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DESCRIPTION

The invention relates to projectiles for firing by a fire arm comprising a rear part, whose diameter determines the size of the projectile and a front part having a generally conical configuration and terminated by a front nose.

The hitherto known projectiles of this type have had a generally conical front part with a simple shape which could be conical, ogival with a convex curvature or ogival with a concave curvature. The shock or impact effects on penetration of such a projectile were limited, which reduced the stopping power of the projectile.

Thus, French patent 393 079 describes a projectile with a conical front nose giving same no particular shock or impact effect. In the same way French patent 512 809 describes a projectile having a front nose with an ogival shape with a convex curvature providing it with no particular impact effect.

British patent 1 524 743 relates to a compressed air projectile to be fired at a target, the front part of said projectile being either conical (fig 1) or flat (fig 5) and its function is not to bring about an impact effect.

The 1911 British patent 2236 describes a projectile of the type defined in the preamble of claim 1 and which has a front nose, whereof part has ogival shape with a concave curvature. More specifically said front part has, towards the front nose, a front inward bulge area connected to said front nose. This tapering shape of the front part does not give the projectile any special characteristic with respect to its impact effect. In fact, this tapering shape with a concave curvature would appear to reduce the impact effect compared with a projectile having a front part with an ogival shape and convex curvature like that described in French patent 512 809.

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According to the invention, the projectile has increased impact effects compared with conventional projectiles due to the fact that it has a front part with a generally conical configuration and is terminated by a front nose, said front part having a front inward bulge connected to the nose and which is characterized in that said front part also has a rear inward bulge connected to the rear part and at least one outward bulge connected to the rear inward bulge and to the front inward bulge.

As a result of this arrangement, on penetration, there is a first impact effect produced by the outward bulge and a second impact effect produced by the rear inward bulge at its connection to the rear part of the projectile.

Moreover, the outward bulge located between the two inward bulges, facilitates the use of ammunition equipped with such a projectile in an automatic, semi automatic or repeat action fire arm. Thus, said outward bulge facilitates the introduction of the ammunition into the chamber of the fire arm by cooperating with the access ramp to said chamber.

Advantageously, the rear part has a succession of outward bulges separated by inward bulges, the diameter of the rear part at said outward bulges determining the size of the projectile.

Preferably, the radii of curvature of the inward bulges of the front part are equal to one another and equal to the radius of curvature of the outward bulge of said front part. Said radii of curvature can have a value equal to one third of the length of the front part.

Also in preferred manner, the radii of curvature of the outward bulge of the rear part are equal to one another and equal to the radius of curvature of the inward bulges of said rear part. Said radii of curvature can have a value equal to one third of the length of the rear part.

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According to a preferred embodiment of the invention, a recess is formed in the rear part of the projectile and extends into its front part.

The invention will be better understood from the following description of a preferred embodiment of the invention with reference to the single drawing showing in axial section a projectile according to the invention.

This projectile has a rear part N_1 , whose diameter determines the size of the projectile and a front part N_2 having a generally conical configuration and terminated by a front nose A.

Between the front nose A and the rear part N_1 , the front part N_2 has a front inward bulge Z_{17} connected to the front nose A, a rear inward bulge Z_7 connected to the rear part N_1 , whereby said two inward bulges Z_{17} and Z_7 are connected by an intermediate area constituted by at least one outward bulge Z_9 . The connection of said outward bulge Z_9 to the rear inward bulge Z_7 can be over two thirds of the length LN_2 of the front part N_2 starting from the end of the front nose A.

Advantageously rear part N_1 can have a succession of outward bulges P_3, P_2 separated by inward bulges P_1 , the diameter of the rear part N_1 at said outward bulges P_3, P_2 determining the size of the projectile.

Preferably, the radii of curvature R_{17}, R_7 of the inward bulges Z_{17}, Z_7 of the front part N_2 are equal to one another and equal to the radius of curvature R_9 of the outward bulge Z_9 of said front part N_2 . These radii of curvature R_{17}, R_7, R_9 have a value equal to one third of the length LN_2 of front part N_2 .

Once again in preferred manner, the radii of curvature R_3, R_2 of the outward bulges P_3, P_2 of the rear part N_1

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are equal to one another and equal to the radius of curvature R_1 of inward bulge P_1 of said rear part N_1 . These radii of curvature R_3, R_2, R_1 have a value which is equal to one third of the length LN_1 of the rear part N_1 .

According to the illustrated embodiment of the invention, a recess 2 is formed in the rear part N_1 and extends into the front part N_2 . Recess 2 is formed by a rear cone frustum 2_a of angle α_3 , by an intermediate cone frustum 2_b of angle α_4 and a front cone 2_c of angle α_5 , the point 2_d of said front cone 2_c being located in the front N_2 , approximately level with its outward bulge Z_9 . Angle α_3 exceeds angle α_4 , angle α_5 is smaller than angle α_3 and larger than angle α_4 .

When the projectile according to the invention is to be crimped onto a case E, said crimping takes place on the rear part N_1 , on the outward bulge P_3 located closest to the front part N_2 . The front nose A of front part N_2 can have a flat face PA, or a pointed or rounded end.



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CLAIMS

1. Projectile for firing by a fire-arm comprising a rear part (N_1), whose diameter determines the size of the projectile and a front part (N_2) having a generally conical configuration and terminated by a front nose (A), said front part (N_2) having a front inward bulge (Z_{17}) connected to the nose (A) characterized in that said front part also has a rear inward bulge (Z_7) connected to the rear part (N_1) and at least one outward bulge (Z_9) connected to the rear inward bulge (Z_7) and to the front inward bulge (Z_{17}).

2. Projectile according to claim 1, characterized in that the rear part (N_1) has a succession of outward bulges (P_3, P_2) separated by inward bulges (P_1), the diameter of the rear part (N_1) at said outward bulges (P_3, P_2) determining the projectile size.

3. Projectile according to claims 1 or 2, characterized in that the radii of curvature (R_{17}, R_7) of the inward bulges (Z_{17}, Z_7) of the front part (N_2) are equal to one another and equal to the radius of curvature (R_9) of the outwards bulge (Z_9) of said front part (N_2).

4. Projectile according to claims 2 or 3, characterized in that the radii of curvature (R_3, R_2) of the outward bulges (P_3, P_2) of the rear part (N_1) are equal to one another and equal to the radius of curvature (R_1) of the inward bulge (P_1) of said rear part (N_1).

5. Projectile according to any one of the preceding claims 1 to 4, characterized in that the value of the radii (R_{17}, R_7, R_9) is equal to one third of the length (LN_2) of the front part (N_2).

6. Projectile according to any one of the claims 1 to 5, characterized in that the connection of the outward bulge (Z_9) to the rear inward bulge (Z_7) is located at two thirds of the length (LN_2) of the front part (N_2) starting



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from the end of the front nose (A).

7. Projectile according to any one of the claims 2 to 6, characterized in that the value of the radii (R_3 , R_2 , R_1) is equal to one third of the length (LN_1) of the rear part (N_1).

8. Projectile according to any one of the claims 1 to 7, characterized in that a recess (2) is made in the rear part (N_1) and extends into the front part (N_2).

9. Projectile according to claim 8, characterized in that the recess (2) is formed by a rear cone frustum (2) of angle (α_3), by an intermediate cone frustum (2)^a of angle (α_3) and by a front cone (2)^c of angle (α_5), the point (2)^d of said front cone (2)^c being located in the front part (N_2).

10. Projectile according to claim 9, characterized in that the angle (α_3) is larger than the angle (α_4) and that the angle (α_5) is smaller than the angle (α_3) and larger than the angle (α_4).

11. Projectile according to any one of the claims 2 to 10, for crimping onto a case (E) characterized in that the crimping of case (E) is performed on the rear part (N_1) on the outward bulge (P_3) positioned closest to the front part (N_2).

12. Projectile according to any one of the claims 1 to 11, characterized in that the front nose (A) of the front part (N_2) has a flat face (PA), or a pointed or rounded end.