

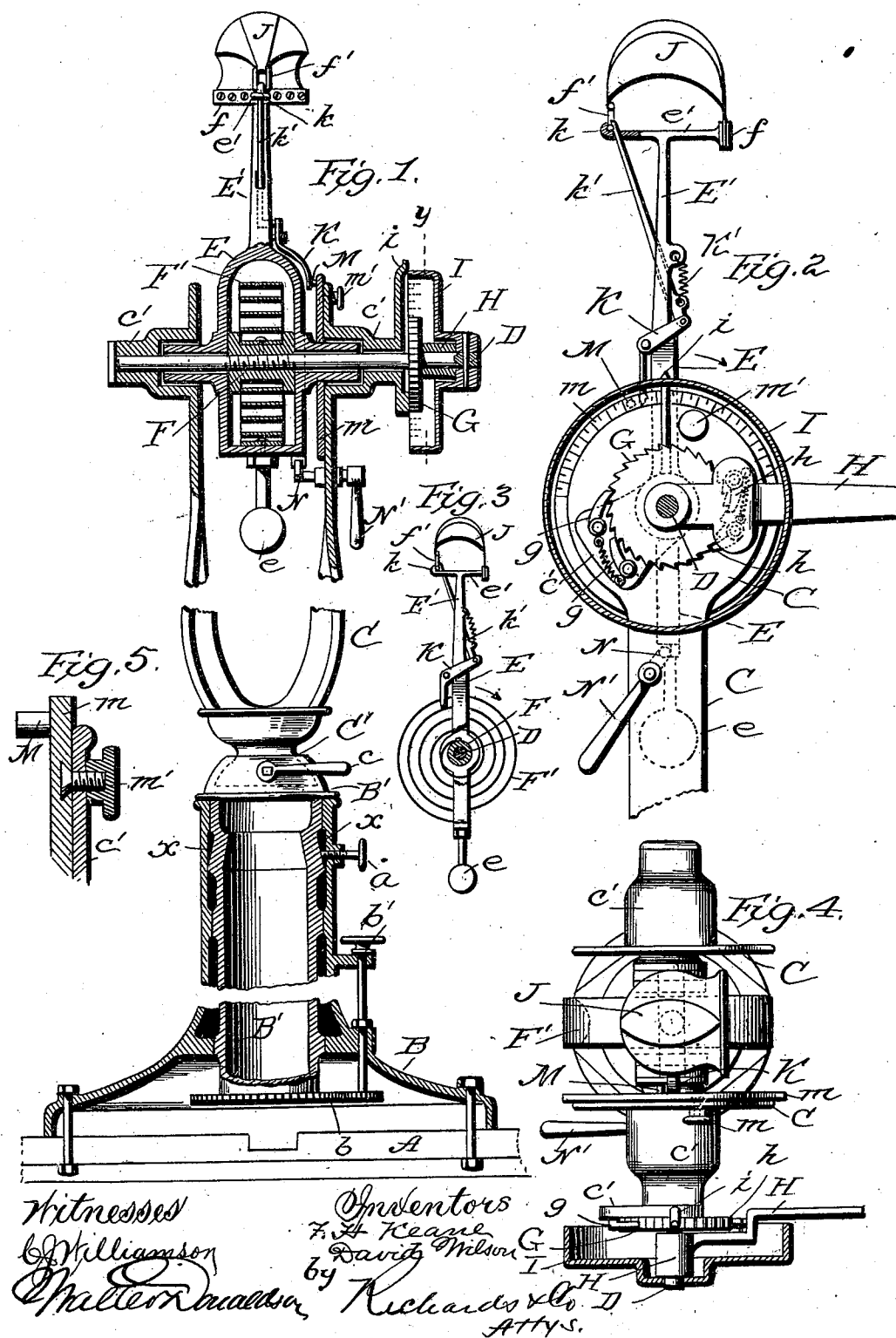
(No Model.)

2 Sheets—Sheet 1.

F. H. KEANE & D. WILSON.
BALL THROWING OR BOWLING MACHINE.

No. 502,299.

Patented Aug. 1, 1893.



(No Model.)

2 Sheets—Sheet 2.

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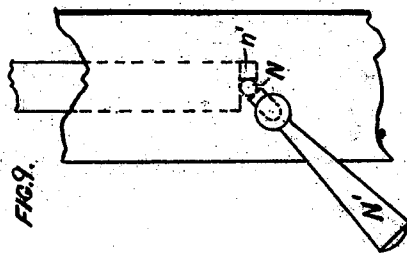


FIG. 9.

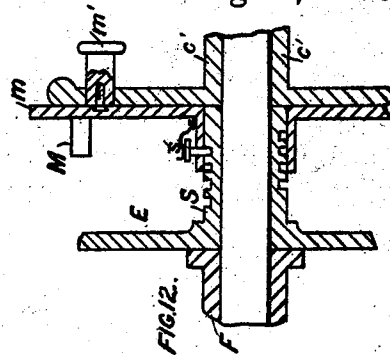


FIG. 12.

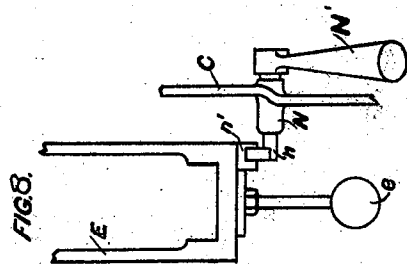


FIG. 8.

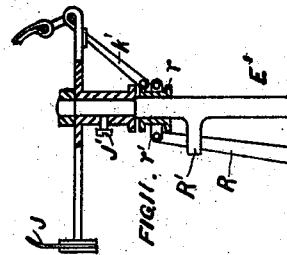


FIG. 11.

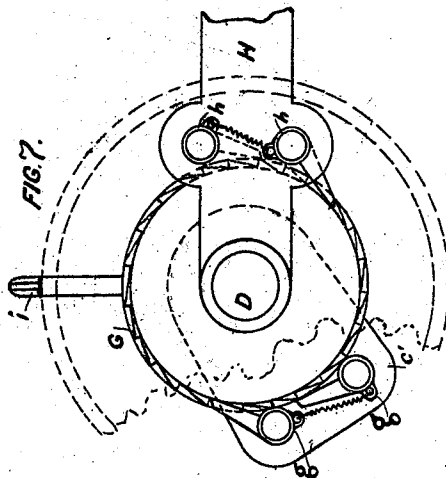


FIG. 7.

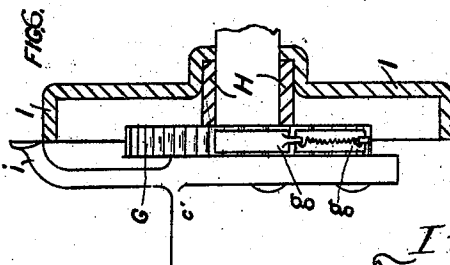


FIG. 6.

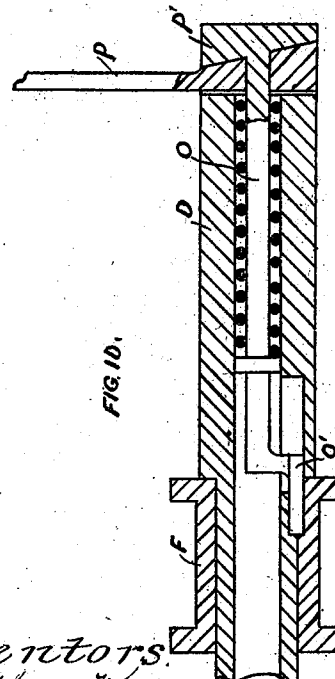


FIG. 10.

Witnesses:
C. R. Bolton
M. A. Walsh

Inventors:
Frederick Henry Keane
Daniel Wilson

By

McInerney
their Attorneys

UNITED STATES PATENT OFFICE.

FREDERICK HENRY KEANE AND DAVID WILSON, OF CAPPOQUIN, IRELAND.

BALL THROWING OR BOWLING MACHINE.

SPECIFICATION forming part of Letters Patent No. 502,299, dated August 1, 1893.

Application filed August 6, 1891. Serial No. 401,950. (No model.)

To all whom it may concern:

Be it known that we, FREDERICK HENRY KEANE and DAVID WILSON, residing at Cappoquin, in the county of Waterford, Ireland, have invented an Improved Ball Throwing or Bowling Machine, of which the following is a specification.

This invention relates to machines for throwing balls and is particularly applicable to cricketing practice as a bowling machine, by reason of the accuracy of the throw of the ball, and the simple variation in elevation and direction of the machine, by which either under or over hand bowling can be given and any desired variation in the speed, length of pitch, direction, and movement of the ball can be produced at will by the operator.

By our invention we obviate the many disadvantages existent in the bowling machines that have been used up to the present, viz:—first, excessive wear and tear; secondly, the danger owing to uncertainty of direction of aim, and third the large amount of power required to be put into the machine in comparison with that given out in propelling the ball. These disadvantages we overcome by allowing the machine to bring itself to rest after having thrown the ball instead of suddenly arresting the throwing mechanism to release the ball from its holder, thereby having to overcome some considerable resistance before it leaves the holder. The ball being mechanically and freely held and mechanically and automatically released by the throwing arm at a definite and predetermined point in its revolution, the direction in which the ball leaves the machine is perfectly certain and under the control of the operator. We can also give the ball a revolving motion round an axis within itself and can regulate and determine the position of that axis in relation to the direction of the ball and a horizontal or vertical plane as the case may be.

In order that our invention may be the better understood we now proceed to describe the same in relation to the drawings hereunto annexed reference being had to the letters marked thereon.

Like letters refer to like parts in the various figures.

Figure 1 is a sectional view of our improved bowling machine. Fig. 2, is an elevation looking from the right of Fig. 1, the end casing being in section on line Y—Y of Fig. 1. Fig. 3 is a side view of the upper part as shown in Fig. 1 looking from the right and showing the spring. Fig. 4, is a plan view of the apparatus partly in section. Fig. 5 is a part sectional view of the adjustable stop for tripping the ball releasing mechanism showing the means for securing the same to the side of the frame. Fig. 6 is a view of the shoulder or bearing carrying the index finger and the registering disk for determining the tension on the spring and also the ratchet wheel and pawls and the boss of the lever. Fig. 7 is a side view of the same. Fig. 8 is a view of the pawl or catch of the revolving frame showing its engagement therewith. Fig. 9 is a side view of the same. Fig. 10 shows a modified arrangement for effecting the same purpose as that shown in Figs. 8 and 9. Fig. 11 is a sectional view of the ball retaining device and the release mechanism adapted to be moved round the axis of its support. Fig. 12 is a view of the adjustable stop for tripping the ball releasing mechanism, arranged so as to permit the revolving frame to make one, two or more revolutions before the release mechanism is operated.

Our machine is constructed as follows: A wood block foundation A is securely pinned to the turf and forms the base upon which is bolted a metal base plate B. Within this base plate is supported the lower part of the frame B' so as to be capable of revolution therein, such revolution being conveniently effected by means of a cog-wheel *b* attached to the base thereof and the pinion operated by a hand wheel and shaft *b'* from the exterior. The frame B' may be maintained in any fixed position by means of a set screw *a* preferably engaging against an inclined face arranged around the frame B' at *x*, Fig. 1 so as to maintain it in the required position and prevent it from being disengaged from the base plate B by an upward pressure. Upon the upper part of the frame B' we mount an upper double standard frame C by means of a knuckle joint C' the said joint being locked in any desired position by a jamming screw *c*. It will

thus be seen that the whole of the machine may be revolved in a vertical axis on the base plate B and the upper part capable of a certain amount of sidewise movement in a vertical plane.

The upper ends of the standard frame C carry bearings c' in which is supported the shaft D. Upon this shaft D the carrier E with the throwing arm E' is mounted so as to revolve freely thereon. Upon the center of this shaft is fixed, preferably, by being screwed thereon, the collar F to which is attached a coiled spring F' , the outer end of this said spring being attached preferably to the end of the carrier E where the counter balance weight e is situated.

Upon the outside of the bearing c' we mount in a fixed manner the ratchet wheel G Figs. 1, 2, 6 and 7 upon the shaft D. Next to the ratchet wheel we mount loosely a hand lever H Figs. 1, 2, 3, 4 and 8 upon the said shaft carrying preferably two spring pressed pawls h Figs. 2, 4 and 7 which engage into the teeth of the ratchet wheel G. Other spring pressed pawls g, g , Figs. 2, 4 and 7 are arranged upon the side of the bearings c' in order to retain the ratchet wheel against the reaction of the spring F' in any position in which it may be placed by the hand lever H. The object of having two pawls is in order to get the same effect as if there were twice as many teeth in the ratchet wheel G.

Upon the exterior of the shaft D we rigidly attach a registering disk or collar I on which suitable numbers are engraved (dotted lines, Fig. 1) in order to register by means of the finger i the amount of tension that may be put upon the spring F' . At the end of the carrier arm E' the ball is carried and it is preferably made as light as possible in order to allow of suitable acceleration of speed to be obtained from a spring of ordinary tension.

At the end of the arm E' a cross-bar e' is situated, one end of which carries a flat plate f to which a sling of leather or other flexible material J is attached, preferably by means of screws. The other end of the sling J terminates in a metal ring f' and is retained in position by means of a hook k and a rod k' passing through a hole in the crossbar e' so as to meet the hook k . The opposite end of this rod k' is attached to the tripping mechanism which may consist of a bell crank lever K Figs. 1, 2, 3 and 4, which is pivoted upon the carrier arm E' . The rod k' may be kept in the closed position by being spring pressed by a spring K' .

Upon the side of the frame and preferably upon the bearing we mount an adjustable stop M Figs. 1, 2, 4 and 5 against which one end of the bell crank lever engages in order to trip the releasing gear. This stop M is preferably mounted upon a disk m which is capable of rotation concentric to that of the carrier or carrier arm, and may be fixed in

any definite position by a jamming nut and bolt m' Figs. 1, 2, 4 and 5 passing through the side of the frame or bearing c' and engaging in a circular dovetail slot situated in the disk or plate m Fig. 5; by this means the stop M can be fixed at any definite predetermined point in order that the mechanism shall be there released. Suitable marks or numbers may be arranged upon this disk in order to define the point at which the release is to be made as shown in Fig. 2.

In Figs. 8 and 9, we show the retaining catch or pawl which prevents the rotation of the carrier arm E, during the reinforcement of the spring F. This catch N we mount upon a spindle n on the side of the frame C, and upon this spindle the handle N' is arranged so as to operate the catch N from the outside. This catch N engages against the projection n' situated upon the end of the frame E. In Fig. 10 we show a view of a modification of this arrangement. The shaft D is made hollow at one end and carries therein, a sliding spring pressed spindle O which carries a side bolt O' working in a suitable groove in the shaft D and adapted to engage with the recess situated in the collar F which carries the spring F' .

The release of the mechanism may be effected by the action of a hand lever P attached to a cam face reacting on a cam face P' situated on the end of the spindle.

In Fig. 11 we show the ball holder adapted to be turned about the axis of the supporting arm E' . The object of this arrangement is to permit of a twisting movement being given to the ball in any particular direction when being delivered from the sling J.

The set screw J' is provided at the side of the shoulder of the ball holder to maintain the same in any definite position.

In order to provide for the operation of the releasing rod k' in any position of the ball carrier, we attach the rod k' to a sleeve r which slides freely upon the arm E' . This sleeve r is grooved, and into this groove is inserted a split ring so as to be capable of easy sliding movement one with the other. To this ring r' the rod R is attached at one end while at the other it is attached to the bell crank K, being suitably guided at the upper end by a guide R' . It is obvious that in whatever position the ball holder may be in relation to its support the tripping gear will properly operate the rod k' , in order to release the sling J.

In Fig. 12 we show a modified method of mounting the adjustable stop attached to the disk m , so as to permit of one, two or more revolutions of the carrier arm by the spring F before the tripping gear releases the ball holder in order to transmit a greater amount of energy to the ball than can be done in one revolution; this we effect by mounting the disk m carrying the stop M upon the trunnion S of the revolving frame E so as to slide side-

wise thereon. Upon the exterior of the trunnion S we form a screw thread preferably square and arrange a small spring pressed sliding stop *s* upon a shoulder projecting from the disk *m*. The jamming screw *m'* is arranged to pass freely through the side of the frame or bearing *c'*, and jam against the back face of the disk *m*. If now it is desired to allow the arm to be rotated by the spring four times before the release mechanism is tripped the sliding stop *s* is withdrawn from its engagement with the screw thread on the trunnion S and moved toward the right hand until the sliding stop *s* can engage with the fourth thread from the carrier E. When now the spring is reinforced and the carrier released and allowed to revolve the tripping arm of the bell crank lever K shown in Figs. 1 and 2 misses the stop M until some period in the fourth revolution when it shall have been drawn sufficiently toward the revolving frame E so as to come in contact with the stop M and thus release the ball. The shoulder of the jamming screw *m'*, being parallel, and fitting the hole in the side of the frame or bearing *c'*, allows the disk *m* carrying the stop to be moved backward and forward in a fixed position. When it is necessary to allow of two or three revolutions to be made before the releasing mechanism is actuated, the spring pressed stop *s* is engaged with No. 2 or 3 thread upon the frame E respectively. The end of the thread, or rather the bottom of the groove between the threads is brought gradually up to the full diameter outside in order that the stop shall be gradually pushed out of the helical groove when the necessary distance has been traveled by the disk *m* to effect the tripping of the releasing gear and thus prevent any damage to the machine during the period that is occupied after the release of the ball and the coming to rest of the parts.

We have described a flexible sling as the best means for holding the ball but may equivalently use suitable claws or fingers which may embrace the ball and be held in the embracing position by means of the rod *k'*. These fingers may be hinged on the opposite side of the cross bar *e'* to that occupied by the retaining catch.

The operation of our machine is as follows:—The ball is placed in the ball holder and retained by the link *f'* and catch or hook *k* of the sling J, being maintained under the hook *k* by the rod *k'*. The arm E is placed vertical with the ball upward so that the catch or pawl N engages with the small projection *n'* on the revolving frame E. The spring F is then wound up by means of the lever H through the pawls *h* engaging with the teeth on the ratchet wheel G such reinforcement of the spring being retained by the pawls *g g*. The stop M on the disk *m* is then adjusted in the particular position, at which it is desired to trip the releasing mechanism in order

to release the ball. When so adjusted the jamming nut M' is screwed up to retain the disk *m* in that position. The amount of tension on the spring may be shown by any suitable marks or figures arranged around the shoulder or flange on the registering disk I in connection with the finger *i*. When now the handle N' is lifted the pawl or catch N moves away from the stop *n'*, the spring F revolves the frame and during such revolution the one arm of the bell crank K on the carrier E comes in contact with the stop M operating the rod *k'* and thus releasing the catch or link *f'* of the sling J, the ball forcing the sling back in its projection from the machine. The carrier E' and ball holder continue to revolve until brought to rest by the friction of the mechanism such being permitted by the ratchet wheel G moving in the direction so as to lift the pawls *g, g, h, h* over the teeth during the revolution of the frame E. As the retaining sling hugs the ball during its retention in the holder when released the sling gives to the ball a rotary motion round an axis within itself and the position of this axis may be adjusted by the rotation of the ball holder about the axis of its support as shown in Fig. 11. By this means we are enabled to bowl a breaking ball with our machine, or to give a backward or forward twist upon the ball relative to the direction of its path.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, what we claim is—

1. A ball throwing or bowling machine consisting of a thrower arm adapted to rotate in a vertical plane about an axis, a spring actuating said thrower arm, a ball holder having mechanical release adjustable to any definite point of the revolution or revolutions, a movable retaining catch against which the spring is reinforced, and a frame carrying the axis of rotation, adapted to be adjustably rotated on a fixed base plate round a vertical axis.

2. In a ball throwing or bowling machine the combination of a flexible ball holder and a locking bar; with a release device carried with the locking bar upon thrower arm or arm carrier, and an adjustable trip or tappet mounted upon a regulator disk or drum or other part of the frame to operate the said release device at any definite and predetermined point in the revolution of the carrier arm.

3. In a ball throwing or bowling machine an adjustable trip engaging by an adjustable stop with a screw thread on a sleeve on the carrier arm so as to be moved sidewise to an adjustable extent automatically by the carrier arm in combination with the ball release device to permit the carrier arm to make one or more revolutions before the tripping of the ball release mechanism.

4. In a ball throwing or bowling machine
a ball holder adapted to be moved and ad-
justed about the axis of its support having a
grooved ring pivotally attached to the lock-
5 ing bolt of the catch of the ball holder and
sliding upon the carrier arm in combination
with a ring engaging in the said grooved ring
and pivotally attached to the rod of the trip-
ping device, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

FREDERICK HENRY KEANE.
DAVID WILSON.

Witnesses:

WILLIAM C. STACEY,
DAVID MAGEE.