No. 735,299. PATENTED AUG. 4, 1903.

E. VON REICHENAU.

SHELL.

APPLICATION FILED MAY 25, 1903.

NO MODEL.

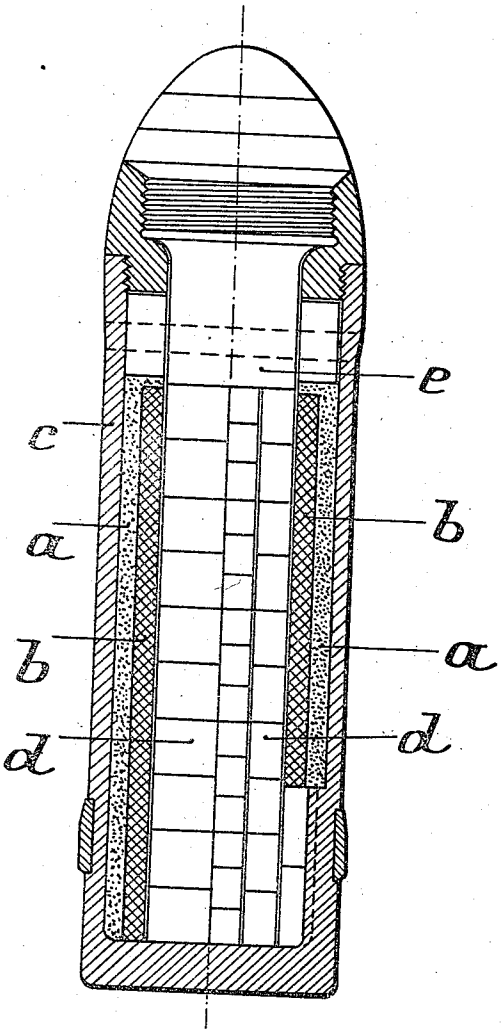


Fig. 1.

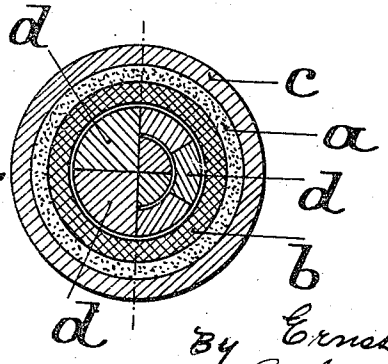


Fig. 2.

WITNESSES

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No. 735,299. Patented August 4, 1903.

UNITED STATES PATENT OFFICE.

ERNST VON REICHENAU, OF DÜSSELDORF-OBERKASSEL, GERMANY.

SHELL.

SPECIFICATION forming part of Letters Patent No. 735,299, dated August 4, 1903.

Application filed May 25, 1903. Serial No. 158,713. (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 Shells for Artillery; 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.

The subject of the present application relates to an improved artillery projectile for guns of flat trajectory character, the action of which is such that on the priming becoming ignited it instantaneously bursts under circumstances which cause the contents to be dispersed with only a small divergent angle for the cone of dispersal, and consequently with great destructive effect. Besides fulfilling this necessary condition the projectile is also adapted to offer a good opportunity for observation at the moment of bursting. This latter effect is obtained by employing a high explosive—*i. e.*, an explosive instantaneously decomposing—together with a rapid smoke-generating substance, and by a special arrangement of these substances relatively to one another within the projectile.

In accordance with this invention the high explosive charge and smoke-generating material form hollow masses, which extend a relatively considerable length within the thin steel shell of the projectile, and one of these hollow masses is caused to surround the other. There is in consequence a large area of contact between the explosive charge and the smoke-generating material, whereby a certain and complete combustion of the smoke-generating substance is insured. The smoke-generating substance is preferably placed within the explosive charge for the purpose of preventing it from being dispersed and incompletely consumed.

The double cylindrical lining formed by the explosive charge and smoke-generating material is arranged as close as possible to the circumference of the shell, so that surrounding it is the relatively thin envelop of shell material itself, the strength of which naturally depends on its capability to withstand the stresses due to firing. The space within the double cylindrical lining is filled with projectile material, being either a single mass or composed of pieces already divided up and packed in contact with each other. When employing divided pieces for the packing, while steel of the required hardness and tenacity must be used due regard should also be paid to the advantage of increased specific weight obtained by suitably alloying the same. Also the proportions adopted should correspond to the calculated tables for projectiles.

As distinguished from the action of shells which have the explosive and smoke-generating substance in the center of the projectile, the effect of the arrangement in accordance with this invention is to cause the angle of the cone of dispersion of the contents of the shell to be considerably decreased.

On the bursting of shells which have the explosive in the center a force is exerted outward on the surrounding projectile material which adds itself to the effect of the centrifugal action and tends to increase the dispersal and the angle of the cone of divergence, even though the force may be small, as when only a small quantity of explosive is present. In this new arrangement the main portion of the projectile material (represented by the packed pieces which are inclosed within the double lining before mentioned) is subjected to a force which is opposed to the action of the centrifugal force. The pieces produced by rupture at the moment of the explosions or previously introduced as divided masses are subjected by the explosion to theoretically no influence which could drive them out of the path of the projectile. The small dispersal which does occur to the pieces of projectile is caused by unavoidable inequalities in the explosive and by the action of the air resistance and the like. The angle of the cone of dispersion is therefore reduced to a minimum.

In the accompanying drawings, Figure 1 is a longitudinal section, and Fig. 2 a cross-section, of the shell.

a is the lining composed of the charge of explosive.

b is the lining composed of dense smoke-generating material. In the left half of the drawings the double lining extends to the base

of the projectile and in the right the projectile is shown with the length of the double lining somewhat shortened.

c is the external casing, and *d* is the projectile material, arranged within the double lining *a b*. In the example illustrated it is shown composed of steel pieces closely packed together. On the left of the cross-section the pieces form quadrant-shaped pieces and on the right the pieces are more divided.

e is the priming of the projectile. It is obvious that the arrangement of the cylindrical linings *a* and *b* of explosive and smoke-generating substances, respectively, may be reversed with regard to each other.

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. A shell for a projectile adapted to effect, with the instantaneous ignition of the explosive charge, the generation of a dense volume of smoke and cause the angle of the cone of dispersion of the contents of the shell to be kept relatively small, consisting of a thin hollow casing lined with a cylindrical layer of high explosive material and another cylindrical layer of smoke-generating material, the space within the two layers being packed with projectile material.

2. A shell for a projectile adapted to effect, with the instantaneous ignition of the explosive charge, the generation of a dense volume of smoke and cause the angle of the cone of dispersion of the contents of the shell to be kept relatively small, consisting of a thin hollow casing lined with a cylindrical layer of high explosive material and another cylindrical layer of smoke-generating material, the layer of explosive surrounding the layer of smoke-generating material, the space within the interior layer being packed with a mass of divided projectile material.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERNST VON REICHENAU.

Witnesses:
PETER LIEBER,
EMMA HERBER.