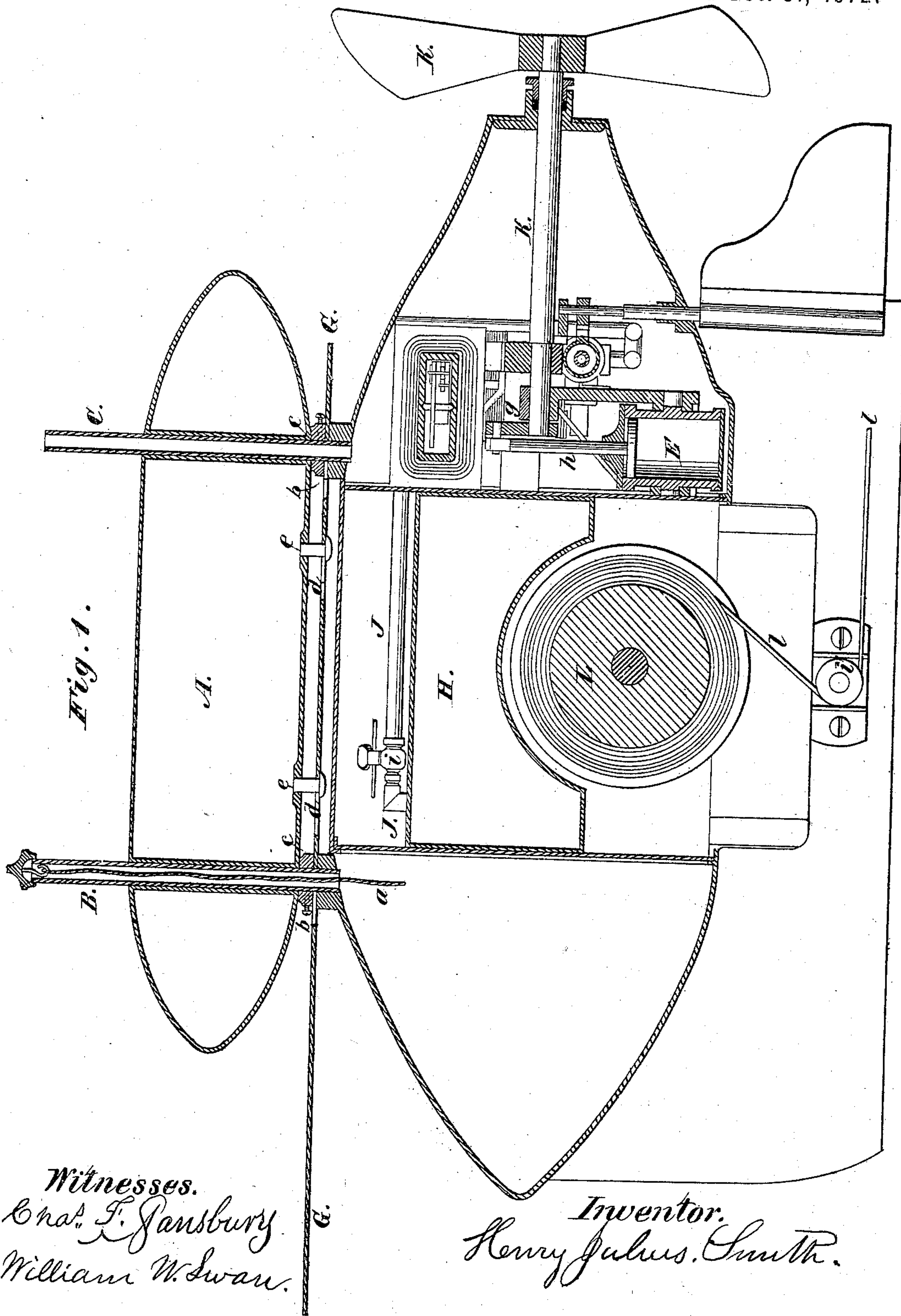


H. J. SMITH.
Submarine Torpedoes and Boats.
 No. 134,493. Patented Dec. 31, 1872.



Witnesses.
 Chas. F. Jansbury
 William W. Swan.

Inventor.
 Henry Julius Smith.

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Submarine Torpedoes and Boats.

2 Sheets--Sheet 2.

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Fig. 2.

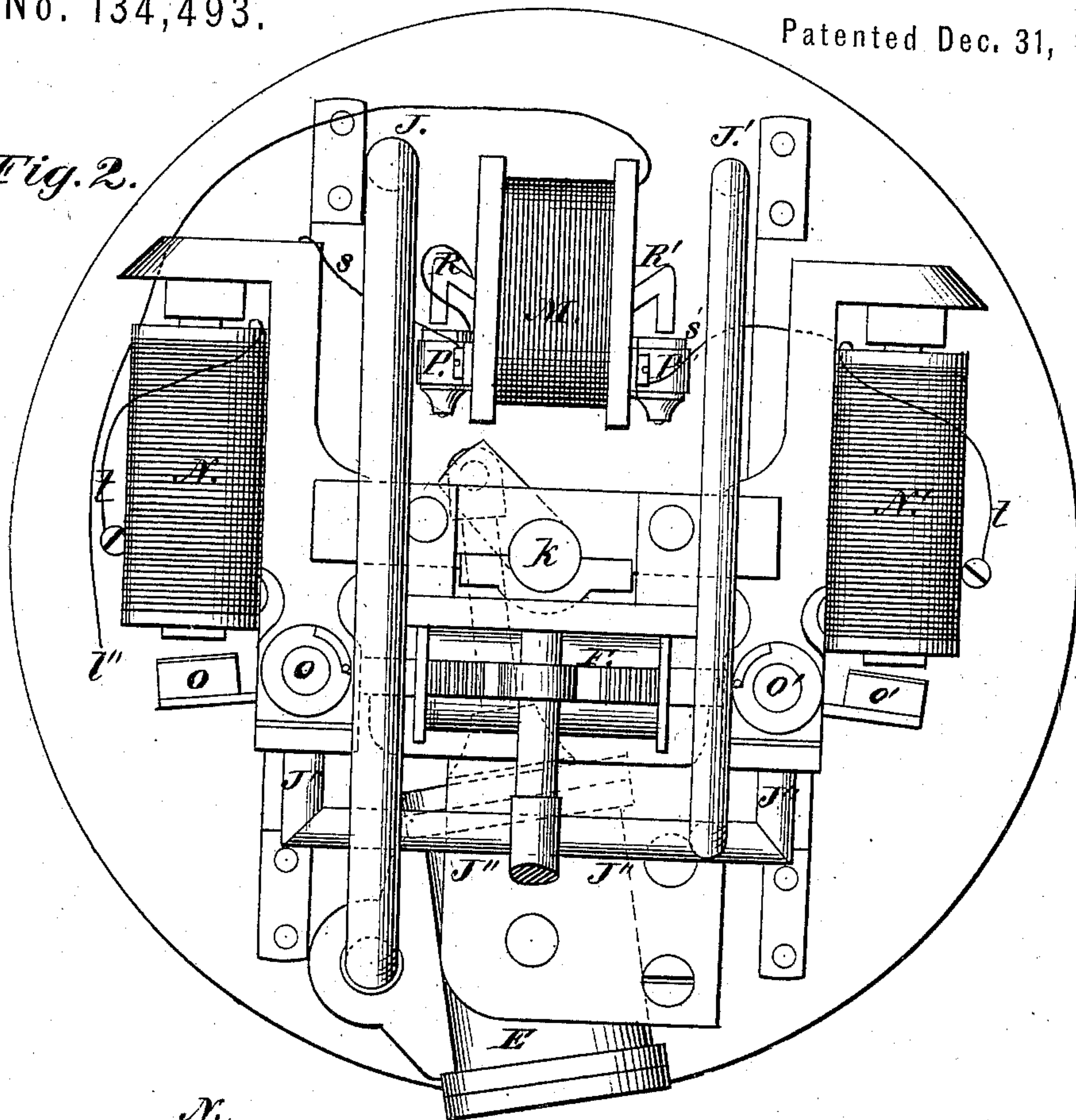


Fig. 3.

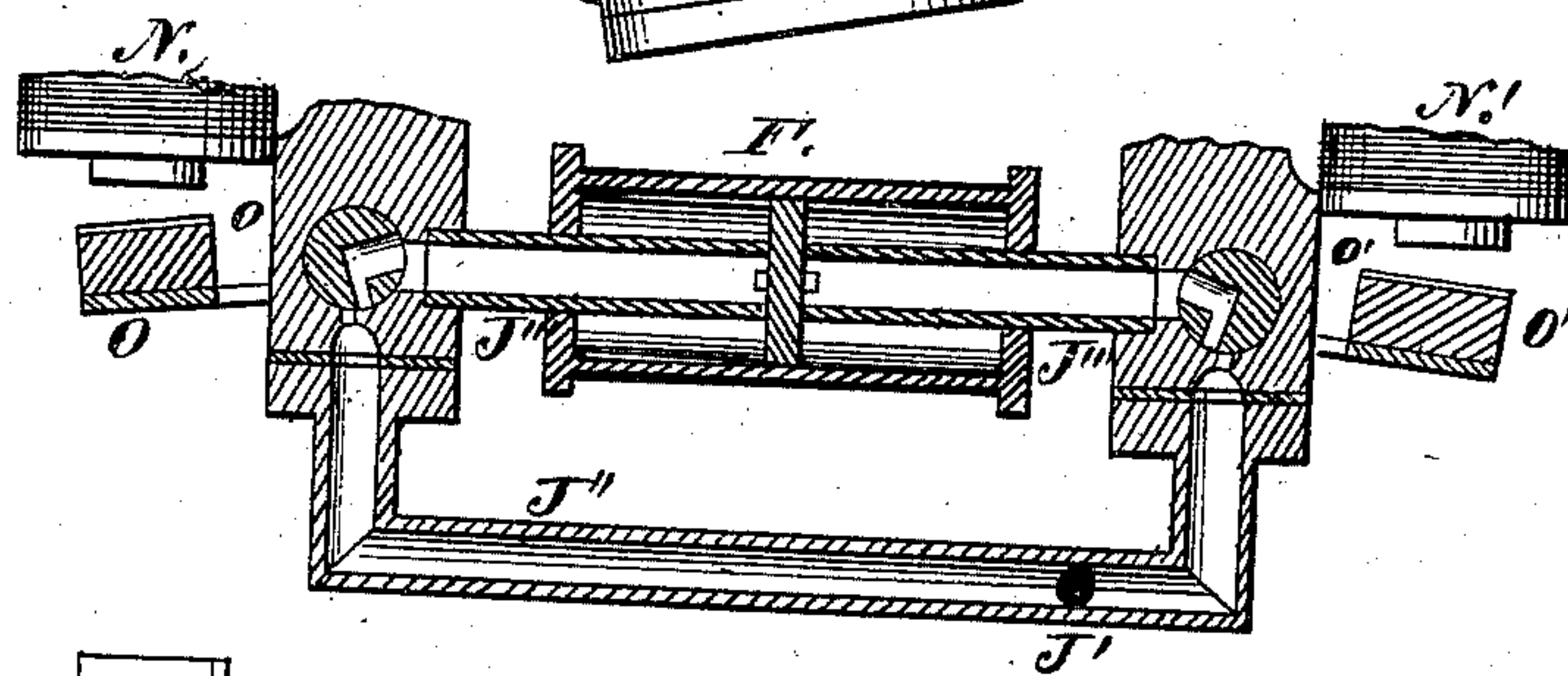
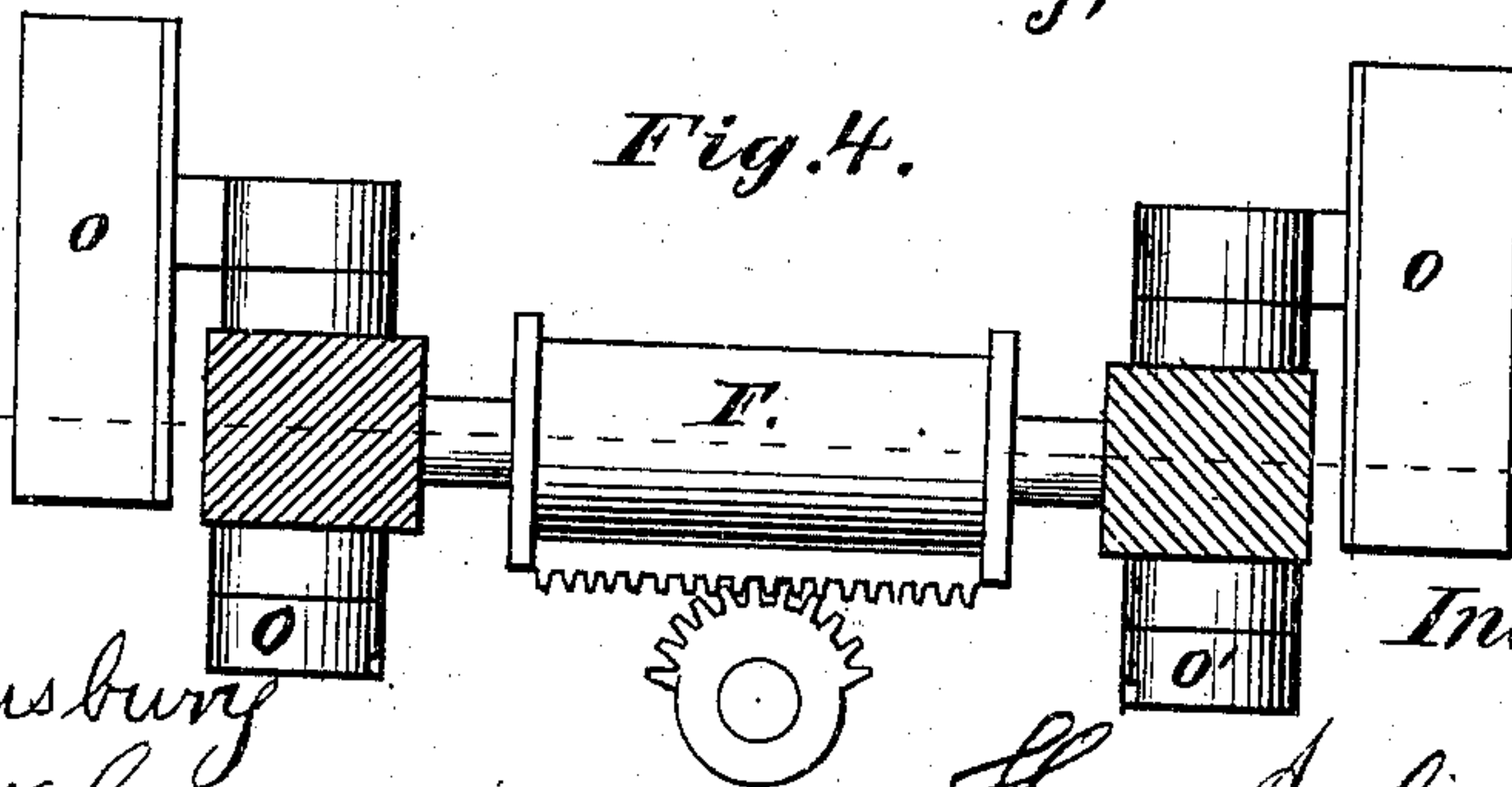


Fig. 4.



Witnesses.

Chas. F. Gansbury
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Inventor.

Henry Julius Smith.

UNITED STATES PATENT OFFICE.

HENRY JULIUS SMITH, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO WILLIAM B. FOWLE, OF SAME PLACE.

IMPROVEMENT IN SUBMARINE TORPEDOES AND BOATS.

Specification forming part of Letters Patent No. 134,493, dated December 31, 1872.

CASE B.

To all whom it may concern:

Be it known that I, HENRY JULIUS SMITH, of Boston, in the State of Massachusetts, have invented certain Improvements in Submarine Torpedo-Launches; and I do hereby declare the following to be a full and correct description of the same, reference being had to the accompanying drawing, in which—

Figure 1 is a longitudinal sectional elevation of the launch and apparatus which I have employed in carrying out my inventions; Fig. 2 is a rear elevation, with the float, rudder, and propeller omitted or broken; and Figs. 3 and 4 are, respectively, a sectional elevation and a plan of the engine for operating the rudder, including a portion of the contrivance governing the admission, into this engine, of compressed air or similar motive power, at the will of the operator.

Although, in this description, compressed air will be spoken of as employed to work the engines, other gases may be used, and I have used, and I prefer to use, compressed or liquefied ammonia. It is unnecessary to add that when ammonia is used the metal employed in the construction of the launch and the apparatus contained therein with which the ammonia comes in contact must be iron or steel.

In an application now pending before the Patent Office I have fully described the manner in which my torpedo-launch is propelled and navigated.

The present invention relates more especially to means employed for exploding the torpedo when the launch strikes the enemy's vessel, and to means employed for regulating the depth under the surface of the water at which the explosion shall take place.

The launch which I have used in carrying out my invention is a cigar-shaped boat built of iron. It has a keel and rudder, as shown in the drawing, and is navigated under water. It is divided, as shown, by bulkheads, into three compartments—viz: the forward compartment, which is the torpedo proper, being a chamber filled with the material by the explosion of which the vessel attacked is to be destroyed; the stern compartment, carrying the propelling and steering apparatus; and the middle compartment, carrying the reservoir in

which is confined the motive power; or, in other words, carrying the boiler and carrying also a coil of insulated wire, by means of which electrical communication may be established between the launch and the shore. The stern and forward compartments are water-tight; the middle compartment, for reasons hereinafter made known, is open to the water. The launch with its contents is much too heavy to float. To keep it from sinking to the bottom a float is employed buoying the launch until detached, as hereinafter explained. Use is also made of the float to regulate the depth at which the explosion shall take place.

In the drawing, the float is marked A. B is a tube or pipe, passing through the float and communicating with the forward compartment of the launch or magazine, as shown. In this tube is a cord or chain, marked *a*, by means of which the torpedo is exploded at a depth determined by the length of the cord or chain, as hereinafter explained. C is an exhaust-pipe, also passing through the float, as shown. G is a boom projecting in front of the launch and its float, as shown. It is slotted at *b b*, as shown, and rests upon shoulders of the tubes B and C, as shown, being held in place (but so loosely as to allow it to slide freely the length of the slots) by collars *c c*, which are secured by set-screws, as shown. The boom G forms a part of the device for securing the launch to the float. For this purpose it has two other slots, *d d*, in which are two flat-headed bolts, *e e*, rigidly secured to the float. The slots *d d* are enlarged at their forward ends to permit the heads of the bolts to slip through when the boom strikes the enemy's vessel, the launch and float traveling on an instant after the boom is checked. When the bolts *e e* pass through their slots, the launch and float becoming detached from each other, the launch sinks until checked by the cord *a*, which, becoming taut, explodes the torpedo at the required depth by pulling a frictional primer, or otherwise, as desired. H is a metallic reservoir within the middle compartment, as shown, and holding the compressed air by which the launch is propelled and steered. As previously intimated, the water of the sea has free play upon nearly the whole outer surface of this reservoir. This

is for the purpose of supplying the heat abstracted from the compressed air or other gas. Moreover, if all sources of heat are cut off the gas would lose its expansive force, and some gases would freeze. The sea-water takes the place of the fire under an ordinary steam-boiler; and H may be more properly, and in this description hereafter will be, termed a boiler. Instead of the box-shaped boiler, shown in the drawing, I prefer a series of tubes. J is a pipe communicating, as shown in Fig. 2, with an oscillating marine-engine, E, in the stern compartment of the launch, and is used to convey compressed air to this engine from the boiler H. The trunnions of the oscillating engine E have bearings, as shown in Fig. 1. This engine operates the propeller K in the ordinary manner by means of the piston-rod *h*, crank *g*, and propeller-shaft *k*. L is a reel carrying a coil of insulated wire, *l*, one end of which, passing under the roller *l'*, communicates with the battery on shore. The other end of the wire passes through a stuffing-box in the axis of the reel, and then through packing at *l''* in one of the bulkheads, and connects with the outer end of a wire of a galvanometer, as shown. This galvanometer is marked M. Its use is one of the essential features of an invention which I have described in another application.

When one of the valves O or O' is opened the compressed air passes from the pipe J'' into the pipe J'''. The last-named pipe is stationary, and serves as a piston-rod, having a piston-head also stationary. This piston-rod and piston-head, with a cylinder, shown in combination with them, form the engine F, the cylinder being driven to the right or left by the gas which passes into it through small holes in the piston-rod at either face of the piston-head. This motion of the cylinder is communicated to the rudder by a rack and toothed sector, as shown. The cylinder and piston-rod fit loosely, and the spent gas escapes into the stern compartment, whence it finds its exit by means of the pipe C.

The practical operation of the launch in respect to the propelling and steering apparatus is described elsewhere. It is here only necessary to refer to the mode of operation when the launch strikes the enemy's vessel and the torpedo is exploded.

A torpedo exploded in close proximity to the vessel attacked, but near the surface of the water, will do but little damage. It is absolutely necessary that it be exploded at a considerable depth below the surface; and

yet it is impracticable to run the launch at a depth at which the explosion will be effective. Some means, therefore, equivalent to the device I have described must be employed to sink the torpedo just before it explodes.

Other devices than that described may be employed; for instance, the concussion of the launch itself with the enemy's ship may be made to separate the launch from a floating apparatus and ignite a time-fuse, or set clock-work or electrical apparatus in operation to discharge the torpedo.

When the torpedo is rigged upon the boom it can best be discharged by a cord performing the office of the cord *a* in the drawing, one end being attached to the primer of the torpedo, and the other secured to the boom.

In like manner a boat may be used, although under water, of such shape that independent torpedoes may be carried on the deck, and be detached when the boat comes in contact with the object attacked by a contrivance like the boom G, each independent torpedo having its own separate float and cord for the purpose of explosion.

The float A shown in the drawing does a double duty, in buoying the launch so that it may be run at a safe and practicable distance below the surface, and also performing the office described in the explosion.

It is needless to add that when the torpedo proper is a chamber or magazine of the launch the explosion will blow up the launch.

I claim—

1. A torpedo-launch constructed substantially as described, in combination with a detachable float, so that the launch may be disconnected and sunk to the required depth before the explosion of the torpedo.

2. The combination of the boom G, float A, and torpedo-launch, whereby the float and launch are coupled and uncoupled, substantially as described.

3. A float and a torpedo, when united by a cord which determines the depth at which the torpedo shall be exploded, substantially as described.

4. The combination of a float and a torpedo and a cord to explode the torpedo, substantially as described.

The above specification of my said invention signed and witnessed, at Washington, this 23d. day of December, A. D. 1872.

H. JULIUS SMITH.

Witnesses:

GEORGE E. LINCOLN,
CHAS. F. STANSBURY.