No. 633,294. Patented Sept. 19, 1899.

L. P. PEREW.

TOWING SYSTEM FOR CANAL BOATS.

(Application filed June 15, 1898.)

(No Model.) 2 Sheets—Sheet 1.

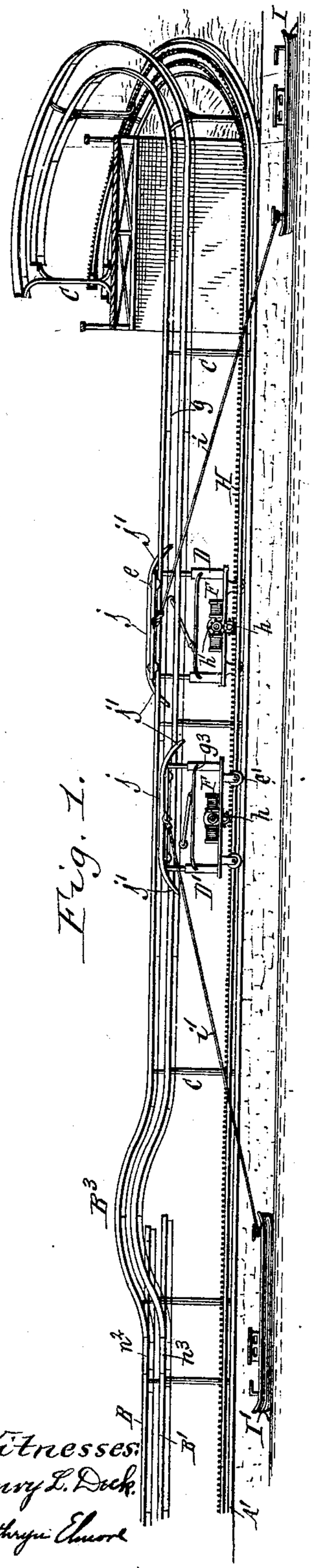

Fig. 1.

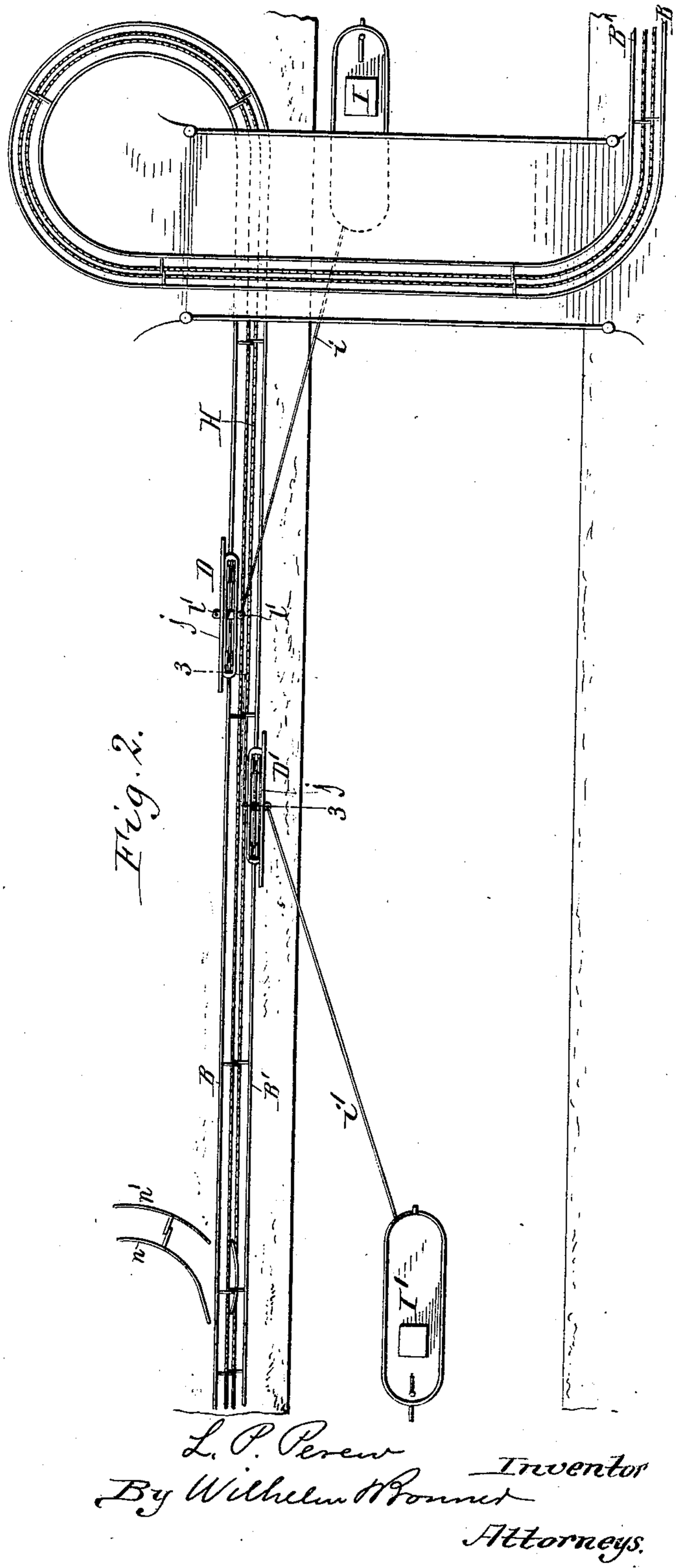

Fig. 2.

Witnesses:
Henry L. Dock.
Kathryn Elmore

L. P. Perew Inventor
By Wilhelm Bonner
Attorneys.

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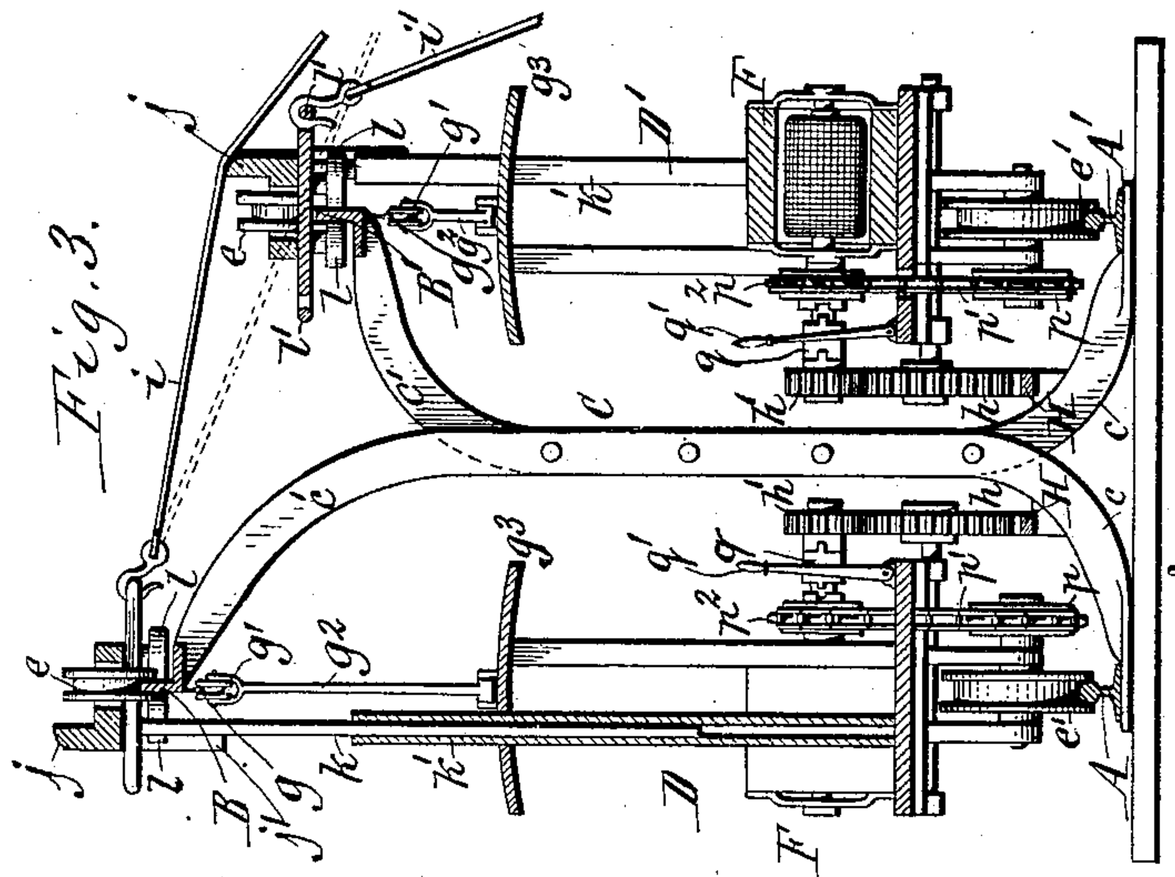

Fig. 3.

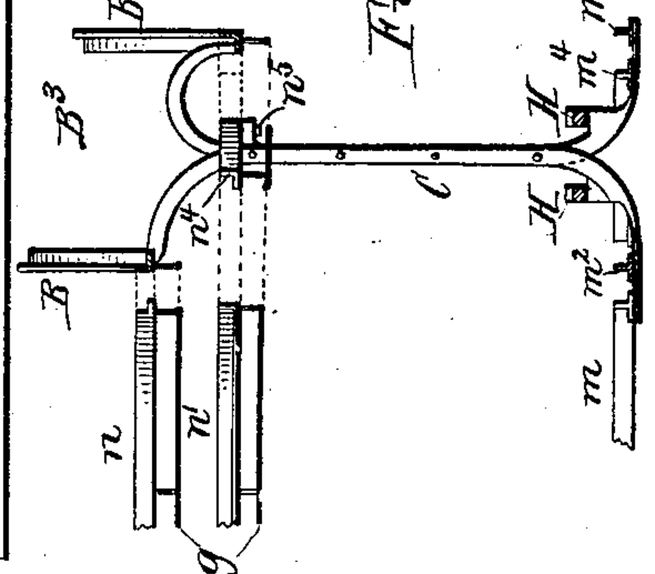

Fig. 7.

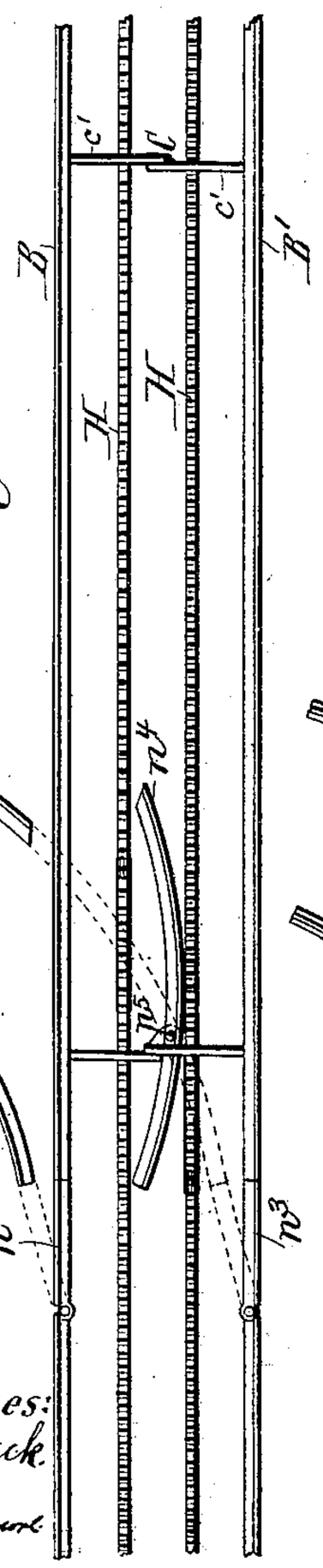

Fig. 4.

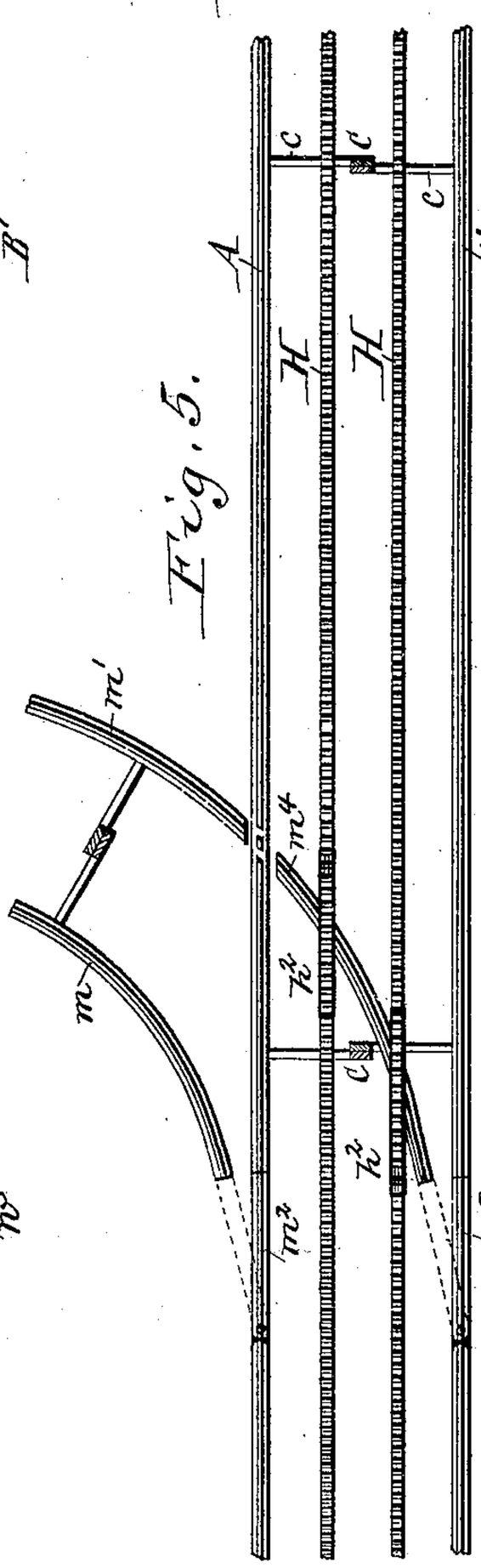

Fig. 5.

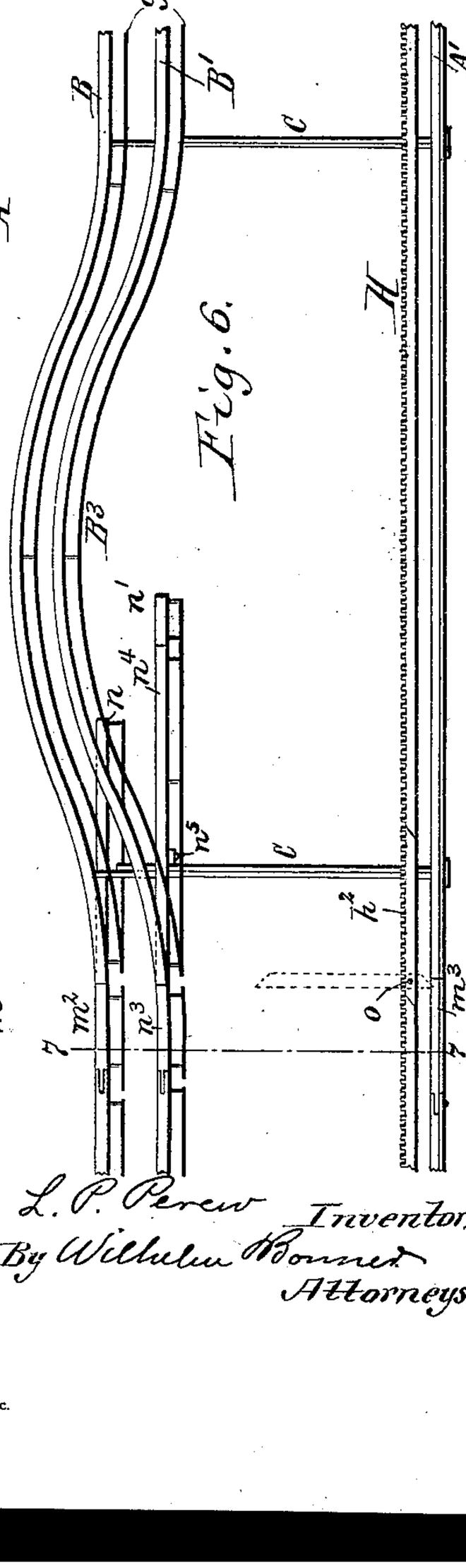

Fig. 6.

Witnesses:
Henry L. Deck.
Kathryn Elmore.

L. P. Perew Inventor.
By Wilhelm Bonnet
Attorneys

UNITED STATES PATENT OFFICE.

LOUIS PHILIP PEREW, OF TONAWANDA, NEW YORK, ASSIGNOR TO HELEN E. PEREW, OF SAME PLACE.

TOWING SYSTEM FOR CANAL-BOATS.

SPECIFICATION forming part of Letters Patent No. 633,294, dated September 19, 1899.

Application filed June 15, 1898. Serial No. 683,457. (No model.)

To all whom it may concern:

Be it known that I, LOUIS PHILIP PEREW, a citizen of the United States, residing at Tonawanda, in the county of Erie and State of New York, have invented new and useful Improvements in Towing Systems for Canal-Boats, of which the following is a specification.

This invention relates to a system or apparatus for towing boats on canals or other watercourses, and more particularly to a system in which the boats are towed by electric-motor cars running upon tracks extending along the tow or heel path of the canal and in which two independent series of motor-cars are employed, one series running in one direction and towing the "up" boats, for instance, and the other series running in the opposite direction and towing the "down" boats.

The tracks for the motor-cars are laid side by side along the canal, and each track comprises a surface rail and an elevated rail, the cars having upper and lower guide-wheels which run on said rails, respectively.

The principal objects of my invention are to provide a compact towing system which does not interfere with the use of animals for towing the boats, which materially reduces the cost of transportation, and which permits oppositely-moving boats to pass each other without the necessity of transferring the towing-lines from one motor-car to another, which is necessary when all of the cars run on a single track, thus insuring a more rapid transit of the boats.

Other objects of the invention are to so arrange the elevated guide-rails of the motor or towing cars that the towing-lines connected with the cars which run on the outer track clear the elevated rail of the inner track, so as to prevent wear of the lines by contact with said rail, to provide the motor-cars with means whereby they are reliably retained on the track, and also to so organize the system that any of the motor-cars can be readily switched off the main track while loading and unloading boats and for other purposes.

In the accompanying drawings, consisting of two sheets, Figure 1 is a central longitudinal section of a watercourse equipped with my improved towing system. Fig. 2 is a top plan view thereof. Fig. 3 is an enlarged transverse section in line 3 3, Fig. 2. Fig. 4 is an enlarged top plan view of a portion of the track system, showing an elevated switch. Fig. 5 is a horizontal section of the track system, taken between the surface and elevated tracks and showing a surface switch. Fig. 6 is an enlarged side elevation of a portion of the track system. Fig. 7 is a transverse section in line 7 7, Fig. 6.

Like letters of reference refer to like parts in the several figures.

A A′ represent the lower or surface rails, arranged side by side on the same side of the canal or watercourse, and B B′ the elevated rails, arranged directly over the surface rails. When the rails are placed on the tow-path, they are located along the outer portion thereof, so as not to interfere with the use of animals for towing the boats. The surface rails are mounted on suitable ties or stringers, and the elevated rails B B′ are supported by a suitable trestle or elevated framework having the necessary strength and stability. The supports shown in the drawings consist of transverse standards C, provided at their lower ends with oppositely-extending legs or feet *c*, which are secured to the ties, and at their upper ends with oppositely-extending arms *c′*, which carry the elevated rails B B′, as most clearly shown in Fig. 3.

D represents one of the towing or motor cars which run on the outer track A B, and D′ one of the motor-cars which run on the inner track A′ B′, the cars on one track towing the up boats and those on the other track the down boats. A sufficient number of such cars is employed to meet the requirements of the traffic. Each of these cars is provided with grooved upper and lower rollers *e e′*, which run, respectively, on the elevated and surface rails, and whereby the car is supported and guided on the rails, and each car carries a motor F, preferably an electric motor, of sufficient power to drive the car and tow a number of canal-boats connected with the car. The electric motor may be of any approved or well-known construction and receives power from an overhead wire or conductor *g* through a trolley-wheel *g′* and arm g^2, similar to those employed on street-car trolley systems. A wire or conductor *g* is arranged

above each series of motor-cars and suspended from the arms of the standards C. In order to positively drive the motor-cars, each car is provided with a toothed traction-wheel *h*, which meshes with a toothed traction-rail or horizontal gear-rack H, arranged parallel with the rails, and which in turn meshes with a pinion *h'* on the motor-shaft. One of such racks is provided for each series of cars, as shown. Each motor-car is provided with a suitable switch or controller, which is operated by an attendant or motorman stationed on the car and which is not shown in the drawings, and with a roof or canopy g^3 for sheltering the motorman, the trolley-pole being preferably attached to this canopy, as shown.

I I' represent two canal-boats running in opposite directions, and *i i'* are the tow-lines which connect these boats with the motor-cars D D', respectively, the lines being preferably attached to the cars about on a level with the upper guide-wheels of the cars, as shown. When the up and down boats are towed in this manner by independent cars running on separate tracks on the same side of the canal, the tow-lines attached to the cars on the outer track will rub against the elevated rail of the inner track if the elevated rails of both tracks are of the same height. To prevent this rubbing and consequent wear of the tow-lines, the inner elevated rail B' is arranged so much lower than the outer elevated rail that at the ordinary angle assumed by the tow-lines attached to the outer series of cars said lines will clear the inner elevated rail, as shown by dotted lines in Fig. 3. When oppositely-moving boats pass each other, the inner motor-car must pass underneath the tow-line attached to the outer car, and in order to facilitate this the cars are provided on their upper portions with horizontal guards *j*, which extend above the upper rollers *e* of the car and terminate at both ends in downwardly-curved horns *j'*, the ends or noses of which dip below the elevated rails, so as to pass under a tow-line extending across the low rail and keep the line clear of all parts of the car against which it is liable to catch, as shown by full lines in Fig. 3.

The tow-path is not always located on one side of the canal from one terminus to the other, but extends along one side thereof between some points and along the opposite side between other points, bridges being provided at the places where the tow-path shifts from one side to the other for the passage of the animals and towing-cars. In such cases the two tracks of my improved towing system are extended across the bridges to and along the opposite side of the canal, the tracks being located at one side of the bridge, as shown in Fig. 2, to avoid interference with animals when these are also used for towing. At the places where the tow-path shifts to the opposite side of the canal the car-tracks after passing over the bridge extend down the inclined embankment on one side of the bridge, and thence under the bridge in the form of a loop of comparatively large radius—say eighteen feet—after which the tracks continue along the same side of the canal to the next shifting-point of the tow-path, as shown in Fig. 2, when they again cross a bridge to the opposite side of the canal, and so on throughout the length of the waterway. Owing to this shifting of the tow-path that elevated rail which is the outer rail on one side of the canal becomes the inner rail on the opposite side of the canal, and in order to preserve the relative heights of these rails their arrangement as to height must be reversed—that is, the rail which is the high rail on the first-named side of the canal being now the inner rail must be placed below the plane of the outer rail which on the other side of the canal is the low inner rail. This change in the height of the two rails is gradual and the inclination of the rails necessary to effect this changing or merging of same from the high to the low altitude, and vice versa, preferably takes place at the loop in the tracks above described.

In order to enable the upper guide-wheels *e* of the motor-cars to adjust themselves to the varying distances between the upper and lower rails due to this shifting of the tow-path, said guide-wheels are mounted on vertically-movable supports or parts of the car, which permit the wheels to rise and fall for following the variations in the height of the rails, so as to remain at all times in engagement with the same. In the construction shown in the drawings this is accomplished by making the guard or top portion *j* of each motor-car vertically movable on the lower portion thereof by means of upright bars or stems *k*, secured at their upper ends to said guard and sliding in vertical sockets or ways *k'*, arranged on the lower portion of the car, forming a telescopic connection between the upper and lower parts of the car, as shown in the left-hand portion of Fig. 3. When the car passes from a high to a low section of the elevated rail, its upper guide-wheels are free to descend by gravity for remaining in contact with the rail, and when the car passes from a low to a high section of the rail the telescopic connection between the upper and lower portions of the car permits the necessary rise or extension of the upper portion to always keep said guide-wheels against the rail. If desired, suitably-applied springs may be employed for lowering the top portion of the car when the latter passes from a high to a low section of the elevated rail.

Each motor-car is provided on its upper portion with horizontal retaining-rollers *l*, which run against opposite sides of the adjacent elevated rail, as shown in Fig. 3, so as to prevent the cars from being derailed by the lateral strain exerted by the towing-lines. This strain is considerable when the boats pass around a bend of the canal, where they are liable to drift out of their course, or when

they are caused to drift away from the tow-path by the force of the wind. The retaining-rollers *l* resist such strains and effectually prevent the cars from being pulled from the rails under such conditions. Only that retaining-roller of the car which runs against the outer side of the rail resists the tendency of the towed boat to pull the car off the track; but when a car by reason of the shifting of the tow-path passes from one side of the canal to the other its position with reference to the canal is reversed, which brings said retaining-roller on the front or inner side of the rail, and it is therefore necessary to provide the car with two such rollers, one on each side of the rail, in order to keep the car on the rails on both sides of the canal. The retaining-rollers are carried by the guard or upper portion *j* of the car. This reversal of the car also renders it necessary to provide the car with hooks or attachments for the tow-lines on both sides of the car, as shown in Fig. 3, so that the line can always be attached to the side of the car which faces the canal. These attachments may consist of eyes or perforated arms *l'*, projecting from opposite sides of the guard or top portion of the car.

As the motor-cars of the up and down boats in my improved towing system run on independent tracks, no transferring of the towing-lines is required when two oppositely-moving boats pass each other, as is necessary when the towing-cars of both the up and down boats run on the same track, thus avoiding the delays and loss of headway of the boats incident to transferring the lines and permitting a more rapid transit of the boats and enabling them to make a greater number of trips in a season. When two oppositely-moving boats or groups of boats meet, the lines of the boat or boats connected with the motor-cars on the inner track are slackened to permit the other boat or boats to pass over the same in the same manner as in the well-known animal towing system. When a motor-car passes over a bridge, the towing-line slackens and is carried over and under the bridge to the opposite side of the canal, as in the animal towing system, so that the boats lose no headway, but continue on their course without interruption. The tracks and the elevated framework are very compact, occupying a space not exceeding three feet in width on the outer portion of the tow-path, so that the system does not interfere with the ordinary system of towing by animals, while the arrangement of the inner elevated rail below the plane of the outer rail permits the use of both tracks on the same side of the canal without rapidly wearing out the tow-lines attached to the motor-cars on the outer track, which would occur if the elevated rails of both tracks were placed at the same height. The extensible or telescopic construction of the motor-cars permits the same to adjust themselves automatically to the varying distances between the surface and elevated rails in following a shifting tow-path from one side of the canal to the other.

In order to permit drays or other conveyances to cross the tracks and pass under the elevated rails of the system at points where the boats are loaded and unloaded, the elevated rails are raised sufficiently at such points, as shown at B^3 in Figs. 1 and 6. The extensible construction of the motor-cars permits the upper guide-wheels to remain in contact with the overhead rails at these elevated places. At such stopping or unloading points it is necessary to leave the tracks unobstructed to allow the towing-cars of other boats to pass without delay, and for this purpose a side track is provided at each of these places, so that the car of a boat which is being loaded or unloaded can be temporarily switched upon the siding.

Referring to Fig. 5, *m m'* represent the surface rails of two adjacent side tracks. m^2 is a horizontally-swinging switch rail or tongue forming normally a portion of the outer surface rail of the main track and adapted to be swung in line with the corresponding rail *m* of the side track, as shown by dotted lines in Fig. 5, for switching a car upon the siding. m^3 is a similar switch-rail included in the inner surface rail of the main track and adapted to be swung in line with a curved rail-section m^4, secured between the two main surface tracks and forming a continuation of the inner surface rail of the siding.

n n', Fig. 4, represent the elevated rails of the siding arranged directly over the surface rails *m m'*, and n^2 is a horizontally-swinging switch-rail forming normally a portion of the main outer elevated rail B and adapted to be swung in line with the corresponding elevated rail *n* of the siding, as shown by dotted lines in Fig. 4, for switching a car upon the siding. n^3 is a similar switch-rail included in the main inner elevated rail B' and adapted to be swung in line with a curved rail-section n^4, which latter is arranged between the two main elevated rails and adapted to form a continuation of the inner elevated rail *n'* of the siding, as shown by dotted lines in Fig. 4. This curved rail-section in its normal position is arranged directly over and in the same position as the corresponding rail-section m^4 between the main surface rails A A', but instead of being fixed, like the rail-section m^4, it is movable, so that it can be swung into a position in which it clears the superstructure of cars running on the main tracks, it being clear from an inspection of Fig. 7 (where the normal position of said rail-section is shown by dotted lines) that said rail-section would otherwise stand in the way of the trolley-poles and telescopic stems *k k'* of cars running on the main tracks. In the construction shown in the drawings said rail-section is pivoted between its ends to the adjacent standard C, as shown at n^5, so that it can be swung substantially parallel with the main elevated

rails when not in use, as shown by full lines in Fig. 4, or be swung into the normal dotted position shown in the same figure when it is desired to switch a car upon the siding.

As the gear-racks H are somewhat elevated, it is necessary to make the portions thereof immediately over the curved rail-section m^4 movable, so that the same can be moved out of the way to permit a car on the inner main track to pass upon the siding. For this purpose the adjacent portions or sections h^2 of the gear-racks are each hinged or mounted at one end on a horizontal pivot o, so that they can be swung upward out of the way, as shown by dotted lines in Fig. 6.

It will now be understood that when it is desired to run a car from the outer main track upon the corresponding siding, or vice versa, it is only necessary to shift the upper and lower switch-rails m^2 n^2 into the dotted position shown in Figs. 4 and 5, while when a car is to be switched from the inner main track to the corresponding siding, or vice versa, the switch-rail m^3 of the surface rail is shifted to the dotted position shown in Fig. 5, the pivoted rail-section n^4 is swung in line with the corresponding elevated rail of the siding, and the switch-rail n^3 is swung in line with said rail-section, as shown by dotted lines in Fig. 4, and the hinged sections of the gear-racks are swung up to the position shown by dotted lines in Fig. 6.

Each of the elevated switch-rails and the pivoted rail-section n^4 carries a section of the conductor-wire g, as shown in Figs. 1 and 6. The surface rails of the main and side tracks are electrically connected together by wires, as is common in trolley systems, these wires not being shown in the drawings.

The gear-racks H preferably extend only along the main tracks, and in order to furnish the necessary power for propelling the towing-cars from the main tracks to the siding, and vice versa, each car is provided with suitable driving and clutch mechanism, whereby power may be transmitted from its electric motor either to its toothed traction-wheel h for propelling the car along the main track or to one of its supporting-wheels for propelling the car upon the siding by the friction of said wheel against the surface rail. In the construction shown in the drawings the axle of said supporting-wheel is provided with a sprocket-wheel p, connected by a chain p' with a sprocket-wheel p^2, which is normally loose on the motor-shaft. The pinion h' is also normally loose on the motor-shaft, and either this pinion or the loose sprocket-wheel p^2 is placed in gear with the motor-shaft by a sliding clutch q, splined on the shaft and operated by a hand-lever q'.

I claim as my invention—

1. In a towing system, the combination with two surface tracks arranged side by side on the same side of the waterway, of independent towing-cars arranged to run upon said tracks in opposite directions, and towing connections which are attached, respectively, lower to the car nearest the watercourse than to the car on the outer track, to clear each other when the cars pass each other, substantially as set forth.

2. In a towing system, a pair of independent elevated tracks arranged side by side along one side of the watercourse, the inner track or that nearest the watercourse being arranged below the plane of the outer track, substantially as set forth.

3. The combination with two independent surface tracks arranged side by side on one side of the watercourse, of two elevated tracks arranged over said surface tracks, respectively, the inner elevated track or that nearest the watercourse being lower than the other elevated track, and two independent series of towing-cars running upon said inner and outer sets of tracks, each of said cars having lower wheels which run upon one of said surface tracks and upper wheels which run against the corresponding elevated track, substantially as set forth.

4. In a towing system, the combination with two independent surface tracks arranged side by side along the watercourse and both extending from one side of the watercourse over a bridge thereof to and along the other side of the watercourse, of elevated tracks arranged over and following the line of said surface tracks, the inner elevated track or that nearest the watercourse being lower than the other elevated track on both sides of the watercourse, substantially as set forth.

5. In a towing system, the combination with two independent surface tracks arranged side by side along the watercourse and both extending from one side of the watercourse over a bridge thereof to and along the other side of the watercourse, of elevated tracks arranged over and following the line of said surface tracks, the inner elevated track or that nearest the watercourse being lower than the other elevated track on both sides of the watercourse, and towing-cars running on said sets of tracks and each having lower wheels which run upon one of said surface tracks and upper guide-wheels which run against the corresponding elevated track and which are capable of moving vertically on the car for adapting themselves to the varying altitude of the elevated tracks, substantially as set forth.

6. The combination with a surface track, of an elevated track arranged over said surface track and at varying distances from the same, and a towing or motor car composed of a lower portion having wheels which run upon said surface track and an upper portion which is vertically movable on the lower portion of the car and is provided with upper guide-wheels which run against said elevated track, substantially as set forth.

7. In a towing system, a towing-car com-

posed of a lower portion having wheels adapted to run on a surface track, a vertically-movable upper portion carrying guide-wheels adapted to run against an elevated track arranged over said surface track and a sliding connection whereby the upper portion of the car is guided on the lower portion thereof, substantially as set forth.

8. In a towing system, a motor-car provided on its upper portion with guide-wheels adapted to engage with an elevated track, and a horizontal guard extending along the top of the car whereby the towing-lines are kept clear of said guide-wheels, substantially as set forth.

9. In a towing system, a motor-car provided on its upper portion with guide-wheels adapted to engage with an elevated track, and a horizontal guard extending along the top of the car and projecting above said guide-wheels and terminating at both ends in horns which are arranged to extend below the level of the elevated track, substantially as set forth.

10. In a towing system, a motor-car provided at its top with a vertically-movable guard and guide-wheels journaled on said guard below the upper surface thereof and adapted to engage with an elevated track extending along the watercourse, substantially as set forth.

11. The combination with a surface track and an elevated track arranged over the same, of a towing-car having upper and lower wheels running upon said surface and elevated tracks, respectively, and provided with a vertically-movable upper portion which carries an attachment for a towing-line, substantially as set forth.

Witness my hand this 4th day of June, 1898.

LOUIS PHILIP PEREW.

Witnesses:

CARL F. GEYER,

THEO. L. POPP.