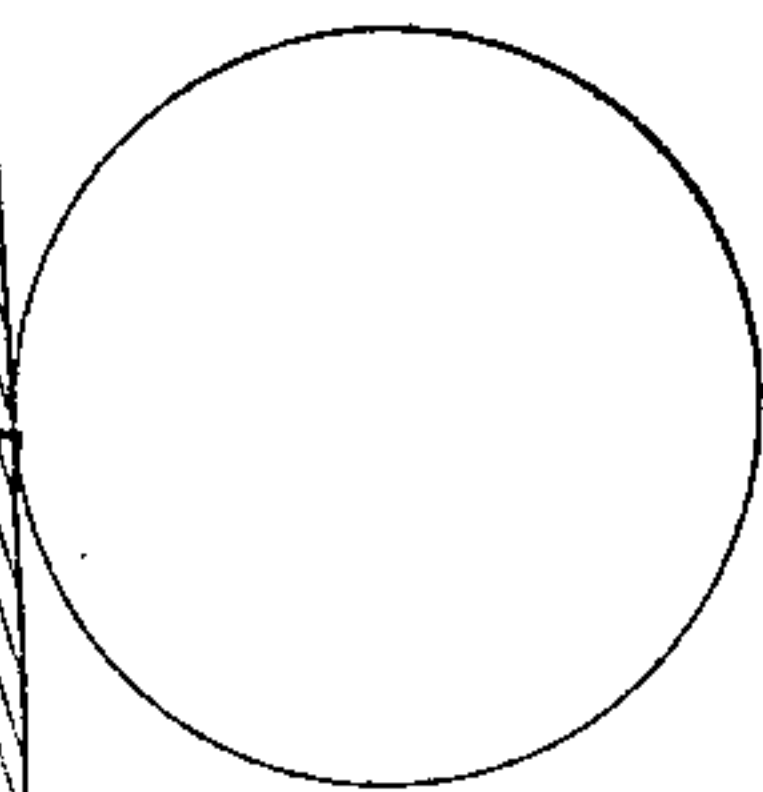
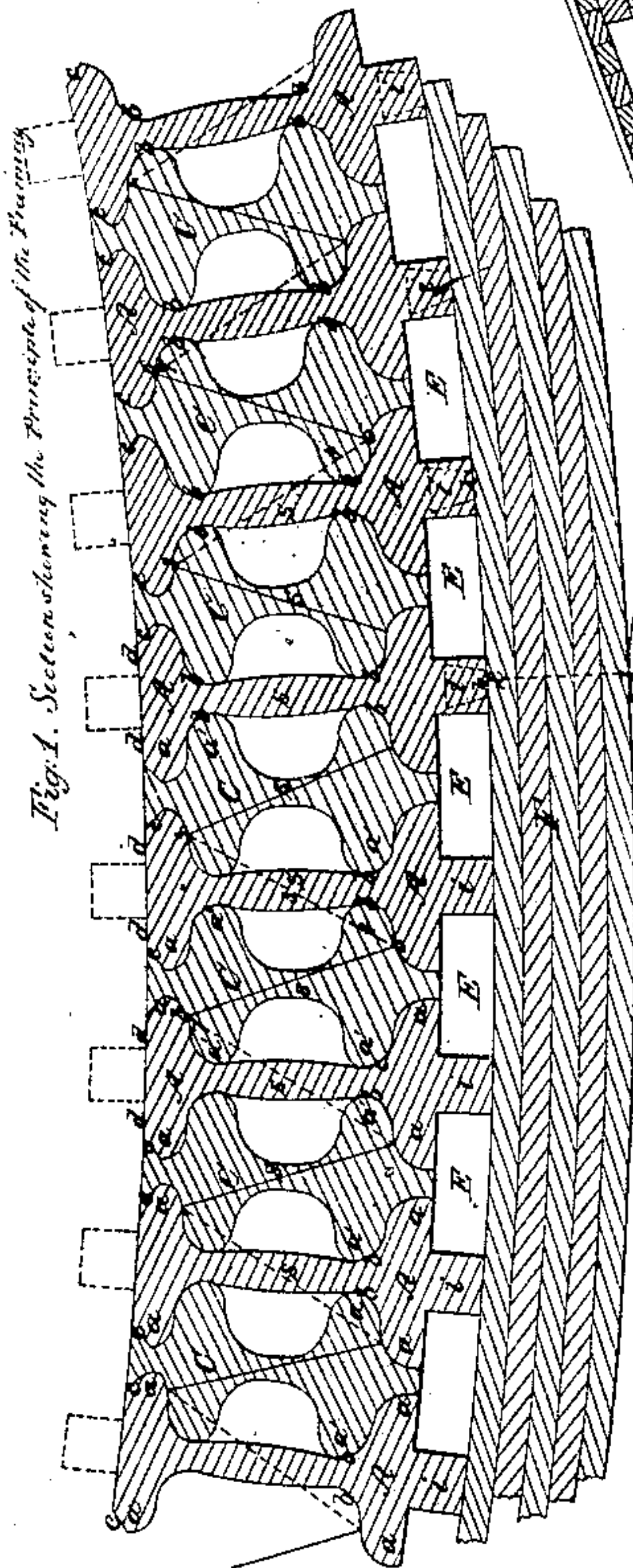
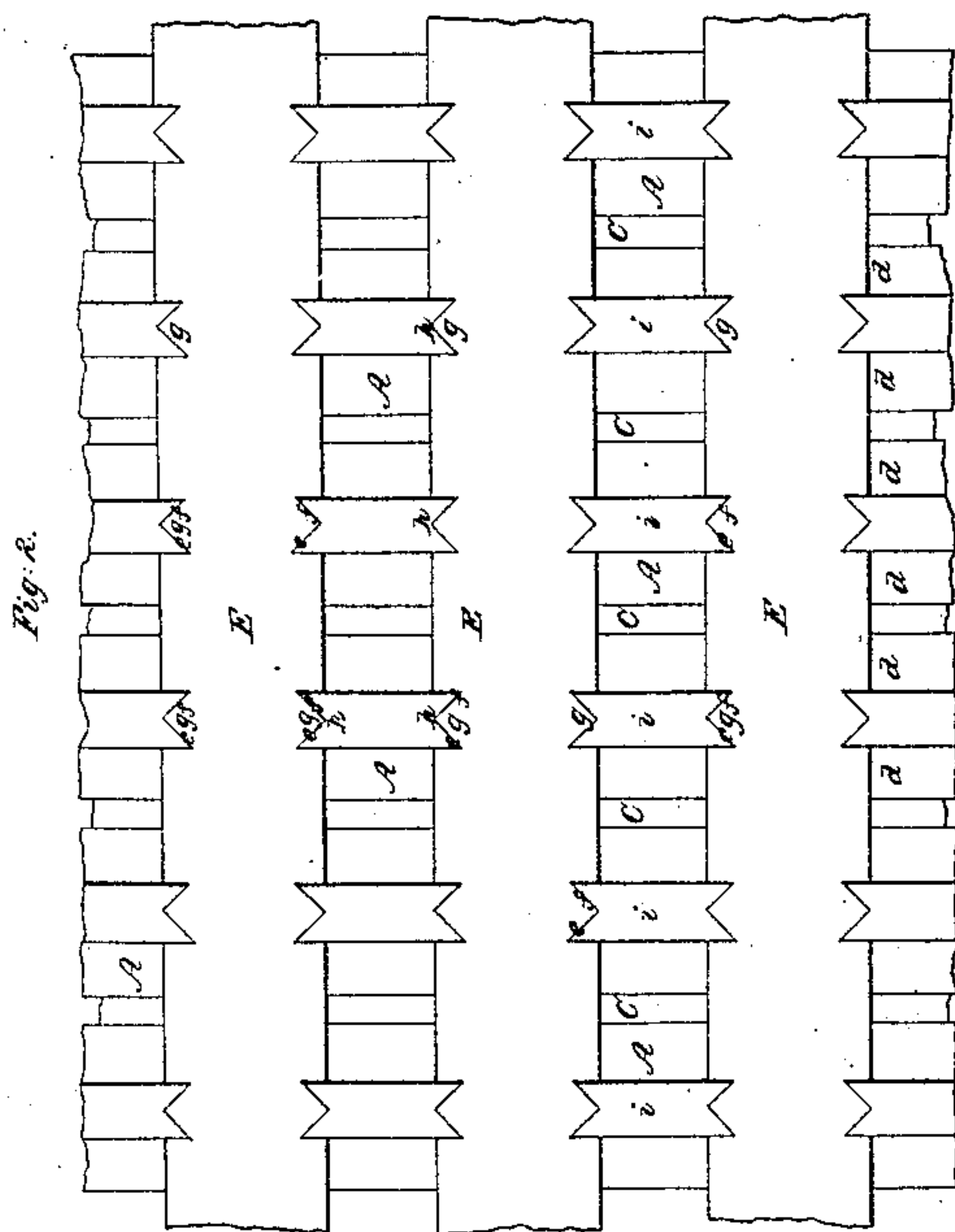
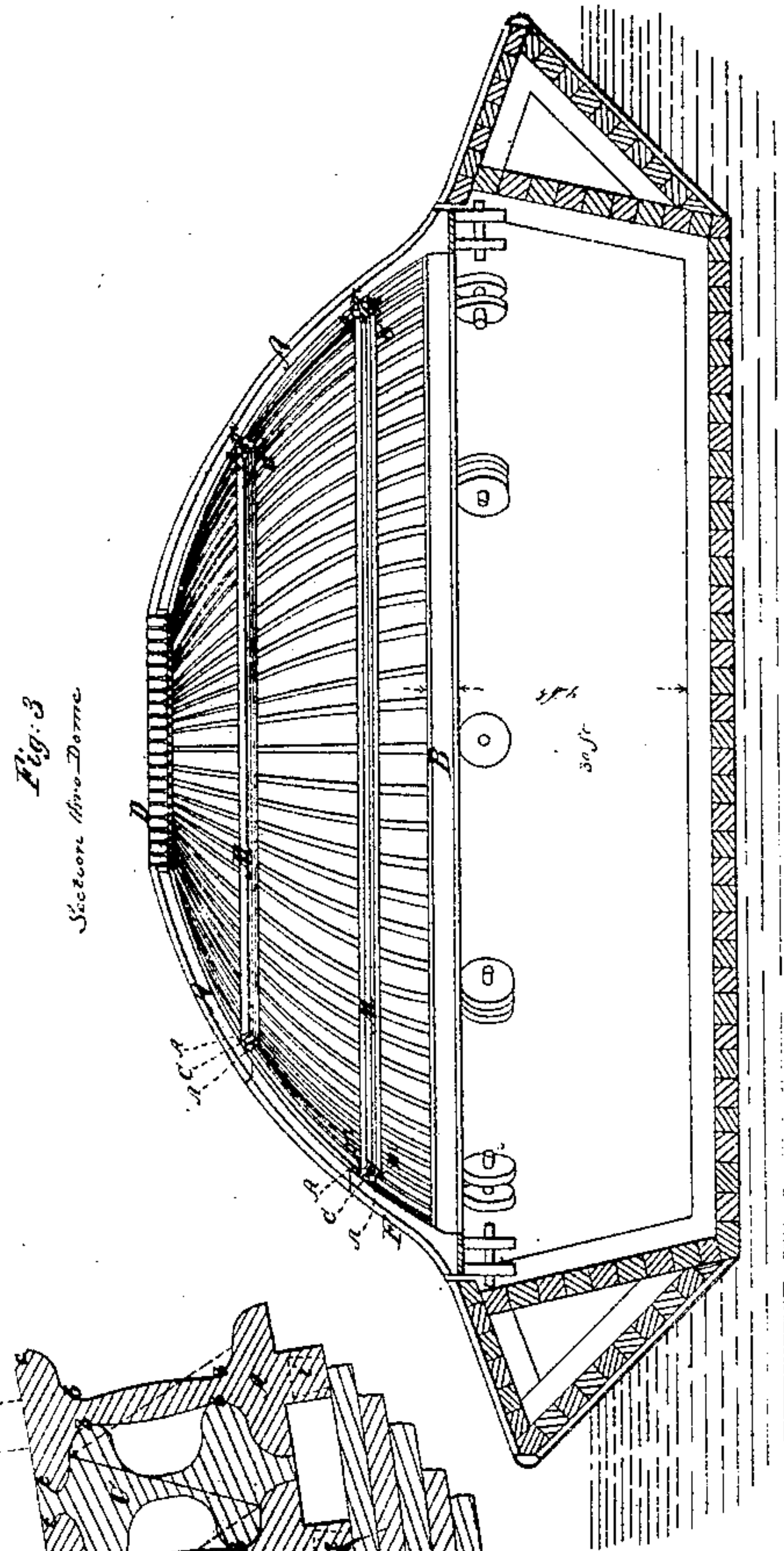
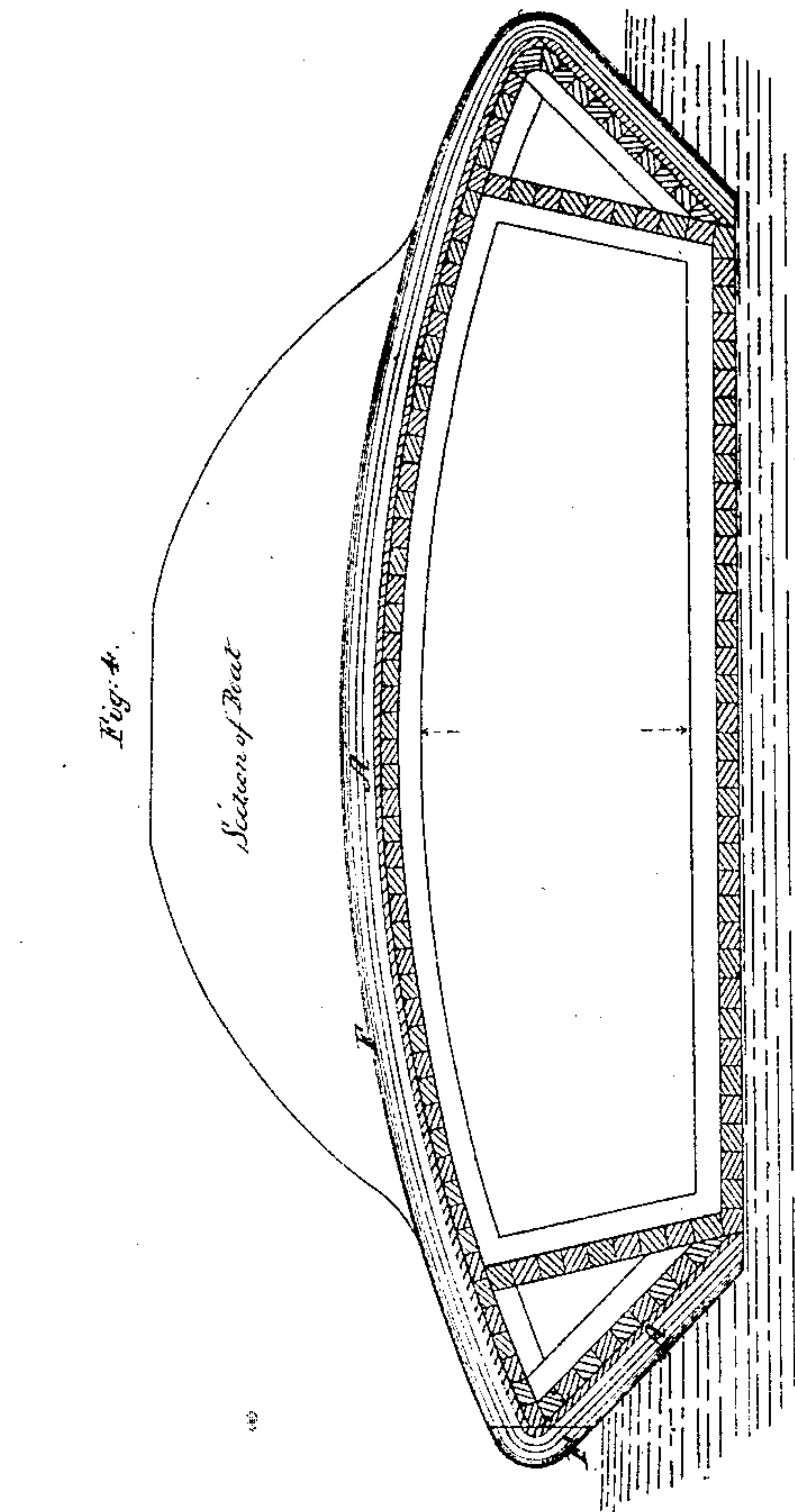


*W. Rumbold.*  
*Construction of War Vessels.*

*Steel 1-2 Sticks.*

*Nº 35,895.*

*Patented Jul. 15, 1862.*



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*W. Rumbold*  
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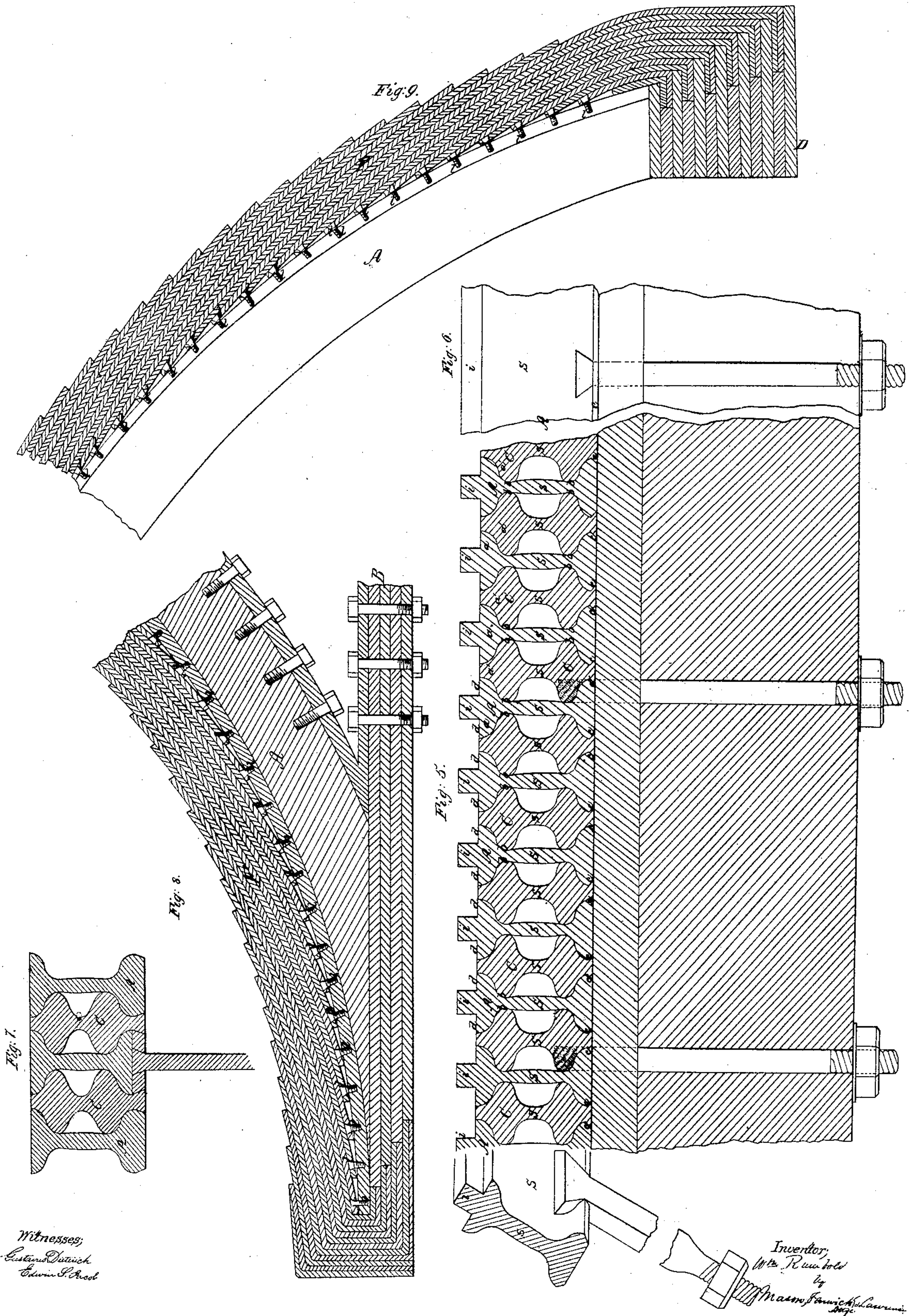


*W. Rumbold.*  
*Construction of War Vessels.*

*Sheet 2-2 Sheets.*

*N<sup>o</sup> 35,895.*

*Patented Jul. 15, 1862.*



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# UNITED STATES PATENT OFFICE.

WILLIAM RUMBOLD, OF ST. LOUIS, MISSOURI.

## IMPROVED CONSTRUCTION OF THE DEFENSIVE ARMOR OF SHIPS.

Specification forming part of Letters Patent No. **35,895**, dated July 15, 1862.

*To all whom it may concern:*

Be it known that I, WILLIAM RUMBOLD, of the city and county of St. Louis, and State of Missouri, have invented a new and useful Improvements in Disposing Iron for Forming Ball-Proof Domes and Armor to War-Vessels and other Defensive Structures; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a horizontal section of my invention as applied in the erection of a revolving dome for a war-vessel. Fig. 2 is an elevation of the same as before the defensive plating or clothing is applied. Fig. 3 is a transverse section of a war vessel and dome embodying my invention. Fig. 4 is a similar section of the vessel, the dome being in elevation. Fig. 5 is a cross-section showing my invention as applied to the sides or deck of a war-vessel. Fig. 6 is an elevation of the same. Fig. 7 is a modification of the form of the parts adopted in carrying out my invention. Figs. 8 and 9 show a modification of the mode of applying the plating or clothing.

Similar letters of reference in each of the several figures indicate corresponding parts.

The nature of my invention consists in so forming and disposing iron beams relatively to one another in the construction of a revolving war-dome for vessels, or in the construction of a foundation for defensive plating or clothing, that the shock produced by the force of a cannon-ball is transmitted or distributed from the point of concussion throughout the whole circumference of the dome, or along the whole length of the side or deck of the vessel, and thus penetration or destruction by the ball at any one point obviated to a very great degree, my invention at the same time presenting a light but very durable structure, and admitting of any desired thickness of superstructure of metal beams and of plating or clothing being employed, and obviating the injury due to "bolting through," as practiced in many methods heretofore devised.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

To apply my invention in the construction

of a war-dome, a number of wrought-iron beams, A A, curved to the contour of the desired structure, are placed vertically upon a ring-base, B, in close proximity to each other, but not in contact. These beams are constructed with front and rear flanges *a* on both sides, which flanges are curved, so as to act as sockets, at *b b*, and are beveled, as at *c c*, so as to act as tongues, and squared, as at *d d*, so as to act as shoulders. Between the beams A A other wrought-iron beams, C C, which are curved and shaped to match the flanged portions of those, A A, are placed, as shown in the drawings in Figs. 1, 2, and 3. The web or central portion, *s*, of the two sets of beams are made narrower than the flanged portions *a a'*, and while the flange portions of the two sets touch and work upon one another after the manner of knuckle-joints, these central portions do not touch, but have large spaces existing between them. The upper ends of the beams A C, as well as the lower ends thereof, abut against ring-frames, as indicated at B D, and the two sets of beams are tied together by means of strong cylindric bands E E, which have double dovetail recesses *e f* cut in their edges and V-shaped tongues *g g* formed between these recesses. These bands are placed around the skeleton dome and their V tongues enter V-shaped recesses *h*, formed in raised ribs or beads *i* of the beams A by cutting away a portion of said ribs, as shown in Fig. 2. The dome thus far constructed supports and holds itself together without the aid of through-bolts.

The plating F or other character of plating may be applied in any approved manner; but the plan illustrated in Figs. 8 and 9 I would suggest as being the best. In this plan any number of sheets of iron or steel—say, about one-eighth to one inch in thickness—may be used, and the number for the clothing may be from thirty to ninety sheets, according to the resistance required. These sheets are fastened only at their lower ends, their upper ends being left loose.

To construct a foundation for the plating or clothing to a war-vessel, the beams A C are made longitudinally to conform to the contour of the vessel, and are placed side by side one another, tied together, and bolted to the framing of the vessel, as shown in Figs. 5 and 6 of



the drawings; and the same course is pursued in applying the invention to casemates, land-batteries, and other war structures.

To illustrate the operation of my improved disposition of metal beams, we will suppose that a cannon-ball strikes the covering or plating of a dome or ship at the point 1, (but will throw this point into 2.) The instant it strikes the point 2 the force passes down to the point 3, causing the beam 3 to deflect according to the power acting and then bearing on the beam 4 at 5, which again transmits the force on the beam 6 at 7, and so on throughout the circle or line. The same is the effect in an opposite direction. Thus the force will act without material injury or fracture of the iron, as the interlocking or bracing action of the beams insures a uniform distribution or transmission of the same throughout the structure, except in such instances when a cannon-ball strikes with sufficient force to penetrate the whole plating, &c.

It will be seen that the double dovetailing in the tie-bands is very important, for if a ball cuts its way through the whole covering or plating and through the tie-bands the double dovetails will still hold the adjoining beams as firmly as though no cut had been made, and, in fact, if twenty holes were thus cut through the superstructure below, the plating remains firm and united by the aid of these double dovetails.

In practice it may be deemed best to plate the vessel and dome with plates in the manner shown in Figs. 5 and 6, in which case dovetail ribs may be formed on the plates and dovetail grooves cut in the beads *i* of the beams, as shown by dotted lines at *k*, Fig. 1. The plates themselves might also be dovetailed upon one another by means of tongues and grooves of dovetail form; but, as before stated, the plan of plating shown in Figs. 8 and 9 may be found the most advantageous and effective, because in it no fastenings which are depended upon to hold the plating to the vessel are exposed, as will be evident by referring to *l l*, Figs. 8 and 9. Again, a large amount of surface of iron is presented to the ball. Again, a pliant loose body of metal to receive the ball is obtained, and, finally, if a ball should penetrate a portion of the sheets it would probably (owing to the upper ends of said sheets being loose and there being a number of separated surfaces to contend with and the same inclined) be glanced upward and out between said loose ends instead of being held in and compelled to go in a direct line through the remaining sheets, by reason of fastenings at the upper ends of the sheets.

Another mode of applying the plating to the dome is to roll out curved sheets the same length as the beams and about an inch in thickness. These sheets might be tongued and grooved on their edges and their upper and lower ends shaped so as to tenon into mortises formed in the ring-frames B D, while the tongues of one plate enter grooves of another. Thus two or more layers of plates may be applied, as circumstances may require, without bolting through the plates or the superstructure.

My invention is a very important one, as it enables me to construct those parts of a war-vessel which are now known as "turrets" and "towers" with a curved or spherical surface without the aid of heavy internal supports or foundations, which style of surface is far more effective in deflecting balls than flat or conical surfaces, or even cylindric surfaces.

Previous to my invention dome-shaped war towers or turrets have not been constructed, and therefore I desire to be protected in the so disposing and forming metal beams that such towers or turrets may be constructed so as to support themselves against ordinary force of cannon-balls without the aid of internal frame-work or truss-bracing other than the skeleton superstructure or dome upon which the plating is applied.

In the drawings at M M, Fig. 3, I have shown a plan of applying an internal layer of beams A C, for the purpose of giving additional strength to that portion of the dome in which the port-hole is formed. This layer of beams A C is placed horizontally, and the respective beams A are held in place by shoulder-pieces *m m*, as shown. This additional strengthening-layer may never be necessary, but I have deemed it proper to make provision for all contingencies.

What I claim as my invention, and desire to secure by Letters Patent, in the construction of war-domes and war-vessels and other defensive structures, is—

1. So forming and arranging, relatively to one another, metal beams A C that the force of a cannon-ball or other force is transmitted in an indirect line from the point of contact, substantially in the manner and for the purpose set forth.

2. The combination of the beams A C and tie-bands E E, the whole constructed and applied together substantially in the manner and for the purpose described.

WILLIAM RUMBOLD.

Witnesses:

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EDWIN S. JACOB.