a sphere provided with concaves of grooves over its surface for reducing the flight distance of the ball.

The golf ball 119 shown in Figures 106 and 107 is provided with concave parts 120 comprising a number of patterned units aligned vertically and placed horizontally zigzag. The concave parts 120 are formed of an oval with its central portion along the longer side narrowed. Inside of the oval, the focus points are remained as remaining islands 121.

In Figure 106, the surface of the remaining islands 121 and the surface 122 of the golf ball 119 are shown as of equal level. However, The remaining islands 121 can be formed as island projections higher than the surface 122 of the golf ball 119. The golf ball 119 can be made of a single material of soft rubber, soft plastics, etc. as single layer structure, or made of double layer structure such as plastic surface part and foam synthetic resin core (for example, foam polyurethane). The depth of the concave parts 120 relative to the surface 122 of the golf ball 119 is set to the appropriate value for reducing the flight distance of the golf ball 119 when shot by a full swing with a golf club. The profile pattern of the concave parts 120 is formed of an arc, but can be of a cubic box or a mixed pattern of an arc and a cubic box for reducing the flight distance down to the appropriate value.

The golf ball 123 shown in Figures 108 and 109 has a number of rows of concave parts 124 both vertically and horizontally. The patterned unit of the concave parts 124 is of a cross turned 45 degrees. Inside of the concave parts 124, the remaining islands are not formed as shown in Figure 106, but remaining islands or island projections can be provided at the center of each patterned unit of the concave part 124. The concave parts 124 are formed shallower toward four ends 125, and the remaining islands 126 are formed of equal level.

The golf ball 127 shown in Figures 110 and 111 is provided with concave parts 128 comprising a number of patterned units placed horizontally zigzag and aligned vertically. The concave parts 128 are formed of a rectangle 128a, and a circular remaining island 129 or an island projection 130 is formed around the center of the concave part.

The golf ball 131 shown in Figures 112 and 113 is provided with a number of concaves 132 in lozenge patterns, and lozenge islands 133 remain

as convex parts in the center of the concaves 132.

Thus, when the golf ball provided with the above described concave parts over the surface is shot by a full swing with a golf club, the concave parts resist the forward air, causing a larger resistance of the golf ball against the air and then reducing the flight distance of the golf ball.

A golf ball is usually identified by the number or the name of its owner printed on its surface, but the identification often cannot be recognized depending on the directional state of the ball.

Figures 114 through 133 show a golf ball which is provided on its surface with an identification pattern recognizable from every direction of the ball.

The golf ball 134 shown in Figures 114 and 115 is made of a single material such as elastic rubber or synthetic resin, or a combination of these materials. The diameter of the golf ball is 42.67 mm - 41.15 mm. Three circles 135 are printed at two opposite tops of the golf ball 134. The width of these circles 135 is 3 mm and the interval of each circle is set to 1 mm. Inside of the innermost circle 135, a dot 136 of about 4 mm diameter is printed at the center. This pattern is printed on two opposite tops of the golf ball 134 symmetrically on the basis of the central point. No patterns are printed on the side of the ball 134 between these opposite tops.

The golf ball 137 shown in Figures 116 and 117 has two opposite patterned-tops comprising 4 arcs 138 of 4 mm width around each center. Two same patterns are printed symmetrically on the basis of the center point and center line. In the front view of this golf ball, one interval of arcs of each pattern on top and bottom comes to the front. The convex parts of arcs of the top and bottom patterns are aligned. No patterns are printed on the side of the golf ball 137 between these opposite tops.

The golf ball 139 shown in Figures 118 and 119 has the same pattern on two opposite tops. The pattern comprises 4 arcs 140 of about 5 mm width. These 4 arcs are arranged at 90 degrees apart from one another connected on both ends to one another, and the convex part of each arc faces the center of each pattern. The pattern is designed symmetrically on the basis of the center point and center line.

The above pattern is designed to be about 9 mm in width around the connected end portion of the arcs. No patterns are printed on the side of the golf ball 139 between these opposite tops.

The golf ball 141 shown in Figures 120 and 121 has the same pattern on two opposite tops. The pattern 142 comprises eight lines of 12 mm length and 3 mm width having round ends. These eight lines are printed with an equal interval from

one another radiantly and symmetrically on a basis of the center point.

No patterns 142 are printed on the side of the golf ball 141 between these opposite tops.

The drawings of dimples are skipped in each figure of a golf ball described above.

Now optional patterns printed along the maximum circumference of a golf ball are described below.

The golf ball 143 shown in Figures 122 and 123 is provided with three dotted lines of 18 mm total width along the maximum circumference of the ball. The dot 144 is 6 mm in diameter. When the golf ball 143 is viewed at 90 degrees from the above dotted lines, a half width of the three-line-pattern can be recognized as forming a circular outline of the ball.

The golf ball 145 shown in Figures 124 and 125 is provided with a checker band of 18 mm width along the maximum circumference of the ball. The checker pattern comprises three lines of rectangles 146 of about 6 mm width. When the golf ball is viewed at 90 degrees from the above checker band, a half width of the checker band pattern can be recognized as forming a circular outline of the ball.

The golf ball 147 shown in Figures 126 and 127 is provided with a meandering line of 3 mm width along the 18 mm width area of the maximum circumference. When the golf ball 147 is viewed at 90 degrees from the above meandering line pattern, each curve on the right or left end of the pattern can be viewed.

The golf ball 149 shown in Figures 128 and 129 is provided with a patterned band of 18 mm width in different color from the color of the surface along the maximum circumference of the golf ball 149. The pattern comprises a number of long white figures like bamboo-grass 150 printed vertically to the length of the band.

The golf ball 151 shown in Figures 130 and 131 is provided with a 18 mm width band along the maximum circumference of the ball. The band has a pattern comprising a number of lines 152. Each line has round ends and its central part gets narrower than these round ends. The lines are printed vertically to the length of the band. When the golf ball 151 is viewed at 90 degrees from the above band, round ends on either side of the band can be viewed as forming a circular outline of the ball.

The golf ball 153 shown in Figures 132 and 133 is provided with a 18 mm width band. The band has a pattern comprising a number of figures like convex lenses 154 printed vertically to the length of the band. When the golf ball 153 is viewed at 90 degrees from the above band, the half width of the band of convex lenses 154 can be viewed as forming a circular outline of the ball.

The drawings of dimples are skipped in each figure of a golf ball described above.

Any other patterns can be printed on the surface of a golf ball as long as they are printed on two opposite tops or printed along the maximum circumference of the ball with the predetermined width.

In the miniature golf links applied with the present invention, the following score cards are recommended because players enjoy their games in fewer holes than in formal golf links.

The score cards shown in Figures 134 through 136 are used in golf links having a total of 9 holes each comprising a 5-hole group and a 4-hole group.

The score card 155 (referred to as a horizontal format) shown in Figure 134 is provided with frame lines on a sheet 156 of paper or synthetic resin, etc. In the column on the top row 157 of this card, the title of the game is entered. The next row comprises a column for a player's name 158 and a column for a date of the game 159. Below these columns 157, 158, and 159, columns 160, 161, 162, 163, and 164 are provided each for hole numbers, distances for male and female players respectively, handicap values, and par values. Below the par value columns 164, columns are provided for players' names 165 and for counts to be filled in each hole 166. Below these count columns 166 are columns 167, 168, 169, 170, and 171 for total counts of outer-course, inner-course, the sum of them, handicap values, and net scores obtained by subtracting a handicap value from a total count. Right bottom columns are provided for a player's signature 172 and a marker's signature 173.

The score card 174 (referred to as a vertical format) shown in Figure 135 is a sheet of paper or synthetic resin provided with frame lines. The left half side columns 176, 177, 178, 179, and 180 are provided for hole numbers, handicap values, distances for male and female players respectively, and par values, and each columns are filled in with necessary information. The players' names columns 181 are provided at upper right position of the score card, and below these columns 181 are blank columns for filling in player's counts for each hole. Below these count columns 182 are columns 183, 184, 185, and 186 for total counts of inner-course, outer-course, the sum of them, and handicap values respectively. Below these columns are net score columns 187 for containing values obtained by subtracting a handicap value from a total count.

Below the net score columns 187 are columns 188, 189, and 190 for a player's name, accompanying players' names, and the date of the game.

The score card 191 shown in Figure 136 is provided with frame lines for forming a so-called

horizontal format. In the left top column 192 is a date of the game column, and the right top column 193 a column of a birthday and gender of the player. Below these columns 192 and 193, columns are provided on right and left. Left columns 194, 195, 196, and 197 are for hole numbers 1 to 5, distances for male and female players respectively, and par values. Below the par value columns 197 are columns for players' names 198, and grid columns for their scores 199 for filling in the score based on the predetermined count for each hole. Likewise in right columns, columns 194, 195, 196, and 197 are provided for hole numbers, distances for male and female players respectively, par values, and below them are columns for players' scores. These scores can be filled in by entering scores with a symbol or a pattern into a grid.

Total outer-course score columns for 1 to 5 holes 200 are provided to the right of the score columns for 1 to 5 holes. Total inner-course score columns 201 for 6 to 9 holes 201, sum of outer-course and inner-course columns 202, handicap value columns 203, and net score columns 204 for containing the values obtained by subtracting a handicap value from a total count are provided to the right of the score columns for 6 to 9 holes. At the bottom of this score card are a player's signature column 205 and a marker's signature column 206.

The configuration of the above score card can cover all results performed in the golf links described hereto.

Figure 137 shows another score card to be used in miniature golf links comprising 4 outer-course holes and 5 inner-course holes.

The score card 207 shown in Figure 137 is a so-called horizontal format sheet.

The score card 207 can be formed on a paper or synthetic resin sheet of more than 10 cm length and 20 mm width.

The sheet is placed with a longer pair of sides as the top and bottom sides of the form, and with a shorter pair of sides as the right and left sides of the form. The left top column along the longer side of the form is a player's name column 208. The right top column is a date of the game column 209. Below these columns 208 and 209 are columns in the frame of about 6 cm length along the shorter side of the sheet and about 20 cm width along the longer side of it. These are hole number columns 210, columns 211 and 212 indicating a distance from a teeing ground 2 or 4 (set respectively for male and female players) to each hole, handicap value columns 213, par value columns 214, and accompanying players' score columns 215.

In the form above, total of outer-course columns 216 are provided to the right of 1 to 4 hole score columns, and to the right of these columns

are double vertical frames to distinguish the scores of the outer-course from those of the inner-course. Likewise to the right of the 5 to 9 hole score columns, total of inner-course columns 217 are provided. To the right of total of inner-course columns are sum of outer-course and inner-course columns separated by double vertical frame lines.

Below all columns above are a player's signature column 218 and a marker's signature column 219.

The score card 220 shown in Figure 138 is a paper or synthetic resin sheet of 20 cm length and 15 cm width provided with frame lines. The sheet is placed with a longer pair of sides as the right and left sides of the form, and with a shorter pair of sides as the top and bottom sides of the form. The left bottom columns along the left longer side are a player's name column 221, an accompanying player's name column 222, and a date of the game column 223. Above these columns are two column groups. The upper column group comprises hole number columns 224 of 1 to 4 outer-course holes, handicap value columns for these holes 225, distance columns for male and female players respectively 226 and 227, par value columns 228, and name and score columns of a player and accompanying players 229. The lower column group is configured similarly and comprises hole number columns 224 of 5 to 9 inner-course holes, handicap value columns for these holes 225, distance columns for male and female players respectively 226 and 227, par value columns 228, and score columns 229, and the total of inner-course and outer-course score columns 230.

The score card 220 comprises two column groups comprising a 4 inner-course hole column group and 5 outer-course hole column group. Therefore, scores can be recorded easily without an error. Even if an erroneous score is recorded, there is enough space reserved to correct the error in. Besides, in this score card, mis-recordings of scores, for example, by failing to record a score can be reduced exceedingly because these golf links comprise a half number of holes of ordinary golf links.

Figure 139 and 140 show an example of a score card to be used in miniature golf links comprising three golf courses applied with the present invention.

Figure 139 shows a score card 231 in a so-called horizontal format. The score card is a paper or synthetic sheet of at least 10 cm length and 20 cm width provided with frame lines.

The sheet is placed with a longer pair of sides as the top and bottom of the score card 231, and with a shorter pair of sides as the left and right side of the card. The left top column along the longer side is a player's name column 232. The right top

column along the longer side is a date of the game column 233.

Below these columns 232 and 233 are columns enclosed in a frame of about 6 cm length (along the shorter side) and about 20 cm width (along the longer side). They are hole number columns 234, columns 235 and 236 for indicating the distance from a teeing ground to a hole cup on a putting green each for male and female players, handicap value columns 237, par value columns 238, score columns for each hole 239. Total of outer-course hole score columns 240 are provided separated by double vertical frame lines to the right of score columns for the 3rd hole to distinguish the outer-course hole scores from the total values, and to the right of these columns 240 likewise. Total of central-course hole columns 241 are provided separated by double vertical frame lines to the right of the 6th hole score columns to distinguish the central-course hole scores from the total values, and to the right of these columns 241 likewise.

Total of inner-course hole score columns 242 are provided separated by double vertical frame lines to the right of score columns for the ninth hole score columns to distinguish the inner-course hole scores from the total values, and double vertical frame lines to the right of these columns likewise to distinguish the total value from the following grand total score columns.

Below these columns are a player's signature column 243 and a marker's signature column 244.

Figure 140 shows a score card 245 of a paper or wood board of about 20 cm length and about 15 cm width. The sheet is placed with a longer pair of sides as the left and right sides of the score card 245, and with a shorter pair of sides as the top and bottom side of the card. The left bottom columns along the longer side of the sheet are a player's name column 246, accompanying players' name columns 247, and a date of the game column 248. Above these columns 246, 247, and 248 are columns enclosed by frame lines. They are hole number columns 249, handicap value columns for each hole 250, and columns 251 and 252 for indicating the distance from a teeing ground to a hole cup in a putting green each for male and female players, par value columns 253, name and score columns for a player and accompanying players 254. Outer-course hole score columns 255 contain total of the 1st to 3rd hole scores; central-course hole score columns 256 total of the 4th to 6th hole scores; and inner-course hole score columns 257 total of the 7th to 9th hole scores. Thus, the whole course comprises 9 holes. The out-, center-, and inner-course score columns 255, 256, and 257 are separated from the following score columns by double horizontal frame lines to easily distinguish the score of each course.



Playing round the above 9 hole course, a player will finish one round, and the score card 245 has enough space for each column, thereby enabling easy correction of records and serving for readability.

Figure 141 shows a score card that is similar to the above mentioned score card in Figure 136, but differs in the numbers of the outer- and inner-course score columns respectively.

The score card 258 is a paper or synthetic resin sheet 259 provided with frame lines. In a rectangular score card of about 14 cm length and about 24 cm width having players' name columns provided vertically in a so-called horizontal format, a date of the game column 260 is provided on the left top of the form, and a player's birthday and gender column 261 on the right top.

On the left and right of the sheet 259 are columns enclosed by the left frame lines 262 and right frame lines 263. The left frame lines contain score columns for 4 holes. The first columns in the left frame lines 262 are hole number column 264. The second and third columns are distance columns 265 and 266 showing the distances between a putting green and a back teeing ground and between a putting green and a front teeing ground respectively. Below these distance columns 265 and 266 are par value columns of each hole 267.

Below these par value columns 267 are players' name columns 268 and score columns 269 of each hole.

These score columns 269 are segmented in a grid form by dotted lines for example to have small square columns of the double number of each par value plus one. If the number of these small square columns are too many to be contained in each score column 269, blank area in the next score column 269 can be used. That is, a score column 269 of a par 5 hole needs 11 small square columns, while a score column 269 of a par 4 hole needs 9 small square columns. If a column is provided with an equal number of small square columns, the column 269 lacks one small square column. Then the column is supplemented by one of the following small square columns of the par 4 hole which has 1 spare square column.

To the right of these small square columns is a total score column of 1 - 4 holes 271.

The first columns in the right frame lines 263 of the sheet are hole number columns 272 like those in the left frame lines 262. To the right of these hole number columns are inner-course total score columns 273, total of in- and outer- course score columns 274, handicap value columns 275, and a net score columns 276.

Below par value columns 277 are players' score columns for each hole 278 that are provided with small square columns by dotted line as de-

scribed before.

Below these column groups enclosed in the right and left frame lines 262 and 263 are a player's signature column and a marker's signature column 281.

As a score column of each hole has small square columns of the double number of each par value plus 1, a player who is continuing his play after recording the double number of strokes in a hole is automatically forced to stop at that point, and his score is recorded as one stroke added to the double par value.

A score card 142 in Figure 142 is similar to that in Figure 139.

In Figure 142, a score card 282 is formed similarly to the score card 258, and the frame lines are provided like in the score card 258, but the layout of score columns 283 for each hole are somewhat modified. That is, to the right of the score columns 283 for 1 - 3 holes, total of outer-course 1 - 3 hole score columns 284 are provided. Likewise, to the right of score columns 283 for 4 - 6 holes, total of central course 4 - 6 hole score columns 285 are provided. To the right of score columns 283 for 7 - 9 holes, total of inner-course 7 - 9 hole score columns 286 are provided.

The score cards shown in Figures 141 and 142 are used in 9 hole golf links or 9-hole-course-in-3-hole-configuration golf links, but also can be used in ordinary golf links other than those described above.

In the above described score cards, the small square columns 269 are formed by dotted lines 270, but can be formed of various shapes such as octagons (Figure 143), lozenges (Figure 144), circles (Figure 145), fan-shapes (Figure 146), and semi-circles (Figure 147), each divided into a plurality of sections. The number of strokes can be entered by any symbols such as O, X, -, /, etc. Different symbols used for entering strokes between a shot and a putt will serve for readability of a score card.

As described above, golf scores can be entered in graphics, by patterns and symbols as well as numerical characters, and can be entered on the course. Therefore, a recommendable score card which can reduce errors of no-recording or mis-recording and help the calculation of the total score (the result of a game) can be successfully prepared.

The Possibility of Utilizing the Invention in the Industrial View

As described above, miniature golf links applied with the present invention can be constructed in a smaller area than ordinary golf links to be used for informal golf games with a golf ball of shorter

flight distance. These miniature golf links require less maintenance cost, can be constructed and removed easily at a comparatively low cost, and cause no problems of water pollution by applying harmful agricultural chemicals.

In these miniature golf links, a ball is designed to be easily identified and to have shorter flight distance than a formal golf ball, thereby reducing the possibility of being lost or stolen. Besides, as it is designed to float on water, it will hardly be a lost ball in water.

Additionally, specific score cards are made for these miniature golf links to reduce erroneous recordings.

With all these new ideas, all players can enjoy playing golf easily in a shorter time at a lower cost regardless of age and gender than in conventional golf links.

## Claims

1. A plurality of golf links provided with putting greens comprising a plurality of teeing grounds and a plurality of corresponding putting greens wherein:

said golf links comprise long, middle, and short holes, each hole used for more than one time as outer-, inner, and central courses;

a score card is used which is provided with score columns based on a par value of each hole; and

said score columns are prepared as a plurality of sets to be used as outer-, inner-, and central course score cards respectively.

2. The miniature golf links according to claim 1, wherein:

said miniature golf links comprise a total of 9 holes comprising the first hole group of 4 holes and the second hole group of 5 holes, wherein the first hole group comprises 2 long holes and 2 middle holes, and the second hole group 3 middle holes and 2 short holes, with each hole provided with a putting green comprising 2 teeing grounds and 2 corresponding holes.

3. The miniature golf links according to claim 1, wherein:

said miniature golf links comprise a total of 6 holes comprising the first and second hole groups of 3 holes each, wherein each group comprises a long, middle, and short holes with each hole provided with a putting green comprising 3 teeing grounds and 3 corresponding holes.

4. The miniature golf links according to claim 1,

wherein:

said miniature golf links comprise a total of 3 holes; a long, middle, and short holes with each hole provided with a putting green comprising 3 teeing grounds and 3 corresponding holes.

5. The miniature golf links according to claim 1, wherein:

said miniature golf links comprise a total of 4 holes with a middle hole provided with the first teeing ground and putting green on both sides, and with the second teeing ground and putting green around the central part of said hole.

6. The miniature golf links according to claim 1, wherein: said putting green comprises:

a grass section comprising a permeable sheet planted with a number of artificial grass,

a recoverable material laid under said grass section that is made of foam resin material in a permeable structure, and deforms immediately when external force is added to the thickness direction and recovers slowly to its original form,

a catchment area provided under said recoverable material and a permeable and corrosion-resistant synthetic resin mat, and

a drainage pipe for draining water to an external ditch.

7. The miniature golf links according to claim 1, wherein:

said putting green comprises:

a cup hole around the central part of said putting green,

a flag supporting small hole provided under said cup hole formed on a concentric circle with said cup hole,

a center part having the predetermined height and area around said cup hole, with plane surface to be covered with said grass sheet,

a slope forming material having the height of said center part as the maximum height that is formed to make a slope down toward the outer direction, comprises a plurality of divided parts to build up said center part, and is covered with said grass sheet, wherein:

said center part and said slope forming material are easily assembled and sectioned.

8. The miniature golf links according to claim 1, wherein:

said golf links are provided with hazard comprising bank sections made of sand bags piled and formed of various shapes of loop

banks, an artificial grass sheet applied over the outside and inside of said bank sections, and concave sections formed by being surrounded by said bank sections.

9. The miniature golf links according to claim 8, wherein:  
said hazard is filled with sand inside of said concave section.
10. The miniature golf links according to claim 8 wherein:  
said hazard is provided with a waterproof artificial grass sheet as the bottom of said concave section that contains water in.
11. The miniature golf links according to claim 1, wherein:  
a base ground comprises a plurality of supporting objects, foam objects of a continuous foam material applied among said supporting objects; and sand, grass or artificial grass sheet is laid over said supporting objects.
12. The miniature golf course according to said claim 1, wherein:  
said putting green is provided with a circular OK zone for exempting a player from the last 1 stroke into the hole, and said OK zone is mounted as easily assembled and removed.
13. The miniature golf course according to said claim 12, wherein:  
said OK zone comprises:  
a main body formed of a predetermined thickness object having low resiliency that a golf ball does not bounce strong when fallen on it,  
a cup comprising a hole set at the center of said main body and a flag supporting hole,  
a cover part set for supporting said cup and the bottom part of said main body, and  
an artificial grass sheet laid as covering said main body.
14. The miniature golf links according to claim 12 provided with removable covers in said OK zone.
15. The miniature golf links according to claim 14, wherein:  
said covers comprise:  
a main body formed of predetermined thickness objects having low resiliency that a golf ball does not bounce strong when fallen on them,  
a handle mounted on at least 1 point of said main body, a cover part for supporting the

bottom part of said main body,  
and an artificial grass sheet laid as covering said main body.

16. The miniature golf links according to claim 12, wherein:  
a plurality of said OK zones are provided on a putting green, with each hole set in center and provided with a removable cover.
17. Miniature golf links having putting greens comprising a plurality of teeing grounds and a plurality of corresponding holes, wherein:  
said golf links comprises long holes, middle holes, and short holes, each holes used for multiple times as an outer-, inner-, and central-course hole,  
a golf ball has low resiliency to reduce its flight distance,  
a plurality of score cards having the number of score columns based on each par value of each hole are prepared taking it in consideration that each hole is used as an outer-, inner-, or central-hole.
18. The miniature golf links according to claim 17, wherein:  
said golf ball is formed of a three layer structure; a surface part, intermediate part, and core. Said surface part is made of the same composite of rubber and filler as a formal golf ball, said intermediate part is made of a softer material of larger gravity than the material of said surface part, and said core is formed hollow.
19. The miniature golf links according to claim 17, wherein:  
said golf ball is formed of a three layer structure; a surface part, intermediate part, and core. Said surface part is made of the same composite of rubber and filler as a formal golf ball, said intermediate part is made of a softer material of smaller gravity than the material of said surface part, and said core is made of a harder material of larger gravity than the material of said surface part.
20. The miniature golf links according to claim 17, wherein:  
said golf ball is formed of a three layer construction; a surface part, intermediate part, and core. Said surface part is made of the same composite of rubber and filler as a formal golf ball, said intermediate part is made of a softer material of smaller gravity, and said core is made of the same composite as said intermediate part or of a softer material of smaller

gravity than the material of said intermediate part.

- 21.** The miniature golf links according to claim 20, wherein:

said intermediate part is made of a light foam material.

- 22.** The miniature golf links according to claim 20, wherein:

said golf ball has average gravity of less than 1.

- 23.** The miniature golf links according to claim 17, wherein:

said golf ball has three narrow holes that cross orthogonally from one another and penetrate said ball from one point of the surface to another point. The wall of said hole is tapered from the central part of said ball to its surface.

- 24.** The miniature golf links according to claim 17, wherein:

said golf ball has a spherical surface, and said surface has a plurality of concaves having an optional outline of its bottom. Between said concave bottom and said surface, the side portion of said concave is built in a profile of trapezoid.

- 25.** The miniature golf links according to claim 17, wherein:

said golf ball has a spherical surface, and said surface has a plurality of convexes having an optional outline of top surface. Between said convex top and said spherical surface, the side portion of said convex is built in a profile of trapezoid.

- 26.** The miniature golf links according to claim 24, wherein:

said golf ball has a spherical surface, and said surface has a plurality of convexes having an optional outline of top surface. Between said convex top and said spherical surface, the side portion of said convex is built in a profile of trapezoid.

- 27.** The miniature golf links according to claim 17, wherein:

said golf ball is made of soft rubber, soft plastics, foam polyurethane, or other materials and formed of a sphere. The surface of said sphere is provided with optional form of concaves to reduce the flight distance of said golf ball.

- 28.** The miniature golf links according to claim 27,

wherein:

said golf ball has a plastic surface and foam synthetic resin core.

- 29.** The miniature golf links according to claim 27, wherein:

said golf ball has concaves of a pattern of grooves over the surface.

- 30.** The miniature golf links according to claim 17, wherein:

said golf ball has at least one small hole to set a ball on a projection on a tee.

- 31.** The miniature golf ball according to claim 17, wherein:

said golf ball has an optional graphic pattern over the surface to identify said golf ball from every direction.

- 32.** The miniature golf links according to claim 1, wherein:

a total of 9 holes can be used both as outer holes and inner holes, and a score card is provided with score columns according to the usage of above holes.

- 33.** The miniature golf links according to claim 4, wherein:

said golf links comprise 3 holes each used for three times as an outer hole, central hole, and inner hole, and a score card is provided with score columns separated for each hole.

- 34.** The miniature golf links according to claim 1, wherein:

said score card has a plurality of small square or other optional forms of segmented columns.

- 35.** The miniature golf links according to claim 34, wherein:

The number of said small square or other optional segmented columns is defined as the double number of each par value plus 1.

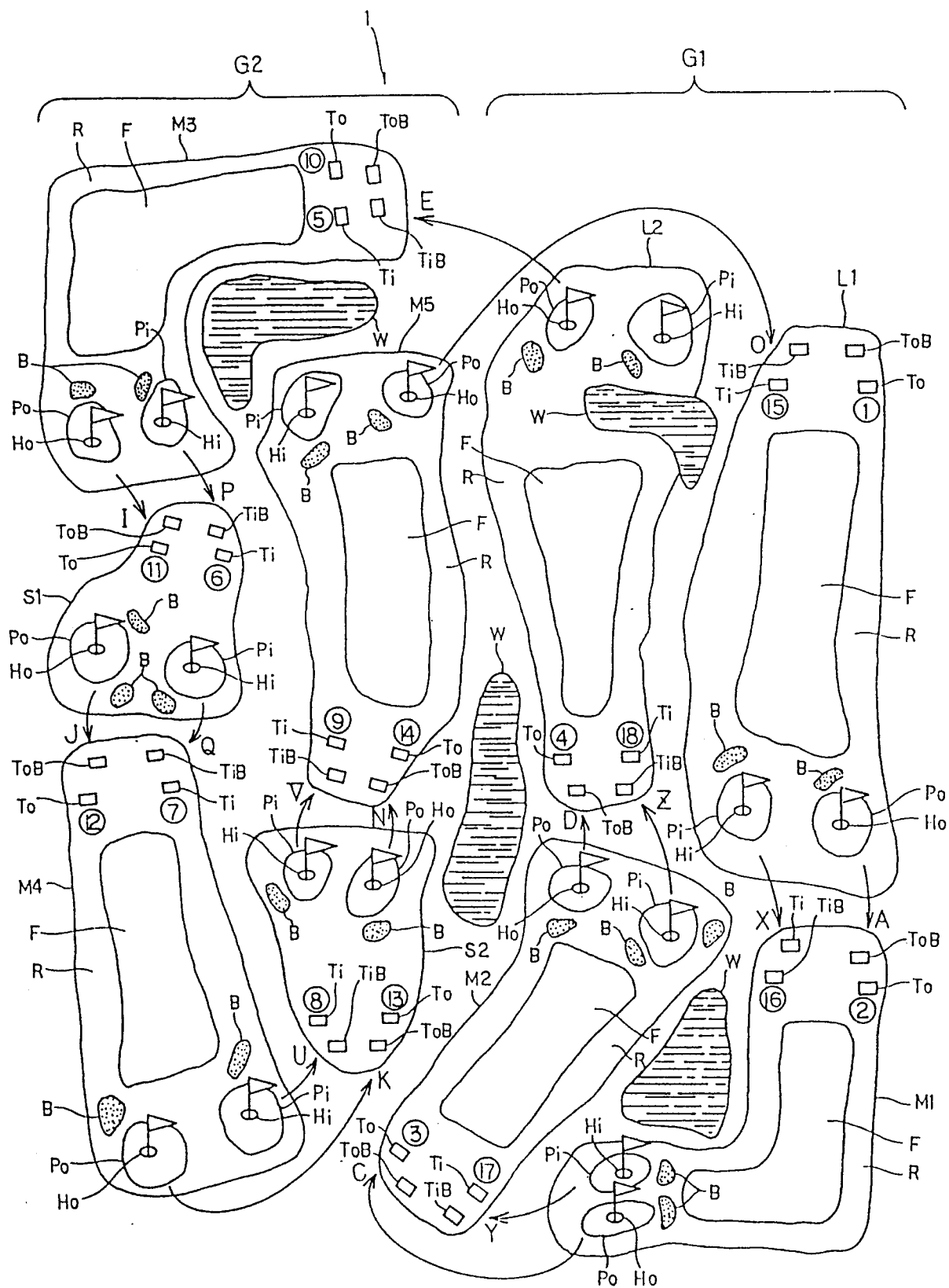
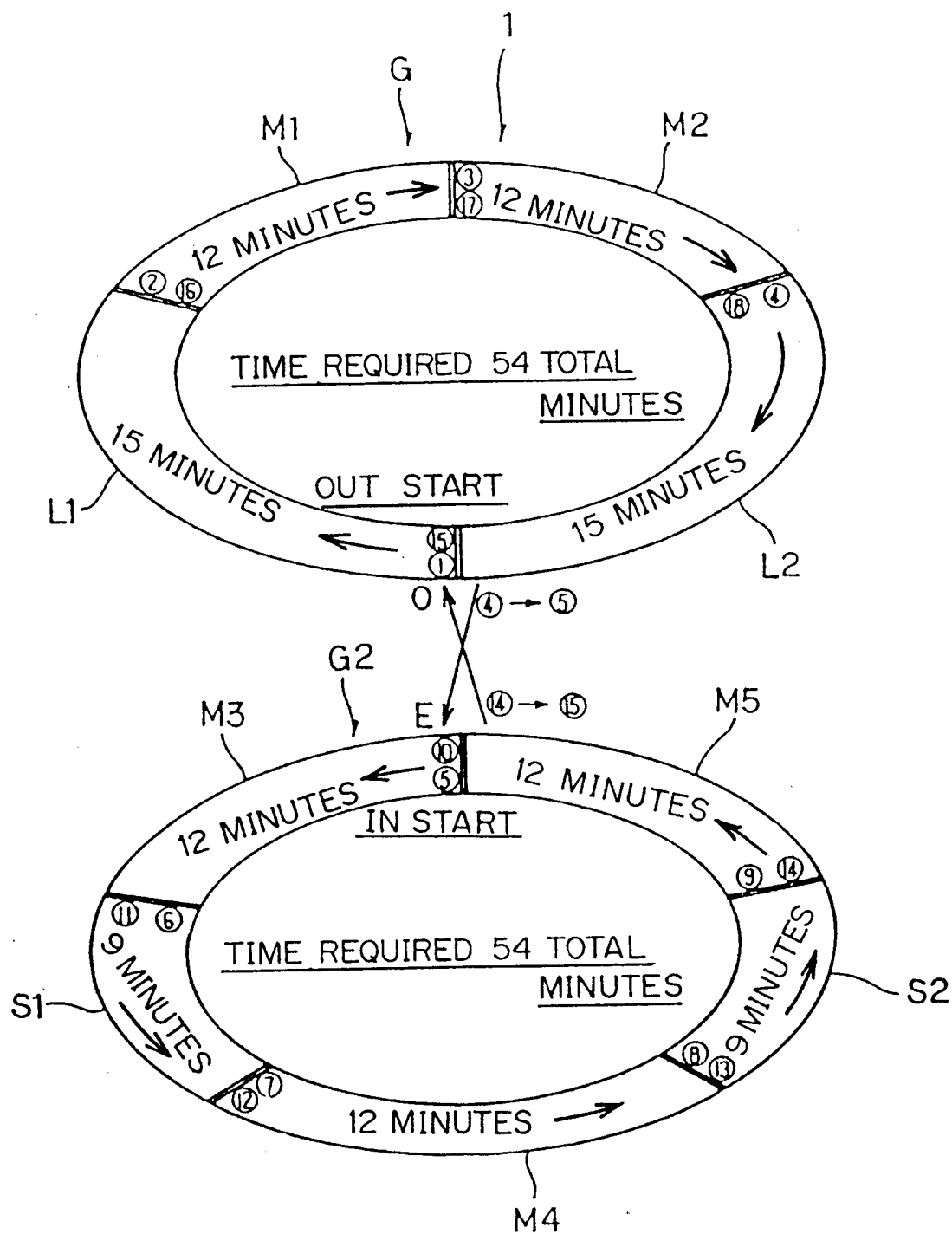


Fig. 1



F i g . 2

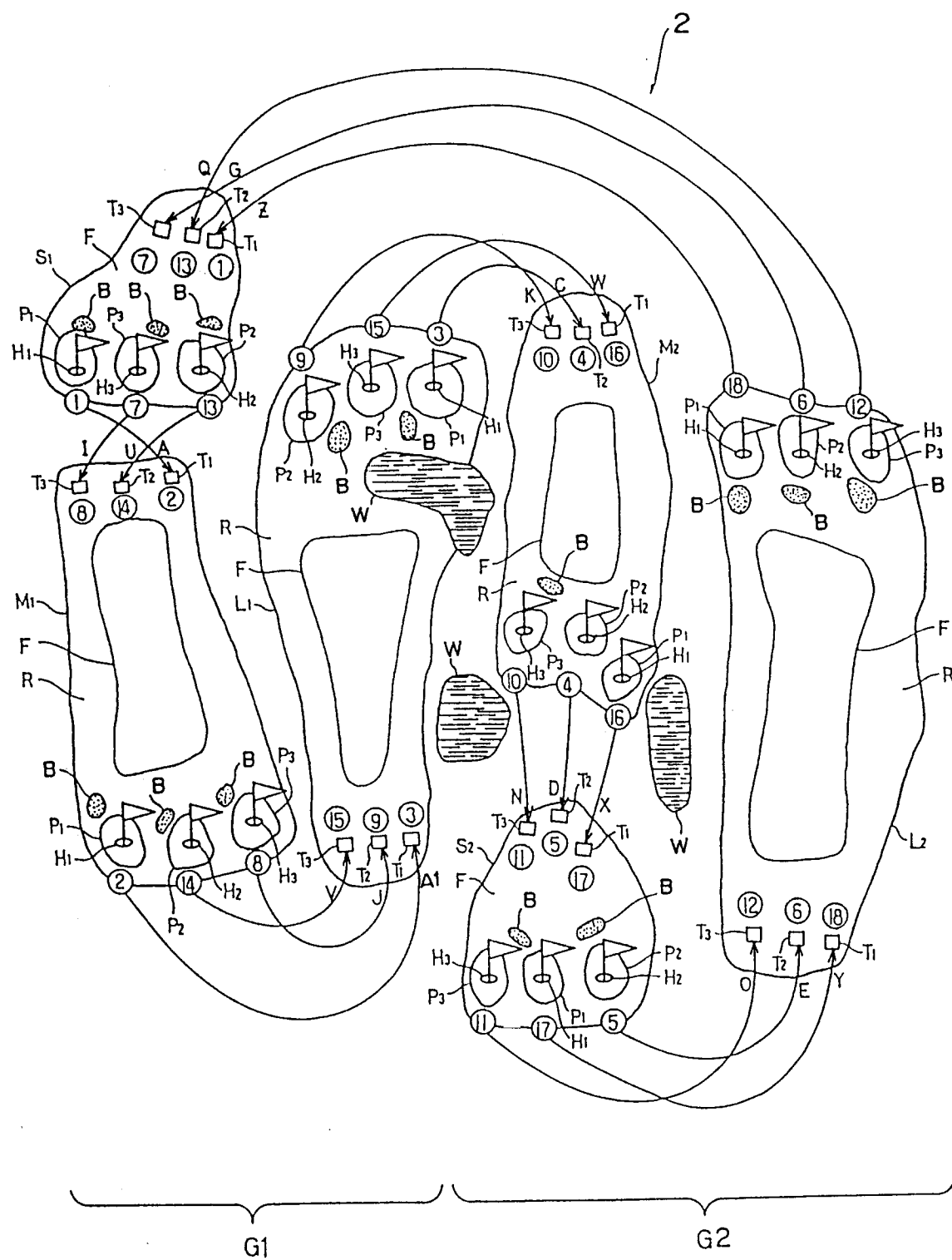


Fig. 3

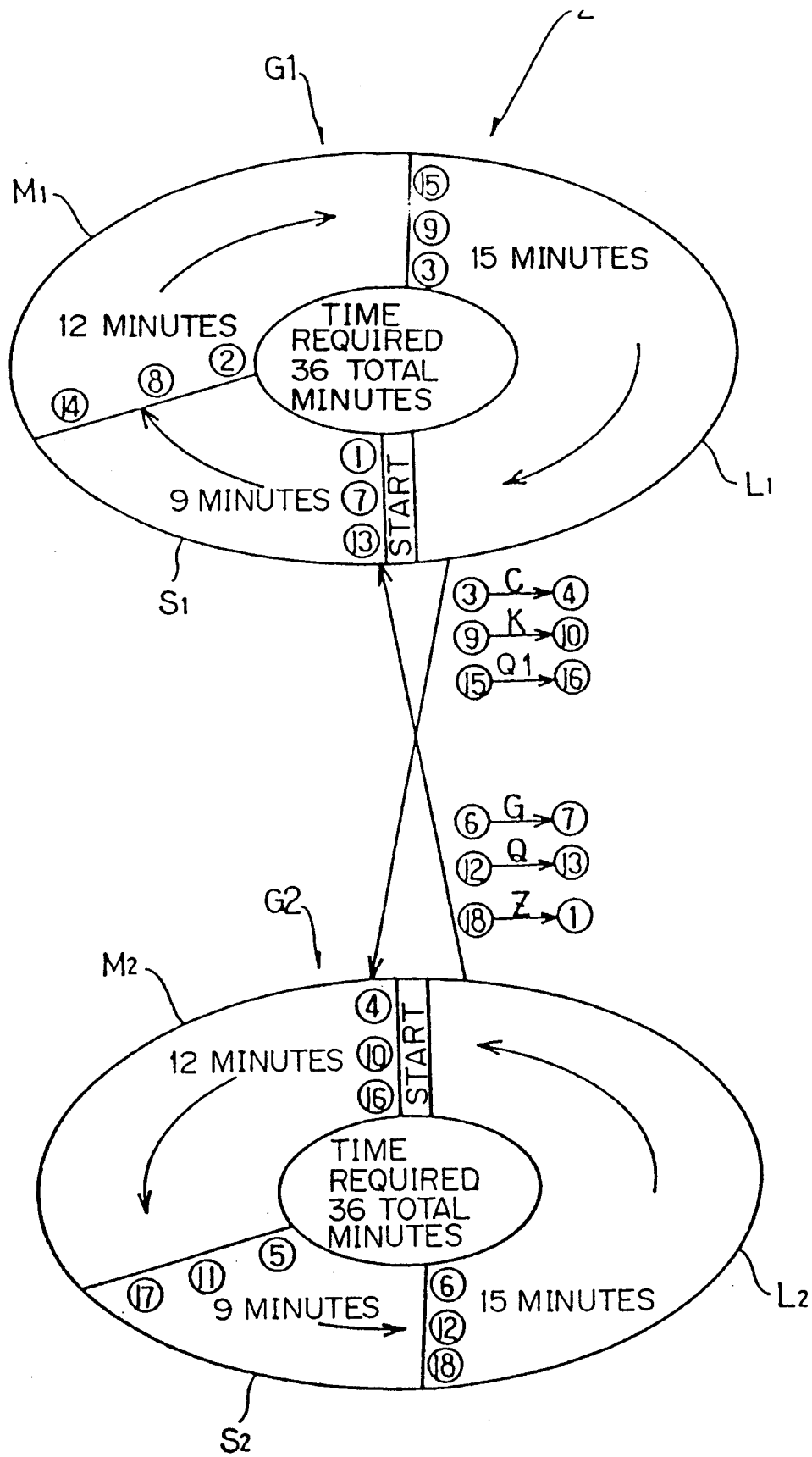
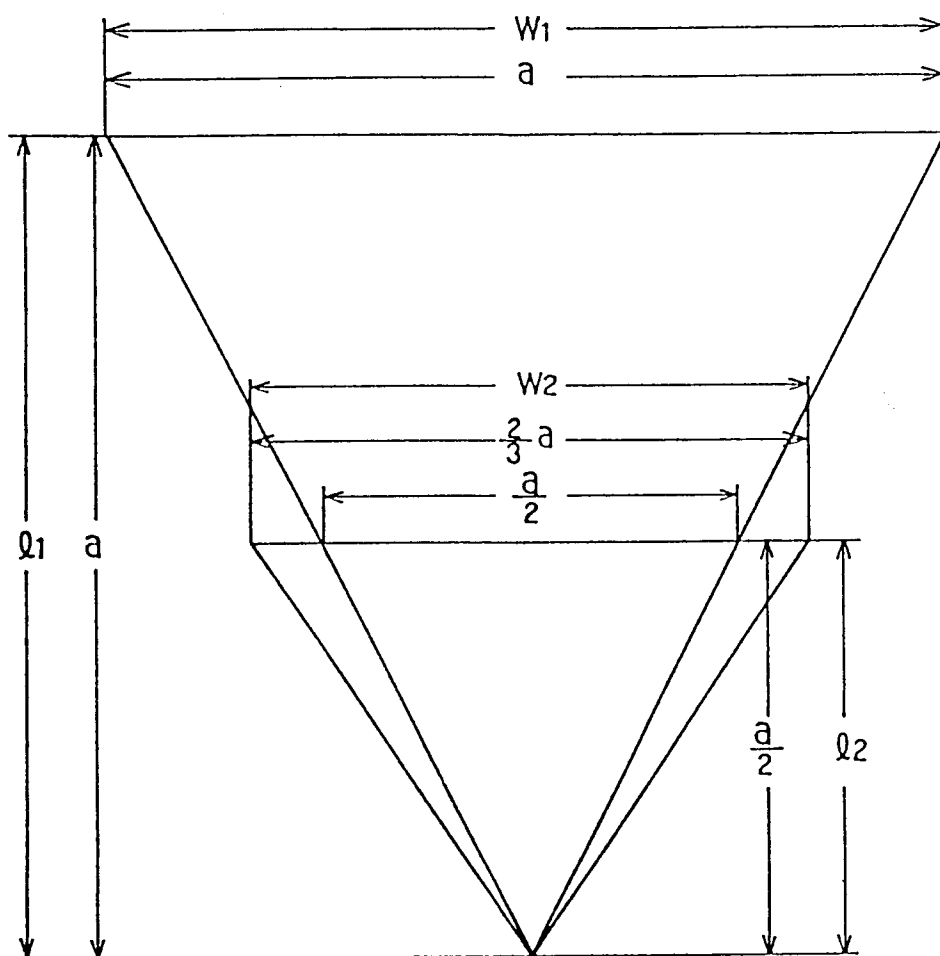
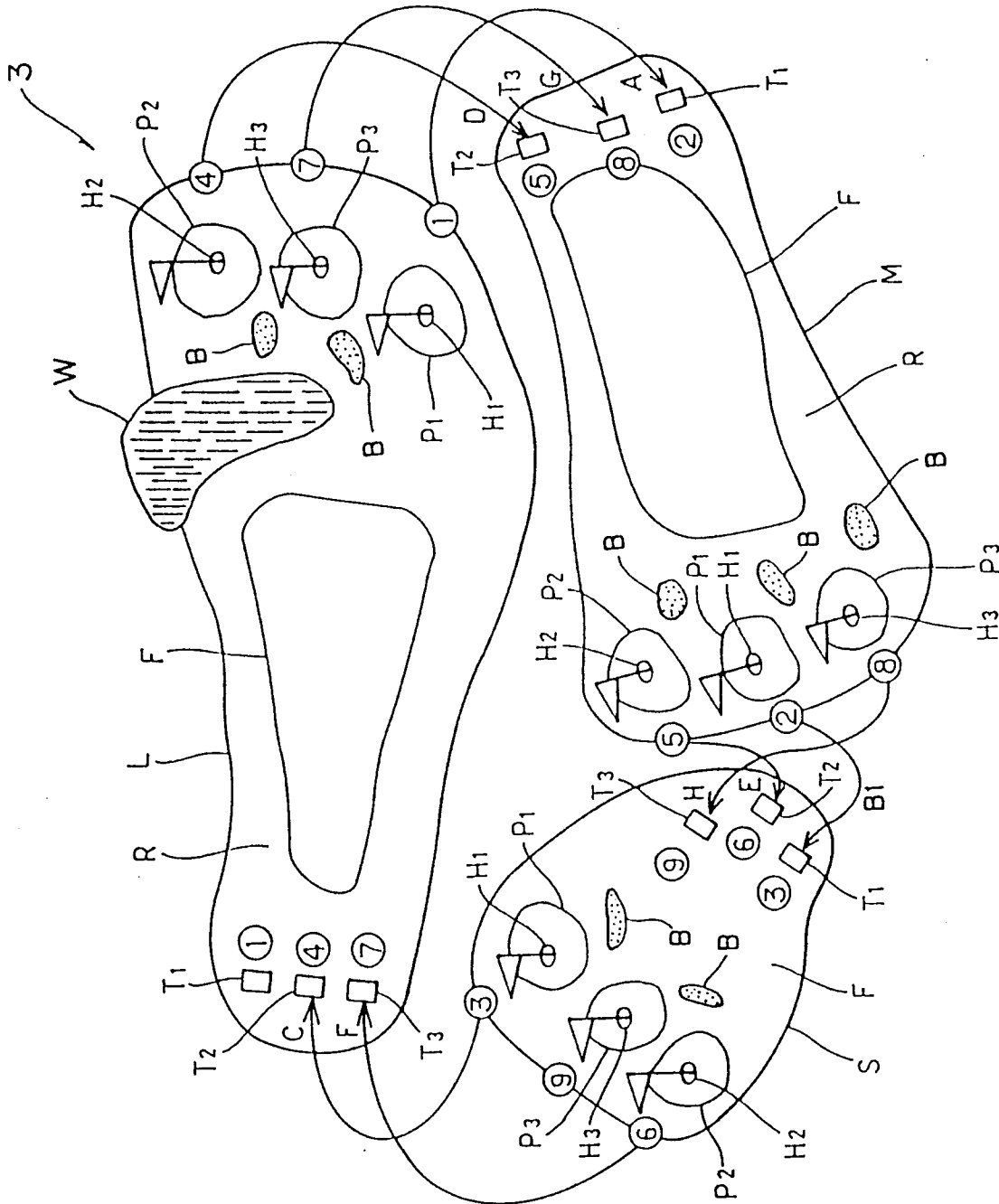


Fig. 4





F i g . 5



6.  
50.  
1.  
H.

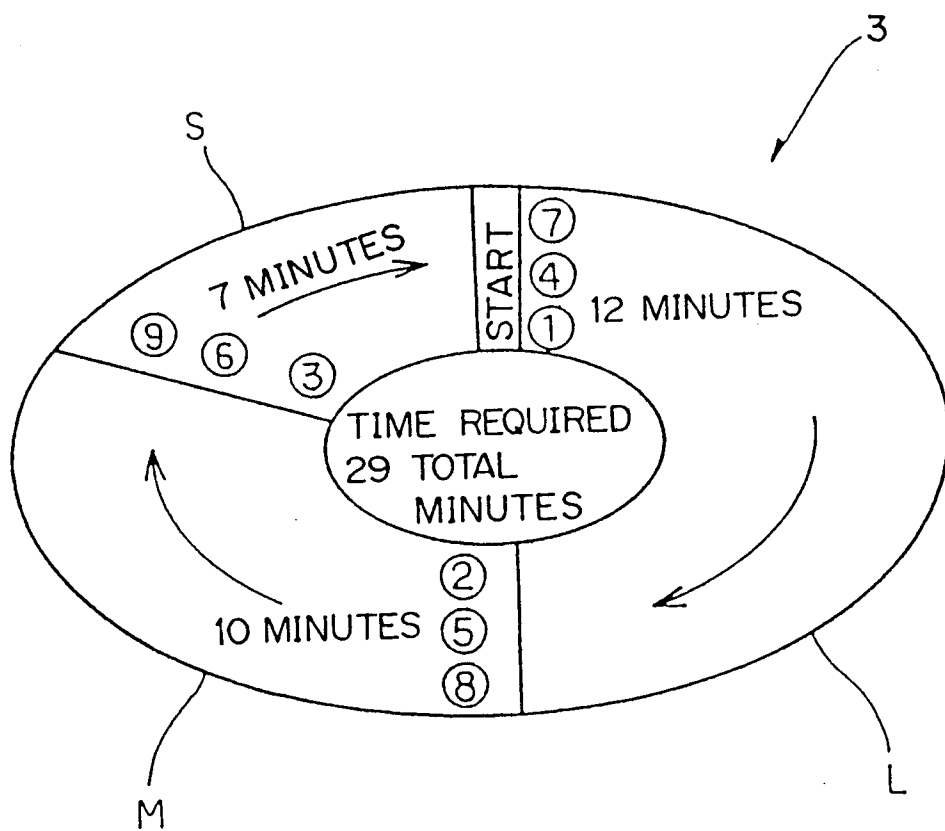


Fig. 7

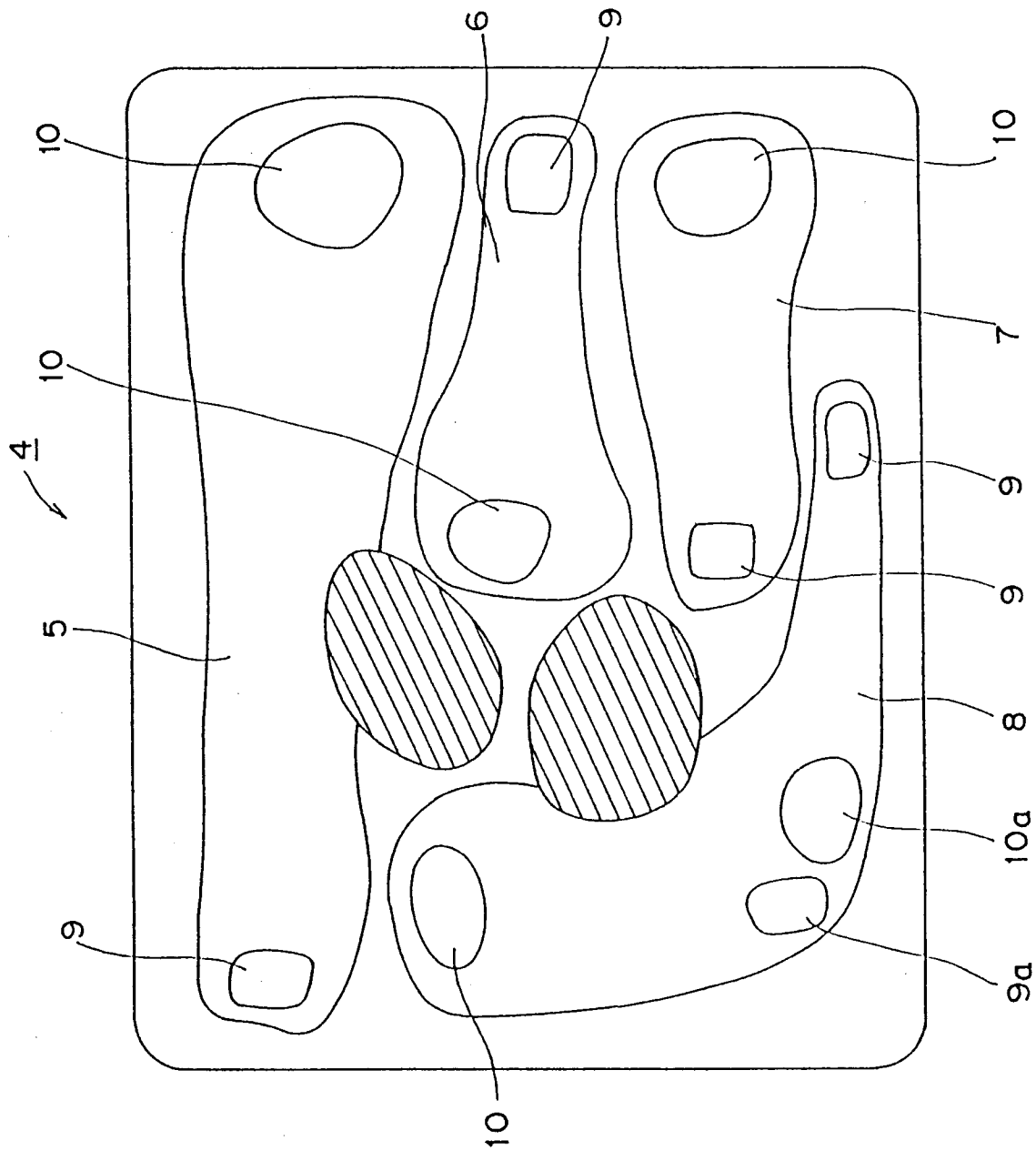
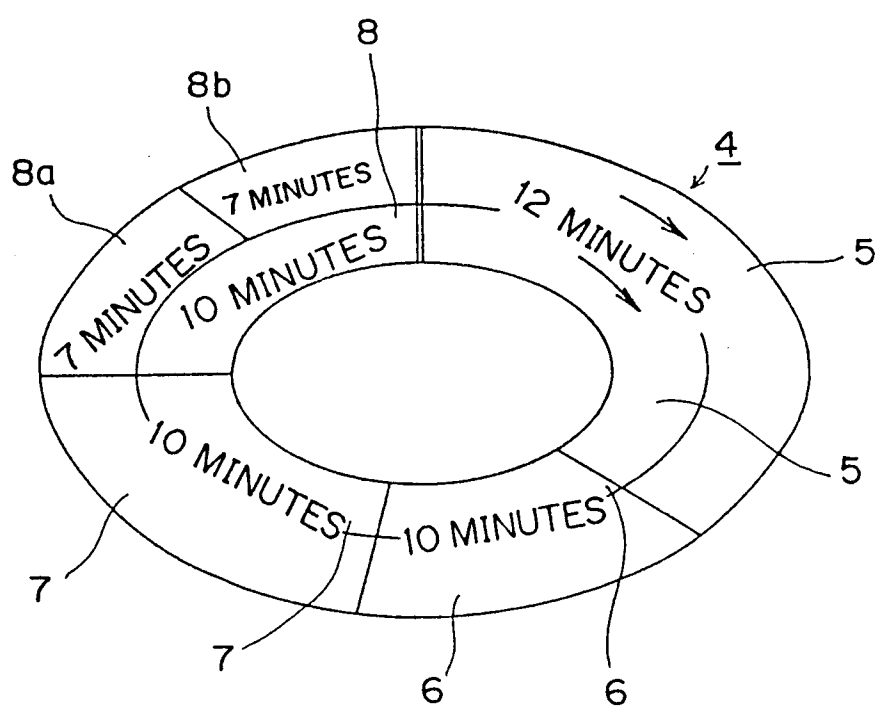
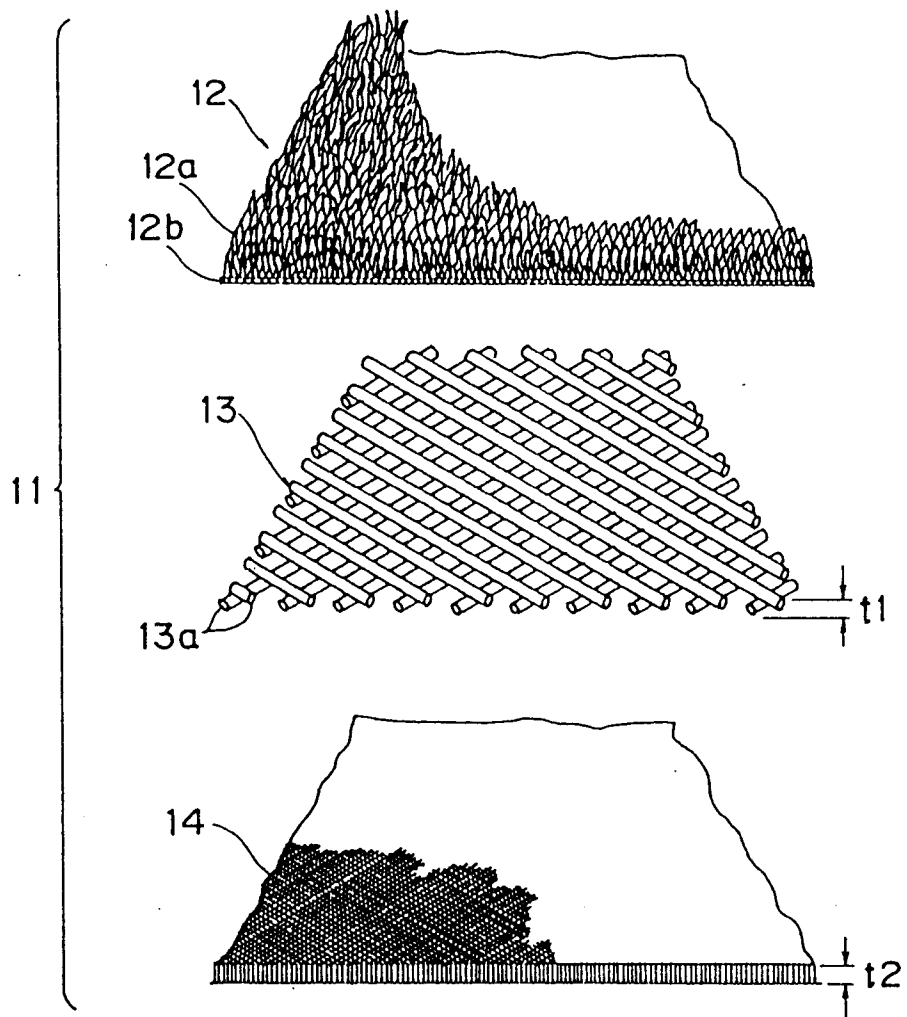


Fig. 8



F i g . 9



F i g . 1 0

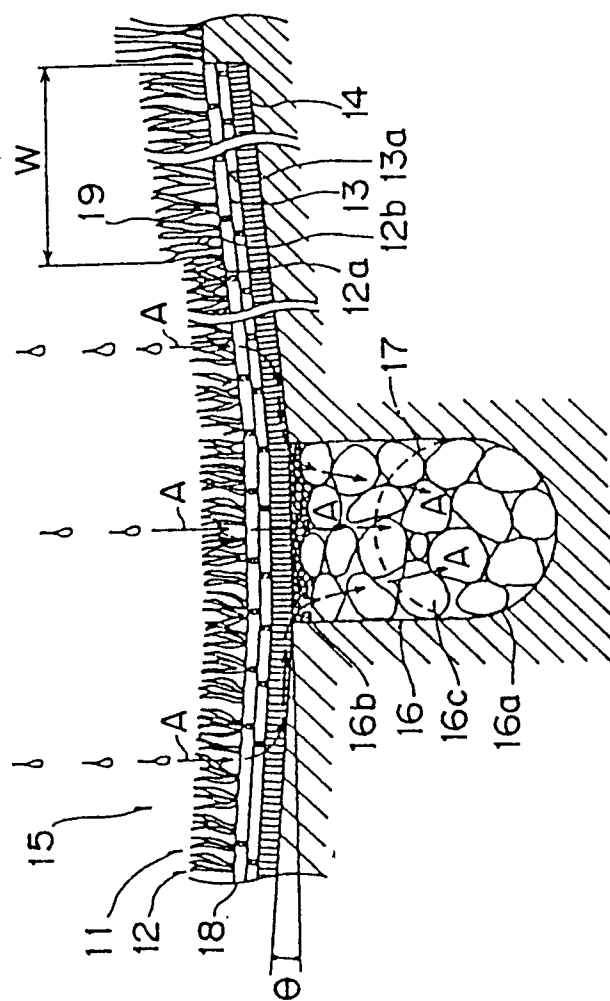


Fig. 11

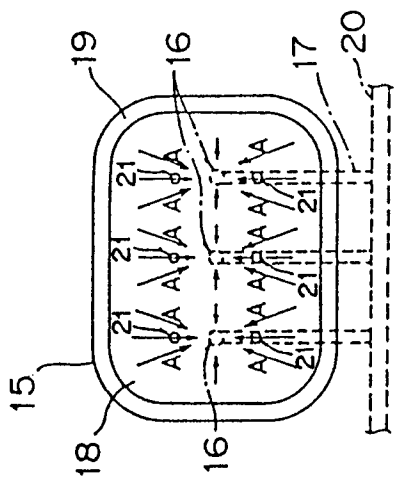


Fig. 12

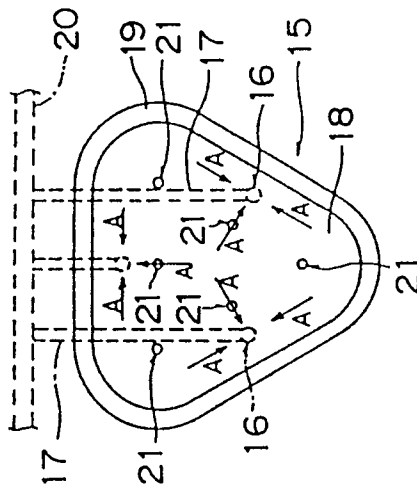


Fig. 13

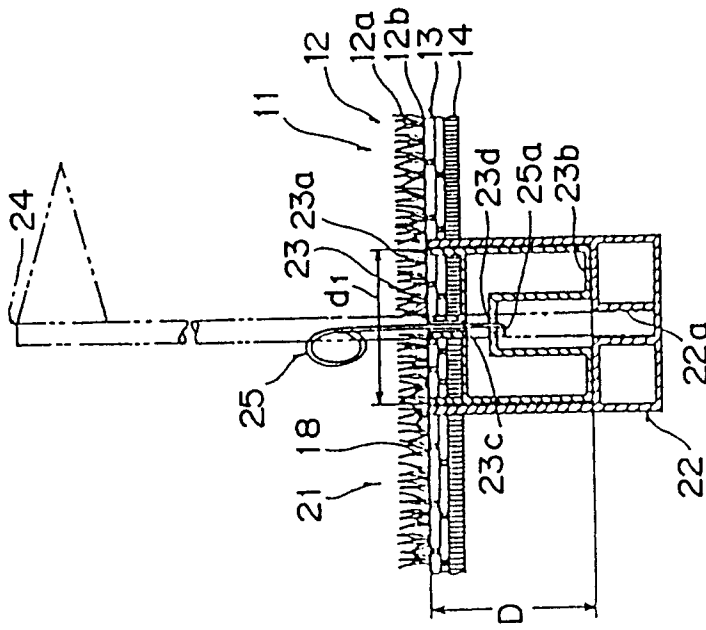


Fig. 14

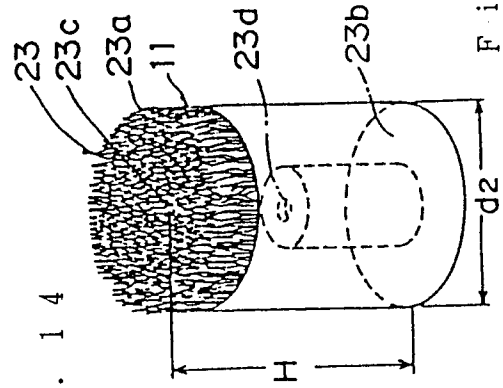


Fig. 15



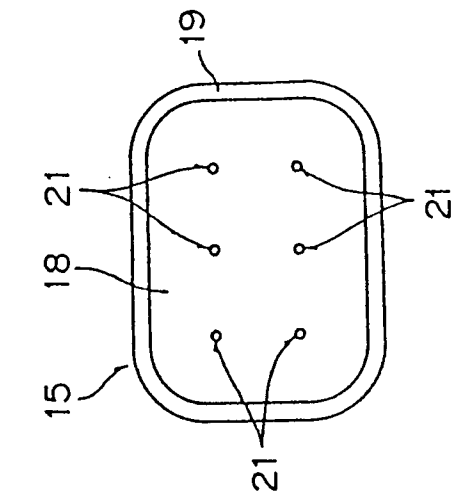


Fig. 16

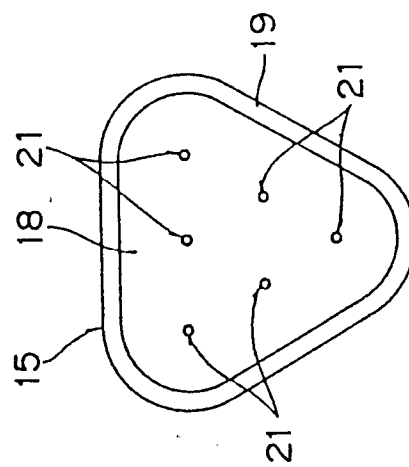


Fig. 17

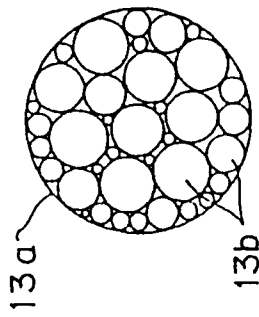


Fig. 18

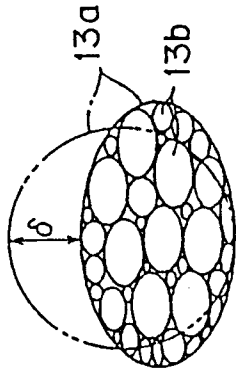


Fig. 19

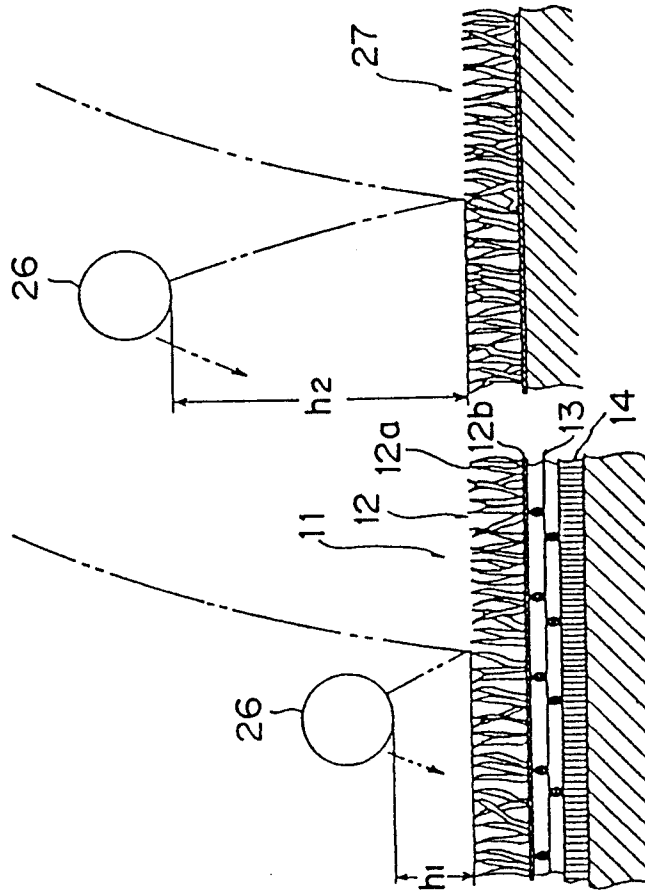
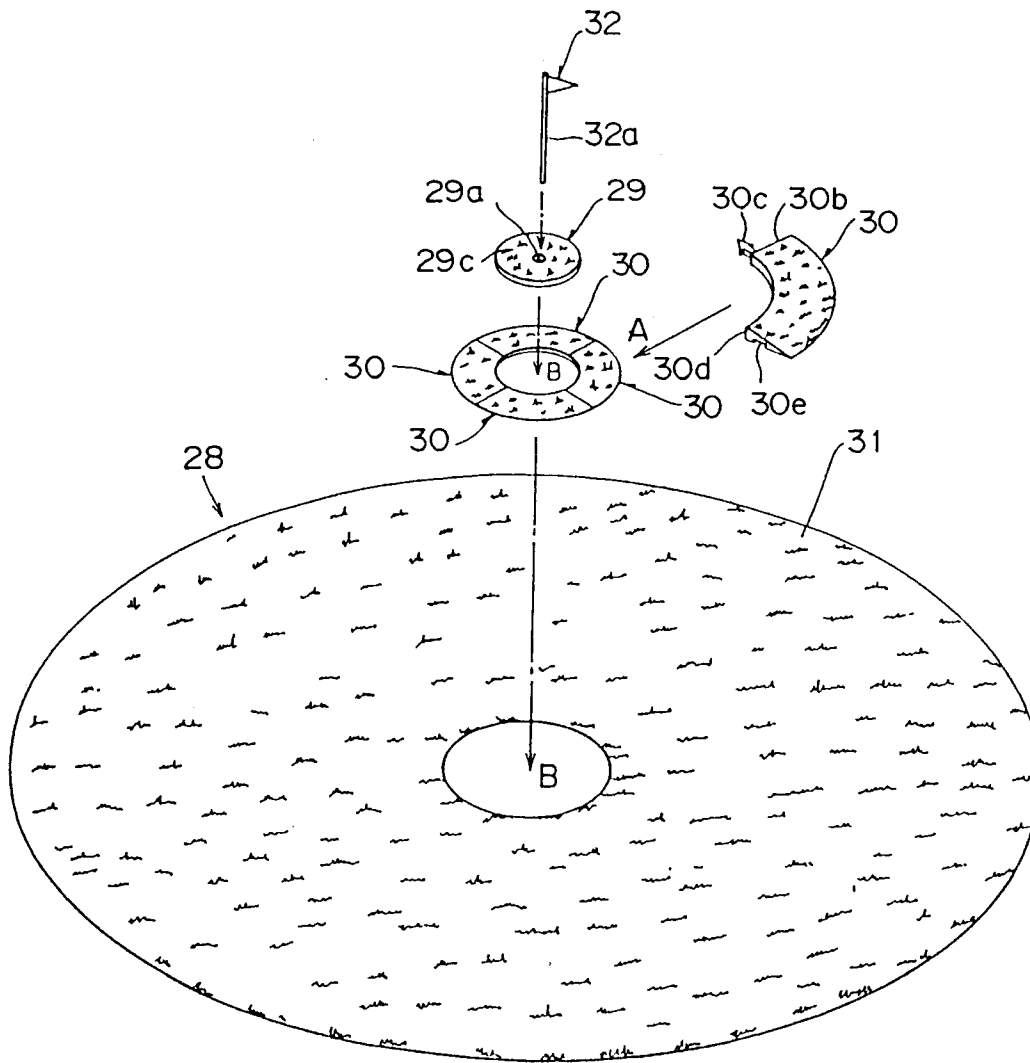


Fig. 21

Fig. 20



F i g . 2 2

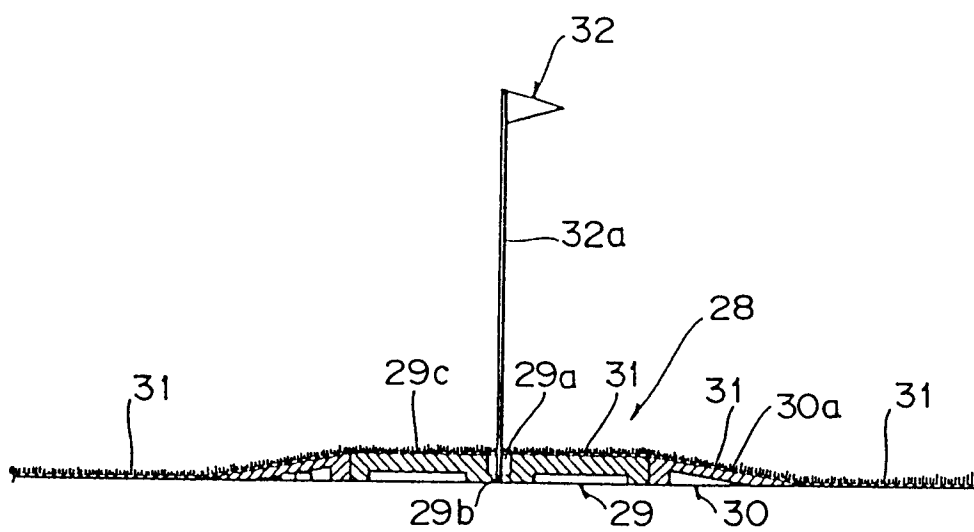


Fig. 23

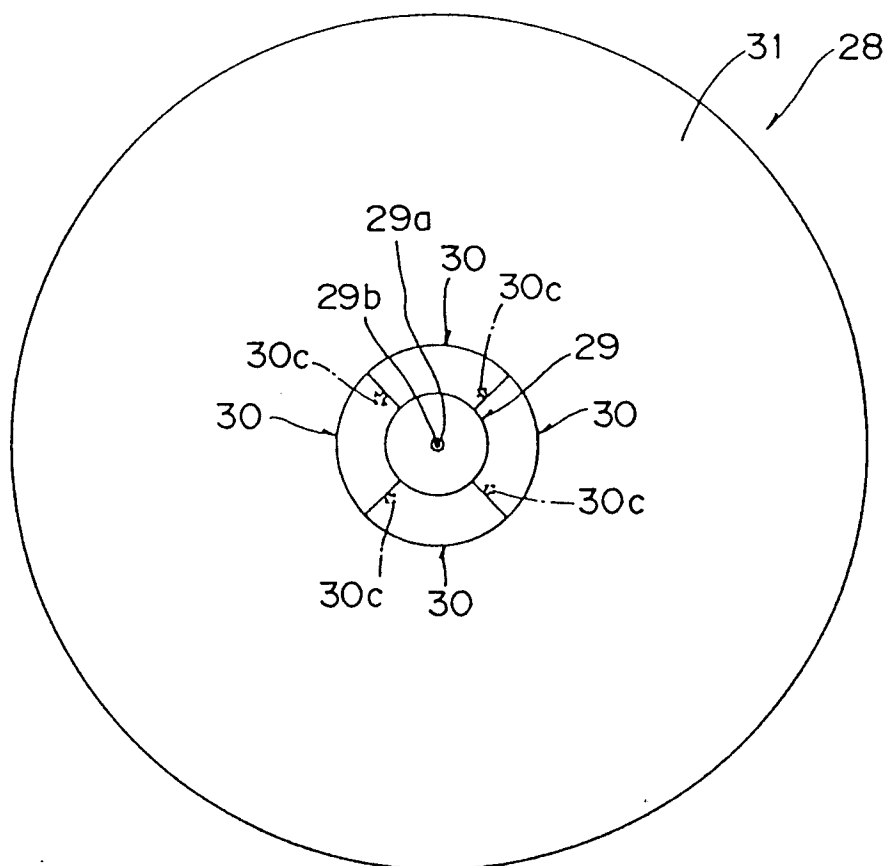
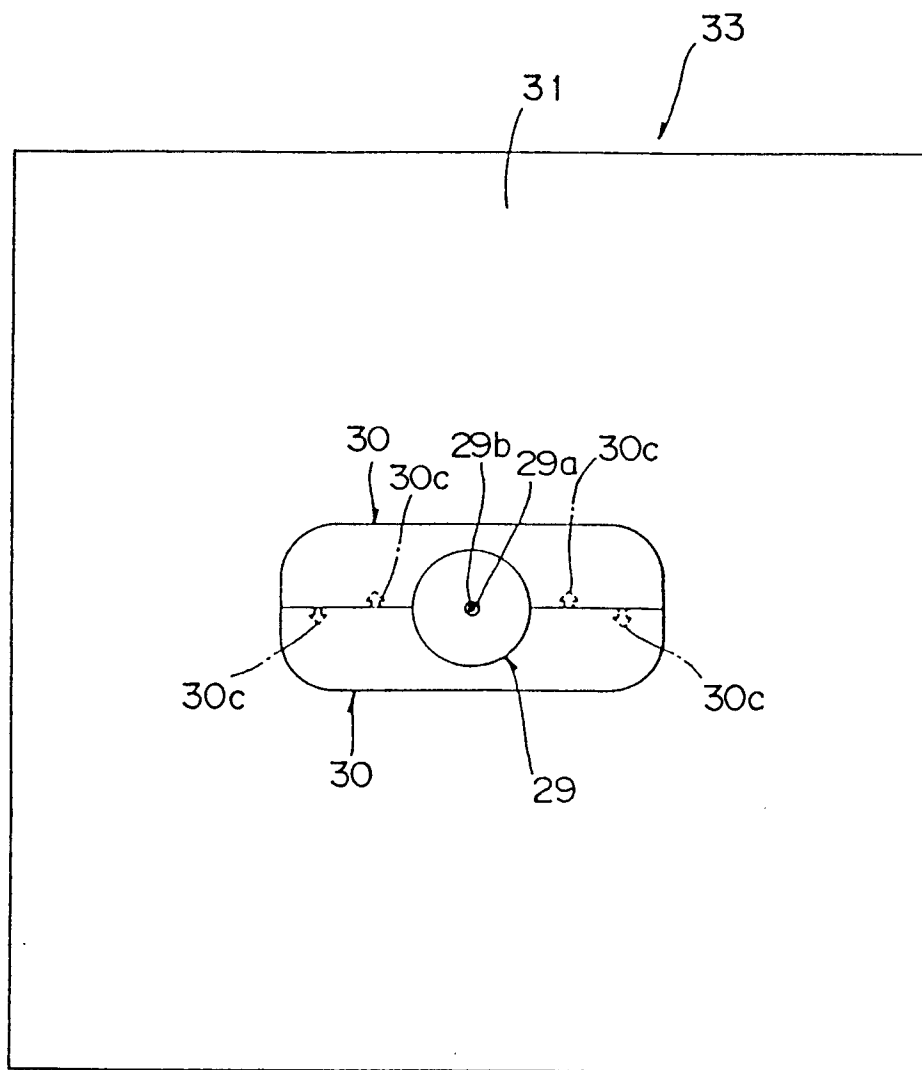


Fig. 24



F i g . 2 5

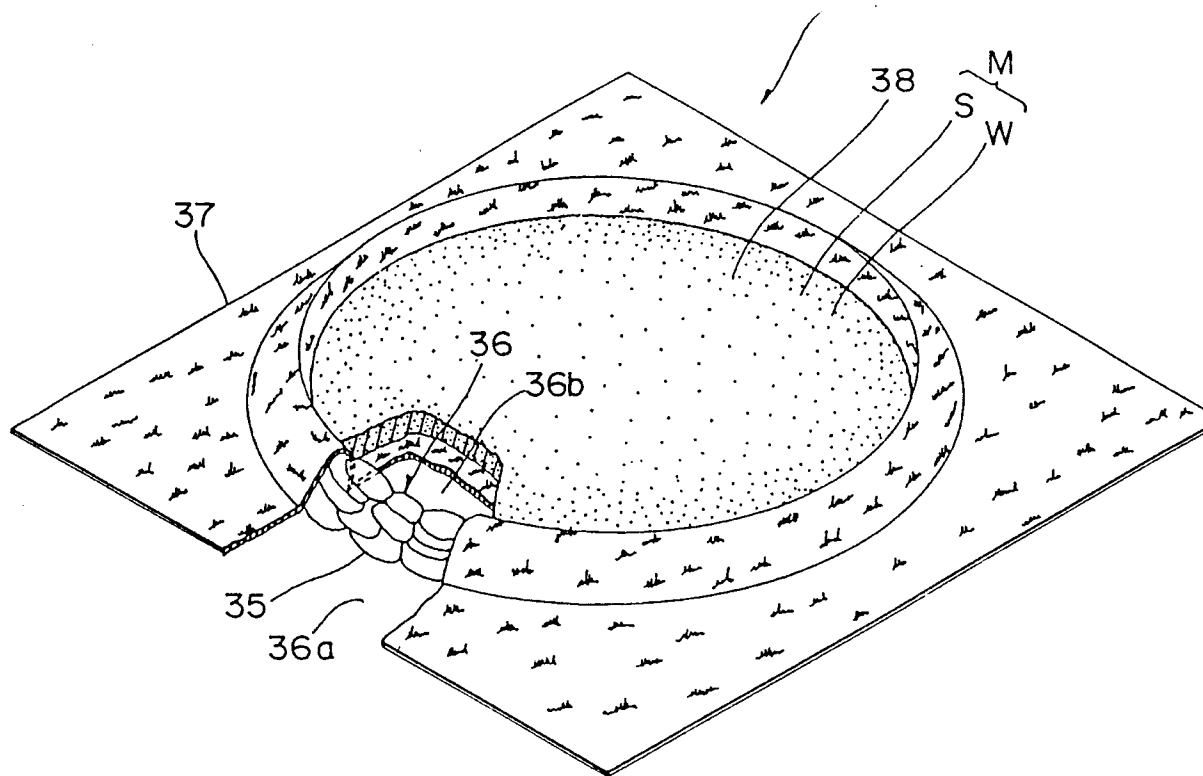


Fig. 26

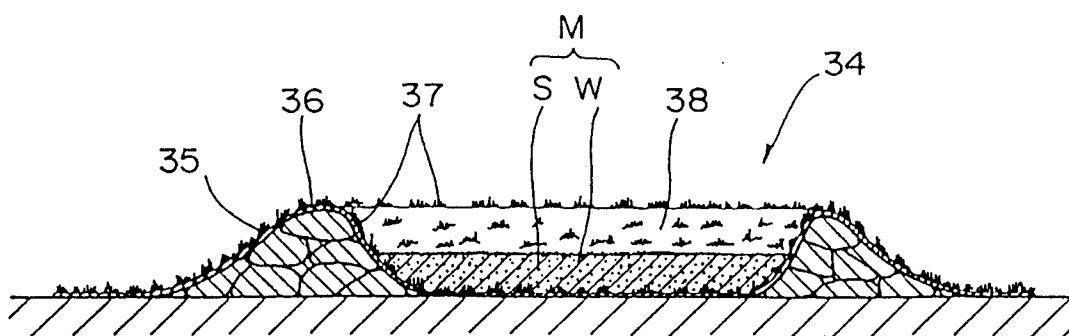
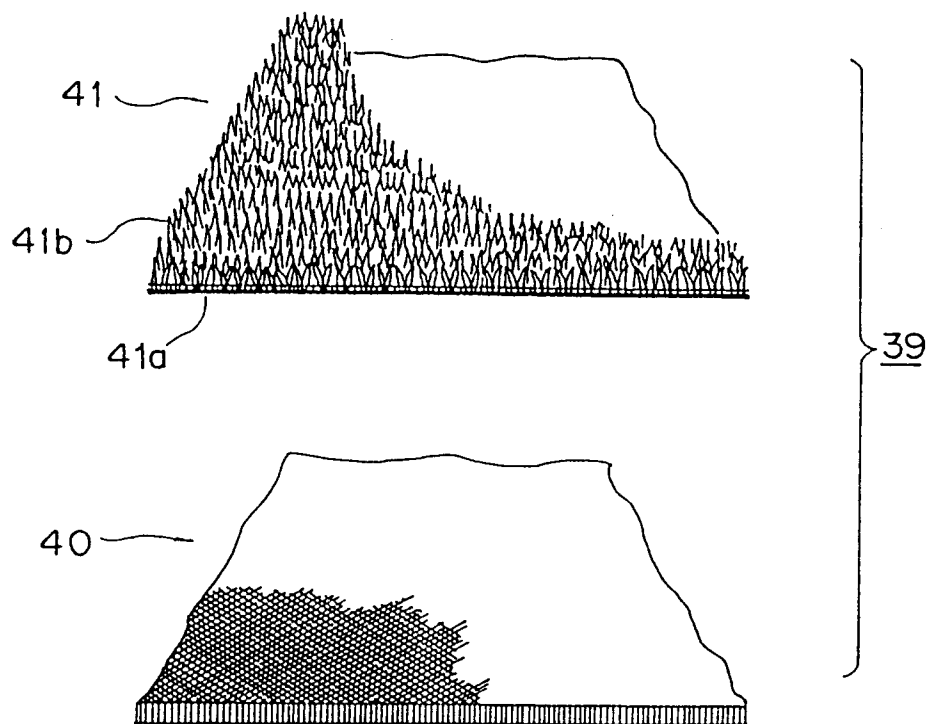
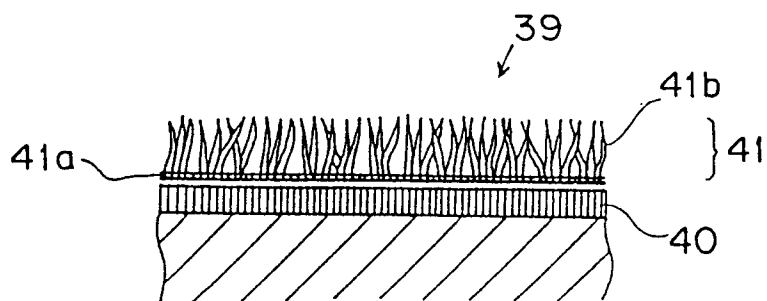


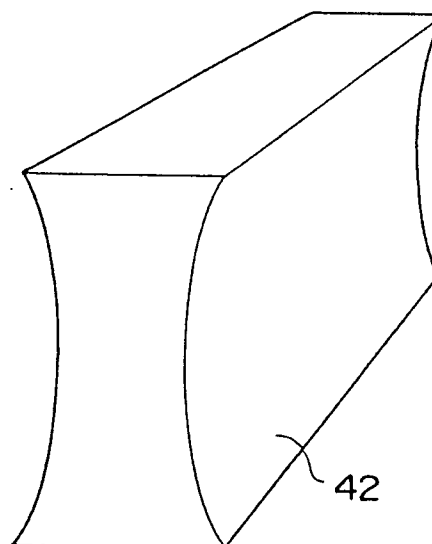
Fig. 27



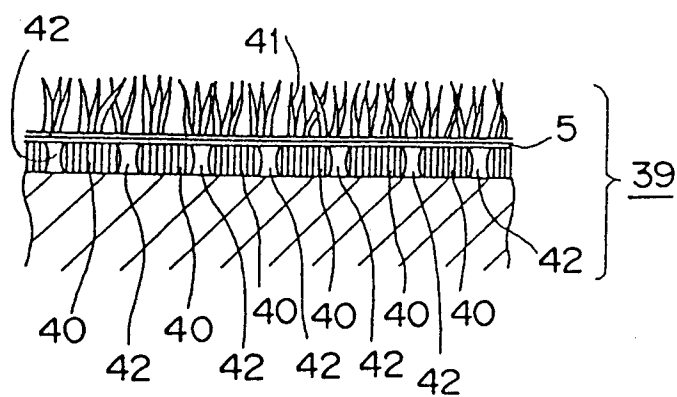
F i g . 2 8



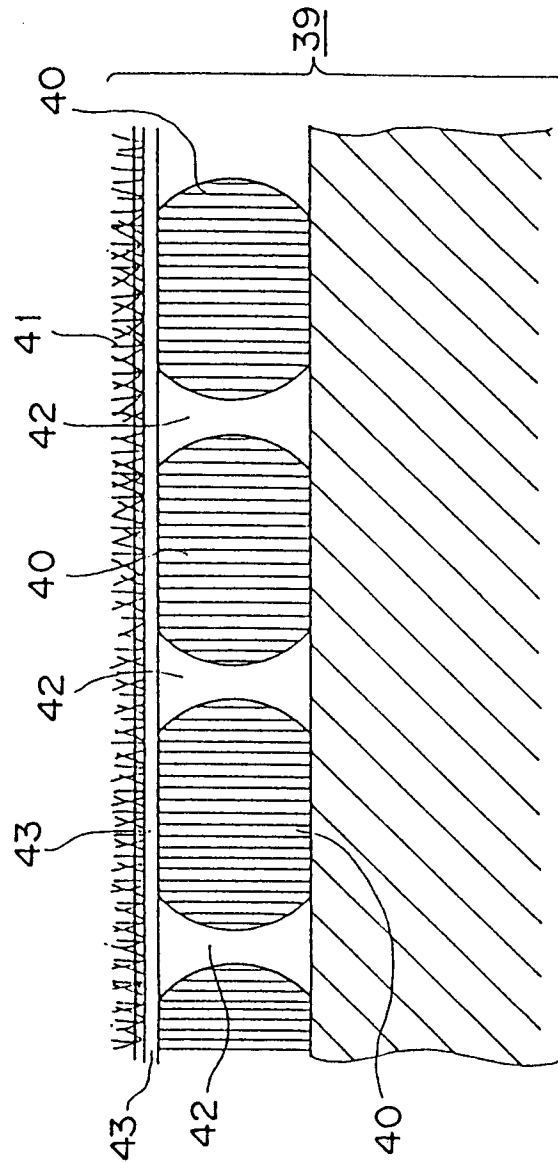
F i g . 2 9



F i g . 3 0



F i g . 3 1



Fi 23.2



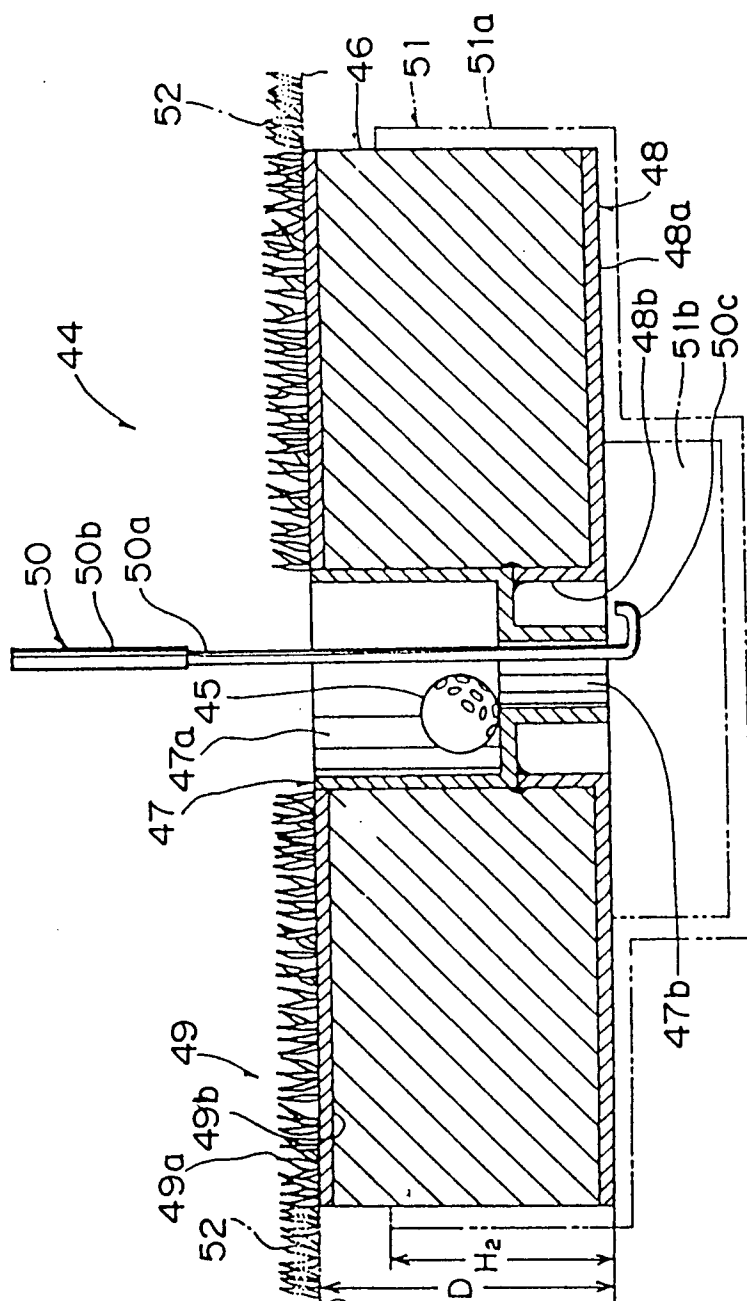
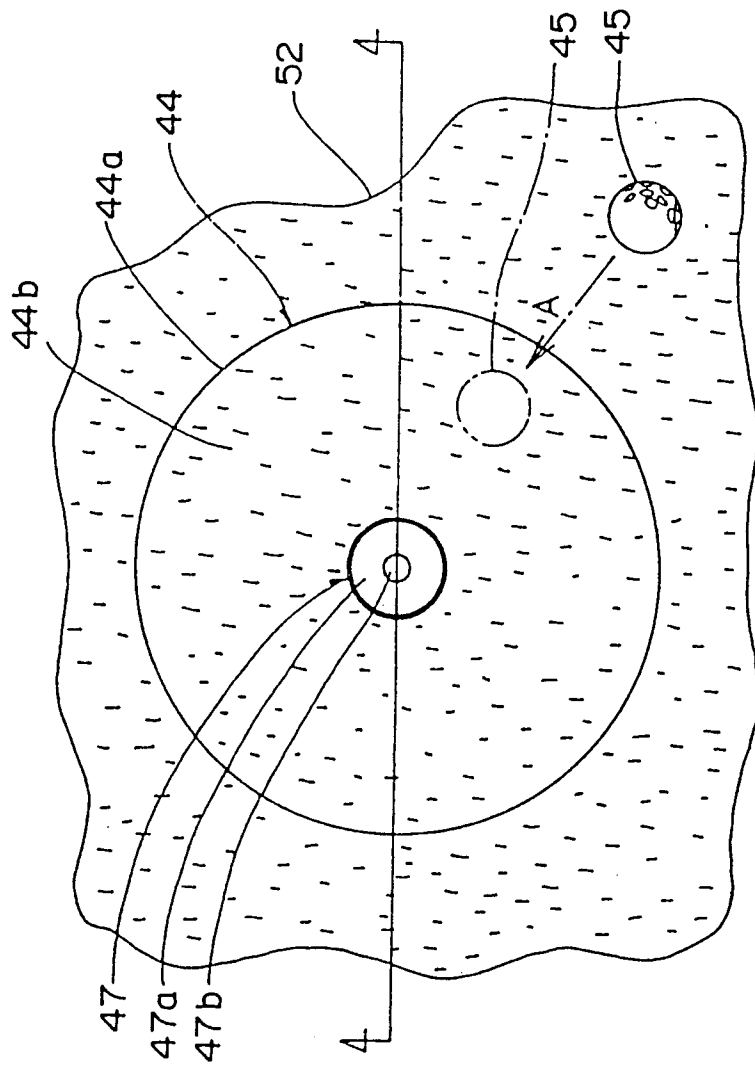


Fig. 33



Fi 34

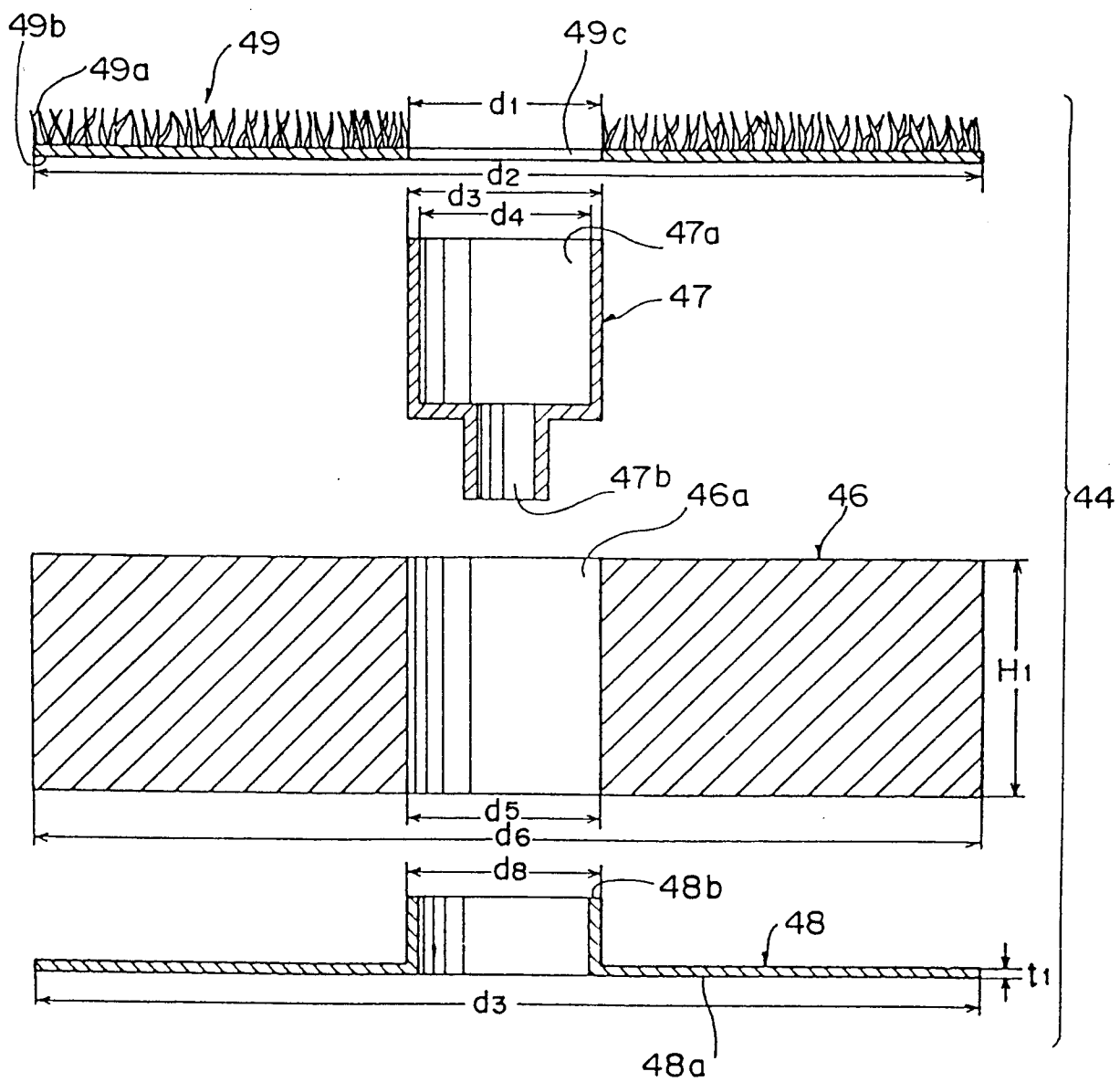


Fig. 35

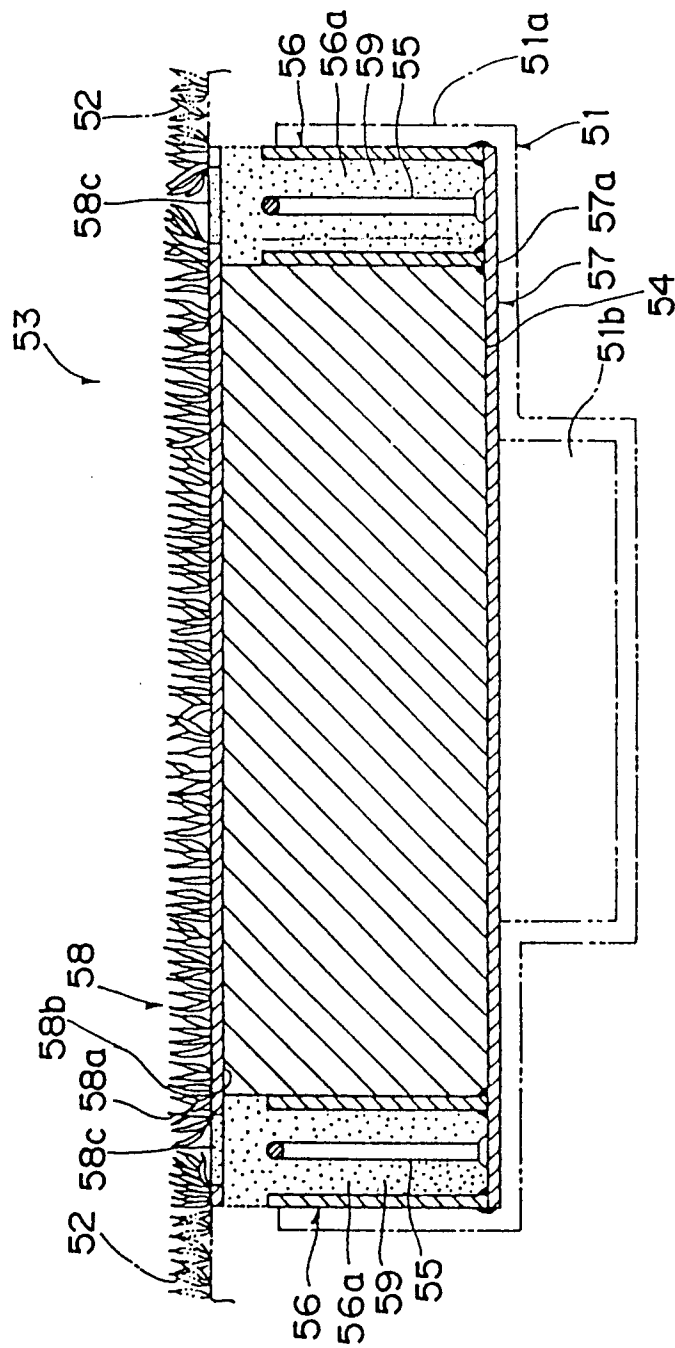


Fig. 36

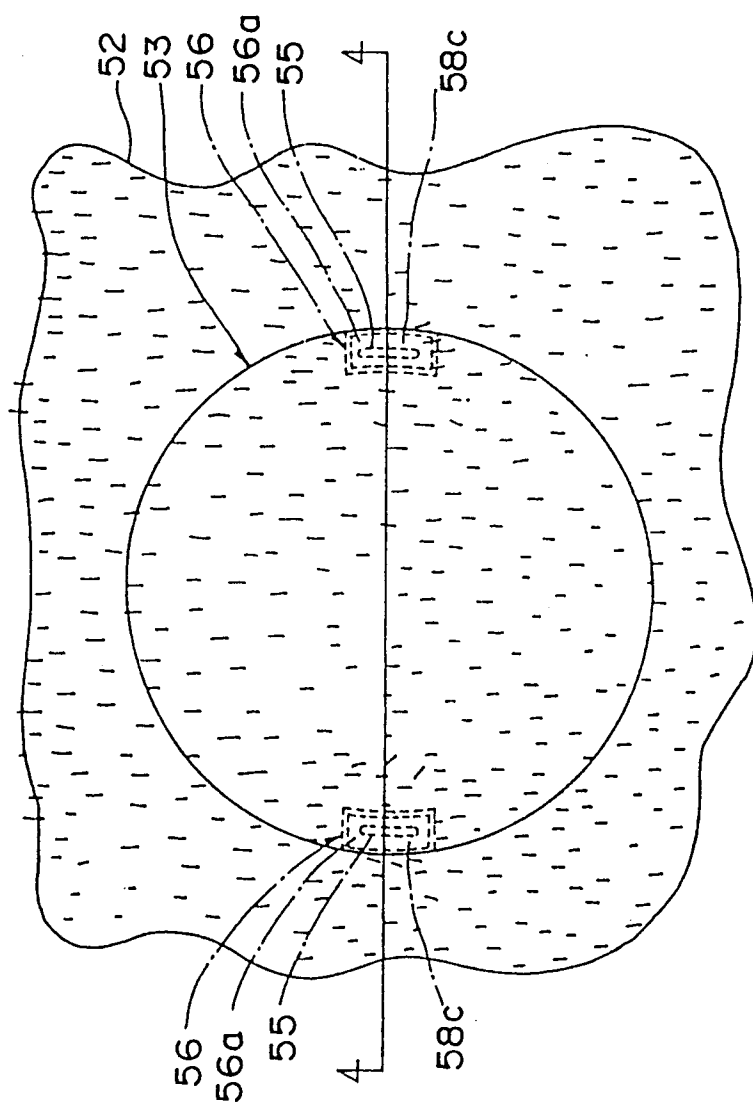
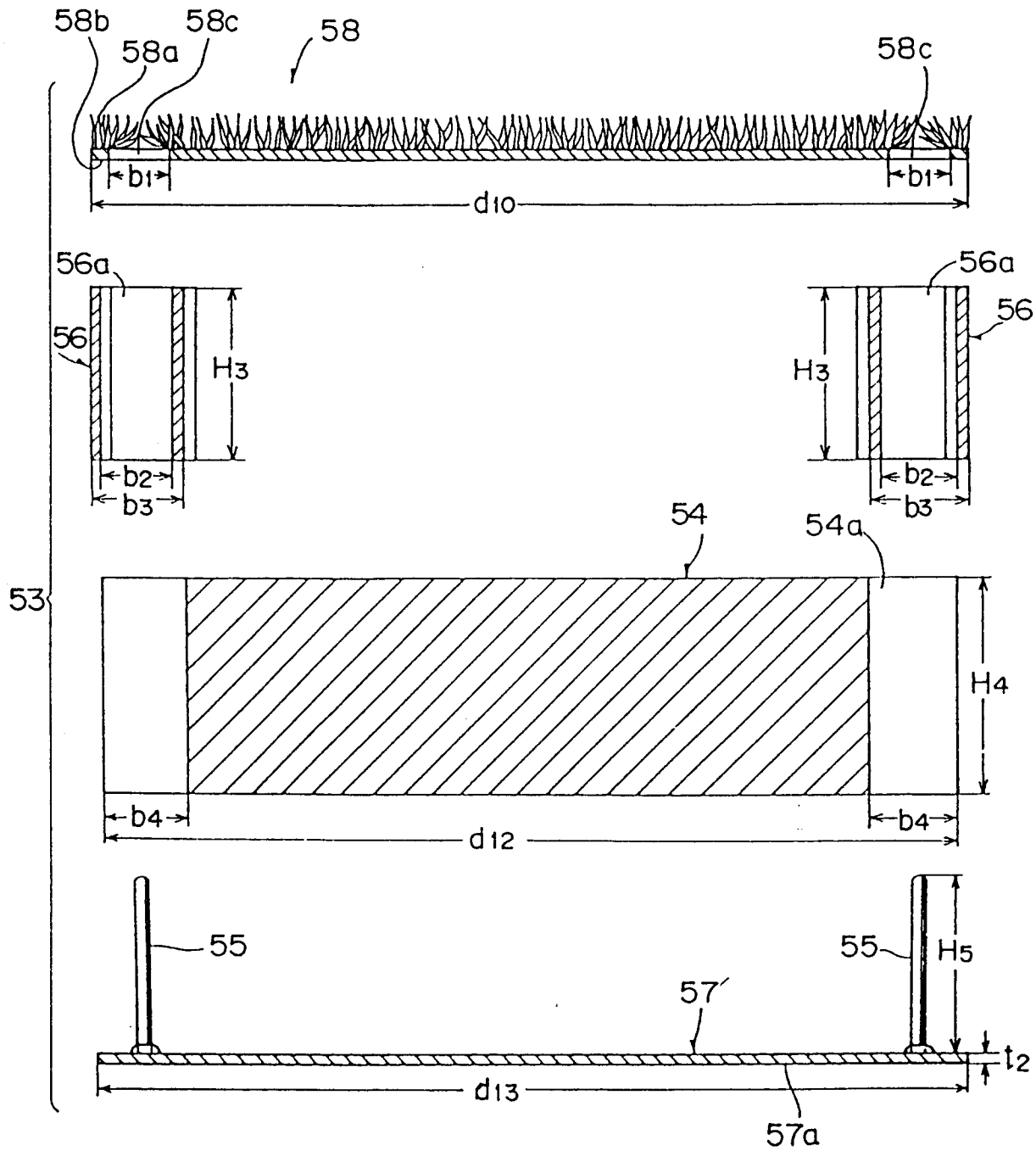
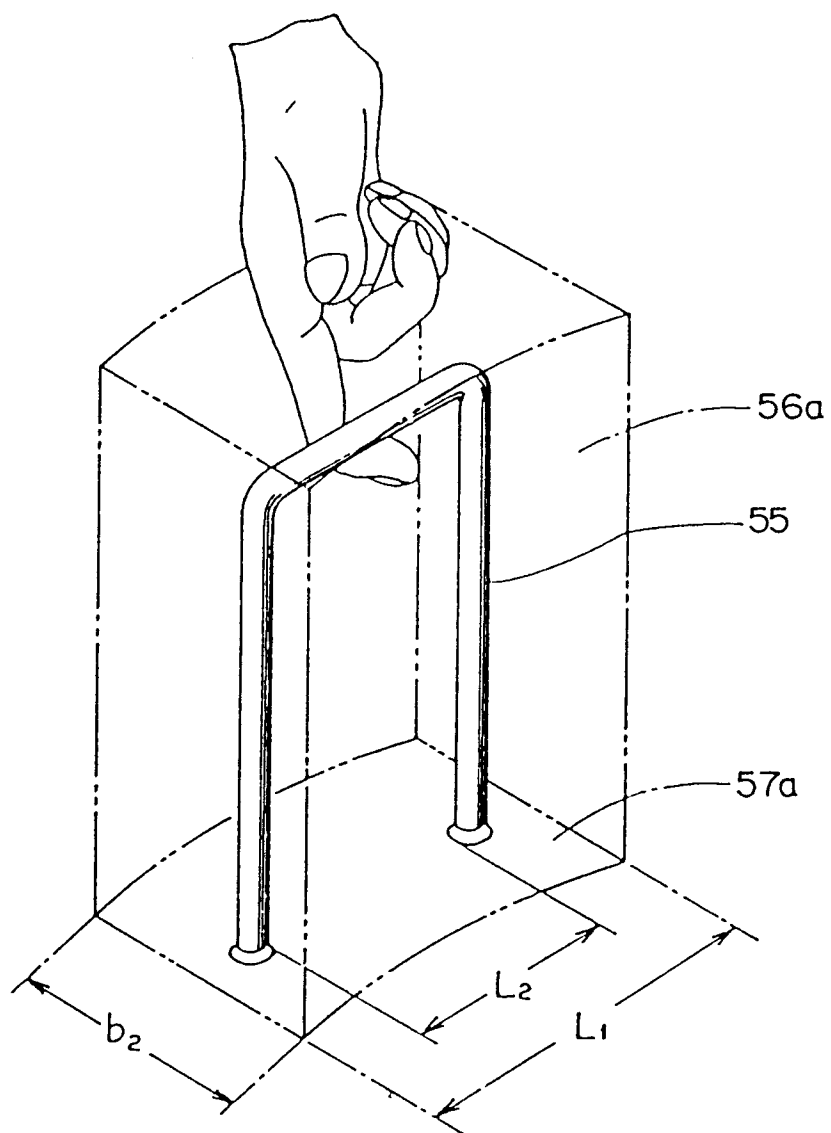


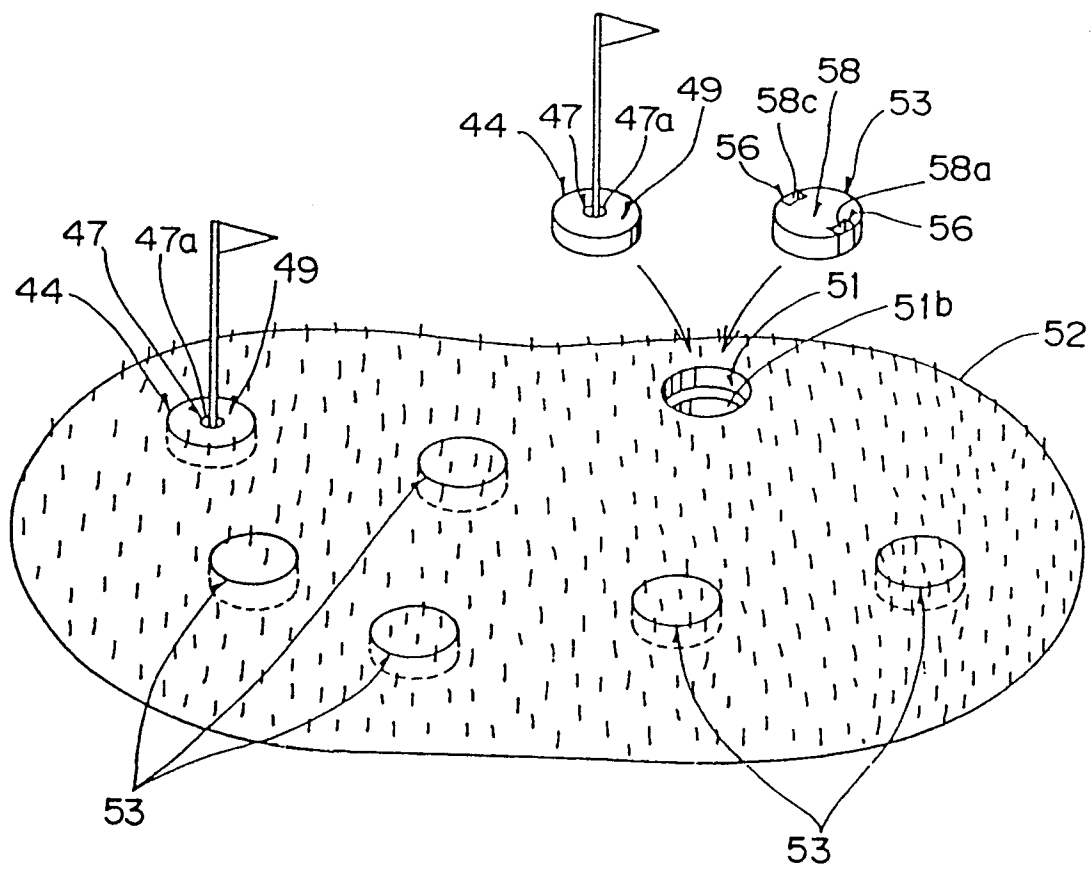
Fig. 37



F i g . 3 8

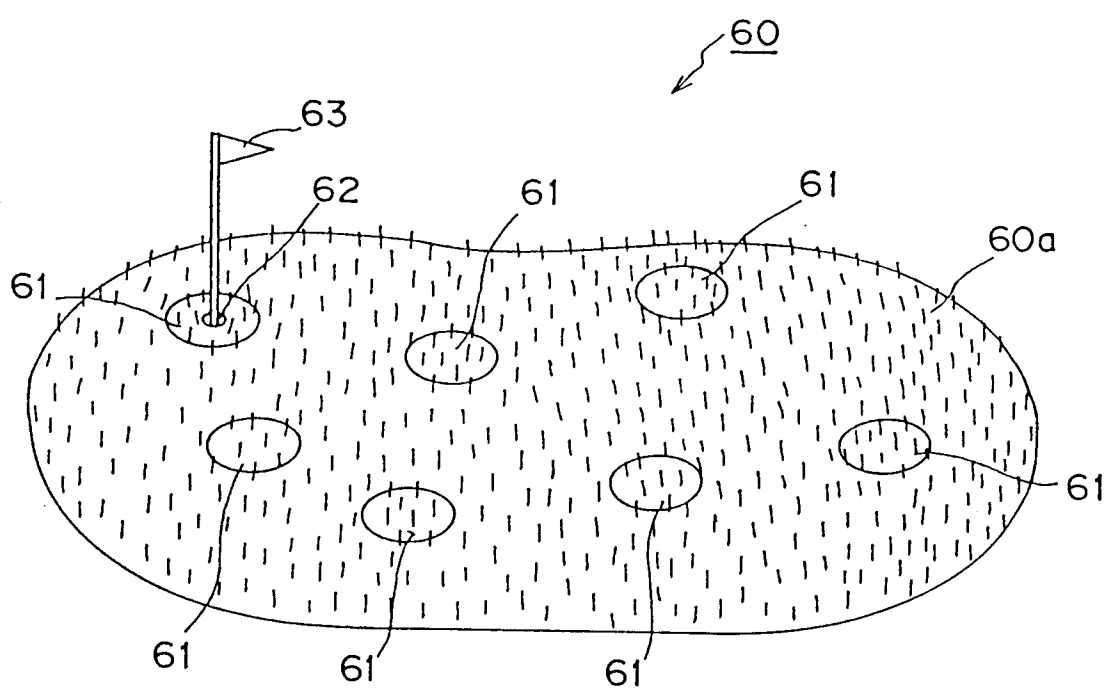


F i g . 3 9

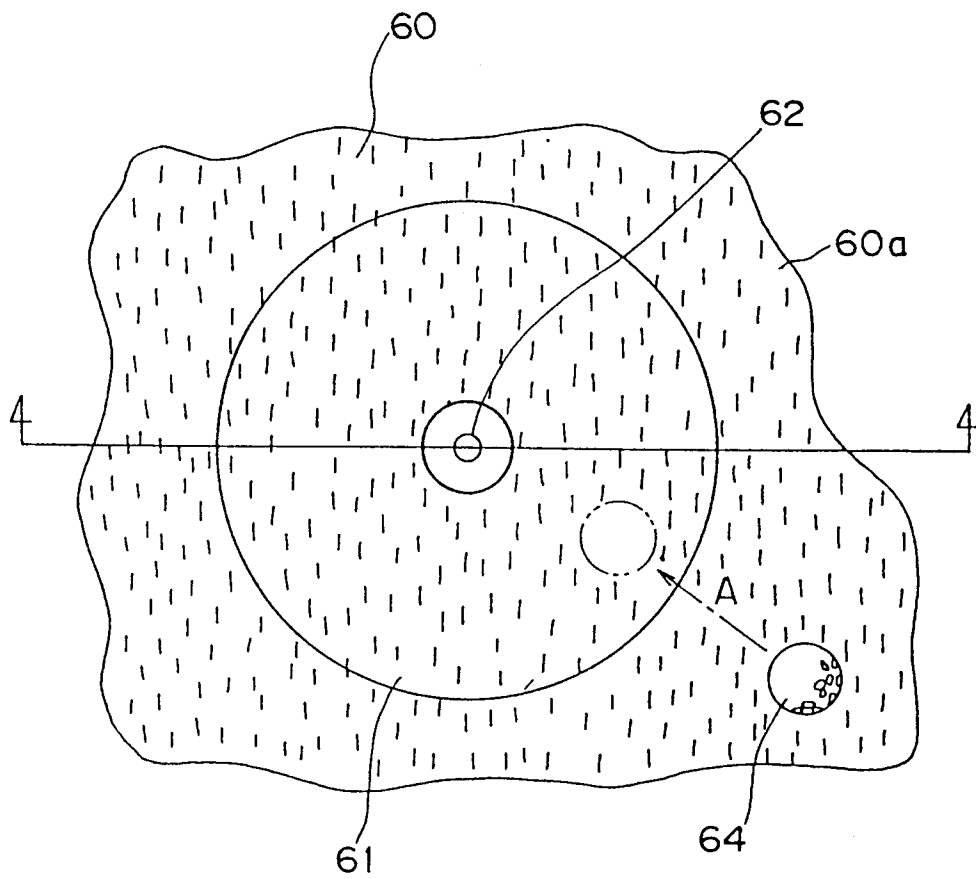


F i g . 4 0

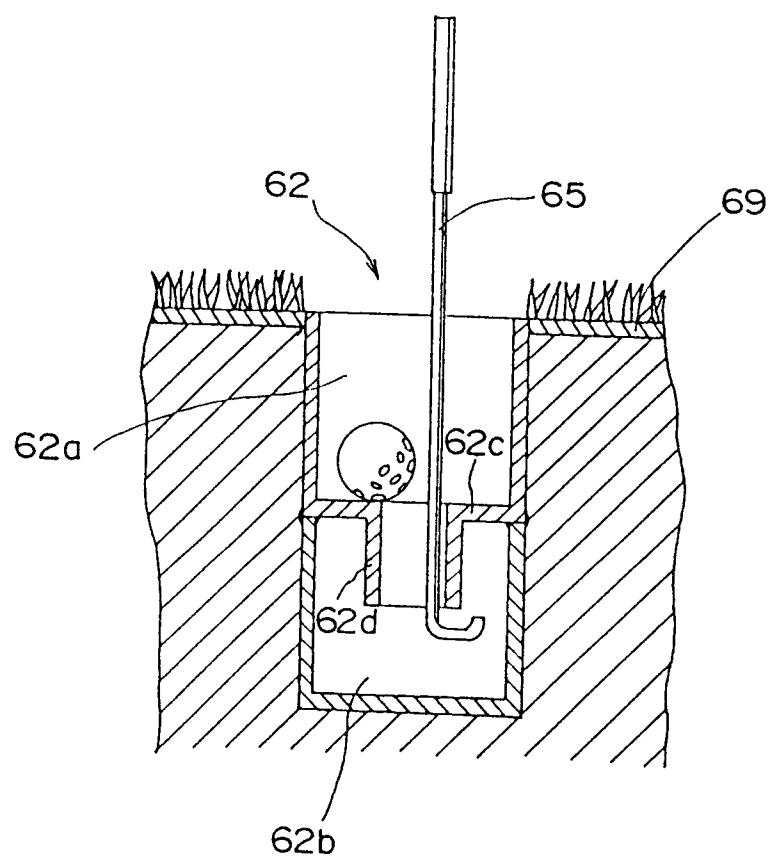




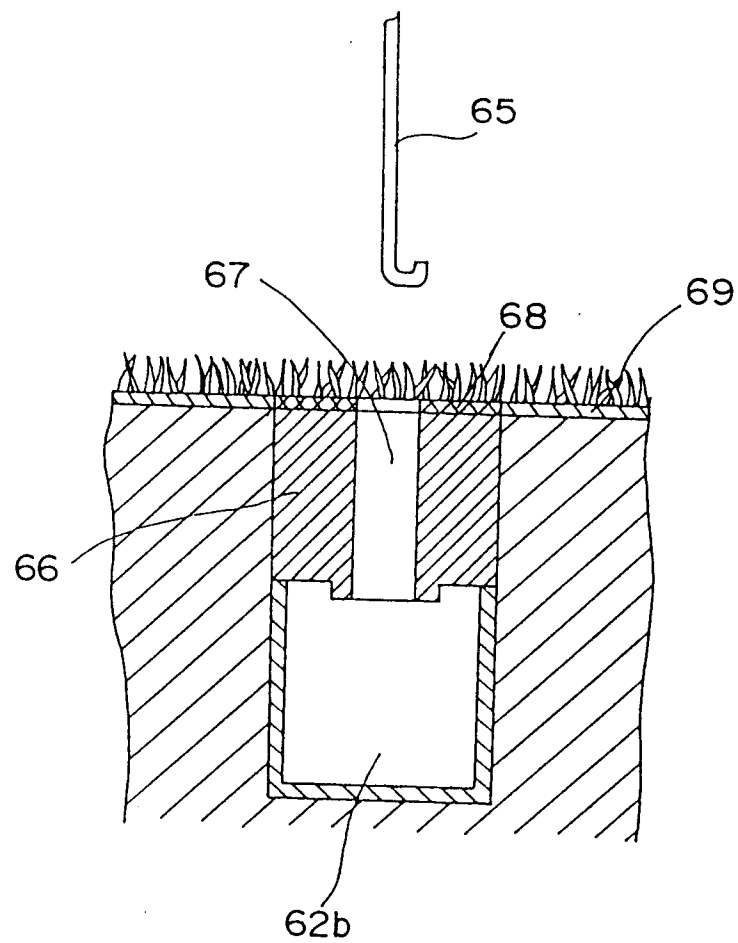
F i g . 4 1



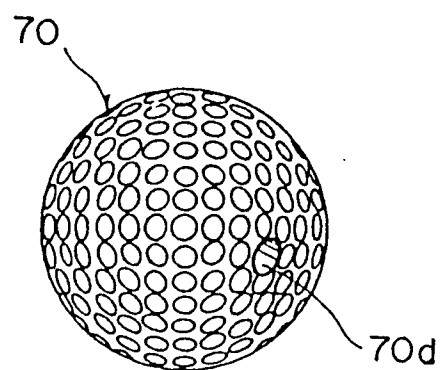
F i g . 4 2



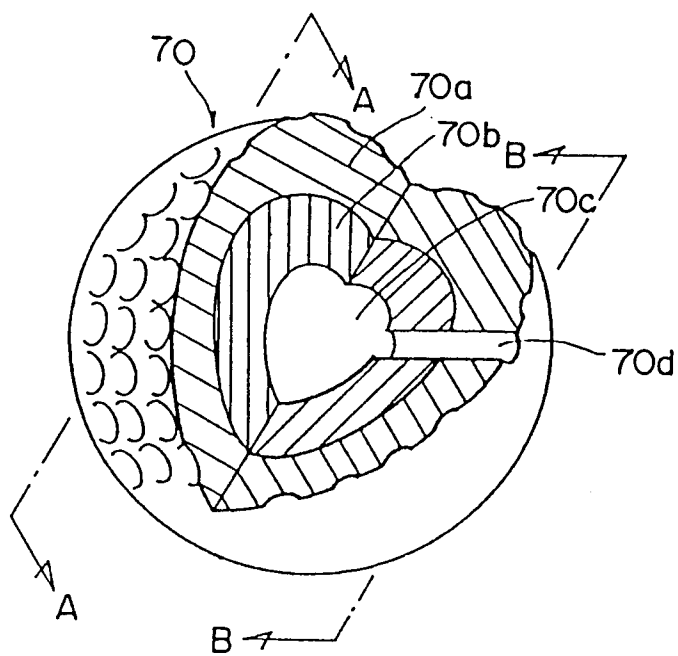
F i g . 4 3



F i g . 4 4



F i g . 4 5



F i g . 4 6

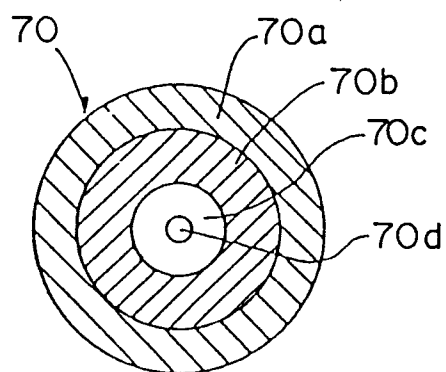


Fig. 47

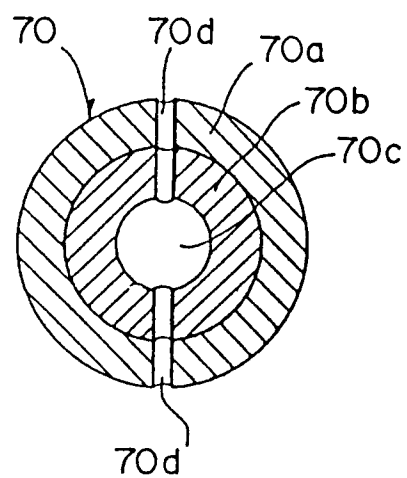


Fig. 48

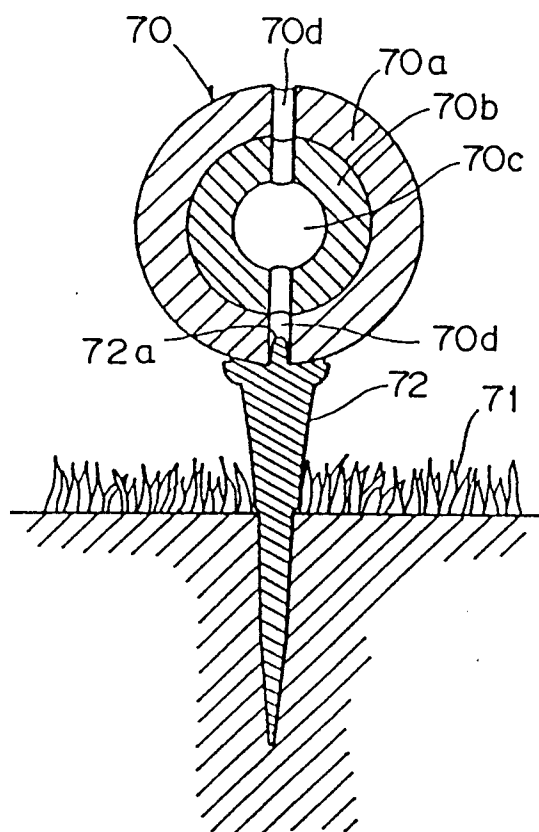
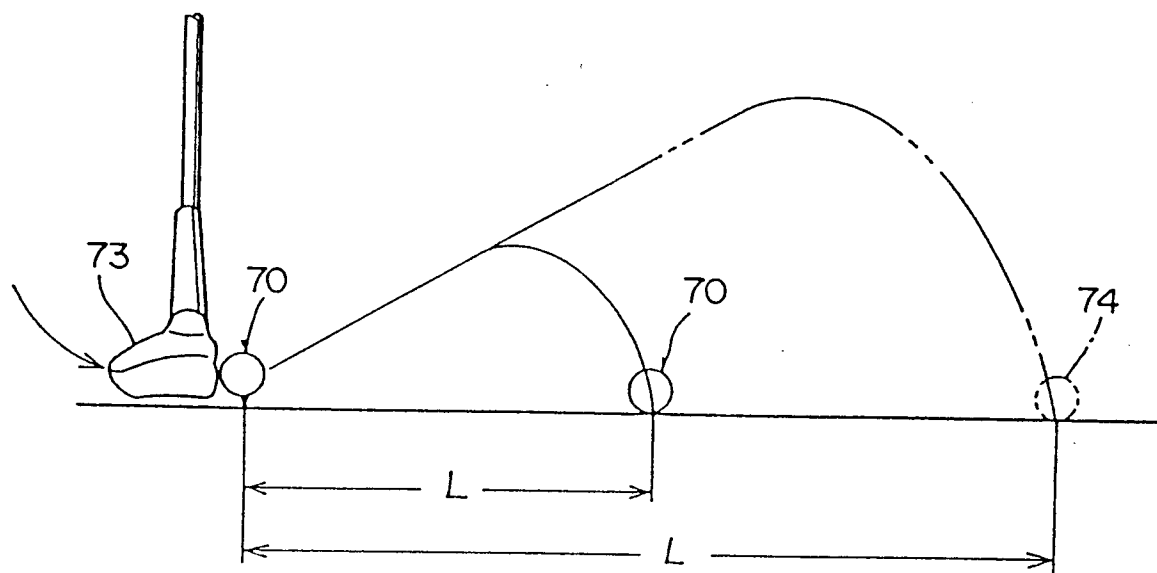
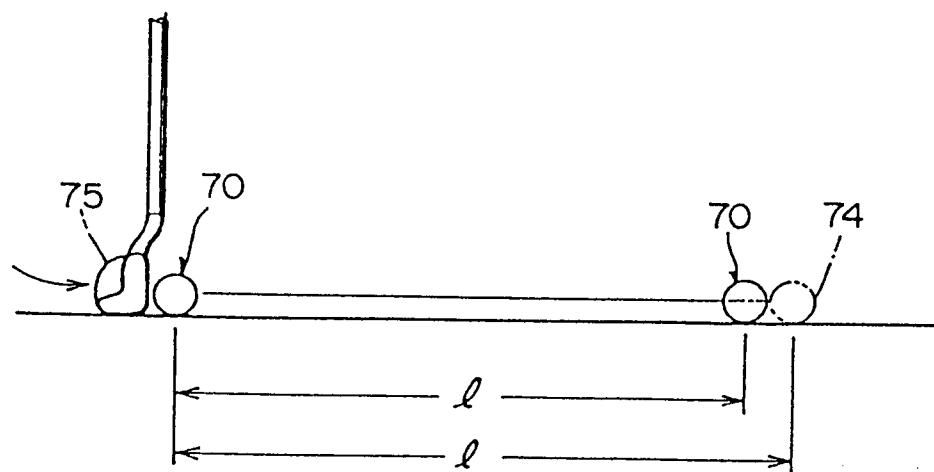


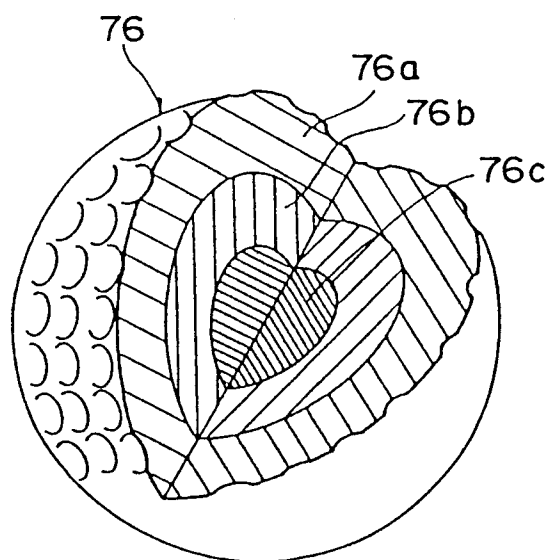
Fig. 49



F i g . 5 0



F i g . 5 1



F i g . 5 2



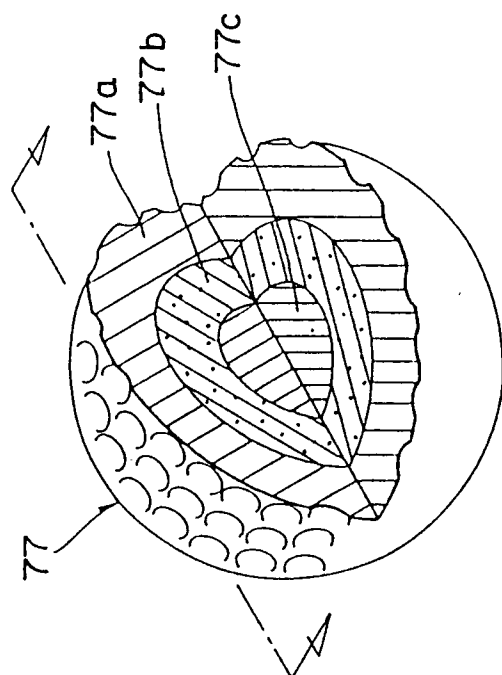


Fig. 53

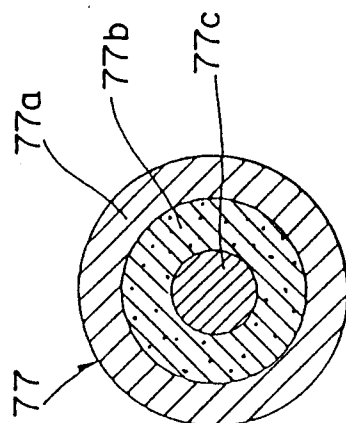


Fig. 54

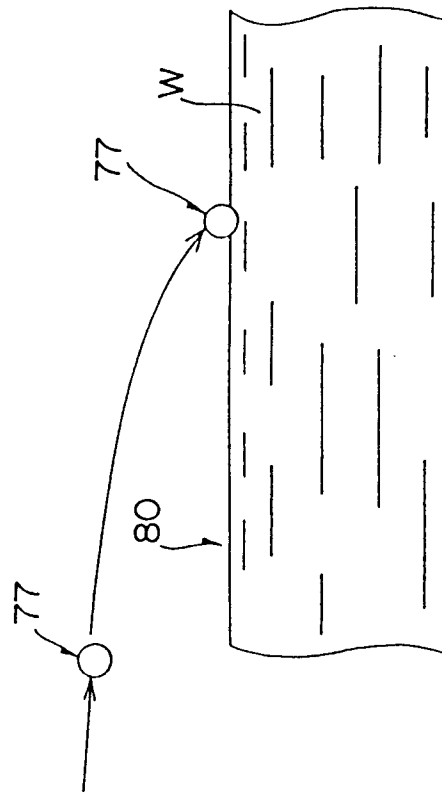
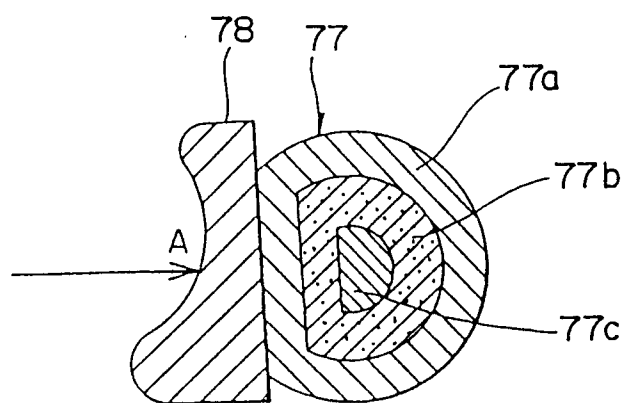
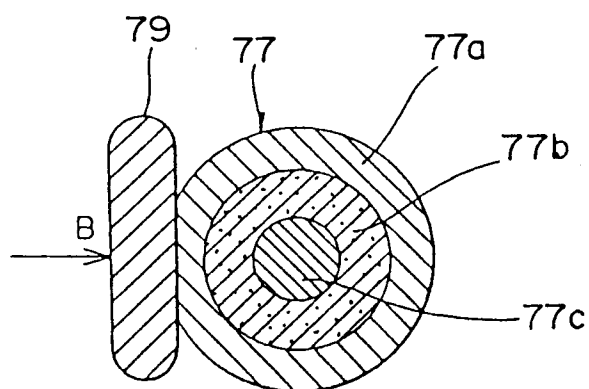


Fig. 55



F i g . 5 6



F i g . 5 7

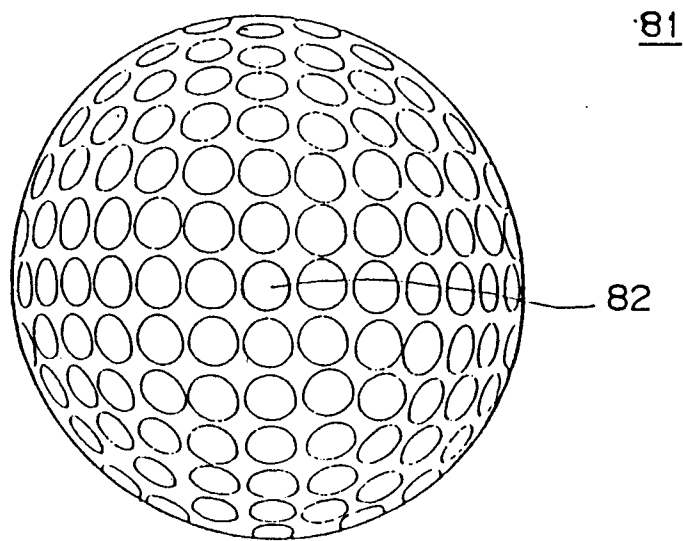


Fig. 58

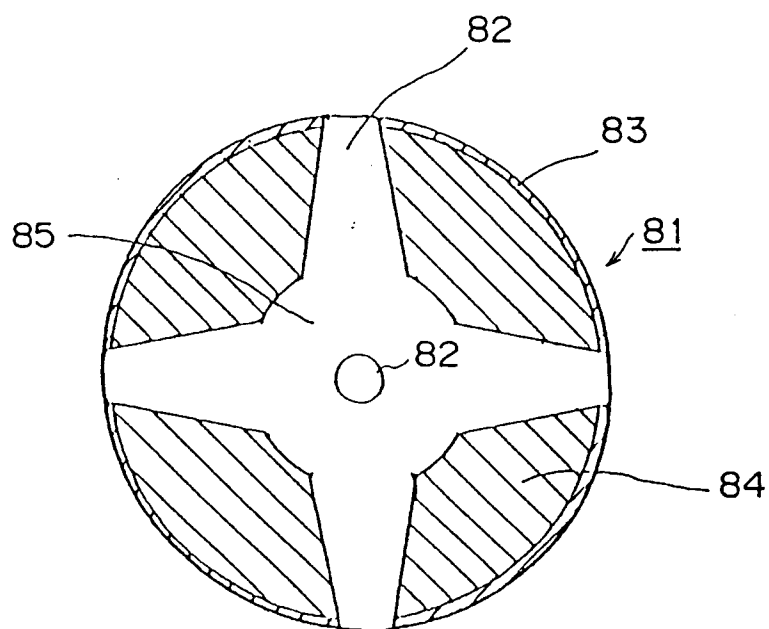
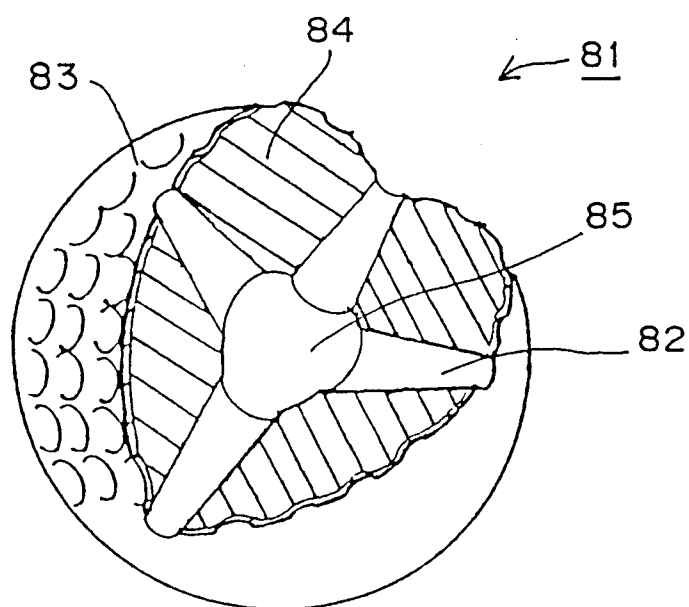


Fig. 59



F i g . 6 0

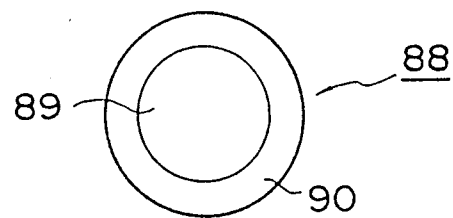


Fig. 62



Fig. 63

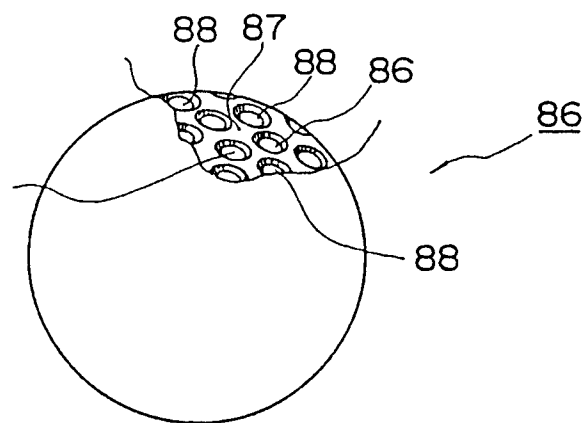


Fig. 61

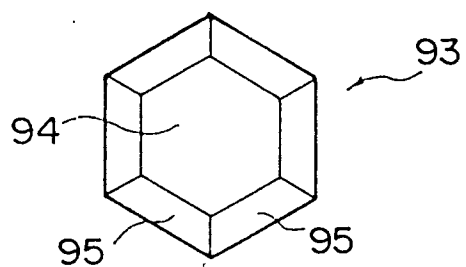


Fig. 65

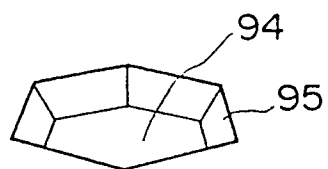


Fig. 66

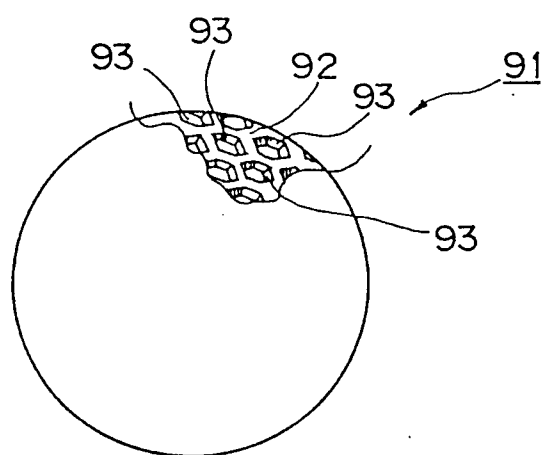
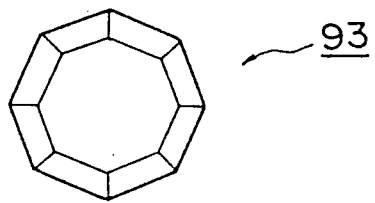
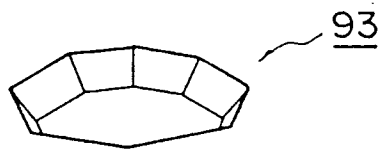


Fig. 64

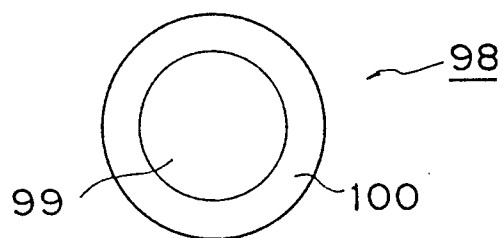


F i g . 6 7

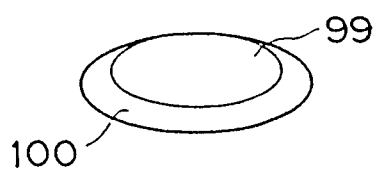


F i g . 6 8

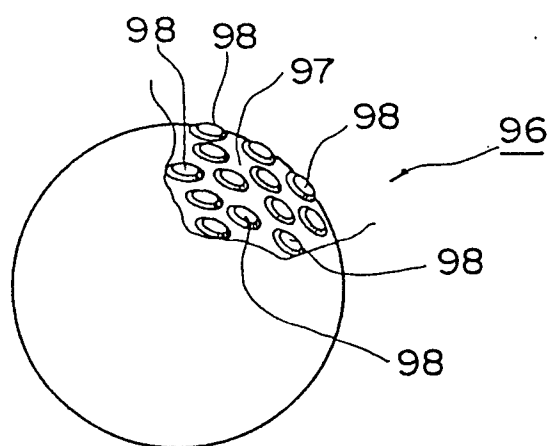




F i g . 7 0



F i g . 7 1



F i g . 6 9

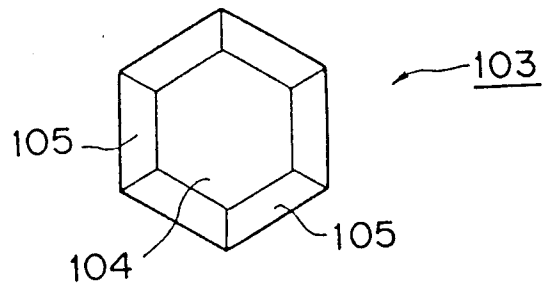


Fig. 73

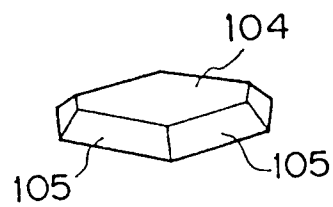


Fig. 74

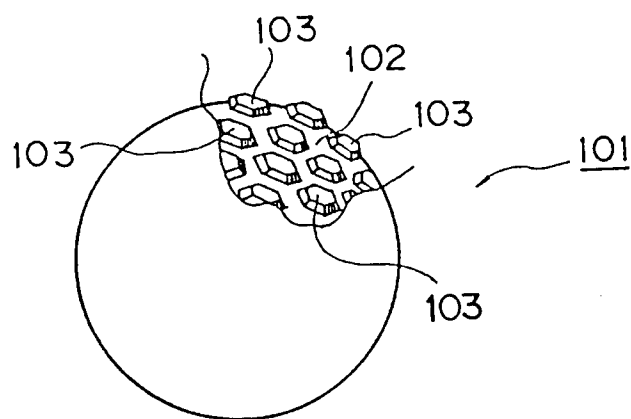


Fig. 72

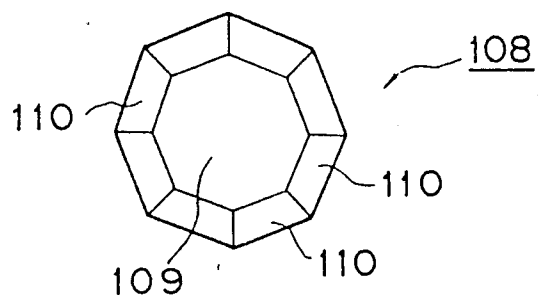


Fig. 76

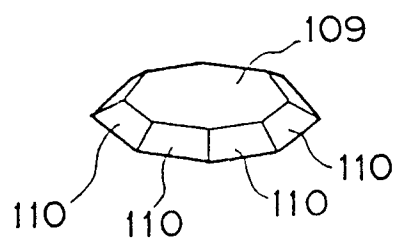


Fig. 77

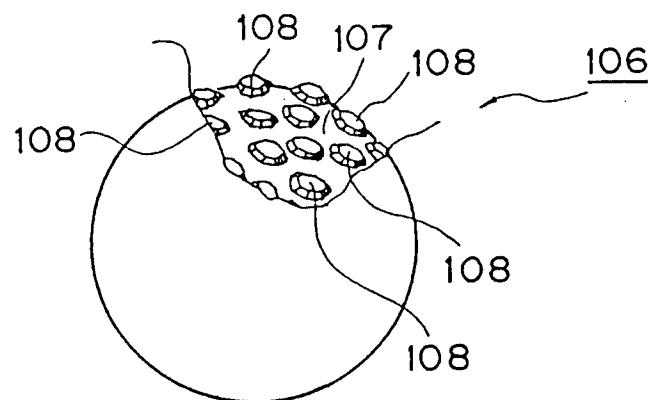


Fig. 75

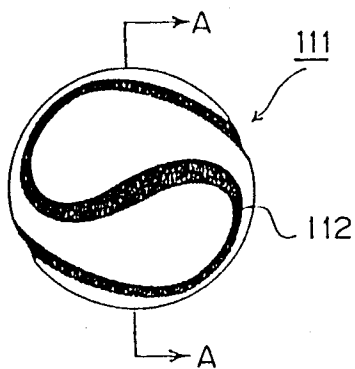


Fig. 78

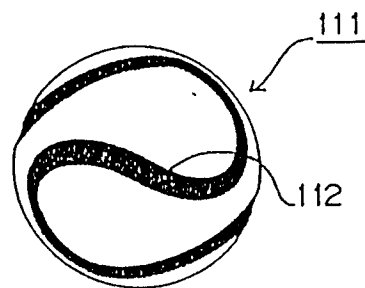


Fig. 79

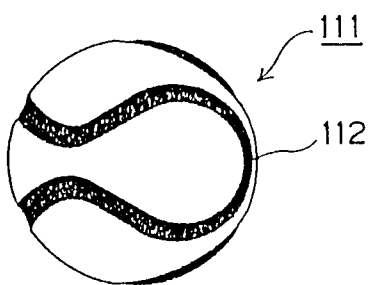


Fig. 80

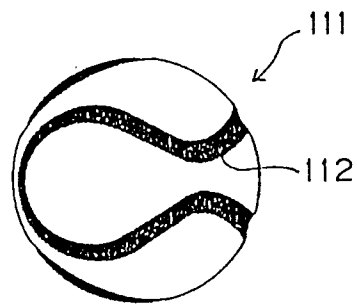


Fig. 81

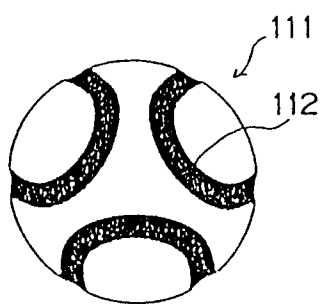


Fig. 82

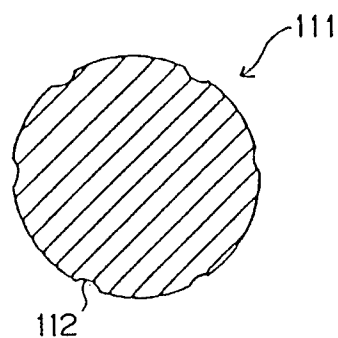


Fig. 84

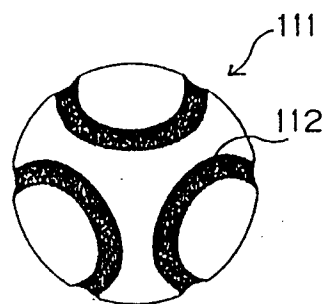


Fig. 83

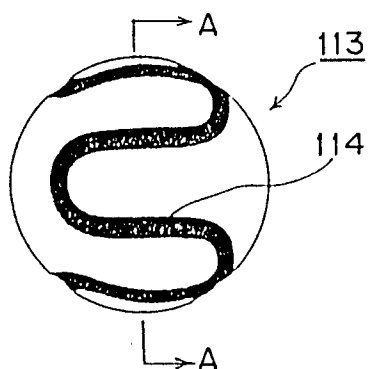


Fig. 85

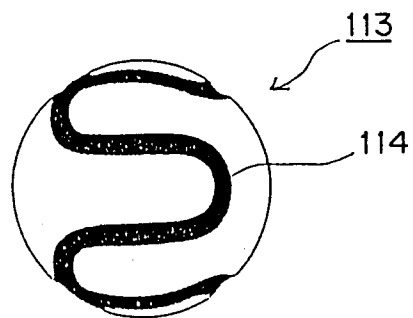


Fig. 86

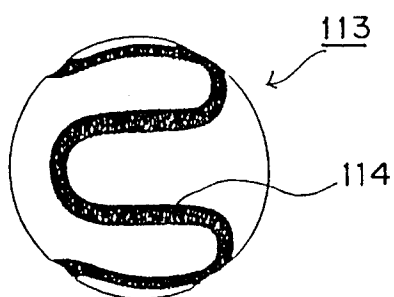


Fig. 87

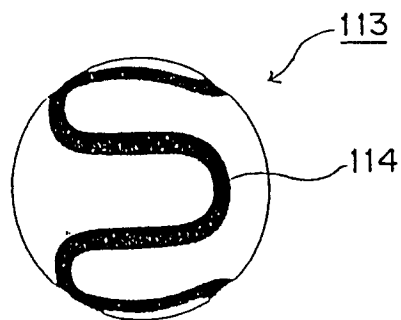


Fig. 88

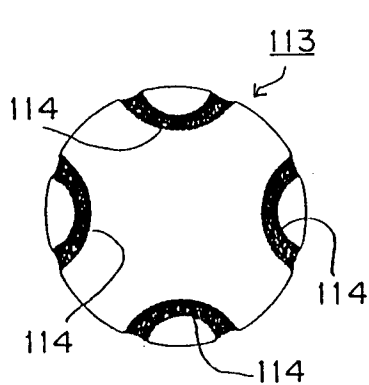


Fig. 89

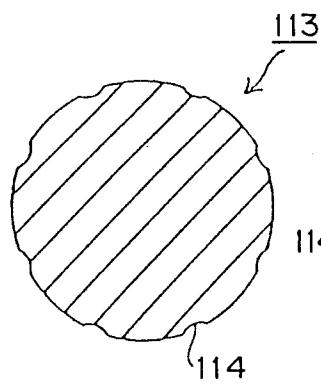


Fig. 91

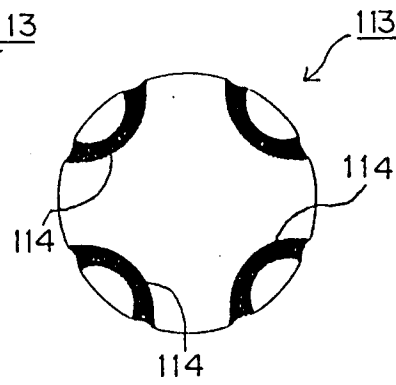


Fig. 90

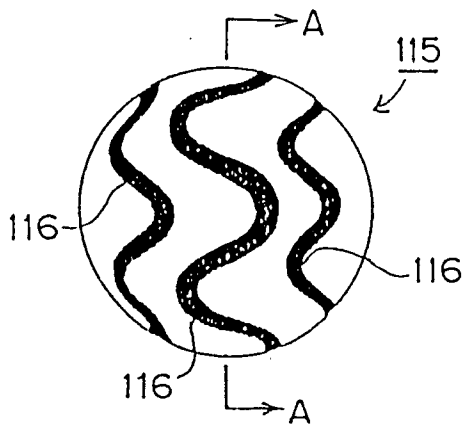


Fig. 92

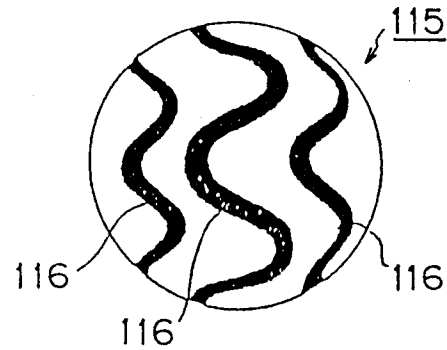


Fig. 93

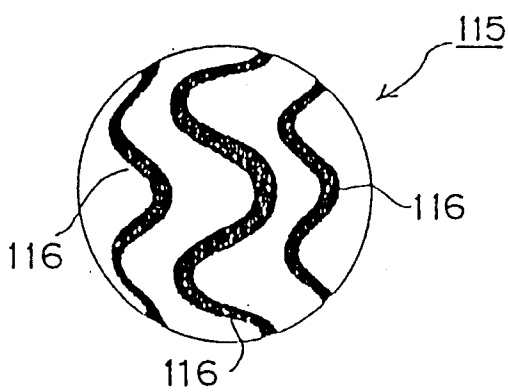


Fig. 94

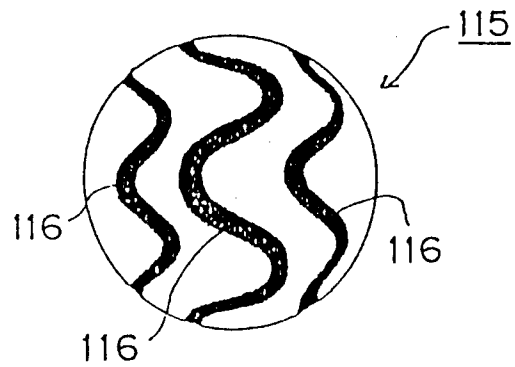


Fig. 95

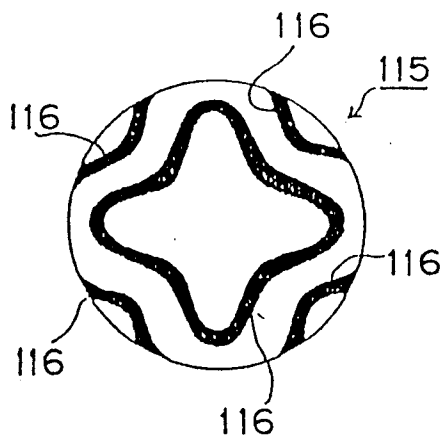


Fig. 96

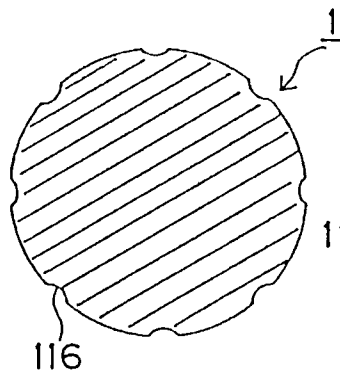


Fig. 98

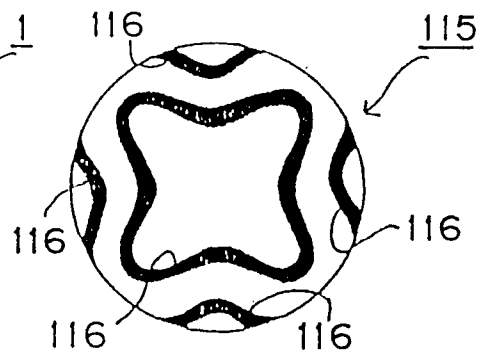


Fig. 97

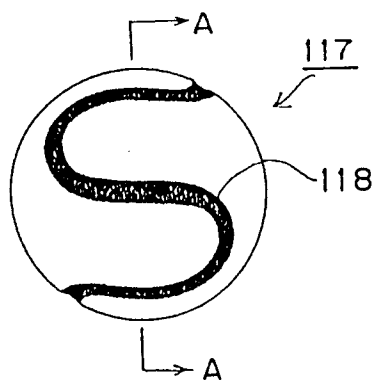


Fig. 99

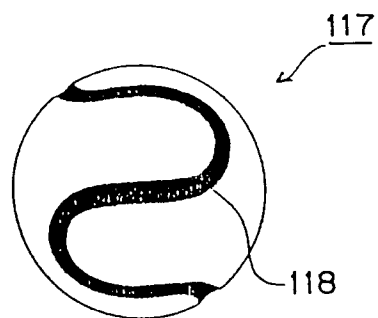


Fig. 100

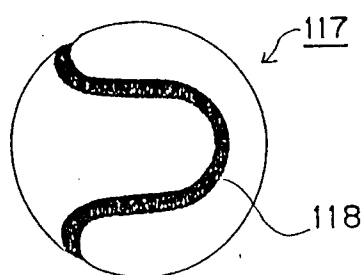


Fig. 101

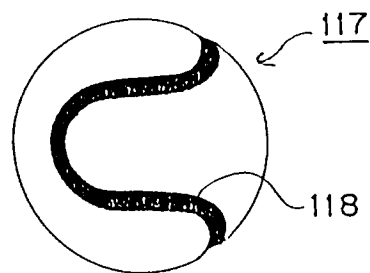


Fig. 102

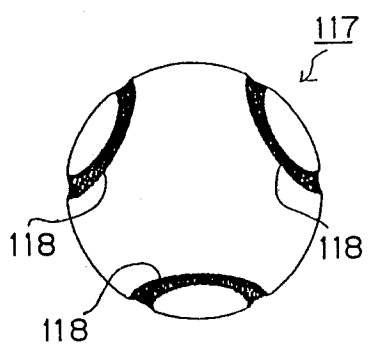


Fig. 103

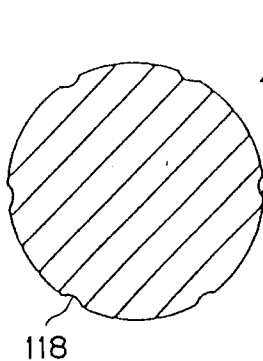


Fig. 105

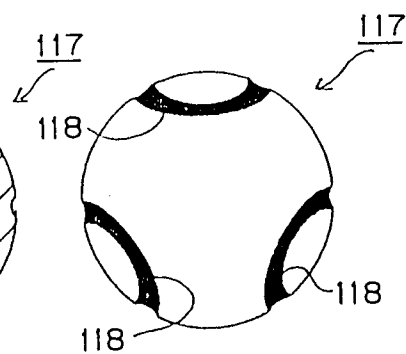


Fig. 104

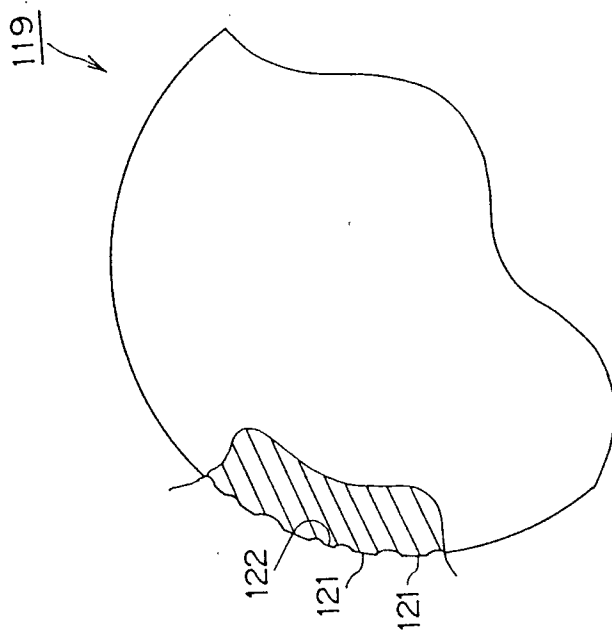


Fig. 107

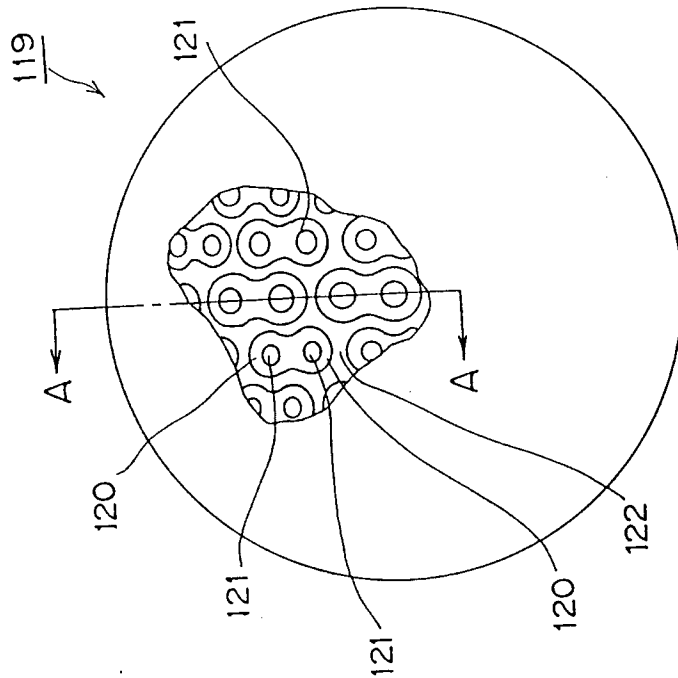


Fig. 106



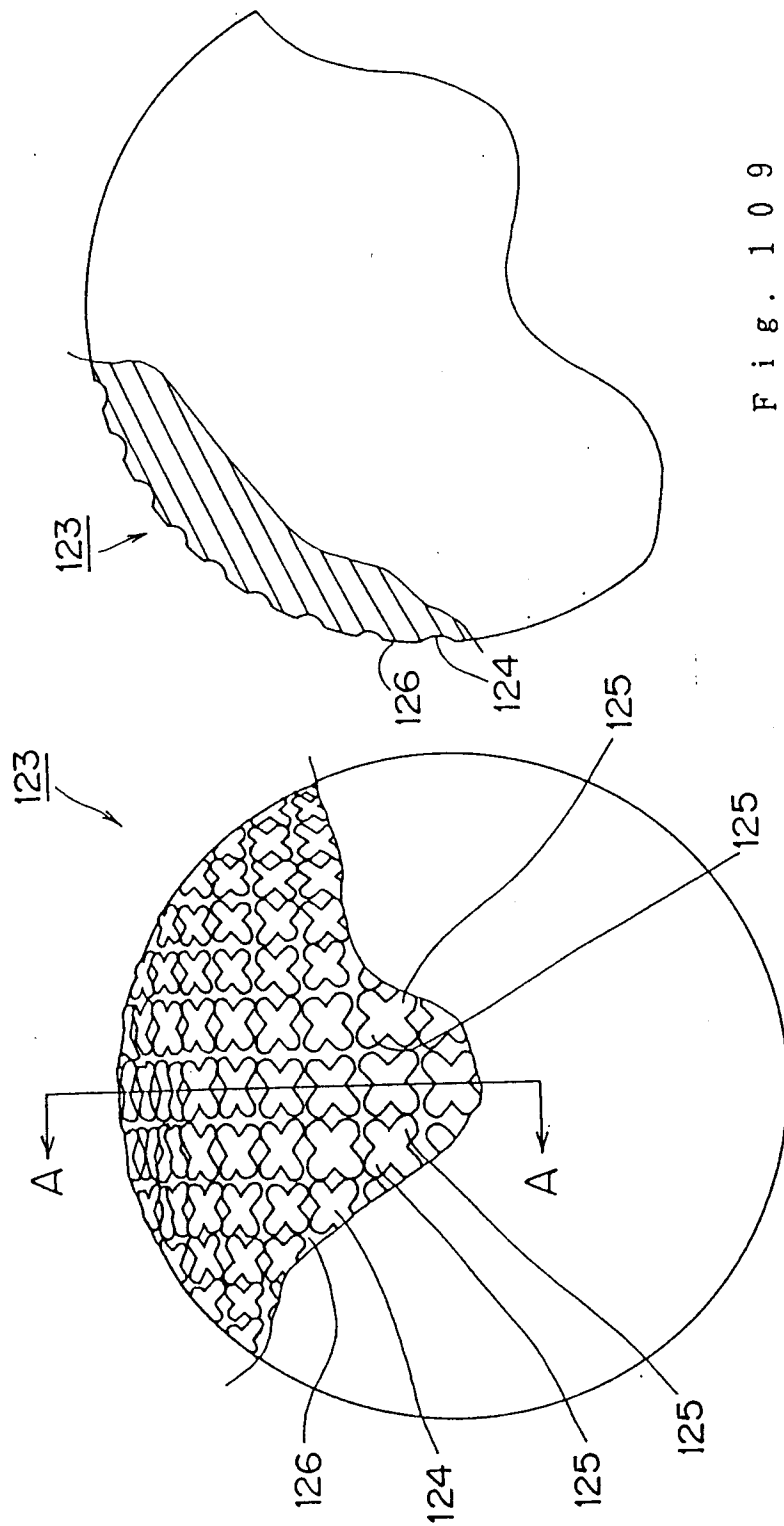


Fig. 108

Fig. 109

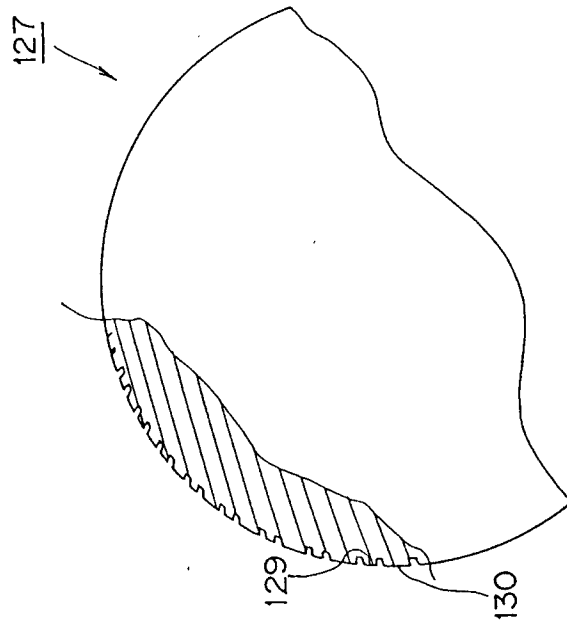


Fig. 111

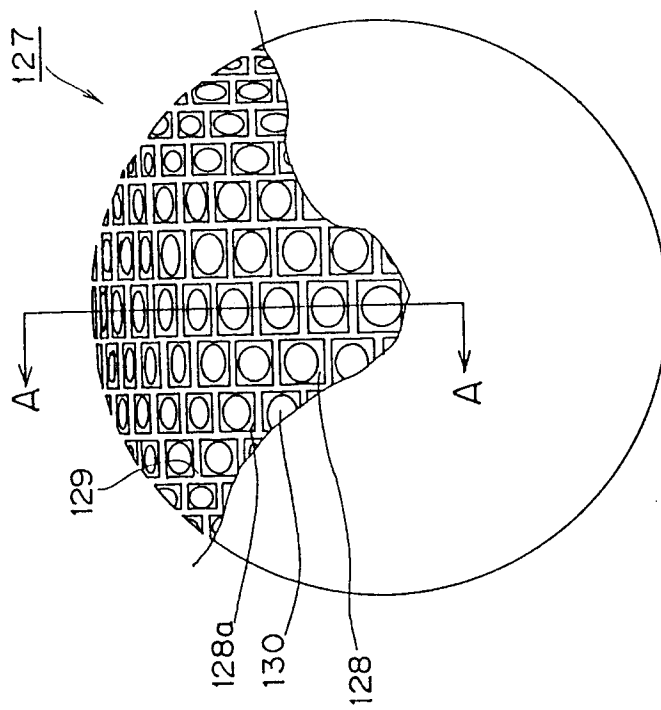


Fig. 110

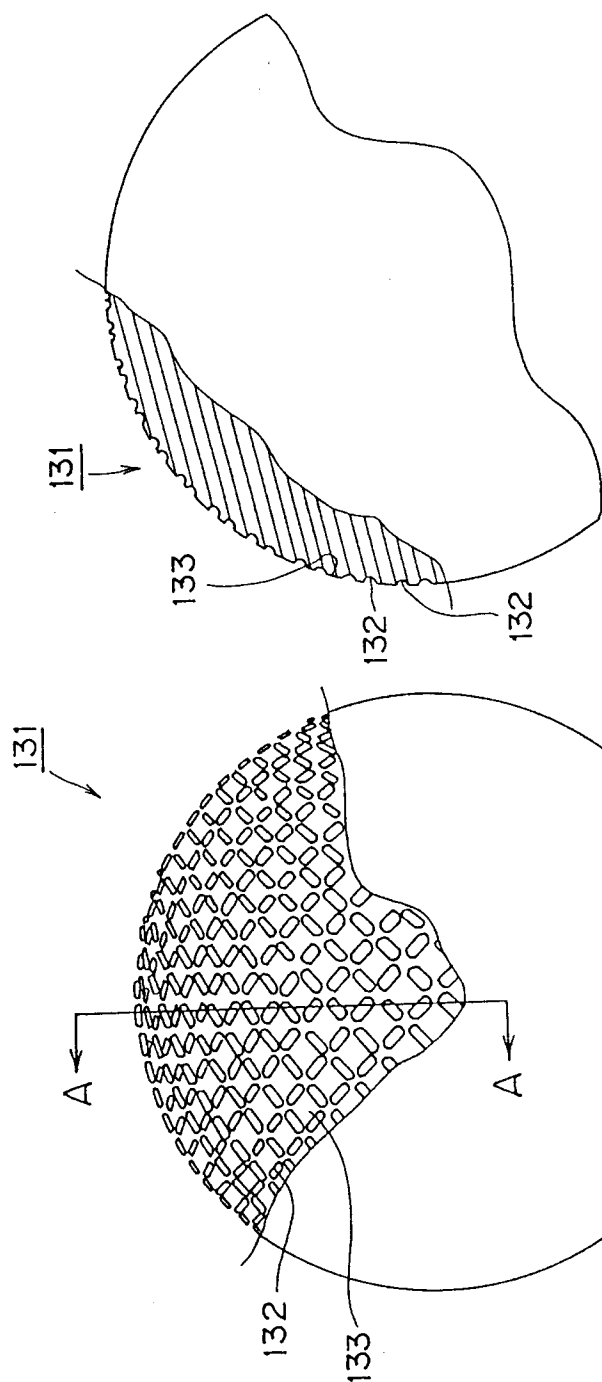


Fig. 113

Fig. 112

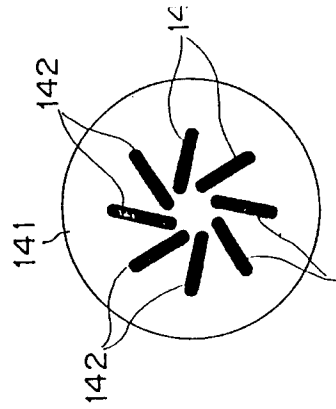


Fig. 120

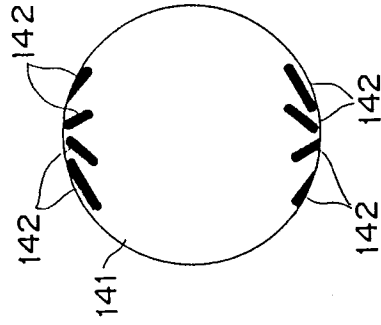


Fig. 121

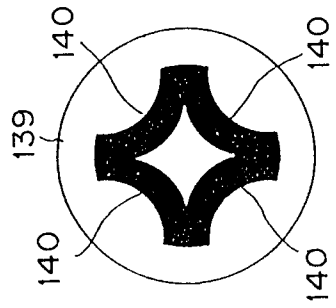


Fig. 118

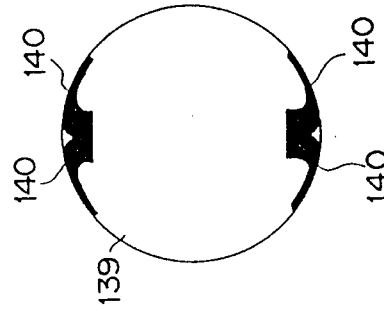


Fig. 119

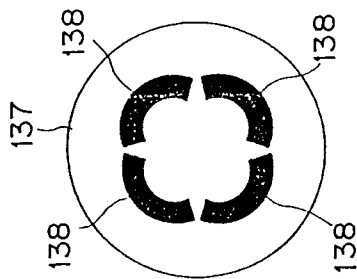


Fig. 116

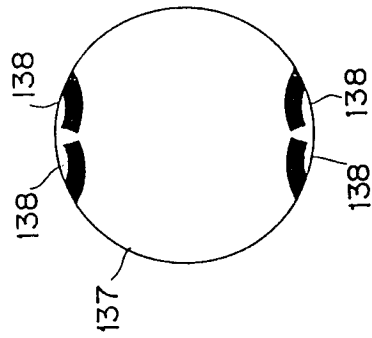


Fig. 117

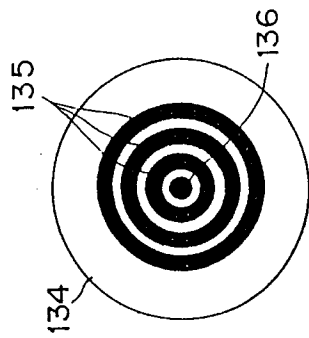


Fig. 114

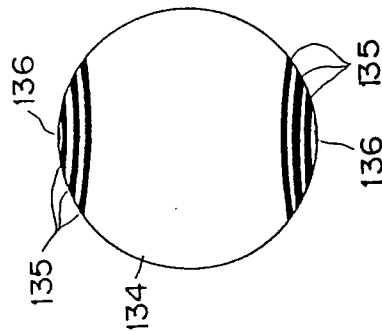


Fig. 115

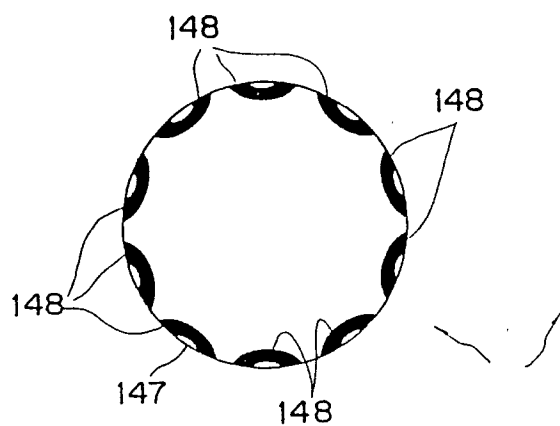


Fig. 127

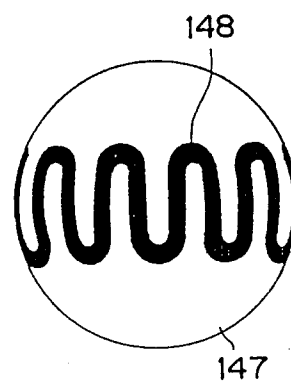


Fig. 126

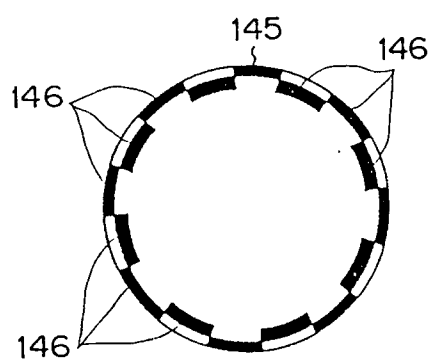


Fig. 125

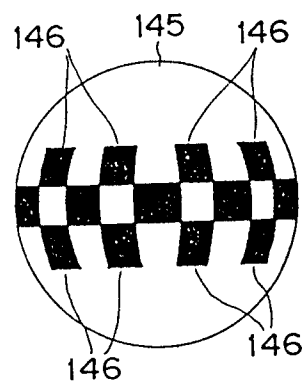


Fig. 124

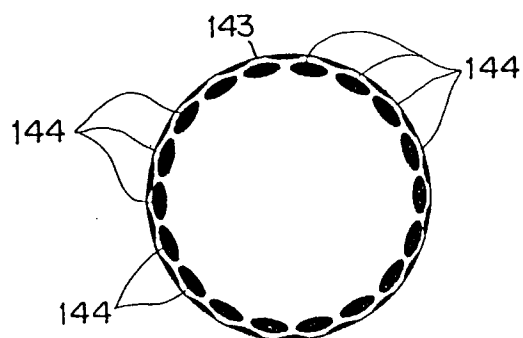


Fig. 123

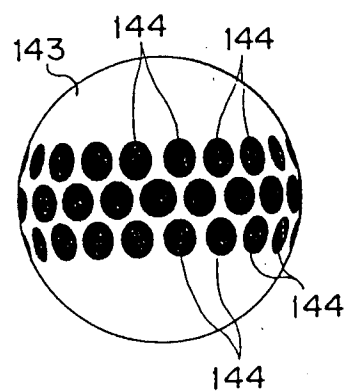


Fig. 122

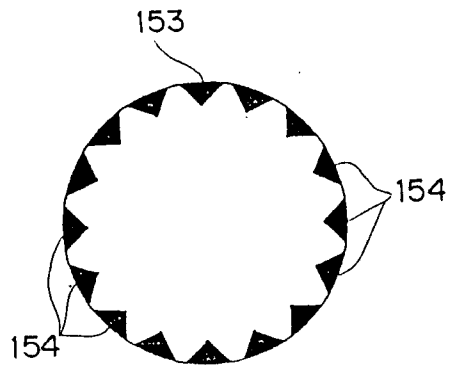


Fig. 133

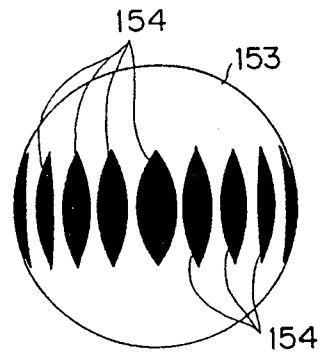


Fig. 132

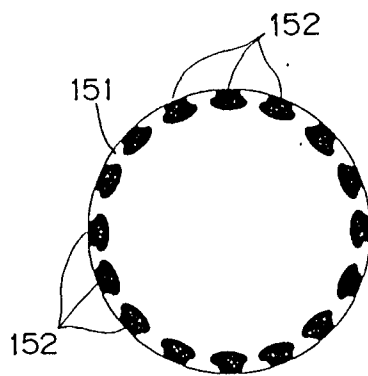


Fig. 131

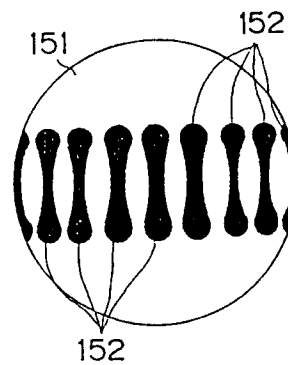


Fig. 130

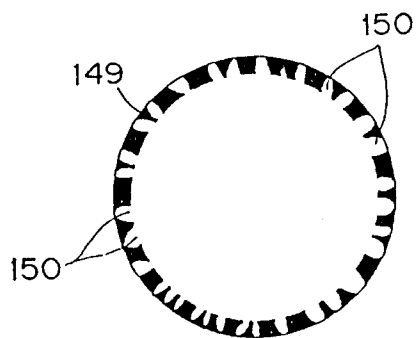


Fig. 129

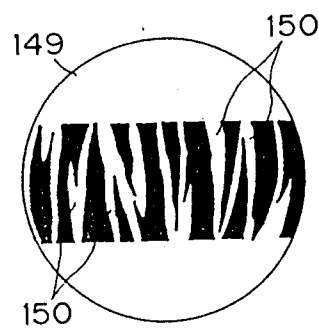


Fig. 128

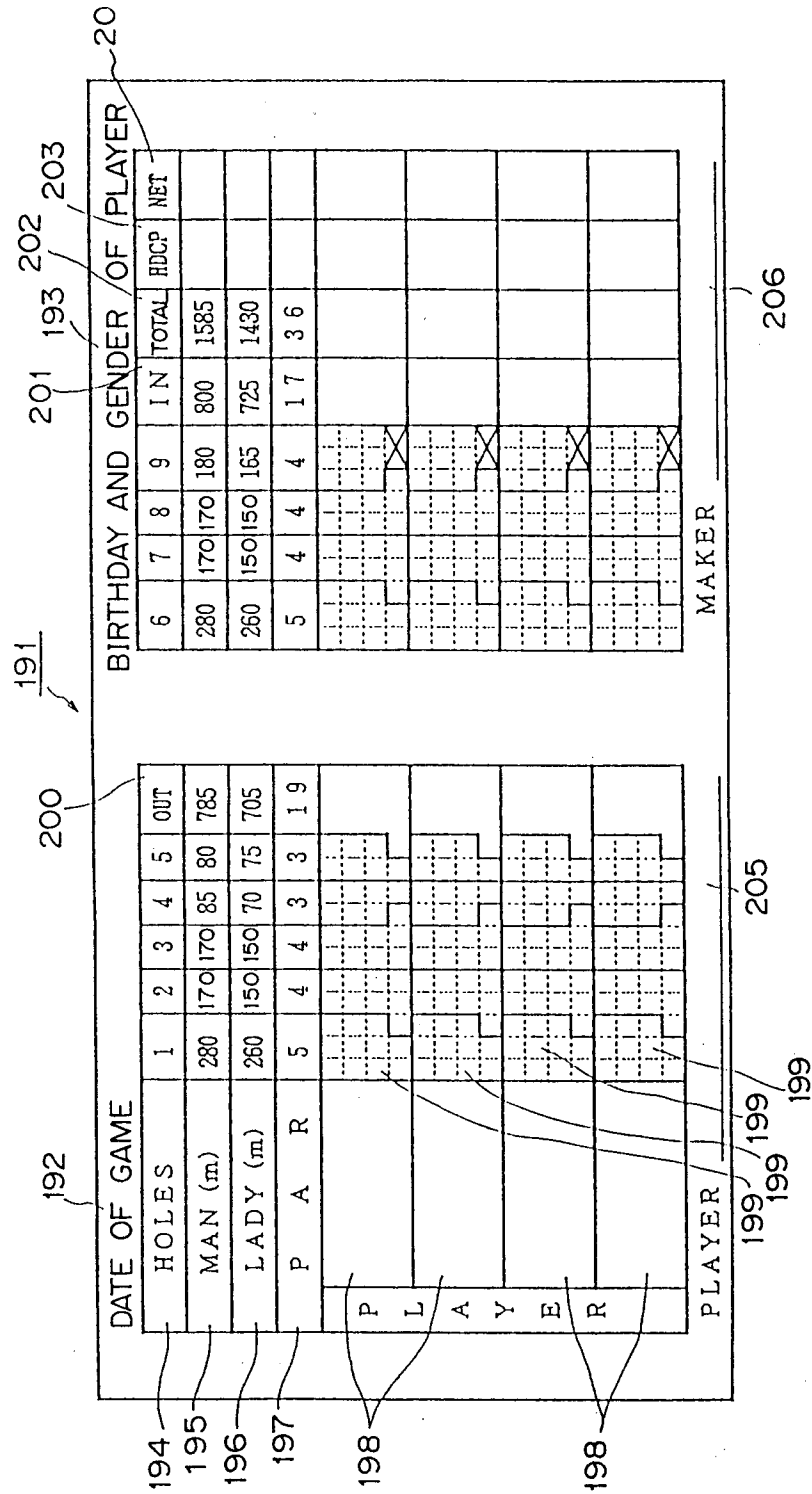
|             |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
|-------------|-------|-------|-----|-------|-----|-----|-----|-----|-----|-------------------|-----|--|--|--|--|--|--|--|--|
| 155         |       |       |     |       |     |     |     |     |     | 159               |     |  |  |  |  |  |  |  |  |
| 158         |       |       |     |       |     |     |     |     |     | 157               |     |  |  |  |  |  |  |  |  |
| CONPETITION |       |       |     |       |     |     |     |     |     | DATE              |     |  |  |  |  |  |  |  |  |
| PLAYER      |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
| HOLES       | 1     | 2     | 3   | 4     | 5   | OUT | 6   | 7   | 8   | 9                 | IN  |  |  |  |  |  |  |  |  |
| MAN(m)      | 280   | 170   | 170 | 85    | 80  | 785 | 280 | 170 | 170 | 180               | 800 |  |  |  |  |  |  |  |  |
| LADY(m)     | 260   | 150   | 150 | 70    | 75  | 705 | 260 | 150 | 150 | 165               | 725 |  |  |  |  |  |  |  |  |
| HDCP        |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
| P A R       | 5     | 4     | 4   | 3     | 3   | 19  | 5   | 4   | 4   | 4                 | 17  |  |  |  |  |  |  |  |  |
|             |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
|             |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
|             |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
|             |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
|             |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
| TOTAL SCORE |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
|             | M     | A     | N   | LADEY | PAR |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
| OUT         | 785m  | 705m  | 19  |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
| IN          | 800m  | 725m  | 17  |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
| TOTAL       | 1585m | 1430m | 36  |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
| HANDICAP    |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
| NET SCOPRE  |       |       |     |       |     |     |     |     |     |                   |     |  |  |  |  |  |  |  |  |
|             |       |       |     |       |     |     |     |     |     | 172               |     |  |  |  |  |  |  |  |  |
|             |       |       |     |       |     |     |     |     |     | PLAYERS SIGNATURE |     |  |  |  |  |  |  |  |  |
|             |       |       |     |       |     |     |     |     |     | MAKERS SIGNATURE  |     |  |  |  |  |  |  |  |  |
|             |       |       |     |       |     |     |     |     |     | 173               |     |  |  |  |  |  |  |  |  |

Fig. 134

| 176 177 178 179 174<br>COMPETITION                |       |      |      |     | 180 181<br>PLAYER |  |  |  |
|---------------------------------------------------|-------|------|------|-----|-------------------|--|--|--|
| NO                                                | (HDP) | MAN  | LADY | PAR |                   |  |  |  |
| 1                                                 | ( )   | 280  | 260  | 5   |                   |  |  |  |
| 2                                                 | ( )   | 170  | 150  | 4   |                   |  |  |  |
| 3                                                 | ( )   | 175  | 155  | 4   |                   |  |  |  |
| 4                                                 | ( )   | 85   | 70   | 3   |                   |  |  |  |
| 5                                                 | ( )   | 85   | 75   | 3   |                   |  |  |  |
| O U T                                             |       | 795  | 710  | 19  |                   |  |  |  |
|                                                   |       |      |      |     |                   |  |  |  |
| NO                                                | (HDP) | MEN  | LADY | PAR |                   |  |  |  |
| 6                                                 | ( )   | 280  | 260  | 5   |                   |  |  |  |
| 7                                                 | ( )   | 170  | 150  | 4   |                   |  |  |  |
| 8                                                 | ( )   | 175  | 150  | 4   |                   |  |  |  |
| 9                                                 | ( )   | 180  | 165  | 4   |                   |  |  |  |
| I N                                               |       | 805  | 725  | 17  |                   |  |  |  |
| O U T                                             |       | 795  | 710  | 19  |                   |  |  |  |
| TOTAL                                             |       | 1600 | 1435 | 36  |                   |  |  |  |
| HANDICAP                                          |       |      |      |     |                   |  |  |  |
| NET SCORE                                         |       |      |      |     |                   |  |  |  |
| 187<br>PLAYER'S NAME _____                        |       |      |      |     |                   |  |  |  |
| 188 190 189<br>ACCOMPANYING (PLAYER'S NAME) _____ |       |      |      |     |                   |  |  |  |
| DATA OF GAME _____                                |       |      |      |     |                   |  |  |  |

Fig. 135





Fi 5. 136

207

208 209 217

|                    |             |     |     |     |     |     |     |    |     |    |     |                    |  |  |  |
|--------------------|-------------|-----|-----|-----|-----|-----|-----|----|-----|----|-----|--------------------|--|--|--|
| CONPETITION        |             |     |     |     |     |     |     |    |     |    |     | DATE               |  |  |  |
| PLAYER             |             |     |     |     |     |     |     |    |     |    |     |                    |  |  |  |
| 210                | HOLES       | 1   | 2   | 3   | 4   | 5   | 6   | 7  | 8   | 9  | IN  | TOTAL              |  |  |  |
| 211                | MAN(YARDS)  | 240 | 150 | 155 | 245 | 790 | 155 | 80 | 170 | 75 | 160 | 1430               |  |  |  |
| 212                | LADY(YARDS) | 220 | 130 | 135 | 215 | 700 | 140 | 70 | 155 | 65 | 145 | 1275               |  |  |  |
| 213                | HDCP        |     |     |     |     |     |     |    |     |    |     |                    |  |  |  |
| 214                | PAR         | 5   | 4   | 4   | 5   | 18  | 4   | 3  | 4   | 18 | 36  |                    |  |  |  |
| 215                |             |     |     |     |     |     |     |    |     |    |     |                    |  |  |  |
| 215                |             |     |     |     |     |     |     |    |     |    |     |                    |  |  |  |
| 215                |             |     |     |     |     |     |     |    |     |    |     |                    |  |  |  |
| 215                |             |     |     |     |     |     |     |    |     |    |     |                    |  |  |  |
| PLAYER'S SIGNATURE |             |     |     |     |     |     |     |    |     |    |     | MARKER'S SIGNATURE |  |  |  |

218 219

Fig. 137

| COMPETITION                |       |      |      |     | PLAYER |  |  |  |
|----------------------------|-------|------|------|-----|--------|--|--|--|
| NO                         | (HDP) | MAN  | LADY | PAR |        |  |  |  |
| 1                          | ( )   | 240  | 220  | 5   |        |  |  |  |
| 2                          | ( )   | 150  | 130  | 4   |        |  |  |  |
| 3                          | ( )   | 155  | 135  | 4   |        |  |  |  |
| 4                          | ( )   | 245  | 215  | 5   |        |  |  |  |
| OUT                        |       | 790  | 700  | 18  |        |  |  |  |
| NO                         | HDP   | MEN  | LADY | PAR |        |  |  |  |
| 5                          | ( )   | 155  | 140  | 4   |        |  |  |  |
| 6                          | ( )   | 80   | 70   | 3   |        |  |  |  |
| 7                          | ( )   | 170  | 155  | 4   |        |  |  |  |
| 8                          | ( )   | 75   | 65   | 3   |        |  |  |  |
| 9                          | ( )   | 160  | 145  | 4   |        |  |  |  |
| IN                         |       | 640  | 575  | 18  |        |  |  |  |
| OUT                        |       | 790  | 700  | 18  |        |  |  |  |
| TOTAL                      |       | 1430 | 1275 | 36  |        |  |  |  |
| PLAYER'S NAME              |       |      |      |     |        |  |  |  |
| ACCOMPANYING PLAYER'S NAME |       |      |      |     |        |  |  |  |
| DATA OF GAME               |       |      |      |     |        |  |  |  |

Fig. 138

231

|                    |             |     |     |    |     |     |     |    |     |     |     |                    |     |     |     |          |     |
|--------------------|-------------|-----|-----|----|-----|-----|-----|----|-----|-----|-----|--------------------|-----|-----|-----|----------|-----|
| 232                |             | 240 |     |    |     |     |     |    |     |     |     | 241                |     | 233 |     | 242      |     |
| COMpetition        |             |     |     |    |     |     |     |    |     |     |     | DATE               |     | .   |     |          |     |
| PLAYER             |             |     |     |    |     |     |     |    |     |     |     |                    |     |     |     |          |     |
| 234                | HOLES       | 1   | 2   | 3  | OUT |     |     |    |     |     |     | CENTER             |     |     |     | IN TOTAL |     |
| 235                | MAN(YARDS)  | 240 | 150 | 80 | 470 | 240 | 150 | 80 | 470 | 240 | 150 | 80                 | 470 | 240 | 150 | 80       | 470 |
| 236                | LADY(YARDS) | 220 | 130 | 70 | 420 | 220 | 130 | 70 | 420 | 220 | 130 | 70                 | 420 | 220 | 130 | 70       | 420 |
| 237                | HDCP        |     |     |    |     |     |     |    |     |     |     |                    |     |     |     |          |     |
| 238                | P A R       | 5   | 4   | 3  | 12  | 5   | 4   | 3  | 12  | 5   | 4   | 3                  | 12  | 5   | 4   | 3        | 12  |
| 239                |             |     |     |    |     |     |     |    |     |     |     |                    |     |     |     |          | 36  |
| 239                |             |     |     |    |     |     |     |    |     |     |     |                    |     |     |     |          |     |
| 239                |             |     |     |    |     |     |     |    |     |     |     |                    |     |     |     |          |     |
| 239                |             |     |     |    |     |     |     |    |     |     |     |                    |     |     |     |          |     |
| PLAYER'S SIGNATURE |             |     |     |    |     |     |     |    |     |     |     | MARKER'S SIGNATURE |     |     |     |          |     |
| 243                |             |     |     |    |     |     |     |    |     |     |     | 244                |     |     |     |          |     |

Fig. 139

| COMPETITION                |       |      |      |     | PLAYER |  |  |  |
|----------------------------|-------|------|------|-----|--------|--|--|--|
| NO                         | (HDP) | MAN  | LADY | PAR |        |  |  |  |
| 1                          | ( )   | 240  | 220  | 5   |        |  |  |  |
| 2                          | ( )   | 150  | 130  | 4   |        |  |  |  |
| 3                          | ( )   | 80   | 70   | 3   |        |  |  |  |
| OUT                        |       | 470  | 420  | 12  |        |  |  |  |
| CENTER                     |       |      |      |     |        |  |  |  |
| 1                          | ( )   | 240  | 220  | 5   |        |  |  |  |
| 2                          | ( )   | 150  | 130  | 4   |        |  |  |  |
| 3                          | ( )   | 80   | 70   | 3   |        |  |  |  |
| IN                         |       | 470  | 420  | 12  |        |  |  |  |
| CENTER                     |       | 470  | 420  | 12  |        |  |  |  |
| OUT                        |       | 470  | 420  | 12  |        |  |  |  |
| TOTAL                      |       | 1410 | 1260 | 36  |        |  |  |  |
| PLAYER'S NAME              |       |      |      |     |        |  |  |  |
| ACCOMPANYING PLAYER'S NAME |       |      |      |     |        |  |  |  |
| DATE OF GAME               |       |      |      |     |        |  |  |  |

Fig. 140.

Fi 8. 141

| DATE OF GAME |               |   |   |   |         | BIRTHDAY AND GENDER OF PLAYE |   |   |             |   |   |   |     |           |         |       |  |
|--------------|---------------|---|---|---|---------|------------------------------|---|---|-------------|---|---|---|-----|-----------|---------|-------|--|
|              | H O L E S     | 1 | 2 | 3 | O U T / | 4                            | 5 | 6 | C E N T E R | 7 | 8 | 9 | I N | T O T A L | H D C P | N E T |  |
| P            | B A C K (m)   |   |   |   |         |                              |   |   |             |   |   |   |     |           |         |       |  |
| L            | F R O N T (m) |   |   |   |         |                              |   |   |             |   |   |   |     |           |         |       |  |
| A            | P A R         | 5 | 4 | 3 | 12      | 5                            | 4 | 3 | 12          | 5 | 4 | 3 | 12  | 36        |         |       |  |
| Y            |               |   |   |   |         |                              |   |   |             |   |   |   |     |           |         |       |  |
| E            |               |   |   |   |         |                              |   |   |             |   |   |   |     |           |         |       |  |
| R            |               |   |   |   |         |                              |   |   |             |   |   |   |     |           |         |       |  |
| P L A Y E R  |               |   |   |   |         |                              |   |   |             |   |   |   |     |           |         |       |  |
| M A K E R    |               |   |   |   |         |                              |   |   |             |   |   |   |     |           |         |       |  |

Fig. 142

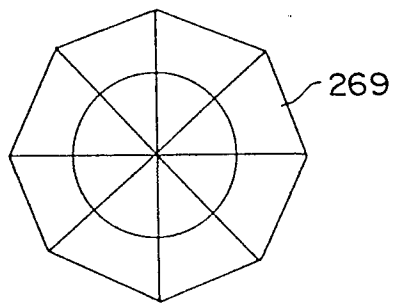


Fig. 143

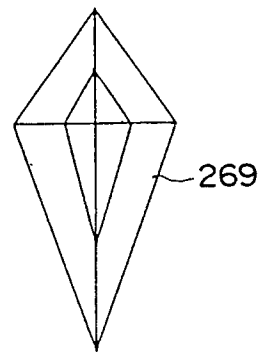


Fig. 144

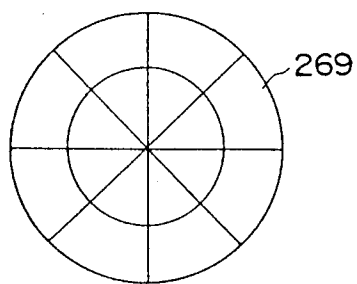


Fig. 145

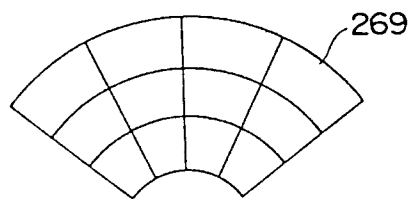


Fig. 146

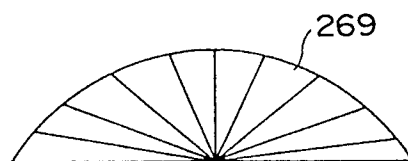


Fig. 147



# INTERNATIONAL SEARCH REPORT

International Application No PCT/JP91/00437

|                                                                                                                                    |                                                                                                                                                                                |                                     |
|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| <b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) *                               |                                                                                                                                                                                |                                     |
| According to International Patent Classification (IPC) or to both National Classification and IPC                                  |                                                                                                                                                                                |                                     |
| Int. Cl <sup>5</sup> A63C19/00, A63B37/00, A63B67/02                                                                               |                                                                                                                                                                                |                                     |
| <b>II. FIELDS SEARCHED</b>                                                                                                         |                                                                                                                                                                                |                                     |
| Minimum Documentation Searched <sup>7</sup>                                                                                        |                                                                                                                                                                                |                                     |
| Classification System                                                                                                              | Classification Symbols                                                                                                                                                         |                                     |
| IPC                                                                                                                                | A63C19/00, A63B37/00, A63B67/02                                                                                                                                                |                                     |
| Documentation Searched other than Minimum Documentation<br>to the Extent that such Documents are Included in the Fields Searched * |                                                                                                                                                                                |                                     |
| Jitsuyo Shinan Koho                                                                                                                | 1926 - 1991                                                                                                                                                                    |                                     |
| Kokai Jitsuyo Shinan Koho                                                                                                          | 1971 - 1991                                                                                                                                                                    |                                     |
| <b>III. DOCUMENTS CONSIDERED TO BE RELEVANT *</b>                                                                                  |                                                                                                                                                                                |                                     |
| Category *                                                                                                                         | Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>                                                                 | Relevant to Claim No. <sup>13</sup> |
| X                                                                                                                                  | JP, A, 61-64271 (Hiroyasu Ozaki),<br>April 2, 1986 (02. 04. 86),<br>(Family: none)                                                                                             | 1                                   |
| X                                                                                                                                  | JP, A, 62-170277 (Andrew J. Carrigan),<br>July 27, 1987 (27. 07. 87)<br>& US, A, 4,660,834 & GB, AO, 8,700,713<br>& GB, AI, 2,185,191 & AU, AI, 6,752,187<br>& AU, B2, 582,520 | 2                                   |
| X                                                                                                                                  | JP, U, 53-63971 (Kiyohiko Ikeya),<br>May 30, 1978 (30. 05. 78),<br>(Family: none)                                                                                              | 4                                   |
| X                                                                                                                                  | JP, A, 63-125703 (Tamapack K.K.),<br>May 28, 1988 (28. 05. 88),<br>(Family: none)                                                                                              | 6                                   |
| Y                                                                                                                                  | JP, A, 62-170277 (Andrew J. Carrigan),<br>July 27, 1987 (27. 07. 87)                                                                                                           | 1, 3-35                             |
| Y                                                                                                                                  | JP, U, 53-63971 (Kiyohiko Ikeya),<br>May 30, 1978 (30. 05. 78)                                                                                                                 | 3                                   |
| * Special categories of cited documents: <sup>10</sup>                                                                             |                                                                                                                                                                                |                                     |
| "A"                                                                                                                                | document defining the general state of the art which is not considered to be of particular relevance                                                                           | "T"                                 |
| "E"                                                                                                                                | earlier document but published on or after the international filing date                                                                                                       | "X"                                 |
| "L"                                                                                                                                | document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)            | "Y"                                 |
| "O"                                                                                                                                | document referring to an oral disclosure, use, exhibition or other means                                                                                                       | "8"                                 |
| "P"                                                                                                                                | document published prior to the international filing date but later than the priority date claimed                                                                             |                                     |
| <b>IV. CERTIFICATION</b>                                                                                                           |                                                                                                                                                                                |                                     |
| Date of the Actual Completion of the International Search                                                                          | Date of Mailing of this International Search Report                                                                                                                            |                                     |
| May 24, 1991 (24. 05. 91)                                                                                                          | June 10, 1991 (10. 06. 91)                                                                                                                                                     |                                     |
| International Searching Authority                                                                                                  | Signature of Authorized Officer                                                                                                                                                |                                     |
| Japanese Patent Office                                                                                                             |                                                                                                                                                                                |                                     |

## FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

|   |                                                                                                              |           |
|---|--------------------------------------------------------------------------------------------------------------|-----------|
| Y | JP, A, 52-20140 (Honda Motor Co., Ltd.),<br>February 15, 1977 (15. 02. 77)                                   | 5         |
| Y | JP, A, 60-156482 (Toei Kenso K.K.),<br>August 16, 1985 (16. 08. 85),<br>(Family: none)                       | 8-10      |
| Y | JP, A, 62-270180 (Ceoda W. Torasco),<br>November 24, 1987 (24. 11. 87),<br>(Family: none)                    | 1-17      |
| Y | JP, B <sub>1</sub> , 47-47740 (Shiodo L. Baras),<br>December 1, 1972 (01. 12. 72),<br>(Family: none), Fig. 4 | 32-35, 17 |

V ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE <sup>1</sup>

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers \_\_\_\_\_, because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claim numbers \_\_\_\_\_, because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claim numbers \_\_\_\_\_, because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

VI ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING <sup>2</sup>

This International Searching Authority found multiple inventions in this international application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:
3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:
4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

## Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

**FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET**

|   |                                                                |                 |
|---|----------------------------------------------------------------|-----------------|
| Y | JP, A, 63-125703 (Tamapack K.K.),<br>May 28, 1988 (28. 05. 88) | 7, 11,<br>13-16 |
|---|----------------------------------------------------------------|-----------------|

**V ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE <sup>1</sup>**

This international search report has not been established in respect of certain claims under Article 17(2) (a) for the following reasons:

1. ☐ Claim numbers because they relate to subject matter not required to be searched by this Authority, namely:
  
2. ☐ Claim numbers because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
  
3. ☐ Claim numbers because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4(a).

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