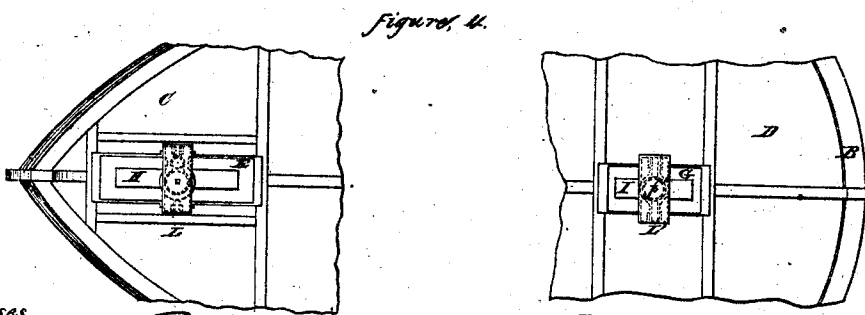
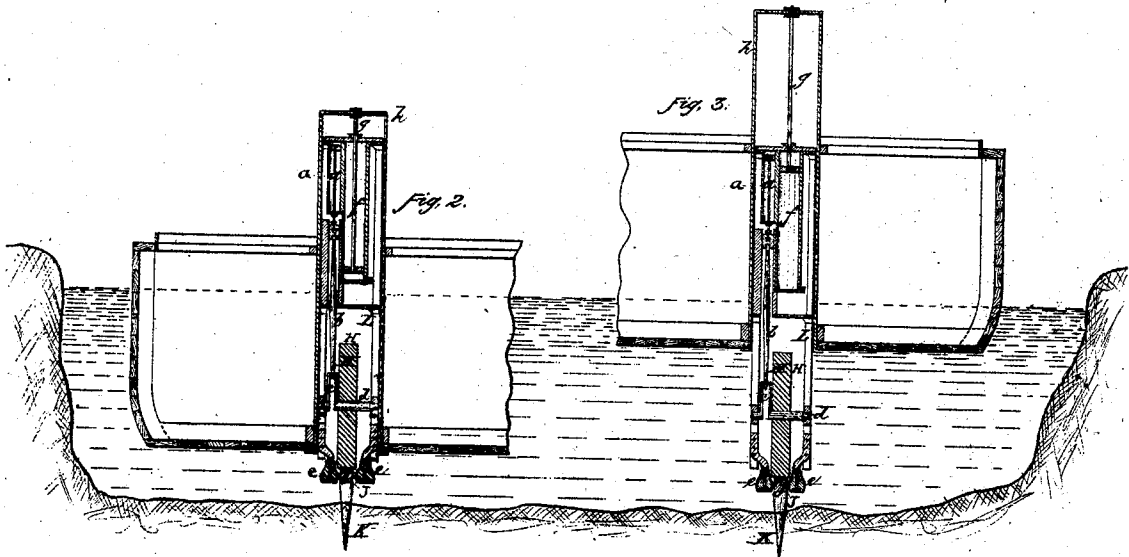
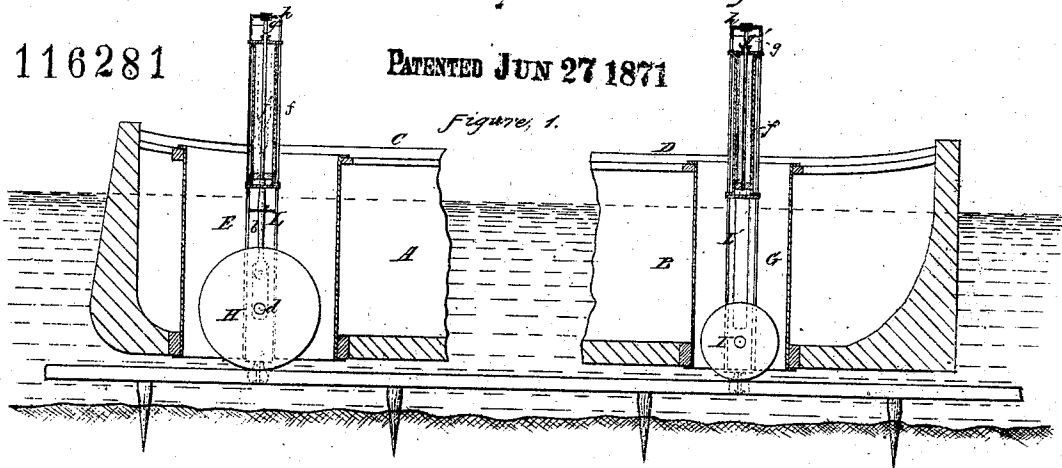


William T. Duval's Invention in Canal Navigation

116281

PATENTED JUN 27 1871



Witnesses.

J. C. Robbing
James O. Smith

Inventor.

Wm. T. Duval
by Attorneys
Brown, Coombs & Co.

UNITED STATES PATENT OFFICE.

WILLIAM T. DUVALL, OF GEORGETOWN, DISTRICT OF COLUMBIA.

IMPROVEMENT IN PROPULSION OF CANAL-BOATS.

Specification forming part of Letters Patent No. 116,281, dated June 27, 1871.

To all whom it may concern:

Be it known that I, WILLIAM T. DUVALL, of Georgetown, in the county of Washington and District of Columbia, have invented certain new and useful Improvements in Canal Navigation; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, through letters of reference marked thereon, forming part of this specification, and in which—

Figure 1 represents the bow and stern of a deeply-loaded boat, its middle portion being broken away. Fig. 2 is a section taken through the line *xx* on Fig. 1. Fig. 3 is a similar section of an unloaded boat, both represented in a cross-section of a canal, showing the respective water-lines of the loaded and unloaded boat. Fig. 4 is a top view, in part, of the two ends of a boat, the middle and sides being also broken away.

The same letters indicate like parts in all the figures.

In the application of steam to canal navigation by any of the various kinds of paddle-wheels, or propellers, or other means heretofore known, waves and currents are formed in the water which have an injurious effect on the banks of the canal, and have for the most part been discarded on that account. The ordinary means of animal traction even has a similar effect, though in less degree. The lateral or angular direction of the tow-line tending to draw the boat toward the tow-path creates greater resistance against that side of the bow, and consequently a greater wave and wash from the bow displacement on that bank. This necessitates the keeping of the rudder at a greater or less angle at all times toward the opposite side, thereby creating a wave to wash the other bank, besides causing greater resistance to the traction employed.

To remedy these objections, and to apply steam-power in a practical manner to canal navigation, are the objects of my invention; which consists, mainly, in a novel application of a traction-wheel to a canal-boat and a permanent rail set in the bed of the canal. Other peculiarities of construction and operation are also embraced in my invention, which will be hereinafter described.

In the accompanying drawing, A represents the bow portion of a canal-boat, and B its stern portion; C, the deck of the former, and D that of the latter. Within these portions are con-

structed water-tight wells E and G, one in each, respectively, which pass vertically through the boat, and which are fitted with guide-ways for the vertically-sliding motion of machinery and steam-cylinders connected with the traction-wheel H and the trail-wheel I, all of which will be hereinafter more fully described; and in the bed of the canal are arranged two single rails, J, of wood, iron, or other suitable material, one for the up-line the other for the down-line to travel on, and which are or may be supported on piles K driven into the bed of the canal, or in any other suitable manner. Fitted to slide vertically within the well E is a frame, L, which supports a steam-engine cylinder, *a*, and all its ordinary appurtenances, which operate through the pitman *b* and crank *c* to rotate the axle *d*, hung in suitable bearings at or near the lower portion of the frame L. This axle carries the traction-wheel H running on the rail J, and at the lower end of the frame L are provided friction-rollers *e*, which rotate on vertical axes at either side of the rail J to prevent the wheel H from running off the track or rail; or the wheels may be made with flanges or V-shaped grooves and the side rollers in such case dispensed with. The frame L also carries another steam-cylinder, *f*, the piston of which is suspended by its rod *g* from a stationary gallows or bridge, *h*, spanning the well E, the purpose of which will appear in the description of operation hereinafter. The well G, near the stern of the boat, is provided with a similar vertically-sliding frame, L', which carries the trail-wheel I and steam-cylinder *f'*, the piston of which is suspended in like manner to that of the cylinder *f*, heretofore described. The steam-cylinders *f* and *f'* are provided with openings at their upper and lower ends, suitably connected with the steam-boiler, which openings are controlled by a cock or cocks, so that when the pressure is applied at the lower end of either cylinder the upper end shall be open to the atmosphere, and vice versa.

The boat, being loaded, is swung off until it is centrally over and parallel with the rail J in the bed of the canal. Steam is then let into the bottom of the cylinders *f* and *f'*, which, operating against the stationary pistons in each, bear the frames L L' and all connected with them downward until the wheels H and I ride upon the rail J, with the friction-rollers *e* on either side of the latter. The constant pressure of steam in the lower

part of the cylinders $f f'$ acts as a steam-cushion to keep the wheels down to the track or rail with a uniform pressure, which may be increased or diminished to produce the necessary adhesion for traction. Steam then being applied to the engine a , which may be duplicated if desired to operate another crank on the other side of the wheel H , said wheel will be rotated and carry the boat forward by its adhesion to and consequent traction on the rail, while the wheel I , being borne down in like manner upon the rail, serves to guide the boat in a direct line, by which means the ordinary rudder may be dispensed with and a longer boat be admissible in the locks, thus giving more additional room in the boat than is occupied by the machinery.

It will be apparent that by the action of the steam in the cylinders f and f' the wheels H and I will be borne down to the track whatever depth of water the boat may draw, and will compensate for any swell in the water caused by a passing boat, and being immediately under its center, for any rolling motion for a like cause.

By this mode of propulsion or traction there can be no disturbance of the water except what is due to the bows plowing through it; and with the additional length of the boat, by dispensing with the rudder, and the utilizing of that portion now occupied by mules, the bows may be made much sharper without detriment to the carrying capacity, in which case the wave will be deflected at such an angle as to spend its force before striking the shore.

Wood or iron, but preferably the latter, may

be used for the rails; and, if found necessary to increase adhesion, a rubber tire may be used on the traction-wheel.

When it is desired to make a wharf the steam is applied to the upper end of the cylinders f and f' and allowed to escape from the lower part, by which the frames L and L' are lifted into the wells E and G away from the rail; and when desired to return the frame is to be lowered by the reverse action and the boat shoved off until the rail is touched by the rollers, when, by lifting them slightly, they may be caused to span it as before.

To form a continuous connection with the rails J , a floating rail with suitable guides may be arranged within the lock, and switches at either end to guide the traction and trail-wheels onto their proper rail in entering and leaving the lock, a plan for which I have devised, which may be made the subject of another application for Letters Patent if found desirable, but at present it is not believed to be necessary.

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

1. The vertically-sliding frame L or L' , in combination with the well E or G and traction or trail-wheels H or I , substantially as specified.
2. The steam-cylinder f and its piston, in combination with the sliding frame L and wheel H , substantially as set forth.

WM. T. DUVALL.

Witnesses:

SYDNEY E. SMITH,
W. MORRIS SMITH.