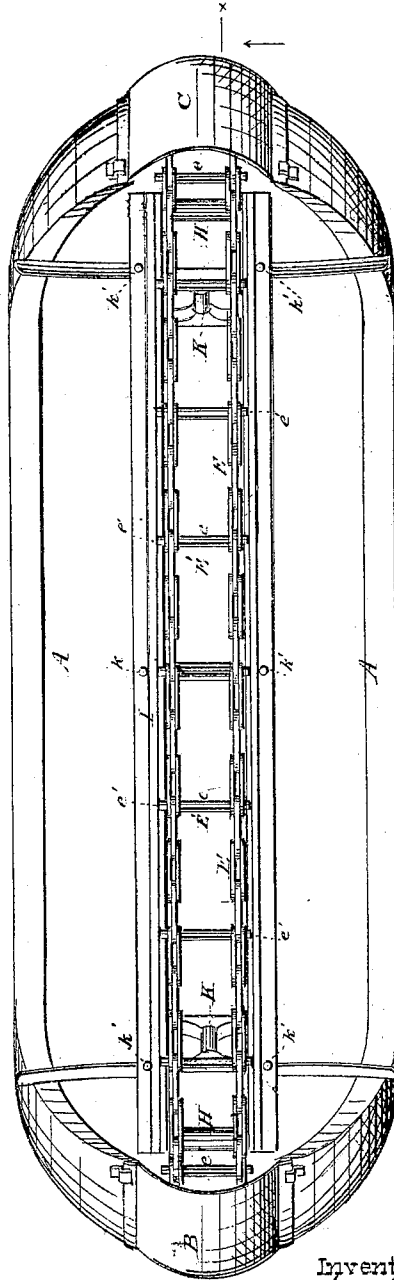


W. W. VIRDIN.  
PROPELLING CANAL BOATS.

No. 113,951.

Patented Apr. 18, 1871

Fig. 1.



Witnesses.

*Q. A. Lettner*  
*C. H. Poole*

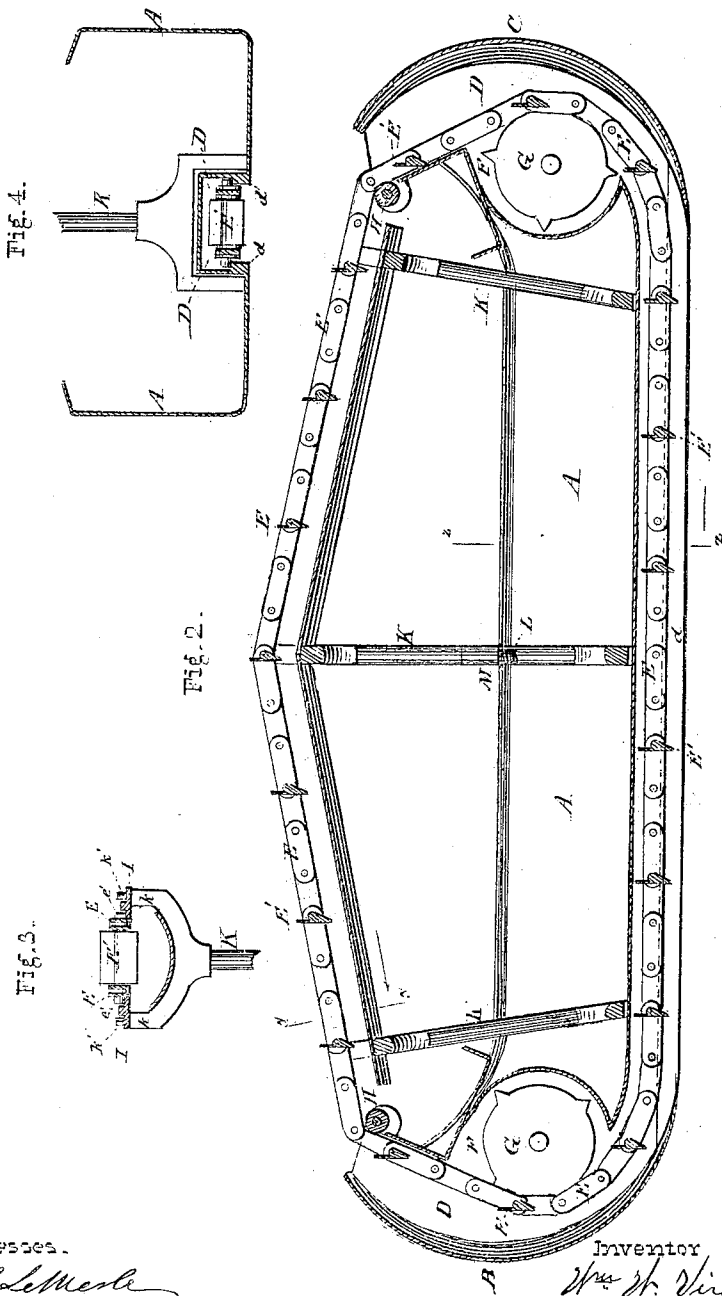
Inventor.

*Wm. W. Virdin, by*  
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Atty.

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Witnesses.

*A. L. Meserle*  
*C. H. Poole*

Inventor

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# United States Patent Office.

WILLIAM W. VIRDIN, OF BALTIMORE, MARYLAND.

Letters Patent No. 113,951, dated April 18, 1871.

## IMPROVEMENT IN PROPELLING CANAL-BOATS.

The Schedule referred to in these Letters Patent and making part of the same.

### *To all whom it may concern:*

Be it known that I, WILLIAM W. VIRDIN, of Baltimore city, in the county of Baltimore and State of Maryland, have invented certain new and useful Improvements in Self-Propelling Canal-Boats; and do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, in which—

Figure 1 is a plan view of the upper side of a boat constructed in accordance with my improvements;

Figure 2 is a vertical longitudinal section of the same on the line *xx* of fig. 1;

Figure 3 is a vertical cross-section of the propelling-chain, with its ways and support, on the line *yy* of fig. 2; and

Figure 4 is a like view of the boat on the line *zz* of same figure.

Letters of like name and kind refer to like parts in each of the figures.

My invention is an improvement in the construction and operation of self-propelling boats for use on canals; and

It consists principally in the peculiar exterior form of the boat, substantially as and for the purpose hereinafter specified.

It further consists in the employment, within the ends of the boat, of suitable inclosed grooves for the reception of the propelling-chain, substantially as and for the purpose hereinafter shown.

It further consists in the peculiar construction of the boat, whereby the same is adapted to receive the propelling-chain and its operating mechanism, substantially as hereinafter shown and described.

It further consists in the means employed for sustaining the propelling-chain within its grooves at the bottom of the boat, substantially as hereinafter set forth.

It further consists in an endless chain working within a suitable groove constructed longitudinally within the bottom of the boat and upon or over a suitable way suspended above the boat, combined with pivoted paddles or buckets so constructed as to maintain at all times a vertical position, substantially as is hereinafter specified.

It finally consists in the supports employed for sustaining above the boat the propelling-chain and its supporting-way, substantially as is hereinafter shown and described.

In the annexed drawing—

A represents the boat, constructed with a flat bottom, A', and having its ends B and C extended upward and inward in a curve, the forward end, B, being somewhat higher than the rear end, C.

Within the bottom A' and ends B and C, at their

transverse center, is cut a longitudinal groove, D, of a suitable width and depth to contain the propelling-chain E, while within each of said ends is provided a semicircular recess, F, corresponding in width to and opening into said groove, and furnishing a space for suitable chain-wheels, G, through which motion is communicated from the operating mechanism to said chain.

The propelling-chain E is constructed of two single chains connected together at suitable intervals by means of rods *e*, upon or to which are pivoted the buckets E', said buckets being attached to said rods at their vertical center, so as thereby to equalize the pressure of water upon their faces.

In order that said buckets may be caused to maintain a vertical position at all times, and thereby prevent the lifting of water, the lower half of each is made somewhat thicker than its upper half, so that while exposing the same amount of surface to the pressure of the water said weighted half will incline downward with sufficient force to insure the desired vertical position of the bucket, whatever its position with relation to the boat.

At each of the upper ends and bottom of the groove D is placed a roller, H, over which the chain E, after leaving the driving-wheels G, passes inward toward the longitudinal center of the boat.

In order that said chain may be sustained between said rollers and sufficiently elevated above the boat to permit the operations of loading and unloading to be carried on without interference, two rails, I, having the form shown in figs. 1 and 3, extend from or between said rollers, and are suspended upon the upper ends of three or more braces, K, said braces being forked at said upper ends, and each arm of said fork *k* provided with a vertical stud, *k'*, which pass upward through suitable openings made in and through said rails, the latter of which are thereby held in lateral as well as vertical position.

A groove upon the inner side of each rail receives a number of friction-rollers, *e*, which are pivoted upon the projecting ends of the rods *e* outside of the chain, and thereby the weight of the latter is sustained and its position with relation to said rails or ways insured.

The lower ends of the braces K are secured in position upon the bottom of the boat, and in order that they may be made to conform to any required length, so as to enable the desired tension of the chain to be secured, a portion or the whole of said braces are divided at their longitudinal center, and have a screw, L, secured within the lower section and passing loosely into a suitable opening within the upper section.

A threaded sleeve, M, fitted upon said screw, between said sections, furnishes a means whereby the latter may be forced apart and the brace lengthened,

to accomplish which result said sleeve is screwed upward upon said screw, carrying with it the upper section.

In order to prevent the chain from sagging, so as to hang below the bottom of the boat at or near its center, a ledge, *d*, is formed upon and projects horizontally inward from the sides of the horizontal portion of the groove *D*, and furnishes a bearing for the friction-rollers *e*, by which means said chain is not only held in vertical position, but, also, its weight is sustained so as to cause no undue strain upon the supporting mechanism above the boat.

The grooves within the ends of the boat being covered in any suitable manner, and operating mechanism being connected with the shafts *g* of the chain-wheels *G*, the chain *E* is caused to move longitudinally within the groove *D*, so as to force the buckets *E'* against the water, and thereby impart motion in an opposite direction to the boat.

As the buckets are comparatively small, by reason of the number that is within the water at one time, and as said buckets when drawing are contained within the groove, no possibility exists of washing the banks of a canal beyond what would result from the motion of the boat irrespective of the means employed for imparting motion to the latter.

From the peculiar manner in which the buckets are constructed and suspended no water is either pressed downward or lifted, so that the entire power of the operating mechanism, less the friction of the chain, is utilized in giving motion to the boat.

Finally, the peculiar construction of the boat with its raised and curved ends affords room for the operating mechanism without encroaching upon the space required for freight, and, also, especially adapts said boat to and renders practicable the use of the endless propelling-chain.

Having thus fully set forth the nature and merits of my invention,

What I claim as new is—

1. The boat *A*, provided with the upward and inward-curving ends *B* and *C*, substantially as and for the purpose specified.

2. A boat, *A*, provided at or within each end with a suitable inclosed groove, *D*, constructed on a vertical plane, for the reception and passage of a propelling-chain, which works longitudinally around said boat, substantially as and for the purpose shown.

3. The boat *A*, provided with the upward and inward-curving ends *B* and *C*, the longitudinal groove *D*, and the recesses *F*, substantially as and for the purpose set forth.

4. In combination with the chain *E*, provided with the friction-rollers *e*, the ledges *d*, secured to and projecting horizontally inward from the sides of the groove *D*, substantially as and for the purpose shown and described.

5. In combination with an endless chain, *E*, working within a suitable longitudinal groove constructed within the bottom and ends of a boat, and upon or over a suitable way suspended above the boat, the paddles or buckets *E'*, pivoted at their vertical centers, and weighted upon their lower edges, so as to cause them to maintain at all times a vertical position, substantially as and for the purpose specified.

6. The braces or supports *K*, constructed as described, and combined with the rails *I*, in the manner and for the purpose substantially as shown.

In testimony that I claim the foregoing I have hereunto set my hand this 30th day of December, 1870.

Witnesses:

GEO. S. PRINDLE,  
EDM. F. BROWN.

W. W. VIRDIN.