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ROCKET SHELL

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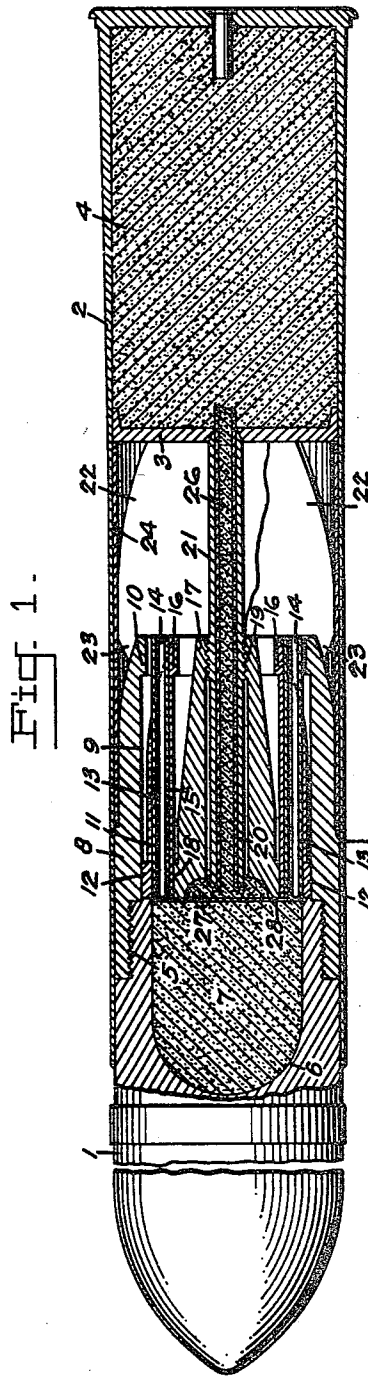


Fig. 1.

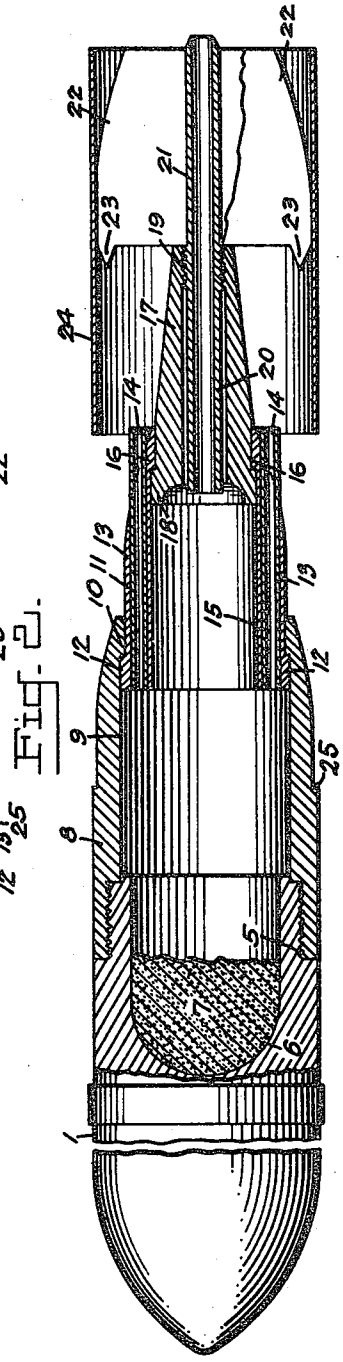


Fig. 2.

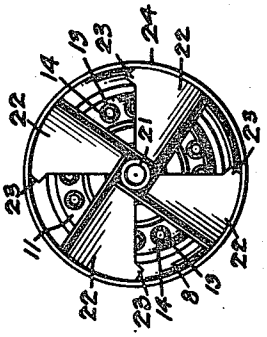


Fig. 3.

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ROCKET SHELL

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12 Claims. (Cl. 102—38)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to a shell and more particularly to a shell which is provided with rocket means to augment the action of the propellant charge in the gun.

It is an object of this invention to decrease the recoil force upon a gun and increase the efficiency with which the shell may be propelled along the trajectory.

The exact nature of the invention as well as other objects and advantages thereof will be apparent from the description of a preferred embodiment as shown in the accompanying drawing in which:

Fig. 1 is a longitudinal sectional view of a complete round including my invention.

Fig. 2 is a similar view of the projectile in the position it will occupy during flight conditions.

Fig. 3 is a rear end elevational view corresponding to Fig. 2.

Referring to the drawing by characters of reference there is shown in Fig. 1 a complete round of ammunition comprising a projectile body 1, preferably hollow for the reception of a suitable explosive charge, a cartridge case 2 and a disk 3 to receive and communicate the force of the explosion of the propellant 4 to the projectile 1. The base of the projectile 1 is reduced in diameter and provided with external threads as at 5 while a cup like cavity 6 extends forward into the body of the projectile a sufficient distance to house the auxiliary propellant charge 7 of type suitable for propelling a rocket. A barrel segment 8 is provided with internal threads adapted to engage the threaded rear end of the projectile and provide a hollow extension thereof. The barrel segment 8 is provided with a cylindrical bore 9 the rear end of which is partially obstructed by the flange 10 formed by reducing the diameter of the bore. Slidable in the bore 9 is a tube segment 11 which is provided with a flange 12 engageable with the flange 10 to limit the rearward movement of the tube segment. Parallel with the axis of the tube segment and uniformly spaced about the circumference thereof are a plurality of tube receiving bores 13 which communicate with the interior of the barrel and are provided with rocket tubes 14. The tube segment 11 is provided with an internal bore 15 having a flange portion 16 of reduced diameter and slidable therein is the tail segment 17 which has a flanged portion 18 engageable with the flange 16 to limit rearward movement of the tail segment with relation to the tube segment. The tail segment is preferably tapered rearwardly and is provided at 19 with internal threads which receive the fuse tube 20. The fuse tube 20 extends forwardly through the

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tail segment to communicate with the cavity 6. The fuse tube is provided with a rearward extension 21 to which a plurality of curved vanes 22 are secured by welding or other convenient means. Preferably the vanes are provided at their front ends with nibs 23 which are designed to engage the tapered rear end of the barrel segment and assist in centering the vane assembly during the action of the propellant in the gun. Optionally a cylindrical tail member 24 may be secured to the outside of the curved vanes 22 by welding or other convenient means, and may conveniently be carried forward into engagement with an external flange 25 on the barrel segment 8.

A delay train 26 or other suitable time fuse means is provided in the fuse tube 20 to carry ignition from the propellant 4 to the front end of the tail segment. A priming charge 27 is preferably contained in the forward end of the tail segment and may be separated from the auxiliary propellant 7 by means of a powder gasket 28 or similar convenient means.

The operation of the device may be summarized as follows: Upon firing of the main propellant 4 the projectile assembly will be impelled through the barrel, the disk providing a gas tight seal with the fuse tube by reason of the tapered joint therewith and by reason of the skirt providing a tight seal with the walls of the bore. At the same time the delay train 26 in the fuse tube will be ignited and, by the time the projectile assembly has cleared the gun muzzle a sufficient distance to insure safety to the gun crew and avoid disclosing the gun position, will ignite the priming charge 27 which will in turn fire the auxiliary propellant 7. The auxiliary charge 7 will extend the tube and tail segments, and the blast of gas escaping through the fuse tube 20 and the rocket tubes 14 will, by reaction, exert an additional propelling influence on the projectile assembly. The deflection of the blast from the rocket tubes by the curved surface of the vanes will tend to stabilize the assembly by maintaining it in rotation about the axis to some extent, although the bulk of the stabilizing influence will come from the flow of air through the vanes. It will be obvious that the sabot will probably be separated from its tapered engagement with the fuse tube by the force of air resistance and will be definitely separated by the initial blast from the rocket tubes.

It is obvious that a projectile of this nature may be fired from either a rifle or smooth bore weapon although it is probable that higher accuracy may be obtained by initially rotating the assembly, as in firing from a rifled bore.

I claim:

1. A round of ammunition comprising a primary propellent charge, a projectile including a

rocket propellent charge and racket tubes communicating with said propellant charge, a fuse tube leading through said projectile to said rocket charge, a disk bearing on the rear end of said projectile to transmit the thrust from the primary propellent charge to the projectile, an aperture in said disk in substantially gas tight engagement with the exterior of said fuse tube, and a delay fuse passing through said fuse tube to transmit ignition from the primary propellant to the rocket propellant.

2. A projectile comprising a hollow body having a boat-tailed rear end, a telescoping tail structure capable of being received in said hollow body, vanes on said tail structure bearing on the rear end of said body when the tail is telescoped, and forwardly extending nibs on said vanes bearing on the boat-tail portion of the body whereby the telescoped tail structure is positively centered in relation to the body.

3. A projectile comprising a hollow body portion, a tubular extension on the rear end of said hollow body having a tapered rear end, telescoping tail segments receivable in said tubular extension and capable of limited rearward extension therefrom, tail vanes on the rearmost tail segment engageable with the tapered rear end of the extension when the tail segments are telescoped, a rearwardly facing flange on said tubular extension, and a cylindrical stabilizer secured to said tail vanes and bearing against the flange when the tail vanes engage the rear of the tubular extension.

4. A projectile as described in claim 3, a rocket charge in said hollow body portion, rocket orifices in at least one of said tail segments, and fuse means to ignite said rocket charge.

5. A projectile as described in claim 3, said tail vanes being curved to maintain the assembly in rotation during flight.

6. A projectile as described in claim 3, forwardly extending nibs on said tail vanes capable of engaging the exterior of said tapered rear end portion.

7. A projectile as described in claim 3, a rocket charge in said hollow body, delay fuse means passing through the rearmost tail segment into communication with said charge, and rocket orifices in said segments for propulsion of said projectile.

8. A projectile comprising a hollow body having an auxiliary propellent charge in its forward portion, inner and outer telescoped tail segments normally within the body with their inner ends adjacent said charge, rocket tubes in the outer tail segment in communication with said auxiliary propellant charge, a delay fuse carried by the inner segment for igniting the auxilary charge, the telescoped segments being adapted to be extended with relation to each other and to the hollow body, means for limiting the rearward extension of the outer tail segment with relation to said body and means limiting the rearward movement of the inner segment with relation to the outer segment, and means for igniting the delay fuse at the beginning of the projectile flight.

9. A projectile comprising a hollow body having an auxiliary propellent charge in its forward portion, inner and outer telescoped tail segments normally within the projectile body with inner front ends adjacent said charge, a delay fuse carried by the inner segment for igniting the charge, the telescoped segments being adapted to be extended with relation to each other and to the projectile body, means for limiting the rearward extension of the outer segment with relation to the projectile body, and means for limiting the extension of the inner segment with relation to the outer segment, open end rocket tubes arranged around the periphery of the outer segment communicating with the gas chamber formed in the projectile body upon the extension of the outer tail segment, and means for igniting the delay fuse at the beginning of the projectile flight.

10. A round of ammunition comprising a primary propellant charge, a projectile comprising a hollow body portion defining a chamber, a rocket charge in said chamber, a rearward extension on said body, inner and outer tail segments normally telescoped within said extension, rocket orifices in at least one of said tail segments, and stabilizing vanes on the inner tail segment and normally spacing said rearward extension from the primary propellant charge.

11. A round of ammunition comprising a primary propellant charge, a projectile comprising a hollow body defining a chamber, a rocket charge in said chamber, a rearward extension on said body, inner and outer tail segments normally telescoped within said extension, rocket orifices in the outer segment, a fuse tube in the inner segment and communicating at its forward end with the rocket charge and its rear end with the propellant charge, a fuse in said tube for igniting the rocket charge, said fuse tube serving to augment said rocket orifices after the ignition of said rocket charge.

12. The invention of claim 11 characterized in that the fuse tube is extended beyond the rear end of the inner tail segment and stabilizing circularly spaced curved vanes are secured to said tube extension and normally space said rearward extension from said propellant charge, said vanes being positioned to receive the blasts from the said rocket orifices whereby said vanes are moved from normal to a position remote from the extension of the projectile body during the flight of the projectile.

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