G. B. Manley.

Armor Clad.

No. 37,402. Patented Jan. 13, 1863.

Fig. 2

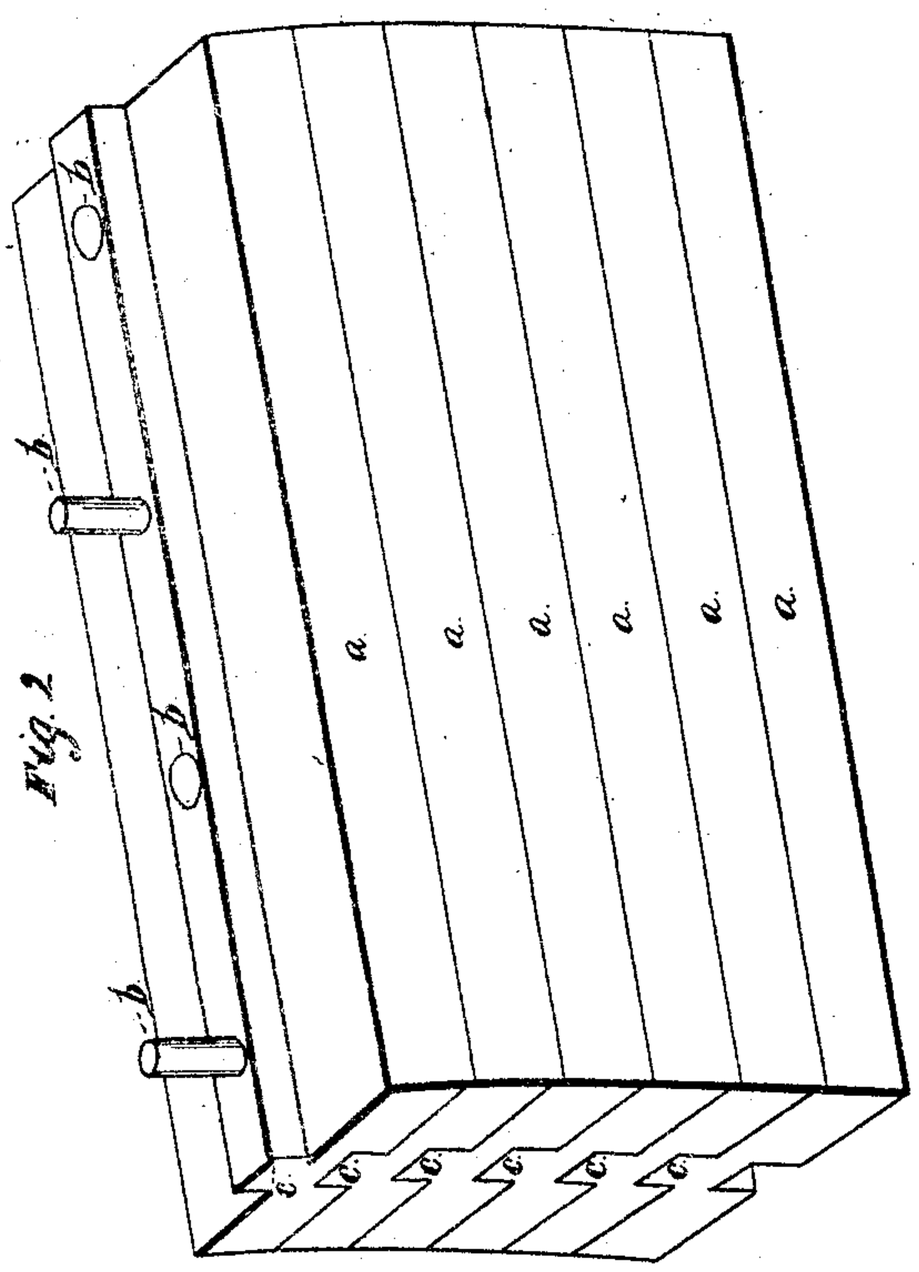


Fig. 4.

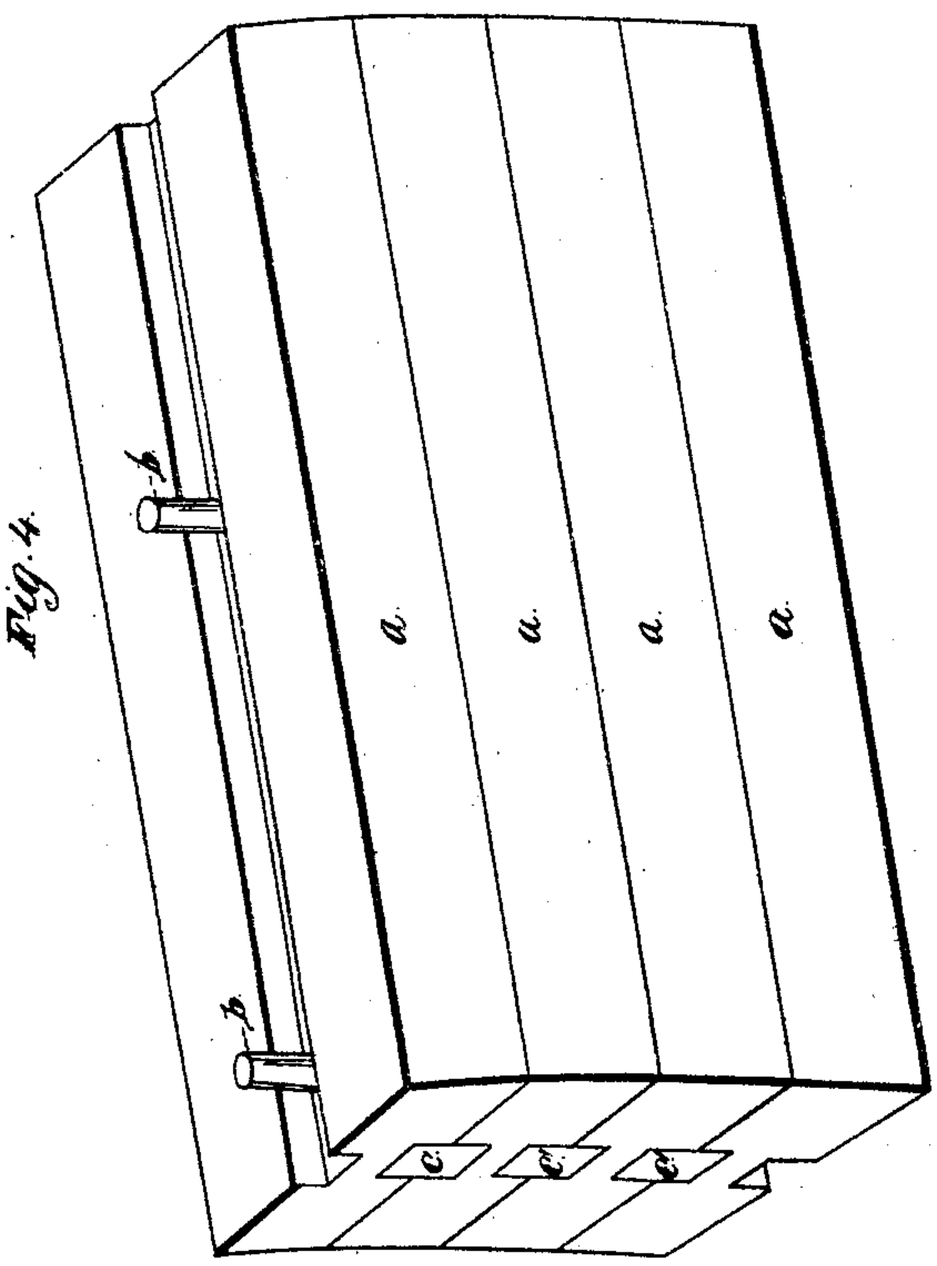


Fig. 1.

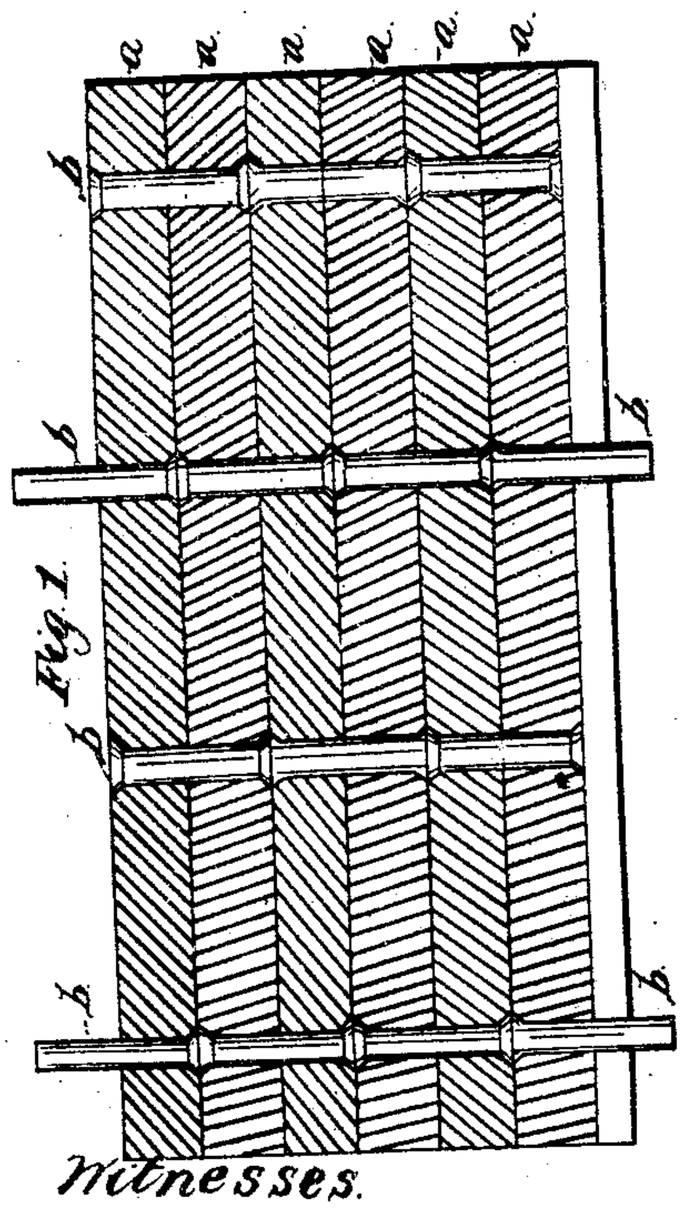
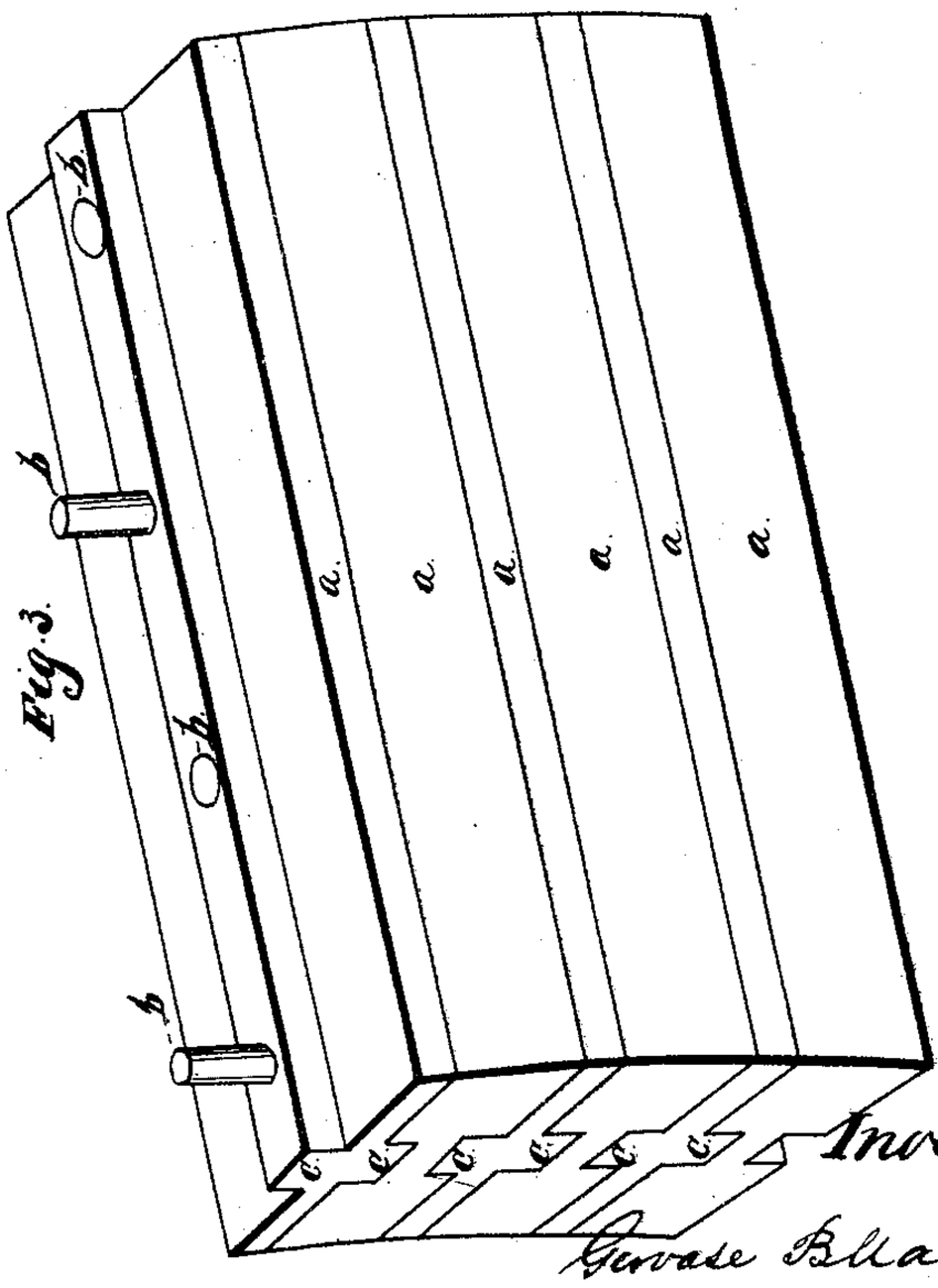


Fig. 3.



Witnesses.

E. G. Heyburn

H. D. Heyburn

Inventor.

Gervase B. Manley

UNITED STATES PATENT OFFICE.

GERVASE B. MANLEY, OF DANVILLE, PENNSYLVANIA.

IMPROVED DEFENSIVE ARMOR FOR SHIPS AND OTHER BATTERIES.

Specification forming part of Letters Patent No. **37,402**, dated January 13, 1863.

To all whom it may concern:

Be it known that I, GERVASE B. MANLEY, of Danville, county of Montour, and State of Pennsylvania, have invented a new and useful Improvement in Armors for War-Vessels and Fortifications; and I do hereby declare that the following is a full, clear, and exact description of the construction of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a vertical longitudinal section of a portion of armor for war-vessels and fortifications, being a number of tongued and grooved bars, *a*, placed together and fastened by means of rivets *b*. Fig. 2 is a perspective view of the same. Fig. 3 shows a modification in the construction of the bars, one set of alternate bars having tongues on each side, and the other alternate bars having corresponding grooves, the tongues of one set of bars fitting in the grooves of the other set. Fig. 4 shows another modification in the construction of the bars, all the bars being grooved on each side and united by means of independent tongues.

Like letters in all the figures represent the same parts.

The nature of my invention consists in the construction of the sides and decks of war-vessels with bars of wrought-iron or steel, which are tongued and grooved and fitted together in the manner which I will hereinafter describe.

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

In Figs. 1 and 2, *a a a a a a* represent a series of bars of rolled wrought-iron or steel, which constitute a portion of armor for war-vessels and fortifications, the bars being held together by rivets *b*, placed at suitable distances apart, each rivet passing through two or more bars. Instead of rivets, bolts with a head on one end and a nut on the other may be used, if preferred. The bars are constructed with a tongue, *c*, on one side and a corresponding groove in the other, running throughout their whole length, so that the tongue of each bar fits in the corresponding groove of an adjacent bar. The bars should be about two inches in thickness, and may vary in width from four to eight inches, according to the strength required for the armor in war-vessels, but in the walls of fortifications the width may be greater or the thickness of the walls may be increased by having two or more layers of bars placed transversely. The grooves should be equal to one-half the thickness of the bars, so as to produce a uniform thickness in the latter.

In Fig. 3 I show a modification in the construction of the bars, one set of alternate bars having tongues on each side, and the other set of alternate bars having corresponding grooves on each side, so that the tongues of one set of bars may fit in the grooves of the adjacent bars.

In Fig. 4 I show another modification in the construction of the bars, each bar having grooves in each side, there being independent tongues *c'*, which unite the bars together.

Bars of wrought-iron and steel constructed as described can be readily constructed by the usual process of rolling, so as to fit snugly together, without being subjected to the tedious and expensive operation of planing incidental to the construction of tongued and grooved plates.

It will appear evident that the walls and decks of vessels can be constructed entirely of these rolled bars without the necessity of wooden hulls, as the rivets or bolts passing through the middle of the bars and at right angles to their broad surfaces, hold them together so securely as to give great stiffness to the vessels. Wooden hulls of vessels already constructed may be advantageously covered with these rolled bars, and which will be less expensive than hammered plates. The expense of my improved armor, according to accurate calculations which I have recently made, does not exceed one-half of that of the armor heretofore used. It will evidently appear that by tonguing and grooving the sides or broad surfaces of the bars and confining them together by means of rivets or bolts, as represented, that much greater stiffness is secured to the armor than when thick plates or slabs are used and placed with their broad surfaces parallel to the planes of the vessels or fortifications.

I am aware that metallic armor-plates have before been laid in planes perpendicular to the surfaces to be protected, and have been secured by tonguing and grooving, and by horizontal and vertical bolts in various ways.

I am also aware that the principle of securing bodies of wood or metal together by means of dowels or bolts passing through tongues and grooves is not new in itself; but

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

The combination of the plates *a*, tongues *c* or *c'*, and bolts or rivets *b*, when the said plates are placed in planes perpendicular to the surfaces to be protected, the bolts or rivets passed directly through the tongues in the center of the plates and perpendicularly to the latter, and all the parts constructed, arranged, and secured in the manner and for the purposes specified.

GERVASE B. MANLEY. [L. S.]

Attest:

E. G. HEYLMUN,

H. D. HEYLMUN.