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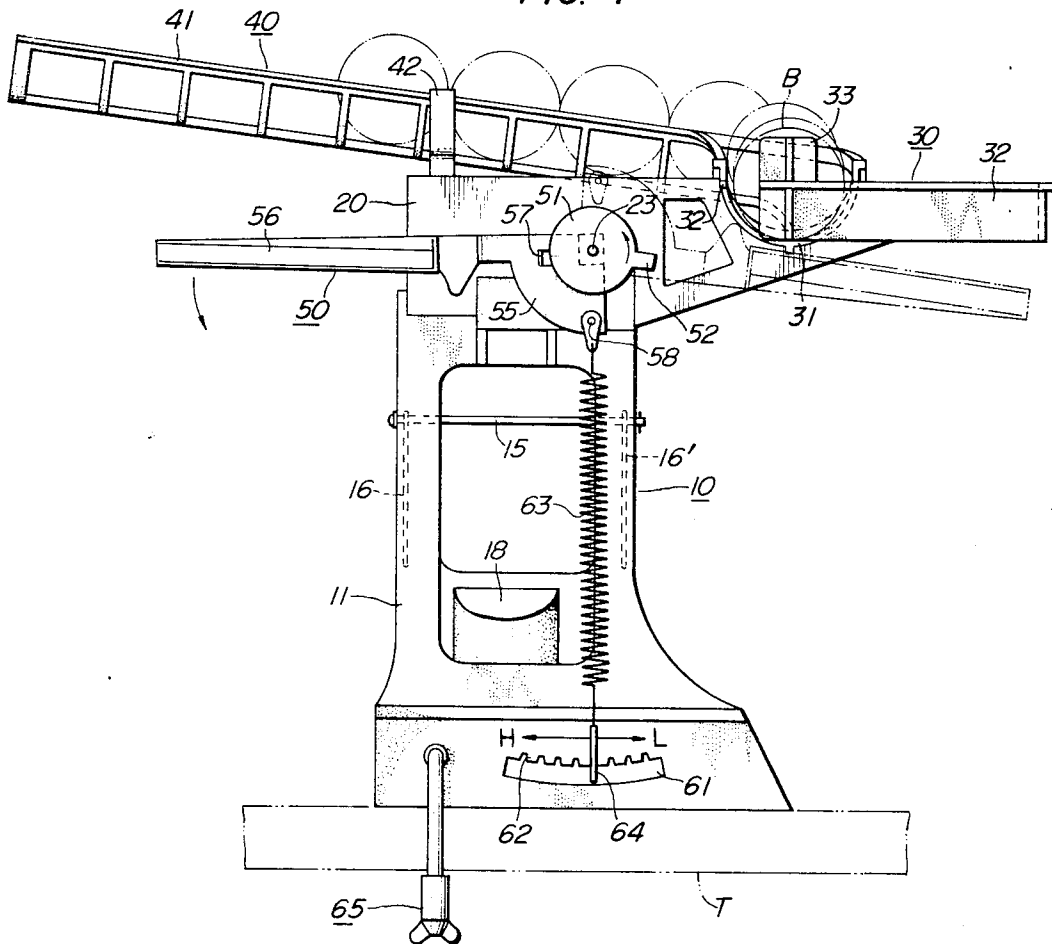
3,511,225

SMALL SIZED TOY PITCHING MACHINE

Filed Oct. 22, 1968

2 Sheets-Sheet 1

FIG. 1



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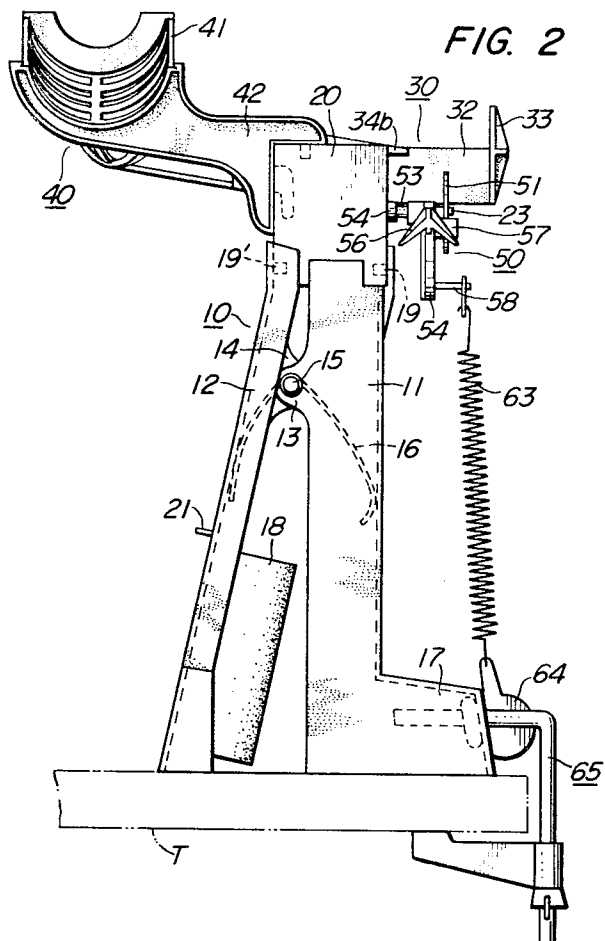
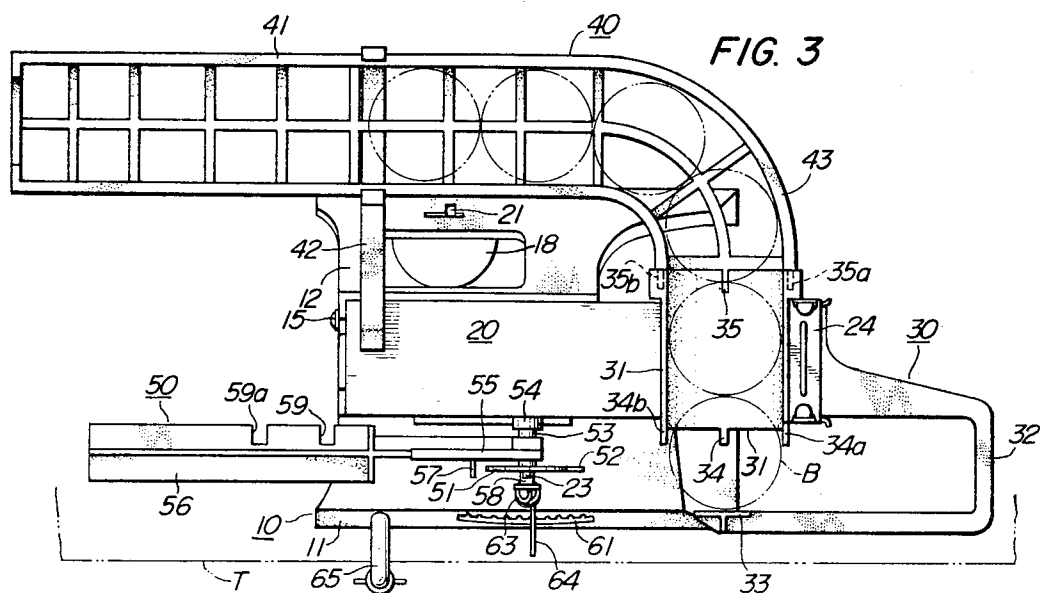
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SMALL SIZED TOY PITCHING MACHINE

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2 Claims

ABSTRACT OF THE DISCLOSURE

A small sized pitching machine for use by children in indoor batting games. The machine has a two-part plastic base which supports a metallic housing. The housing contains a battery-powered motor and reduction gearing. The housing detachably supports an inclined ball magazine leading at its lower end to a ball-holding station. A pitching arm is mounted for unidirectional 360 degree rotation to pick up and throw a ball from the holding station. The arm is rotated by the reduction gearing through a cocking movement to load an adjustable overcenter spring and then released to be driven by the spring through a ball-pitching movement.

FIELD OF THE INVENTION

This invention relates to a toy pitching machine for use in indoor and outdoor batting game among children.

BACKGROUND OF THE INVENTION

There have heretofore been baseball pitching machines for use in baseball batting practice. One of these conventional pitching machines is disclosed in U.S. Pat. No. 2,877,757. However, none of the conventional pitching machines is suited for use by children who are interested in baseball games. It is, therefore, a primary object of the present invention to provide a small sized toy pitching machine which is suited for use in childlike baseball batting game either in a room or in a garden.

Another object of the invention is to provide a small sized automatic toy pitching machine which can be manufactured at lower cost and which may be disassembled for storing purpose when not in use.

A still another object of the present invention is to provide an automatic toy pitching machine of the class mentioned and in which a simple mechanism is provided for selectively varying the trajectory of the balls to be thrown.

SUMMARY OF THE INVENTION

According to the present invention, there is provided a toy pitching machine for use in a batting game among children, said machine comprising a base section consisting of a pair of molded plastic members, one of the plastic members being formed therein with a recess for accommodating a dry cell therein; a gear box section consisting of a rectangular metallic box having therein an electric motor and a set of speed reduction gears for transmitting the output of the motor at reduced speed,

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said motor being electrically connected to said dry cell through conductors having provided therein switching means, said box section having an output shaft extending from the final gear of said reduction gears and projecting outwardly through one of the walls of said metallic box; a ball guiding and holding section mounted on said gear box section rearwardly of said output shaft and including means for holding a ball in position and means for guiding another ball into said holding means after removal of the first mentioned ball; a ball storing and feeding section consisting of an inclined chute member detachably mounted on said metallic box and detachably connected to said ball guiding means in alignment therewith; a pitching arm section including a disc member rigidly connected to the outer end of said output shaft for rotation therewith and having thereon a projection extending radially outwardly of said disc member, a pitching arm in the form of a fan-shaped plate mounted at one end on said output shaft for independent free rotation of the latter within a predetermined angular range and having a ball pitching palm connected onto said arm at the other end thereof, said arm having thereon a lateral projection at such a position as to interfere with the path of the rotational movement of said projection on said disc member, a tensioned coil spring having its one end pivotally connected to said fan-shaped plate at a point angularly spaced from said lateral projection and having the other end of said coil spring connected to one of said base members at a selective point in a lower portion of said one base member whereby the rotation of said disc member causes said projection on the latter to engage said lateral projection on said arm to rotate same together with said pitching palm against said tensioned spring until the latter abruptly drives said arm and palm in advancement of the rotation of said output shaft when the pivotal point of said spring on said fan-shaped plate proceeds just beyond an extension of a line joining the axis of said output shaft and the point at which the said other end of said coil spring is connected to said one base member.

The base section of the pitching machine of the present invention may be formed at a lower side portion of one of the base members with an arcuate slot having a toothed upper edge. A hook member may be connected to the coil spring on the end other than that pivotally connected to the pitching arm. The hook member is engaged with the toothed upper edge of the slot at a selected point. An appropriate adjustment of the engagement point of the hook with the toothed upper edge of the slot will serve to shift or displace the dead point of the tensioned coil spring and, thus, to vary the trajectory of the balls to be thrown by the pitching palm of the pitching machine.

The pitching machine of the present invention may be used either with conventional balls which are designed to be used in table tennis or with particularly designed balls of a soft plastic material. However, such particular balls to be used with the machine of the present invention are not a part of the invention. Also, a plastic bat may be used in a batting game wherein the pitching machine of the invention is used. The present invention, however, does not include therein such plastic bat.

Other objects and features of the present invention will be made apparent from the following description with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view of an embodiment of the toy pitching machine according to the present invention.

FIG. 2 is a front view of the machine shown in FIG. 1, and

FIG. 3 is a top view of the machine in FIGS. 1 and 2.

DESCRIPTION OF A PREFERRED EMBODIMENT

The toy pitching machine of an embodiment of the present invention comprises a base section 10, a gear box section 20, a ball guiding and holding section 30, a ball storing and feeding section 40 and pitching arm section 50. As will be best seen in FIG. 2, the base section 10 is composed of two members 11 and 12 of molded plastic material. Each of the plastic members 11 and 12 has substantially U-shaped cross-section so as to save the material and thus to reduce the weight of the member. The member 11 is provided with integral projections 13 on the opposite edges of the legs of the U-shaped cross-section. The member 12 also has similar projections 14 on the corresponding portions thereof. The members 11 and 12 are joined together by means of the projections 13 and 14 and a rod 15 extending therethrough so that the members 11 and 12 cooperate to define a hollow space of rectangular shape in cross-section. A pair of springs 16 and 16' are mounted around the rod 15 and have their opposite ends in pressure contact with the respective inner surfaces of the base members 11 and 12 so that the lower portions thereof are normally urged outwardly by the springs for the purpose which will be described later. The base member 11 has an outwardly enlarged bottom portion 19. Also, the base member 12 is formed at a lower portion with a recess 18 for receiving a dry cell.

The gear box section 20 includes a generally rectangular box of a metallic material which is detachably mounted on the top portions of the plastic base members 11 and 12. The base members 11 and 12 each have a plurality of projections 19 and 19' in the upper portions of their inner surfaces. The projections 19 and 19' engage apertures in the opposite side walls of the metallic box 20 for positively supporting the latter in position. The pressure force of the springs 16 and 16' serves to bring the upper portions of the plastic base members 11 and 12 into pressure contact with the sides of the box 20 for firmly holding the latter.

Within the metallic box 20 are mounted a DC motor and a set of speed reduction gears which form a conventional drive mechanism and thus are not shown in the drawings. The DC motor is electrically connected by means of a conductor, not shown, to the dry cell received in the recess 18. An electrical switch, only an actuator 21 of which is shown in FIG. 2, is provided on the plastic member 12 adjacent the recess 18 for opening and closing the electrical connection between the dry cell and the motor.

As shown in FIG. 1, the metallic box 20 is provided with a semi-circular notch 22 in the upper surface thereof near the right end as seen in this figure. The notch 22 receives therein an upwardly opening semi-cylindrical portion 31 of the ball guiding and holding section 30 which is fastened to the box 20 by means of a metallic band 24 (FIG. 3). The semi-cylindrical portion 31, which is of a radius somewhat greater than that of the balls to be used, has an integral U-shaped portion 32 having its one leg extending horizontally rearwardly from one of the sides of the portion 31 and having its other leg extending horizontally forwardly and terminating in an upwardly projecting plate 33 which is in lateral alignment with the semi-cylindrical groove of the portion 31. A plurality of projections 34, 34a and 34b project from the end of the portion 31 adjacent the plate 33 toward the latter. The semi-circular portion 31 at the other end is somewhat enlarged radially and is provided with a groove 35 in the

inner surface of the semi-cylindrical groove and with a plurality of notches 35a and 35b in the radially enlarged wall at the diametrically opposite positions. The purpose of the groove 35 and the notches 35a and 35b will be described hereinafter.

As best shown in FIG. 3, the ball storing and feeding section 40 comprises a latticed chute 41 of plastic material. The chute 41 has a semi-cylindrical shape in cross-section, as seen in FIG. 2, of the curvature which is substantially the same as the semi-cylindrical portion 31 of the ball guiding section 30. A bracket 42 of plastic material is detachably mounted on the metallic box 20 at the side face remote from the U-shaped portion 32 of the ball holding section 30 by appropriate means, such as projections on the bracket and apertures in the surfaces of the box 20. The bracket 42 extends at substantially right angles from the box 20 as shown in FIG. 3 and has at the free end a semi-circular notch in which the chute 41 is detachably received at a portion near one end thereof.

The chute 41 has at the other end portion 43 which is bent at substantially right angles with respect to the major portion of the chute. The bent end portion 43 is provided at the end extremity with a plurality of projections which are snugly and detachably received in the notches 35, 35a and 35b in the ball guiding section as shown in FIG. 3.

As seen in FIG. 2, the bracket 42 is so shaped that the bottom of the semi-circular notch therein is at the level which is in lateral alignment with or higher than the top of the box 20. This causes the chute 41 to incline upwardly as best shown in FIG. 1, so that the balls manually fed thereinto at the free end roll down toward the curved end 43 and, thus, into the groove defined by the semi-circular portion 31 of the ball guiding section 30. The first one of the balls fed into the chute 41 will run over the end of the grooved portion 30 and will be stopped by the plate 33 at a position as shown in FIG. 3 by dotted line indicated at B. The plate 33 cooperates with the projections 34, 34a and 34b to rest the first ball in this position for the purpose which will be described hereinafter.

The pitching arm section 50 includes a disc 51 of a metallic material which is fixedly secured to the outer end of the aforementioned extension 23 for rotation therewith. The disc 51 has thereon a radial projection 52. On the shaft extension 23 is loosely mounted a sleeve member 53 between the disc 51 and a thrust bearing 54 mounted on the side face of the box 20, so that the sleeve member is freely rotatable about the shaft 23. The sleeve member 53 is fixedly connected with an arm 55 which is in the form of a substantially fan-shaped plate (FIG. 1) extending in parallel relationship with the disc 51 as shown in FIG. 2. The arm 55 is connected at the free end with a ball pitching palm 56 of molded plastic material. Adjacent one side of the fan-shaped plate of the arm 55, there is provided a laterally outwardly directed projection 57 at such a position as to interfere with the circular path of the movement of the projection 52 on the disc 51. The fan-shaped plate of the arm 55 is also provided thereon with a pin 58 projecting laterally outwardly from a point which is angularly spaced by substantially 90° from the projection 57 on the arm as shown in FIG. 1.

The ball pitching palm 56 is formed therein with two spaced notches 59 and 59a. The distances from the axis of the shaft 23 to the centers of the notches 59 and 59a are substantially equal to the distances as measured from the shaft 23 to the projections 34 and 34a, respectively.

As shown in FIG. 1, the base member 11 is formed, in the lower portion of the side surface thereon, with an arcuate slot 61 which has a toothed upper edge 62. The slot 61 is positioned such that the longitudinal center thereof is vertically aligned with the axis of the shaft extension 23. A coil spring 63 is pivotably connected at its one end to the pin 58 on the fan-shaped arm 55 and is connected at the other end with a hook member 64 which

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in turn is detachably received in the slot 61 and is adapted to be selectively adjusted with respect to the point of engagement thereof with the toothed edge 62 of the slot 61 for the reason which will be described later. The coil spring 63 is so tensioned that the arm 55 and the pitching palm 56 is normally held in the position as shown in FIG. 1.

The machine of the present invention, when in use, may either be simply mounted on a table T or be fastened thereonto by fastening means as is generally shown at 65 in the drawings.

When the actuator 21 of the switch is operated to electrically connect DC power source to the motor within the box 20, the motor starts rotating which is transmitted to the shaft 23 in a conventional manner by a series of speed reduction gears within the box 20 so that the disc 51 is rotated in a counterclockwise direction as indicated by the arrow. This rotation causes the projection 52 on the disc 51 to engage the projection 57 for thereby rotating the arm 55 and the palm 56 in counterclockwise direction against the tensioned coil spring 63. When the arm 55 and the palm 56 arrive at a position as shown by dotted line in FIG. 1, the pin 58 is on the extension of an imaginary line joining the axis of shaft 23 and the point at which the hook 64 engages the toothed edge 62. In this position of the pin 58, the spring 63 is subjected to the greatest degree of tension and thus this position is called as "dead point." As soon as the arm 55 is moved by the disc 51 beyond the dead point, the tensioned spring 63 will violently contract toward its initial position. This contraction of the spring 63 will cause the arm 55 and palm 56 to violently swivel or rotate in counterclockwise direction independently and in advancement of the rotation of the disc 51. In this rotational movement, the ball pitching palm 56 first relatively slowly approaches to the ball held in the position as indicated at B in FIG. 3 and receives the ball in the concave surface of the palm at the radially inward portion thereof. The palm 56 then lifts the ball upwardly. At or about this time, the spring 63 is in such a position that the pin 58 is slightly displaced in counterclockwise direction from the position as shown in dotted line in FIG. 1. After this moment, the movement of the arm 55 and the palm 56 are accelerated by a further contraction of the spring 63, so that the ball on the concave surface of the pitching palm 56 is accelerated to roll radially outwardly by the centrifugal force and reaches near the outer end of the palm and finally is pitched off the palm along a predetermined trajectory toward a batter. When the ball has been removed from the ball holding position as shown at B, following balls roll down along the groove of the chute 41 by gravity and the foremost one is guided into the position B to be ready for a next pitching by the arm and the palm and this is cyclically continued. The arm 55 and the palm 56, after having pitched a ball, will be at rest in the position as shown by full line in FIG. 1 until the projection 52 on the disc 51 arrives at the projection 57 of the arm 55 for a next rotation.

To vary the trajectory along which the pitched ball is moved, it is only required to adjust the hook member 64 leftwardly or rightwardly as viewed in FIG. 1. It will be appreciated that, if the hook member 64 is set at the leftward end of the toothed edge 62, the dead point is shifted or displaced in clockwise direction as compared with the case where the hook member is set at substantially intermediate position of the toothed edge 62. This will result in a clockwise displacement of point of ball release from the palm whereby the trajectory is rendered somewhat mountainous. An opposite result will be obtained where the hook member 64 is shifted to the rightward end of the toothed edge 62 and, in this case, a pitched ball will be moved along a relatively plainer trajectory.

Thus, it will be appreciated that the present invention provides very simple mechanism for selectively varying the trajectory of pitched balls.

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When a batting game in which the machine of this invention is used has completed, the machine may be disassembled for storage purpose. The disassembly may be simply carried out in such a manner that the curved end portion 43 of the chute 41 is first detached by disengaging the projections on the end portion from the notches 35, 35a and 35b and then the chute 41 is removed from the semi-circular notch of the bracket 42. Then, the bracket 42 is detached from the box 20. The hook 64 is then disengaged from the toothed edge 62 of the slot 61 to cause the arm 55 and the palm 56 as well as the spring 63 to be freely pivotable about the shaft 23 and the pin 58, respectively. Finally, the fastening means 65 are removed so that the base section 10, the gear section 20, the ball guiding and holding section 30 and the pitching arm section 50 are carried away as a unit into a container for the machine, and the unit together with the detached parts is stored in the container with the palm 56 positioned between the legs of the U-shaped portion 32. The detachment of the chute 41 and the bracket 42 serves to reduce the bulkiness of the machine.

The present invention has been described with reference to a preferred embodiment. It is to be understood that the invention is not limited to the described and illustrated embodiment but may have various modifications and changes within the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A toy pitching machine for use in a batting game among children, said machine comprising a base section consisting of a pair of molded plastic members, one of the plastic members being formed therein with a recess for accommodating a drycell therein; a gear box section consisting of a rectangular metallic box having therein an electric motor and a set of speed reduction gears for transmitting the output of the motor at reduced speed, said motor being electrically connected to said drycell through conductors having provided therein switching means, said box section having an output shaft extending from the final gear of said reduction gears and projecting outwardly through one of the walls of said metallic box; a ball guiding and holding section mounted on said gear box section rearwardly of said output shaft and including means for holding a ball in position and means for guiding another ball into said holding means after removal of the first mentioned ball; a ball storing and feeding section consisting of an inclined chute member detachably mounted on said metallic box and detachably connected to said ball guiding means in alignment therewith; a pitching arm section including a disc member rigidly connected to the outer end of said output shaft for rotation therewith and having thereon a projection extending radially outwardly of said disc member, a pitching arm in the form of a fan-shaped plate mounted at one end on said output shaft for independent free rotation of the latter within a predetermined angular range and having a ball pitching palm connected onto said arm at the other end thereof, said arm having thereon a lateral projection at such a position as to interfere with the path of the rotational movement of said projection on said disc member, a tension coil spring having its one end pivotally connected to said fan-shaped plate at a point angularly spaced from said lateral projection and having the other end of said coil spring connected to one of said base members at a selective point in a lower portion of said one base member whereby the rotation of said disc member causes said projection on the latter to engage said lateral projection on said arm to rotate same together with said pitching palm against said tension spring until the latter abruptly drives said arm and palm in advancement of the rotation of said output shaft when the pivotal point of said spring on said fan-shaped plate proceeds just beyond an extension of a line joining the axis of said output shaft and the point at which the said other end of said coil spring is connected to said one base member.

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2. A toy pitching machine as defined in claim 1 in which one of the plastic base members is formed at a lower side surface thereof with a slot having a toothed upper edge with which adjustably engages a hook member which in turn is connected to said coil spring at the one end other than that pivotally connected to said fan-shaped plate of said pitching arm, whereby an adjustment of engaging point of said hook member with said toothed edge of said slot serves to displace or shift the dead point of said spring for thereby varying the trajectory of the balls to be thrown by said pitching arm and palm.

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RICHARD C. PINKHAM, Primary Examiner

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