

(No Model.)

N. B. CLARK.
Armored Vessels.

No. 231,899.

Patented Sept. 7, 1880.

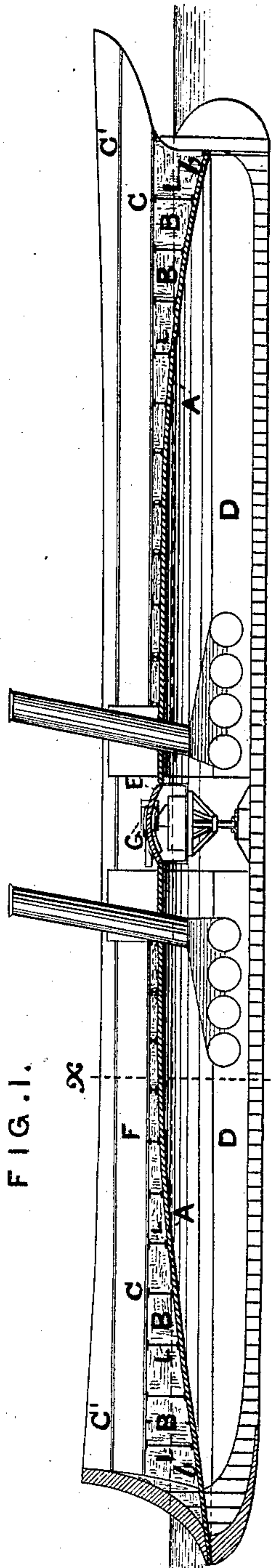


FIG. 1.

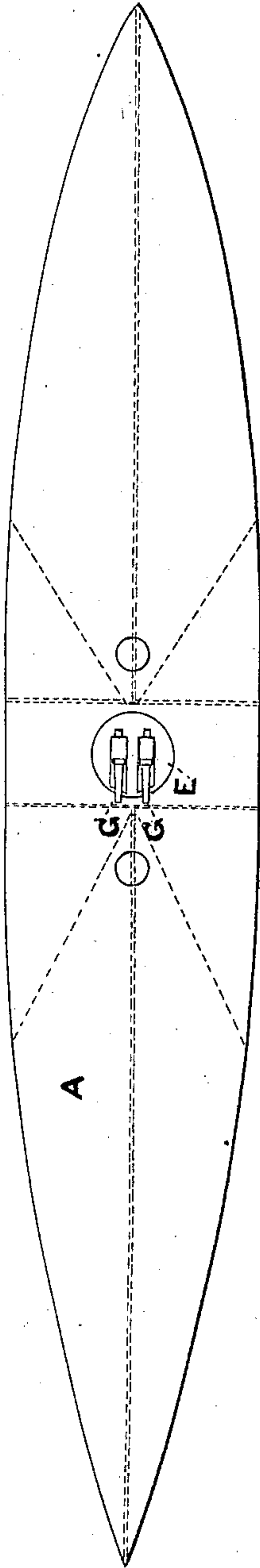


FIG. 3.

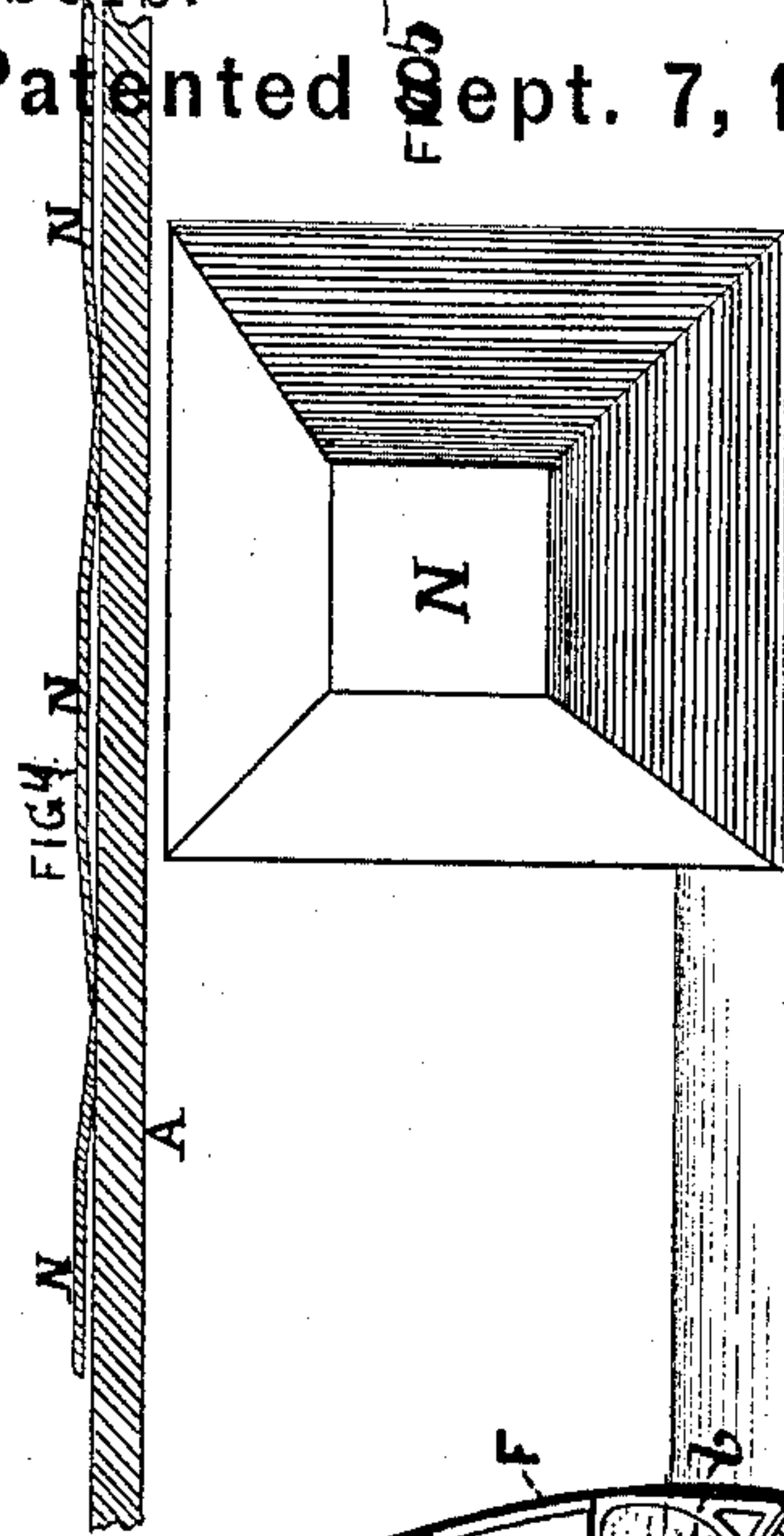
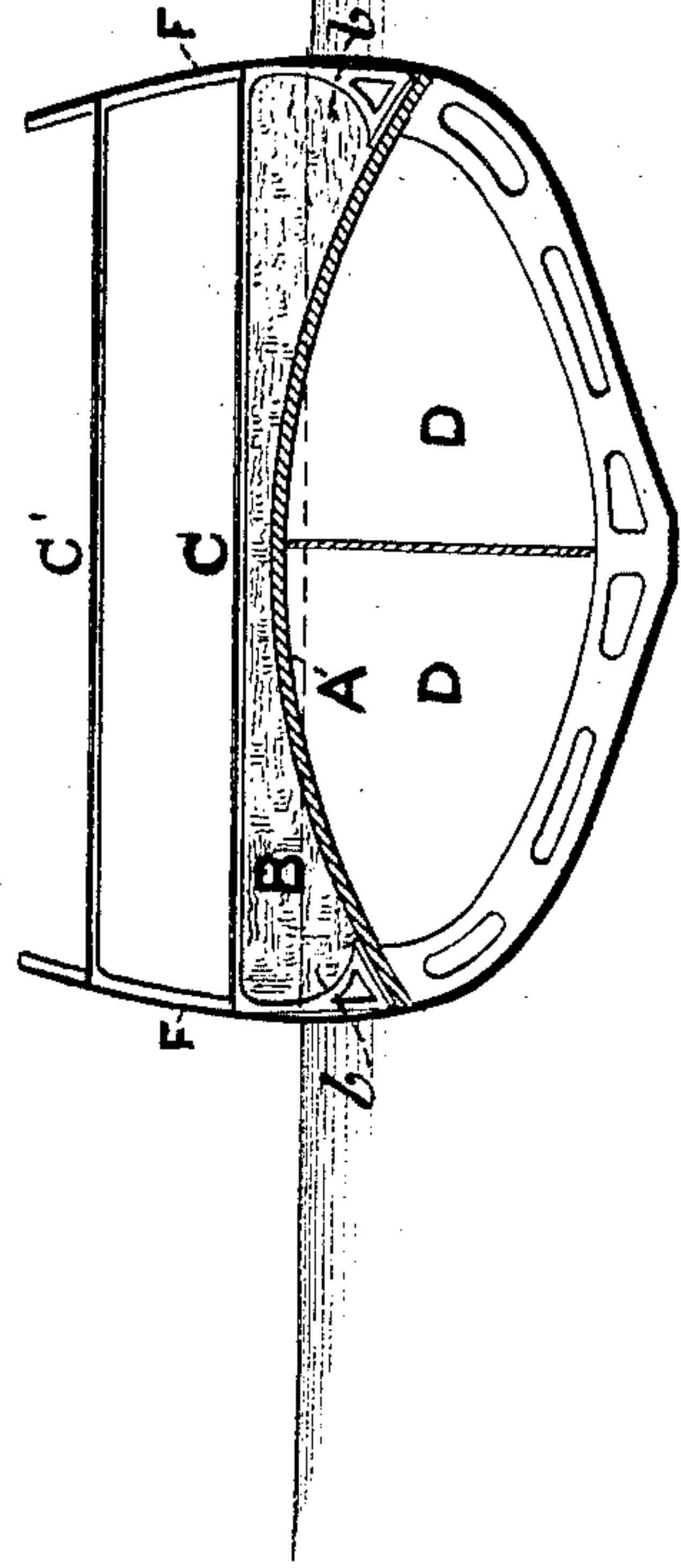


FIG. 2.



WITNESSES.

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ARMORED VESSEL.

SPECIFICATION forming part of Letters Patent No. 231,899, dated September 7, 1880.

Application filed June 9, 1880. (No model.)

To all whom it may concern:

Be it known that I, NATHAN B. CLARK, a citizen of the United States, and a resident of Germantown, Philadelphia, county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Armored Vessels or the Method of Protecting Vessels with Armor, of which the following is a specification.

Experience proves that projectiles from modern guns will pierce any armor a ship can carry provided they strike at or near right angles to the plane of its surface. I therefore propose to dispose the armor to deflect the shot, and will not try to resist the irresistible.

Reference being had to the accompanying drawings, Figure 1 is a longitudinal sectional elevation of a steam war-vessel armored with my internal convex deflecting-shield. Fig. 2 is a transverse section, on an enlarged scale, through the line *xx* of Fig. 1. Fig. 3 is a plan view of the shield.

The object of my improvement is to protect the vital parts of a war-vessel by means of an internal convex deflecting-shield so disposed within the hull as to present to a horizontal shot at the water-line a surface inclined at an acute angle, which shall remain practically constant through all positions assumed by a vessel while rolling and pitching, thus deflecting the shot from the parts whose protection is essential and offering the least possible resistance to its passage through other portions to which injury is of comparatively trifling consequence.

By not attempting to interpose a direct resistance to the passage of projectiles I am enabled to use much lighter armor and to distribute its weight in a manner most conducive to the strength and seaworthy qualities of the vessel.

In the drawings, D represents the hull of a vessel, within which is placed the convex deflecting-shield A, preferably constructed of steel, three (3) inches more or less in thickness. This internal convex deflecting-shield extends downward on either side and at each end to such a depth that its edge shall always remain beneath the water-line under all conditions of rolling and pitching. I deem it suf-

ficient to allow as a maximum of rolling, under conditions where combat is possible, a departure from horizontal of twenty (20) degrees. The shield rises amidships to a point slightly above the water-line. I prefer that the portion thus exposed shall not exceed one-half the depth of the shield. It will thus be seen that the curve of the transverse section, which may be the arc of a circle, is determined by three conditions given—namely, the breadth of beam of the vessel, the submersion of the edge of the shield during a roll of twenty (20) degrees, and the exposure of not more than one-half of the total height of the shield above the water-line when in its normal position.

The sides F F of the vessel are extended upward above the shield, and the decks C C' are placed above it. The space between the convex surface of the shield and the deck C above it is divided into numerous water-tight compartments, B B B, by means of transverse and longitudinal bulk-heads L L L. These compartments are filled with cork, cotton, wood, or other suitable buoyant and elastic material, or by air-tight metallic canisters, and the cellular water-tight sides of the ship above and below the shield are also to be packed with cork, cotton, or other similar buoyant and elastic substance that will close up after a shot and prevent the entrance of water, the cotton to be rendered fire-proof by alum or other suitable chemical means. Beneath this internal convex deflecting-shield is placed the magazine, the motive power, steering-gear, and the personnel, except such as may be stationed elsewhere during an action.

It will be seen that the part of the vessel which is above the internal convex deflecting-shield A is not intended to and does not present substantial resistance to the passage of projectiles, but may be completely riddled without injury to the efficiency of the vital parts of the ship, since a shot striking the vessel's side would plow through the cork, which, being elastic, would fill up after it and prevent the entrance of water, and, striking the deflecting-shield, would be deflected upward and outward above the water-line. It therefore follows that the buoyancy and stability of the ship cannot be materially affected by the penetra-

tion of shot above the edge of the convex deflecting-shield, the compartments B B B being prevented from filling with water by reason of the cork or other buoyant material with which they are packed.

It follows from the form of the shield A that its weight is distributed in almost direct ratio to the displacement of the parts of the vessel under it, and therein differs advantageously from vertical armor. Tied in by the chords of its arc and supported on longitudinal and transverse bulk-heads, the shield adds great strength to the ship and distributes the shock of ramming to the whole vessel, the shield extending forward as the beak of a ram.

Wherever openings are made in the internal convex deflecting-shield for hatches, ventilators, guns, &c., the armor is to be brought up square or level all around, and when the angle has to be made more obtuse the armor must be thickened.

Fig. 4 is a longitudinal sectional elevation of internal convex deflecting-shield, A, covered with sliding deflectors N N N, which are intended as a safeguard against square-headed punching-shot. It is proposed to cover the entire surface of the internal convex deflecting-shield with these sliding deflectors, which are made of sheet metal, square in form, and dished as represented, so as to act as a stiff spring, and beveled on all four sides, so as to freely slide over each other, and loosely attached to the main shield, like shingles on a roof, only in reverse order, the object being to ride projectiles striking them up the convex surface of the shield.

Fig. 5 is a plan view of the sliding deflectors N N N. The sliding deflectors may also be formed like shingles. The sliding or auxiliary deflectors are to be slightly attached, by means of tap-bolts or screws, to the main shield.

I am aware that it is not new to protect vessels by a curved plating commencing below the water-line and enveloping exteriorly the upper portions of the hull. My method, however, differs from this in that I make no attempt at protecting the upper works of the ship, and hence am enabled to construct my shield with so flat a curve that a very acute and practically constant angle is presented to a horizontal shot, notwithstanding the rolling or pitching of the vessel, and consequently my armor need not be constructed of as great a thickness as would be necessary were it disposed so as to directly resist the impact of a shot, as must be the case where protection of the entire upper portion of the vessel is attempted; whereas my shield serves merely as an interior deflecting-plate, protecting the vital parts of the ship and permitting the penetration of all other portions with the least resistance compatible with a sea-going vessel.

I am also aware that it is not new to construct vessels with water-tight compartments

filled with cork or other equivalent material. My present invention, however, consists of water-tight compartments filled with cork or its equivalent, above the convex surface of the interior deflecting-shield, so as to prevent the entrance of water, thereby insuring the buoyancy and stability of the vessel.

I am also aware that it is not new to construct a vessel with armor inclined at the sides, extending below the water-line, with flotation secured by water-tight compartments above the submerged portion of the armor; but this armor presents a plane flat surface, which, as the ship rolls, presents a constantly-varying angle to a horizontal shot, and one which at its maximum would not fail to be penetrated by projectiles from modern guns, while my convex deflecting-shield presents a practically constant angle of impingement so acute as to not permit of penetration.

I am also aware that vessels have been constructed with the parts of their flat decks situated below the water-line, over the boilers, plated with armor to protect them by impact from the fragments of shell exploding within the hull above them. This, however, differs from my convex deflecting-shield both in the location and form, and in no sense serves as a deflecting-shield, but merely as a direct shield against vertical impact.

I am also aware that vessels have been constructed with an armored deck, plane and flat, excepting such slight spring transversely as is usually given to decks, extending forward and downward, forming the beak of a ram; but such armor presents a constantly-varying angle of impingement to a horizontal shot as the ship rolls, and therefore differs materially from my convex deflecting-shield, the object being merely to support the ram.

What I claim as new in the above-described improvements, and desire to secure by this patent, is as follows:

1. The combination, with the hull of a vessel, of the convex deflecting-shield described, extending over the vital parts of the ship, and having submerged edges, and the light penetrable upper works surmounting said shield, substantially as shown and described.

2. In combination with the aforesaid internal convex deflecting-shield, A, the water-tight compartments B B B, filled with cork, cotton prepared to resist fire, or other equivalent material, which prevents water from entering although they were riddled with shot, thereby insuring the buoyancy and stability of the vessel.

3. The combination, with the shield described, of external water-tight compartments filled with cork, cotton prepared to resist fire, or similar material, substantially as described.

4. In combination with the aforesaid convex deflecting-shield, the water-tight cellular sides of the ship above and below the shield,

filled with cork, cotton prepared to resist fire, or other suitable buoyant elastic substance that will close up after a shot and prevent the entrance of water.

5. The combination, with a thin inclined deflecting-shield, of square auxiliary deflectors, each one dished and having beveled edges,

and all placed edge to edge on the main shield, so as to entirely cover the same, substantially as set forth.

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Witnesses:

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