Oct. 17, 1961 A. M. JOHNSON 3,004,360

TARGET PROJECTING DEVICE UTILIZING A CAN AND A BLANK CARTRIDGE

Filed March 11, 1960 2 Sheets-Sheet 1

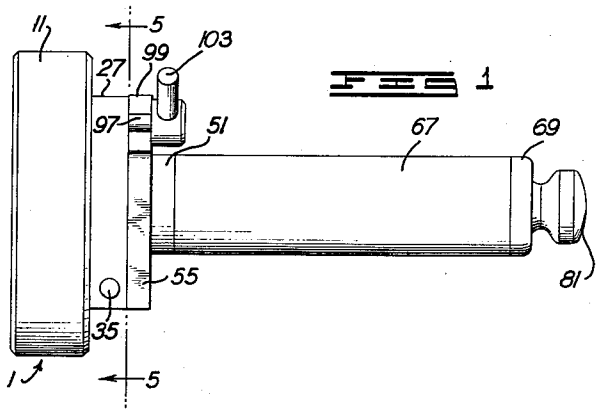


FIG 1

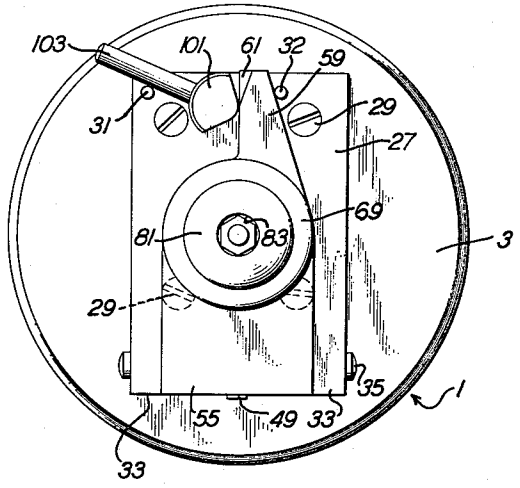


FIG 2

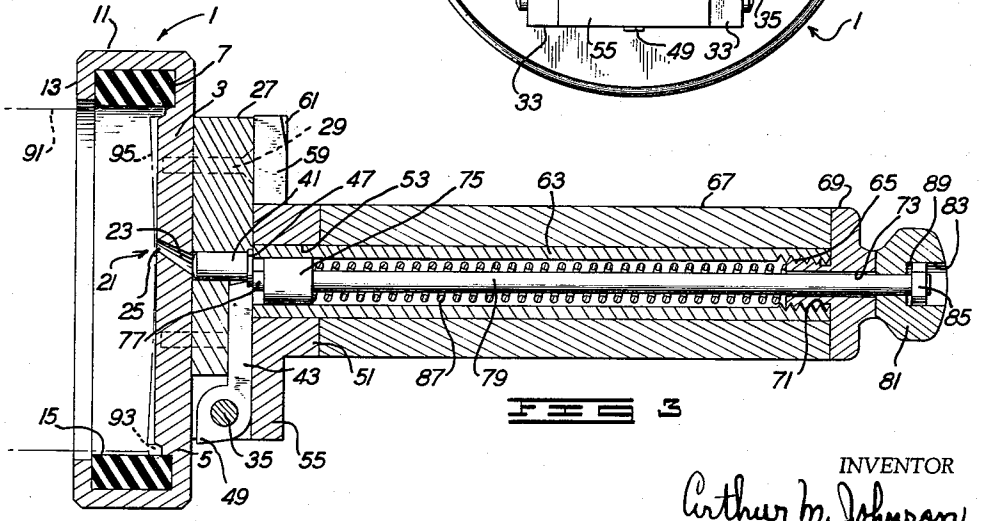


FIG 3

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TARGET PROJECTING DEVICE UTILIZING A CAN AND A BLANK CARTRIDGE

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FIG 4

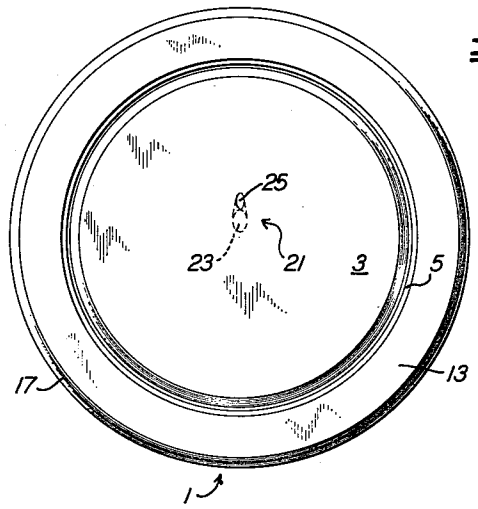


FIG 3

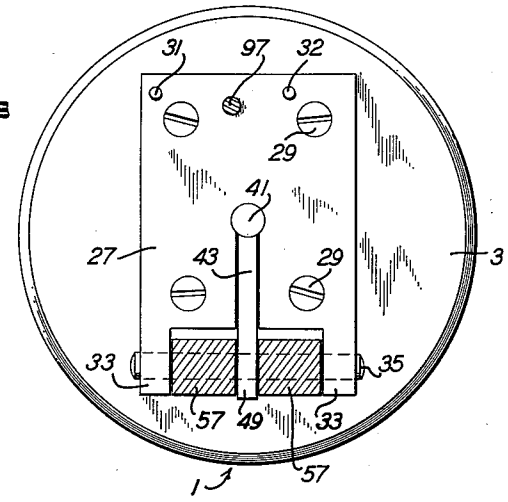
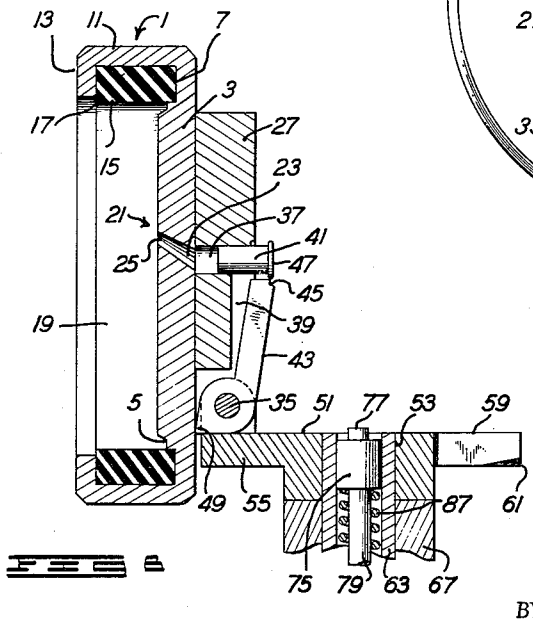


FIG 2



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United States Patent Office 3,004,360
Patented Oct. 17, 1961

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TARGET PROJECTING DEVICE UTILIZING A CAN AND A BLANK CARTRIDGE

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Filed Mar. 11, 1960, Ser. No. 14,448
6 Claims. (Cl. 42—1)

This invention relates broadly to the art of devices for projecting or discharging targets or other objects into the air for flight therethrough and in its more specific aspects it relates to such a device which produces a charge of gas which is operable on a surface of the target or other object to propel it from the device and into the air; and the nature and objects of the invention will be readily recognized and understood by those skilled in the art to which it relates in the light of the following explanation and detailed description of the accompanying drawings illustrating what I at present believe to be the preferred embodiment or mechanical expressions of my invention from among various other forms, arrangements, combinations and constructions, of which the invention is capable within the spirit and scope thereof.

Trap shooting has long been a popular sport and consists generally of tossing or ejecting a disk of clay or the like into the air as a target for the marksmen to shoot at. Various target ejecting means have heretofore been used for propelling the so-called "clay pigeon" into the air and many of them are relatively expensive to produce, and may be somewhat complicated mechanically.

It has been one of my objects to provide a device for projecting a target or other projectile into the air which is relatively inexpensive to produce, requires little or no maintenance, and is practically fool-proof in its operation and is safe to handle and operate. In evolving this device I have provided, in effect, a gun which generates a charge of gas when it is fired and which gas charge is caused to impinge upon an imperforate surface of the target or other projectile to eject it from the gun and into a relatively flat trajectory which is highly desirable.

In shooting at targets, which may for instance be clay pigeons, a substantial number of the targets will be consumed in a shooting session. Since the cost of conventional targets is not inconsiderable, target shooting may be economically out of the reach of many who would otherwise be practicing the pastime. With the expense of conventional targets and projecting means in mind, I have devised a projecting means which is adapted to project, propel and fire used or empty beverage cans or the like, such as used beer cans, into the air as the target for the marksman. The substantial saving in the cost of conventional targets will be readily apparent, for used or opened cans are obtainable practically anywhere, and at no cost.

A number of problems were encountered in designing a projector which would satisfactorily propel empty cans into the air with a desirable trajectory so that the desirable and necessary flight distance would be obtained. For instance, it was necessary to provide a target or projectile receiving head which would receive the target, projectile or can in relatively sealed relation thereto so that the propelling compression of the pressured gas would not be lost, and the target or projectile would be projected from the head under the action of the gas propellant.

I have solved this particular problem by providing a projecting device which uses a pressured gas as the propellant for the target. As one example, I have herein illustrated a blank cartridge, the explosion of which generates a charge of gas which propels the target or projectile from the projecting device. It is within my contemplation, however, to use compressed gases other than

those created by the explosion of a blank cartridge and I therefore do not intend that this projecting device be limited solely to use with blank cartridges.

In attaining my purposes I have provided a unique type of target or can receiving head which ensures that no compression will be lost and that substantially all of the generated pressure will be directed against the imperforate end or surface of the target, can, or projectile. This is accomplished by causing the target or can when operatively mounted in the head of the projecting device to be in releasably sealed relation relative thereto, so that the pressured gas will cause the target to be ejected from the head for its flight through the air. In accomplishing my objective of providing a highly satisfactory projecting device I have made use of the conventional configuration of the can or target to coact with the head to ensure against loss of compression and also to prevent the lodging of paper from the spent cartridge in the head which, from my experiments, causes loss of compression and failure of the device to properly project a target into the air.

In evolving the target receiving head which is endowed with the above-mentioned and other attributes, I have not sacrificed simplicity of design and assembly nor the very definite advantage of ease of mounting the target into operative position in the head. Since the device of this invention will be used by many who may not be mechanically adept, it is considered important that the target be easily and quickly mounted in sealed operative position in the head, and I have provided such an arrangement, for it is merely necessary to insert the target into the head and the device is ready for firing. No extraneous locking or the like means is required and no manipulation is required beyond the act of pushing the target into the head with the imperforate gas charge receiving surface disposed innermost of the head.

I have provided a combustion chamber which receives the blank or other gas providing means and it is here that the explosion or the release of the gas occurs and the pressured propelling gas is generated. The pressured gas is ducted to the imperforate surface of the target and I have so constructed and arranged the ducting means with respect to the combustion chamber that the gas pressure is increased and built up to create ample pressure to eject the target from the gun or projecting device. Involved in the aforesaid pressure increasing means is also the novel positioning of the imperforate surface of the target relative to the duct for conveying the charge of gas. The usual can end has a bulge therein, forming in effect a convex surface, which under a charge may bulge inwardly. My device is so designed and constructed that the path of the pressured gas charge is not substantially enlarged by the configuration of the can end so that the compression of the charge will not be lost.

It is desirable that the imperforate charge receiving surface not be perforated by the force of the charge being applied thereto by the explosion of the cartridge or by the cartridge wad. I have found that the force of the pressured gas and the wad may be sufficient to perforate the charge receiving surface of the target so that the ejecting force may be reduced and the target may not be used again. I have devised a design and construction which ensures against the perforation of the charge receiving surface so that the full effect of the pressured gas will be applied to the target and the target may be retrieved for re-use. I have also designed the duct for conducting the pressured gas and the wad to eliminate sharp corners and to cause the wad to break up for its ejection from the duct.

In a device of the character in which I am interested, it is important that it be engineered to provide for the safety of the user. This target projecting device is so

designed that in its operation it requires the use of both hands of the shooter thereby eliminating the possibility of the shooter having one of his hands in front of the device in the path of the ejected target. Furthermore, I have provided an assembly which prevents accidental firing as a result of an inadvertent rap or blow on the operating knob or trigger of the device. I have also provided means automatically ejecting the shell when the device is opened for reloading. The device of this invention has been designed so that it cannot be overloaded by using oversize blank ammunition and loaded ammunition cannot be received in the combustion chamber. Thus, I have adequately and amply incorporated safety factors into the device.

While I have adapted my target projecting device for use with empty cans, such as the conventional beer can of commerce, it is to be distinctly understood that this is merely by way of example and I do not intend to limit the targets with which my device may be used to cans, such as empty beer cans. It is therefore fully within my contemplation to use a variety of types of targets with my target projection device.

With the foregoing general objects, features and results in view, as well as certain others which will be apparent from the following explanation, the invention consists in certain novel features in design, construction, mounting and combination of elements, as will be more fully and particularly referred to and specified hereinafter.

Referring to the accompanying drawings:

FIG. 1 is a view in side elevation of the target projecting device.

FIG. 2 is a rear end view in elevation of the device.

FIG. 3 is a sectional view of the device.

FIG. 4 is a front end view in elevation of the device.

FIG. 5 is a view taken on line 5—5 of FIG. 1.

FIG. 6 is a view of the device in opened position ejecting a spent shell and with parts of the device being broken away.

For clarity and simplicity of description I shall hereinafter refer to the target or projectile which is projected into the air by my projecting device as a "can," but it is to be understood that my projecting device has been designed to and will project objects other than cans into the air.

In the accompanying drawings I have used the numeral **1** to designate the can receiving and mounting head in its entirety. The head is of annular configuration and comprises a circular base plate **3** which is formed about its periphery with a stepped formation providing a radially extending continuous seat or ledge **5** from the periphery of which radially extends a further and wider continuous seat or ledge **7**. I provide a continuous rim **11** upstanding from the edge of seat **7** and the outer end of the rim is formed with a continuous radially inwardly extending lip **13** which may be of slightly less width than the width of the seat **7**. Within the annular pocket formed by seat **7**, rim **11** and lip **13**, I insert a sealing rim **15** which may be formed of any suitable compressible material having a degree of resilience, such material may be neoprene, rubber or the like. The sealing ring is dimensionally such that it snugly fits within the aforesaid pocket and its width, i.e., its radial dimension, being substantially the same as the like dimension of the seat **7**. The upper end of the sealing ring will extend radially inwardly of the inner edge of lip **13**, as at **17**. As will be explained in greater detail hereinafter, a circular can receiving area **19** is defined by base plate **3** and the sealing ring **15** which area is adapted to receive and mount the end portion of a cylindrical can of commerce, for example, a used beer can.

Extending through the base plate **3** is a duct designated generally by the numeral **21**, the duct forming a compression chamber for the gas charge and also a means for conveying the gas from a primary gas chamber and to the imperforate end of the can for projecting the can from the device and into the air. The duct **21** is provided with an inlet end **23** and the diameter thereof is gradually and uniformly reduced outwardly to provide a discharge end **25** of reduced diameter relative to the inlet end.

As will be apparent, the duct **21** extends through the base plate **3** at an angle to the horizontal or axis of the entire device.

I affix to the back surface of base plate **3** a generally rectangular block or plate **27**, which I shall term the "combustion chamber block," and this block may be affixed to the base plate by means of screws **29** or in any other suitable manner. A pair of spaced pins **31** and **32** are provided which project rearwardly from the block. The purpose of these pins will be explained hereinafter. At its lower end the block **27** is formed with a pair of spaced-apart depending ears **33** and a pivot pin **35** extends between and is journaled in said ears. A combustion and compression chamber **37** is formed in the block **27** centrally thereof and positioned in line and in communication with the inlet end **23** of duct **21** when the block is fixed to the base plate. The block **27** is also provided with a slot **39** opening into the combustion chamber and extending downwardly therefrom and through the lower edge of the block between the ears **33** thereof. Operable within this slot is an ejector for a cartridge **41** which is positioned within the combustion chamber. The ejector may comprise an arm **43** which is mounted on pivot pin **35** and extends upwardly therefrom and is swingable in slot **39**. At its upper end the arm **43** is notched as at **45**, the notch being adapted to engage the rim **47** of the cartridge for its ejection from the combustion chamber when the ejector arm is rocked rearwardly. The ejector arm at its lower end is provided with a cam surface or shoulder **49** which is engaged in a manner to be described to cause rearward rocking motion of the ejector arm.

The handle forming housing for the firing mechanism, or the mechanism for releasing a pressured gas, is operatively connected to the unit comprising the block and the head so that the combustion chamber may be accessible for loading and unloading of the gas producing means. This unit of my projecting device comprises a member **51** having a bore **53** therethrough and having a depending skirt or ejector operating portion **55** which is hingedly mounted on pivot pin **35** between the ears **33** by means of forwardly projecting journals **57**. The member **51** also involves an upwardly projecting leg **59** having a notch **61** formed in the upper part thereof.

Fixed by press fitting or by other means at one end within the bore **53** of the member or collar **51** is an elongated sleeve **63** which may be formed of metal or other suitable material. At its opposite or outer end the sleeve is internally threaded as at **65** for a purpose which will hereinafter be explained. The sleeve **63** is encompassed by a handle **67** having a bore in which is mounted the sleeve, the handle **67** abutting collar **51** at its forward end and being closed at its rear end by means of a cap **69** having an externally threaded nipple **71** extending therefrom which is threaded into the rear end of the sleeve. The cap **69** is formed with a bore **73** therethrough.

Reciprocally mounted within the sleeve **63** is a firing pin member which may consist of a cylindrical body **75** of a diameter to have a sliding fit within the sleeve and a firing pin **77** projects forwardly from the body to engage the rim **47** of the cartridge **41**. A firing pin stem **79** is fixed to firing pin body **75** and extends rearwardly therefrom and through sleeve **63**, through nipple **71** and through and outwardly beyond cap **69**. I provide a triggering knob **81** having a bore through which the stem extends, the knob being formed with a recess **83** for receiving the end of the stem on which a nut **85** is threaded. A compression spring **87** is coiled about stem **79** and when the firing pin, stem and spring are in the position illustrated in FIG. 3, the nut **85** is removed from the bottom of the recess **83** leaving a space **89** so that an accidental blow on the knob will not cause retraction of the firing pin and undesired explosion of the cartridge to project the can.

In the embodiment of my invention which I have selected

for purposes of illustration only, I have used a .22 rim firing blank cartridge and for this reason the sleeve 63 is not in alignment with the combustion chamber 37.

In FIG. 3 of the drawings I have illustrated in dotted lines an empty beer can 91 mounted in the head 1, the O.D. of the beer can body being substantially the same or slightly less than the I.D. of the ring 15 so that the end portion of the can may be inserted in the head. It is conventional practice for each end of a can to be formed with an external bead 93 thereon which extends radially outwardly a small distance beyond the circumferential wall of the can body.

The said bead 93 also extends longitudinally a slight distance beyond the end wall 95 of the can.

When the end portion of the can having the imperforate end wall 95 is inserted in the head to full operative position, the bead 93 will rest on seat 5 and the radial portion of the bead will slightly compress the ring 15, causing a complete seal at this point which, as will become apparent, ensures against loss of compression. The center portion at least of the normally outwardly bulged can bottom will be in contact with the base plate 3 at the discharge end 25 of duct 21. If found desirable, the inner surface of ring 15 may be greased prior to inserting a can in operative position therein.

As pointed out above, the handle forming housing for the firing mechanism is hingedly associated with the unit comprising the head and the combustion chamber forming block so that access may be had for loading the device and for removing the spent gas generating means, and I provide locking means for locking the housing in operative position. Such means may comprise a spindle 97 rotatively mounted in block 27 and extending rearwardly therefrom through journal means 99 and carrying a latch plate 101 on the end thereof from which an operating lever 103 extends. The latch plate 101 is rotatable into position in notch 61 to hold the housing in locked operative position and is movable to unlocked position as illustrated in FIG. 2 to permit the housing to swing down to loading and unloading position, as illustrated in FIG. 6. The pin 31 constitutes a stop for lever 103 while pin 32 maintains leg 59 against lateral play which might result from continuous hinging movement of the housing unit.

With the can 91 properly inserted, as explained above, and the mechanisms in the positions disclosed in FIG. 3, the device may be fired by grasping triggering knob 81 and pulling it rearwardly which causes the firing pin member to be retracted in the sleeve and the spring to be compressed. Release of the triggering knob permits the firing pin member to be sharply moved forwardly under the biasing action of the spring and into firing engagement with the cartridge, causing the blank to explode in combustion and compression chamber 37. The pressured cases will move into duct 21 and against the imperforate end of the can to propel it from the head and into the air. Since the inlet end of the duct 21 is of reduced diameter relative to the combustion chamber and the interior of the duct is more or less of conical form, the gas pressures will be increased and built up prior to their impingement upon the imperforate surface of the can. Since the rate of burning of smokeless powder increases in proportion to the pressure under which it is burned, it will be seen that full combustion will result because of the pressures built up in duct 23 and chamber 37. Merely as an example, and not as a limitation, the approximate diameter of the inlet end 23 of the duct 21 may be approximately half the diameter of the combustion and compression chamber 37. The combustion and compression chamber 37 is dimensioned only to receive the cartridge or gas container for which designed so that a larger cartridge or live ammunition will not be received therein. In firing or operating the device it is significant to note that one hand must be around handle 67 while the other operates triggering knob 81 so that the user cannot place one hand in front of the can which is being projected.

I have found that the imperforate can bottom will not be perforated by the impingment of the pressured gas and the cartridge wad thereon if the duct 21 is formed to extend at an angle to the axis of combustion chamber 37, such angle may be on the order of 25°. I have also found that the tapering formation of duct 21 also functions to break up the wad for its ejection from the duct.

After the can is fired from the projecting device, the lever 103 is rotated to remove the latch 101 from its locking position in notch 61 so that the housing unit may be swung downwardly on pivot 35 into the position shown in FIG. 6. This hinging or pivoting motion of the housing will cause depending skirt portion 55 to engage shoulder 49 on the ejector arm 43 causing it to rock rearwardly retracting the spent cartridge 41 with it for its removal from the combustion chamber so that a new cartridge may be inserted. The housing unit is then swung upwardly and locked in operative position by the above described latching means. The ejector arm 43 will be rocked forward to the position disclosed in FIG. 3 by engagement with collar 51.

It will be appreciated that the diameter of the head may be varied to suit targets of varying diameters, shapes and forms without departing from the spirit and scope of my invention, and while I have illustrated the gas generating means as comprising a .22 blank cartridge, it will be understood that it is within my contemplation to use a gas charged container which would be opened by penetration or otherwise by the firing pin.

Not only does the compression of the ring 15 by bead 93 produce the desirable seal to prevent compression losses, but this arrangement also functions to prevent waste matter resulting from explosion of the cartridge from becoming wedged under or behind the ring which might cause distortion thereof, upsetting its sealing function.

It will now be recognized that I have devised a simple and efficient means for projecting targets into the air, and which may be used, for instance, to project used cans or other objects which are in plentiful supply and at no cost.

I claim:

1. A projecting device for projecting a can having a peripheral bead on at least one end into the air, said device including a head providing an area, a base plate forming an end of said area, a seat formed about the periphery of said base plate, said seat being below the surface of said base plate which is directed toward the area, said area adapted to releasably receive and mount a can therein in abutment with said base plate and with the bead of the can received in said seat, means fixed on said head for releasably maintaining the can mounted within the area and said device including a pressure chamber containing a gas generating means and said pressure chamber being in communication with said area for directing the pressured gas against the can for its projection from the head and into the air, and means operable to activate said gas generating means.

2. A projecting device for projecting a can having a peripheral bead on at least one end into the air, said device including a head having a base plate, said base plate having an operative surface and a rear surface, a seat formed about the periphery of said base plate and below the operative surface thereof, a further seat formed about the periphery of said first named seat and positioned in a plane below the plane of said first named seat, a continuous rim upstanding from the periphery of said further seat defining an area for releasably receiving and mounting a can in position in said area in abutment with said base plate and with the bead of the can seated in said first named seat, a compressible sealing element positioned on said further seat and upstanding therefrom in engagement with said rim and engageable by the can to sealably mount the can on the head and in said area, said device including a pressure chamber containing a gas generating means, said

chamber being in communication with said area for directing the pressured gas against the can for its projection from the head and into the air, and means operable to activate said gas generating means.

3. A projecting device for projecting a can into the air, said device including a head providing an area, a base plate forming an end of said area, said area adapted to releasably receive and mount a can therein, means fixed on said head for releasably maintaining the can mounted within the area, and said head including a chamber containing a blank cartridge providing a gas generating means, and said base plate having a gas conducting duct extending therethrough having an inlet end in communication with said chamber for receiving gas therefrom and an outlet end in communication with said area for directing the gas against the can for its projection from the head and into the air, and said duct being of substantially reduced diameter throughout its length relative to the diameter of said chamber, and means to fire said blank cartridge.

4. A projecting device in accordance with claim 3 wherein said duct extends in a uniform direction.

5. A projecting device in accordance with claim 3 wherein said duct extends at an angle relative to the longitudinal axis of said chamber.

6. A projecting device for projecting a can having a peripheral bead on at least one end into the air including, in combination, a head providing an area open at one end for releasably receiving and mounting a can in position for projection therefrom and into the air, said head including means providing a chamber containing a blank cartridge providing a gas generating means, said head having a gas conducting duct extending therethrough having an inlet end in communication with said chamber for receiving gas therefrom and an outlet end in communication with said area for directing the gas against the can for its projection from the head and into the air, and said duct being of substantially reduced diameter throughout its length relative to the diameter of said chamber, and a housing operatively connected to said head and movable with respect thereto to a position opening said chamber for the loading and unloading thereof and to a position closing said chamber when the blank cartridge is to be fired, a blank cartridge firing member movably mounted in said housing, a stem fixed to said member and extending through and outwardly of said housing, a triggering knob having a recess therein and said stem extending through said triggering knob and into said recess, a nut threaded on the outer end of said stem and in normal position spaced from the bottom of said recess, and means biasing said member forwardly toward said blank cartridge.

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