

No. 865,282.

K. VÖLLER.
EXPLOSIVE PROJECTILE.
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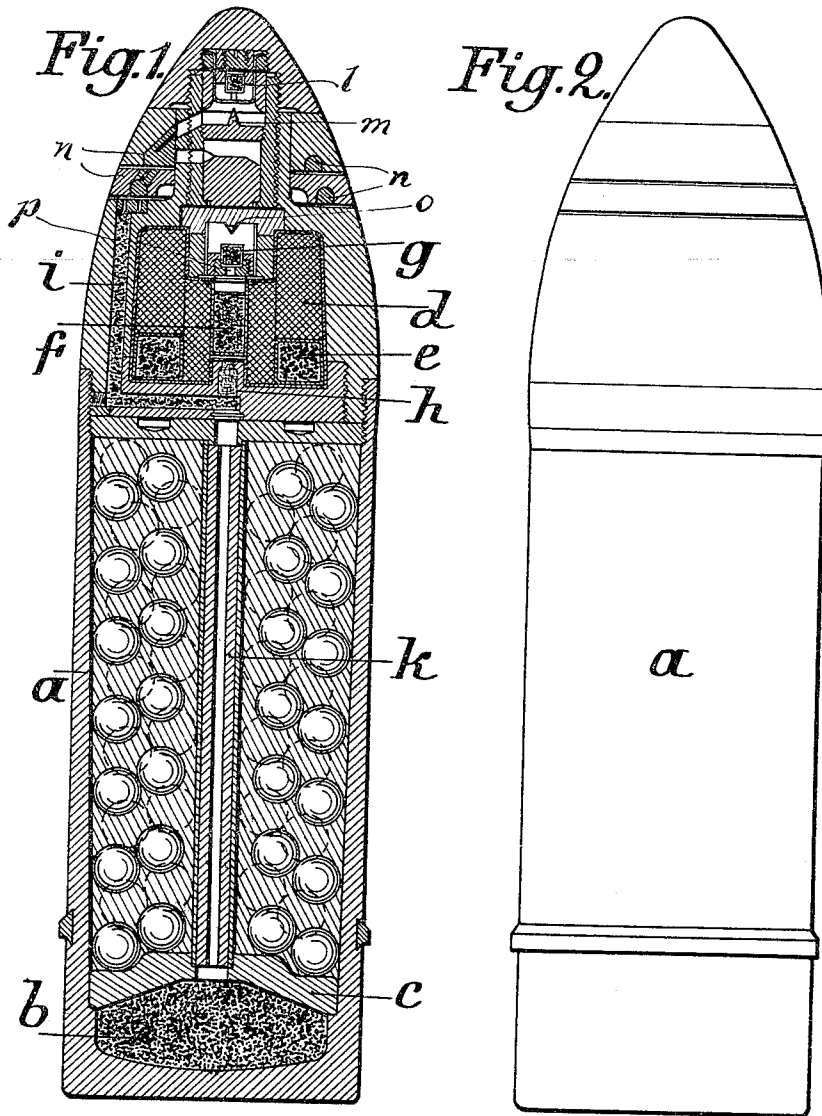


Fig. 3.

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EXPLOSIVE PROJECTILE.

No. 865,282.

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To all whom it may concern:

Be it known that I, KARL VÖLLER, engineer, a subject of the German Emperor, residing at Düsseldorf, 17 Jülicherstrasse, Germany, have invented certain new and useful Improvements in Explosive Projectiles; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

10 This invention relates to explosive projectiles having two bursting charges, and it has for its object to improve the action of such projectiles when under time fuse fire. For this purpose the grenade charge, in addition to being acted upon by a percussion fuse, is also operated by
15 the time fuse, in a similar manner to the shrapnel charge, but the time fuse communicates with the grenade charge through a retarding device such, that the latter, after the expulsion of the shrapnel charge, will continue its flight for some distance so as only to be exploded in immediate proximity to the mark.

20 On the accompanying drawing is shown a projectile constructed according to this invention in which

Figure 1 shows a vertical section and Fig. 2 an elevation. Fig. 3 is a diagram showing the action of the pro-
25 jectile.

The casing *a* of the projectile contains, as usual, the ball charge which, after the explosion of the powder in the chamber *b* is propelled forward by the expelling disk *c*. In front of the ball charge, immediately behind the
30 double fuse, is arranged the bursting charge *d*, which, as distinguished from previous constructions, entirely fills the front chamber. In this chamber is also provided the smoke producer *e*.

The balls which, in previous constructions, were arranged round the grenade charge are omitted in this construction, as they are pressed flat by the explosion, so that the grenade charge is entirely outside the shrapnel charge. For increasing the grenade action the front walls are made specially thick.

40 The detonator *f* is arranged so that on the one hand it can be fired by the percussion fuse by the igniting pellet *g* and on the other hand it can also be fired by the powder pellet *h*.

The time fuse may be of any well known type. In
45 that shown the primer *l* is exploded by being thrown against the anvil *m* by the set back upon firing, whereupon the flame passes by way of the double time ring *n* and the channels *i* and *k* to the explosive *b*, and also from the channel *i* by way of the slow burning pellet *h*
50 to the detonator *f*. The percussion fuse is also of the ordinary type, the primer pellet *g* being thrown forward against the anvil *o* by its inertia upon the sudden stopping of the projectile, and the flame passing through the uncovered channel *p* to the detonator *f*.

When using the projectile with time fuse fire, the 55 charge in the base chamber is ignited by the time fuse through the channel *i* and tube *k*, and at the same time the powder pellet *h* is also ignited. The expelling disk *c* then throws forward the head of the shell with the grenade charge, the percussion fuse and the burning 60 pellet *h*, after which follows the ball charge. The duration of the burning pellet *h* is so adjusted that the grenade charge will be detonated in the immediate vicinity of the mark. In the event, however, of the grenade part previously striking an obstacle, the per- 65 cussion fuse comes into action.

The advantages of this construction as compared with those heretofore employed, in which the grenade charge was exploded simultaneously with the shrapnel charge or directly after the expulsion of the balls, 70 will be seen from Fig. 3, where *S* is the point of explosion of the shrapnel. The ball charge is thrown forward from this point with conical dispersion, and in the known construction the grenade charge would be detonated either at the same time or immediately af- 75 terwards, and the burst fragments would be dispersed still at a considerable distance from the mark fired at, as indicated by the lateral dotted lines. With the present improved construction however the head of the shell with the grenade charge will continue its flight 80 for some distance in front of the balls and will only be detonated at the point *T* directly over the object fired at. It will be evident from the above that the destructive action of the projectile upon the object fired at will be considerably increased. 85

As compared with the projectiles in which the grenade part continues its flight until it is detonated by the percussion fuse in coming in contact with an object, the new construction affords the advantage that the dispersive action is increased by the fact that the point of explosion occurs in the air. In addition, misfires 90 which may occur through unfavorable impact of the percussion fuse are entirely obviated. A further advantage is obtained in that when firing under conditions in which the projectile must be exploded at a short distance from the gun, a rearward action of the grenade fragments upon the gun cannot occur as the grenade charge continues to fly forward some distance until, in the vicinity of the mark, it is exploded in the air, so as to produce its full effect. 100

The described construction of the projectile allows of a particularly favorable utilization of the weight thereof, so that both the ball charge and the grenade charge can be increased.

The invention can of course also be applied in a corresponding manner to projectiles which have the grenade charge in the rear in place of in front as described.

Having now particularly described and ascertained

the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In an explosive projectile, the combination, with a
5 shrapnel charge, a grenade charge, and a time fuse communicating with both the shrapnel and grenade charges, of retarding means arranged between the time fuse and grenade charge.
2. In an explosive projectile, the combination, with a
10 shrapnel charge, a grenade charge, and a time fuse communicating with both the shrapnel and grenade charges, of retarding means arranged between the time fuse and grenade charge, and a percussion fuse communicating with the grenade charge.
- 15 3. In an explosive projectile, the combination, with a shrapnel charge, a grenade charge, and a time fuse communicating with both the shrapnel and grenade charges, of a slow burning composition arranged in the path from the fuse to the grenade charge.

4. In an explosive projectile, the combination, with a
20 shrapnel charge, an explosive acting thereon, a grenade charge, and a detonator therefor, of a time fuse communicating both with the explosive and with the detonator, and a slow burning composition interposed between the fuse and the detonator.

5. In an explosive projectile, the combination, with a
25 shrapnel charge, an explosive acting thereon, a grenade charge and a detonator therefor, of a time fuse communicating both with the explosive and the detonator, retarding means in the form of a slow burning composition arranged between the time fuse and the detonator, and a percussion fuse arranged to act upon the detonator.

30 In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

KARL VÖLLER.

Witnesses:

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