A. W. GRAHAM.

PROJECTILE.

APPLICATION FILED APR. 21, 1917.

1,234,657. Patented July 24, 1917.

Fig. 1.

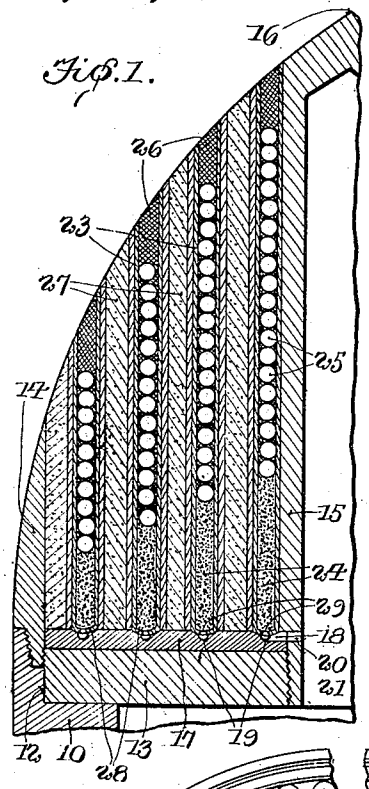


Fig. 3.

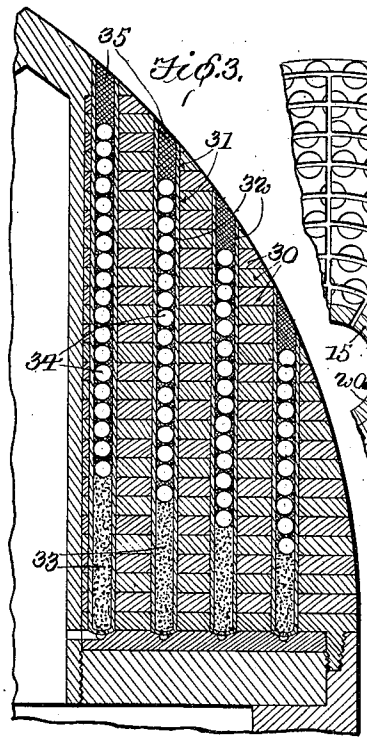


Fig. 5.

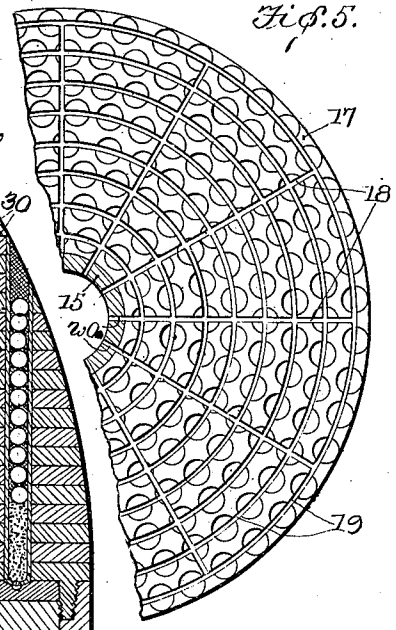


Fig. 2.

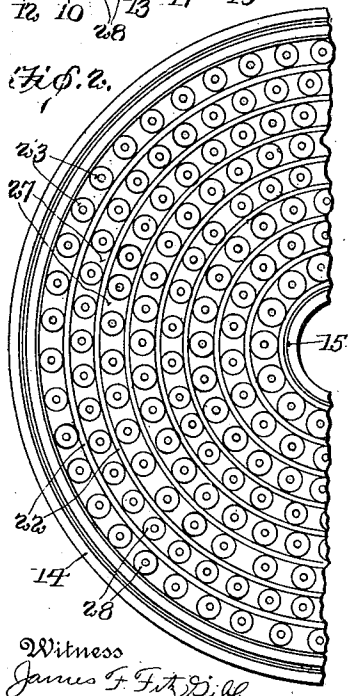


Fig. 4.

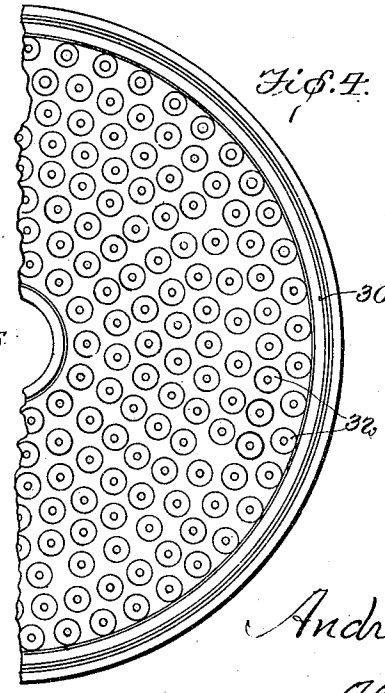
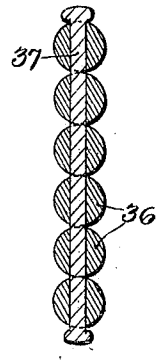


Fig. 6.



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PROJECTILE.

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To all whom it may concern:

Be it known that I, ANDREW W. GRAHAM, a citizen of the United States of America, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Projectiles, of which the following is a specification.

This invention relates to projectiles and has special reference to an improved form of shrapnel or other shells and especially to an improvement on my prior Patent No. 1,219,724, March 20, 1917.

It is a well known fact that in the employment of shrapnel shells, especially against air craft of any class, it is extremely difficult to find the range with the consequence that the shell frequently bursts so far in advance of reaching the objective that the shrapnel bullets are scattered in such a way as to be ineffective. At other times too great a range is used with corresponding ineffectiveness of the bullets.

The principal and most important object of the present invention is to provide a shrapnel shell which is so arranged as to produce a successive discharge of charges of bullets at various points in its flight, all of these charges being directed forwardly so that the danger zone for the objective is greatly increased in extent.

Another important object of the invention is to provide a novel arrangement of the shell itself for the better dispersion of its component parts.

With the above and other objects in view, as will be hereinafter apparent the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings, and specifically claimed.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and:—

Figure 1 is a half longitudinal section of one form of the improved shell.

Fig. 2 is a half transverse section of said form.

Fig. 3 is a half longitudinal section of a modification of the shell.

Fig. 4 is a half section of the modification.

Fig. 5 is a half plan view of the fuse arrangement used herewith.

Fig. 6 is a view of an improved slug used herewith for the purpose of cutting barbed wire or the wire braces of air craft.

In the construction of this shell there is provided the usual shell body 10 in each form, containing a suitable bursting charge 11. At the front of this body the wall of the shell is rabbeted as at 12 and on this rabbet is seated a plate 13. Suitably secured on the front of the body is a ring 14 in the form shown in Figs. 1 and 2 and in each form the plate 13 is provided with a central aperture in which is secured a tube 15 terminating in a point 16. Resting on the plate 13 is a fuse disk 17 provided with a series of radial grooves 18 which connect with one or more circular grooves 19, the grooves 18 and 19 being packed with a suitable fuse powder. These grooves 18 open into the interior of the tube 15 by means of ports 20, the interior of this tube being likewise packed with a suitable powder so that when the powder in the tube 15 is ignited by a time fuse, as at 21, the flame will spread through the ports 20, out the radial channels 18 and along the channels 19.

In the form of the device shown in Figs. 1 and 2 there are positioned between the tube 15 and ring 14 a series of rings or cylinders 22 and in the spaces thus formed are packed a series of tubes 23 constituting chambers for the explosive 24 and the balls or bullets 25 the ends of these chambers being closed by a suitable cementitious substance as at 26 and the entire nose being formed of the usual shape. In the spaces left by the tubes 23 there is employed a suitable cementitious substance as at 27. Thus these tubes are held in concentric rows and the rear end of each tube is preferably provided with a diaphragm 28 having an opening 29 therein registering with the respective channel 19. Now it will be observed that as the flame passes out the

channels 18 it will first find its way through the innermost of the channels 19 and thus ignite the innermost charges 24. Following this the successive rows of channels 19 will be fired with the result that successive rows of explosive charges will be ignited.

By employing this form of the shell the fuse being set to anticipate the time of arrival at the objective, the innermost row of projectiles is fired considerably in advance of reaching the objective and as the shell advances toward the objective successive additional rows are fired so that very great depth of danger zone is obtained.

In the form of the device shown in Figs. 3 and 4 the nose is built up of a series of disks 30 having alined openings 31 therein wherein are placed tubes 32 forming the chambers for the explosive 33 and balls or bullets 34. Suitable cementitious material 35 is employed in this instance also to hold the balls in position until firing. The other parts of the device are all arranged in substantially the same manner as in the form shown in Figs. 1 and 2. In this form it is to be noted that the tubes serve to prevent rotation of one disk on the other and that the projectile depends not alone on the bullets for its destruction but on the fact that when the bursting charge of the shell proper is reached the entire nose is disintegrated into small fragments by reason of the weakening occurring along the lines of the rows of the openings in the disks and the disks thus scattering in all directions.

It will be obvious that the number of rows of explosive and projectile chambers will be regulated by the diameter of the shell and in some instances but a single row may be employed while in other instances the rows may run up to ten or twelve.

Where it is desirable to arrange for cutting barbed wire or wire braces in air craft it is preferred that the charges of bullets be arranged as in Fig. 6 wherein is shown a series of perforated balls 36 strung on a headed wire or pin 37.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that many minor changes may be made in the form and construction of the invention without departing from the material principles thereof. It is not therefore desired to confine the invention to the exact form herein shown and described but it is wished to include all such as properly come within the scope claimed.

It is obvious, also, that the form shown in Figs. 1 and 2 may be constructed from a solid casting or forging provided with drilled chambers and that no matter which construction is used the explosion may be timed by any suitable time fuse independently of the character or construction of such fuse.

Having thus described the invention, what is claimed as new is:—

1. The combination with a shell body provided with a nose consisting of a series of thin disks having a plurality of rows of explosive and ball chambers arranged concentrically about the axis of the shell and forwardly directed; of charges in said chambers each including an explosive at the rear of each chamber, an explosive charge in the shell body, and means to fire the rows of explosive charges successively and thereafter fire the last-mentioned explosive charge.

2. The combination with a shell body, provided with a nose consisting of a series of thin disks having alined openings forming a plurality of rows of explosive and ball chambers arranged concentrically about the axis of the shell and forwardly directed; of charges in said chambers each including an explosive at the rear of each chamber, and means to fire the rows of explosive charges successively.

3. The combination with a shell body provided with a nose consisting of a series of disks having alined openings, liner tubes in said openings forming a plurality of rows of explosive and ball chambers arranged concentrically about the axis of the shell and forwardly directed; of charges in said chambers each including an explosive at the rear of each chamber and means to fire the rows of explosive charges successively.

4. The combination with a shell body provided with a nose consisting of a series of thin disks having alined openings forming a plurality of rows of explosive and ball chambers arranged concentrically about the axis of the shell and forwardly directed; of charges in said chambers each including an explosive at the rear of each chamber, an explosive charge in the shell body, and means to fire the rows of explosive charges successively and thereafter fire the last-mentioned explosive charge.

5. The combination with a shell body provided with a nose consisting of a series of disks having alined openings, liner tubes in said openings forming a plurality of rows of explosive and ball chambers arranged concentrically about the axis of the shell and forwardly directed; of charges in said chambers each including an explosive at the rear of each chamber, an explosive charge in the shell body, and means to fire the rows of explosive charges successively and thereafter fire the last-mentioned explosive charge.

6. The combination with a shell body pro-

vided with a nose consisting of a series of thin disks having a plurality of rows of explosive and ball chambers arranged concentrically about the axis of the shell and forwardly directed; each row of said chambers consisting of a series of tubes opening forwardly and having flame openings at the rear, of charges in said chambers each including an explosive at the rear of each chamber, and means to fire the rows of explosive charges successively.

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

ANDREW W. GRAHAM.

Witnesses:
HELGE MURRAY,
ALBERT POPKINS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."