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Kahelin

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[45] **Oct. 1, 1974**

[54] **BALL THROWING MACHINE WITH BARREL EXTENSION**

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[52] **U.S. Cl.** ..... **124/11 R,** 124/30 R, 273/26 R, 273/60 R

[51] **Int. Cl.** **A63b 69/40,** F41f 1/02

[58] **Field of Search** ..... 124/11 R, 30 R; 273/26 D

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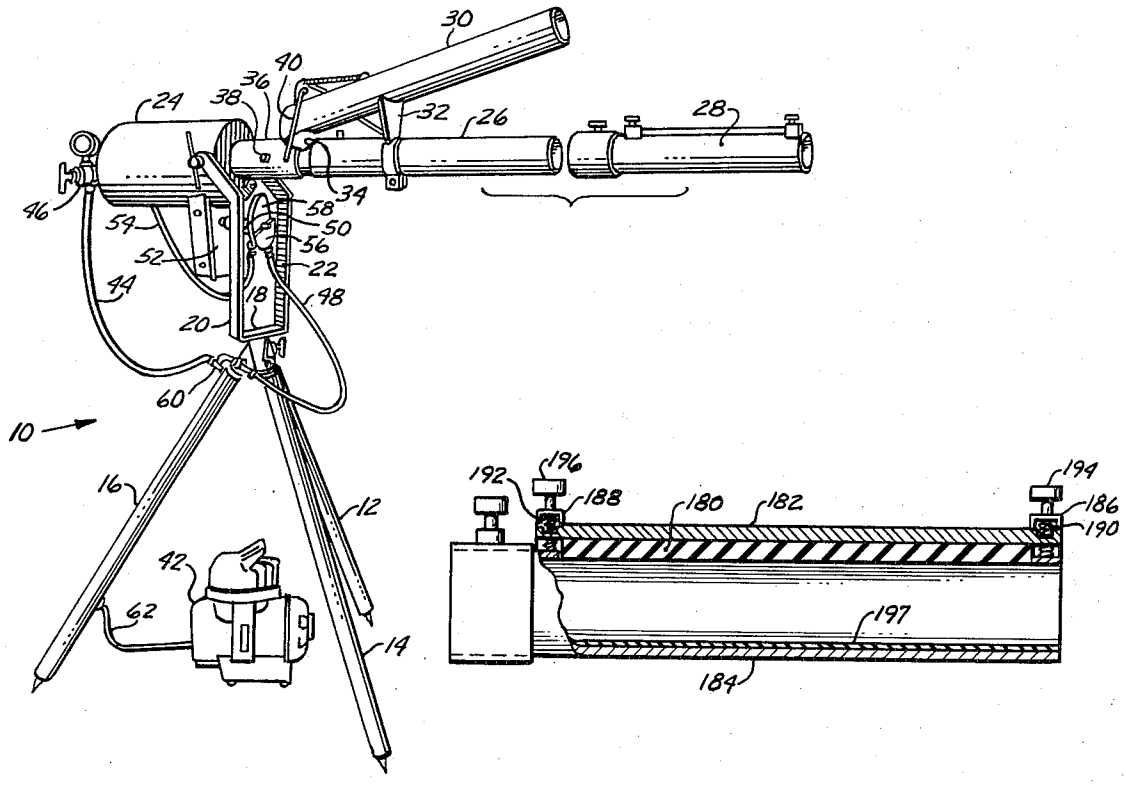
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Primary Examiner—Richard C. Pinkham
Assistant Examiner—R. T. Stouffer

[57] **ABSTRACT**

An improved compressed fluid ball projecting apparatus having an improved ball feeding device and ball control ejection barrel extensions. The barrel extensions come in several forms to provide for high and low velocity baseball ejection, and for the throwing, of tennis balls. Included in each of several given forms of the barrel extension structures is a slot extending through the wall of the extension structure. A strip of friction material extends inwardly through this slot. This strip of material is resiliently mounted so as to be outwardly depressable through the slot in response to engagement by a ball passing through the barrel and barrel extension of the ball projecting apparatus. Adjusting screws provide for adjustment of the position of the friction strip relative to the wall of the extension for desired penetration of the strip into the interior thereof. Diametrically opposite the strip is a slippery surface so that a ball passing through the barrel extension is subjected to the friction strip on one side and the slippery surface on the other and is caused to spin thereby.

5 Claims, 10 Drawing Figures



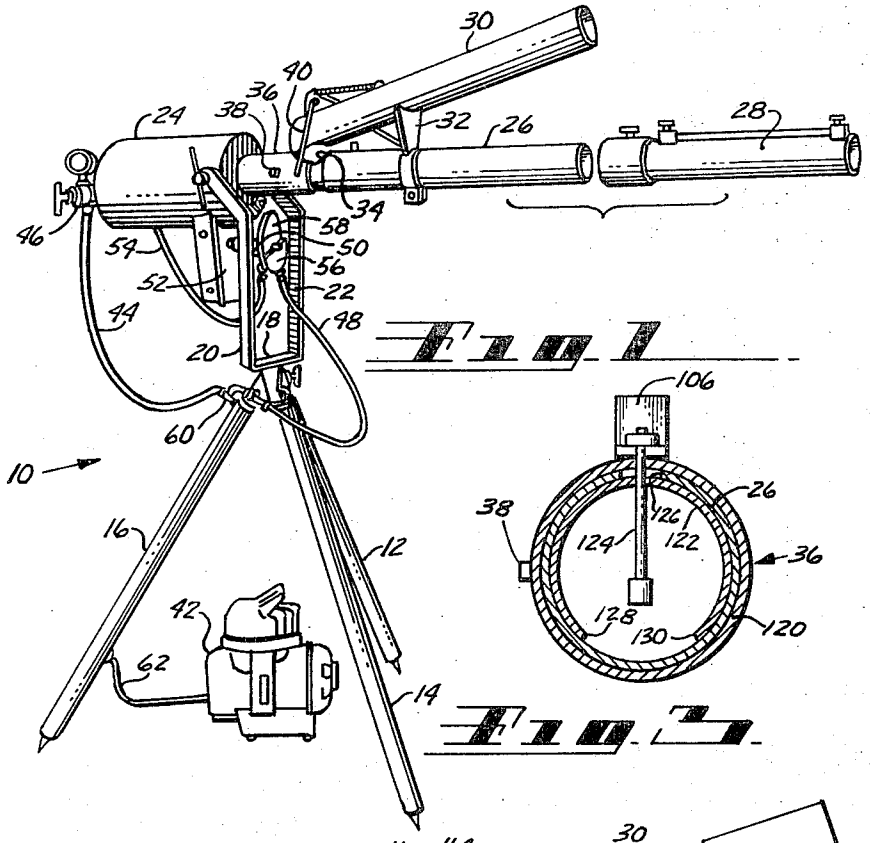


FIG. 1

FIG. 2

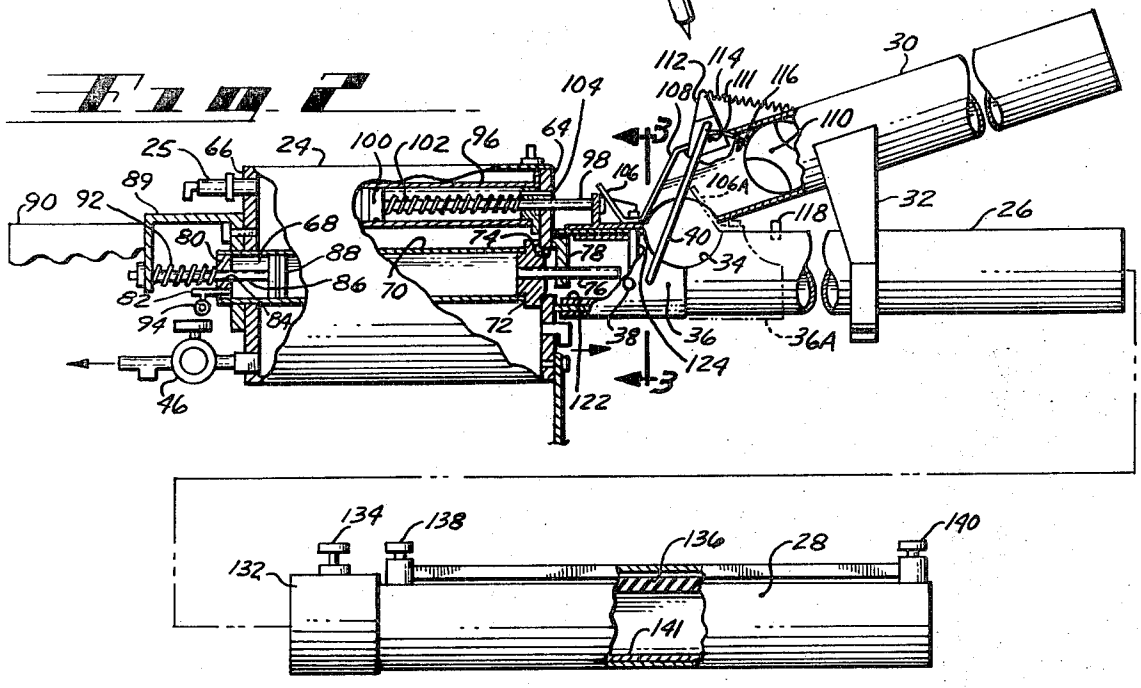
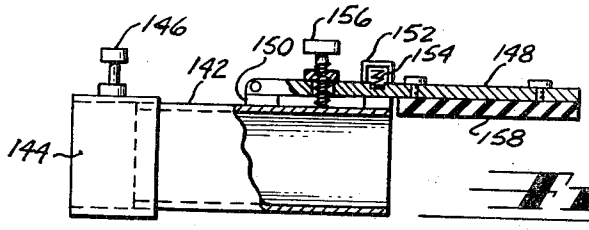


FIG. 3



PRIOR ART

Fig. 4

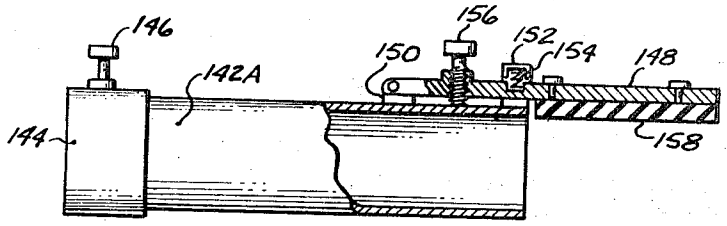


Fig. 5

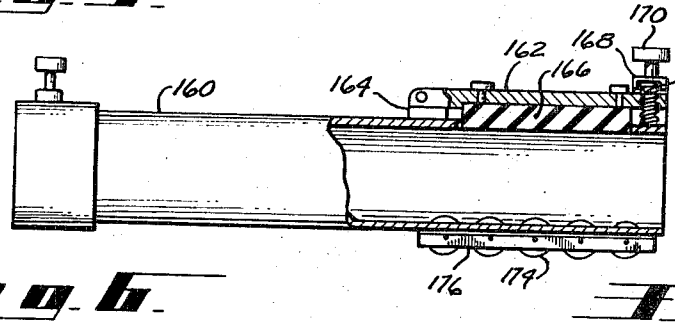


Fig. 6

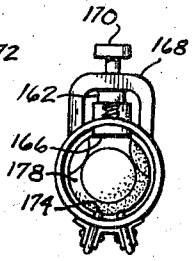


Fig. 7

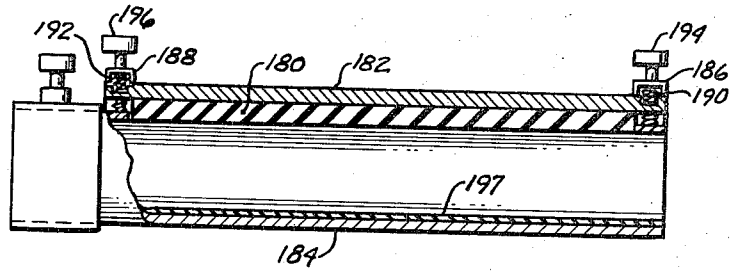


Fig. 8

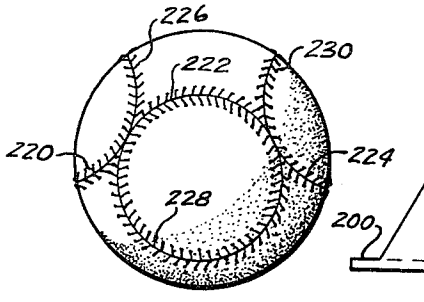


Fig. 10

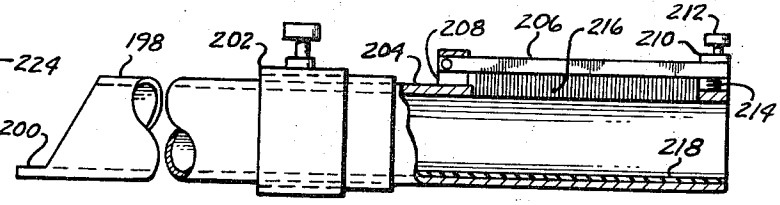


Fig. 9

BALL THROWING MACHINE WITH BARREL EXTENSION

RELATED INVENTIONS

The present invention is an improvement over the apparatus shown and described as a Baseball Pitching and Fielding Practice Device in U.S. Pat. no. 3,018,769 which issued Jan. 30, 1962 to F. L. Parsoneault. The details of that patent are hereby incorporated herein as if fully set forth and reference is made to that patent for an understanding of the present invention and its advantages over the prior art. Both the Parsoneault patent and the present invention are presently owned by K-Lin Specialties, Inc., 812 Fifth Street, Manhattan Beach, Calif. 90266 and apparatus currently marketed by them will incorporate the improvements set forth in the present application.

BACKGROUND OF THE PRESENT INVENTION

Baseball, tennis and other popular games requiring swinging at the ball with an instrument requires practice in hitting, catching, retrieving and other specific maneuvers necessary in achieving proficiency in the game. Hence, throwing the ball repeatedly and with accuracy into a strike zone, into the air or with a bounce off the ground is very desirable in the practice and training of a participant. A machine for this purpose is preferable to the manual propulsion of a ball by a person.

An excellent machine for the throwing of balls at a constant velocity and with consistent accuracy is known as the "Fireball," a trademark of K-Lin Specialties. It reflects the teachings of the previously mentioned Parsoneault patent and is used in practice by teams in professional leagues, schools, "Little League," and by park and playground teams. It is light, mobile, easy to erect for use and to disassemble for transportation and storage.

In the "Fireball" machine, balls are automatically fed into a propulsion chamber behind which is a chamber for supplying the compressed air which propels the balls, one at a time and at predetermined intervals, out of the barrel. A sleeve automatically covers the ball entrance opening into the barrel before the ball is ejected, to prevent the compressed air from escaping from the opening. The machine also has a ball curve attachment on the end for giving the ball a spin as it leaves the barrel.

The sleeve and the barrel over which it slides, in the "Fireball" machine, must have a precision fit to prevent escape of compressed air therebetween and yet permit effortless sliding of the sleeve over the barrel each time a ball is ejected. Dirt or foreign particles between the two cause jamming and malfunction. Looseness of fit or play from wear cannot be tolerated.

The ball curve attachment ahead of the end of the barrel for spinning the ball does not provide the high degree of control that is desired, particularly when the balls are ejected at the slower "Little League" velocities.

SUMMARY OF THE PRESENT INVENTION

The present invention incorporates the principle features of the Parsoneault patent. A portable tripod mounted, angularly adjustable, ball ejecting barrel is provided with an automatic feed dropping a ball into

the barrel after the previous one was fired. A two step mechanism is now provided to prevent ball jamming, to accommodate different sized balls and balls that tend to stick together. The sleeve which moves over the opening in the barrel also has been changed in the present invention to eliminate the close fit previously required. This is done by providing for an inner self sealing sleeve that bears against the inside of the barrel when it is subjected to the compressed air yet slides loosely inside the barrel when the compressed air has been spent. A compressed air chamber is fed with a portable air compressor and a timing device actuates an air pressure release, permitting the compressed air to be released to the rear of the ball in the barrel and firing it therefrom at a velocity depending upon the chamber air pressure at the time of release. This velocity, of course, may be regulated as desired for park recreational or professional play. Instead of the ball spinning device forward of the barrel, a plurality of barrel extensions are available for high and low velocity baseball ejection, and for the throwing of tennis balls, all with greater accuracy and consistency.

The foregoing improvements make the basic machine more reliable, efficient and accurate in use without an increase in cost or complexity. Its greater variety of uses, in addition to its dependability, make it a more desirable machine.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a perspective view of the ball throwing machine constructed in accordance with the present invention.

FIG. **2** is an enlarged fragmentary side elevational view, partly in vertical cross section, of the main components of the machine.

FIG. **3** is a sectional view of the barrel and sleeve taken along the line **3** — **3** in FIG. **2.**

FIG. **4** is an enlarged fragmentary side elevational view, partly in vertical cross section, of the ball curving attachment as known in the prior art.

FIG. **5** is a similar view of a first improvement.

FIG. **6** is a similar view of a second embodiment.

FIG. **7** is an end view of the second embodiment.

FIG. **8** is an enlarged fragmentary side elevational, partly in vertical cross section, of a third embodiment.

FIG. **9** is a similar view of a fourth embodiment, and

FIG. **10** is a perspective view of a preferred type of baseball for use with the machine in batting practice.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to FIG. **1** there is shown a ball throwing machine **10** built in accordance with the present invention. Included is a tripod having legs **12, 14** and **16** connected to a U-shaped frame **18** having rearwardly extending legs **20, 22.** Pivotally mounted on legs **20, 22** is a compression tank **24** having a barrel **26** extending forwardly therefrom. A barrel extension **28** for a selected ball control function is adapted for attachent to the outer end of the barrel **26.** The barrel **30** of a ball feeding device is attached to barrel **26** by mounting bracket **32** and is adapted to drop balls, one at a time, into opening **34** at the rear of barrel **26** preparatory to their ejection. A sleeve **36** slides over barrel **26** to close the opening **34** to prevent loss of compressed air which

is used in ejecting the ball from the barrel **26.** This ejection is at sufficient velocity to simulate a pitched ball, pop fly, grounder or other desired simulation. As sleeve **36** moves forwardly, a laterally extending lug **38** on the sleeve pushes the lower end of pivot arm **40** on barrel **30** forwardly to ready a ball for dropping into opening **34** when it is again uncovered by the rearward movement of sleeve **36.**

A compressor **42** is the source of compressed air which is stored in compression tank **24** through conduit **44.** Pressure control regulator **46** controls the pressure within the tank **24** at the time of its release to fire the ball. Pressure within the 10 to 15 psi (pounds per square inch) range is appropriate for ejecting a ball at Little League speeds of 40 to 70 feet per second velocity whereas a safety valve **25,** shown in FIG. **2,** set at approximately 30 psi limits the velocity of ball ejection for professional use.

Conduit **48** leads to a cycle valve **50** which is operated by a timing motor **52** to connect it with conduit **54.** This actuates release of compressed air from tank **24** for firing the ball.

A batter can tell when a ball is about to be ejected by watching the semi-circular member **56** rotate in front of disc **58** as the cycle valve **50** rotates to connect conduit **54** to air from conpressor **42** to fire the ball.

In the embodiment in FIG. **1** the compressor **42** connects with conduits **44** and **48** through a T-fitting **60** attached to leg **16** which is hollow. A conduit **62** connects the compressor **42** to the leg **16.** However, other connections between the compressor **42** and the cycle valve **50** and compression tank **24** are within the teachings of the present invention.

Referring now to FIG. **2** there is shown the cylindrical compression tank **24** having a front end plate **64** and a rear end plate **66.** Rear end plate **66** has a central bore **68** through which a smaller cylinder plunger **70** is slidingly mounted. The front end of plunger **70** has a resilient sealing pad **72** adapted to plug opening **74** in the front end plate **64.** This opening **74** communicates with the rear end of barrel **26** for supplying compressed air behind a ball in the barrel when the sealing pad **72** is moved rearwardly to expose the opening **74.** A guide rod **76** extends forwardly of pad **72** and is slidingly supported by bracket **78** on end plate **64.** The rear end of cylinder plunger **70** is sealed with a plug **80** which has an air fitting **82** adapted for connection with conduit **54** in FIG. **1.** Plug **80** also has a central opening **84** in which is slidingly mounted a shaft **86** connected to a piston head **88** within cylinder **70.** The outer end of shaft **86** is held by a bracket **89** fastened to the outer surface of rear plate **66.** A handle **90** is also attached to bracket **89** and may be used to change the angle of barrel **26** between ball ejections as desired. A compression spring **92** between bracket **89** and plug **80** keeps the cylinder plunger **70** in its forward position, as shown, with the sealing pad **72** over the opening **74** until compressed air enters fitting **82** and into the chamber between plug **80** and piston head **88.** Since the piston head **88** cannot move forward, to the right in FIG. **2,** the plug **80,** and thus plunger **70** with its sealing pad **72,** must move rearwardly, to the left in FIG. **2.** This releases the compressed air in chamber **24** behind the ball in barrel **26** and the ball is ejected. As the cycle valve **50** in FIG. **1** continues to rotate, the fitting **82** becomes exposed to the atmosphere and the triggering compressed air between plug **80** and piston **88** is lost. Compression spring **92** then pushes the cylinder plunger **70** forwardly again (as shown in FIG. **2**) and air pressure again builds up in chamber **24** for the next ball ejection. Ring **94** attached to fitting **82** on plunger **70** may also be pulled rearwardly by hand to cause firing at any time should the automatic timed firing through motor **52** and cycle valve **50** not be desired.

The buildup of air pressure in compression chamber **24** is also used to close the opening **34** in barrel **26** prior to the firing of the ball. This is necessary to prevent loss of air behind the ball until it leaves the barrel. This is accomplished by another pressure responsive actuator within chamber **24.** This actuator consists of a cylinder **96** attached to the inner surface of front plate **64.** A rod **98** is slidingly mounted on plate **64** and is attached at its inner end to a piston head **100** within the cylinder **96.** Its outer end is attached to cylinder sleeve **36** on barrel **26.** Compression spring **102** between plate **64** and piston head **100** holds sleeve **36** rearwardly, as shown, until air pressure against piston **100** builds up, depresses the spring, and moves sleeve **36** forwardly to close opening **34.** This position is shown in phantom lines **36A.** An air bleed **104** through plate **64** prevents back pressure to piston head **100.**

Sleeve **36** has an upwardly and rearwardly extending tab **106** which passes through a slot (not shown) in the back cover **108** of barrel **30** to its phantom line position **106A** to receive ball **110** when the lower end of pivot arm **40** has been moved forwardly by the laterally extending lug **38** on sleeve **36.** Arm **40** has an upper pivot mounting **111** on the top of barrel **26** with a lever arm **112** extending upwardly. Tension spring **114** is connected to this lever arm to return pivot arm **40** to the position shown when sleeve **36** is returned to its rear position. Attached to pivot arm **40** is a ball stop arm **116** which moves upwardly with the forward movement of pivot arm **40** and out of the path of ball **110** to permit it to roll down into contact with tab **106A.** When sleeve **36** and tab **106A** move rearwardly, opening **34** is exposed and the ball drops down into the barrel **26.** As lever arm **40** moves rearwardly the ball stop arm **116** moves downwardly to stop the next ball in the ball feed barrel **30.** A spring pressed detent **118** on barrel **26** prevents the ball from moving forwardly until ejected by the compressed air when plunger **70** is actuated.

As shown in FIG. **3,** the sleeve **36** actually consists of an outer sleeve **120,** an inner seal **122,** tab **106,** lug **38** and a ball positioning bolt **124** connecting the outer sleeve **120** and and inner seal **122** through a slot **126** in barrel **26.** The outer sleeve **120** may have a loose fit over barrel **26** to avoid binding problems and to insure dependability without precision manufacturing. The problem of air leakage is resolved with the inner seal **122** which preferably does not form a complete cylindrical wall. With a longitudinal strip removed from its cylindrical wall, its longitudinal edges **128** and **130** are spaced and permit radial flexibility. This seal preferably is made from sheet metal which snugs against the inner surface of barrel **26** when subjected to the blast of compressed air from chamber **24** used in ejecting the ball from barrel **26.** In the absence of such pressure it retracts enough to slide along the inner surface of barrel **26** without binding.

The barrel extension **28** has a collar **132** adapted to fit over the outer end of barrel **26.** A thumb screw **134** fastens it securely in place. Along the upper inner sur-

face of the barrel **28** is a longitudinal strip **136** of friction material such as rubber which may be recessed into the barrel by an amount regulated by adjustment screws **138** and **140.** Along the lower surface is a longitudinal Teflon strip **140** or other strip of non-friction material that may be adhesively applied or baked on as a plurality of coatings. As a ball passes through extension **28** the upper friction material tends to retard the upper portion of the ball and the non-friction material **141** lets the lower portion of the ball continue. This results in a spinning motion of the ball as it leaves the extension **28.** Other forms of extensions are set forth in subsequent views.

In FIG. **4** there is shown the ball spin device used in the old "Fireball" machine which preceded the extensions of the present invention. Here a sleeve extension member **142** is provided with an attaching collar **144** engageable on the end of the ejection barrel. Locking screw **146** rigidly secures the sleeve member **142** on the barrel in a desired position of angular adjustment around the axis of the barrel. An arm **148** is pivoted on lug **150** on the extension **142** and extends through a U-shaped bracket **152** near the end of the extension **142.** A compression spring **154** bears down on the arm **148.** An adjusting screw **156** passes through arm **148** and bears on the outer surface of sleeve extension **142** to limit the downward movement of arm **148** in response to the compression on spring **154.** By adjusting the screw **156,** the inclination of arm **148** may be adjusted.

The under surface of arm **148** has a strip of friction material such as rubber attached thereto which extends into the path of travel of a ball ejected through the sleeve extension **142.** The adjustment of screw **156** regulates the amount of spin imparted to the ball and thus the degree of curving action applied to the ball.

While this prior art development has merit, it also had problems which made it lack dependable accuracy. For example, the differences in balls fired such as slight variations in size, roughness, and moisture content would change the angle of ricochet of the ball from the friction material. Thus, improvements were necessary such as those in FIGS. **5** to **10,** inclusive.

The structure in FIG. **5** is similar to the prior art structure in FIG. **4** and like parts are identified by like numerals. However, extension **142A** in FIG. **5** is longer. It was found that with the same amount of compressed air, the ricochet of the ball from the friction pad **158** reduced its velocity. By lengthening the extension, the initial velocity could be restored without an increase in compressed air. This, however, did not correct the accuracy problems in the prior art device.

By placing the friction material within the length of the extension and providing a relatively non-friction surface on the other side of the barrel inner surface, the ball can be made to spin without ricochet and any curve developed will result from the spinning effect of the ball, not its bounce from an object forwardly of the barrel extension. In FIG. **6,** there is shown a barrel extension **160** with an area **162** pivoted at bracket **164** on the extension. A slot is provided in the wall of the extension to permit the friction material **166** fastened under the arm **162** to pass into the extension to contact a ball passing through the extension. A bracket **168** on the outer end of the extension has a bolt **170** passing through the bracket to engage the outer surface of the extension. The bolt is threadedly connected to the end of arm **162** so that rotation of bolt **170** regulates its penetration into the extension. A spring **172** between bracket **168** and arm **162** provides outward resiliency when the ball passes through and pushes the friction strip **166** outwardly.

On the opposite side of the extension from the friction strip **166** are two rows of rollers **174** mounted on the extension **160** by bracket **176.** These rollers pass through the extension **160** to engage a ball passing through. These rollers provide the slippery or non-friction surface on the side of the barrel extension opposite to that of the friction surface. Bolt **170** regulates the degree of spin on the ball thus generated and the orientation of the extension **160** on the end of the ball exit barrel determines the angular direction of the spin. The end view in FIG. **7** is for additional clarity in understanding its operation. As ball **178** is forced between the rollers **174** and the friction strip **166,** it lifts the strip up against the spring **172.** This also acts as a speed killer and can be made to reduce the ball velocity if desired.

In FIG. **8** is another version wherein a long strip of friction material is used to dampen the ball velocity to Little League speeds. The bumpiness at slow speeds as in the case of the rollers is not present. A forced spin is developed without ricochet for a more reliable ball ejection. Here a longer strip of friction material **180** is attached to the underside of arm **182** which is resiliently mounted at both ends to barrel extension **184.** Brackets **186, 188** are attached to the extension **184** and springs **190, 192** urge the strip **180** inwardly. Bolts **194, 196** are threadedly engaged through arm **182** and bear against the extension **184** for adjustment purposes both fore and aft. On the inner surface opposite strip **180** is a Teflon or similar slippery surface **197** which may be applied. A liquid Teflon sprayed and baked in successive layers has been very effective. Also a Teflon strip bonded or glued to the inner surface works satisfactorily.

In FIG. **9** there is shown an attachment for throwing tennis balls. Since the diameter of a tennis ball is 2.75 inches compared with a baseball of 2.95 inches in diameter, a sleeve insert **198** is used which extends down into the ejection barrel of the machine. Lip **200** fits between edges **128, 130** of inner sleeve **122** shown in FIGS. **2** and **3.** Attaching collar **202** is used, as before, in securing the extension **204** with the proper orientation. Arm **206** is pivotally mounted by bracket **208** to extension **204** with bracket **210,** bolt **212** and spring **214** resiliently adjusting the arm **206** for penetration. Attached to arm **206** are stiff bristles **216** which frictionally retard the upper surface of the tennis ball while Teflon surface **218** applies the slippery surface contact with the ball from the other side.

In FIG. **10** is shown the configuration of a baseball preferably used with the extensions in FIGS. **5, 6, 7** and **8.** This ball is of conventional size but has a second set of stitches symmetricaly applied with a reverse pattern. Thus, stitching **220, 222, 224** shows the conventional configuration with stitching **226, 228, 230** constituting the reverse pattern. If the ball has a molded rubber outer surface the simulated stitching is textured for a distinct rise along the stitching. The importance of this second set of reverse stitching is that no matter how the ball is handled or happens to drop into the sleeve for firing, the batter sees the spinning of strings at the girth

of the ball. The blur of strings at top and bottom of the ball as it spins is not detrimental to the batter.

Having described illustrative embodiments of the present invention, other modifications thereof will occur to those skilled in the art and it is to be understood that these variations are to be considered as part of the present invention as set forth in the claims.

What I claim is:

1. A ball throwing machine comprising:

a stand;

a ball ejection barrel supported by said stand;

means for ejecting a ball out of said barrel;

a barrel extension adapted for mounting on the end of said barrel;

said extension having a slot extending through the wall thereof;

said extension further having a strip of friction material extending inwardly through said slot;

means for resiliently mounting said strip in said slot so that said strip is outwardly depressable through said slot in response to engagement by a ball passing through said barrel and said barrel extension;

means for adjusting the position of said strip relative to said wall for desired penetration of said strip into the interior of said extension;

said barrel extension having a slippery inner surface diametrically opposite said strip whereby a ball passing through said extension is subjected to said outwardly depressable strip and said slippery inner surface and be caused to spin thereby.

2. A ball throwing machine as in claim **1** wherein said slippery inner surface is a Teflon material affixed to the inner surface of the barrel of said extension.

3. A ball throwing machine as in claim **1** wherein said slippery inner surface is a plurality of rollers having edges thereof protruding into said extension.

4. A ball throwing machine as in claim **1** wherein said strip of friction material comprises inwardly directed bristles against which a ball will brush as the ball passes therethrough.

5. A ball throwing machine as in claim **4** wherein said barrel extension has an inner sleeve insertable into said ball ejection barrel for the ejection of balls smaller in diameter than the diameter of said barrel.

* * * * *