

May 15, 1945.

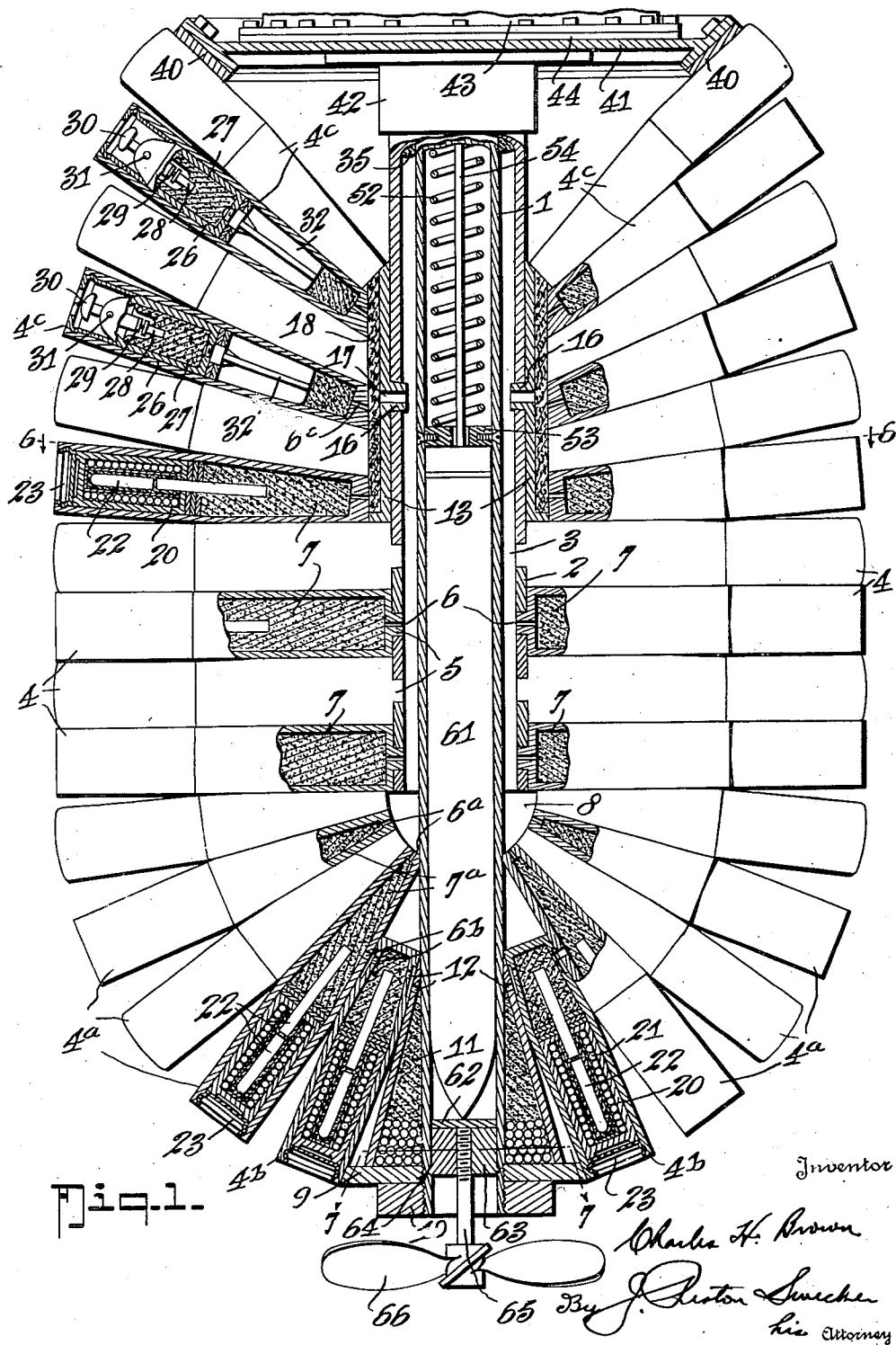
C. H. BROWN

2,376,227

AERIAL BOMB

Filed Aug. 14, 1940

6 Sheets-Sheet 1



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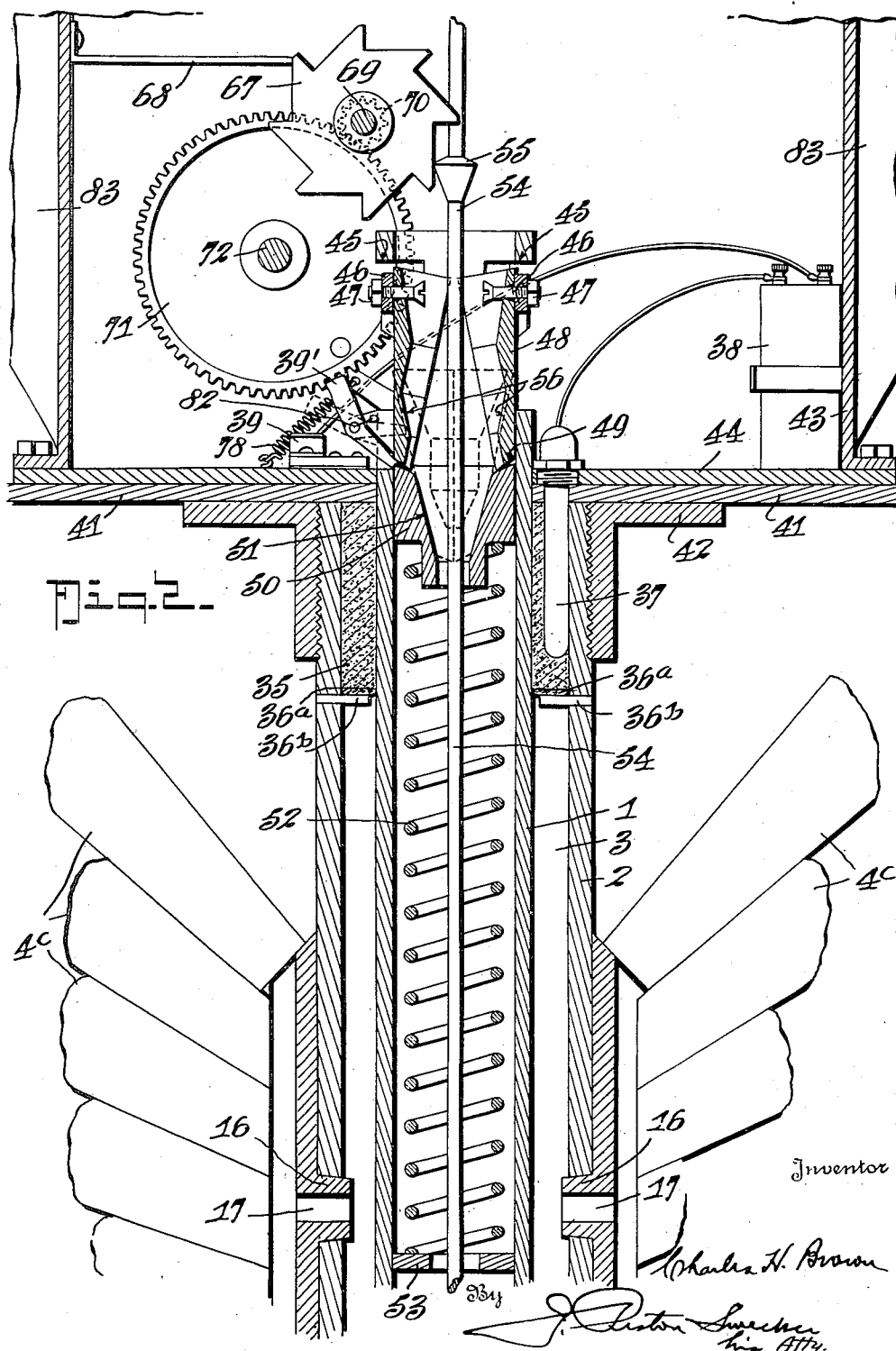
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Filed Aug. 14, 1940

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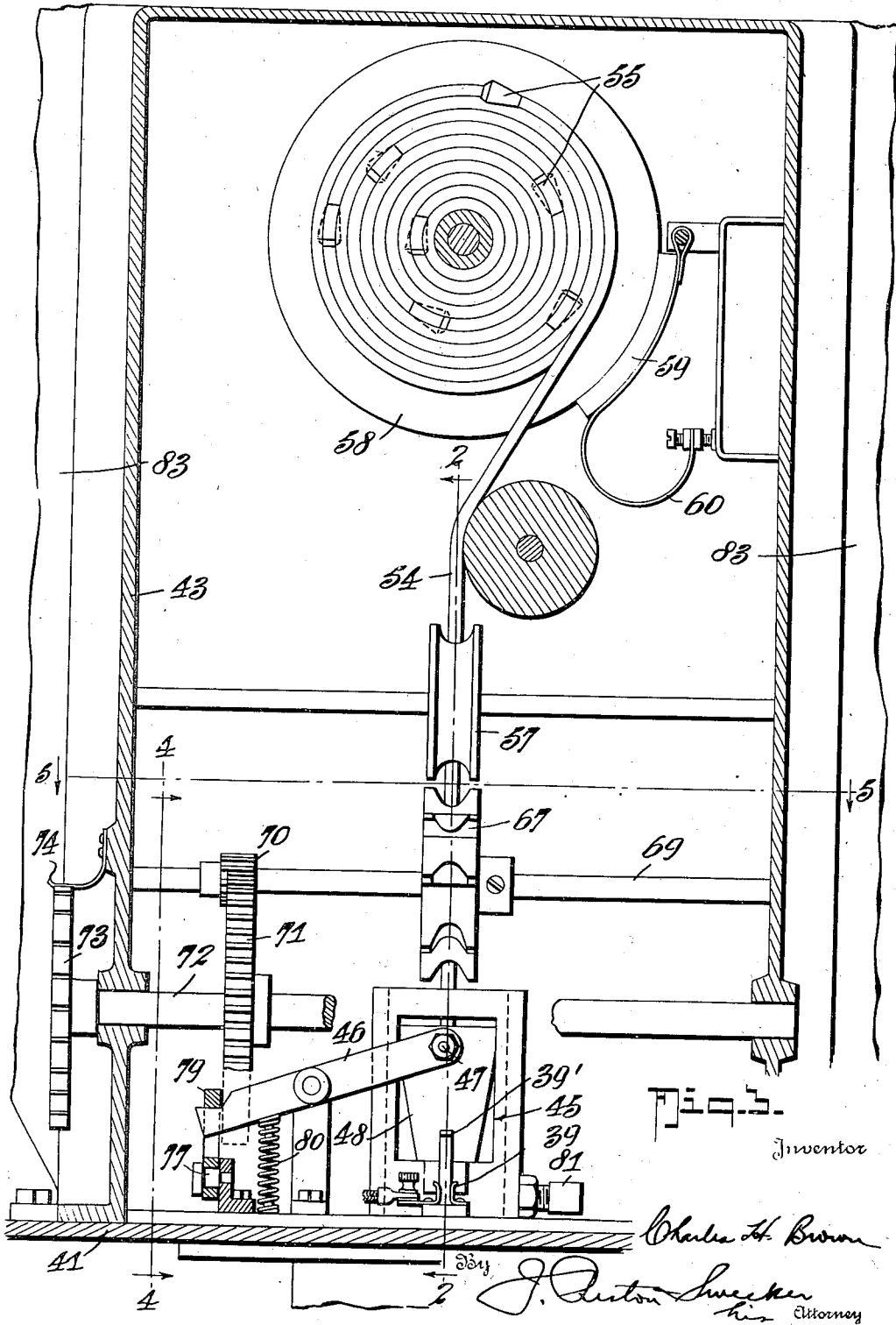
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Filed Aug. 14, 1940

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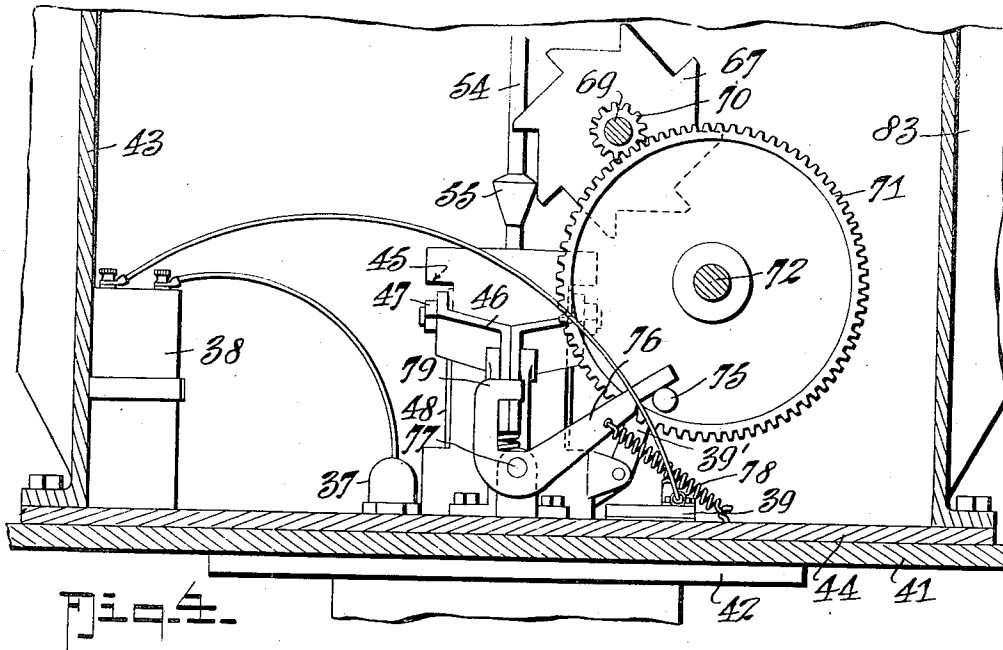
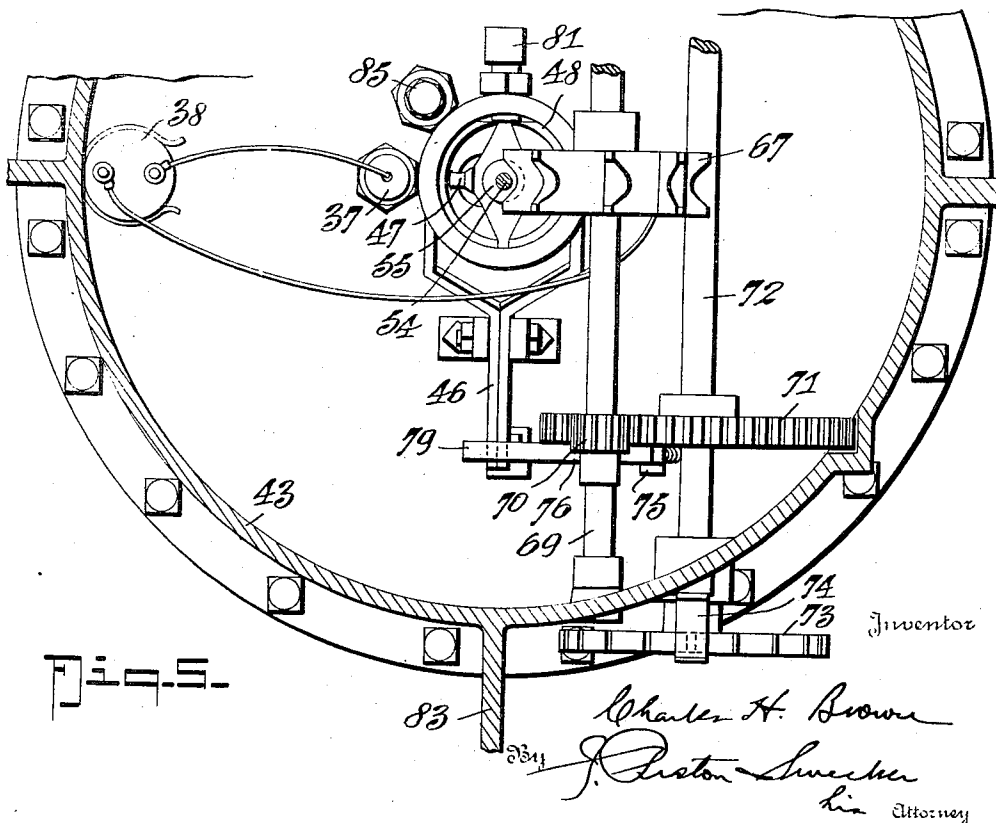
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Fig. 6.

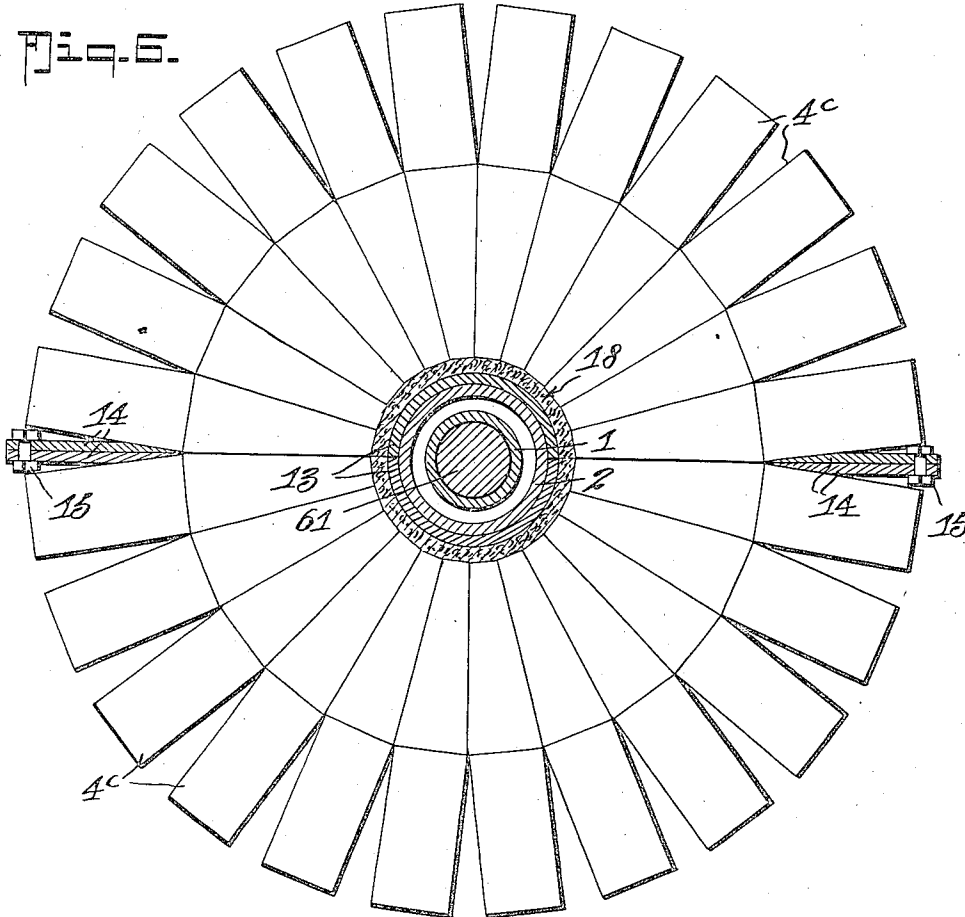
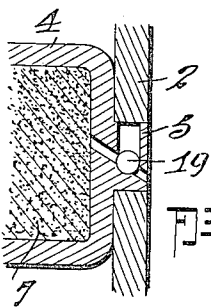
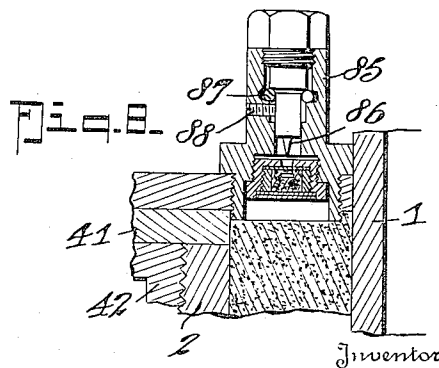
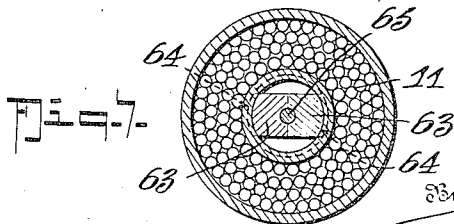


Fig. 8.



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Fig. 10.

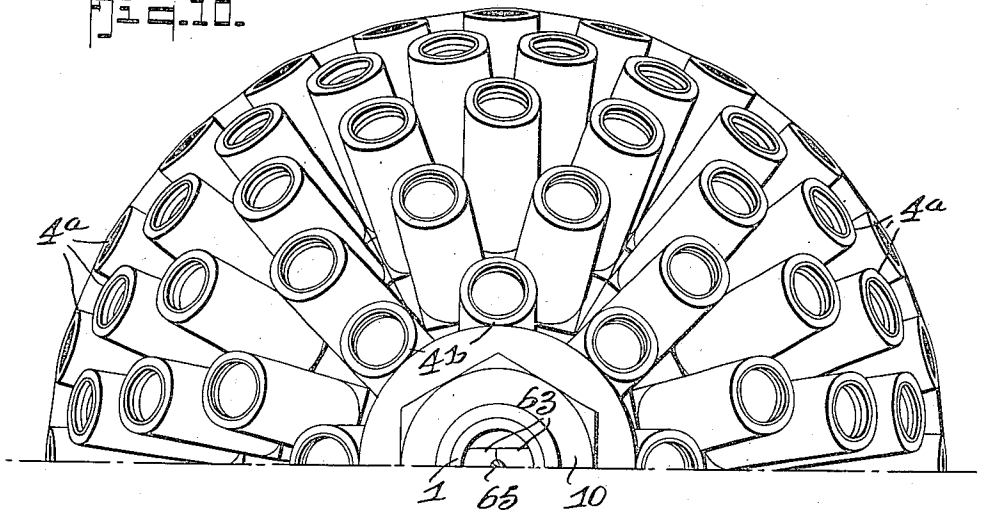


Fig. 12.

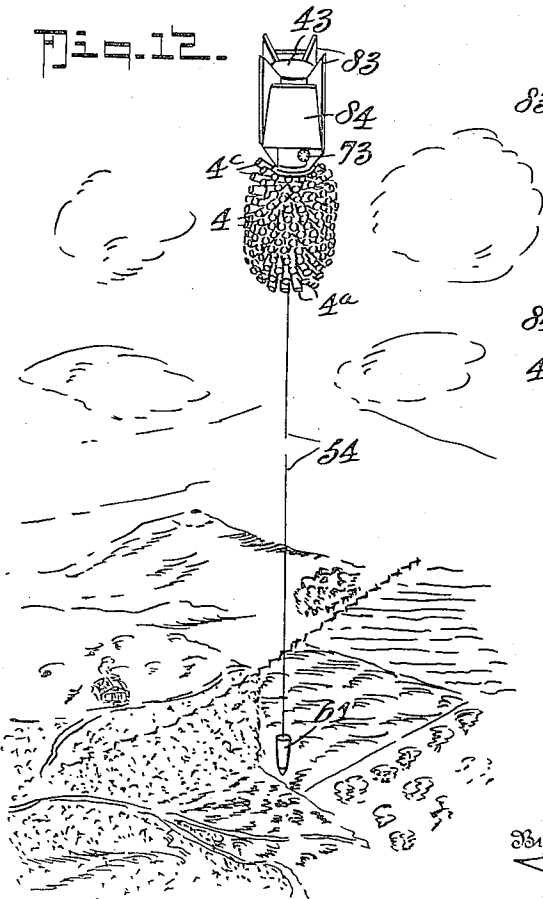
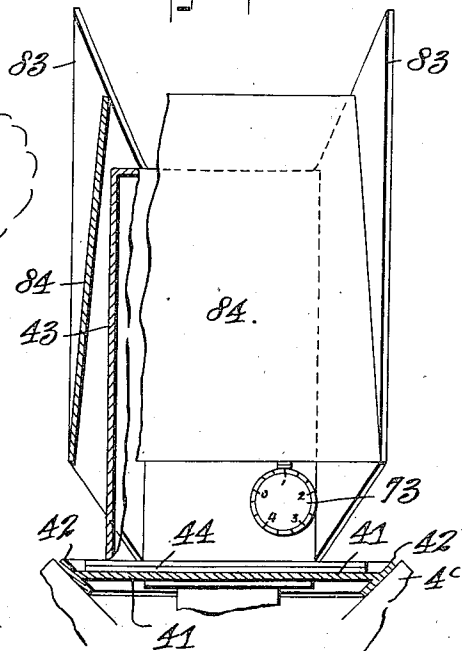


Fig. 11.



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UNITED STATES PATENT OFFICE

2,376,227

AERIAL BOMB

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Application August 14, 1940, Serial No. 352,587

11 Claims. (Cl. 102—5)

This invention relates to an improvement in aerial bombs, and more particularly to a bombing device which is designed to be dropped from aircraft for explosive action at a predetermined point above the ground.

The object of this invention is to improve the construction of a bomb of this character to provide for multiple barrels therein which will discharge projectiles of the same or different kinds from the barrels, at a predetermined point above the ground which may be varied according to the set condition of the bomb, by which the effectiveness of the device may be materially increased both as to range and extent of penetration of the projectiles.

By the discharge of an explosive shell from each of the barrels of the bomb, the kinetic energy of the falling body will be utilized to impart increased speed and force to the projectile, in addition to the discharging power which ejected the same from the device.

The bomb embodying this invention in its preferred form, is formed with a body comprising a multiplicity of barrels, preferably arranged substantially in all directions both horizontally and angularly relative to the direction of falling movement of the body, and each of which is adapted to receive a projectile adapted to be discharged from the barrel to fall to the ground for explosion upon impact or to be exploded after a predetermined time interval or in the form of an ordinary bullet, according to the character of the projectile used in the bomb.

Provision is made for discharging the projectiles at a predetermined point above the ground according to the set position of the mechanism, by actuating the ejecting means in response to the contact with the ground of a plummet suspended from the bomb. Thus, when the projectiles are discharged from the barrels of the bomb, the kinetic energy of the falling body increases the speed of movement of the projectiles over that applied to discharge the same from the barrels for more effective action and penetration of the projectiles. The barrels are preferably arranged in direct side-to-side contact with each other and fire simultaneously with substantially equal charges of explosives in the respective barrels, so as to oppose and balance the barrel bursting force of the explosives used to discharge the projectiles from the barrels.

This preferred embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical sectional view through the body portion of the bomb with parts in elevation;

Fig. 2 is a similar view through the upper portion thereof including the control mechanism, taken substantially on the line 2—2 of Fig. 3;

Fig. 3 is a side elevation of the control mechanism, with parts shown in section;

Fig. 4 is a detail cross section therethrough on the line 4—4 of Fig. 3;

Fig. 5 is a horizontal section therethrough on the line 5—5 of Fig. 3;

Fig. 6 is a detail cross section, on the line 6—6 of Fig. 1;

Fig. 7 is a detail horizontal section through the lower portion of the body parts, on the line 7—7 of Fig. 1;

Fig. 8 is a detail sectional view through an auxiliary detonator;

Fig. 9 is a detail sectional view through an inner portion of a barrel showing a check-valve therefor;

Fig. 10 is a half bottom plan view of the bomb body;

Fig. 11 is a side elevation, partly in section, of the upper portion of the bomb; and

Fig. 12 is a perspective view of the bomb and plummet in descent.

Referring to Fig. 1, the body of the bomb is shown as provided with a central tube designated generally by the numeral 1, the upper portion of which is surrounded by a sleeve 2, which is enlarged relative to the tube 1, providing a chamber 3 therebetween. Surrounding the tube 1 and sleeve 2 is a multiplicity of barrels designated generally by the numerals 4, 4a, 4b and 4c.

The barrels 4 are arranged in rows about the sleeve 2 from which they radiate, being in close side-by-side relation and superimposed one upon another, with the walls of the barrels permanently secured together as by welding. Each barrel has an annular shell-receiving outer portion of circular cross-section, while the inner portion thereof is flattened transversely with converging sides drawn substantially to the shape of a flattened truncated pyramid in the mid-portion of the body, and of truncated prism shape at the rounded ends thereof, arranged to permit the barrels to lie in close side-by-side relation around the sleeve 2, radiating therefrom, so that a multiplicity of barrels will be provided in a plurality of rows along said sleeve. The inner ends of the barrels 4 are provided with reduced projections 5 thereon, extending into openings formed in the sleeve 2, and orifices 6 extend through said projections 5 to establish communication between the chamber 3 in the sleeve and the chambers 7 formed in the inner portions of the barrels 4.

The lower portion of the body is formed substantially hemispherical, of a multiplicity of barrels 4a which radiate from the tube 1, with the inner portions of said barrels 4a converging both vertically and horizontally substantially in the shape of a truncated pyramid, and having the sides thereof rigidly secured in face-to-face contact with each other, as by welding, so as to hold the barrels in assembled relation. The barrels 4a radiate in all directions from an open space 8 at the lower end of the chamber 3 communicating therewith, and which space 8 communicates through orifices 6a at the inner ends of the barrels 4a with chambers 7a therein.

A row of barrels 4b is provided around the lower end of the tube 2 supported upon a plate 9 secured thereto by a nut 10, as well as by being welded to the lowermost row of barrels 4a and to the tube 1. The inner ends of the barrels 4b do not extend to the chamber 8, but communicate with the chambers 7a in the lowermost row of barrels 4a through connecting orifices 6b therebetween.

Also surrounding the lower end portion of the tube 1 is a chamber 11, having communication through orifices 12 with the firing chambers of the barrels 4b to receive a firing flame therefrom when firing occurs in the barrels 4b. The chamber 11 is filled preferably with blasting powder or other explosive mixtures, adapted to demolish the structure of the device after the projectiles have been discharged therefrom which explosion should be sufficiently slow burning or slow in action as to occur after all of the projectiles have been discharged from the barrels.

Arranged above the barrels 4 is a multiplicity of barrels 4c, the inner end portions of which converge in both directions substantially in the shape of truncated pyramids, and thus are inclined relative to the axis of the body, corresponding substantially to the action of mortars in the manner in which they discharge their projectiles. The inner ends of the barrels 4c are secured to semi-circular sleeve sections 13 having flanges 14 secured directly together by bolts, rivets, welding, or other fastening devices 15, to hold the sleeve sections 13 in permanently secured relation about the sleeve 2. Each of the sleeve sections 13 has a reduced inner projection 16 thereon, extending through an opening in the sleeve 2, with an orifice 17 through said projection to establish communication between the chamber 3, and a chamber 18 formed between the section 13 and the inner ends of the barrels 4c. The chamber 18 communicates through orifices 5c with firing chambers 7c in the barrels 4c. Chambers 18 contain a small charge of loose guncotton, or the like, the firing of which further raises the temperature of the gas in chambers 18 for igniting the cell charges through orifices 6c.

Although the orifices 6, 6a-6c are constricted in size sufficient to prevent substantial back pressure therethrough upon firing in the barrels, nevertheless, check-valves 19 may be provided in the orifices if desired, as shown in Fig. 9, for effectively preventing the discharge from passing back into the chamber 3 from the respective barrels. Also, when the firing chambers contain loose powder, the orifices should be lightly plugged with collodion or the like, to prevent spilling of powder, said collodion being readily combustible, would burn through into the firing chambers instantly upon the firing of the charge in the combustion chamber.

Although any desired type of projectiles or shells may be used in the barrels, either of one or more types of firing, I prefer to employ projectiles that are discharged from the barrels for subsequent explosion. For this purpose, I have illustrated two different forms of projectile, either or both of which may be used, one of which is in the nature of a shrapnel shell adapted for explosion by a time fuse, while the other is an impact projectile adapted to be exploded upon striking the ground or other solid object.

The shrapnel shell is shown at 20 filled with a charge of powder and bullets 21 adapted to be exploded by a time fuse 22. The fuse 22 is constructed with a small orifice therein to extend into the firing chamber 7 or 7a in each barrel, so as to be ignited by the discharge explosion therein, whereby the projectile will be exploded a predetermined period of time after being discharged from the barrel. The projectile 20 is retained in the barrel by a retainer disc 23 frictionally and resiliently retained in the outer end of each barrel for removal therefrom by the force of the explosion in the barrel that causes the ejection of the projectile. This delaying action by the disc 23 raises the gas pressure behind the charge and thereby increases the muzzle velocity of the projectile.

The impact projectiles shown as used in the mortar-like barrels 4c are designed generally by the numeral 26, each containing an explosive charge 27 therein adapted to be exploded by a blank cartridge 28, actuated by a firing pin 29. The firing pin 29 is attached to a plunger 30 held in a retracted position by a shear pin 31, but capable of being sheared off upon engagement of the outer end of the plunger 30 with the ground or other solid object to move the firing pin 29 against the cartridge 28 with sufficient force to fire the latter and explode the charge 27 in the projectile. Attached to the back end of the projectile 26 are fins or vanes 32 capable of maintaining the direction of movement of the projectile through the air after being discharged from the barrel 4c.

The firing chambers 7, 7a-7c of the barrels are filled with explosive charges behind the projectiles to discharge the projectiles from the barrels. For the purpose of igniting the explosive charges in the barrels, an explosive charge is provided in the upper end of the chamber 3, as designated by the numeral 35 in Fig. 2, which charge is retained in place by a friable washer 35a and pins 36b. An electrical detonator 37 is arranged in the charge 35 adapted to explode the charge by creating combustion therein. For this purpose, the detonator 37 is connected with a source of electrical supply, such as a battery 38, with its circuit controlled by a switch 39 having a switch arm 39' hereinafter described more in detail.

When the detonator 37 is energized upon the closing of the circuit thereto, the resultant explosion of the charge 35 is communicated throughout the chamber 3 and into the chambers 8 and 18, as described, thence through the orifices 6-6c into the firing chambers 7-7a of the barrels, where the charges will be fired with sufficient force to discharge the projectiles from the barrels at greatly increased speed, and occurring simultaneously substantially throughout the body, all of the projectiles will be discharged at one time in substantially all different directions for subsequent explosion of the projectiles in flight, as described above. The simultaneous dis-

charge of the projectiles by equal and opposed explosions in the different barrels balances the barrel-bursting force of the explosions therein.

If the bomb is dropped from an aircraft traveling one hundred miles per hour at 5000 feet, the bomb would strike the earth at 520 to 550 feet per second. At 500 feet elevation, the bomb would be traveling 470 to 500 feet per second. Added to this falling force would be the force of discharge of the projectile from the downwardly inclined barrel, of say 600 feet per second, making the then velocity of 1070 to 1100 feet per second, to which is then added the shrapnel bursting speed of 250 to 300 feet per section, as a result of which the shrapnel bullets would strike objects on the ground at a speed of 1320 to 1400 feet per second, for the cells on the lower end of the bomb, and an average speed of more than 900 feet per second for the entire charge, with the slowest—those from the elevated cells—well above the disabling speed. A shrapnel bullet weighing $\frac{1}{2}$ lb., at 400 feet per second will disable a man. Also, one shrapnel bullet per square yard in ordinary warfare, is good practice. The bomb shown, having barrels made of tubing of two inch inside diameter and $\frac{1}{8}$ " shell wall, will take charges of at least 70 shrapnel bullets for each of the 302 barrels, a total of 21,140 shrapnel bullets, the slowest of which would give an impact of more than the necessary speed to disable a man. At two bullets per square yard, this will give a possible coverage of 10,570 square yards, or $2\frac{3}{4}$ acres of men, without the necessity of dive bombing by the aircraft. By using the 86 barrels that point downward in the bottom of the bomb as shot guns, the above capacity is greatly increased and still bullet speeds of easily 700 to 1000 feet per second, are obtained.

The control device for regulating the point of discharge of the projectiles from the bomb, is shown in detail in Figs. 2 to 5. This device is arranged at the upper end of the tube 1 and sleeve 2, as shown in Fig. 1, having a radially split ring 40 welded or otherwise secured to the uppermost row of barrels and supporting thereon a platform 41, the inner edge portion of which is also supported by a flanged bushing 42 secured to the upper end of the sleeve 2. The platform 41 carries a housing 43 secured thereon and having a bottom 44 in which the electrical detonator 37 is mounted and to which one side of the detonator is electrically grounded.

As shown in Fig. 2, the tube 1 extends upwardly an appreciable distance above the bottom 44 of the housing 43 and has slots 45 formed in opposite sides thereof into which the bifurcated arms of a lever 46 extend. The arms of the lever 46 carry shear bolts 47 from the inner end of each of which is loosely suspended a slip 48. The slips 48 are slidably mounted within the upper end portion of the tube 1, and have beveled lower ends 49 in position to engage the beveled upper edge of a ring 50. The ring 50 is slidably mounted in the tube 1, and has a conical seat 51 therein adapted to receive and support the slips 48 when they are turned to the dotted line position relative thereto, as shown in Fig. 2. The ring 50 is carried by an expanding spring 52 interposed between the ring and an abutment 53 fixed in the tube 1, which spring is pre-loaded in excess of the weight of the cable without the plummet, tending to hold the ring 50 in its elevated position.

Extending downwardly through the slips 48 and the ring 50 is a cable 54 which is provided at

regular intervals thereon with cones 55, shown as inverted frustro-conical, and adapted to engage seats 56 in the slips 48, when the latter are lowered to a closed position, as shown in dotted lines in Fig. 2.

The cable 54 extends upwardly between guide rollers 57 and is wound on a drum 58 journaled in the housing 43, as shown in Fig. 3. A brake shoe 59 yieldingly bears against the drum 58, being resiliently supported at 60, to prevent too free spinning of the drum in unwinding of the cable therefrom.

The free end of the cable 54 carries a plummet 61 normally housed within the lower end portion of the tube 1, as shown in Fig. 1. The plummet 61 is initially retained in the tube 1 by a washer 62 supported by a split nut 63 (Fig. 7), the sections of which are slidably received in the lower end of the tube 1, and have prongs 64 engaging in opposite sides thereof, where they are retained by a screw 65 threaded between the sections, as shown in Figs. 1 and 6. The screw 65 has a propeller 66 fixed thereon arranged to remove the screw 65 from between the sections of the nut 63 when the bomb starts to descend, allowing the weight of the plummet 61 to eject the nut and to descend relative to the body of the bomb. The plummet 61 is so constructed as to descend at a preferably greater rate of speed than the body of the bomb to cause downward movement of the cable 54 relative thereto. The extent of such downward movement is regulated and determined by the cones 55 on the cable, as hereinafter described.

The cones 55 are spaced at predetermined measured distances apart on the cable 54, and during the downward movement of the cable by the plummet 61 relative to the body of the bomb, the cones 55 engage and rotate a ratchet wheel 67, shown in Figs. 2 and 4, and held against backward turning movement by a spring pawl 68. The ratchet wheel 67 is mounted on a shaft 69 (Fig. 3) journaled in the housing 43 and carrying a pinion 70 thereon, meshing with a gear 71 mounted on a shaft 72, also journaled in the housing 43. The outer end of the shaft 72 has a dial 73 fixed thereon and provided with graduations as indicated in Figs. 3 and 8, coacting with a resilient finger 74, to indicate the desired set position of the dial 73.

As shown in Figs. 4 and 5, the gear 71 carries a laterally projecting pin 75 in position to engage the free end of a lever 76 pivotally mounted at 77 in the housing 43. The free end of the lever 76 is held normally in a downward position against the pin 75, by a spring 78. The opposite end of the lever 76 is provided with a hook 79 in position to engage over and restrain the outer end of the lever 46, to hold said lever in the position shown in Figs. 3 and 4, against the tension of a spring 80, but to permit downward movement of the bifurcated end of the lever 46 by the spring 80 upon release thereof by the hook 79, for shifting movement of the slips 48 into the dotted line position in Fig. 2, to engage one of the cones 55 and hold the cable 54 against further extending movement relative to the body.

The parts are shown in Fig. 2, in their initial positions, where the ring 50 is held against further upward movement by a stop 81 in a side of the sleeve 1, beneath the free end of the switch arm 39' which is pivotally supported at 82 (Fig. 2), and extends through a slot in the tube 1 to a point above the ring 50. The switch arm is adapted to engage and bridge the contacts of the

switch 39 when it is moved to an extreme position as hereinafter described. The switch-arm 39' is grounded to the casing, as is one side of the detonator 37, while the line from the detonator to the switch has the battery 38 connected thereby, whereby the circuit will be closed to energize the detonator, upon the closing of the switch.

With the parts in their initial positions substantially as shown in Figs. 1 and 2, when the bomb is to be dropped from an aircraft, the operator first determines the amount of cable that should be let out according to the distance above the ground at which it is desired to discharge the projectiles from the bomb, and the dial 73 is set accordingly. This distance may vary according to the height of the aircraft, being progressively greater for higher altitude, and the dial may be graduated either in terms of hundred feet of cable, or in terms of altitude of the aircraft, or both, as indicated generally in Fig. 11.

When the operator thus adjusts the dial 73, the bomb is ready to be launched, and the initial downward movement thereof will release the plummet 61, as described above and allow it to move downward at greater speed than the body of the bomb, drawing out the cable 54. The cones 55 on the cable will cause step-by-step turning movement of the ratchet wheel 67 to rotate the gear 71 until the pin 75 thereon (which was moved away from the lever 76 by the initial setting of the dial 73), is brought into engagement with the lever 76 and actuates the latter to release the hook 79 from the lever 46. This action allows the spring 80 to swing the lever 46 upwardly, forcing the slips 48 downwardly in the upper end of the tube 1. The beveled edges 49 of the slips acting on the beveled upper surface of the ring 50, causes the slips to be tilted as shown in dotted lines in Fig. 2, when the seats 56 thereof are moved inward in position to engage the next succeeding cones 55 and stop the unreeling of the cable 54. This action will occur when a predetermined measured amount of cable has been drawn out, holding the plummet 61 at said predetermined distance below the body of the bomb.

The weight of the plummet when applied to the slips is sufficient to cause a shearing off of the bolts 47 to permit relative downward movement of the slips in the tube 1, against the tension of the spring 52, which will be set so as to allow the slips to pass beneath the free edge of the switch-arm 39', and the switch-arm then will assume the dotted line position in Fig. 2, against a shear pin 82; it now is cocked ready for action.

Then, when the bomb moves downward until the plummet strikes the ground, this relieving of the weight from the cable 54, will allow the spring 52 to force the slip seat, carrying the slips upwardly, causing further swinging movement of the switch-arm 39', shearing off the pin 82, and forcing the switch-arm between the contacts of the switch 39, closing the latter, and energizing the electric circuit through the battery 38 to the electrical detonator 37, to cause a sufficient ignition therein to discharge the powder charge 35 which then causes explosions in the barrels to discharge the projectiles therefrom.

The shrapnel projectiles 20 which are provided with time fuses will be exploded at predetermined periods of time after being discharged from the barrels, while the projectiles 26 that are dis-

charged from the mortar-like barrels, will be exploded upon impact with the ground or other rigid objects.

As the barrels are discharging, the firing charge will be communicated through the interconnected orifices 6a, 6b and 12, into the powder chamber 11, to ignite the blasting charge therein for destroying the structure of the bomb, and additional explosive charges may be provided in other portions of the bomb, for like purpose.

To facilitate the downward direction of the bomb from the aircraft, the housing 43 is provided with radial vanes 83 thereon, as shown in Figs. 11 and 12. Inclined plates 84 are arranged between the vanes 83 providing upwardly converging air passageways therebetween, to retard the downward movement of the bomb, so as to allow sufficient time for the plummet to move the cable relative thereto, as far as desired, before the plummet strikes the ground.

The charge 35 may be provided, if desired, with an auxiliary detonator 85 to discharge the same, adapted to be actuated by impact of the bomb with the ground, to explode the charges in the firing chambers of the barrels if the firing mechanism described above should fail. The detonator 85 is provided with a firing pin 86 for exploding a powder cartridge, which pin is normally retained by a spring ring 87, but the impact of the bomb with the ground causes the firing pin to slide free of the ring and explode the charge. To prevent accidental firing of the charge, as when the bomb must be dropped in friendly territory, the detonator 85 has a set screw 88 screwed into the side thereof into the path of the head of the firing pin 86, and when turned in to safety position, said screw 88 prevents sufficient movement of the firing pin to explode the charge.

I claim:

1. An aerial bomb comprising an elongated explosion chamber, a plurality of radially arranged barrels extending outwardly therefrom and communicating with the explosion chamber, a plurality of barrels arranged at an end of the explosion chamber at acute angles to the central axis thereof, the last-mentioned barrels having the sides of the inner end portions thereof converging toward the explosion chamber substantially in prismatic shape and being disposed in side-by-side abutting relation and arranged at different angular positions relative to the axis of the explosion chamber, said angular barrels having orifices in the inner ends thereof communicating with the explosion chamber, and a discharge chamber disposed centrally between said angular barrels and having an orifice communicating with one or more thereof to be fired there-through for demolishing the structure after the firing of the barrels.

2. An aerial bomb comprising a central tube, a sleeve-like structure telescoped over the tube and spaced therefrom providing an explosion chamber therebetween, means for firing said explosion chamber, a plurality of barrels extending radially from said sleeve-like structure and secured thereto, said barrels having orifices in the inner ends thereof communicating with the explosion chamber, a plurality of barrels interposed between said radial barrels and one end of the tube and arranged at different angular positions relative thereto, said plurality of barrels having orifices in the inner ends thereof communicating with the explosion chamber, segmental sleeves surrounding the first-mentioned sleeve at the opposite end of the tube, a plurality of upwardly in-

clined barrels supported by said segmental sleeves with spaces between the inner ends of said upwardly inclined barrels and the segmental sleeves, and means of communication between said spaces and the explosion chamber.

3. An aerial bomb comprising a central tube, a sleeve-like structure telescoped over the tube and spaced therefrom providing an explosion chamber therebetween, means for firing said explosion chamber, a plurality of barrels extending radially from said sleeve-like structure and secured thereto, said barrels having orifices in the inner ends thereof communicating with the explosion chamber, a plurality of barrels interposed between said radial barrels and one end of the tube and arranged at different angular positions relative thereto, said plurality of barrels having orifices in the inner ends thereof communicating with the explosion chamber, segmental sleeves surrounding the first-mentioned sleeve at the opposite end of the tube, a plurality of upwardly inclined barrels supported by said segmental sleeves with spaces between the inner ends of said upwardly inclined barrels and the segmental sleeves, means of communication between said spaces and the explosion chamber, and means for controlling said firing means including an actuating cable suspended through the tube, and a plummet carried by the lower end of said cable or actuating said firing means upon striking the ground.

4. An aerial bomb comprising an explosive charge, an igniting device therefor, and means for actuating said igniting device including a cable having a plummet suspended thereon, means for suspending said cable from the bomb for extending movement relative to the bomb, said cable having enlargements thereon at spaced intervals, means carried by the bomb for engaging said enlargements to stop the relative movement of the cable, and means for actuating said engaging means upon a predetermined extent of movement of the cable relative to the bomb.

5. An aerial bomb comprising a structure having an explosive charge therein, an igniting device therefor, a drum mounted on said structure, a tube extending through the structure, a cable wound on the drum and extending downwardly through the tube, said cable having a plummet suspended from the free end thereof and having cones fixed at spaced intervals thereon, slips slidably mounted relative to the tube at different sides of the cable and having means for moving the same into engagement with the cones upon longitudinal movement of the slips, means operatively connected with the drum and operable upon a predetermined extent of relative movement of the cable to the structure for moving the slips into engaged positions relative to the cones for stopping the extending movement of the cable, and means associated with the cable for actuating the igniting device when the plummet strikes the ground.

6. An aerial bomb comprising a structure having an explosive charge therein and having a central tube therethrough, an igniting device for said explosive charge, a drum mounted on the structure, a cable having an end wound on the drum and having the opposite end portion thereof extending through the tube, said cable having a plummet suspended from the free end thereof and having cones fixed thereon at spaced intervals, slips slidably mounted in the tube at different sides of the cable, means for supporting said slips for longitudinal movement, means for moving said slips into engaged position upon said

longitudinal movement thereof to support the cable by engagement with one of the cones thereof and prevent longitudinal movement of the cable relative to the structure, means for actuating said slip moving means upon a predetermined extent of relative movement of the cable, and means operatively associated with the slips for actuating the igniting device upon contact of the plummet with the ground.

7. In an aerial bomb, the combination of a body having an explosive charge, an igniting device therefor, means for actuating said igniting device including a cable having a plummet suspended therefrom for extending movement relative to the body, and supporting means for limiting the extending movement of the plummet relative to the body, said supporting means comprising means forming longitudinally spaced projections on the cable, means in position for actuation by said projections for stopping the relative movement of the plummet by the projections.

8. An aerial bomb comprising a body having an explosive charge, means for igniting said charge, and means for actuating said igniting means comprising a cable having a plummet suspended therefrom, said cable having longitudinally spaced lateral projections thereon, a winding drum on the body supporting the cable for extending movement therefrom, rotatable means actuated by said projections, and means actuated by said rotatable means for stopping the relative extending movement of the cable.

9. An aerial bomb comprising a body having an explosive charge, means for igniting said charge, and means for actuating said igniting means comprising a cable having a plummet suspended therefrom, said cable having longitudinally spaced lateral projections thereon, a winding drum on the body supporting the cable for extending movement therefrom, clamping means in position for movement into holding engagement with the cable, and means actuated by the projections for moving said clamping means into holding position.

10. An aerial bomb comprising a body having an explosive charge, means for igniting said charge, and means for actuating said igniting means comprising a cable having a plummet suspended therefrom, said cable having longitudinally spaced lateral projections thereon, a winding drum on the body supporting the cable for extending movement therefrom, a ring having a tapered seat therein and through which the cable extends, slips in position for sliding movement on said tapered seat into supporting engagement with the cable, and means actuated by the projections for moving said slips to said supporting position.

11. An aerial bomb comprising a body having an explosive charge, means for igniting said charge, and means for actuating said igniting means comprising a cable having a plummet suspended therefrom, said cable having longitudinally spaced lateral projections thereon, a winding drum on the body supporting the cable for extending movement therefrom, a ring having a tapered seat therein and through which the cable extends, slips in position for sliding movement on said tapered seat into supporting engagement with the cable, a lever connected with the slips for moving the same, and gearing having operative connection with the cable projections for movement thereby for actuating the lever.

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