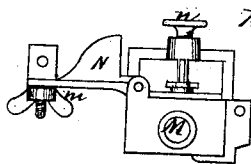
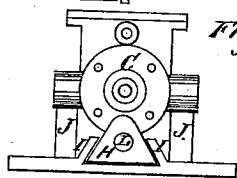
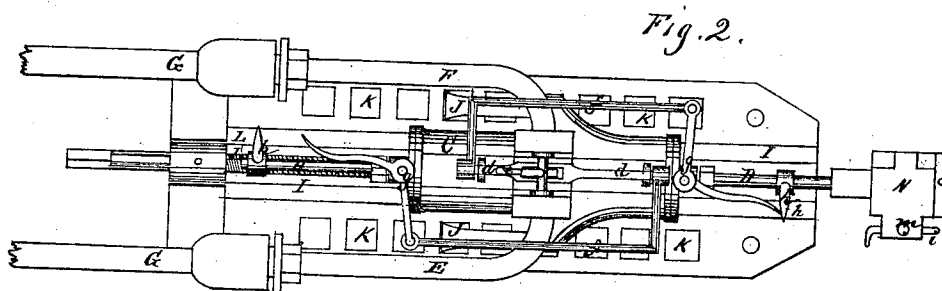
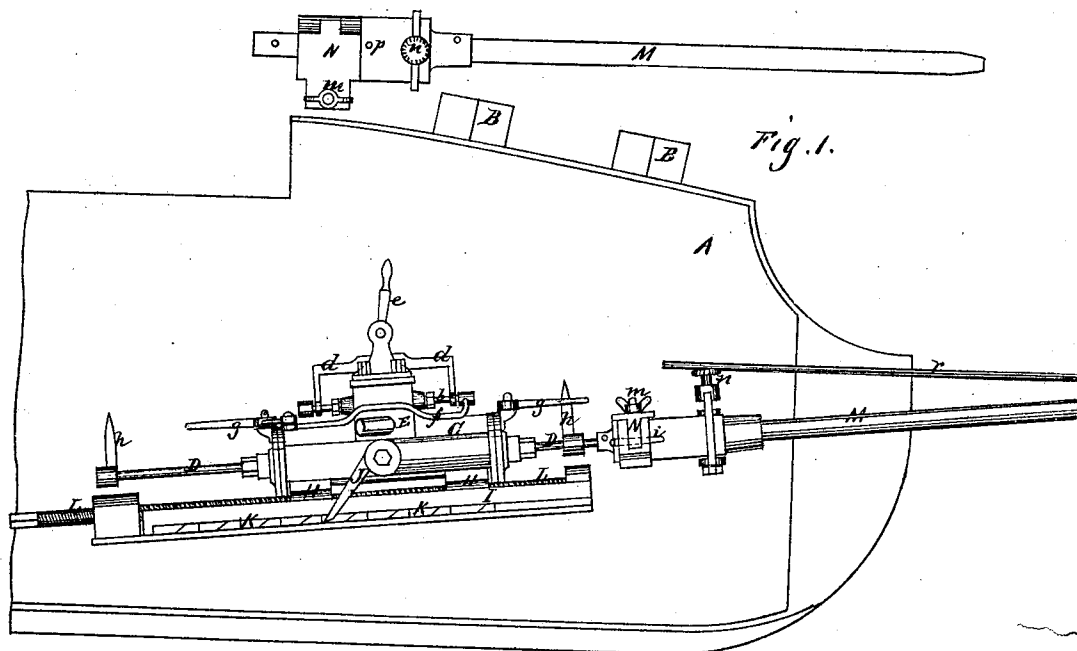


T. HILL.
STEAM RAM.

No. 103,883.

Patented June 7, 1870.



Witnesses:
Geo. H. Strong,
Wm. Gerlach.

Inventor:
Thomas Hill

United States Patent Office.

THOMAS HILL, OF VALLEJO, CALIFORNIA.

Letters Patent No. 103,883, dated June 7, 1870.

IMPROVEMENT IN STEAM-RAMS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, THOMAS HILL, of Vallejo, county of Solano, State of California, have invented an improved Steam-Ram; and I do hereby declare the following description and accompanying drawing are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvements without my invention or experiment.

My invention relates to an improved steam-ram for piercing a hole in the sides of iron-clad and other vessels below the water-line, and the iron casing or shield.

The ram is attached to a piston-rod, which is operated by a steam-cylinder, and it projects through the bow of the vessel, and to a distance in front of it.

The ram is provided with a bore, through which a shell or other projectile can be fired after it has been thrust through the side of the vessel, and before it is withdrawn.

In order to more fully explain my invention, reference is had to the accompanying drawing forming a part of this specification, in which—

A represents the forward part of the bow of an iron-clad or other steam vessel intended for marine warfare.

This vessel, when in condition for making a voyage, stands with its deck clear above the water; but when prepared for action is sunk by admitting water into compartments inside the vessel until but a small portion of the deck is visible.

Upon the deck, in the most suitable and appropriate positions, are placed boxes B, intended to contain shells, which can be fired by an electric wire in case an enemy should attempt to board the vessel.

The armor-plate is to be five inches thick, and of wrought iron, behind which an elastic cushion is placed in order to allow it to spring, if necessary.

The deck will be convex on top, as shown, and will be covered with three-inch plate iron.

The vessel may be supplied with a telescopic smoke-stack, to slide up and down, as required.

Inside of the vessel, and near the forward end, is located a steam-cylinder, C, which is provided with an ordinary slide-valve.

This valve is operated by the rod *l*.

A yoke, *d*, has its opposite ends secured to the two ends of the rod, and a vertical lever, *e*, is attached to its center, by which the piston can be set in motion by hand.

Rods or bars *f*, which are bent at right angles, as shown, have their ends of their short arms secured to the opposite ends of the valve-stem outside of the valve-arms and extend in opposite directions to the end of the cylinder opposite to that to which they are secured, where they are attached to one arm of a bell-crank, *g*, the cranks being pivoted, as shown, and in this case operating horizontally.

The opposite arms of the bell-cranks stand at a slight angle to the rod *D*, and at opposite ends of the cylinder.

The piston-rod *D* should be made square or polygonal, so as to prevent it from turning; and it extends a short distance outside of the cylinder at each end, the piston being situated at its middle.

To each end of the piston-rod is fixed an upward-projecting pin or stem, *h*, the two inclining in opposite directions and operating the valve by alternately striking the arms of the bell-cranks, and by the connecting-levers the engine is reversed.

Steam is taken from the boiler of the central engine through the steam-pipe *E*, and the exhaust passes out through the opposite pipe *F*.

These pipes are made to slide within the larger pipes *G G*, and are kept tight by stuffing-boxes, as shown. The object of this is to allow the cylinder to be moved back or forward on its sliding frame without difficulty.

In order to move the cylinder, it has a wedge-shaped tongue, *H*, fastened beneath it, so as to slide within the ways *I*, being moved by a long triple-threaded screw, *L*, which is operated by a small independent engine.

The cylinder *C* is supplied with a pawl, *J*, on each side, working into a rack, *K*, so as to hold the cylinder at any point where it is left by the screw *L*.

When it is necessary to move the cylinder backward, a lever raises the pawls from the rack, leaving the cylinder free to move.

To the front end of the piston *D* is fixed the ram *M*. This consists of a steel tube twenty-four feet long, sixteen inches in diameter, and having an eight-inch bore, the outer end being tapered to an edge, and the bore decreasing for about eight inches from the outer end, so as to be easily cleared of obstructions by the shell.

This tube extends out through the front end of the vessel below the water-line and below the line of plating of vessels, being kept water-tight by a stuffing-box.

At the inner end of the tube is a movable breech, *N*, which is hinged so as to be thrown back, and when closed is kept in place by a key, *i*, and set-screw *m*.

Just in front of this is the water cut-off, which closes the bore, and is operated by a screw, *n*.

In loading the apparatus, a shell is placed in the receiving-chamber and pushed forward to the water cut-off. The breech-piece *N* is then closed and the key *i* inserted, forming a solid breech, the screw *m* bringing it down perfectly solid. The water cut-off is then raised, leaving the shell ready to be fired, which is done by igniting its fuse through the hole *p*.

Only powder enough is necessary to send the shell about sixty feet.

An indicator, *r*, gives warning when the ram is approaching the opposing object.

The operating cylinder is four feet in diameter and has a stroke of eight feet, the valve-motion being automatic, as before described, and as the indicator gives warning of the approach, the fuse of the shell is lighted and steam let on in the cylinder. This latter drives the piston and ram forward with enormous force, piercing a hole through the side of the opposing vessel, and at the same instant the shell is fired.

The piston can make upward of forty strokes per minute, and, if desired, the side of the opposing vessel may be pierced with many holes before separating.

Liquid fire, or any other suitable form of offense, may be used in the tube.

Having thus described my invention,

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

1. The combination, with a hollow projecting weap-

on, M, of a hinged breech-block, N, provided with a pin, *i*, and screw *m*, and the valve or water cut-off operated by the screw *n*, substantially as and for the purpose specified.

2. The combination, with the cylinder C, of the slides H, ways I, screw L, and extensible pipes E and F, arranged to operate substantially as and for the purpose described.

3. The arrangement, in combination, of the yoke *d*, rods *f*, cranks, *g*, and arms *h*, substantially as and for the purpose specified.

In witness whereof I have hereunto set my hand and seal.

THOMAS HILL. [L. S.]

Witnesses:

GEO. H. STRONG,
WM. GERLACH.