L. STEINBERGER.

NOISELESS, SMOKELESS, RAPID FIRE GUN.

APPLICATION FILED FEB. 27, 1917.

1,316,397.

Patented Sept. 16, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

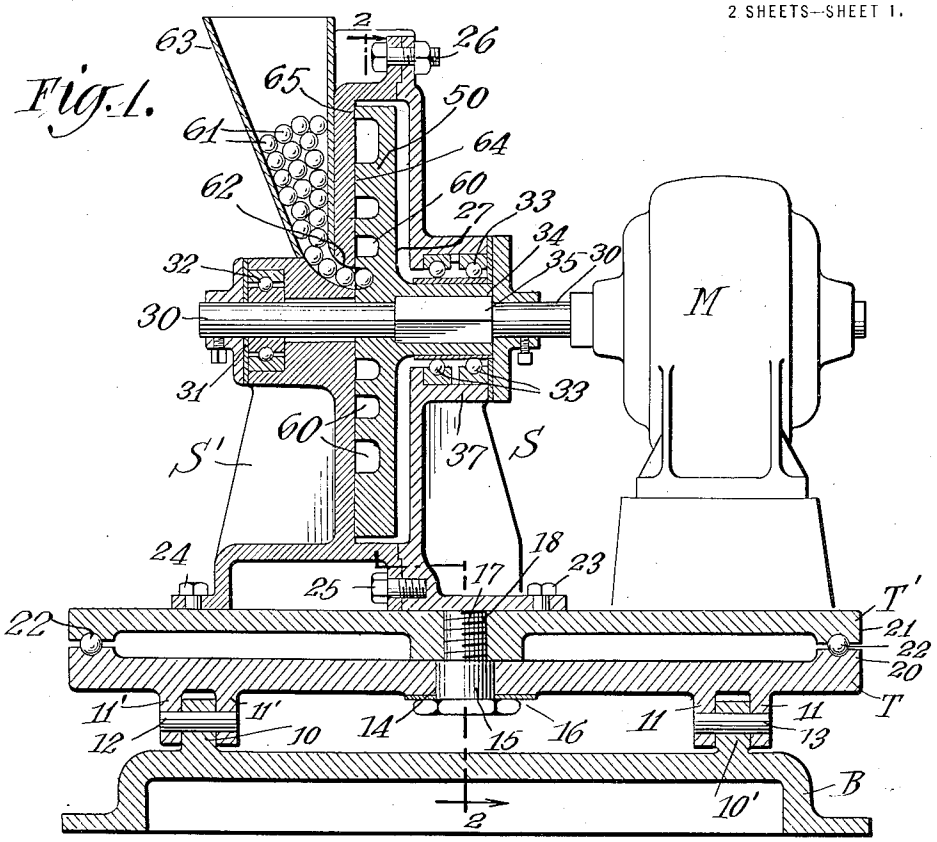


Fig. 2.

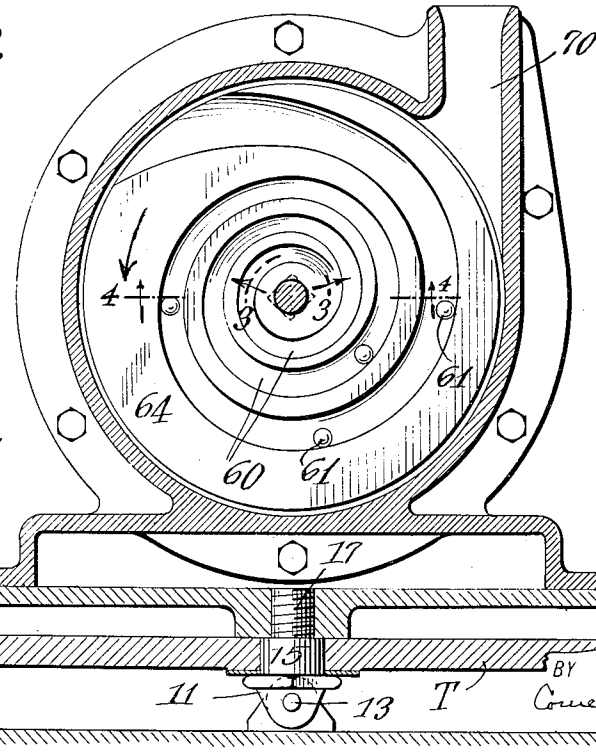


Fig. 3.

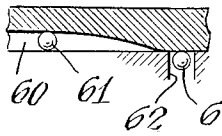
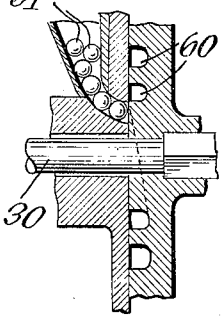


Fig. 4.



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Witness

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2 SHEETS—SHEET 2.

Fig. 5.

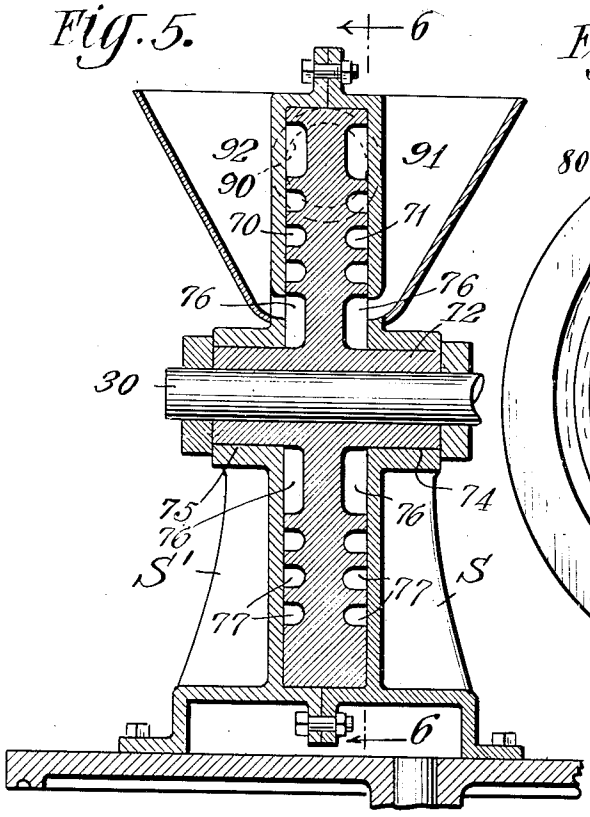


Fig. 6.

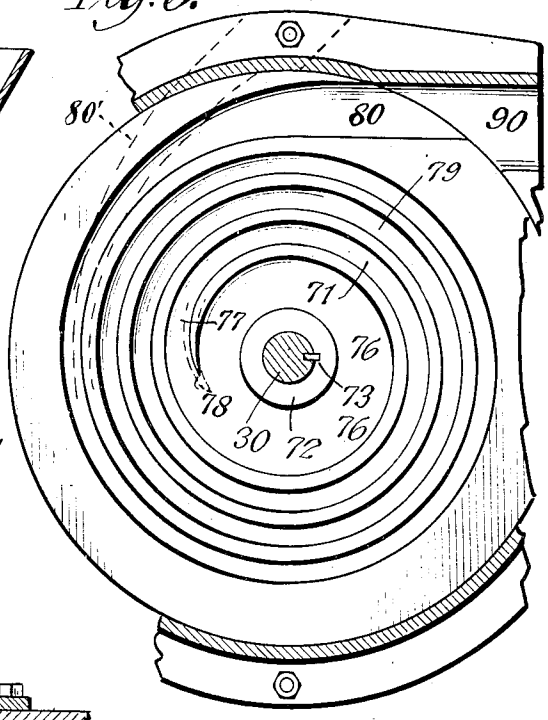


Fig. 8.

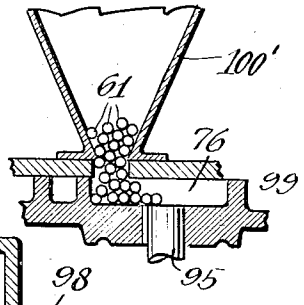


Fig. 7.

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UNITED STATES PATENT OFFICE.

LOUIS STEINBERGER, OF BROOKLYN, NEW YORK.

NOISELESS, SMOKELESS, RAPID-FIRE GUN.

1,316,397. Specification of Letters Patent. Patented Sept. 16, 1919.

Application filed February 27, 1917. Serial No. 151,159.

To all whom it may concern:

Be it known that I, LOUIS STEINBERGER, a citizen of the United States, and a resident of the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Noiseless, Smokeless, Rapid-Fire Guns, of which the following is a full, clear, and exact description.

My invention relates to improved means for throwing or hurling shots, bombs, grenades, base-balls, etc., at any predetermined velocity without appreciable noise and without the use of gun-powder, and it consists essentially in a centrifugal thrower or hurler operated by a motor, or any power generating device.

In its simplest form, the structure comprises a single motor and a single centrifugal thrower or hurler to be operated by the motor, the said thrower or hurler being provided with either a single or double barrel for releasing and directing the trajectory of the shots.

My invention also comprises a structure embodying a single motor and a plurality of centrifugal throwers or hurlers, each of which is provided with a single or double barrel, the centrifugal thrower or hurling elements being connected to or mounted upon the shaft of the motor.

The thrower or hurler member may be arranged either in a plane perpendicular to the plane of the base or in a plane horizontal thereto, and it consists essentially of a plate having a groove cut either in one or both faces thereof, the shape of the groove being that of a curve which may be broadly defined as that of a volute. More specifically the volute curve constitutes only a portion of the entire curve, for the reasons that at the center the curve is practically circular for nearly an entire revolution and at the periphery it takes the form of the path which the projectile will normally take upon being thrown from the hurler.

I have illustrated and will hereinafter more particularly describe two different constructions pertaining to the center of the hurler plate at the point where the projectile enters the groove.

The objects of this invention will be made clear from the sub-joined description and claims.

Referring to the drawings;

Figure 1 is a view in section of one form of hurler or thrower with the motor shown in elevation.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a sectional detail on line 3—3 of Fig. 2.

Fig. 4 is a sectional detail showing a construction similar to that shown in Fig. 1, the hurler or throwing element, however, being in a different axial position from that shown in Fig. 1.

Fig. 5 is a section of a double hurler shown in substantially the same position as the hurler in Fig. 1, the grooves, however, in the faces of the hurler, being of different form and construction.

Fig. 6 is a sectional view partly broken away on line 6—6 of Fig. 5.

Fig. 7 is a vertical section of a structure provided with a single faced hurler placed in a horizontal position, the motor being in elevation.

Fig. 8 is a section of a detail showing a modified construction of a feeding hopper from that shown in Fig. 7.

Referring to the drawing in which like reference characters refer to like parts;

B is a base upon which the gun mechanism is supported, T is a table supported by means of horizontal pivots to the base B, T′ is a turn-table mounted upon the table T so arranged and constructed as to turn on a vertical pivot. M is a suitable electric motor fixedly mounted upon the turn-table T′. Also mounted upon the turn table T′ are stands S and S′ for supporting the hurler or thrower mechanism and the magazine for the reception of and for feeding the projectile to the throwing or hurling element.

It is my object to mount the hurler or thrower mechanism so that it may be trained to assume any desired direction of fire. To accomplish this purpose, I provide perforated lugs 10 and 10′ extending upward from the base B and two pairs of duplicate lugs 11 and 11′ extending downwardly from the under-side of the table T′ so fitted as to straddle or embrace the lugs 10 and 10′. These coöperating lugs are pivoted to each other by the pivots 12 and 13 as shown. The table T is held in its adjusted position with respect to the base B by means of a screw-threaded rod 2 pivotally connected by a link 3 to the table T, the screw-threads of the rod 3 engaging a nut 4 fitted to turn on

the base B, but without reciprocating movement as shown. The nut is provided with an operating handle 5, for easy manipulation.

At the center of the table T is a hole 14 through which passes a bolt 15 provided with a head 16 and a screw-threaded shank 17, engaging with screw-threads in a hole 18 bored through the center of the plate T'. Oppositely extending flanges 20 and 21 are provided at the peripheries of the plates T and T' and in these flanges are seats or grooves for the reception of roller bearing balls 22 in order to permit the turning of the plate T' upon the plate T with as little friction as possible.

Extending upwardly from the plate T' are suitable castings to form a support for the motor shaft 30. These castings are secured to the table T' by bolts 23 and 24 and to each other by bolts 25 and 26. The faces of these castings are dished out to provide a space 27 for the reception of the disk portion of the hurler or thrower element 50.

The motor M is provided with a shaft 30, which shaft at one end rests in bearings in the stand S' which is preferably provided with a nest of anti-friction ball bearings 32. The hub 34 of the hurler 50 extends for a substantial distance along the shaft and is keyed thereto as at 35 throughout the length of the hub. Any effective key may be used for this purpose, but I have shown a portion of the shaft 35 which is rectangular in cross section and which engages with a similarly shaped axial opening through the hub so that the hurler will turn with and therefore will be turned by the motor shaft 30. The hub of the hurler is mounted with roller bearings 33 which closely fit in the space between the hub and a sleeve 37 of the stand S in order to allay friction. To avoid wear the roller bearings will rotate around a hardened metal sleeve fitted to the outside of the hub. The hurling element as shown in Figs. 1, 2, 3 and 4 is provided on its face opposite to the elongated hub with a substantially volute groove 60 for the reception of the projectiles 61 as they enter said groove from the outlet 62 of the magazine 63 as shown. The grooved face 64 of the hurler fits closely against the smooth face 65 of the stand S' so that the extremities of the groove are open only at the central portion and at the periphery of the hurler. In this particular construction, the central part of the grooved face is flush with the plate 65 of the stand and the groove which is of sufficient width to receive the projectile gradually attains its full depth along an inclined surface through an arc of about 45°. The curve then follows a curve which is substantially that of a volute until the periphery of the hurler is reached when the curve of the groove takes a form which lies substantially in the path taken by the projectile, when it is hurled or thrown from the centrifugal hurling element.

I have provided a muzzle portion 70 which may extend in any suitable direction from the cavity in which the hurler revolves.

In the construction shown in Fig. 5, I provide curved grooves 70 and 71 in the opposite faces of the hurling element. The shape of the groove in both faces is the same and therefore it is only necessary to describe the groove in but one face of the hurling element in Fig. 5. It should first be explained that the hurling element is provided with a hub 72 which extends a substantial distance on each side of the center and this hub is splined at 73 to the motor shaft 30, the entire structure being journaled at 74 in the stand S and at 75 in the stand S'. The face of the hurling element is cut away for a distance from the hub greater than two diameters of the projectiles to be fired, and therefore leaves an open space 76 of suitable area for the reception of a plurality of the projectiles. The groove 77 begins at the knife-edge point 78 the latter forming a wall between the space 76 and the groove 77. The said groove gradually decreases into a groove of normal width 79 which continues in the form of a volute until the groove reaches the periphery of the hurler at 80, at which point the groove is cut to substantially follow the curve of the trajectory of the projectile as it leaves the hurler. In this structure there are two grooves in which the projectiles are placed and a single barrel 90 for the reception of the projectiles as they leave both grooves, 91 and 92 are a pair of feeding magazines so constructed that the projectiles enter one by one into the space 76 at the center of the hurling disk.

In Fig. 7, I show a motor M, the shaft 30 of which is provided with a beveled gear 93 which meshes with a beveled gear 94 on the vertical shaft 95 projecting through the plate 96 which is secured in any suitable manner to the supporting brackets 97 and 98. The hurler is splined to the shaft 95 and rests upon ball-bearings as shown to allay friction. A dish-shaped plate 97 is secured at its flanges 98 to the plate 96 and its inner face is adjacent to the grooved face of the hurler 99 which assumes a horizontal position as shown in Fig. 7. Mounted upon the plate 97 is a feeding hopper 100 supported by brackets 101 and 102, the mouth of which is so arranged that the projectiles will fall by gravity into the space 76 so as to be in a position to enter the groove when thrown out to the periphery of the space 76 by centrifugal force.

In Fig. 8, I have shown a detail of a structure which is similar in all respect to that shown in Fig. 7 with the exception that the delivery end of the feeding hopper 100'

is of sufficient width to permit the feeding into the groove of a number of projectiles side by side.

In operation the hoppers or magazines are filled with projectiles and the hoppers are kept supplied during the firing. The motor is then set in motion thereby revolving the hurling or throwing element, at any speed desired. The projectiles will then fall by gravity to the center of the hurling plate or element and they will either enter serially the inner end of the groove as it opens to receive a projectile at each revolution of the motor, when a hurling structure such as shown in Figs. 1 and 4 is used, or they will enter the cavity at the center of the face of the hurler in sufficient number to keep that cavity full during the firing when a hurling structure such as shown in Figs. 5 and 8 is used. The projectiles will enter the grooves in both cases and be expelled therefrom at great velocity, by means of centrifugal force.

The projectiles will be fed from the magazine either serially or in numbers, depending on the size of feed opening of the hopper or magazine.

A single motor is effective for operating a plurality of either single or double hurlers or throwers, all of which may be situated either at one side or on both sides of the motor. It is of course obvious that my invention is not restricted to the use of the particular form of motor shown, but any suitable form of motor or power mechanism producing the required number of revolutions of the thrower or hurler member, will come within the scope of my invention.

The motor and the hurler may be so proportioned and the motor regulated to attain such a speed that the hurler will throw, hurl or fire 2500 to 7,000, shots or more per minute.

Oil or water may be fed into the hurler for lubricating and cooling the revolving parts and the body of the gun. The position of the terminal inlet for the shots as shown in Fig. 2, may be so fixed that the shots will be propelled vertically, and hence the gun will be useful for shooting at aeroplanes, balloons, and other air-craft.

As shown in Fig. 6, the terminal outlets for the shots may be located at different levels, that is one of the outlets as shown in dotted lines at 90′ may be so positioned with relation to the groove 80′ in one face of the centrifugal hurler, that the gun will shoot high and the other outlet as shown in full lines at 90 may be so positioned with relation to the groove 80 of the other face of the hurler so that the gun will shoot lower.

From the above description, it is readily seen that the gun may constitute a single unit, in which one motor and one centrifugal thrower having a single barrel or muzzle for directing the course of the shots may be utilized and again it may consist of a motor and a centrifugal thrower provided with a double barrel for releasing and directing the trajectory of the shots. Again the structure may comprise a single motor and a plurality of centrifugal throwers single or double barreled connected to or mounted upon the shaft of the motor either at one side of the motor or at both sides of the motor.

It is to be understood that I do not limit myself to the particular shape or form of any part shown, neither do I limit myself to the precise arrangement of the parts with respect to each other.

It is to be further understood that the above description and drawings are merely illustrative, and that the invention is not to be limited in any respect, except as defined in the sub-joined claims.

Having now described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a device of the class described, a shaft, a plate fixedly secured thereto at the center thereof, a substantially volute groove in the face of the plate extending from a point near to the center of the plate to its periphery, the face of the central portion of the plate being flush with the face of the portion of the plate forming the walls of the groove, means for closing the open side of the groove and means for turning the shaft.

2. In a device of the class described, a hurling element provided with a substantially volute groove in the face thereof, the entire central portion of the face being in the same plane with the outer faces of the portions forming the walls of the groove.

3. In a device of the class described, a hurling element containing a substantially volute groove in each face, the center of the hurling element immediately surrounding the hub being provided with cavities each of the same depth as the grooves.

4. In a device of the class described, a shaft, a hurling element fixedly secured thereto, a substantially volute groove in the face thereof, a means for covering the open side of said groove, said hurling element having a cavity in its face surrounding the hub, said cavity being of a depth substantially equal to that of the groove and having a diameter substantially larger than the width of the groove, a funnel or magazine situated adjacent to the cavity, the inner extremity of the said funnel communicating with the cavity and means for turning the shaft.

5. In a device of the class described, a shaft, a plate fixedly secured to the shaft, said plate having a central depression in the face thereof, and a substantially volute groove extending from the depression to the outer edge of the plate, a funnel magazine

for the reception of projectiles adjacent the central cavity, the inner end of the funnel being of sufficient width for the simultaneous passage of a plurality of projectiles, the inner end of the magazine funnel communicating with the central cavity and means for turning the shaft.

6. In a device of the class described, a base, a plate horizontally pivoted to said base, a second plate vertically pivoted to the first mentioned plate, a stand secured to the second plate, a centrifugal hurler rotatably mounted on the stand and means for rotating said hurler.

7. In a device of the class described, a disk shaped hurling element, each face of which is provided with a volute groove for the reception of projectiles, said grooves extending from the center to the periphery of the disk, the said grooves being arranged with respect to each other so that similar points in each groove will be situated at different radial positions.

Signed at the borough of Manhattan, city, county and State of New York, this 26th day of February, 1917.

LOUIS STEINBERGER.

In presence of—

SARAHETLE SMITH,

ISABEL R. RICHARDS.