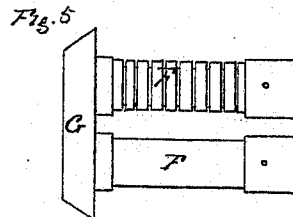
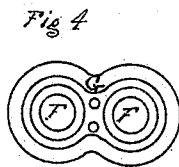
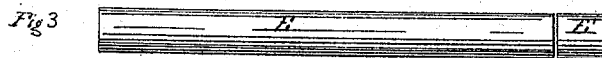
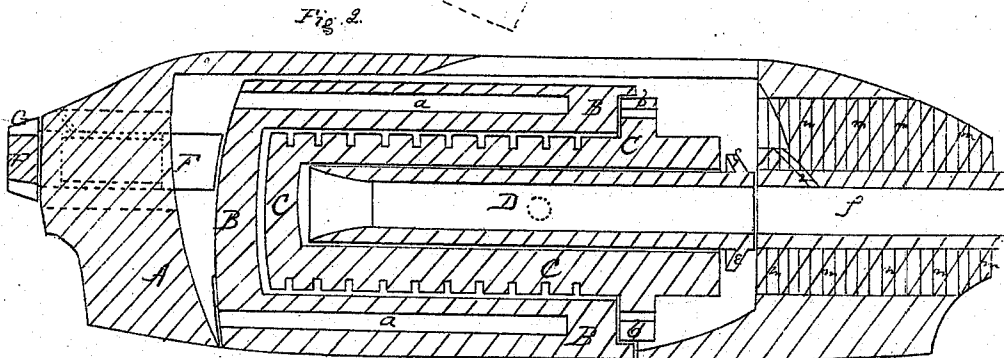
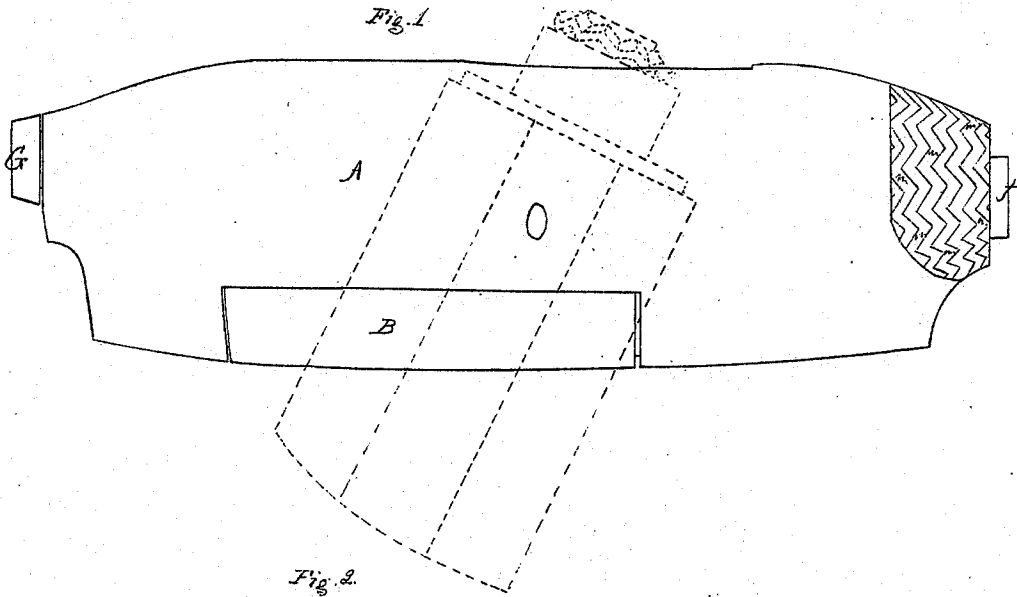


No. 121,455.

**DAN: FITZGERALD'S**  
**SUBMARINE CANNON OR MORTAR.**

2 Sheets--Sheet 1.

Patented Dec. 5, 1871.



Witnesses

*Harry King*  
*Joseph Over*

Inventor.

*Dan. Fitzgerald*  
*per Alexander Mason*  
*Att'y*

No. 121,455.

2 Sheets- Sheet 2.

DAN. FITZGERALD'S

SUBMARINE CANNON OR MORTAR.

Patented Dec. 5, 1871.

Fig. 6

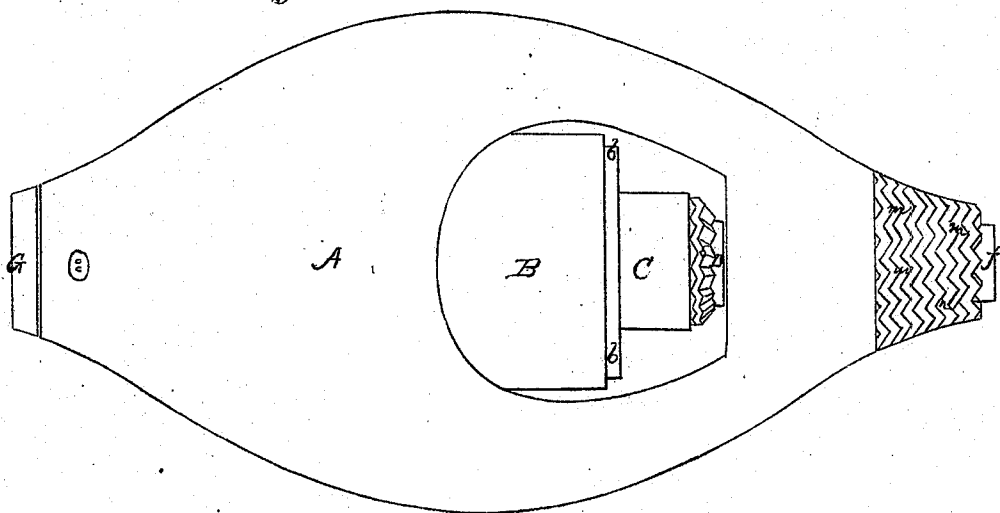
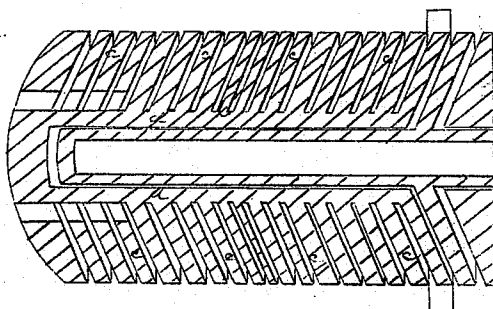


Fig. 7



Witnesses.

Harry King  
Lloyd Smith

Inventor.

Danl. Fitzgerald  
per Charles Mason  
Att'y.

# UNITED STATES PATENT OFFICE.

DANIEL FITZGERALD, OF NEW YORK, N. Y.

## IMPROVEMENT IN SUBMARINE ORDNANCE.

Specification forming part of Letters Patent No. 121,455, dated December 5, 1871; antedated December 2, 1871.

*To all whom it may concern:*

Be it known that I, DANIEL FITZGERALD, of New York, in the county of New York and in the State of New York, have invented certain new and useful Improvements in Submarine Cannon or Mortar; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing and to letters of reference marked thereon making a part of this specification.

The nature of my invention consists in the construction and arrangement of a vessel with one or more cannons or mortars, which will be partially submerged in water, and which can be made to throw shells or balls of different caliber.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawing which forms a part of this specification, and in which—

Figure 1 is a side view of the vessel. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a side view of a steel shaft, the use of which will be hereinafter fully set forth. Fig. 4 is a front view of the guns in the stern of the boat. Fig. 5 is a plan view of the same. Fig. 6 is a plan view of the vessel, and Fig. 7 is a longitudinal vertical section of the large cannon or mortar.

A represents a vessel of any suitable size and dimensions, having a hole or aperture in its bottom. In this aperture is placed a large mortar, B, which is hung on trunnions having their bearings in the sides of the vessel A. This mortar is so arranged that it can be turned on its trunnions so as to be horizontal, perpendicular, or at any angle desired; and when placed horizontally it will fill up and close the aperture in the bottom of the vessel.

Usually mortars or cannons of very large caliber have to be very thick so as to withstand the immense pressure from the inside; but if such a mortar or cannon were partially submerged in water the pressure of the water on the outside would counteract the pressure from the inside to some extent, and hence the mortar need not be of such great thickness. For this purpose I place the mortar B as above described, so that when it is to be fired at an angle its breech, and in fact the greatest portion thereof, will be submerged in water and the water itself receive the greatest portion of

the concussion. I may not hang the mortar on trunnions, but have it placed stationary at a certain angle, if so desired. It will be seen that in either case the vessel itself, so to say, becomes the gun-carriage, and as both the gun and the vessel are in the water the effect of the concussion will be greatly lessened. Besides this advantage the mortar is kept constantly cool, and as a consequence can be fired with greater rapidity and for a longer period than is usually the case. To increase this cooling effect of the water I may perforate the sides of the mortar longitudinally, either partially or clear through, forming a series of passages, *a a*, in or through the metal, as seen in Fig. 2. Such perforations will not, as might be supposed, impair the efficiency of the gun.

If it is desired to use smaller projectiles another cylinder, C, may be inserted in the mortar B. This cylinder I cut with circular grooves its entire length, or place hoops or rings around the same at suitable distances apart, and provide with a lip or flange, *b*, which extends over the upper edge of the mortar B, the main portion of the cylinder projecting above the same. Water is admitted between the mortar and cylinder, whereby the strength of both these concentric cylinders is consolidated and combined, and, at the same time, it keeps the inner cylinder cool.

In Fig. 7 I have represented the cylinder C with a series of concave circular grooves and rings, *c c*, put around the outside of a cylinder, *d*, which thus increases the strength of the gun, as the strain has a tendency to go off in two directions; and, besides, when the gun is immersed in water it will become cooled a considerable distance into the metal. I also provide a steel tube, D, which may be smooth or rifled, and is inserted into the cylinder C, its rear end being enlarged, as seen in Fig. 2, so as to form a chamber for the powder. The tube D extends beyond the front end of the cylinder C, and is, at its mouth, provided with an elastic steel ring, *e*, which rests against the outer end of the cylinder C. The size of the mortar B, cylinder C, and tube D should be such that when the mortar is placed horizontally the mouth of the tube D shall be flush up against the end of the vessel—that is, against the inner front side of the cavity in which the mortar is placed. Through the bow of the vessel is placed a steel tube, *f*, in such a manner as to form a continuation of the

tube D, so that any projectile fired from the tube D will pass through the tube *f* and out at the bow of the vessel.

The tube *f* may be used alone as a gun, in which case I insert a shaft, E, Fig. 3, of steel or other suitable material, in the tube D, the front end of said shaft being even with the mouth of the tube. In the inner end of the tube *f* is inserted a plug or block, E', which forms the breech of the gun, and is supported by the shaft E. A vent-hole, *i*, is then also provided. In the stern of the vessel are made two cylindrical openings, in which are inserted two guns, F F. These guns are made thicker or provided with rings or bands around the mouth and breech of such size as to fit exactly in the cylindrical openings in the vessel, while the center of the guns has a chamber or space around it, which is filled with water through an aperture in the upper side of the vessel. The guns F F may also have grooves, as seen in Fig. 5, for the same purpose as above described for the cylinder C. Around the mouths of the guns F F is placed a block, G, which connects the two guns together, and, being secured to the stern of the vessel, holds the guns securely in position.

It will be understood that I may use as many guns or cylinders, one inside the other, as may be desired, having water between them, and not confine myself to the specific number above mentioned.

It is well known that heavy guns, which must be of great thickness, are very liable to crack and burst; but by combining a series of guns, one inside of the other, and the interstices filled with water, I get all the advantages of a solid gun of the combined thickness without the danger of bursting, as the water tends to consolidate and combine all the thicknesses and, at the same time, keeps it cool. Safety-valves are of course placed at convenient points, as well as inlet and outlet-tubes, so that any steam that might possibly be generated may escape, and so that the water can be drawn off and replenished again. Another advantage of making a heavy gun in this manner, so to say, in sections, is that it can be far easier transported than if it was in one solid piece. The gun which I have represented in Fig. 7, having a series of conical or concave rings, may be used without water; and these rings may be of almost any shape desired—the more conical the better—and answer all the purposes of a solid gun of the same thickness, with the additional advantage of there being no danger of bursting, as the expansion of the metal tube has free room to go off without any injury to the outer circumference. These

guns may then also be used as field-pieces, or be placed in some stationary battery, in which latter case I may also surround it by water, if so desired.

When the gun is placed horizontally in the vessel the breech should come directly against the rear side of the cavity in which the gun is placed, thus taking off all effects of the concussion from the trunnions. When the gun is placed at an angle and consequently submerged in water, then the water receives a great part of the concussion, relieving the trunnions.

The gun or tube *f* in the bow of the vessel is surrounded by a series of rings, *m m*, made of steel or other suitable material. These rings are made in kind of zigzag shape, as shown in Fig. 1, and slipped over the gun and fastened together in any suitable manner, forming a part of the vessel, and may be of any diameter desired, so as to form, in fact, a gun of enormous thickness. The rings *m m*, being of the peculiar shape above mentioned, will allow for any expansion of the gun itself without any danger of breaking or bursting.

I am aware that guns have been made of a series of straight rings secured together; hence I do not claim such to be my invention.

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

1. The mortar B, hung on trunnions or stationary in the bottom of the vessel A, so as to be partially submerged in water while it is being discharged, substantially as and for the purposes herein set forth.

2. In combination with the mortar B, the cylinder C, constructed as described, and the space between the two filled with water, substantially as and for the purposes herein set forth.

3. The combination of the mortar or gun B, one or more cylinders, C, and the tube D, provided with a zigzag or corrugated flange, E, all constructed substantially as specified.

4. The arrangement, with the vessel A, of the mortar or gun B, one or more cylinders, C, and the perforated bow *f*, forming an elongation of the gun, all substantially as set forth.

5. The gun herein described, composed of a series of conical or zigzag rings surrounding a central core, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 22d day of April, 1869.

DANIEL FITZGERALD.

Witnesses:

LEOPOLD EVERT,  
A. N. MARR.

(105)