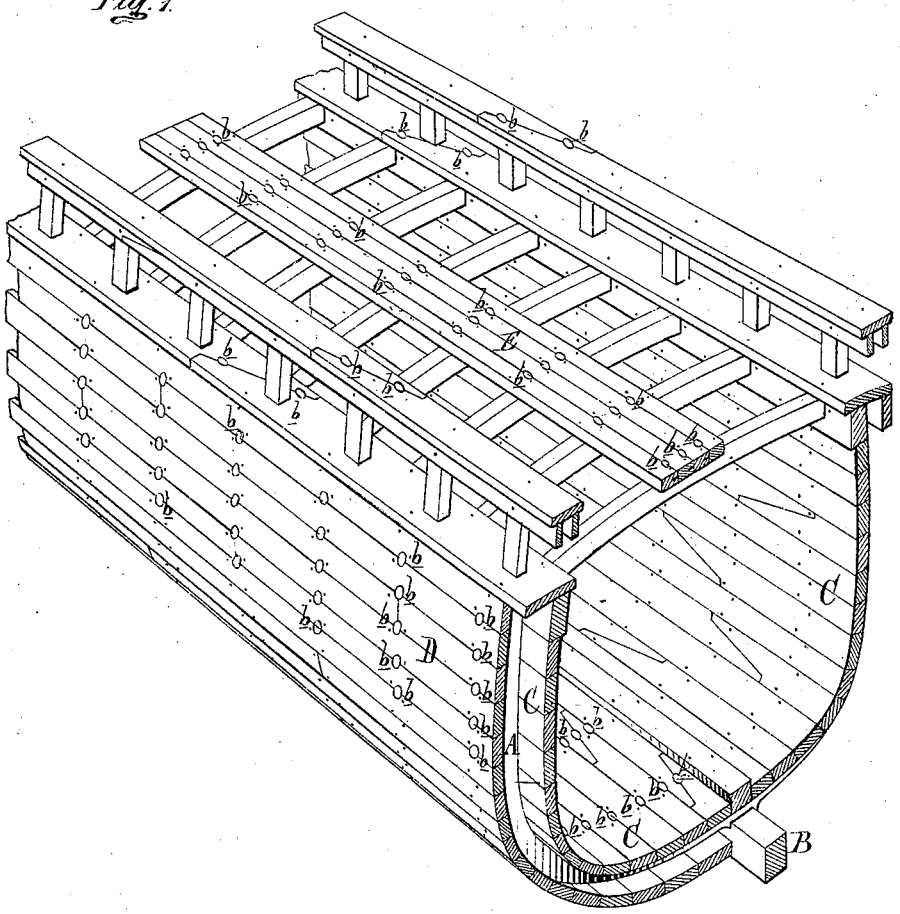
2 Sheets—Sheet 1.

H. SQUIER.

FASTENING HULLS OF WOODEN SHIPS.

No. 181,603. Patented Aug. 29, 1876.

Fig. 1.



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Edward Barthel.
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Inventor.
H. Squire
By Atty
Thos. S. Sprague

2 Sheets—Sheet 2.

H. SQUIER.

FASTENING HULLS OF WOODEN SHIPS.

No. 181,603. Patented Aug. 29, 1876.

Fig. 2.

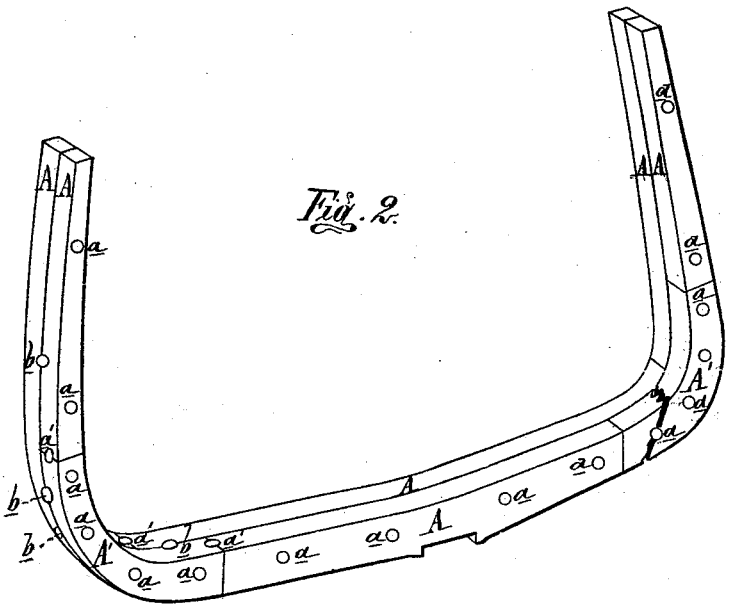
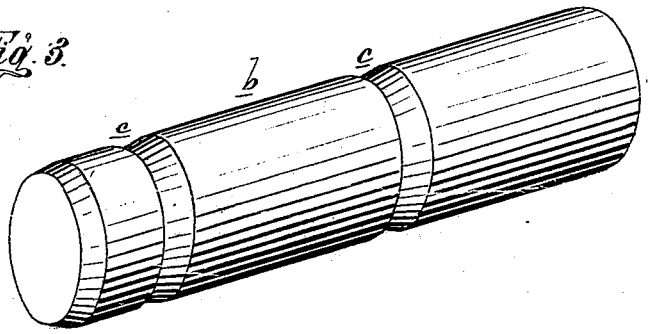


Fig. 3.



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UNITED STATES PATENT OFFICE.

HEBER SQUIER, OF GRAND HAVEN, MICHIGAN.

IMPROVEMENT IN FASTENING HULLS OF WOODEN SHIPS.

Specification forming part of Letters Patent No. **181,603**, dated August 29, 1876; application filed June 6, 1876.

To all whom it may concern:

Be it known that I, HEBER SQUIER, of Grand Haven, in the county of Ottawa and State of Michigan, have invented an Improvement in Fastening Hulls of Wooden Ships and other structures, of which the following is a specification:

In the construction of the hulls of wooden ships and vessels one of the chief elements of weakness is the frames of the hulls, which, being composed of several scantlings or flitches, are liable to work loose upon one another, and the futtock at the bilge of each frame is liable to work and split at one or both ends in the direction of the grain, under the strains to which the frames are subjected in a seaway.

Another element of weakness is the hogging strain upon the planking, ceiling, and other longitudinal streaks, tending to cause them to work one upon the other, and thereby wrench the frames, open her seams, and leak.

My invention consists, first, in keying the joining ends of the flitch and futtocks of each frame by halving a pin or treenail into the joining ends of both flitch and futtock, which prevents the scantling from working at the joint, and tends to prevent the futtock from splitting in the direction or line of the grain by the wedge-like effect of the pins in compressing the ends of the futtocks; secondly, as an additional fastening for the planking, ceiling, and all longitudinal streaks, or any of them, a cylindrical pin, or a treenail driven through and into the frame, in such a manner that it will be halved into the edges of contiguous planks, and also halved into the sides of contiguous members of each frame, thereby preventing the working of the timbers longitudinally upon each other, as well as the working of the members of the several frames upon themselves. This improvement is equally applicable to the fastening of scarf-joints, deck-planks, and all longitudinally-contiguous timbers of a ship's hull or other structure, where it is desirable to combine the strength of all the parts. Thirdly, in a peculiarly-barbed pin or treenail, employed for securing the timbers together.

Figure 1, Sheet 1, is a perspective view of a portion of a ship's hull embodying my improved system of fastening. Fig. 2, Sheet 2, is a perspective view of a frame, one of whose futtocks is fastened in the ordinary way, and shown split at one end, as frequently happens, while the other futtock is shown as fastened by my improved method, as is also that side of the frame. Fig. 3 is a perspective view of my barbed pin or tree-nail.

In the drawing, A represents the flitches or scantlings, which, with the futtock A′ at each bilge, compose a frame. These members of each frame are fastened together by transverse pins or treenails *a*, in the usual manner, when the frame is ready to be raised onto the keel B. Either before or after the frame is raised, I take a large auger and bore a hole laterally through the frame, through the middle of each joint formed by the abutting of a flitch against the end of a futtock, and halving the hole in each timber end. Into this hole I drive a wooden pin or treenail, *a′*, preferably of seasoned wood, which wedges the ends of the futtock, to prevent them from splitting in the direction of the grain, and, being halved into the joint, resists any tendency of the latter to work in a seaway. Where two futtocks abut together in large frames I key their ends in like manner, as also the abutting ends of floor-timbers. The bilge-streaks, ceiling, clamps, and shelf-pieces C, comprising the internal skin of the hull, are then bolted, pinned, or treenailed to the internal faces of the frames in the usual manner. I then take a large auger, and in the line of joints in each frame, and at the joint of contiguous planks or longitudinal timbers, bore a hole through the inner skin and into the frame, into which I drive a wooden pin, *b*, Fig. 3, which is thus halved into the skin-joint, as well as into the contiguous members of the frame. These pins *b* not only afford a means for securing the inner skin to the frame, in addition to the usual fastenings, but also prevent contiguous streaks of the skin and members of the frames from working upon one another. The planking D is then spiked onto the frames in the usual way, and then holes are bored at their meeting edges into the joints of each frame. Into each hole a wooden pin, *b*, is driven, for the purpose already described and set forth. The deck-planks E being spiked to their frames in the usual way, they are ad-

ditionally secured by the pins *b* driven through holes bored so as to halve their joining edges, and thus prevent them from working longitudinally upon each other. To increase the holding-power of the pins, I turn two grooves, *c*, in each, into which the timbers expand when the pin is driven into the hole, the grooves serving as barbs to prevent the pins from working out. If each hole be partially filled with tar before driving in the pin, upon driving in the latter the tar will be forced into the grain of the timber, and thus prevent it from rotting around the pin.

What I claim as my invention is—

1. The method of fastening the abutting-joints of a ship's frame, or the fastening of the longitudinal timbers to the frames, and keying the adjacent members to each other by key-pins halved into such joints or into the contiguous edges of longitudinal timbers and contiguous members of frames, substantially as described.

2. The wooden treenail described, consisting of a cylindrical body, *b*, having the groove *c*, constructed and arranged substantially as described and shown.

HEBER SQUIER.

Witnesses:

F. B. STOCKBRIDGE,

WM. M. FERRY.