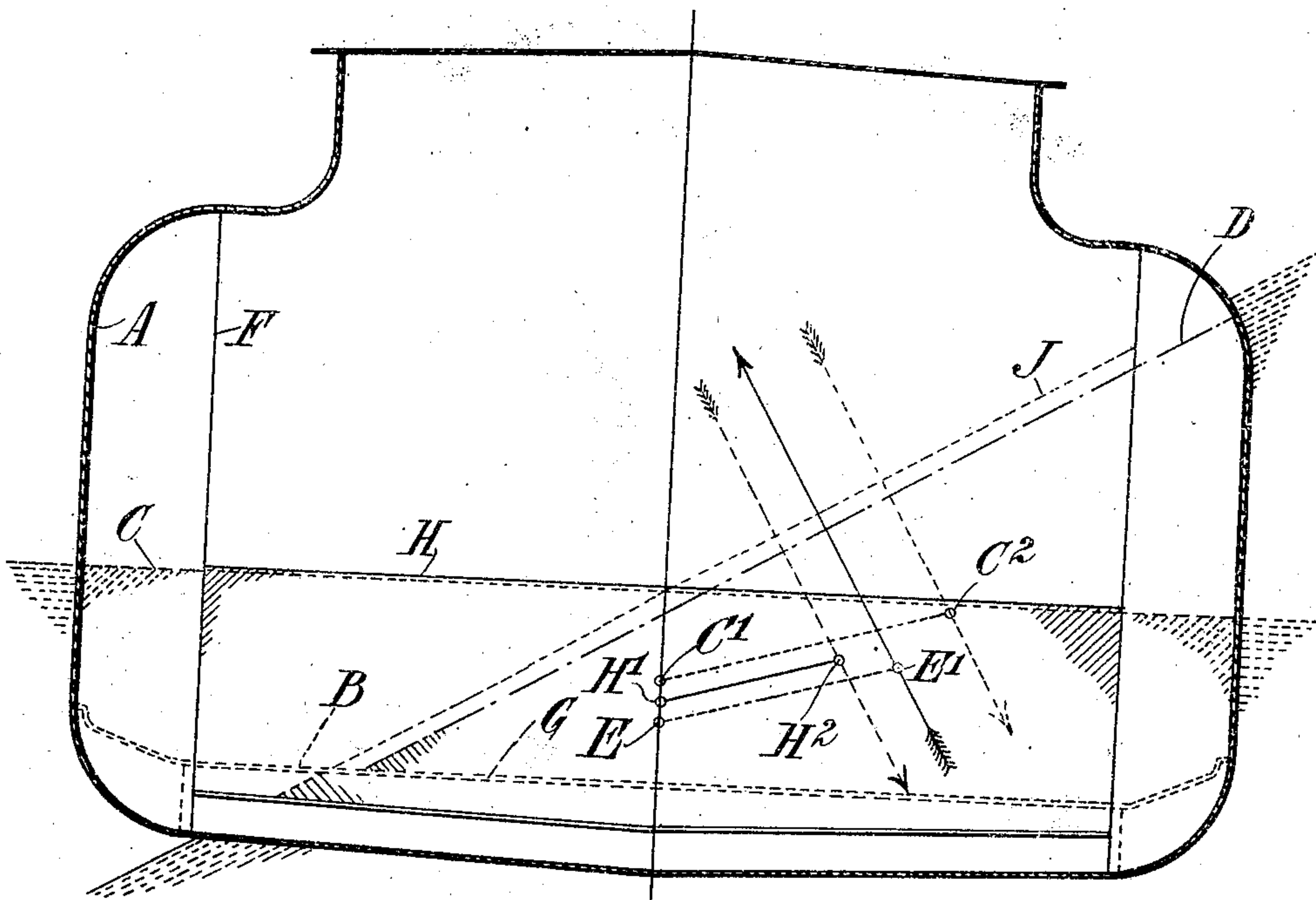


No. 897,884.

PATENTED SEPT. 8, 1908.

W. DOXFORD.
CARGO VESSEL.
APPLICATION FILED APR. 3, 1907.



Witnesses

Thomas Durant
Elizabeth Griffith

Inventor:

William Dofford.
 Aug Church & Church
 his Attyys.

UNITED STATES PATENT OFFICE.

WILLIAM DOXFORD, OF SUNDERLAND, ENGLAND.

CARGO VESSEL.

No. 897,884.

Specification of Letters Patent.

Patented Sept. 8, 1908.

Application filed April 3, 1907. Serial No. 366,156.

To all whom it may concern:

Be it known that I, WILLIAM DOXFORD, a subject of the King of England, residing in Sunderland, in England, have invented certain new and useful Improvements in Cargo Vessels, of which the following is a specification.

This invention relates to improvements in sea-going vessels for bulk cargoes and is applicable to the well known forms of vessel and particularly to vessels of the turret type.

In vessels which carry an easily shifting bulk cargo such as grain, central bulkheads, by statutory requirement, have to be fitted grain-tight to minimize the transverse movement of the center of gravity of the cargo during the process of loading or discharging when the vessel may take transverse inclinations, or in the case of stranding where jettisoning of the cargo has to be resorted to or by heavy rolling at sea. In all such cases it is well known that a central division is essential to the safety of the vessel, as the grain being almost liquid in its movements, shifts with any transverse inclination of the vessel. Should the central bulkhead be omitted, on a transverse inclination of the vessel, the transverse movement of the center of gravity of the cargo being greater than that of the center of buoyancy, the ship would be unstable and disaster would result. It is desirable for many reasons to dispense with the central bulkhead, but under the existing designs it is essential that it should be fitted.

According to this invention in sea-going vessels for bulk cargoes, inner upright walls are fitted some distance from the hull and the bottom of the hold is carried as close to the outer bottom shell as loading regulations for such goods will permit, the whole being so arranged that when the vessel is transversely inclined the weight of the cargo and the buoyancy create a restoring couple. The spaces between the cargo hold and the outer shell at the sides and at the bottom may be used either for drainage or for water ballast as may be desired, and when the vessel is loaded with cargo the side spaces will act as buoyancy tanks as in the case of life-boats.

The accompanying drawing is a diagram representing the application of this invention to one of Doxford's turret vessels.

The line A represents the hull of the vessel; the line B represents the bottom of the hold in the existing arrangement. The line C represents the position of the cargo when

the vessel is partially filled and is upright. The line D represents the position of the same quantity of cargo when the vessel is transversely inclined; the point C¹ represents the center of gravity of the cargo in the existing arrangement, and the point C² represents the position of the center of gravity of the cargo when displaced. The point E represents the position of the center of buoyancy when the vessel is upright and the point E¹ represents the position of the center of buoyancy when the vessel is displaced.

In carrying out the invention, upright inner walls F are fitted at some distance from the hull and the bottom G of the hold is carried down as near the bottom of the vessel as possible. In this arrangement the line H represents the level of the same quantity of cargo as before when the vessel is upright. The line J represents the level of the cargo when displaced. The point H¹ represents the center of gravity of the cargo when the vessel is upright and the point H² represents the center of gravity of the cargo when displaced. It will be seen from the diagram that while under the existing arrangement the action of gravity on the cargo acting at C¹ and the buoyancy acting at E¹ produce a capsizing couple, in the new arrangement the action of gravity on the cargo acting at H² and the buoyancy acting at E¹ form a restoring couple. By this arrangement the capacity of the cargo space is retained as in the ordinary existing plans, but the transverse movement of the grain is restricted within the inner walls so that the movement of the center of gravity is not so great as that of the center of buoyancy, and the stability of the vessel is retained in all conditions of loading and discharging and in a sea way.

I am aware that it has been proposed to provide water ballast or other tanks at the sides of sea-going vessels, but this does not constitute the novel feature of the present invention.

It is to be understood that the details of construction and arrangement may be varied without departing from this invention.

What I claim as my invention and desire to secure by Letters Patent is:—

In a vessel for easily shifting bulk cargoes, the combination of the hull comprising side walls and an outer bottom shell, inner upright walls fitted some distance from the hull and a hold bottom fitted close to the

bottom shell, whereby when the vessel is transversely inclined the transverse movement of a partial cargo will be restricted and the movement of its center of gravity will be less than the movement of the center of buoyancy and the stability of the vessel retained.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM DOXFORD.

Witnesses:

EDMUND C. THOMPSON,
ROBERT YOUNGS.