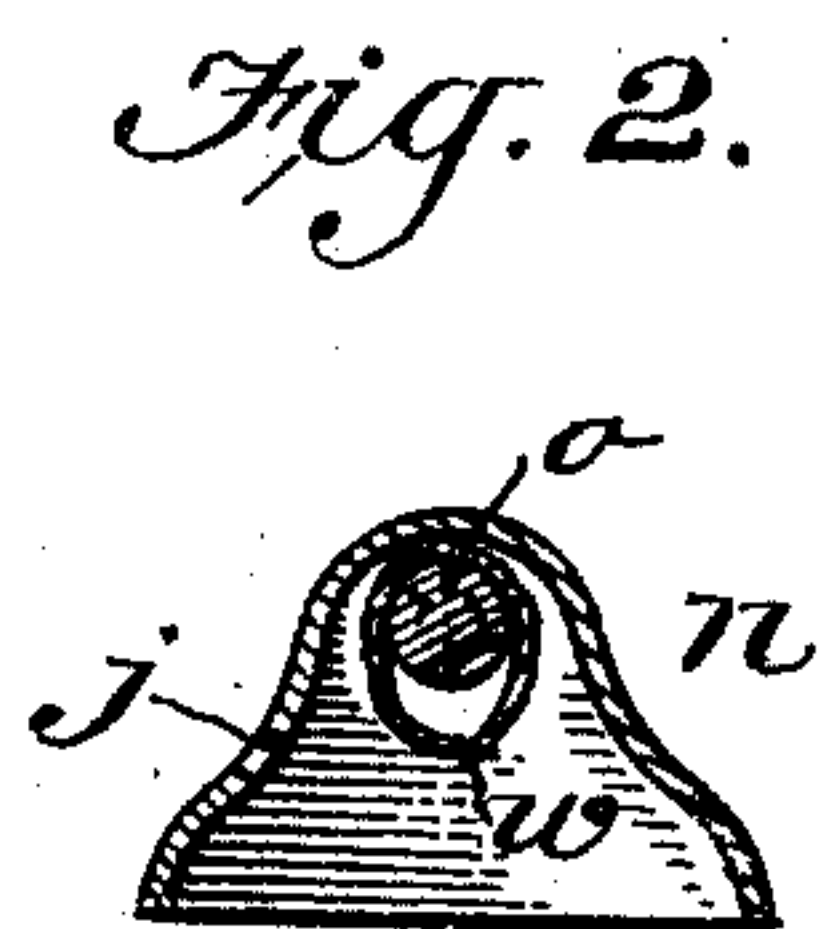
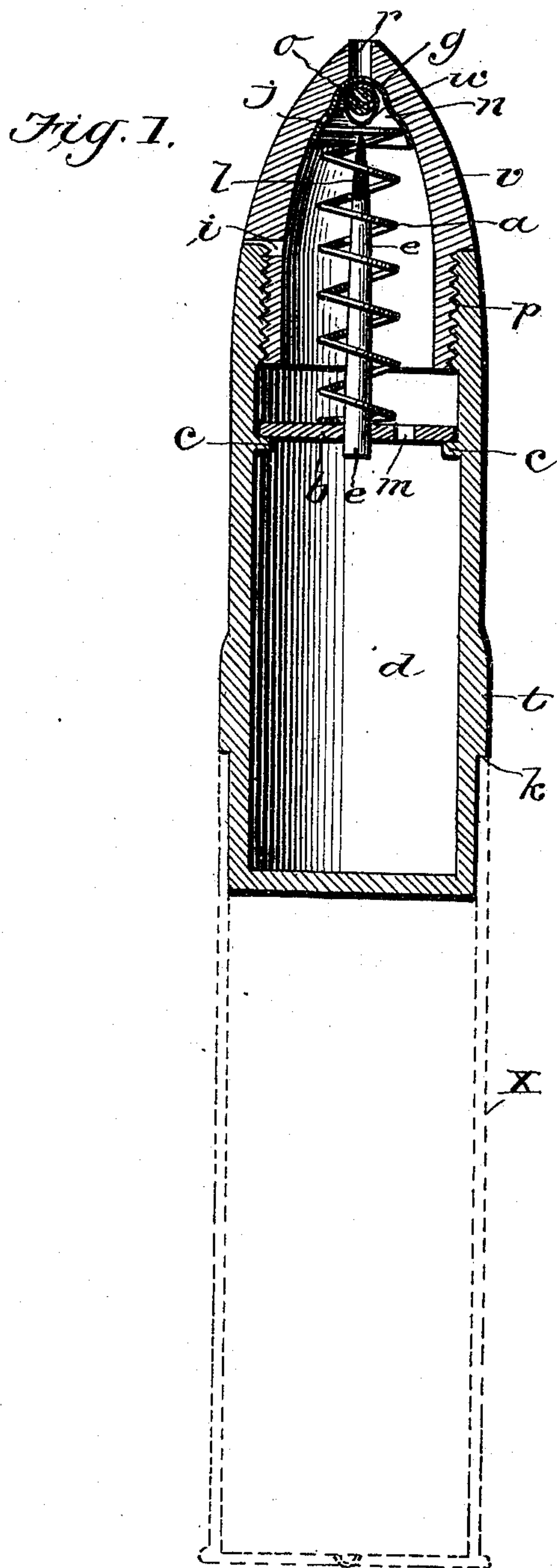


No. 693,718.

Patented Feb. 18, 1902.

L. JULIG.
PROJECTILE AND FUSE.
(Application filed Sept. 21, 1901.)

(No Model.)



WITNESSES:

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LEOPOLD JULIG, OF SAN FRANCISCO, CALIFORNIA.

PROJECTILE AND FUSE.

SPECIFICATION forming part of Letters Patent No. 693,718, dated February 18, 1902.

Application filed September 21, 1901. Serial No. 76,064. (No model.)

To all whom it may concern:

Be it known that I, LEOPOLD JULIG, of San Francisco, in the county of San Francisco and State of California, have invented a new and useful Improvement in Projectiles and Fuses, of which the following is a specification.

My invention is in the nature of a new projectile and fuse for use in warfare whereby greater effectiveness is obtained from hollow explosive projectiles. It is an improvement upon that form of projectile in which the fuse or primer is ignited by the primary combustion of the metal potassium, which when brought into contact with water ignites and burns spontaneously in a well-known way.

My invention consists in a simple and practical construction of projectile and fuse operating upon this general principle, which I will now proceed to describe with reference to the drawings, in which—

Figure 1 is a longitudinal section through the projectile with the cartridge-shell shown in dotted lines, and Fig. 2 a detail view of the potassium-capsule.

In the drawings, X represents the cartridge-shell, and *t* is the projectile fitted in the end of the shell by means of a shoulder *k*, formed around the projectile. The shell X forms no part of my invention and receives the powder charge by which the projectile *t* is fired from a cannon or heavy gun.

The projectile has a detachable nose portion *v*, having an opening *r* in its end and connected by a screw-joint *p* with the projectile. On the inner side of the projectile there are formed shoulders or lugs *c*, on which rests a partition-disk *b*, having a hole *m* through it. A wooden pin or stem *e* is fixed to this disk and has on its end at *l* a waterproof-powder composition glued with shellac to the same. A coiled spring *a* is wound around this stem and bears at one end against the disk and at the other end against a valve-shell *n*, which fits in a seat *g* in the detachable cap *v* and closes the opening *r* in the cap. In the center of the valve-shell on the inside is seated a piece of potassium *o*, suitably inclosed and held in place by a bag *w* of fabric saturated with coal-oil. In the side of the cap *v*, just at the upper end of the screw-threaded part, there is an air-vent open-

ing *i*. The compartment *d* of the projectile below the disk *b* is to be filled with any high explosive, such as guncotton, and is fired through the opening *m* from the space above.

The operation of my invention is as follows: It is intended to be exploded only after it strikes the water, where it produces a destructive effect upon a warship, either below the water-line, along its sides, or under the keel. When fired from a gun, no effect is produced on the igniting devices as long as it is passing through the air, as the spring *a* holds the valve-shell *n* closed over the hole *r* and also holds the opening *j* in the valve-shell closed against the valve-seat on the inner side of the cap *v*. When, however, the projectile strikes the water and passes beneath the same, the force of the water through opening *r* forces back the valve-shell *n*, and the valve-shell *n* fills with water, the air escaping through the vent-hole *i*. The water then coming through opening *j* in contact with the potassium *o* ignites the same, and this in turn sets fire to the waterproof-powder composition *l* on the end of the stem *e*, and the flash is transmitted through the orifice *m* to the high explosive below the same.

The valve-shell *n*, with its little ball of metallic potassium *o* inclosed in fabric, forms a sort of capsule, which capsules are kept stored in glass jars or bottles filled with coal-oil or other liquid which does not oxidize the potassium, and these capsules are taken out and inserted in the cap of the projectile when the latter is about to be used.

When in flight through the air, the spring *a* by pressing valve-shell *n* against the opening *r* prevents the inrush of air, which might oxidize the potassium and make it less sensitive to the action of the water.

No air during the period of flight can enter at *i* to do any harm, because of the position of the hole *i* and its very small size, being but little larger than a needle's point. When, however, the projectile strikes the water, this heavier fluid forces open the valve-shell *n*, and water passing through the orifice *j* directly to the potassium causes the explosion to take place before the part *v* of the shell becomes filled with water. The air-vent *i*

allows the quick backward movement of the valve-shell *n* by preventing any air-cushion.

The use of the explosive waterproof powder *l* is necessary to give sufficient energy to explode the guncotton which is not exploded with certainty by the burning of the potassium alone.

Instead of using metallic potassium sodium or any other material that will burn by contact with water may be used.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination with a hollow projectile having a hole in its nose; of a spring-seated valve held closed upon said hole and bearing on its inner side a charge of metallic potassium or its equivalent as described.

2. The combination with a hollow projectile having a hole in its nose, and an air-vent in rear of the same; of a spring-seated valve held closed upon said front hole and bearing on its inner side a charge of metallic potassium or its equivalent as described.

3. A hollow projectile made in two parts and separated by a partition into a rear compartment for high explosive and a front compartment containing a piece of potassium and a waterproof-powder composition, and means for preventing the oxidation of the potassium when in flight through the air, and igniting

it by contact with the water substantially as shown and described.

4. A potassium-capsule constructed as a valve, combined with a projectile having a hole in the same, said capsule forming a valve for closing said hole and means for holding said valve to its seat in a yielding manner substantially as described.

5. As a new article of manufacture a potassium-capsule consisting of a cup-shaped metal shell adapted to form a valve and containing on the inside a potassium pellet inclosed in an envelop of fibrous material saturated with a non-oxidizing liquid substantially as described.

6. The combination of a hollow projectile having a transverse partition with an opening through it, and a screw-threaded and detachable nosepiece with a hole in the end, a potassium-capsule forming a valve fitting in the end of the nosepiece and closing the opening in the same, a spring interposed between said capsule-valve and the transverse partition, and a central stem mounted on the transverse partition and carrying a waterproof explosive powder substantially as described.

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Witnesses:

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