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(54) **SET FOR INTERACTIVE LITE CURLING SPORTS GAME**

(57) The complex for an interactive sports game in curling light comprises a game track, game elements made in the form of a body of circular horizontal cross-section, the game track is made with a sliding surface which is located on the base made in the form of a rectangular frame, equipped with decorative sides around the perimeter and installed on supports. The complex comprises an accelerometer, signal emitters, a processor, a monitor, control units, software products, a database, a video camera for identifying the game elements, a mechanism for returning the game elements, and a unit for automatic cleaning the game track. The complex is equipped with a control computer connected electronically with a video display device, administration systems and audio support systems above the game track. The sliding game element further comprises a light indication, a radio interface, a touch sensor, and contactless charging. Enabled is returning of the elements to the initial position, cleaning of the game field, contactless charging of the game elements, and also the interactivity of the game.

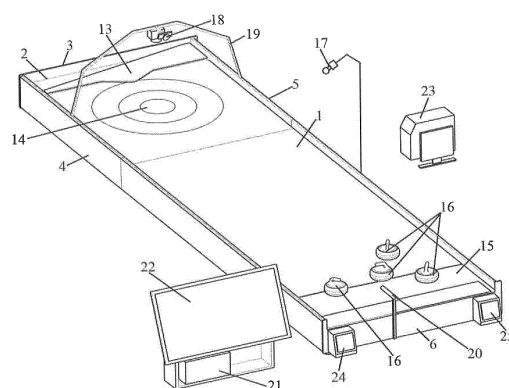


Fig. 1

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Description

FIELD OF THE INVENTION

[0001] The invention relates to the field of sports, games and entertainment, in particular devices and equipment for playing lightweight curling, both indoors and outdoors, with the possibility of receiving wireless communication, emitting a signal from game objects, collecting information for monitoring and analyzing the game.

DESCRIPTION OF THE PRIOR ART

[0002] The method of obtaining a multilayer ice coating for curling is known, comprising the formation of an ice base, which has increased hardness and is similar in structure and sliding properties to monocrystalline ice. First, freeze the lower adhesive layer with a thickness of at least 1 mm with the addition of not more than 50 ppm of a composite - an aqueous suspension of polytetrafluoroethylene and/or a copolymer of tetrafluoroethylene with hexafluoropropylene and/or perfluorodecalin, then the base is formed by successive freezing of several layers, clean without additives, each with the thickness of not more than 1 mm, on the base, modified protrusions - pabbles are frozen on with the help of water at the temperature of at least 60 ° C, which contain ammonia additives in an amount from 0.1 ppm to 100 ppm and an aqueous suspension of polytetrafluoroethylene and/or a copolymer of tetrafluoroethylene with hexafluoropropylene and/or perfluorodecalin in the amount from 50 ppm to 100 ppm (Patent No RU 2364806. Publ. 20.08.2009).

[0003] However, the known multilayer curling ice cover is not intended to be used when playing lightweight curling, not only outdoors, but also in an indoor room in which the coating is used made of the material corresponding to the coefficient of friction of sliding elements of curling stones.

[0004] The maglev (magnetic levitation) system for curling stones is known, which includes a maglev curling-stone ball and a maglev track. The maglev curling stone ball contains curling stone ball body, magnetic coil, printed circuit board (PCB), rechargeable battery, balance adjustment and counterweight filling; the magnetic coil, PCB, rechargeable battery, balance adjustment and counterweight filling are located inside the curling stone ball body. The magnetic track contains track panels, permanent magnets, magnet holder and magnetic protection layer; permanent magnets are evenly mounted on the magnet holder with uniform polarities. The pole generating the direction of the maglev curling stone ball is fixed, the adjustable magnetic force field acts with permanent magnets in the maglev track, the adjustable maglev force is generated, the friction between the maglev curling stone ball and the maglev track is adjusted, and true curling is modeled (Patent No CN104288975. Publ. 2015.01.21).

[0005] However, in the known system, despite the presence of the elements similar in function: curling stones, a playing track, there are no electronic components, in particular: data acquisition unit, processor and display with wireless transmission. In addition, there is no mechanism for the automatic return of curling stones (projectiles) equipped with light indication, a module for contactless charging of projectile batteries, an electric drive and gearbox, and a radio interface.

[0006] The information terminal for supporting competitions, systems, information processing and recording programs, is able to easily enter, analyze and store game information about curling competitions, system, information processing program and recording medium. The information terminal includes a display means for displaying various information, an input means for performing input on a displayed screen, a storage means for storing information input from the input means and various icon images about a previously entered curling competition, and a control means for controlling the display means, an input means, and a storage medium. The control means selectively reads game-related information, including at least a curling sheet and a stone icon image from the storage means, when inputting game information in the curling competition, so that the display means displays game-related information and stone storage. The position information in the storage medium when the stone icon image displayed through the input tool is dragged and moved (Publication No JP2015006325 - 2015.01.15).

[0007] However, the well-known information terminal characterizes only the electronic component and does not contain a description of its connections with structural mechanical elements, such as: a play track, curling stones, a mechanism for the automatic return of curling stones (projectiles) equipped with light indication, a contactless charging module for projectile batteries, an electric drive and a reduction gear, radio interface.

[0008] The invention of a cue bowling and a sports game system is known, which combines the rules of curling and bowling for indoor spaces, in which a device for twisting (projectile) is proposed, comprising: a body in the form of a flat rod made of polyester material; a finger hole is formed on one side of the body portion to allow the body portion to be perforated using a wrist latch. In addition, the system has the following: a place for curling to display the target part and provide a bowling trajectory to the target part; a processor located at the upper end of the curling target part of the curling sheet and photographing the bowling stop position when the bowling reaches the curling target portion; a video display unit located at an upper end of the roll-sheet throwing position; a game control unit that receives information photographed by the processing unit, calculates a score corresponding to the stop position in the corner bowling, and displays the score on the image display unit (Publication No KR20190063785 - 2019-06-10).

[0009] However, the known invention characterizes

only a video terminal, which allows only assessing the number of projectiles that have reached "home" while throwing. The known invention does not use projectiles of a traditional design for curling, and, accordingly, the projectiles do not have the possibility of contactless recharging, equipping with light indication, the play track, does not have a mechanism for automatic return of curling stones (projectiles) equipped with light indication, an electric drive and a gearbox, radio interface and other electronic elements.

[0010] The game elements provided with one or more luminous devices are known (Publications No WO2003076026A1- 2003-09-18).

[0011] However, the known game elements with luminous devices are not intended for playing curling light due to the lack of the possibility to move along the game track.

[0012] The curling play set is known, in particular for rooms, in which the play mat is made of pile fabric and thus allows the player to control the movement of the curling stone using an air curler (Publication No WO2019198878 (A1) - 2019-10-17).

[0013] However, the use of pile fabric as a game track is rather laborious when carrying out the movement of the projectile. In addition, the well-known game set does not contain an electronic component that allows you to control, track down the movement of game projectiles and analyze the game situation.

[0014] The invention of curling stones, handles, as well as systems and methods for tracking down game objects, is known in which the curling stone or game object has a data collection unit operating during movement to measure the values of acceleration, rotation, time or other parameters of the game object. The data collection unit processor wirelessly transmits one or more of these parameters, which are the data indicative of the player's performance. Game fields, such as a rolling sheet, have devices that are activated by the game object as it moves. Each device, when activated over the wireless network, emits an information signal indicating at least the position of the device relative to the game field (Application No CA3006829. Publ. 2018-11-30).

[0015] However, the known invention, despite the presence of elements similar in function: curling stones, a filling sheet, a data collection unit, a processor and a display with wireless transmission, is not intended to use a game track made of sliding material having a sliding coefficient corresponding to the sliding elements of curling stones. In addition, in the known solution there is no emitter of curling stones and an additional video camera to accurately determine the location of the game element (projectile). In the aforementioned known source, the location of the game element is determined by a computational method with respect to lines and speed. The known source lacks a mechanism for the automatic return of curling stones (projectiles), equipped with light and sound indications, accompanying events, actions, the state of the complex and curling stones. In addition,

the lack of devices for supporting arms and legs when performing throws, a module for contactless charging of projectile batteries, an electric drive and a gearbox, a radio interface, creates uncomfortable conditions for using the complex.

DISCLOSURE OF THE INVENTION

[0016] The object of the present invention is to provide a technical solution with an automatic system that allows playing lightweight curling, both indoors and outdoors.

[0017] The technical result is manifested in the design of interactive game elements and a game track having minimum sliding coefficient close to the sliding coefficient of a granite projectile on ice, interactive game elements and the material of the game track.

[0018] Another aspect is the presence of an automatic mechanism for returning interactive elements to their original position and wirelessly recharging them during use.

[0019] In addition, the interactive game elements have the possibility of their color indication, which makes it possible to identify the number of points scored by the players, while automatically calculating the final result, by the scored points of each player and the team as a whole.

[0020] One more aspect is the possibility to automatically control an interactive sports game, including the registration of players, control of payment for game time.

[0021] Another aspect is the visualization and audio support not only of the course of the game, but also the possibility of interactive understanding the rules of the game by the players through its computer simulation.

[0022] Another aspect is the autonomous control of the operation of all the elements when using the complex.

[0023] The problem is solved by the fact that in complex for an interactive sports game in curling light, containing a game track, game elements, an accelerometer, signal emitters, a processor, a monitor, control units, software products, a database, a video camera for identifying game elements on the playing field, the game track is made of the sliding surface, which is located on the base made in the form of a rectangular frame, equipped with decorative sides around the perimeter and installed on supports, the rectangular frame is equipped with a movable mechanism for returning the game elements to their original position by means of a gearbox connected to an electric motor, while the mechanism for returning the game elements is equipped with a unit for automatically cleaning the game track from dust and dirt, the complex is equipped with a control computer connected electronically with a video display device for evaluating the ends, software, administration systems and audio support, an additional video camera is installed above the game track to identify game elements, in addition, each game element is equipped with sliding elements, it is made in the form of an ellipsoidal body when it is cross-sectioned by a vertical plane, and a circular section when it is cross-

sectioned by a horizontal plane, a handle, while a closed groove is made in the body on the side opposite to the handle, in the said groove, sliding elements are fixed, the coefficient of friction of them is selected in accordance with the coefficient of friction of the sliding surface, and an element for contactless charging of the game element, in addition, on the side of the handle in the closed groove of the body there are the following interconnected elements: accelerometer, battery and control board, on the handle body there are signal emitters for determining the position of the game element and light indication, radio interface, a touch sensor, while one of the narrow sides of the rectangular frame is equipped with a source of contactless charging of the game elements.

[0024] In order to create conditions for a comfortable throw, on the narrow side of the rectangular frame, opposite to the installed mechanism for returning the game elements to the initial position, it is advisable to install a support for the hands, with the possibility of transverse movement along the narrow side of the rectangular frame.

[0025] In order to speed up the return of the game elements and automating the complex, the mechanism for returning the game elements to their original position should be performed in the form of a supporting frame, consisting of two rectilinear elements, one ends of which are connected at an angle to each other, the free ends are movably connected to an engaging element located along one of the long sides of the rectangular frame and connected to the gears located at opposite ends of the long side of the frame behind the decorative side, it is advisable to install a symmetrical contact panel on one of the rectilinear elements, which is equipped in the central part with an angular protrusion directed to the target, while positioning support rollers between the rectilinear elements, and to make the engagement element in the form of an anti-slip chain.

[0026] In the variant of embodiment, in order to prevent skewing of the engaging element, it is advisable to make the mechanism for returning the game elements to their original position in the form of a supporting frame, consisting of two rectilinear elements connected in parallel to each other, the ends of which are movably connected to the engaging element and an additional engaging element located along the long sides of the rectangular frame, connected with gears and additional gears located, respectively, at opposite ends of the long sides of the frame behind the decorative sides, to install a symmetrical contact panel on one of the rectilinear elements, which is equipped in the central part with an angular protrusion directed towards the target, while positioning support rollers between the rectilinear elements, to make the engagement elements in the form of anti-slip chains.

[0027] In the variant of embodiment, in order to create smooth and discrete movement of the engaging elements, it is rational to make the mechanism for returning the game elements to their original position in the form of a carriage installed with the possibility to move, by

means of two engagement elements, to make each of them in the form of a rack-and-pinion gear and support rollers, at the same time, to arrange the rack-and-pinion gears along the long sides of the rectangular frame behind the decorative sides, to make one of the sides of the carriage in the form of a symmetrical contact panel, equipped in the central part with an angular protrusion directed to the target.

[0028] In order to simulate the sliding of the game elements on ice, it is advisable to make the sliding game track of the material, the coefficient of friction of which is selected in accordance with the coefficients of friction of the sliding elements of the game elements.

[0029] For favorable ergonomics in relation to the musculoskeletal system of a person (an adult and a child), it is efficient to make the circumference of the game element at least 565.4 mm and no more than 914.4 mm (standard 659.7 mm), the net weight of the game element should be not more than 12 kg.

[0030] It is advisable, in order to increase the visualization of the target by the players, the target should be designated with multi-colored circles of various diameters, in the center of which a circle should be placed, filled with red or another color different from the color of the performed circles.

[0031] In the variant of embodiment, in order to obtain information about the game situation using various electronic devices, it is advisable to equip the complex with radio interface.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] The present invention is illustrated by a detailed description and diagrams, in which:

Figure 1 is a general scheme in a perspective view of the arrangement of the elements of the complex, according to the invention;

Figure 2 is a main view of the game element with sectioning by the vertical plane, and the top view of the game element;

Figure 3 is a main view of the game track (rotated to the left by 180°), installed on the supports, and namely - a planar schematic image, with a local view A, limited by the cliff lines, with located on it: game elements, a support for hands when performing throws, a mechanism for returning the game elements to their original position, the location of the module for contactless recharging of the game elements, in addition, the location of the gearbox interacting through gears and an engaging element in the form of an anti-slip chain;

Figure 4 is a top view of the game track equipped with a target for hitting the game elements, the arrangement and construction of the mechanism for

returning the game elements to the initial position, the arrangement of the gearbox and the electric drive, the same as in FIG. 3;

Figure 5 is a top view of the game track equipped with a target for hitting game elements, the location and structure of the mechanism for returning game elements to their original position, the location of the gearbox and the electric drive, interconnected through gears with engaging elements located along the long sides of the rectangular frame;

Figure 6 is a top view of the game track with local views B and C, equipped with a target for hitting the game elements, the arrangement and design of the mechanism for returning the game elements to their original position, in which the engagement elements are made in the form of rack-and-pinion gears and are located along the long sides of the rectangular frame;

Figure 7 is a functional diagram of the complex for an interactive sports game in curling light;

Figure 8 is a functional diagram of the game element.

BEST MODE FOR CARRYING OUT THE INVENTION

[0033] Terminology and abbreviations used in the description text.

GT - game track, playing field, playing area.

GE - game element, stone, projectile.

PC - personal computer.

End - time, period of the game.

ASS - automatic scoring system.

CB - control board.

EGE - the emitter of the game element.

CC - control computer.

[0034] The complex for an interactive sports game in curling light (further referred to as the complex) contains a game track 1 made of sliding material (Fig. 1). The sliding material of the game track 1 is located, by means of tension, on the base 2, which is made in the form of a rectangular frame. The base 2 is equipped with the decorative sides 3, 4, 5, 6 along the perimeter. The height of the decorative sides 3-6 is not less than 50 mm and not more than 1000 mm. The decorative side 6 is made in the form of a U-shaped frame. The base 2 is made in the form of a rectangular frame, and is mounted on the

supports 7-12 (not shown) located in the lower part of the rectangular frame symmetrically to each other along the perimeter of the frame. The number of the supports 7-12 is set depending on the length of the game track 1.

On one of the narrow sides of the rectangular frame, the mechanism 13 for returning the game elements to their original position is installed (hereinafter, mechanism 13). The mechanism 13 is equipped with a mechanism for automatically cleaning the track from dust and dirt (not shown). The target 14 is designated on the sliding surface of the game track 1, in front of the game element return mechanism 13. The target 14 can be designated by multi-colored circles of various diameters, in the center of which there is a circle painted over with one color, namely: red or another color different from the color of the made circles. On the opposite narrow side of the base 2 from the return mechanism 13, there is the return zone 15 of the game elements 16 equipped with sliding elements. The return zone 15 is equipped with a contactless charging module (not shown) of the game elements 16. The game track 1 is made of the sliding material, the friction coefficient of which is selected in accordance with the friction coefficients of the sliding elements of the game elements 16. The number of the game elements 16 is 16 pieces, 8 pieces in each of the two teams. In this case, the video camera 17 is installed above the game track 1, as well as the additional video camera 18 on the support 19, which can be made either in the form of a rack, or in the form of a U-shaped support, or in another form. The video camera 17 is installed on the side of one of the long sides of the rectangular frame of the base 1. The additional video camera 18 is installed on one of the narrow sides of the rectangular frame of the base 1 above the mechanism 13 for returning the game elements 16. The video camera 17 and the additional video camera 18 are designed to identify the game elements 16. At the end of the narrow side of the rectangular frame of the base 1, from the side of the return zone 15, the support 20 for hands is installed with the possibility of moving along the narrow side of the rectangular frame. The support 20 for hands is installed with the possibility of moving longitudinally. The complex is equipped with the control computer 21, electronically connected with the video display device 22 for evaluating the ends, the administration systems 23 and the audio supports 24 and 25 located at the ends of the narrow side of the base 2 from the side of the return zone 15 or otherwise. The audio tracks 24 and 25 are equipped with personal headphones (not shown).

[0035] Each game element 16 is made in the form of the body 26, which, when cut by a vertical plane, has an ellipsoidal shape, and when cut by a horizontal plane, it is circular (Fig. 2). The game element 16 is equipped with the handle 27. From the side of the handle 27, in the groove 28 of the body 26, there is the control board 29, on which the radio interface 30 and the accelerometer 31 are located and interconnected. In addition, the battery 32 is located in the groove 28. The handle 27 is made shaped, having an upper console part and a lower one

fixed to the body 26. The touch sensor 33 is built into the upper cantilever part of the handle 27. In the lower part of the handle 27, there are the emitters 34. The emitters 34 are arranged evenly around the circumference as a part of the annular plate 35. In addition, the annular plate 35 is equipped with the light indication 36. The emitters 34 are intended for detecting the position of each game element 16 on the game track 1. The light indication 36 allows players to intuitively understand which game element 16 (projectile) is intended for the next throw, as well as to see the number of points received on the track, the possibility of increasing or decreasing them. In this case, the body 26 is equipped with the groove 37 from the side opposite to the handle 27. In the said groove 37, the sliding elements 38 are fixed, the coefficient of friction of which is selected in accordance with the coefficient of friction of the game track 1 made of sliding material. The contactless charging element 39 of the game element 16 is installed in the said groove. The circumference of each game element 16 is not less than 565.4 mm and no more than 914.4 mm (standard 659.7 mm), the net weight of the game element 17 is no more than 12 kg.

[0036] The base 2, in the form of a rectangular frame, is mounted on the supports 7-12 located in the lower part of the rectangular frame symmetrically to each other along the perimeter of the frame (Fig. 3). From the inner side of the frame of the base 1, under the return zone 15 of the game elements 16, a module for contactless recharging of 40 game elements 16 is installed. The mechanism 13 for returning the game elements 16 to their original position is made in the form of the supporting frame 41 made of two rectilinear elements, 42 and 43, respectively. The ends of the said rectilinear elements 42 and 43 are movably connected to the engaging element 44. The engaging element 44 is made in the form of a snow chain. The engaging element 44 is connected to the gear 45, fixed at the corner of the base 1 from the side of the return zone 15 of the game elements 16, and to the gear 46, fixed at the opposite corner of the base 1. The engaging element 44, the gears 45 and 46 are located between the base 1 and the decorative side 5. The gear 46 is interconnected with the gearbox 47. The gearbox 47 is equipped with an electric motor 48 (Fig. 4). The second ends of the straight elements 42 and 43 of the support frame 41 are connected at an angle to each other. The symmetrical contact panel 49 is mounted on the rectilinear element 42, equipped in the central part with an angular protrusion directed towards the return zone 15 of the game elements 16. In this case, support rollers 50 and 51, respectively, are located between the rectilinear elements 42 and 43.

[0037] The mechanism 13 for returning the game elements to their original position is made in the form of a supporting frame 52 (Fig. 5). The supporting frame 52 is made of two straight elements 53 and 54 connected in parallel to each other. The ends of each rectilinear element 53 and 54 are movably connected, respectively, to the engaging element 44 and the additional engaging

element 55 located along the long sides of the rectangular frame behind the decorative sides 5 and 4, respectively. The engaging member 44 is movably connected by a pair of gears 45 and 46. An additional engaging member 55 is movably connected by an additional pair of gears 56 and 57. Pairs of the gears 45, 46 and the additional pair of gears 56, 57 are located, respectively, at opposite ends of the long sides of the rectangular frame 2 behind the decorative sides 5 and 4. The symmetrical contact panel 58 is installed on one of the rectilinear elements 54, it is equipped in the central part with an angular protrusion directed to the return zone 15 of the game elements 16. In this case, pairs of the support rollers 59 and 60 are located between the rectilinear elements 53 and 54. The engagement elements 44 and 55 are made in the form of anti-slip chains.

[0038] The mechanism 13 for returning the game elements to their original position can be made in the form of the carriage 61 (Fig. 6). The carriage 61 is installed movable by means of two engaging elements 62 and 63. Each of the engaging elements 62 and 63 is designed as a rack-and-pinion. In addition, the carriage is equipped with pairs of the support rollers 64 and 65. In this case, the rails of the engaging elements 62 and 63 are located along the long sides of the rectangular frame 2 behind the decorative sides 2 and 4. One of the sides of the carriage 61 is made in the form of the symmetrical contact panel 66, equipped in the central part with an angular protrusion directed towards the return zone 15 of the game elements 16.

[0039] Figure 7 shows a functional block diagram of the electronic interaction of the elements of the complex, in which the video camera 17 and the additional video camera 18 are connected by direct and feedback electronic communication with the personal computer 21 equipped with an interface for controlling the complex. PC 21 is connected directly and by feedback to PC 23 of the administrator. In addition, PC 21 is connected to the video display device 22, the audio support 24, 25. PC 21 is connected directly with the electric motor 48, which contacts the gearbox 47 of the mechanism 13 for returning the game elements 16 to the original position. In addition, the PC 21 is connected to the contactless charging module (device) 26. The PC 21 is connected with the direct and feedback possibility to the radio interface 68, which has radio communication 67, the latter has the possibility to contact the radio interfaces 30 of each of the game elements 16.

[0040] Figure 8 shows a functional block diagram of each game projectile 16, in which the control board 29 (further CB) is interconnected with the accelerometer 31 directly and by feedback. In addition, the control board 29 is directly connected with the emitters 34, the light indication elements 36. The CB 29 is interconnected by feedback with the battery 32 and through it with the wireless charging 39 of the game element 16. In this case, the CB 21 has the possibility to contact the radio interface 30 of the game element.

[0041] The complex for an interactive sports game in curling light works as follows.

[0042] The game track 1 made of sliding material is placed on a horizontal surface indoors or outdoors using the supports 7-12 or the required number of the supports 7-12, depending on the length of the said game track 1. The mechanism 13 for returning the game elements together with the mechanism for automatically cleaning the track from dust and dirt is installed on the game track. Then, the above-mentioned mechanism 13 is connected with the engagement element 44, through the ends of the rectilinear elements 42 and 43. The narrow and long sides of the rectangular frame of the base 2 should be closed with the decorative sides 3-6, respectively. The video camera 17, the additional video camera 18 should be placed above the game track 1. The control computer 21 is placed next to the game track 1, the mentioned CC 21 was electronically connected with the video display device 22 for evaluating the ends, the administration systems 23 and the audio support 24, 25. If necessary, personal headphones were distributed to players and other personnel.

[0043] The complex, being a sports and entertainment game complex, is similar to the Olympic sports "Curling" and bowling in some elements. At the same time, it differs significantly in equipment (sports equipment), its design, the sequence of game techniques (rules), the method of determining points and calculating the results. The use of the complex is completely automated. The trade name of the complex is CurlingLight. Participants of different ages can use the complex, in other words, play, namely: starting with children aged 6 and over. The length of the game track 1 is selected depending on the age of the participants. The length of the game track 1 should be not less than 3 meters and not more than 18 meters, the width should be not less than 1.5 meters and not more than 3 meters. The length of the game track 1 for children under the age of 14 should be no more than 9 meters and its width - 1.5 meters.

[0044] Two teams take part in the game. The number of players in each team is no more than 8 subjects. Before the start of the game, all participants in the game should be registered by the administrator, who enter the data into CC 21: surnames, names of players, names of teams, sequence of teams and players. Subsequently, the administrator enter the results of the game into CC 21, the video display device 22, the administration system 23. Then the teams carry out the drawing of lots, i.e. determine the team that starts the first end (game period). The draw is made automatically, by random selection. The winning team in the selection determines the order of throws in the first end, and the loser one chooses the color of the handle 27. Eight (8) game elements 16 with the handles 27 of the same color for the first team and eight (8) game elements 16 with the handles 27 of a different color for the second teams. The color is highlighted by the light indication 36 of the game elements 16. Each player should throw the game element 16 by pushing it

along the game track 1 of sliding material. At the same time, for the convenience of performing the throw, the player should use the hand support 20 and the handle 27 of the game element 16. The game element 16, when moving along the sliding material with the help of the sliding elements 38, aims to reach the target 14, the so-called "Home". The target 14 consists of three sectors in the form of concentric circles. "Home" 14 is divided into three sectors by circles with a single center: the first sector - the central (Circle) circle, highlighted in a bright color, different from the color of the track and other sectors, the second sector - a circle of average diameter highlighted in the second color, the third sector - the circle of the largest diameter highlighted in the third color. A painted circle is depicted in the center of the target 14. Each team, receives points for getting home 14, depending on which sector the game element 16 gets into. The team with the most points wins. The teams begin subsequent ends of the game, taking turns. The teams start the game on the signal of the automatic system, namely, the audio support 24, 25 with the help of the headphones, which are provided to the players. The game consists of several ends (no less than 4, no more than 12). In each end (independent period of the game), all players of the two teams have to push all eight game elements 16 in play towards the target 14. The main goal is to score the most points by knocking the opponent's game elements 16 out of the Home 14, having taken the most advantageous position in "Home" 14, closer to its center. When hitting (stopping) the center of the game element 16, i.e. in the first sector - the team is awarded 3 points. When the center of the game element 16 hits (stops) the second sector - the team is awarded 2 points, when the center of the game element 16 hits (stops) the third sector - the team is awarded 1 point.

[0045] When after the throws all the game elements 16 are found in the target 14 or behind it, the mechanism 13 is used to move them to their initial position - the return zone 15. The mechanism 13, with the help of the symmetrical contact panel 49, which has an angular protrusion in the central part and is located on the narrow side of the rectangular frame of the base 2 behind the target 14, carries out automatic longitudinal movement of the game elements 16 along the sliding material of the game track 1 in the direction of the return zone 15 for their contactless recharging with the power supply 40. In this case, the mechanism 13 cleans the game track from dust and dirt by means of the automatic cleaning mechanism of the game track 1. The mechanism 13 is moved by the electric motor 48 using the gearbox 47, a pair of the gears 45 and 46, the engaging element 44 in the form of an anti-slip chain and the support rollers 50 and 51, or two pairs of the gears 45, 46 and 56, 57, with which the engaging elements 44 and 55 in the form of an anti-slip chain and pairs of the support rollers 59 and 60 interact, respectively. In addition, in another variant of embodiment, the movement of the mechanism 13 is carried out by means of the rack-and-pinion gear 62 and 63 and

pairs of the support rollers 64 and 65.

[0046] The team - the winner of the game is determined by the total sum of the results, the accumulated points of all the ends.

[0047] The scoring is performed by CC 21 for each team for the hit of each game element 16 in the target 14.

[0048] Each team can have the game elements 16, no more than two, with unique properties, which are indicated by the light indication 36. The unique properties of the game element 16 - the double - when this stone 16 is in the target 14 the points are doubled after finishing the end. The unique properties of the game element 17 - strike - when this stone 16 is in the target 14 when finishing the end, all the points scored by the team in that end are doubled. The order of throwing the game elements 16: 3rd throw of the team - the stone 16 strike, 4th throw of the team - the stone 16 double. For intuitive understanding of the order of the throw and the order of the team, the game elements 16 are illuminated by the light indication 36.

INDUSTRIAL USABILITY

[0049] The proposed complex for an interactive sports game of curling light with an automatic system allows playing the game of lightweight curling, both indoors and outdoors, since the sliding coefficient of the material of the game track and game elements is selected in such a way that is approximately equal to the coefficient of sliding of granite curling stone and ice.

[0050] In addition, the proposed complex wireless recharging of the game elements is possible, as well as automatic return of game elements to their original position, automatic cleaning of the track from dust and dirt, light indication of the game elements allows them to be visualized in relation to the team.

[0051] The proposed complex allows automatic control of an interactive sports game with the help of software products, including the registration of players, the sequence of throws, automatic counting of points and the overall result, control of the payment of playing time, visualization and audio support of the process of the game, intuitive understanding of the rules of the game by the players through its computer modeling.

Claims

1. A complex for an interactive sports game in curling light, comprising a game track (1), game elements (16), an accelerometer (31), signal emitters (34), processor, monitor, control units, software products, database, video camera (17) for identifying game elements (16) on the playing field,
characterized in that the game track (1) is made of a sliding surface, which is located on the base (2), made in the form of a rectangular frame, equipped along the perimeter with decorative sides (3, 4, 5, 6)

and installed on supports (7-12), the rectangular frame is equipped with a movably installed mechanism (13) for returning the game elements (16) to their original position by means of a gearbox (47) connected to an electric motor (48), while the mechanism (13) for returning the game elements is equipped with an automatic cleaning unit for the game track (1) from dust and dirt, the complex is equipped with a control computer (21), connected with a video display device (22) by electronic communication to evaluate the ends, software, administration systems (23) and audio support (24, 25), an additional video camera (18) is installed above the game track (1) for identifying game elements (16), in addition, each game element (16) is equipped with sliding elements (38), made in the form of an ellipsoidal body (26) at its cross-sectioning with a vertical plane and circular cross-section when it is sectioned by a horizontal plane, a handle (27), while on the side opposite to the handle (27) a closed groove (37) is made in the body (26), in the said groove (37) sliding elements (38) are fixed, the coefficient of friction of which is selected in accordance with the coefficient of friction of the sliding surface, and a contactless charging element (39) of the game element (16), in addition, from the side of the handle (27) in the closed groove (37) of the body there are the following interconnected elements: an accelerometer (31), a battery (32) and a control board (29), on the handle body (27) there are signal emitters (34) for determining the position of the game element (16) and light indication (36), radio interface (30), touch sensor (33), while one of the narrow sides of the rectangular frame is equipped with a contactless charging source (39) of the game elements (16).

2. The complex according to claim 1, wherein on the narrow side of the rectangular frame opposite to the installed mechanism (13) of returning the game elements (16) to their initial position, a support (20) for hands is installed, with the possibility of transverse movement along the narrow side of the rectangular frame.
3. The complex according to claim 1, wherein the mechanism (13) for returning the game elements (16) to the initial position is made in the form of a supporting frame (41), consisting of two rectilinear elements (42, 43), one ends of which are connected at an angle to each other, the free ends are connected with an engaging element (44), with the possibility of displacement, moreover, the engaging element (44) is located along one of the long sides of the rectangular frame and connected to the gears (45, 46) located at the opposite ends of the long side of the frame behind the decorative side (5), a symmetrical contact panel (49) is installed on one of the rectilinear elements, and is equipped in the central part

with an angular protrusion directed to the target (14), while there are support rollers (50, 51) on the rectilinear elements (42), and the engagement element (44) is made in the form of anti-slip chain.

equipped with radio interface (30).

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4. The complex according to claim 1, wherein the mechanism (13) of returning the game elements (16) into the initial position is made in the form of a supporting frame (52), consisting of two rectilinear elements (53, 54) connected in parallel to each other, the ends of which are connected with the possibility to move with the engagement element (44) and the additional engaging element (55), which are located along the long sides of the rectangular frame, connected to the gears (45, 46) and the additional gears (56, 57) located, respectively, at opposite ends of the long sides of the frame behind the decorative sides (5, 4), a symmetrical contact panel (58) is installed on one of the rectilinear elements, being equipped in the central part with an angular protrusion directed to the target (14), while between the rectilinear elements (53, 54) there are support rollers (59, 60), engagement elements (44, 55) are designed as anti-slip chains.

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5. The complex according to claim 1, wherein the mechanism (13) for returning the game elements (16) to the initial position is made in the form of a carriage (61), installed with the possibility of moving, by means of two engaging elements (62, 63), each of them is made in the form of rack-and-pinion gear and support rollers (64, 65), while the rack-and-pinion gears are located along the long sides of the rectangular frame behind the decorative sides (4, 5), one of the sides of the carriage (61) is made in the form of a symmetrical contact panel (66), equipped in the central part with an angular protrusion directed towards the target (14).

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6. The complex according to claim 1, wherein the sliding game track (1) is made of the material, the coefficient of friction of which is selected in accordance with the coefficients of friction of the sliding elements of the game elements (16).

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7. The complex according to claim 1, wherein the circumference of each game element (16) is not less than 565.4 mm and no more than 914.4 mm (standard 659.7 mm), the net weight of the game element is not less than 3.5 kg and no more than 12 kg.

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8. The complex according to claim 1, wherein the target (14) is indicated by multi-colored circles of various diameters, in the center of which there is a circle painted over in red or in another color different from the color of the performed 10 circles.

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9. The complex according to claim 1, wherein it is

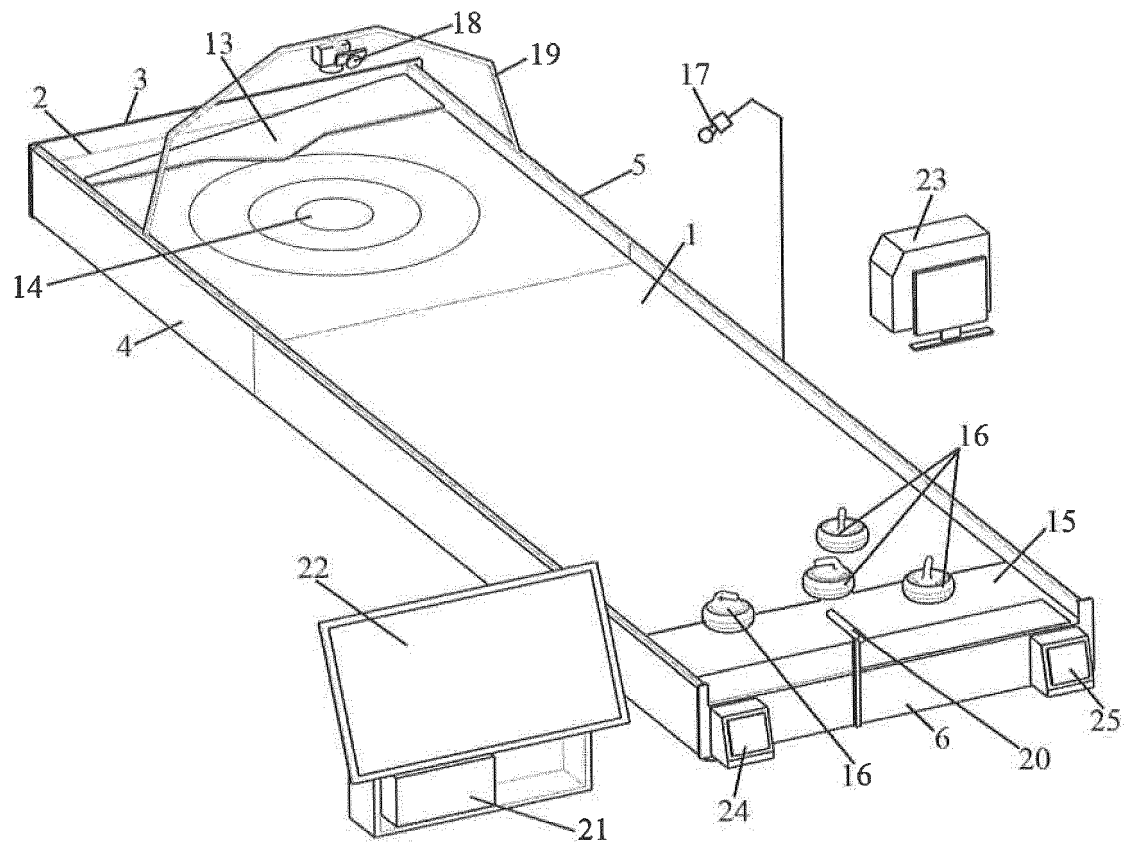


Fig. 1

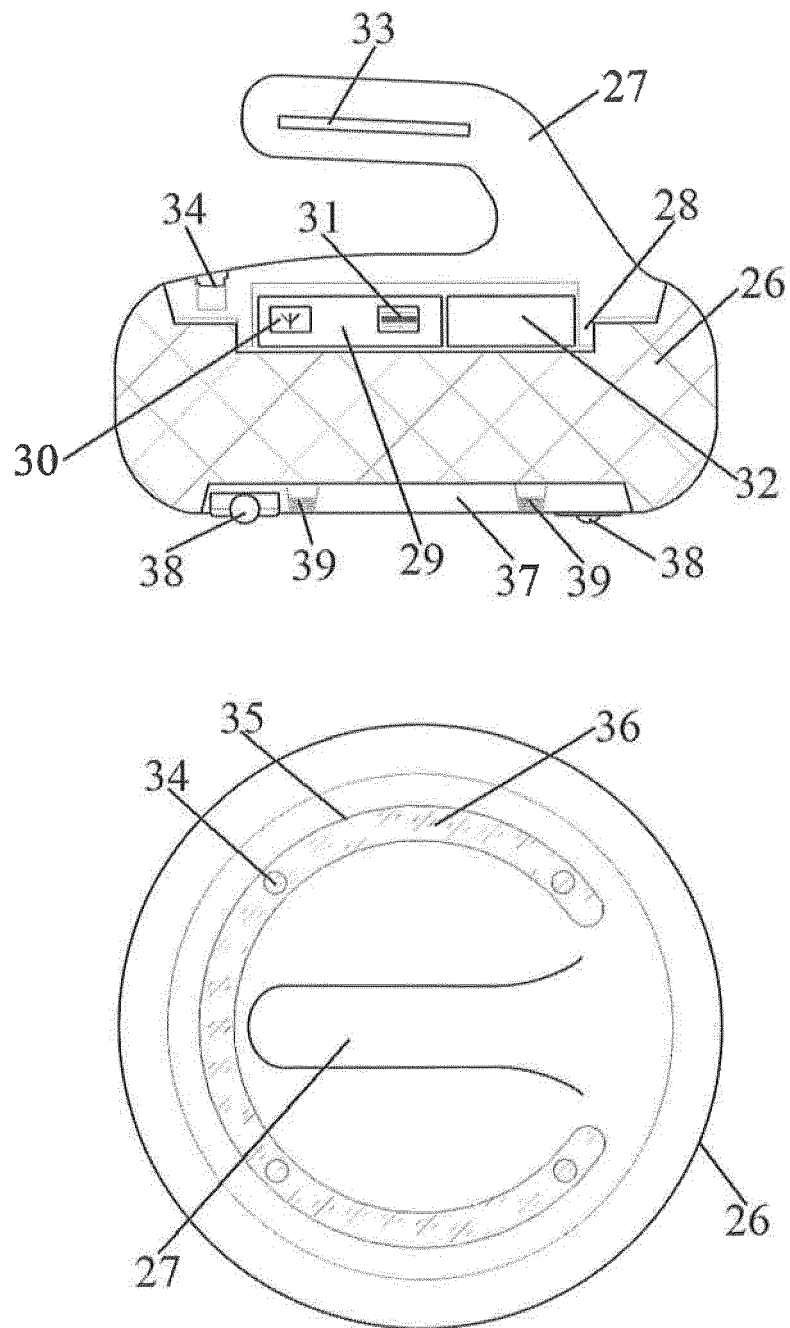


Fig. 2

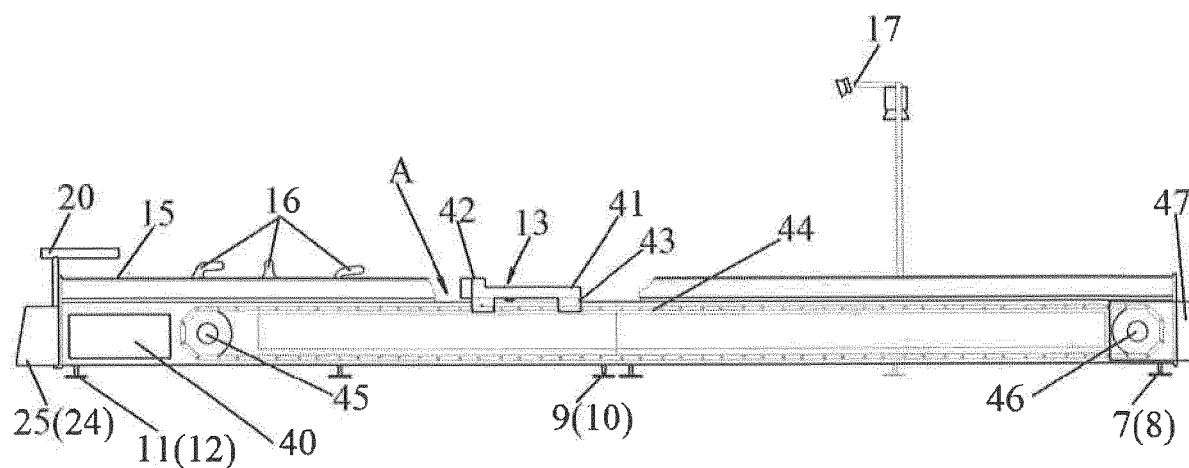


Fig. 3

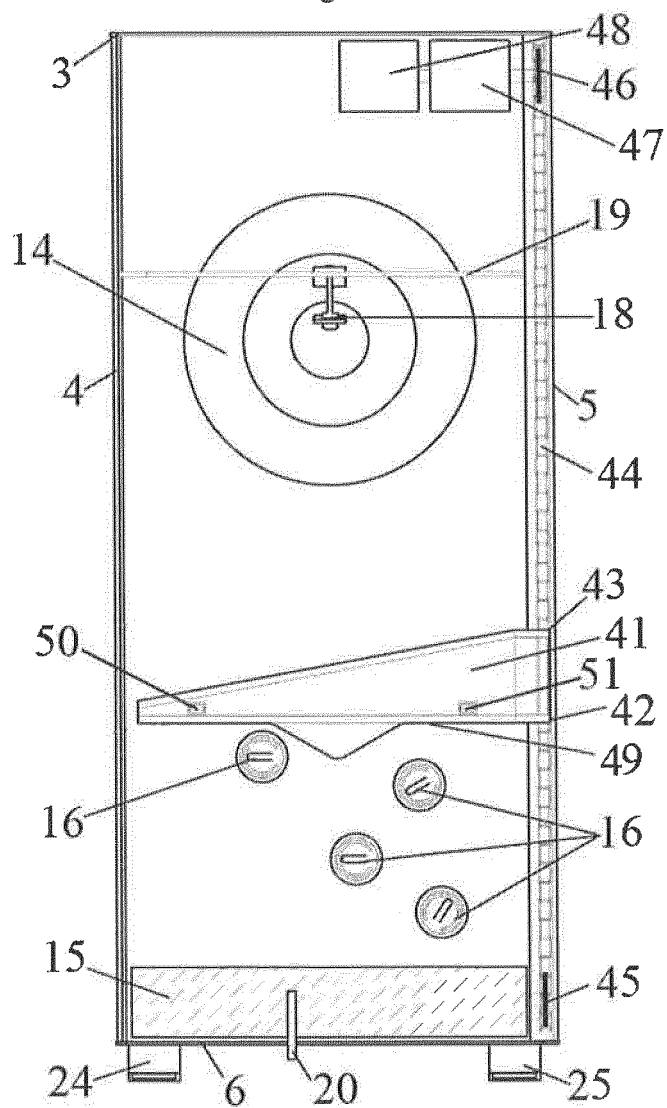


Fig. 4

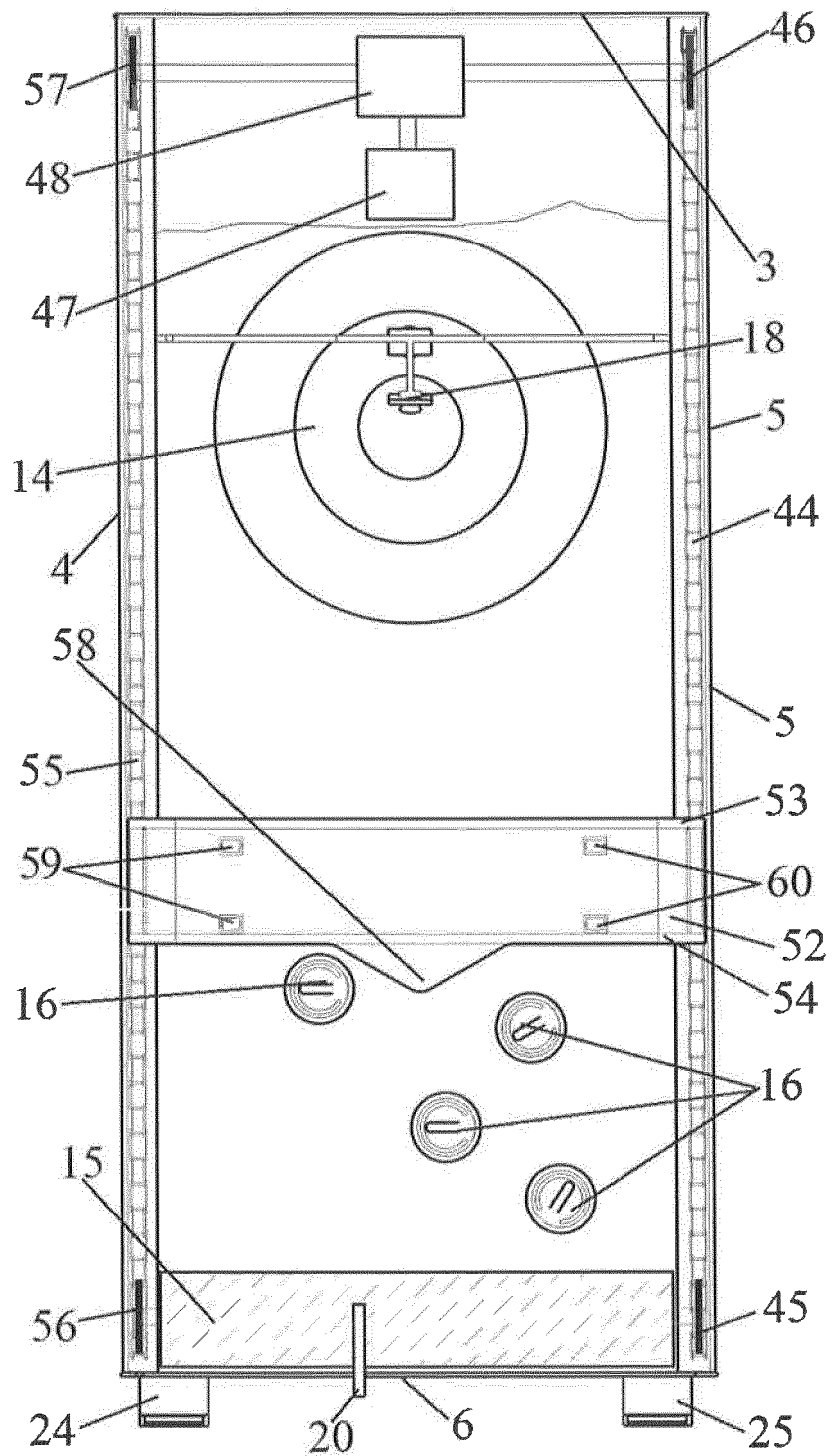


Fig. 5

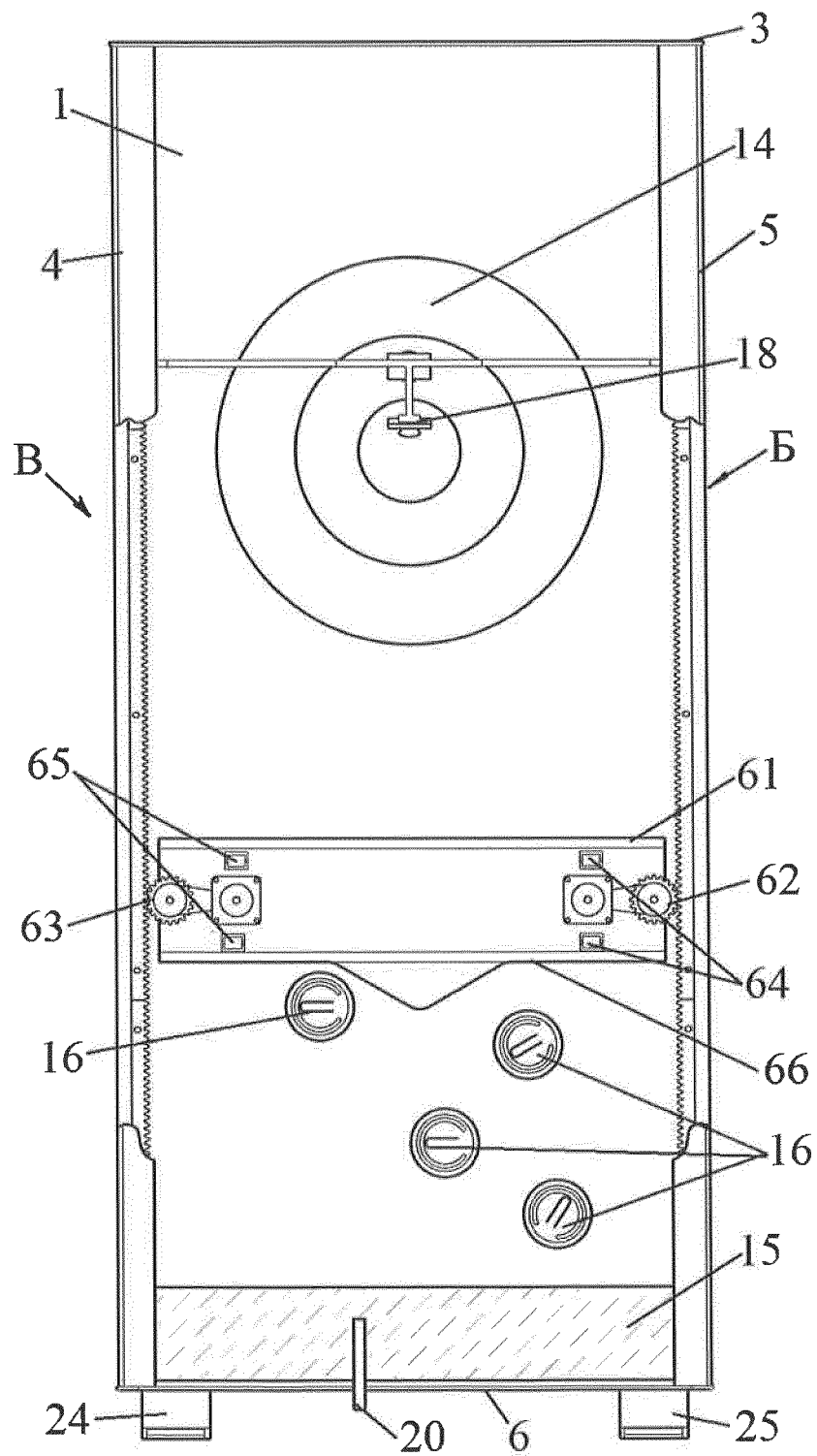


Fig. 6

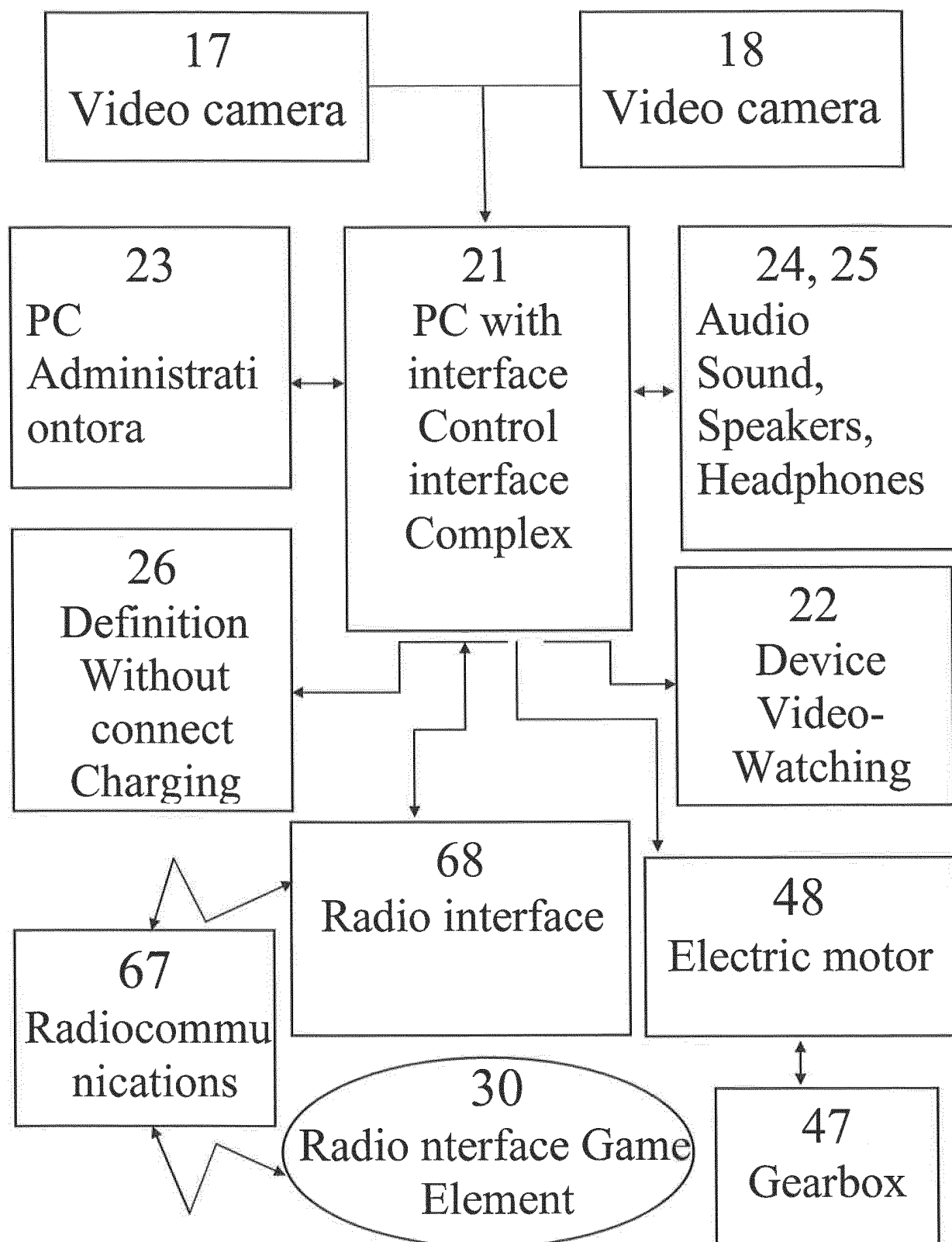


Fig. 7

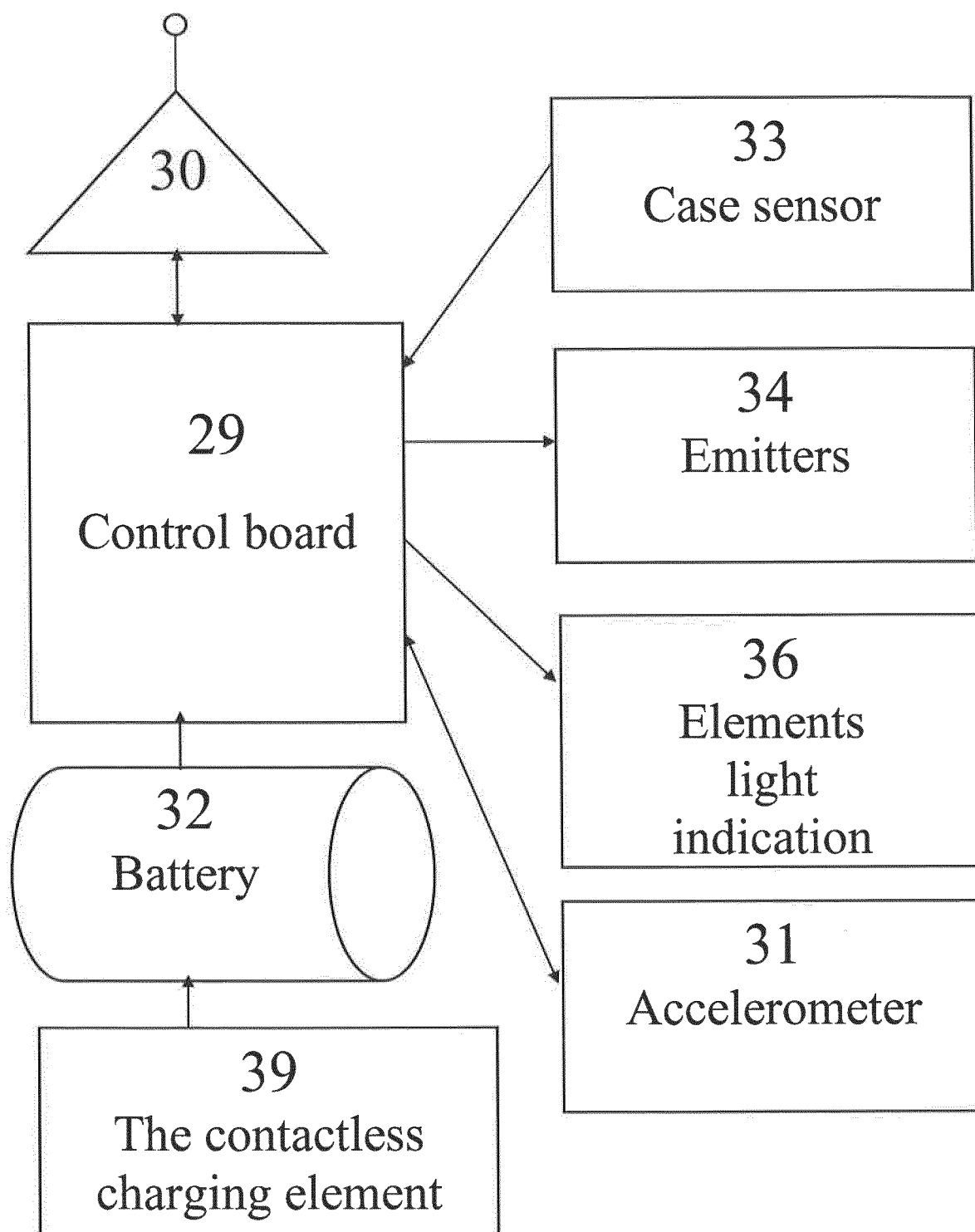


Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/RU 2020/000063

A. CLASSIFICATION OF SUBJECT MATTER

A63B 67/14 (2006.01)

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A63B 67/00-67/14

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

PatSearch (RUPTO Internal), USPTO, PAJ, Espacenet, Information Retrieval System of FIPS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 3239226 A (PAUL MATTE) 08.03.1966	1-9
A	KR 20190107553 A (CHOI HAE YONG) 20.09.2019	1-9
A	KR 101586685 B1 (KIM MOON-KI et al.) 19.01.2016	1-9
A	JPH 06154369 A (ISHIKAWAJIMA HARIMA HEAVY IND) 03.06.1994	1-9
A	KR 20150003626 U (SEO, JONG-HYUK et al.) 06.10.2015	1-9
A	KR 101875727 B1 (OH K YUNG KEUN) 06.07.2018	1-9
A	RU 193702 U1 (GALAIKO VLADIMIR VASILEVICH et al.) 11.11.2019	1-9

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

09 November 2020 (09.11.2020)

Date of mailing of the international search report

19 November 2020 (19.11.2020)

Name and mailing address of the ISA/

Authorized officer

Facsimile No.

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REFERENCES CITED IN THE DESCRIPTION

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