

June 24, 1947.

C. L. EKSERGIAN

2,422,720

ROCKET PROJECTILE

Filed Aug. 15, 1944

2 Sheets-Sheet 1

Fig. 1.

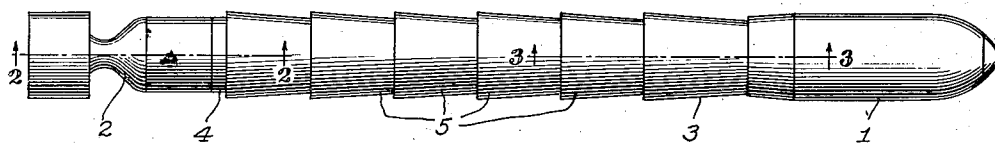


Fig. 2.

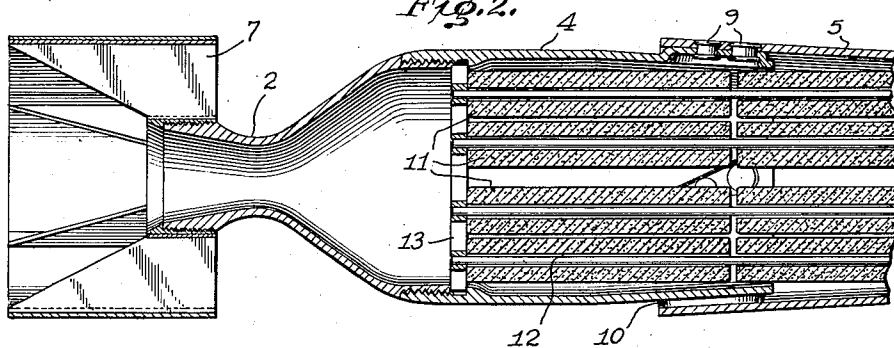


Fig. 3.

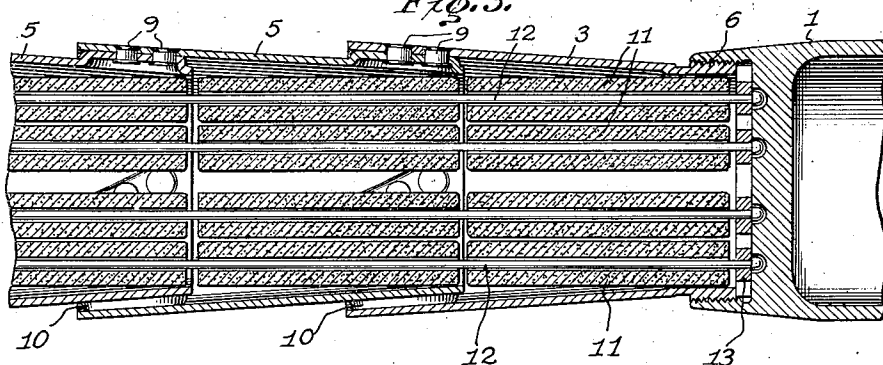
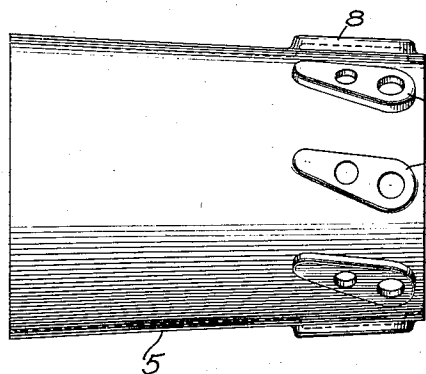


Fig. 4.



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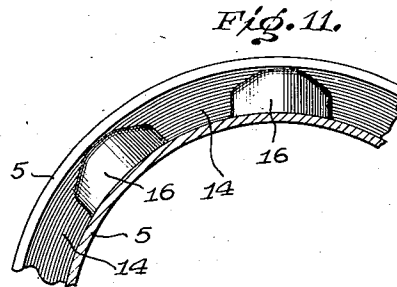
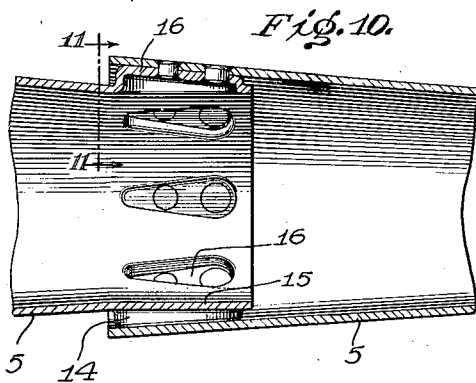
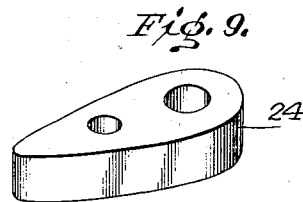
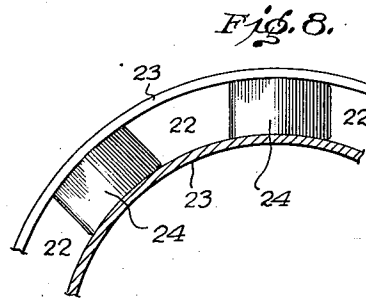
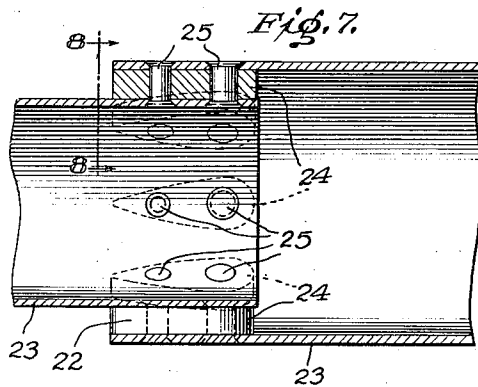
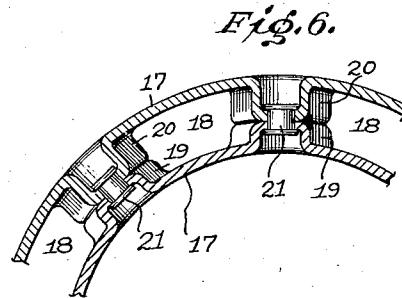
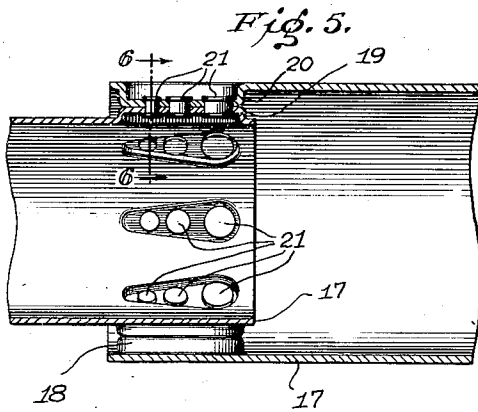
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2,422,720

ROCKET PROJECTILE

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Application August 15, 1944, Serial No. 549,543

6 Claims. (Cl. 102—49)

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This invention relates to projectiles, more particularly to projectiles of the so-called rocket type, it being one of the objects to provide a rocket projectile casing capable of being expeditiously fabricated from a plurality of tubular sections.

Another object is to provide a rocket projectile body fabricated from a plurality of tubular sections in which the sections are performed and overlapped in such manner as to provide a plurality of axially spaced peripheral passages for the discharge of the gases resulting from the burning of the rocket charge.

A further object is to provide a rocket projectile which can be easily manufactured and assembled.

With the above and other objects in view, which will be apparent to those skilled in the art to which the invention appertains, the present invention consists of certain features of construction and combinations of parts to be hereinafter described with reference to the accompanying drawings, and then claimed.

In the drawings which illustrate suitable embodiments of the present invention:

Figure 1 is a side elevation of one form of the projectile;

Figure 2 is an enlarged section taken substantially on line 2—2 of Figure 1;

Figure 3 is an enlarged section taken substantially on line 3—3 of Figure 1;

Figure 4 is an enlarged side elevation of one of the sections of the projectile casing;

Figure 5 is a fragmentary longitudinal section through the connection of adjoining sections of modified formation;

Figure 6 is an enlarged transverse section taken substantially on the line 6—6 of Figure 5;

Figure 7 is a section similar to Figure 5 but of a further modified construction;

Figure 8 is an enlarged section taken substantially on line 8—8 of Figure 7;

Figure 9 is a perspective view of one of the button-like elements used in the construction of Figures 7 and 8;

Figure 10 is a section similar to Figures 5 and 7 but in which the sections are of a further modified construction, and

Figure 11 is an enlarged section taken substantially on line 11—11 of Figure 10.

Referring to the accompanying drawings, the rocket projectile embodies, in general, a nose portion or body 1 adapted to contain an explosive charge (not shown) a tail portion 2, forward and rearward sections 3 and 4, respectively, and a plurality of intermediate sections 5.

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In the construction shown in Figures 2, 3, and 4, the tubular sections 3 and 5 are of frusto-conical shape, the smaller diametered end of the forward section 3 being threadably secured to the trailing end of the leading section as indicated at 6 in Figure 3. The tail piece 2, which is of Venturi formation and carries a number of stabilizing vanes 7, is threadably secured to the rearward end of the rearward section 4 as shown in Figure 2. The forward ends of the section 4 and the sections 5 are embossed to provide a plurality of circumferentially spaced Venturi-forming portions 8, each of which is rounded at its forward end and tapers rearwardly. The forward ends of these sections are nested within the rearward ends of the adjoining sections, the embossed portions 8 seating firmly against the inner surfaces of the adjoining sections and being secured thereto by rivets 9. The tapering sides of the embossed portions 8 and the surrounding surfaces of the adjoining sections thus form a number of circumferentially spaced Venturi passages 10 for the discharge of the propelling gases resulting from the burning of the rocket charge. The rocket charge as here shown is in the form of a plurality of annular powder sticks 11 supported on rods 12. The rods 12 are carried by suitable end plates 13 as shown in Figures 2 and 3. The rocket charge and its manner of support, however, forms no part of the present invention.

The longitudinal axes of the embossed portions 8 are inclined relative to the axis of the sections whereby the discharging gases will impart rotation to the projectile. If, however, rotation is not desired, the longitudinal axes of the embossed portions may be parallel to the axis of the sections.

Whereas in Figures 2 and 3, the radial walls of the Venturi passages 10 are substantially parallel and the Venturi throat is produced circumferentially only, the modified construction of Figures 10 and 11 provides Venturi passages 14 having throat produced both circumferentially and radially. In this case, that portion 15 of a section 5 which lies within an adjoining section is made substantially cylindrical and the embossed portions 16 are so formed that the passages 14 increase in area both circumferentially and radially.

In some cases it may be desirable, as in a step rocket, to employ straight tubular sections 17 of gradually reduced diameters, as illustrated in Figures 5 and 7, in lieu of the frusto-conical sections of Figures 1 to 4, 10 and 11. In Figures 5 and 6, in order to provide Venturi passages 18 of

greater area, the overlapping ends of adjoining sections 17 are both embossed, the inner section having outwardly projecting embossed portions 19 and the outer section having correspondingly shaped inwardly projecting embossed portions 20. The embossed portions 19 and 20 firmly abut each other and are secured together as in Figures 2 and 3 by rivets 21. The embossed portions 19 and 20 may be inclined, if desired, as in Figure 4, so that the discharging gases will impart rotation to the projectile.

In Figures 7, 8, and 9, the Venturi passages 22 at adjoining sections 23 are formed solely by circumferentially spaced tapering buttons 24 disposed between the circumferentially spaced ends of adjoining sections and secured thereto by rivets 25.

In each of the constructions described, a plurality of circumferentially spaced Venturi passages are provided between each pair of adjoining sections by simple means. In each case the rivets may be dispensed with, if desired, and the parts secured together by welding.

By arranging the parts and Venturi passages in the manner described it is possible for a given diameter of projectile to use a mass of the rocket charge greater than has been heretofore possible with the result that greater velocity and, hence, greater range and striking power are attainable.

Depending on the length of the projectile or the amount of rocket charge desired any number of sections may be utilized.

Various changes may be made in the detailed construction and arrangement of the parts described without departing from the spirit and substance of the invention, the scope of which is defined by the appended claims.

What is claimed is:

1. In a rocket projectile, a plurality of tubular sections, the adjacent ends of adjoining sections being overlapped with each other, one of said sections at its overlapped region having a plurality of circumferentially spaced embossed portions radially abutting the adjacent section, said embossed portions being contoured to define a plurality of circumferentially spaced Venturi passages with the overlapped regions of said sections, and means securing the adjoining sections together through said embossed portions.

2. In a rocket projectile, a plurality of tubular sections, the adjacent ends of adjoining sections being overlapped with each other, one of said sections at its overlapped region having a plurality of circumferentially spaced embossed portions radially abutting the adjacent section, said embossed portions being contoured to define a plurality of circumferentially spaced Venturi passages with the overlapped regions of said sections, and means securing the adjoining sections together through said embossed portions, the walls of each of said passages being divergent in an axial direction.

3. In a rocket projectile, a plurality of tubular

sections, the adjacent ends of adjoining sections being overlapped with each other, one of said sections at its overlapped region having a plurality of circumferentially spaced embossed portions radially abutting the adjacent section, said embossed portions being contoured to define a plurality of circumferentially spaced Venturi passages with the overlapped regions of said sections, and means securing the adjoining sections together through said embossed portions, the walls of each of said passages being divergent both in an axial and a radial direction.

4. In a rocket projectile, a plurality of tubular sections, the adjacent ends of adjoining sections being of different diameters and the smaller diametered end extending within the larger diametered end, said smaller diametered end having a plurality of circumferentially spaced embossed portions extending outwardly toward and abutting the surrounding section, and means securing said embossed portions to the surrounding section, said embossed portions being contoured to define Venturi passages with the adjoining embossed portions and the surrounding section.

5. In a rocket projectile, a plurality of tubular sections, the adjacent ends of adjoining sections being of different diameters and the smaller diametered end extending within the larger diametered end, said smaller diametered end having a plurality of circumferentially spaced embossed portions extending outwardly toward the surrounding section and the surrounding section having a corresponding number of correspondingly shaped circumferentially embossed portions abutting the embossed portions of the surrounded section, and means securing said sections together through said embossed portions, said embossed portions being contoured and cooperating with each other to define a plurality of Venturi passages.

6. In a rocket projectile, a plurality of frusto-conical hollow sections having a common axis, each section having its smaller diametered end surrounded by the larger diametered end of an adjacent section, at least one of the surrounded and surrounding ends having a plurality of circumferentially spaced embossed portions radially abutting the other, and means securing said sections together through said embossed portions, said embossed portions being contoured to define Venturi passages leading from the interior of said sections.

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The following references are of record in the file of this patent:

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