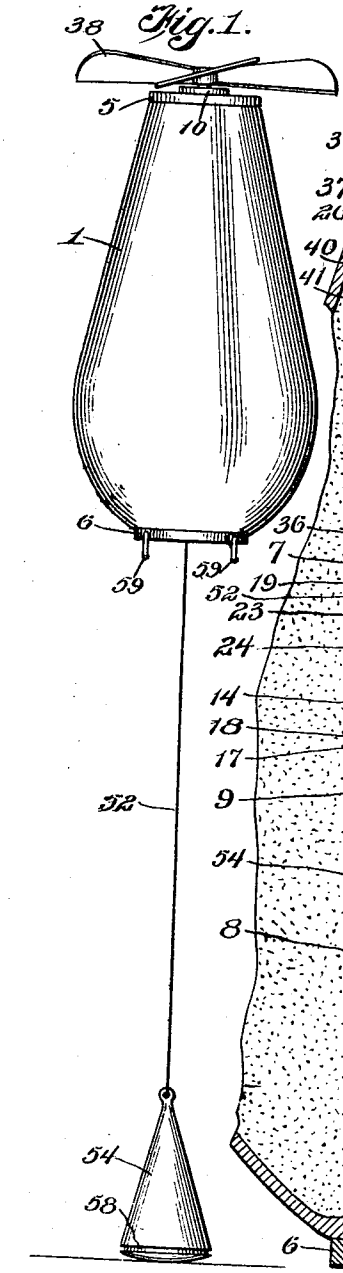
A. VELO.

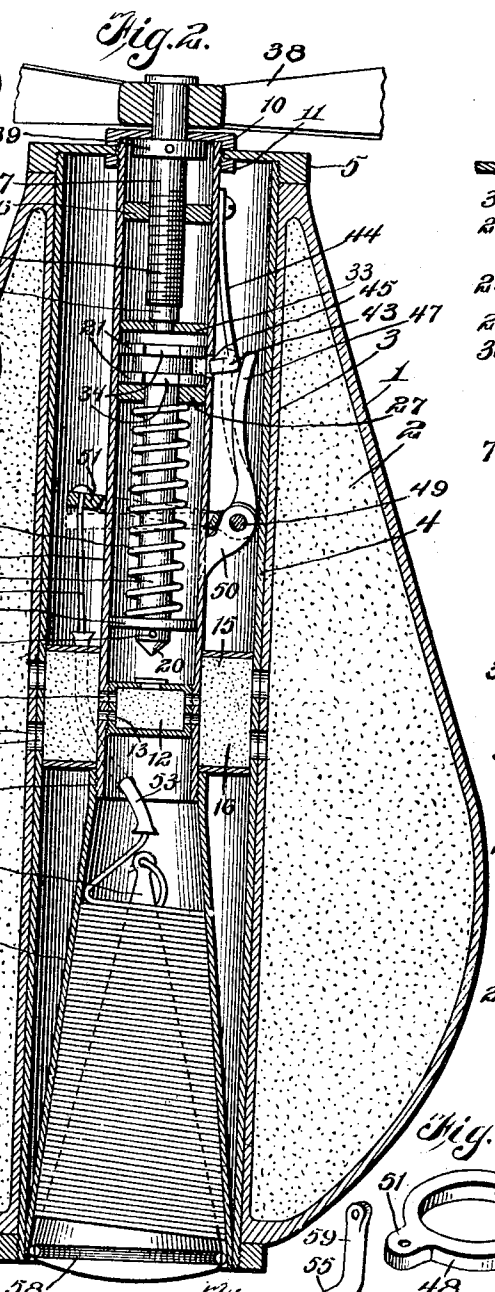
AERIAL TORPEDO.

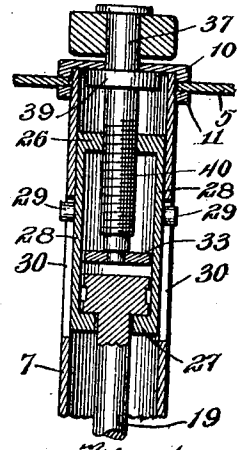
APPLICATION FILED MAY 9, 1917.

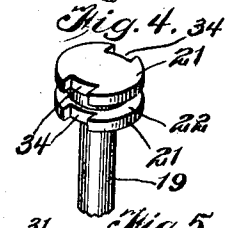
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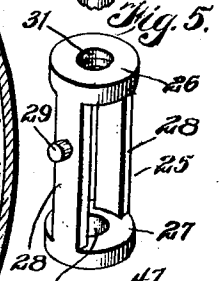
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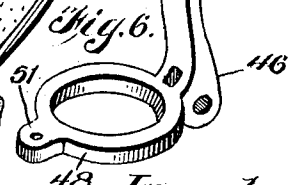




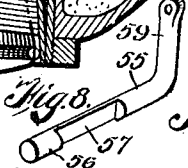












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UNITED STATES PATENT OFFICE.

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AERIAL TORPEDO.

1,309,708. Specification of Letters Patent. Patented July 15, 1919.

Application filed May 9, 1917. Serial No. 167,520.

To all whom it may concern:

Be it known that I, ANTHONY VELO, a citizen of the United States, residing at Washington, in the District of Columbia, have invented new and useful Improvements in Aerial Torpedoes, of which the following is a specification.

This invention relates to bombs or torpedoes of the kind especially designed for use with airplanes and other aircraft and intended to be dropped therefrom on to the ground, object or target below, and particularly to aerial bombs or torpedoes adapted to explode a predetermined distance above the ground surface, object or target, and to be set for action a certain interval after having been released from the aircraft, so as to obviate the liability of a premature explosion.

One object of the invention is to provide novel means for holding a firing pin or like device from action until the bomb reaches a point in proximity to the target and then releasing it for action to effect the explosion of the bomb.

Another object of the invention is to provide means for priming or setting normally inactive or deënergized firing pin actuating means so as to render such firing pin actuating means capable of actuating said pin at a predetermined interval after the bomb has been dropped from the aircraft, and not before.

Still another object of the invention is to provide an aerial bomb which is simple and comparatively inexpensive of construction and capable of being safely handled, which is practically proof against accidental explosion while carried by the aircraft, which is adapted to be easily and conveniently shipped or transported from place to place for use upon an aircraft, and which embodies simple and efficient means for locking the firing pin against action and releasing it for action, to insure certainty of explosion of the bomb when in proper proximity to the ground, object or target.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:—

Figure 1 is a side elevation of an aerial bomb embodying my invention showing the contact device released for use and in the act of engaging the ground or target.

Fig. 2 is a vertical longitudinal section through the bomb on an enlarged scale, and showing the parts in normal position.

Fig. 3 is a vertical longitudinal section through the guide tube or inner casing of the firing mechanism taken in a plane at right angles to the section shown in Fig. 2, and showing particularly the device for setting or energizing the firing pin actuating spring.

Fig. 4 is a fragmentary perspective view of the firing pin.

Fig. 5 is a perspective view of the cocker or traveler actuated by the spring priming or energizing device.

Fig. 6 is a perspective view of the setting arm or lever.

Fig. 7 is a perspective view of a movable abutment head or bearing member.

Fig. 8 is a perspective view of one of the pilot weight locking and releasing devices.

In the form of my invention as herein disclosed, the bomb comprises an outer or main shell or casing 1, which may be of any suitable size or form, and which contains the main high explosive charge 2. This charge 2 is packed between the outer shell and an internal tubular core or sleeve 3 extending axially through the shell from end to end thereof. Inclosed within the central tube or sleeve 3 is an inner tube 4 which fits snugly therein and forms a casing to normally contain and inclose the parts of the firing mechanism. The casing 4 is of somewhat greater length than the sleeve 3 and is threaded at its projecting ends to receive a threaded cap nut or head 5 and a threaded retaining nut 6, whereby the parts of the firing mechanism are secured in position within the bomb casing.

Inclosed within the casing 4 is a barrel comprising a main upper cylindrical section 7 and a lower frusto-conical section 8, which sections are threaded or otherwise suitably united at their approximate ends, as shown at 9. The section 7 has its upper end threaded and extending through an opening in the cap nut 5 and secured in position by upper and lower clamping nuts 10 and 11, the nut 10 being in the form of a cap nut to close and protect the barrel from the en-

trance of dirt, moisture and other foreign substances. The lower enlarged end of the conical section 8 of the barrel terminates substantially in line with the lower end of the casing 4 and is preferably tapered to a thin edge, as shown.

Disposed within the lower end of the section 7 of the firing tube is a detonator 12, comprising a chamber containing an explosive charge and provided with a fulminate or other suitable explosive cap, said chamber being in communication through openings 13 therein and registering openings 14 in the tube 7 with a firing chamber 15 containing a firing charge 16, adapted to be ignited from the charge 12. Registering openings 17 and 18 are formed in the casing 4 and sleeve 3, for establishing communication between the firing charge chamber and the interior of the main shell or casing 1, whereby the explosion of the main explosive charge 2 is effected when the detonating and firing charges are set off.

The detonating charge is set off by means of a firing pin 19 having a pointed lower end 20 to engage the explosive cap and provided at its upper end with a head composed of spaced flanges 21 forming an annular intervening groove 22. The lower end of the firing pin 19 is mounted for sliding movement in a bearing and abutment head or disk 23 slidably arranged within the tube 7 and limited in downward movement by a stop pin 24, while the flanged or headed end of said firing pin is arranged for coöperation with a cocker or setter 25. This cocker or setter 25 consists of a cage-like nut or traveler composed of upper and lower circular heads 26 and 27, rigidly connected by a pair of diametrically disposed longitudinally extending bars 28, said bars being provided with lugs or projections 29 movable in longitudinal guide slots 30 in the tube 7, whereby said traveler is permitted to have free sliding or reciprocating motion, but is held from rotation. The upper head 26 of the traveler is provided with a threaded opening 31, while the lower head 27 thereof is provided with a smooth-surfaced opening 32, which slidably receives the shank of the firing pin, whereby the traveler and firing pin are connected for relative sliding movements.

The headed end of the firing pin is fitted for movement within the traveler cage between the head 27 and an abutment member 33 fixed to the tube 7, the flanges 21 of the head of the firing pin and the side edges of the abutment head 33 being respectively provided with notches or recesses 34 and 35 receiving and slidably engaging the bars 28, whereby the cage and firing pin are permitted to have free sliding movement, but are held from rotation on their axes, and ease of motion of these parts, without liability of binding, is secured in a reliable and effective manner. Surrounding the firing pin between the movable bearing or abutment member 23 and the lower head 27 of the cocker or traveler is a coiled expansion pin-actuating spring 36. The head 27 normally holds the pin elevated and from dropping by gravity, while the spring 36 is normally expanded and, by contact with the abutment 23, serves merely to hold the firing pin from upward displacement from an accurate initial position. The spring 36 is therefore normally inoperative or deënergized, but is adapted to be tensioned and energized to actuate the firing pin on its firing motion, as hereinafter described. It will thus be seen that the firing pin is normally held from movement and away from the detonator against any possibility of casual or accidental firing motion, thus securing absolute safety in the handling and transportation of the bomb and preventing the firing of the explosive charge until the firing mechanism is positively primed for action by the compression and tensioning of the spring.

The spring is adapted to be compressed and tensioned by means of an air-operated primer or setting device, which is automatically thrown into action when the bomb is dropped and operated by air pressure to prime or tension the spring after the bomb has dropped a predetermined distance. While the spring is thus being tensioned and primed for actuating the firing pin, the latter is locked and held from firing motion by a locking and releasing device, which holds the firing pin locked until the comb reaches a point in desired proximity to the ground, object or target, and then releases the locking pin for action by the spring to instantly explode the bomb.

The spring tensioning or priming device comprises a stem or shaft 37 which is disposed within the upper end of the tube 7, said shaft or stem having its outer end extending through and journaled for rotation in the cap 10, and carrying at its outer end an actuating fan or propeller 38. This propeller 38 is composed of a hub fixed to the shaft and an annular series of blades pitched so as to be acted upon by air pressure when the bomb drops by gravity, whereby the propeller and shaft will be rotated in a given direction at a more or less determined rate of speed. Fixed to the shaft within the tube 7 is a collar 39 disposed on the opposite side of the cap 10 from the propeller hub and serving therewith to hold the shaft from any but a limited longitudinal movement, while permitting it to freely revolve. The body of the shaft is provided with a screw threaded portion 40 which extends through and works in the threaded opening 31 of the traveler head 26, and the

lower end of said shaft is provided with smooth-surfaced circular stepped or reduced portions 41 and 42, the portion 41 being of less diameter than the threaded portion of the shaft and of somewhat greater diameter than the portion 42, which portion 42 is journaled for rotation in a bearing opening in the abutment head or disk 33. The shaft 40 is thus adapted when revolved to rotate in the abutment head or disk 33 and to transmit motion to the traveler 25 through the action of the interengaging screw threaded surfaces, the head 27 of the traveler being thereby forced downwardly along the firing pin and serving to tension or compress the spring 36 against the abutment 23, to prime or energize said spring for the firing action. The length of the threaded portion 40 and pitch of the threads thereof is such as to require a certain interval of time to feed the head 26 of the traveler 25 downwardly the full length of said threaded portion, whereby the bomb will drop a predetermined distance below the aircraft after its release until the spring is compressed or energized for action, thus furnishing one safe-guard against accidental explosion of the bomb, or its explosion at any point in close proximity to the aircraft after it has been released. When the head 26 reaches the limit of its downward movement it passes the threaded portion 40 and comes into alinement with the smooth-surfaced portion 41 of the shaft 37, which is of smaller diameter than the threaded opening 31, whereby as the bomb continues to fall and the shaft 37 to rotate, said shaft will be permitted to freely rotate without imparting further movement to the traveler, thus obviating all liability of over pressure upon the spring or derangement of any of the working parts. As the propeller operates against the resistance of the spring until said spring is fully energized or tensioned, it will be understood that the downward movement of the bomb will first be retarded until the spring is fully energized, after which a freer movement of the propeller will be permitted to allow the bomb to drop at a determined rapidity of speed.

For the purpose of holding the firing pin against movement while the spring is being tensioned, a spring detent or locking member is provided comprising a spring locking lug 43 carried by one end of a spring arm 44 mounted upon the exterior of the tube 7, said lug being normally held retracted by the spring arm and adapted to be projected or forced inwardly through an opening 45 in the tube into engagement with the annular groove or recess 22 of the firing pin, to lock said pin against downward movement. The locking member is controlled by a setting lever 46 of bell-crank form, said lever being provided with a setting arm 47 and an actuating arm 48. The setting arm 47 is disposed between the casing 4 and tube 7 and its free end is arranged to engage the lug 43, while the arm 48, which is of annular or ring form, loosely embraces the tube 7. The lever is mounted at the angle of intersection of its arms upon a pivot pin 49 carried by a lug 50 fixed to the tube 7, so that through downward and upward movements of the lever arm 48, the lever arm 47 will be moved inwardly and outwardly to project the locking device against the resistance of its spring arm, or permit it to be automatically retracted through the action of its spring arm, said spring arm normally holding the locking lug and the setting lever in inactive positions, as shown in Fig. 2.

A lug or projection 51 extends from the lever arm 48 at a point diametrically opposite its pivot and has connected therewith one end of a cable or like flexible connection or line 52 which extends downwardly into the flaring or conical section 8 of the firing tube through a suitable guide tube 53. The opposite or free end of this cable is connected to the tip or apex portion of an elongated contact member or pilot weight 54, which is of conical form and is normally disposed within the conical tube 8.

The cable is of such length as to allow the weight, when released from the tube 8, to drop a desired distance below the torpedo, to travel in advance thereof for contact with the ground, target or object, as shown in Fig. 1, when the bomb reaches a predetermined distance above the same. Normally the weight 54 is held within the tube 8 by fastening or retaining means, and the slack portion of the line or cable is coiled or wound therearound in the flaring space between the weight and wall of the tube, in such a manner as to permit the cable to unwind freely, without liability of kinking or tangling, when the weight is released. The fastening means employed for holding the weight in position may consist of bell-crank locking and releasing levers 55, mounted to rotate or oscillate upon the lower end of the tube 8 and nut 6. Each locking and releasing device has a locking arm 56 of circular form provided with a cut away portion or recess 57, thus forming a flat face and a curved face, the curved faces of the locking devices being adapted for engagement with a groove 58 in the base of the weight 54 to lock the same in position. Each locking device is also provided with an actuating arm 59, and the actuating arms of the locking devices may be connected to suitable operating means under control of the aviator or other occupant of the aircraft, whereby the weight may be released preliminary to the release of the bomb, as will be readily understood. The

release of the weight is effected by turning the locking devices so that their flat sides 57 face the groove 58, thus moving the locking arms out of engagement with the groove and permitting the weight to fall. The locking device thus acts in the nature of cam or eccentric locking members mounted for oscillation for movement into and out of locking position.

In practice, the bomb is supported upon the airplane in any preferred manner, preferably in a vertical position, and any suitable means for fastening it in position and releasing it for action may be employed. It will be understood that in the operation of dropping the bomb, the weight 54 is first released and allowed to fall from the tube 8, whereby the cable 52 is unwound and the setting lever operated to move the locking device 43 into locking engagement with the firing pin, thereby holding said pin from downward movement. The bomb is then released from its support and allowed to drop, and as it falls the action of the air upon the propeller 38 causes said propeller to revolve and to rotate the screw shaft 40. In the rotation of this shaft the traveler 25 will be moved downward until its head 26 comes into alinement with the surface 41 of the shaft, whereby the head 27 will be moved downward on the firing pin and will compress and energize the spring 36. This will be effected during a preliminary portion of the travel of the bomb, the speed of which will be retarded by the resistance of the spring to the movement of the propeller 38, and until the spring is fully compressed, at which time the threaded head 26 will be released from engagement with the threads 40 and the portion 42 of the screw shaft will turn loosely or idly in its bearing in the abutment member 33. During this period while the spring is being tensioned and energized for action it will be understood that the firing pin is inoperative and held from action, thus securing a further safe-guard against accidental explosion of the bomb, or any liability of premature explosion of the bomb before it is launched or until it has fallen a safe distance below the aircraft. When the weight 54 comes in contact with the ground, object or target, the continued descent of the bomb for a short distance will cause a slack in the cable 52, whereby the setting lever 46 will be released for the retraction of the arm 57 and locking lug 43 by the action of the spring arm 44, thus releasing the firing pin which will be impelled downward by the force of the spring, thus exploding the bomb above and in the desired proximity to the ground, object or target.

It will be observed that as the firing mechanism in entirety is normally stored within the inner casing 4, which is detachably fastened by the cap and retaining nuts to the bomb body, these two main parts of the bomb or torpedo may be separately shipped in disconnected condition and separately handled until it is desired to connect the same for application to the aircraft, whereby a maximum degree of safety in shipping and handling the parts of the torpedo will be secured. It will also be observed that safety in the use of the bomb or torpedo against accidental or premature explosion is insured, since the operative parts of the firing mechanism are normally inoperative or out of working condition, and that the firing pin and its energizing spring must be separately primed and set for action, and jointly put in condition for action, before an explosion of the bomb can be effected. Thus the bomb cannot be exploded while mounted on the aircraft or until it has dropped a sufficient distance below the aircraft to obviate any liability of injury to the aircraft or its occupants in the rare event that a premature explosion should occur. In this connection it is apparent that in all ordinary conditions of service the bomb will not be exploded until the firing pin and its energizing spring are primed or set and the pilot weight comes in contact with the ground, object or target. It will, of course, be understood that by the use of a flexible connection between the contact or pilot weight and the setting element which it controls, an immediate and positive explosion of the charge will be effected upon contact of the weight with any object in its path of movement, irrespective of the character of such object or the position in which the weight may strike. A material advantage is thus secured over sliding or telescopic contact rods or the like, which are liable to bind or to be bent or deflected and rendered inoperative when it strikes an object at an angle or unless it strikes squarely in the center line of its direction of movement. Other advantages of the invention will be readily understood by those versed in the art from the foregoing description.

Having described my invention, I claim:

1. In an aerial drop bomb, a firing pin, a spring for actuating said pin, a locking device for engaging and holding the pin fixed and immovable, means for moving said locking device into engagement with the firing pin and thereafter releasing it to permit firing motion of said pin, and means for tensioning the spring while the pin is held fixed and immovable by said locking device.

2. In an aerial drop bomb, a firing pin, a coiled actuating spring encircling said pin, a locking device for engaging and holding the pin fixed and immovable, means for moving said locking device into engagement with the firing pin and thereafter releasing it to permit firing motion of said pin, a member slidable on the pin for compressing

and tensioning the spring while the pin is held fixed and immovable by said locking device, and means for actuating said slidable member.

3. In an aerial drop bomb, a detonator, a firing pin, an abutment carried by the pin, a slidable member having a head embracing the pin, a coiled actuating spring encircling the pin between said abutment and head, a locking device for engaging and holding the pin fixed and immovable, means for moving said locking device into engagement with the firing pin and thereafter releasing it to permit firing motion of said pin, and means for sliding said slidable member longitudinally of the pin to compress and tension the spring between the abutment and head while the pin is held fixed and immovable by said locking device.

4. In an aerial drop bomb, a firing pin, a spring for actuating said pin, a normally retracted locking device for engaging and holding the pin fixed and immovable, a setting member movable to effect projection and retraction of said locking device, a precursory contact releasable from the torpedo to travel in advance thereof, a connection between said contact and setting member and coöperating therewith to move the locking device into locking position when the contact is released and to effect retraction of said locking device when the contact strikes a surface, a slidable member movable longitudinally of the pin for compressing and tensioning the actuating spring, and means for actuating said slidable member for tensioning the spring while the firing pin is held fixed and immovable by the locking device.

5. In an aerial drop bomb, a firing pin, a coiled spring compressible in the direction of firing motion of the pin so as to be placed under tension to actuate said pin, a locking device for holding the pin fixed and immovable while the spring is being tensioned, means for throwing the locking device into action preliminarily to tensioning the spring and thereafter effecting retraction of said locking device to permit the pin to be actuated by the tensioned spring, and means operative in the descent of the bomb for compressing and tensioning the spring while the pin is held fixed and immovable by said locking device.

6. In an aerial drop bomb, a firing pin, a coiled actuating spring surrounding the pin, a spring retracted locking device for engaging and holding the pin fixed and immovable, a pivotally mounted setting lever having a setting arm and an actuating arm, the former being adapted upon reverse pivotal movements of the lever to respectively move the locking device to locking position and to permit retraction thereof, a contact device releasable from the torpedo to travel in advance thereof, a cable connecting said contact device with the actuating arm of the lever, and means operative in the fall of the torpedo and after said contact device is released to compress and tension the spring for action while the firing pin is held fixed and immovable by said locking device.

7. In an aerial drop bomb, a firing pin, a spring for actuating the same, a locking device for engaging and holding said pin fixed and immovable, means for throwing the locking device into action and for releasing it when the bomb strikes an object, a traveler slidable longitudinally on the pin for compressing and tensioning the spring while the pin is held fixed and immovable by said locking device, a shaft having a threaded engagement with the traveler to move the same a prescribed distance, and thereafter having an idling action, and an air-operated propeller for rotating said shaft.

8. In an aerial bomb, a detonator, a firing pin, a spring for actuating the firing pin, a traveler for normally holding the pin from movement toward the detonator, said traveler being movable longitudinally of the pin and toward the detonator to wind the spring for action, an air-operated member for moving the traveler to an extent to wind the spring and thereafter having an idling action, a self-retracted locking device for engaging and holding the firing pin fixed and immovable while the spring is being tensioned by the movement of the traveler, a contact releasable from the bomb to travel in advance thereof, and a connection between said contact and the locking device operative to throw the locking device into engagement with the firing pin when said contact is released and to permit retraction of said locking device when the contact strikes an object.

9. In a torpedo adapted to be dropped from aircraft, the combination of a main explosive charge, a detonating charge, a firing pin for exploding the detonating charge, a locking device, means including a precursory contact device releasable from the torpedo and operative by and on the release of said contact device to throw said locking device into action to lock the pin fixed and immovable and thereafter operative in the fall of the torpedo and on engagement of said contact device with an object to release the pin for firing action, a spring for actuating the firing pin on its firing motion, and means separate from and operable independently of the first named means for tensioning said spring while the firing pin is held fixed and immovable for actuating said pin when the latter is released.

10. In a torpedo adapted to be dropped from aircraft, the combination of a main

explosive charge, a detonating charge, a firing pin for actuating the detonating charge, a spring for actuating the firing pin, a locking device, means including a precursory contact device releasable from the torpedo and operative by and on the release of said contact device to throw said locking device into action to lock the firing pin rigid against movement and thereafter, on engagement of said contact device with an object, to release said pin for action, and means for initially holding the firing pin from movement, said means being operative in the fall of the torpedo for first releasing the firing pin and then tensioning the spring while the firing pin is held locked and immovable by said locking device.

11. In a torpedo adapted to be dropped from aircraft, the combination of a casing, a detonator therein, a normally inoperative firing pin adapted to strike said detonator, a spring surrounding said pin and adapted to be placed under tension to operate the same, a traveler slidable longitudinally of said pin and having a portion in engagement with said spring, rotary means operated by the fall of the torpedo and engaging said traveler to slide the same along the pin to tension said spring, and a locking device for locking said firing pin in fixed position and immovable while the spring is being tensioned and released, by contact of a portion of the torpedo with an object, to free the pin for a firing action.

12. In a torpedo adapted to be dropped from aircraft, a normally uncocked firing mechanism including a firing pin, and an impelling spring therefor, a cocking means for initially holding the firing pin from movement and for releasing the same and tensioning the spring, while the pin is held fixed and immovable, during the fall of the torpedo, and a setting and releasing means, wholly independent of said cocking means, and including a contact device movable in advance of the torpedo, said setting and releasing means being operative to first lock the firing pin rigidly from movement while the spring is being tensioned and then to release it for firing action.

13. In a torpedo adapted to be dropped from aircraft, a normally inoperative firing pin, a spring for actuating the same, means including a traveler slidable along the longitudinal axis of said pin in the direction of firing motion thereof during the fall of the torpedo for tensioning said spring and rendering the pin operative, and means operable to first lock the firing pin from movement while the traveler is in action and the spring is being tensioned thereby and then to release it for operation previous to the torpedo striking an object.

14. In a torpedo adapted to be dropped from aircraft, a normally uncocked firing element, means for cocking the same during the fall of the torpedo, a spring detent normally in an inoperative position and adjustable to first lock the firing element from action and then to release it for action, a contact device releasable from the torpedo to travel in advance thereof, and a setting member engaged with said spring detent and operated by the release of said contact device to adjust the detent to locking position.

15. In a torpedo adapted to be dropped from aircraft, the combination of a casing, an explosive charge therein, a firing pin, a normally untensioned resilient actuating member for said pin, a tensioning member for said resilient actuating member, an air driven rotary propeller arranged exteriorly of the casing and geared to said tensioning member and adapted to operate automatically during the descent of the torpedo to set said resilient actuating member, a locking member for rigidly locking said pin, a contact member adapted to be released from the torpedo to travel in advance thereof, and connecting means between said contact member and locking member, whereby the latter is moved to locking position to rigidly lock the firing pin from movement when the contact member is released and while said resilient actuating member is being tensioned and moved to unlocking position after said resilient actuating member is tensioned and when said contact member strikes a surface.

16. In a torpedo adapted to be dropped from aircraft, the combination of a main explosive charge, a relatively fixed detonating charge, a firing pin, a locking device, means including a precursory contact device operative during the fall of the torpedo to first throw the locking device into action to rigidly lock the pin from movement and thereafter release the pin for action upon engagement of the contact device with a surface, means for actuating the pin when released, and rotary air driven means separate from and independent of the first named means for energizing said actuating means during the fall of the torpedo while the pin is locked.

17. In a torpedo adapted to be dropped from aircraft, the combination of a main explosive charge, a detonating charge, a firing pin for exploding the detonating charge, a locking device, a precursory contact device operative during the fall of the torpedo for controlling said locking device so as to successively rigidly lock the firing pin from movement and release it for action, a spring for actuating the firing pin, and rotary air-propelled means independent of the contact device and locking device for initially holding the firing pin from movement and thereafter releasing it and ten-

sioning said spring while the firing pin is held locked.

18. In a torpedo adapted to be dropped from aircraft, the combination of a main explosive charge, a detonating charge, a normally inoperative firing pin for exploding the detonating charge, a traveler movable longitudinally of said pin, a spring adapted to be tensioned by movement of said traveler to propel the pin on its firing action, locking and releasing means including a precursory contact releasable from the torpedo for locking the pin rigidly from movement during the tensioning of the spring and operative upon contact with a target for releasing it for action after the spring has been tensioned, and rotary air-propelled means operative during downward travel of the torpedo to actuate the traveler while the pin is rigidly locked.

19. In a torpedo adapted to be dropped from aircraft, the combination of a main explosive charge, a detonating charge, a normally inoperative firing pin for exploding the detonating charge, a traveler movable longitudinally of said pin, a spring adapted to be tensioned by movement of said traveler to propel the pin on its firing action, locking and releasing means including a precursory contact releasable from the torpedo for rigidly locking the pin from movement during the tensioning of the spring and operative upon contact with a target for releasing it for action after the spring has been tensioned, and rotary air-propelled means operative during downward travel of the torpedo to actuate the traveler while the pin is immovably locked, said air-propelled means having a threaded thrusting connection with said traveler.

20. In a torpedo adapted to be dropped from aircraft, the combination of a firing mechanism, a contact member released from the torpedo and adapted to precede the fall thereof, and a pair of elements, one of which is pivoted and actuated by the release of the contact member to adjust the other element into locking engagement with said firing mechanism during a major portion of the fall of the torpedo.

21. In an aerial torpedo of the character described, a casing having an interior contact receiving chamber, firing mechanism, including a locking and releasing element, a contact weight normally housed within said chamber and adapted to be released therefrom to travel in advance thereof, and a flexible connection between said locking and releasing device and the contact member, said flexible connection being normally coiled about said contact member and between the surface thereof and the wall of the chamber.

22. In a torpedo adapted to be dropped from aircraft, the combination of a casing, a normally inoperative firing pin movable longitudinally of said casing, a spring encircling said pin and adapted to be placed under tension to operate the same, an adjustable traveler including upper and lower heads, the latter of which engages said spring to tension the same when the traveler is adjusted, means operated by the fall of the torpedo and engaging said upper head for adjusting the traveler, and means for locking said firing pin against movement and released, by contact of a portion of the torpedo with an object, to fire an explosive charge.

23. In a torpedo adapted to be dropped from aircraft, the combination of a casing, a tubular member therein, a normally inoperative firing pin movable longitudinally of said tubular member, a spring encircling said pin and adapted to be placed under tension to operate the same, an adjustable traveler including upper and lower heads, the latter of which engages said spring to tension the same when the traveler is adjusted, means operated by the fall of the torpedo and engaging said upper head for adjusting the traveler, and means for locking said firing pin against movement and released, by contact of a portion of the torpedo with an object, to fire an explosive charge.

24. In a torpedo adapted to be dropped from aircraft, the combination of a casing, a normally inoperative firing pin movable longitudinally of said casing, a spring encircling said pin and adapted to be placed under tension to operate the same, an adjustable traveler movable longitudinally of said casing and including upper and lower heads, the latter of which engages said spring to tension the same when the traveler is adjusted, means preventing rotary movement of said traveler when adjusted, means operative by the fall of the torpedo and engaging said upper head for adjusting the traveler, and means for locking said firing pin against movement and released, by contact of a portion of the torpedo with an object, to fire an explosive charge.

25. In a torpedo adapted to be dropped from aircraft, the combination of a casing, a tubular member therein, a normally inoperative firing pin movable longitudinally of said tubular member, a spring encircling said pin and adapted to be placed under tension to operate the same, an adjustable traveler movable longitudinally of said tubular member and including upper and lower heads, the latter of which engages said spring to tension the same when the traveler is adjusted, means preventing rotary movement of said traveler when adjusted, means operative by the fall of the torpedo and engaging said upper head for adjusting the traveler, and means for locking said

firing pin against movement and released, by contact of a portion of the torpedo with an object, to fire an explosive charge.

26. In a torpedo adapted to be dropped from aircraft, the combination of a casing, a detonator therein, a normally inoperative firing pin adapted to strike said detonator, a spring engaging said pin and adapted to be placed under a tension to operate the same, a traveler adjustable longitudinally of said casing and having a portion in engagement with said spring, and a rotary member operable during the fall of the torpedo and having a screw threaded portion and a smooth portion, the former normally engaging and adjusting said traveler to aline the engaged part thereof with said smooth portion and thereby prevent further longitudinal movement of the traveler.

27. In a torpedo adapted to be dropped from aircraft, the combination of a casing, a detonator therein, a normally inoperative firing pin adapted to strike said detonator, a spring surrounding said pin and adapted to be placed under tension to operate the same, a traveler slidable longitudinally of said pin and having a portion in engagement with said spring, means for operatively engaging said traveler to slide the same along the pin to tension said spring, and a locking device for locking said firing pin in fixed position and immovable while the spring is being tensioned and released, by contact of a portion of the torpedo with an object, to free the pin for a firing action.

28. In a torpedo adapted to be dropped from aircraft, the combination of a firing mechanism, a contact member released from the torpedo and adapted to precede the fall thereof, and a pair of elements, one of which is actuated by the release of the contact member to adjust the other element into locking engagement with said firing mechanism during a major portion of the fall of the torpedo.

29. In an aerial torpedo, the combination of a casing having an interior conical contact receiving chamber at the lower end thereof, firing mechanism, including a locking and releasing element, a conical contact weight normally housed within said chamber and adapted to be released therefrom to travel in advance of the torpedo, said weight being of a form to provide a cable receiving space between its surface and the wall of the chamber, and a flexible connection between said locking and releasing device and the contact member, said flexible connection being normally coiled about said contact weight in the said space between the same and the wall of the chamber.

In testimony whereof I affix my signature.

ANTHONY VELO.