DISPOSABLE PROJECTILE LAUNCHER
OF THE RECOILLESS TYPE

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References Cited
UNITED STATES PATENTS
3,122,059 2/1964 Choate et al. ...................... 89/1.813
3,376,784 4/1968 Abramson .......................... 89/1.703
3,380,340 4/1968 Bergman et al. .................... 89/1.706
3,494,249 2/1970 Choate ............................ 89/1.8

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ABSTRACT
A disposable projectile launcher is disclosed in which a round of ammunition includes a tubular case section having a nozzle and enclosing a projectile and a propellant charge and slidable fitting within the rear end of a launcher section so that the two sections can have a shortened, inoperative relationship and an extended, operative relationship. Firing means are connected to the round and include a trigger carried by the launcher section and operable only in the operative relationship of the sections. A gas pressure retaining seal between the overlap of the sections in their operative relationship maintains internal pressures suitable for the efficient burning of the propellant. The projectile has a releasable connection with the case section at the nozzle end thereof.

33 Claims, 25 Drawing Figures
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DISPOSABLE PROJECTILE LAUNCHER OF THE RECOLLECTS TYPE

This application is a continuation-in-part of my co-pending application, Ser. No. 159, filed Jan. 2, 1970, now abandoned.

The present invention relates to projectile launchers, particularly to those functioning as a container for a round of ammunition and disposable after the discharge of the contained projectile.

Rocket launchers that are sufficiently light and compact to be carried and operated by one man have proved to be effective weapons. Such launchers have first and second tubular sections that are telescopically connected, the smaller or second section being the breech end of the launcher and housing the rocket, the launcher being extensible from a shortened, inoperative relationship into an extended operative relationship. Launchers of this type are illustrated by U.S. Pat. No. 3,122,059, No. 3,200,708, No. 3,256,777, and No. 3,370,578.

Such launchers are lightweight and strong and are sufficiently inexpensive so that they may be discarded after the rocket carried therein has been launched. As demands grow for more powerful projectiles so do the problems of maintaining the launchers sufficiently light in weight and low in cost for disposable uses.

In U.S. Pat. No. 3,494,249, dated Feb. 10, 1970, owned by applicant's assignee, a weapon is disclosed consisting of a forward launcher section and a round of ammunition whose casing is sufficiently strong to withstand the pressure of its contents. The projectile charge when ignited. Means are provided to enable the forward part of the casing to be detachably attached to the breech of the launcher section, the attaching means also functioning to provide a gas-tight seal. This construction enables each casing section to serve as a discardable launcher section with the forward section being reusable with other like rounds of ammunition to have the disadvantageous feature of the types that are not self-contained, i.e., the weapon and its ammunition are separate.

The general object of the present invention is to provide projectile launchers combining the advantages of launchers of the type disclosed in said patents with those of the type disclosed in U.S. Pat. No. 3,494,249, an objective attained by utilizing a round of ammunition having a case section encasing the projectile and the propellant charge and functioning as the inner, rearward section of a disposable extensible launcher, the launch including a gas seal between the overlap of the sections. The extended relationship that is adapted to maintain pressures within the launcher suitable for efficient burning of the propellant. The projectile, which may be a rocket, is attached to the case section at the nozzle end thereof by means of a connection extending through the propellant charge and releasable in response to pressures attendant the burning of the charge.

Another objective of the invention is to provide a round of ammunition having a bulkhead between the projectile and the propellant charge with retaining means extending axially through the propellant charge and having a connection with the nozzle end of the case section and a connection with the projectile, one connection of a type that is released once the projectile is air borne. Preferably the retaining means is releasable with respect to its connection to the nozzle end of the case in order that it may serve as a stabilizer for the bulkhead for a substantial part of its flight to ensure its travel so as not to endanger friendly personnel in an immediate forward area. Preferably the retaining means includes a plug seated in the nozzle end of the case section.

Another objective of the invention is to provide an obturator between the projectile and the propellant charge with the obturator being effective with respect to both to the case section and the launcher section, the diameter of which is greater than that of the case section, an objective attained by means of a cylindrical, rearwardly disposed, expansible bulkhead flange or skirt, an annular seal mounted on the periphery of the bulkhead and of V-shaped cross section with its outer wall of a cross sectional shape providing increased resistance as it is forced outwardly to the larger diameter of the launcher section, and preferably by means of both the flange and the seal with the seal then functioning as a back-up for the expandable skirt.

Yet another objective of the invention is to provide firing means that comprise a tubular member with one end fixed on the nozzle end of the case section and the other end extending freely into a housing on the launcher section and there having an axial chamber in the rear of which there is a primer for the ignition of a firing line extending rearwardly through the tubular member and operatively connected to ignition means within the round. A seat is slidably confined in the chamber and is moved forwardly therein against the action of a firing spring by its engagement with a trigger portion during the short relative movement of the launcher sections from a partly extended relationship into their fully extended, operative relationship.

Another objective of the invention is to provide a round of ammunition having a connection between its projectile and bulkhead that is self-releasing once the projectile is free of the launcher section with one such connection being actuated by self-erecting projectile fins and another such connection having radial pins held by the case section in a position interconnecting the bulkhead and projectile but spring-ejected once the projectile is air borne.

A further objective of the invention is to provide trigger mechanism having a rear-engaging portion transversely movable into a rear-releasing position together with a safety operable to block such trigger movement.

Another objective of the invention is to provide firing means that includes a rotatable seat between the trigger and the firing member.

In the accompanying drawings, there is shown embodiments of the invention illustrative of these and other of its objectives, novel features, and advantages.

In the drawings:

FIG. 1 is a perspective view of the launcher in its shortened, inoperative position;

FIG. 2 is a like view but with the launcher extended into its operative position;

FIG. 3 is a section, on an increase in scale, taken approximately along the indicated lines 3—3 of FIG. 2;

FIG. 4 is a fragmentary, longitudinal section showing the forward part of the round and the rear part of the launcher section with the two sections in their operative relationship;

FIG. 5 is a fragmentary, longitudinal section showing the rear part of the round;

FIG. 6 is a section taken approximately along the indicated lines 6—6 of FIG. 5;

FIG. 7 is a fragmentary top plan view of the launcher with the two sections so extended that only short further movement is required to bring them into their operative relationships, the housing being broken away to show the firing means;

FIG. 8 is a like view but with the launcher sections in their operative relationship and the safety released;

FIG. 9 is a fragmentary perspective view, on an increase in scale, of the parts of the firing means within the housing;

FIG. 10 is a fragmentary section, on a further increase in scale, taken longitudinally of the firing means in the position thereof illustrated by FIG. 7;

FIG. 11 is a like section but illustrating cocking of the firing means as the launcher sections are being further extended from their position illustrated by FIG. 7;

FIG. 12 is a like view illustrating the travel of the round when released by the trigger;

FIG. 13 is a like view showing the firing pin driven in firing contact with the primer when the rearward travel of the seat is arrested;

FIG. 14 is a fragmentary longitudinal section illustrating a round of ammunition in accordance with another embodiment of the invention;

FIG. 15 is a fragmentary, longitudinal section illustrating a seal between the launcher sections illustrating yet another embodiment of the invention;
When the rocket launcher has been extended so that only a short further movement will establish its operative position, see FIG. 7, the sear 45 engages the wall portion 34 and, on such movement, it is carried forward as shown in FIG. 46, see FIG. 8. It will be noted from FIG. 10 that when the firing means is uncocked, the sear 45 engages the head 49 of the firing line 48. While the firing pin 53 is or may be in contact with the primer 50, its permitted travel is too short to cause accidental ignition under any circumstances. When the sear 45 is in its cocked position and the firing device is in the act of firing, the momentum of the sear 45, under the influence of the firing spring 46, results in the firing pin 53 being impelled against the primer 50, causing its ignition, as will be appreciated from a comparison of FIGS. 12 and 13.

Until the trigger 33 is actuated, its wall portion 34 holds the sear 45 against being moved by the firing spring 46. When the trigger is so actuated, the sear 45 is free to move when the slot portion 37 of the wall portion 34 comes into registry therewith. It a safety, generally indicated at 55, and best seen in FIGS. 7, 8, and 9 includes a slide portion 56 through which the tubular member 38 freely extends and which has an offset, forwardly extending arm 57 terminating in a lock 58 dimensioned to fit the slot 36 and the slot portion 37, see FIG. 3, thus to hold the trigger 33 against movement until the safety 55 has been pulled rearwardly to a predetermined extent. The slide portion 56 has a pair of rearwardly extending resilient arms 59, each terminating in a finger grip 60 and having a pair of longitudinally spaced notches 61 and 62. The rear end of the housing 25 has an inwardly disposed shoulder 63 at each side to catch in the appropriate notch 61 when the safety 55 is in its operative position, see FIG. 7, and disengageable therefrom when the arms 59 are squeezed towards each other and to catch in the appropriate forward notch 62 when the safety 55 is then pulled rearwardly until the stop 64 engages one of the shoulders 63 and the arms 59 released, the lock 58 then being withdrawn from its operative position, see FIG. 8.

Turning now to FIGS. 4–6, it will be noted that the round of ammunition includes a projectile 65, a propellant charge 66, a bulkead 67 between the projectile and the propellant charge, and a support 68 in the form of a plug closing the nozzle 22 and carrying an axial, tubular member 69 having a series of vents 70 and supporting an igniter 71 to which the firing line 48 is operatively connected.

The front end of the tubular member 69 is threaded to receive the plug 72 having an easily broken connection 72 with a plug 74 threaded axially into the rear face of the bulkhead 67. With this arrangement, the connection 73 releases the bulkhead in response to pressures developing when the propellant charge 66 is ignited. The bulkhead 67 has an annular obturator 75 ensuring the tight sealing of the bulkhead as it and the projectile 65 are discharged. It will be noted that the projectile 65 has a shoulder 76 seated against the forward end of the case section 21 and is thereby held against rearward movement. The projectile 65 is connected to the bulkhead 67 thereby to prevent its forward movement, the bulkhead 67 being connected to the nozzle end of the section 21 as has previously been noted. The connection between the projectile 65 and the bulkhead 67 is shown as comprising an axial projection 77 on the front face of the bulkhead 67 and entrant of a socket 78 in the rear end of the projectile 65. The projection 77 has a transverse bore 79 containing a pair of detents 80 resiliently urged by a spring 81 into aligned radial bores 82 with which the rear projectile end is formed thereby to connect the projectile 65 to the bulkhead 67.

The projectile 65 is shown as having guidance fins 83 connected to its rear part by pivots 84 and held in their inoperative position prior to launch by the sections 21 and 23 but yieldably urged into an erected position by springs 85 once the projectile is in air borne. Each fin 83 has a cam portion 86 seating a retainer 87 against a detent 80 and operative, as the fins become erect, to store the cavitation energy 88 imparted to the retainer 87 by the cam portion 86 inwardly to an extent sufficient to disconnect the projectile from the bulkhead 67. A spring 88 held compressed...
in the socket 78 is provided then to ensure the separation of the projectile 65 from the bulkhead 67. From the foregoing, it will be apparent that weapons in accordance with the invention are well adapted to meet a wide range of requirements but its functioning depends on an effective seal between the overlapping portions of the sections in their extended relationship as leakage would not only imperil the user but would also effect the burning of the fuel as to impair seriously the effectiveness of the round, the burning of the propellant within a casing involving pressure problems not encountered with exhaust gasses discharged from rockets. At the same time the sealing means between the sections must not make their relative movement too difficult.

In accordance with this requirement, the launcher section 23 is provided with a rearwardly projecting sleeve 89 having a series of annular channels 90, see FIG. 4. The rearmost channel 90 is shown as having a seal 91 of the O-ring type confined therein and in engagement with the case section 20 while the other channels 90 function as gas expansion chambers to ensure a reduction of the gas pressure to a level that the seal 91 can withstand. With a seal arrangement ensuring gas expansion with corresponding pressure reduction, the round of ammunition can be safely fired without loss of propellant efficiency.

When the launcher is in its extended, operative position, the firing means is cocked but the safety 55 is in its operative position. It will be apparent that the firing means may be uncoupled by releasing the latch 43 and telescoping the sections to return the launcher to its shortened, inoperative position. When the safety 55 is released, and it may at any time be returned to its operative position, the trigger 33 may be squeezed towards the opposite side of the chamber 25 with the resulting release of the seat 45 effecting ignition of the propellant charge 66. When the pressure within the case section 21 builds up to a predetermined extent, the connection 73 falls with the bulkhead 67 travelling with the projectile 65 but being separated therefrom when the projectile is air borne. The plug 68 and tube 69 are driven rearwardly by exhaust gasses.

Rearward travel of the plug 68 is desirably minimized and in FIG. 14 there is shown a preferred plug construction with parts corresponding to the previously described embodiment distinguished by the suffix addition "A" to the appropriate reference numerals. The plug 68A is shown as in the form of a cup consisting of identical sections whose abutting edges have a tongue and groove interlock 92. The firing tube 69A extends through the end wall of the plug 68A to receive the tubular member 38A and has oppositely disposed flanges 93 one in engagement with each plug section and having a weakened area 94 thereby to respond to shear forces during the burning of the propellant charge. This construction not only has the advantage that the firing tube 69A travels with the bulkhead of the round but also provides a plug of minimum weight consisting of sections that separate as the plug 68A is dislodged.

As previously stated, the sealing of the overlap between the sections against gas leakage is essential and while that previously detailed is effective, the embodiment illustrated by FIG. 15 may be used if a substantial difference in the diameter of the launching sections can be tolerated. In this embodiment of the invention, parts corresponding to previously described embodiments are distinguished by the suffix addition "B" to the appropriate reference numerals. The forward end of the case section 21B is provided with an annular member 98 having a rearwardly opening annular channel 99 shown as having a sealing ring 97 lodged therein. The breech end of the launcher section 23B has an annular portion 98 having a bearing 99 engageable with the case section 21B and having a forwardly disposed, annular flange 100 shaped and dimensioned for sliding entry into the channel 96 and into seating engagement with the sealing ring 97.

In practice, the nozzle 22 is slotted as at 101 so that the firing line 48 is not exposed outside the nozzle. A plastic spray indicated at 102 provides an effective seal against moisture leakage into the round. It will be noted from FIG. 14 that a similar seal 102A is provided for the plug 68A.

The embodiment of the invention illustrated by FIGS. 18-25 is shown as employing an ignition system of the type illustrated in U.S. Pat. No. 3,256,777 but with important differences.

The round of ammunition has a tubular launcher section 103 and a case section 104 slidably fitted within the rear end thereof and having its breech end in the form of a nozzle 105. At the rear end of the section 103 there is an annular band 106 whose rear portion 106A is dimensioned to closely fit the case section 104 and has an annular cavity 107 between its ends for a sealing ring 108 of V-shaped cross section and disposed to expand to any gas leakage between the sections when the round is discharged.

The nozzle 105 of the case section 104 is shown, see FIG. 19, as supporting a housing generally indicated at 109 having a chamber 110 for supporting the ignition cap 111 in a position to be engaged by the firing pin portion 112 of the firing member 113. The firing pin portion 112 is within a chamber 114 of the housing 109 and has a flange 115 engaged by the firing spring 116 backed by a retainer 117 at the forward end of the chamber 114. A cushioning spring 118 is located between the rear end of the chamber 113 and the flange 114. A passageway 119 between the chambers 110 and 114 receives the extremity of the firing pin portion 112 to enable it to strike the cap 111.

A U-shaped channel member 120, secured to the housing 109 extends forwardly into a housing 121 extending lengthwise of and secured to the launcher section 103 and within the channel member 120 is slidably backed by a support 122. The channel member 120 slidesly supports the firing member 113 and its extension 123. As disclosed in said Patent No. 3,256,777, a self-erecting rear sight 124 is pivotally connected to the rear end of a trigger chamber 121A defined by an enlarged rearward portion. The rear sight 124 is so mounted that it may be swung rearwardly to occupy, in the shortened inoperative position of the launcher, the chamber 125 with which the housing 109 is provided and then spring into its operative position, see FIG. 22, when the launcher is extended for use.

Also, as disclosed in said Patent No. 3,256,777, the housing 121 has, at its front end, an upwardly opening slot 126, see FIG. 23, and has a self-erecting front sight 127 therein and attached thereto by a transverse pivot 128. The front sight 127 is normally held within the housing 121 by a holder 129 pivotally connected to the forward end of the channel member 120 and including a latch 130. The latch 130 in the extended, operative position of the launcher, engages the forward edge of a boot-covered port 131 thus to provide a releasable lock holding the extended launcher against becoming accidentally shortened. The holder 129 is yieldably urged upwardly by one end of a spring 132 centrally secured to the channel member 120.

The firing member 113 and its extension 123 are interconnected within the trigger chamber 121A. As may be seen in FIG. 25, the extension 123 is wider than the firing member 113 and the connection is effected by means of a reverse bend 123A adjacent the rear end of the extension 123 and having a slot 123B through which extends the hook portion 113A at the forward end of the firing pin member 113, the hook portion 113A being entrant of a slot 123C in the extension 123. This construction provides a shoulder 133 at the rear end of the extension 123.

The trigger chamber 121A has a boot-covered slot 134 in its top wall. A trigger 135 within the chamber 121A is transversely pivoted thereto and has a portion yieldably disposed upwardly through the slot 134 by a spring 136. The trigger 135 engages the shoulder 137A of a rotatable seat 137 mounted on a transverse pivot 138 and having transversely spaced shoulders 137B straddling the firing pin member 113 with each shoulder 137B in a position to be engaged by the shoulder 133 as the launcher is extended for use. The rotatable seat 137 is provided with a spring 139 yieldably urging the seat 137 to turn in a clockwise direction.

The extension 122 of the firing member 113 and the channel member 120 are normally interconnected. To this end, a
latch 140 is pivotally connected to the front portion of the channel member 120 and is yieldably held seated therein by the rearwardly disposed portion of the spring 132. The latch 140, see FIGS. 22, 24, and 25, is also continually connected by a hinge and upwardly inclined extension 140B. The hook 140A extends through a slot 123D in the extension 123 and into a slot 120A in the channel 120 thus interconnected them. It will be noted that the slot 123D is substantially longer than the slot 120A thus to enable the member 123 to be moved a short distance forwardly relative to the channel member 120. In this connection, compare FIG. 23 with FIGS. 22 and 24. It will be noted that until the latch is substantially fully extended, the latch 140 is held in its operative position both by the rearwardly disposed spring portion of the spring 132 and by the top wall of the housing 121 until the latch is nearly fully extended.

Relative movement between the launcher and case sections, results, when the launcher is nearly fully extended, in the rear shoulders 137B coming into engagement with the shoulders 133, see FIGS. 23 and 25, thus forcing the firing member extension 123 and the firing member 113 forwardly relative to the channel member 120 tensioning the firing spring 116 with the latch 140 being operated forwardly and rearwardly in the launcher sections in their operative relationship. The shoulder 137A of the rear 137 is thus brought into engagement with the trigger 135. The spring-tensioned rear 137 ensures a resistance to trigger actuation that will be uniform from launcher to launcher.

As shown 141, see FIGS. 22 and 24, is slidably supported within the trigger chamber 121A and is provided with a rod 142 extending forwardly thereof and provided with a grip 143 by which it may be pulled forwardly from its operative “on” position into its inoperative “off” position against the action of the spring 144. In the operative position, see FIG. 24, the safety 141 underlies the trigger 135 to prevent its actuation. The safety 141 has a channel 141D dimensioned to accommodate the latch when positioned in an inoperative position as will presently be described and having a forwardly and downwardly inclined wall 141C. The safety 141 is also provided with a rearwardly disposed shelf 141D.

When the latch is fully extended, the latch 140 is still operative to limit rearward movement of the firing member relative to the channel member 120. In order that the round may be fired, the latch 140 must be held in an inoperative position. When the latch is fully extended, but with the safety 141 in its operative position, the latch 140 is so positioned that when the safety 141 is in its inoperative position, the shelf 141D engages and cam upwardly the latch hook until it is caught by the shelf 141D thus holding the safety 141 in said inoperative position and permitting rearward movement of the firing member to effect engagement of the firing pin portion 112 with the ignition cap 111. The safety 141 may be returned to its operative position with the latch 140 then being released.

Turning now to the launcher section 103 and the case section 104, it will be seen that the nozzle 105 is closed by a plug 143 carrying an annular seal 144 and having an internal axial cavity 145 for the ignition charge 146 with which the tube 111A forms the ignition chamber 110 in communication. The projectile 147 is or may be identical to that described in connection with the other embodiments and will, accordingly, not again be detailed except for its releasable attachment to the generally indicated bulkhead 148, see FIGS. 19 and 21, into which is threaded one end of a rod 149 whose other end extends axially through the plug 143 and a washer 150 with a clamping nut 151 threaded on its exposed end thereby to lock the projectile against accidental forward movement. Rearward movement of the projectile is prevented by the projectile shoulder 152 which is engaged by the forward end of the case section 104. The rod 149 is designed to break in response to pressures attendant the firing of the round and such separation is desirably effected close to the plug 143 in order that the rod 149 may function as a flight stabilizer for the bulkhead. The weakened area of the rod 149 is indicated by the transfer bore 149A.

The bulkhead 148 is shown as consisting of a forward plate 153 and a rearward relatively thick member 154 having a rearwardly disposed cylindrical flange 155 providing both a cup to receive the sticks of the propellant charge 156 and an integral skirt sufficiently thin to be responsive to gas pressures when the charge 156 is ignited and become sized to the inside diameters of the sections 103 and 104 and in this manner secure the desired obturating functions. The member 154 has a forward shoulder which with the plate 153 provides a channel for the annular seal 158. The seal 158 is shown as V-shaped and is disposed to have its outer wall expanded into sealing relation with the launcher sections 103 and 104. Because of the two part construction of the bulkhead 148, the seal 158 need not be expansible and may be of plastic or metal provided its outer wall can be temporarily or permanently sized to the inside diameter of the launcher section. Such a seal may be used by itself but the combination of the seal 158 and the expansible skirt 155 is desirable.

The propellant charge 156 is shown as comprising a multiplicity of sticks with forward ends embedded in a plastic 159 and their rearward ends spaced from the plug 143 to provide a mixing chamber 160. The rear face of the bulkhead member 154 is shown as having annular channels 161 which anchor the plastic mass.

The bulkhead plate 153 is shown, see FIGS. 20 and 21, as having a series of accurately spaced, forwardly disposed projections 162 positioned between the fins 163 of the projectile and having radial bores 164 which overlie seats 165 on the rear end of the projectile. Headed pins 166 are fitted in the bores 164 and those are dimensioned so that when they are entrant of the seats 165, the heads are in contact with the case section 104. The heads are backed by springs 167 ensuring separation of the projectile from the bulkhead once the projectile is in flight. The bulkhead, however, travels with the projectile for a substantial part of its flight with the rod 149 functioning as a stabilizer for the bulkhead ensuring that it travels a distance such as to endanger friendly personnel located in the immediate forward area.

From the foregoing, it will be apparent that launchers in accordance with the invention are well adapted to provide an effective disposable unit meeting production and use requirements.

I claim:

1. A disposable projectile launcher comprising a round of ammunition and a tubular launcher section, said round of ammunition comprising a tubular case section having a nozzle at its rear end and a projectile, a propellant charge, and an intermediate bulkhead encased by said section, a connection between the bulkhead and the projectile releasable when the projectile is air borne, retaining means extending axially through the charge and including a connection with said nozzle and a connection with said bulkhead, one connection being releasable in response to gas pressures attendant the burning of the charge, said case section having sufficient wall strength to withstand gas pressures attendant the combustion of the propellant charge, said launcher section telescopingly receiving the case section within it and the nozzle exposed to enable the two sections to have a shortened, inoperative relationship and an extended, operative relationship, firing means connected to said charge and including a trigger mounted on said launcher section and connected to said firing means, obturator means between said projectile and said charge capable of with respect both to the case and said launcher sections and comprising a cylindrical, rearwardly disposed expansible bulkhead flange providing an integral skirt sizeable to the inside diameter of said sections in response to said gas pressure, and means to seal the overlap of the sections in their operative relationship and operable to maintain the gas pressure within the sections suitable for the efficient burning of the propellant charge.
2. The disposable launcher of claim 1 in which the obturator means also includes a sealing ring carried by said bulkhead forwardly of the expandable bulkhead skirt, the sealing ring being of a V-shaped cross sectional shape disposed to be expanded by any gas escaping by the skirt into sealing engagement with the launcher sections.

3. A disposable projectile launcher comprising a round of ammunition and a tubular section, said round of ammunition comprising a tubular case section having a nozzle at its rear end and a projectile, a propellant charge, and an intermediate bulkhead encased by said section, a connection between the bulkhead and the projectile releasable when the projectile is air borne, retaining means extending axially through the charge and including a connection with said nozzle and a connection with said bulkhead, one connection being releasable in response to pressures attendant the burning of the charge, said case section having sufficient wall strength to withstand gas pressures attendant the combustion of the propellant charge, said launcher section telescoping receiving the case section within it with the nozzle exposed to enable the two sections to have a shortened, inoperative relationship and an extended, operative relationship, firing means connected to said charge comprising a plurality of equally spaced, forwardly disposed section and connected to said firing means, an annular obturator, said bulkhead including forward and rearward members, said obturator being operatively positioned between them, said obturator including an annular wall expandable into obturating relationship with said launcher sections in response to said gas pressures, and means to seal the overlap of the sections in their operative relationship and operable to maintain the gas pressure within the sections suitable for the efficient burning of the propellant charge.

4. The launcher of claim 3 in which one of the bulkhead members includes an annular shoulder in support of the obturator disposed towards and closed by the other bulkhead member.

5. The launcher of claim 3 in which the retaining means includes a member on the forward end of which the bulkhead members are threaded.

6. A disposable projectile launcher comprising a round of ammunition and a tubular launcher section, said round of ammunition comprising a tubular case section having a nozzle at its rear end and a projectile, a propellant charge, and an intermediate bulkhead encased by said section, retaining means extending axially through the charge and including a connection with said nozzle and a connection with said bulkhead, one connection being releasable in response to pressures attendant the burning of the charge, said case section having sufficient wall strength to withstand gas pressures attendant the combustion of the propellant charge, firing means connected to said charge and including a trigger mounted on said lineage section and connected to said firing means, an annular seal, said bulkhead including forward and rearward members interconnected with said annular seal operatively positioned between them, said seal including an annular wall expandable into obturating relationship with said launcher sections in response to said gas pressure, and means to seal the overlap of the sections in their operative relationship and operable to maintain the gas pressure within the sections suitable for the efficient burning of the propellant charge.

7. A disposable projectile launcher comprising a round of ammunition and a tubular launcher section, said round of ammunition comprising a tubular case section having a nozzle at its rear end and a projectile, a propellant charge, and an intermediate bulkhead encased by said section, retaining means extending axially through the charge and including a connection with said nozzle and a connection with said projectile, one connection being releasable to said charge and including sufficient wall strength to withstand gas pressures attendant the combustion of the propellant charge, said launcher section telescoping receiving the case section within it with the nozzle exposed to enable the two sections to have a shortened, inoperative relationship and an extended, operative relationship, firing means connected to said charge and including a trigger mounted on said launcher section, a rear rearwardly supported by said launcher section, spring means yieldably urging the turning of the rear in one direction, said firing means including a firing member engageable with the rear in the extended relationship of the launcher section operable to turn the rear against the action of the spring means and to effect the operative relationship between the rear and the trigger, obturator means between said projectile and said charge operable with respect both to the case and said launcher sections, and means to seal the overlap of the sections in their operative relationship and operable to maintain the gas pressure within the sections suitable for the efficient burning of the propellant charge.
effect the release of the projectile from the bulkhead once the projectile is air borne.

10. A disposable projectile launcher comprising a round of ammunition and a tubular launcher section, said round of ammunition comprising a tubular case having a nozzle at its rear end, and a projectile and a propellant charge encased by said section, retaining means connecting said projectile to said case section to prevent axial movement of said projectile relative thereto in either direction but releasable in response to gas pressure developed during the burning of the propellant charge, the retaining means that prevent forward movement of the projectile including a connection with said nozzle, said case section having sufficient wall strength to withstand pressures attendant the combustion of the propellant charge, said launcher section telescopingly receiving the case section with it with the rear end of the case section exposed to enable the two sections to have a shortened, inoperative relationship and an extended operative relationship, firing means connected to said charge and including a trigger mounted on said launcher section and connected to said firing means and operable only in the operative relationship of the sections, obturator means between the projectile and said charge operable with respect both to the case and launcher sections, and a gas pressure retaining seal between the overlap of the sections in their operative relationship operable to maintain the gas pressure within the sections suitable for the efficient burning of the propellant charge.

11. The launcher of claim 10 in which the seal includes a forward, gas-expansion section and a rearward, annular compressible seal in physical contact with both sections.

12. The launcher of claim 10 in which the seal includes annular portions, one adjacent the front end of the case section and secured thereto and one adjacent the rear end of the launcher section and secured thereto, said annular portions being operatively engaged when the sections are in their operative relationship.

13. The launcher of claim 12 in which at least one annular portion is resilient.

14. The launcher of claim 12 in which at least one annular portion is resiliently compressible.

15. The launcher of claim 12 in which one annular portion has a concentric channel opening towards the other annular portion and the other annular portion includes an annular bearing in engagement with the section to which said one annular portion is secured and a concentric flange shaped and dimensioned for entry into the concentric channel in the operative relationship of the sections.

16. The launcher of claim 10 in which the retaining means includes a bulkhead member between the projectile and the propellant charge.

17. The launcher of claim 16 in which there is a connection between the projectile and the bulkhead member and including releasable means operable when the projectile is air borne.

18. The launcher of claim 17 in which the releasing means comprises an axial post extending forwardly from the front of the bulkhead member and includes a resilient detent, and the projectile includes a plurality of self-erecting fins, at least one for including a cam portion, the projectile also has an axial bore to receive the post of the bulkhead and a radial bore in communication therewith and which receives the detent when the post is seated in the axial socket, and a release pin in the radial bore is confined between the detent and the cam portion to effect the release of the detent when the fins are erected.

19. The launcher of claim 18 in which an ejection spring is held between the post and the axial socket when the detent connects the projectile to the post.

20. The launcher of claim 10 in which the retaining means that prevents forward movement of the projectile includes a plug member seated in the nozzle, a bulkhead, a connection between the bulkhead and the projectile that is releasable when the projectile is air borne, a connection between the bulkhead and the plug member extending through the propellant charge and releasable in response to pressure developing during the burning of the propellant charge.

21. The launcher of claim 20 in which the connection between the bulkhead and the plug member is a member extending axially through the propellant charge.

22. The launcher of claim 21 in which the connection between the bulkhead and the plug member is releasable with respect to the bulkhead.

23. The launcher of claim 21 in which the connection between the bulkhead and the plug member is releasable with respect to the plug member.

24. The launcher of claim 20 in which the connection between the bulkhead and the plug member is a perforated tube extending axially through the propellant charge, and the firing means includes a component within the tube.

25. The launcher of claim 20 in which the plug member consists of separable sections releasable from one another except when seated in the nozzle.

26. The launcher of claim 10 in which the launcher section has a lightweight housing having a latch-receiving opening, and the firing means includes a rigid member extending into the housing and secured to the nozzle end of the case section, the member has a spring-pressed latch entrant of the opening in the operative relationship of the sections, a firing spring, and a sear movable for compressing the firing spring, and the firing means also includes a trigger supported by the launcher section for movement transversely thereof with a portion thereof engageable by the sear during the short relative movement between the sections required to extend the sections into their operative relationship from a partly extended relationship and disengageable therefrom when the trigger is released.

27. The launcher of claim 26 in which the member in a tube having a chamber slidably confining the sear and supporting the spring between the sear and the forward end of the chamber, the firing means includes a firing line extending from the chamber through the tube and into the round through the nozzle end thereof, the firing line including a primer within the chamber, and the sear includes a primer-engaging firing pin supported thereby for movement relative thereto.

28. The launcher of claim 27 and a safety slideably lengthwise of the housing and including a portion engageable with the trigger and holding it against movement into its sear-releasing position.

29. The launcher of claim 28 in which the safety is slidably supported by the rigid tube.

30. The launcher of claim 26 in which the trigger portion has a transverse slot through which the tube extends and a vertical slot opening into the transverse slot and disposed and dimensioned to receive the sear when the trigger is released.

31. The launcher of claim 30 and a safety slidably supported by the launcher section and including a portion entrant of the slot and operable to block trigger movement into a sear-disengaging position.

32. The launcher of claim 28 in which the rear end of the housing includes an inwardly disposed detent portion and the safety includes a resilient arm having a recess entered by the detent portion in the operative position of the safety and manually engageable to be forced out of engagement with the detent portion and a stop operable to limit the extent to which the safety may be moved when thus released.

33. The launcher of claim 32 in which the arm has a second recess entered by the detent portion when its movement is prevented by the stop.