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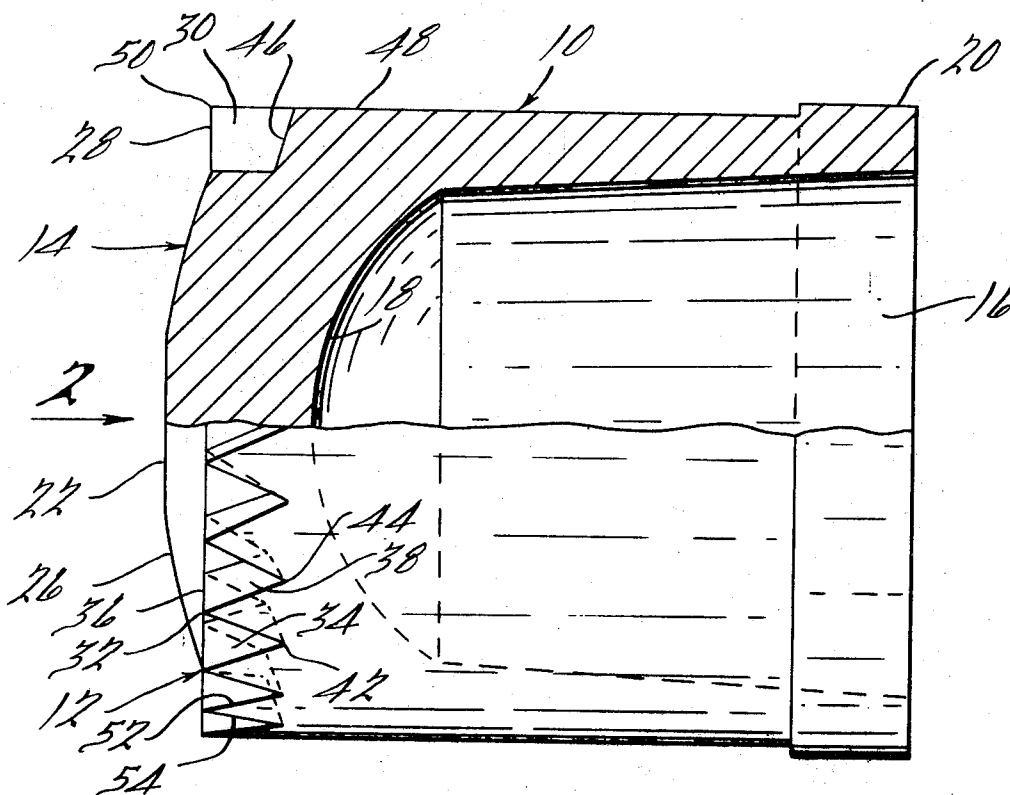
[50] Field of Search..... 102/41,
 92.7

[56] **References Cited**
UNITED STATES PATENTS
 1,122,738 12/1914 Gully..... 102/92.7
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[54] **PROJECTILE WITH TARGET CUTTING MEANS**
5 Claims, 2 Drawing Figs.

[52] U.S. Cl..... 102/92.7
 [51] Int. Cl..... F42b 11/18

ABSTRACT: There is herein disclosed a projectile having target cutting means comprising a multiple edge serrated peripheral cutting rim located closely adjacent the front of the projectile.



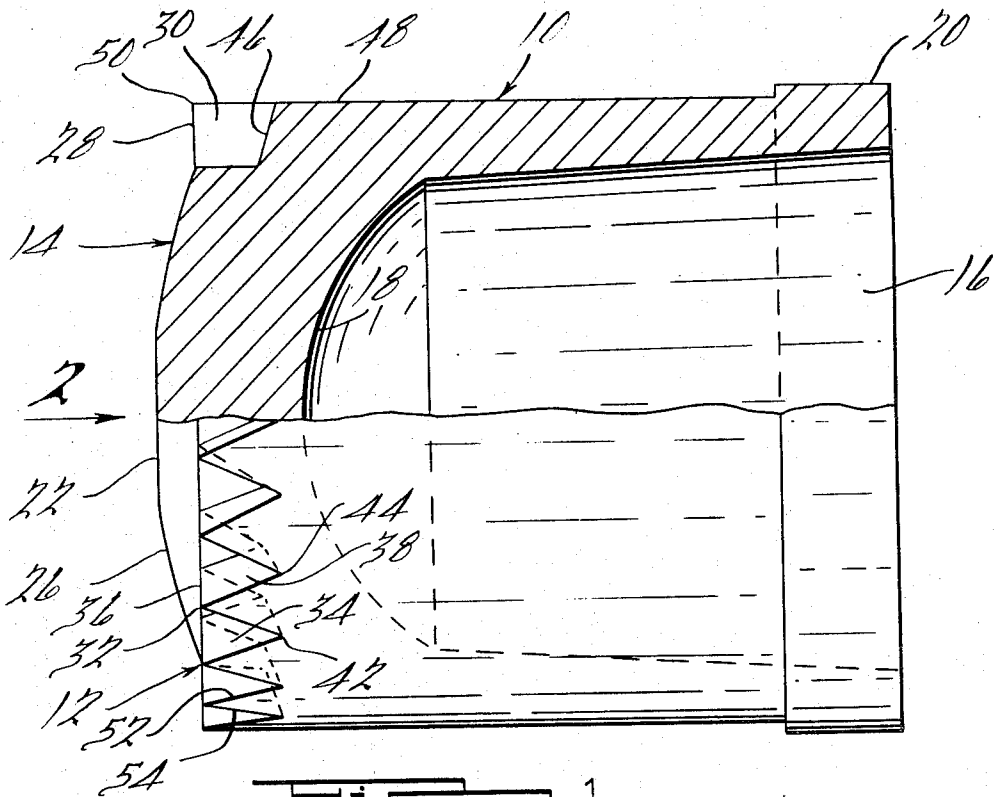


FIG. 1.

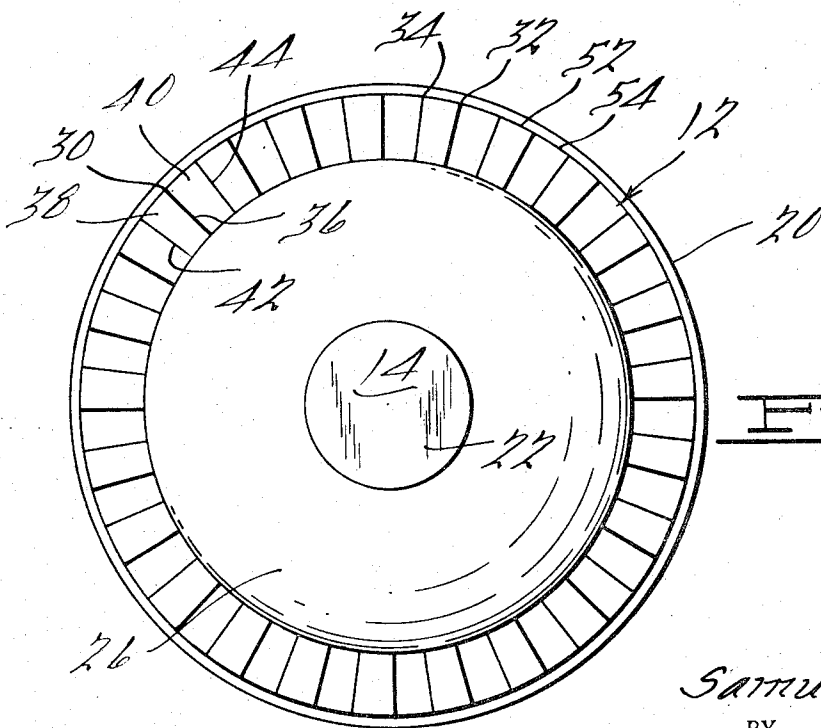


FIG. 2.

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PROJECTILE WITH TARGET CUTTING MEANS

PRIOR ART

The desirability of obtaining a well defined marking hole on a target, caused by the passage of a projectile, has been recognized heretofore and it has been proposed to provide an annular single edge cutting rim on a projectile as disclosed in U.S. Pat. No. 2,008,571.

SUMMARY OF INVENTION

This invention provides new and improved cutting means on a projectile which will sever a target and produce a hole of extremely well defined contour while minimizing the tendency to tear a paper target or the like. The present invention comprises a projectile having a serrated cutting rim located closely adjacent the front multiple cutting edges which in the presently preferred embodiment are formed by a relatively large number of serrations uniformly circumferentially spaced along a peripheral forward facing shoulder located immediately adjacent the front of the projectile slightly rearwardly of a nose portion providing an outwardly and rearwardly tapering surface. The serrations provide a series of alternating peaks and gaps which define circumferentially spaced radially extending cutting edges at the peaks and generally rearwardly extending inclined cutting edges therebetween.

DRAWING

An illustrative embodiment of the inventive principles is shown in the accompanying drawing in which:

FIG. 1 is a side elevational view, partly in section, of a projectile embodying the inventive principles; and

FIG. 2 is an end view of the projectile shown in FIG. 1 taken in the direction of the arrow 2.

DETAILED DESCRIPTION

Referring now to the drawing, a generally cylindrical projectile 10 is a .22-caliber lead pellet projectile particularly adapted for use with an air propulsion gun of the type manufactured by the Daisy/Heddon Division of Victor Comptometer Corporation of Rogers, Arkansas. Air guns of this type produced relatively low projectile velocities of approximately 300—700 f.p.s. as compared with the 1,100 f.p.s. velocities of similar powder driven projectiles. At the lower velocities, conventional projectiles tend to produce noncylindrical flap edged holes.

Target cutting means 12 are provided at the front of the projectile circumjacent a blunted nose portion 14. The projectile is hollow and has a tapered rearwardly opening cavity 16 which is terminated by a rounded front wall 18. A rifling and sealing rim 20 is provided at the rear of the projectile and has a radial thickness of approximately .0035 inch. The nose portion is considered to be the front of the projectile and the rim 20 is considered to be the rear of the projectile. The terms "radial" and "axial" relate to the central longitudinal axis of the projectile. The length of the projectile is approximately .216 inch. Nose portion 14 is defined by a generally flat circular front surface 22 which has a diameter of approximately .060 inch or somewhat less than one-third of the diameter of the outside diameter of the projectile and serves to space the target cutting means from adjacent rounds in a magazine or the like as well as first engage a target in flight. The nose portion is further defined by a rearwardly tapered surface 26 in the form of a rounded outer surface whose radius is centered on the longitudinal axis of the projectile at the rear edge of the projectile and which extends radially outwardly and rearwardly to an intersection with a serrated shoulder portion 28. The axial length of the nose portion 14, as measured between the front surface 22 and the front edge of shoulder 28, is approximately .020 inch or less than one-twentieth of the length of the projectile. The radial width of the shoulder portion is approximately .025 inch.

The target cutting means comprises a uniform series of serrations 30 comprising alternating peaks 32 and grooves 34 of generally triangular shape as viewed in side elevation in FIG.

1. Each serration 30 comprises a generally radially extending leading edge 36 defined by intersecting generally axially extending side surfaces 38, 40 intersecting at an angle of about 60° and extending from spaced bottom edge portions 42, 44 at an angle of about 60°. The axial length of serrations, as axially measured between the front of shoulder 28 and the rear of the grooves 34, is approximately .030 inch. The relatively sharp, i.e., 60°, points of the individual cutting elements seem to provide particularly advantageous results. Furthermore, the groove bottom edges 42, 44 are rearwardly tapered, as indicated at 46, while the side surfaces 38, 40 are outwardly flared along radial lines which is believed to reduce tearing of the target. Also, the leading transverse edges 36 intersect the side peripheral surface 48 of the projectile at right angles as shown at 50 thereby to provide sharp circumferentially spaced cutting points at the intersection of cutting edges 52, 54 provided at the intersection of serration side surfaces 38, 40 with the outer peripheral cylindrical projectile surface 48. In the presently preferred embodiment there are about six cutting points per quadrant or 24 total cutting points provided by 48 intersecting rearwardly axially extending surfaces 38, 40 which provide two additional cutting edges on each serration 30. It appears that the number of serrations may be widely varied and that, as a minimum, there be at least one such serration in each quadrant of the shoulder portion. Also, while it is presently preferred to provide uniform equally spaced serrations, it is contemplated that the size, shape, and distribution of the serrations may be varied in the broadest aspects of the invention.

While the exact reason why the subject cutting means provides a very good clearly defined hole in a paper target is not known, it would appear that the small forwardly protruding surface 22 tends to fold the paper onto the rounded tapered intermediate surface 26 and causes the cutting points 50 to uniformly initially cut the paper at spaced locations whereafter the edges 36, 38, and 40 serve to further cut and spread the paper without tearing while the bottom surface 46 permits the severed paper to slide over the entering projectile without tearing. Also, the projectile has a rotational spin caused by the rifling effect on shoulder 20 as the projectile travels through the gun barrel. Thus, there may also be a twisting effect whereby the points 50 cut axially and one set of the edges 52, 54 cut circumferentially as the projectile passes through the target. Since it is not known what the exact function of some of the edges and surfaces may be, the term "cutting means" is utilized to refer to both the edges 36, 52, 54 and the points 50 while the term "cutting edges" is utilized to refer to the edges 36, 52, 54 even though one or more of the edges may not actually cut the paper in any given instance. It is to be understood that the aforesaid hypothesized cutting action is merely an attempt to explain the good results achieved and is not intended to limit the scope of the invention.

I claim:

1. A projectile having generally cylindrical peripheral configuration and a plurality of cutting means provided along the cylindrical periphery of the projectile, said cutting means comprising: a plurality of circumferentially spaced radially extending cutting edges intersecting the cylindrical periphery of the projectile, generally axially extending cutting edges intersecting said radially extending edges to form cutting points therebetween, the cutting points and edges being formed by generally triangularly shaped forwardly facing serrations, and there being more than four such serrations spaced about the periphery of the projectile.

2. The invention as defined in claim 1 and having a nose portion extending forwardly of said cutting points and edges so as to engage a paper target prior to engagement with the cutting points and edges.

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3. The invention as defined in claim 2 and said nose portion having a central generally flat section and a rearwardly tapered section connecting the flat section to the radially extending edges.

4. The invention as defined in claim 1 and the serrations being of uniform size and shape spaced equally circumferentially about the cylindrical periphery of said projectile.

5. A projectile having an outer side surface of generally cylindrical peripheral configuration:

a nose portion on the front of the projectile;

circumferentially extending forwardly facing shoulder

means spaced axially rearwardly of said nose portion;

a rearwardly tapered circumferentially extending inter-

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mediate surface connecting said nose portion to said shoulder means;

a plurality of serrations equally circumferentially spaced about said shoulder means, there being at least one serration in each quadrant; and

each serration comprising a pair of intersecting generally axially extending side surfaces forming a generally radially extending edge extending from the intersection of said shoulder means and said intermediate surface to the outer side surface and defining a cutting point at the intersection therewith.

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