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[56]

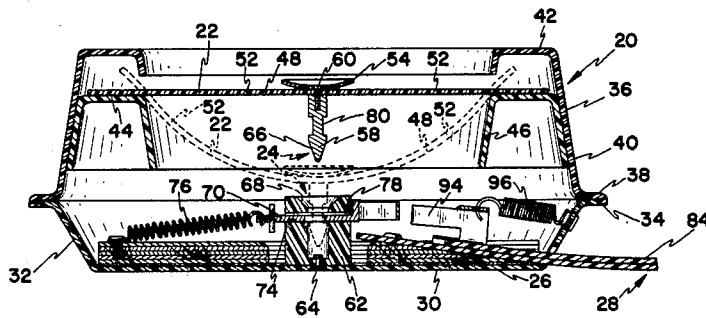
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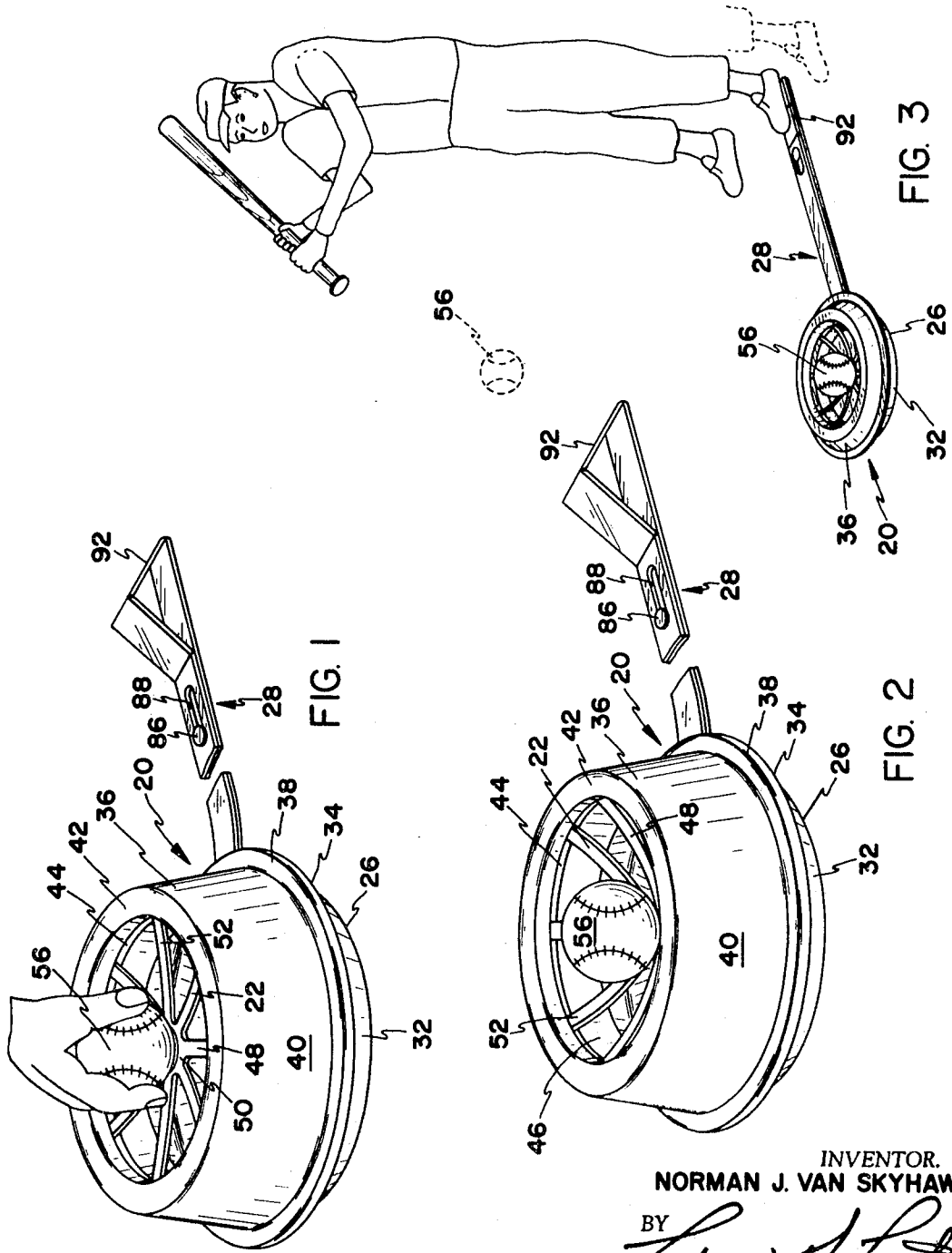
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- [54] **BATTING TRAINER APPARATUS AND METHOD**
 19 Claims, 18 Drawing Figs.
- [52] U.S. Cl..... 273/26 R,
 124/16, 124/34, 124/41, 273/DIG. 12
- [51] Int. Cl..... A63b 69/40
- [50] Field of Search..... 273/26 R,
 105, 129; 124/7, 16, 17, 34, 37, 41

ABSTRACT: A cup for holding a ball is equipped on its underside with a necked plunger that extends downwardly and may engage a latch remotely operable by a treadle and fastened to the base of an annular housing. Planar spring means between the cup and the housing catapults the ball into the air when the plunger is released.





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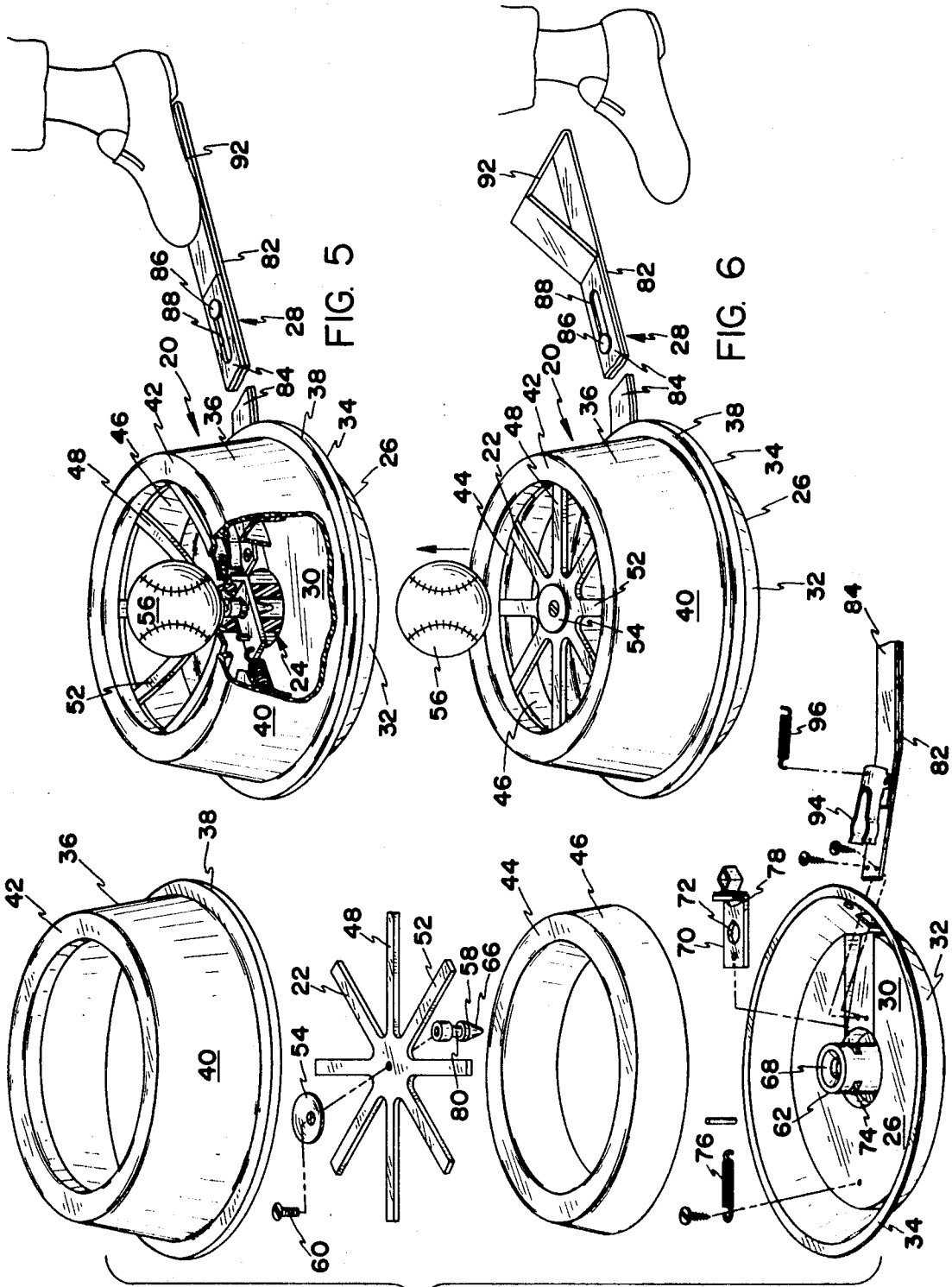


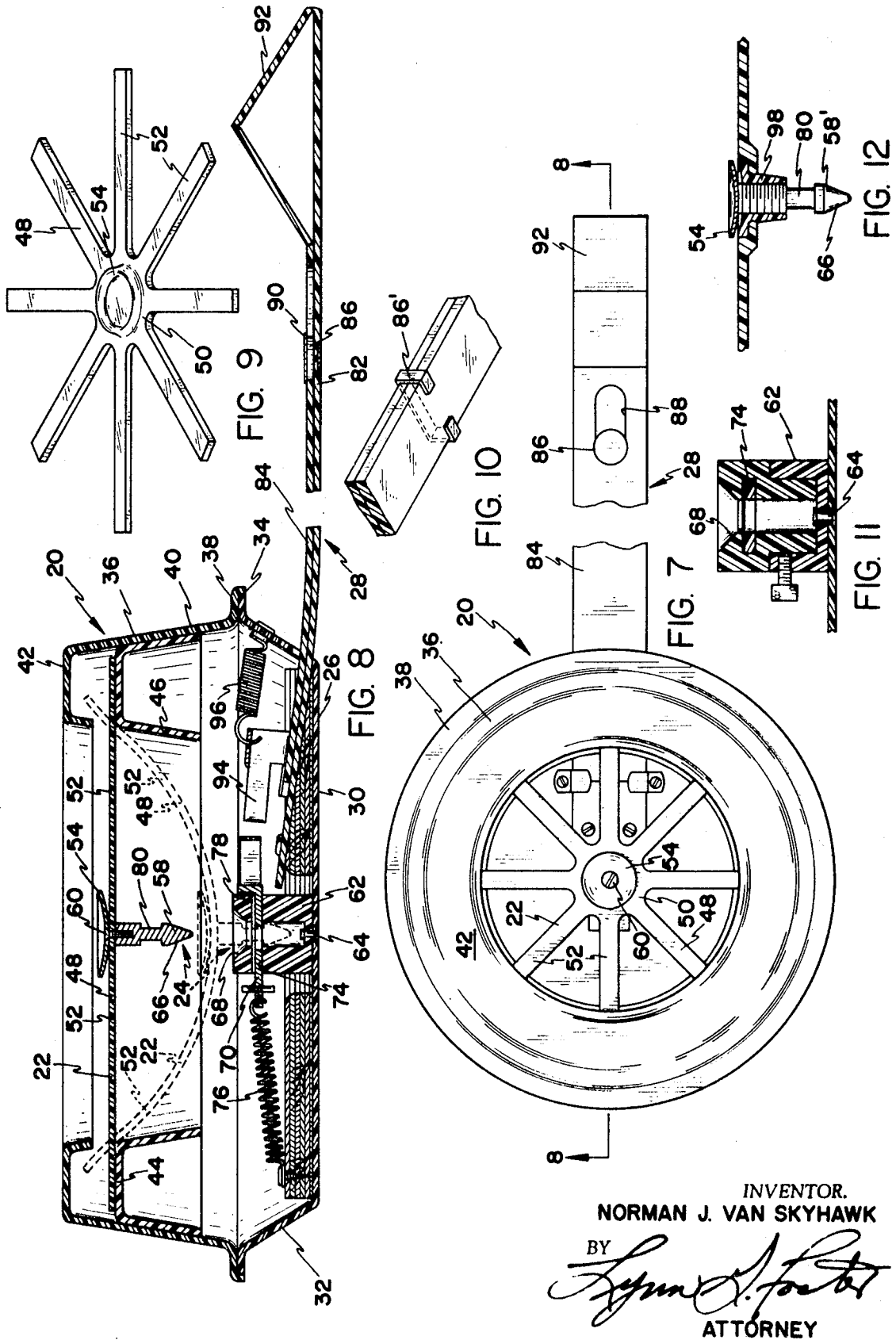
FIG. 4

FIG. 5

FIG. 6

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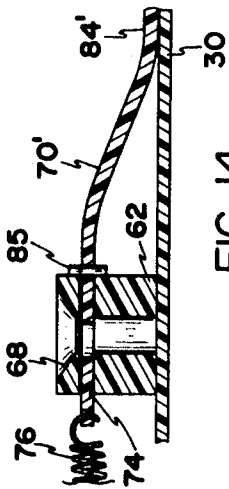
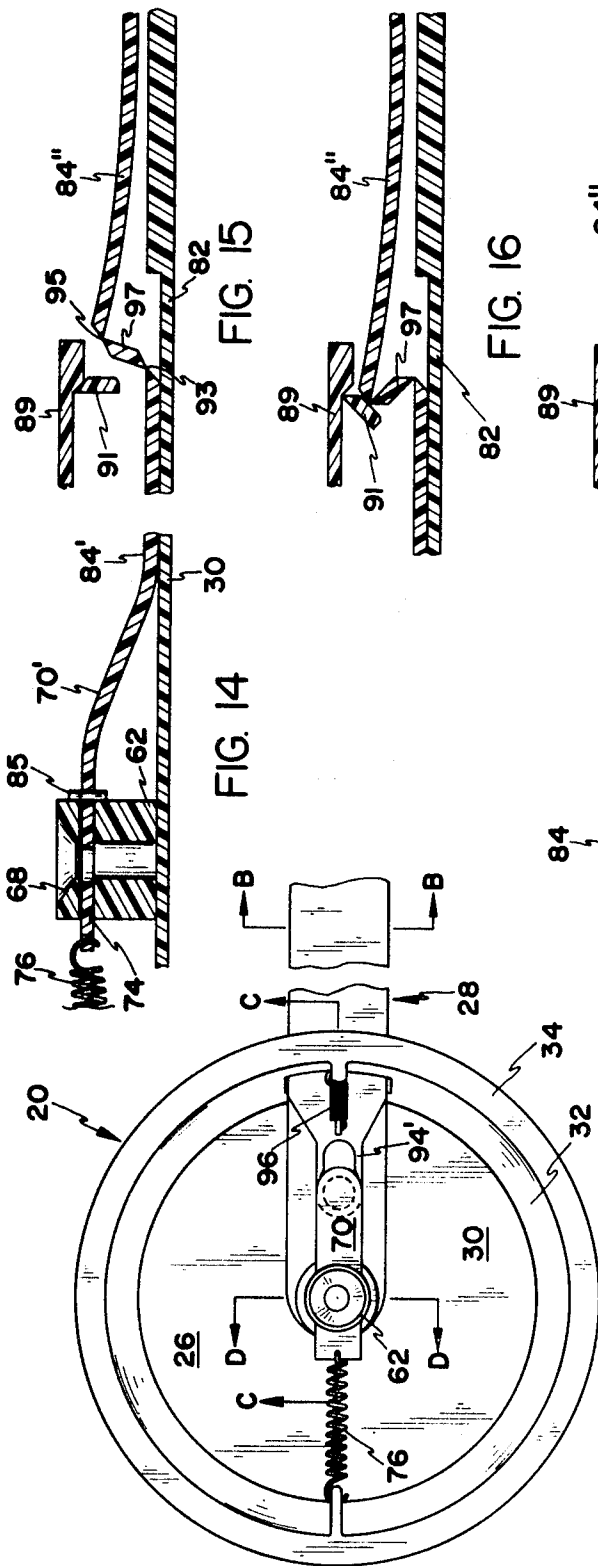


FIG. 14

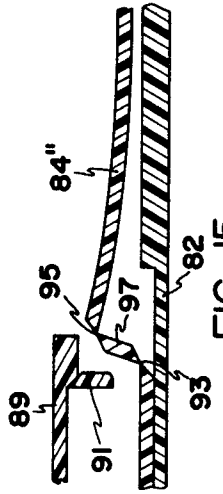


FIG. 15

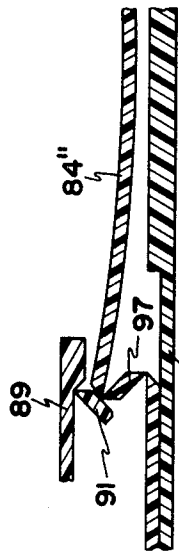


FIG. 16

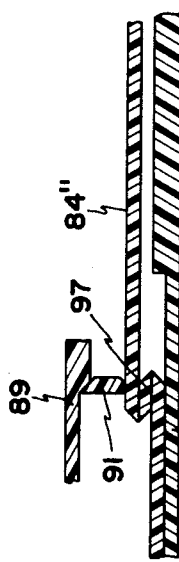


FIG. 17

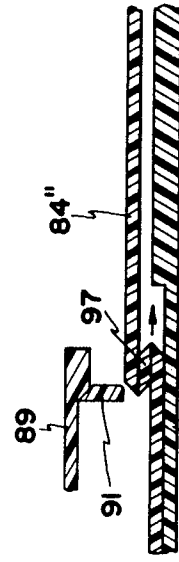


FIG. 18

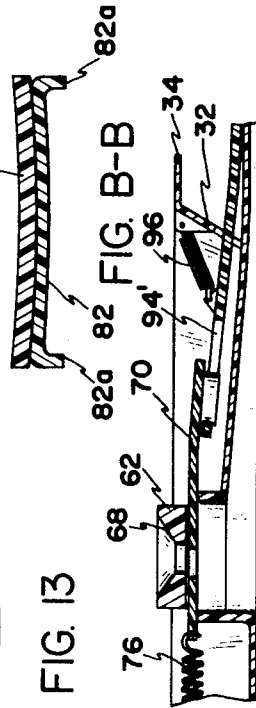


FIG. 13

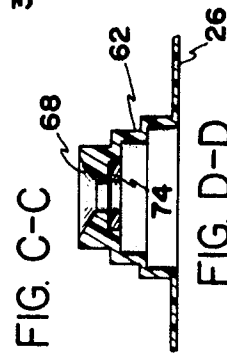


FIG. C-C

FIG. D-D

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BATTING TRAINER APPARATUS AND METHOD

BACKGROUND OF THE INVENTION

1. Field of Invention

This invention relates generally to spring-loaded throwing devices; and, more particularly to such apparatus adapted for baseball-batting practice and operable by the unassisted user.

2. Description of the Prior Art

Some of the operations in the game of baseball, e.g., batting the ball, require greater skill and coordination than is ordinarily possessed by small boys learning the game. Hence, extensive individual practice to develop such a skill tends to make the game more enjoyable when the learner participates as a team member. The present invention is directed toward providing intensive batting practice without aid from others.

Disadvantages of other throwing devices have been their excessive bulk, weight and complexity, making them difficult for the young user to operate successfully.

OBJECTS AND SUMMARY OF THE INVENTION

Objects of the present invention are to provide a ball-tossing device that is easily portable, reliable and simple to operate. Important features of the invention are its simple, rugged construction and an absence of delicate parts and the need for high precision in manufacture. Another important feature is that it is completely safe for use by a young child, being made primarily of synthetic plastic having natural resilience and no sharp edges.

A cup having a necked plunger projecting downwardly from it is centrally supported in an annular housing by a planar resilient biasing means. The plunger may be engaged by a latch when the cup is pressed downwardly. A ball may then be placed in the cup and the latch released by a foot treadle attached thereto, whereupon the ball is tossed vertically into the air.

These and other objects and features of the present invention will become more fully apparent from the following description and appended claims taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the invention illustrating the simple means of spring loading the ejection cup thereof;

FIG. 2 is a similar view showing the spring means applied and ready for release;

FIG. 3 is a similar view including a human figure to show how the invention is operated to release the ball—broken lines show the ejected ball and the moved foot of the operator;

FIG. 4 is an exploded view to show all of the parts of the invention and their relationships in detail;

FIG. 5 is a perspective view with parts broken away to show the relationships of parts when the latch means is cocked preparatory to ejection of the ball;

FIG. 6 is a similar view showing the moved foot of the operator and ejection of the ball;

FIG. 7 is a top view of the invention;

FIG. 8 is a sectional view taken on line 8—8 of FIG. 7;

FIG. 9 is a detail sectional view of a modified spider support;

FIG. 10 is a detail view of a modified actuation arm guide;

FIG. 11 is a sectional view of a modified plunger receptacle;

FIG. 12 is a sectional view of a modified plunger;

FIG. 13 is a top view of the base and a modified latch;

FIG. 14 is a sectional view of a second modification of the plunger receptacle;

FIGS. 15—18 comprise a series of four sectional views to illustrate a toggle that may be incorporated into the actuation arm; and

FIGS. B—B, C—C and D—D are sections taken on cutting lines so labeled in FIG. 13.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As is best shown in FIGS. 4, 7 and 8, the invention consists essentially of an enclosure or housing 20, a resilient biasing means 22, a latch means 24 for centrally latching the resilient biasing means to the base 26 of the housing 20, and a latch release means 28.

The housing 20 has two primary parts. The base 30 has outwardly sloping sidewalls 32, terminating in an annular flange 34 that extends outwardly. The top member 36 has an annular flange 38 that coincides with that of the base and is fixed thereto. The sidewalls 40 extend upwardly from the flange 38 and terminate in an annular top 42, that is curled downwardly for esthetic appearance. A shelf 44 is provided by an inverted, annular channel 46 that is fixed inside the top member 36. The shelf 44, being spaced slightly below the curled-down edge of the annular top 42, provides retaining means for peripheral retention of the resilient biasing means 22.

The resilient biasing means 22 in this preferred embodiment, is a spider support 48 having a central portion 50 and a plurality of radial spokes 52 integral therewith. The spider support 48 is preferably made of some synthetic plastic with natural springiness, or "memory," such as polypropylene. An ejection cup 54 is fixed to the top of the central portion 50 of the spider support 48, for supporting and ejecting a ball 56, as shown in FIGS. 1, 2, 3, 5 and 6. This ejection cup 54 may either be molded on the top of the central portion 50 of the spider support 48, as an integral part thereof as shown in FIG. 9, or it may be incorporated as a part of the latching means as shown in FIGS. 4, 8 and 12.

The latch means 24, best shown in FIGS. 4 and 8, has a downwardly extending, necked plunger 58, centrally fixed to the underside of the spider support 48. A preferred means of fastening the plunger 58 to the spider support 48 is by means of a single screw 60, that also passes through the ejection cup 54. Alternatively, the ejection cup 54 may be integral with the plunger 58, as shown in FIG. 12. A tubular plunger receptacle 62 is centrally fixed to the base 26 by a rivet 64, or by other suitable means. A downwardly pointing, conical surface 66 on the plunger 58 and an upwardly divergent, conical inner surface 68 at the upper end portion of the receptacle 62 comprise a guide means for making the plunger and the receptacle easily engageable without the necessity of high precision in the manufacture of the parts. A latch member 70, having a hole 72 to admit passage of the plunger 58, is slidably engaged in a slot 74 in the receptacle 62, and is biased toward one side of the enclosure 20 by a tension spring 76. A stop in the form of a shoulder 78 allows the hole 72 of the latch member 70 to become sufficiently misaligned with the tubular receptacle 62 that it may engage the neck 80 of the plunger 58, when the plunger is forced into the receptacle 62.

The latch release means 28 has a long, flat guide arm 82 fixed to the base 30 and extending outwardly therefrom. A preferred construction for the guide arm 82 is shown in FIG. B—B; the edges 82a are flanged downwardly for strength. A long, flat actuation arm 84 is fastened parallel to the guide arm 82 for limited, longitudinal sliding movement relative to the guide arm 82. The fastening means shown in most of the Figures are flanged studs 86 fixed to the guide arm 82 and extending through slots 88 in the actuation arm 84. The flanges 90 of the studs are of larger diameter than the widths of the slots 88 so that the two arms may not become disengaged. An alternative means of fastening these arms together is shown in FIG. 10. "C"-clamps pass over the actuation arm 84 and engage recesses in the underside of the guide arm 82 by spring tension. An upwardly arched treadle 92 is hinged at one end to the outer end of the guide arm 82, and at its other end to the outer end of the actuation arm 84. These hinged connections are achieved simply by narrowing the thickness of the material from which the arms are made, at selected points. The inner end of the actuation arm 84 is equipped with a spring clamp 94 that may releaseably engage the latch member 70 by grasping a stud or other fixture thereon. Alternatively, the spring

clamp may be in the form of a continuous, necked spring loop 94' that surrounds a stud on the latch member 70 (see FIGS. 13 and C—C).

A simplified construction, wherein the latch member 70' is integral with the end of the actuation arm 84' is shown in FIG. 14. A stop 85 is included to limit motion of the latch member 70'.

In practicing the invention, the user first places a ball 56 on the ejection cup 54 and exerts pressure sufficient to latch the plunger 58 into the receptacle 62. This places the spider support 48 under spring tension so that it will forcefully eject the ball upon release of the plunger 58. The user then places his foot on the treadle 92 and deforms it to a flattened shaper with downward pressure, causing the actuation arm 84 to move forward and grasp the latch member 70. In the embodiment wherein the actuation arm 84 is equipped with a necked spring loop that surrounds a stud on the latch member, the neck of the loop 94' must pass beyond the stud. When the user is ready to strike the ball, he removes his foot from the treadle 92 and typically places it astride thereof. The actuation arm 84, being spring biased toward the treadle 92 both by a spring 96 and by the springiness or memory of the treadle itself, moves toward the treadle 92. This in turn moves the latch member 70 for a distance sufficient to release the plunger 58 and eject the ball 56.

The force with which the ball is ejected may be regulated by means of an adjustable plunger, such as that shown in FIG. 12, wherein the plunger 58' is threadedly engaged in a boss 98 in the spider support 48. Adjustment of the necked portion 80 of the plunger 58 relative to the latch member 70 enables the user to select the amount of spring tension that will be on the spider support when it is latched to the base. The same result may be achieved with an adjustable plunger receptacle 62', as shown in FIG. 11, wherein the latch member 70 may be moved relative to the necked portion of the plunger 58. Adjustable spring tension of the spider support may also be achieved by the adjustment of both an adjustable plunger and an adjustable receptacle relative to one another.

An important feature of the invention is that a predetermined time delay allows the user to shift his weight and prepare his bat before the ball is ejected. This is due to the fact that a specified amount of time is required for the plastic treadle to resume its normal shape after having been deformed by the user's foot. Polypropylene has been found to be a satisfactory material for making a treadle that will achieve this result.

It is also important to note the rather remarkable features of the spider support. It performs simultaneously the functions of providing spring means for ejecting the ball, and of serving as a support for the ejection cup and the plunger. It is easily removable to provide easy access to the latching mechanism. It is completely safe for young users to handle; and, being loosely retained in the housing 20, it requires no precision of manufacture.

FIGS. 15-18 illustrate the action of a toggle line 97 that may be incorporated into the actuation arm 84''. It is formed by a wedge-shaped recess 95 in the top surface of the actuation arm 84'' that defines one end of the toggle link 97 and a similar recess 93 in the bottom surface of the actuation arm 84 that defines the other end. Forward motion of the actuation arm 84 causes the toggle link 97 to fold under or over the portion of the actuation arm adjoining the treadle (depending on the relative locations of upper-surface and lower-surface recesses). This effectively shortens the length of the actuation arm 84'' by twice the length of the toggle link 97. A dog 91, pivotally supported above the folded toggle link 97 by a support 89 attached to the base 30, maintains the resulting three thicknesses of the actuation arm 84'' in intimate contact, so that the toggle link 97 may not unfold itself as the actuation arm 84'' is withdrawn. Use of this link may obviate the need for an assisting spring to bias the actuation arm 84'' toward the treadle 92 after it has been flattened.

The invention may be embodied in other specific forms without departing from the spirit of essential characteristics

thereof. The present embodiments are, therefore, to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. Apparatus for tossing a ball vertically into the air to develop coordination between the stride and swing of a batter, comprising:

base means;

resilient biasing means substantially planar in an at rest position and disposed generally parallel to the base means, the biasing means comprising means for carrying the ball; support means carried by the base means for supporting the biasing means at the peripheral edges of the biasing means in spaced relation above the base means;

first latch means mounted to the base means and mating latch means mounted on the underside of the biasing means for releasably attaching the biasing means to the base means when the biasing means are displaced downward counter to the bias; and

release means comprising a treadle operable by removal therefrom of the foot of a user for releasing the first and mating latch means from latched relation to allow the biasing means to move under force of the bias toward the at rest position thereby propelling the ball upwardly.

2. Apparatus as defined in claim 1 wherein the resilient biasing means comprise yieldable spider support means having a central portion and integral radially directed spokes, the spider support means being formed of synthetic material with memory so that it resumes its planar at rest position upon being released from its deformed latched position.

3. Apparatus as defined in claim 1 wherein the ball-carrying means comprises an ejection cup adjustably connected near the geometric center of the biasing means.

4. Apparatus as defined in claim 1 wherein the ball-carrying means and the mating latch means are of one-piece construction and wherein the mating latch means comprises a downwardly directed plunger.

5. Apparatus as defined in claim 4 wherein the first latch means comprises a vertically disposed receptacle having a cylindrical vertically oriented plunger-receiving bore, the receptacle being mounted to the base and having a generally horizontal slot which intersects the bore and a latching member slidably disposed in the slot in the receptacle and having an aperture therein to admit passage of the plunger, the latching member being biased laterally partially out of alignment with the bore in the receptacle so as to engage a stepped recessed neck of the plunger when the plunger has been displaced through the aperture against the bias of the biasing means.

6. Apparatus as defined in claim 5 wherein the vertical position of the latching member is adjustable.

7. Apparatus as defined in claim 4 wherein the length of the plunger below the biasing means is adjustable.

8. Apparatus as defined in claim 1 wherein the release means comprise a guide arm fixed to the base means and extending radially outwardly therefrom; an actuating arm hingedly connected to the guide arm at the end of the guide arm remote from the base means and superimposed over the guide arm for longitudinal sliding movement relative thereto, the actuating arm being spaced above the guide arm adjacent the hinge connection so as to form a downwardly displaceable treadle, and releaseable coupling means carried by the end of the actuating arm proximal to the base means capable of freeing the attachment between the first and mating latch means when the treadle is released.

9. Apparatus as defined in claim 8 wherein the releasable coupling means is a spring-biased clamp releasably engaging a mating clamp mounted on the first latching means with forward motion of the actuating arm, the clamp laterally displac-

ing the first latching means out of latching relation with the mating latching means with rearward motion of the actuating arm and releasing the mating clamp at a predetermined displaced location.

10. Apparatus as defined in claim 8 wherein the actuating arm is made of a flat length of synthetic plastic material and comprises a toggle link formed by a wedge-shaped recess in the top surface of the arm to define one end of the toggle link and a second wedge-shaped recess in the under surface of the arm to define the other end of the toggle link, whereby forward motion of the arm causes the toggle link to fold upon itself into parallel relation with the actuating arm and effectively shorten the length of the actuating arm; and a depending dog mounted upon support structure carried by the base and supported above the folded toggle length, the dog pivotally displaceable from the vertical to the horizontal in one direction to accommodate folding of the link and resisting pivotal displacement from the vertical to the horizontal in the opposite direction to thereby maintain the resulting folded link in the folded condition until the actuating arm moves rearward when the treadle is released.

11. Apparatus as defined in claim 8 wherein the actuating arm is formed of synthetic material with memory so that deformation thereof by downward pressure causes lateral movement of the actuating arm relative to the guide arm and the memory of the forming material causes the treadle to resume the at rest spaced relation of the guide arm when the downward pressure is removed from the actuating arm.

12. Apparatus as defined in claim 11 wherein the guide arm comprises upwardly projecting studs fixed to the guide arm and projecting through elongated slots in the actuating arm, each stud having a diametrically enlarged flange at the end exposed through the slot so that direction of relative movement of the guide and actuating arms is well defined and so that the arms are not inadvertently disengaged.

13. Apparatus as defined in claim 11 further comprising generally C-shaped brackets mounted upon the guide and actuating arms for maintaining the actuating arm in parallel relation with the guide arm, each bracket passing transversely over the actuating arm and the ends of the bracket engaging the underside of the guide arm.

14. Apparatus as defined in claim 14 wherein the memory of the forming material is slow acting so as to provide a time delay between release of the treadle and the freeing of the attachment between the first and mating latch means.

15. Apparatus as defined in claim 14 wherein the first latching means is equipped with a generally vertically oriented stud, and the proximal end of the actuating arm comprises an elongated spring loop disposed over the stud and accommodating relative movement of the actuating and guide arms for the length of the loop whereupon the end of the loop engages the stud and moves the first latching member to release the biasing means thereby providing a time delay between actuation by the foot of the user and the release of the mating latch means.

16. Apparatus as defined in claim 11 wherein said synthetic material is polypropylene.

17. A baseball skill developing and conditioning device comprising:

- a base member having an annular wall defining an annular opening;
- a hollow plunger-receiving sleeve mounted upon the base in axial alignment with the opening, the sleeve comprising a transverse slot;
- a laterally displaceable arm disposed in the slot, the arm having a through-bore therein adapted, when in a selected lateral position, to align with the hollow of the plunger-receiving sleeve and biasing structure for biasing the aperture partially out of alignment with the hollow;
- a foot-actuated treadle formed of resilient material with

memory extending radially from a position adjacent the plunger-receiving sleeve to a position remote from the base, the treadle comprising a lower member, the adjacent end of which is connected to the base and an upper member juxtaposed the lower member along a substantial portion of the length thereof and longitudinally movable relative thereto, the upper member being releasably associated with the displaceable arm and comprising (a) a first set of hinged joints which, in the normal position, elevate a portion of the remote end of the upper member so that the upper member is longitudinally shifted toward the remote end of the treadle and in the foot depressed position, the elevated portion is flattened against the lower member so that the upper member is longitudinally shifted toward the adjacent end of the treadle and (b) a second set of hinged joints near the adjacent end of the treadle;

one-way gate structure carried by the base which allows the second set of joints to fold a portion of the upper member upon itself in response to flattening the elevated portion, the gate structure restraining the portion in the folded condition until the treadle longitudinally shifts the upper member toward the remote end of the treadle, the longitudinal shifting of the upper member causing simultaneous lateral displacement of the arm so that the through-bore therein is moved selectively into and out of alignment with the hollow of the plunger-receiving sleeve;

annular support structure carried upon the base and presenting an enlarged central aperture, exposing the central portion of the base and the plunger-receiving sleeve;

a deformable resilient biasing member comprising a central portion and radially outwardly projecting fingers, the ends of which rest upon the annular support structure; and

a ball-receiving pedestal comprising a downwardly projecting plunger having an annular recess exposed adjacent a forwardly tapering head thereof, the plunger being adapted to project into the hollow of the plunger-receiving sleeve and through the bore in the laterally displaceable arm to be latched therein when the arm moves into the annular recess, the plunger having a variable length to selectively vary the deformation of the biasing structure when the plunger is latched within the plunger-receiving sleeve so that the height to which the ball will be projected can be selectively varied.

18 In a method of projecting a ball vertically into the air, the ball being carried upon a vertically displaceable upwardly biased pedestal having a downwardly directed plunger, the steps of:

biasing the ball-carrying pedestal toward a normal elevated position by uniformly distributing the biasing force radially around the pedestal;

forcing the ball-carrying pedestal downwardly against the bias;

locking the plunger in the downward-biased position;

longitudinally shifting an upper layer of a foot treadle relative to a lower layer from an at rest to an active position by depressing an elevated portion of the upper layer with a foot preparatory to unlocking the plunger; and

allowing the upper layer of the treadle to longitudinally shift to the at rest position to unlock the plunger by removing the foot from the treadle thereby snapping the ball-carrying pedestal upwardly to its at rest position in response to the upward force of the bias.

19. In a method as defined in claim 18 wherein the forcing step is preceded by adjusting the effective length of the downwardly directed plunger thereby selecting the height to which the ball will be projected.

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