C. R. GREEN.

PNEUMATIC BALL PROJECTOR.

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1,379,403.

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Fig. 1.

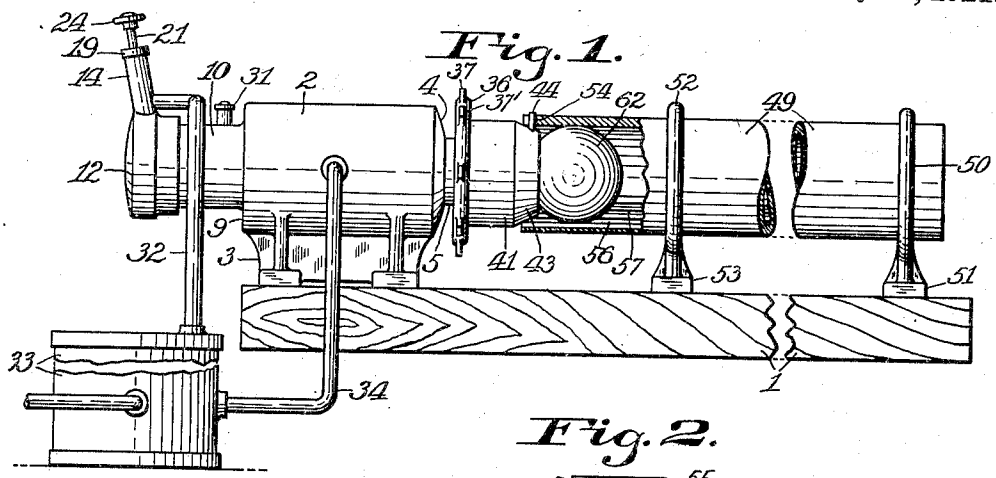


Fig. 2.

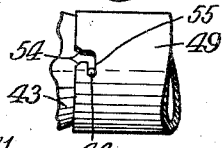


Fig. 4.

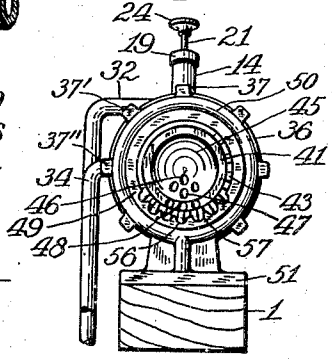


Fig. 3.

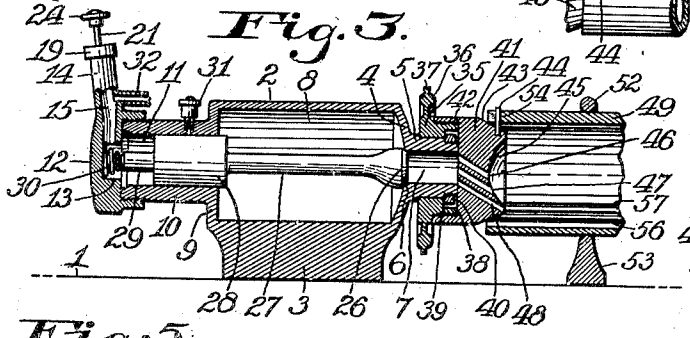


Fig. 5.

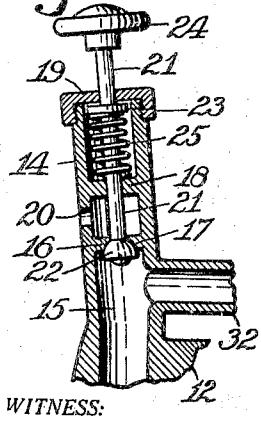


Fig. 6.

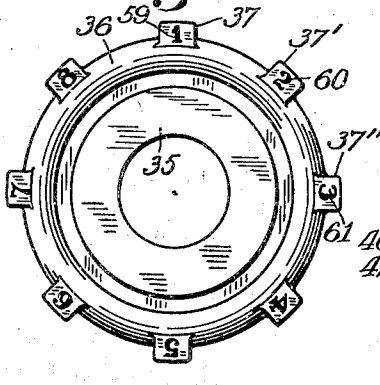
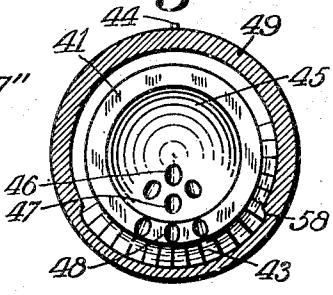


Fig. 7.



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PNEUMATIC BALL-PROJECTOR.

1,379,403. Specification of Letters Patent. Patented May 24, 1921.

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To all whom it may concern:

Be it known that I, CHARLES R. GREEN, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented a new and useful Pneumatic Ball-Projector, of which the following is a specification, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon.

This invention relates to a machine that is designed for projecting or throwing a ball either at a target or other object or to a distant point, the invention having reference more particularly to a machine whereby a ball may be thrown by means of compressed air and the ball caused to follow a curved course, the direction of which may be controlled by the operator of the machine.

An object of the invention is to provide an improved ball-projecting machine of the above-mentioned character which shall be so constructed as to permit it to be readily moved about from place to place for exhibition or practice purposes, and which may be used for throwing or projecting various kinds of balls, and especially those commonly known as "base-balls" which may be caught by a person within range of the projected ball.

Another object is to provide a ball-projecting machine that shall be capable of twirling a ball and causing it to follow a curved course either to the right or to the left, or upward or downward, as may be desired by the operator, and permit the operator to change the course for each succeeding ball thrown, in order to compel one attempting to "bat" or to catch the ball to become skilful and alert in action.

A further object is to provide a simple and efficient machine for projecting or throwing balls, which may be produced at reasonable cost so as to be available for use in the entertainment of societies or clubs or small associations seeking instructive amusement, or in playing the game of "base-ball" instead of the usual practice of pitching the ball to the batter by hand, which machine shall be so constructed as to be durable and economical in use.

With the above mentioned and other objects in view, the invention consists in a pneumatic ball-projector having improved air-controlling apparatus and also an improved barrel adapted to cause a projected ball to follow a curved course; and, the invention consists also further in the novel parts and combinations and arrangements of parts as hereinafter particularly described and further defined in the accompanying claims.

Referring to the drawings,—Figure 1 is a side elevation of the improved ball-projector as preferably constructed, portions of the barrel of the machine being broken away and exposing a ball in position to be thrown; Fig. 2 is a fragmentary top view of a portion of Fig. 1; Fig. 3 is a longitudinal central section of the ball projector, a portion of the barrel being broken away; Fig. 4 is an elevation of the muzzle end of the machine; Fig. 5 is a longitudinal sectional detail on an enlarged scale of a controlling valve with which the machine is provided; Fig. 6 is a plan view on an enlarged scale of a rotary breech block and indicator dial designed to enable the operator to set the barrel intelligently to different positions to throw the ball in different directions of curvature; and, Fig. 7 is a transverse section of the barrel of the machine on an enlarged scale and slightly modified, looking toward the breech block.

Similar reference characters in the different figures of the drawings indicate corresponding elements or features of construction herein referred to in detail.

Practically embodied the invention preferably comprises a suitable main base 1 which may be of any design desired to support the various elements of the machine unitarily, with the barrel of the machine either horizontally or otherwise as may be desired or required. A valve box 2 is provided which may be made as a casting of suitable metal and having a suitable base 3 which is secured to the main base 1. The valve box, being hollow has an annular head 4 in its forward end on which is a hollow cylindrical neck 5, and the inner side of the head has an annular valve seat 6 which is at the inner end of the bore or opening 7 in the neck. The inner side 8 of the wall of the valve box may be unfinished or rough as cast. The opposite end of the valve box has an annular head 9 from which extends a cylindrical valve chest 10 having a smooth bore 11 that is greater diametrically than the valve seat 6, and the valve chest

has a head or cap 12 secured to its end, the inner side of the head preferably having a socket 13 therein, and the head has a valve body 14 thereon which has a channel 15 therein extending to the socket. In the channel is a partition 16 in which is a valve seat 17. There is also a partition or bridge 18 in the channel at a distance from the partition 16 to form a chamber. The valve body has a head or cap 19 on its end and has an exhaust port 20 in the body wall between the partitions for the escape of air from the chamber. A valve stem 21 is arranged in the head and the partitions and has a valve 22 thereon which is normally in contact with the valve seat 17, being arranged to be moved from the seat inward toward the socket in head 12. The valve stem has a collar or piston 23 fixed thereon adjacent to the head 19, and the end of the valve stem has a knob 24 thereon. Preferably a retracting spring 25 is arranged on the valve stem and seated on the partition 18 and the collar 23 to promptly close the valve after it has been opened. The valve 22 when closed is held to its seat by air pressure.

A valve 26 is provided which is arranged on the valve seat 6 and it has a stem 27 which is fixed to a valve piston 28 arranged in the valve chest 10. The piston 28 is larger in diameter than the valve 26 and divides the space between the interior of the valve box 2 and the farther or outer portion of the bore 11, and it preferably has a central stop projection 29 thereon that may be received into the socket 13, and preferably a cushion spring 30 is arranged in the socket and against the stop projection. Preferably the upper portion of the valve chest 10 is provided with an oil cup 31 to lubricate the piston 28. A pipe 32 is connected with the valve body 14 and also with a reservoir 33 in which air under compression may be maintained, and another pipe 34 is connected also with the reservoir and with the valve box 2, so that air under pressure from one and the same source is maintained on the ends of the piston 28.

An improved breech block and adjuster is provided which comprises an annular guide member 35 having a wheel-like rim 36 on the circumference of which a suitable number of projections 37, 37′, 37″ are arranged equi-distantly apart. The member 35 is rotatively guided on the neck 5 and has a cylindrical extension 38 on its forward side in which is a recess 39 receiving a retaining collar 40 which is secured to the neck 5 and retains the member 35 on the neck. The breech block includes also a head block 41 which has a recess 42 in its back in which the extension 38 is secured. The head block 41 has an externally tapered or conical forward portion 43 to which a stud 44 is fixed. The front of the block 41 preferably has a concave central portion 45. The block 41 has a suitable number of channels 46, 47, 48 therein which extend from the bore 7 obliquely to the front of the block, some of the channels having their orifices in the concave face 45.

An improved barrel 49 is provided which preferably is of uniform diameter throughout and one of its ends is placed on the conical portion 43 and centered thereby, the barrel being rotatively supported in an annular guide 50 having a foot 51 secured to the base 1, the barrel being preferably provided also with a similar guide 52 having a foot 53 secured also to the base 1, to permit the barrel to be moved forward by hand and readily guided back to the breech block. The rear end of the barrel has a V-shaped notch 54 therein to receive the stud 44, and preferably the barrel has also a transverse slot 55 extending from the notch to receive the stud whereby to hold the barrel to the breech block. One portion of the inner side of the barrel 49 has a suitable number of straight grooves 56, 57 therein which are so arranged to receive air from channels in the breech block, the grooves extending throughout the length of the barrel in parallel arrangement. In some cases, however, the barrel may have a single broad groove or channel 58 as shown in Fig. 7 instead of separate relatively narrow grooves.

For the purpose of enabling the operator, when at the rear of the machine, to intelligently turn the barrel so that the groove or grooves therein shall be in the position he may desire to project the ball as he may design, the rearward side of the projections 37, 37′ and similar projections are provided with indicator marks 59, 60 and 61, such as numerals 1, 2 and 3, one of which may be readily seen by the operator looking over the valve box 2.

The barrel 49 may be readily unlocked from the stud 44 and moved forward sufficiently to receive a ball 62 in its rear end, after which the barrel may be readily returned to the breech block and locked in place. The ball should be of proper size to fit closely but not tightly in the barrel.

In practical use, a ball is properly placed in the barrel and the machine set so as to throw the ball in the desired direction, and the pipes 32 and 34 being charged with compressed air, the pressure is equal on the opposite ends of the piston 28 and the valve 26 is held to its seat. If then the operator strikes the knob 24 forcibly with his hand the valve 22 is opened and the equilibrium of pressure disturbed because of the escape of air from the port 20 and the outer portion of the bore 11, permitting the air pressure in the valve box 2 to force the piston 28 outward so as to force the valve

26 from its seat, to permit the air in the valve box to rush out through the bore 7 and the oblique channels in the breech block and against the ball in the barrel. Some of the air rushes against the middle portion of the ball and acts to force the ball out of the barrel while the air from other channels enters the grooves in the barrel and causes the adjacent portions of the ball to move faster than the opposite portion of the ball, so that the ball shall roll against that portion of the barrel which is opposite to the grooves, with the result that when the ball leaves the barrel it is twirled or twisted and follows a curved course through the air, the direction of which depends upon the position of the grooves in the barrel. After the ball has been thrown out of the barrel, the valve 22 having become closed and the air pressure in the valve box 2 reduced by the sudden out-flow of air, the greater pressure in the outer portion of the bore 11 forces the piston 28 inward and causes the valve 26 to be again seated, after which the air pressure becomes equalized at the opposite sides of the piston and the machine is then ready to again be operated.

Having thus described the invention, what is claimed as new is—

1. A pneumatic ball-projector including a rotatably-supported barrel and a breech block fixedly connected thereto, the barrel having a longitudinal groove in the inner side thereof, the breech block having a plurality of channels extending obliquely toward the groove, and means to control admission of a forceful fluid to the channels.

2. A pneumatic ball-projector including a valve box having a hollow neck, a valve to operate in the neck, means to control the valve, a breech block rotatively connected with the hollow neck and having a plurality of channels obliquely arranged therein, a barrel detachably connected to the breech block and having a longitudinal groove in the inner side thereof extending approximately from the outer end of one of the channels, and a guide rotatably supporting the barrel.

3. A pneumatic ball-projector including a barrel having a straight longitudinal groove in the inner side thereof, a breech block fixedly connected to one end of the barrel and having an approximately central channel therein and also a channel extending obliquely toward the groove in the barrel, the breech block having a dial thereon to indicate the position of the groove, means to rotatively support the barrel, and means to control admission of a forceful fluid to the channels in the breech block.

4. A pneumatic ball-projector comprising a supported valve box having a hollow neck on one end and a smooth-bore cylinder on the opposite end thereof, the cylinder having a diametrically larger bore than the neck and being closed at its outer end, a valve to operate in the inner end of the neck and having a stem, a piston to operate in the cylinder and being fixedly connected to the stem, a breech block connected to the hollow neck and having a channel therein, a barrel connected to the breech block, a guide supporting the barrel, an exhaust valve having a body connected with the outer end of the cylinder, a reservoir, a pipe connected with the valve box and the reservoir, and a pipe connected with the reservoir and the exhaust valve body.

5. A pneumatic ball-projector comprising a supported valve box having a hollow neck, a breech block swiveled on the neck and having an externally conical end portion and a concave end face, the block having also channels therein extending obliquely from the neck to the concave end face and having also a wheel-like rim thereon provided with projections, a valve in the valve box to operate in the hollow neck, means to operate the valve, a barrel rotatably supported and seated on the conical end portion of the breech block, the inner side of the barrel having a plurality of grooves extending longitudinally and approximately in register with the orifices of said channels, and means to secure the barrel to the breech block.

6. In a pneumatic ball-projector, the combination with a valve box having a hollow neck, and a valve to operate in the neck, of a breech block swiveled on the neck and having a channel extending from the hollow neck, said block having also a wheel-like rim provided with projections, each of said projections having an indicator mark thereon, and a barrel rotatably supported and locked to said block, the inner side of the barrel having a straight groove therein in register with said channel.

7. In a pneumatic ball-projector, the combination of a base, a reservoir, a valve box mounted on the base and having a hollow neck on one end and a valve chest on the opposite end thereof, said chest having a cap on its end and also a smooth bore that is larger diametrically than said neck, said cap having a valve body thereon provided with a spring-retracted valve adapted to open inwardly toward said cap, the valve body having an exhaust port therein behind said valve, said valve having a stem extending out of said body and provided with a push-knob, a valve in the valve box to operate in the mouth of said hollow neck and having a stem thereon provided with a piston that is movable in said smooth bore, said piston having a stop projection extending toward said cap, a spring between said projection and said cap, a pipe connected with

the reservoir and said valve body, a pipe connected with the reservoir and said valve box, and a breech block connected with said hollow neck and having a channel therein, with an annular guide secured to said base, and a barrel supported in the guide and connected with the breech block.

In testimony whereof, I affix my signature in presence of two witnesses.

CHARLES R. GREEN.

Witnesses:
E. T. SILVIUS,
R. H. SAMPLE.