No. 884,024. PATENTED APR. 7, 1908.

R. H. LAKE.

MECHANICAL BALL THROWER.

APPLICATION FILED DEC. 18, 1902.

2 SHEETS—SHEET 1.

Fig. 1.

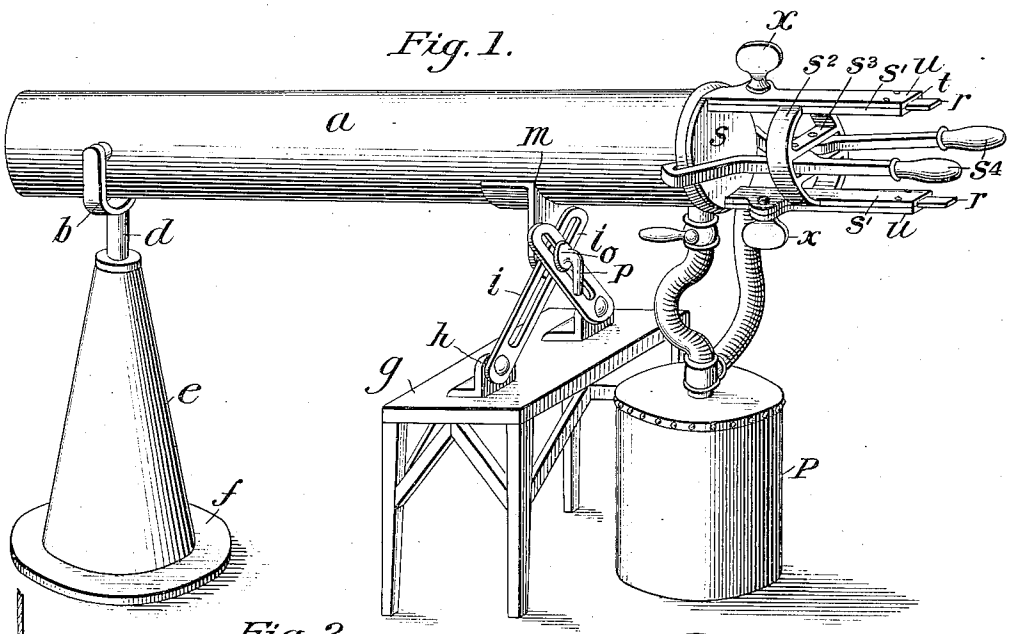
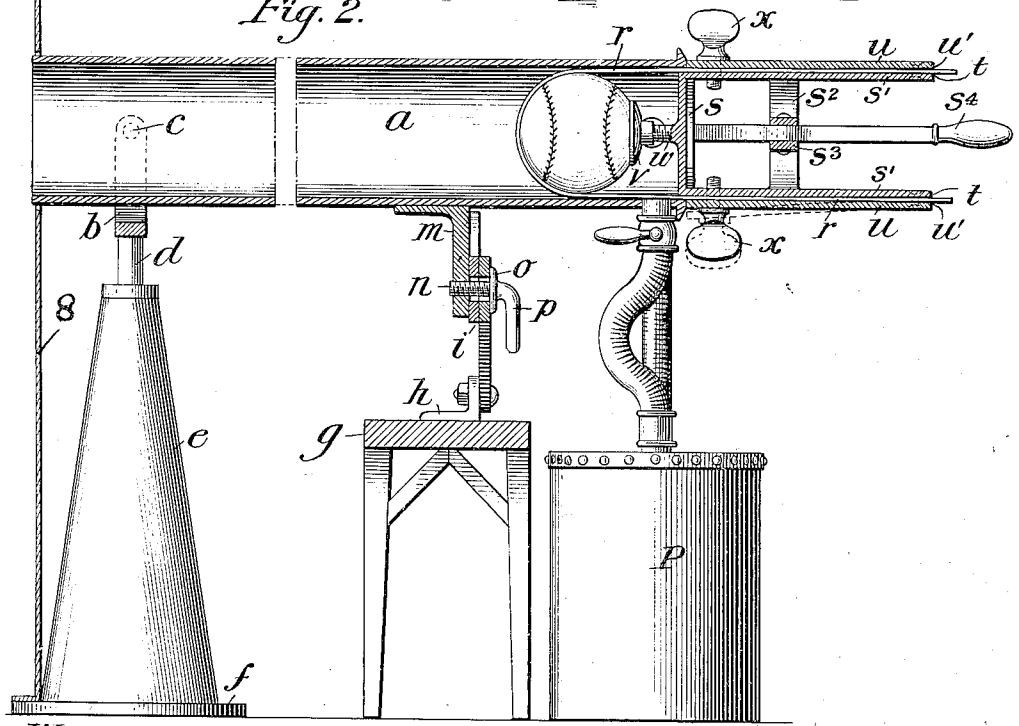


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4.

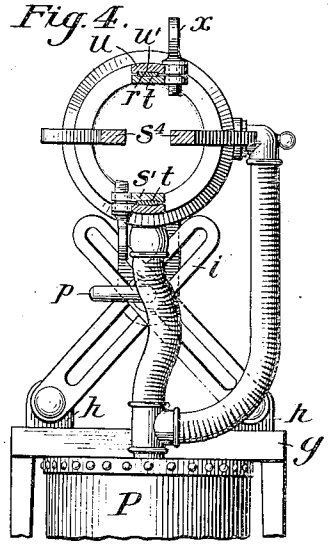


Fig. 3.

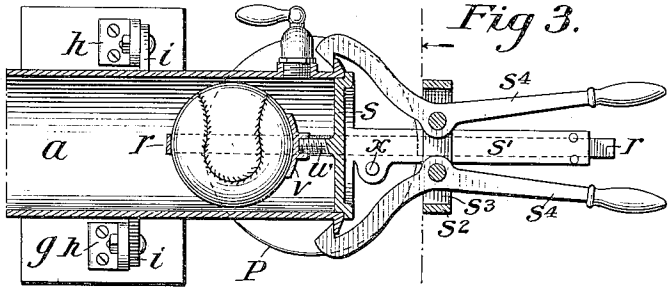


Fig. 6.

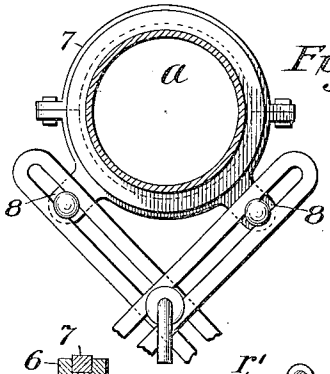
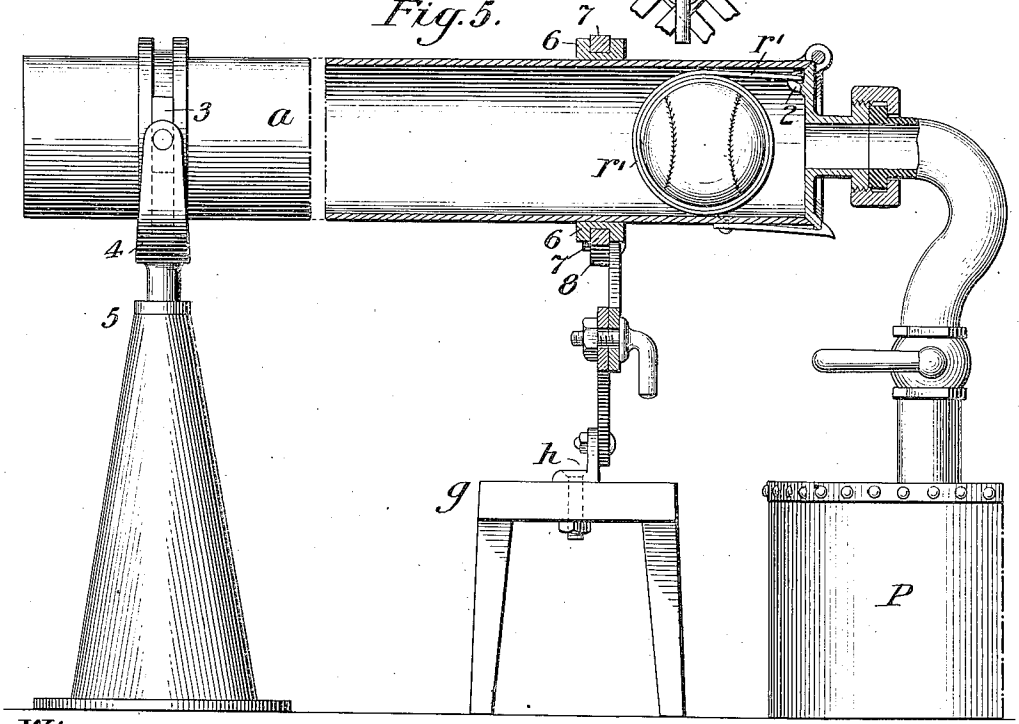


Fig. 5.

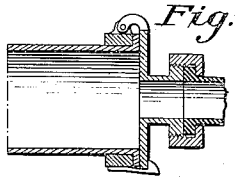


Witnesses:

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Fig. 7.



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UNITED STATES PATENT OFFICE.

ROBERT HOWARD LAKE, OF WASHINGTON, DISTRICT OF COLUMBIA.

MECHANICAL BALL-THROWER.

No. 884,024. Specification of Letters Patent. Patented April 7, 1908.

Application filed December 18, 1902. Serial No. 135,719.

To all whom it may concern:

Be it known that I, ROBERT HOWARD LAKE, of Washington, in the District of Columbia, have invented certain new and useful Improvements in Mechanical Ball-Throwers, of which the following is a specification.

My invention relates to mechanical base ball pitchers or machines primarily intended to be employed in a game of base ball, particularly in the practice thereof, which are constructed not only to throw the ball in varying positions relative to the batsman, *i. e.*, high or low, close to or away from the batsman, but also to cause the ball to travel in either a rectilinear or curvilinear direction, and to vary the direction of the curve and the amount thereof in close simulation of the balls delivered by the ordinary expert pitcher in the game of base ball.

One of the objects of the invention is to provide a machine of simple and durable construction which may be quickly and easily manipulated to vary the general direction of travel of the balls delivered thereby, as well as the direction or amount of curve imparted thereto.

Other objects of the invention will appear, and the many advantages thereof be appreciated when the same is more fully described.

While the invention is susceptible of various modifications, I have illustrated in the accompanying drawings and shall hereinafter describe what I now conceive to be the preferred embodiment of the same.

In these drawings—Figure 1 is a perspective view of one of the embodiments of my invention. Fig. 2 is a vertical longitudinal section of the same. Fig. 3 is a detail view in section of a part of the mechanism of the construction shown in Fig. 1. Fig. 4 is a detail rear elevation of the same. Fig. 5 is a side elevation, parts being shown in section of a modified embodiment of my invention. Fig. 6 is a detail transverse sectional view of the same, and Fig. 7 is a detail view of a further modification.

In the present exemplification of my invention, the same includes primarily a pneumatically-operated gun having means for supporting the same which will permit of a large range of adjustment to vary the general direction of travel of the projectile thrown therefrom, and it further includes means located at the breech end of the gun to coact with the projectile in the initial movement thereof to impart thereto a rotary or twisting movement in a direction transverse in relation to the longitudinal axis of the gun, and thus cause the projectile in its travel, after leaving the muzzle of the barrel, to describe a curvilinear course, the means located at the breech end of the barrel being adjustable so as to vary the amount of rotation given to the projectile, and consequently the amount of curve imparted thereto and being further adjustable to vary the direction of said rotation, and as a consequence the direction of said curve.

In the embodiment of my invention, illustrated in Figs. 1 to 4 inclusive, the barrel of the gun is indicated by the letter *a*, and has associated therewith a muzzle and a breech support. The former is constructed to permit of slight elevation and lateral movement of the muzzle, while the latter is constructed to provide for lifting the breech vertically and shifting the same laterally. The front support preferably includes a yoke *b*, having bearings provided in the ends thereof for pivot pintles *c* projecting from the barrel, and a stem *d* depending centrally from the yoke swiveled in a base support *e* having a flanged or enlarged bottom *f*. The particular construction of breech support illustrated includes a platform *g*, having upwardly projecting ears or lugs *h* bolted thereto, to which the lower ends of slotted crossing arms *i* are pivotally connected. To the barrel, adjacent to the breech end thereof, a bracket *m* is secured, the lower end of which is provided with a threaded opening designed to receive the threaded end of a pin *n* projecting axially from a bearing head *o*, which is further provided with a handle *p*. The pin *n* passes through the slots in the arms *i* at the point of intersection thereof, and engages a threaded opening in the bracket *m*. By turning the handle *p* to screw the pin into the opening, the arms *i* are firmly gripped between the opposing face of the bracket *m* and head *o*, and thus held from relative shifting movement, forming, when gripped together in this manner, a fixed support for the breech of the gun. As will be apparent, in order to shift the barrel *a*, either to elevate the breech or shift the same laterally, it is only necessary to loosen the head *o* and move the breech to the desired position, the arms *i* being freely shifted by the pin *n*. When the desired position is attained, the head *o* is again tightened up to clamp the arms *i* against relative movement and therethrough maintain the

barrel in the position to which the same has been shifted.

For projecting the ball from the barrel, as before premised, pneumatic pressure is preferably provided, for which purpose a tank of compressed air P is located in any desired position adjacent to the gun and connected with the interior thereof, back of the ball when the latter is in discharging position, by a suitable valve controlled flexible conduit.

To give the ball a rotary or twisting movement, so that when discharged it will travel in a curvilinear direction, means are provided, as hereinbefore referred to, for coacting with the ball in the initial movement thereof. The means provided in the present exemplification of my invention for this purpose, consists of a flexible band or strap *r*, designed to engage directly with the surface of the ball, and through frictional contact therewith impart to the same a rotary or twisting movement about an axis transverse to its line of flight, as the ball is forced forward under the impulse of the compressed air. The strap *r* is preferably held in a fixed position at one end during the discharge of the gun, being preferably carried by a displaceable breech closure *s*, which, during the discharge of the gun, completely closes the breech end of the barrel, but which may be displaced from said end in order to engage the strap with the ball and place the latter in the barrel in position to be discharged therefrom.

In the embodiment of my invention shown in Fig. 1, the breech closure is constructed to be removed entirely from the barrel *a*, and includes a head designed to fit within the breech end of the barrel, and diametrically-oppositely-arranged rearwardly-extending arms *s'*, connected centrally of their lengths by a web s^2 between the sides of which supplemental webs s^3 extend, to which spring pressed clamping arms s^4 are pivoted. The front ends of the larger arms are provided with suitable catches or hooks, to engage with an annular outwardly projecting flange upon the breech end of the barrel to hold the head within said end. Extending through the entire length of the arms in the outer faces of the same, and continuing through the edge of the head of the breech closure, are shallow grooves *t*, while fitting upon said outer faces and provided with corresponding or counterpart grooves *u'* are supplemental arms *u*. In the chambers formed by each set of companion grooves *t*, *u'*, the opposite ends of the strap *r* are held, the central or bail portion of which extends in advance of the head in position to engage the ball. The latter finds a seat within a cup or concave disk *v* adjustably mounted upon the end of a short stud *w* projecting axially from the head of the breech closure. The strap *r* is preferably of sufficient length to permit the ends thereof to extend entirely through the guide chambers provided for the same and project out from the rear ends of the arms *s' u*. The rear ends of the supplemental arms *u* are secured to the corresponding ends of the arms *s'* by rivets, and the forward ends of the arms *u* are secured to the arms *s'* adjacent to the head of the breech closure by clamping screws *x*. Adjacent to said head, the grooves *t*, *u'*, of each arm and companion supplemental arm are made so shallow that the chamber formed by the same is not sufficient to permit of the free passage of the strap *r* when the screw *x* is tightened, but the opposing walls of said chambers will securely clamp the strap between the same, and thus prevent movement thereof.

When the machine is set for operation, either one or the other of the screws *x* is tightened to securely clamp one end of the strap *r* in fixed position, while the companion screw is loosened, thus permitting the opposite end of the strap to have perfectly free movement.

As before premised, the gun is loaded by removing the breech closure, placing the ball in the cup *v*, passing the strap over the same, drawing upon the free end thereof until the same is taut to grip the ball, and then replacing the closure upon the barrel, the hooked ends of the arms s^4 engaging the annular flange upon the breech end thereof. The valve controlling the air conduit is then manipulated to admit air to the barrel in the rear of the ball, the pressure of which instantly discharges the ball, which, in its movement necessarily pulls upon the strap *r*, drawing the free end thereof through its chamber and into the barrel, disengaging itself therefrom only when the strap is straightened, and through this frictional engagement receiving a rotary or twisting movement. The amount of this movement determines the amount of curve or deflection of the ball from a true rectilinear line in its flight, and may be regulated by adjusting the strap in its chambers to give a greater or less length of free end.

The direction of the curve described by the ball in its flight may be varied by merely turning the breech closure around the longitudinal axis of the barrel, and thus the incurve, drop, outcurve and upcurve, which are at the command of only the most expert base ball pitchers, may be obtained.

As the adjustments of the breech closure about the axis of the barrel may bring the strap *r* against any radial section thereof, and if but a single air conduit opening were provided in the barrel over the mouth of the same, I have preferably provided two flexible conduits connecting the same with the barrel at points approximately ninety degrees separated from each other.

In the embodiment of my invention, dis-

closed in Figs. 5 and 6, a modification of the arrangement of the breech closure and supports for the barrel first described is shown. In this construction the breech closure is permanently connected to the barrel and is movable to one side of the bore thereof for the purpose of loading. The arrangement of strap for imparting a twisting movement to the ball is also somewhat modified and coacts with the ball in a slightly different manner from the construction first described. As disclosed in Fig. 5, the edge of the breech closure is hinged at one point to the breech end of the barrel, and the latter is provided opposite to said hinged connection with a spring catch which coacts with the closure to hold the same in closed position. The strap r' in this exemplification of my invention is secured at one end to a hook 2 or other fastening means provided on the closure, and the free portion thereof is designed to be wrapped about the ball. The unwrapping of this strap as the ball is discharged, gives the latter the desired twisting movement. As in this construction the breech closure is not arranged to be rotated about the axis of the barrel, the latter is supported so that the same may be turned as an entirety. For this purpose a collar is secured to the periphery of the barrel adjacent to the muzzle thereof, provided with an annular groove in which shoes 3 are arranged having pintles projecting therefrom finding bearings in the ends of a yoke 4, swiveled in a suitable base 5. The breech end of the barrel is also provided with a collar 6 having an annular groove therein which receives a ring 7, provided with radially extending ears 8 provided with pins which engage the slots, in cross arms corresponding to and mounted in a similar manner to the arms i in the first form of the invention described. This construction of supporting means for the barrel permits of the free rotation thereof upon its axis, and provides for the vertical and lateral adjustment thereof described in connection with the first form of the invention. But a single air conduit is associated with the modification of the invention last described, the same leading into the breech end of the barrel through the breech closure, the latter having a hollow stud extending therefrom which is coupled to the end of the air conduit by means which will permit of the relative rotation of the same. This coupling preferably includes a flange on the end of the conduit, a flange having a peripheral thread on the end of the stud and a collar threaded upon the last-named flange and having an inwardly-extending flange overhanging the flange upon the end of the air conduit.

In the exemplification of my invention illustrated in Fig. 7, a hinged breech closure is employed.

The strap is arranged as in the construction disclosed in the second embodiment of my invention, and the barrel is mounted as in the first-described embodiment of the same. The breech closure, however, is designed to turn upon the barrel, and for this purpose a band is provided loosely fitting about the periphery of the barrel and finding a bearing against the flanged rear end thereof. To this band, the breech closure is hinged, and the same carries the catch for retaining the closure in closed position. As will be apparent, to vary the direction of the curve, it is only necessary to turn the band about the barrel. For facilitating this manipulation, the same may be provided with a handle.

In the use of the invention, it is desirable to prevent the batsman from becoming advised of the adjustments of either the barrel or the ball curving mechanism. To this end a shield 8 is provided having an opening therein to receive the end of the muzzle of the gun, this shield providing a mask for the entire mechanism located behind the same, and serving to prevent the batsman from seeing the adjustments which may be given to the barrel, or the movements of the ball curving mechanism.

The construction and operation of my invention will be readily understood upon reference to the foregoing description and accompanying drawings, and it will be appreciated that the parts and combinations may be varied within a wide range without departing from the spirit of the same.

Having thus described my invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. In a mechanical base ball thrower, the combination with a barrel, and a compressed air supply communicating therewith, of a strap to engage the ball while the latter is at rest, and to impart thereto a twisting movement about an axis transverse to its line of flight as the result of the forward movement of the ball, substantially as described.

2. In a mechanical base ball pitcher, the combination with a barrel and an ejecting medium to act upon the ball, of a flexible strap engaging the ball while the latter is in a state of rest and coacting with the same to impart a twisting movement thereto as a result of the forward movement of the ball under the influence of said ejecting medium, substantially as described.

3. In a mechanical base ball thrower, the combination with a barrel, and a compressed air supply communicating therewith, of a flexible ball curving device independent of the wall of the bore of the gun, to coact with the ball in the initial forward movement thereof, substantially as described.

4. In a mechanical base ball curver and in combination, a barrel, a compressed air-supply therefor, and a curving mechanism including a strap having frictional contact

with the ball, while at rest and in the initial forward movement thereof only, to impart thereto a twisting movement transverse to its line of flight as a result of said forward movement.

5. The combination with a barrel and a compressed air supply, of a displaceable breech closure and a device working within the bore of the gun carried thereby and engaging the ball to impart a twisting movement to the same, substantially as described.

6. The combination with a barrel and a compressed air supply, of a displaceable breech closure, and a ball curving device carried thereby, said device operating in advance of said closure, substantially as described.

7. The combination with a barrel and a compressed air supply, of a displaceable breech closure, and a flexible ball curving device secured at one end thereto, substantially as described.

8. The combination with a barrel and a compressed air supply, of a displaceable breech closure, and a flexible ball curving device wrapped about said ball and secured at one end to said closure, substantially as described.

9. The combination with a barrel and a compressed air supply, of a displaceable breech closure, and a ball curving device adjustably connected to said closure, substantially as described.

10. The combination with a barrel and a compressed air supply, of a ball curving device and a breech closure carrying the same said closure being adjustable about the longitudinal axis of the barrel, substantially as described.

11. The combination with a barrel having a flanged rear end and a compressed air supply, of a ball curving device, a breech closure carrying the same, and means associated with said closure coacting with said flanged end of the barrel for maintaining the breech closure in place substantially as described.

12. The combination with a barrel and a compressed air supply, of a ball curving device, a breech closure carrying the same, and an adjustable seat for the ball carried by said closure, substantially as described.

13. The combination with a barrel and a compressed air supply, of a ball curving device, a breech closure carrying the same, and a seat for the ball carried by said closure, substantially as described.

14. The combination with a barrel and a compressed air supply, of a ball curving device, a breech closure carrying the same, a stud projecting axially from said closure, and a ball receiving cup threaded thereupon, substantially as described.

15. In a mechanical base ball thrower, the combination with a barrel and a compressed air supply, of a curving device coacting with the ball to impart a twisting movement thereto, and a breech closure mechanism having said device associated with the same, said mechanism being adjustable to vary the amount of rotation imparted to the ball and the direction thereof, substantially as described.

16. The combination with a barrel, a breech closure mounted thereupon rotatable in relation thereto, and a ball curving device carried by said breech closure working within the bore of the gun, substantially as described.

17. The combination with a barrel, a breech closure mounted thereupon rotatable in relation thereto, a ball curving device carried by said breech closure, and means for adjusting said device in said breech closure to vary the amount of rotation imparted to the ball, substantially as described.

18. The combination with a barrel and a compressed air supply, of a breech closure, means for imparting a rotary movement to the ball including a strap having its ends mounted in said closure substantially as described.

19. The combination with a barrel and a compressed air supply, of a breech closure, and a ball curving device including a flexible strap having one end fixed to said closure, substantially as described.

20. The combination with a barrel and a compressed air supply, of a breech closure a ball curving device comprising a strap having one end secured in the closure, and a free portion to be passed about the ball, and means for varying the length of said portion, substantially as described.

21. The combination with a barrel and a compressed air supply, of a ball curving device, a breech closure carrying the same including a head fitted to the end of the barrel, arms extending therefrom coacting with the ball curving device, and means for detachably securing the breech closure to the barrel, substantially as described.

22. The combination with a barrel and a compressed air supply, of a flexible strap to coact with the ball to impart a rotary movement thereto with the initial movement of the same, and a breech closure including a head, arms extending therefrom having channels to receive the ends of said strap, and means for securing the head to the barrel, substantially as described.

23. The combination with a barrel and a compressed air supply, of a flexible strap to coact with the ball to impart a rotary movement thereto with the initial movement of the same, and a breech closure comprising a head, two pairs of arms extending therefrom, the members of each pair having companion grooves therein forming guide chambers for the ends of the strap, means for forcing the members of either pair of arms toward each other to clamp the strap within the guide

chamber, and pivotally mounted arms having hooked ends engaging said barrel, substantially as described.

24. In a machine for projecting balls, the combination, with means for projecting or discharging the ball forward, of a flexible strap for causing said ball to spin or rotate on an axis transverse to its line of flight, and of means for adjusting the flexible strap to vary the angle of inclination of the axis of rotation of said ball in a plane transverse to its line of flight.

25. In a machine for projecting base balls, the combination with means for projecting or discharging the balls forward, of a flexible device engaging the ball for causing the same to spin or rotate upon an axis transverse to its line of flight, such rotation being imparted to the ball during and as a result of its forward movement, a member having said device connected thereto at one end, two pairs of arms extending rearwardly from said member having companion grooves therein forming guide chambers for said device, and means for forcing the member of either pair of arms towards each other to clamp the flexible device, substantially as described.

26. In a mechanical base-ball pitcher, a barrel, means for ejecting the ball therefrom, and removable means for engaging the ball to impart a twisting movement to the latter, transverse to its line of flight, as the result of the forward movement of the ball, said means being engaged with the ball before the latter is placed within the barrel, substantially as described.

27. In a mechanical base-ball pitcher, a barrel, means for ejecting the ball therefrom and removable means for engaging the ball to impart a twisting movement thereto, transverse to its line of flight, as the result of the forward movement of the ball, said means being designed to be passed about the ball before the latter is placed within the barrel, substantially as described.

28. In a mechanical base-ball pitcher, a barrel, means for ejecting the ball therefrom and removable means co-acting with the ball to impart a twisting movement to the latter transverse to its line of flight, said means being engaged with the ball prior to the latter's insertion within the barrel, substantially as described.

29. In a mechanical base-ball pitcher, a barrel, ejecting mechanism and a removable curving device, designed to be placed in operative position within the bore of the barrel as the ball, upon which it operates, is placed therein, substantially as described.

30. In a mechanical base-ball pitcher, a barrel, ejecting mechanism and a removable curving device operatively associated with the ball without the bore of the barrel and inserted within the bore with the ball, substantially as described.

31. In a mechanical base ball pitcher, the combination with means for projecting the ball forwardly, of means for imparting a twisting movement to the ball about an axis transverse to its line of flight, comprising a flexible strap engaging the ball, said strap being held at one end and free at its opposite end, substantially as described.

32. In a base ball curving machine and in combination, a barrel, a compressed air supply, a displaceable breech closure, and a ball curving strap fixed at one end and having a free portion within the barrel.

33. In a base ball curving machine, a barrel, an ejecting medium, and a device for frictionally engaging the ball to impart a rotation thereto as the ball is projected by the ejecting medium, said device being adjustable to vary the amount of rotation imparted to the ball.

34. In a base ball curving machine, a barrel, ball ejecting mechanism associated therewith, and a ball curving device adjustable to vary the length of the surface which coacts with the ball, whereby the amount of twist imparted to the ball may be varied.

35. In a ball curving machine, a barrel, a compressed air supply, and a strap designed to engage the ball to impart a twisting motion thereto, said strap being adjustably mounted, whereby varying lengths of the same may engage the ball for varying the amount of twist imparted to the latter.

36. In a base ball curving machine, a barrel, a compressed air supply, and a flexible ball curving device having a portion arranged within the barrel to frictionally engage the ball, said device being adjustably mounted to vary the length of the portion which engage the ball when the same is projected, whereby the amount of curve imparted to the ball by the device may be varied.

37. In a machine for pitching base-balls and in combination a barrel having the inner periphery of its bore smooth, or without a projecting part, an ejecting medium, and means independent of the barrel co-acting with the ball while the latter is within the bore of the barrel for imparting a twisting movement to the ball as the latter is projected forwardly by the ejecting medium, substantially as described.

In testimony whereof, I have hereunto signed my name in the presence of two attesting witnesses, at Washington, in the District of Columbia.

ROBT. HOWARD LAKE.

Witnesses:
HENRY E. COOPER,
E. P. GARGES.