

B. S. ALEXANDER.
PROJECTILE FOR RIFLED ORDNANCE.

No. 34,091.

Patented Jan. 7, 1862.

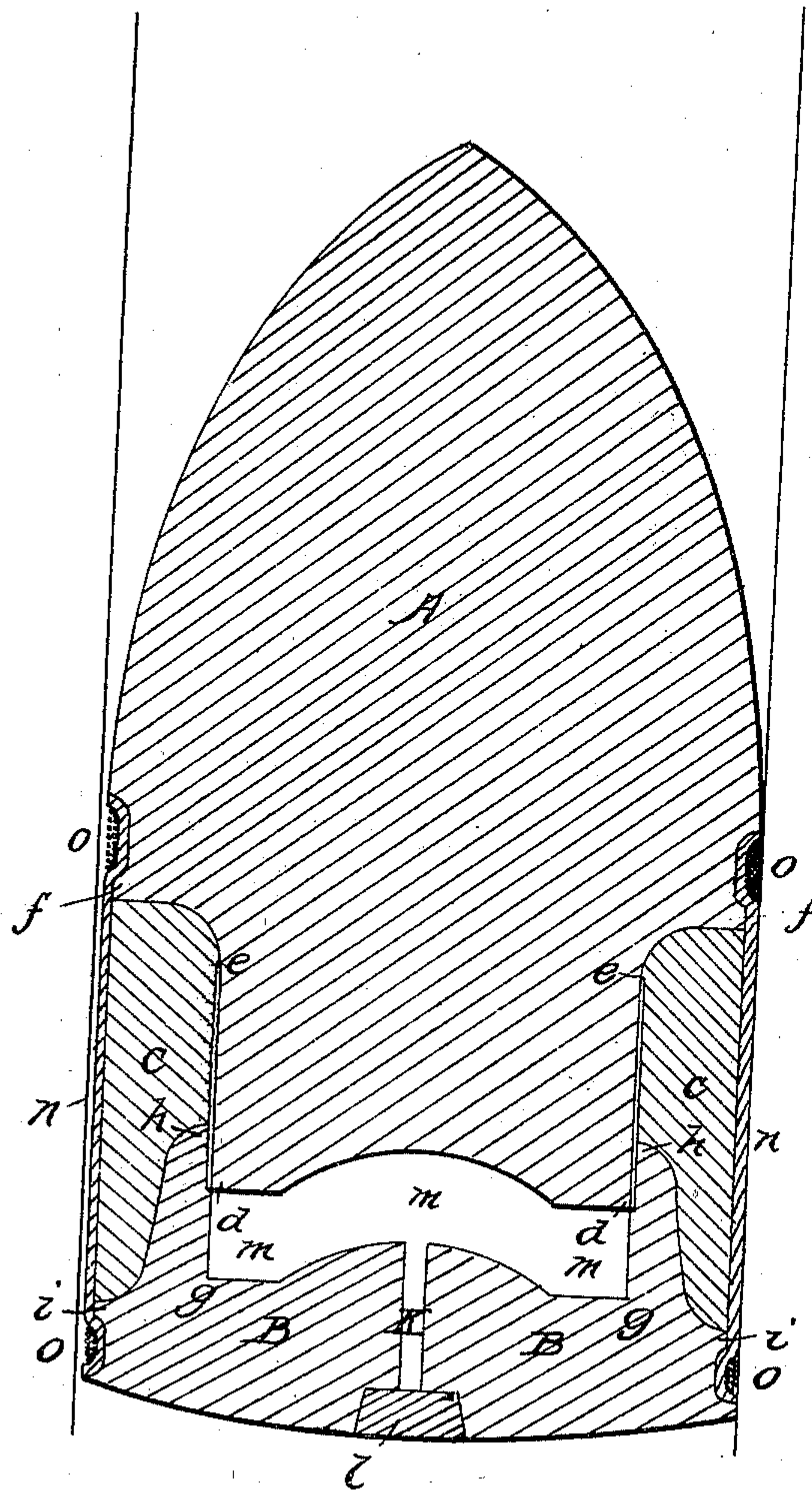
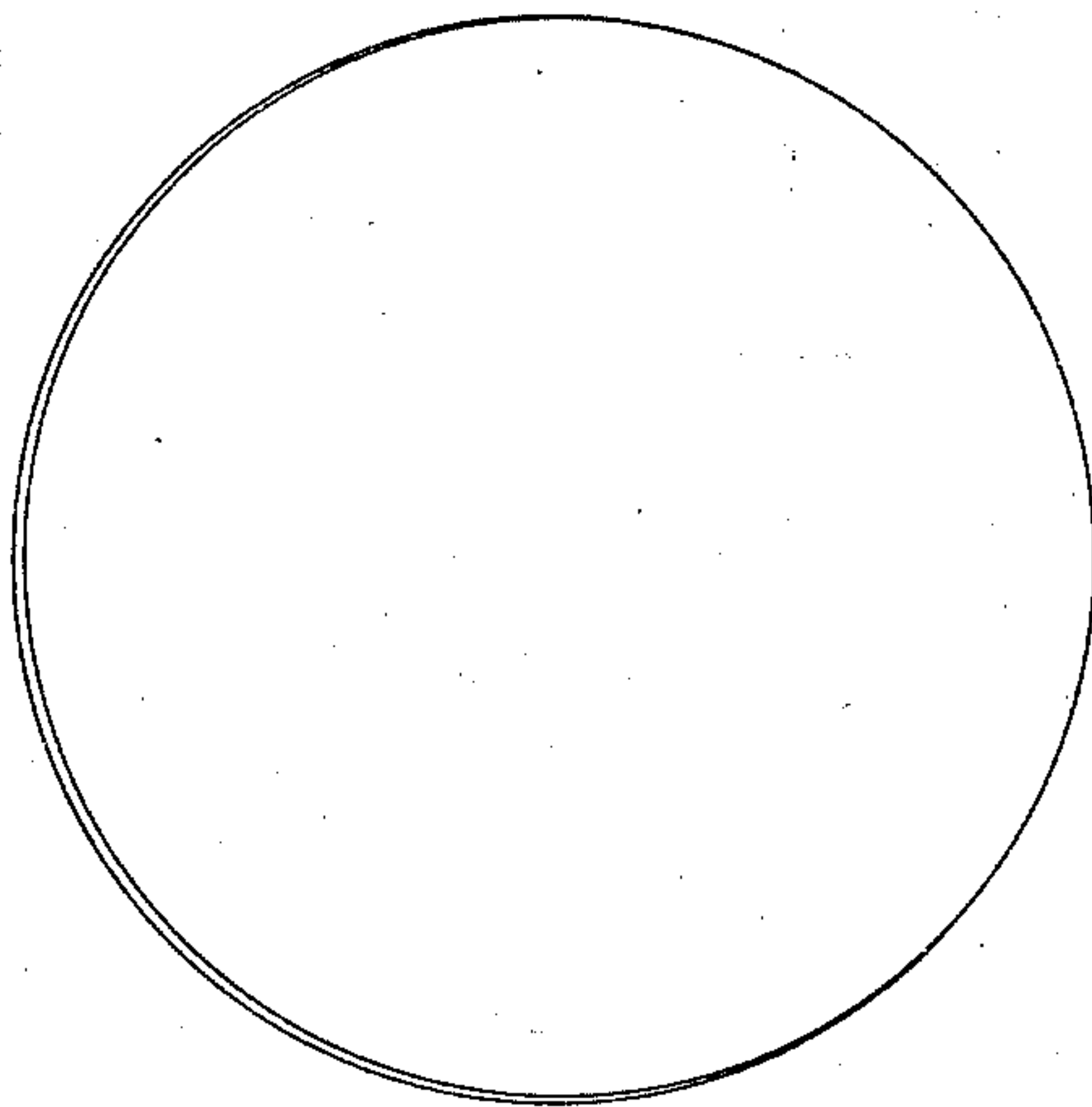


ABB Iron
CC Lead
nn Canvas
de Paper
oo Wire or Twine.



Attest:

Wm H. H. H. H.
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Inventor

B. S. Alexander

UNITED STATES PATENT OFFICE.

BARTON S. ALEXANDER, OF THE UNITED STATES ARMY.

IMPROVED PROJECTILE FOR RIFLED ORDNANCE.

Specification forming part of Letters Patent No. 34,091, dated January 7, 1862.

To all whom it may concern:

Be it known that I, BARTON S. ALEXANDER, a captain in the corps of engineers, United States Army, have invented a new and Improved Shot for Rifled Guns, both cannon and small-arms; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, showing a section through the axis of said shot, and to the letters of reference marked thereon.

The nature of my invention consists in the manufacture of a compound shot of iron and lead, or of other metals, in such a manner that the parts of the shot shall not separate when fired, and so that the inertia of the shot shall be more gradually overcome than has hitherto been done, and the strain on the gun consequently diminished.

To enable others skilled in the art of making shot to manufacture and use the one which I have invented, I will proceed to describe its construction and operation.

The shot consists, essentially, of three parts, marked, respectively, A, B, and C on the drawing. The parts A and B are made of some hard metal—like iron—when the shot are for cannon, and of iron, copper, or some softer metal when the shot are for small-arms. The part C is made of some soft metal—like lead—in all cases.

In order to explain the exact mode of construction in a given case, we will suppose the parts A and B to be made of cast-iron and the part C to be made of lead. A and B are first cast, making the usual allowance for windage, and so that the shot, when completed, may be of any required form on the front and rear and of any required length. That part of A marked *d e f* is then turned, so that a section taken at right angles to the axis of the shot will be a true circle. The parts of B marked *g h* and *h i* are also turned in a similar manner, so that the diameter of that part of B from *h* to *h* shall be a very little larger than the part of A from *d* to *d*. That portion of the surface of the part A from *e* to *f* is then tinned in the ordinary manner of tinning iron, as is also that portion of the surface of the part B from *h* to *i*. A piece of paper or cloth is then accurately fitted around the cylindrical portion of the part A, extending from *d* to *e*. The two parts A and B are then fitted together, so that their axes

shall be coincident, as is shown on the drawing. The object of the paper or cloth which had been fitted on the part A is to hold the parts A and B in their proper position after they are fitted together. The shot is now heated and placed in a mold whose diameter is the same as the diameter of the shot, and the part C is filled up with melted lead or some other compressible metal the surface of which, if not sufficiently smooth, may be made so after the shot is removed from the mold.

In making the part B a small hole is bored through its center at *k*. The exterior portion of this hole is enlarged and fitted with a plug of iron marked *l*. That portion of the shot from *f* to *i* is then covered with canvas dipped in tallow or some similar lubricating substance, and the shot is then completed and ready for use. In firing this shot the part B, at the moment of the explosion of the charge, and while the inertia of the shot is being overcome and its velocity is being generated, will be driven forward on the cylindrical portion of the part A, compressing the confined air in the space *m m m*, between the two parts A and B, and at the same time the lead of the part C will be "upset" and driven out into the grooves of the gun, so as to stop all windage.

The object of confining the air between the parts A and B is that it may act as an elastic cushion during that point of time while the rifling is taking place and while the inertia of the shot is being overcome and its velocity is being generated, thereby enabling the resistance of the shot to its forward motion to be more gradually overcome, and consequently reducing the strain on the gun.

The object in tinning the parts *e f* and *h i* is to enable the lead of the part C to adhere to the tin in the same manner as the tin adheres to the iron, thereby holding all the parts of the shot together and overcoming the tendency to separation which has hitherto obtained in reference to all compound shot.

The object of the hole *k* and the plug *l* is to guard against the tendency to separation of the parts A and B after the shot leaves the gun, which might be produced by an imperfect adjustment of those parts before the lead C is poured around them. Thus, if they were fitted too closely together and the air at *m m m* were compressed by the explosion of the charge to the density of one thousand atmospheres

before the rifling was completed and the forward motion of the part B was stopped, this compressed air would exert a pressure of fifteen thousand pounds on a square inch in all directions, tending to separate the parts A and B, and this pressure would be exerted equally whether the shot be in a state of rest or motion.

By the arrangement of the hole and plug the moment the shot leaves the gun the compressed air acts unopposed, except by the atmosphere, on the face of the plug *l*, and if its pressure is sufficient to overcome its velocity, the pressure of the atmosphere, and the friction or cement by which it is held in place the plug will be left behind and fall harmlessly, thereby enabling the compressed air to escape through the hole *k*.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The mode of making the two or more parts of a compound shot adhere together by the use of tin, solder, or any other metallic compound to which a rim of lead, when cast between those parts, will adhere.

2. The hole *k* and the plug *l*, as a means of relieving the pressure caused by the compressed air or other confined substance between the two parts of the shot, and tending to separate them, as herein described.

B. S. ALEXANDER.

Attest:

JOHN S. HOLLINGSHEAD,
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