

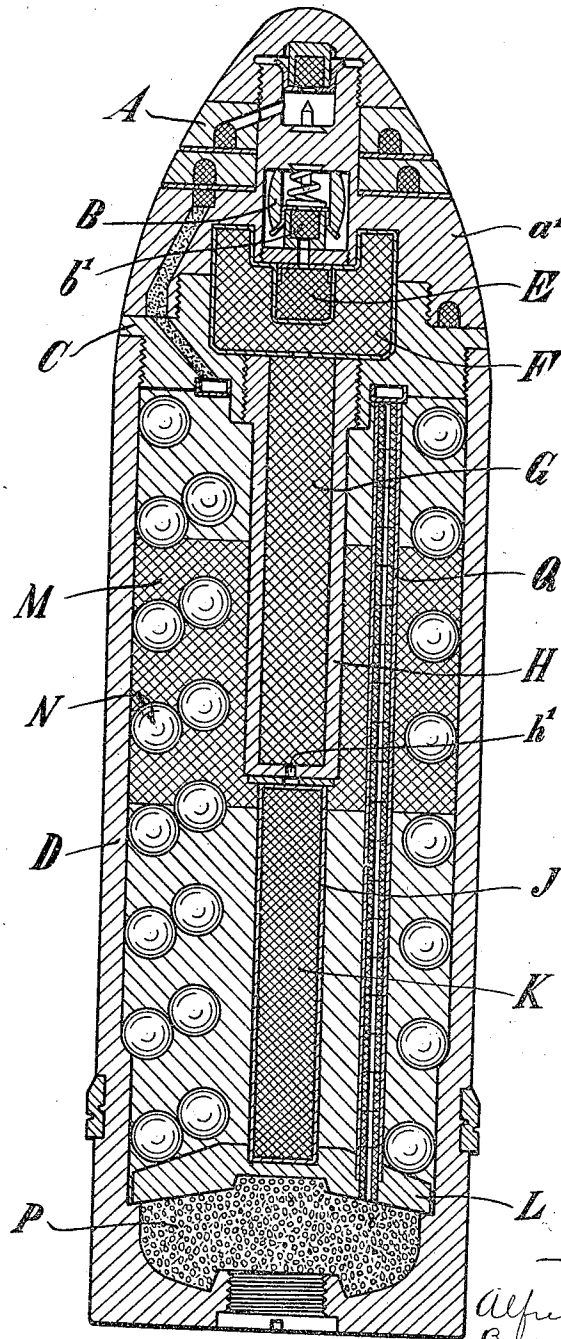
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PROJECTILE.

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982,338.

Patented Jan. 24, 1911.



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UNITED STATES PATENT OFFICE.

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982,338.

Specification of Letters Patent.

Patented Jan. 24, 1911.

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To all whom it may concern:

Be it known that I, ALFRED WRATZKE, a subject of the Emperor of Germany, and a resident of Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Projectiles, of which the following is a specification.

This invention relates to projectiles which have a grenade charge and arranged in the base chamber, a shrapnel charge, and has for its object to raise to the highest possible efficiency, the effect of the projectile in impact firing without appreciably reducing its effect in shrapnel firing. This purpose is attained, according to the invention, by arranging the exploding substance constituting the grenade charge, partly in a shot chamber lying in advance of the filling shot, partly in an intermediate chamber lying between the filling shot and extending in the vicinity of the base chamber, and partly in the spaces lying among the filling shot.

In the accompanying drawing one illustrative embodiment of the invention is shown in longitudinal section.

The hollow of the projectile body is closed at its front end by a hollow head-piece consisting of two parts *a'* and *C* which are screwed together. The head-piece *a'* *C*, which is provided with a double fuse comprising a time fuse *A* and an impact fuse *B*, contains a grenade-charge *F* consisting of high-explosive. A detonator *E*, which stands in communication with the pellet *b'* of the impact-fuse, extends into the grenade-charge *F*. A second grenade charge *G* of high explosive is located beneath the first in a strong shell *H*, whose axis coincides with the longitudinal axis of the projectile and is rigidly secured to the head-piece *a'* *C*. The shell *H* reaches to about the middle of the hollow projectile body *D* and is provided at the middle of its base with a bore *h'*. Tightly closed against the end of the shell *H*, is a thin wall closed housing *J*, which receives a third grenade charge *K* of high explosive and is seated in the driving disk *L*. A fourth grenade charge *M* likewise of high explosive, is located at the intermediate portion of the hollow body of the projectile and in the spaces between the filling shot *N*.

The base chamber of the projectile receives the shrapnel charge *P*, which consists of a bursting substance (for example, smoke-

less powder), which, according to the degree of excitation, can be exploded or detonated. This charge is connected through an ignition tube *Q* with the time fuse *A*. The ignition tube has such a small section that the igniting flame coming from the time fuse (owing to the throttling induced by its passage through the narrow igniting tube) can readily produce an explosion but not a detonation of the base chamber charge *P*. The dimensions of the igniting tube *Q* are readily so determined by experiment that the desired purpose will be attained.

In shrapnel firing, after the projectile has traversed the distance for which the time fuse has been set, the igniting flame coming from the time fuse will be conducted through the tube *Q* to the shrapnel charge *P* and causes the latter, for the reasons above given, to explode and not to detonate. By the explosion of the shrapnel charge, the driving disk *L*, the housing *J*, the filling shot *N* and the head-piece *a'*, *C* and the double fuse *A*, *B*, constituting the projectile head, together with the shell *H* will be projected. This causes the filling shot to act like those of an ordinary shrapnel without any detonation of the grenade charge *M*, located among them, taking place. Much less is there any detonation of the grenade charge *K* at this time, since the housing *J* separates itself from the shell *H* when projected from the projectile body and finally drops ineffectively to the ground. The projectile head, together with the shell *H* continues forward until it strikes. The shell *H* imparts to the projectile members, the property of an arrow shot, at this time, so that tumbling of the projectile parts, during the flight, is prevented. Were the housing *J* omitted and the shell *H* extended to the driving disk *L*, the beneficial influence of the shell *H*, upon the path of flight of the projected parts, as experiments have shown, would be partially lost. Upon impact of the projectile head, the impact fuse *B* comes into effect and causes detonation of the grenade charges *F* and *G* through the medium of the detonator *E*.

In impact firing, the charges *F* and *G* are brought to detonation through the impact fuse *B* and the detonator *E*, immediately after impact of the projectile. This fractures the shell *H*. The detonating flame thus strikes into the grenade charge *M* and

since the thin walled housing J naturally imposes no hindrance to the development of the detonation, it also extends to the grenade charge K and causes both charges 5 to detonate. By the detonation of the charge K, the driving disk L is broken up and the shrapnel charge P is very highly excited so that this also detonates.

The detonations of the different charges 10 succeed one another in an immeasurably short time; in consequence, the projectile acts the same as if it possessed a single condensed grenade charge of correspondingly large weight, and exerts, therefore, upon 15 impact, an extraordinarily heavy effect. Since in grenade firing, the charges detonating with explosive effect extend over nearly the entire length of the projectile, the projectile possesses a particularly large 20 area of destruction. At the same time, the described arrangement of the grenade and shrapnel charges secures the advantage of not essentially reducing the space for the filling charge so that the projectile has a 25 high efficiency as a shrapnel shot.

Having thus described my invention, what I claim as new therein and desire to secure by Letters Patent, is:—

1. A projectile with a grenade charge and, 30 having arranged in its base chamber, a shrapnel charge; said grenade charge being arranged in a middle chamber surrounded by the shrapnel filling shot, said projectile being provided with a head having an im- 35 pact fuse arranged therein, and said middle chamber comprising two parts, of which the forward part is rigidly connected with the projectile head, while the rear portion is 40 releasably arranged relatively to the forward part.

2. A projectile with a grenade charge and,

having arranged in its base chamber, a shrapnel charge; the bursting material constituting the grenade charge being arranged 45 partly in a middle chamber, surrounded by the shrapnel filling shot, partly in a projectile chamber, lying in advance of the shrapnel filling shot, and partly in the spaces between the shrapnel filling shot, said projectile being 50 provided with a head having an impact fuse arranged therein, and the said middle chamber comprising two parts, of which the forward part is rigidly connected with the projectile head, while the rear portion is releasably arranged relatively to the forward 55 part.

3. A projectile having a base chamber and comprising a grenade charge, a shrapnel charge arranged in said base chamber and consisting of a bursting material capable of 60 being either exploded or detonated, a head having an impact fuse arranged therein for igniting said grenade charge and a time fuse connected with the shrapnel charge through 65 the medium of a fire-tube of sufficiently small section to excite said charge to explosion but not to detonation, said grenade charge being arranged in a middle chamber, surrounded by the shrapnel filling shot and 70 consisting of two parts, of which the forward part is rigidly connected with the projectile head, while the rear portion is releasably arranged relatively to the forward part, said shrapnel charge being subject 75 to detonation when the grenade charge arranged in said middle chamber is detonated.

The foregoing specification signed at Barmen, Germany, this 25th day of May, 1910.

ALFRED WRATZKE. [L.S.]

In presence of—

OTTO KÖNIG,
CHAS. J. WRIGHT.