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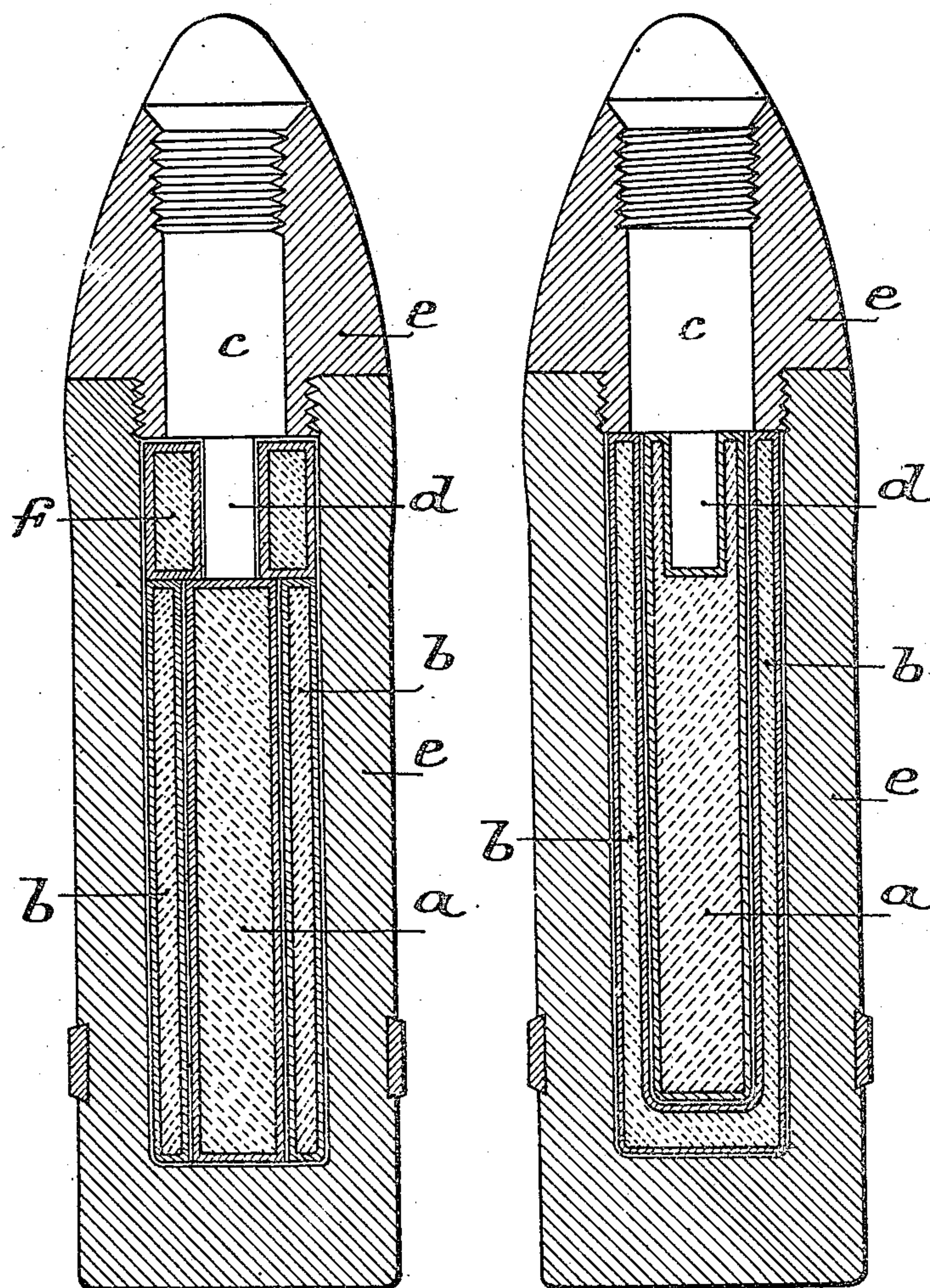
E. VON REICHENAU.  
AMMUNITION SHELL.

APPLICATION FILED JUNE 16, 1902.

NO MODEL.

Fig. 1.

Fig. 2.



WITNESSES  
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## UNITED STATES PATENT OFFICE.

ERNST VON REICHENAU, OF DÜSSELDORF-OBERKASSEL, GERMANY.

## AMMUNITION-SHELL.

SPECIFICATION forming part of Letters Patent No. 754,013, dated March 8, 1904.

Application filed June 16, 1902. Serial No. 111,845. (No model.)

*To all whom it may concern:*

Be it known that I, ERNST VON REICHENAU, lieutenant-general, a subject of the German Emperor, residing at 30 Kaiser Wilhelm-Ring, Düsseldorf-Oberkassel, Germany, have invented certain new and useful Improvements in Ammunition-Shells, of which the following is a specification.

Before high explosives were used for charging shells a non-detonating powder of comparatively slow combustion was used. When these shells exploded, the scattering-angle was small, a result of the feeble effect of the powder as compared with that of the modern high explosives. The comparatively gradual combustion of the explosive, however, also retards the bursting of the shell, so that these shells have the objection that when they strike on soft or ordinary ground they may bury themselves completely before they explode, so that the shot is more or less ineffective. If such a shell were to strike the shield of a modern field-piece, it would pass through the shield and pass a little beyond it before the explosion induced by the concussion with the shield occurred, so that the bursting of the shell would happen behind the gunners. For shooting at men not under cover or only under indifferent cover such shells, in spite of their small scattering-angle, which is otherwise advantageous, are of no use. In consequence for shooting at men not under cover shrapnel-shells have been used which have a small explosive charge, burst during their flight, and have a small scattering-angle, while in the high-explosive shells for use in field artillery—that is, for low trajectories and of caliber about seventy millimeters—the explosive charge is made as great as possible to impart a wide scattering-angle to the pieces of the bursting shell in order that when fired with a time fuse the shell may be able to strike men immediately behind cover. The present detonating explosive shells have therefore a wide scattering-angle and are consequently not suitable as percussion-shells against men, for they have no penetration.

The present invention relates to a shell which fulfils the purpose of the old shrapnel, in that it is burst by the smallest possible explosive

charge that will insure disruption in order that the pieces may have a small scattering-angle and that penetration which has been wanting in the high-explosive shells at present in use owing to their large charge. This penetration is essential for shooting men in the field not under cover or only under light cover, such as a protective shield.

Unlike the shells charged with gunpowder referred to above the shells made according to the present invention, in consequence of the high-explosive charge selected for them, burst as soon as they strike the ground or a shield. The detonation of the explosive which immediately follows the concussion allows no time for the shell to enter the ground and the pieces are projected in close proximity to each other and with a small scattering-angle, or if the shell passes through a light cover, such as an armor-plate shield on a field-piece, the bursting happens directly it is through the shield and the pieces are projected with small deviation from the original line of flight of the shot into the midst of the gunners. The shell in question, owing to its special construction, has also the property of the shrapnel of producing a strong development of smoke necessary for observing the point of explosion, which is indispensable for the use of the new shell in the field.

Figures 1 and 2 are sections through two forms of the shell made according to this invention.

*a* is an explosive-charge, small as compared with that used in the known explosive shells, but sufficient for disruption of the shell. It is not contained as a short mass in the shell, but as a long cylinder, prism, or the like extending nearly the whole length of the shell and in the middle line thereof, so that the bursting of the shell is as nearly as possible uniform and effective pieces are scattered from the whole of it. Surrounding the cylinder the smoke-developer *b* is placed. This arrangement allows a considerable quantity of such developer to be used and insures that it is completely and certainly burned, for it is in intimate contact along its whole inner surface with the momentarily-acting flame of the explosive. The arrangement also produces a



comparatively small explosive effect, and therefore a small scattering-angle of the pieces produced, accompanied by a thick cloud of smoke. It is especially to be noted that in 5 shot of small caliber—for example, under six centimeters—for which the aforesaid construction is advantageous, a sufficient development of smoke for satisfactory observation is not obtained by the construction hitherto used.

10 In the accompanying drawings, *a* is the explosive, and *b* the smoke-developer, both surrounded by a casing of the usual kind.

*c* is the igniter, which when the shot strikes 15 fires the charge by means of the igniting charge *d*.

*e* represents the walls of the shell.

In Fig. 1 there is a small explosive charge *f* above the long cylindrical charge *a* and surrounding the ignition charge *d*.

20 Instead of surrounding the explosive charge with the smoke-developer the arrangement may be reversed—that is to say, the inner chamber may contain the smoke-developer and the explosive charge may surround it.

25 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—

30 1. An ammunition-shell comprising a suitable casing, a high-explosive bursting charge arranged within the casing and limited in

amount to that necessary to burst the shell, whereby a rapid explosion is obtained and the fragments of shell given a small scattering-angle, and a smoke-generating substance arranged within the casing to be ignited by the explosion of the bursting charge. 35

2. An ammunition-shell comprising an outer casing, a high-explosive bursting charge arranged centrally within said casing in the 40 form of a relatively long body and limited in amount to that necessary to burst the shell, and a smoke-generating substance arranged within said casing and extending concentric with and throughout the length of the bursting charge and adapted to be ignited by said 45 charge, substantially as described, for the purpose set forth.

3. An ammunition-shell comprising a suitable casing, a high-explosive bursting charge 50 arranged within the casing, and a charge of smoke-generating substance suitably arranged within the casing to be ignited by the explosive material when the latter explodes, for the purpose described. 55

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

ERNST VON REICHENAU.

Witnesses:

PETER LIEBER,

WILLIAM ESSENWEIN.