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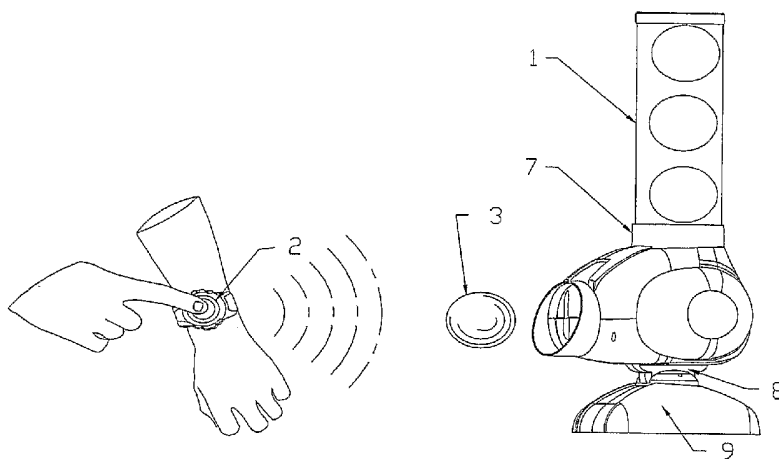
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ance Notes on Codes and Abbreviations" appearing at the begin-
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(54) Title: A BALL PROJECTING APPARATUS



(57) Abstract: The present invention relates to an apparatus for projecting soccer balls with a wide range of trajectory and speed options conveniently available and a remote control member of the player to control the timing of the projection. It comprises a projection member for projecting soccer balls and a remote control member for sending control signals to the projection member. The projection member comprises a storage means, a projecting means, a feeding means, a main body, an angle controlling means, a base member, a processing means and a first power source and a second power source.

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A BALL PROJECTING APPARATUS

Technical Field

The present invention relates to an apparatus for projecting balls and
5 more particularly pertains to an apparatus for projecting soccer balls with a wide
range of angle options conveniently available and a remote control member for
the player to control the timing of the projection.

Background Art

There are various ball projecting apparatuses available in the
10 marketplace. Some of them are constructed to project balls which are lighter in
weight and smaller in size such as baseballs, tennis balls and table tennis balls,
whereas others are constructed for balls which are bigger in size such as
soccer balls. These apparatuses provide a convenient way for a single player to
play or practice the aforementioned ball games. The player may put the
15 apparatus at a desired location which can project the balls at various angles
towards the player so that the player can practice receiving, hitting or kicking
the balls.

However, the ball projecting apparatuses for projecting balls in bigger
size such as soccer balls as disclosed in the prior art are all bulky in size and
20 inconvenient to carry around or to be stored. Further, the player has to press at
least a control button on the machine in order to control the machine to project a
ball. This is highly inconvenient as the player has to walk to and fro between the
machine and the specific location to receive, hit or kick the ball. Some machines
have remote control function but most of them can only project the balls at a
25 single, or a narrow range of angle. This is disadvantageous as the players may
easily get used to the trajectories of the balls and the level of excitement soon
decreases. To overcome this disadvantage, some apparatuses allow the players
to adjust the projecting angles of the balls, but the adjustment procedures are
usually complicated to learn and remember.

Disclosure of the Invention

In view of the aforesaid disadvantages now present in the prior art, the present invention provides a ball projecting apparatus with a wide range of angle options conveniently available and a remote control member for the
5 player to control the timing of the projection.

To attain this, the present invention generally comprises a projection member for projecting balls and a remote control member for sending control signals to the projection member; the projection member comprises (a) a storage means for storing a plurality of balls which are to be projected; (b) a
10 projecting means for projecting one ball at a time; (c) a feeding means for receiving the balls from the storage means, feeding the balls to the projecting means and controlling the operation of the projecting means; (d) a main body for housing the storage means, the projecting means and the feeding means with an angle controlling means attached to the bottom thereof which is
15 pivotable on a horizontal axis; (e) a base member with a rotatable flange for receiving the angle controlling means in a manner which allows the angle controlling means to pivot on the horizontal axis and a direction controlling means for controlling the rotation of the flange so as to control the direction towards which the balls are to be projected one by one; (f) a processing means
20 including a receiver for receiving control signals on a wireless basis from the remote control member and an integrated circuit for controlling the operation of the feeding means; (g) a first power source electrically connected with the projecting means, the feeding means and the processing means; and (h) a second power source electrically connected with the direction controlling means;
25 the remote control member comprises one or more control keys disposed thereon, a power source and a signal transmitter to send control signals on a wireless basis to the receiver of the processing means in response to the activation of the control keys.

The storage means is in the shape of a cylinder, the diameter of which is

slightly larger than that of one ball such that the balls are aligned vertically one by one.

The projecting means comprises a left projecting member and a right projecting member which are placed opposite to each other underneath the storage means and the space between the two projecting members is just
5 enough for holding one ball, each of the projecting members comprises a casing, a roller disposed in the casing with the part in contact with the ball to be projected protruding from the casing and a first motor inside the casing with a rotating shaft thereof passing through the center of the roller for driving the roller
10 to rotate at a speed high enough to project the ball to a desired distance.

The roller is covered with a roller sleeve with rough surface to reduce the friction between the casing and the roller and to prevent the ball from sliding forward.

The rotating shaft is covered with a shaft sleeve at the top end next to the casing to reduce the friction between the rotating shaft and the casing.
15

A ring is attached to the roller to increase the moment of inertia of the roller.

The feeding means comprises a pair of guiding rods positioned underneath the storing means with the space in-between sufficient for the balls
20 transported from the storage means to align vertically one by one and move downward; a L-shaped tray located at the bottom of the storage means to receive one ball at a time transported from the pair of guiding rods; a first eccentric wheel which drives the L-shaped tray to move in a reciprocating manner between a default position where the ball would not be projected by the
25 projecting means and a feed position where the ball is in contact with the rollers of the projecting means; a second motor with a rotating shaft thereof passing through the first eccentric wheel to rotate the first eccentric wheel; a leaf switch serving as the control switch for the operation of the second motor, the activation of which is controlled by the first eccentric wheel.

The feeding means further comprises a detainer in the form of flexible flap, the position of which is at the top and in front of the L-shaped tray such that the lower edge of the detainer is in contact with the upper front part of the ball so as to prevent the ball from sliding forward to the projecting means when
5 the L-shaped tray is in the default position.

The angle controlling means is in the form of a hemisphere.

The direction controlling means comprises a second eccentric wheel which drives the flange to rotate in a reciprocating manner between a left position and a right position and a third motor with a rotating shaft thereof
10 passing through the second eccentric wheel to rotate the second eccentric wheel.

The remote control member is in the form of a watch.

The balls to be projected are soccer balls.

To use the present invention, the player first places the projection
15 member at a desired location and then puts the balls into the storing means. The player may then adjust the angle controlling means to a desired angle. The player then switches on the first power source. If the player wishes the balls to be projected at different angles, the player switches on the second power source so as to activate the direction controlling means as well. When the first
20 power source is switched on, power is supplied to the first motors and the processing means. The rotation of the first motors drives the rollers to rotate. When the second power source is switched on, power is supplied to the third motor. The rotation of the third motor drives the second eccentric wheel to rotate and thus drives the flange to rotate in a reciprocating manner between a left
25 position and a right position.

Then, the player can walk away from the projection member and go to an appropriate location and prepare himself for receiving or kicking the balls. When the player is ready, he presses the appropriate control key on the remote control member. The signal is then transmitted by the signal transmitter to the receiver.

When the signal is received by the receiver, the pre-programmed integrated circuit of the processing means enables the first power source to supply power to the second motor of the feeding means. The duration of the power supply as controlled by the integrated circuit only lasts for two to three seconds.

5 During the two to three seconds, the rotation of the second motor of the feeding means drives the first eccentric wheel to rotate and drives the L-shaped tray to move in a reciprocating manner from the default position to the feed position. When the L-shaped tray is driven to move forward from the default position to the feed position, the ball on the L-shaped tray is then in close
10 contact with the rollers and is being projected by the rotating rollers. The L-shaped tray will then be automatically driven to move backward to the default position by the rotation of the first eccentric wheel.

By the time when the L-shaped tray is moved back to the default position, the position of the first eccentric wheel will deactivate the leaf switch which will
15 then stop the first power source from supplying power to the second motor. As a result, the L-shaped tray remains in the default position until the receiver receives another control signal from the remote control member.

Brief Description of Drawings

FIG. 1 shows the projection member and the remote control member of
20 the present invention.

FIG. 2 is a cross-sectional view of the projection member of the present invention as viewed from the rear.

FIG.3 is a cross-sectional view of the projection member of the present invention as viewed from the side.

25 FIG. 4 is the remote control member of the present invention.

FIG. 5 is a block diagram of the present invention.

Best Mode for Carrying out the Invention

As illustrated in Fig. 1, an embodiment of the present invention comprises a projection member 1 for projecting soccer balls 3 and a remote

control member 2 for sending control signals to the projection member 1. As illustrated in Figs. 2 and 3, the projection member 1 comprises a storage means 4, a projecting means 5, a feeding means 6, a main body 7, an angle controlling means 8, a base member 9, a processing means 11, a first power source 10
5 and a second power source.

The storage means 4 stores a plurality of balls 3 which are to be projected. In the present embodiment, the storage means 4 is in the shape of a cylinder, the diameter of which is slightly larger than that of one ball 3 such that the balls 3 are aligned vertically one by one.

10 The projecting means 5 projects one ball 3 at a time. It comprises a left projecting member 51 and a right projecting member 51' which are placed opposite to each other underneath the storage means 4 and the space between the two projecting members 51, 51' is just enough for holding one ball. Each of the projecting members 51, 51' comprises a casing 52, a roller 53 disposed in
15 the casing 52 with the part in contact with the ball 3 to be projected protruding from the casing 52 and a first motor 54 inside the casing 52 with a rotating shaft 55 thereof passing through the center of the roller 53 for driving the roller 53 to rotate at a speed high enough to project the ball 3 to a desired distance. In the present embodiment, the roller 53 is covered with a roller sleeve 56 with rough
20 surface to reduce the friction between the casing 52 and the roller 53 and to prevent the ball 3 from sliding forward. The rotating shaft 55 is covered with a shaft sleeve 57 at the top end next to the casing 52 to reduce the friction between the rotating shaft 55 and the casing 52. A ring 58 is attached to the roller 53 to increase the moment of inertia of the roller 53.

25 The feeding means 6 receives the balls 3 from the storage means 4, feeds the balls 3 to the projecting means 5 and controls the operation of the projecting means 5. The feeding means 6 comprises a pair of guiding rods 61, 61', an L-shaped tray 62, a first eccentric wheel 63, a second motor 64, a leaf switch and a detainer 67. The guiding rods 61, 61' is positioned underneath the

storing means 4 with the space in-between sufficient for the balls 3 transported from the storage means 4 to align vertically one by one and move downward. The L-shaped tray 62 is located at the bottom of the storage means 4 to receive one ball 3 at a time transported from the pair of guiding rods 61,61'. The first
5 eccentric wheel 63 drives the L-shaped tray 62 to move in a reciprocating manner between a default position where the ball 3 would not be projected by the projecting means 5 and a feed position where the ball 3 is in contact with the rollers 53 of the projecting means 5. The second motor 64 is provided with a rotating shaft 65 which passes through the first eccentric wheel 63 to rotate the
10 first eccentric wheel 63. The leaf switch serves as the control switch for the operation of the second motor 64, the activation of which is controlled by the first eccentric wheel 63. The detainer 67 is in the form of flexible flap. The position of the detainer 67 is at the top and in front of the L-shaped tray 62 such that the lower edge of the detainer 67 is in contact with the upper front part of
15 the ball 3 so as to prevent the ball 3 from sliding forward to the projecting means 5 when the L-shaped tray 62 is in a default position.

The main body 7 houses the storage means 4, the projecting means 5 and the feeding means 6. An angle controlling means 8 is attached to the bottom of the main body 7. The angle controlling means 8 is in the form of a
20 hemisphere and is pivotable on a horizontal axis 81.

The base member 9 is provided with a rotatable flange 91 for receiving the angle controlling means 8 in a manner which allows the angle controlling means 8 to pivot on the horizontal axis 81. The base member 9 is further provided with a direction controlling means 92 for controlling the rotation of the
25 flange 91 so as to control the direction towards which the ball 3 is to be projected. The direction controlling means 92 comprises a second eccentric wheel 921 which drives the flange 91 to rotate in a reciprocating manner between a left position and a right position and a third motor 922 with a rotating shaft 923 thereof passing through the second eccentric wheel 921 to rotate the

second eccentric wheel 921.

The processing means 11 includes a receiver 101 for receiving control signals on a wireless basis from the remote control member 2 and an integrated circuit for controlling the operation of the feeding means 6 and the direction
5 controlling means 92. As illustrated in Fig. 5, the receiver 101 includes an antenna 102 in the form of a coil, amplifiers 103, a mixer 104, a detector 105 and a driver 106. The amplifiers 103 are used to amplify the received signals and the amplified signals are mixed at mixer 104. The mixed signals are then detected at the detector 105 to recover the signals at 315MHz. The detected
10 signals are then introduced to the driver 106.

The first power source 10 is electrically connected with the projecting means 5, the feeding means 6 and the processing means 11. The second power source is electrically connected with the direction controlling means 9.

As illustrated in Fig. 4, the remote control member 2 comprises a control
15 key 21 disposed thereon, a power source 22 and a signal transmitter 23 to send control signals on a wireless basis to the receiver 101 of the processing means 11 in response to the activation of the control key 21.

In the present embodiment, the remote control member 2 takes the form of a watch. As illustrated in Fig. 5, the signal transmitter 23 includes a crystal
20 controlled oscillator 231, an amplifier 232 and an antenna 233. The oscillator 231 produces signals at a frequency of 315 MHz and the signals are amplified at the amplifier 232. The amplified signals are then introduced to the antenna 233 for transmission.

To use the present invention, the player first places the projection
25 member 1 at a desired location and then puts the balls into the storing means 4. The player may then adjust the angle controlling means 8 to a desired angle. The player then switches on the first power source 10. If the player wishes the balls 3 to be projected at different angles, the player switches on the second power source so as to activate the direction controlling means 9 as well. When

the first power source 10 is switched on, power is supplied to the first motors 54 and the processing means 11. The rotation of the first motors 54 drives the rollers 53 to rotate. When the second power source is switched on, power is supplied to the third motor 922. The rotation of the third motor 922 drives the
5 second eccentric wheel 921 to rotate and thus drives the flange 91 to rotate in a reciprocating manner between a left position and a right position.

Then, the player can walk away from the projection member 1 and go to an appropriate location and prepare himself for kicking the balls. When the player is ready, he presses the control key 21 on the remote control member 2.
10 The signal is then transmitted by the signal transmitter 22 to the receiver 101. When the signal is received by the receiver 101, the driver 106 then passes the signal to the pre-programmed integrated circuit of processing means 11 to enable the first power source 10 to supply power to the second motor 64 of the feeding means 6. The duration of the power supply as controlled by the
15 integrated circuit only lasts for two to three seconds.

During the two to three seconds, the rotation of the second motor 64 of the feeding means 6 drives the first eccentric wheel 63 to rotate and drives the L-shaped tray 62 to move in a reciprocating manner from the default position to the feed position. When the L-shaped tray 62 is driven to move forward from the
20 default position to the feed position, the ball 3 on the L-shaped tray 62 is then in close contact with the rollers 53 and is being projected by the rotating rollers 53. The L-shaped tray 62 will then be automatically driven to move backward to the default position by the rotation of the first eccentric wheel 63.

By the time when the L-shaped tray 62 is moved back to the default
25 position, the position of the first eccentric wheel 63 will deactivate the leaf switch which will then stop the first power source 10 from supplying power to the second motor 64. As a result, the L-shaped tray 62 remains in the default position until the receiver 101 receives another control signal from the remote control member 2.

As to a further discussion of the manner of usage and operation of the present invention, the same should be apparent from the above description. Accordingly, no further discussion relating to the manner of usage and operation is provided.

5 With respect to the above description, it is to be realized that the optimum relationships for the parts of the invention in regard to size, shape, form, materials, function and manner of operation, assembly and use are deemed readily apparent and obvious to those skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the
10 specification are intended to be encompassed by the present invention.

The present invention is capable of other embodiments and of being practiced and carried out in various ways. It is to be understood that the phraseology and terminology employed herein are for the purpose of description and should not be regarded as limiting.

15 Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to falling within the scope of the
20 invention.

Industrial Applicability

The present invention provides an apparatus for projecting soccer balls with a wide range of trajectory and speed options conveniently available and a remote control member for the player to control the timing of the projection. The
25 present invention is of simple and reliable construction and is easy and convenient to use. Further, the present invention is susceptible of a low cost of manufacture with regard to both materials and labor, and which accordingly is then susceptible of low prices of sale to the consuming public, thereby making

such ball projecting apparatus economically available to the buying public, thus overcoming the disadvantages of the prior art.

CLAIMS

1. A ball projecting apparatus comprising a projection member for projecting balls and a remote control member for sending control signals to the projection member; the projection member comprises (a) a storage means for storing a plurality of balls which are to be projected; (b) a projecting means for projecting one ball at a time; (c) a feeding means for receiving the balls from the storage means, feeding the balls to the projecting means and controlling the operation of the projecting means; (d) a main body for housing the storage means, the projecting means and the feeding means with an angle controlling means attached to the bottom thereof which is pivotable on a horizontal axis; (e) a base member with a rotatable flange for receiving the angle controlling means in a manner which allows the angle controlling means to pivot on the horizontal axis and a direction controlling means for controlling the rotation of the flange so as to control the direction towards which the ball is to be projected; (f) a processing means including a receiver for receiving control signals on a wireless basis from the remote control member and an integrated circuit for controlling the operation of the feeding means and the direction controlling means; (g) a first power source electrically connected with the projecting means, the feeding means and the processing means; and (h) a second power source electrically connected with the direction controlling means; the remote control member comprises one or more control keys disposed thereon, a power source and a signal transmitter to send control signals on a wireless basis to the receiver of the processing means in response to the activation of the control keys.
2. A ball projecting apparatus as in claim 1, wherein the storage means is in the shape of a cylinder, the diameter of which is slightly larger than that of one ball such that the balls are aligned vertically one by one.
3. A ball projecting apparatus as in claim 1, wherein the projecting means comprises a left projecting member and a right projecting member which are placed opposite to each other underneath the storage means and the space

between the two projecting members is just enough for holding one ball, each of the projecting members comprises a casing, a roller disposed in the casing with the part in contact with the ball to be projected protruding from the casing and a first motor inside the casing with a rotating shaft thereof passing through the center of the roller for driving the roller to rotate at a speed high enough to project the ball to a desired distance.

4. A ball projecting apparatus as in claim 1 or 3, wherein the roller is covered with a roller sleeve with rough surface to reduce the friction between the casing and the roller and to prevent the ball from sliding forward.

5. A ball projecting apparatus as in claim 1 or 3, wherein the rotating shaft is covered with a shaft sleeve at the top end next to the casing to reduce the friction between the rotating shaft and the casing.

6. A ball projecting apparatus as in claim 1 or 3, wherein a ring is attached to the roller to increase the moment of inertia of the roller.

7. A ball projecting apparatus as in claim 1, wherein the feeding means comprises a pair of guiding rods positioned underneath the storing means with the space in-between sufficient for the balls transported from the storage means to align vertically one by one and move downward; an L-shaped tray located at the bottom of the storage means to receive one ball at a time transported from the pair of guiding rods; a first eccentric wheel which drives the L-shaped tray to move in a reciprocating manner between a default position where the ball would not be projected by the projecting means and a feed position where the ball is in contact with the rollers of the projecting means; a second motor with a rotating shaft thereof passing through the first eccentric wheel to rotate the first eccentric wheel; a leaf switch serving as the control switch for the operation of the second motor, the activation of which is controlled by the first eccentric wheel.

8. A ball projecting apparatus as in claim 1 or 7, wherein the feeding means further comprises a detainer in the form of flexible flap, the position of which is at the top and in front of the L-shaped tray such that the lower edge of the

detainer is in contact with the upper front part of the ball so as to prevent the ball from sliding forward to the projecting means when the L-shaped tray is in a default position.

9. A ball projecting apparatus as in claim 1, wherein the angle controlling means
5 is in the form of a hemisphere.

10. A ball projecting apparatus as in claim 1, wherein the direction controlling means comprises a second eccentric wheel which drives the flange to rotate in a reciprocating manner between a left position and a right position and a third motor with a rotating shaft thereof passing through the second eccentric wheel
10 to rotate the second eccentric wheel.

11. A ball projecting apparatus as in claim 1, wherein the remote control member is in the form of a watch.

12. A ball projecting apparatus as in claim 1, wherein the balls to be projected are soccer balls.

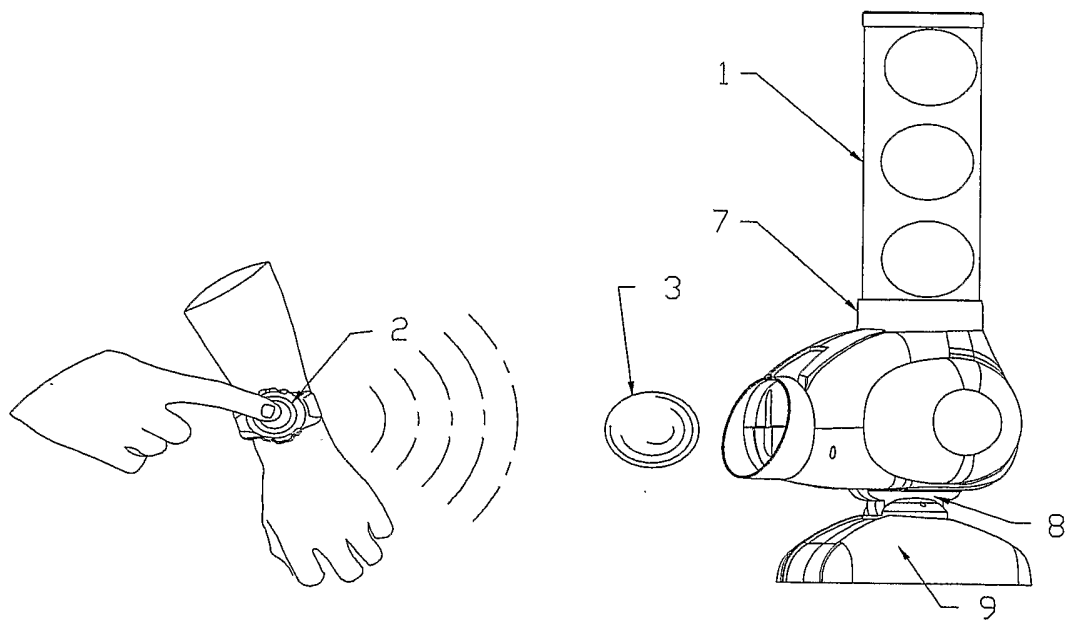


Fig. 1

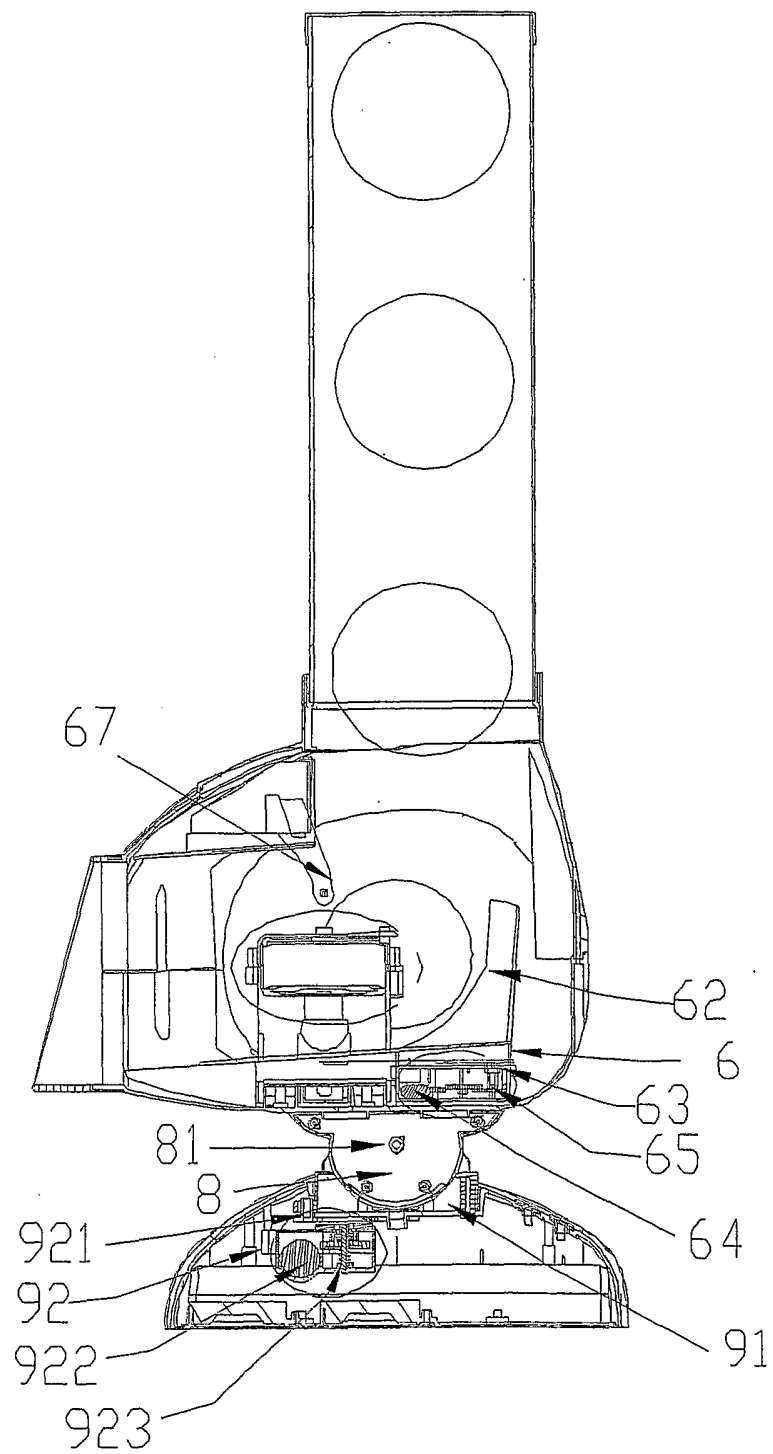


Fig. 3

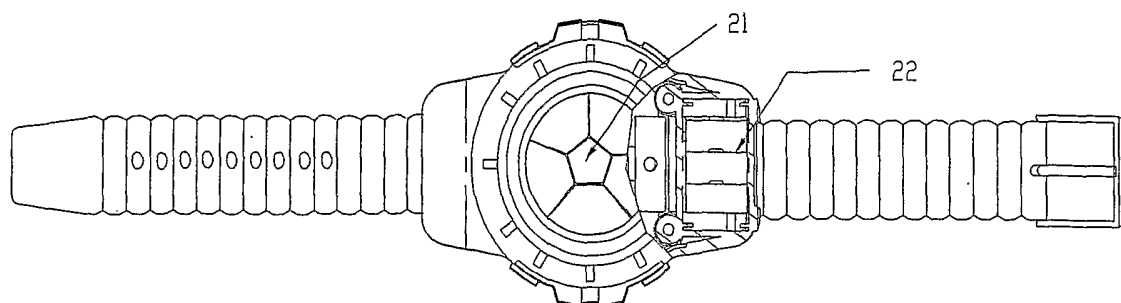


Fig. 4

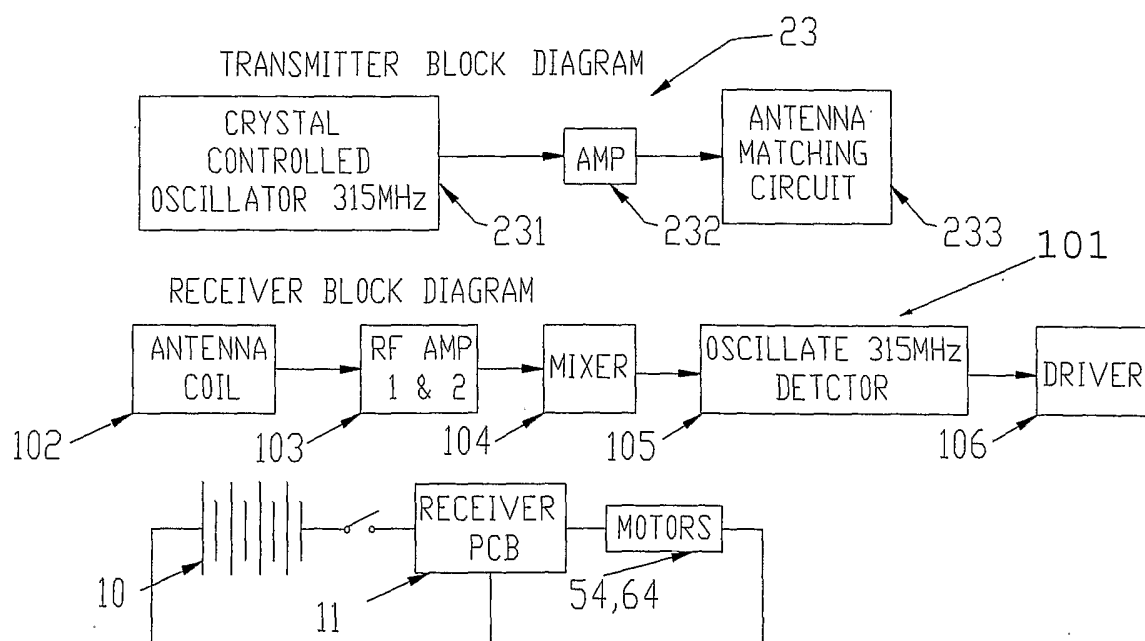


Fig. 5

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2005/000157

A. CLASSIFICATION OF SUBJECT MATTER

IPC⁷ A63B69/00

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)

IPC⁷ A63B

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

CNKI, CNPAT

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

WPI, EPODOC, PAJ

ball, service, serving, projection, project, throw, eject, launch, shoot, training, remote control, telecontrol

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN2068849U (UNIV SHANXI NORMAL), 9. Jan. 1991(09-01-1991), the whole document	1-12
A	CN2334447Y(YAN, Guangge), 25.Aug.1999(25-08-1999), the whole document	1-12
A	CN1481917A (WANG, Nengfa), 17.Mar.2004(17-03-2004), the whole document	1-12
A	EP0541484A1(JOSSE PRAEZISIONSMECHANIK HANS), 12.May 1993(12-05-1993), the whole document	1-12
A	DE3914017A (REENTS H), 31.Oct.1990(31-10-1990), the whole document	1-12
A	WO9532033A1(JAEGER BEAT; JAEGER RUDOLF; DURBAN JACK), 30.Nov.1995(30-11-1995), the whole document	1-12

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

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“&”document member of the same patent family

Date of the actual completion of the international search
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
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