(No Model.) 3 Sheets—Sheet 1.

J. ERICSSON.

SUBMARINE GUN.

No. 245,363. Patented Aug. 9, 1881.

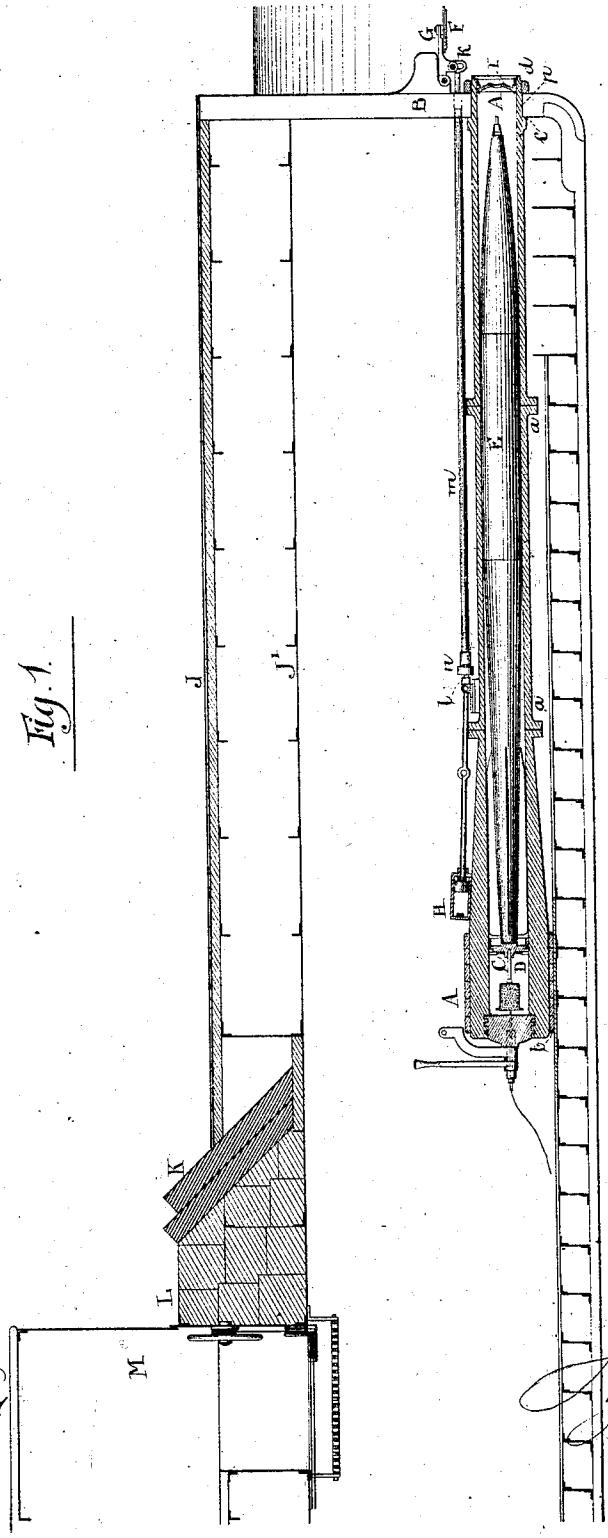


Fig. 1.

Witnesses:
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Louis W. Whitehead

Inventor:
John Ericsson
by his Attorneys
Brown & Brown

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Fig. 3.

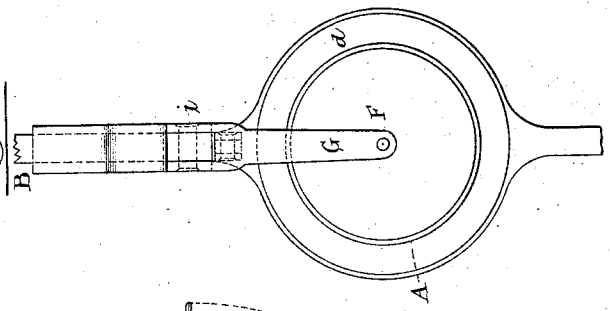


Fig. 2.

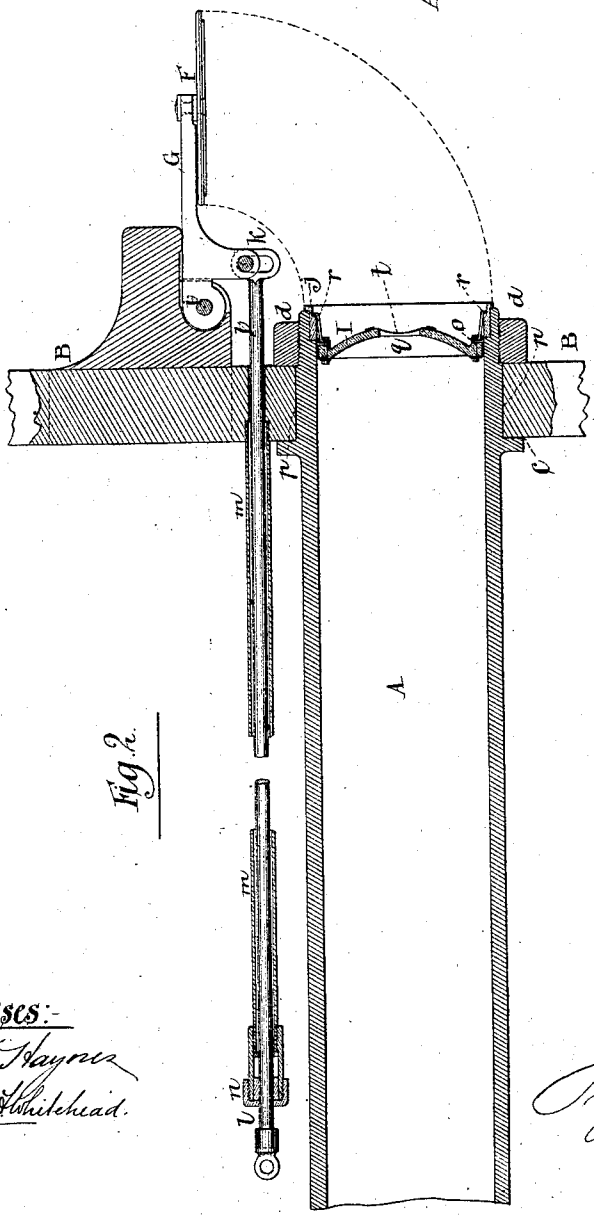
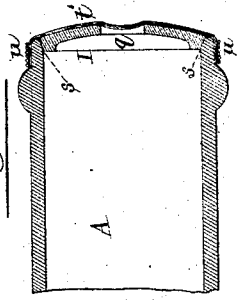


Fig. 4.



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Fig. 5

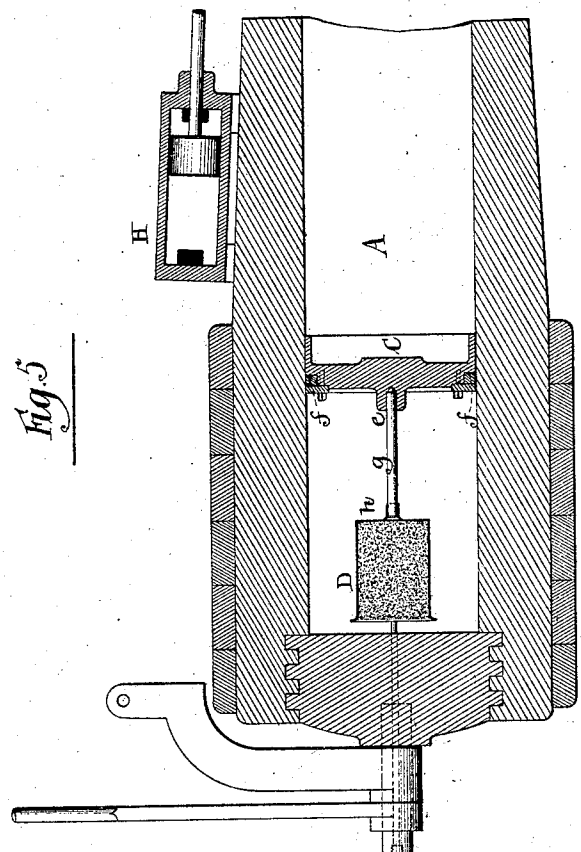
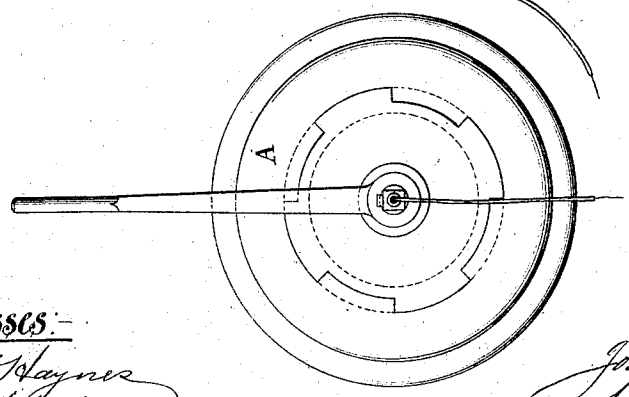


Fig. 6.



Witnesses:-
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Inventor:-
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UNITED STATES PATENT OFFICE.

JOHN ERICSSON, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO CORNELIUS H. DELAMATER AND GEORGE H. ROBINSON, BOTH OF SAME PLACE.

SUBMARINE GUN.

SPECIFICATION forming part of Letters Patent No. 245,363, dated August 9, 1881.

Application filed May 28, 1881. (No model.)

To all whom it may concern:

Be it known that I, JOHN ERICSSON, of the city, county, and State of New York, have invented certain new and useful Improvements in Guns for Submarine Warfare, of which the following is a specification, reference being had to the accompanying drawings.

These improvements in guns are especially intended for the use of torpedoes. They are applicable to breech-loading guns, the muzzles of which are presented through, and fitted water-tight within, openings below the water-line in the bows of the vessels on which they are to be used, and also to guns, either breech-loading or muzzle-loading, which may be loaded on the decks of vessels of ordinary construction, and afterward placed on and fired from supports on the exterior of such vessels below the water-line.

In carrying out my invention I use between the projectile and its projecting-charge a piston, which is fitted gas-tight to the bore of the gun; and one part of my invention, which is applicable to both muzzle-loading and breech-loading guns, consists in a box or case which contains the projecting-charge of powder, and is of a diameter much smaller than the bore of the gun, and is attached to the aforesaid piston by a supporting rod or stem, of wood or other material, entering a socket in the back thereof, the said case and its contained charge occupying but a small portion of the space left in the chamber of the gun between the said piston and the breech.

My invention further consists in a novel construction of, and novel mode of securing to the muzzle of a gun for firing under water, a frangible valve which serves to exclude water from the bore of the gun before the discharge of the projectile, but which is destroyed by the projectile during the act of its discharge.

Figure 1 in the drawings is a longitudinal central sectional view of a torpedo-vessel having fitted to its bow a breech-loading gun with my improvements. Fig. 2 exhibits a longitudinal central section of the forward portion of the gun, and shows the stem of the vessel, the temporary and permanent muzzle-valves, and the means of working the said permanent valve. Fig. 3 is a front view corresponding with Fig. 2. Fig. 4 is a central section illustrating the method of attaching the temporary valve to a muzzle-loading gun. Fig. 5 exhibits a central longitudinal section of the breech portion of the gun, and shows also the piston and the attached powder-case. Fig. 6 is a rear view of the breech of the gun.

The gun A, which has a smooth bore, may be and is represented as made of flanged sections, with flange-joints at *a a*. It is shown as a fixture within the vessel, which is practically a floating gun-carriage, and is represented as constructed of iron or steel. The breech rests on a bed, *b*, on the keelson of the vessel. The muzzle is fitted into a port or opening, *p*, provided for it in the stem B or bow of the vessel, with a shoulder, *c*, inside, and is secured by a nut, *d*, screwed on it outside, as shown in Figs. 1 and 2. The breech-loading system of the gun thus applied may be of the well-known kind, shown in Figs. 1, 5, and 6, or of any other suitable kind.

C is the metal piston, fitted with metallic packing *f* of any suitable kind—such, for instance, as is used in steam-engine pistons. This piston is fitted to work in the smooth bore of the gun A like the piston works in the cylinder of a steam-engine. The said piston is made with a central socket, *e*, (see Fig. 5,) in its back for the reception of the supporting-rod or stem *g*, of wood or other suitable material, to which the powder-case D is attached. This powder-case, which may be of tin plate and in the form of a cylinder, has a central socket, *h*, for the reception of the stem *g*. When placed in the gun its rear end is uncovered except by a piece of netting, which serves to prevent the powder from falling out, but through which the fire from the fuse can reach the whole of the rear surface of the charge. By this method of applying the powder-case in the gun the powder, which occupies but a small portion of the chamber of the gun, is kept out of contact with the gun at the time of its ignition, and injurious local pressure on the gun is avoided, and the force resulting from the explosion of the charge is caused to start the piston easily against the torpedo or pro-

jectile E. This projectile is represented as occupying nearly the whole length of the bore of the gun in front of the piston C.

F is the permanent valve for keeping the muzzle of the gun closed before and during the loading. This valve is represented as attached to an elbow-lever, G, which is hinged to the stem of the vessel by a hinge or pivot joint, *i*, above the projecting muzzle of the gun. It may be faced with an india-rubber gasket, or otherwise fitted to the seat *j*, provided for it at the muzzle of the gun. This seat *j* is shown as consisting of a separate ring of brass or gun-metal fitted to the muzzle. The elbow-lever G is connected, as shown at *k* in Fig. 2, with a rod, *l*, which passes through a hole in the stem of the vessel, and through a tube, *m*, which is screwed into the said hole, and which is fitted at its rear end with a stuffing-box, *n*, in which the said rod is packed. This rod may be manipulated by any convenient means for the purpose of working the lever G to open and close the valve; but it is shown as connected with a piston operated by steam or hydraulic pressure in a cylinder, H, suitably arranged on board the vessel.

The temporary valve, which is to be shot away by the projectile, is shown in Figs. 1 and 2, of a construction adapted for breech-loading guns. As there represented, it is composed of a wooden disk, I, furnished with a cup-packing, *o*, or other suitable packing, of leather, india-rubber, or other suitable material, and having a hole, *q*, in its center, which is covered and closed water-tight by a piece of india-rubber or other soft and penetrable material, *t*, secured around the margin. It is furnished, as shown in Fig. 2, with three or more catches, which may be variously constructed, but which are represented as consisting of elastic steel hooks *r r*, which are secured to its face, and which always exert a tendency to spring outward beyond the circumference of the valve. The valve thus constructed is intended to fit like a piston to the bore of the gun, and to be inserted thereinto from the breech before inserting the projectile, and pushed forward along the bore by a suitable rod, its spring-hooks being confined in the bore of the gun until it arrives near the muzzle, and until the said hooks *r r* can spring outward after passing a rabbet provided around the interior of the muzzle of the gun or the interior of the permanent valve-seat *j*. The clicking noise made by the springing of these hooks into the rabbet will be audible on board the vessel through the bore of the gun, and the valve will not afterward be pushed further forward. These hooks serve to retain the valve in place against the pressure of the water outside of the vessel.

For a muzzle-loading gun the temporary valve, which is to be applied to the muzzle after loading the gun, will be modified as shown in Fig. 4, the disk I being fitted into a seat, *s*, in the muzzle, and secured by a cap, *t'*, of india-rubber, which fits over the muzzle, and may be secured thereto by a binding-cord, *u*. This cap *t'* also serves as a water-tight covering for closing the central hole, *q*, of the valve. This valve I' *t* or I *t'*, which offers very little resistance to pressure from within the gun, will be shot away by the projectile as the latter begins to leave the muzzle, and will generally be broken in pieces, and the central portion of it, being of soft material, will offer so little resistance to the firing-pin in the front of the explosive projectile that there will be no danger of premature explosion of the charge contained in the projectile.

The vessel represented is constructed with a double deck, or rather two decks, J J', the space between which I propose generally to make about three feet high, and intend to fill with floats composed of or filled with cork, or floats consisting of bags of india-rubber or other material inflated with air. The vessel is intended to be immersed to such depth that the lower one, J', of these decks will be below the water-line, and the portion of the vessel below it will be protected in a great degree from enemy's shot by the surrounding water. In case of the upper deck, J, or any part of the vessel above the deck J', being penetrated by a shot, such of the floats between the two decks as are not destroyed will continue to give buoyancy to the vessel. I also construct all across the vessel above the decks and in front of the pilot-house M, and in front of the base of the smoke-stack, (the vessel being intended to be propelled by steam-power,) a shield, K, composed of very heavy armor-plates, which are inclined upward and backward in such manner as to deflect any shot or other projectiles that may strike it. This shield has a backing of solid timber, L, that would enable it to resist shot which might strike it at or nearly at a right angle.

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

1. The combination, with a piston fitted to the bore of a gun, of a powder-case and a supporting rod or stem for attaching said case to the said piston, substantially as and for the purpose herein described.

2. The combination, with a gun, of a temporary muzzle-valve fitted as a plug to the bore of the gun, and composed of a disk of wood or other material, with a central hole, and a cover of india-rubber or other soft water-tight material to close the said hole, substantially as herein described.

3. The combination, with a breech-loading gun, of a temporary muzzle-valve adapted to pass through the bore of the gun, and furnished with spring hooks or catches, which are also adapted to pass through the bore of the gun, but are capable of springing outward to engage with the muzzle thereof, substantially as herein described.

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Witnesses:
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