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Publication number: **0 590 703 A1**

EUROPEAN PATENT APPLICATION

Application number: **93202424.3**

Int. Cl.⁵: **A63F 5/04**

Date of filing: **17.08.93**

Priority: **29.09.92 NL 9201681**

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Date of publication of application:
06.04.94 Bulletin 94/14

Designated Contracting States:
AT BE CH DE DK ES FR GB GR IE IT LI LU MC
NL PT SE

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Game of skill with a ball.

Equipment for a game in which a ball (4) is enabled to move via supply means to a rotating disk (3), to be referred to as number disk, provided with marked compartments, in which the ball can be received in one of the compartments, and in which participants choose one or more compartments in which they expect the ball to come to rest, in which the supply means (14) are designed for causing the ball to move through the supply means (14) in a manner which cannot be influenced, always accord-

ing to the same pattern of motion, and the number disk (3) can be driven at precisely the same speed in each case, whilst delay means (2) moving relatively to both the supply means (14) and the number disk (3) are arranged between the supply means (14) and number disk (3), such that the ball leaving the supply means (14) at the lower end thereof is brought via these delay means (2) onto the number disk (3) provided with compartments.

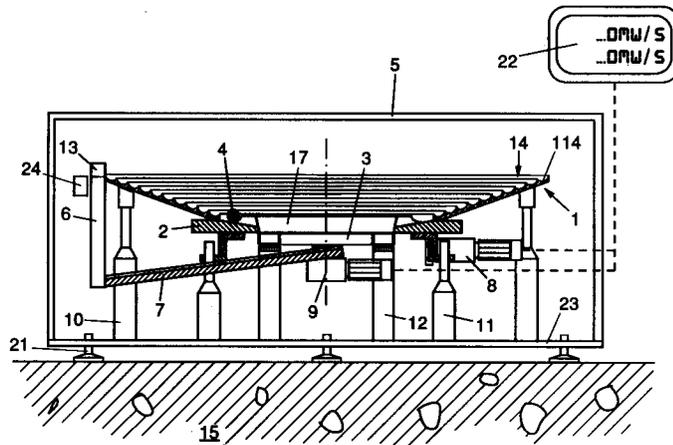


FIG. 2

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This invention relates to equipment for a game of the type in which a smooth spherical object, to be referred to as 'ball', is enabled to move via supply means to a disk, to be referred to as 'number disk', comprising numbered or otherwise marked compartments and rotating relatively to the supply means; in which the ball can be received in one of the compartments; in which the number disk can be driven at precisely the same speed in each case; and in which participants in the game, during at least a part of the time during which the ball moves through the supply means, choose one or more compartments in which they expect the ball to come to rest. Such gaming equipment is disclosed in German Offenlegungsschrift 34 35 956.

In games where the outcome of the game is mainly determined by the path of a ball relative to its surroundings, and the place where it comes to rest, a distinction is made between games of chance, such as French roulette, where the player does not have any influence on the odds of winning, and games of skill, where the player does have the possibility of influencing the odds of winning. In games of skill, a distinction is made between games where the player exerts an influence on the movements of the ball, directly or indirectly, such as for instance a pinball machine, and games where the player, on the basis of the motions of the ball during the game, is to predict the outcome thereof, without exerting any influence on the movement of the ball.

A game of the type described in the preamble is regarded as a game of skill only when, under the influence of the equipment, the course of the game is such that it is possible for the position of the various compartments relative to a ball located in or on the supply means, to be determined absolutely and consistently through observation, and that it can be calculated from that position in which sector of the number disk the ball will be received in one of the compartments. In other words, the odds of winning for the players of the game should, through skill at the game, be greater than the odds of winning as determined by pure chance.

For the game to proceed in the proper manner and in accordance with the rules, such game equipment should comprise a positioning and control device for leveling and adjusting the game equipment.

In the known device, the ball must be placed at the top end of the supply path and set in motion by hand. As a consequence, the velocity of motion and the pattern of motion of the ball, in spite of the spiral guide, is different in each round of the game, for instance as a result of the differences in initial velocity or spin of the ball, but, for instance, also as a result of possible static charging of the ball. The deviations involved are so large that the players

cannot predict the outcome of the game sufficiently accurately.

If the ball in such a device always moved to the number disk according to the same pattern of motion (which is not so), the game of the known design would be too easy because then the players could always predict the correct outcome of the game with only very little practice, since a direct and unique connection could be made between, on the one hand, the position of the number disk at the time when the ball is set in motion and, on the other hand, the position of the number disk at the time when the ball reaches the lower end of the supply path, without any further factor, which may or may not be constant and uniform, having any influence on the outcome of the game.

The object of the present invention is to provide equipment for a game of the type described in the preamble, with the aid of which equipment the game can be played as a game of skill, in which the outcome of the game can be predicted with reasonable certainty from a combination of at least three uniformly defined, independent factors, it being possible to increase this predictive possibility by practice, and in which one of the factors is formed by the pattern of motion of the ball, and a second factor is formed by the pattern of motion of the number disk.

To that end, the equipment is characterized in that the supply means are designed for causing the ball to move through the supply means in a manner which cannot be influenced, always according to the same pattern of motion, whilst delay means moving relatively to both the supply means and the number disk are arranged between the supply means and the number disk, such that the ball leaving the supply means is brought via these delay means onto the number disk provided with compartments.

Because the ball always moves according to the same pattern of motion via the supply means, it can be positively predicted when the ball will reach the end of the supply means. Because the motions of the number disk and the delay means are accurately defined, it can therefore be predicted what position they will be in at that time. From those positions it can then be predicted what position the number disk will be in when the ball can pass the delay means and, accordingly, in what compartment it will (probably) be received. The game equipment according to the invention therefore makes it possible to play a fair game, in which the players can influence their own chances of winning through observation and practice, without it being possible for the outcome of the game to be influenced by the conductors of the game, the players or through arbitrary factors, which game is sufficiently difficult to play.

In this connection, it is particularly advantageous when the players can simultaneously observe the motions of the ball moving in or on the supply means, preferably under the influence of gravity, and particularly the motions of the number disk and the delay means relatively thereto. To that end, the supply means can be designed as a sloping path extending along the inside of a truncated cone-shaped body with a wide, open top, with the number disk located at the narrow bottom of the truncated cone-shaped body.

In a preferred embodiment of the game equipment according to the invention, the delay means are equipped with a circular ring which, on one side thereof, connects to a discharge end of the supply means and, on the other side thereof, connects to the number disk, and comprises an upright edge divided into segments, with ball passages formed between the edge segments.

In a further elaboration of the game equipment, a stop is arranged at the lower end of the supply means, such that a ball coming from the supply means and resting against the stop can be supplied from the supply means to one of the compartments only when one of the ball passages is at least largely located adjacent the ball resting against the stop, so that the place where the ball will be received in one of the compartments is defined with respect to the supply means, regardless of the position of the delay means at the time when the ball leaves the lower end of the supply means.

For determining the position of the ball relative to the supply means, and for determining the time during which the players are given an opportunity to observe the motion of the ball within the equipment as well as the time during which the players are given an opportunity to choose the compartments, it is particularly convenient to subdivide the supply means into at least two adjoining zones by means of optical distinguishing means, these zones being passed in succession by the ball as the ball is being supplied to the number disk. During the time when the ball is located in the first zone, the players can observe the motions and during the time when the ball is located in the second zone, the players can choose one or more compartments.

In this connection, it is particularly advantageous when it is indicated when the ball enters and leaves the first and the second zone by means of acoustic and/or further optical means which are controlled by the ball located in or on the supply means, it being moreover particularly advantageous when the second zone terminates at some distance before the end of the supply means. Thus, the period of time during which the players can choose one or more compartments is clearly marked. The

acoustic and/or optical signals indicating the end of the observation zone can be a support for the player during his observations since they mark a fixed point in the supply means, allowing the acoustic and/or optical signal to be perceived while the player observes the motions of the segment disk and number disk.

By making known to the outside, for instance on a display, the driving speeds of the number disk and the delay means, which are controlled with great accuracy, the players are given the possibility of checking the accuracy of these speeds.

In a further elaboration of the invention, the accuracy of the pattern of motion of the ball through the supply means is further improved in that the width of the path is smaller than the diameter of the ball, such that the ball only rests on the upper longitudinal edges of the path. Thus, the influence of friction is minimized.

To prevent the motions of the ball being influenced through manipulation thereof by people, the game equipment may comprise means for mechanically returning a or the ball from any of the compartments to the supply end of the supply means, and means for releasing the ball into the supply end of the supply means at a standard initial speed, preferably of 0 m/s, so that the entire course of the game takes place without the ball being touched or otherwise manipulated directly by human hands, which might, for instance, lead to changes in the rolling properties of the ball through wetting, static charge or heating, or through replacement of the ball.

To prevent any other influences on the motions of the ball in the equipment, the equipment may further comprise an at least partly transparent cover, which is arranged such that the game equipment, and particularly the motion of a ball disposed in the game equipment, cannot be influenced by, for instance, dust, air streams or influences of temperature, or by human action, while yet a ball disposed in or on the supply means, the delay means or the number disk can be observed from outside of the game equipment.

To clarify the invention, one exemplary embodiment of the game equipment will now be described with reference to the accompanying drawings.

Fig. 1 is a top plan view of the game equipment; Fig. 2 is a sectional elevation taken on line II-II in Fig. 1;

Fig. 3 is a top plan view of the segment ring; Fig. 4 is a diagrammatic representation of an alternative embodiment of the game equipment; Fig. 5 is a side elevation in cross-section of a part of the path, with the ball disposed thereon; and

Fig. 6 is a top plan view of a central portion of the game equipment in an alternative embodiment.

The game equipment according to the drawings, in the embodiment shown, comprises supply means 14 in the form of a pan 1 having a truncated cone-shaped inner form of a cross-section decreasing towards the lower end. Provided along the inner surface of the pan 1 is a spiral sloping path 114 in the form of a groove or, for instance, a transparent tube. When at the upper end of the sloping path 114 a ball 4 is released, this ball will move downwards along the sloping path under the influence of gravity. The pan 1 is connected to a rigid base plate 23 by means of adjusting means 10, so that the path 114 can always be set in the proper position.

In order to give at least the players of the game the possibility of determining the position of the ball 4 relative to the sloping path 114, the sloping path 114 is subdivided into three adjacent zones R, B and R by means of optical distinguishing means, such as, for instance, different colors, these zones being passed in succession by the ball 4 as it rolls down over the sloping path 114.

The end of the second zone B is located at some distance before the end of the supply means 14, whilst at the beginning and the end of the first zone R and the zone B means are provided for producing a signal when the ball 4 passes these means, so that at least a clear marking of the beginning and end of the second zone B is obtained.

A game of the subject type can be played as a game of skill only if the ball 4 always moves in the same manner along the path 114 to the number disk 3. One of the factors having a major influence on this is the (rolling) resistance of the ball 4 relative to the path 114. By minimizing this resistance, the pattern of motion of the ball 4 through the supply means is rendered better reproducible, so that the influence of chance is further reduced and the outcome of a game played with such equipment is better predictable. To achieve a minimization of this resistance, in the variant embodiment of the equipment according to the invention shown in Fig. 5, the width of the path 114 is smaller than the diameter of the ball 4. As a result, in the supply means the ball 4 only rests on the upper longitudinal edges L of the path 114 and, in a manner of speaking, rolls down over rails.

Provided centrally of the bottom surface of the pan 1 is a substantially horizontal disk 3, to be referred to as 'number disk', mounted for rotation about a vertical axis and comprising numbered compartments 16 in which the ball 4 can be received. By means of driving means 9 the number disk 3 can be driven at precisely the same speed

in each case.

The lower end of the sloping path 114 connects to a segment ring 2 rotating in the horizontal plane, as is shown in Fig. 3, which ring is provided with an inwardly sloping top surface and functions as guiding means for the ball 4 from the sloping path 114 to the number disk 3. The segment ring comprises an upright edge 17, divided into a plurality of segments 20, with ball passages 18 provided between the segments 20. The segments 20 are preferably of unequal length, and the ball passages 18 may also be of unequal length. With the aid of driving means 8, the segment ring 2 can be driven at precisely the same speed in each case, whilst the direction of rotation of the segment ring 2 is preferably opposite to the downward direction of the sloping path 14, and the direction of rotation of the number disk 3 is preferably opposite to the direction of rotation of the segment ring 2.

Both the number disk 3 and the segment ring 2 can be positioned relatively to the other parts of the game equipment with the aid of at least adjusting means 12 and 11, respectively. With the aid of the adjusting means 21, the entire game equipment can be leveled in a simple manner. By providing a display 22 presenting the driving speeds of the number disk 3 and the segment ring 2 to the outside of the equipment, the players are given an opportunity to check the accuracy of these speeds of rotation.

Provided at the lower end of the sloping path 114 is a stop 19 against which the ball will come to rest when it reaches the lower end of sloping path 114, with one of the segments 20 being located directly adjacent to the stop 19. Only when one of the ball passages 18 is located substantially next to the stop 19 will the ball 4 be able to move from the sloping path 114 via the top surface of the segment ring 2 through the ball passage 18 to the number disk 3 to be subsequently received in one of the numbered compartments 16. The direction of rotation of the number disk 3 is preferably equal to the direction of motion of the ball 4 on the sloping path 114 and the direction of rotation of the delay means 2 is opposite thereto.

In an alternative embodiment of the game equipment according to the invention, the lower end of the sloping path 114 is bent in the direction of the number disk 3, such that the sloping path 114, upon rotation of the segment ring 2, is alternately closed by a segment 20 and cleared by a ball passage 18. Thus, the stop 19 can be omitted and the direction of motion of the ball 4 in the supply means is only changed in a smooth manner, so that the ball 4 is prevented in a simple manner from, for instance, bounding backwards or upwards from the stop 19 in the supply means 14 and, accordingly, moving in an unpredictable man-

ner.

After the ball 4 has been received in one of the numbered compartments 16 and the number corresponding with the compartment 16 has been made known, the ball can be returned to the upper end of the sloping path 114 by means of ball return means, comprising a ball return path 7 and a ball lifting device 6. Provided at the upper end of the sloping path are starting means 13, which keep the ball 4 in the same position until, for instance through an electronic signal S given by the conductor of the game to indicate the beginning of a round in the game, the starting means 13 release the ball 4 at the upper end of the sloping path, so that the ball 4 can roll down along the sloping path 114.

Further included are switching means 24, which retain the ball 4 for some time after the starting signal S has been issued. This period of time is randomly chosen between two fixed limits W1 and W1+W2 by the means 24, so that any intentional and unintentional influence on the moment of release on the part of the conductor of the game is prevented. Indeed, if the ball were released directly after the starting signal has been given, the conductor of the game, by appropriately selecting the starting moment, could choose in what compartment 16 on the number disk 3 he will have the ball end up, since the outcome of the game is predictable to a very high degree.

A transparent cover 5 protects the moving number disk and segment ring, and in particular a ball moving in the apparatus, against influences from outside of the game equipment.

According to a preferred embodiment of the invention, the equipment for playing a game of skill of the type described in the preamble is designed in such a manner that when a ball 4 is placed at the supply end of the path 114, the ball 4 will move exclusively under the influence of gravity in a predetermined period of time T1+T2+T3 via the zones R, B, R to the exit end of the path 114, whereafter the ball 4 is guided through one of the ball passages 18 in the segment ring 2 to one of the compartments 16 of the number disk 3, which compartments 16 are provided along the circumferential edge of the number disk 3, it being possible, on the basis of the position of the ball 4 in or on the supply means, on the basis of the position and velocity of motion and direction of motion of the ball passages 18 and on the basis of the position and velocity of motion and direction of motion of the number disk 3, to mathematically calculate in which part of the number disk 3, in particular a part forming a sector smaller than 360°, the ball 4 will be received in one of the compartments 16.

With the game equipment according to the invention, a game of skill can be played in the following manner.

With the aid of the return means 6, 7 the ball is conveyed to the releasing means 13 and retained by them at the upper end of the supply path 114. The conductor of the game gives a signal S, warning the players that the game is going to commence. Through the starting signal S, a fixed first delay time W1 is started, which is directly followed by a second delay time W2. This second delay time W2 is randomly chosen by the switching means 24, so that the conductor of the game cannot influence the moment of release of the ball 4 in any manner whatsoever. After the ball 4 has been released by the releasing means 13, preferably without any initial velocity, but in any event always with the same initial velocity, the ball 4, under the influence of gravity, rolls over the first zone of the sloping path, always in the same period of time T₁, during which time the players can observe the motions of the different parts of the equipment. Then the ball rolls over the second zone of the sloping path, always in the same period of time T₂. During this period of time T₂ the players are given an opportunity to choose one or more compartments 16 in which they expect the ball 4 will come to rest. After leaving the second zone B, the ball will roll to the lower end of the sloping path 114, always in the same period of time T₃. At the lower end of the sloping path 114 the ball 4 abuts against a segment 20 and (if present) the stop 19, until one of the ball passages 18 allows the ball 4 to pass to the number disk 3, whereafter the ball 4 will be received in one of the numbered compartments 16. After the number in question has been made known to the players, for instance electronically or by way of the conductor of the game, so as to be compared with the numbers chosen by them, the ball 4 is returned via the ball return means 6, 7 to the releasing means 13, and a next round in the game can commence.

Fig. 4 shows an alternative embodiment of the game equipment according to the invention, where the sloping path is provided at the outer circumference of a truncated cone-shaped body widening towards the lower end thereof, with the segment ring and the number disk arranged at the wide lower end at the outer circumference of the truncated cone-shaped body. In this embodiment, the ball can only be observed periodically in a portion of the sloping path, so that greater skill is required for the game of skill to be played successfully.

It will be clear that the invention is not limited to the embodiments described. The essence is that the game equipment can be used in a game of skill in which a ball is supplied along supply means to a number disk in a manner which cannot be influ-

enced, always according to the same pattern of motion, which number disk can be driven always at the same speed, with means being included between the supply means and the number disk for, always predictably, influencing the pattern of motion of the ball. In other words, with the aid of the game equipment, a game of skill can be played, in which players can increase the odds of winning through observing at least three moving objects, and through calculation and/or a good conception of three-dimensional space.

It will further be clear that instead of being designed as a sloping path over which a ball moves down under the influence of gravity, the supply means can be designed differently, for instance as a rotary flat disk with a spiral groove, on which a ball or differently shaped object, retained by a stop extending, for instance, in substantially radial direction across the disk, is forced to move along a radius to the centre or to the circumferential edge of the disk.

Claims

1. Equipment for a game of the type in which a smooth spherical object, to be referred to as 'ball', is enabled to move via supply means to a disk, to be referred to as 'number disk', comprising numbered or otherwise marked compartments and rotating relatively to the supply means; in which the ball can be received in one of the compartments; in which the number disk can be driven at precisely the same speed in each case; and in which participants in the game, during at least a part of the time during which the ball moves through the supply means, choose one or more compartments in which they expect the ball to come to rest, characterized in that the supply means (14) are designed for causing the ball (4) to move through the supply means (14) in a manner which cannot be influenced, always according to the same pattern of motion, whilst delay means (2) moving relatively to both the supply means (14) and the number disk (3) are arranged between the supply means (14) and the number disk (3), such that the ball (4) leaving the supply means (14) at the lower end is brought via these delay means (2) onto the number disk (3) provided with compartments (16).
2. Game equipment according to claim 1, characterized in that driving means (8) are provided for causing the delay means (2) to move uniformly relatively to the supply means (14) and the number disk (3).
3. Game equipment according to claim 1 or 2, characterized in that the delay means comprise a circular ring (2) which, on one side thereof, adjoins the exit end of the supply means (14) and, on the other side thereof, adjoins the number disk (3), which ring (2) comprises an upright edge (17) divided into segments (20), with ball passages (18) formed between the edge segments (20).
4. Game equipment according to claim 3, characterized in that the segments (20) and/or the ball passages (18) are of unequal size.
5. Game equipment according to claim 3 or 4, characterized in that a stop (19) is arranged at the lower end of the supply means (14), such that a ball (4) resting against the stop (19) can be supplied from the supply means (14) to one of the compartments (16) only when one of the ball passages (18) is at least largely located next to the ball (4) resting against the stop (19).
6. Game equipment according to any one of the preceding claims, characterized in that the driving speeds are displayed to the outside of the game equipment in a clear manner.
7. Game equipment according to any one of the preceding claims, characterized in that the supply means (14) comprise a groove-shaped path (114), which groove (114) has a width which is smaller than the diameter of the ball (4), such that in the supply means (14) the ball (4) only rests on the longitudinal edges of the groove (114).
8. Game equipment according to any one of the preceding claims, characterized in that the supply means (14) are subdivided into at least two adjoining zones (R, B) by means of optical distinguishing means, said zones being passed in succession by the ball (4) as the ball (4) is being supplied to the number disk (3).
9. Game equipment according to any one of the preceding claims, characterized in that the two adjoining zones (R, B) comprise means for producing a signal, which means are controlled by the ball (4) disposed in or on the supply means (14), said means producing a signal each time the ball (4) enters one of the zones (R and B, respectively) and each time the ball (4) leaves one of the zones (R and B, respectively).

10. Game equipment according to claims 1-9, characterized in that means (6, 7) are provided for mechanically returning a or the ball (4) from each of the compartments (16) to the supply end of the supply means (14). 5
11. Game equipment according to claims 1-10, characterized in that releasing means (13) are provided for introducing the ball (4) into the supply end of the supply means (14) at a standard initial velocity. 10
12. Game equipment according to claims 1-11, characterized in that the initial velocity of the ball (4) in the supply means (14) is 0 m/s. 15
13. Game equipment according to claim 11 or 12, characterized in that the releasing means (13) are electronically controlled, with means being provided for producing a starting signal (S), with means (24) being included for starting, after a first, fixedly settable delay time (W1), a second delay time (W2), said second delay time being determined by a random generator (25), and for releasing the ball (4) after the second delay time (W2). 20
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14. Game equipment according to any one of the preceding claims, characterized in that an at least partly transparent cover (5) is provided, which protects at least the moving number disk (3), the delay means (2) and a ball (4) moving in the apparatus against influences from outside of the game equipment. 30
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15. Game equipment according to any one of claims 8-14, characterized in that the game equipment is so designed that when a ball (4) is placed at the supply end of the supply means (14) and is released from the releasing means (13) at an initial velocity of 0 m/s, the ball (4) moves exclusively under the influence of gravity via the zones (R, B) of the supply means (14) to the exit end of the supply means (14) in a period of time to be determined beforehand, whereafter the ball (4) is guided through one of the ball passages (18) to one of the compartments (16), which compartments (16) are provided along the circumferential edge of the number disk (3), it being possible, on the basis of the position of the ball (4) in or on the supply means (14), on the basis of the position and the velocity of motion and the direction of motion of the ball passages (18) and on the basis of the position and the velocity of motion and the direction of motion of the number disk (3), to mathematically calculate in what part of the number disk (3), which part forms a sector which is smaller than 360°, the ball (4) will be received in one of the compartments (16). 40
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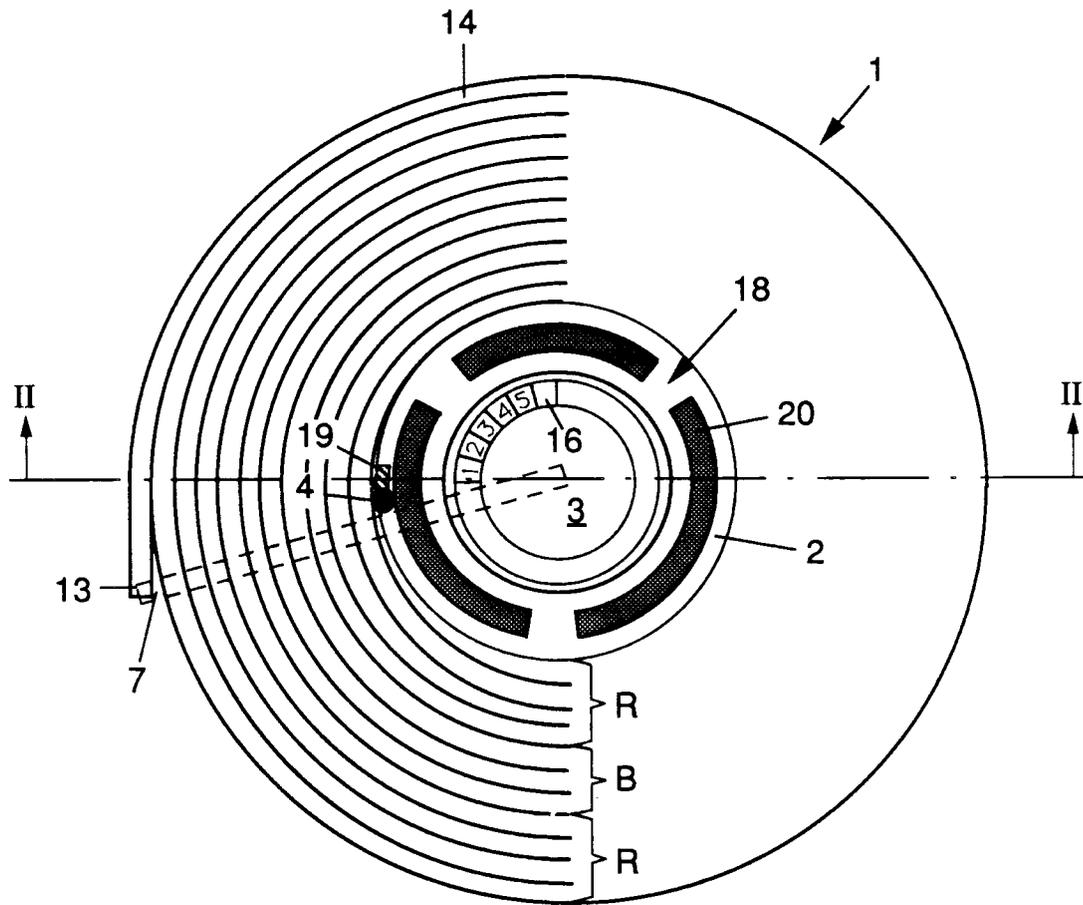


FIG. 1

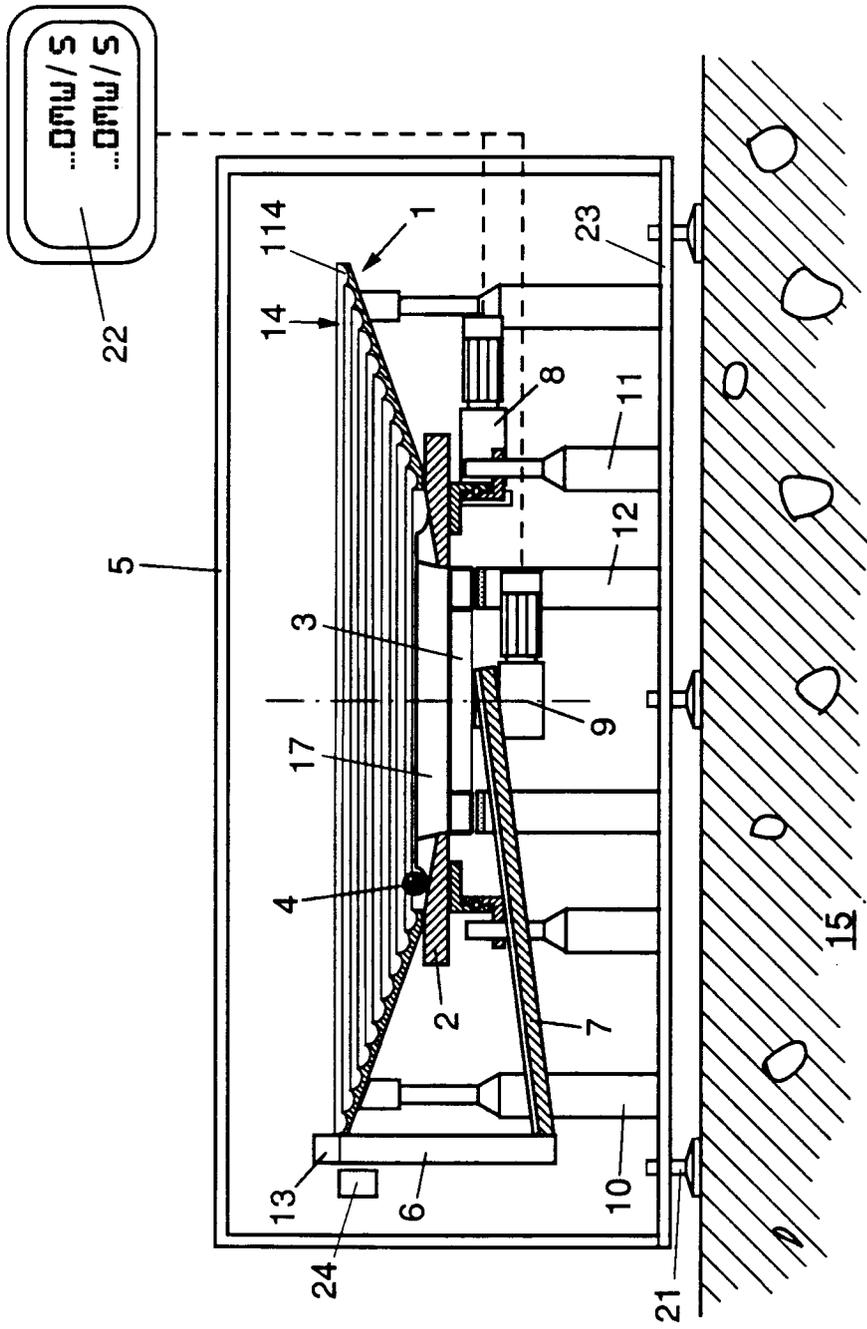


FIG. 2

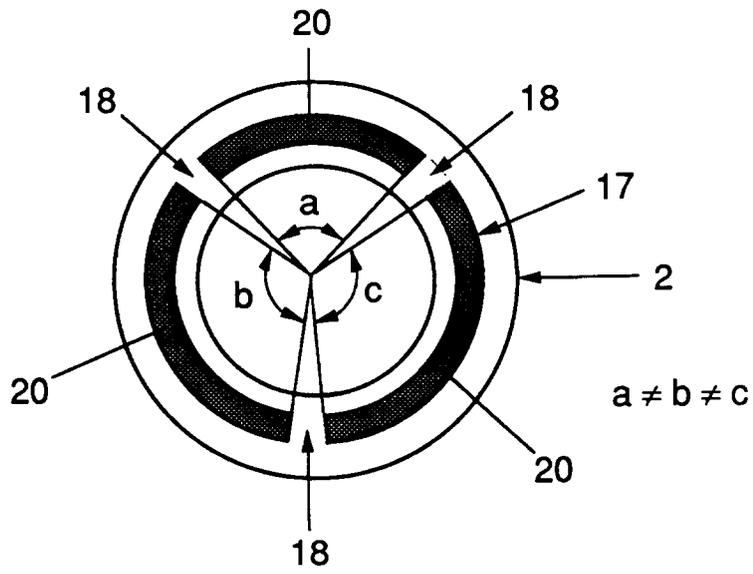


FIG. 3

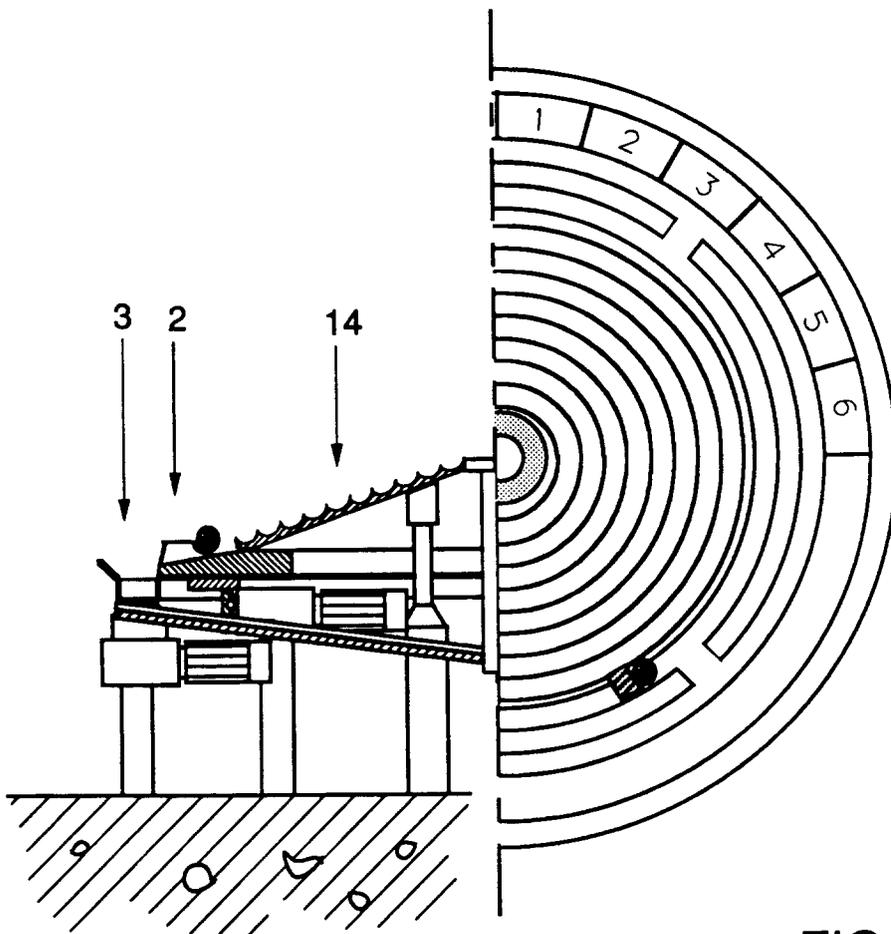


FIG. 4

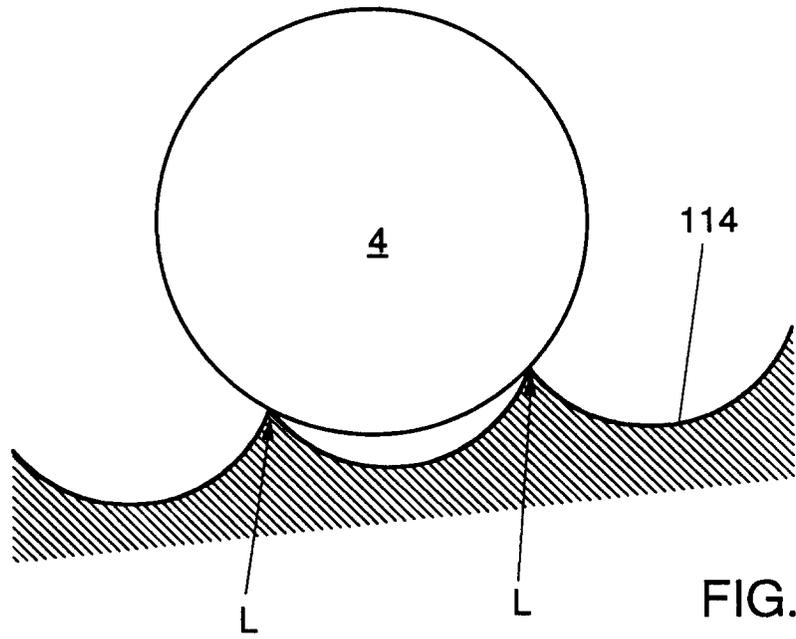


FIG. 5

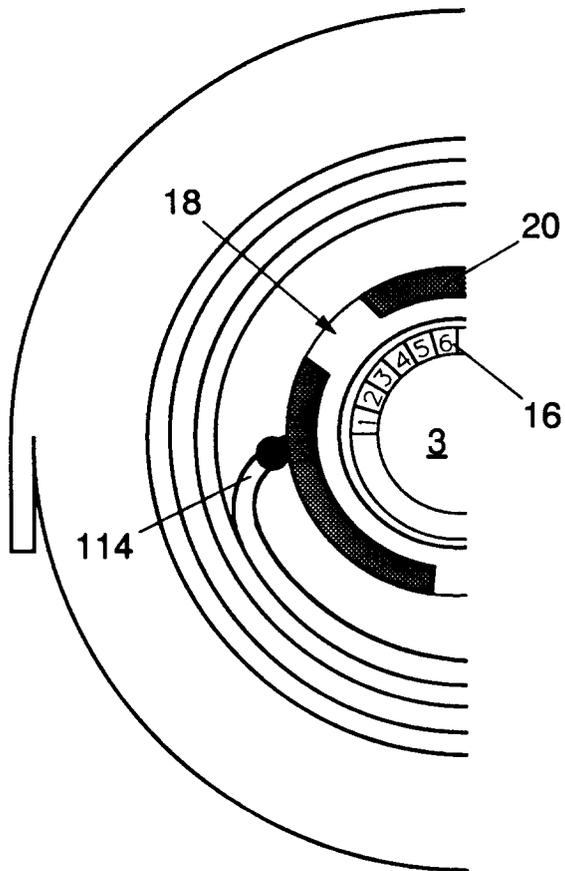


FIG. 6



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.5)
D,A	DE-A-34 35 956 (HADJAKIS) * page 7, line 22 - line 33 * ---	1,5,8, 11,12	A63F5/04
A	GB-A-2 174 010 (CASTANELLOS) * page 1, line 46 - line 50 * * page 1, line 77 - line 88 * ---	1,6	
A	US-A-2 660 434 (DURANT) * column 1, line 43 - line 45 * * column 2, line 36 - line 41 * ---	1,10,14	
A	EP-A-0 269 331 (SIGMA) * column 8, line 56 - column 9, line 56 * ---	11	
A	EP-A-0 160 157 (HERZENBERGER) ---		
A	US-A-5 096 196 (GUTKNECHT) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			A63F
Place of search	Date of completion of the search	Examiner	
THE HAGUE	20 December 1993	Glas, J	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application I : document cited for other reasons ----- & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			