J. S. LANE & J. L. MATHEWS.

TOW BOAT AND SYSTEM OF TOWAGE.

APPLICATION FILED OCT. 9, 1907.

922,160. **Patented May 18, 1909.**

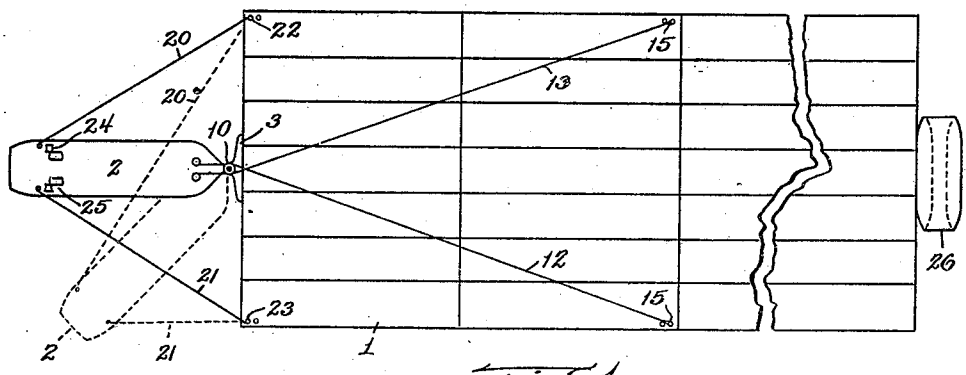


Fig. 1

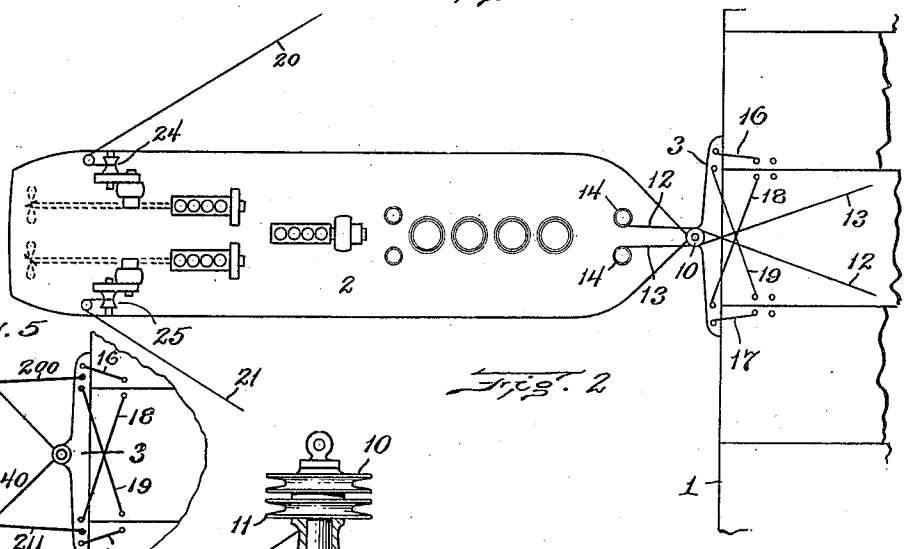


Fig. 2

Fig. 5

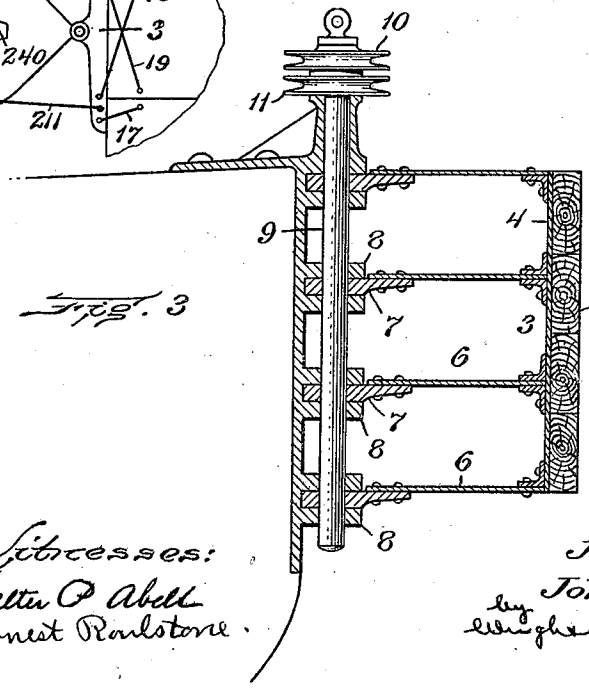


Fig. 3

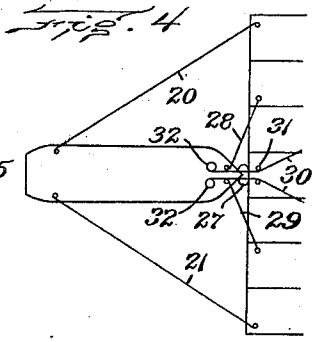


Fig. 4

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UNITED STATES PATENT OFFICE.

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TOWBOAT AND SYSTEM OF TOWAGE.

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No. 922,160. Application filed October 9, 1907. Serial No. 396,632.

To all whom it may concern:

Be it known that we, JULIUS S. LANE and JOHN L. MATHEWS, respectively of Brooklyn, in the county of Kings and State of New York, and of Billerica, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Towboats and Systems of Towage, of which the following is a specification.

The present invention consists in a novel construction of towboat or propelling unit and means for attaching the same to a fleet, raft or gang composed of a number of barges, scows or the like, securely lashed together, and so arranged that the towboat may be inclined at an angle to the gang or fleet, whereby to push or pull transversely upon the gang to swing the same around bends in a waterway, and control the fleet more efficiently than is possible by present methods.

The towboats at present used for propelling large tows upon winding rivers are provided with wide blunt bows and usually made rigidly fast to the after end of a large gang or raft composed of barges. Such towboats are prevented by the blunt bows and the manner in which they are made fast, from turning with respect to the tow. Consequently, they can only steer the tow around bends by a cumbersome process known as "flanking", which consists in working the towboat around until it is on the off shore side of the fleet, and then backing up and pulling off shore. In this process, a great deal of time is consumed as the tow at such times is not actually progressing as fast as the current of the river, and much power and fuel are used to hold back, which might otherwise have been used to push the tow ahead.

By our invention we claim to facilitate the maneuvering of large tows so that the power of the towboat may be used in pushing ahead at the same time that it turns the tow around bends. For this purpose, the towboat is provided either with a pointed bow protected with a rope fender or cushion on the stem and so lashed to the tow that the bow cannot move sidewise, or preferably we use a pushing beam at that end which is attached to the tow, which is capable of attachment to a gang of barges in a way similar to that in which the towboats are connected under the present system, and is pivoted so as to enable the towboat to be swung from side to side, by holding lines adjustable in length, run from the towboat to the tow or to the beam so as to control the direction of the towboat in relation to the center line of tow.

Figure 1 represents a plan view of a fleet or raft of barges to which is connected a towboat constructed in accordance with our invention, and used in connection with a bow auxiliary. Fig. 2 represents a similar view on an enlarged scale, of the aft end of the raft and the towboat, showing the manner in which the boat is made fast to the gang. Fig. 3 represents a vertical sectional view, showing the construction of the pivoted pushing beam and the manner in which the same is attached to the boat. Fig. 4 represents the bow of an ordinary tug boat when used by our system. Fig. 5 represents a modification of the principle illustrated in Figs. 1 and 2.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings,—1 represents barges, scows or other boats capable of carrying cargo, which are secured together so as to form a continuous gang or raft capable of being propelled and turned as a unit. To the stern of this raft is secured a towboat 2. Between the hull of the boat and the gang is a pushing beam 3, which has a wide surface adapted to bear against the aft end of the raft so as to apply the power of the towboat over a wide area. This beam is pivotally connected with the bow of the towboat so as to lie entirely forward of the hull. It is constructed of metal framing, consisting of a front vertical plate 4 on which is mounted a facing of wooden timbers 5 and horizontal plates 6 rigidly secured to the front plate by means of angle irons. At the center of each of the horizontal plates is secured a tongue or lug 7 which projects between a pair of ears 8 on the bow of the towboat. There are as many pairs of ears on the boat as there are lugs, and these ears are arranged in vertical alinement, being bored so as to receive a pivot pin 9, the tongue 7 also being bored for the same purpose.

Upon the upper end of the pivot pin are mounted sheaves or pulleys 10 and 11 which serve as guides for the lines 12 and 13, by which the towboat is made fast to the tow. These lines pass from capstans 14 partly

around the sheaves forward and laterally to points near the sides of the fleet, where they may be made fast to bitts 15 on the outermost barges of the fleet. The pushing beam 3 is also made fast by lines 16 and 17, and prevented from shifting laterally when power is applied transversely by the diagonal lines 18 and 19.

From the stern of the towboat two lines 20 and 21 extend to bitts 22 and 23 on the aft and outermost boats of the fleet to which they are made fast. The location of the fastening points for these lines is such as to give the greatest possible divergence to the lines. The inboard ends of the lines are passed around winches 24 and 25, whereby their lengths may be varied. As shown by dotted lines in Fig. 1, by slackening off line 20 and taking up on line 21, the stern of the towboat may be swung to the right, while by reversing this procedure, the towboat may be swung in the opposite direction. Thus the towboat as a whole may be swung from side to side, whereby its force may be applied either pushing or pulling in diagonal or oblique lines so that the rear end of the gang may quickly be swung from side to side. If desired, an additional propelling unit, such as the pontoon 26 shown in Fig. 1, may be employed. This pontoon is provided with a motor and propeller arranged to exert force in the direction of its length, and is made fast transversely across the forward end of the gang. Power generated by the towboat is transmitted by any approved method so as to drive the propelling screws therein, and is controlled by the pilot of the towboat either directly or by signal. Thus by driving the additional propeller in the desired direction, a lateral impulse to either side may be given to the forward end of the gang at the same time that the towboat is pushing or pulling transversely at the aft end thereof.

Fig. 4 represents one manner of adapting our system of towboat control to a tugboat, lacking the pivoted beam. Here a rope fender 27 is interposed between the bow of the tug and the tow. Lines 28 29 from the tug to the tow prevent the bow of the tug from shifting sidewise, and lines 30 from distant points on the sides of the tow passing bitts 31 on the tow near the bow of the tug and onto winches 32, serve to connect the tug and tow either for pushing or pulling. The aft end of the tug may be swung at an angle to the fore and aft line of the tow by the rudder of the tug and by lines 20 21 from the stern of the tug to the sides of the tow.

Fig. 5 shows a modification in which, instead of guiding lines 20 and 21 passing from the stern of the towboat to widely separated points on the tow, there are substituted lines 200 and 211 made fast adjacent to the ends of the beam 3 and led around guides near the end of the boat to a differential winch 240, by which either line may be paid off and the other taken up at a rate such as will keep them both taut.

It is to be understood that a towboat embodying the principles of our invention may be attached to the tow at the forward end of the latter as well as at the aft end. A towboat equipped for such attachment may have its beam pivoted to the stern instead of to the bow. In other words, the invention is not limited to a boat having a pivoted beam at the bow, but includes one which may have the beam at either end or both ends.

We claim:—

1. In combination with a barge or fleet or gang of connected boats, a propelling boat, a transverse beam pivoted to the end of the propelling boat and detachably fastened to the barge or fleet, and securing lines passing from the propelling boat around the pivot of said beam to points of attachment in the barge or fleet.

2. A propelling boat having at an end a pivot pin, and a beam having a transverse pushing surface connected to said pivot and adapted to be detachably connected with another boat or gang of boats.

3. In connection with a propelling boat, a pushing beam pivoted to the boat at one end thereof and having an extended surface adapted to bear against a boat or gang of boats, being manipulated by the propelling boat.

4. A propelling boat having at an end a vertical series of pairs of ears, a transverse beam having tongues arranged in vertical series entering each pair of ears, and a pivot pin passing through said ears and tongues, whereby the beam is secured or hinged so as to be capable of swinging transversely.

5. A propelling boat having at its end a vertical series of pairs of ears, a transverse beam having vertically arranged tongues entering each pair of ears, a pivot pin passing through said ears and tongues, whereby the beam is secured so as to be capable of swinging transversely, and pulleys mounted on the pivot pin to receive and guide lines making fast the propelling boat to a tow in such wise as to permit relative swinging movement without displacing or appreciably altering the length of the lines.

6. A propelling boat having at its end a pivot, and a beam attached to the pivot with its ends extending laterally in each direction therefrom so as to swing thereon, said beam having a bearing surface for detachable engagement with another boat or gang of boats.

7. In combination with a tow, a propelling boat secured thereto with provision for swinging laterally, lines passing from both sides of the towboat to separated points at-

tached to the tow, and a differential winch to which the inboard ends of the lines are made fast, said winch being adapted to take in and pay out on the lines at rates proportional to the angularity of the lines with respect to the tow, whereby the lines are kept taut.

8. In combination with a tow, a propelling boat secured thereto with provision for swinging laterally, lines passing from both sides of the towboat to separated points attached to the tow, and a differential winch having a drum of greatest diameter at the middle and tapering toward the ends, to which the inboard ends of the lines are made fast, whereby they may be taken in and paid out at varying rates as their inclinations with respect to the tow vary.

In testimony whereof we have affixed our signatures, in presence of two witnesses.

JULIUS S. LANE.
JOHN L. MATHEWS.

Witnesses:
A. C. RATIGAN,
P. W. PEZZETTE.