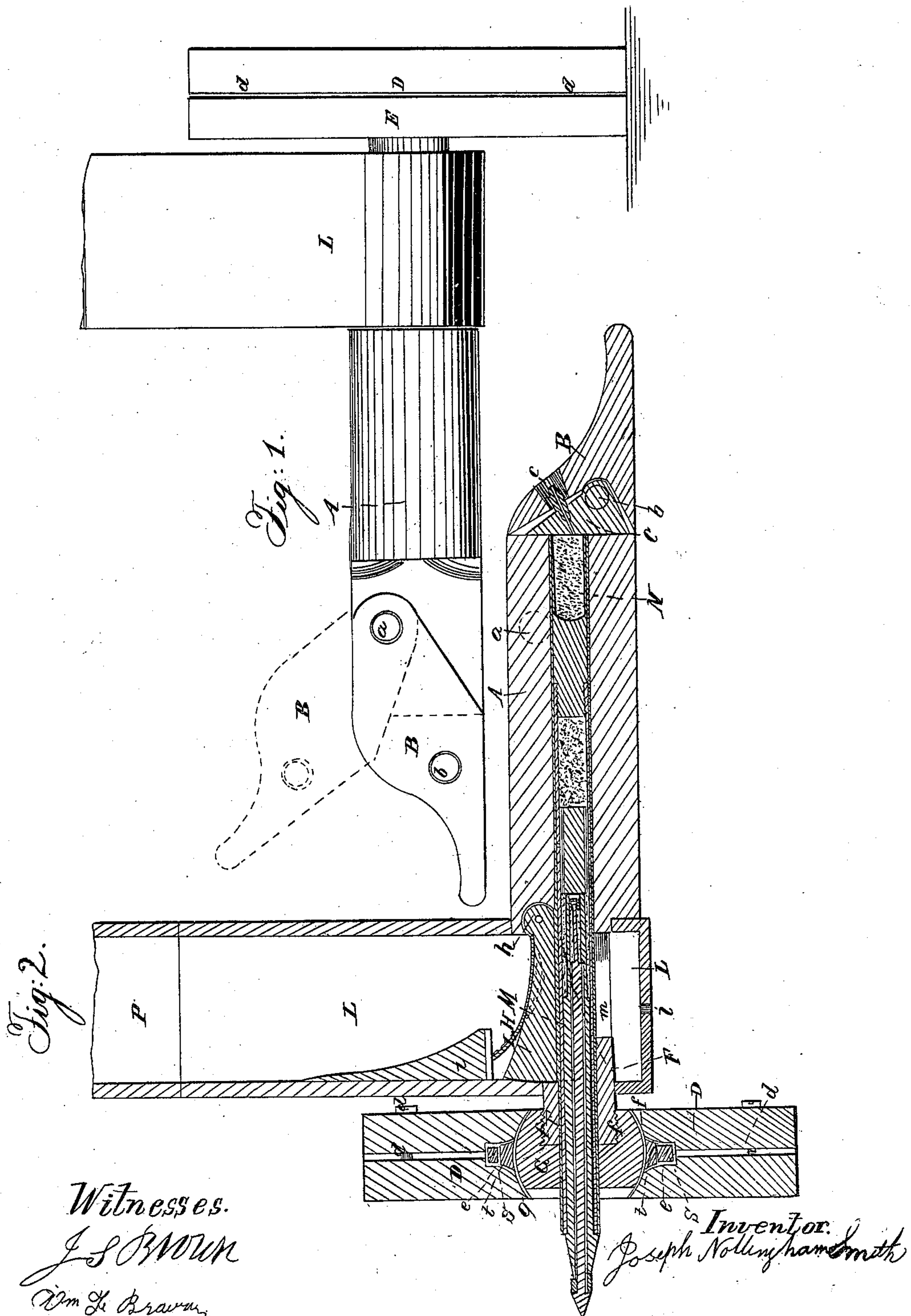


J. N. SMITH.

Submarine Gun.

No. 41,402.

Patented Jan. 26, 1864.



UNITED STATES PATENT OFFICE.

JOSEPH NOTTINGHAM SMITH, OF NEW YORK, N. Y.

IMPROVEMENT IN SUBMARINE GUNS.

Specification forming part of Letters Patent No. 41,402, dated January 26, 1864; antedated January 4, 1864.

To all whom it may concern:

Be it known that I, JOSEPH NOTTINGHAM SMITH, of the city, county, and State of New York, have invented a new and Improved Submarine Gun or Battery; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, making part of this specification—

Figure 1 being a side elevation of the gun; Fig. 2, a central longitudinal vertical section thereof.

Like letters designate corresponding parts in both of the figures.

I employ a gun-barrel, A, the muzzle F of which is secured tightly and permanently (by a male and female screw, *f*, Fig. 2, or otherwise) in a ball, G, of a ball-and-socket joint; and hence I require the gun to be breech-loading, in addition to the further object herein-after specified, and to the ordinary advantages thereof. To accomplish this part of the invention, a breech-piece, B, is pivoted to the gun-barrel by trunnions *a*, the axis of which is situated somewhat above the center of the gun's bore, substantially as represented, the breech-piece turning in vertical planes thereon, so as to be lifted for the insertion of the charge, as indicated by red lines in Fig. 1. This eccentricity of the pivots of the breech-piece causes it to tighten against the rear end of the gun-barrel by an oblique approach instead of a parallel or sliding cut-off motion, which would result from a concentric pivoting of the breech-piece. Therefore I am enabled to cause the breech-piece to fit tightly, but without binding, upon the gun-barrel, however much the gun may expand by the heat or contract by cold, the more the gun expands the less the breech-piece descending to tighten against the barrel. The breech-piece may turn in horizontal planes; but in that case the weight of the same cannot assist in keeping it closed.

In order to enable the breech-piece B to close with a perfectly-tight joint against the barrel A in the variable positions and angles which it may assume in respect to said barrel, there is formed in its front or joint face a cavity (having the form of a portion of a cylinder generally nearly semi-cylindrical) for the reception of a packing-block, C, which has a

part also of the form of a portion of a cylinder fitting concentrically in the cavity of the breech-piece, and which is made self-adjusting by being pivoted at *b* in the breech-piece, there being sufficient room in the cavity of the breech-piece to allow the requisite vibration to perform its function. The axis of this pivot is transverse to the breech-piece and parallel with the axis of the trunnions on which the breech-piece turns. Thus, as the breech-piece is pressed down or to the barrel, the packing-block adapts itself to the rear surface of the barrel with equal closeness in every part. The pivot *b* is situated somewhat below the center line of the gun's bore, so that the pressure of the exploding charge against the face of the packing-block shall be greater above than below the pivot, thereby causing the lower edge of the said packing-block to hug the rear end of the barrel, and consequently counteracting any tendency to lift the breech-piece from its place. The pivot-pin *b* is removable, so that when the necessity may arise by simply withdrawing it the breech-block C becomes inoperative, and the gun consequently disabled. An opening is made through the breech-piece B through which to reach the cap-tube *c*, located in the packing-block C, for firing the charge, substantially as shown in Fig. 2.

The ball G fits in a port-hole socket, *g*, which is formed in the side or wall of the vessel D, and in an inner cap-plate, E, applied to the wall D for the purpose, being secured thereto by screw-bolts *d d* or their equivalents, capable of tightening the socket around the ball G. In a suitable cavity, *e*, between the plate E and wall D, is located an annular packing, *t*, of india-rubber or other suitable material, and this is surrounded by a metallic ring, *s*, to prevent its being squeezed out of place, into the joint-space between the plate E and wall D, as the packing is tightened by the screws *d d*. The ball G thus may turn in every direction, and consequently permit a corresponding freedom of movement to the gun, so that the latter may be pointed, in line and range, at any required angle. The breech end of the gun is moved vertically and horizontally by any of the well-known means, which need not be described here.

I employ a projectile, M, which fills the

whole bore of the gun containing the charge of powder N in its rear end, and its point also projecting through the socket-ball G into the water outside of the vessel, as indicated in Fig. 2, so that there shall be no water to displace in the muzzle of the gun when fired, and consequently no damaging shock nor abrasion resulting therefrom. When the gun is fired, the gases generated by the explosion do not follow the projectile out through the muzzle into the water, but are set free into a chamber, L, inside of the vessel, substantially in the following manner: There are apertures *m* in the sides of the gun upward and downward opening into the said chamber L, which surrounds the barrel so as to receive the gases both above and below. In one of the apertures, (properly the upper one,) not filling it, however, but leaving sufficient space at the sides for the escape of the gases, works a cut-off, H, the heel of which is pivoted above the bore of the gun, and the head of which fits into a seat in the muzzle F, made slightly eccentric to its motion, so that it will pack tightly therein as it descends, and perfectly cut off the ingress of water through the muzzle of the gun. A spring, I, (or its equivalent,) on the top of the cut-off, and kept pressed down by a stop, *i*, forces the cut-off down into the gun as soon as the projectile is forced out, as indicated by red lines in Fig. 2; and no pressure of the water can raise the cut-off again, on account of its being pivoted above or outside of the gun-bore; it being evident that the greater the pressure of water from the outside the greater the tendency to hold the cut-off down into its seat; but when another projectile is inserted from behind its front end automatically lifts

the cut-off out of the bore of the gun into the position shown by black lines in Fig. 2, and holds it there till the charge is again fired. As there may be a little water forced in past the cut-off just as the next projectile lifts it, provision is made for the escape thereof out of the chamber L, through an aperture, *l*, in the bottom thereof into a suitable receiver. The gases of the explosion first find vent into the chamber L, and thence escape upward through a separate discharge-tube, P, above the deck of the vessel. The chamber L surrounds and moves with the gun, and therefore not only must the tube P be separate therefrom, but must be wider, so as to receive the gases from it in whatever position the gun may be.

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

1. The breech-piece B, when pivoted above the central line of the bore of the gun, and provided with a packing-block centered below the said central line of the bore, substantially as and for the purpose herein specified.
2. The self-adjusting packing-block C, pivoted transversely in the breech-piece, in combination with said breech-piece, substantially as and for the purpose herein set forth.
3. Disabling the gun by means of the removable pivot-pin *b*, which pivots the packing-block to the breech-piece, as specified.
4. A cut-off, H, for closing the muzzle of the gun against the influx of water into the barrel, after the discharge of the projectile therefrom.

JOSEPH NOTTINGHAM SMITH.

Witnesses:

J. S. BROWN,
WM. FRANK BROWN.