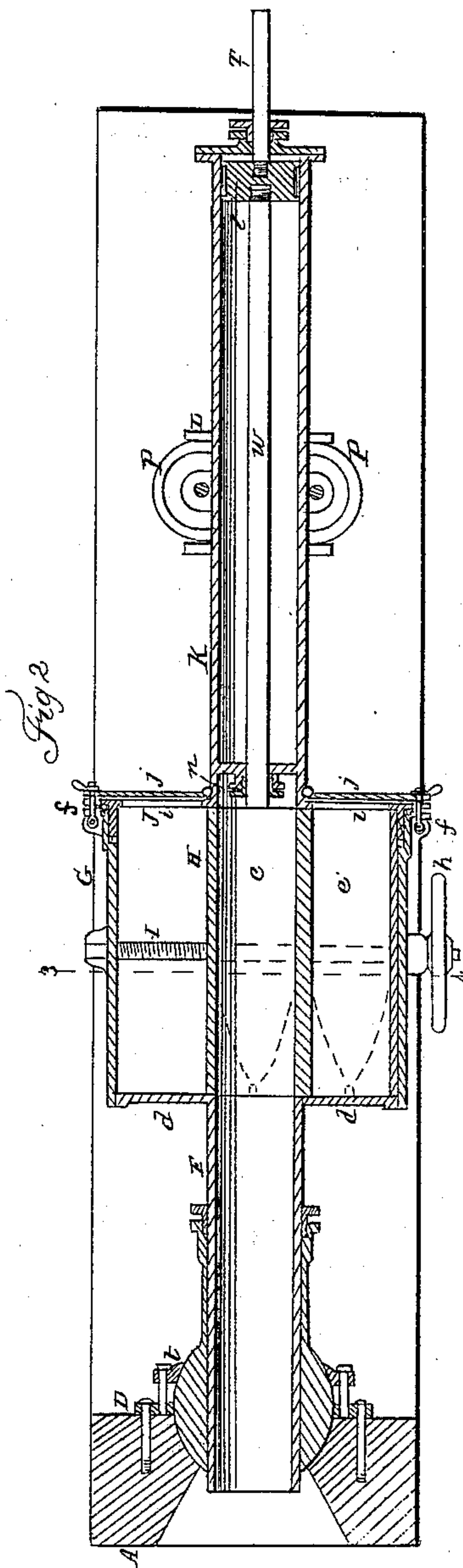
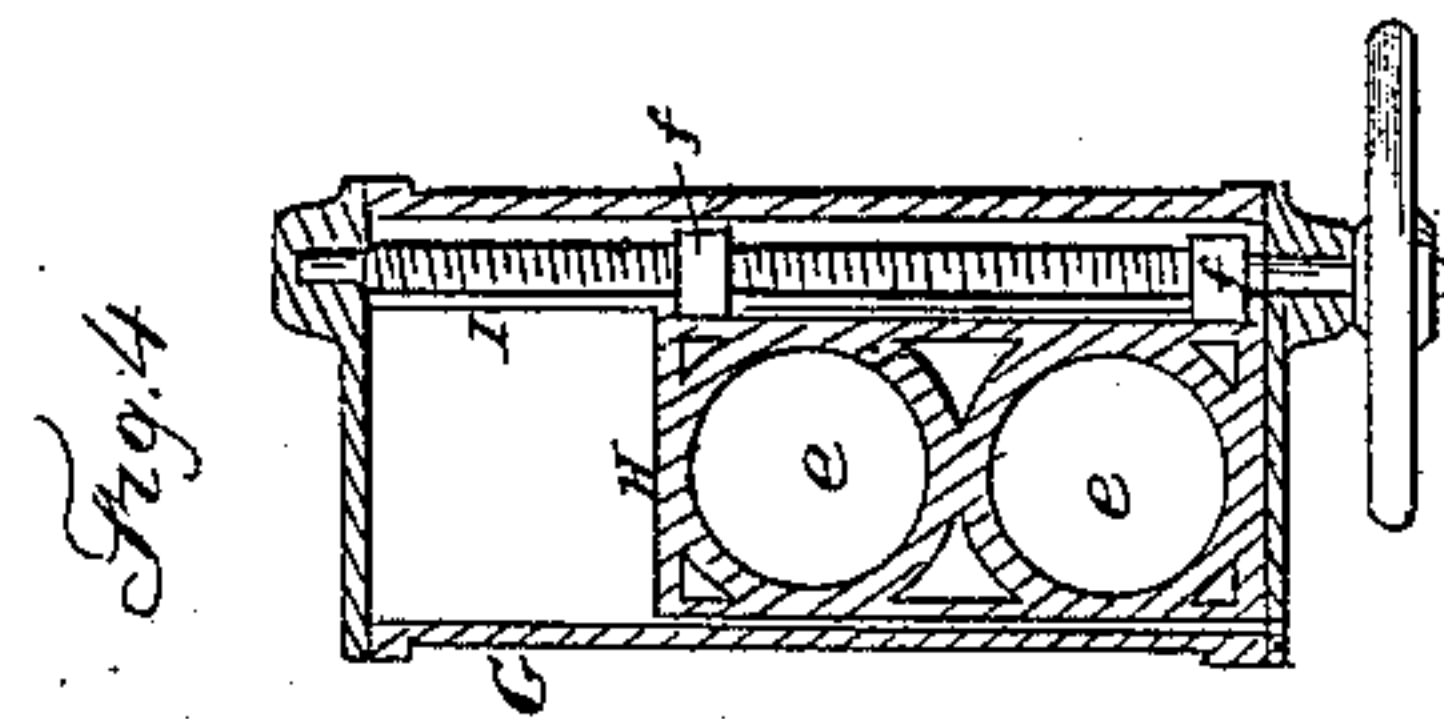
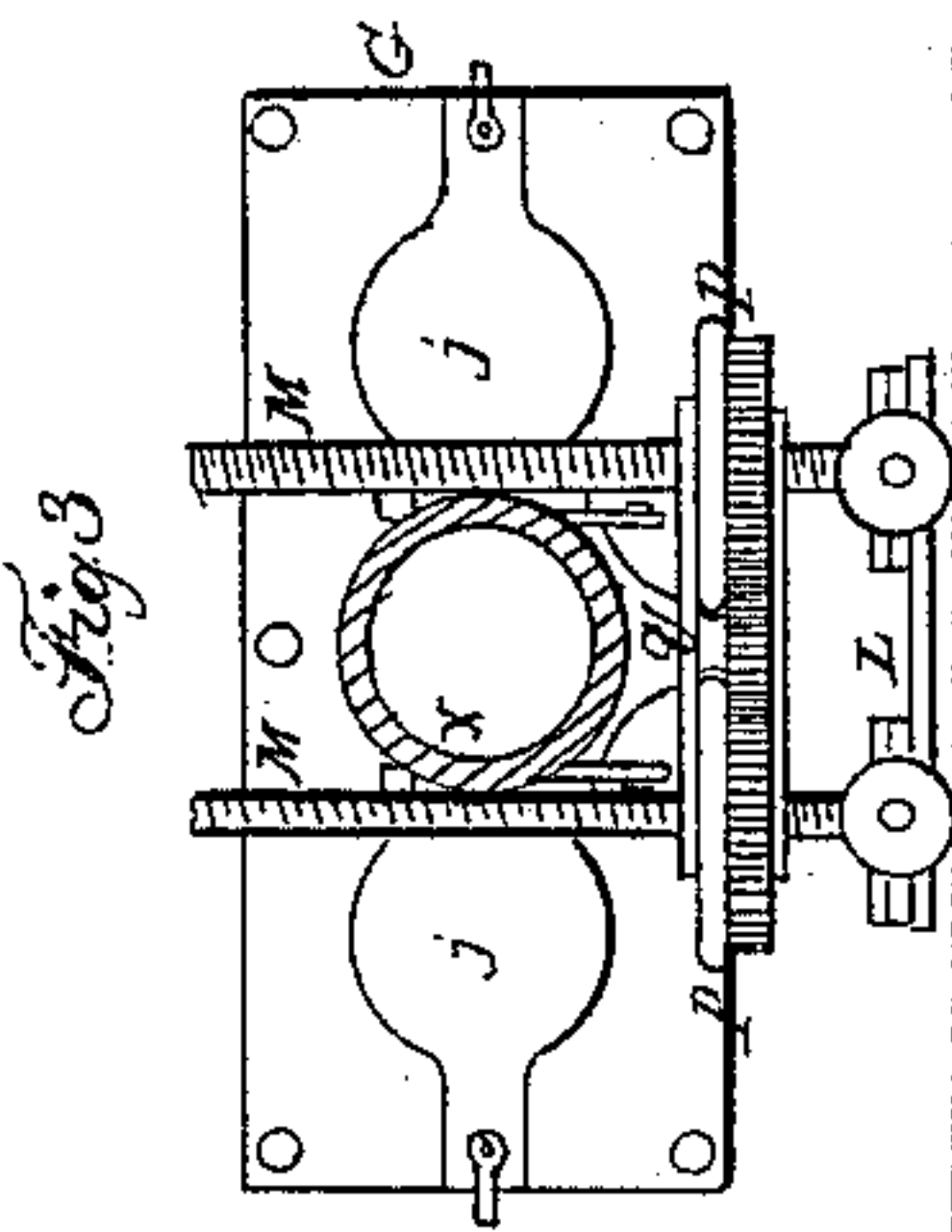
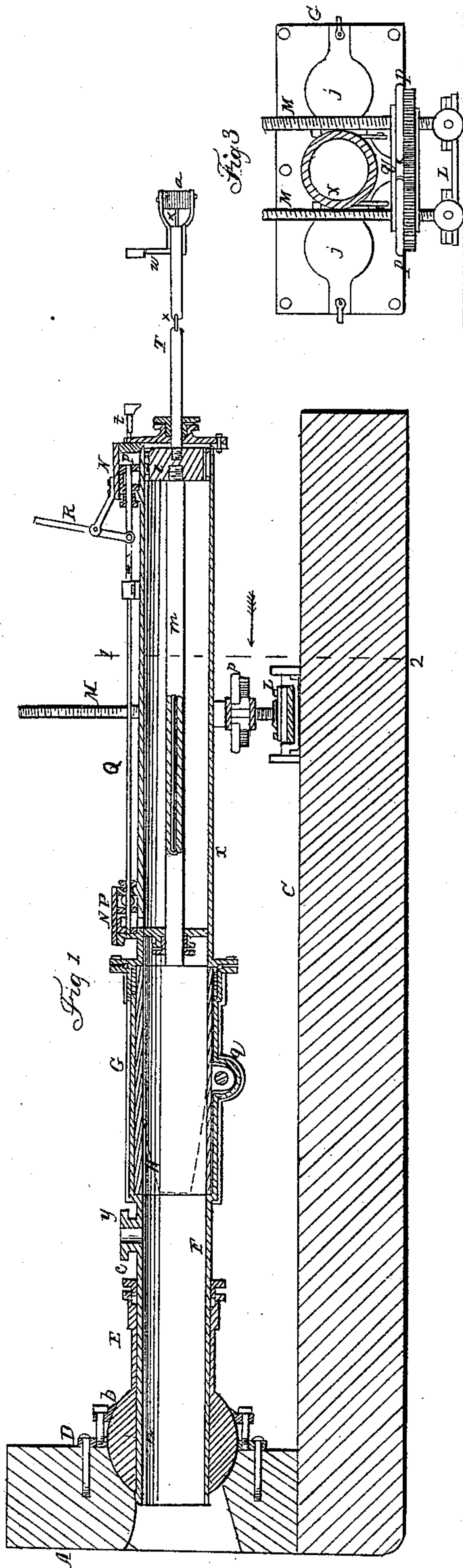


WOOD & LAY.

Marine Torpedo.

No. 48,862.

Patented July 18, 1865.



Witnesses
Mr. Albert Steel
Charles Howson

UNITED STATES PATENT OFFICE.

WM. W. W. WOOD, OF PHILADELPHIA, PENNSYLVANIA, AND J. L. LAY,
OF BUFFALO, NEW YORK.

IMPROVED SUBMARINE STEAM-GUN.

Specification forming part of Letters Patent No. 48,862, dated July 18, 1865.

To all whom it may concern:

Be it known that we, W. W. W. WOOD, chief engineer United States Navy, and JOHN L. LAY, first assistant engineer United States Navy, have invented a Submarine Steam Shell-Gun; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Our invention consists of machinery and apparatus, fully described hereinafter, for projecting shells from vessels into and through the water by the pressure of steam, the machinery being so constructed that shell after shell can be projected with the greatest rapidity and at any desirable angle.

In order to enable others to make and use our invention, we will now proceed to describe its construction and operation.

On reference to the accompanying drawings, which form a part of this specification, Figure 1 represents a vertical section of the steam shell-gun; Fig. 2, a sectional plan of the same; Fig. 3, a transverse section on the line 1 2, Fig. 1, looking in the direction of the arrow; and Fig. 4, a transverse section on the line 3 4, Fig. 2.

Similar letters refer to similar parts throughout the several views.

A represents part of the stern-post of a vessel, and C the keelson. To the inside of the stern-post is secured a plate, D, having an opening for the reception of the spherical end *a* of a pipe, E, which is confined by an annular plate, *b*, and suitable bolts to the said plate D, a ball-and-socket joint being thus formed. Within the pipe E a tube, F, is arranged to fit snugly a follower, *c*, with suitable packing, forming a perfectly tight joint. The tube F terminates at the rear in plates *d d*, Fig. 2, which form the front of a box, G, the latter being much wider than it is high, as best observed on reference to Fig. 4. In this box G fits the sliding piece, or, as we call it, the "trunk," H, having two cylindrical compartments, *e* and *e'*, each of which is of a proper diameter to receive the shell, and either of which can, by moving the said trunk, be made to coincide with the tube F. Two lugs, *f f*, Fig. 4, project from the under side of the trunk, the box G being enlarged at *g* for their recep-

tion, these lugs serving as nuts for a screw, I, which turns in the opposite sides of the box, and which is furnished at one end with a suitable hand-wheel, *h*. A plate, J, forms the rear of the box G, and the steam-cylinder K forms part of or may be attached to this plate, the cylinder being in line with the tube F.

In the plate J are two circular openings, *i*, one on each side of the steam-cylinder, and each opening is provided with a door, *j*, hinged to the plate at one side and confined by a bolt, *f'*, at the other, the bolt being so hinged to a lug on the box G that it can (after its nut is loosened) be moved away from the door, leaving the latter at liberty to be opened.

The steam-cylinder, which extends to a considerable distance beyond the rear of the box G, is provided with a suitable piston, *l*, and piston-rod *m*, the latter passing through a stuffing-box, *n*, situated in a recess of the plate J of the box G.

Midway or thereabout between the opposite ends of the steam-cylinder, and situated beneath the same, is a truck, L, having wheels which are arranged to run in a track formed in the bottom of the vessel, this track being in the form of a segment of a circle of which the ball-joint at the stern is the center. To this truck are hinged the lower ends of two screws, M M, the nuts of which consist of the hubs of hand-wheels *p p*, which are confined to a cross-bar, *q*, the latter having projections which are jointed to lugs on the under side of the steam-cylinder. On each end of this cylinder is a suitable valve-chest, N, containing a slide-valve for admitting steam to and permitting it to escape from the cylinder-valve P, the two valves being connected together by a rod, Q, which can be controlled by the hand-lever R, and which is connected to a projecting rod, *t*, at the rear of the cylinder.

The piston *l*, in addition to its internal rod, *m*, is provided with an external rod, T, and on the latter is a projection, *w*, for striking the rod *t* of the valve-rod under the circumstances described hereinafter. A hole extends through both piston-rods and through the piston *b*, for the reception of the cord *x*, by which the charge of the shell is exploded, the rear end of the cord being coiled round a roller or spool, *a*, at the end of the external piston-rod.

From the tube F projects a bracket, Y, to

which is connected a hose or other pipe communicating with an air-pump.

The shell used in this apparatus is similar to that for which Letters Patent were allowed us on the 25th day of August, 1864, the rod which is attached to the friction-primer in the shell being also secured to the outer end of the rope *x*.

Operation: As seen in Figs. 1 and 2, the moving parts are in proper position preparatory to the discharge of a shell, which is contained in the compartment *e* of the movable trunk *H*, the end of the piston-rod *m* bearing against the rear of the shell, and the cord for discharging the same passing from the discharging-rod of the shell through the piston-rod to the roller or spool *a*, round which it is wound. The attendant, by means of the lever *R*, so operates the valves that steam is admitted into the cylinder *K* at the rear of the piston *l*, which is thus projected suddenly forward, causing the piston-rod *m* to drive the shell from the compartment *e* of the trunk through the tube *F*, and through the stern of the vessel into and through the water toward the vessel or other object against which it is intended to act. After the shell has been thus projected from the vessel it will rise through its own buoyancy and come in contact with the object to be acted on. It can then be discharged by simply pulling the cord which is wound round the pulley *a*, thereby withdrawing the rod from the shell and pulling the wire of the friction-primer; or the shell may be made self-discharging by regulating the length of the cord, for as soon as the shell passing through the water has withdrawn all the cord from the pulley *a* and the cord becomes tight the friction-primer must be acted on.

It should be understood that when the shells have to be projected through the tube *F* the latter is maintained clear of water by compressed air forced through the branch *Y*; otherwise the water contained in the tube would seriously impede the progress of the shell, and might cause it to become jammed in the tube. Before the piston *l* reaches the front end of the cylinder the projection *w* on the piston-rod *T* comes in contact with the projection *t*, which is connected to the valve-rod *Q*, and so operates the valves that steam is admitted to the front end of the cylinder and forms a cushion which arrests the forward movement of the piston, the steam forcing the piston back to the rear of the cylinder.

During the time the above-described operations are in progress the compartment *e'* of the

trunk *H* has been in position to receive another shell, the introduction of which can be readily accomplished after opening the door *j*, the door being closed after the introduction of the shell.

By operating the screw *I* the trunk *H* is moved to the opposite end of the box *G*, so that the compartment *e'*, with its new shell, shall coincide with the tube *F*, when this shell is in position to be projected into and through the water in the manner described, and the compartment *e*, from which the shell has been previously projected, is in a position to receive a new shell. It will thus be seen that shell after shell can be projected with great rapidity.

When the shells have to be projected at an angle downward the screws *M M* are so operated as to elevate the rear of the apparatus until the latter has assumed the desired angle, and when the shells have to be projected at an angle laterally the entire apparatus can, through the medium of the trunk *L*, be moved laterally by suitable tackle.

We claim as our invention, and desire to secure by Letters Patent—

1. Projecting submarine shells from vessels by means of a steam-cylinder and piston and piston-rod acting against the rear of the shell, substantially as described.

2. The cylinder, in combination with the tube *F*, through which the shells are forced by the piston-rod of said cylinder, substantially as specified.

3. The combination of the tube *F* with the pipe *E* and the ball-joint, substantially as set forth.

4. The moveable trunk *H*, constructed and arranged in respect to the steam-cylinder and discharge-tube *F*, substantially as set forth.

5. The combination of the said movable trunk with the box *G* and its doors *j*, substantially as specified.

6. The combination of the pipe *E* and its spherical end *a*, the pipe *F*, the box *G*, its trunk *H*, and steam-cylinder *K* with the trunk *L* and elevating-screws *M M*.

7. The spool or roller *a*, arranged at the end of the external piston-rod, for receiving the discharge-cord.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WM. W. W. WOOD.
JOHN L. LAY.

Witnesses:

W. H. FIELD,
C. A. JACKSON, Jr.