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A. McDOUGALL.

TOW BOAT.

No. 259,889. Patented June 20, 1882.

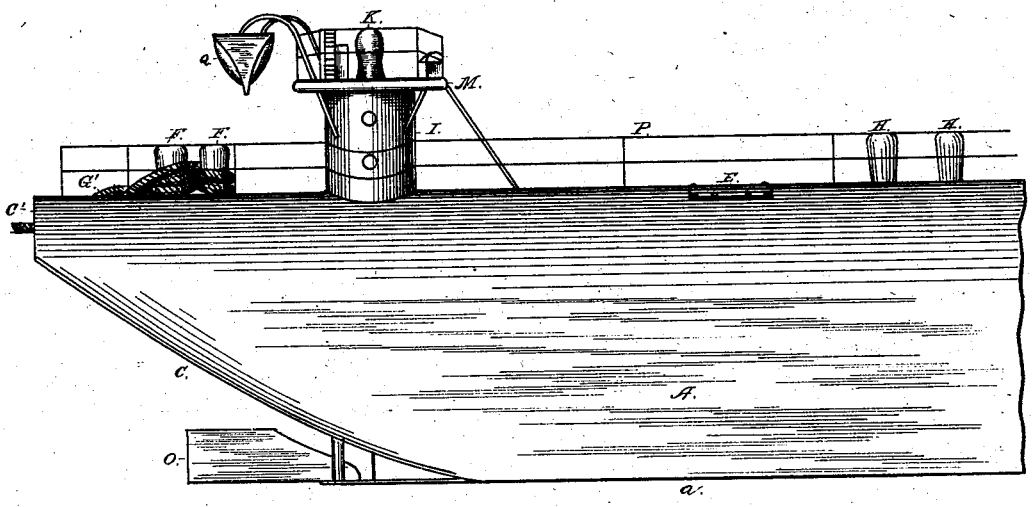
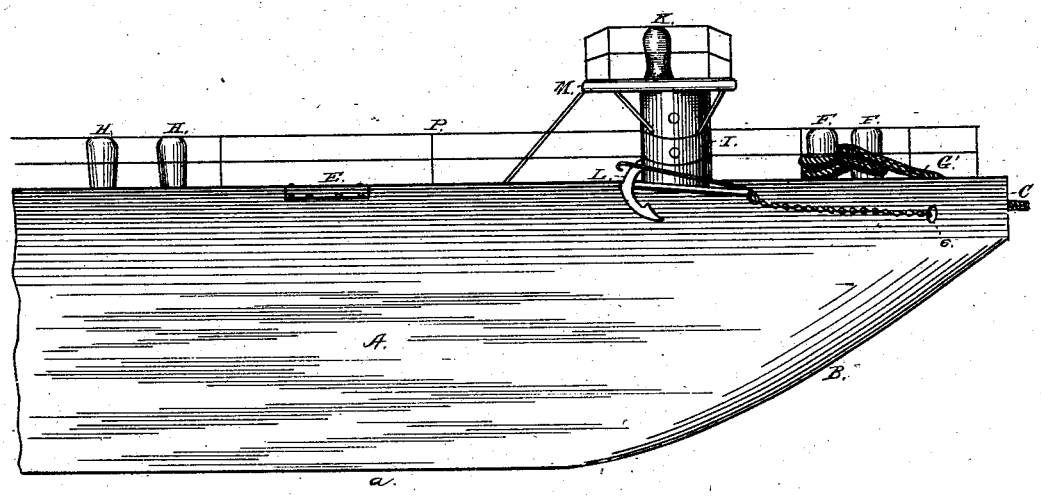


Fig. 1.



WITNESSES

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 2.

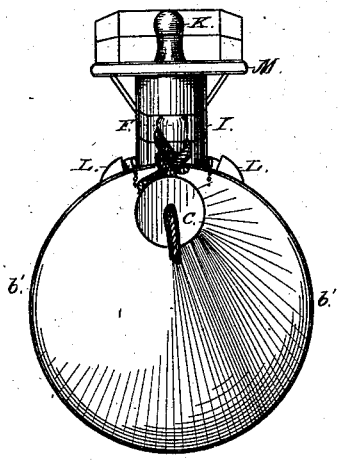


Fig. 3.

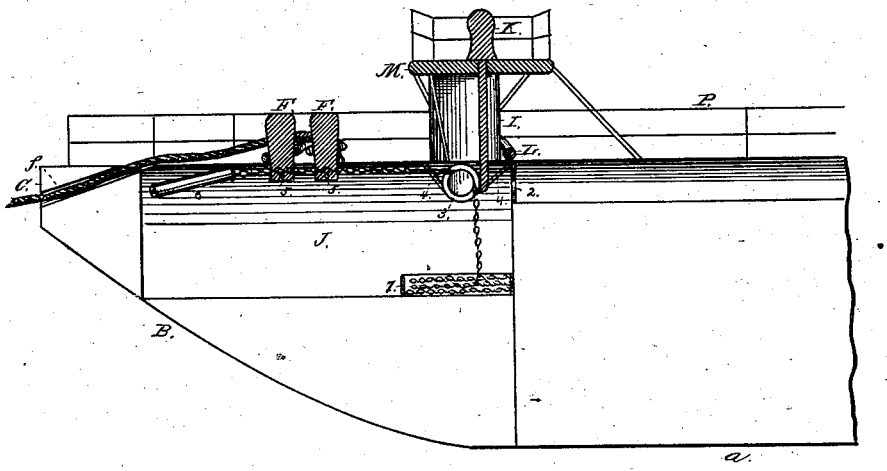
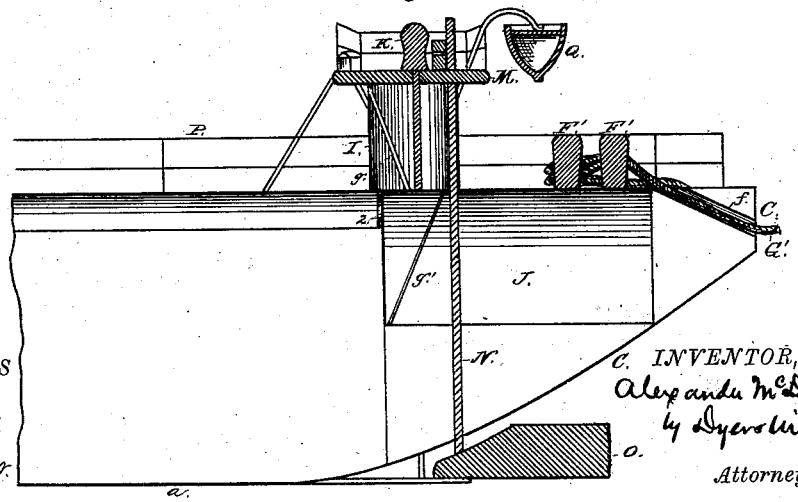


Fig. 4.



WITNESSES

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TOW BOAT.

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Fig. 5.

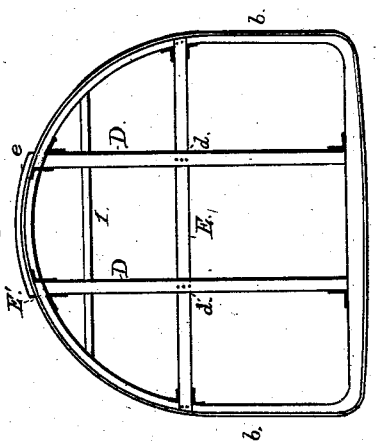
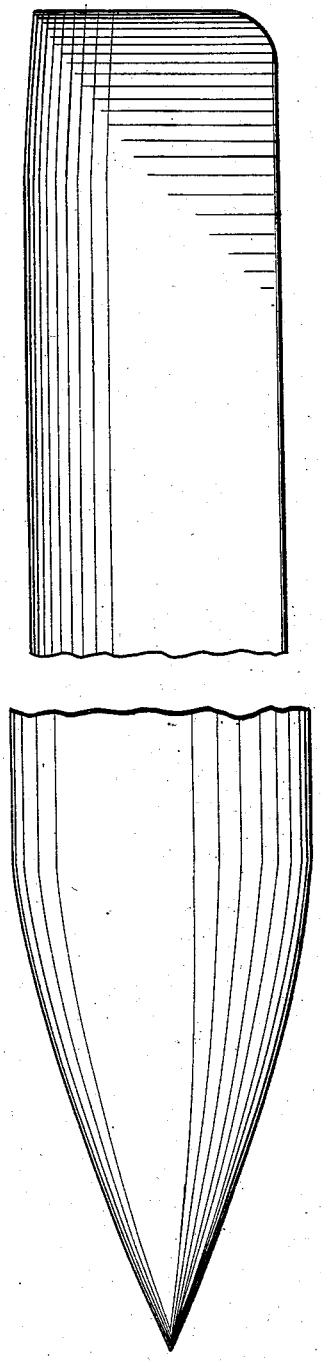


Fig. 6.



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UNITED STATES PATENT OFFICE.

ALEXANDER McDOUGALL, OF CLEVELAND, OHIO.

TOW-BOAT.

SPECIFICATION forming part of Letters Patent No. 259,889, dated June 20, 1882.

Application filed April 4, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER McDOUGALL, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Improvement in Tow-Boats; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

One style of tow-boats at present in use upon the great lakes of the country is constructed of wood in a manner and of a form like the sailing-vessels, and for purposes of safety when separated in transit from the towing-steamer have masts, spars, and sails, so as to be practically independent. These masts, spars, and sails are not only expensive of first cost, but of renewal, and require for their management a considerable crew at such time as their use is needed. In addition, these masts, spars, and sails are of very considerable weight and offer a large area of resistance to the air or winds, so that a considerable proportion of the motive force applied in moving the vessel is expended in moving such masts, spars, and sails. In the construction of these vessels very expensive bows and sterns are required, supporting stems and stern-posts, supposed to be essential in order to enable the vessel to cut the water smoothly and leave it in like fashion, and high and strong bulwarks flaring outwardly at the bows to keep the water off the decks, and for the same reason the deck is given a sheer or is raised both fore and aft, both of which tend to retain water coming in on deck, whereby much additional weight is imposed upon the craft and an increased power is required for towage. The vessels spoken of, being made of wood, speedily decay in the fresh waters of the lakes and require frequent and expensive repairs. In addition, from the form of the hull, they tow badly, as well as heavily, requiring constant labor and watchfulness on the part of the helmsman, and are inclined, especially in stormy weather, to sheer out of their proper course, which results often in the breaking of the tow-line, and consequently in vexatious and expensive delays, and in such stormy weather are towed with great expenditure of steam-power and at a very low rate of speed.

My invention proposes to obviate these disadvantages by making the tow-boat of iron or steel instead of wood, by dispensing entirely with masts, spars, sails, and bulwarks, and by adopting a form of hull best suited to be towed easily in all sorts of weather and to make the least deviation from the line of towage. The construction required to secure these advantages constitutes the invention which is the subject of this application; and it consists, first, in the shape of the hull; second, in placing decks elevated on turrets above the hull proper for the guidance and management of the vessel; third, in the construction of the hull; and, fourth, in various details of construction, all hereinafter to be more fully described.

For the better comprehension of my invention reference is to be made to the accompanying drawings, in which—

Figure 1 is a side elevation broken out in the center; Fig. 2, an end elevation; Fig. 3, a central vertical section of the bow; Fig. 4, a similar section of the stern; Fig. 5, a vertical cross-section of the hull, and Fig. 6 two views showing a modification of the bow and stern.

Like letters represent the same parts in all the figures.

In the drawings, A represents the hull, which is preferably in extreme length about ten times the breadth of the beam, and the depth of the hull is about four-fifths of the breadth of beam—that is to say, in a tow-boat two hundred feet long I prefer to have the same about twenty feet wide and sixteen feet deep. The frames which constitute the ribs are precisely similar in size and shape throughout about three-fourths of the entire length of the hull. In this extent of the hull vertical sections would show a bottom, *a*, nearly flat, or preferably with a rise to the floor-timbers of not over a half-inch to the foot. From this bottom the sides *b*, with a slight curvature at the point where they meet the bottom, rise in substantially vertical lines to a point about half the depth of the hull. Above this the top sides, *b'*, rise preferably in a true semicylindrical form. Thus the lower half of the hull has substantially vertical sides and a flat horizontal bottom and the upper half a semicylindrical form with a top in the same horizontal plane. By reason of this particular form of the lower

half of the hull there are obtained the greatest degree of buoyancy and the largest capacity for carrying weight with a given depth of submersion, and at the same time the most convenient form for the storage of cargo, while the upper half, from its arch-like form, gives the greatest possible power of support to the remainder of the hull with the least weight of metal. In the construction of this portion of the hull described I propose to use ribs, keelsons, covering-plates, &c., in ways now well known in building iron vessels.

The bow B and stern C are built and shaped alike, tapering in regularly outwardly curving lines at the sides and from the bottom upward, so that vertical sections of the bow and stern at a little distance from the hull proper assume forms nearly cylindrical. Both the bow and stern, at their upper parts, are nearly horizontal and in line with the line of the upper part of the hull, and the extreme ends, *c c'*, of the bow and stern are preferably flat or bluntly rounded. This exterior tubular form of the hull, it will be seen, permits the vessel to be submerged to a great depth, as there are no openings for water to enter, and at the same time offers little resistance to the air or winds. It permits a great cheapness of construction, as it employs similar frames throughout the body of the hull and the corresponding frames at the bow and stern are precisely alike. It avoids the difficult and expensive system of a great number of dissimilar frames as ordinarily used, and particularly those in connection with the stem and stern-post, which from their form make it difficult and expensive to bend and secure the covering-plates. By my plan the covering-plates would have to be bent very slightly at any point, and could be bent cold.

From the rounded form of the bows, without a stem, I have demonstrated by experiment that there is the least tendency to deviate while the vessel is under towage, whether the sea be heavy or otherwise, and this tendency to follow exactly the line of strain is increased by the fact that the tow-line is made fast to the central extremity of the vessel.

The interior of the hull is strengthened by stanchions D and cross-beams E, preferably to every second frame, as usual, secured at their respective ends to angle-irons and arranged so as to come in contact, and then secured together, as shown at *d d*.

I prefer to place a deck about four feet below the center horizontally of the top of the hull, extending from the bulk-head of the cabin to that of the forecastle, (shown by Figs. 3 and 4 in the drawings,) and having access both to the cabin and the forecastle by means of proper man-holes with water-tight covers, (marked 2 2 in the drawings,) and to have the hold below this deck unobstructed except by the beams and stanchions. The purpose of this deck will be to give a covered passage-way in extremely severe storms between the cabin and forecastle, and also to prevent the cargo, under any stress of weather, from shifting, and also in some degree to have a chamber nearly air-tight in the extreme upper part of the hull, the better to preserve the equilibrium of the same under all conditions.

Upon the top, or what corresponds to the deck, are several hatchways, E' E', capable of being closed water-tight in any well-known way. When the hatchways occur I prefer to use the dependent sides of the hatch-combing *e* as an angle-iron, to which the upper ends of stanchions are secured.

Upon the forward end of the deck suitable tow-posts, F F, are placed, and similar ones, F' F', at the after end of the deck. Between these and the extreme bow and stern *c c'* there is inserted a hawse-pipe, *f*, or some equivalent means, by which the tow-lines G' G' pass down below the level of the deck and out of the extreme ends, *c c'*, one of these tow-lines being commonly used to draw the tow-boat along and the other for attachment to another tow-boat which follows. At various points along the deck are shown timber-heads H H, for securing lines to the hull for various well-known purposes. Near the bow of the vessel is a turret, I, which rises above the deck a sufficient distance to be above the reach of the waves, preferably about eight feet for lake navigation. This turret is an iron cylinder of a size sufficient to permit of a stairway, *g*, down to the deck of the forecastle, J, and also to permit of a capstan, K, which may operate a suitable windlass. In this forecastle are placed suitable chain-boxes or other convenient receptacles for the chain cables, which lead up through the deck to the anchors L L, which are secured upon the deck. I prefer to have this windlass (marked 3) journaled in hangers 4, bracing inwardly and secured at their upper ends, and to have the chain-box (marked 7) under it. The chain cable then passes up from the chain-box over the windlass and along the upper portion of the forecastle and near to or between the lower extension, 5, of the tow-posts F F and into a hawse-pipe, (marked 6,) which is suspended from the roof of the forecastle and should have suitably-tight plugs to prevent the inflow of water. To these tow-post extensions suitable cable-nippers can be secured, so as to take the strain of the cable off the windlass when the tow-boat is riding at anchor in a seaway. These hawse-pipes terminate in a proper opening (marked 6) in the bow of the vessel. The anchors should lie with a fluke against the side of the turret and be lashed to the same in such a way that the lashing can be released from the deck of the turret, and then the anchor can be displaced by a hand-spike from the same deck, when it will, from the sloping character of its resting-place, fall by gravity into the water.

Upon the top of the turret is placed a suitable deck, M, protected by railings. At the stern

of the boat is a similar, but preferably a little larger, turret, I, having a stair-case, g', leading down to the floor of the cabin J′, and a capstan, K′, and a deck, M′, upon its top, with suitable railing, having a steering-wheel operating a rudder-post, N, which in turn operates the rudder O. This forecastle J, as well as the cabin J′, is placed in the upper portion of the hull, preferably near the bow or stern, and is protected on all sides from the entrance of water, thereby, in case of leakage in the hull, acting not only to prevent the vessel from sinking, but to preserve its proper vertical position.

Suitable railings, P P, inclose a central walk along the deck of the vessel from end to end, in which are placed ladders, which give access to the tops of the turrets.

From the deck M′ a small boat, Q, may be conveniently hung by davits.

The hull of the vessel is provided with water-tight bulk-heads near the tow-posts, and preferably between them and the extreme ends, $c\,c'$, of the vessel, and other bulk-heads may be used in other portions of the hull, as desired.

I have described two turrets, which I prefer for convenience; but it is evident that a greater or less number could be used, or they could be placed in positions upon the deck different from those indicated, without departing from the spirit of my invention.

In Fig. 5 is shown a modification of the bow and stern wherein the sides of the vessel only are narrowed down, while the lines of the top and bottom are unchanged. This modification I do not prefer; but it may be employed to advantage under certain circumstances.

The advantages attending my construction have been so fully explained throughout this specification as to require no further enumeration of them.

Having thus described my invention, what I claim as new therein is—

1. A tow-boat having a flat bottom and vertical sides, except at the ends, a semicylindrical upper portion throughout its entire length, and having the bottom and sides toward the ends tapering in outwardly-curved lines to the extremities, so as to form a precisely similar conical bow and stern, substantially as described.

2. A tow-boat, substantially as described, having turrets rigidly secured to the same, each turret supporting a separate open working-deck, upon which is placed and worked the steering and hauling-in gear, substantially as described.

3. In a tow-boat, substantially as described, in combination with the turrets, and communicating with them, a water-tight cabin and forecastle arranged on the upper part of the hull and communicating with each other by means of a passage-way in the upper central portion of the hull and separated from the cargo-space, substantially as described.

4. The skeleton of a tow-boat, substantially as described, consisting of numerous rib-frames, precisely alike in size and form, each with substantially flat lower parts and vertical sides and rounded tops throughout the body of the hull, bow and stern frames nearly annular and precisely alike in size and form at equal distances from the extreme ends, and cross-beams and stanchions secured together at their points of contact, whereby a keel, keelson, and stem and stern-post are dispensed with.

This specification signed and witnessed this 23d day of December, 1881.

ALEXANDER McDOUGALL.

Witnesses:
JOHN C. SCHROEDER,
J. ELLS. CLARK.