J. L. Lay. Sheet 1, 2 Sheets.

Submarine App's.

No. 46,850. Patented Mar. 14, 1865.

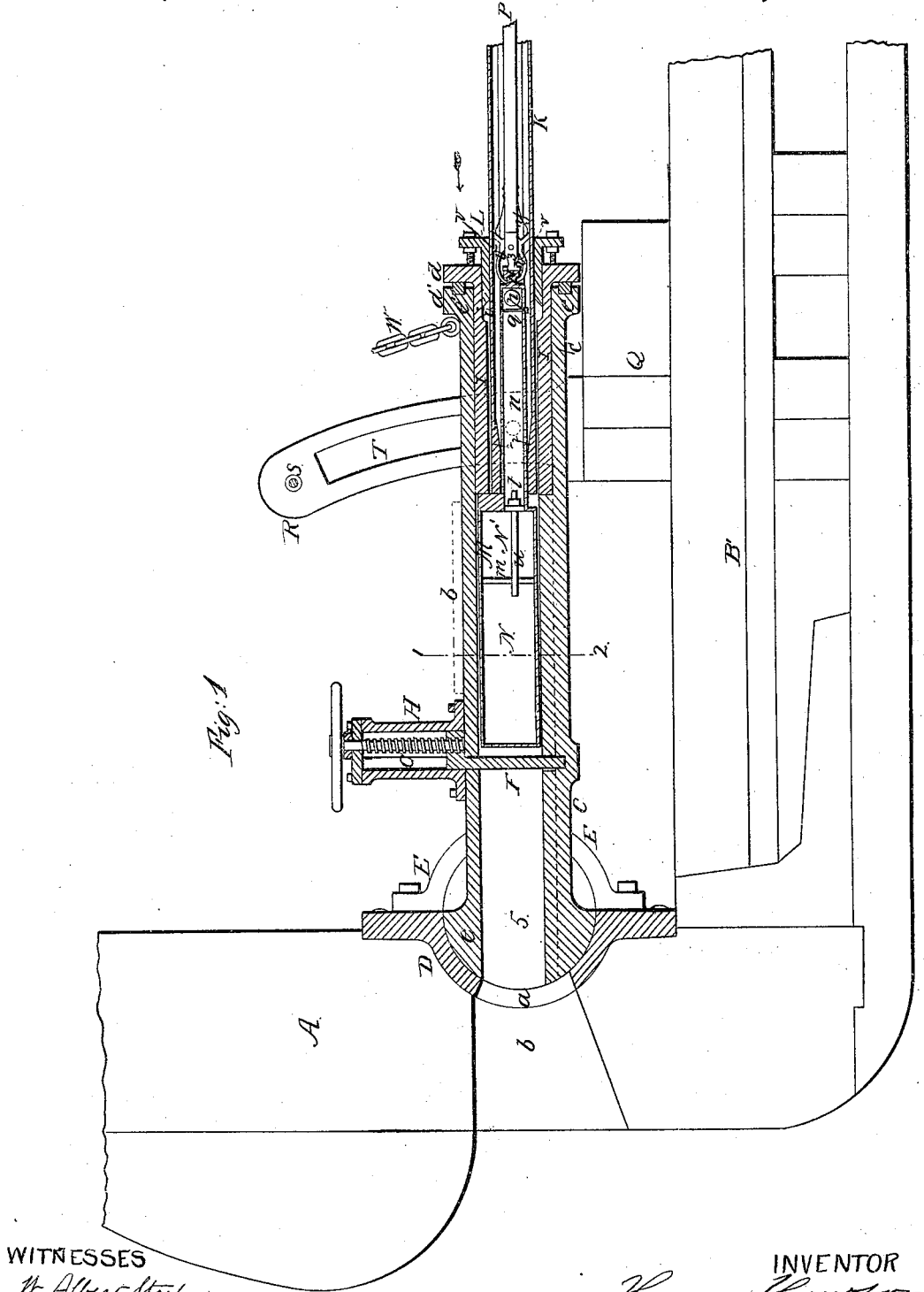

Fig. 1

WITNESSES

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J. L. Lay. Sheet 2, 2 Sheets.

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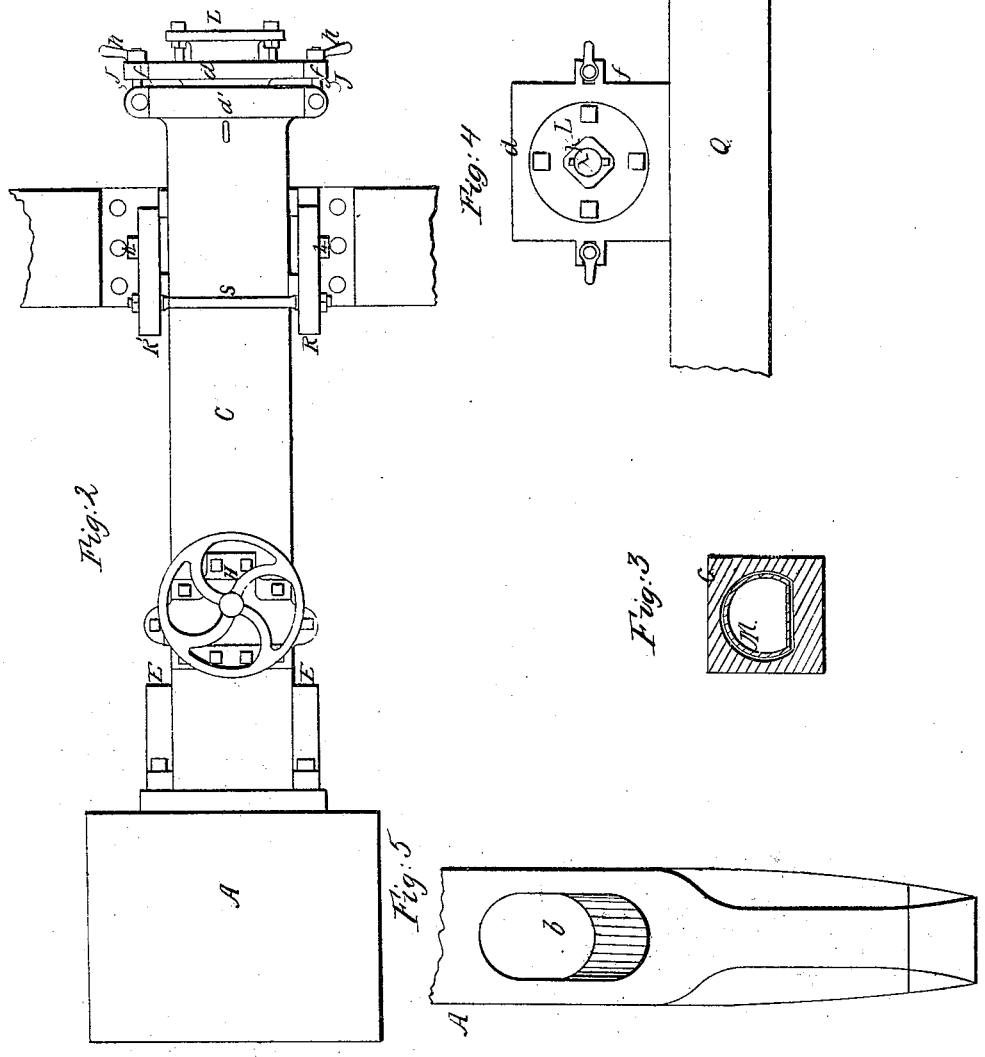

WITNESSES

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UNITED STATES PATENT OFFICE.

JOHN L. LAY, OF BUFFALO, NEW YORK, ASSIGNOR TO HIMSELF AND W. W. W. WOOD, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO DONALD McKAY, OF EAST BOSTON, MASSACHUSETTS.

IMPROVED APPARATUS FOR OPERATING TORPEDOES, &c.

Specification forming part of Letters Patent No. **46,850**, dated March 14, 1865.

To all whom it may concern:

Be it known that I, JOHN L. LAY, first assistant engineer, United States Navy, have invented certain Apparatus for Operating Submarine Shells or Torpedoes; and I 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.

My invention consists of certain apparatus, fully described hereinafter, for so projecting from a vessel and submerging shells or torpedoes that they may be exploded without danger to the apparatus itself, the vessel from which the operations are conducted, or to those whose duty it is to manage the operations.

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

On reference to the accompanying drawings, which form a part of this specification, Figure 1 is a vertical section of part of a vessel with my apparatus for operating submarine shells or torpedoes; Fig. 2, a plan view of the apparatus; Fig. 3, a transverse section of part of the apparatus on the lines 1 2, Fig. 1; Fig. 4, an end view of Fig. 1, looking in the direction of the arrow; and Fig. 5, an end view of the stem of the vessel.

Similar letters refer to similar parts throughout the several views.

A represents part of the stem-post of the vessel to which my apparatus is applied, and B the bottom of the vessel, composed of ribs, knees, and other timbers firmly secured and of a strength greater than that of ordinary vessels. To the inside of the stem-post A is secured a plate, D, adapted to receive the semicircular end *e* of the pipe C, there being in the plate an opening, *a*, communicating with the opening *b* in the stem-post and with the interior of the pipe C. The semicircular end *e* of this pipe is securely confined to the plate D by straps E in such a manner that the rear end of the pipe can be raised and lowered at pleasure, its end *e* turning freely in the plate, and the joint at this point being perfectly tight, so as to prevent the access of water to the interior of the vessel. At a short distance from the stem-post, and in the pipe C, is arranged a sluice-valve, F, which, by the aid of a screw, G, can be raised and lowered at pleasure, the valve when raised being contained in a water-tight chamber, H, and when depressed forming a water-tight obstruction in the interior of the pipe. In the rear end of the pipe C an internal pipe, I, fits snugly, but so as to be withdrawn readily, and between the flange *d* of this internal pipe and the flange *d'* on the end of the pipe C intervenes a water-tight packing, *e'*, of gum-elastic or other suitable material. The flange *d'* is secured to the flange *d* by means of bolts J, each bolt being hinged at one end to the flange *d*, and the other end passing through an opening in a lug, *f*, on the flange *d*, on the outside of which each bolt is furnished with a handled nut, *h*, after loosening which the bolts may be turned outward, leaving the internal pipe, I, at liberty to be withdrawn from the external pipe, C.

K represents part of a hollow stem of wrought-iron, which is arranged to pass through and slide freely in the internal pipe. I, and through the gland or follower L, which, together with the packing *i*, forms a stuffing-box of the ordinary construction. I prefer to make this stem of a square form with the sharp corners removed, as seen in Fig. 4.

The submarine shell or torpedo consists of a hollow cylinder, M, of plate-iron, the cylinder being flattened at one part of its circumference, as seen in Fig. 3, and this flattened part resting on a plane-surface formed in the interior, and at the bottom of the pipe C, theshell being thus prevented from turning round in the said pipe. The interior of the cylindrical casing M is separated by a wad or diaphragm, *m*, into two compartments, N, and N', in the former of which is packed the gunpowder or other explosive substance, the chamber N' forming an air-space. At one end of the cylinder M is a tube, *n*, which fits into the hollow stem K, and at the end of this tube a spherical weight, *p*, is confined by a pin, *q*, the weight, when the pin is released and the shell occupies a vertical position in the water, falling and striking a cap loaded with detonate and placed on a nipple, *t*, the hole in which communicates through a small tube, *n*, charged with powder, with the charge in the chamber N of the shell.

In the interior of the hollow stem K is a rod, P, near the end of which are hinged the levers *v v*, the bent arms of the latter forming jaws, in which is confined a projection at the outer end of the tube *n* of the shell. The inclined arms of the levers *v v* are arranged to fit in longitudinal grooves *x x* in the hollow stem K, and are so acted on by springs *y y* that they grasp the said projection *w* of the tube *n* until, by moving forward the rod P, the inclined arms of the levers *v v* come in contact with the inclined terminations 2 of the grooves *x x* in the hollow stem, when the jaws open and release the projection *w*. It will be seen that the extreme end 3 of the rod P bears against the end of the said projection.

When the apparatus is at rest, it is supported by strong timbers Q, secured to the bottom of the vessel, and to these timbers are secured the two curved guides R and R′, connected together at the top by a cross-bar, *s*, these guides having openings T arranged in the arc of a circle, the center of which coincides with the center 5 of the semicircular end of the pipe C. From each side of this pipe projects a pin, 4, which passes through a block, the block of one pin being arranged to fit into the opening T of the guide R, and that of the other pin into the opening of the guide R′. It will thus be seen that the guides maintain the pipe *c* and its appurtenances in the proper position laterally, and serve to guide the pipe while it is moved in the plate or socket D.

As seen in the view Fig. 1, the shell or torpedo has been placed in its proper position prior to being projected from the vessel and discharged. The sluice-valve F having been raised, the rear end of the pipe C, together with all the above-described appliances connected therewith, is elevated by means of a chain, W, and suitable hoisting-gear operated by a steam-engine or otherwise until the pipe has reached the desired angle. The hollow stem K is then pushed forward by the aid of any suitable tackle and gearing, and carries before it the shell or torpedo, pushing the same through the pipe C, through the opening *a* in the plate D, through the opening *b* in the stem of the vessel, and submerging the shell in the water at a point adjacent to the vessel to be destroyed.

When the shell has been submerged to the desired depth, it becomes necessary to release it from the hollow stem K, which is accomplished by pushing the rod P forward through the stem K until the levers *v* of the jaws come in contact with the inclined terminations 2 2 of the grooves *x* in the stem, when the jaws will open and release the projection *w* on the tube *x* of the shell, which tube had been pushed from the hollow stem by the operation of the rod P. The moment the shell has been thus released from the hollow stem the latter is moved back into the pipe C. In the meantime the shell assumes a vertical position, and, being rendered buoyant by the air-space N′, rises and comes in contact with the keel or side of the vessel to be destroyed. The moment this contact takes place the charge of the shell should be ignited, which is accomplished in the present instance by a cord attached to the pin *q*. This cord being pulled withdraws the pin and permits the spherical weight *p* to fall on the cap previously placed on the nipple *t*, and thus discharges the shell while it is in contact with the vessel or other object to be destroyed.

One end of the cord for withdrawing the pin *q* may be attached to the hollow stem K, or to the rod P, the cord being so arranged that by and during the act of moving back the stem the pin may be withdrawn and the charge of the projectile ignited. The cord, however, should be of such a length that the explosion of the shell cannot take place until the hollow stem and its internal rod, P, have been withdrawn into the pipe C, and are too far away from the shell to be endangered by the explosion.

When another shell has to be projected from the apparatus and submerged, the sluice-valve F is closed so as to prevent the access of water to the interior of the pipe C, the nuts *h h* are loosened, and their bolts J turned away from the flange *d* of the pipe I, which is withdrawn from the pipe C, the stem K and rod P being also drawn back, thus leaving the pipe C open at the rear end. The tube *n* of the shell is then placed in the hollow stem K, the jaws seizing the projection *w*, and the shell, hollow stem K, its rod P, and the pipe I moved forward, the shell being pushed into the pipe C, followed by the pipe I, until the whole of the parts again assume the position shown in Fig. 1, after which the flange *d* of the pipe I is secured to the flange *d′* of the pipe C, the sluice-valve F raised, the rear of the pipe C, with all appliances connected to the same, elevated so that the torpedo may be projected into the water at the desired angle, when the apparatus is again ready for carrying out the above-described operations.

The introduction of the shell into the pipe C can be effected without the preparatory removal of the pipe I by making a suitable opening in the top of the pipe C and providing the same with a detachable water-tight cover, (shown by dotted lines, Fig. 1,) the shell being introduced into this opening, fitted to the hollow stem K and to the jaws of the rod P, while the sluice-valve is depressed, and the cover 5 being replaced prior to the raising of the sluice-valve.

In operating the above-described apparatus it will be seen that as the sluice-valve prevents the entrance of water to the pipe C, and as the rear end of the pipe is packed perfectly tight, no inconvenience can arise from leakage, the latter under any circumstances being too small to present any impediment to the operations, and whatever small quantity of water there may be in the pipe C at the rear of the valve F flows from the same into

the bottom of the vessel when the rear of the pipe is exposed.

The pipe C may be fixed in a horizontal or inclined position, although I prefer to make it movable in the manner described, as the shells may have to be submerged to a greater depth on some occasions than is necessary in others.

It will be seen without further description that by the aid of the above-described apparatus the shells can be projected, submerged, and discharged at brief intervals without any danger to the apparatus itself, to the operators, or to the vessel from which the operations are conducted.

I may remark here that the shells, briefly described above, have been designed by Chief Engineer W. W. W. Wood, United States Navy, and myself, for concentrating the force of the explosion and directing that force in the proper course, the effect of the explosion being thus entirely confined to the object to be destroyed.

The construction and operation of this improved shell have been too fully described in a separate application for a patent to need minute description here.

I claim—

1. The pipe C, arranged to receive and to act as a guide for the shell, in combination with a stem or rod for pushing the shell through the said pipe, all substantially as set forth.

2. The plate or socket D and straps E, secured to the vessel, and arranged for the reception and retention of the end of the pipe C, substantially as described.

3. The internal pipe, I, adapted to the reception of the operating-bar K, and arranged for attachment to and withdrawal from the pipe C, substantially as described, for the purpose specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN L. LAY.

Witnesses:
JOHN WHITE,
CHARLES HOWSON.