

No. 725,219.

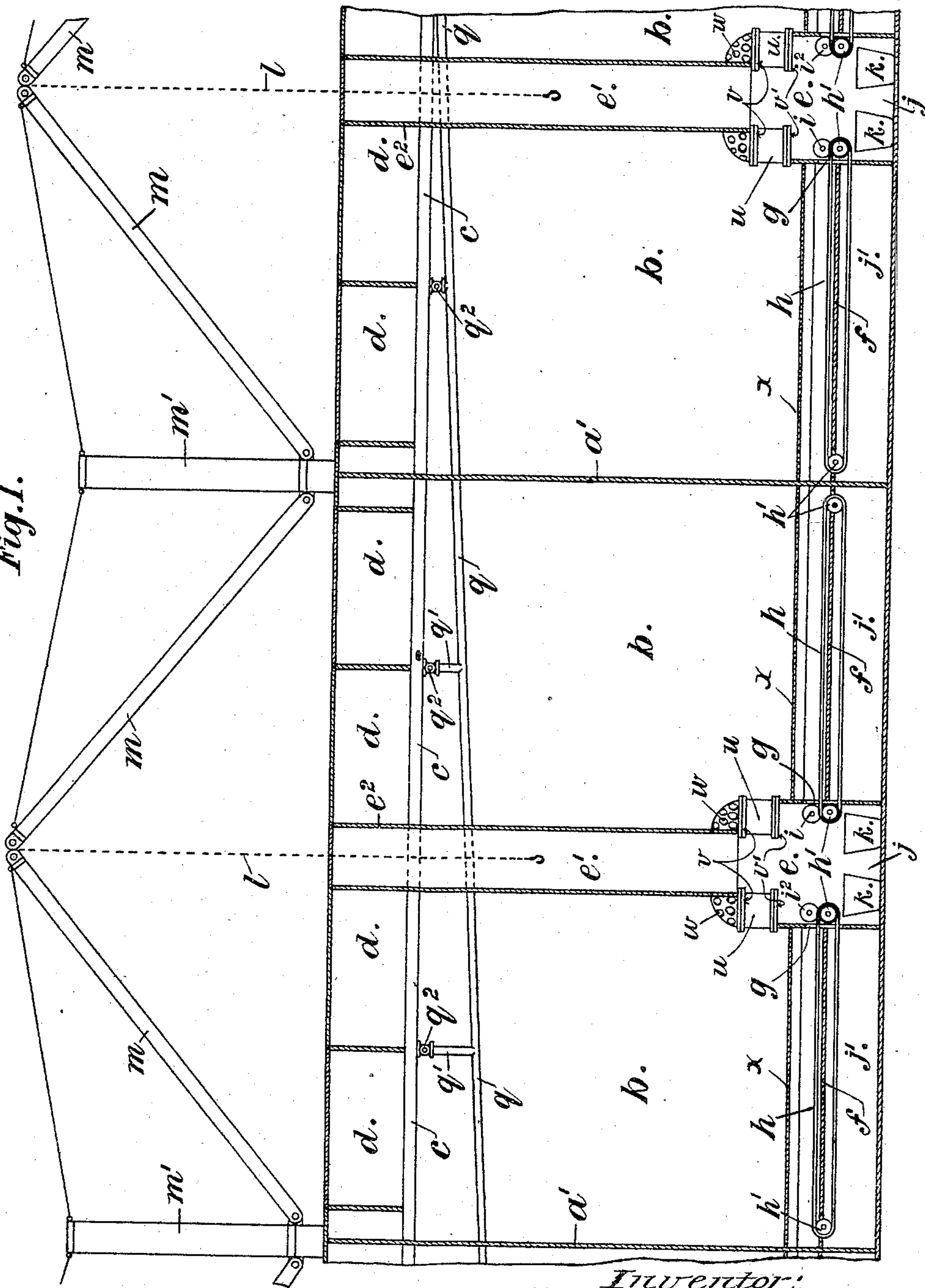
PATENTED APR. 14, 1903.

W. G. CLARK.  
CARGO TRANSPORT VESSEL.  
APPLICATION FILED MAY 27, 1902.

NO MODEL.

5 SHEETS—SHEET 1.

Fig. 1.



Witnesses:  
E. H. Bolton  
Sam. Aldom.

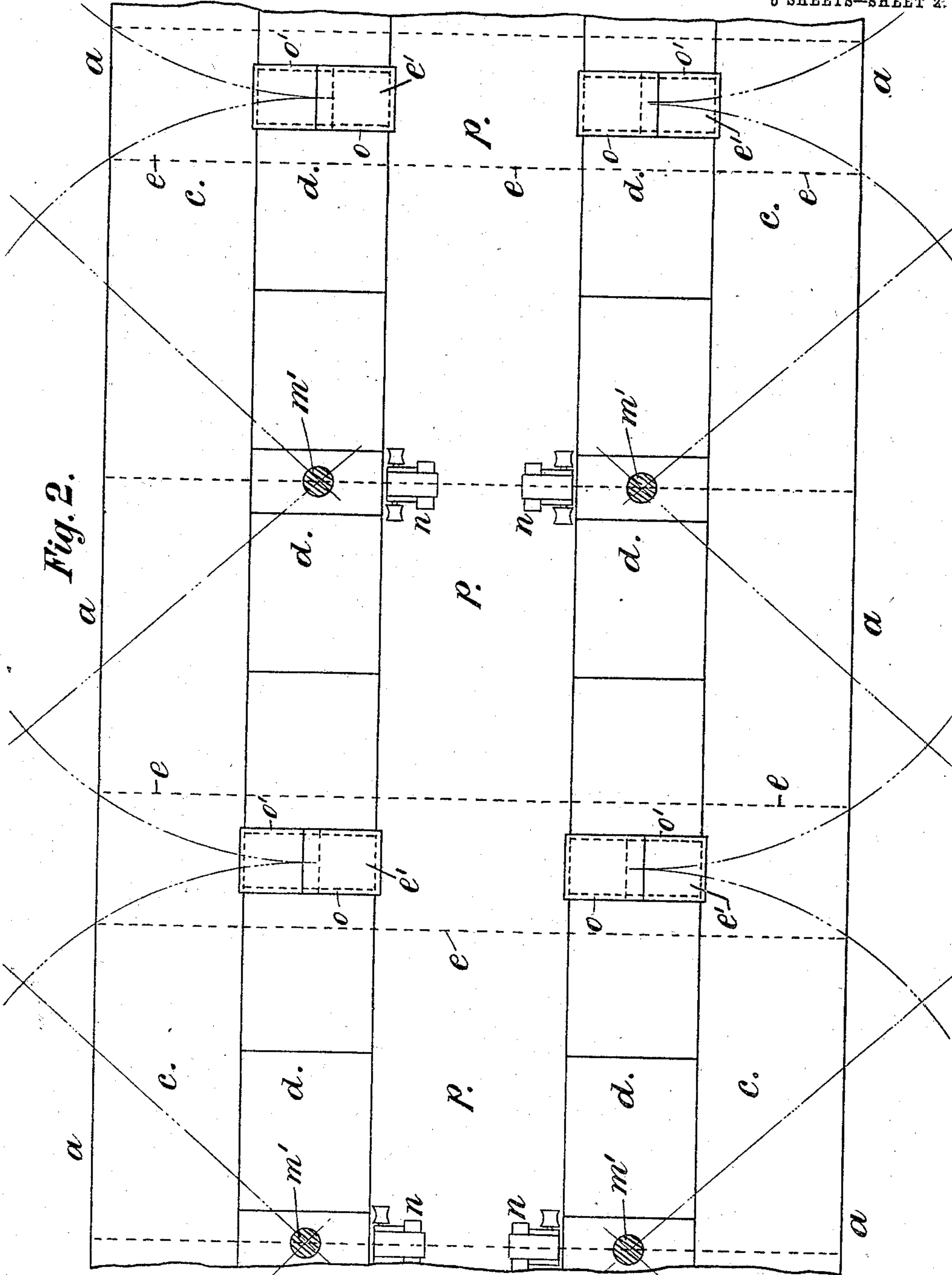
Inventor:  
William Graham Clark  
By *Richard J. [Signature]*  
his Attorneys.

W. G. CLARK.  
CARGO TRANSPORT VESSEL.  
APPLICATION FILED MAY 27, 1902.

NO MODEL.

5 SHEETS—SHEET 2.

Fig. 2.



Witnesses:  
E. B. Rolton  
Harry Aldom

Inventor:  
William Graham Clark  
By *Richard A. [Signature]*  
his Attorneys.

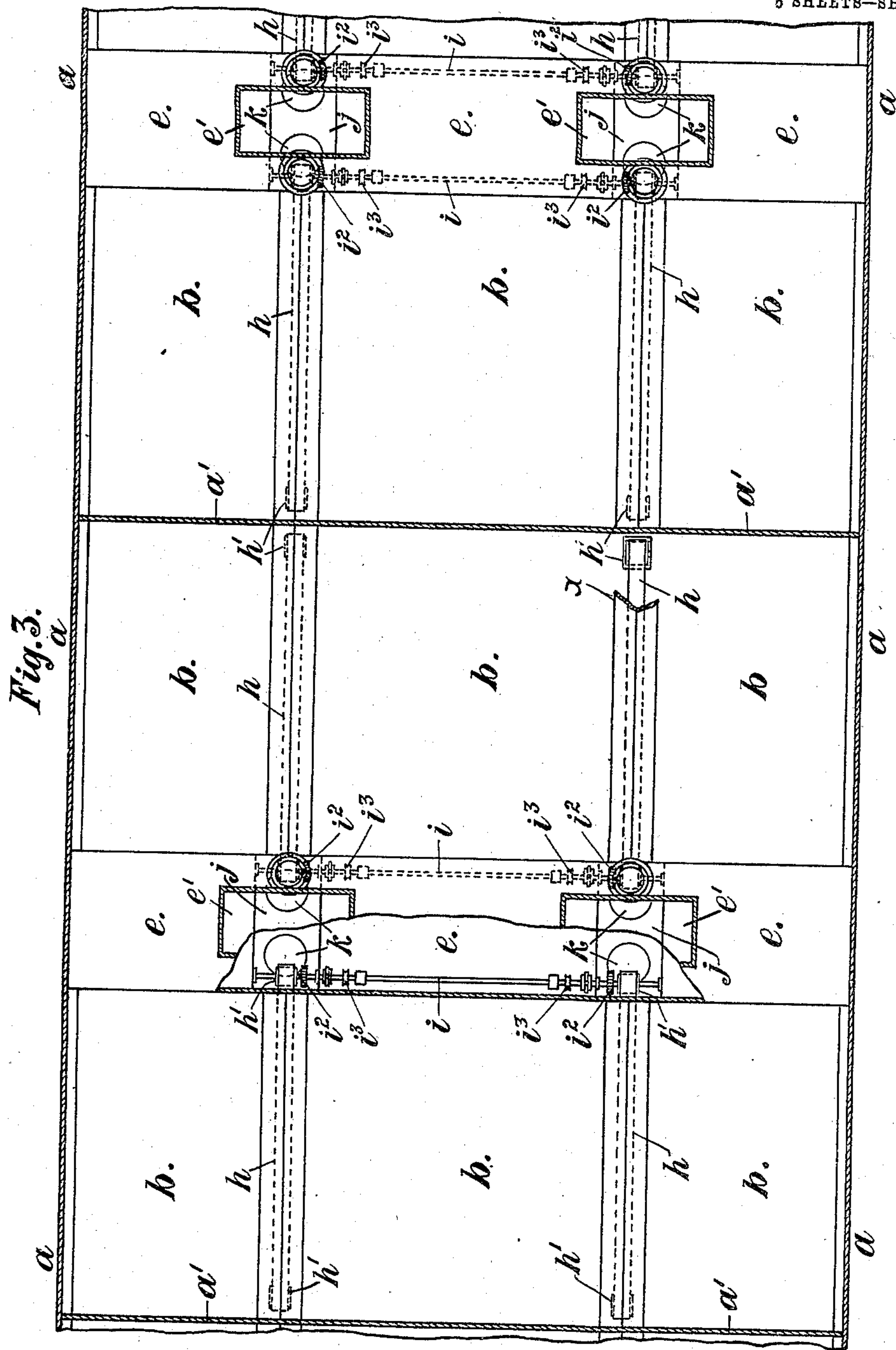
W. G. CLARK.

CARGO TRANSPORT VESSEL.

APPLICATION FILED MAY 27, 1902.

NO MODEL.

5 SHEETS—SHEET 3.



*Witnesses:*

C. B. Bolton

Harry Aldom

*Inventor:*

William Graham Clark

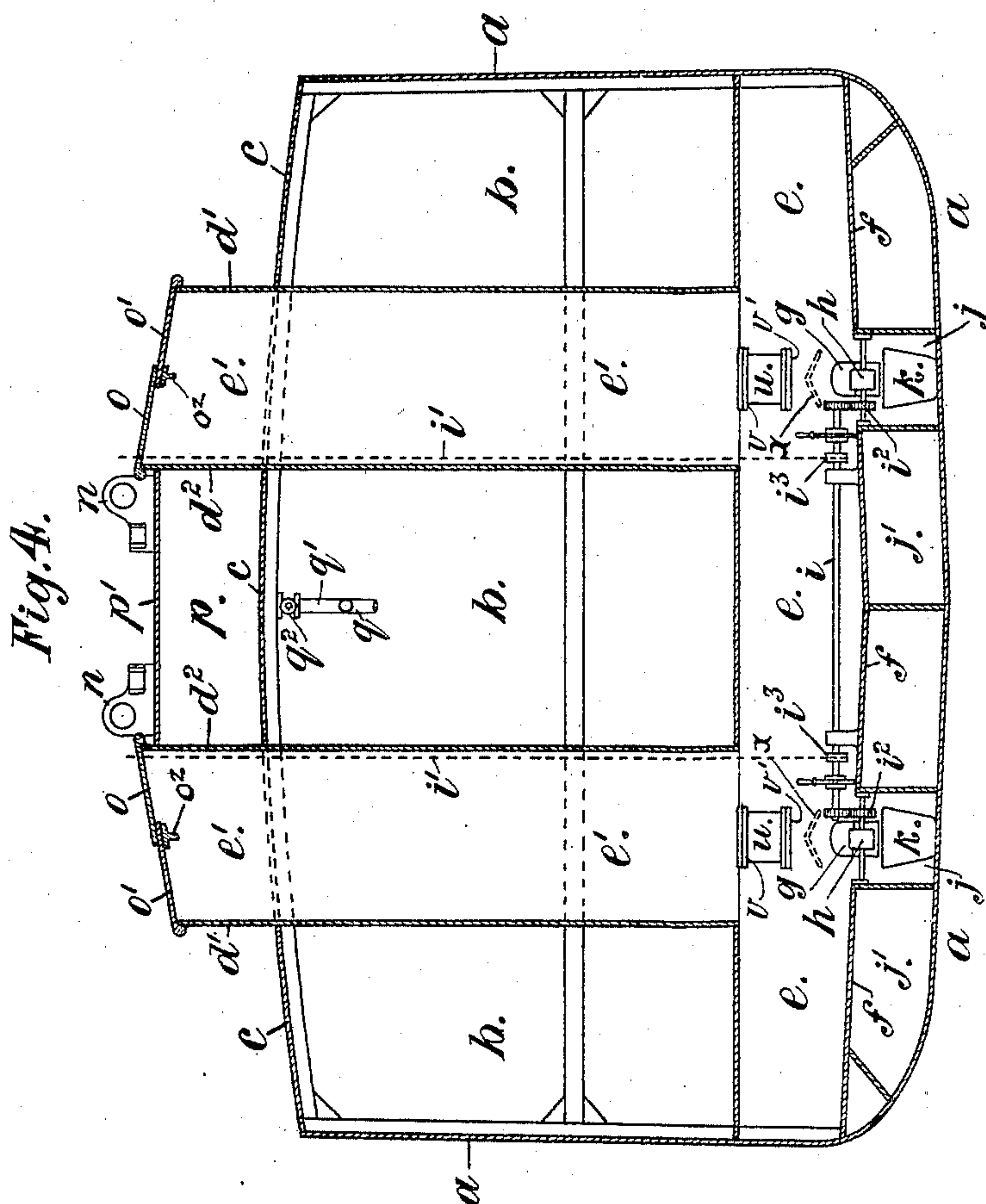
By *Richard J.*  
his Attorneys.



W. G. CLARK.  
CARGO TRANSPORT VESSEL.  
APPLICATION FILED MAY 27, 1902.

NO MODEL.

6 SHEETS—SHEET 4.



Witnesses:

E. B. Bolton  
H. W. Aldom

Inventor:

William Graham Clark

BY Richard R.

his Attorneys.

No. 725,219.

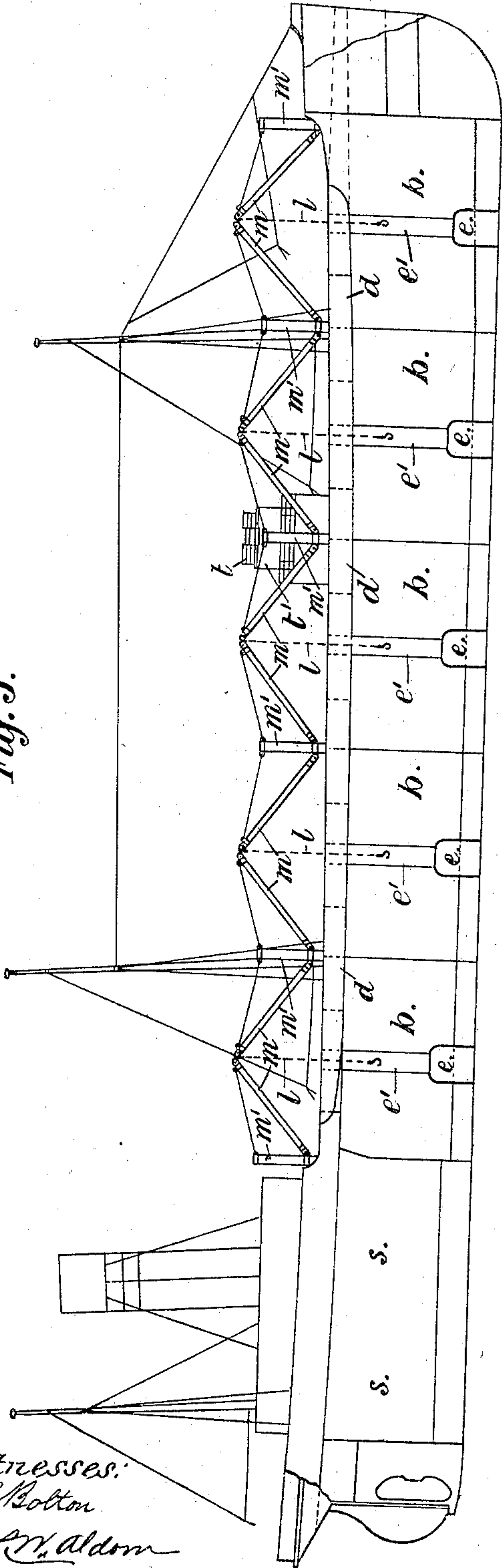
PATENTED APR. 14, 1903.

W. G. CLARK.  
CARGO TRANSPORT VESSEL.  
APPLICATION FILED MAY 27, 1902.

NO MODEL.

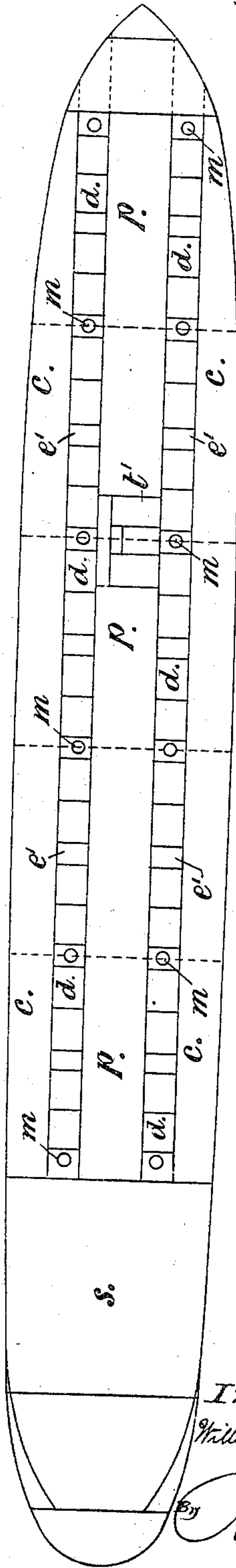
5 SHEETS—SHEET 6.

Fig. 5.



Witnesses:  
E. B. Bolton  
L. M. Aldom

Fig. 6.



Inventor:  
William Graham Clark

By *Richardson*  
his Attorneys.



# UNITED STATES PATENT OFFICE.

WILLIAM GRAHAM CLARK, OF WATERLOO, NEAR LIVERPOOL, ENGLAND.

## CARGO-TRANSPORT VESSEL.

SPECIFICATION forming part of Letters Patent No. 725,219, dated April 14, 1903.

Application filed May 27, 1902. Serial No. 109,189. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM GRAHAM CLARK, a subject of the King of England, and a resident of Waterloo, near Liverpool, in the county of Lancaster, England, have invented new and useful Improvements in and Connected with Cargo-Transport Vessels, of which the following is a specification.

In the transporting of goods by water in bulk (or in other form) in addition to the requirement of the storage of cargo or construction of ship so that it shall be easy and safer when in ballast one of the first functions connected with such transport is that of providing a mode of and means for rapidly and economically admitting the goods from the shore or other place of deposit into the ship's hold and of rapidly removing the cargo out of the hold at the place of arrival and delivering it on the quay or other place of deposit. To this end machinery and construction of hulls and holds of ships have been variously devised and so arranged as to form a self-contained organized means for the rapid and economical handling and transport of goods from one place to another, enabling a vessel of a given size and cost to make more journeys and carry more goods in a given time.

The object and effect of the present invention are to provide an improved arrangement or construction of hull and means of raising and lowering and moving the cargo, as hereinafter described, by which these ends are directly accomplished and such other improvements, as are hereinafter described, which are accessory to these ends and to vessels of the character concerned.

Also it is the object to provide a construction which produces a self-trimming vessel and one easy to work.

It has also the further object and effect to provide a construction which will enable the vessel to carry cargo (especially coal and grain) in bulk as well as cargo in bales, bags, or packages.

For convenience I will describe the complete transport vessel comprising its structural and mechanical characteristics involving the several improvements hereunder applied conjointly; but it is to be understood that the invention is not restricted to the em-

ployment of all these improvements conjointly.

In the drawings illustrating the invention, Figure 1 is a longitudinal section of the vessel, and Fig. 2 is a deck plan of same. Fig. 3 is a plan in section, the section being taken through the holds; and Fig. 4 is a transverse section through one of the holds of the vessel. Figs. 5 and 6 are respectively longitudinal section and plan showing the whole vessel.

Referring now to the drawings, with regard to the general construction of vessel the hull *a* is divided transversely by a plurality of athwartship bulkheads *a'* built onto the hull and constituting a structural portion of the ship and forming the vessel (except the propelling-machinery spaces, which are at the stern of the vessel) into a plurality of holds *b*.

All the structural parts of the vessel are of steel or iron.

The upper or deck structure of the vessel side a continuous hatch *d*, formed by build-comprises above the deck proper, *c*, at each ing on the upper deck at either side two vertical parallel high outside and inside girders *d'* *d''*, and thereby forming the two parallel hatches *d* along the ship above the deck-level. These longitudinal hatches *d* constitute practically continuous hatches, one along each side of the vessel over the holds *b*.

Between the hatches *d* a plurality of tanks *p* are formed by covering over the space between the inner girders *d''* of the parallel hatches by the plating *p'*, which is riveted onto the transverse girders *d''* by carrying up the bulkheads *a'* to this plating *p'* and riveting it to the girders *d''*. These closed central tanks are constructed to serve as water-ballast tanks or oil-fuel-containing tanks. In connection with these central-deck tanks in the case of their being used or some of them being used as oil-fuel containers certain of these tanks so used—say the alternate ones or two or more of them—would be connected by an inclined pipe *q*, extending to the stoke-hole where the oil is to be used, this inclined pipe being placed under the deck *c* and passed through the several bulkheads *a'* and holds *b*. The branches *q'*, connecting the pipe *q* with the several tanks,



would have cocks  $q^2$  on them, so as to enable any of them to be used as and when required. By this means the trim of the ship fore and aft may be maintained or regulated to a considerable extent. The other tanks or some of them will be filled with water when required for ballasting purposes, and according to the trim of the ship or degree of her loading more or less of these tanks would be filled or used. If oil is not used as fuel, any or all of these tanks can be used for water-ballast.

Within each of the holds  $b$  there is a tunnel  $e$ , running transversely of the hold and on the floor  $f$ , and from each of the hatch-trunks  $d$  a vertical shaft  $e'$  extends downward to the upper part of the tunnels  $e$ . These tunnels  $e$  are of platework and are riveted onto the bottom floor  $f$  at the lower edges and to the hull  $a$  at its ends, and the shafts  $e'$  are riveted to the tunnels  $e$  and the plating of the hatches  $d$ , their sides at the upper part (at  $e^2$ ) being continued up to the top of the girders  $d' d^2$ , to which they are riveted. These tunnels and shafts therefore form an integral portion of the structure of the ship. The tunnels  $e$  have openings  $g$  in them on either side of the shafts  $e'$  and are provided with doors for the admission of the material from the holds  $b$  into the part of the tunnels  $e$  under the shafts  $e'$  when commencing to discharge bulk cargo, and these tunnels, in conjunction with the shafts  $e'$ , serve as a means of discharging the cargo from the bottom of the bulk and the ship from the commencement to the end of discharging—that is to say, the cargo is taken from the bottom of the ship by means of the tunnels and is taken up through the shafts  $e'$ .

In order to introduce or deliver the cargo or material from the holds  $b$  into the tunnels  $e$  automatically when discharging cargo—such as coal, grain, or ore—mechanical means are employed. In the arrangement illustrated this means consists of endless conveyers  $h$ , extending from the ends of each hold to the tunnel  $e$  and the upper runs of which practically rest and run on the floor  $f$  of the hold. The conveyer belt or chain  $h$  is supported by and runs over pulleys  $h'$  at either end, which are actuated by spur-gearing  $i^2$ , placed in the tunnels and driven from a shaft or rod  $i$ , said shaft being actuated by means of a sprocket-chain  $i'$ , passed down the sides of the shafts  $e'$  and gearing with a sprocket-wheel  $i^3$  on the shaft or rod  $i$ .

V-shaped covers or protectors  $x$  are provided, which extend from bulkhead to tunnel directly over and above and throughout the length of the conveyers for the purpose of protecting said conveyers from the weight of cargo directly above same. Where the endless conveyer-belts pass through the tunnel sides, the tunnel is, as before stated, provided with a door or shutter for closing the aperture communicating with the hold and the interior of the tunnel  $e$ , and within the tunnel a pit or chamber  $j$  is formed in the hol-

low bottom  $j'$ , in which the ends of the conveyers terminate, and in operation they will discharge their contents into buckets or receptacles  $k$ , lowered into these pits through the tunnel-shaft  $e'$ , they being disposed directly under the shaft. Holes or recesses are provided through the double inner bottom floors to allow of the return run of the lower portion of the conveyers  $h$ . In action when the conveyers, which are provided with any suitable attachments for positively taking up and conveying the cargo, are set in motion, the material which will rest on the conveyer on the floor of the hold will be removed by the conveyers from the hold inside the tunnel  $e$  and delivered to the receptacles  $k$  inside the pits  $j$ , and when full these buckets or receptacles will be lifted by chains  $l$  or the like by the hoisting-gear on the deck of the ship through the shafts  $e'$  and then swung or conveyed outward to the place of deposit. In this way the whole of the contents of the holds is moved from the bottom, so that practically the whole can be mechanically or to a large extent mechanically removed and filled into the receptacles  $k$  for hoisting.

With regard to the portion of the raising, lowering, and moving means on the deck these consist of duplicate cranes or derricks in connection with each hold and tunnel-shaft. The jibs or poles  $m$  of these cranes or derricks are supported from arms or pillars  $m'$ , fixed above and on the top of the hatches and above the transverse bulkheads, at which point they are placed over and the column fixed on same. This arrangement provides rigidity and strength for the cranes. The winches  $n$  for working them are placed near the columns. By this arrangement four cranes may be used and are available for working each hold, and being disposed at each side their peaks will swing out well over the side of the ship, and consequently their angle does not require to be shifted in working between the holds and overboard.

The shaft-covers consist of doors  $oo'$ , hinged to the edges of the shaft and overlapping at the center, where when the shafts are closed they are supported by a bar  $o^2$ , fixed on the edge of the lower door.

For the purpose of handling cargo, as coal in bulk, and discharging same from the holds of the vessel, hoppers or chambers  $u$  are provided at the upper portion of the tunnels  $e$ , and are fitted with plates or valves  $v v'$ , which are operated from the inside of the tunnel. Perforations or holes  $w$  are provided at the top of the chambers  $u$ . In use the upper valve  $v$  is withdrawn or opened and the coal lying immediately above the chamber  $u$  is "started" by means of a pucker-bar, and falling through the holes or perforations  $w$  fills the chamber  $u$ . The valve  $v$  is now closed and the lower valve  $v'$  opened, whereupon the coal contained in the chamber  $u$  falls into one of the buckets  $k$  and is hoisted up the shaft  $e'$  and discharged. Valve  $v'$  is now



closed and *v* opened, whereupon the chamber *u* is again filled and discharged, as before described. The capacity of the chambers *u* is preferably about equal to that of the buckets *k*.

By the construction of ship as above described when used for the transport of cargo in bulk it will provide a self-trimming construction as well as a construction by which the operations connected with the discharging of the cargo are rendered partly automatic. Also when the vessel is light it will give extra ballast capacity on deck.

At the stern part of the ship the propelling-machinery holds *s* are provided and the requisite deck-houses, while between the holds *s* and the bow of the ship a bridge *t* and chart-house *t'* are fitted over the longitudinal hatches.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A cargo-transport vessel, having its hull divided into a plurality of holds by athwartship bulkheads; tunnels at the lower part of the holds, and extending transversely therein; vertical shafts extending between the deck above the holds and the upper part of the tunnel; a continuous hatch disposed on either side of the center line of the ship, raised on and standing above same, into which the upper ends of the said shafts enter, and to which they are connected; substantially as set forth.

2. A cargo-transport vessel, having its hull divided into a plurality of holds by athwartship bulkheads; a tunnel at the lower part of the holds, extending across same laterally; a vertical shaft extending from the tunnel up to the deck; and an endless conveyer on the floor of the hold; extending between the interior of said holds and the interior of the tunnel; substantially as herein set forth.

3. In a cargo-transport vessel, a plurality of holds, separated by transverse bulkheads; a deck forming a roof to said holds; a plurality of tunnels at the bottom of the holds extending transversely therein; and a plurality of shafts extending up from the tunnels to the deck; each tunnel and its shaft being practically integral with one another, and with the floor and deck respectively; substantially as set forth.

4. In a cargo-transport vessel having its hull divided into a plurality of holds by transverse bulkheads, a deck forming a roof to said holds, and a parallel trunk or hatch fixed

on and standing above the deck on either side of same, and a continuous series of tanks for containing liquid between the inner walls of said raised hatches, and standing above the deck; substantially as set forth.

5. A cargo-transport vessel, having its hull divided into a plurality of holds by athwartship bulkheads; a tunnel at the lower part of the holds, extending across same laterally; a vertical shaft extending from the tunnel up to the deck; and an endless conveyer on the floor of the hold, extending between the interior of said holds and the interior of the tunnel, and valved hoppers or chambers disposed in the said tunnel; the walls of said tunnel being provided with holes or perforations above the hoppers or chambers; substantially as set forth and for the purposes specified.

6. In a cargo-transport vessel, the combination of a plurality of holds in the hull thereof, separated by transverse bulkheads, extending between the floor and the deck; a deck above said holds forming the roof to same; a tunnel on the floor of each hold; a shaft extending up from the upper part of the tunnel to the deck on either side of the center; a column *m'* disposed over the dividing-bulkheads between each of the shafts longitudinally, and in line with same longitudinally, a jib or boom *m* carried on either side, the raising and lowering part of which operates in connection with the vertical shafts; substantially as set forth.

7. In a cargo-transport vessel, the combination of a plurality of holds in the hull thereof, separated by transverse bulkheads, extending between the floor and the deck; a deck above said holds forming the roof to same; a tunnel on the floor of each hold; a shaft extending up from the upper part of the tunnel to the deck on either side of the center; a column, *m'*, disposed over the dividing-bulkheads between each of the shafts longitudinally, and in line with same longitudinally, a jib or boom *m* carried on either side, the raising and lowering part of which operates in connection with the vertical shafts; and endless conveyers on the floor of the hold, for conveying material from the holds into the tunnel; as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM GRAHAM CLARK.

Witnesses:

JOHN H. WALKER,  
SOMERVILLE GOODALL.