Nov. 1, 1960 J. L. AUXIER 2,958,287

PROJECTILE

Filed July 16, 1954 2 Sheets-Sheet 1

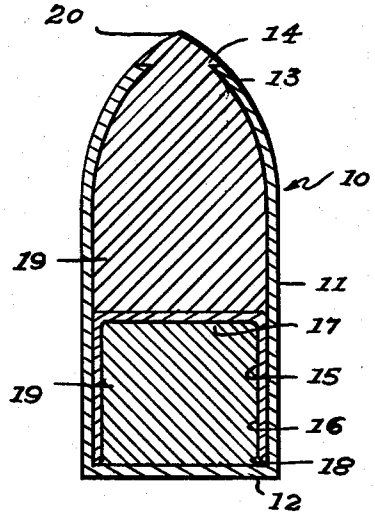


Fig. 1

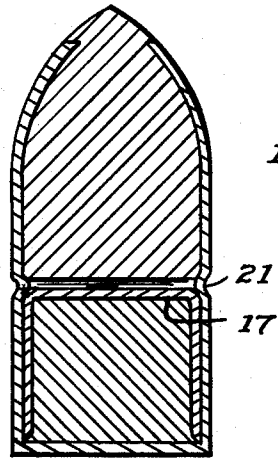


Fig. 2

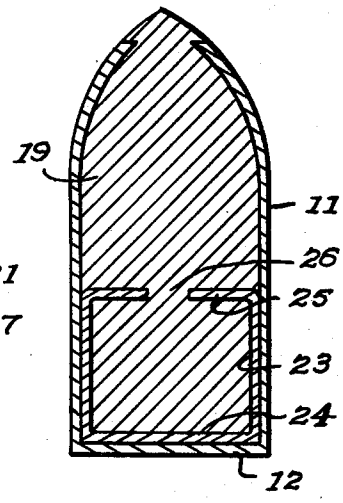


Fig. 3

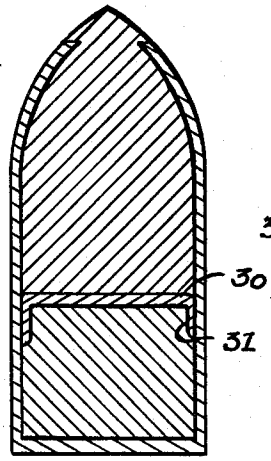


Fig. 4

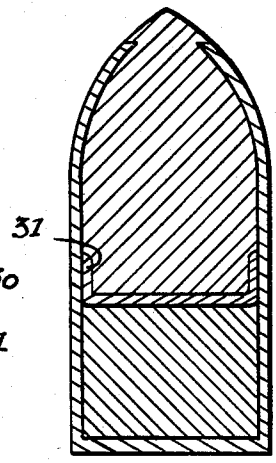


Fig. 5

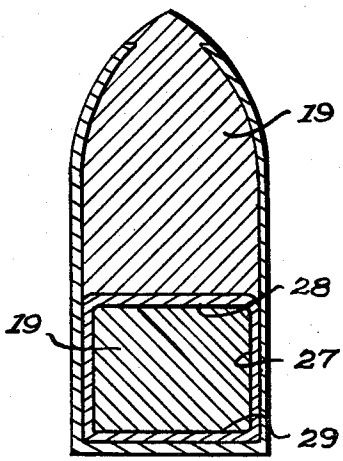


Fig. 6

INVENTOR.
JEAN L AUXIER
BY
Wm. N. Pattison
his attorney

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PROJECTILE

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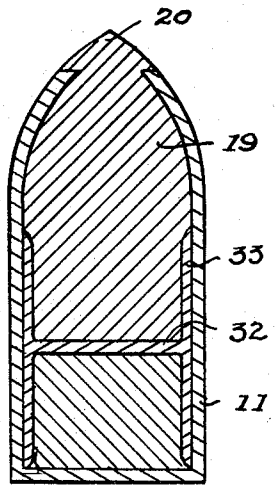


Fig. 7

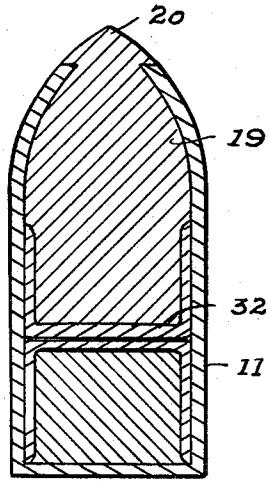


Fig. 8

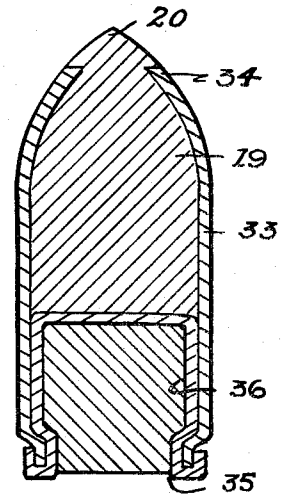


Fig. 9

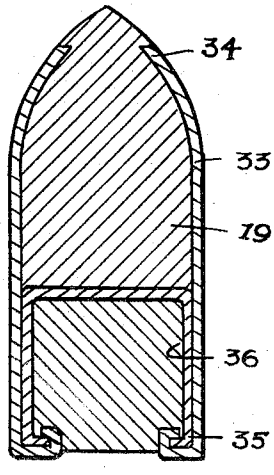


Fig. 10

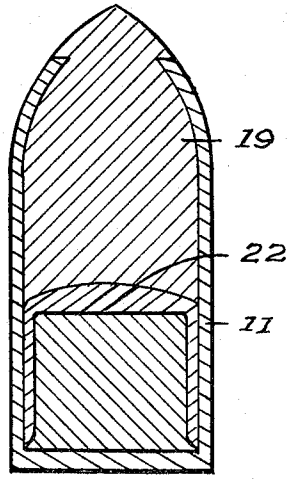


Fig. 12

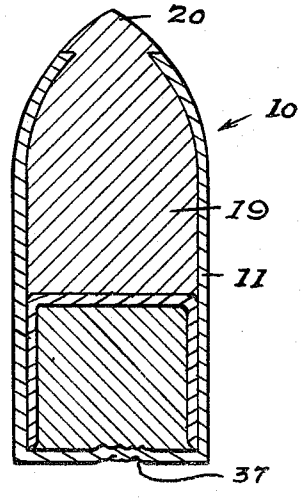


Fig. 11

INVENTOR.
JEAN L. AUXIER
BY
Wm. H. Pattison
his attorney

United States Patent Office

2,958,287

Patented Nov. 1, 1960

2,958,287

PROJECTILE

Jean L. Auxier, Pikeville, Ky.

Filed July 16, 1954, Ser. No. 443,730

1 Claim. (Cl. 102—91)

The present invention relates to ordnance projectiles and more particularly and specifically to expanding bullets for use in sport rifles for game hunting.

For many years expanding bullets were manufactured in the form of a simple soft metal projectile such as lead the forward end of which would mushroom and expand on impact. These projectiles were completely satisfactory in service during that period of time when simple black powder charges were used as the initiating force.

With the advent of smokeless powder it was discovered that the increased velocities at which projectiles travelled required an improved projectile construction which would offer an increased deterrent to the expansion of the rear portion of the projectile on impact and which would tend to permit the rear portion of the projectile to remain substantially intact for the purpose of maintaining the momentum of the projectile after impact to carry it into or through the target.

In order to accomplish this desired result, projectiles were manufactured with copper or gilding metal jackets with an impounded lead core in the forward portion of the projectile.

Because of increased technology and improved manufacturing techniques the velocities of projectiles have continued to increase since the advent of smokeless powder so that today projectiles travel at velocities in excess of three thousand feet per second. With projectile jackets made in accordance with certain prior art constructions proper expansion of the forward nose portion and continued intactness of the rearward portion are lost at the present day high velocities.

Certain prior constructions suggest that the jackets now be manufactured strong enough to retard expansion at close range. However it has been discovered that jackets constructed with such a strength would not properly expand at long range with a reduction in velocity whereupon the projectile would pass entirely through the object struck with only a small puncture such as would be produced by a full jacket bullet.

With these foregoing problems in mind certain prior constructions have suggested making a projectile jacket with a thickened rear wall portion decreasing in a tapered thickness through the forward nose portion of the jacket. However I have discovered that projectiles made along the lines of these constructions do not offer proper difference between the strengths of the front and rear sections to properly control expansion and momentum at high velocities and at varied ranges. Furthermore, I have discovered that projectiles made in accordance with these prior constructions often permit a separation of the jacket and core upon impact thereby destroying the momentum and piercing effect of the projectile.

With the numerous disadvantages and problems in mind which are inherent in prior expanding bullet constructions, I have discovered that it is necessary to prevent disintegration of the jacket and to retain the core in proper relationship with the rear portion of the projectile both prior to and after impact. By producing a projectile having these characteristics it has been discovered that an extremely efficient and dependable expanding bullet for use at extremely high velocities can be provided with results in both proper expansion and penetration characteristics.

It is therefore a general object of the present invention to provide an expanding bullet which overcomes those many disadvantages inherent in prior constructions.

It is a specific object of the present invention to provide an expanding bullet for use in game hunting rifles which will offer correct penetration and expanding characteristics at extremely high velocities and at varied ranges.

It is another object of this invention to provide an expanding bullet which presents a soft, malleable core in the forward nose portion of the projectile and which provides for a strengthened rearward projectile portion which will retain its shape and configuration upon and following impact for the purpose of providing penetration.

It is still another object of the present invention to provide an expanding bullet which consists of a simple one-piece jacket construction having a cup-like partition member located therein at an intermediate position along the length of the projectile which will serve to strengthen the rearward penetrating portion of the projectile.

Another object of the present invention lies in the provision of an expanding projectile which is readily adapted to and capable of extremely simple and inexpensive manufacture by virtue of its extremely simple and efficient construction.

Still further objects and advantages of the present invention will become readily evident to those skilled in the art when the parts, constructions and arrangements comprising the present invention are understood from the following general statement, description and illustrations.

The present invention may be stated in general terms as consisting of an expanding nose projectile including a one-piece jacket having a tapered nose, a soft core filling said jacket, and a cup-like partition member within said jacket intermediate its length dividing the core into nose and heel portions.

Referring now to the accompanying drawings in which like numerals designate similar parts throughout the several views:

Fig. 1 is a side elevation in vertical section of the improved projectile constituting the present invention;

Fig. 2 is an elevation in vertical section of a modified form of the invention as shown in Fig. 1;

Fig. 3 is an elevation in vertical section of an additional form of the invention;

Fig. 4 is an elevation in vertical section of a modified form of the invention;

Fig. 5 is an elevation in vertical section of a modified form of the construction shown in Fig. 4;

Fig. 6 is an elevation in vertical section of a modified form of the construction shown in Fig. 3;

Fig. 7 is an elevation in vertical section of another modified form of the invention.

Fig. 8 is a modified form of the construction shown in Fig. 7;

Fig. 9 shows the adaptation of the present invention to an open base projectile;

Fig. 10 is a modified form of the construction shown in Fig. 9;

Fig. 11 is a further modified form of the construction as shown in Fig. 9;

Fig. 12 is a modified form of the constructions as shown in Figs. 1 and 2.

In the accompanying drawings there are illustrated several modified forms of constructing a projectile in accordance with the present invention, however, all of such modifications have a basic and generic construction which as set forth in the foregoing general statement includes the utilization of a cup-like partition member intermediate the length of a projectile jacket for the purpose of dividing the core of the jacket into nose and heel sections.

Referring now in particular to Fig. 1 wherein the projectile is generally designated at **10** and specifically includes a one-piece jacket **11** of elongated tubular construction having a closed base end **12** and a tapered nose end **13** which is open as at **14** in its restricted area.

Located within the one-piece jacket at a point intermediate the length thereof is a cup-like partition element **15** which includes a tubular wall section **16** provided with a circular end closing wall member **17**. The cup-like partition member is positioned within the jacket in an inverted position with the extended circumferential end portion **18** of the circular wall section **16** abutted with the inside face of the closed jacket base **12** and thereby locating the end closing wall **17** transversely of the jacket at a point intermediate the base and the nose thereof.

The jacket **11** is filled with a metallic core **19** both forward and rearward of the partition element end wall **17**, the core being of a soft malleable metal such as lead or the like which will flatten or mushroom in the nose portion of the shell upon impact with a target. The core portion in the nose element of the jacket is filled forwardly beyond the tapered open end of the jacket **14** to form a pointed soft core nose **20** on the projectile in advance of the jacket.

In the manufacture of a projectile of the type above set forth, the cup-like partition element is formed with an outside diameter substantially identical with the inside diameter of the jacket so that a portion of the core may be poured into the jacket, the cup-like partition member, in an inverted position, tightly telescoped downwardly through the open nose of the jacket to enclose the core portion, the remainder of the core being poured on top of the end wall **17** of the partition member, and then the nose portion being contracted into its tapered form in shaped finished condition.

As an alternative to the foregoing method of manufacture the cup-like partition member may be drawn or extruded in place within the jacket member prior to the closing operation at the base end of the jacket. By manufacture of the projectile by this second method it would be necessary to fill the core portion within the cup-like member from the base end of the jacket before closing the same.

In the projectile construction illustrated in Fig. 2 all the parts and the arrangement of the parts of the projectile are identical with those described relative to the disclosure of Fig. 1 with the exception of the formation of a cannelure **21** annularly around the jacket wall immediately above the end wall **17** of the partition member, said cannelure being formed to a sufficient depth to overlie the end wall **17** thereby securely retaining the partition member in place rearwardly of the jacket.

In the other modification of the projectile construction as shown in Fig. 1, the end wall **17** of the partition member is provided with a crown portion **22**, as shown in Fig. 12, to provide an increased thickness from the center portion outwardly of the wall for the purpose of giving additional strength and penetrating force to the heel portion of the projectile.

Referring now to Figs. 3 and 6 another form of the present invention is shown wherein, in Fig. 3, a partition element **23** is located within the projectile jacket **11** in the form of a cup-like member wherein the rearward end of the cup member is provided with an end closing wall **24**

which is located juxtaposition with the closed base end **12** of the projectile and the forward end wall is formed thereon by an inturned flange member **25** defining a central opening **26** therein which communicates between the nose and heel sections of the jacket and which permits the core to be poured in a continuous one-step operation.

The modified form shown in Fig. 6 includes a hollow tubular member **27** having completely closed front and rear end walls **28** and **29** which completely confine the core portion **19** therein and completely separate the heel portion of the core from the nose portion of the core.

In Figs. 4 and 5 there are shown modifications of the projectile construction wherein the cup-like partition member includes a partition wall or end wall **30** having a short flanged, circular side wall **31** thereabout. In the modification shown in Fig. 4 the cup-like member is positioned with the flanged side wall **31** extending rearwardly of the projectile in close adjacency with the side wall of the projectile and terminating at a spaced distance away from the base end of the projectile locating the end wall at an intermediate position lengthwise of the projectile and dividing the core into nose and heel portions.

In the construction shown in Fig. 5 the positioning of the cup-like partition member is reversed with the end wall **30** in substantially the same location lengthwise of the projectile as is provided by the construction of Fig. 4 but in which the flanged side wall portions are positioned to extend forwardly toward the nose of the projectile.

The projectile constructions shown in Figs. 7 and 8 include a modified form of the cup-like partition member wherein the member includes a wall portion **32** extending transversely of the jacket intermediate its length and is provided with substantially equally extending side walls **33** extending forwardly and rearwardly therefrom to form a double cup partition of H configuration in cross section. In Fig. 7 the partition member is formed as a single unit, whereas in the construction shown in Fig. 8 the central wall member **32** is formed in two parts accomplished by using two cup members similar to the partition member shown in Fig. 1 positioned in base to base abutting position within the projectile to locate the dividing wall member **32** at a point intermediate the projectile length and disposing the open end of each cup forwardly and rearwardly of the projectile respectively.

In order to adapt the present projectile construction to an open base type of projectile it is possible by utilizing the constructions shown in Figs. 9 and 10 to produce a projectile jacket **33** having an open tapered nose portion **34** and an open ended base **35** to insert in inverted position through the open base a cup-like partition member **36** and then, by leaving a rearward portion of the side walls of the partition in extended position through the open jacket base, turning over the rearward wall portion of the partition upon the outer wall of the jacket locking the same in place thereon.

In Fig. 10 the locking feature or arrangement of the partition to the jacket is accomplished in reverse to that shown in Fig. 9 wherein the jacket wall is turned in and locked over the rearward end of the partition side wall.

The disclosure of Fig. 11 is for the purpose of illustrating the ability of the present projectile to be made by inserting a cup-like partition through the base end of the projectile and then swaging the base end of the projectile closed as at **37** to form a one-piece jacket and produce a projectile of the type shown in Fig. 1.

In accordance with the foregoing it can be seen that new and improved expanding nose projectile construction has been provided which is capable of efficient and low cost manufacture by any of several possible means consistent with present manufacturing equipment and techniques.

It is also evident that a projectile has been provided which is capable of manufacture in any one of several

modified forms to produce a resultant expanding nose bullet which inherently accomplishes and satisfies all of those objects and advantages heretofore set forth.

Having thus described and illustrated my invention in the several possible and preferred embodiments thereof, what I desire to claim is:

A projectile including a tubular jacket having a forwardly tapering nose portion, a soft core entirely filling the jacket, a short tubular member having one closed end, said tubular member being positioned concentrically adjacent the inner wall of the jacket and disposed with the closed end thereof in a forwardly direction, a second tubular member having one closed end, said second tubular member being positioned concentrically adjacent the inner wall of the jacket forwardly of the first tubular member and having the closed end thereof disposed in surface to surface abutment with the forwardly disposed end enclosing wall of said first tubular member; whereby the end enclosing walls of said tubular members form a partition within the jacket dividing the core into nose and heel portions and providing a double jacket wall thickness through the length of the heel portion and through a part of the length of the nose portion immediately forward of the heel portion.

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