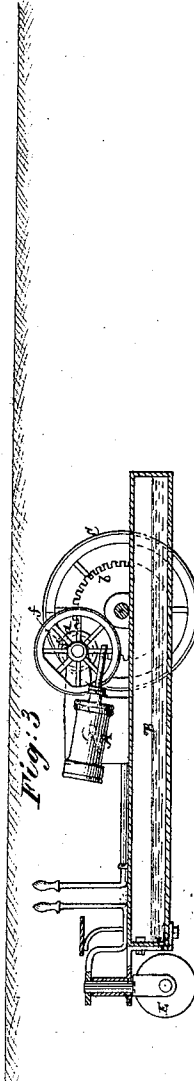
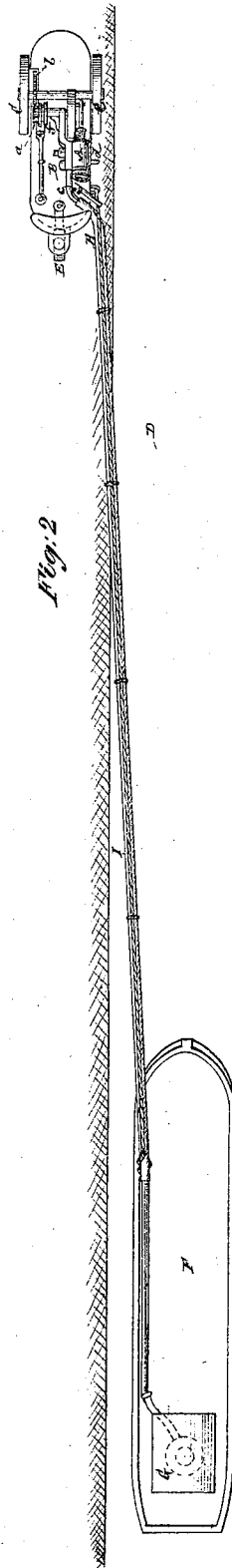
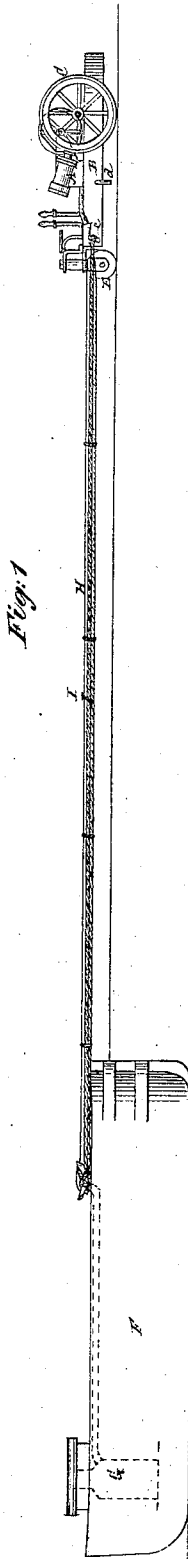


I. P. TICE.
Towing Canal-Boats.

No. 136,343.

Patented Feb. 25, 1873.



Witnesses:
George Smith
W. Morris Smith

Inventor.

Isaac P. Tice

UNITED STATES PATENT OFFICE.

ISAAC P. TICE, OF NEW YORK, N. Y.

IMPROVEMENT IN TOWING CANAL-BOATS.

Specification forming part of Letters Patent No. 136,343, dated February 25, 1873.

To all whom it may concern:

Be it known that I, ISAAC P. TICE, of the city, county, and State of New York, have invented certain new and useful Improvements in Means for Towing Canal-Boats and other Floating Vessels or Bodies; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a side view of a canal-boat with my improved means for drawing the same applied; Fig. 2, a plan of the same; and Fig. 3, a longitudinal sectional elevation of a traction-engine by which said boat is towed or drawn.

Similar letters of reference indicate corresponding parts.

The object of my invention is to provide improved means for drawing or towing canal-boats and other navigable vessels, rafts, or floating objects by the agency of steam, compressed air, or other elastic gases. The invention generally consists in a combination of a traction-engine on the tow-path or land, a power generator or reservoir on or in the boat or body to be drawn, and a pipe, tube, or hollow tow-line, connecting the engine with the boiler or its equivalent, and serving to supply the engine with its propelling medium or gases. The invention also includes various combinations of parts and peculiarities of construction, whereby increased facilities, conveniences, or advantages are obtained for carrying the main principle of the invention into effect.

By using a traction-engine on the tow-path or shore, deriving its power from a boiler or its equivalent within the boat which said engine serves to draw, I avoid all agitation of the water other than that produced by the passage of the boat itself or body or bodies being towed, and am enabled to utilize steam as the moving agent without the cumbrance of an engine on board the vessel, and without the aid of a jet, paddle-wheels, screw, or other propeller carried by the vessel, the fuel, and force pump, however, preferably being carried, as well as the boiler, by the boat.

The tow-line (which I propose to make of a flexible tube, as described) in ordinary use is a Manila rope about seven-eighths ($\frac{7}{8}$) of an inch in diameter, and from one hundred and twen-

ty-five to two hundred feet in length. It is absolutely necessary that the connection between the horses or engine and the boat should be perfectly flexible, and of sufficient length to allow boats moving in opposite directions to pass each other. This is accomplished by sheering one boat toward the opposite side of the canal from the tow-path, and allowing its tow-line to sink to the bottom, so that the inner boat may overrun it. When this is done the outer boat may resume its course as before. No rigid connection between the boat and engine or horses could be operated.

When the tow-path is changed from one side of the canal to the other, which is often the case, great length and flexibility of line are required to allow the horses or engine to cross the bridge before the boat comes to rest if moving slow, or the line is tightened if moving at too great speed. The greater the length of tow-line the less the angle at which the boat is drawn toward the shore, and the more readily does the boat yield to the action of the rudder. A long and flexible connection between the engine or horses and a canal-boat is also rendered necessary on account of the difference in the height of the tow-path above the water-level, which in some cases, through basins, and along the shores of rivers, when forming a section of the canal, is more than fifteen feet, while in other cases the path and water are on the same level. Again, at waste-gates and overflows, the water crosses the tow-path upon properly-prepared beds of stone or aprons of timber.

Except the engine here described is so constructed as to be loaded, to insure traction, and be relieved of its load to secure portability, several inconveniences would follow which in practice would render this system objectionable. The full effect of its traction is not necessary when towing an unloaded boat, or one partially loaded, and to relieve the engine of its then surplus load results in great economy of fuel. The weight of the engine proper must not exceed the ability of its driver, who rides upon and guides it along the tow-path, to haul it across a gang-plank aboard the boat, or to draw it, by his own exertions, around obstructions, bridges, or locks, should occasion require it.

The novel feature and the essential element

of this traction-engine are, that its useful weight may be proportioned exactly to the work which it has to perform, and the strength of those of the boat's crew by whom it is moved when disconnected from the boiler.

Referring to the accompanying drawing, A is a steam-engine mounted upon a hollow frame or bed-plate, B, and connected by gearing *a b* with drivers C C, the whole forming a traction-engine, without boiler, for travel along the tow-path of a canal or other piece of water, D. Said engine is provided with a third or steering-wheel, E, for the driver to direct the course of it. F is a boat being towed by said engine, and G a steam-boiler arranged on or in the boat, and serving to supply the engine with steam to effect its propulsion, by means of a hollow flexible pipe, H, which may also be used as the tow-line, either separately or in conjunction with an ordinary tow-line, I, the latter being auxiliary to the first, or independent of it, as desired. The driving-wheels C C of the engine and hollow frame or bed-plate B, upon which the engine is mounted, are made as light as practicable, to facilitate lifting or moving of the whole engine, as required. To give weight to produce the necessary traction, water is pumped or put into the hollow engine-frame or bed-plate B, as by a pipe, *c*, of a pump or jet, and be drawn or run off therefrom by a cock or pipe, *d* when it is required to lighten the engine—as, for instance, when it is desired to take the engine on board the boat or draw it past a lock. When the water, which forms ballast, is drawn from the hollow bed-plate B, the whole engine may be drawn by one man, or be run over a gang-plank on board the boat. The boiler G may either be

on the deck of the boat or in the space usually occupied by the stable of a canal-boat. The same may be lifted out of the boat on arrival at a terminus, and be put on another boat for utilization in the latter. The engine or motor A is provided with a clutch, *f*, for throwing it in and out of driving connection with the wheels C C, in order that the engine proper or motor may be started or run without a forward movement of the whole apparatus as a traction device or engine; also, in order that a load may be started gradually.

Compressed air or other elastic gases may be substituted for steam to work the engine, a reservoir on board the boat taking the place of the boiler.

What is here claimed, and desired to be secured by Letters Patent, is—

1. The combination of a traction-engine on shore or outside of the boat or vessel to be towed, a steam-boiler or its equivalent arranged on or in the boat, and a flexible pipe or tube operating as a tow-line, and connecting the boiler with the engine, and serving to convey the propelling medium or gases from the boiler to the engine, substantially as specified.

2. A traction-engine adapted to receive ballast for insuring adequate traction according to variable loads, and discharging the same to insure lightness and portability, substantially as described.

3. The combination of an auxiliary tow-line, I, with the hollow tow-line H, substantially as and for the purpose described.

ISAAC P. TICE.

Witnesses:

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