J. G. LEAL.

AERIAL BOMB.

APPLICATION FILED OCT. 3, 1916.

1,289,483.

Patented Dec. 31, 1918.

2 SHEETS—SHEET 1.

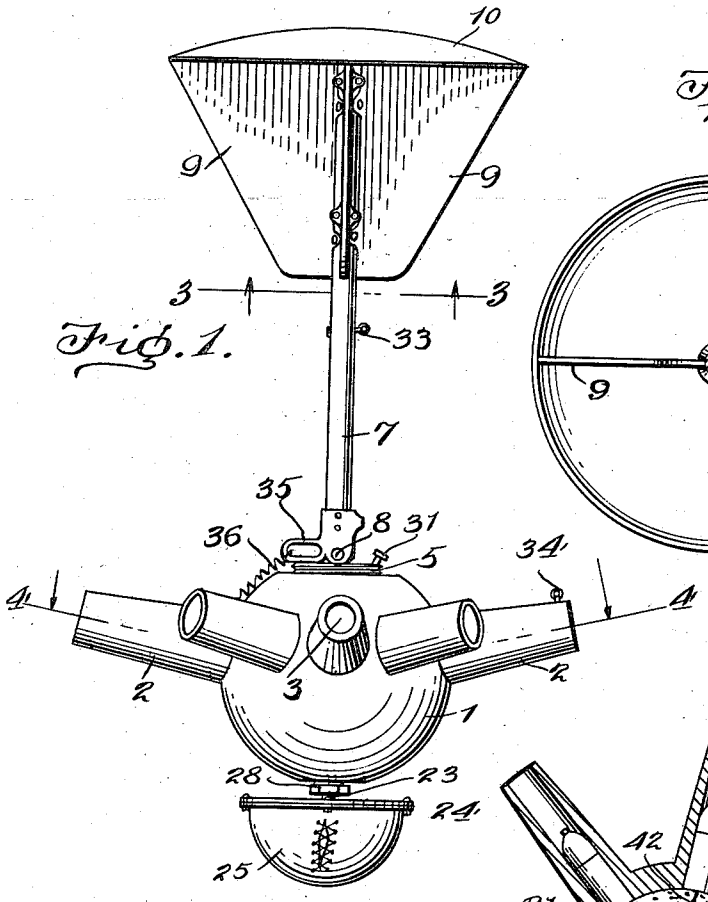


Fig. 1.

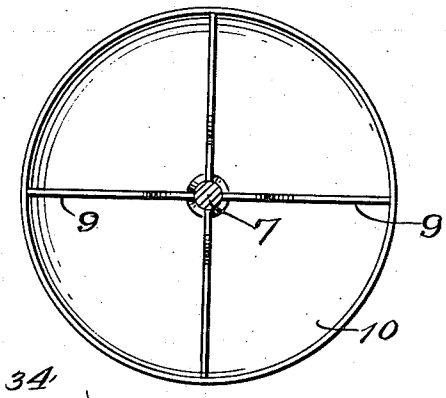


Fig. 3.

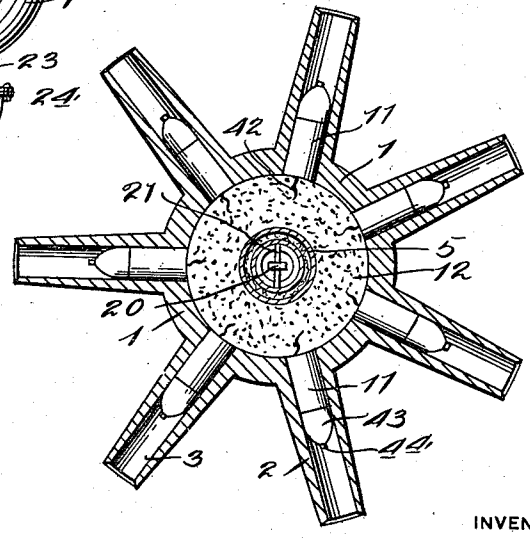


Fig. 4.

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2 SHEETS—SHEET 2.

Fig. 6.

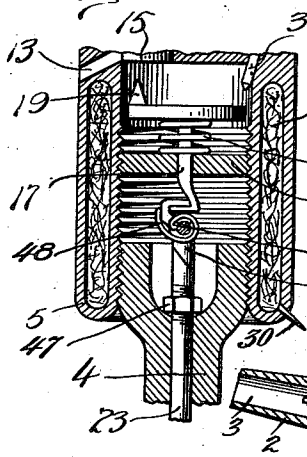


Fig. 2.

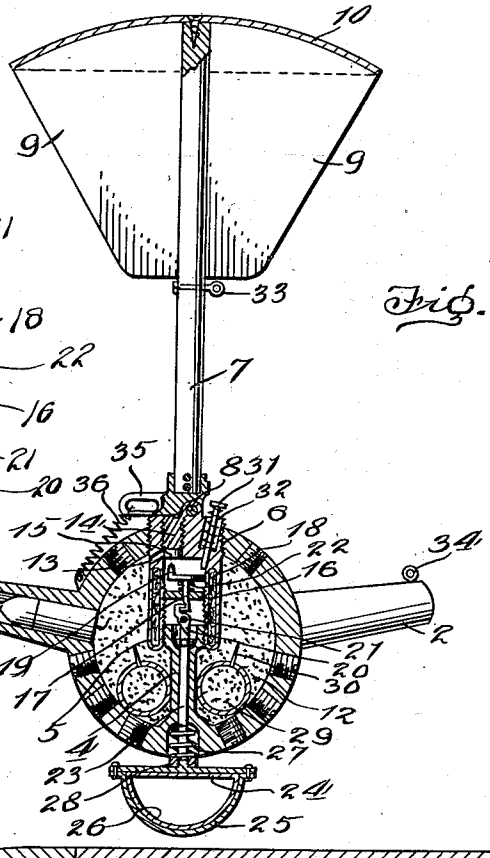
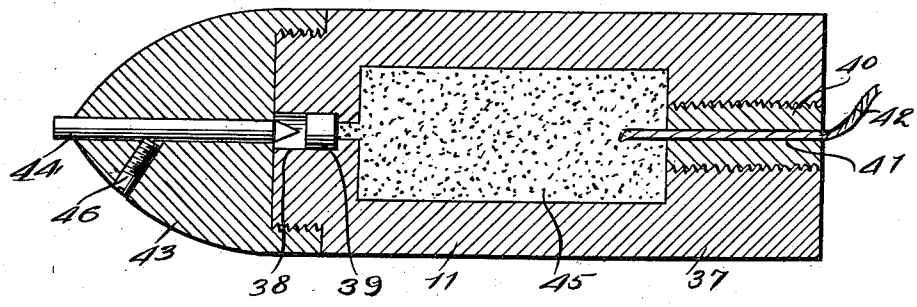


Fig. 5.



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AERIAL BOMB.

1,289,483. Specification of Letters Patent. Patented Dec. 31, 1918.

Application filed October 3, 1916. Serial No. 123,587.

To all whom it may concern:

Be it known that I, JESSE G. LEAL, a citizen of the United States, residing at Bakersfield, in the county of Kern and State of California, have invented certain new and useful Improvements in Aerial Bombs, of which the following is a specification.

An object of my invention is to provide a bomb which may be dropped from an air craft or may be thrown by hand as a grenade, and which is so arranged that as the bomb strikes, projectiles will be discharged therefrom at a plurality of points and explosives will be set off to burst the shells and scatter the fragments in all directions.

A further object is to so construct the parts that the bomb will be guided to be carried in the desired path and will be caused to fall in a manner that the trigger by which the cap is fired to ignite the explosive will be operated.

A still further object lies in the construction of the projectiles in such a manner that as each of the independent projectiles is discharged from the bomb, a fuse will be lighted which will cause the projectiles to be exploded to burst and throw the fragments, and also to provide means forming a part of the projectile by which it is exploded upon striking any material of sufficient density that a blow is imparted to a firing pin.

With other objects in view, my invention consists in such novel features of construction and combinations of parts which will be hereinafter described in connection with the accompanying drawings and then pointed out in the claims.

In the drawings:

Figure 1 is a view in side elevation with the parts of the bomb shown in the position which they would occupy during the flight of the same.

Fig. 2 is a view similar to Fig. 1 with certain of the parts illustrated in section.

Fig. 3 is a transverse sectional view on the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1 and looking in the direction indicated by the arrow.

Fig. 5 is an enlarged detail sectional view to better disclose the construction of one of the projectiles.

Fig. 6 is an enlarged fragmentary sectional view.

The shell 1 has the barrels or tubes 2, several of which are illustrated in the present disclosure, disposed around the same to project radially and preferably inclined slightly above the horizontal, and the bore 3 of each of these barrels 2 extends entirely through the shell to the interior thereof. A stem 4 is disposed upwardly from the lower side of the shell 1 and this stem has a central bore extending entirely throughout the length thereof, a sleeve 5 being screwed or otherwise mounted through an opening 6 in the upper side of the shell 1 to be alined with the stem 4 and to have screw threaded connection with the same at its lower end.

The sleeve 5 has the upper end thereof closed and a stem 7 by which the guiding tail structure of the bomb is carried has pivotal mounting on the bearing 8 on the upper closed end of the sleeve 5. Guiding vanes, or wings 9 are carried by the outer end of the stem 7 to extend radially from the sides thereof, and a circular plate 10 is curved or cupped to form a cap which is received over the end of the stem 7 and the upper edges of the vanes, or wings 9. By arranging the parts in the manner set forth, it is apparent that the flight of the bomb will be directed in such a manner that the shell 1 will carry foremost with the vanes or wings 9 directing the course of the same, and the cap 10 acting to cause the bomb to fall with the parts arranged so that the stem 7 will occupy an approximately vertical position and that the tubes or barrels 2 will each be positioned to discharge at substantially the same angle upwardly from the ground or other surface against which the bomb strikes, while at the same time a firing means to be hereinafter set forth will be tripped by the fall of the bomb in the manner set forth.

In loading the bomb, it is the intention that the projectiles or shells 11 shall be placed in each of the tubes 2, to occupy a position at the inner end of the bore 3 thereof, that the interior of the shell 1 be filled with powder or some other explosive, as indicated at 12, means being provided to fire this explosive within the shell 1 to cause the projectiles 11 to be discharged through the tubes or barrels 2. To the ends above set forth, a passage way 13 is provided through the wall of the sleeve 5 at one side thereof and at a point just below the connection of the sleeve through the opening 6 of the shell, the upper closed end of this sleeve 5 being

bored through and a plug 14 which will hold in place a percussion or firing cap is mounted in the bore and the cap 15 is thus held at a position that as the same is fired a spark will carry through the passage 13 and will ignite the explosive 12 within the shell 1. A plate 16 is mounted across the interior of the sleeve 5 at a point above the connection thereof with the stem 4 of the shell, and a stem 17 is mounted to be capable of sliding movement through a central opening in this plate 16. The stem 17 has a head 18 provided thereon with a firing pin 19 disposed on one side of the head 18 in a relation that upon upward movement of the head, this firing pin 19 will engage with the percussion cap 15 to cause the same to be discharged and to thus ignite the explosive charge within the shell 1. A trigger 20 which is pivotally mounted on the shaft 21 disposed across the sleeve 5 has the upper end thereof hooked to be received in a hooked portion formed on the lower end of the stem 17 and the stem will be normally held in a position that the firing pin 19 is out of contact with the percussion cap 15. A spring 22 is disposed around the stem 17 between the plate 16 and the head 18, and thus as the trigger 20 is disengaged from the stem 17, the head 18 and consequently the firing pin 19 will be moved under the tension exerted by the spring 22 and the firing pin will be brought to a sharp contact with the percussion cap 15 to cause the same to be fired. The lower end of the trigger 20 is beveled or cut across diagonally, and a rod 23 having the upper end thereof beveled and cut across to approximately the same angle as the beveled end of the trigger 20, is fitted in the bore of the stem 4 to be capable of endwise sliding movement, the parts being so arranged that as the tripping rod 23 is given movement in an upward sliding path the trigger 20 will be caused to be rotated around this mounting on the shaft 21 to disengage the hook thereof from the hooked portion of the stem 17 and in consequence the firing pin 19 will be dropped to a firing contact against the percussion cap through the tension exerted by the spring 22.

In some instances it may be found sufficient to provide only the rod 23 passing through the bore of the stem 4 and projecting from the lower side of the shell 1, however, it is my purpose to provide a bomb which will be fired upon striking the surface of a body of water as well as when it strikes a solid object or surface, and to this end I provide a plate 24 which is of considerable extent and secure the same on the end of the rod 23. Such an arrangement would cause upward movement of the rod 23 when the plate 24 strikes a hard object or surface and would doubtless prove efficient when the plate drops in its broad extent upon the surface of a body of water, however, it is perhaps advisable that a casing 25 which may be of leather or any other suitable material, be secured on the face of the plate 24 and that a rubber or other inflatable bladder 26 be inserted within this casing 25 to permit the casing 25 to be distended as an air cushion which will aid in the upward movement of the stem 23 when the bomb falls upon the surface of the water and which will at the same time somewhat cushion the shock sustained by the same as it is precipitated onto the ground from any considerable height, as for instance, when the bomb is thrown from an air craft. In the latter use, there will necessarily be a considerable air pressure against the casing 25 through the fact that the bomb is caused to fall with the shell downward through the guiding effect of the tail structure mounted on the stem 7 and to counteract this pressure which might otherwise tend to move the rod 23 sufficiently to trip the trigger 20, a spring 27 is mounted around the rod 23 and a nut 28 is provided thereon to adjust the tension of this spring to vary the pressure exerted by the same to hold the rod 23 against upward movement and to thus permit regulation of the structure to be operated at various pressures to be exerted against the plate 24.

With the structure as hereinbefore described, the only effect upon the firing of the percussion cap 15 will be to cause the projectiles 11 to be discharged through the tubes or barrels 2, and it is preferable that cartridges 29 of a high explosive character be placed within the shell 1 and provided with the fuses 30 which will be ignited as the explosive charge 12 is fired and will cause a second explosion which will burst the shell 1 and scatter the same in practically every direction to make the bomb even more deadly in use. If desired, the sleeve 5 may also in its side walls be provided with a charge of the high explosive in order that this shell will be positively split and burst. In Fig. 2 of the drawings, I have illustrated the shell 1 as having a plurality of screw threaded bores formed therethrough with plugs stuck in these openings and in this way the structure of the shell is weakened and as the high explosive charge at 29 is fired, the shell will be caused to split and burst into a greater number of pieces.

To insure greater safety in the handling of the bomb preparatory to projecting the same or when it is being transported or stored, a safety pin 31 is passed through a bore provided in the closed end of the sleeve 5 in a position that as the pin is depressed against the tension of a spring 32 which is mounted therearound, this pin will be brought into engagement with the head 18 and will hold the head against movement under the tension of the spring 22, thus se-

curing the firing pin 19 out of contact with the percussion cap 15. The stem 7 is mounted on the bearing 8 in a relation that it may be swung to one side to bear against the pin 31 to move the same to a position of engagement with the head 18 and by locking through the eyes 33 and 34 which are carried by the stem 7 and by one of the tubes 2, the parts will be positively held in an inoperative relation and a premature explosion is prevented.

A ring eye 35 is formed at the top of the stem 7 adjacent the bearing 8 and as the stem 7 is swung to a position in which the eyes 33 and 34 are alined, this ring eye 35 is located at a point that the bomb may be suspended through the same. A spring 36 is connected between the ring eye 35 and the shell 1 of the bomb so that as the stem 7 is released, the same will be moved to the position indicated in the drawings, where the vanes or wings 9 and the cap 10 will act to guide the course of travel of the bomb and will at the same time through the action exerted by the cap 10 cause the speed of falling of the same to be somewhat cushioned and retarded. As the stem 7 moves to the lately disclosed position through the action of the spring 36, the spring 32 will cause the safety pin 31 to be moved to release the head 18 and thus by a blow thrust against the parts connected with the rod 23 with sufficient force to overcome the tension of the spring 27, this rod will be moved upwardly to displace the trigger 20 from its engagement with the hooked end of the stem 17 and this stem will be permitted to have upward movement through the force exerted by the spring 22 in such a relation that the firing pin 19 will be brought with a subcontact against the cap 15 and the same will be fired to explode the charge within in the shell 1 of the bomb.

While any form of projectile 11 might be used, it is preferable that the same be constructed to comprise the hollow shell 37 having a cap recess 38 at one end thereof to receive a percussion cap 39 and having the opposite end thereof closed by a plug 40 which is bored centrally at 41 to permit the fitting of a fuse 42. A hardened point 43 is fitted on the end of the hollow shell 37 and a pin 44 is fitted centrally through this point to be capable of endwise movement. The pin 44 is projected beyond the end of the point 43 in such a relation that as the projectile hits a solid surface or object, the pin 44 will be given sufficient inward movement to contact with the percussion cap 39 and thus a spark will be transmitted to the explosive charge 45 which is packed in the open center of the hollow shell 37. A set screw 46 is threaded through the side of the point 43 to have engagement against the side of the pin 44 and thus the pin will be held against accidental inward movement to a position to fire the cap 39. As has been stated, a fuse 42 is fitted through the bore 41 of the plug 40 at the inner end of the projectile 11, and as the explosive charge 12 within the shell 1 of the bomb is fired, this fuse 42 will be ignited and thus should the firing pin 44 fail to contact with sufficient force to discharge the cap 39, or should the flight of the projectile carry the same to a great distance, the fuse will burn through the passage 41 and will discharge the explosive charge 45 to burst the shell 37 and scatter the fragments in every direction.

From the foregoing it will be seen that I have provided a bomb which may be dropped from an air craft, may be thrown by hand, or may be projected in some other way and which is so arranged that upon striking the surface of a body of water or upon hitting against earth or some solid body, a trigger will be tripped which will cause the projectiles to be discharged from the shell of the bomb at various points and will at the same time ignite a high explosive contained therein to cause the shell to burst and the fragments to be thrown in all directions. Further, it will be seen that the safety means is so arranged that the bomb may be handled with entire safety and may be transported or stored, and that as the parts are released and the bomb is dropped from an air craft or otherwise projected, the cap 10 will cause the same to be precipitated in a manner which will bring the proper pressure upon a trigger tripping means to cause the same to be fired, also that the hood 10 will act as a parachute to slacken the speed at which the bomb falls when dropped from an air craft and in combination with the inflated casing 25, will act to prevent the shell 1 of the bomb from burying itself in the ground through the excessive speed of movement gained in its fall.

As is shown in Fig. 6, means may be provided on the rod 23, which is here shown as the adjusting nut 47, which means will permit adjustment of the rod 23 to vary the proximity of the same to the beveled or diagonally cut lower end of the trigger 20, and thus by adjusting this nut 47 along the length of the rod 23, the bearing of the rod against this beveled portion can be regulated and in consequence, the setting of the hook of the trigger over the hook of the stem 17 can be varied with great exactness to regulate the device to operate at different degrees of pressure as exerted to move the rod 23 upwardly. A spring 48 is connected at one end to the shaft 21 and the free end of this spring bears against the trigger 20 at the back of the hook thereof so that the trigger is at all times spring pressed to the operative relation and the hook thereof will

be constantly engaged and held in this engagement with the hook of the stem 17 until the trigger 20 is swung around its mounting on the shaft 21 by the upward movement of the rod 23.

While I have herein shown and described only one specific form of the bomb, it will be understood that various modifications might be resorted to in the means by which the trigger is held in the safety or inoperative position, the construction of the projectiles, and in other features and combinations of parts without departing from the spirit and scope of my invention and hence I do not wish to be limited except for such points as may be set forth in the claims.

I claim:—

1. A bomb comprising a shell adapted to contain an explosive, a plurality of tubes radially projecting from said shell with the bores thereof extending through to the interior of the same, projectiles mounted in the bores of said tubes, means for holding a percussion cap within the shell, and at such point that when exploded a spark will be delivered to the explosive, means carried by the shell to become operative upon striking of the bomb to cause the percussion cap to be fired to ignite the explosive, a tail extension for the shell constructed to direct the flight of the same and to retard the speed of movement in flight, and pneumatic means arranged in conjunction with the percussion cap firing means to cushion the shock imparted thereto by striking of the bomb.

2. A bomb comprising a shell adapted to contain an explosive, a plurality of tubes radially projecting from said shell with the bores thereof extending through to the interior of the same, projectiles mounted in the bores of said tubes to be discharged therefrom by ignition of the explosive within the shell, means to hold a percussion cap within the shell, means carried by the shell to become operative upon the bomb striking, and to cause the percussion cap to be fired to ignite the explosive, means by which the cap firing means is held in an inoperative position, a stem extending within the shell adjacent the holding means and having the outer end thereof projecting from the shell to be struck through impact of the bomb and to release the cap firing means, a tail structure carried by the shell at a point substantially opposite to the projection of the stem therefrom and shaped to direct the travel of the bomb to cause the projecting stem to strike and also acting to retard the speed of movement of the bomb, and pneumatic means carried by the projecting stem to cushion the shock incident to the striking of the bomb.

3. A bomb comprising a shell adapted to contain an explosive, a plurality of tubes projecting from said shell and extending radially with the bores thereof communicating with the interior, a stem formed to extend from the bottom of the shell toward the center thereof, a sleeve received through the upper side of the shell to connect with said stem, percussion cap holding means, a firing pin mounted in said sleeve to be normally moved to a position to fire the cap, a trigger to hold the firing pin in an inoperative relation, and means extending through the stem to be struck from the outside of the shell to throw the trigger to its inoperative position.

4. A bomb comprising a shell adapted to contain an explosive, a plurality of tubes projecting from said shell and extending radially with the bores thereof communicating with the interior, a stem formed to extend from the bottom of the shell toward the center thereof, a sleeve received through the upper side of the shell to connect with said stem, percussion cap holding means, a firing pin mounted in said sleeve to be normally moved to a position to fire the cap, a trigger to hold the firing pin in an inoperative relation, means extending through the stem to be struck from the outside of the shell to throw the trigger to its inoperative position, projectiles to be received in the bores of the tubes, a spring to normally hold the tripping means in an inoperative relation, and a plate carried by the tripping means to be struck as the flight of the bomb is stopped to cause the tripping means to become operative and through the firing of the percussion cap to discharge the projectiles from the tubes.

5. A bomb comprising a shell adapted to contain an explosive, a plurality of tubes projecting from said shell and extending radially with the bores thereof communicating with the interior, a stem formed to extend from the bottom of the shell toward the center thereof, a sleeve received through the upper side of the shell to connect with said stem, percussion cap holding means, a firing pin mounted in said sleeve to be normally moved to a position to fire the cap, a trigger to hold the firing pin in an inoperative relation, means extending through the stem to be struck from the outside of the shell to throw the trigger to its inoperative position, projectiles to be received in the bores of the tubes, a spring to normally hold the tripping means in an inoperative relation, a plate carried by the tripping means to be struck as the flight of the bomb is stopped to cause the tripping means to become operative and through the firing of the percussion cap to discharge the projectiles from the tubes, a stem pivotally mounted on the upper side of the shell and having guiding vanes and a cap carried by the free end thereof, a pin to be engaged

by said stem which pin bears against the parts carrying the firing pin to hold the same fixedly in an inoperative relation, and means to secure the stem in a position of engagement against the means by which the firing pin is rendered inoperative.

6. A bomb comprising a shell adapted to contain an explosive, a plurality of tubes projecting from said shell and extending radially with the bores thereof communicating with the interior, a stem formed to extend from the bottom of the shell toward the center thereof, a sleeve received through the upper side of the shell to connect with said stem, percussion cap holding means, a firing pin mounted in said sleeve to be normally moved to a position to fire the cap, a trigger to hold the firing pin in an inoperative relation, means extending through the stem to be struck from the outside of the shell to throw the trigger to its inoperative position, projectiles to be received in the bores of the tubes, a spring to normally hold the tripping means in an inoperative relation, a plate carried by the tripping means to be struck as the flight of the bomb is stopped to cause the tripping means to become operative and through the firing of the percussion cap to discharge the projectiles from the tubes, a stem pivotally mounted on the upper side of the shell and having guiding vanes and a cap carried by the free end thereof, a pin to be engaged by said stem, which pin bears against the parts carrying the firing pin to hold the same fixedly in an inoperative relation, means to secure the stem in a position of engagement against the means by which the firing pin is rendered inoperative, and means to return the stem to a position of disengagement from the firing pin holding means and to a relation to guide the course of travel of the bomb in its flight.

In testimony whereof I affix my signature in presence of two witnesses.

JESSE GONVAS LEAL.

Witnesses:
LUCY G. LEAL,
W. H. SPURGEON.