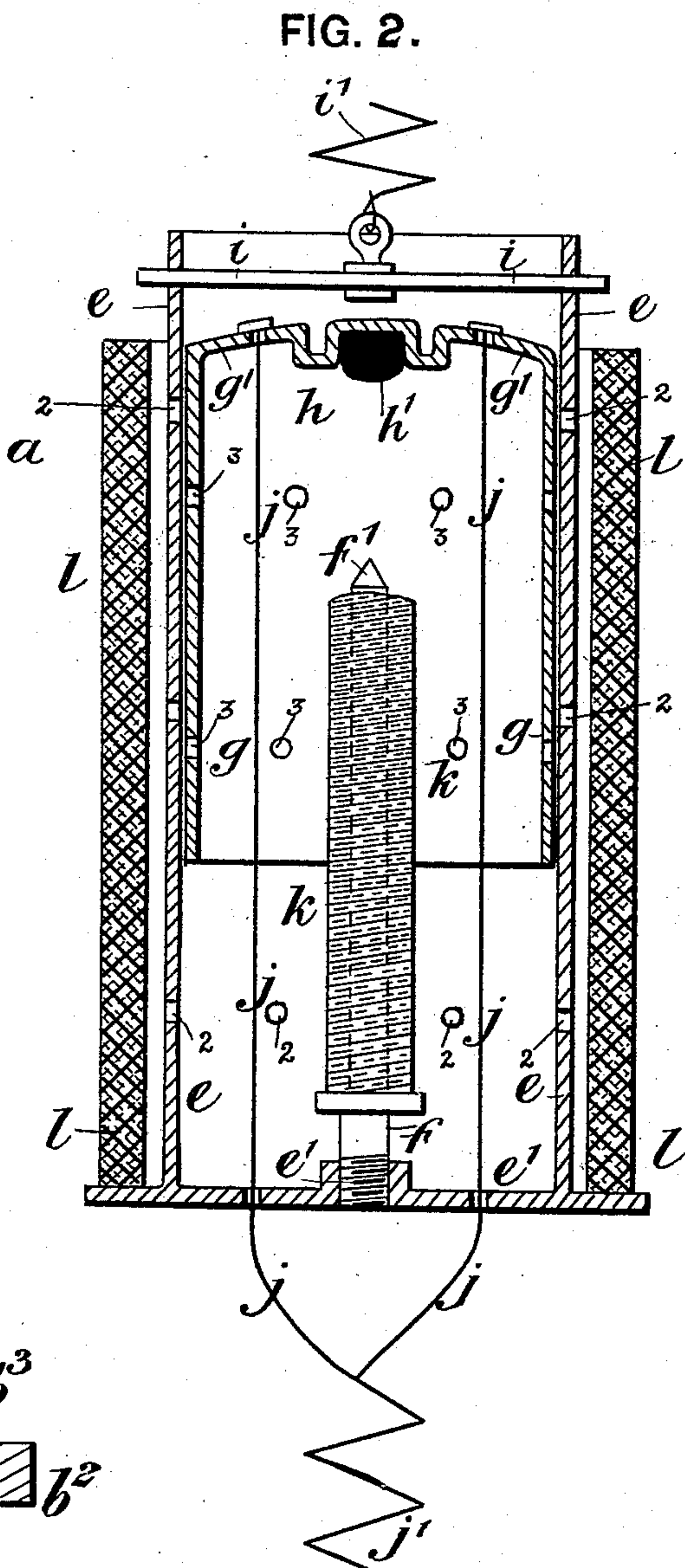
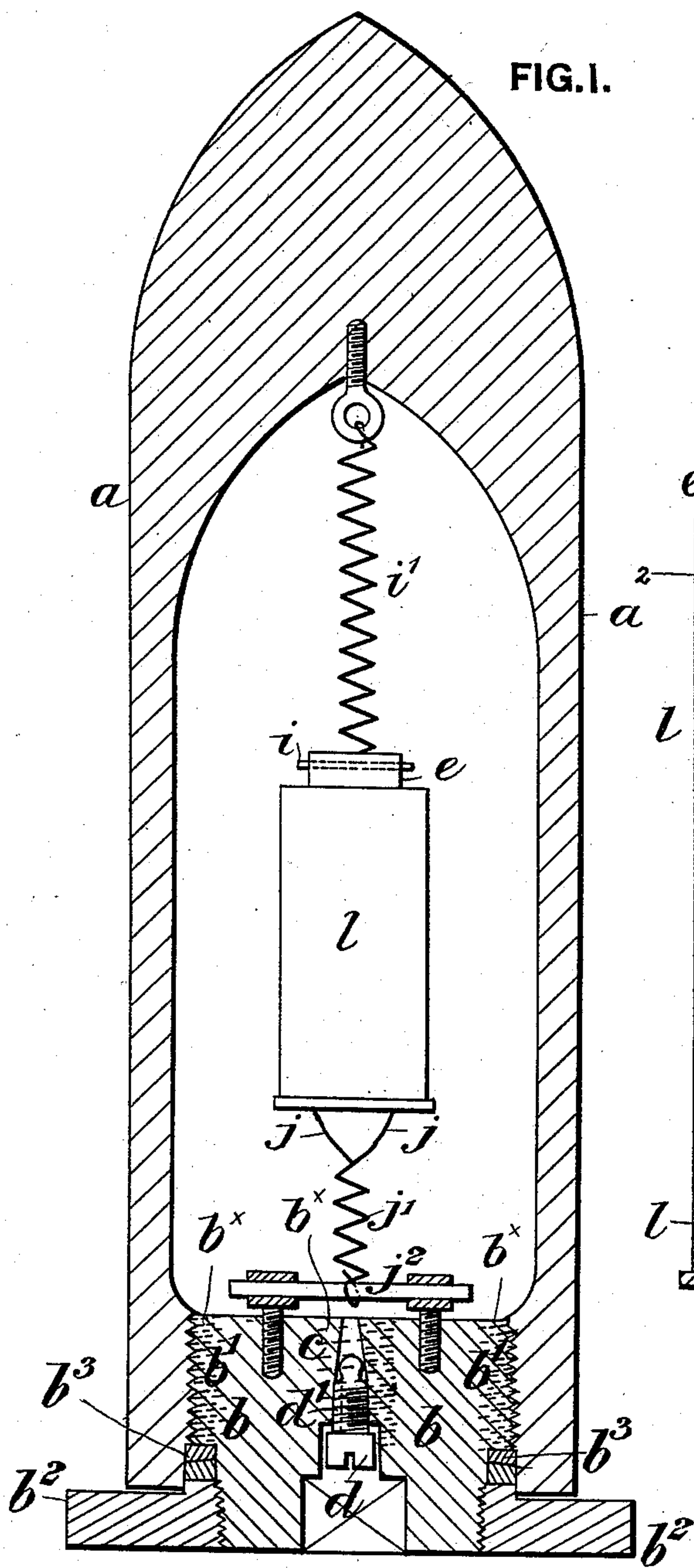


(No Model.)

J. E. BOTT & G. H. CAMMELL.
SHELL OR OTHER PROJECTILE.

No. 472,748.

Patented Apr. 12, 1892.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOSEPH ELTON BOTT, OF STOCKPORT, AND GEORGE HENRY CAMMELL, OF
HATHERSAGE, ENGLAND.

SHELL OR OTHER PROJECTILE.

SPECIFICATION forming part of Letters Patent No. 472,748, dated April 12, 1892.

Application filed November 10, 1891. Serial No. 411,478. (No model.) Patented in England September 9, 1890, No. 14,161.

To all whom it may concern:

Be it known that we, JOSEPH ELTON BOTT, residing at Brinnington Hall, Stockport, in the county of Chester, and GEORGE HENRY CAMMELL, residing at Brookfield Manor, Hathersage, in the county of Derby, England, subjects of the Queen of Great Britain, have invented certain new and useful Improvements in Shells and other Projectiles, (for which we have obtained a patent in Great Britain, No. 14,161, bearing date September 9, 1890,) of which the following is a specification.

Our invention relates to improvements in shells or other projectiles, whereby gun-cotton, bellite, roburite, dynamite, or other high explosives may be exploded in the rear of a shell or projectile. The said high explosive (at the moment of detonation) is surrounded by compressed air or gas, or both, in such manner that a mobile cushion is formed, whereby the rending tendency of such high explosives is retarded and instead of the breech or body of the cannon or other weapon being burst the shock is reduced and the impulsive force of the released gases transferred to the shell or projectile to be ejected.

In order to carry our invention into effect, we prefer to use "Bott's self-propelling shell or projectile" (one form of which is shown in Patent No. 466,056, dated December 29, 1891) in the manner hereinafter described.

The self-propelling shell or projectile above referred to consists of a shell or projectile having a body to which is attached (preferably by an interrupted screw) an easily-detachable breech-piece or base, in which is a valve for the purpose of admitting gas or air, or both, under pressure and retaining the same in the chamber of the shell or projectile. On the said detachable breech being released from the shell or projectile when in the bore of a cannon the fore part of the shell or projectile is instantly propelled by the expansion of the compressed air or gas, or both, issuing from the rear chamber thereof.

The object of our invention is to increase the velocity of the shell or projectile without using highly-compressed air or gas, or both. We inclose in the chamber of the shell or projectile a quantity of high explosive capable of generating a sufficient amount of gas to in-

crease the velocity at which the shell or projectile is ejected when the same is charged with air or gas, or both, under pressure.

In order to effect the detonation of the high explosive, we suspend it in the body of the shell or projectile and attach a detonator, (preferably fulminate of mercury,) the attachment consisting of a wire or cord of suitable material secured to the fore part of the shell or projectile, the rear part of the detonator being secured to the detachable breech or base of the shell or projectile by a spring, cord, wire, or other flexible device, so that when the breech-piece or base of the shell or projectile is detached—for example, in the manner referred to in said patent—the fore part is propelled some distance up the bore of the cannon or other weapon until the spring, cord, wire, or other device is in full tension and breaks, when the detonator is fired and the charge of high explosive is detonated in a cushion of compressed air, which thus receives the shock. By these means the advantage of the enormous power generated by high explosives is obtained without the danger of bursting the gun or cannon by instantaneous shock. Other suitable means may, however, be employed for detonating the explosive at the required moment.

In order that our said invention may be more clearly understood and readily carried into effect, we will proceed, aided by the accompanying drawings, more fully to describe the same.

In the drawings, Figure 1 represents a longitudinal section of a self-propelling shell or projectile fitted with our present invention; and Fig. 2 is a separate longitudinal section of part constructed according to our present invention, drawn to a larger scale than Fig. 1.

In both figures like parts are indicated by similar letters and figures of reference.

Our present invention is specially designed for use with Bott's self-propelling shell or projectile, in which compressed air or gas contained in the shell or projectile is liberated at the breech by the detachable plug.

In the accompanying drawings, *a* represents the body of the shell; *b*, the breech-piece or base, which is attached to the body *a*, preferably by an interrupted screw *b'*, (shown in

detail by the columns of dotted lines b^x ,) in order that by a partial turn the said breech-piece or base may be liberated from the shell or projectile.

5 b^2 is a flange, which is screwed firmly to the breech-piece or base and secures a backing b^3 , of gutta-percha or other suitable material, in position.

c is an opening through the breech-piece or
10 base for the purpose of admitting air or gas, or both, under pressure, and d is a screw plug or stopper formed with a groove d' , which when the shell or projectile is in the charging machine and the plug d is screwed partially
15 back admits the air or gas thereto, and when the pressure-gage shows it is properly charged the plug d is screwed firmly up to its seat.

We prefer to carry our invention into effect as follows: We construct an apparatus carry-
20 ing a charge of high explosive and a detonating arrangement in the following manner: We employ a tube e , (of metal or other suitable material,) having a base e' , into which is secured a pointed striker f . This cham-
25 ber acts as a guiding-tube for a tube g , (of smaller diameter,) capable of sliding in the bore thereof when required. The said inner tube g has a head g' , in which is formed an anvil or receptacle h , which contains the de-
30 tonating fulminate h' . The tube e is connected by a cross-rod i and coiled wire i' with the fore part of the shell or projectile a , and the tube g is connected with the breech-
35 plug b of the shell or projectile by wires j , attached to the head g' of the tube g and passing through holes in the base e' of the tube e , a coiled wire j' connecting the wires j with a rod j^2 , fixed to the breech-plug b . On the striker
40 f a coil of gun-cotton k or other form of a detonating explosive is wound or placed, and as the respective tubes e and g are perforated, as at 2 and 3, detonating contact is made with the body of high explosive l , which we prefer to be of cylindrical form and to place around
45 tube e , as shown in the drawings. Thus when the breech-plug b is released the fore part of the shell or projectile carrying the wire i' is propelled toward the muzzle of the gun by the contained charge of compressed air or gas,
50 and as the wire j' is fastened to the breech-plug b and retained at the breech of the gun it follows that when the shell or projectile has progressed a sufficient distance to uncoil the wires i' and j' contact must take place between
55 the point f' of the striker f and the fulminating detonator h' , thus firing the coil or cylinder

of explosive k , which in turn fires the main charge l . It is evident that the point at which this explosion takes place may be accurately governed by the length of the coils of wire i' 60 and j' .

By our invention it is possible to use high explosives for propelling or accelerating the propulsion of shells and other projectiles with-
65 out any danger of bursting the gun, which generally takes place when a charge of high explosive is used between the shell or projectile and the breech of the gun.

According to our invention the high explosive is fired in a stratum or body of compressed
70 air or gas behind a rapidly-moving shell or projectile, thus practically fulfilling the necessary conditions under which high explosives can be safely used for ballistic propulsion.

If desired, the shell or projectile may be
75 charged with explosive gas instead of air, in which case the effect will be still more powerful.

Shells or projectiles of the character referred to when provided with our present improve-
80 ments are capable of use with rifled guns.

Having fully described our invention, what we desire to claim and secure by Letters Patent is—

1. A self-propelling projectile containing
85 an elastic or expansive fluid, a charge of high explosive, elastic mediums at opposite ends for suspending such charge of high explosive movably within the projectile, a detonator for
90 exploding the charge, arranged in the projectile, and a removable breech-plug for permitting the fluid generated by the explosion to propel the projectile, substantially as de-
scribed.

2. A shell or projectile comprising the body,
95 its removable breech-piece, a tube e , and an elastic medium connecting it with the fore part of the body, a tube g , telescoping with the other tube, and a frangible medium connecting it with the breech-piece, a detonating
100 mechanism arranged between these telescoping tubes and fired by their coming together, and a body of high explosive supported by the outer tube, substantially as described.

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