

No. 724,367.

PATENTED MAR. 31, 1903.

S. W. WOOD.  
ELECTRICAL TRACTION TOWAGE.

APPLICATION FILED JUNE 25, 1902.

3 SHEETS—SHEET 1.

NO MODEL.

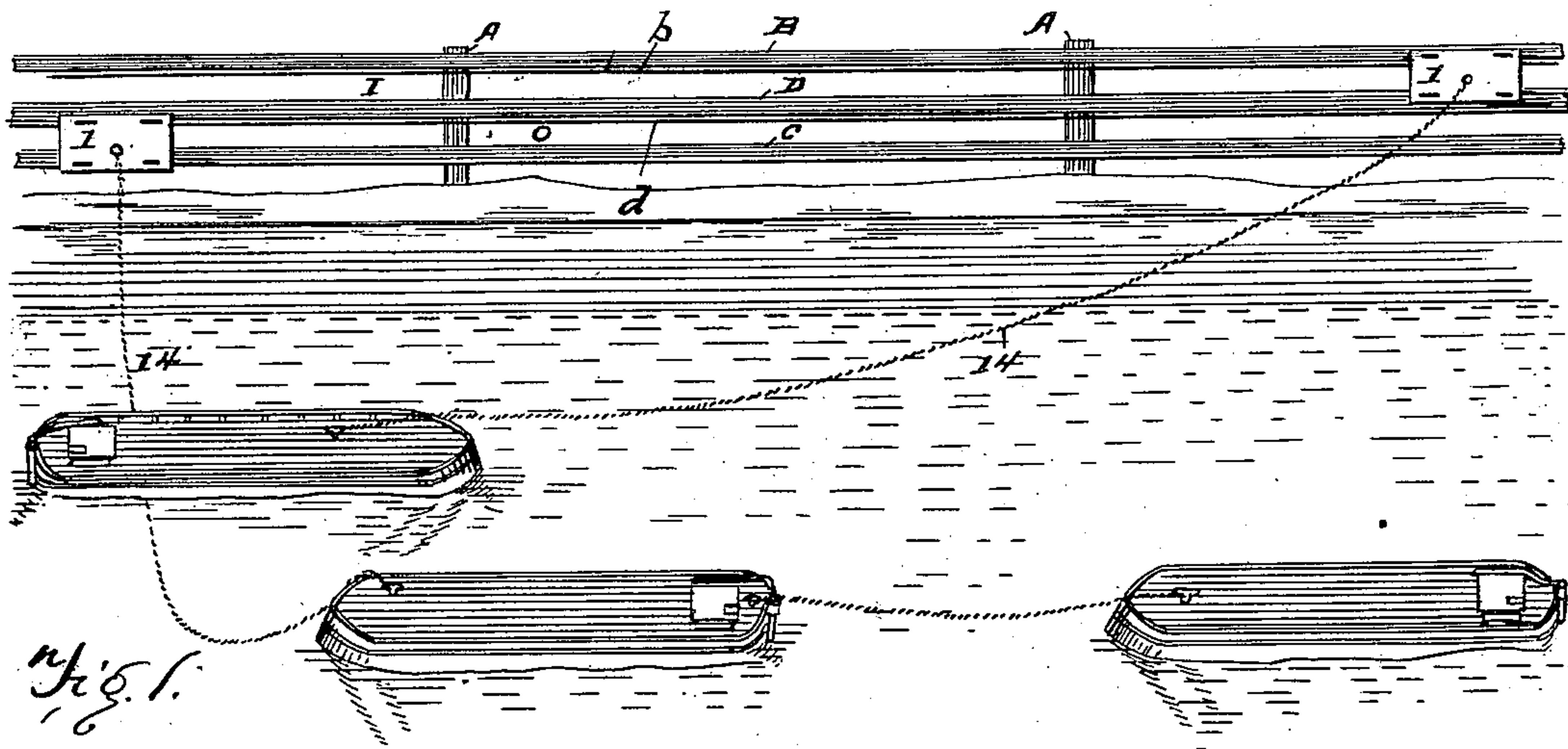


Fig. 1.

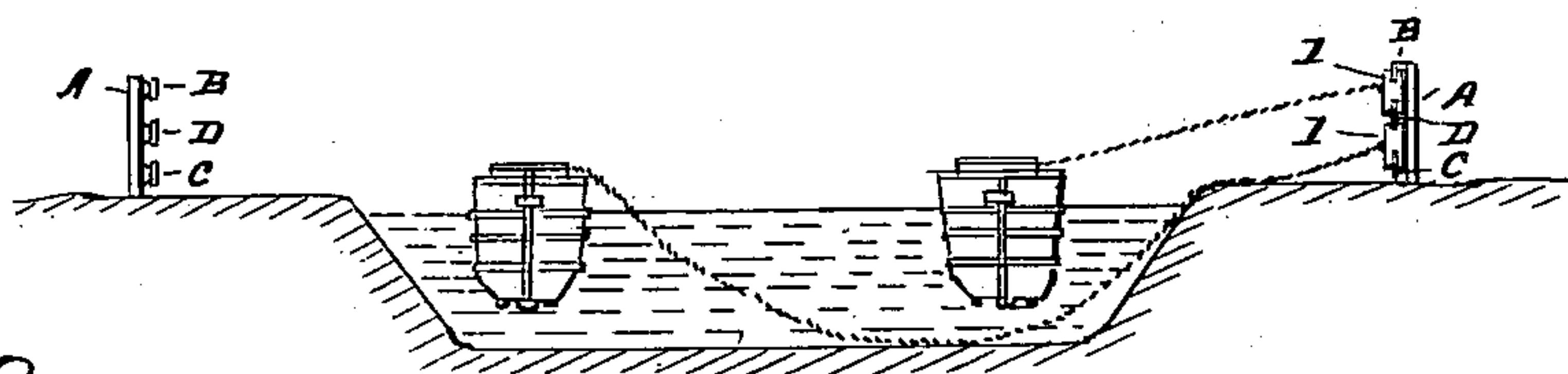
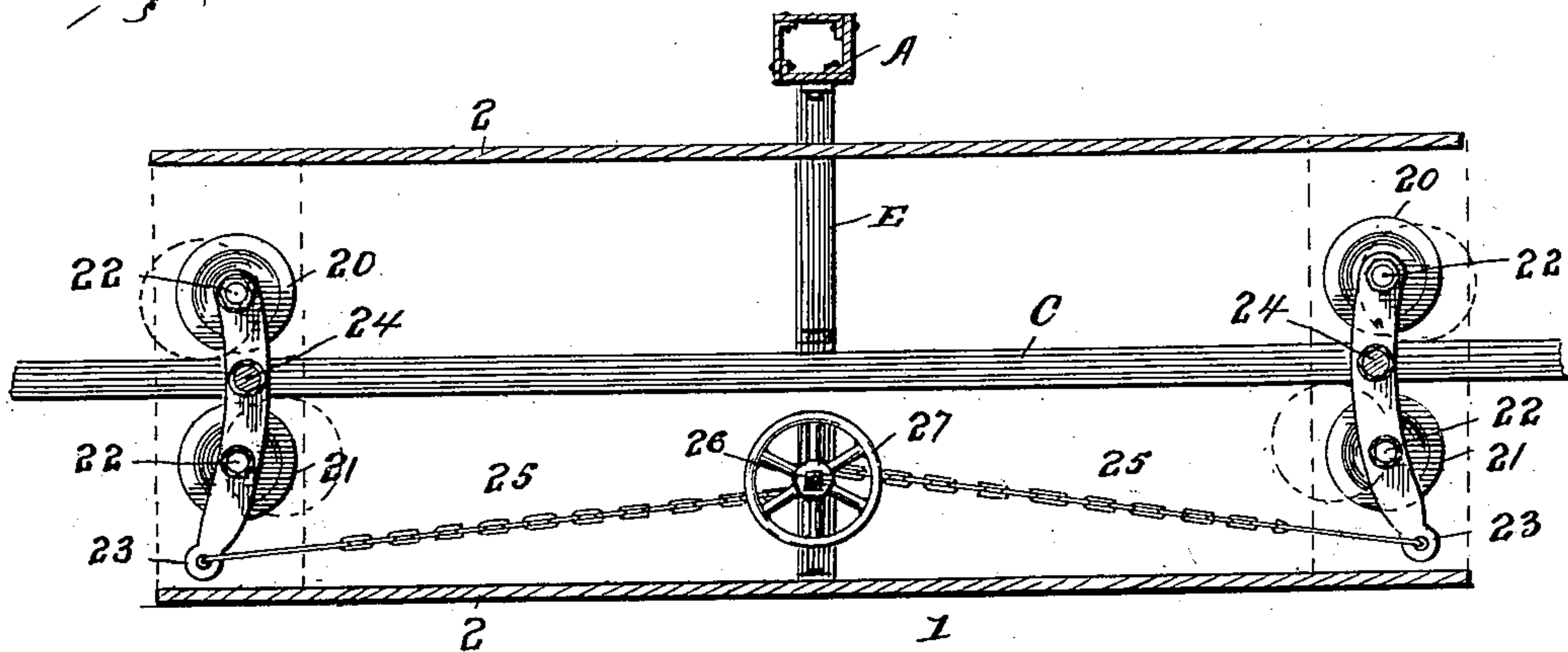


Fig. 2.

Fig. 5.



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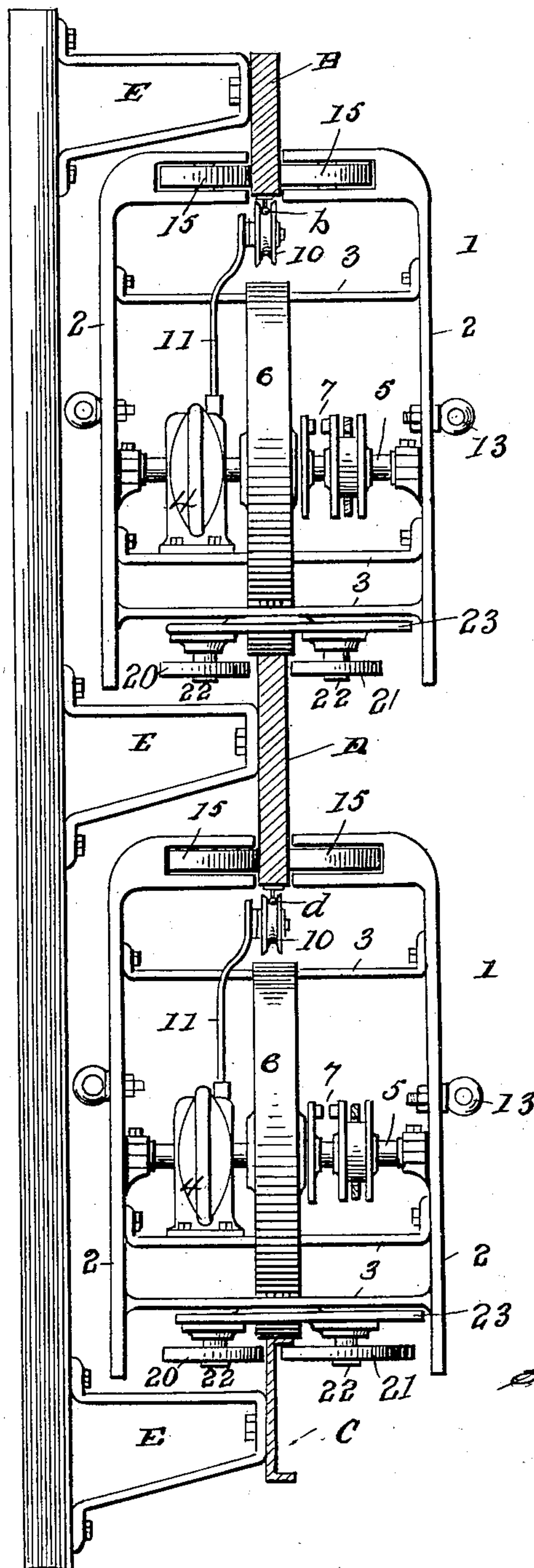
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3 SHEETS—SHEET 2.

*Fig. 3.*



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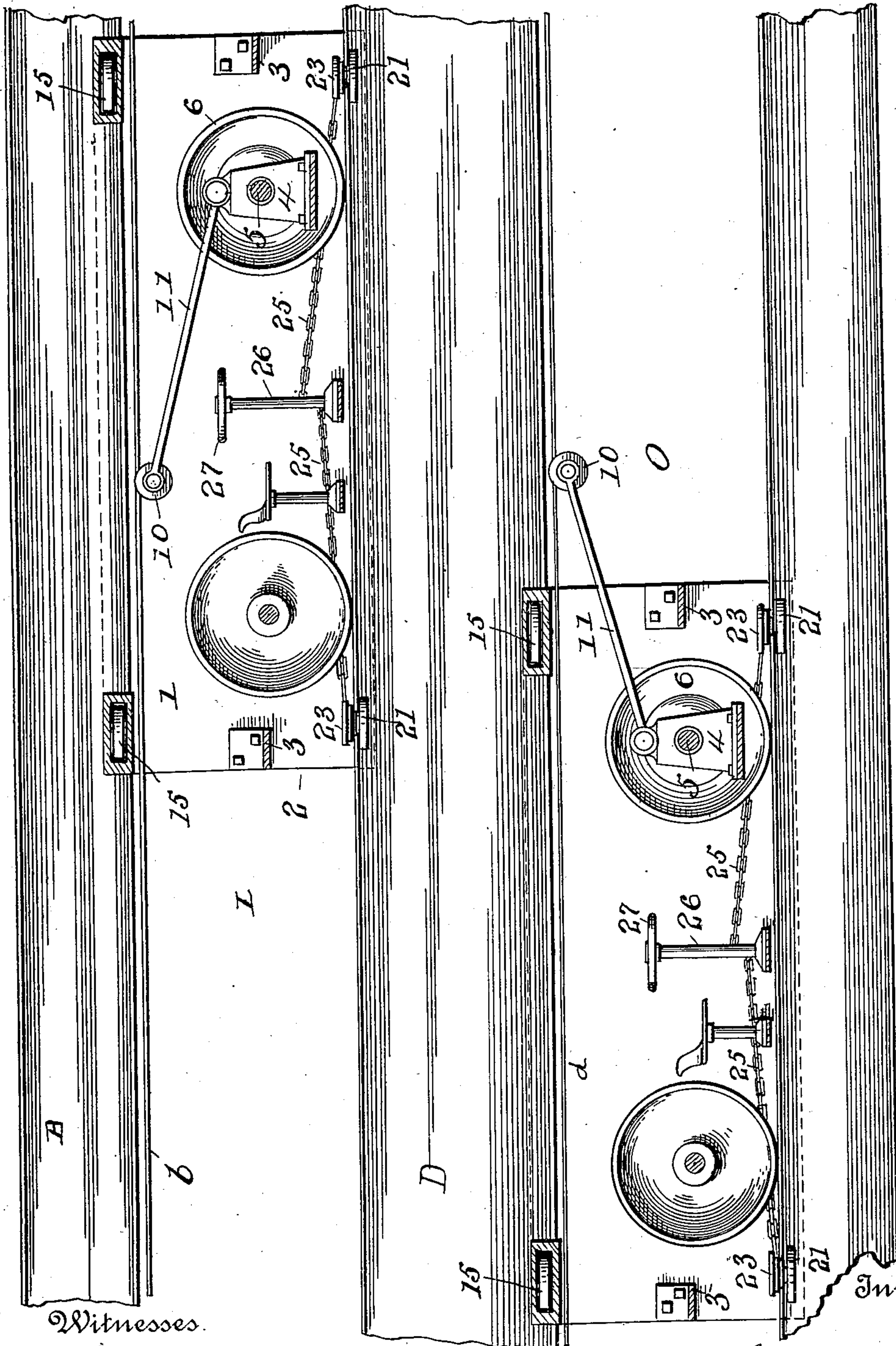
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3 SHEETS—SHEET 3.



Witnesses.

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# UNITED STATES PATENT OFFICE.

STEPHEN W. WOOD, OF NEW YORK, N. Y.

## ELECTRICAL TRACTION TOWAGE.

SPECIFICATION forming part of Letters Patent No. 724,367, dated March 31, 1903.

Application filed June 25, 1902. Serial No. 113,177. (No model)

*To all whom it may concern:*

Be it known that I, STEPHEN W. WOOD, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Electrical Traction Towage, of which the following is a specification.

This invention relates to electrical traction towage on canals.

The object of the invention is to construct a traction-way alongside of a canal with minimum expense and complication, along which way electrically-driven motors or tractors may be independently driven in either direction, and each tractor may be connected by a tow-line to a boat or tow of boats on the canal to move the same at such speed as conditions warrant.

The invention consists in certain details, combinations, and improvements in the mechanisms of the way and tractor by which the same are adapted to cooperate for the purpose named and to operate without interfering with animal towage should such be used. It will be my endeavor to briefly point out these improvements in the claims hereto annexed.

The average speed of a boat towed by animals on a canal is probably more than one and less than two miles per hour. My tractors are intended to make a speed of four to six miles per hour and might travel much faster but for the fact that as canals are usually constructed fast travel is prohibited owing to the danger of washing the banks. As my tractors are not intended for very high speed, much complication in mechanism and electrical connections is avoided.

The limit of height to which a traction-way of this kind may safely extend is about eight feet above the tow-path, as canal-bridges are generally built of a height to permit about eight feet in the clear. Consequently in my traction-way I have endeavored to make the entire structure so compact that the tractors as a rule shall not exceed four feet in height, so as to pass each other within the above-named limit of height.

Canal traction is now largely accomplished by animal-power. It is one of the features of my improvement that the traction by animal-power need not be interfered with by my towage system, so that boats may be towed

by animals, as usual, without obstruction from the towing way or mechanism of my device.

The tow-path of a canal generally lies on one bank of a canal for a distance and then on the other bank of the canal, because of the conformation of the ground, presence of hills, rivers, and buildings, and what not. My traction-way is adjusted to such conditions, and the tractors running thereon can be switched from one way to another on the opposite side of the canal as readily as a car can be switched from one track to another on a common railway.

The constructions I have devised should be considered in relation to these facts and conditions and other factors known in this art.

In the drawings, Figure 1 is a perspective view supposed to represent a short section of a canal with boats thereon, showing an electrical traction-way along the canal. Fig. 2 is a cross-section of a possible canal with boats thereon, showing traction-way at both sides back from the water side of the tow-path and indicating connection to passing boats. Fig. 3 is a section through the traction-way, showing rails of the way supported on brackets and showing tractors in section in operative position on the rails of the way. Fig. 4 is a broken elevation of the way, showing two tractors, each partly in section, on the two traction-rails of the way. Fig. 5 is a plan of a rail-gripping mechanism as applied to a tractor.

Let A indicate posts or supports arranged on the bank of a canal and preferably far enough removed to permit of a tow-path for animal traction between the traction-way herein provided for and the margin of the canal.

B, C, and D indicate three rails supported from the posts A on brackets E. The projection of the brackets from the posts is as small as is consistent with the size of the motors or tractors employed. The middle rail D projects both above and below the faces of its supporting-brackets, so that its outer and inner faces near either edge may both be engaged by grippers on the tractors. The lower rail projects upwardly and the upper rail projects downwardly from the respective supporting-brackets, so that the grippers on the brackets will have room to embrace the faces of these rails for a little distance from the



edge without interfering with the movement of the tractors along said rails, the tractors moving substantially in the horizontal plane of the spaces I O between the rails.

5 The numeral 1 indicates the frame of a tractor. This frame extends both without and within the towing-way, preferably to an equal distance. The front and rear plates or bars 2 2 are connected by tie-bars 3 3, which connect through the space or opening I or O between the track-rails B D or C D. The upper tractor has its weight on the middle rail. The lower tractor has its weight on the lower rail. Each tractor-frame contains an electrical engine 4 of any usual or suitable form or construction. As shown in Fig. 3, the engine is mounted on the shaft or axle 5 of the driving-wheel 6 and in such manner that a shifting clutch 7, of usual construction, may engage the shaft or axle with the driving-wheel or may permit the shaft or axle to run free.

The track-rails B and D support trolley-wires *b* and *d*. These wires are shown directly beneath the track-rails, and a trolley 10, of usual construction, runs along the trolley-wire. A trolley-pole 11 is connected to the tractor and has the usual connections for supporting the trolley-wheel in contact with the wire and for conducting electricity therefrom to the driving-engine 4. The circuit is supposed to be completed through the track-rails, as usual. The wires *b d* are of course insulated from the track-rails B D, and these wires are supplied with electricity in any usual manner.

The tractor-frame has any suitable means, as a lug 13, to which a tow line or cable 14 may be attached, said cable extending to a boat or two in the canal. A lug 13 is shown on each face of the tractor, so that the connections may be made to a tow from that face of the tractor which is toward the canal, whichever face that may be.

15 The rails B C D are shown, except in Fig. 4, as rectangular bars having smooth faces. This is merely suggestive, as any suitable and approved form of rail may be used. The space or passage-way I between the upper and middle rails should be of the same width as the space O between the middle and lower rails, and the projection of the tractor-frame from the rails should be about the same at the front and rear of the track-rails—that is, away from and toward the rail-supporting posts. Thus the motors can travel with equal facility in either passage I or O.

The tow-path is sometimes on one bank and sometimes on the other bank of the same canal. The traction-way is similarly arranged. The tractors are so constructed that they can be passed from a traction-way on one bank to a similar way on the other bank and will fit either way without reversal of position. The tractors also fit either passage I O between the rails and may be switched from the middle to the lower rail, or vice

versa, and run in either direction on either rail.

The tractor-frame 1 bears guide-wheels 15, 70 Figs. 3 and 4, which guide-wheels run on the outer and inner faces of the rail above which the tractor travels. These guide-wheels are held to the faces of the track-rail by any usual means.

The rail on which the tractor travels, being rail D or C, supports the weight of the tractor, and the contact of the driving-wheel 6 with this rail causes the tractor to move along the rail when the drive-wheel is in coupling with the moving engine. To insure a sufficient contact under circumstances which might otherwise cause the driving-wheel 6 to slip on the rail, the pairs of gripper-wheels 20 21 are arranged in the tractor-frames so as to grip the outer and inner faces of the lower rail when desirable. (See Figs. 3 and 5.) The wheels 20 21 are carried on vertical shafts or pintles 22, which pintles are mounted on levers 23. The levers 23 extend above the traction-rail and are carried on pivots 24 on the frame, so that a wheel 20 on one lever 23 is on one face of the rail and a wheel 21 on the same lever is on the other face of the same rail. The wheels of each pair 20 21 are far enough apart to permit the tractor to move when lever 23 is in normal position without engagement between these gripping-wheels and the rail; but by swinging lever 23 on pivot 24 the gripping-wheels are brought into firm bearing on the opposite faces of the rail. (See dotted lines, Fig. 5.) Chains or cables 25 connect the ends of levers 23 to shaft 26 and on opposite sides thereof. By turning hand-wheel 27 the levers 23 are drawn toward each other, as in setting a common brake on a railway-car. Thus the wheels 20 21 grip the rail, and so hold the tractor down to the rail. When so gripped, the engagement of the driving-wheel with the track is much more intimate than would be due to the mere weight of the tractor. The grip of the tractor to the sides of the rail is seldom necessary except at starting a boat or tow into motion. When in motion, the driving power of the driving-wheel on the track is generally sufficient to continue the movement.

In operating my traction-way it is desirable that all the tractors in the passage I move in one direction and all those in passage O move in reverse direction. The tow-line 14 is so connected to each tractor that two boats or two tows of boats may move in one section of the canal and in opposite directions at the same time, passing each other side by side. In fact, each tractor corresponds nearly to a team of animals, except that the tractor has much more power and cannot be pulled from the traction-way by the resistance of the tow, except by breakage of the tractor or traction-way. The tow-line is of such length that the strain on the traction-way is largely backward and not greatly sidewise, so that great strength against side strains on the way is



not likely to occur. When such is found to be needful, a system for bracing posts A can be easily devised. When one tow-boat or train of boats drawn by tractors desires to pass another similar tow, the lower tractor will be stopped or slackened and the slackened tow-line will sink, so that the other tow can pass over it. So in passing a tow drawn by animals the line may be slackened and the animals may walk over it.

As I have hereinbefore indicated, I do not in general confine my claims to precise constructions. Any usual or improved form of electrical engine or motor may be used. The way may vary in many particulars from the construction illustrated, especially as to character of track, so that the general combination of elements be preserved, and while the system is specially intended for towage it may also be employed in transportation on any way on which vehicles can move.

What I claim is—

1. In a traction-way for canals, the combination of suitable supports, three rails arranged to form two ways one above another, trolley-wires arranged for each way, and a tractor constructed to run in either of the two ways, said tractor having a trolley connection to reach the wire when in either of the ways.

2. An electrical traction-way having supporting-posts, brackets projecting at one side thereof, three rails one above another and supported by said brackets to form two ways, and trolley-wires in proximity to each of the two ways.

3. In a towage-way, the combination of supporting-posts, brackets extending at one side thereof, three rails, one above another, supported on said brackets, and a tractor having a driving-wheel constructed as described so as to run on the lower rail with guide-wheels bearing on the middle rail, or to run on the middle rail with guide-wheels bearing on the upper rail.

4. In a traction-way for canals, the combination with suitable supports at both sides of the canal, of traction-rails, one above another supported on brackets from said supports, and a tractor constructed substantially as described to run in either direction on either rail, and at either side of the canal with either side projecting toward the supports without obstruction therefrom.

5. In a traction-way for canals, the combination of supports, three rails arranged parallel and one above another, trolley-wires supported below the middle and upper rails, a tractor constructed to run on either the lower or the middle rail and having guide-wheels to bear on the rail next above, said tractor having also a trolley to bear on the wire above.

6. In a traction-way, the combination of supporting-posts, brackets extending at one side thereof, a central rail attached to said brackets and extending above and below the faces thereof, a lower rail having its edges

extending above the faces of its supporting-brackets, and an upper rail having its lower edge extending below the faces of its supporting-brackets, and a tractor with traction-wheel arranged in its lateral center and projecting equally at the sides thereof, so that the tractor may run on either the lower or central rail and be guided by the rail above, and may present either side toward the posts without obstruction therefrom.

7. An electrical traction-way having supporting-posts, brackets projecting at one side thereof, three rails one above another supported by said brackets, and trolley-wires supported from and arranged below the two upper rails.

8. In a canal towage system the combination with the supporting-posts and brackets extending at one side thereof, of three parallel rails supported on said brackets and arranged one above another to form two ways of equal width with electrical connections along two of the ways, independent tractors in the two ways between the rails, and separate tow-lines extending from the tractors to boats or trains on the canal.

9. The combination with a series of supporting-posts, brackets extending at one side of said posts and parallel track-rails on said brackets having their edges projecting toward each other past the face of the brackets, of a tractor-frame having its side projecting at each side of the vertical plane of said track-rails, tie-pieces connecting the tractor-frame sections through the spaces between the rails, guide-wheels on the tractor bearing on the side faces of the rails above and below the tractor, and means for electrically driving said tractor.

10. The posts, parallel rails having a trolley-wire supported from and below the upper rail, a tractor having a drive-wheel bearing on the lower rail and guide-wheels bearing on both rails, and a trolley connected to the tractor and bearing on the wire between the rails, all combined.

11. The combination with the tractor-frame, a track-rail, and means for propelling the tractor along said rail, of gripper-wheels carried on the tractor and bearing on the sides of the rail, levers supporting said gripper-wheels, chains connected to said levers, and an axle to which said chains are connected.

12. In an electric traction-way, the combination of suitable supports, three rails arranged on said supports to project at one face thereof and form two ways at different elevations, electrical tractors running in each of said ways, and electrical connections communicating with said tractors.

In testimony whereof I affix my signature in presence of two witnesses.

STEPHEN W. WOOD.

Witnesses:

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M. E. BROWN.