R. Germain.
Towing.

No. 26,099. Patented Nov. 15, 1859.

Witnesses;
F. Gaer
C. B. Forbush

Inventor;
Rollin Germain

UNITED STATES PATENT OFFICE.

ROLLIN GERMAIN, OF BUFFALO, NEW YORK.

CONSTRUCTION OF SHIPS OR OTHER NAVIGABLE VESSELS.

Specification of Letters Patent No. 26,099, dated November 15, 1859.

To all whom it may concern:

Be it known that I, ROLLIN GERMAIN, of the city of Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in the Form and Construction of Vessels for Navigation; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and the letters of reference marked thereon.

The nature of my invention consists in certain devices, arrangement and shape of the parts of a navigable vessel by which a vessel of extreme length compared with its breadth of beam and draft may be built, possessing steadiness, stability, safety, capacity, strength and economy, and capable of a very high degree of velocity.

The principal features of a vessel constructed as hereinafter described are, 1st, opening the track of the vessel through the water by surfaces inclined exceedingly near to the line of movement; 2d, permitting the water to close in, after the vessel, along surfaces inclined exceedingly near to the line of movement; 3d, combining very great length, with comparatively narrow breadth of beam; and light draft of water; 4th, constructing the exterior parts of the vessel, which move through the atmosphere, including smoke pipes, pilot house, &c., in a manner similar to that already described, as to the parts which move through the water; 5th, a V-shaped, fin-like projection along the sides of the vessel, below the water line; 6th, the adaptation and use of the extreme after part of the vessel, for the purposes of a rudder; and 7th, joining the metallic plates, knees, ribs, &c., used in the construction of the vessel, so that they shall hook or lock together, and be as strong at the fastenings, as at any other part thereof, and at the same time, present a smooth and even exterior surface.

To enable others skilled in the art, to make and use my invention, I will proceed to describe the same.

Figure I is a side elevation of a vessel constructed according to my improvements. Fig. II is a bottom plan of the same. Fig. III is a section of a portion of the bow. Fig. IV is a section of a portion of the stern, showing how its extreme after part is adapted to the purposes of a rudder. Fig. V is a cross section of the vessel midships. Figs. VI, VII, and VIII are sections of the metallic plates used in the construction of the vessel, and showing the manner of connecting and fastening the same together. Figs. VI and VII (each) show a plan or form of iron knee and the manner of fastening the plates and knees together. Fig. IX is a section of the two walls of the vessel, showing the manner of connecting and bracing the same. Fig. X is a cross section of a smoke pipe.

For the purpose of description I will divide the vessel into three sections; viz., bow section, stern section, and middle section. From L to the line M M (Fig. I) is the bow section. From the line O P to Q is the stern section. Between the lines M M and O P is the middle section. By the term breadth of beam herein used, is intended the breadth of the vessel below the water line exclusive of the fin-like projection.

The form of structure is thus determined:

1st, having reference to the contemplated use (as for river, lake, or ocean navigation) I determine the suitable draft, and the breadth of beam necessary for steadiness. 2d, with a like reference to use, and upon a careful calculation of the strength of material to be used in the construction, I determine the greatest length which, with the draft, and breadth of beam already determined, and a nearly uniform taper to a point or edge, may be given to the bow section, consistently with the required strength,— thereby securing the least practicable angle of inclination of its surfaces to the line of motion, which angle should not exceed three and a half degrees, for the parts below the water line. 3d, the stern section should be made substantially of the same shape and dimensions as the bow section, a portion thereof being hinged and used for the purposes of a rudder. 4th, the middle section should be made with sides nearly or quite parallel to the line of motion, and as long as convenience will permit. Great length not being considered a cause of weakness, but the opposite, and the resultant advantages of increased capacity in this part of the vessel, unattended by any resistance from the water, except friction, being so numerous and great, there is left no other limitation on length, aside from the amount of business, but simply that of convenience in management of the vessel, especially in channels and harbors. Whenever this limitation

will permit, the length of the middle section should be so extended, that, if a right line be drawn longitudinally through the middle of the vessel, commencing at the water line at the bow, and terminating at the water line at the stern, when the vessel is loaded; and another line be drawn transversely, along the water surface, from the water line on one side to the water line on the other side, at the middle of the middle section, and from every point in this last described line, right lines be drawn to each end of the first-described line, the average of all the angles made by these last lines with the first described line, will not exceed one and a half degrees. Angles are avoided and curved lines used where the sections join.

A (Fig. V) represents a V shaped fin like projection, being a part of the vessel on the sides, below the water line, and commencing with a point or edge in the bow and stern sections, and enlarging gradually until it attains its full size, which, in this case, is at a point near the middle of the length of the bow or stern section. It may continue of uniform size along the middle section of the vessel, as represented in the drawings, or it may diminish or altogether disappear as it approaches the middle section. The object of this device is mainly to stiffen and strengthen the bow and stern sections and thus enable me to incline their surfaces much nearer to the line of motion, than could otherwise be done and retain sufficient stiffness and strength. This device also increases the buoyancy and steadiness of the vessel.

B (Fig. IV) represents a joint which converts the after part of the stern section into a rudder. This joint occupies the whole thickness and height of the stern section where it occurs, and allows the rudder to turn freely to guide the vessel. In order to preserve a smooth surface in contact with the water, I make a sheathing of spring steel or other elastic material which covers the joint, but is not fastened at the after edge, so that the rudder in turning will slightly flex and raise the edge of such sheathing, and still give the water a smooth passage over the joint. This device is represented at Z. The rudder (B^2) may be worked by any of the approved methods.

C C (Fig. VI) are metallic plates used in the construction of the vessel. They are made thicker at their lapping ends, than at the middle, to compensate for the waste of rivet holes and notches, and insure as much strength at their connections as at other parts. The lines C^2 show a series of corresponding notches, made in each plate so that they clutch and hold together and relieve the strain upon the rivets. Fig. VIII shows another form of constructing the plates, so that they will hook together, as shown at C^3. Fig. VII represents another form of constructing the ends of the plates, in which they do not overlap each other, but the plates and the iron knee (D) are correspondingly notched, so that the plates and knee clutch together, the knee operating to bind and hold the plates. The rivets (or bolts) E pass through the plates and knee, and thus the plates and knee are combined and firmly held together. The rivets are countersunk on the outside so as to make the outside surface smooth.

D D (Figs. VI and VII) represent two forms of knee which may be used in construction of the vessel, and to which the plates are connected as before described.

F (Figs. VI and VII) is an edge view of the metallic plates used in the construction of the double walls to bind the two sides thereof together, and F (Fig. IX) is an edge view of said walls. E E are bolts or rivets to fasten said plates to the knees.

H H (Fig. IX) represent timbers and the manner of laying up the same for the purpose of bracing and supporting the main walls of the vessel. Double walls, thus braced and supported, are used in large vessels for the entire hull, including the bottom and fin like projection, and the bow and stern sections up to the point where these become so thin, in their wedge like form, as to admit of solid wood or iron as represented by I and J (Figs. III and IV) and X Y (Fig. V). Each cell formed in the double walls by the cross walls, is water tight, and the interior of the vessel, below the main deck should be divided into convenient water tight compartments.

K K (Fig. V) are inside walls which run lengthwise nearly through the vessel, and are made of metallic plates in a manner similar to that of the outside walls. The top of each outside wall (X Fig. V) is a compact mass of iron, gradually diminishing in size toward each end of the vessel. The corresponding portions of the walls at the bottom, and the outside edges of the fins are filled with solid wood, as represented at X Y.

R, deck floor, made of metallic plates joined together, as before described. A knee is formed on the end of the plates where they connect with the walls as shown at S. T, pillars for supporting the decks. U, hollow iron beams filled with wood, for supporting the upper deck. R^2, overhanging decks which project from the sides of the vessel, an equal distance, in this instance, with the fin like projection A. In the space between these, are the propeller or paddle wheels, any number of which, with the engines necessary to obtain the requisite power and speed, may be used. *y z* dotted lines representing bolts; r^3, braces; N, wheel

house; V, pilot house; W, chimney or smoke pipe.

The form is shown by a cross section thereof (Fig. X) and the same figure may be taken to represent the pilot house, which is of like shape in its cross section but of larger size.

The size and top of the vessel should be as high, in the middle parts, as steadiness will permit, sloping inward and downward along the narrow extremities, so as to present to the atmosphere, surfaces slightly oblique to the line of motion, substantially as already described for the surfaces exposed to the water.

All parts of the vessel above the water, and exposed to the resistance of the atmosphere, should be made to conform as nearly as may be, to the general principles of construction herein set forth. The whole exterior surface of the vessel should be made even and smooth, particularly those which move in the water.

The drawings show a vessel with the water surfaces of the bow and stern sections tapered partly from the bottom, and partly from the sides. In practice, this may be done altogether from the sides, or bottom, or, in other proportions from both.

I hereby disclaim including in this specification, or in any of the following claims, vessels of less than twenty tons burden.

I claim as my invention, and desire to secure by Letters Patent—

1. Vessels for navigation when the bow and stern sections shall taper uniformly, and the vessel below its water lines, be of the form and model substantially as described, and when the relative proportions, as to length, breadth of beam, and draft of water shall be such that if a right line be drawn longitudinally through the middle, commencing at the water line at the bow and terminating at the water line at the stern (when the vessel is loaded) and another line be drawn at right angles to said line along the water surface from the water line on one side to the water line on the other side at the middle of the part of the vessel where a cross section below the water line is greatest, and from every point in this last described line, right lines to be drawn to each end of the first described line, the average of all the angles made by these last lines, with the first described line, shall not exceed two degrees.

2. The combination of the fin-like projection V, with a vessel constructed below its water lines substantially as herein described.

3. The combination of the overhanging deck, with a vessel constructed below its water lines substantially as herein described.

4. Constructing the pilot house and smoke stacks (separately) in respect to their forward and rear parts in a tapering or wedge-like form substantially as herein set forth.

5. The combination of the notched plates C, C, the iron knee D, and rivets E, with a vessel constructed substantially as described, for the purposes set forth.

Buffalo, February 8, 1859.

ROLLIN GERMAIN.

Witnesses:
R. W. Haskins,
T. J. Sizer.