E. SOKOLOWSKI.

METHOD OF CASTING EXPLOSIVE CHARGES.

APPLICATION FILED OCT. 3, 1911.

1,054,049.

Patented Feb. 25, 1913.

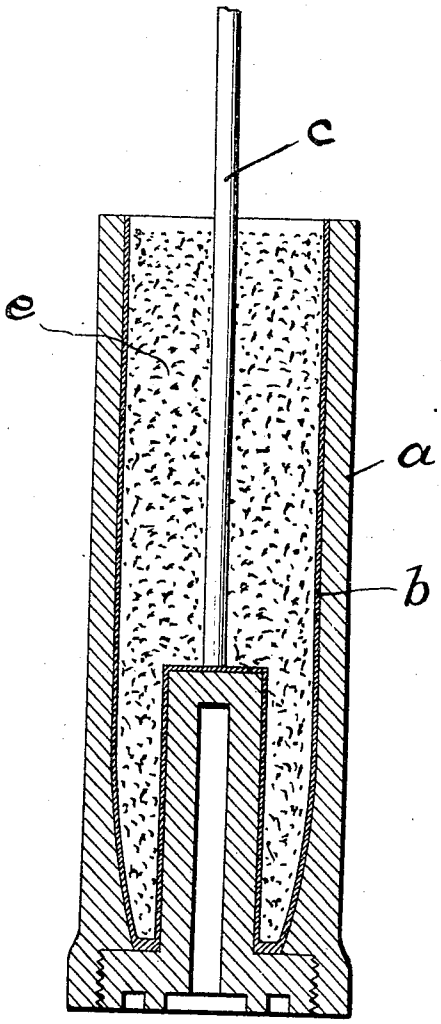

FIG. 1.

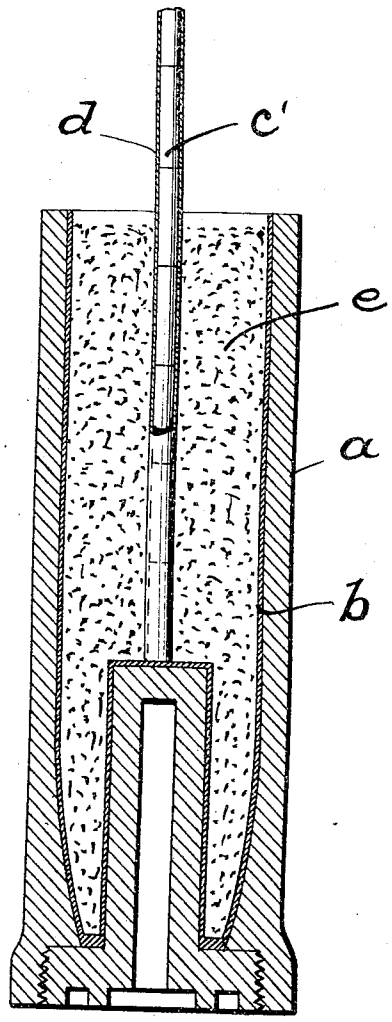

FIG. 2.

WITNESSES:

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METHOD OF CASTING EXPLOSIVE CHARGES.

1,054,049. Specification of Letters Patent. Patented Feb. 25, 1913.

Application filed October 3, 1911. Serial No. 652,480.

To all whom it may concern:

Be it known that I, ERNST SOKOLOWSKI, a subject of the Emperor of Germany, residing at Hamburg, Germany, have invented a new and useful Improvement in Methods of Casting Explosive Charges, of which the following is a full, clear, and exact description.

The methods used heretofore for the casting of fusible explosives are slow, since the same necessitates a chilling of the explosive from the outer surface concentrically to the inside. In all these methods, furthermore, the center line of the explosive charge is in accordance with experience the place where hollow places are easily formed during the process of chilling.

The object of the present invention is to considerably reduce the time from the casting to the chilling, so as to render the casting appliances available for a new casting charge at the earliest possible moment.

Another and the main object of this invention is the production of a homogeneous explosive charge throughout and particularly in the center line.

Other advantages of the invention will be cited in the description of the same.

The method consists in the following: Into the center line of the mold a cold substance made of an explosive in the shape of a rod is introduced and maintained in position by means of a suitable appliance from its upper end. The introduction of the cold rod made of an explosive substance can be effected in such manner that this rod is introduced into the empty mold before the fused material is poured into same, or the rod can be inserted after the cast has been made by pressing same into the latter. The filling of the mold may be carried out in accordance with any desired pouring process, for instance, by means of an ordinary casting, by means of casting under pressure, or by means of a heatable pouring funnel. In the latter case the neck of the funnel can be used for the guiding of the cold rod-shaped substance. The latter consists, for instance, of an explosive which is not covered and which has been fused and chilled, or of an explosive pressed in a tube-shaped closed shell, the latter, for instance, consisting of celluloid, pasteboard or sheet metal. The diameter of this cold, rod-shaped explosive material is to be adapted to the diameter of the explosive charge. By means of providing this cold rod made of an explosive substance in the center of the cast, or by sinking this rod into the fused explosive mass, a quick chilling of the liquid portion of the charge is effected. The rod-shaped cold explosive body is thus tightly surrounded by the chilling explosive charge. Experience shows that fusing of the rod substance does not take place, or takes place to but a slight extent, whenever the casting operation is carried out at as low a casting temperature as possible and with indications of the commencement of the formation of crystals. This condition is of great importance in this method of casting and for the purpose of producing the high density of the cast obtained thereby.

When using a rod made of a pressed explosive in a pasteboard or other cover, this pressed explosive serves directly as a priming charge which tightly bears against the bottom of the explosive charge container surrounding the igniting charge of the fuse. Owing to the long shape of this priming charge passing almost throughout the entire length of the charge, the detonation becomes very satisfactory, and a very strong propagation of the detonation upon the fused main charge is more fully insured than in the case of the usual priming charges placed with one side only near the fuse and surrounding the same.

Of special importance is the advantage that, as a consequence of the quick cooling of the cast simultaneously from the outside and from the inside, a very fine crystalline structure of the cast, and as high a density as possible, are obtained. For this reason large crystals will not break, even though the impact of the shot should be especially violent, and the charge will not contract, since the highest possible density has been imparted to the same during the casting, and since a densifying beyond this point is not possible. These two points render impossible movements within the explosive charge with violent impact of the shot, thus directly insuring against premature detonations to an extent which is not obtained when using other pouring methods.

Of special importance is the fact that the explosive used for the cold rod-shaped body can possess chemical properties entirely different from those of the main charge. It

is therefore possible to use, for the rod charge, for instance a brisant explosive which detonates with violence; while for the main charge a more inert fused explosive which is very safe against shock, for instance tronitrotoluol, can be used.

Finally, as important advantage of the process is the fact that explosive charges, prepared in accordance therewith, when cut open, clearly show that they have actually been prepared in accordance with the process, which guarantees to a high degree the good quality of the charge. When using, for instance, the rod-shaped body without a cover and made of a fused explosive, the structure of the same can be clearly distinguished from that of the main charge, since its appearance is different, notwithstanding the fact that an exceedingly intimate fusion of the two charges has been effected. This is, of course, still more apparent when the rod body is used in a pressed state and with a special cover.

The way in which the process is carried out will be clear from the accompanying drawings, in which each figure is a longitudinal sectional view of a mold containing the main body of explosive and the central explosive core; Figure 1 showing an uncovered explosive core and Fig. 2 showing an explosive core in a shell.

a represents an iron casting mold, *b* a paste-board container placed in the same, and *c* (Fig. 1) a rod-shaped body of fused explosive extending throughout the axial length of the mold.

c' (Fig. 2) represents a rod-shaped body consisting of a paste board shell *d* with several pressed bodies of explosives, *c'*, placed therein.

I do not herein claim the explosive charge made by the process forming the subject matter of this application, as the said product forms the subject matter of an application filed by me May 15, 1912, Serial No. 697,588.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is—

1. The process of manufacturing explosive charges of highest density and without hollow spaces, which consists in expediting the solidification of the fused explosive by chilling it both from the outside and from the center of the charge.

2. The process of manufacturing explosive charges of highest density and without hollow spaces, which consists in chilling the main explosive body from the outside and simultaneously therewith uniting the same to an internal cold explosive core whereby the explosive is also simultaneously cooled from the inside and the cooling thereby expedited.

3. The process of forming explosive charges which consist in inclosing within the main explosive body, a cold internal longitudinally extending explosive core and chilling the main body of explosive, whereby the latter tightly and permanently surrounds the internal core, the homogeneity and density of the casting is improved, and the chilling expedited.

4. The process of forming explosive charges, which consists in inclosing, with a main body of fusible explosive, a cold central explosive core of small diameter relatively to the diameter of the main explosive body and extending substantially throughout the axial length of the mold, and chilling the main body of explosive.

5. The process of manufacturing explosive charges of highest density and without hollow spaces, which consists in expediting the chilling of the fused charge by inserting in and throughout its center a rod-shaped cast or compressed body of cold explosive.

6. The process of forming explosive charges which consists in inclosing within a main body of fusible explosive a central longitudinally-extending cold explosive core of pressed explosive, and chilling the fusible explosive.

7. The process of forming explosive charges which consists in inclosing, within a main body of fusible explosive a cold explosive core contained within a longitudinally extending central shell, and chilling the main body of explosive.

8. The process of manufacturing explosive charges of highest density and without hollow spaces, which consists in expediting the chilling of the fused charge by inserting in and throughout its center a cold rod-shaped shell containing a fused or compressed explosive charge.

9. The process of forming explosive charges which consists in introducing a cold rod-shaped explosive body into a mold, pouring fused explosive around said body, and chilling the fused explosive.

In testimony of which invention, I have hereunto set my hand, at Hamburg, on this 19th day of Sept., 1911.

ERNST SOKOLOWSKI.

Witnesses:
ERNEST H. L. MUMMENHOFF,
ANDREW W. PENTLAND.