(No Model.) 2 Sheets—Sheet 1.

A. H. LUCAS.

HULL AND KEEL FOR STEAMSHIPS.

No. 368,725. Patented Aug. 23, 1887.

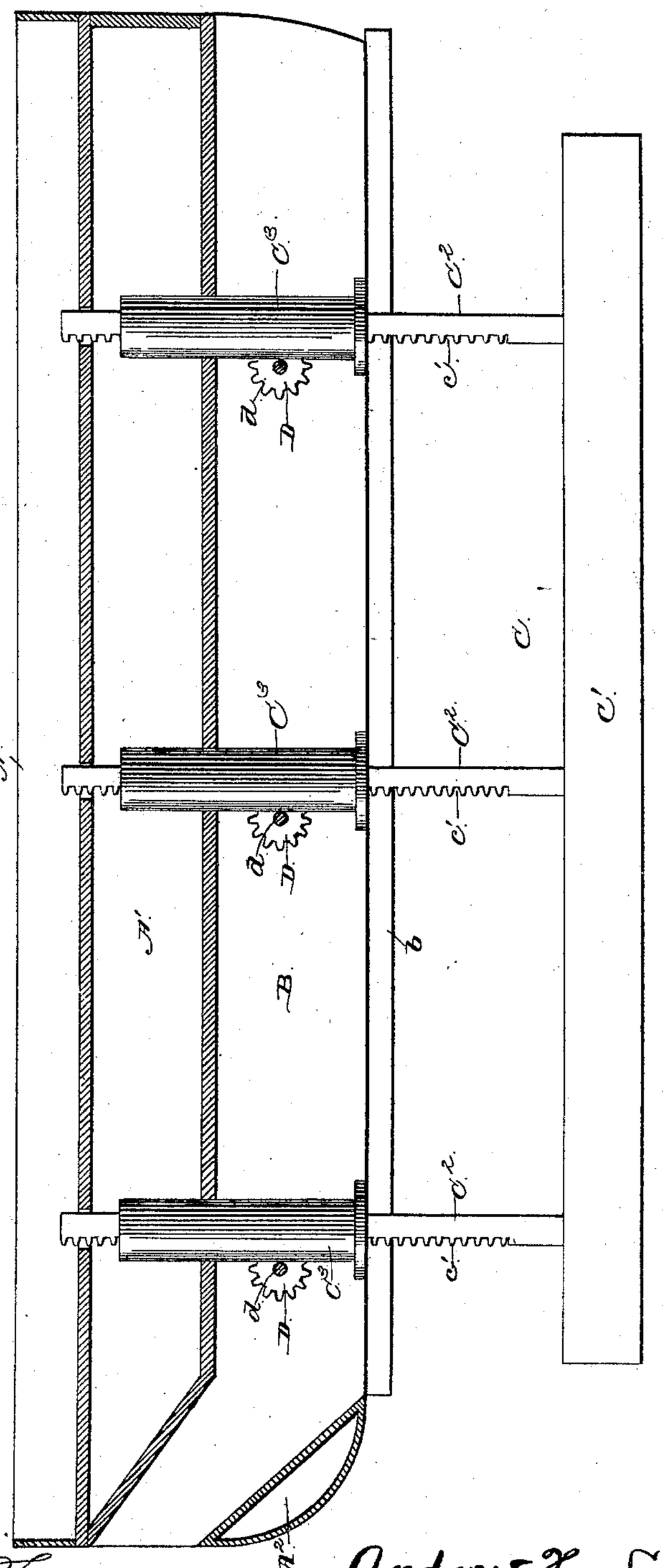

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

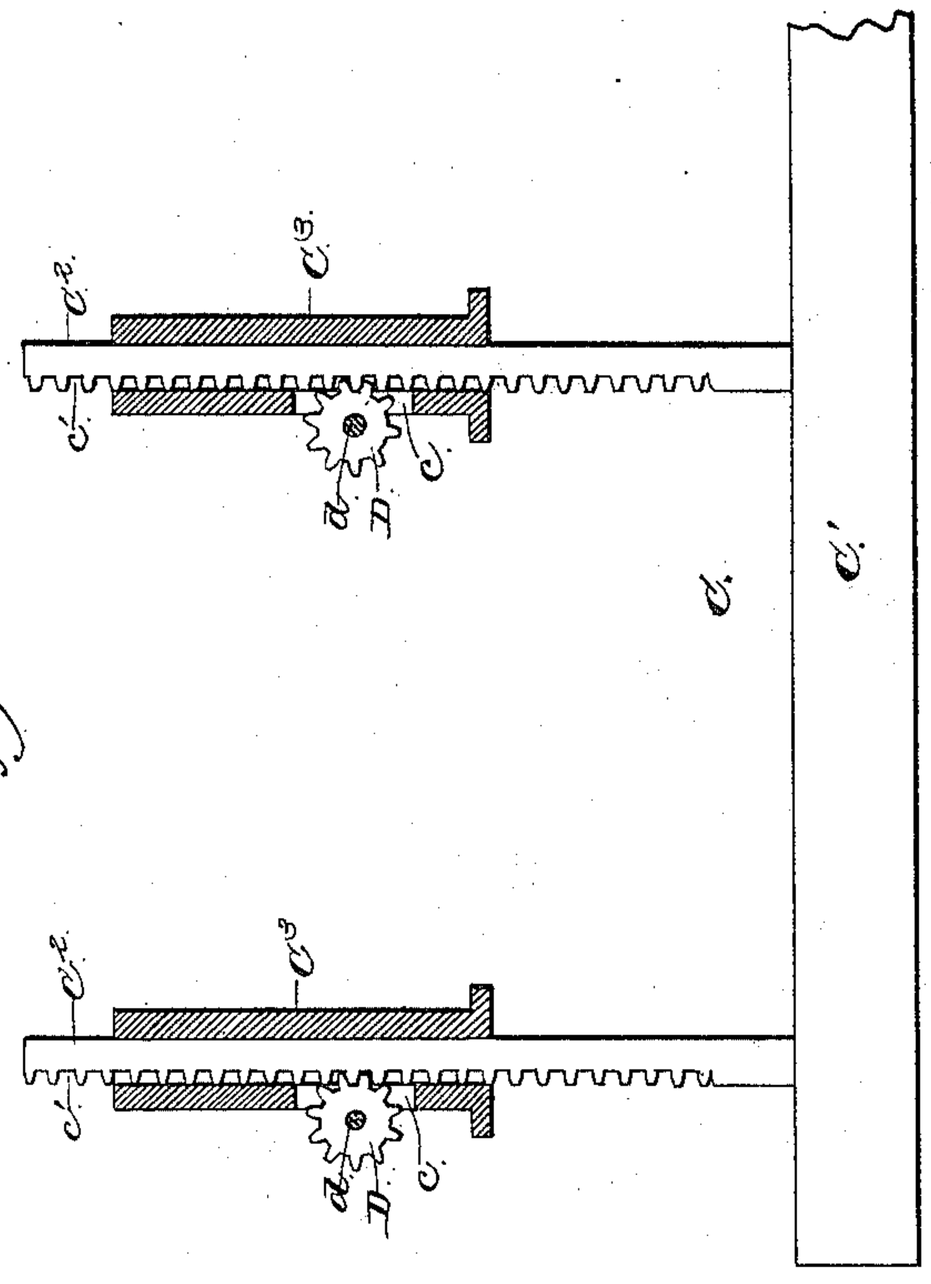
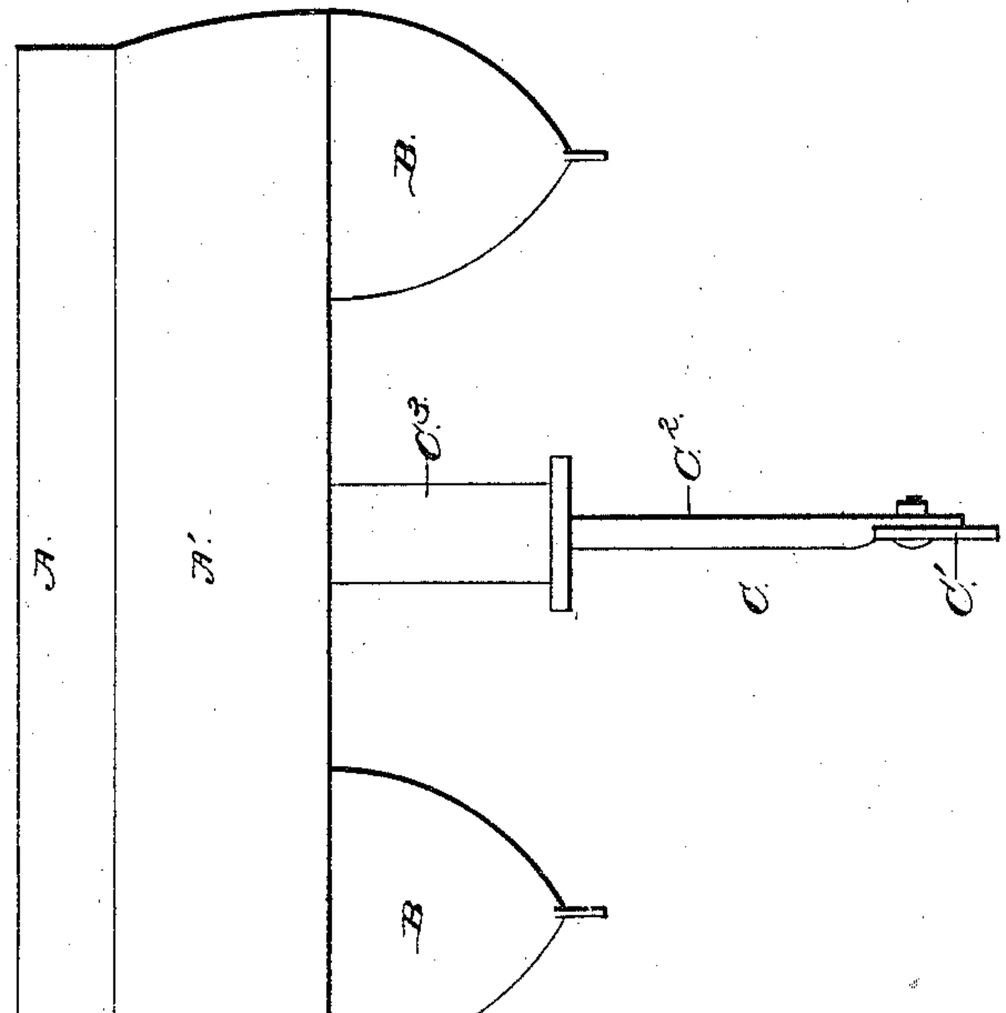


Fig. 2.



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UNITED STATES PATENT OFFICE.

ANDREW H. LUCAS, OF ST. LOUIS, MISSOURI.

HULL AND KEEL FOR STEAMSHIPS.

SPECIFICATION forming part of Letters Patent No. 368,725, dated August 23, 1887.

Application filed May 3, 1887. Serial No. 236,971. (No model.)

To all whom it may concern:

Be it known that I, ANDREW H. LUCAS, a citizen of the United States, residing at St. Louis, in the State of Missouri, have invented new and useful Improvements in Hulls and Keels for Steamships, of which the following is a specification.

My invention relates to improvements in steamships; and it consists in the novel construction and arrangement of the parts of the same, which will be more fully hereinafter described, and pointed out in the claims.

The object of my invention is to provide a steamship having a drop or adjustable keel and supplemental hulls the several parts of which are simple and effective in their construction and operation, strong and durable, readily understood and operated, which adapts the vessel for navigation either in rivers of shallow depth or in the open ocean, and are so arranged as to guard against and prevent injury to the mechanism for controlling and operating the several parts. I attain this object by the construction illustrated in the accompanying drawings, wherein like letters of reference indicate similar parts in the several views, and in which—

Figure 1 is a longitudinal vertical section of my improved steamship, showing the drop-keel lowered and the controlling mechanism therefor. Fig. 2 is a rear elevation of the same. Fig. 3 is a detail view in sectional side elevation of a portion of the drop-keel, and its attachments removed from the hull.

A indicates the upper or bulwark portion of the vessel, which may be of the ordinary form and construction, or otherwise preferably constructed. The lower portion of the vessel, which is immersed, is provided with supplemental hulls B B, arranged on each side of and connected to or forward with the main hull A'. The two hulls B B may be constructed of desirable dimensions and proportions, and are united at their forward ends by a single bulk-head, A^2.

It will be readily seen that in the formation and provision of these hulls B B on each side of the main hull A an open space is provided between the hulls B, in which the propellers may be suitably mounted and protected from the attack and injury of the shots and shells of an enemy. The hulls B are constructed as storage-holds, to carry cargoes of any material put therein, and may support a part of the mechanism requisite for use in connection with steam-vessels. The said hulls B may also be provided with small stationary keels *b*, which materially aid in the propulsion of the vessel and the resistance thereof against pitching and tossing in high-running seas, and, being united by a single bulk-head, A^2, are rendered strong and durable.

In the center of the under part of the hull A' my improved adjustably-mounted drop-keel C is situated. This keel C consists, essentially, of a beam, C', extending the entire length of the ship and of suitable width, and connected at predetermined regulated intervals to uprights or posts C^2, which pass up through and are adapted to vertically move in upright cylinders C^3, having elongated openings *c* formed in their sides, as shown in Fig. 3. These cylinders C^3 are securely fastened to and supported in the center of the hull A', and project to such a distance upwardly therein as to have their upper open ends at an elevation above the level of the water to prevent an inflow through the same into the hull. The posts C^2 are constructed in the form of rack-bars, and have cog-teeth *c'* formed with one side thereof, which move in a line with the slots *c* in the cylinder C^3, and through said slots *c* spurs or pinions D revolve and engage with the rack-surface *c'* of the posts C^2. The spurs or pinions D are mounted upon suitable shafts, *d*, which are revolved and in connection with the engine-shaft of the vessel, which connection may be made by any well-known mechanical means; and it will be understood that the series of pinions D are adapted to be run together and at the same rate of speed, so that there will be no cramping of the posts C^2 in the cylinders C^3. The said posts C^2 and cylinders C^3 will be relatively mounted and stationarily fixed as regards their position.

The manner and effect of the operation of the keel and the advantages of the construction are readily appreciable.

The propellers, working between the hulls, are thoroughly protected from the enemy's shot and protected against the ordinary acci-

dents of the sea. By my construction the great breadth of beam, in proportion to the height of the decks above water, would of itself give unusual steadiness; but this is supplemented in my improvement by an adjustable drop-keel, which can be raised or lowered by proper machinery in the space between the hulls to any depth required up to twice the ordinary immersion of the loaded ship—that is to say, suppose the ordinary draft of the loaded vessel, with her guns, armor, coal, and stores all in place, should be seven feet, at which condition she could navigate shallow streams or rivers at nearly all ordinary stages of water, and when she is called upon to go to sea, or to meet rough weather, her false keel can be lowered to fourteen feet below the line of the normal draft, giving her a total practical immersion of twenty-one feet, with corresponding resistance to storm or wind pressure above.

It is obvious that many minor changes in the construction and arrangement of the parts might be made and substituted for those shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, I claim—

1. In a ship, the combination of the main hull A, the parallel supplemental hulls B, arranged under and supporting the same, said hulls B being at a suitable distance apart, and the vertically-movable keel C, suspended from the center of the main hull, substantially as described.

2. In a ship, the combination of the main hull A, the parallel supplemental hulls B, arranged under and supporting the same, the vertical open-ended cylinders C^3, arranged in line in the center of the main hull and depending therefrom, the vertically-movable keel C, arranged under the main hull and having the posts extending up through the cylinders, and means, substantially as set forth, to raise and lower the said posts and keel, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

ANDREW H. LUCAS.

Witnesses:

JOHN F. CAHILL,

CHAS. WOLFF.