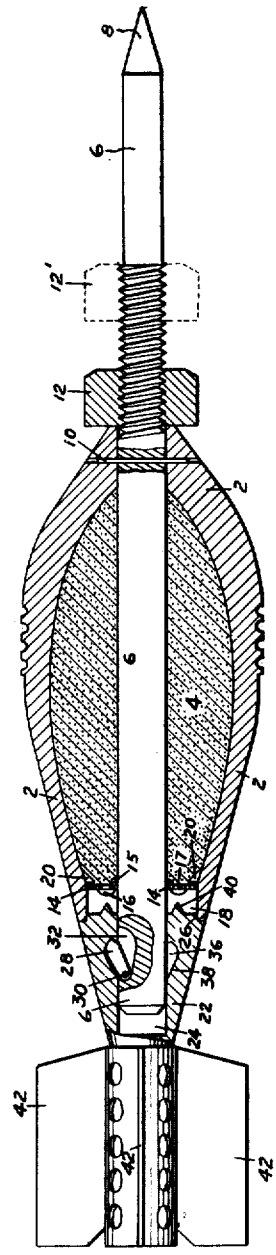
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MORTAR FLARE SHELL

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Inventor
Gerald H. Shea

By G. J. Kessenich & J. H. Church

Attorneys

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MORTAR FLARE SHELL

Gerald H. Shea, United States Army,
La Jolla, Calif.

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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 projectiles, and more particularly to flare-bearing projectiles which may be fired from small, mobile artillery such as trench mortars.

Observation of enemy terrain at all times is necessary for knowledge of enemy activity. Such observation is necessarily difficult at night, if not impossible, but it is then that observation is important because of the likelihood of enemy activity under cover of darkness. It therefore becomes desirable to provide troops with flares which give off a brilliant light, these flares to be disposed without warning in the enemy's midst. Moreover, disposition of the flares should be under the control of each rather small troop unit. Furthermore, the flares should be so constructed as to result in a minimum of risk to the troops using them.

It is an object of this invention to provide a flare in the form of a projectile which is readily and safely used by small bodies of troops and which produces a brilliant light upon impact. This object is achieved by the provision of a charge-containing projectile body in which a pointed rod extends through the body and is slidable relative thereto. Upon impact, the pointed rod penetrates soft earth, holding the flare-projectile substantially at the impact angle. A pin is sheared permitting the body to slide relatively to the rod. Thereupon, strikers mounted in an end cap or tailpiece strike ignition means on the rod, igniting the charge. Motion of the body and end cap relative to the rod serves to knock off the cap, permitting the charge to burn freely.

The single figure of the drawing is a view in longitudinal section of a flare-projectile made according to the invention.

A projectile body 2 of the conventional mortar type is shown, having a cavity adapted to receive a charge 4 suitable for the intended purpose. Where the projectile is to be used as a flare, the charge will be any substance which upon burning gives off a brilliant light. A rod 6, pointed as at 8, is mounted for limited sliding movement relative to body 2. Point 8 is provided to permit the projectile to stand, after impact, at substantially the angle of impact. The flare will thus be found to be more effective in lighting up the surrounding landscape, although it should be understood that the flare will operate even if lying on its side, which circumstance might occur in rocky or frozen terrain into which point 8 might not penetrate.

Movement of rod 6 relatively to body 2 is prevented by shear pin 10, which is of course broken upon impact of the projectile with the target. Nut 12 has threaded engagement with rod 6 and may be screwed tight against body 2 to prevent shearing of pin 10 upon accidental dropping of the projectile. Just before firing of the projectile, nut 12 will be screwed to the position shown in dotted lines, at 12'.

Inside body 2, a support 14 is secured to rod 6 by suitable means 15 such as welding, and priming charges 16 for igniting the illuminant through flash holes 17 are carried thereby. The ignition means used will of course depend upon the nature of charge 4. Support 14 also preferably serves as a guide to help maintain alignment of rod 6 in body 2. The cooperating part of body 2 is the portion 18 in which support 14 is adapted to slide. Ears or tabs 20 may be provided on body 2 to limit motion of the rod in the extruded position thereof.

An end cap for body 2 is provided in the form of a tailpiece 22 which has a central bore 24 to slidably receive the end of rod 6. A shoulder 26 is provided in cap 22 for cooperation with the open end of body 2, to assist in maintaining alignment of cap 22 on the rod. A key 28 is pivotally secured at 30 to rod 6, fitting in slot or recess 32 of the rod. Note that recess 36 has a sloping wall 38 which is adapted to cam key 28 into slot 32. The forward face of cap 22 carries strikers 40 which are adapted to engage and set off the ignition means 16 upon impact of the projectile.

Tailpiece 22 will also preferably be provided with the usual guide vanes 42, which tend to prevent tumbling of the projectile during flight.

In assembly, after rod 6 and charge 4 have been put in place in body 2, end cap 22 is slipped over the end of rod 6 and with the tail end of body 2 engaging shoulder 26 of cap 22. The parts are then turned to permit key 28 to drop into annular recess 36 by gravity. Collar 12 is then screwed up tight, further pulling body 2 and cap 22 together. Body 2 and cap 22 preferably fit together somewhat snugly, so that the friction between the mating parts will hold them together even after collar 12 is screwed to 12' just before firing, until the parts are separated upon impact, as described below. With the parts assembled as described and collar 12 screwed up tight against body 2, shear pin 10 is secured in

place. The holes in body 2 and rod 6 for pin 10 may be drilled before assembly if desired, but it will generally be found expedient to drill them after assembly.

Operation.—Before the projectile is dropped into the mortar, collar 12 is screwed as far forward as it will go. The projectile is then ready for use. It is fired from a mortar of proper caliber in the usual way. Upon impact of the projectile with relatively soft earth, point 8 penetrates the surface and tends to hold the projectile substantially at the angle of impact. The inertia of the body and the tail assembly carries those elements forward on rod 6, shearing pin 10 and causing sloping face 38 to cam key 28 into slot 32. Body 2 is carried forward, guided by engagement of rod 6 with the forward end of the body, and by support 14 sliding in the portion 18 of the body. Simultaneously, cap 22 carrying guide vanes 42 is likewise carried forward. The distance from the forward end of body 2 to the collar 12 in its unscrewed position at 12' is greater than the distance from strikers 40 to ignition means 16, insuring that cap 22 will move forward far enough to effect contact between the strikers and the ignition means. Furthermore, the distance from the tail end of rod 6 to the end of recess 24 is greater than the distance from the strikers to the ignition means. These strikers contact and set off the ignition means, which set fire to the charge 4.

It should be noted further that the distance from the forward end of body 2 to collar 12 at 12' is greater than the distance from the tail end of rod 6 to the end of recess 24, so that there will be a gap between the tail end of body 2 and end cap 22. End cap 22 will be knocked off the end of rod 6 by the contact of strikers 40 with the ignition means on support 14, or by the end of rod 6 coming into contact with cap 22 at the end of recess 24, in case the strikers break through the support. However, if these expedients fail to dislodge the end cap upon impact, the gases resulting from the burning of charge 4 will build up sufficient pressure to force it off.

It will of course be understood by those skilled in the art that the projectile of this invention is not limited in its application to flares. It could equally well be adapted to a smoke-producing means, or to the releasing of toxic gases, to incendiary missiles, or the like.

I claim:

1. In a projectile, the combination of a casing for holding an illuminant charge open at the tail-end and provided at the nose-end with an aperture, a tailpiece adapted to close the said open end of the casing and provided with a central recess, a rod slidably mounted in the said nose aperture of the casing and in the said central recess of the tailpiece, a disc carried by the said rod and provided on its side facing the said tailpiece with a priming charge, the said tailpiece being provided with a striker contactable with the said priming charge, means for engaging the said rod with the said tailpiece, the said means being disengaged from the tailpiece upon tailward movement of the rod, frangible means for securing the rod to the casing in position to maintain the tailpiece in closed relation to the casing, the said slide rod extending in front of the projectile nose and adapted upon contact with the target to slide tailward relative to the casing and tailpiece, the said frangible securing means fracturing upon the said contact with the target, the said tailward sliding of the rod being effective to contact its said priming charge disc with the said striker of the tailpiece to ignite the said illuminant charge and to push off the tailpiece to expose the open end of the illuminant charged casing.

2. The combination according to claim 1 wherein the said casing is provided with an internal bearing surface for the said disc.

3. The combination according to claim 1 wherein the said engaging means comprises a dog pivotally mounted on the said rod, a slot in the said rod to receive the said dog, and an annular recess in the said tailpiece, the wall of the said recess being sloped to cam the said dog into the said rod slot upon tailward movement of the rod to disengage it from the tailpiece.

GERALD H. SHEA.