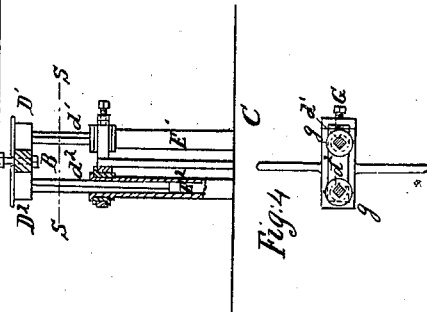
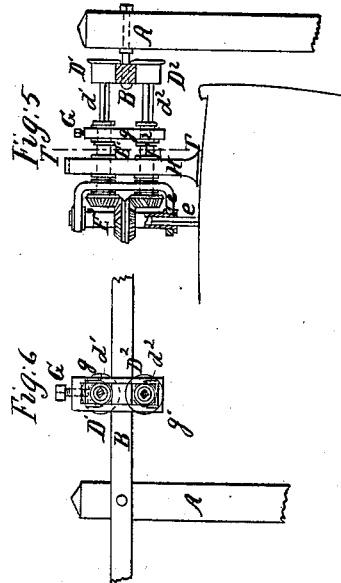
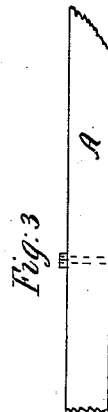
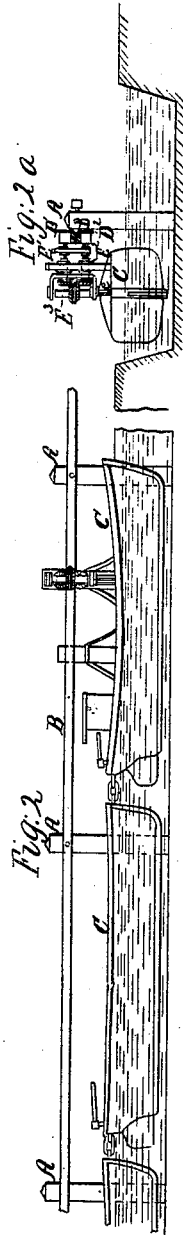
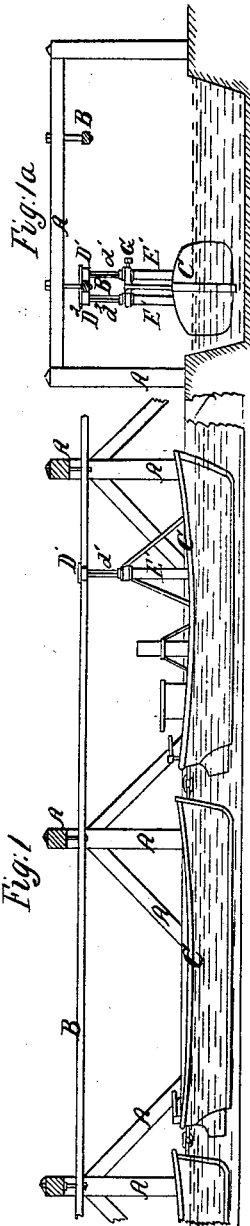


# G. Stackpole, Towing

N<sup>o</sup> 53,088.

Patented Mar. 6, 1866.



Witnesses

Chas. H. Colby  
Kimball W. Peterson

Inventor

Greenleaf Stackpole

# UNITED STATES PATENT OFFICE.

GREENLEAF STACKPOLE, OF NEW YORK, N. Y., ASSIGNOR TO HIMSELF  
NATHL. F. SPEAR, OF ELIZABETH, NEW JERSEY, AND C. AND D. COBB,  
OF BOSTON, MASSACHUSETTS.

## IMPROVED DEVICE FOR CANAL PROPULSION.

Specification forming part of Letters Patent No. 53,088, dated March 6, 1866; antedated February 28, 1866.

*To all whom it may concern:*

Be it known that I, GREENLEAF STACKPOLE, of the city and county of New York, and State of New York, have invented certain new and useful Improvements in the Propulsion of Canal-Boats and other Vessels; and the following is a description of the apparatus in which my invention is involved.

The accompanying drawings form a part of the description.

Figure 1 is a side elevation of a canal-boat containing my invention, and is represented as drawing a train of boats in the canal, which is in section. Fig. 1<sup>a</sup> is an end view of the same. Fig. 2 is a corresponding elevation with Fig. 1, but shows another form of the invention, and Fig. 2<sup>a</sup> is an end elevation of the same. Fig. 3 is an enlarged view of a portion of Fig. 1<sup>a</sup>, showing the wheels D' D<sup>2</sup> and connected shafts, the sleeve E<sup>2</sup> being partly in section. Fig. 4 is a cross-section on the line S S in Fig. 3. Fig. 5 is an enlarged view of that portion of Fig. 2<sup>a</sup> above the deck, showing the wheels D' D<sup>2</sup> and connected machinery, the sleeve E<sup>3</sup> being partly in section. Fig. 6 is a cross-section on the line T T in Fig. 5.

Similar letters of reference indicate corresponding parts in all of the figures.

A A, &c., are upright posts fixed in the earth. B is a longitudinal rod of timber or other suitable material. I prefer timber plated with iron. This rod is firmly fixed to the posts A, and the several lengths are joined by scarfing or otherwise, so as to form a continuous bar or rail of any required length. I propose to make this rail extend the whole length of the canal, or along such portion of the canal, river, basin, &c., as shall be required.

C is a boat containing the necessary apparatus for giving a powerful and rapid rotatory motion to the propelling-wheels. The wheels take hold of the rod B, before described, either by the friction, or "traction," as it is sometimes termed, of smooth wheels, or by the more reliable grasp of gear-wheels upon racks extending along on opposite faces of the rail B.

D' D<sup>2</sup> are the propelling-wheels. They are rotated in opposite directions and are held up to the bar B in the manner described. In

Fig. 1 the wheels are horizontal, and the rail B is mounted above the boat. In Fig. 2 the wheels are vertical, and are held to their work against a rail, B, mounted at the side of the canal. Either plan may be adopted at pleasure, but they require different modifications of the details.

Referring to Fig. 1, d' d<sup>2</sup> are shafts of square section. E' E<sup>2</sup> are hollow shafts or sleeves into which the square shafts d' d<sup>2</sup> may freely slide. The shafts E' E<sup>2</sup> are geared together or are otherwise connected so as to rotate in opposite directions, and a corresponding rotatory motion is thereby imparted to the wheels D' D<sup>2</sup>, while the latter are free to rise and sink within wide limits by the sliding of the shafts d' d<sup>2</sup> within the correspondingly-shaped interior of the sleeves E' E<sup>2</sup>. The wheels D' D<sup>2</sup> are provided with stout flanges on their upper edges, which, by resting on the upper edge of the rail B, prevent them from dropping down out of contact with the rail. The screw G, acting on a box, g, or bearing-piece, presses together the wheels D' D<sup>2</sup>, or allows them to separate, as may be required in adjusting to the width of the rail B, or disconnecting the boat from the rail altogether. To effect this latter operation it is necessary simply to separate the wheels and allow them to drop down. To renew the connection, or to connect to a different rail, it is necessary simply to bring the boat into position, and elevate the wheels D' D<sup>2</sup> by sliding the shafts d' d<sup>2</sup> longitudinally upward to the proper height, and then securing them together. There may be springs of any convenient kind arranged to receive the pressure of the screw G; but in most cases shafts will spring of themselves sufficiently to allow for the trifling variations in the breadth of the rail or the crooks and irregularities of the rail which will occur under ordinary conditions.

Referring to Fig. 2, the shafts d' d<sup>2</sup> and the sleeves E' E<sup>2</sup> are mounted horizontally, and are geared not directly together, but to a wheel on an upright sleeve, E<sup>3</sup>, as represented. This sleeve, together with the yoke or framing represented and the several connected parts, may slide vertically on a shaft, e, which is rotated by the engine. (Not represented.)

H H are guides which sustain the parts in their proper positions, as will be obvious.

Any variations in the vertical thickness or in the height of the rail B are accommodated by the elasticity of the shafts and by the sliding of the parts vertically within the yoke or guides H. The vertical shaft *e* is square, and the interior of the sleeve *E*<sup>3</sup> is of corresponding form, and the length of the shaft *e* is sufficient to allow the sleeve *E*<sup>3</sup> and its connections to move vertically many feet, sufficient to accommodate the difference in the plane of flotation when loaded or light, and to allow for the varying levels of water on the canal. The upper extremity of the shaft *e* may be sufficiently elevated to stand always above the top of the sleeve *E*<sup>3</sup>, and may be steadied by any convenient frame-work, if desired.

The sliding motion of the shafts *d'* *d*<sup>2</sup> within their respective sleeves when mounted horizontally, as in Fig. 2, need not be very considerable. I propose to make it only sufficient to accommodate the slight variations of the rail B from an absolutely straight line, and to allow for the movement of the boat due to waves, which is supposed to be slight. To diminish the strain on the parts I propose to employ in practice a pair of rollers or wheels (not represented) mounted on vertical shafts immediately in front or behind the wheels *D'* *D*<sup>2</sup>. The shafts of these extra wheels may be connected to the boat as firmly as may be desired.

I can provide each boat with an engine and boiler, or can use one boat so provided to pull a large number of ordinary boats. I can turn the shafts by the power of men, horses, or other known power, and can in either case adapt the apparatus to work at varying velocities, or to work backward, by obvious modifications of the mechanism. I prefer that form of the device in which the shafts are horizontal and the wheels vertical, as indicated in Fig. 2; but I can employ the form

shown in Fig. 1, or any mere mechanical modification of either plan, as may be preferred. I propose in some instances to employ a chain or rope in place of the bar or rail B, using, by preference, the form of chain known as "pitch-chain," composed of flat plates and rivets put together so as to form links having rectangular holes in which to receive spurs of suitable form projecting from the wheels. This form of chain is familiar in watches and in the feed mechanism of lathes.

I consider the employment of the two wheels *D'* *D*<sup>2</sup>, acting on opposite sides of the bar B, as very important. Where only one is employed every movement of the boat is liable to disconnect the mechanism. If gearing is employed it is liable to involve accidents and delays, which might be quite serious, and where the friction or traction alone is relied on it is obviously difficult, if not impossible, to obtain any reliable and uniform amount, except by a pressure on opposite sides in the manner provided by my invention.

The wheels *D'* *D*<sup>2</sup> may be flanged on both their edges instead of one edge, if preferred.

Having now fully described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

1. In combination with the bar B, or its equivalent, wheels *D'* *D*<sup>2</sup> and suitable power within the boat C, the sleeves *E'* *E*<sup>2</sup>, and shafts *d'* *d*<sup>2</sup>, adapted to slide one upon the other, substantially in the manner and for the purpose set forth.

2. In combination with the sleeves *E'* *E*<sup>2</sup>, shafts *d'* *d*<sup>2</sup>, and wheels *D'* *D*<sup>2</sup>, the transverse sleeve *E*<sup>3</sup>, adapted to slide on the shaft *e* and allow the wheels *D'* *D*<sup>2</sup> to yield both vertically and laterally, substantially in the manner and for the purpose herein set forth.

GREENLEAF STACKPOLE.

Witnesses:

HENRY M. COLLYER,  
KIMBALL W. STETSON.