May 18, 1926.

1,585,193

J. J. R. HAALCK

BOAT TRANSPORTING APPARATUS

Filed March 19, 1925

5 Sheets-Sheet 1

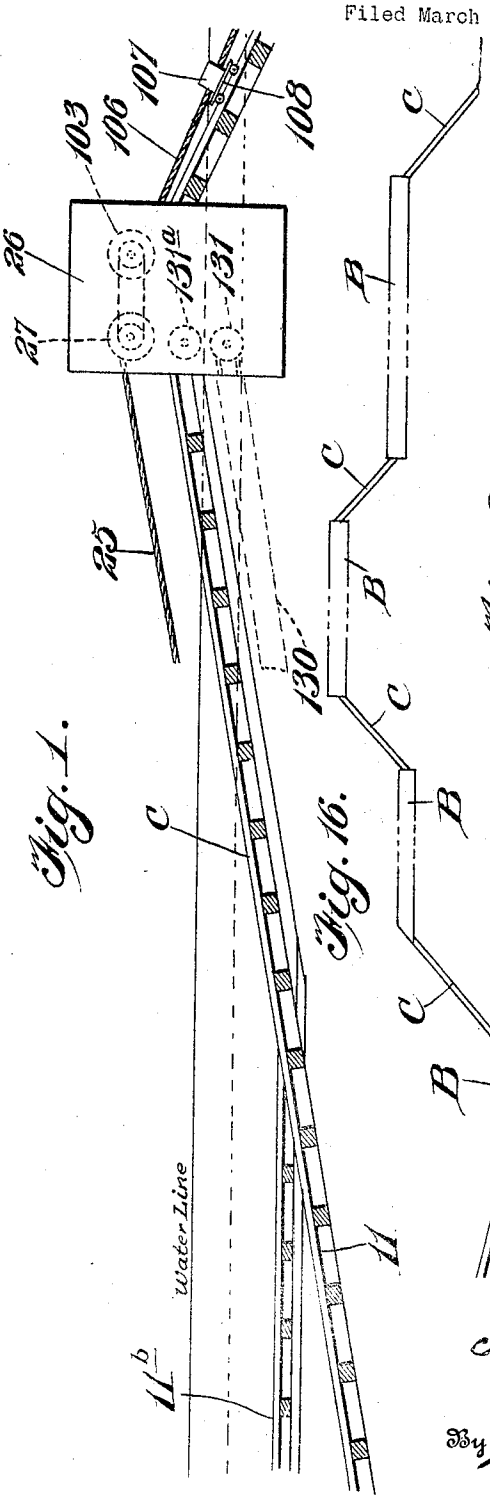


Fig. 1.

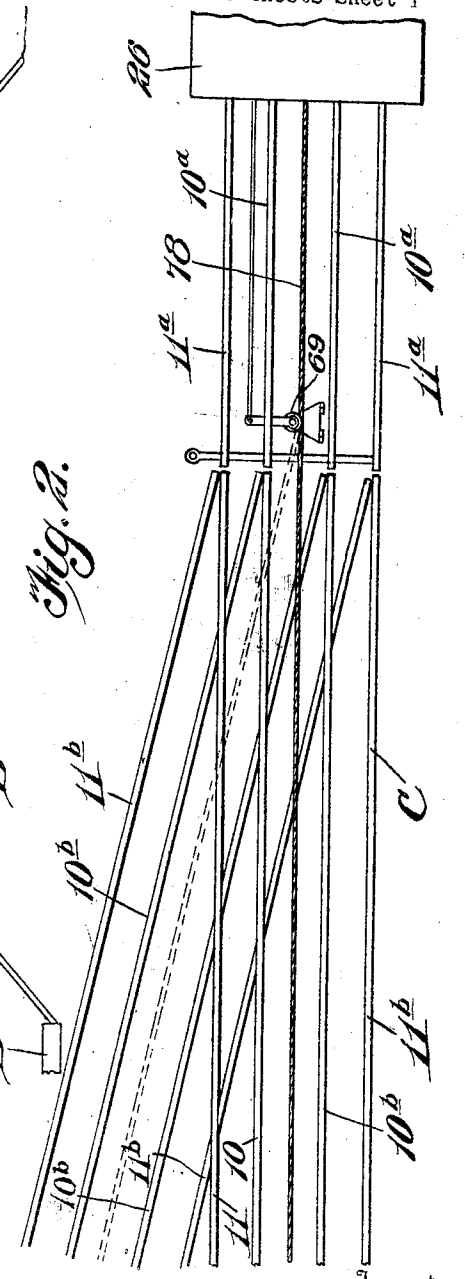


Fig. 2.

Fig. 1b.

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5 Sheets-Sheet 2

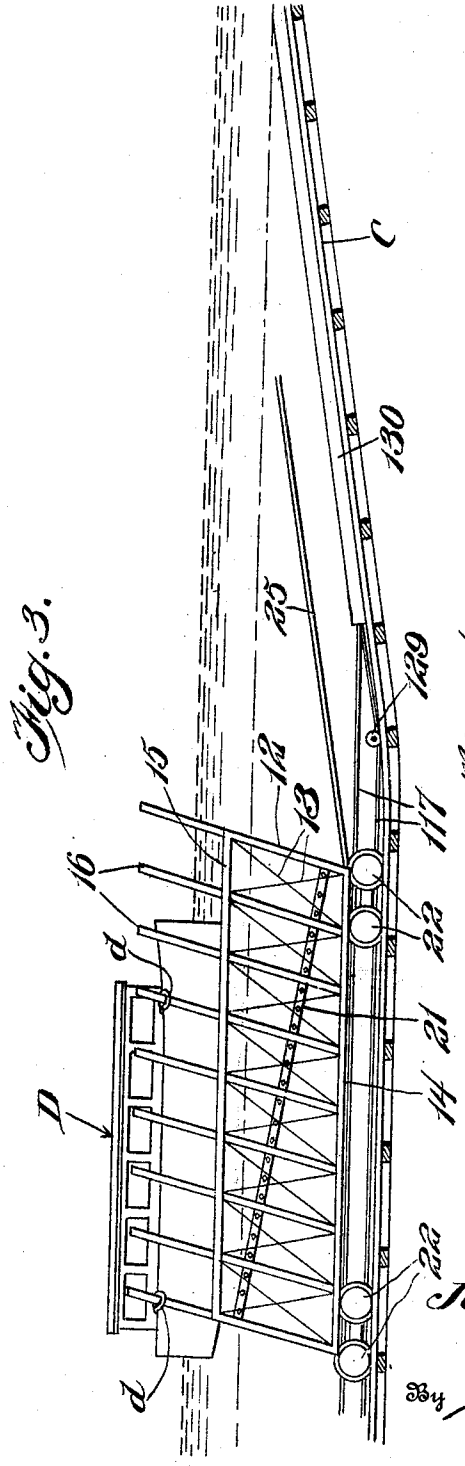


Fig. 3.

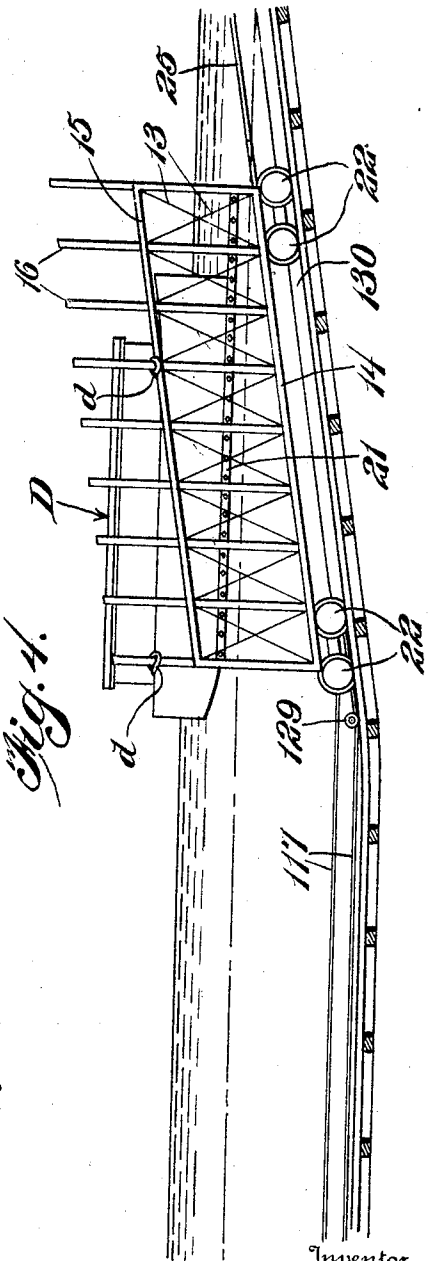


Fig. 4.

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Fig. 5.

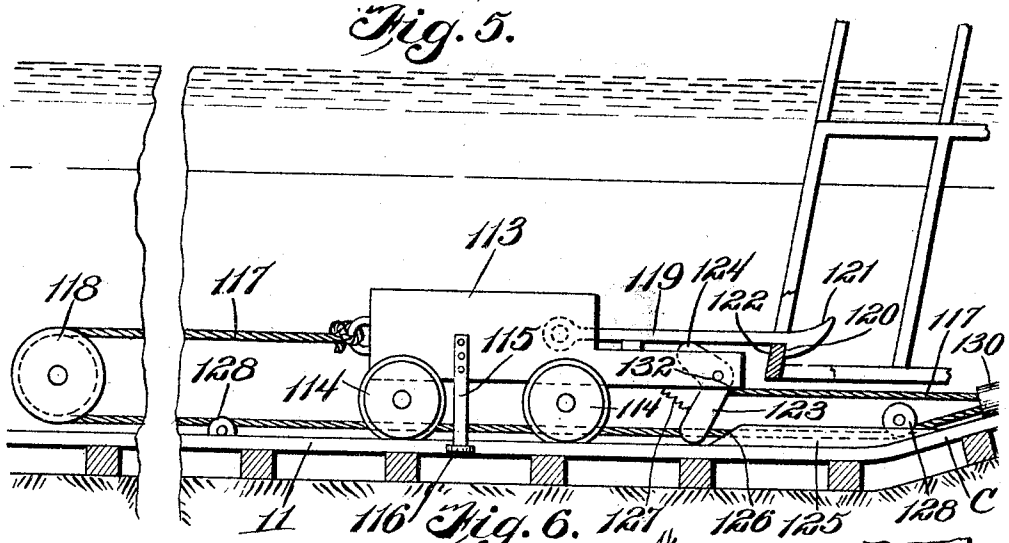


Fig. 6.

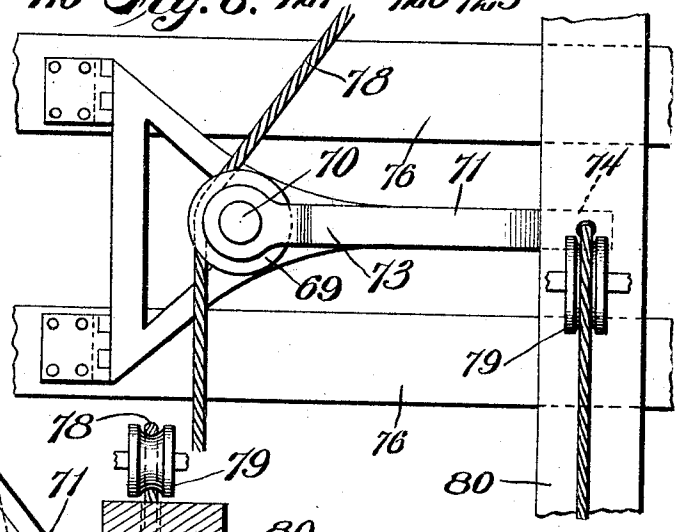


Fig. 7.

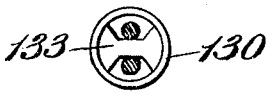
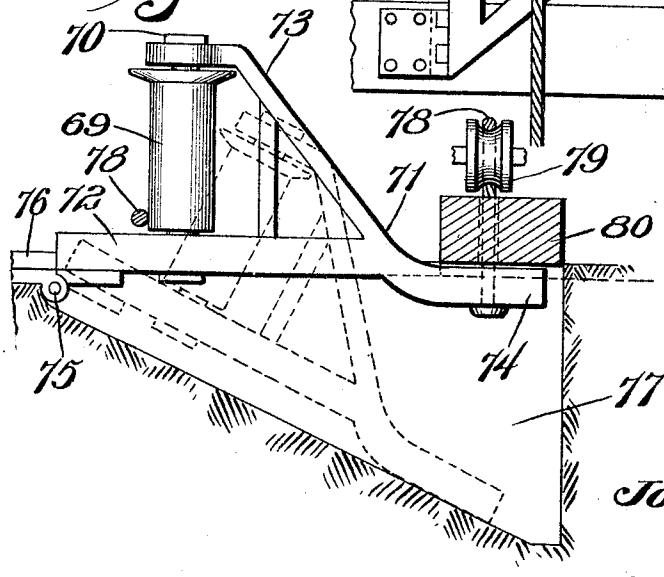


Fig. 8.



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Fig. 9.

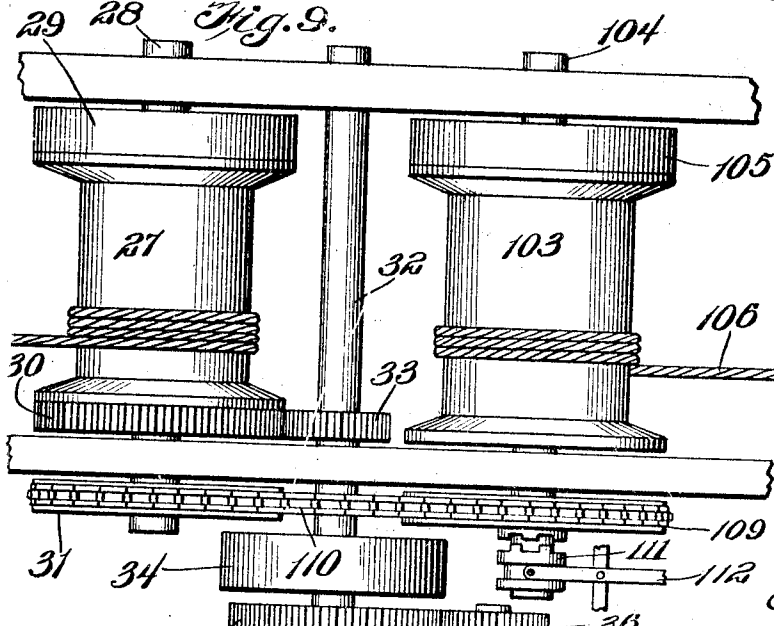


Fig. 10.

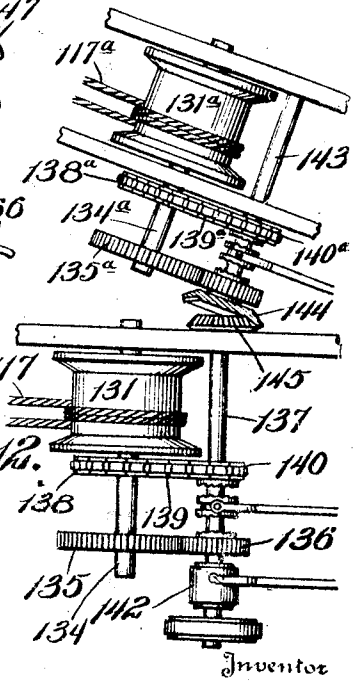


Fig. 11.

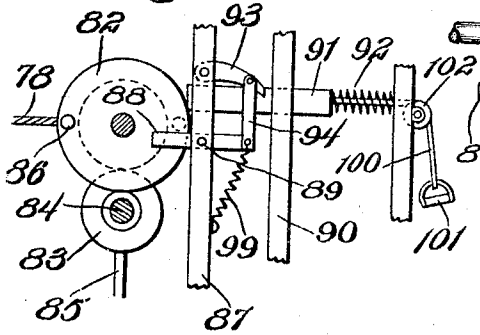
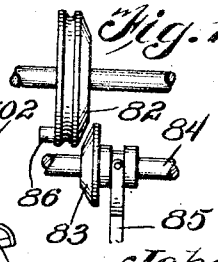
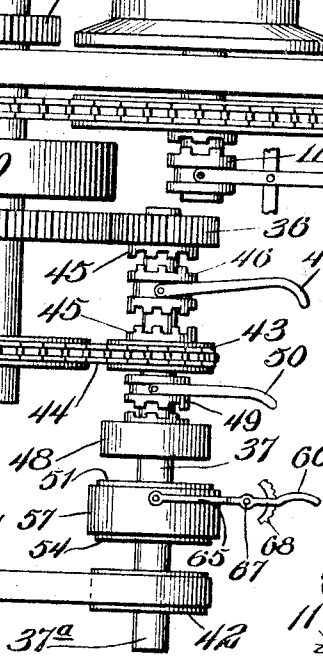


Fig. 12.





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BOAT TRANSPORTING APPARATUS

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Fig. 13.

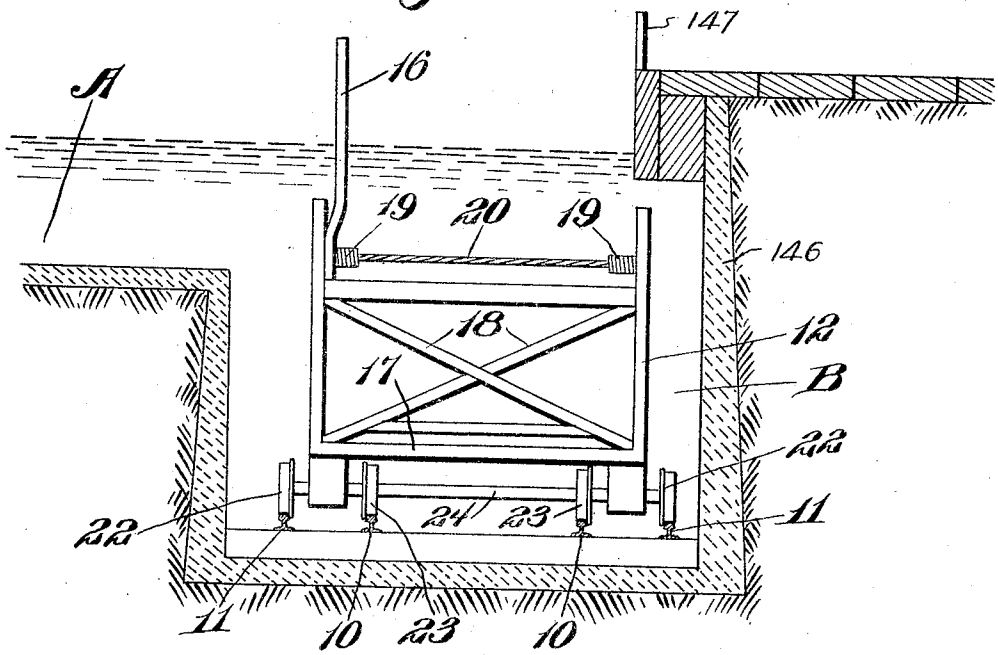


Fig. 14.

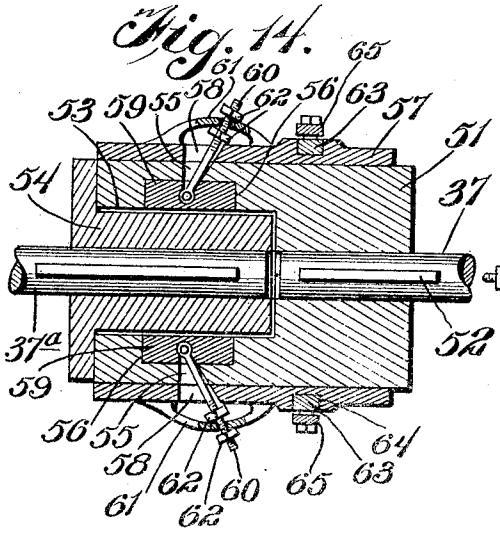
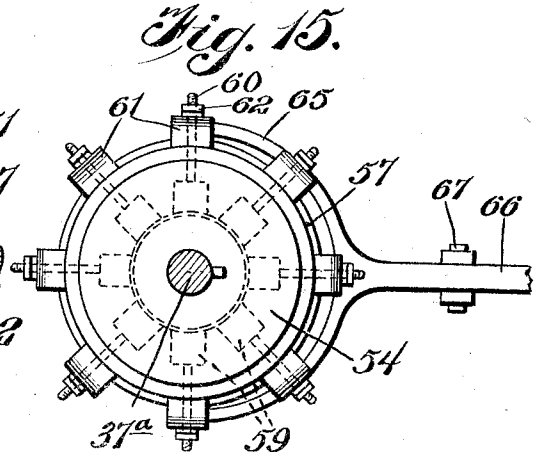


Fig. 15.



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UNITED STATES PATENT OFFICE.

JOHANN JURGEN RICHARD HAALCK, OF BAKERSFIELD, CALIFORNIA.

BOAT-TRANSPORTING APPARATUS.

Application filed March 19, 1925. Serial No. 16,853.

This invention relates to boat transporting apparatus such as shown in my Patents #1,259,620 granted March 19, 1918, and #1,283,744 granted November 5, 1918, and in my pending application for patent Serial #701,724, filed on the 25th day of March, 1924, the structures shown in these patents and in the pending application being so constructed that the boat may be carried from a lower level to a higher level or vice versa and taken from one body of water to another, over hills or along any desired route.

In all of the structures therein described and illustrated, the boat while being transported up or down an incline is supported in a horizontal position either, for instance, by a swinging cradle which, through the action of gravity, is kept horizontal, or, for instance, the boat is lifted at one end and retained in this horizontal position by jacks or like elements on the transporter while it is being carried up the incline or down the incline and lowered into the water. These devices necessitate very great strength in the structure and an expenditure of great lifting power, and this requires relatively complicated mechanism.

The present invention contemplates a simplification of such transporting apparatus and an elimination of overhead boat supporting mechanism and of power operated means for lifting the boat by the provision of a transporter which supports a fixed cradle or boat carrier which, when the transporter is in a horizontal position, is inclined but which, as the transporter moves up the incline, is gradually brought to a horizontal position beneath the horizontal bottom of the boat and as the transporter moves up the incline lifts the boat upward out of the water. It further contemplates in this connection a transporter having structural elements which, when the transporter is on a horizontal stretch of track and the boat is not supported thereby, extends at such an inclination that when the transporter is disposed upon the inclined portion of the track and is moving upward with the boat and supporting the same, the structural elements will be in a vertical position and the strain downward.

A further object is to provide a transporter which is hauled up or lowered down the incline by a cradle-operated member and power house, and to provide in connection with the transporter a puller or hauling truck also operated over the power house and operating on the horizontal portion of the track over which the transporter moves, whereby the transporter may be hauled along the horizontal canal or basin toward or from the beginning of the inclined portion of the track and from the transporter, which canal or basin constitutes the approach to the inclined portion of the track.

A still further object is to provide means whereby, when the transporter has been hauled to the peak of the incline, it may be switched onto a branch track and so carried into another canal or basin into which the boat is gradually lowered until the boat floats independently of the transporter, and to provide means whereby the cable connected to the transporter may be properly guided and shifted from the first named track, as it may be called, into line with this branch track and vice versa, said means being shifted out of the way of the transporter as the transporter arrives on the switch.

Another object is to provide means whereby the weight of the transporter itself may be counterweighted as, for instance, when the transporter is moving on the inclined portion of the track so as to thereby reduce the power required to raise or lower the transporter.

Other objects have to do with the means for controlling the operation of the cables which operate the transporter, the hauling carriage and the counterweight, and with the details of construction which will be later described.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a vertical sectional view through a basin showing the inclined trackway by which a vessel is drawn upward from a lower level to a higher level;

Figure 2 is a top plan view of the track structure shown in Figure 1 to show the manner in which the transporter with its vessel is shifted from the main upwardly inclined track to a track running downward into the water;

Figure 3 is a vertical sectional view through the basin from which the vessel is taken and through a portion of the upwardly inclined track;

Figure 4 is a like view to Figure 3 but showing the vessel as it is moved onto the inclined track;

Figure 5 is a vertical sectional view

through the basin showing the device for shifting the transporter along the horizontal portion of the basin;

Figure 6 is a top plan view of the means for guiding the cable at the switch;

Figure 7 is an end view of the conduit 130;

Figure 8 is a top plan view of the structure shown in Figure 6;

Figure 9 is a top plan view of the controlling mechanism for the transporter;

Figure 10 is a top plan view of the cable controlling means for the hauling trucks 113;

Figure 11 is a side elevation of the mechanism for raising or lowering the structure shown in Figures 6 and 8;

Figure 12 is an elevation of the friction wheels 82 and 83 and the shafts upon which they are mounted;

Figure 13 is a cross section through the canal and the basin showing the transporter in end elevation;

Figure 14 is a longitudinal sectional view through the main clutch;

Figure 15 is an end elevation of the structure shown in Figure 14;

Figure 16 is a diagrammatic view showing the manner in which the elevating structure which I have described may be used to connect a series of canals or basins;

Referring to Figures 1 to 4, it will be seen that I have illustrated a portion of a basin, canal or river, designated A, and laterally with relation to this canal or river there is a basin B deeper than the canal and with which, of course, the canal communicates. Disposed in this basin B are tracks consisting preferably of rails 10 and parallel rails 11. This track extends along the basin B to any desired length and then is upwardly inclined and extends upward to any desired height, as at C.

Operating upon these rails is a boat-supporting structure, which I will call the transporter and which, as illustrated, consists of a supporting frame including in its make-up the uprights 12, these being connected by cross braces 13, these uprights 12 being connected to a base 14. I do not wish to be limited to any particular manner of supporting and bracing these parts. The uprights 12 adjacent their upper ends are connected by longitudinal rails 15, and attached to the uprights 12 on one side and extending some distance above the same are the mooring posts 16. No strain comes upon these mooring posts and, therefore, they may be made of lighter material than the uprights 12.

As shown in Figure 13, these uprights 12 are connected to the lower sills 17 of the supporting frame and are braced from each other by means of cross braces 18. Attached to the uprights 12 adjacent their upper ends, preferably by means of coiled springs 19, is a bed consisting of transversely extending cables 20. These cables are placed relatively close together and the springs 19 are preferably attached to beams 21, which in turn are attached to the uprights. It will be seen from Figure 3 that these beams 21 are inclined downward at an angle to the horizontal so that at one end of the transporter, which I will call the forward end, the beams 21 and the bed formed of the cables 20 is relatively close to the bottom of the transporter, while at its other end this bed is relatively high above the bottom of the transporter.

It will also be noted from Figure 3 that the uprights 12 with their mooring posts 16 are disposed at an angle to the vertical and at right angles to the inclination of the beams or longitudinal members 21 which support the bed springs and cables. The transporter formed as heretofore described is supported by means of wheels 22 and 23, both pairs of wheels being mounted upon the axles 24, the wheels 23 engaging with the rails 10 and the wheels 22 with the rails 11. It will likewise be noted that when the transporter is in a horizontal position, as shown in Figure 4, that the bed, by which is to be disposed the cables 20, their springs and allied parts, is disposed in a downwardly and forwardly inclined position, but that when the transporter reaches the upwardly inclined portion C of the track, the uprights will then be in a vertical position and the bed will be in a horizontal position.

Now it is obvious that if the transporter be brought with its bed beneath the vessel D floating on the water of the canal or basin, the bed at one end will be adjacent to the bottom of the boat, while at the other end the bed will be distanced from the bottom of the boat. Under these circumstances, if the boat be loosely connected as, for instance, by the hawsers *d* to the posts 16, then as the transporter moves along toward the inclined portion of the track the boat D will be hauled along with the transporter, and then as the transporter moves up the incline the forward portion of the transporter will commence to rise beneath the boat and the forward portion of the bed will commence to rise beneath the boat until eventually, and when the transporter is fully on the inclined portion C of the track, the bed will be disposed in a horizontal position beneath the horizontal portion of the boat. At the moment when this occurs, the boat will be still floating upon the water and with only a minimum of weight upon the bed, but as the boat advances up the inclined portion C the bed of the transporter will lift the boat and the boat will be gradually taken out of the water until it is entirely supported upon the

transporter. At this time the uprights 12 are in their vertical position so that they will be in position for then supporting the load.

The transporter, as before remarked, is operated by means of a cable 25. This cable is attached to the forward end of the transporter and extends up the incline to a power house, illustrated more or less diagrammatically in Figure 1 and designated 26, within which power house is located a drum 27 upon which the cable 25 is wound. When power is applied to this drum in one direction, the transporter is drawn to the upper end of the incline, and when the power is released the weight of the transporter or the transporter and boat will cause the drum to rotate in the reverse direction, the cable to be unwound, and the transporter to move on down the incline.

Before describing what occurs when the transporter and the vessel have reached the top of the incline, I will describe the means whereby the drum 27 is operated. This drum 27 is mounted upon a shaft 28 and the drum carries a brake 29 of any suitable character whereby the speed of the drum may be controlled. Mounted upon this shaft 28 is a gear wheel 30 and sprocket wheel 31. Extending parallel to the shaft 28 is a countershaft 32 upon which is mounted a pinion 33 engaging the gear wheel 30. This shaft also carries upon it an automatic block, which I will not describe at the present time but which is designated 34 and is for the purpose of permitting power to be applied gradually to the shaft 32 or power released gradually from the shaft 32.

Mounted upon the shaft 32 beyond the automatic block 34 is a gear wheel 35, and also mounted thereon is the sprocket wheel 35ª. Extending parallel to the shaft 32 and also, of course, located in the power house, is a power shaft 37 which is shown as being driven by a motor 38 actuating a shaft 39 carrying a belt pulley 40, over which passes a belt 41 to a belt pulley 42 on a shaft 37. Any other suitable means of transmitting power to the shaft 37 may be used. Loosely mounted upon this shaft 37 is the pinion 36 which meshes with the gear wheel 35, and also loosely mounted upon the shaft 37 is the sprocket wheel 43 which is engaged with the sprocket wheel 35ª by means of the chain 44. The gear wheel 36ª and sprocket wheel 43 are each formed with confronting clutch teeth 45, and disposed midway between these clutch teeth and splined upon the shaft 37 is a rotatable clutching member 46 which is longitudinally shiftable either into clutching engagement with the pinion 36 or with the sprocket wheel 43.

It is obvious now that when the clutch member 46 is shifted by means of the lever 47 into engagement with the pinion 36 that the shaft 32 will be turned in one direction and that when, on the contrary, the clutch member 46 is shifted into engagement with the clutch teeth on the sprocket wheel 43 the shaft 32 will be turned in the reverse direction. Thus I have provided power operated means for driving the shaft 32 and, therefore, the shaft 28 in either direction. The shaft 37 also carries upon it a pulley or belt wheel 48 which is loosely mounted upon the shaft and which is engaged with the shaft by means of the clutch member 49 having a lever 50. The object of these parts 48, 49 and 50 will be later stated. The shaft 37 I have described as if it was in one section, but as a matter of fact it is in two sections 37 and 37ª, the section 37ª being separated from the sections 37 and power being transmitted from the section 37ª to the section 37 through a friction block whose construction will be now described.

Referring to Figure 14, it will be seen that this friction block is formed in two sections, an outer shell or barrel designated 51 which is keyed upon the shaft section 37 by means of a key 52, this outer shell or barrel 51 having a longitudinally extending recess 53 in which the shaft section 37ª extends. Keyed upon the shaft section 37ª is the other or male section of the clutch which is designated 54, which section 54 extends to the end of the shaft 37ª and is adapted to be inserted in the recess 53 so that thus a portion of the barrel or shell 51 is concentric to the portion 54. At intervals the barrel 51 is provided with triangular recesses 55 which extend inward from the exterior of the barrel, the apices of these triangular recesses being inward and opening into a series of rectangular recesses 56 formed on the inner face of the barrel.

Surrounding the barrel 51 is a cylindrical shell 57 also formed with slots 58 which align with the recesses 55. Disposed within the rectangular chambers 56 are a series of friction blocks 59 which bear against the periphery of the clutch member 54, and passing inward through the slots or recesses 55 and 58 are a plurality of bolts 60 which are hinged to the blocks 59 and which at their outer ends extend beyond the shell 57 and pass through curved, outwardly bowed irons 61. Nuts 62 are disposed on the bolt 60 on each side of each iron 61.

It is obvious now that if the shell 57 be shifted toward the right in Figure 14, the bolts 60 will be disposed at an angle to a plane at right angles to the axis of the barrel, but that if the shell 57 be shifted toward the left in Figure 14 the irons 61 will carry the bolts into or toward a position at right angles to the longitudinal axis of the shell and through a toggle action these bolts will force the friction blocks 59 against the pe-

riphery of the clutch member 54, thereby clutching or engaging the member 54 with the member 51 and causing the unitary rotation of the shaft sections 37 and 37ª.

For the purpose of shifting the shell 57 longitudinally, I provide a circular band 63 which is disposed in an annular recess 64 or otherwise engaged with the shell, this band being operatively pivoted to the fork 65 of a shifting lever 66 pivoted at 67 and operating over a rack 68 or other means whereby this shifting lever 66 is held in its shifted position.

From the description which has gone before, it will be obvious that by shifting the lever 47, the shaft 32 may be driven in one direction or the other to thus, through the gear wheels 33 and 30, drive the drum 27 in one or the other direction to wind up or unwind the cable 25 and that the power will be gradually applied to the shaft 32 by means of the automatic block 34 previously referred to, which really constitutes a clutch between the section 32ª of the shaft 32 and the section 32 itself. After the clutch member 46 has been shifted into one or the other of its operative positions, the clutch formed of the members 51 and 54 is operated to thereby transmit the power of the shaft section 37ª to the shaft section 37 and this power is transmitted to the drum 27 as before described.

After the transporter has been raised on the inclined portion C of the track to the upper end of this inclined portion, it is necessary that the transporter be shifted over to a branch track which will conduct it to a higher basin, canal or the like. To this end, tracks 10ª and 11ª are provided which align with the tracks 10 and 11 but are located at the upper ends of the tracks 10 and 11 and adjacent the power house 26, these tracks 10ª and 11ª being pivoted or otherwise mounted so that they may be shifted from a position in alignment with the tracks 10 and 11 into a position in alignment with the branch tracks 10ᵇ and 11ᵇ, as seen in Figure 2. Any suitable switch stand may be used for shifting these tracks 10ª and 11ª. The tracks 10ᵇ and 11ᵇ may extend at a suitable incline down a hill for a short distance and into a basin from which a canal may lead, just exactly as the canal A will lead into the basin B in Figure 13.

It is necessary that the transporter be brought onto the track sections 10ª and 11ª, which have a length equal to the length of the transporter, and that then the rails 10ª and 11ª be shifted into alignment with the rails 10ᵇ and 11ᵇ and that the transporter be then allowed to run down these rails. The cable 25, when it is operating beneath the main tracks 10 and 11 and beneath the switch tracks 10ª and 11ª when the latter are in alignment with the tracks 10 and 11, is in a straight line, but when the rails 10ª and 11ª are shifted into alignment with the rails 10ᵇ and 11ᵇ the cable 25 would not be in the middle of the track but would be out of its proper position and, therefore, it is necessary to provide means to hold the cable properly disposed in the middle of the tracks 10ª and 11ª and 10ᵇ and 11ᵇ.

To this end I mount at the entrance of the rails 10ª and 11ª at the middle thereof a cable guide, shown in Figures 6 and 8 and comprising a vertically disposed spool or spindle 69, which is illustrated as mounted upon a vertical shaft 70 supported in a forked frame 71 having a lower horizontally extending arm 72 and an upwardly and forwardly extending arm 73, this frame at the junction of the arms 72 and 73 having a longitudinally extending prolongation or shank 74. The lower arm 72 is hinged at 75 to one of the cross ties 76 of the track, and beneath the frame 71 the earth is dug away to form a pit 77 into which the frame 71 may move to thus carry the spool 69 and the arm 73 downward so far that they will be below the lowermost portion of the transporter and thus permit the transporter to pass over this guide spool 69 and frame 71.

It will be seen from Figure 6 that this frame has a generally triangular shape with the hinges 75 at the corners of the triangle, and the spool 69 at the apex of the triangle but any other suitable form may be used. For the purpose of raising or lowering the spool I provide a cable 78 which is attached to the end of the arm 74 and passes over a pulley 79. This cable 78 passes through an opening in the cross tie 80 which is laid at a suitable point over the ties 80 upon which the rails 10ª and 11ª are disposed. After the cable passes over the grooved pulley 79, the cable 78 passes into the machine room 26 and onto a grooved wheel 82. This wheel is rotatably mounted in any suitable manner and the cable 78 is attached to the wheel at one point in its diameter. The wheel is designed to be oscillated in one direction to wind up the cable 78 upon the wheel by means of a friction wheel 83. This is mounted upon a shaft 84 for longitudinal shifting action and is shifted by means of a shipper lever 85 into or out of engagement with the pulley. This shaft 84 may be connected to the motor 38 in any suitable manner.

The wheel 82 is designed, as before remarked, so as to carry the point of attachment of the cable 78 through 180° and the take-up of the cable 78 caused by the oscillation of the shaft 82 in this direction should be sufficient to draw the frame 71 from its position at the bottom of the pit 77 into its horizontal position. The semi-periphery of the wheel 82 must, therefore, be equal in length to the depth of the pit 77.

Projecting laterally from the wheel 82 at the point of attachment of the cable 78 thereto is a stud 86. Disposed tangentially with relation to the periphery of the wheel 82 is an upright 87 which carries upon it a stop 88 which extends across the face of the wheel 82 and against which the stud 86 will bear or strike when the wheel 82 has made a semi-revolution. This stop 88 is pivoted at 89. Mounted upon this support 87 and upon the support 90 is a bolt 91 which is urged by a spring 92 into position across the face of the wheel 82 but which is held back out of its projected position by means of a locking pawl 93. This locking pawl is connected by a link 94 to the stop lever 88, and the lower end of the link 94 is connected by means of a spring 99 with the member 87. Attached to the bolt 91 is an operating cord 100 having a handle 101 passing over a pulley 102 so that when this operating cord is pulled the bolt 91 will be retracted.

The operation of this portion of the mechanism is as follows: When a transporter moves up the branch tracks 10^b and 11^b and is about to strike the guide spool 69, the handle 101 is pulled, which retracts the bolt 91 which is at this time projecting over the stud 86. As soon as this is retracted against the force of the spring 97 it will be caught by the pawl 93 and at the same time the strain on the cable 78 will cause the rotation of the wheel 82 in a counterclockwise direction, thus dropping the frame 71 into the pit 77, thus moving the frame 71 with the spindle or spool 69 out of the way of the transporter. The guiding pulley or spool 69 is used when the transporter has been drawn up onto the switch tracks 10^a and 11^a and then is about to be guided along onto the tracks 10^b and 11^b. This spool is then raised but is lowered immediately that the transporter reaches the spool and then is again raised after the transporter has passed onto the rails 10^b and 11^b and then holds the cable 25 at the middle of the tracks 10^b and 11^b while the transporter is passing down these branch tracks to the upper canal or basin. It is also, of course, used when the transporter is being drawn upward along these branch tracks 10^b and 11^b and is dropped just as the transporter enters upon the tracks 10^a and 11^a and remains dropped while the transporter is passing along the tracks 10^a and 11^a and onto the tracks 10 and 11 and down these tracks, as it is not used except when the transporter is moving on the tracks 10^b and 11^b.

For the purpose of counterbalancing the transporter and thus relieving the strain on the motor, I provide a counterbalancing drum, designated 103, (see Figure 9) which is mounted upon a shaft 104 extending parallel to the shafts 32 and 28. This drum is fast upon the shaft 104 and is controlled by means of a brake band 105 or any other suitable brake. A counterweighting cable 106 is wound upon the drum, this cable being connected to a counterweight 107 mounted upon a carriage of truck 108. The shaft 104 is driven by means of a sprocket wheel 109 mounted upon the shaft and over which passes a sprocket chain 110 which passes over the sprocket wheel 31. This sprocket wheel 109 is loose upon the shaft 104 but may be clutched thereto by means of the clutch member 111 operated by means of the shipper lever 112. Thus whenever it is desired to use the counterweight, the counterweight drum 103 may be readily connected with the drum 27, and when it is not desired to use the counterweight the clutch 111 is shifted to release the drum. Obviously the two drums 27 and 103 will so operate that the counterweight will go downward as the transporter moves up the track, and the counterweight will move up its track as the transporter moves down its track.

For the purpose of shifting the transporter longitudinally along the basin B and in a direction away from the inclined track C, I provide a hauling truck, which I will hereafter designate the puller, this hauling truck, as illustrated in Figure 5, comprising a body 113. This body 113 is mounted upon four wheels 114 which operate upon the tracks 11 and the body is held to these tracks 11 by a depending member 115 which has a roller 116 engaging beneath the head of the rail 11. This body 113 is connected to a cable 117 which passes around a pulley 118 operatively supported at the end of the basin remote from the incline C. To the opposite end of the body 113 is pivoted vertically shiftable draw bars 119 which at their ends are formed with hooks constituted by downwardly extending shoulders 120, the draw bars 119 having their ends upwardly curved, as at 121. These shoulders or hooks 120 engage with a transversely extending beam or like element 122 on the rear end of each transporter. The body 113 extends out beneath the draw bars 119 and acts to support the draw bars in a horizontal position, and pivoted upon the sides of the body and adapted to engage with the draw bars to lift them are bell crank levers 123. These bell crank levers are pivoted to the projecting portion of the body 113 and are so disposed that when the bell crank levers are turned with their arms 124 upward the hooked draw bars will be raised and when the arms 124 are turned into a horizontal position or nearly to a horizontal position, the bars will be lowered.

For the purpose of automatically turning these bell crank levers into their vertical position and thus lifting the hooked draw bars, I provide adjacent the beginning of the upwardly inclined portion C of the tracks

the stop irons 125 which have upwardly inclined forward ends 126. Springs 127 act to urge the depending arms of the bell cranks downward into a vertical position.

The cable 117 passes from the pulley 118, as previously described, and then passes over the guide pulleys 128 and 129 and then passes as, for instance, through a conduit 130 over a drum 131, then back along the track, and above the ties thereof to the forward end of the puller 113 to which it is attached at 132. Preferably the conduit 130 is divided into two parts by the separator 133 (see Figure 7) and the upper stretch of the cable 117 passes through the upper portion of the conduit, while the lower stretch passes through the lower portion. By operating the drum 131, it is obvious that the cable 117 may be shifted in either direction to thus pull the hauling carriage 113 either away from the inclined portion C of the track or toward the inclined portion of the track, as desired. This drum 131 is mounted upon a shaft 134 which, of course, is disposed within the operating room, and this shaft carries upon it the gear wheel 135 which meshes with a pinion 136 loosely mounted upon a shaft 137 extending parallel to the shaft 134.

Also mounted upon the shaft 134 is a sprocket wheel 138 over which passes a sprocket chain 139 to a sprocket wheel 140 loosely mounted upon the shaft 137. A shiftable clutch 141 is adapted, in an obvious manner, to connect either the sprocket wheel 139 with the shaft or the gear wheel 136 with the shaft so as to rotate the drum 131 either in one direction or the other. The shaft 137 is, of course, to be driven by power and is preferably formed in two sections, as heretofore described, and provided with a friction block or clutch 142. Either mounted above the shaft 137 or in any suitable relation thereto is a shaft 143, which shaft carries upon it a beveled gear wheel 144 which may mesh with the beveled gear wheel 145 mounted upon the shaft 137. It will be understood that any suitable gearing may be arranged between the shafts 137 and 143 so as to drive the shaft 143 from the shaft 137.

Extending parallel to the shaft 143 is a second drum shaft 134[a] carrying upon it a drum 131[a], and the mechanism connecting this shaft 143 with the shaft 134[a] is the same as that between the shaft 137 and the shaft 134 and, therefore, it is not believed necessary to recapitulate this description. Extending over the drum 131[a] is a cable 117[a], which cable is connected to a second hauling carriage or puller arranged for the branch basin or canal and operated precisely the same as the carriage 113, by the same mechanism, and in the same way.

In Figure 16, I have shown diagrammatically the manner in which the tracks and basins or canals would be used in crossing elevated country and carrying a vessel, for instance, from a river on one side of hills to a river or basin or any other port on the other side of the hills. It will be obvious that the mechanism which I have devised might be used in a large number of different situations either for crossing a slightly elevated country or for carrying ships around land through which a canal could not for some reason be built.

The operation of the device will be obvious from what has gone before. The vessel enters the lower canal which is immediately to one side of the basin B. As soon as it is desired to lift the vessel, the puller 113 is operated by means of the cable 117 and the winding drum 131 to draw the transporter from a position adjacent the incline C to the opposite end of the basin. Before the transporter is brought into position, however, the vessel is warped or otherwise shifted into position against the side wall 146 of the basin, as shown in Figure 13, and may be held to the posts 147 by cables. The transporter is then pulled by the hauling carriage 113 into position beneath the vessel, as shown in Figure 3. The vessel is then connected by means of the cables *d* to the post 16 and when the cable has been properly connected to the posts the strain is placed upon the cable 25 through the instrumentality of the power operated drum 27. This draws the transporter up the incline C and, of course, draws the vessel along with the transporter. When the transporter reaches the incline C, it rises and the bed formed of the members 21, 20 and 19 comes up beneath the bottom of the boat and as the transporter moves upward the boat is gradually lifted until eventually, and when the vertical members 12 have reached their vertical position, the boat is resting fully upon the bed or cradle and is only slightly supported, if at all, by the water. The transporter then moves up the incline to any desired distance.

It may be stated here that as the transporter moves over to the beginning of the inclined portion C, the draw bars 119 will be lifted by reason of the depending arms of the bell crank levers 123 striking the inclined faces 126 of the stop irons 125. This then releases the hauling carriage 113 from its engagement with the transporter. The transporter then moves up the incline C, as before stated, but the hauling carriage remains at the bottom of the incline ready for a descending transporter.

When the transporter arrives on the switch rails 10[a] and 11[a], the switch rails are shifted so as to align them with the branch rails 10[b] and 11[b]. The connection of the drum 27 with the power operated shaft 37[a]

is then made so as to unreel the cable 25 and the transporter with its load rolls down the inclined rails 10^a and 11^a and onto the rails 10^b and 11^b. As soon as the transporter has fully entered upon the rails 10^b and 11^b, the spindle or guide 69 is raised by pulling on the handle 101 and the cable 25, therefore, bends at the point 92 and is thus held at the middle of the branch track. The transporter with its load now rolls down the branch track 10^b and 11^b into the upper canal, which may be but a relatively short distance below the rails 10^a and 11^a. When it reaches a horizontal position, the second puller or hauling carriage which is on the branch track is in position to receive it, and as the transporter comes to this carriage the beam 122 strikes the upwardly inclined ends 121 of the draw bars 119 and lifts these draw bars up until the hooks 120 engage over the rim 122, then power is applied to the cable 117^a, and the carriage 113^a is drawn along the canal, taking with it the transporter, until a proper place is reached for the vessel to be released from its engagement with the posts 16, whereupon the vessel passes out from over the transporter and passes on into its berth or into the canal leading therefrom. The operator then reverses the drum 27, which draws the transporter back, and when the transporter reaches the upwardly inclined portion C, the bell crank lever 123 will again operate to release the transporter from its engagement with the hauling carriage 113^a. The transporter is then again drawn up upon the switch rails 10^a and 11^a and the switch rails are again turned into alignment with the rails 10 and 11, the guide spindle or spool 92 is depressed, and the transporter allowed to roll down the rails 10^a and 11^a and rails 10 and 11 into the basin B ready to receive another vessel from the canal A.

Obviously the transporter may be used for transporting boats from the high level to the low level as well as transporting boats from the low level to the high level.

I claim:—

1. A boat transporting system including a lower basin, an upper basin, rails extending upward at an inclination to the level of the upper basin, switch rails extending upward from the upper ends of the main rails, branch rails extending downward to the upper basin and with which the switch rails are adapted to align, means for shifting the switch rails from the main rails to the branch rails and vice versa, a boat transporter moving over the rails, a cable attached to one end of the transporter and extending up said inclined track, a winding drum disposed above the inclined switch rails and with which said cable is connected, means for applying power to the transporter to wind up or unwind the winding drum, and a guide spool movable into or out of the path of movement of the transporter and disposed at the middle of the switch track at the entrance end thereof whereby to cause the cable to flex at this point and permit the cable to extend down the middle of the branch track.

2. A boat transporting system including a lower basin, an upper basin, rails extending from the lower basin upward toward the upper basin lower basin, switch rails extending upward from the upper ends of the main rails, branch rails extending downward to the upper basin and with which the switch rails are adapted to align, means for shifting the switch rails from the main rails to the branch rails and vice versa, a boat transporter moving over the rails, a cable attached to one end of the transporter and extending up said inclined track, a winding drum disposed above the inclined switch rails and with which said cable is connected, a guide spool movable into or out of the path of movement of the transporter and disposed at the middle of the switch track at the entrance end thereof whereby to cause the cable to flex at this point and permit the cable to extend down the middle of the branch track, a pit beneath the spool, a hinged frame supporting the spool and movable with the spool down into the pit, manually controlled power operated means for raising the frame and locking it in its raised position, and manually operable means for releasing said locking means to permit the frame to drop into the pit.

3. A boat transporting system including a basin, a track extending horizontally along the basin and then upward and out of the basin at an inclination thereto, a boat transporter moving on the track and having a boat-supporting bed, a cable connected to one end of the boat transporter whereby it may be hauled up the inclined track or lowered down the same, and a power operated puller operating on the horizontal portion of the track and adapted to haul the transporter along the horizontal portion of the track away from the inclined portion thereof.

4. A boat transporting system including a basin, a track extending horizontally along the bottom thereof and then upward and out of the basin at an inclination thereto, a wheeled transporter movable along the track and having boat-supporting means thereon, a winding mechanism disposed at the top of the inclined portion of the track, a cable extending from the winding mechanism down the inclined portion of the track and connected to the adjacent end of the transporter, and a power operated hauling carriage operating on the horizontal portion of the track and movable therealong

in either direction and having means for automatically engaging one end of the transporter when the transporter is at the lower end of the inclined portion of the track.

5. A boat transporting system including a basin, a track extending horizontally along the bottom thereof and then upward and out of the basin at an inclination thereto, a wheeled transporter movable along the track and having boat-supporting means thereon, a winding mechanism disposed at the top of the inclined portion of the track, a cable extending from the winding mechanism down the inclined portion of the track and connected to the adjacent end of the transporter, a power operated hauling carriage operating on the horizontal portion of the track and movable therealong in either direction and having means for automatically engaging one end of the transporter when the transporter is at the lower end of the inclined portion of the track, and means causing the disengagement of the puller from the transporter when the transporter has been drawn by the cable toward the inclined portion of the track and has reached the foot of said inclined portion.

6. A boat transporting system including a basin, a track extending horizontally along the basin and then upward and out of the basin at an inclination thereto, a transporter movable over the track, a winding device mounted at the upper end of the inclined portion of the track, a cable extending from the winding device downward to the transporter and operatively connected thereto whereby the transporter may be drawn up the inclined portion of the track or lowered down the same, and power operated means for shifting the transporter along the horizontal portion of the track in said basin away from the inclined portion.

7. A boat transporting system including a basin, a track extending horizontally along the basin and then upward and out of the basin at an inclination thereto, a transporter movable over the track, a winding device mounted at the upper end of the inclined portion of the track, a cable extending from the winding device downward to the transporter and operatively connected thereto whereby the transporter may be drawn up the inclined portion of the track or lowered down the same, power operated means for shifting the transporter along the horizontal portion of the track in said basin away from the inclined portion including a carriage movable on the track and having pivoted draw bars at one end, the draw bars being hooked to engage over a portion of the carriage, an endless cable attached to opposite ends of the carriage, winding means for the endless cable, means for releasing the draw bars from engagement with the transporter comprising bell crank levers pivoted upon the carriage, each having a depending arm and an arm extending beneath the corresponding draw bar, and members disposed at the beginning of the inclined portion of the track with which the depending arms of the bell crank levers are adapted to engage to thereby shift the bell crank levers to raise the draw bars.

In testimony whereof I hereunto affix my signature.

JOHANN JURGEN RICHARD HAALCK.