E. T. MOORE AND S. SINGER.

FEEDING BULLETS AND THE LIKE FROM HOPPERS.

APPLICATION FILED AUG. 9, 1918. RENEWED AUG. 1, 1919.

1,332,993. Patented Mar. 9, 1920.

Fig. 1.

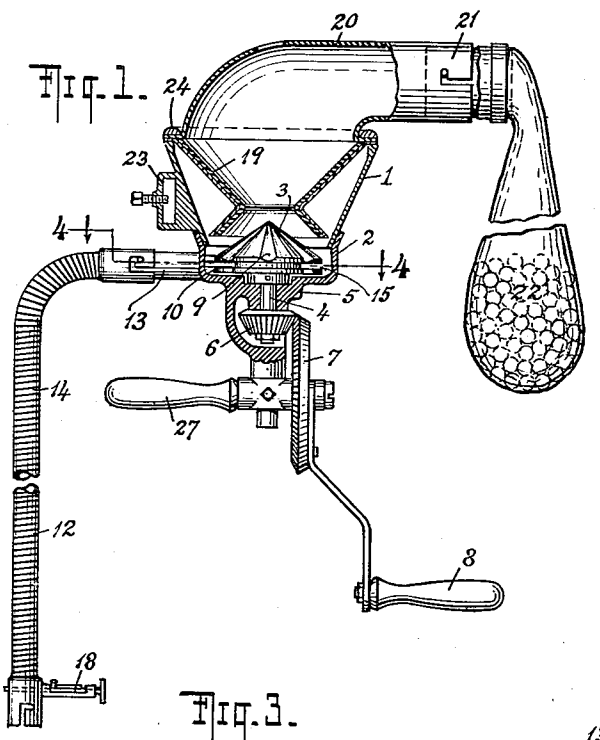


Fig. 2.

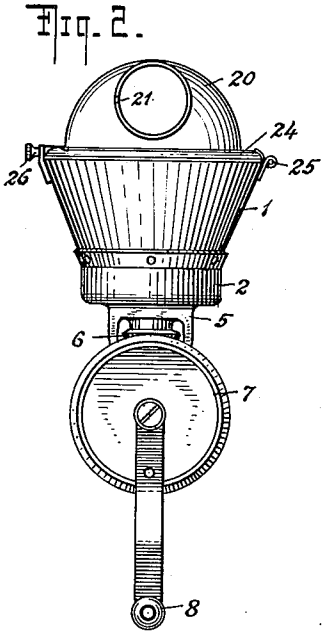


Fig. 3.

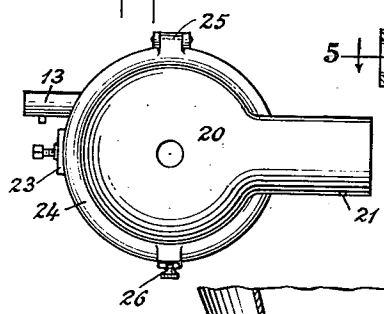


Fig. 4.

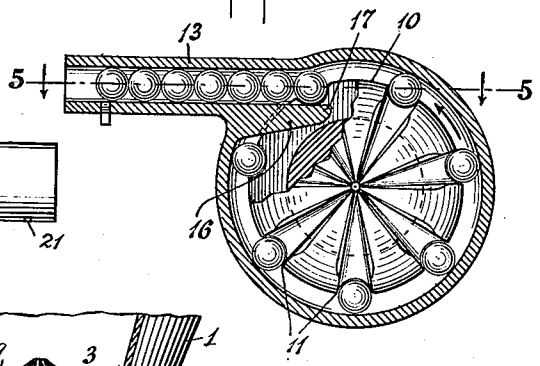
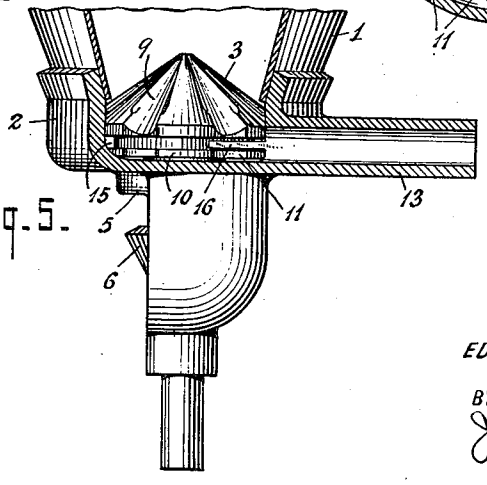


Fig. 5.



WITNESSES

G. V. Rasmussen

INVENTORS
EDWARD THOMAS MOORE
SAUL SINGER
BY
Joseph Treanor & McNair.
THEIR ATTORNEY

UNITED STATES PATENT OFFICE.

EDWARD THOMAS MOORE, OF PASSAIC, NEW JERSEY, AND SAUL SINGER, OF CEDARHURST, NEW YORK, ASSIGNORS TO AERO TANK MACHINE GUN CO., INC., A CORPORATION OF NEW YORK.

FEEDING BULLETS AND THE LIKE FROM HOPPERS.

1,332,993. Specification of Letters Patent. Patented Mar. 9, 1920.

Application filed August 9, 1918, Serial No. 249,200. Renewed August 1, 1919. Serial No. 314,729.

To all whom it may concern:

Be it known that we, EDWARD THOMAS MOORE and SAUL SINGER, both citizens of the United States, residing, respectively, in the city and county of Passaic, State of New Jersey, and at Cedarhurst, Queens county, State of New York, have invented certain new and useful Improvements in Mechanism for Feeding Bullets and the like from Hoppers, of which the following is a specification.

Our invention relates to mechanism for taking bullets or the like from a hopper or magazine containing such articles in bulk and feeding or supplying them one by one to a gun or other suitable device.

The object of our invention is to provide a mechanism of the class described which shall deal with the bullets or other articles which the hopper contains, and which are supplied to the hopper in bulk, one after the other and feed them to the gun or other device, or merely from the hopper, positively and certainly and without interruption or jamming.

A further object of the invention is to provide a mechanism of the class described such that no bullets or other articles shall leave the hopper except when the feeding mechanism is operated.

Our invention will be found particularly useful in connection with centrifugal machine guns where it is necessary to feed large numbers of bullets in rapid succession to the gun. In the prior art, great difficulty has been experienced in thus supplying bullets to the gun from a hopper owing to the tendency of the bullets to jam between the hopper and the gun.

With our improved mechanism no jamming is possible and the bullets are positively fed in rapid succession as long as the mechanism is operated and there are bullets remaining in the hopper.

While our invention has been primarily designed as a means of feeding bullets to a centrifugal machine gun, and while the specific embodiment herein described and shown is for such purpose, it may, nevertheless, be advantageously adapted to and employed in other fields, as *e. g.*, for feeding baseballs in various games, for feeding bottle caps or corks to bottling machines and in bottling operations, and for other like purposes.

Our invention will be better understood by referring to the accompanying drawings in which Figure 1 represents a side view, part elevation, of a preferred embodiment of our device; Fig. 2 represents an end view, taken from the right of Fig. 1, with the flexible bullet bag or receptacle removed; Fig. 3 represents a view, taken from the top of Fig. 1, the bag and feed tube being removed; Fig. 4 represents a section taken along the line 4—4 of Fig. 1; and Fig. 5 represents a section, part elevation, taken along the line 5—5 of Fig. 4.

In the drawings the hopper and feed mechanism proper are shown embodied in an assembled unitary device adapted to be attached to or disattached from a centrifugal gun of the type shown in our co-pending application entitled "Centrifugal machine guns" filed June 20, 1918, Serial No. 240943.

Briefly described, our invention comprises a hopper having preferably but not necessarily, upwardly and outwardly flaring walls and an axially revoluble circular bottom, the upper surface of said bottom being centrally and upwardly tapered and provided with spaced radial channels or grooves which deepen and widen as they leave the center and which terminate in vertical grooves formed in the peripheral edge of the bottom. The hopper wall is spaced from this bottom edge so that a bullet which rolls down a radial groove will enter a corresponding vertical groove and be thus held between the edge and the hopper wall and be carried around with the revolving bottom until said bullet strikes a suitably located deflector which turns it outwardly into a feed tube or conveying conduit leading to the breech of the gun.

More particularly and referring to the drawings, the hopper 1, is formed at the bottom so as to provide a shallow cup shaped recess whose rim, 2, preferably converges slightly toward the axis of the hopper. In this cup is fitted a distributer 3, having a central driving axis, 4, mounted in a bearing, 5, and provided with a miter gear, 6, by means of which the axis, 4, and distributer 3, is adapted to be revolved in the cup. Miter gear 6, is meshed with a similar gear, 7, having an operating handle, 8.

The top surface of the distributer, 3, is

conical, being tapered centrally and upwardly, and is provided with spaced radial grooves or channels, 9, which, beginning at the center, gradually widen and deepen as they approach the outer edge, 10. This outer edge, 10, is vertical and provided with grooves or channels, 11, having a depth preferably equal to about half the diameter of the bullets which are to be fed. The outer ends of channels, 9, and the upper ends of channels, 11, intersect.

The vertical height of channels, 11, at the edge of the distributer, is preferably about equal to the diameter of the bullets. The edge of the distributer is spaced from the inner surface of rim, 2, by about half the diameter of the bullets.

Rim, 2, has a feed tube or conveying conduit 12, opening therethrough. This feed tube comprises a short inner section 13, preferably formed integral with the rim and having a direction, as it opens into the rim, substantially tangential thereto; and an outer flexible section 14, joined to section, 13, by a bayonet or other suitable joint at one end, and adapted to be joined by a similar joint at the other end to the breech or loading mechanism of the gun.

The central plane of the outer edge, 10, of the distributer 3, is provided with a deep groove, 15, in which there is disposed, but so as not to touch the distributer at any point, a deflector or feather 16. This deflector is supported from any convenient part of the cup of which the rim, 2, forms a part and has its front edge, 17, so positioned that, as a bullet is carried around (in the direction of the arrow, Fig. 4) by a vertical groove, 11, of the distributer, it will, when it comes opposite the mouth of the feed tube, meet said edge and be deflected by it into the feed tube.

The feed tube is provided with a shut off, 18, comprising a pin adapted to be either thrust across the center of the tube so as to prevent the movement of bullets therethrough; or withdrawn so as to permit the movement of bullets therethrough.

Hung from the upper inwardly flanged edge of the hopper is a bullet retainer, 19. This may, preferably, be made of comparatively thin sheet material and comprises two oppositely flared but connected cones, the bottom and smaller cone having its inner surface substantially parallel with the conical top surface of the distributer and spaced therefrom by approximately a distance not much greater than the diameter of the bullets. Bullets fed into the upper cone, therefore, will spread out over the conical surface of the distributer between it and the surface of the lower cone and will be prevented by the lower cone from rebounding from the distributer, this tendency to rebound being greatly accentuated by the high speed at which the distributer is being rotated during the operation of the invention, as will later be described.

Bullet retainer, 19, while preferable, is, however, by no means essential to our invention.

A hood or cover, 20, fits over the top of and closes hopper, 1, having outturned bottom flanges which rest upon the flanges from which hangs bullet retainer, 19. Opening into hood, 20, at one side and connected therewith by a bayonet or other preferred joint, 21, is a flexible bag, 22.

Hopper, 1, is provided with a clamp, 23, by means of which our mechanism as a whole may be attached to the frame of the gun in connection with which it is intended to be operated.

A locking ring, 24, is hinged to the hopper at 25, and clamps the flanges of the hood and of the bullet retainer against the top of the hopper. It is locked by locking device 26.

The operation of our invention is as follows: The bag, 22, is removed, filled with bullets, and replaced. It is then lifted so that a supply of bullets will run therefrom into the bullet retainer, 19; from this supply some will enter and fill in the space between the distributer surface and that of the bottom cone. Bullets will lie in the grooves, 9, and in each of the vertical grooves, 11. The distributer being now revolved by the handle, 8, the bullets in grooves, 11, will be swept around in the rim, 2, and will successively meet the edge, 17, of deflector, 16, and be forced into the feed tube, 12. As a bullet thus leaves a groove, 11, its place will be taken by another bullet lying in the intersecting groove, 9. This operation will continue as long as there are bullets in the bullet retainer. From time to time the bag, 22, should be lifted so as to insure that a sufficient supply of bullets is thus kept in the retainer. When the bag, 22, is emptied it may be removed and refilled without stopping the mechanism.

In operating the device, the operator may steady himself by grasping the steadying handle, 27.

Since each bullet is positively held in its vertical groove, 11, it will, when it meets the deflector, 16, be positively forced into the feed tube, 14. If, therefore, there is a sufficient supply of bullets, it follows that the feed tube will always contain a column thereof which is being pushed outwardly by the action of the mechanism. The mechanism may, therefore, be placed below the level of the gun breech without interfering with its operation since each bullet will be positively lifted to the breech.

Instead of operating the mechanism by means of the handle, 8, the same may obviously be driven from any suitable source of power. When used in connection with

a centrifugal gun, the same power source used to drive the gun may be used to drive the mechanism of this invention.

The feeding may be instantly stopped by ceasing to revolve the distributer since, obviously, no bullet can enter the feed tube until it is brought opposite the opening thereof by the movement of the distributer. Of course, if the feed mechanism is higher than the breech, any bullets actually in the feed tube, will pass therefrom by gravity, but this can be prevented by use of the shut off, 18.

Hood, 20, and bag, 22, may of course, if preferred, be omitted and bullets fed directly into the hopper or into the bullet retainer as the case may be.

The dimensions and arrangement of parts may be varied widely without departing from the spirit of our invention. They must, obviously, be varied, where the size or shape of the article to be fed itself varies. But even for bullets of the same size, many changes may be made as *e. g.*, in the angle of the distributer cone and of the bullet retainer, in the diameter of the distributer, in the number of its radial and vertical grooves, and the like.

Other changes will also occur to those skilled in the art.

Having described our invention, we claim:

1. In a device of the character described, a hopper for receiving in bulk the articles to be fed, a revoluble distributer having a conical top constituting the bottom of the hopper, the conical surface being provided with radial grooves which gradually widen and deepen as they approach the bottom edge which is vertical and spaced from the inner surface of the hopper and provided with vertical grooves intersecting the radial grooves, and a feed tube leading from the hopper adjacent said bottom edge so that, as the distributer is revolved, the articles are fed successively into the feed tube.

2. In a device of the character described, a hopper for receiving in bulk the articles to be fed, a revoluble distributer constituting the bottom of the hopper and having a vertical edge spaced from the hopper wall by a distance less than the diameter of the articles, said edge being further provided with vertical grooves to receive the articles singly, a feed tube leading from the hopper adjacent said vertical edge, and a deflector fixedly held with respect to the hopper and having an edge adjacent to the mouth of the feed tube extending across the path of the vertically grooved edge so as to engage the articles one by one as they are revolved by the distributer and cause them to enter the feed tube.

3. In a device of the character described, a hopper for receiving in bulk the articles to be fed, a feed tube leading therefrom, a revoluble distributer constituting the bottom of the hopper and having a conical top surface, said distributer being provided with means for engaging the articles singly and moving them successively into the feed tube, and a bullet retainer comprising an upper receiving portion and a lower portion spaced from the conical surface of the distributer by a distance substantially equal to the diameter of the articles.

4. In a device of the character described, a hopper for receiving in bulk the articles to be fed, means for engaging the articles singly and feeding them from the hopper, and a flexible bag having its mouth normally connected with the mouth of the hopper so as to constitute a completely closed receptacle therewith, the bag being adapted to contain a greater supply of the articles than can be held by the hopper so that the hopper may be refilled from time to time by raising the bag.

5. In a device of the character described, a hopper for receiving in bulk the articles to be fed, a revoluble distributer constituting the bottom of the hopper and having a vertical edge with vertical grooves to receive the articles singly and retain them as the distributer is revolved, said distributer edge also having an annular groove, a feed tube leading from the hopper adjacent said vertical edge, and a deflector fixedly held with respect to the distributer and projecting into the annular groove adjacent the mouth of the feed tube.

In testimony whereof we have hereunto set our hands.

EDWARD THOMAS MOORE. [L. S.]
SAUL SINGER. [L. S.]