R. WILLE.

SHRAPNEL.

APPLICATION FILED FEB. 3, 1908.

911,793.

Patented Feb. 9, 1909.

3 SHEETS—SHEET 1.

Fig. 1.

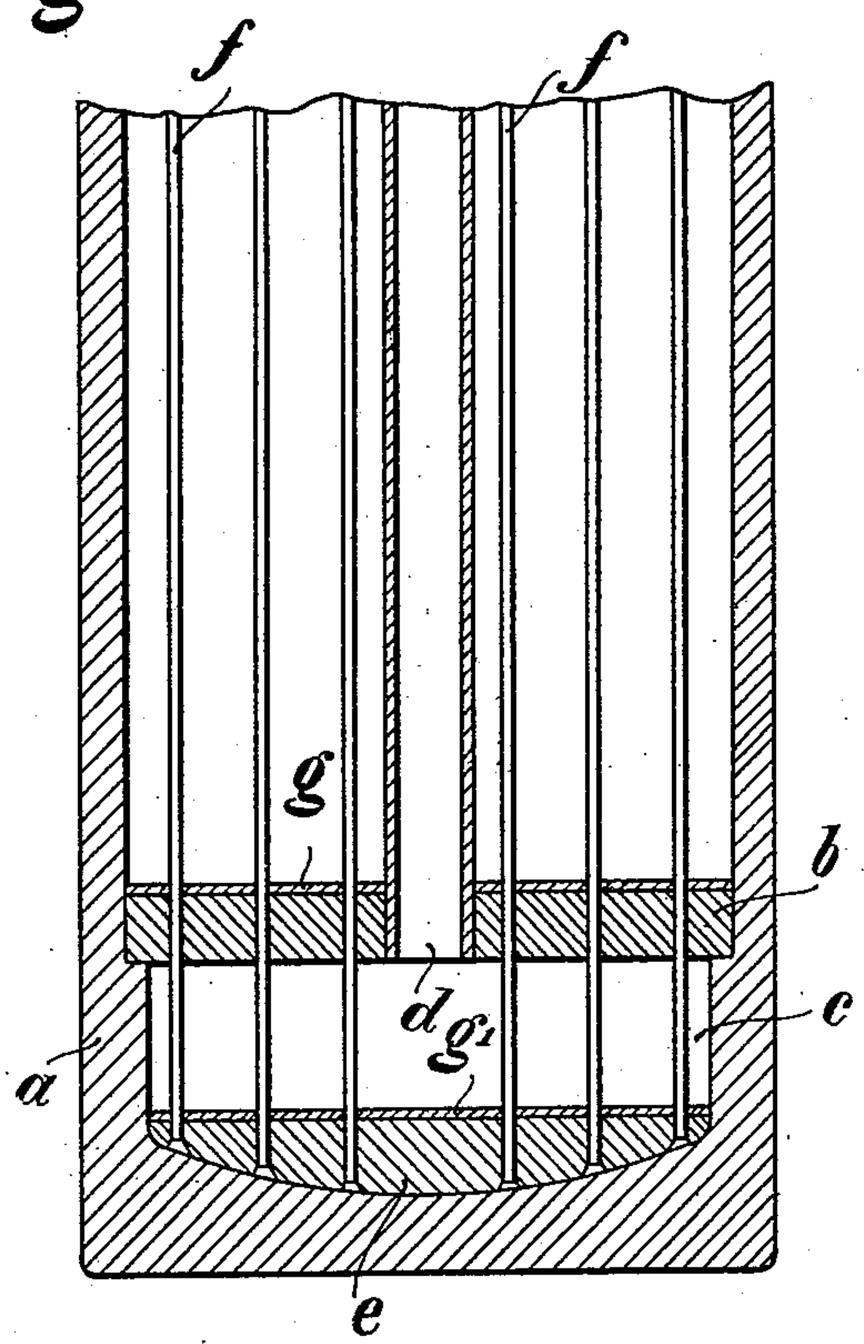


Fig. 2.

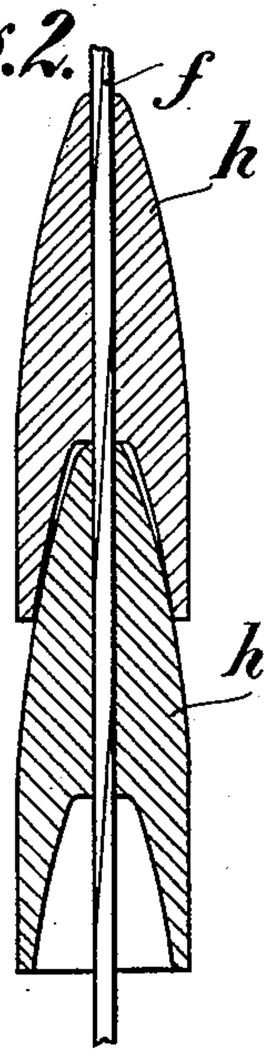
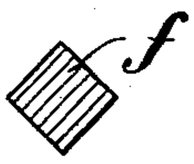


Fig. 3.



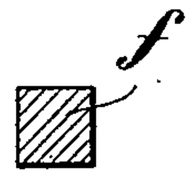
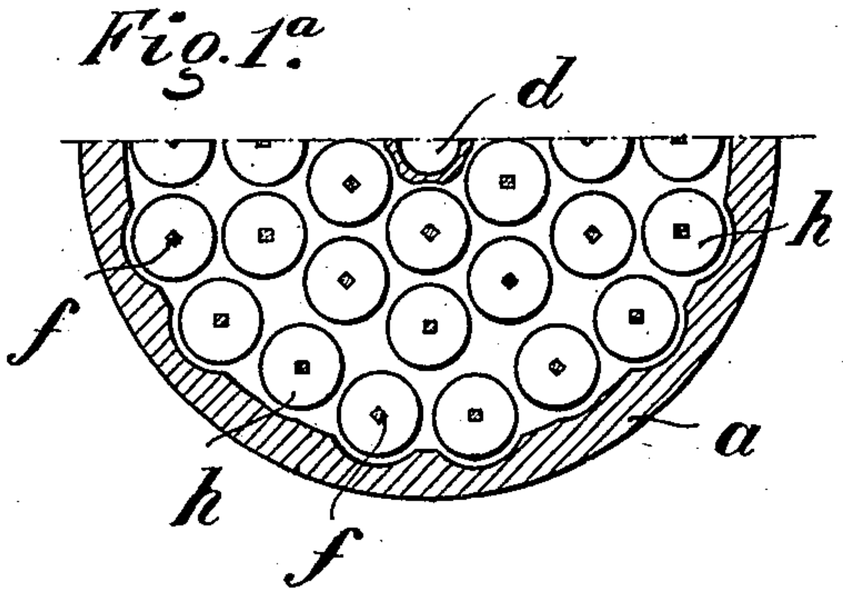


Fig. 1a.



Witnesses,
J. M. Wynkoop,
L. R. Merritt

Inventor
Richard Wille
By Knight Bros
Attorneys.

R. WILLE.

SHRAPNEL.

APPLICATION FILED FEB. 3, 1908.

911,793. **Patented Feb. 9, 1909.**

3 SHEETS—SHEET 2.

Fig. 4.

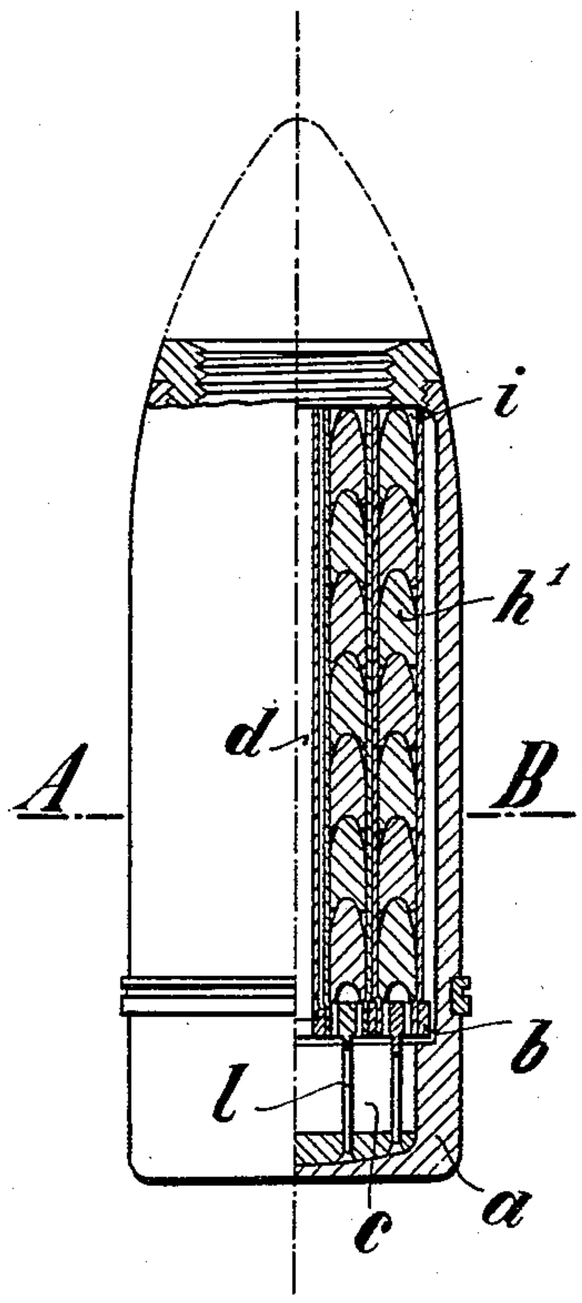


Fig. 5.

Fig. 7.

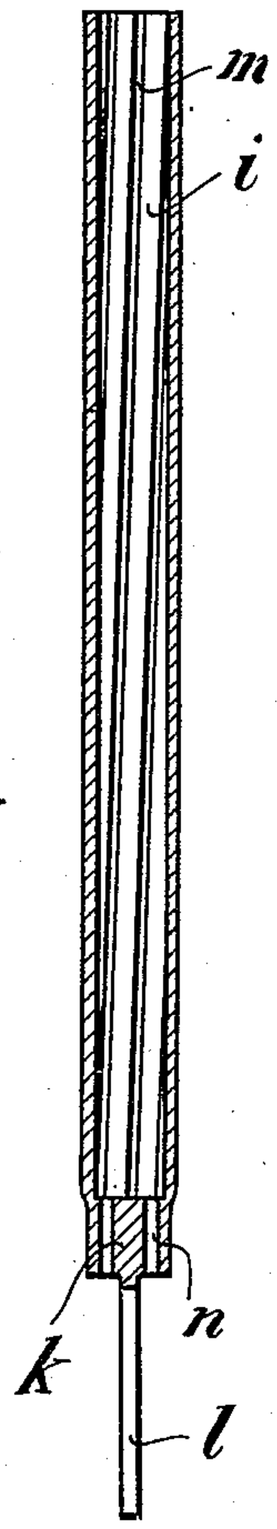
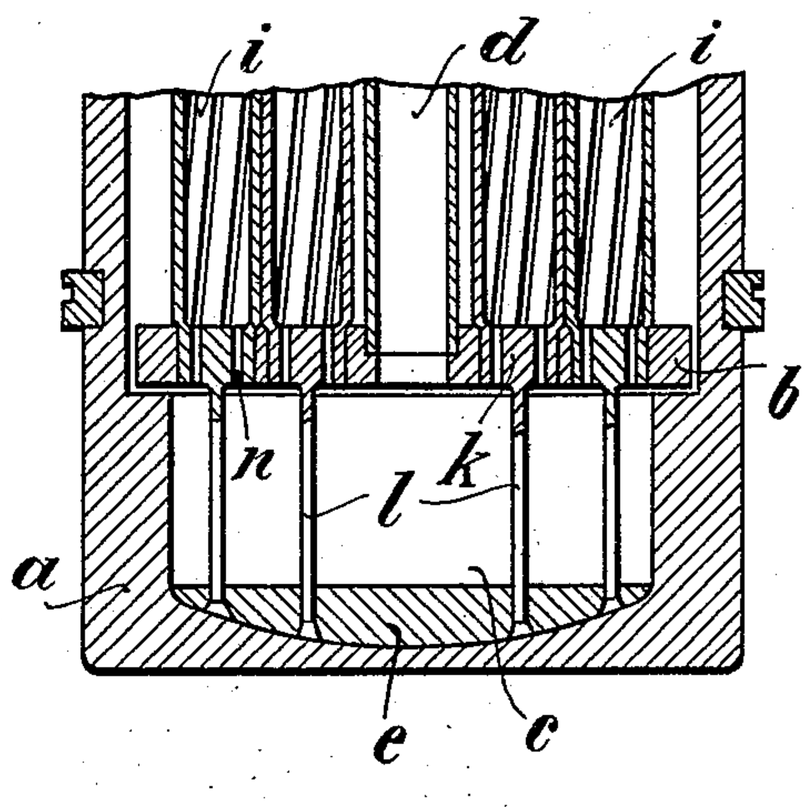


Fig. 6.



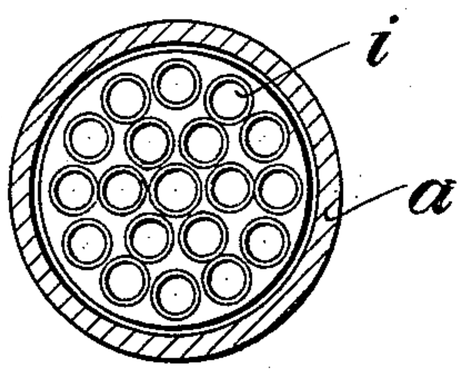
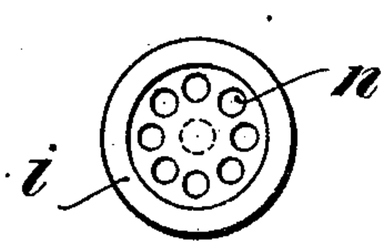


Fig. 8.



Witnesses
I. M. Waynbooth
L. R. Merritt.

Inventor
Richard Wille
By Knight Bros
Attorneys.

R. WILLE.

SHRAPNEL.

APPLICATION FILED FEB. 3, 1908.

911,793.

Patented Feb. 9, 1909.

3 SHEETS—SHEET 3.

Fig. 9.

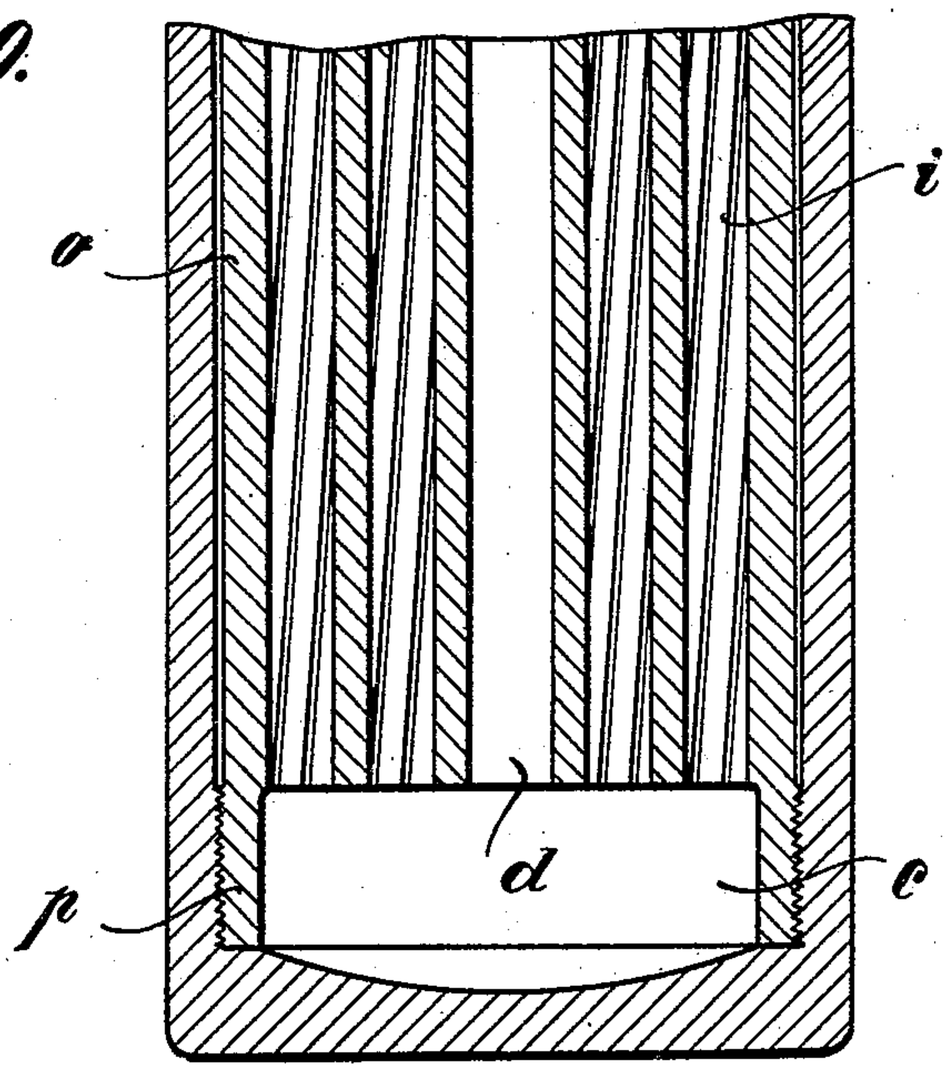
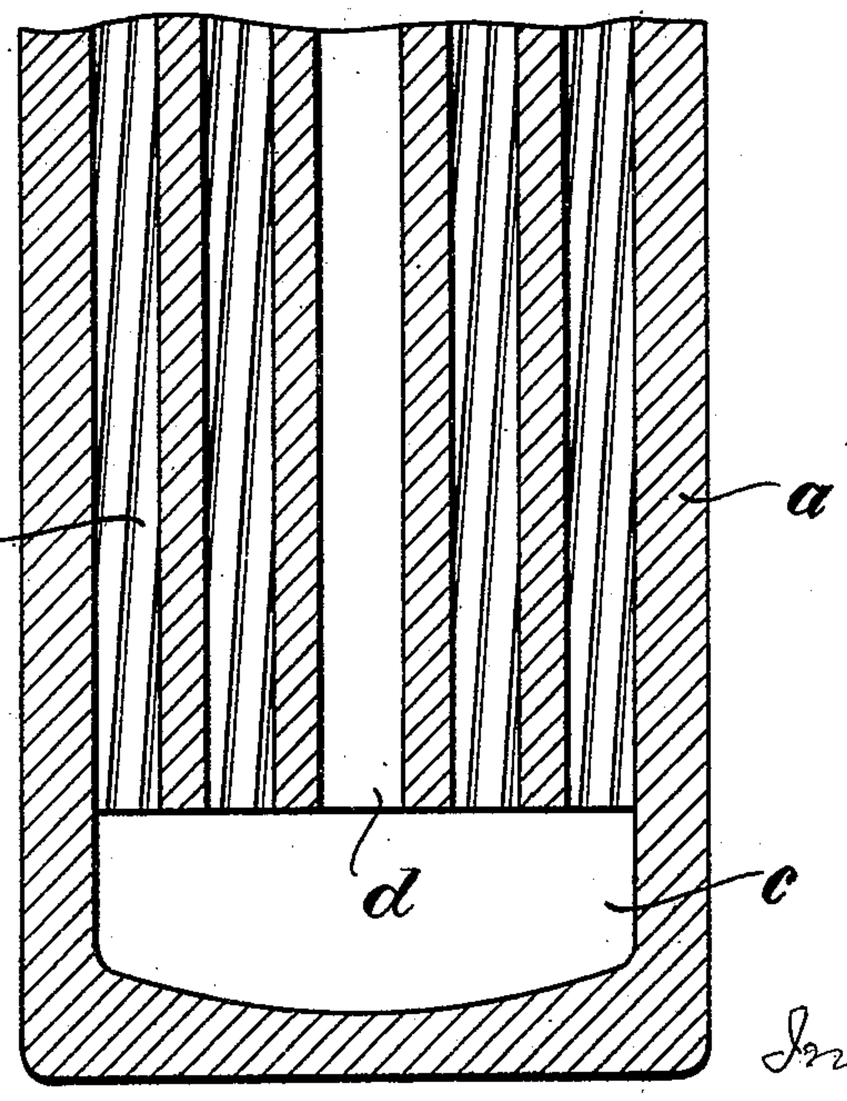


Fig. 10.



Witnesses
J. M. Hyslop.
L. R. Merritt

Inventor,
Richard Wille,
By Knight Bros
Attorneys.

UNITED STATES PATENT OFFICE.

RICHARD WILLE, OF CHARLOTTENBURG, GERMANY.

SHRAPNEL.

No. 911,793. Specification of Letters Patent. Patented Feb. 9, 1909.

Application filed February 3, 1908. Serial No. 414,023.

To all whom it may concern:

Be it known that I, RICHARD WILLE, late major-general, a subject of the Emperor of Germany, and a resident of Charlottenburg, Germany, have invented certain new and useful Improvements in Shrapnels, of which the following is a specification.

The object of the present invention is to give shrapnels a better utilization and to impart a flatter trajectory, greater depth of action, and to give increased penetrative capacity to its bursting sheaf.

The magazine chamber, which surrounds the chamber tube of the shrapnel, between the fuse and the bottom chamber, is filled with a number of elongated projectiles (similar to rifle projectiles) which are piled on top of one another, or pushed into one another for a portion of their length, in several rows or columns parallel to the axis of the shrapnel. These columns of projectiles are conjointly driven forward at the bursting point by the exertion of the force of the bursting charge contained in the bottom chamber; when this action takes place, rotation about their longitudinal axis is imparted to each of the projectiles united into a row or column by a guiding device common to them.

Projectiles, which scatter during their flight or eject small elongated projectiles from rifled passages running obliquely to the longitudinal axis, are already known, so are also projectiles which, at a particular point of their path eject a single elongated projectile from a rifled passage running in the direction of the longitudinal axis. The present invention therefore does not extend to projectiles of this kind.

In the drawing are shown four different constructional forms.

Figure 1 is a longitudinal section and Fig. 1ª, a transverse section through a portion of a shrapnel. Fig. 2 is a section, on a larger scale, through two elongated projectiles pushed onto a twisted, or rifled rod. Fig. 3 shows, on a larger scale, transverse sections of a twisted or rifled rod at different levels. Fig. 4 shows, in partial section, a shrapnel filled with elongated projectiles placed in guiding cases. Fig. 5 is a transverse section through the shrapnel, on the line A—B of Fig. 4. Fig. 6 shows the lower part of a shrapnel according to Fig. 4 on a larger scale. Fig. 7 is an elongated projectile guiding case. Fig. 8 is a plan view of such a guiding case on a larger scale. Figs. 9 and 10 show two further constructional forms of shrapnel in longitudinal section.

In the case *a* of the shrapnel (see Fig. 1) the driving disk *b* closes the front of the bottom chamber *c* provided for the reception of the bursting charge, and is perforated in the middle for the reception of the tube *d*, which transmits the fire from the fuse to the bursting charge. In the bottom plate *e*, which lies behind the bursting charge, are riveted the ends of the rifled rods *f*, which pass through corresponding passages in the driving disk *b*, and at the front enter similar passages in the rear wall of the head of the shrapnel which receives the double action fuse, or in any other suitable part of the shrapnel.

For the purpose of tightly closing in the bursting charge in front and behind, the layers of paraffin *g* and g^1 are placed in front of the driving disk *b* and the bottom plate *e*. The rifled rods *f* are square in transverse section and are, like augers, so twisted that their four longitudinal edges describe helical lines (see Figs. 2 and 3).

Elongated projectiles *h* are pushed onto the rods *f*, and for this purpose are formed at their forward ends with longitudinal passages fitting the transverse section and the twist of the rifled rods, which passages open into the rearward hollow of the projectile; the point of the next projectile enters this hollow with an amount of clearance, which prevents any tendency on its part to stick or become jammed in the front projectile, even should the violent shock on the bursting of the shell cause a certain upsetting of the point of the projectile. If for example there be chosen for 75 mm. caliber, the well known form of the so-called corrugated shrapnel (with longitudinal grooves in the inner wall of the case *a* and in the outer wall of the tube *d*), six columns of projectiles can be conveniently arranged alongside one another in the direction of the diameter, whereas such a shrapnel can only hold four rows of spherical bullets, since such bullets, for an approximately equal weight, have to be of a considerably greater diameter than the elongated projectiles. The explosion of the bursting charge blows the driving disk *b* and consequently also the projectiles *h* resting upon it, outwards, while the rifled rods *f* as they are secured in the bottom plate *e* placed behind the bursting charge, are first

held back or expelled in the opposite direction along with the burst off base of the shrapnel case *a*. The projectiles *h* are therefore stripped off the rods *f* in a forward direction, and at the same time receive the desired rotation about their longitudinal axis corresponding to the rifling of the rods *f*.

The second constructional form differs mainly from the first one, in that the office of the rifled rods is in this case taken over by the guide cases *i* (see Fig. 4), into which the projectiles h^1 are pushed or forced from the front, and the inner walls of which are provided with helically twisted grooves *m*, similar to the barrels or tubes of rifled firearms. The bases *k* of the cases *i* entering passages of the driving disk *b*, are of smaller diameter than the cases themselves, and, like the rifled rods *f*, are riveted into the base plate *e* by means of the mandrels or stems *l*.

The only essential difference between the projectiles h^1 and the projectiles *h*, is that the former have no forward longitudinal passage. When the shrapnel bursts, the projectiles h^1 do not receive their forward propulsion from the driving disk *b* but directly from the powder gases of the bursting charge, which enter the inner chamber of the cases *i* through the parallel passages *n* provided in the bases *k* and drive the projectiles forward. The necessary axial rotation is imparted to the projectiles by the grooves in the cases *i*, which latter are held fast to the base-plate *e*, so that they cannot take part in the forward movement of the projectiles h^1.

For projectiles of comparatively soft metal, it is sufficient, when finishing the shrapnel, to push them into the grooves of the cases *i* with a small amount of clearance, as the force of the powder gases in conjunction with the rear hollowed-out part of the projectiles is sufficient to upset them at their rearward part, or expand them so, that they shall receive sufficient guidance in the grooves of the case *i*. Hard projectiles, on the other hand, must be provided, as they also are in other cases, with a softer guide ring, and forced under moderate pressure into the cases.

In both constructional forms the rifled rods *f*, as well as the cases *i*, may, instead of being connected to the separate bottom plate *e*, be obviously attached to or in the bottom of the shrapnel, or rigidly connected to the rearward part of the shrapnel casing *a* in any other desired manner.

Fig. 9 shows a third constructional form. The guiding cases *i* are all formed in a single body *o* produced by casting, pressing, drawing, stamping, or the like, and which is rigidly connected to the bottom part of the shrapnel casing *a* by a screw-thread *p*, riveting, or in any other manner.

Fig. 10 shows a fourth constructional form. The body *o* is made from the outset in one piece with the shrapnel casing *a*, which is then likewise made by casting, pressing, drawing, stamping, or in any other manner.

In the constructional forms in Figs. 9 and 10, the driving disk *b* is omitted, and the tight closing in of the bursting charge is made by paraffin or the like, which is poured in simultaneously with the insertion of the projectiles in the passages *i*.

Claims.

1. In a shrapnel the combination of elongated filling projectiles arranged in columns parallel to the longitudinal axis of the shrapnel; a bottom-chamber filled with a bursting charge for conjointly driving forward said projectiles at the bursting point and means causing a rotation of said projectiles about their longitudinal axes.

2. In a shrapnel the combination of elongated filling projectiles arranged in several columns parallel to the longitudinal axis of the shrapnel, a bursting charge for conjointly driving forward said projectiles and means provided with helical grooves and secured in the bottom part of the shrapnel and causing a rotation of the filling projectiles about their longitudinal axes.

3. In a shrapnel the combination of elongated filling projectiles piled in several columns parallel to the longitudinal axis of the shrapnel, a bursting charge for conjointly driving forward said projectiles and guiding cases for said projectiles, said cases being provided internally with helical grooves and being secured to the body of the shrapnel and having passages in their bottom part for the passage of the gases of the bursting charge.

4. In a shrapnel the combination of elongated filling projectiles piled in several columns parallel to the longitudinal axis of the shrapnel, a bursting charge for conjointly driving forward said projectiles and guiding cases for said projectiles, said cases being formed all in a body which is rigidly connected to the shrapnel case.

5. In a shrapnel the combination of elongated filling projectiles piled in several columns parallel to the longitudinal axis of the shrapnel, a bursting charge for conjointly driving forward said projectiles and guiding cases for said projectiles, said cases being formed all in a body, which is integral with the shrapnel case.

6. In a shrapnel the combination of elongated filling projectiles provided in the rear portion with a hollow and piled in several columns parallel to the longitudinal axis of the shrapnel, a bursting charge for conjointly driving forward said projectiles and means causing a rotation of the projectiles about their longitudinal axes.

7. In a shrapnel the combination of elongated filling projectiles piled in several col-

umns parallel to the longitudinal axis of the shrapnel, said projectiles being provided in the rear portion with a hollow securing an amount of clearance between two projectiles, a bursting charge for conjointly driving forward said projectiles and means causing a rotation of the projectiles about their longitudinal axes.

8. In a shrapnel having a fuse-containing point, the combination with the filling projectiles; of means for arranging said projectiles in columns parallel to the longitudinal axis of the shrapnel; means for imparting a rotation to the filling projectiles when they are expelled from the shrapnel; a chamber for the bursting charge at the bottom of said shrapnel; and a tube connecting said chamber with the fuse-containing point.

The foregoing specification signed at Berlin, Germany, this 20th day of January, 1908.

RICHARD WILLE.

In presence of—
HENRY HASPER,
WOLDEMAR HAUPT.