March 16, 1965 J. C. MANSHEL 3,173,371

EXPANDING BULLET WITH SPREADER DISK

Filed May 6, 1963

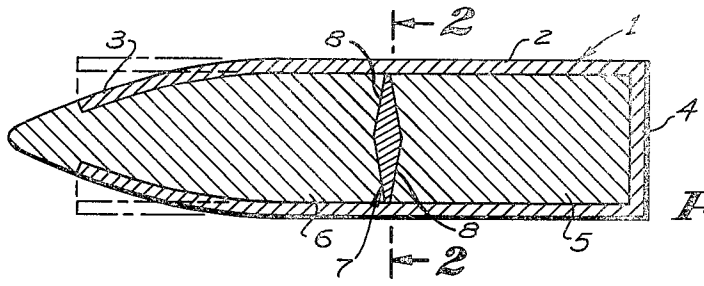


FIG. 1

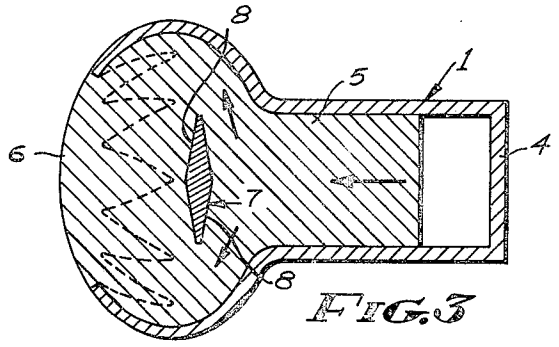


FIG. 3

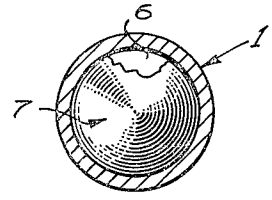


FIG. 2

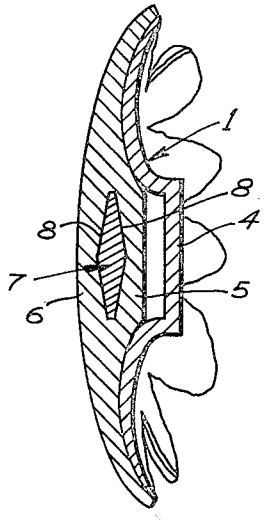


FIG. 4

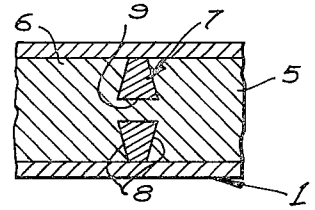


FIG. 5

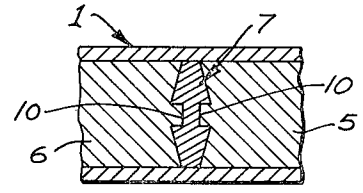


FIG. 6

INVENTOR.
JACK C. MANSHEL
BY Lyon & Lyon
ATTORNEYS

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EXPANDING BULLET WITH SPREADER DISK

Jack C. Manshel, P.O. Box 186, Palmdale, Calif.

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This invention relates to bullets and is a continuation in part of my co-pending application, Serial No. 104,873, filed April 24, 1961, now abandoned, for Bullet.

Included in the objects of this invention are:

First, to provide a bullet of the expanding type which is particularly adapted for the hunting of game with high velocity firearms, expansion of the bullet being accomplished without impairing or changing, or in any manner interfering with the firing of the bullet, its passage through the barrel, or its flight characteristics.

Second, to provide an expanding bullet which remains intact and does not shatter or disintegrate under conditions of impact upon either the soft or more resistant portions of game animals.

Third, to provide an expanding bullet which utilizes a rearward and a forward malleable core surrounded by a jacket and separated by a spreader disk having opposed conical sides which on impact cause the two cores to expand radially and flow together around the disk, thereby to form a unitary mass of relatively large diameter.

Fourth, to provide an expanding bullet which is jacketed in such a manner as to exhibit externally the same appearance as a conventional jacketed bullet, and which is so arranged that its center of gravity corresponds closely to that of the conventional bullet it is intended to replace.

With the above and other objects in view, as may appear hereinafter, reference is directed to the accompanying drawings in which:

FIGURE 1 is an enlarged, longitudinal, sectional view through the bullet.

FIGURE 2 is a transverse sectional view through 2—2 of FIGURE 1.

FIGURE 3 is an idealized, longitudinal, sectional view of the bullet similar to FIGURE 1, showing the bullet as it appears on striking a relatively soft object or when partially expanded.

FIGURE 4 is a similar sectional view showing the bullet fully expanded.

FIGURE 5 is a fragmentary, sectional view similar to FIGURE 1, showing a modification of the deflector disk.

FIGURE 6 is another fragmentary, sectional view showing another modified form of the deflector disk.

The bullet includes a jacket 1 having walls of substantially uniform thickness. The jacket includes cylindrical side walls 2 which merge forwardly into tapered side walls 3. The rear end of the jacket is closed by a base wall 4. The jacket 1 may be initially formed by a drawing operation with its side walls initially cylindrical and uniform in diameter throughout their length, as indicated by broken lines in FIGURE 1.

The jacket 1 receives a rearward malleable core 5 and a forward malleable core 6. Interposed between these cores is a deflector disk 7 having conical end faces 8.

The cores 5 and 6 and the disk 7 may be assembled in the jacket 1 by first molding or extruding the cores so that they are cylindrical in form and of such dimension as to slide within the jacket 1. The rearward malleable core 5 is first placed in the jacket 1, the deflector disk 7 is placed thereon, then the forward malleable core 6 is inserted. The cores and disk are subjected to axial pressure so as to force them into intimate contact with the walls of the jacket 1 and with the surfaces of the deflector disk 7. In accomplishing this operation, the jacket 1 is held in a die so as not to expand.

There is a tendency for the malleable cores 5 and 6

to wedge or flow between the periphery of the disk 7 and the jacket 1, even though the disk may initially fit rather snugly within the walls of the jacket. In any case the disk 7 is firmly held in place by the malleable cores.

The axial compressive forces applied to the malleable cores 5 and 6 during manufacture of the bullet may be accomplished in whole or in part by a swaging or rolling operation by which the forward portion of the jacket 1 is tapered. In practice, the forward end of the malleable core 6 may project beyond the jacket. Externally, the bullet thus formed appears identical to a conventional bullet and may be interchangeable therewith.

The malleable cores 5 and 6 are preferably formed of lead or similar material, whereas the disk 7 is formed of brass, preferably of hard brass, or may be formed of steel or other metal which will not deform when compressed between the malleable cores 5 and 6. The surfaces of the disk are smooth, and, if desired, are otherwise prepared or coated so that they have a low coefficient of friction. This is inherently true if the disk is formed of hard brass and the cores formed of lead.

The physical dimensions of the disk 7 are relatively small so that although it may have a somewhat less density than the lead or malleable cores 5 and 6, the presence of the disk, because of its small volume and because of its location close to the center of gravity of the bullet does not materially affect the balance; that is, does not alter the center of gravity of the bullet. It will thus be seen that the presence of the disk does not alter the operational characteristics of the bullet. In other words, the movement of the bullet in the barrel of the gun and the flight characteristics of the bullet are not altered. Also, the disk 7 is placed at approximately the normal center of balance of the bullet.

The bullet functions as follows:

On initial impact or on impact with a relatively soft surface, the bullet tends to expand as shown in FIGURE 3. The forward malleable core 6 tends to spread laterally, its rear surface flowing radially on the conical forward side of the deflector disk 7. Simultaneously, the disk is driven forward by the rearward malleable core 5 and the forward position of the jacket 1 expands. Actually, the rearward malleable core tends to move forward bodily from within the jacket, and its forward end is deflected laterally as indicated by the diverging arrows in FIGURE 3. The two cores 5 and 6 as they pass beyond the periphery of the disk 7, tend to unite or bond, or weld together into a unitary or common mass.

It will be seen that the effective diameter of the bullet under the condition represented in FIGURE 3, is substantially greater than that of the bullet in its initial condition. If the bullet strikes a more firm target, the bullet expands from the condition represented in FIGURE 3 toward the ultimate condition represented in FIGURE 4, in which the radially moving portions of the two cores tend to peel backward and greatly increase in radial dimension; that is, the effective frontal area of the bullet is greatly increased. Under the condition represented in FIGURE 4, most of the rearward malleable core 5 has flowed radially outward from behind the disk 7, and virtually the entire jacket has been correspondingly expanded.

If it is desired to pour the cores 5 and 6 into the bullet, the deflector disk 7 may be provided with a perforation 9 and then wedged or forced into the jacket 1 to its desired position, whereupon the molten core may be poured into the jacket 1 and flow through the perforation 9. Also the perforated disk may be uti-

lized with the method of manufacture in which the core blanks and disk are inserted and the assembly subjected to axial compression.

The presence of the perforation 9 also tends to keep the disk 7 in essentially axial alignment with the cores 5 and 6 during impact. This latter feature may also be accomplished by providing recesses 10 in opposite sides of the disk as represented in FIGURE 6.

The conical faces of the disk 7 play an important part in proper functioning of the bullet. The included angle at the apices of the conical ends should be between 175° and 150°. If the included angle is maintained within these limits, the lateral flow of the cores 5 and 6 is assured. The relative slope of the two end surfaces of the disk should be also stated in terms of the angle defined between these surfaces, this angle being between 5° and 30°. Furthermore, the periphery of the disk 7 may be attenuated to a knife edge, so that the mass of the disk 7 is reduced to a negligible value. As a result, the balance of the bullet is not impaired, and the flight characteristics which, of course, is of primary importance, are virtually identical to a standard bullet of similar diameter, length, and mass.

For example, one typical bullet made according to the present invention, which has performed excellently in tests, is a .30 caliber bullet having the following specifications:

Included angle of disk		160°
Weight of disk	grains	3.6
Weight of jacket	do	54.0
Weight of front core	do	61.5
Weight of rear core	do	61.5
Total weight of components	do	180.6
Total weight of finished bullet	do	180.0

(A .6 grain loss due to extrusion of a portion of the front grain as the nose of the bullet is formed.)

If lead were substituted in the space occupied by the disk, its weight would be 4.53 grains so that the difference in weight would be 0.9 grain, which is insignificant. Furthermore, the disk is located close to, if not at, the center of gravity, so that it cannot in any way interfere with the balance of the bullet in flight.

The significance of the advantage attained is demonstrated by the fact that if a ball is substituted for the disk 7, the flight characteristics are adversely affected; furthermore, the two cores do not spread laterally in an effective manner. There is a tendency for the cores to break up, rather than stay in a coherent mass. If a cup-shaped element is substituted for the disk 7, the walls of the cup are forced, on impact of the bullet, against the walls of the jacket 1 so that forward flow of the rear core 5 is impaired. Still further, the walls of the cup must rupture before the core 5, or 6, depending on the direction of the walls of the cup, may flow laterally. In either case, any lateral flow is without the benefit of the conical surfaces to aid in intact lateral spreading. As a result, fragmentation occurs.

While a particular embodiment of this invention has been shown and described, it is not intended to limit the same to the exact details of the construction set forth, and it embraces such changes, modifications, and equivalents of the parts and their formation and arrangement as come within the purview of the appended claims.

What is claimed is:

1. A bullet comprising a jacket enclosing the side and rear end of the bullet;
(*a*) a rearward malleable core and a forward malleable core in said jacket,
(*b*) and a disk within said jacket, said disk having a relatively thin edge and oppositely sloping sides defining therebetween an included angle between 5° and 30°, said oppositely sloping sides forming deflecting surfaces for causing on impact radial deflection of said cores into a unitary mass embedding said disk.

2. A bullet as set forth in claim 1 wherein:
(*a*) said disk has opposed centered recesses.

3. A bullet as set forth in claim 1 wherein:
(*a*) said disk has a central perforation therethrough and said cores are interconnected through said perforation.

4. A bullet, comprising:
(*a*) a jacket, including a side wall of substantially uniform thickness forming a tapered forward portion and a cylindrical rearward portion, and a base wall closing the cylindrical end of said jacket;
(*b*) a rearward malleable core filling the major part of the cylindrical portion of said jacket;
(*c*) a deflector disk capping said rearward malleable core;
(*d*) and a forward malleable core overlying said disk and extending to the tapered end of said jacket;
(*e*) said deflector disk having opposed sides defining therebetween at the periphery of the disk an included angle between 5° and 30°, said disk being resistant to deformation when compressed between said cores, and said disk and cores presenting to each other surfaces having low coefficient of friction whereby on impact said cores tend to flow radially into a radially expanded unitary mass.

5. A bullet as set forth in claim 4 wherein:
(*a*) said disk has opposed centered recesses.

6. A bullet as set forth in claim 4 wherein:
(*a*) said disk has a central perforation therethrough and said cores are interconnected through said perforation.

7. A bullet, comprising:
(*a*) a jacket having a base wall, a cylindrical wall joined to the base wall, and an ogival wall continuing from the cylindrical wall;
(*b*) a disk fitted within the cylindrical wall in sliding engagement therewith and located approximately at the center of gravity of the finished bullet;
(*c*) said disk having its greatest axial dimension at its axis and approximately of knife edge dimension at its periphery, the opposing sides of said disk converging toward the periphery of said disk and defining an included angle between 5° and 30°;
(*d*) a rearward malleable core completely filling the space within said jacket between its base portion and said disk; and a forward malleable core completely filling said jacket forwardly of said disk.

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