(No Model.)

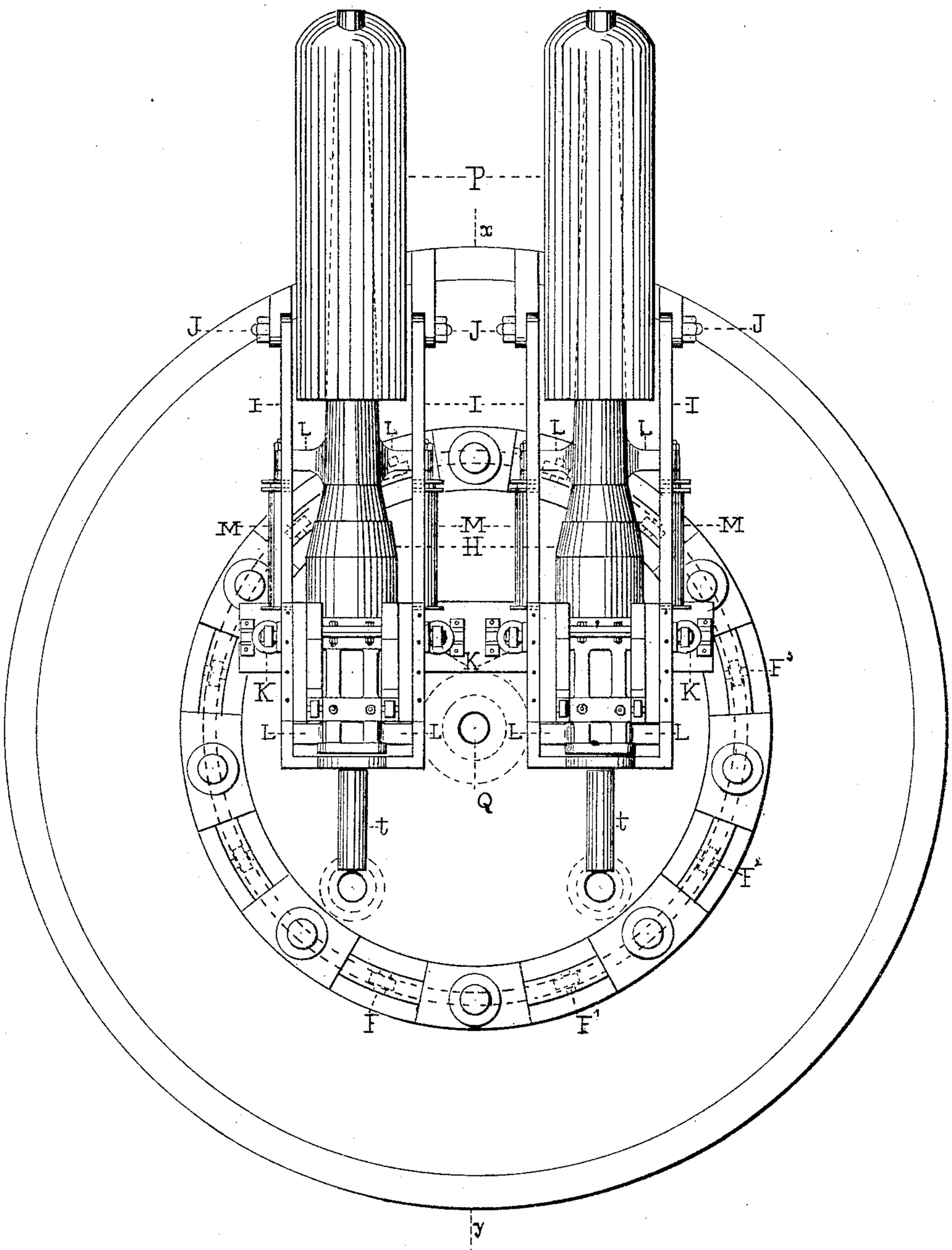
3 Sheets—Sheet 1.

N. B. CLARK.

ARMOR CLAD SHIP.

No. 255,144. Patented Mar. 21, 1882.

Fig. 1.



WITNESSES

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INVENTOR

Nathan B. Clark

(No Model.)

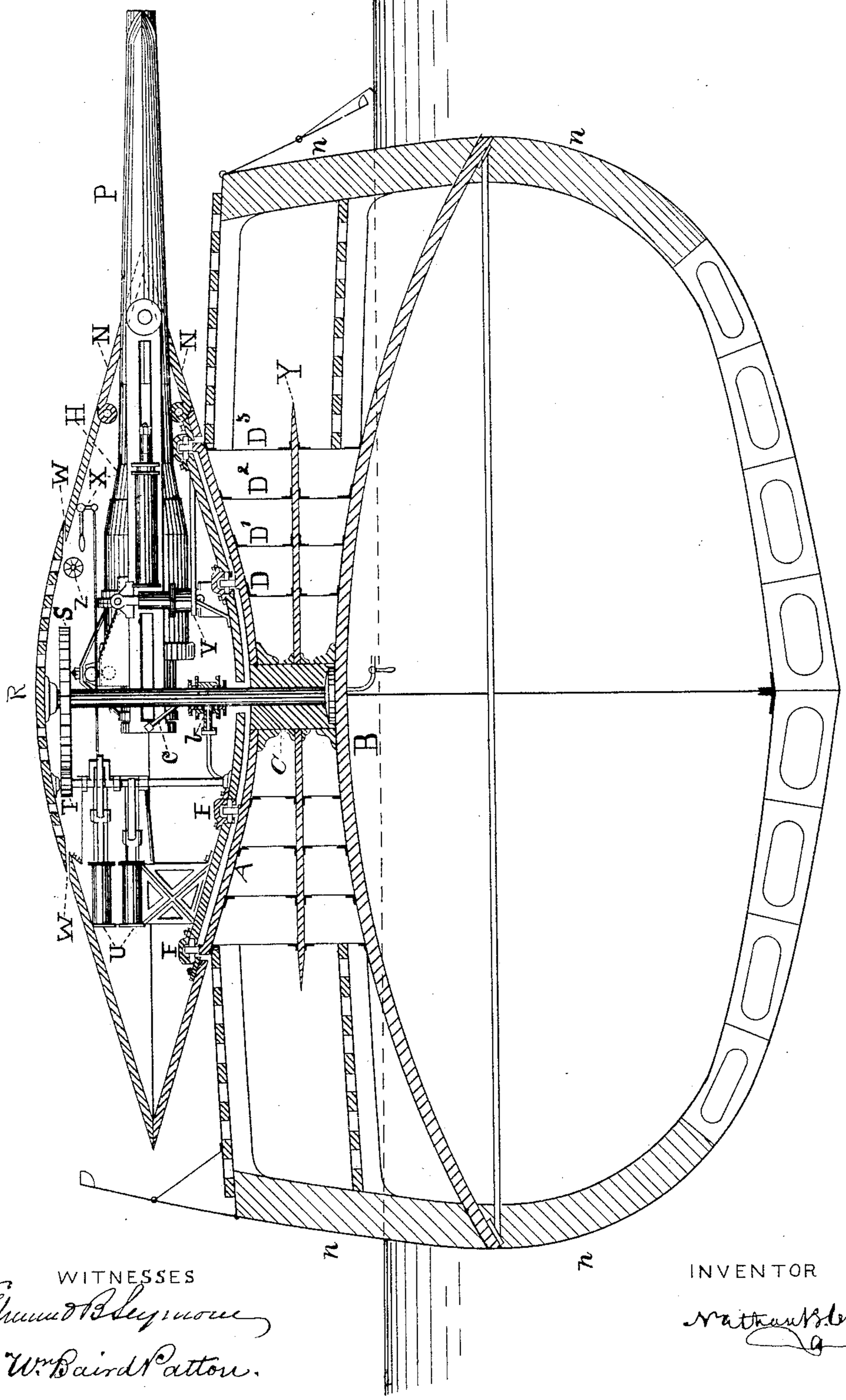
3 Sheets—Sheet 2.

N. B. CLARK.

ARMOR CLAD SHIP.

No. 255,144. Patented Mar. 21, 1882.

Fig. 2.



WITNESSES

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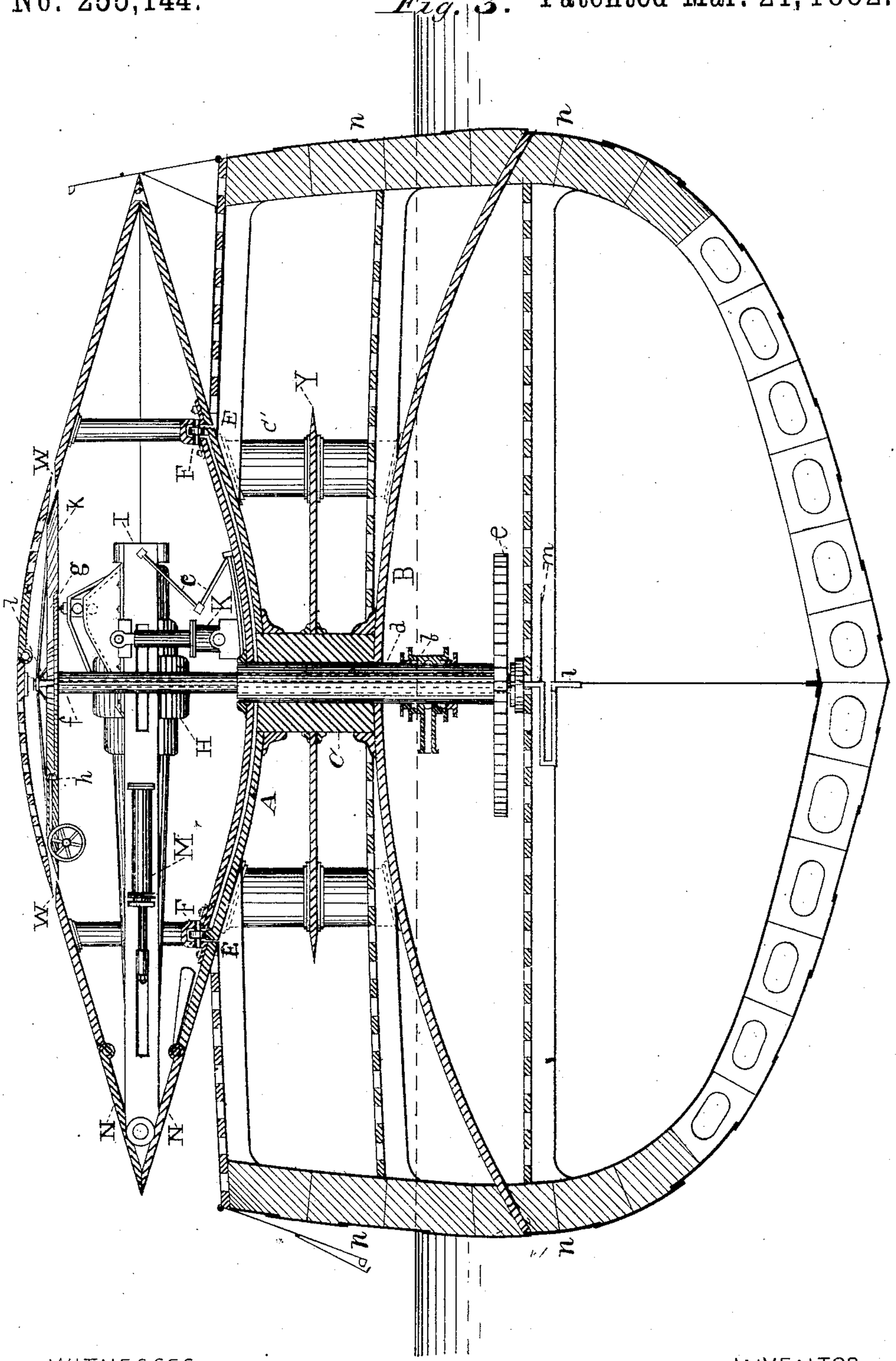
(No Model.) 3 Sheets—Sheet 3.

N. B. CLARK.

ARMOR CLAD SHIP.

No. 255,144. Patented Mar. 21, 1882.

Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

NATHAN B. CLARK, OF PHILADELPHIA, PENNSYLVANIA.

ARMOR-CLAD SHIP.

SPECIFICATION forming part of Letters Patent No. 255,144, dated March 21, 1882.

Application filed August 23, 1880. (No model.)

To all whom it may concern:

Be it known that I, NATHAN B. CLARK, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented a new and useful Method of Protecting Vessels with Defensive Armor, of which the following is a specification.

The object of my invention is to so dispose a ship's armor as to deflect shot from first intention and make no effort at direct resistance; and this object I attain by arranging the armor so as to present to horizontal, or substantially horizontal, shots an acute-angled deflecting-surface only, thereby deflecting the shot after absorbing the small portion of its energy necessary to turn it slightly from its course, thus permitting it to expend its great excess of energy elsewhere.

If a rigid unyielding resistance is presented to projectiles, it invites destruction to the armor. If a yielding elastic resistance is presented, the energy of the shot is absorbed without injury to the armor in like manner as the energy was imparted to it without injury to the gun from which it was fired. Time is an important element in each case. By the use of thin plates at an acute angle I gain the mechanical effect of the inclined plane, combined with an elastic lateral resistance.

In a patent granted to me on September 7, 1880, the system of deflection was applied to the protection of the lower part of the hull of a vessel. By the present invention it is intended to apply the same system for the protection of men and guns.

Reference being had to the drawings, Figure 1, Sheet 1, represents a sectional plan view of a double-convex gun-shield with two guns mounted in it. This shield is intended to take the place of a monitor-turret. Exteriorly it would be well represented by two saucers edge to edge. Fig. 2, Sheet 2, represents a cross-sectional elevation of same shield on a line near the center, indicated by *x y* on the plan. Fig. 3, Sheet 3, represents a cross-sectional elevation of a double-convex gun-shield with some modifications from that shown in Sheet 2.

The central portion, A, of the lower part of double-convex gun-shield is permanently attached to the ship, being supported on the main ship-shield B by means of the stout cylindrical column C, which cannot be shot away, and, being round, is a good deflector. In its supporting duty this column is assisted by the concentric cylinders D D′ D^2 D^3, made of light sheet-iron, which will effectually aid in supporting the shield, but will present no substantial resistance to the passage of shot through them, but will continue to perform supporting duty until almost entirely shot away. The lower portion of the double-convex shield is divided at the points E E, and the whole upper portion of the shield, together with its contents, is supported on anti-friction wheels F F′ F^2, &c., and revolves on circular tracks on the lower stationary portion of the shield A A.

In order to protect the main ship-shield, B, and the lower portion, A, of the double-convex shield from shot which might strike one and be deflected against the other at a penetrating angle, an intermediate deflecting-plate, Y, is placed between them, as shown in Figs. 2 and 3, this plate being circular in outline.

Inside the double-convex shield, and protected by its armor-plating, disposed at an angle sufficiently acute to deflect all projectiles, are to be mounted the guns H H. These guns are mounted on hinged frames I I, which are jointed at the points J close up to the ports, the object being to be able to elevate and depress the guns through the smallest possible opening in the armor.

The breech ends of the guns are supported on hydraulic presses K K, by which they are elevated and depressed. The guns are supported in the frames I I on lugs L L, on which they slide back and forth in slots in the frames. Each gun has four lugs, which may either be made on it or strapped to it by means of bands. The recoil is received on hydraulic presses M M, attached to the gun-frames, and serving as the means whereby the guns are run out to fire. These presses can also be used to run the guns both in and out while exercising.

The port-shutters *n*, Sheets 2 and 3, are hinged and work automatically, the lower one being raised by a counter-weight.

As shown in Sheet 1, the guns extend beyond the shield, the projecting ends of the guns being protected by auxiliary deflectors P, which are of convex form, as represented in the drawings, these deflectors being attached to the

guns by means of bands, and serving to protect the projecting muzzles of the guns from the injurious effects of side shots.

A central shaft, Q, is attached to the main ship-shield B by means of a flange, and the upper end of this shaft is fitted in the collar R on the top of the double-convex shield, which, with all its contents, is made to revolve around the central stationary shaft by means of the pinion T, which gears into the large cog-wheel S, keyed to the said shaft, the pinion T being actuated by the hydraulic cylinders U, the cranks of which are set on the shaft of the wheel at right angles to each other.

The officer in command of the battery stands upon the platform V between the two guns, with his eyes to the observation-slits W, and by means of the lever X, which reverses the valve-gear of the hydraulic cylinder U, and the wheel Z, which actuates the stop-valve of the hydraulic power, he can train the guns at will with great celerity and precision on any object. The inelastic pressure of water or similar fluid gives a very regular motion, and is admirably adapted to the duty required. The stationary central shaft also serves as a conduit for the hydraulic power, from which it is conveyed into the revolving part of the shield by means of the collar *b*, which is fitted with double stuffing-boxes. Hydraulic power is conveyed to the gun-frames I I by means of the jointed pipes *c*.

Fig. 3 represents a cross-sectional elevation of a double-convex shield, in which the guns recoil entirely within the shield. The port-shutters N N act automatically, opening as the gun is pushed through them and closing after the recoil, the lower one being actuated by a counter-weight. This shield is revolved by means of the sleeve *d*, the upper part of which is secured by means of a collar to the revolving part of the double-convex shield, the lower part of the sleeve being keyed to the large gear-wheel *e*, by which the shield is revolved. The sleeve *d* also serves as a conduit for the hydraulic power, which is admitted to it by means of the collar with double stuffing-boxes beneath the main shield B. Inside the sleeve *d* is the stationary sleeve *f*, secured at its lower end to the ship's deck by means of a flange, and surmounted by the gear-wheel *g*, with which engages a bevel-pinion, *h*, motion being thereby imparted to the band *k*, which is attached to the central shaft, *l*, the latter turning in the sleeve *f* and carrying at its lower end the indicator *m*, which shows the man stationed there in which direction to revolve the shield in order to bring the guns to bear on the object sighted by the officer in said shield. The shaft *l* also has two cranks, set at right angles to each other on its lower end, which are connected by rods with other similar cranks on other shafts, for the purpose of actuating indicators with which to train Hotchkiss revolving cannon, Gatling guns, &c., which are to be placed on the spar-deck and worked by spur-gear on vertical shafting, and fed with ammunition by elevators beneath the main ship-shield B. The band *k* is intended to intercept all small missiles which might find their way through the observation-slits W.

In order to insure the buoyancy and stability of the vessel, I propose to pack the cellular sides of the ship at *n n n n*, above and below the main ship-shield B, with cotton chemically prepared to resist fire, or other suitable buoyant and elastic material, which will close up after the passage of shot, and prevent the entrance of water. Percussion-shell striking a vessel will not explode until after passing through the cellular sides, and they will make clean round holes, which will be immediately closed by the cotton or other elastic material with which the sides are packed, and the particles of the shell striking the main ship-shield will be deflected far above the water-line, the shield protecting the buoyant material on the far side from being blown out.

I consider the double-convex form of armor, as represented by the drawings, as the best form for the protection of men and guns; but plano-convex shields can also be used to advantage under certain circumstances.

A deflecting-shield similar to the main ship-shield B B, but considerably shorter, can be constructed on the spar-deck, which could be plated to exclude shot which might be deflected upward from the main shield, and guns can be mounted broadside under this deflecting-shield.

My invention, in brief, aims to protect the vital parts of the hull of a vessel with an interior convex deflecting-shield, the top of which is placed near the water-line, preferably above it, and to exclude the water which would follow after shot by packing the cellular sides with cotton prepared to resist fire, or other suitable buoyant and elastic substance, thereby insuring the buoyancy and stability of the vessel. Having thus protected the hull, I place separate deflecting-shields on the spar-deck for the protection of men and guns, and one for the protection of the commanding officers, from which to direct the combat, these deflecting-shields being placed several feet above the main ship-shield B B, with the intermediate space between the upper and lower deflecting-shield as free and unobstructed for the passage of shot as is compatible with the requirements of a sea-going vessel, because the less resistance that is offered to the passage of shot the less injury will be received by the vessel.

In the vessel shown in Fig. 3 the ammunition for the guns is elevated into the shield through vertical columns C′, which also serve to support the shield. Ammunition may, however, be elevated into the shield through a central column, C, in which case it will not be necessary to turn to a certain fixed station in order to load the gun.

I am aware that it has been proposed to build iron-clads with circular hulls having inclined upper surfaces and cylindrical turrets with vertical sides, and also that it has been

proposed to build passenger-steamers with cabins elevated above the hull, so as to allow the free access of the sea to the space between them. Hence I do not claim broadly inclined armor-plating or the formation of a space between the hull and upper works of a vessel; but

I claim as my invention—

1. The combination, in a war-vessel, of a hull having a deflecting-shield, B, with a turret or gun-shield presenting to horizontal, or substantially horizontal, shots an acute-angled deflecting-surface only, said turret or gun-shield being elevated above the shield B, as described, whereby a practically-unobstructed passage for shot between the two is afforded, as set forth.

2. The combination, in a war-vessel, of a turret or gun-shield shaped exteriorly as described with an armored hull above which the said turret or gun-shield is elevated, whereby a practically-unobstructed passage for shot beneath the turret is afforded, as set forth.

3. The combination, in a war-vessel, of a hull having a shield, B, of deflecting form, with a turret or gun-shield elevated above the said shield B, shaped so as to present to horizontal shots an acute-angled deflecting-surface and capable of turning independently of the hull, as set forth.

4. A war-vessel in which a double-convex or plano-convex gun turret or shield is supported above a hull-protecting shield, B, of deflecting form, so as to provide a passage for shot between the two, as specified.

5. The combination, in a war-vessel, of a hull having a shield, B, of deflecting form, with a deflecting turret or gun-shield elevated above the same, and with one or more armored and hollow columns crossing the space between the shield B and elevated turret, as set forth.

6. The combination of the main hull-protecting shield B, of deflecting form, with the deflecting-turret supported above the same by a series of concentric tubes through which shot can pass without materially affecting their supporting properties, as set forth.

7. The combination, in a war-vessel, of a hull having a deflecting-shield, B, and a plate, A, supported above said shield, with a turret or gun-shield supported by and turning upon said elevated plate A, which forms part of the under surface of the turret, as set forth.

8. The supplementary deflectors P, of convex cross-section, secured to the projecting portions of the guns, to protect the latter from injury by side shots, as set forth.

9. The combination of the main hull-protecting shield of deflecting form, the deflecting turret or shield elevated above the same, and the intermediate deflectors, Y, as set forth.

NATHAN B. CLARK.

Witnesses:
EDMUND B. SEYMOUR,
W. BAIRD PATTON.