United States Patent

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[54] BATTING PRACTICE TETHERED BALL

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[52] **U.S. Cl.**.....**273/26 A,** 273/200 R, 273/58 C

[51] **Int. Cl.** **A63b 69/40**

[58] **Field of Search** .....273/26, 95 A, 200, 183 C, 184 B, 273/185 B, 186 C, 197, 198, 58 C, 204

[56] **References Cited**

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1,839,040	12/1931	McCarrier	273/204 X
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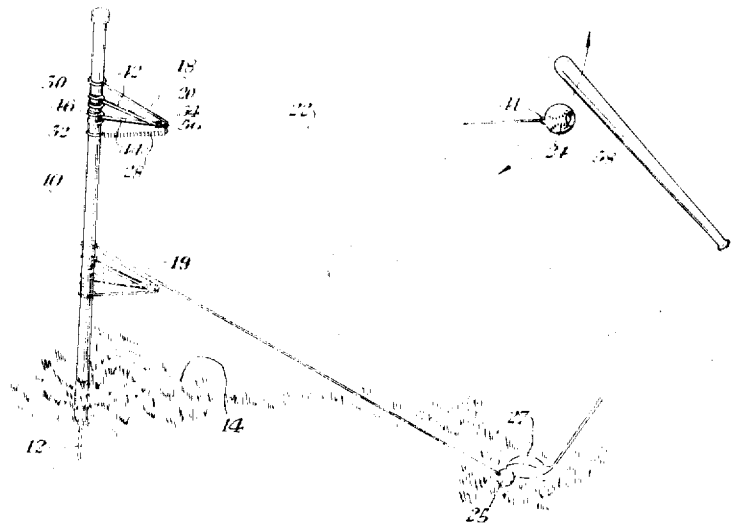
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[57] **ABSTRACT**

I disclose a batting practice device comprising a support, a relatively rigid arm structure rotatably mounted on said support and having a practice ball or similar projectile mounted adjacent its outward free end, and biasing means non-rotatably secured to said support and to said arm structure at a point remote from said support for storing at least a portion of the kinetic energy of said ball as said arm structure rotates after said ball is struck by a user of said device.

9 Claims, 4 Drawing Figures



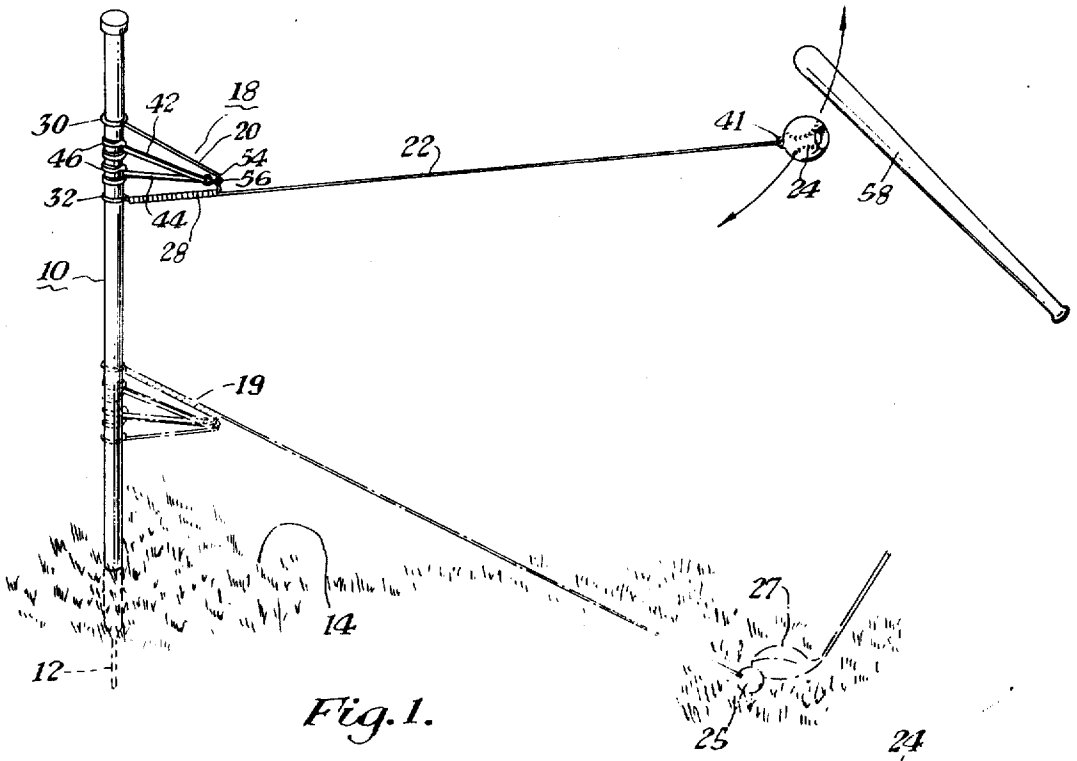


Fig. 1.

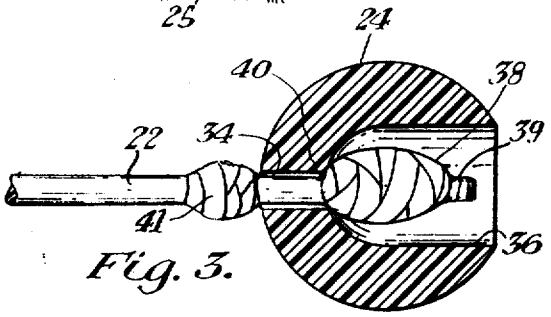


Fig. 3.

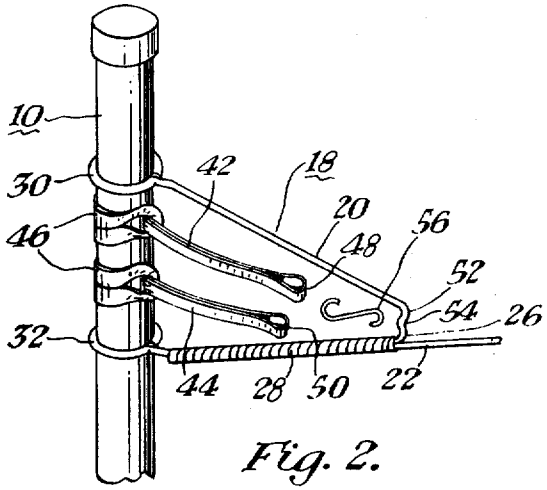


Fig. 2.

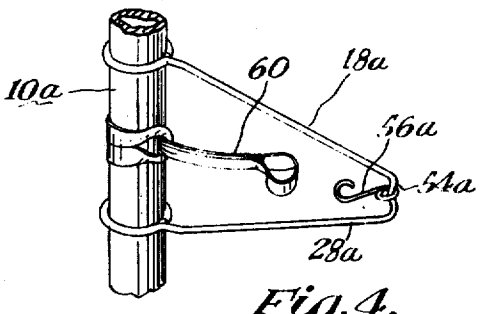


Fig. 4.

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BATTING PRACTICE TETHERED BALL

In certain respects this invention is an improvement upon the practice device described and claimed in my issued U.S. Pat. No. 3,166,316, patented Jan. 19, 1965, titled Batting Practice Device Comprising a Tethered Ball Driven by a Motor Through a Friction Clutch.

My present invention relates broadly to batting practice devices wherein a ball or ball-like member can be struck with various types of rackets or bats, and more particularly to a device of the character described wherein the ball is mounted upon an arm structure which in turn is pivoted to a support so that the arm structure and ball can be revolved in a horizontal path. The invention is particularly useful in providing batting practice for the game of baseball.

Batting practice devices wherein a captive ball is movably secured to a support such as an upstanding post are well known and have been in existence for many years. Some of these devices have been motorized by various means to swing the ball along a given path past the user of the device for batting practice. Examples of such apparatus are my aforementioned patent, and the patents to Walther U.S. Pat. No. 2,058,277; Dickson U.S. Pat. No. 2,134,328; Gonzales, et al. U.S. Pat. No. 3,408,070; and Pennington U.S. Pat. No. 3,333,847. Although such devices, particularly that disclosed in my aforementioned patent, are advantageous in many instances, they do require a convenient source of power, which is not always available. Certain of these devices, as pointed out in my prior patent, in addition have not achieved widespread acceptance for several reasons. In general, previous motor driven devices have been cumbersome and awkward to handle; they have been unduly complicated for manufacturing purposes and, finally, have been susceptible to damage during use.

I am also aware of a number of patents in this field relating to apparatus wherein the practice ball is tethered at the end of a flexible cord attached to some form of support device, as typified by the patents to: White U.S. Pat. No. 1,862,044; Lake U.S. Pat. No. 2,017,720; Conway U.S. Pat. No. 2,751,226; Blaha, et al. U.S. Pat. No. 2,839,300; Moore U.S. Pat. No. 2,942,883; Bales U.S. Pat. No. 2,976,040; Haskett U.S. Pat. No. 3,006,647; Tumelson U.S. Pat. No. 3,166,317; Davis U.S. Pat. No. 3,168,312; Holley U.S. Pat. No. 3,194,557; Galezniak U.S. Pat. No. 3,216,723; Hamilton, Jr., et al. U.S. Pat. No. 3,301,556; Papp U.S. Pat. No. 3,351,343; Lentine U.S. Pat. No. 3,366,383; Navran U.S. Pat. No. 3,367,655; Papp U.S. Pat. No. 3,380,738. Many of these prior devices require two persons for their proper operation, e.g., the patents to Moore U.S. Pat. No. 2,942,883 and Papp U.S. Pat. No. 3,380,738. Previous practice devices, in every case, allow a substantially uncontrolled revolution or oscillation of the ball when struck by the user. An uncontrolled motion of the ball induces internal strains and rapid wearing of the apparatus. Considerable waiting time is expended until the ball comes to rest; otherwise, the ball must be stopped manually at the risk of injury to the user or further damage to the practice apparatus.

The latter problems are alleviated to some extent by the patents to Brandley U.S. Pat. No. 3,341,200 and Mueller U.S. Pat. No. 3,271,030 wherein the practice ball or a simulation thereof is mounted upon a more or less rigid arm. In the Brandley device the arm is rotatable about an inclined post, and, after several revolutions, returns by gravity to its initial position. The inclination of the post, however, is such that very little damping motion is afforded by gravitational attraction and a relatively long waiting period is entailed. In the Mueller arrangement, the simulated ball is mounted on the outer end of a flexible arm and oscillation results when the ball is struck. The period of the oscillation is of such short duration that the ball cannot serve as a target on a return swing Thus, the batter or other user must wait for the oscillations to damp out or must stop the ball manually.

Another known practice device, which may be categorized with the last-mentioned patents as an energy storage device is the patent to Hornig U.S. Pat. No. 2,606,025. In the Hornig arrangement the ball, after being struck, stores its kinetic energy in a coil spring as the ball moves through a vertical orbit to wind up the spring. The ball then moves an equal number of revolutions in the opposite direction as the spring unwinds. The diameter of the orbit and the disposition thereof in a vertical plane renders the ball an inadequate target as the spring unwinds so that the user for all practical purposes must again wait until the spring expends its stored energy and the ball comes to a rest. Moreover, the nature of the coil spring is such that the spring force is not substantially increased (i.e., the spring constant is not subject to change) as the spring is being wound up during the winding or forward motion of the ball. It follows, then, that the energy storage means of the Hornig device, offers little or no damping action to the motion of the ball, beyond that afforded by air friction. The same considerations apply to the aforementioned Mueller and Brandley batting practice devices.

In general, none of the known or existing batting practice devices provide an unpowered arrangement wherein the energy of a previously struck ball can be stored for propelling the ball in the opposite direction to provide the user with an appropriate moving target. More specifically, known practice devices of this character fail to return the ball to the user along a substantially horizontal path which most nearly approximates a manually pitched or batted ball. In the category of relatively noncomplex batting practice devices, wherein the ball of necessity must follow an arcuate path, none of the known devices are capable of returning the ball after being struck along a target path which is not only horizontal but which is of sufficiently gentle curvature as to allow the batter adequate preparation time for striking the ball.

Previous devices fail to make adequate provision for adjusting the height of the ball and ball carrier for different reasons and for simulating different sports.

I accomplish these desirable results and overcome the aforementioned disadvantages of the prior art by providing a batting practice device comprising a support, a relatively rigid arm structure rotatably mounted on said support and having a practice ball or similar projectile mounted adjacent its outward free end, and biasing means non-rotatably secured to said support and to said arm structure at a point remote from said support for storing at least a portion of the kinetic energy of said ball as said arm structure rotates after said ball is struck by a user of said device.

I also desirably provide a similar batting practice device wherein said biasing means are slidably but frictionally coupled to said support, and said arm structure is slidably as well as rotatably mounted on said support so that said arm structure can be moved longitudinally of said support to a selected adjustment thereof and said biasing means maintains said arm structure at said selected position.

I also desirably provide a similar batting practice device wherein said biasing means include at least one elastic band member disposed for wrapping about said support to provide said energy storage when said ball is struck.

I also desirably provide a similar batting practice device wherein said arm structure includes a frame rotatably mounted on said support and a ball supporting rod secured to said frame adjacent the outward end thereof for rotation therewith.

As used herein, the term "batting" is inclusive of striking or practice—hitting with one of a variety of bats racquets, clubs, and the like—for example, baseball bat, tennis racquet, or golf club.

During the foregoing discussion, various objects, features and advantages of the invention have been set forth. These and other objects, features and advantages of the invention, together with structural details thereof, will be elaborated upon during the forthcoming description of certain presently preferred embodiments of the invention and presently preferred methods of practicing the same.

In the accompanying drawings, I have shown certain presently preferred embodiments of the invention and have il-

lustrated certain presently preferred methods of practicing the same, wherein:

FIG. 1 is a perspective view of one form of batting practice device arranged in accordance with my invention;

FIG. 2 is an enlarged perspective view, partially exploded, of a portion of the support structure of the device and showing its energy storage means in detail;

FIG. 3 is a cross sectional view of the target ball and support therefor; and,

FIG. 4 is a partial view, otherwise similar to FIG. 1, of another modification of my practice device.

Referring now more particularly to the drawings, I desirably provided a relatively rigid support or post **10**, the lower end of which is pointed at **12** for driving into the ground as denoted by reference character **14**. Alternatively, the post **10** can be secured to a suitable platform (not shown) or the like for use indoors. In that case, the platform obviously can be provided with suitable dimensions to prevent tipping or tilting of the standard or post secured thereto.

The aforementioned arm structure **18** in this example includes a wire bracket or frame **20** to which is secured a relatively rigid but resilient ball supporting rod **22**. Both the frame **20** and the rod **22**, in accordance with this stipulation, can be fabricated from a wire or rod material, which in turn can be made from a suitable structural material such as mild steel. Alternatively and preferably the rod **22** is made from a fiber glass rod which is thereby better enabled to withstand shock forces associated with striking of ball **24**. Various other structural materials can be utilized in place of the aforementioned materials depending upon the intended use and ultimate size of the practice device. It is contemplated that the ball supporting rod **22**, to the outer or free end of which is secured the practice ball **24** (FIGS. 1 and 3), can be secured to the lower run **26** of the frame **20** by any suitable means. In the illustrated example, I have used a suitable adhesive coated tape **28** desirably with embedded fibers for strength, of which a variety of suitable forms are available in the market place. It is also contemplated that the rod **22** can be secured to the frame **20** by various processes (depending on material) or by the use of suitable fasteners.

Adjacent the standard **10**, the frame **20** terminates in a pair of collar members **30**, **32**, which in this example can be formed integrally with the frame **20** by suitably forming the wire or rod material thereof. The collar members **30**, **32** substantially encircle the standard **10** to support the frame **20**, rod **22** and the ball **24** (which comprise the arm structure **18**) upon the standard **10**. The arm structure **18** thus is rotatably mounted upon the standard **10** and can be adjusted vertically, i.e., longitudinally of the standard **10** to conform to a given height of a user of the practice device. Once a particular adjustment or elevation of the arm structure **18** is established means presently to be described secure the arm structure at such elevation.

In this arrangement of my practice device, the ball **24** can be fabricated from a suitable plastic and otherwise arranged as better shown in FIG. **3**. The plastic can be selected so as to afford a given weight or mass to the ball **24** depending upon the end use of the practice device. For example, the ball **24** can be fabricated from a plastic material such as polyethylene, polyurethane foam, or foamed polystyrene. The exterior surface of the ball **24** can be treated or formed so as to resemble a baseball, tennis ball, golf ball, and the like depending again upon the intended usage of the device.

The arm structure **18** can be adjusted vertically or elevated along the post **10** to the hitting area demanded by a particular sport, as in practice-hitting for baseball, tennis, golf and the like. In the last instance, for example, the arm structure is inverted and moved downward to a rotatable position relatively near the ground **14**, as shown by chain outline **19**. The size of the practice ball **24** naturally can be changed for this purpose. Inverting the arm structure **18** causes the rod **22** to be inclined downward (rather than upward, as in the solid outlined position thereof in FIG. **1**), so that the arm structure **18** can rotate freely of the ground surfaces **14**. The inclination of the rod or wand **22** relative to the balance of the arm structure **18** also permits the use of a shorter post **10** than otherwise would be required when practicing other sports.

Referring again to FIG. **3**, one arrangement for securing the ball **24** to the outward terminous of the rod **22** is illustrated. In this case, the ball **24** is provided with small and large passages **34**, **36** which communicate adjacent the center of the ball **24**. The passage **34** accordingly is shaped to receive loosely the end portion of the ball supporting rod **22**. The larger passage **36** likewise loosely receives retaining member **38** which can be secured at **40** to the supporting rod **22**. The communication between the small and large ball passages **34**, **36** desirably is located such that the retaining member **38** is disposed substantially concentrically of the ball **24** or at least such that the center of gravity of the retaining member **38** is disposed adjacent the center of gravity of the ball **24**, for balancing purposes.

In a specific embodiment, as shown, the retaining member or stop **38** is a built-up ball or mass of tape, for example, of a character similar to that employed for the wrapping **28** (FIGS. **1** and **2**). The mass of tape, i.e., retaining member **38**, can be applied in a figure eight motion or other suitable configuration designed to prevent shifting of individual wrappings after application. Desirably the retaining member wrappings are continued to the end of the rod or wand **22**, along that portion of the rod within ball passage **34**. The wrapped retaining member **38** protects the wand **22** against the severe shock forces involved in striking of the ball **24**.

Of equal importance, the shape and formulation of the wrapped retaining member **38** together with the loose insertions of the wand **22** and retaining member **38** into the respective ball passages **34**, **36**, aid in distributing such striking forces along the wand **22** and prevent concentration of shock forces at any point on the rod or wand **22**. Substantial movement of the ball **24** along the rod or wand **22** can be prevented by a second wrapped retaining member or stop **41**, positioned on the wand **22** ahead of the ball **24**. The life of the wand **22**, therefore is prolonged to a great extent even under conditions of severe usage. The resiliency and relative size of the retaining member **38**, when constituted as described also aids in the avoidance of concentrated striking forces.

In the operation of the batting practice device, centrifugal force positions the ball **24** against the retaining member **38**, as shown.

Referring again to FIGS. **1** and **2**, another feature of my practice device includes energy storage and dampening means for rapidly slowing the ball **24** in its horizontal orbit after being struck and for propelling the ball in the opposite direction along a target projectory. One arrangement of such means includes one or more elastic band members, with two such band members **42**, **44** being employed in this example of my invention. The bands **42**, **44** are secured at their inner ends to the standard **10**, desirably in non-rotative fashion. For example, each of the bands can be so secured by means of cat's paws **46**. Other attaching means can of course be employed; and advantage of the cat's paws **46** is their tendency to tighten as arm structure **18** is wound up to desirably maintain the non-rotative connections between the standard **10** and the energy storage bands **42**, **44**.

The bands **42**, **44** can be made from a wide variety of elastic materials, such as natural rubber or one of the many commercially available synthetic elastomers. The outer ends **48**, **50** of the bands are desirably connected to a common point at or near the outer or free extremity **52** of the frame **20**. One arrangement for so connecting the bands **42**, **44** includes the provision of an indent **54** in the outer end **52** of the frame **20**. A suitable hook **56**, as better shown in FIG. **1**, is then engaged with the indent **54** and the outer ends of the bands **42**, **44**. As shown, the hook **56** can be shaped in the form of an S-hook, although obviously another suitable shape can be substituted. The bands **42**, **44** are of sufficient normal length that they are lightly stretched or tensioned when engaged by the hook **56** to

maintain such engagement and to maintain the hook **56** in the indent **54**.

The frictional engagement of the cat's paws **46** with the post **10** maintain the arm structure **18** at a preselected elevation along the length of the post. When, however, it is desired to change the elevation, it is a simple matter to loosen the cat's paws **46** and to slide the band members **42, 44** and the frame **20** upwardly or downwardly along the post **10**. The band members **42, 44** can of course be unhooked from the hook **56** for this purpose. When the bands are again joined to the outer end of the frame **20**, the tensioning of the bands induced by such joining retightens the cat's paws **46** and prevents subsequent change in the elevation of the arm structure **18**. The weight of the arm structure **18** is of course balanced by the tensile forces of the bands **42, 44**, as any tendency toward downward movement of the arm structure **18** would naturally increase the band tension.

Depending again upon the specific size and application of my practice device it is contemplated that a single elastic band member **60** can be employed for the aforestated purposes, exemplified by that embodiment of my invention shown in FIG. **4**.

In operation, when the ball **24** is struck by a racket, club, or bat, such as baseball bat **58**, the arm structure **18** and ball **24** are caused to revolve one or more times in a horizontal orbital plane about the standard **10**. Save for the energy storing and motion dampening bands **42, 44**, the arm structure **18** is free to rotate about the standard **10** by virtue of its rotatable connection thereto including the collars or rings **30, 32**. The bands **42, 44** are not free, however, to rotate relative to the post **10** and instead become wrapped one or more times upon the post **10** as the arm structure **18** is revolved.

As the amount of band wrap increases, the remaining portions of the bands are increasingly stretched so that a portion of the kinetic energy of the struck ball is stored therein. After such portion of the ball's energy has been stored and the remainder dissipated through air friction, the arm structure **18** comes to rest and commences to revolve in the opposite direction. Owing to the length of the ball supporting rod **22** and its travel in a substantially horizontal plane, the ball during its counter-revolution admirably serves as a target projectile for the user of the device. The batter therefore can swat away at a moving target without waiting for the ball **24** to come to a rest and without pausing to reload or restart the practice device.

The energy storage bands **42** serve also as motion dampening means. As the band members **42, 44** become increasingly wrapped about the post **10**, the amount of the band material subject to tension is changing (owing to friction which prevents relative movement between the wrapped portion of the bands and the post **10**) along with the spring constant of the band material. Accordingly, the revolution of the arm structure **18** is rapidly slowed after the ball is struck and as the bands **42, 44** become increasingly wrapped about the post **10**.

From the foregoing, it will be apparent that novel and efficient forms of batting practice device have been disclosed herein. While I have shown and described certain presently preferred embodiments of the invention and have illustrated presently preferred methods of practicing the same, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the spirit and scope of the invention.

I claim:

1. A batting practice device comprising a support, a relatively rigid arm structure rotatably mounted on said support and having a practice ball mounted adjacent its outward free end, and biasing means non-rotatably secured to said support and attached to said arm structure at a point radially outward with respect to the point of securement to said support for storing at least a portion of the kinetic energy of said ball as said arm structure rotates after said ball is struck by a user of said device, said biasing means being vertically adjustable on said support and frictionally retained in any adjusted position thereon, and said arm structure being slidably as well as rotatably mounted on said support so that said arm structure can be moved longitudinally of said support to a selected elevation position thereof and said biasing means maintains said arm structure at said selected elevation position.

2. A batting practice device comprising a support, a relatively rigid arm structure rotatably mounted on said support and having a practice ball mounted adjacent its outward free end, and biasing means non-rotatably secured to said support and attached to said arm structure at a point radially outward with respect to the point of securement to said support for storing at least a portion of the kinetic energy of said ball as said arm structure rotates after said ball is struck by a user of said device, said biasing means including at least one elastic band member disposed for wrapping about said support to provide said energy storage when said ball is struck.

3. A batting practice device comprising a support, a relatively rigid arm structure rotatably mounted on said support and having a practice ball mounted adjacent its outward free end, and biasing means non-rotatably secured to said support and attached to said arm structure at a point radially outward with respect to the point of securement to said support for storing at least a portion of the kinetic energy of said ball as said arm structure rotates after said ball is struck by a user of said device, said arm structure including a V-frame the two ends of which are rotatably mounted on said support and a ball-supporting rod secured to one leg of said V-frame and projecting from the outward end thereof for rotation therewith.

4. The combination according to claim **3** wherein said ball is secured to said ball-supporting rod by means of a retaining member secured adjacent the outer end of said ball-supporting rod and loosely fitted within recess means formed in said ball, said retaining member being disposed adjacent the center of said ball.

5. The combination according to claim **4** wherein said retaining member is formed from wrappings of tape, said wrappings extending along a portion of said rod to aid in force distribution along said rod.

6. The combination according to claim **4** wherein substantial movement of said ball along said ball-supporting rod is prevented by a second retaining member secured on said rod ahead of said ball.

7. A batting practice device comprising a support, a relatively rigid arm structure rotatably mounted on said support and having a practice ball mounted adjacent its outward free end, and biasing means non-rotatably secured to said support and attached to said arm structure at a point radially outward with respect to the point of securement to said support for storing at least a portion of the kinetic energy of said ball as said arm structure rotates after said ball is struck by a user of said device, said arm structure including a frame rotatably mounted on said support and a ball-supporting rod secured to said frame adjacent the outward end thereof for rotation therewith and said biasing means including a pair of elastic band members secured at spaced points to said support and secured at a common point at the outer end portion of said frame.

8. A batting practice device comprising a support, a relatively rigid arm structure rotatably mounted on said support and having a practice ball mounted adjacent its outward free end, and biasing means non-rotatably secured to said support and attached to said arm structure at a point radially outward with respect to the point of securement to said support for storing at least a portion of the kinetic energy of said ball as said arm structure rotates after said ball is struck by a user of said device, said biasing means including a pair of elastic band members secured at spaced points to said support and secured at a common point on said arm structure.

9. The combination according to claim **8** wherein said arm structure includes a frame member generally surrounding said band members and rotatably secured to said support.

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