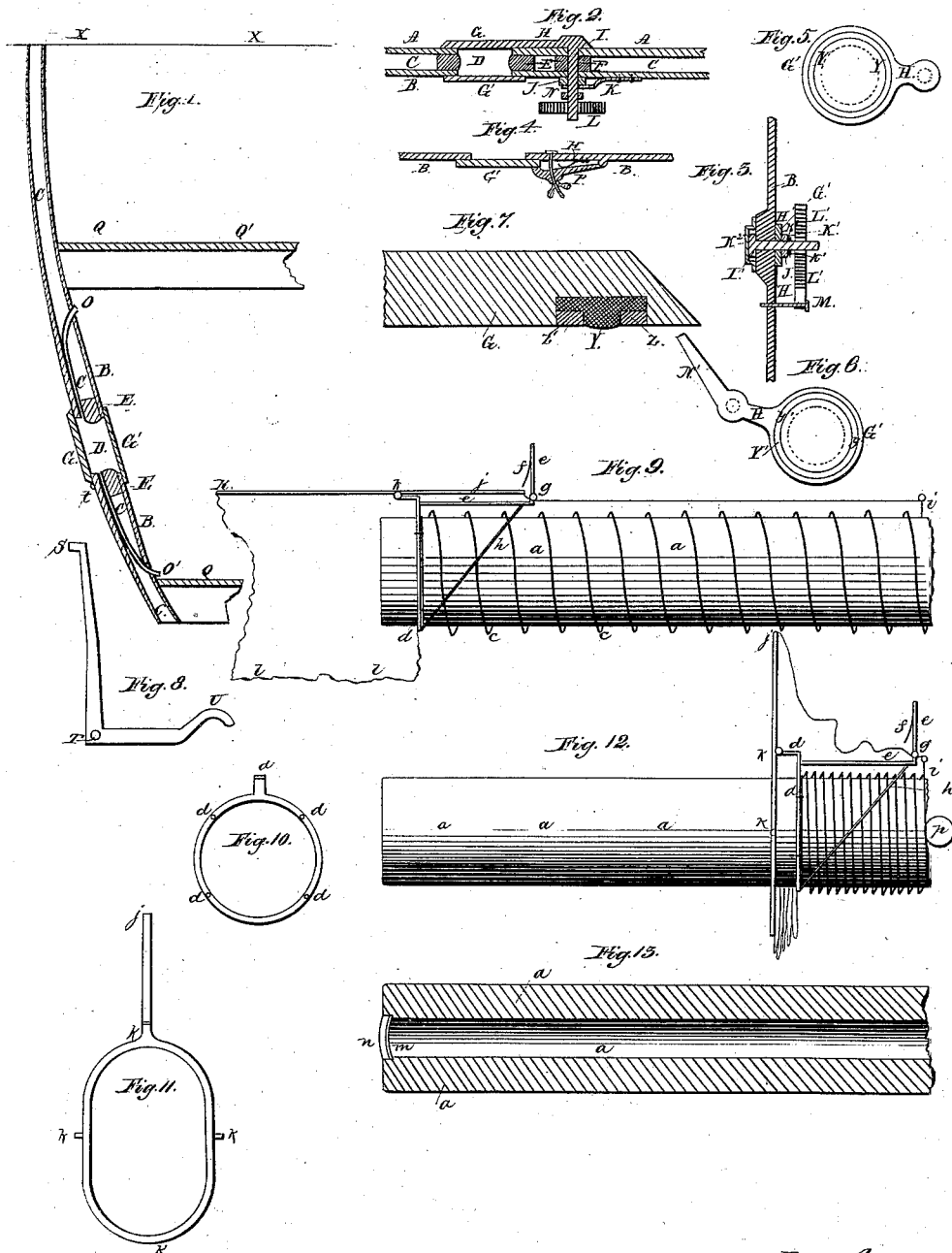


J. H. Karanagh,
Port-Hole Closer for Ships,

N^o 48,074.

Patented June 6, 1865.



Witnesses:
L. D. A. Park
W. C. Goodhue

Inventor:
John H. Karanagh

4 Sheets—Sheet 2.

No. 48,074.

Patented June 6, 1865.



Y. D. & Partis.
Y. C. Goodhue.

John H. Kavanagh

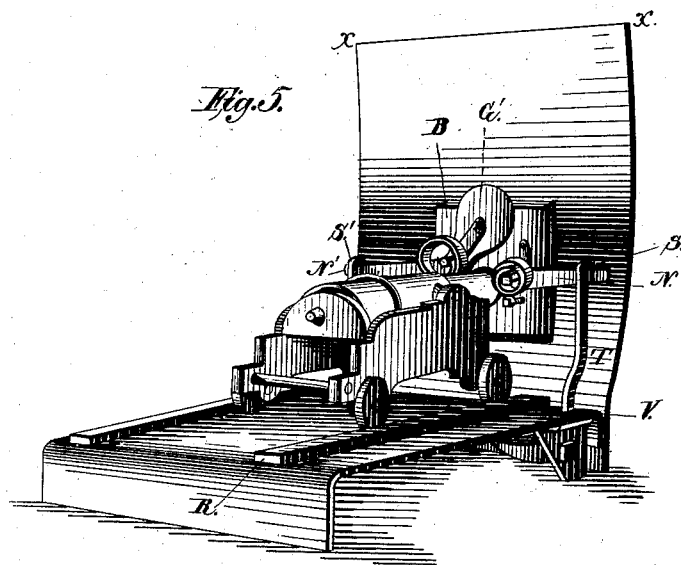
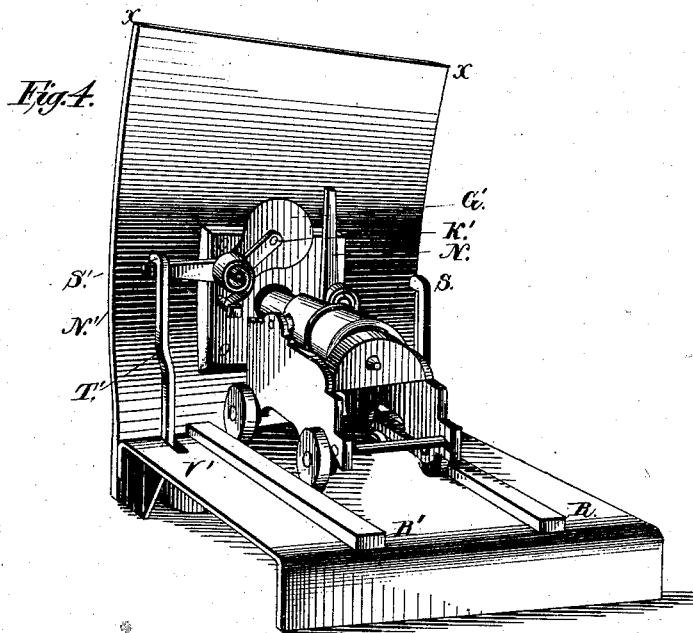
J. H. KAVANAGH.

4 Sheets—Sheet 3.

PORT-HOLE CLOSER FOR SHIPS.

No. 48,074.

Patented June 6, 1865.



Witnesses:

G. D. Parks,
W. C. Goodhue.

Inventor:

John H. Kavanagh.

J. H. KAVANAGH.

PORT-HOLE CLOSER FOR SHIPS.

No. 48,074.

Patented June 6, 1865.

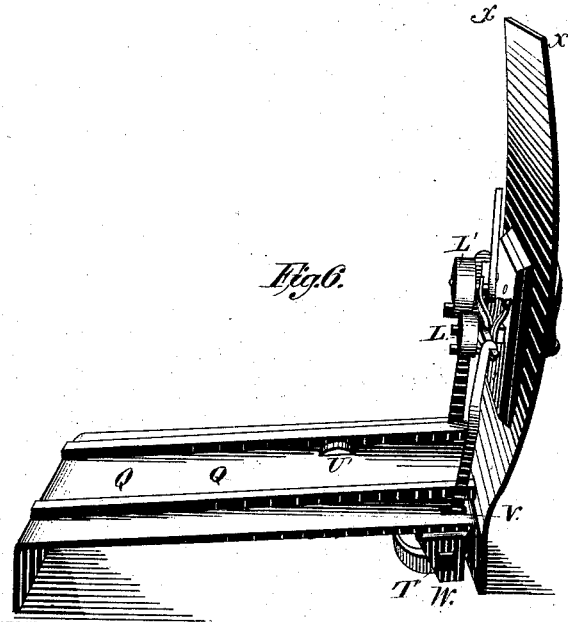


Fig. 6.

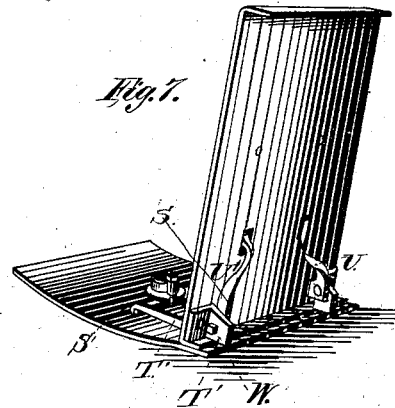


Fig. 7.

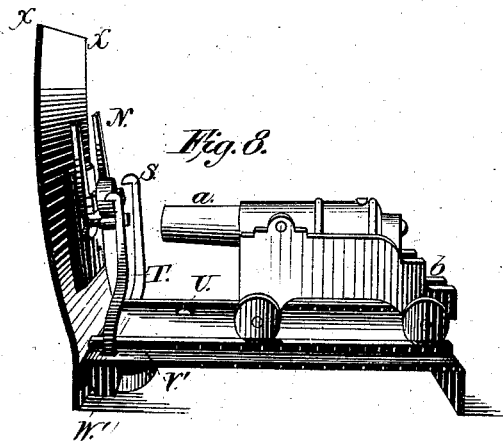


Fig. 8.

Witnesses:

G. D. A. Parks.
W. C. Goodhue

Inventor:

John H. Kavanagh

UNITED STATES PATENT OFFICE.

JOHN H. KAVANAGH, OF JOLIET, ILLINOIS.

IMPROVED SUBMARINE PORT-HOLE CLOSER.

Specification forming part of Letters Patent No. 48,074, dated June 6, 1895.

To all whom it may concern:

Be it known that I, JOHN H. KAVANAGH, of the city of Joliet, in the county of Will and State of Illinois, have invented a new and useful mode of firing a gun under water from the hull of a vessel; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, in which—

On Plate 1, Figure 1 is an exterior view of a portion of the side of a vessel around the port-hole and below the water-line when the outside valve is open. Fig. 2 is a view of the same with the outer valve closed. Fig. 3 is an interior view of the same portion of the side of a vessel and of a part of the gun-deck adjacent thereto when both the outer and inner valves are closed. Fig. 4 is an interior view of the same when the inner valve is open and the gun run out through the port to the outer valve. This figure also shows the view after the gun being fired, when it recoils just far enough to close the outside valve. Fig. 5 is an interior view of same with both the inner and outer valves open and the gun run out into the water, ready to fire. Fig. 6 is a side view of the same portion of the side of a vessel. Fig. 7 is a view of the same part of a vessel partially under the gun-deck. Fig. 8 is a side view of the same part of the vessel with the cannon placed on the track. This view is also shown when the gun recoils after firing. Plate 2, Fig. 1 is a transverse section of the side of a vessel from the water-line to the gun-deck through the center of the port and perpendicular to the deck. Fig. 2 is a transverse section of the side of a vessel, which passes through the center of the port and also through the center of the axle of the outer valve. Fig. 3 is a transverse section of the inner plate through the center of the axle of the inner valve and through the pin of the scroll-spring attached thereto. Fig. 4 is a longitudinal section through the vise-clamp, the inner plate, and inner valve. Fig. 5 is a view of the inside surface of the outer valve and arm. Fig. 6 is a view of the inner valve, arm, and lever. Fig. 7 is a transverse section of part of either valve, showing the packing or inlaying. Fig. 8 is a side view of one

of the two cranks. Fig. 9 is a side view of the gun from the trunnions to the muzzle, showing the apparatus to receive the water when the gun recoils inside the port after firing. Fig. 10 is a circular washer-like plate fixed to the spiral spring. Fig. 11 is an oval washer and lever attached to the circular washer by a hinge-joint. Fig. 12 is a side view of the gun from the trunnions to the muzzle, with the water-catching apparatus drawn back. Fig. 13 is a longitudinal section of the gun through its axis from the muzzle to the trunnions.

Referring to the parts of the drawings by letters, A A is a large plate which surrounds the port on the outside of the vessel, through the center of which plate the port-hole is made. In an iron vessel it forms part of the outside sheeting of the vessel. In a wooden vessel it is fixed to the sheeting outside, or it is countersunk into it, so as not to infringe on the outlines of the vessel. This plate is called the "outer plate," Figs. 1 and 2 in Plate 1.

B B is a large plate which surrounds the port on the inside of the vessel, through the center of which plate the port-opening is made. In an iron vessel this plate forms part of the inside sheeting or skin. In a wooden vessel it is fastened on outside the inner skin, and is called the "inner plate," Fig. 1, Plate 2.

C C are the ribs of the vessel, Fig. 1, Plate 2; D, the port-hole, Figs. 1 and 2, Plate 2; E E, the packing between the inner and outer plates, all around the port, Figs. 1 and 2, Plate 2; F F, the packing between the inner and outer plates around the axle of the outer valve, Fig. 2, Plate 2; G, the valve which closes the outer mouth of the port, (it is called the "outer" valve,) Figs. 1 and 2, Plate 1, and Figs. 1, 2, and 5, Plate 2. G', the valve which closes the inside mouth of the port, (called the "inner" valve,) Figs. 3, 4, and 5, Plate 1, and Figs. 1, 2, 3, 4, and 6, Plate 2; H, the arm which is part of the outer valve, Fig. 5, Plate 2; H', the arm which is part of the inner valve, Fig. 6, Plate 2; I, the axle fastened in the arm of outer valve, (see Fig. 2, Plate 2;) I', the axle of the inner valve, Fig. 3, Plate 2; J, the nut screwed onto the axle I immediately outside the inner plate,

Fig. 2, Plate 2; *J'*, the nut screwed onto the axle *I'* outside of and next to the valve *G'*, Fig. 3, Plate 2; *K*, the guard which holds the nut *J* close to the inner plate, Fig. 2, Plate 2; *K'*, the guard which holds the nut *J'* close to the inner valve-arm, Fig. 3, Plate 2; *K²*, the guard which holds the head of axle *I'* close to the inside of inner plate, Fig. 3, Plate 2; *L*, the scroll-spring of the axle *I* of outer valve, (see Figs. 3, 4, 5, and 6, Plate 1, and Fig. 2, Plate 2;) *L'*, the scroll-spring of axle *I'* of inner valve, (see Figs. 3, 4, 5, and 6, Plate 1, and Fig. 3, Plate 2;) *M*, the pin to which scroll-spring *L* is appended, Fig. 3, Plate 1; *M'*, the pin to which scroll-spring *L'* is appended, Fig. 3, Plate 2; *N*, the lever affixed or fastened to axle *I*, Figs. 3, 4, 5, and 8, Plate 1; *N'*, the lever which forms part of the plate made up of valve *G'*, arm *H'*, and lever *N'*, Figs. 3, 4, and 5, Plate 1; *O*, the ventilator from the top of the port-hole into the vessel through the inner plate, Fig. 1, Plate 2; *O'*, the ventilator from the bottom of the port into a trough to carry away the water lodged in the port after the recoil of the gun, Fig. 1, Plate 2; *P*, the vise-clamp of inside valve, Fig. 4, Plate 2; *Q Q Q*, the gun-deck, Fig. 6, Plate 1, and Fig. 1, Plate 2; *Q' Q' Q'*, the deck above the gun-deck, Fig. 1, Plate 2; *R*, the forward rail of track of gun-carriage, Figs. 3, 4, and 5, Plate 1; *R'*, the aft rail of this track, Figs. 3 and 4, Plate 1; *S T U*, the forward crank, of which *S* is the catch, *S T* the arm, *T U* the leg, and *U* the foot, Fig. 8, Plate 1, and Fig. 8, Plate 2. *T* is also the pivot on which the crank *S T U* turns, Fig. 6, Plate 1. *U* is also the slot cut in the gun-deck directly in the track of the wheel of the gun-carriage, through which slot the foot *U* protrudes, Fig. 3, Plate 1; *S' T' U'*, the aft crank, of which *S'* is the catch, *S' T'* the arm, *T' U'* the leg, and *U'* the foot, Fig. 7, Plate 1, and Fig. 8, Plate 2. *T'* is also the pivot upon which crank *S' T' U'* turns, Fig. 7, Plate 1. *U'* is also the slot in the gun-deck, through which the foot *U* protrudes; *V*, the slot in the gun-deck, forward of the forward rail *R* of track, through which slot the arm *S T* of the crank *S T U* projects, Figs. 5 and 6, Plate 1; *V'*, the slot in gun-deck aft of rail *R'*, through which the arm *S' T'* of crank *S' T' U'* projects, (see Figs. 4 and 8, Plate 1;) *W*, the plate in which pivot *T* is fixed, Fig. 6, Plate 1; *W'*, the plate in which pivot *T'* is fixed, Figs. 7 and 8, Plate 1; *X*, the water-line, Figs. 1, 2, 3, 4, 5, 6, and 8, Plate 1, and Fig. 1, Plate 2; *Y*, the circular or oval ring of rubber (india) or other material inlaid into valve *G*, Figs. 5 and 7, Plate 2; *Y'*, the ring of rubber or other material inlaid into valve *G'*, Figs. 6 and 7, Plate 2; *Z*, the circular oval plates fixed into the valves to compress the flanges of the ring of rubber, &c., Fig. 7, Plate 2.

a is the gun, and *b* the gun-carriage, Fig. 8, Plate 1; *c c c c*, the spiral spring which slides on the gun. One end of this spring is fastened

to the trunnions, Figs. 9 and 12, Plate 2. *dddd*, the circular washer-like bar which slides on the gun, and is fixed to the other end of the spiral spring 1, (see Figs. 9 and 12, Plate 2, also Fig. 10, Plate 2.) *eee* represent the right-angled bar fixed in the back of washer *dddd*, directly over and parallel to the gun, so as not to touch the spring, Figs. 9 and 12, Plate 2; *ff*, the spring affixed to the top of bar *eee*, (see Figs. 9 and 12, Plate 2;) *g*, the pulley fixed in bar *eee* immediately above the right angle, Figs. 9 and 12, Plate 2; *h h*, the oval-shaped brace from washer *dddd* to bar *eee*, and which surrounds the gun in an oblique direction outside of and free from the spiral spring, Figs. 9 and 12, Plate 2; *i*, the pin fastened to the top of the gun over the trunnions. (See Figs. 9 and 12, Plate 2.) *j k* represent the lever of the oval-shaped washer, Fig. 11, Plate 2; *k k k k*, the oval-shaped washer which slides in the gun, and which is fixed to washer *dddd* by a hinge-joint at *k*, Figs. 9, 11, and 12, Plate 2; *l l l*, the bag or bucket fixed to both washers all around the gun, Figs. 9 and 12, Plate 2; *m*, the circular piece of tin or sheet-iron, hollowed out like a segment of a sphere, to freely fit the mouth of the gun, Fig. 13, Plate 2; *n*, the circular piece of rubber fastened to the convex side of the plate *m*, and larger than it, so that when pressed into the mouth of the gun it will effectually exclude water from getting into the mouth of the gun; *p p*, the trunnions of the gun, Fig. 12, Plate 2; *t*, the stop against which the valve *G* closes, Figs. 1 and 2, Plate 1, and Fig. 1, Plate 2; *t'*, the stop against which the valve *G'* closes, Fig. 3, Plate 1.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

The nature of my invention consists constructing a port-hole below the water-line, to be securely closed by two valves which are operated automatically by the recoil of the gun.

After piercing the side of a vessel, making a hole to suit the muzzle of the gun to be used, I protect it with two metal plates, *A* and *B*, one on the outside and the other on the inside of the vessel, securing them properly to the same with bolts, packing, &c., which will best suit the kind of vessel applied to, so as to combine strength and water-tight joints. Between these two plates is secured an india-rubber or other elastic water-proof ring, *E*, which hugs the muzzle of the gun when it is run out, thus preventing any water getting through the port. This ring accommodates itself to any expansion or contraction of the gun. On the outside of the port-hole or plate *A* there is a valve or gate, *G*, to open or close the same, and this valve is secured to an axis-pin, *I*, which passes through both plates, where it connects with a lever, *N*, on the inside. Operating this lever will open or close the port on the outside by turning the valve up or down. The corresponding valve, *G'*, on the inside, is operated

similarly, having a lever, *N'*, an axis, *I'*, on which it rotates, and which axis passes through a hole at the elbow, as seen in Fig. 6, Plate 2.

Securely attached to the axis-pins *I* and *I'*, and coiled around them, are scroll-springs, to be seen in the several figures, the outer ends being secured to the inner plate, *B*. The action of these springs is to throw the levers *N* and *N'* up, closing the port by throwing the valves *G* and *G'* over its outer and inner opening. As an additional security for water-tight joints, I insert rubber or other suitable packing-rings, *yy'*, in the faces of these valves, bearing against the plates *A* and *B*. (See Figs. 5 and 6, Plate 2.) These gates or valves are opened by hand by turning *N* and *N'* to the right and left, or downward. To close them, the springs will do this upon letting go the levers; but to close them automatically by the gun-carriage and by its recoil, I use two crank or bent levers, *S T U* and *S' T' U'*, one for each valve, respectively. They are pivoted at the elbow, below the platform of the gun-carriage, and are susceptible of a slight rocking motion. Their upper extremities, *S* and *S'*, are bent so as to take over the ends of the levers *N* and *N'* when they are brought down to open the port. This holding down is necessary, as the valves are under spring-pressure. When the inside valve is open, the gun is pushed forward, its muzzle entering the ring *E* before the outer one is opened. The lower or curved ends, *U* and *U'*, of the cranks project slightly above the top of the platforms, in which are cut holes for the purpose, and are in the track of the wheels of the gun-carriage, which runs over them in recoiling, rocking the cranks, and detaching the hooked parts *s s'* from the ends and tops of the levers, when the springs throw the valves into their normal positions, closing the port, and the cranks are so arranged as to effect this successively, the outer one closing after the muzzle has receded inside the outer plate, but still embraced by the rubber packing, and the

inner closing the moment the muzzle gets inside the inner plate or valve. The cranks are tripped by different wheels, and not at the same moment, one being on each side of the gun, and the whole operation is almost instantaneous.

In running the gun out I keep the water out of the bore by using a convex disk of metal, *m*, Fig. 13, and a larger disk of rubber in front, both inserted in a recess made at the muzzle. After the discharge the bore fills, and empties in recoiling after the front valve is closed. What is left in the port is carried off by a pipe, *O'*, Fig. 1, Plate 2, and the remainder is caught in a bag, *e e e*, which is pressed forward beyond the muzzle of the gun in its recoil by the action of the spiral spring *c c c* on a holder, *j k d*, Fig. 9. It can then be emptied and drawn back in rear of the muzzle preparatory to loading, &c. The details of this device are not necessary to mention. It will be seen precautions are taken to keep the valves tight up in place when covering the port-hole, at same time susceptible of a properly easy rotation in opening them.

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

1. The combination of the outer and inner valves, *G* and *G'*, with the outer and inner plates, *A* and *B*, surrounding the port-hole, constructed and operated substantially as described.

2. The combination of the valves *G* and *G'* with their axles *I* and *I'* and scroll-springs *L* and *L'*.

3. The rocking-lever cranks *S T U* and *S' T' U'* and their combinations with the valve-levers *N* and *N'* and the wheels of the gun-carriage, substantially as described.

JOHN H. KAVANAGH.

Witnesses:

GAVION D. A. PARKS,
W. C. GOODHUE.