

T. J. O'TOOLE.

Means for Towing Canal-Boats, &c.

No. 147,680.

Patented Feb. 17, 1874.

Fig 1

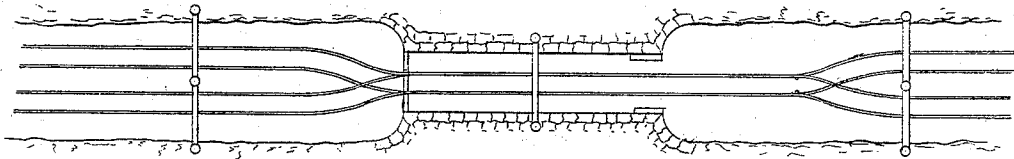


Fig 2

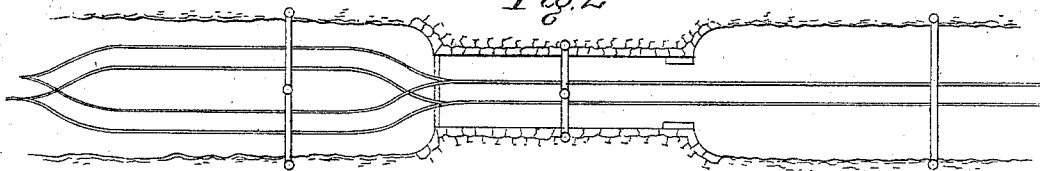


Fig 3

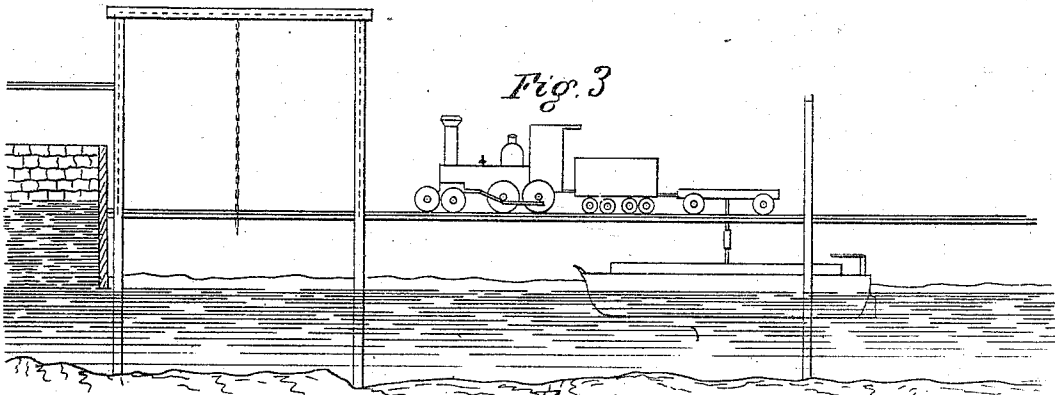
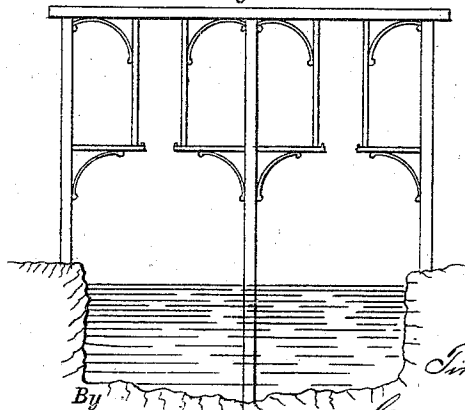


Fig 4



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IMPROVEMENT IN MEANS FOR TOWING CANAL-BOATS, &c.

Specification forming part of Letters Patent No. **147,680**, dated February 17, 1874; application filed January 28, 1874.

To all whom it may concern:

Be it known that I, TIMOTHY J. O'TOOLE, of Brooklyn, in the county of Kings and State of New York, have invented a certain new and useful Method of Combining Rail and Water in the Transportation of Freight; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figures 1 and 2 are plan views of system of railway arranged according to the requirements of my invention. Fig. 3 is a side view of railway system. Fig. 4 is a transverse sectional view.

My invention has for its object to provide a method of towing canal and other boats, whereby said boats may be moved with as great speed as desired through the water without causing a greater swell, commotion, or displacement than results from the ordinary method of towing by horse-power.

The nature of my invention consists in the application or employment of a moving and sustaining force or power above the boats, in such manner that the latter are not only drawn or driven through or upon the water, but are elevated at any desired distance therein, so as to proportion the resistance met according to the velocity sought to be obtained.

In carrying this invention into effect the canals are supposed just as they are, or with such modifications or additions as will give effect to the object in view.

Above the canal, or over it, is to be erected a trestle-work or elevated railway, at a height proper to meet the necessities of locks, bridges, traffic, &c., the track to rest on, or be sustained by, transverse beams supported by arches, piers, or columns located at proper intervals along the sides and in the center of the canal, or at the sides or in the center alone, as may be considered most desirable or expedient. This elevated road will embrace two tracks along the whole line of the canal, built in sections equal to each level between locks, and at a uniform height above the level of the water. On each track the running-gear of an engine, or any equivalent locomotive or traction power, will be arranged and combined with a series of trucks or frames on wheels, to be connected by arms or uprights with the boats, in such manner that the latter may be

readily raised and lowered in the water at will, so as to increase or diminish the draft, as hereinafter fully explained.

Each section of this elevated road will terminate at the lock as to the double track, but will be continued in a single track above and beyond the lock, at least as far beyond as the engine and tender will reach.

The portion of the track on which the engine and tender stand out beyond the lock will be movable or adjustable, and will be raised and lowered by any suitable mechanical means, so as to provide for the transfer of said engine and tender from level to level at the locks, the boats being themselves locked through in the usual or in any suitable manner.

The elevated road will be built in such manner and proportion as to be capable of sustaining the boat and cargo, so that the weight of the latter may be borne in part by the water and part by the track, as herein-after set forth.

From this combination of water and rail support arise the special advantages of my invention—namely, increase of speed of boats and diminution of injury to the canal-banks.

To illustrate, take a boat with its cargo weighing two hundred tons and drawing four feet of water. If the boat be raised out of the water until her draft is diminished by one-third, it will be found that about one-half of the weight, or one hundred tons, is sustained upon the rail and the area of resistance of the water is diminished in about the same proportion—namely, one-half. Now, if the area be diminished, the velocity may be proportionately increased, and only the same amount of resistance, and consequent displacement of water and injury to the banks, be sustained. Besides, boats in motion tend to press prow downward into the water, this tendency being in proportion to weight and velocity, and challenge resistance in the opposite direction—*i. e.*, upwardly—thus disturbing the water violently from its very depths to the great injury of the lower parts of the canal-banks. This disadvantage is overcome by my invention, as the weight of the boat and cargo is divided between the rail and water, and there can be no downward movement of the prow, it being kept at the same distance from the rail at which it was adjusted in starting, whether the velocity be increased or not.

In carrying this method into effect, there

will be two tracks above each level of the canal, and they may be of the very narrowest gage. These tracks will require no sleepers, being laid on longitudinal beams, duly supported, as already mentioned. Each track will be clear from end to end for the locomotive, the power of which will be communicated from its driving-wheels to trucks or frames on wheels, (connected with the boat or boats beneath,) running either on the same track with the locomotive, or on a special track for themselves, a little below the track of the engine. The boats will be connected with these trucks, or with equivalent wheels, by upright arms or bars, either attached permanently to the boat, and easily elevated to their places on the axles above, or, perhaps better, attached permanently to said axles, and arranged so as to be easily dropped to connect with the boats. Manifestly, account must be taken in building boats, or in adjusting those already built, for this combination, of the strength required in them for the partial suspension designed.

The movement of freight by this combination of rail and water carriers may be accomplished in either of two ways—first, by locomotive steam or other power that never passes a lock; second, by locomotive steam or other power that takes the boat and cargo from one end of the route to the other, passing all the locks. In the first way, it would be sufficient to have one engine on each level, which engine would do all the work both for ascending and descending boats, delivering them, respectively, at their locks, and passing back and forth along that level, as would be required. Having delivered its burden at one lock, the engine would return to the lock at the other end of the level for another cargo, its return trip being made at a high rate of speed if it went back unburdened, and at a comparatively great velocity even if attached to light ascending boats.

It might thus be found possible to operate each level, or at least the longer levels, by one central track alone, taking down the cargo, and taking up the light boats or ascending freight, by means of said single track. This would give proportionate relief to canal-banks, removing the disturbing force to the center, and keeping it always there. It would also facilitate movements by preventing the crowding of boats in narrow reaches of the canal, and thereby lessen the chances of accident by collision. It would be entirely practicable on the longer levels, where descending or ascending boats would have room to be drawn aside above or below the lock. On such long levels it would be only necessary to deflect gradually the single track into a double track at a proper distance from the lock at each end of the level—on the one side to give room to the waiting boats to form in line beneath the track, and have all their connections with the running-gear completed while they wait, and thus be ready to start when the engine arrived to take them; on the other side, to allow the de-

scending freighted boats to approach the locks and pass on their way.

In the second way, the same engine passes the locks, continuing to the end of the route, or any other terminus, with the descending boats and cargo, and returns, bringing up the light boats or another cargo.

Thus the two tracks above the canal become, one a descending track, the other an ascending track, and it is obvious that as many engines as the traffic required might be employed. To pass the locks, the engine will require, first, that, descending, or above the locks, the two tracks run into one right above the lock, and this one track be carried out beyond the lock, and below it, far enough to carry the engine and tender clear of the lock and all its belongings; secondly, the section of track on which the engine, &c., stands thus out clear of the lock, must be laterally and vertically adjustable, so as, on the one hand, to be capable of connecting with each track on the next level just below the lock, and, on the other, to be capable of being raised and lowered for purposes of descent and ascent. This double need of lateral and vertical adjustment is met by shape or make of rail and road, or by a turn-table, and by ordinary elevating devices, or other suitable mechanism, comprehending a stationary engine, which may be further utilized to facilitate the locking through of the boats.

The mode of operation last described—namely, by steam or other locomotive power that continues from one end of the route to the other, passing over intervening locks—has this peculiar advantage, that it may be utilized in winter, when the canals are frozen up, by running regular freight-trains over the tracks within the safe capacity of the railway. Manifestly, in constructing the railway, account should be taken of this probable use, and the pillars and other supporting apparatus should be made of such proportions and strength as will permit this application with safety.

It is obvious that the above principle may, under certain circumstances, be applied with advantage to the transportation of boats on other water-courses beside canals—*i. e.*, in cases where it may be desired, while retaining the cargo or burden in the boat, to decrease the draft of the latter by imposing a portion of the weight on a railway above.

What I claim as my invention is—

In canal propulsion, the means herein described for transporting boats and their freight by the employment of an elevated railway above the canal, which supports the motive power for the boats, as well as a part of the weight of the cargo, substantially as described.

In testimony that I claim the foregoing, I have hereunto set my hand this 23d day of January, 1874.

TIMOTHY J. O'TOOLE.

Witnesses:

M. DANL. CONNOLLY,
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