(No Model.)

2 Sheets—Sheet 1.

# W. T. SYLVEN & G. W. COFFIN.

## KEEL FOR SHIPS.

No. 506,139. Patented Oct. 3, 1893.

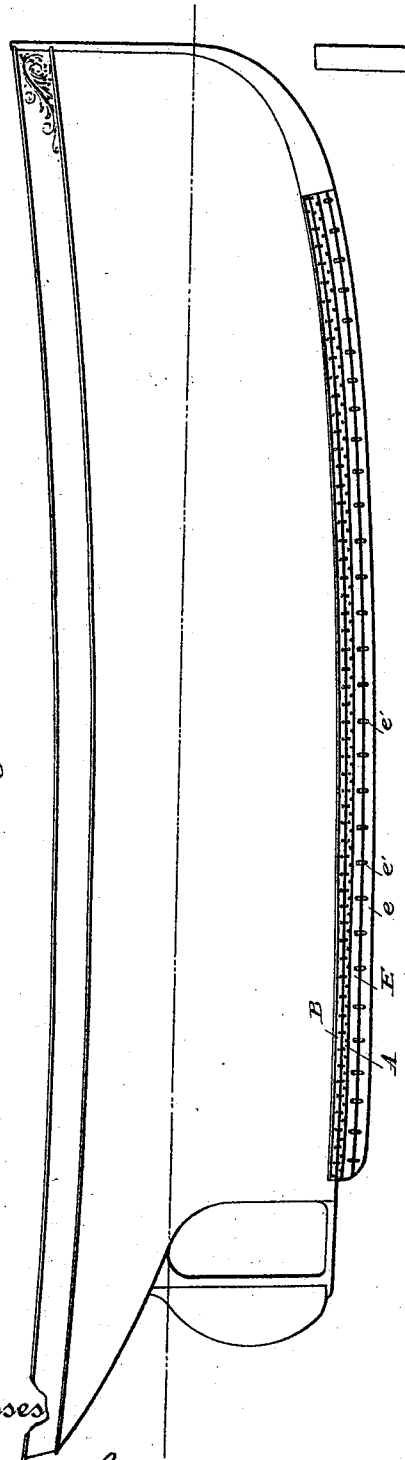


Fig. 1.

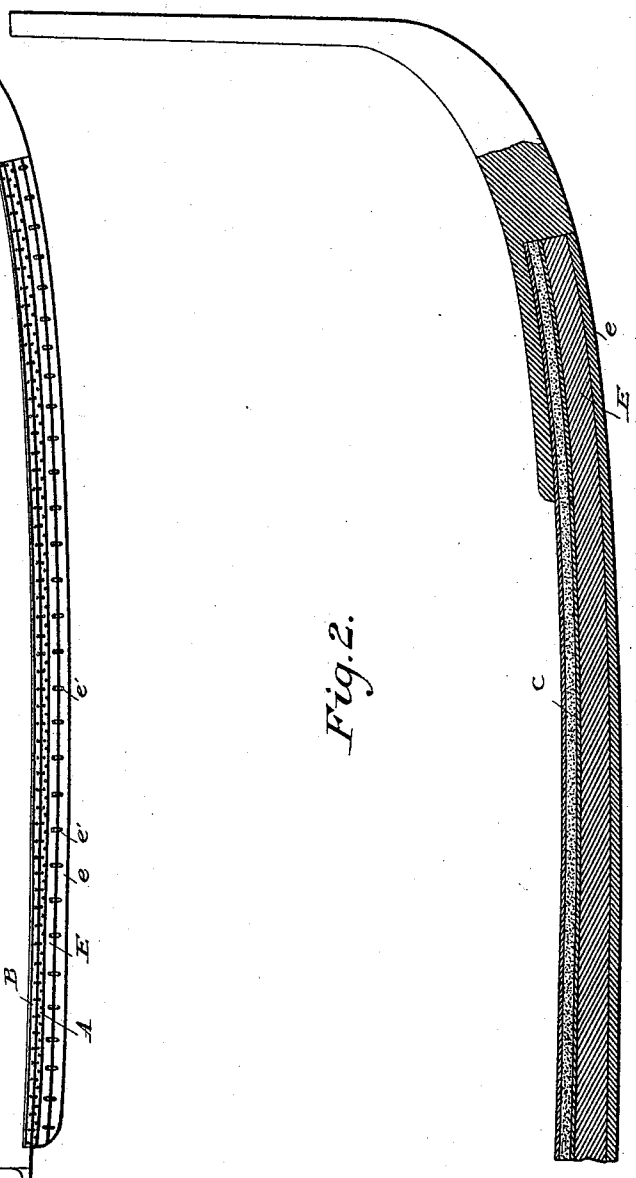


Fig. 2.

Witnesses
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F. A. Elmore

Inventors:
W. T. Sylven
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By P. T. Dodge
Attorney

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# W. T. SYLVEN & G. W. COFFIN.

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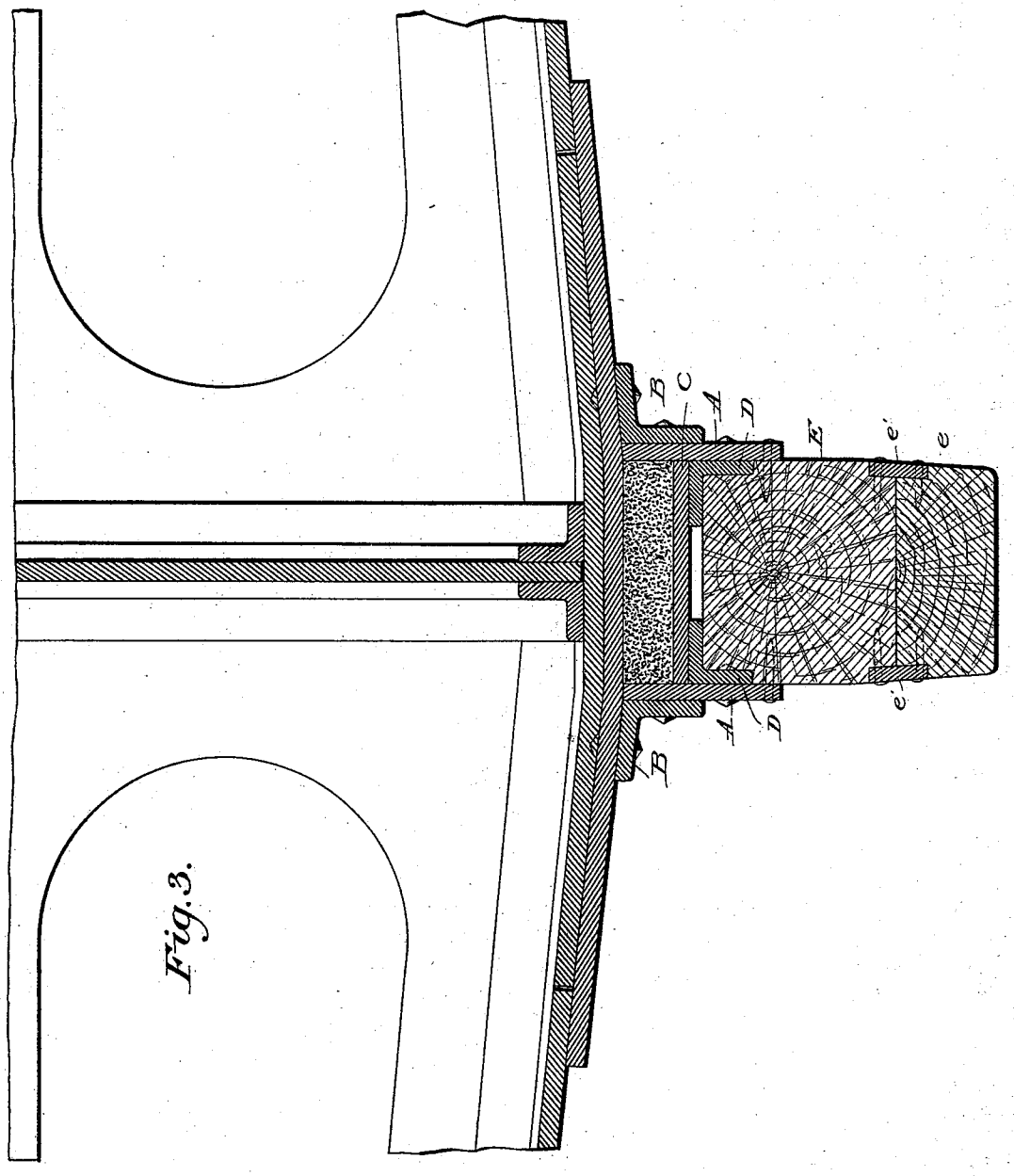


Fig. 3.

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# UNITED STATES PATENT OFFICE.

WALFRID THEODOR SYLVEN AND GEORGE W. COFFIN, OF WASHINGTON, DISTRICT OF COLUMBIA.

## KEEL FOR SHIPS.

SPECIFICATION forming part of Letters Patent No. 506,139, dated October 3, 1893.

Application filed October 28, 1892. Serial No. 450,211. (No model.)

*To all whom it may concern:*

Be it known that we, WALFRID THEODOR SYLVEN and GEORGE W. COFFIN, of Washington, in the District of Columbia, have invented a new and useful Improvement in Keels for Ships, of which the following is a specification.

In vessels as ordinarily constructed, and more particularly in those formed of iron or steel plates, great trouble and annoyance, and serious injury to the vessel, have been caused in the event of its running aground. In such cases, owing to the construction of the keel and its connections with the plates composing the hull, the former has almost invariably become fractured, and, as a result of the severe strains and shocks, the fastenings employed to connect the keel with the vessel have become loose and the water allowed to enter the hull. It is the aim of the present invention to overcome these objections and the consequent disastrous results, and to this end the invention consists in an improved form of keel, and in the peculiar manner of attaching the same to the hull of the vessel, whereby in the event of the grounding of the same, the fastenings will remain intact and leakage and injury to the bottom of the vessel will be prevented.

The invention also consists in the details of construction and the combination of parts hereinafter described and claimed.

In the accompanying drawings,—Figure 1 is a side elevation of a vessel provided with a keel constructed in accordance with our invention. Fig. 2 is a vertical cross-section of the same. Fig. 3 is a longitudinal section through the same.

In the accompanying drawings we have represented our improved keel applied to a vessel having the hull proper composed of steel plates overlapped and riveted or otherwise firmly secured to the ribs or framing of the vessel. In providing a vessel of this character with our keel, we apply to the central bottom plates of the hull two depending parallel plates A, which extend longitudinally of the vessel from the stem to the stern and there terminate in advance of the stern post. These plates are secured by means of two longitudinal angle plates B, which are applied on the outer sides of the depending plates against the same and the central plate of the hull, and are riveted to said parts at intervals as plainly shown in the drawings. Between the two depending plates, we locate a horizontal rail or plate C, a short distance below the hull of the vessel, and secure the same to the said depending plates by means of two angle plates D, which are riveted to said parts as shown. The space between this horizontal rail and the hull we prefer to pack with pitch or other suitable material, which will act as a buffer to deaden the shock to which the keel may in practice be subjected. This, however, we do not deem essential. Beneath the rail C, we apply between the two depending plates the keel E, proper, which may be of any suitable material, preferably of wood, and which is secured to the plates by means of spikes or other suitable fastening devices. To the under side of this keel we apply a false keel *e*, and secure the same firmly to the keel proper by any suitable means, but preferably as shown in the drawings by a series of vertical plates *e'* spiked to the keel proper and to the false keel, and located at intervals throughout their length.

As a result of the foregoing construction in the event of the vessel running aground, the first portion of the keel to give away will be the false keel *e*, its destruction obviously working no serious injury to the vessel. In the event of the shock being more violent the keel proper would suffer injury, and might in certain cases cause the lower edges of the vertical plates to be bent outward, but, owing to their connection with the horizontal rail C, the strain would not be transmitted to the rivets connecting with the hull, and consequently there would be no liability of the vessel leaking.

It will be noted that the keel proper is sustained and protected by a series of plates which are connected and firmly braced, so that there will be little danger of the fastenings securing these plates to the hull becoming loose on account of the shocks to which the keel would be subjected in practice.

The rear ends of the depending plates, the keel proper and false keel, are rounded off, as shown, to present a finished appearance,

and their front ends terminate and are seated in a recess formed in the stem, the line of the keel at this point being thus continuous and unbroken. In terminating the keel at the rear in advance of the stern-post, there will be no liability of the latter becoming injured in the event of the vessel grounding as the keel extends somewhat below the stern post, and will thus act as a guard.

It is of course understood that our improved construction may be employed in the so-called rolling or bilge keels without modification, the action being substantially the same.

Various changes in the details of construction employed, which will suggest themselves to the skilled mechanic, may be made without departing from the limits of the invention, provided the functions and action of the device are not materially different from those indicated above.

Having thus described our invention, what we claim is—

1. The combination with the hull of a vessel of the keel applied exteriorly, and a packing between the hull and keel.

2. The combination with the hull of a vessel of the parallel longitudinal plates depending therefrom, the keel supported between said plates, and the packing between the hull and keel.

3. The combination with the hull of a vessel of the parallel longitudinal plates secured to the outside thereof in vertical position, the horizontal plate connecting said vertical plates below the hull, and the keel supported between said vertical plates below the horizontal plates, substantially as shown and described.

4. The combination with the hull of a vessel of the vertical plates secured to the bottom thereof parallel to each other, the horizontal plate connecting the vertical plates below the hull, the keel below, and adjacent to, the horizontal plate, and the packing between the horizontal plate and the hull.

5. The combination with the hull, of the two depending plates, the angle-plates riveted to the said depending plates and hull respectively, the transverse plate located between the depending plates, the two angle plates riveted to the said transverse plates and depending plates, and the keel located between the said depending plates and secured thereto.

In testimony whereof we hereunto set our hands in the presence of two attesting witnesses.

WALFRID THEODOR SYLVEN.
GEO. W. COFFIN.

Witnesses:
JAS. N. FITZPATRICK,
F. A. MAHAN.