

[54] CHAFF BULLET

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[73] Assignee: The United States of America as represented by the Secretary of the Navy, Washington, D.C.

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[51] Int. Cl. F42b 13/56

[58] Field of Search 102/63, 87, 89, 38, 102/92.6, 37.6, 35.6, 34.6; 340/18 B

[56] References Cited

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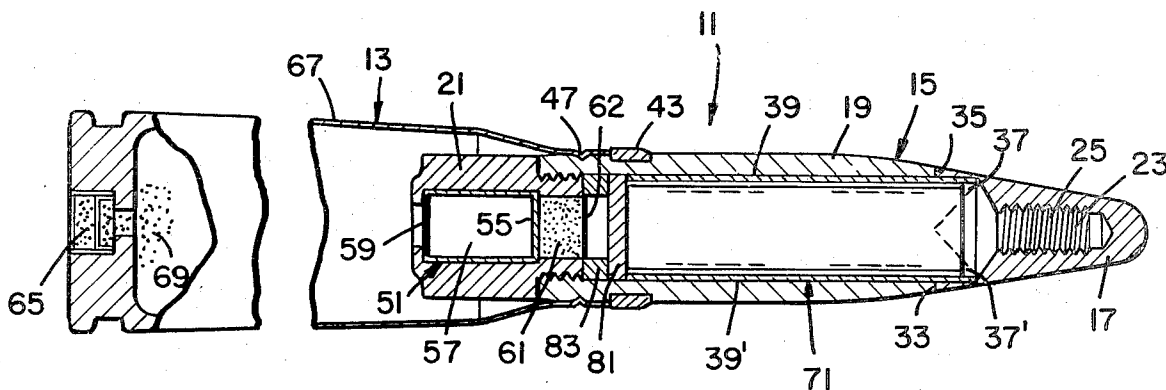
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Attorney—R. S. Sciascia

[57] ABSTRACT

A chaff bullet having a nose piece, a body and a rear section. The body encloses a chaff element which comprises a pair of half shells, each tapered at one end, and a plurality of chaff packettes positioned within the half shells. Each chaff packette includes several thousand elongated chaff which are enclosed by a thin wrapping of Mylar. When the chaff bullet is fired from a gun the tracer powder contained in the rear section burns slowly. After a predetermined time the increasing heat from the burning tracer powder causes ignition of an explosive in the body section which forces out the chaff element. The spin of the bullet causes outward release of the half shells and the chaff packettes. When the chaff packettes enter the air stream the Mylar wrapping is unwrapped which releases the chaff into the air in a well dispersed and undamaged condition.

6 Claims, 14 Drawing Figures



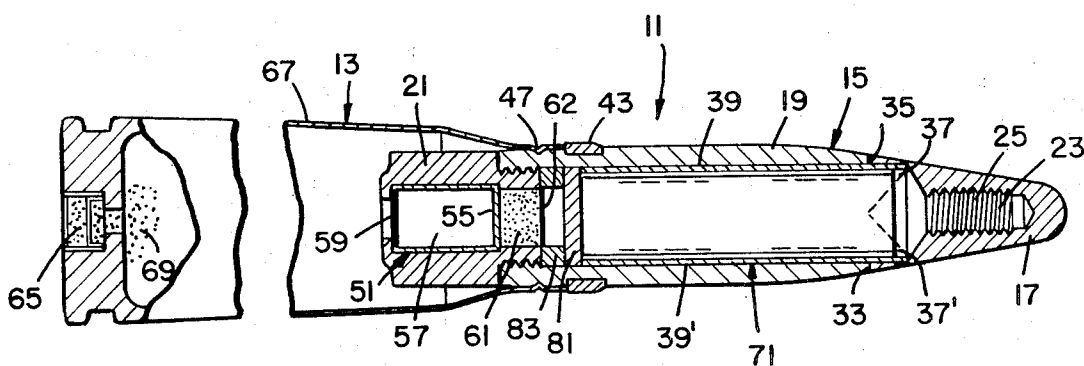


FIG_1

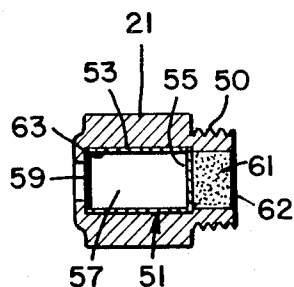


FIG_1C

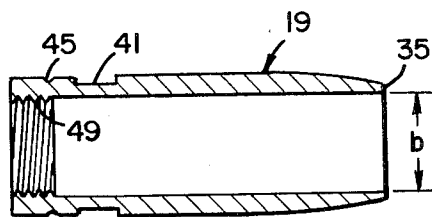


FIG_1B

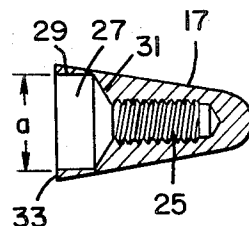


FIG_1A

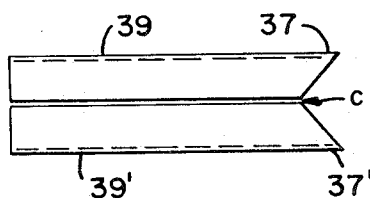


FIG_1D

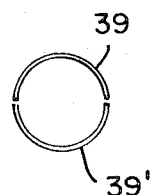


FIG_1E

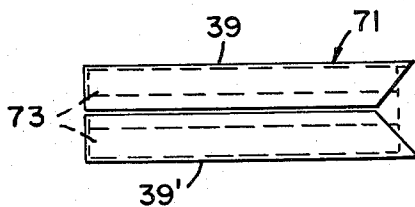


FIG_2A

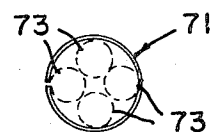


FIG_2B

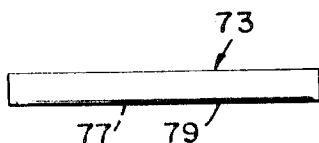


FIG_2C

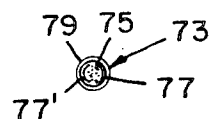


FIG_2D

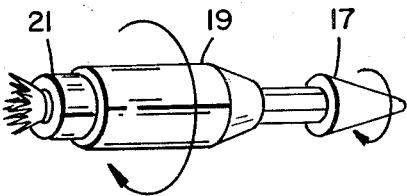
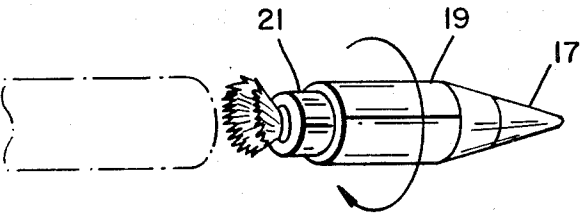


FIG_3C

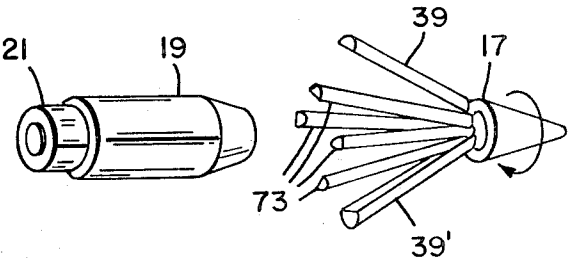
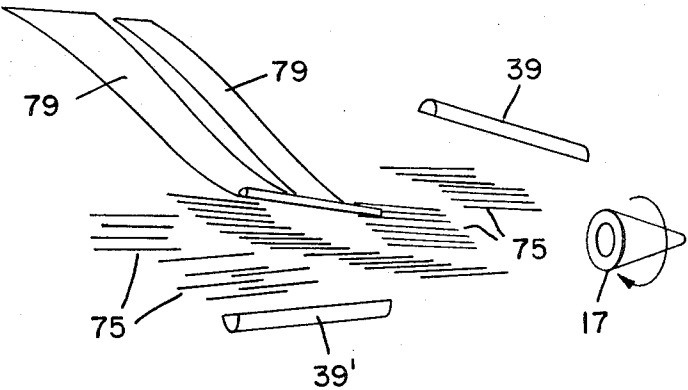


FIG_3D



CHAFF BULLET

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a chaff bullet, and more particularly, to a chaff bullet that effectively releases the chaff into the air in a well dispersed and undamaged condition.

2. Description of the Prior Art

One of the difficulties encountered with prior chaff bullets was their inability to readily accommodate different sizes and numbers of chaff. Another major difficulty was their inability to release the chaff into a large area where the released chaff was well dispersed and undamaged.

SUMMARY OF THE INVENTION

The present invention overcomes the above described disadvantages of prior chaff bullets. Briefly, the present invention comprises a chaff bullet having a nose piece, a body and a rear section. The body encloses a chaff element which comprises a pair of half shells, each tapered at one end, and a plurality of chaff packettes positioned within the half shells. Each chaff packette includes several thousand elongated chaff which are enclosed in a thin wrapping of Mylar. When the chaff bullet is fired from a gun the tracer power contained in the rear section burns slowly. After a predetermined time the increasing heat from the burning tracer powder causes ignition of an explosive in the body section which forces out the chaff element. The spin of the bullet causes outward release of the half shells and the chaff packettes. When the chaff packettes enter the air stream the Mylar wrapping is unwrapped which releases the chaff into the air in a well dispersed and undamaged condition.

STATEMENT OF THE OBJECTS OF INVENTION

An object of the present invention is to provide an effective and reliable chaff bullet.

Another object of the present invention is to provide a relatively inexpensive chaff bullet.

A further object of the present invention is to provide a bullet that can readily accommodate different sizes and numbers of chaff.

A still further object of the present invention is to provide a chaff bullet that releases the chaff into a large area where the released chaff is well dispersed and undamaged.

Other objects, advantages and novel features of the invention will become apparent from the following detailed description of the invention when considered in conjunction with the accompanying drawings wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic drawing of the assembled chaff round of the present invention;

FIG. 1A is a schematic drawing of the nose piece of the chaff bullet of FIG. 1;

FIG. 1B is a schematic drawing of the body of the chaff bullet of FIG. 1;

FIG. 1C is a schematic drawing of the rear section of the chaff bullet of FIG. 1;

FIG. 1D is the side elevation of the pair of half shells of the chaff bullet of FIG. 1;

FIG. 1E is an end view of the pair of half shells of FIG. 1D;

FIGS. 2A and 2B are schematic drawings of the chaff element of FIG. 1;

FIGS. 2C and 2D are schematic drawings of the chaff packette of the chaff element of FIGS. 2A and 2B; and

FIGS. 3A through 3D are pictorial drawings showing the sequence of operation of the chaff bullet of FIG. 1.

In FIG. 1 is shown a 20 mm chaff round 11 which consists of a shell 13 and a chaff bullet 15. The subject of the present invention is the chaff bullet 15 and it is to be understood that the bullet may be made in a variety of sizes and shapes and is not to be limited in use with a 20 mm round. The chaff bullet 15 may be fired from the shell 13 from a gun mounted on a flying aircraft. Normally, there will be fired one chaff bullet for about five to ten live bullets fired from the gun.

Chaff bullet 15 includes a nose piece 17, a body 19, and a rear section 21. Nose piece 17 is illustrated in FIGS. 1 and 1A and has an exterior configuration, as shown, and includes an elongated cylindrical interior section 23 that includes threads 25 shown by the dotted lines in FIG. 1A. The threads 25 are provided for tooling which is used in the manufacturing process of the nose piece. The rear section of nose piece 17 has an enlarged cavity 27 having a cylindrical section 29 and a conical section 31. The cylindrical section 29 has a diameter a which is slightly smaller than the diameter b of body 19, as shown in FIG. 1B. It should be noted that the rear surface 33 of nose piece 17 abuts against the forward surface 35 of body 19 when assembled, as illustrated in FIG. 1. As will be hereinafter explained in greater detail, when assembled the tapered ends 37 and 37' of half shells 39 and 39' are in forced engagement with cylindrical surface 29.

Referring to FIGS. 1 and 1B, body 19 includes a circular groove 41 for receiving ring 43 and circular groove 45 for receiving circular detent 47 of shell 13. The rear section of body 19 is provided with female threads 49 for receiving male threads 50 of rear section 21 of FIG. 1C.

Rear section 21 of FIG. 1C includes a tracer element 51 that comprises a cup having a steel cylindrical wall 53 and a steel bottom section 55. The cup is filled with tracer powder 57 and is closed by means of closure 59 which is made of a foil material such as a heavy gauge aluminum foil. Rear section 21 also includes an explosive charge 61 which may be bulls-eye pistol powder, for example. Closure 62, which may be made of aluminum foil, seals the explosive charge 61 in place and holds it against the forward surface of bottom section 55. Tracer element 51 is retained in position by means of circular lip 63 which prevents the tracer element from being blown out by ignition of explosive charge 61.

Shell 13, which may be a 20 mm shell, for example, includes cap 65, elongated section 67 and explosive powder 69. Upon being fired by the gun, the powder within cap 65 ignites explosive charge 69 which in turn ignites the powder in tracer element 57, rapidly transmitting its heat through foil 59, and propels chaff bullet 15 in the forward direction.

In FIGS. 2A and 2B is illustrated the chaff element 71 used in the chaff bullet 15 of FIG. 1. Chaff element 71 includes half shells 39 and 39', shown in FIGS. 1D, 1E, 2A, and 2B, which contain four chaff packettes 73, as illustrated by the dotted lines of FIGS. 2A and 2B. It is to be understood that more or less than four packettes may be employed and one or more of them may

be dummy packettes. Also, depending upon the particular needs, the packettes may be selected to have different lengths. In FIGS. 2C and 2D is illustrated a single chaff packette 73. The chaff 75, comprising approximately 20,000 pieces of very small metal covered glass rods, are packed into half shells 77 and 77' of chaff packette 73. One method for achieving this described chaff packette structure is to draw 20,000 lengths of chaff 75 through a one-fourth inch soda straw, then cut the straw to length and then make two slits lengthwise in the straw to form half shells 77 and 77'. The chaff filled half shells 77 and 77' are then wrapped by a thin Mylar wrapping 79 having a width that is the same as the length of the half shells. It has been found that a four-inch length of Mylar film is very effective in that it provides an adequate time interval before release at the chaff after the packette is introduced into the air stream as will be hereinafter described in detail.

Referring now to FIG. 1, the assembled chaff bullet includes chaff element 71 that is inserted into body 19. The tapered ends 37, 37' of half shells 39, 39' extend beyond the end of body 19. The outside diameter of chaff element 71 is very slightly larger than the inside diameter *b* of body 19 and is forced into body 19 and is held in place by a snug fit. Also, the outside diameter of chaff element 71 is substantially larger than the inside diameter *a* of nose piece 17. Nose piece 17 is held in position by forcing it over tapered ends 37, 37' until rear surface 33 of nose piece 17 abuts against forward surface 35 of body 19. A metal piston 81, which is preferably made of aluminum, abuts against the flat end of chaff element 71 and a washer 83, preferably made of Teflon, abuts against piston 81. Washer 83 functions to absorb the shock when the bullet is initially fired from the gun. Rear section 21 is mounted on the end of body 19 by means of threads 49 and 51 and shell 13 is mounted on the rear part of body 19.

The following is a description of the operation of chaff round 11 when fired from a gun. The operation is initiated when the gun hammer strikes cap 65 of shell 13. When this occurs the powder in cap 65 ignites which in turn ignites explosive charge 69. The ignition of explosive charge 69 simultaneously projects the chaff bullet 15 down the gun barrel and ignites powder 57. While the chaff bullet 15 travels down the barrel, the rifling of the gun spins the bullet. This rotational spin of the chaff bullet is important for its effective operation. As the powder 57 in tracer element 51 burns, it causes a progressive temperature increase of steel bottom section 55. When the temperature of bottom section 55 reaches about 1,000° F, which occurs when the chaff bullet 15 is about 4500 feet from the gun, then explosive charge 61 is ignited by this elevated temperature. It should also be noted that bottom section 55 of tracer element 51 is sufficiently strong to not blow out when explosive charge 61 ignites. When explosive charge 61 ignites, the pressure generated thereby acts against piston 81 which, being abutted against the flat surface of chaff element 71, forces chaff element 71 out from body 19. This sequence of operation is pictorially illustrated in FIG. 3B. As soon as the chaff element 71 leaves the end of body 19 then the flat end of

the half shells 77 and 77' are free to move outward and will fly open due to the centrifugal force caused by its rotation. This is possible because the taper of tapered ends 37 and 37' permits the shells to pivot about point "C" (see FIG. 1D) such that the flat ends will rotate outwards due to the centrifugal force. When the half shells 39, 39' fly outward then the chaff packettes 73 are released and fly outward by centrifugal force. This sequence of operation is pictorially illustrated in FIG. 3C. When the packettes 73 enter the wind stream then the wind unwinds the wrapping 79 from the chaff 75. This releases the chaff 75 in an undamaged condition into a large area of uniform dispersement and thereby provides an effective radar decoy. This sequence of operation is pictorially illustrated in FIG. 3D. It should be particularly noted that the wrapping 79 protects the chaff 75 and allows sufficient time for the chaff to slow down and travel outward before releasing half shells 77, 77' and the chaff 75 contained therein. Normally, the chaff bullet is traveling at about 1,000 feet per second when the chaff element is expelled from the bullet body.

What is claimed is:

1. A chaff bullet comprising:

- a nose piece, a body and a rear section;
- said rear section being operatively connected to the rear end of said body;
- a chaff element;
- said chaff element being mounted within said body;
- said chaff element comprising a pair of half shells and at least one chaff packette mounted within said half shells;
- each of said half shells includes a tapered end;
- said nose piece including a cavity; and
- each of the tapered ends of said half shells extends beyond the front end of said body and into said cavity of said nose piece to retain said nose piece in position.

2. The chaff bullet of claim 1 wherein:

- said at least one chaff packette includes a plurality of elongated chaff that is wrapped by a strip of thin plastic wrapping.

3. The chaff bullet of claim 4 wherein:

- a pair of half shells are positioned between said chaff and said wrapping.

4. The chaff bullet of claim 1 wherein:

- each of said half shells includes a flat end;
- the flat ends of said half shells are positioned near the rear end of said body; and
- a piston is positioned adjacent said flat ends of said half shells for driving said chaff element from said body.

5. The chaff bullet of claim 4 including:

- a washer made of energy absorbing material positioned between said piston and said rear section.

6. The chaff bullet of claim 6 wherein:

- said rear sections include a tracer element containing a tracer powder and an explosive charge; and
- a metal section positioned between said tracer powder and said explosive charge.

* * * * *