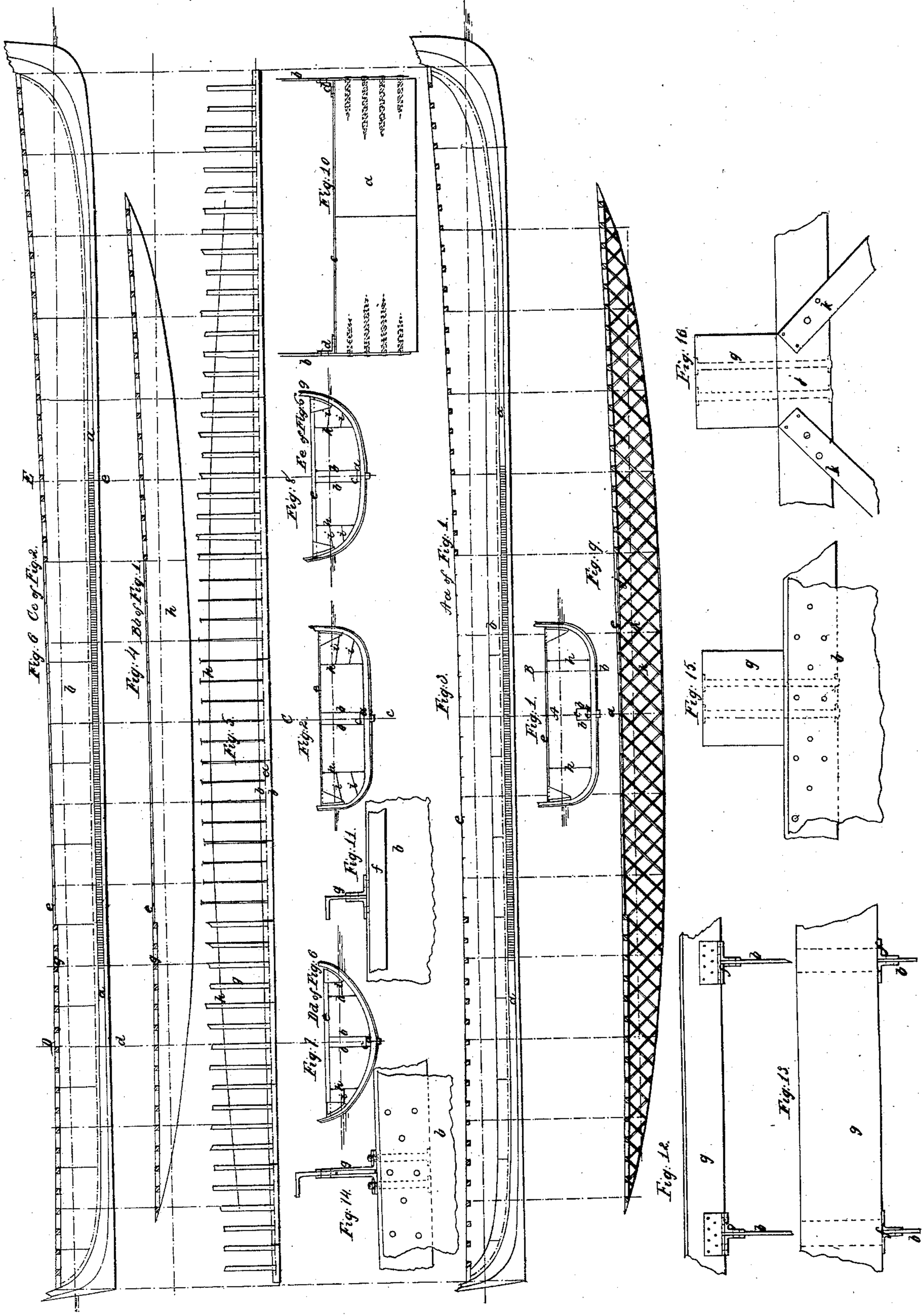
J. W. Griffith.

Building.

No. 11,784. Patented Oct. 10, 1854.



UNITED STATES PATENT OFFICE.

JOHN W. GRIFFITH, OF NEW YORK, N. Y.

IMPROVEMENT IN CONSTRUCTION OF SHIPS.

Specification forming part of Letters Patent No. **11,784**, dated October 10, 1854.

To all whom it may concern:

Be it known that I, JOHN W. GRIFFITHS, naval constructor, of the city, county, and State of New York, have invented certain new and useful Improvements in the Construction of Ships, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a midship vertical section of a ship on my improved plan; Fig. 2, a like section of a modification. Fig. 3 is a longitudinal vertical section taken at the line A *a* of Fig. 1; Fig. 4, a like section at the line B *b* of Fig. 1. Fig. 5 is a plan of the deck to represent the line of the longitudinal bulk-head and the extension of the keelson; Fig. 6, a longitudinal section taken at the line C *c* of Fig. 2. Figs. 7 and 8 are cross-sections taken at the lines D *d* and E *e* of Fig. 6. Fig. 9 is a longitudinal section as a modification of Fig. 4. Figs. 10, 11, 12, 13, 14, 15, and 16 are sections on an enlarged scale representing the manner of forming the connections.

The same letters indicate like parts in all the figures.

The history of nautical science and of maritime pursuits has established the fact that large ships, whether designed for sailing or steaming, are not strong in proportion to their size, for while the small vessel will, in some cases, bear to be sustained by the two ends having a moderate weight on board, the large ship will not bear stranding without injury. This disparity in the strength arises from two causes. First, the capacity increases as the cubes while the strength is only proportionate to the mass, and consequently as the squares. Secondly, the buoyancy and the weight are not commensurate in any vessel, and more particularly on large ships and steamers, inasmuch as it often occurs that a section of length at the ends of the vessel is much heavier than a section of equal length in the more buoyant parts, and it is well known that the very extremities of a ship must sustain the ground-tackle and other fixtures for the entire fabric, while the buoyancy is much less than the amount demanded by the weight of that section of the vessel itself. This will particularly apply to all longitudinally sharp vessels, and although it is no sign of defect in the model yet it bears in its effects upon the ship unmistakable evidence of the disproportion in the size and strength of the vessel, in the consequent effect upon the more buoyant sections, in sustaining the less buoyant but stronger and more weighty ends of the vessel; but while this is the manifest result of building longitudinally sharp and consequently long vessels, the consequences of a want of strength are equally manifest in the vessel having full ends, or with more buoyant bow and stern, when they have attained any considerable size, and (as a result) a proportion of length, although such vessel when in a state of rest is quite competent to sustain not only its own weight, but that which pertains to this particular locality, such as ground tackle, bowsprit, windlass, &c., yet when plunging into the waves in storms at sea she has too much buoyancy, and the bow cannot be kept down, the vessel is partially suspended by the ends, and any extension of pressure beyond the most moderate application of power has the tendency to break the bow; and if continued would part the two extremities from the more central section. Hence it is plain that while the ends of the long and longitudinally-sharp ships have not that support demanded by the weight, they must of necessity depend upon the more buoyant parts for the necessary support not furnished in their own sections, and, consequently, cannot be driven with a degree of power that would cause the overhanging end to protrude beyond the wave by which it is submerged without hazarding the most fearful consequences, particularly if propelled by steam. It is also equally clear that the long ship with full ends encounters difficulties equally insurmountable when driven in storms beyond the most moderate application of power. Thus it is quite manifest that all ocean steamships, as at present constructed, are propelled at a much heavier cost than is needful for the present amount of strength furnished or speed attained consequent upon the expense of their too powerful engines, the power of which can only be used in fine weather, when, in reality, it is not so much needed as in storms, and from this fact, and this alone, arises the great difference in the length of voyages of the trips across the Atlantic of the same ship beyond what is consequent upon bad shape or an ill-shapen

model. It is to obviate these difficulties that I have made the improvements described in this specification, and illustrated by the accompanying drawings, claiming not only the application of those principles of construction for increasing the strength of large vessels, but of any and every transposition of those principles continued to the extremities and taking a longitudinal position in the vessel, but also of applying it to iron in the construction of keelsons, whether side or center, in wooden vessels, which, while they may be so constructed as to occupy no more room than wooden keelsons are both lighter and stronger, and may be used as water-tanks for the use of the crew and passengers. The rights embodied in this invention extend to all iron bulk-heads in wooden vessels secured to the inside of the timbers or to the beams of the lower deck, or to a wooden keelson, gallows, or engine-frame running in parallel, diagonal, or curved lines, whether formed of riveted plates of iron, forming a continuous bulk-head, or formed of plates crossing at any angle secured to the timbers, ceiling-plank, or lower deck, and whether connected to the timber and deck by angle-iron or wood, and whether meeting at the center or at the extremities, or running in such direction as to cause it to terminate before reaching the extremities. The exclusive right is claimed of using iron timbers connecting the timbers or ceiling with the same, or uniting the beams and timbers by an iron partition, whether fore and aft, or in a diagonal or sweeping direction. The right to use iron keelsons for water-tanks in wooden vessels in whatever form and to whatever extent and for whatever purpose, whether to reduce the weight to increase the strength or to enlarge the capacity of vessels.

In the accompanying drawings, *a* represents the wooden keelson of the usual construction but not extending so high, to which is added the iron extension consisting of longitudinal plates *b b*, properly secured to the sides of the wooden keelson and extending from end to end of the ship and made of boiler or plate iron riveted together in the manner of making steam-boilers, or in any other suitable manner to obtain the required size and strength and to be water-tight. The two sides are connected together at top and bottom by plates *c c*, secured thereto by angle-irons *d d* and the bottom one resting on the top of the wooden keelson, and when the sides extend up to the deck *e* the top plate *c* may be omitted and the upper edges secured by angle-irons *f f* to the under side of the wooden beams *g*, as represented at Figs. 13 and 15, or if the beams be of iron in the modes represented in Figs. 11, 12, and 14. In this way the upper part of the keelson is made hollow and water-tight, so that it may be used as water-tanks by being suitably provided with the usual appendages of water-tanks, or if not used as water-tanks, being water-tight, they will add to the buoyancy of the ship in case of leakage, and as they extend the whole length of the ship and the plates of which the sides are made stand on edge, they will add greatly to the strength of the vessel with a very slight addition to the weight. The longitudinal bulk-heads *h h* are placed between the center keelson and the sides of the ship. They are to be made, like the keelsons, of boiler or plate iron and extending fore and aft, and although they may be made parallel I prefer to place them in a line slightly curved, as represented by the line *h*, Fig. 5. Each may be made of one thickness of iron, stiffened at intervals by stay-bolts or braces *i i*, extending to the side timbers, or they may be made hollow like the keelsons. They should extend from the lower or bottom timbers to the under-deck timbers, and secured thereto in the same manner as the keelsons, or in any other suitable manner.

Instead of making the bulk-heads and the keelsons as above described, they may be made in lattice-work of narrow plates *k*, as represented at Fig. 9, the plates being bolted together where they cross each other, and properly secured to longitudinal stringers *j* at top and bottom, and also to the deck-timbers at top and to the timbers or keelsons at bottom. This mode of construction, while it adds greatly to the longitudinal strength of the ship, with less weight than with continuous plates, has the advantage of presenting water-tight bulk-heads, dividing the ship into longitudinal sections for safety and for other purposes.

What I claim as my invention in the construction of ships is—

1. The method of increasing the strength of ships by vertical plates of iron extending up vertically from the keelson to one or more decks and secured to the keelson and deck and extending the whole length of the ship, substantially as described.

2. Giving additional strength to ships by means of longitudinal bulk-heads of plate-iron, and interposed between the center keelson and the sides of the ship and extending from the side timbers to the deck and secured to them, whether made water-tight or of open lattice-work, substantially as specified.

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Witnesses:

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