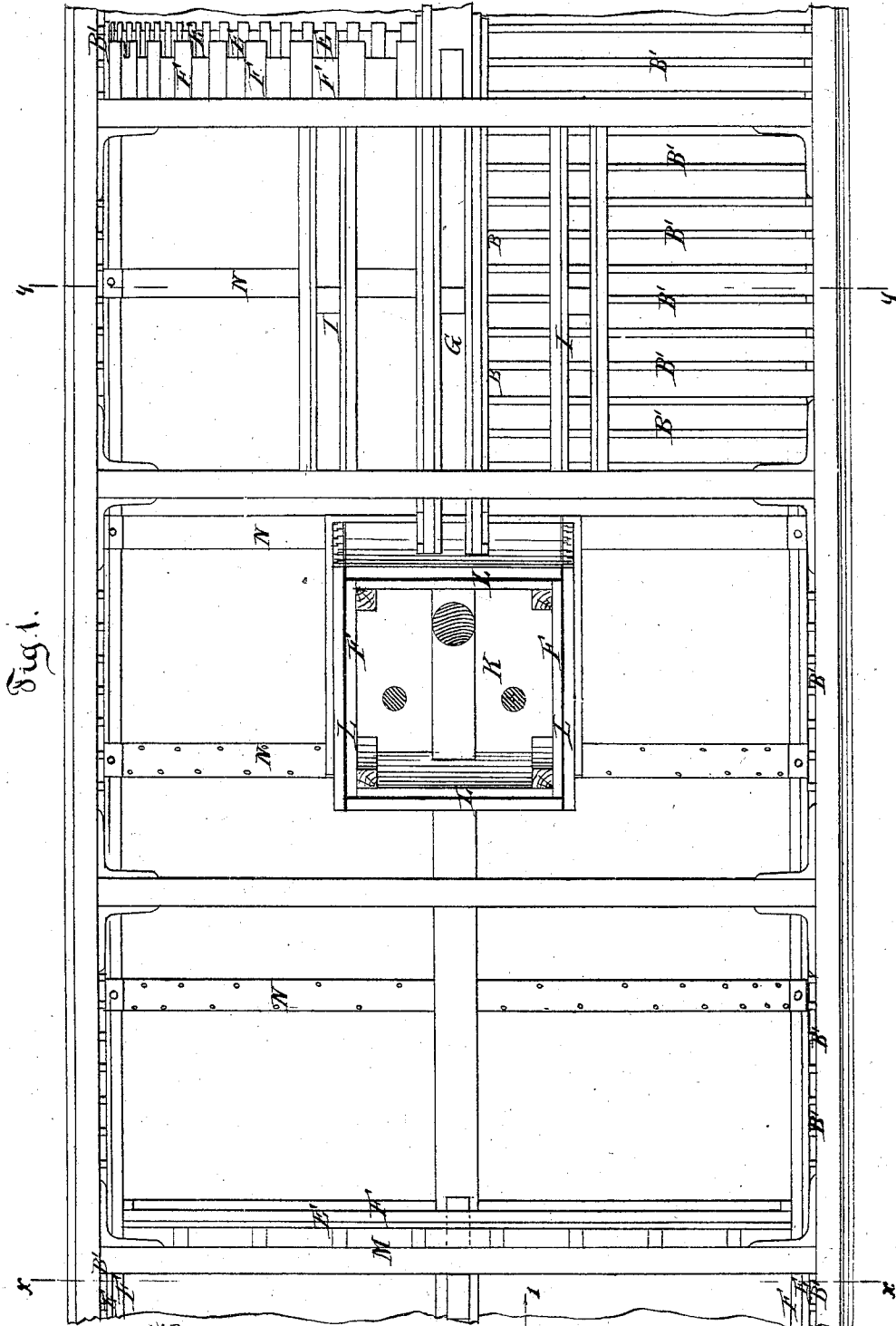


W. F. MORGAN.
Construction of Vessels.

No. 138,178.

Patented April 22, 1873.



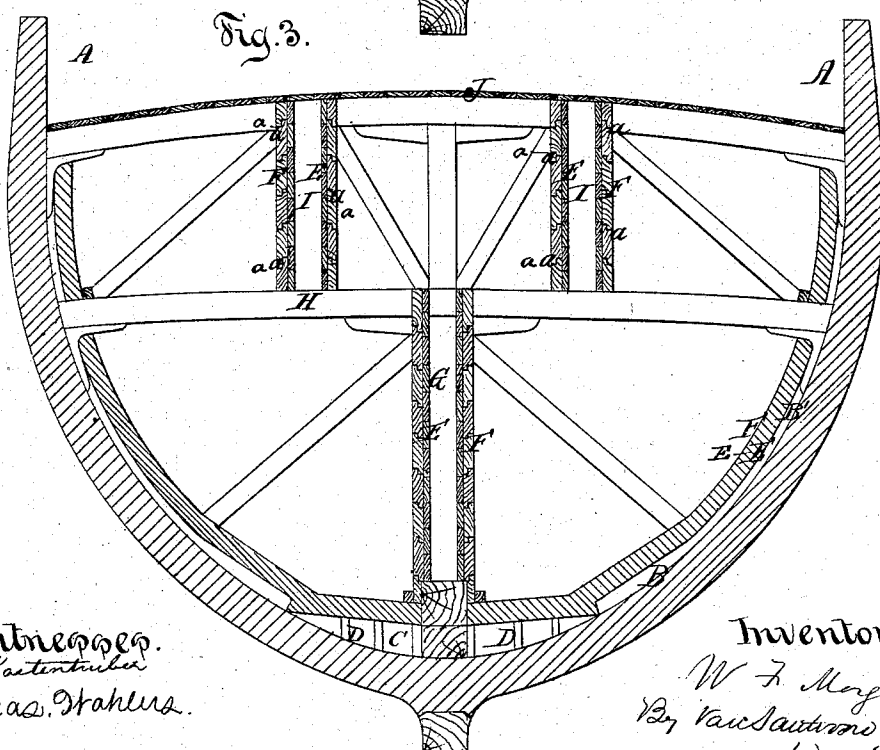
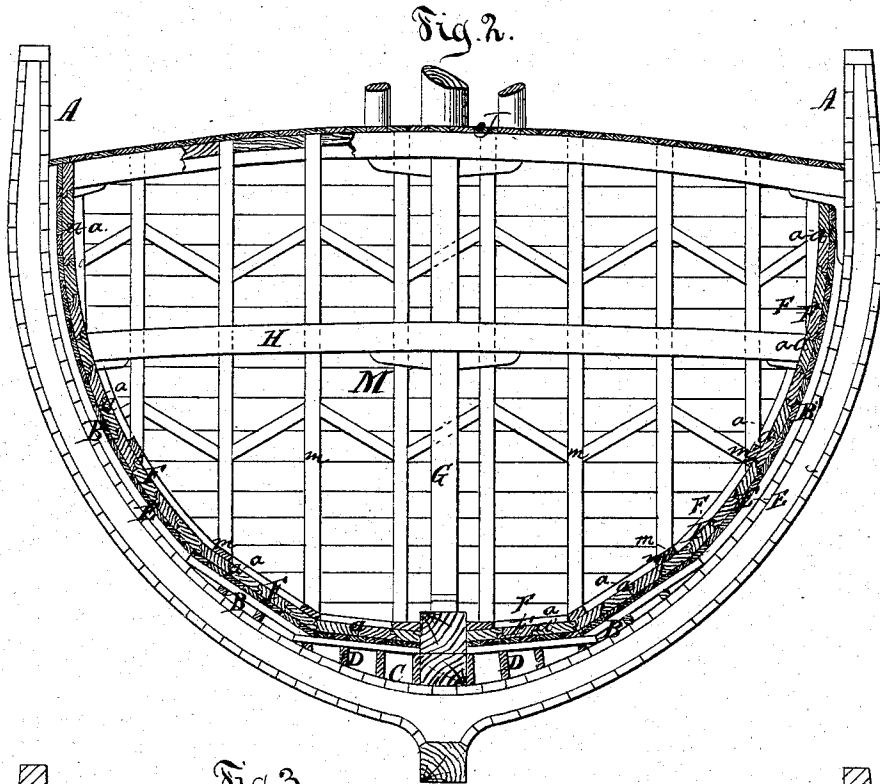
Witnesses,
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Chas. Winkler.

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UNITED STATES PATENT OFFICE.

WILLIAM F. MORGAN, OF NEW YORK, N. Y.

IMPROVEMENT IN THE CONSTRUCTION OF VESSELS.

Specification forming part of Letters Patent No. **138,178**, dated April 22, 1873; application filed February 21, 1873.

To all whom it may concern:

Be it known that I, WILLIAM F. MORGAN, of the city, county, and State of New York, have invented a new and useful Improvement in Ceiling Vessels; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawing forming part of this specification, in which drawing—

Figure 1 is a top view of the interior of a portion of a vessel which contains my invention. Fig. 2 is a transverse section taken in the line *xx* of Fig. 1, looking in the direction of the arrow marked 1 in Fig. 1. Fig. 3 is a transverse section taken in the line *yy* of Fig. 1, looking in the opposite direction.

Similar letters indicate corresponding parts.

This invention relates to ceiling and preparing ships or vessels for transporting grain in bulk or bags; and consists, among other things, in boarding the sides of vessels in a peculiar manner so as to prevent the grain from working through the joints and getting behind the ceiling or in the bilge, the first or inner boarding being formed of hemlock or other comparatively cheap stuff, laid close, edge to edge, and the second boarding being composed of boards rabbeted on opposite sides at their opposite edges so that the overlapping joints will not be thicker than the stuff, and a continuous smooth surface will be produced. This double boarding is carried up to the upper deck, or as high as necessary to be above the top of the grain.

To prevent injurious shifting of the grain from side to side of the vessel I divide the upper part of the hold or cargo space into compartments extending lengthwise of the vessel, by means of partitions or "shifting-plank," which begin at about the height of the lower deck and reach about to the upper deck, and I make the ordinary central partition or shifting-plank to stop at about the level of the lower deck, so that I, in this manner, divide the hold or bin, fore and aft, into five different longitudinal compartments. The hold is divided transversely into suitable compartments by means of end and center bulk-heads, which I construct and ceil in the man-

ner hereinafter explained in describing the bulk-head M, only with the difference that the central bulk-heads must be ceiled on both sides.

The letter A designates the inner sides of a vessel to which I have applied my improvement. I arrange upon the floor and sides of the vessel a system of sleepers, B, and furring B', which extend crosswise of the vessel, and which sleepers are supported over the bilge-space C, by means of uprights D, so as to leave the bilge unobstructed. These sleepers may be of hemlock joists, and they extend up to the height of the "bilge" C, and from their ends extend "furring"-strips B', up the sides of the vessel to the upper deck, forming continuations, as it were, of the sleepers. Upon the sleepers B and furring-strips B' is placed a layer of boards, E, square-edged, laid close to each other, and these are covered over with dressed boards, F, (pine being suitable for the purpose,) provided with rabbets *a*, arranged on opposite edges in reverse order, so that when laid the joints of the boarding F are of even thickness with the thickness of the stuff. The boards F are laid in such a manner that the rabbets which occur on the front face of the boards that extend up the sides of the vessel will be "down," or on the under side, so that any water which may find its way behind the sleepers and furring will have to rise over the edge of the rabbet after entering a joint from behind before it can pass through the boarding. The central framed partition, or shifting-plank, as it is technically called, rises from the top of the keelson to the height of the lower deck H, and the sides of its frame are doubled-boarded with square-edged boards E and rabbeted boards F in the manner already explained in respect to the covering of the floor and sides of the vessel. The central partition or shifting-plank G divides the space below the lower deck into two compartments fore and aft—that is to say, for the entire length of the "bin"—and the space above that deck is divided fore and aft, or for the length of the bin, into three compartments by means of partitions or "shifting-planks" I I, which extend from the level of the lower deck up to the main or upper deck J. The upper partitions or shift-

ing-planks I I have their stanchions covered with like double boarding E F, as shown in the drawing. The pump-well K (see Fig. 1) is in like manner protected by a boarding, F, provided with rabbeted joints, arranged as before described; and, as an additional security from leakage, I cover the outer sides of the well, before I apply the boarding F, with tar-felting L, or equivalent material, which will repel moisture and serve to cover and close any crevices which may exist in the walls of the well. I prefer to apply the felting in double layers or sheets for greater security. The felting should be laid well down on the bottom planking and well up underneath the deck to insure tightness at all points around the pump-well. The bulk-heads M, which form the ends of the bin or grain-space of the vessel, and of which only one is shown in the drawing, are built securely of suitable frames m, and the frames are double boarded with boarding E F on the inner side for the end bulk-heads, and on both sides for the intermediate bulk-heads. The bulk-heads must rest upon the floor-ceiling so as to avoid cutting the latter, and the floor-ceiling as well as that of the sides of the vessel extend, as shown in the drawing, beyond the bulk-head in order to let the bulk-head come directly against the surface of the combined ceiling both at the bottom and sides. The butt-joints of the ceiling, where the ends of the boards F come together, are covered by strips of canvas or other suitable flexible material, N, which will adapt itself to the natural movements of the ends of the boards when great strain is on the ship, and will yet serve to keep the joints tight at those places. The strips are nailed over the joints, as shown in Fig. 1 of the drawing in vertical lines, with large-headed wrought clout-nails, the edges of the strips being closely secured, but the strips are put on so as to allow plenty of play to avoid being torn away in the straining of the vessel. Like strips are placed over the butt-joints of the bulk-heads and shifting-planks, and in the angles where the bulk-heads meet the sides of the vessel, and where they meet the shifting-planks. The strips are also secured in such angle by suitable cleats.

A vessel ceiled in this manner has the following advantages among others: Water, which may collect in the bilge or find its way behind the joists and furring B B', cannot pass through the combined ceiling into the grain. The grain cannot pass through the ceiling into the space behind it, nor get into the bilge, nor pass through the walls of the

pump-well, and consequently the danger of choking the pump by grain is avoided. The upper portion of the grain, or that which in this example will be contained between the lower and upper decks, will be prevented to a great degree from shifting by reason of the upper partitions or shifting planks I I.

The stuff used in ceiling vessels in this manner can be readily taken out and used for many other purposes after being removed from the vessel, and the vessel itself is greatly strengthened and risks of voyages decreased by the improvement above described.

In ceiling ships or vessels for carrying grain in bags, I can omit the first boarding E, and use for ceiling the rabbeted boarding F.

The mode of ceiling ships above described enables me to avoid abrupt or broken surfaces, and consequently there is very little or no liability to the formation of crevices or breaks, which are a fruitful cause of danger to ships and damage to the grain, and at the same time a perfect ventilation is secured and the stuff used in ceiling can be readily removed and used for other purposes.

The tar-felting is placed also, when desired, between the inner and outer layers of boarding throughout the ceiling, as well as in that part around the pump-well.

In some cases it is desirable to retain the ceiling after the grain or other cargo is discharged, and in such cases proper ventilation is secured and maintained by means of temporary hatches or man-holes made in the false floor or ceiling, and in the side of the lower partitions and bulk-heads, so as to allow the air to pass through into the bilge and behind the ceiling, and thereby prevent injury from dampness and confined air. These temporary hatches and openings are, of course, closed perfectly tight when the bin or bins are to receive grain.

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

1. The combination, in ceiling the holds of vessels, of a boarding, E, with square joints, and a boarding, F, with rabbeted joints, constructed and applied substantially as shown, and for the purposes described.

2. The partitions or shifting-planks I I, arranged as described, to divide the upper part of the bin or grain-space, fore and aft, into three parts, substantially as described.

WM. F. MORGAN

Witnesses:

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