

B. F. JACOBS.
BOAT PROPELLING MECHANISM.
APPLICATION FILED MAR. 19, 1909.

939,028.

Patented Nov. 2, 1909.

3 SHEETS—SHEET 1.

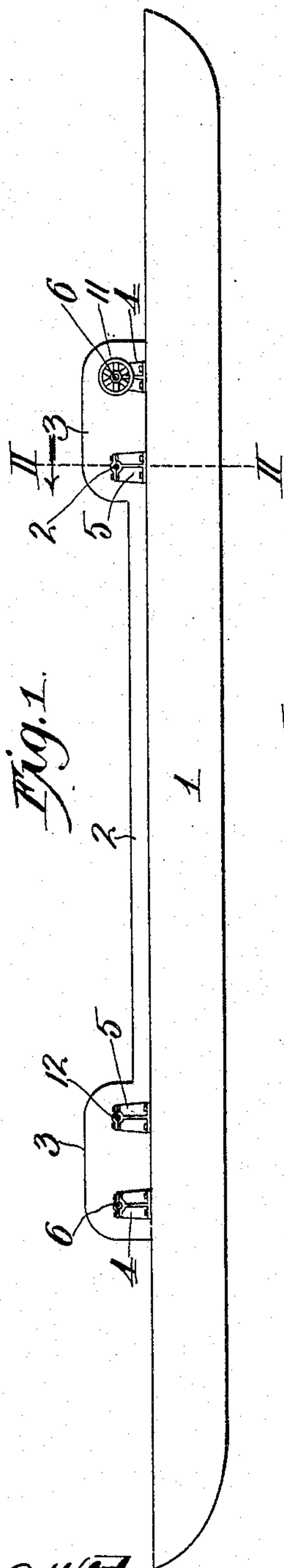


Fig. 1.

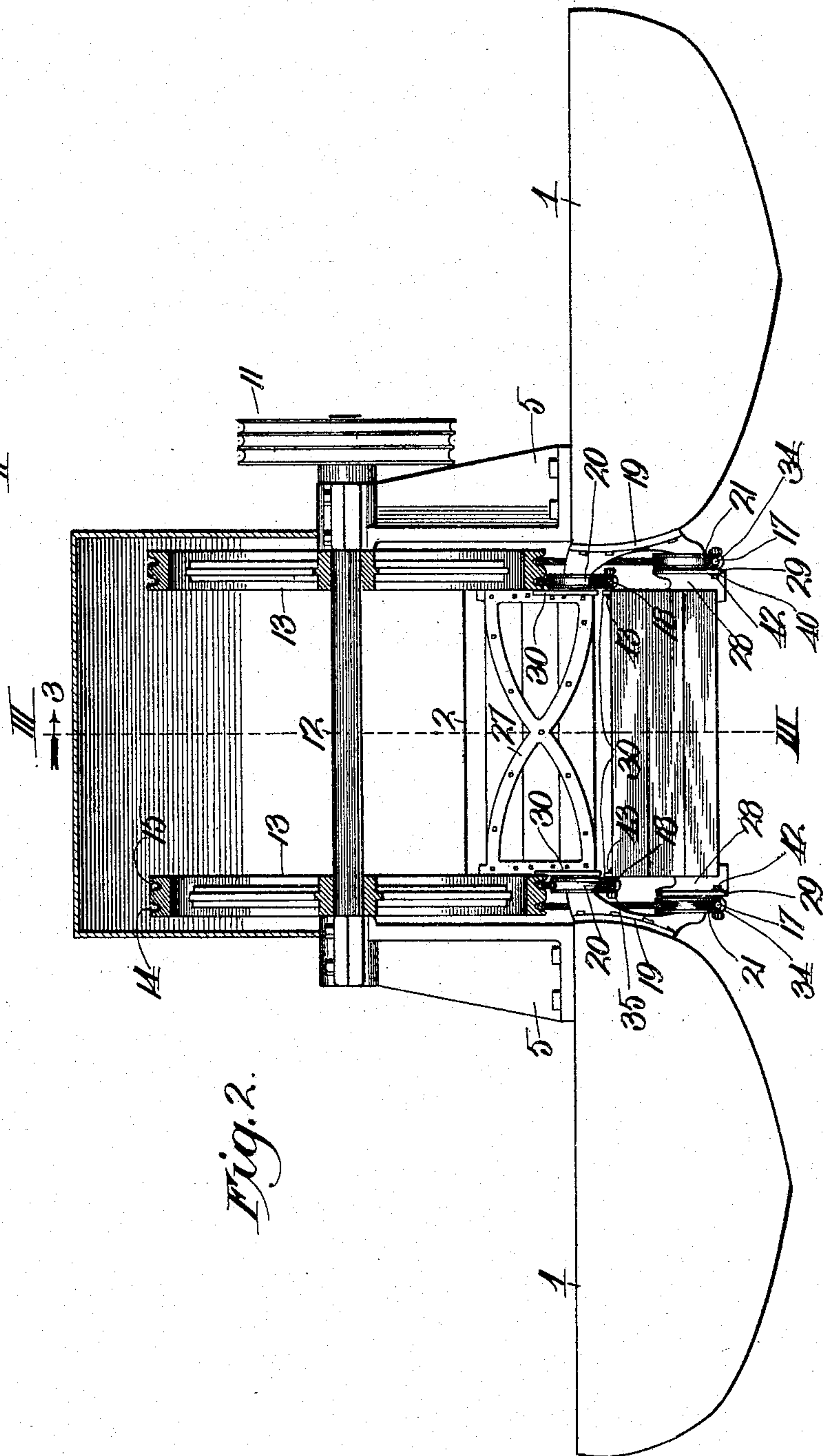


Fig. 2.

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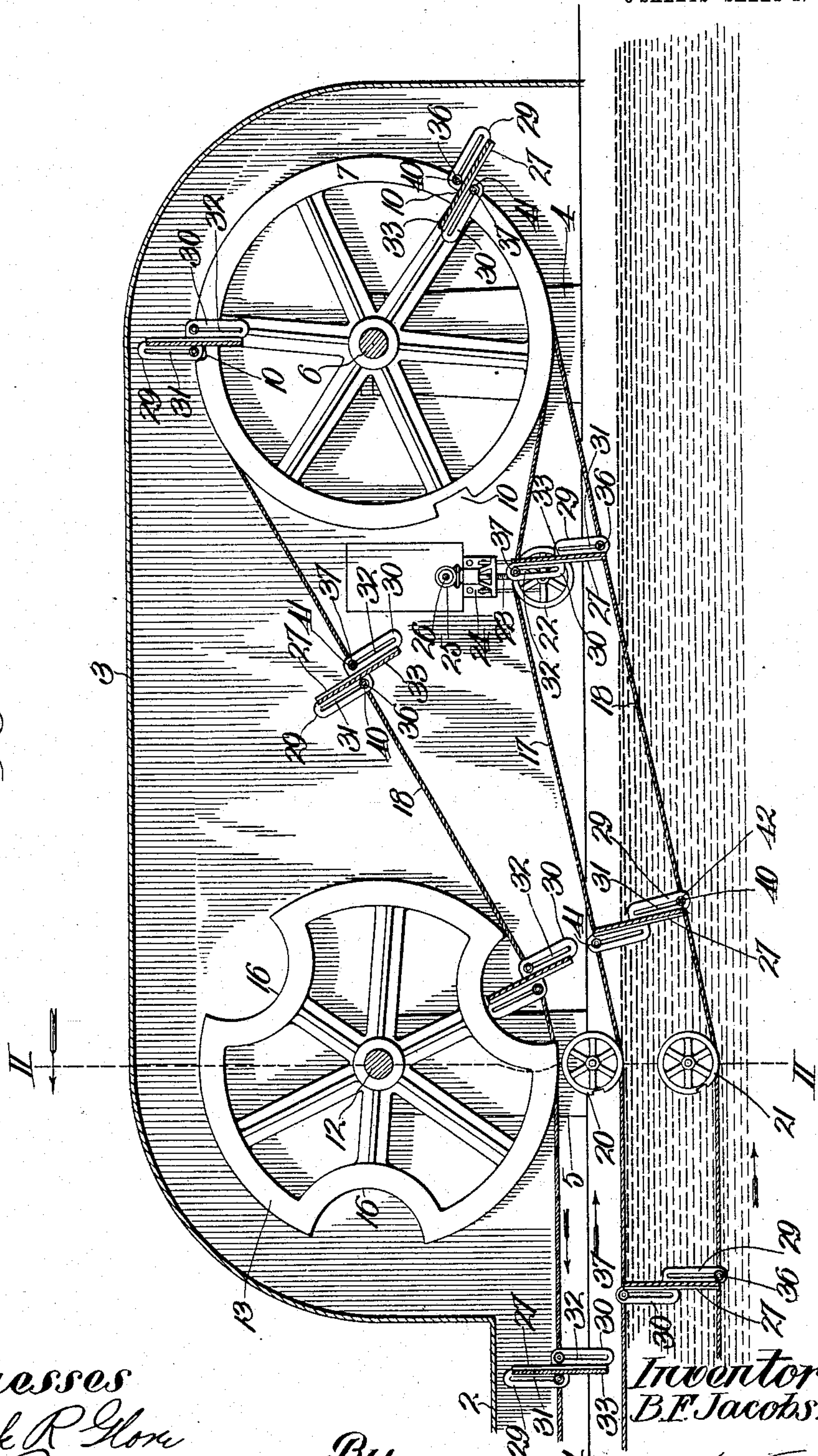
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Fig. 3.



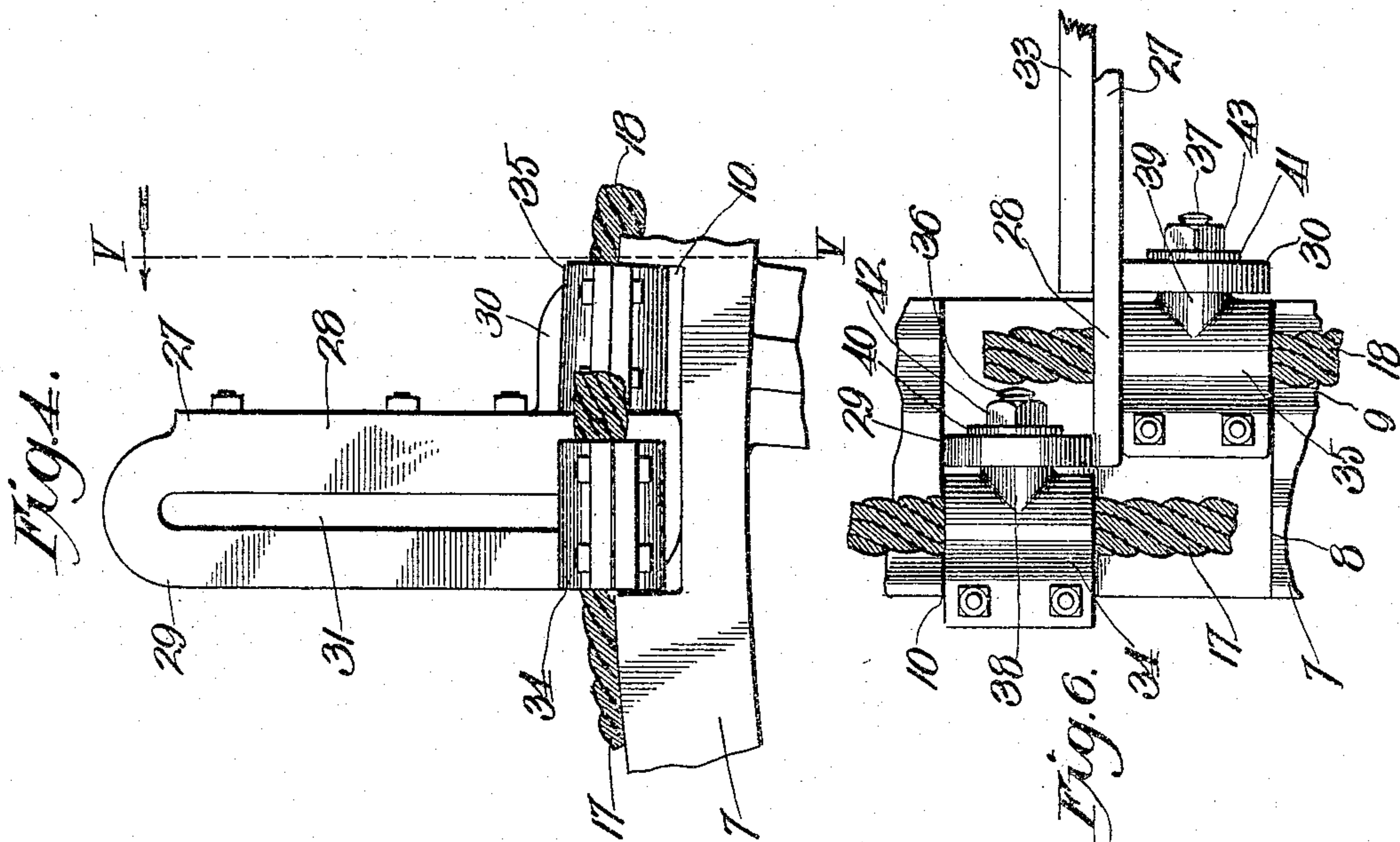
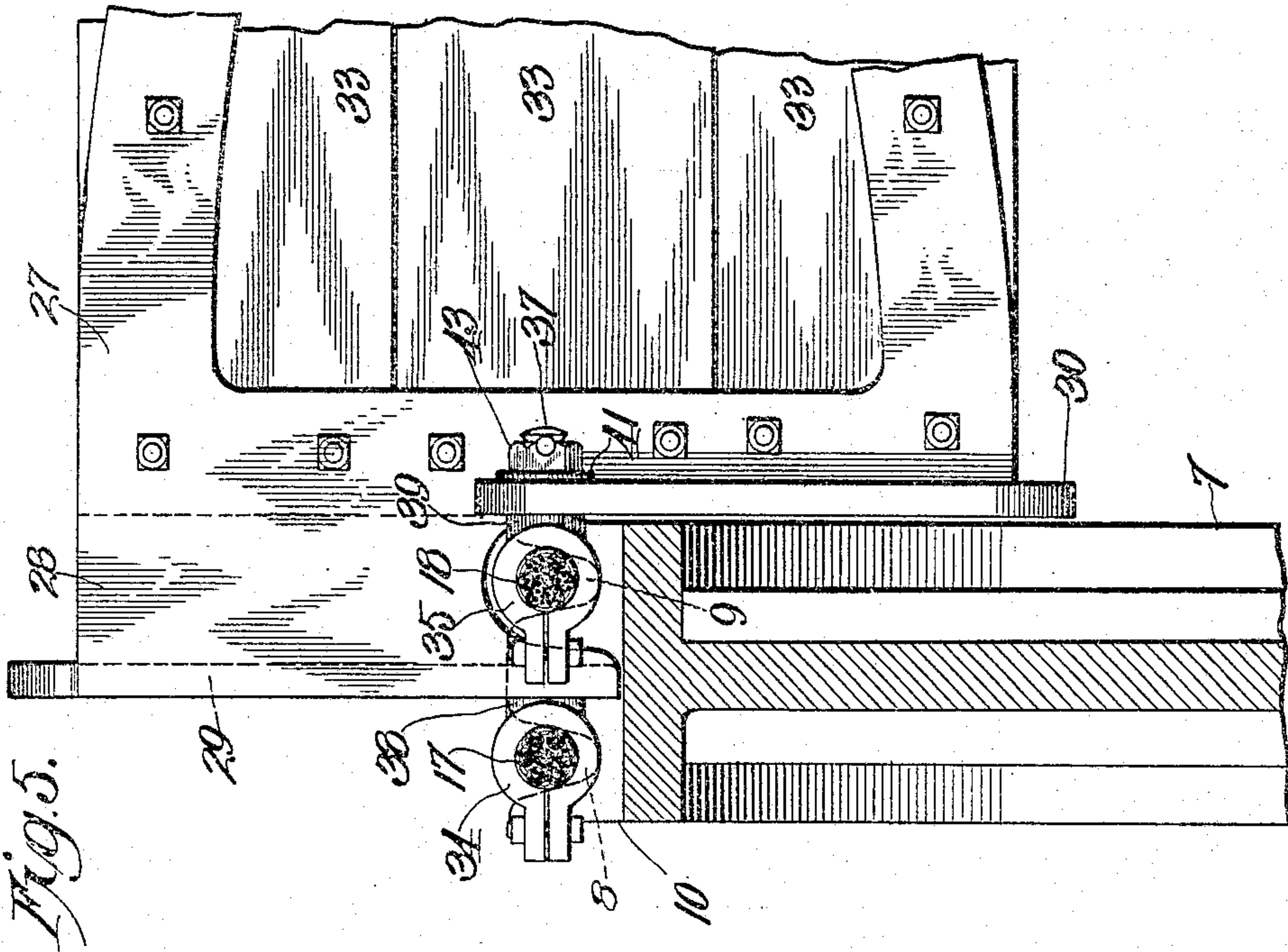
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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BOAT-PROPELLING MECHANISM.

939,028.

Specification of Letters Patent.

Patented Nov. 2, 1909.

Application filed March 19, 1909. Serial No. 484,558.

To all whom it may concern:

Be it known that I, BENJAMIN F. JACOBS, a citizen of the United States, residing at Independence, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Boat-Propelling Mechanism, of which the following is a specification.

This invention relates to boat propelling mechanism and my object is to produce a mechanism of this character which will operate efficiently and reliably and, irrespective of the depth of the water, utilize the resistance of a large area of water surface in the propulsion of the boat.

A further object is to produce a mechanism of this character, employing a plurality of paddles adapted to enter and leave the water with the least possible friction and to press rearwardly against the water from the moment they enter to the moment they emerge from it.

A still further object is to produce a boat propelling mechanism of simple, strong, durable, compact and inexpensive construction, which can be employed with equal facility in propelling the boat in either direction.

With these and other objects in view as hereinafter appear, the invention consists in certain novel and peculiar features of construction and organization as hereinafter described and claimed; and in order that it may be fully understood reference is to be had to the accompanying drawings, in which;

Figure 1, is a side elevation of a boat equipped with propelling mechanism embodying my invention. Fig. 2, is an enlarged section on the line II—II of Fig. 1. Fig. 3, is a fragmentary vertical section on the line III—III of Fig. 2. Fig. 4, is an enlarged side view of the upper part of one of the cable wheels, and a paddle in the act of passing over said wheel. Fig. 5, is a vertical section on the line V—V of Fig. 4. Fig. 6, is a plan view of the construction disclosed by Figs. 4 and 5.

In the said drawings, a suitable boat for traveling in shallow water, preferably of the catamaran type, is employed, 1 indicating the parallel float-members and 2 the cross-deck connecting them, which deck is preferably raised above the floats and at its ends is arched to a higher plane at 3.

4 and 5 indicate bearing standards mount-

ed upon the floats in the sides of the arched portions 3 of the deck, the standards 5 being located inward of or between standards 4, and journaled in the latter are transverse shafts 6 equipped within the arched portions of the deck and near the sides thereof, with wheels 7 provided peripherally with parallel grooves 8 and 9 and at suitable intervals with peripheral notches 10. Externally and at opposite sides of the arched deck, by preference, shafts 6 are equipped with wheels 11 to which motion is adapted to be imparted in any suitable or preferred manner, it being preferred that shafts 6 be independently driven to equalize the strain as far as possible, on the cables of the propelling mechanism, hereinafter described.

Extending through the arched portions of the deck parallel with shafts 6 are shafts 12 journaled in bearing standards 5 and equipped with wheels 13, longitudinally alined with wheels 7 and of the same diameter, and like the latter, provided with peripheral grooves 14 and 15 in the vertical planes of grooves 8 and 9, wheel 13 being also provided with large semi-circular equidistant recesses 16 in its periphery, corresponding in number to notches 10 of wheels 7.

17 and 18 indicate outer and inner endless connections or cables between wheels 7, with their upper strands engaging grooves 14 and 15 of and bent or deflected downward by wheels 13. From one of said wheels 13 to the other, said strands extend horizontally or substantially so, and outward of said wheels said cables respectively engage grooves 8 and 9 of wheels 7. For the purpose of maintaining the lower strands of said cables between wheels 13 substantially parallel, with the said strands of cables 17 in substantially the plane of the surface of the water and the said strands of cables 18 submerged a predetermined distance in the water, the inner sides of the floats are equipped with brackets 19 carrying peripherally notched and grooved idler wheels 20 and 21, the former overlying and engaging cables 17 and the latter overlying and engaging cables 18. Because of this variation in the height of the lower strands of the cables which are of uniform length it is necessary to deflect or bend the lower strands of cable 17 upward between wheels 7 and 13. To accomplish this I provide peripherally-notched idler wheels 22 to underlie

and engage said strands, said idler wheels 22 being carried at the lower ends of vertical worm-shafts 23 mounted in suitably supported brackets 24 and engaged at their upper end by gear-wheels 25 on transverse shafts 26 adapted to be turned by means of cranks, not shown, or otherwise, for the purpose of adjusting wheels 22 vertically.

Referring now to the paddles, 27 is a skeleton metallic frame provided for about one-half its height with arms 28 at each end, and provided at the outer edges of said arms with flanges 29 disposed apart a distance corresponding to that between the centers of the pairs of wheels 7, said flanges projecting in the same direction from the said arms. Projecting from the frames inward of said arms 28 and in the opposite direction to flanges 29 are flanges 30 disposed apart to pass or swing between said pairs of wheels 7. The flanges 29 are provided with longitudinal slots 31 and flanges 30 with longitudinal slots 32, and secured to the frames 27 are boards 33 which with said flanges, form the paddles, though it will be apparent that said frames may be of imperforate or non-skeleton form and thus render unnecessary the use of boards.

For the purpose of securing the paddles reliably to the cables at a distance apart corresponding to that between notches 10 of wheels 7, split sleeves 34 and 35 are clamped firmly upon cables 17 and 18 respectively, said sleeves being provided with bolt-extensions 36 and 37 extending slidably through the slots of flanges 29 and 30 respectively, the sleeves being formed with shoulders 38 and 39 to bear against the outer sides of the flanges and with washers 40 and 41 to engage the inner sides of the flanges, nuts 42 and 43 engaging the inner ends of the bolt-extensions to retain the latter in position and thus cooperate with the said shoulders 38 and 39 in maintaining the paddles in proper operative relation to the cables. In practice the paddles will stand at right angles to the cables and when supported wholly by the upper strands thereof the tension of the cables will guard against rocking movement of the paddles, it being noticed by reference to Fig. 3 particularly, that when carried by the upper strands of the cables the paddles are centrally disposed, that is project an equal distance above and below the cables, it being further noticed that it is impossible for the paddles to assume any other relation unless the cables are spread apart, one upwardly and the other downwardly in order to cause the bolts 36 to slide downwardly in slots 31 and bolts 37 to slide upwardly in slots 32, as shown below wheels 7 and 13.

Assuming that the parts are properly assembled and that motion is imparted to the cables in the direction indicated by the ad-

jacent arrows, Fig. 3, it will be seen that the upwardly-projecting portions of the paddles will be accommodated by the recesses 16 in wheels 13 as they pass down under one set of said wheels and upwardly from under the corresponding wheels at the other end of the deck, which wheels are not shown because they are of precisely the same construction and arrangement as those disclosed in Figs. 2 and 3. It will be noticed that as said paddles pass between the wheels 7 at the corresponding end of the deck, the portions of the paddles will pass between said wheels, transversely aligned notches 10 of the latter receiving the sleeves 34 and 35, the bolt-extensions thereof and the adjacent ends of arms 28, as will be readily understood by reference to Sheet 3. After the paddles pass around said wheels 7, the lower strands of the cables diverge and as a result the bolt-extensions 36 and 37 are caused to slide downwardly and upwardly respectively in slots 31 and 32, in which position it will be apparent power is applied at the upper and lower corners of the paddles to cause them to press rearwardly against the water and therefore impart forward movement to the boat. It will be noticed that the paddles pass edgewise into the water and thus enter the same with the least possible resistance and begin to impose rearward pressure thereon immediately, such pressure being gradually increased until the paddles are fully submerged, in which position they continue to be driven until they pass from under the wheels 13 at the opposite end of the deck, after which the pressure is gradually diminished as they rise vertically out of the water and pass up around the wheels 7 at the corresponding end of the deck, it being understood that as they effect such passage, sleeves 34 and 35 and the juxtaposed parts hereinbefore mentioned, are accommodated by the notches 10 in said wheels, and from the latter the paddles pass downward and as before explained under the adjacent wheels 13, all subsequent operations being repetitions of those described.

The notches in wheels 7 not only receive and thus accommodate the sleeves and juxtaposed parts as explained but incidentally act to increase the traction of the cables on the wheels and thus guard against any slippage of either, and in this connection it is desired to state that the notches in the idler wheels are likewise intended for the reception of the sleeves and parts, as otherwise there would be danger of the dislocation of the cables as the paddles passed such wheels.

It will be apparent of course that the propelling mechanism is capable of operating in either direction and hence will be found of great advantage in connection with ferry boats to enable them to run back and forth across a river or body of water without the

necessity of turning. By the proper construction and arrangement of the paddles and cables, driving and deflecting wheels of relatively small diameter may be employed
 5 so as to produce a mechanism as a whole of small, compact and economical construction. A boat equipped with this mechanism will utilize practically the full power imparted to it as it obtains an extended leverage and
 10 powerful purchase on the water and operates with a minimum of friction. It will be found extremely favorable for towing barges.

From the above description it will be apparent that I have produced a boat propelling mechanism especially well adapted for
 15 shallow water navigation, embodying the features of advantage enumerated as desirable and which is susceptible of modification in various particulars without departing from the spirit and scope of the ap-
 20 pended claims.

Having thus described the invention what I claim as new and desire to secure by Letters-Patent, is;

25 1. A boat, pairs of peripherally-grooved wheels carried thereby, sets of endless connections connecting said wheels and engaging their grooves, grooved wheels between the first-named wheels for bending or de-
 30 flecting downward the upper strands of said connections and provided with peripheral recesses, guide sheaves below said recessed wheels for bending or deflecting downward the lower strands of one set of said connec-
 35 tions, guide sheaves occupying a lower plane than the first-named sheaves, for deflecting to a lower plane the lower strands of the other connections, means for deflecting up-
 40 ward the lower strands of the first-named connections between the first-named sheaves and the first-named wheels, and equi-spaced paddles adapted to pass between the mem-
 45 bers of each pair of wheels and carried by and bearing a slidable relation to the said flexible connections so as to be capable of projecting beyond opposite sides of the same when the connections are side by side and bridging the space between the connections when the latter occupy different horizontal
 50 planes; said paddles being adapted to occupy recesses of said recessed wheels in passing the same.

2. A boat, pairs of peripherally-grooved and notched wheels carried thereby, sets of
 55 endless connections connecting said wheels and engaging their grooves, grooved wheels between the first-named wheels for bending or deflecting downward the upper strands of said connections and provided with pe-
 60 ripheral recesses, guide sheaves below said recessed wheels for bending or deflecting downward the lower strands of one set of said connections, guide sheaves occupying a lower plane than the first-named sheaves for de-
 65 flecting to a lower plane the lower strands of

the other connections, means for deflecting the lower strands of the first-named connections upwardly between the first-named sheaves and the first-named wheels, equi-
 spaced paddles provided at opposite sides 70 with oppositely-extending slotted flanges, and sleeves secured to said connections and provided with bolt-extensions slidably engaging the slots of said flanges and adapted to engage notches of the first-named wheels 75 in passing around the same; each paddle being also adapted to project into recesses of the said recessed deflecting wheels in passing the same.

3. A boat, pairs of peripherally-grooved 80 and notched wheels carried thereby, sets of endless connections connecting said wheels and engaging their grooves, grooved wheels between the first-named wheels for bending or deflecting downward the upper strands of 85 said connections and provided with peripheral recesses, guide sheaves below said recessed wheels for bending or deflecting downward the lower strands of one set of said connections, guide sheaves occupying a 90 lower plane than the first-named sheaves for deflecting to a lower plane the lower strands of the other connections, means for deflecting the lower strands of the first-named con- 95 nections upward between the first-named sheaves and the first-named wheels, equi-spaced paddles extending from one set of the connections to the other and capable of passing between the first-named wheels and pro- 100 vided with arms to pass around said wheels and through the recesses of the recessed wheels and with oppositely-projecting flanges certain of which are adapted to pass between said wheels and the others around 105 the first-named wheels and through the recesses of the other wheels, a pair of sleeves secured rigidly to each connection at opposite ends of each paddle, provided with inwardly-projecting bolt extensions slidably engaging the aligned flanges, and means to 110 prevent the connections from swinging or bending outward from the ends of the paddle.

4. A boat, pairs of peripherally-grooved and notched wheels carried thereby, sets of 115 endless connections connecting said wheels and engaging their grooves, grooved wheels between the first-named wheels for bending or deflecting downward the upper strands of said connections, and provided with pe- 120 ripheral recesses, guide sheaves below said recessed wheels for bending or deflecting downward the lower strands of one set of said connections, guide sheaves occupying a lower plane than the first-named sheaves, 125 for deflecting to a lower plane the lower strands of the other connections, means for deflecting the lower strands of the first-named connections upward between the first-named sheaves and the first-named wheels, 130

equi-spaced paddles extending from one set of the connections to the other and capable of passing between the first-named wheels and provided with arms to pass around said wheels and through the recesses of the recessed wheels and with oppositely-projecting flanges, certain of which are adapted to pass between said wheels and the others around the first-named wheels and through the recesses of the other wheels, a pair of sleeves secured rigidly to each connection at opposite ends of each paddle, provided with inwardly-projecting bolt extensions slidably engaging the alined flanges, and nuts engaging the bolt extensions at the inner sides of the said flanges.

5. A boat, pairs of peripherally-grooved wheels carried thereby, and overhanging the water on which the boat floats, pairs of endless connections engaging said wheels, peripherally-notched sheaves engaging and depressing the lower strands of one pair of said connections, peripherally-notched sheaves engaging and depressing the lower strands of the other connections to a plane substantially below that of the lower strands of the first-named connections, paddles bridging the space between the pairs of connections and corresponding in width approximately to the space between the depressed lower strands of said connections, and means for slidably connecting the ends of said paddles to the adjacent pairs of connections so as to project beyond opposite

sides of said connections when transversely alined and bridging the space between said connections when spaced apart.

6. A boat, pairs of peripherally-grooved wheels carried thereby, and overhanging the water on which the boat floats, pairs of endless connections engaging said wheels, peripherally-notched sheaves engaging and depressing the lower strands of one pair of said connections, peripherally-notched sheaves engaging and depressing the lower strands of the other connections to a plane substantially below that of the lower strands of the first-named connections, paddles bridging the space between the pairs of connections and corresponding in width approximately to the space between the depressed lower strands of said connections, means for slidably connecting the ends of said paddles to the adjacent pairs of connections so as to project beyond opposite sides of said connections when transversely alined and bridging the space between said connections when spaced apart, and means to remove the slack from the first-named lower strands by deflecting them between the wheels and the first-named sheaves.

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

BENJAMIN F. JACOBS.

Witnesses:

H. C. RODGERS,
G. Y. THORPE.