

No. 731,110.

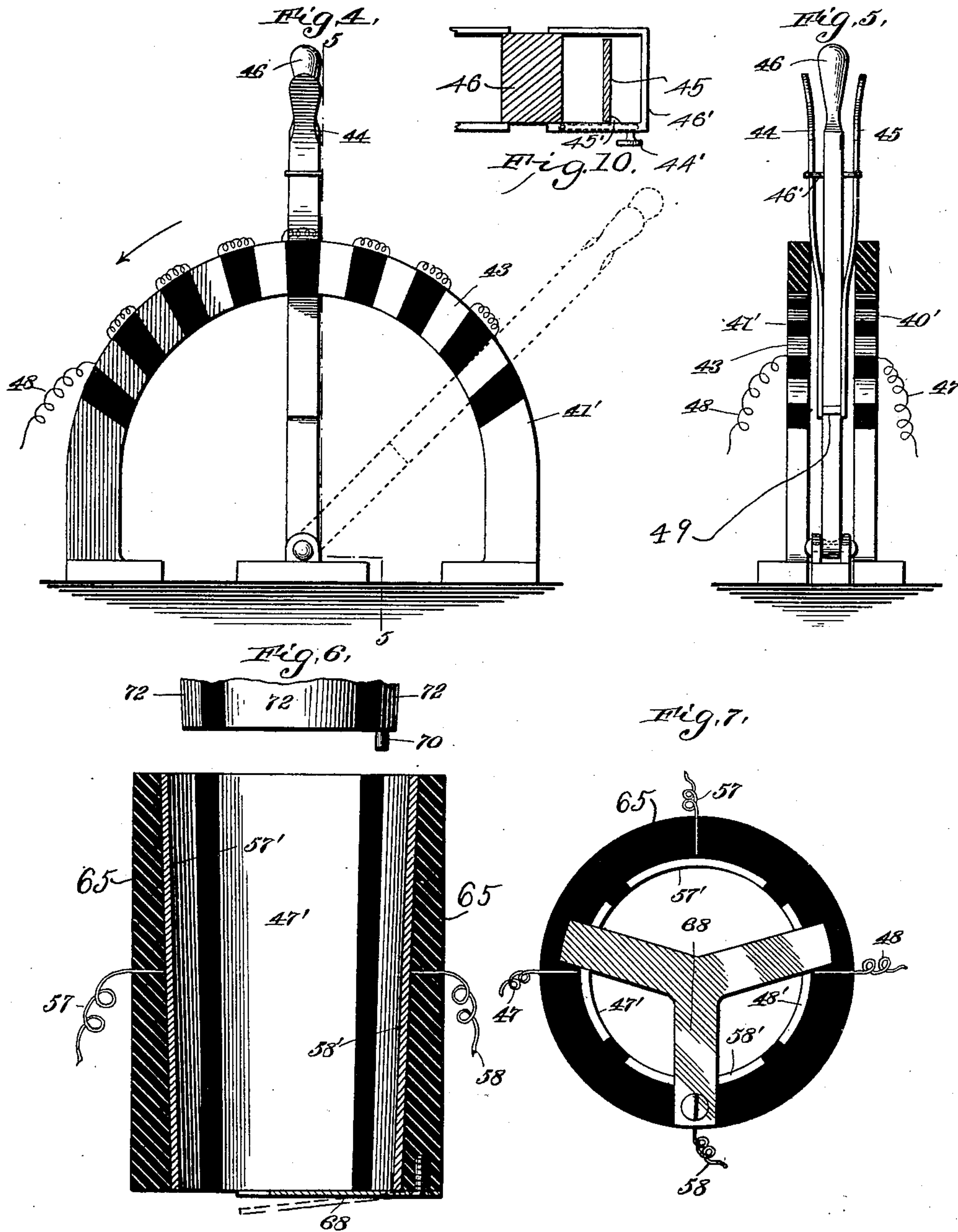
PATENTED JUNE 16, 1903.

I. H. LARR.
BARGE STEERING AND RETARDING MECHANISM.

APPLICATION FILED AUG. 2, 1902.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses
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J. M. E. Parker

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Fig. 8.

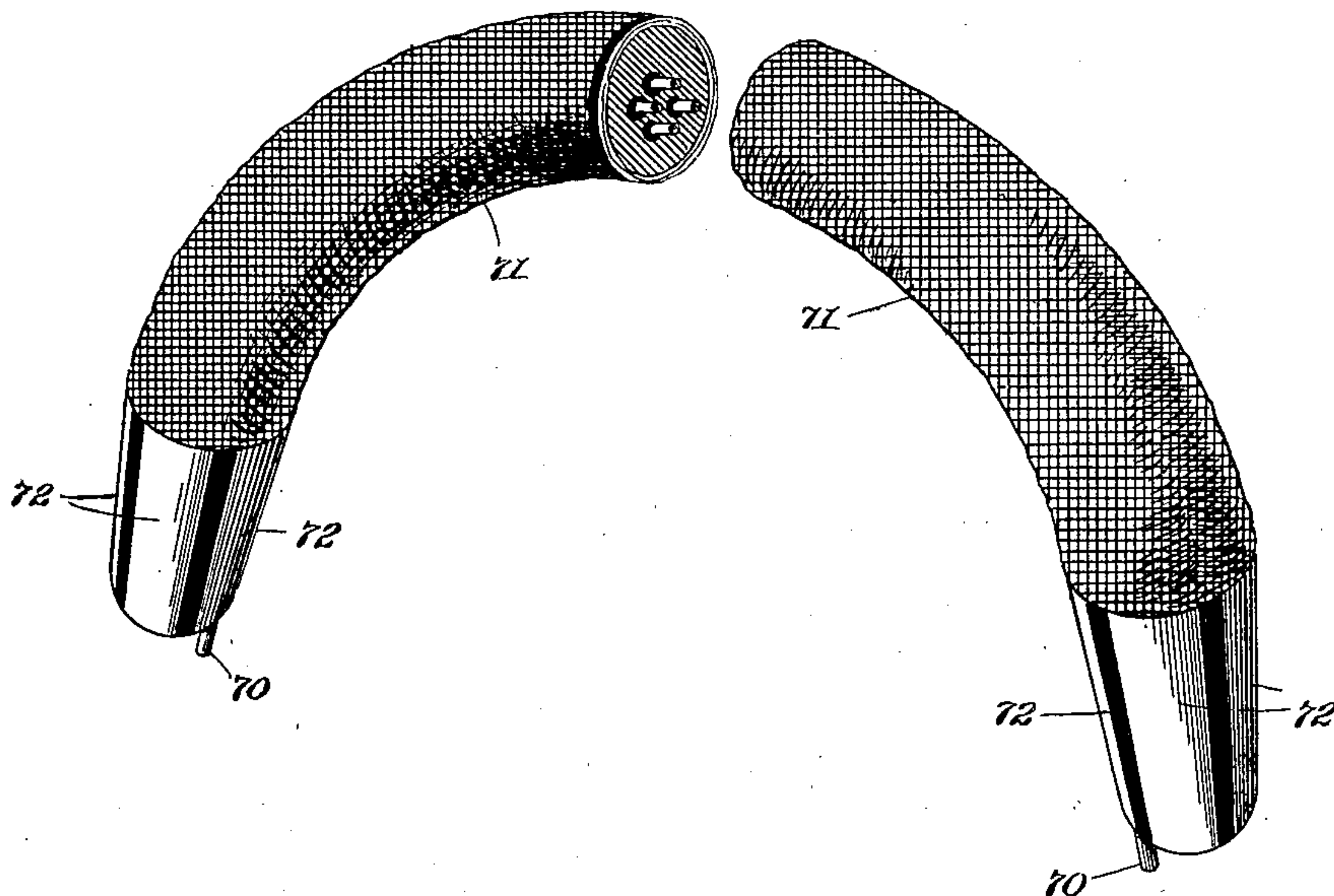
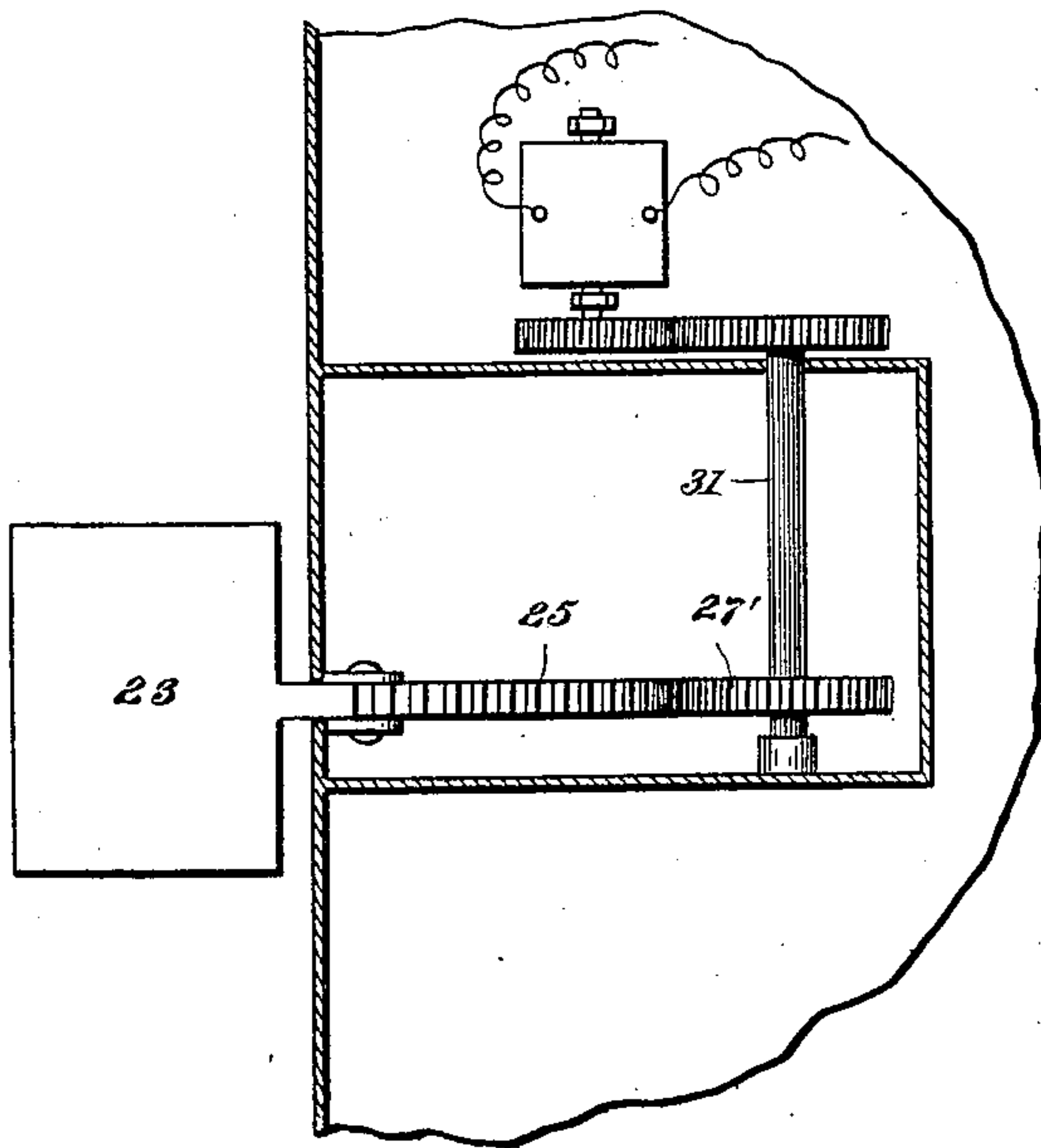


Fig. 9.



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UNITED STATES PATENT OFFICE.

IRA H. LARR, OF SULLIVAN, INDIANA.

BARGE STEERING AND RETARDING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 731,110, dated June 16, 1903.

Application filed August 2, 1902. Serial No. 118,145. (No model.)

To all whom it may concern:

Be it known that I, IRA H. LARR, a citizen of the United States, residing at Sullivan, in the county of Sullivan and State of Indiana, have invented a new and useful Barge Steering and Retarding Mechanism, of which the following is a specification.

My invention relates to certain improvements in mechanism for steering and for retarding the movement of a fleet of barges, and especially adapted for the control of a plurality of barges arranged in the form of a continuous train.

The principal object of the invention is to provide an improved form of steering and retarding mechanism on each of the barges of a fleet and to provide for the control of all of the mechanism from the tug or other towing vessel at the head of the fleet, so that the pilot may more readily control the movement of the fleet in narrow and winding channels than is the case where each barge is provided with an independent steering mechanism.

A still further object of the invention is to provide means whereby the actuating force employed for operating the said mechanism may be accurately regulated to cause such mechanism to move to a greater or less extent and to offer any desired amount of resistance to the water.

A still further object of the invention is to so arrange the couplings and connections on a continuous train of barges that the electrical current, which is the preferred form of power, will be closed when one of the barges is detached, so that the mechanism on the remaining barges will still be operatively connected to the towing vessel.

A still further object of the invention is to arrange the mechanism on each of the barges in such manner as to permit the pilot of the towing vessel to gradually check the speed of the train of barges without attempting to resist the movement of the train by backing the towing vessel, and thus preserve the barges in alinement as an anchorage is approached.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying draw-

ings, and particularly pointed out in the appended claims.

In the drawings, Figure 1 is a plan view illustrating a fleet of barges arranged in the form of a continuous train having a towing- steamer at the head and a tender at the stern of the line. Fig. 2 is a sectional plan view, on an enlarged scale, showing one of the steering and retarding devices. Fig. 3 is a similar view illustrating the steering and retard- ing blade opened out in operative position. Fig. 4 is a sectional elevation of the switch- lever for controlling the strength of electrical current transmitted to the blade-actuating motor. Fig. 5 is a transverse sectional ele- vation of the same on the line 5 5 of Fig. 4. Fig. 6 is a detail sectional view of one of the coupling-sockets employed to close the circuit automatically when one of the barges is de- tached from the line. Fig. 7 is an end view of the socket member, showing the arrange- ment of the automatic switch. Fig. 8 is a de- tail perspective view of one of the flexible coupling members employed to connect the line-terminals between adjacent barges. Fig. 9 illustrates a modification of the actuating mechanism for the steering devices. Fig. 10 is a detail view, on an enlarged scale, of a mechanism which may be employed for mov- ing one or other of the circuit-closers to inop- erative position.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The present invention aims principally to provide means for placing a fleet of barges more completely and thoroughly under the control of the pilot of the tug or other tow- ing vessel than is possible in the towing of barges as at present practiced.

In long-distance towing as at present prac- ticed the barges are connected in a continu- ous line to the towing vessel, but are sepa- rated from each other for a considerable dis- tance, each barge being provided with a rud- der and being separately steered to follow the course of the tug. In a winding channel it is extremely difficult for a barge, and especially an intermediate barge, to keep in proper po- sition behind the tug, owing to the strain ex-

erted by the following barge to which it is connected, and the head barge is always compelled to steer a trifle to one side of the current of water formed by the propeller of the tug. In carrying out the present invention these difficulties are overcome and the line of barges placed completely under the control of the pilot on the towing-steamer and without the necessity of increasing the crew of the steamer and at the same time dispensing with a separate crew for each of the barges. The barges are assembled much after the manner of a train of railway-cars in a continuous, but flexible, line, and each is provided with the steering and retarding mechanism forming the subject of the invention.

Referring to the drawings, 10 indicates a towing-steamer, 11 a barge, and 12 a tender. The bow of the tender and of each of the barges is rounded or substantially semicircular in form and adapted to fit into the concaved stern of the preceding vessel. Any number of barges may be employed and any suitable form of connections may be used to secure the barges to each other. To permit of the proper steering of the fleet, it is preferred to employ lines or chains 13, extending from the starboard quarter of one vessel to the port bow of a following vessel and from the port quarter of the first vessel to the starboard bow of the following vessel. This form of connection permits yielding of the line when it becomes necessary to navigate a winding channel.

In each side of each of the vessels is a recess 20, preferably in the form of a metallic box or casing 21, having upper and lower bearings for the reception of a vertically-disposed shaft 22, on which is mounted a preferably rectangular blade 23, which may be moved out from the side of the boat to retard the movement of the boat or to assist the same in turning. The outer or rear end of the blade is tapered slightly and fits, when the blade is in closed position, in a slight pocket formed by bending the casing 21 inwardly, as indicated at 24, so that the blade is flush with the side of the boat and will not act to retard the same. To the shaft and blade is secured a toothed segment 25, having at one side a narrow plate 26, which closes the contracted portion of the opening in advance of the shaft, so that when the blade is turned around to closed position the casing will be practically closed and no obstruction offered to retard the movement of the boat.

The casing 21 is provided with guiding-openings, preferably packed, as indicated in Fig. 2, through which passes a horizontal rod 27, having gear-teeth which intermesh with the teeth of the segment, and at a point outside the casing said rod is provided with gear-teeth intermeshing with a pinion 29, which is operatively connected to a motor, the latter being preferably an electric motor or a steam or compressed-air motor actuated from the

towing-steamer. This construction may be slightly modified, as shown in Fig. 9, wherein a pinion 27' is employed in lieu of the rod 27, said pinion being mounted on a shaft 31, connected by gearing to the motor 30.

The motors are preferably connected in two series, of which one connects all of the port motors on all of the vessels, while the starboard motors are connected in the second series. The pilot has switching mechanism under his control for simultaneously energizing all of the motors on one or other or both sides of the fleet and in this manner is enabled to project all of the blades on one side of the boat to turn the fleet in a corresponding direction, the barges being quickly responsive to a steering mechanism of this kind and permitting the turning of the fleet within its own length. The mechanism controlled by the pilot is so arranged that the strength of the current may be regulated to exercise greater or less force on the blades and offer a correspondingly greater or less resistance to the movement of the boat. When the blades on both sides are extended, the movement of the fleet is quickly checked and permits the safe anchoring of the fleet without distortion of the line, such as would result in an attempt to check the fleet by backing the tow-boat.

On the towing vessel is a suitable source of power, such as a storage battery, or, as illustrated in the present case, a steam-boiler 40, an engine 41, and a dynamo 42. The current-conducting wires from the dynamo lead to a switching mechanism of the character best shown in Figs. 4 and 5, wherein 40' and 41' designate two segmental bars, to which are secured a row of metallic blocks 43, adapted for contact with spring-arms 44 and 45 on the opposite side of a pivoted lever 46, formed of insulating material. The several blocks 43' on each of the segmental bars are connected in series with a number of resistance-coils, there being one of such coils between each two blocks, as indicated in Fig. 4. From each of the bars leads a current-conducting wire, the wire 47 being connected to all of the port motors and the wire 48 to all of the starboard motors, and both spring-arms are connected by a wire 49 to the dynamo or other source of electrical energy. When the lever is in the position shown in dotted lines in Fig. 4, the current from the dynamo to both sets of motors will be entirely cut off; but as the springs of the lever are moved into sliding engagement with the contact-blocks, the lever being traveled in the direction indicated by the arrow in Fig. 4, the resistance-coils will be sufficiently cut out and the effective strength of the current at the motors increased. The arms carried by the switch-lever are in the form of springs 44 and 45, held by guards 46', one of the guard-arms being provided with a spring-catch 45', which serves to hold the contact-arm in inoperative position

when it is desired to energize only one set of motors. The spring-guard is provided with a handled knob 44', by which the guard may be moved to releasing position and in this manner govern contact of the spring-arms with the contact-blocks, a current being directed to either the starboard or the port motors in order to turn the fleet in the desired direction. The pilot is thus enabled to energize one or other or both sets of motors, and the strength of the current may be accurately regulated to suit requirements.

At the stern of the fleet is a tender in which is placed a storage battery 60 to provide a source of power for the tender when separated from the fleet. The tender is provided with a rudder 50 and a screw 51, the rudder being preferably actuated by an electric motor 53, connected by a suitable conducting-wire and a switchboard 55 on the towing-steamer. The screw is provided with an auxiliary motor which may be energized by a current from the steamer, but is preferably so arranged as to be driven from the storage battery on the tender, the latter being used to tow the single boats of the fleet from a wharf or anchorage to the towing-steamer while the fleet is being assembled and to take single barges from the fleet to loading or unloading point. The several current-conducting wires 47, 48, 57, and 58 are all properly insulated from each other and extend from end to end of each barge under the deck or rail and terminate at each end of the barge in socket members of the character shown in Figs. 6 and 7. The socket is in the form of a hollow ring 65, of insulating material, in which are embedded four plates 47', 48', 57', and 58', the plates 47', 48', and 57' being connected, respectively, to the current-conducting wires and the plate 58' being connected to a return-wire 58, common to all of the circuits. One end of the socket member is flanged, so that it may be readily secured in position, and at the flanged end each plate terminates in an outwardly-bent end portion, as shown more clearly in Fig. 7. To the plate 58' is secured a metallic tongue 68, formed of spring metal and divided into a number of arms adapted to make contact with the remaining plates and close all of the circuits. When the boats are connected together, this circuit-closing tongue is held from contact with the several plates by a plug member 70, forming a part of a flexible connecting device 71. The connecting device 71 is in the form of a tube or other support, formed of rubber or other insulating material and adapted for the reception of sections of wire corresponding to the several wires on each of the boats. These wires terminate in projecting contact-plates 72, which when the plug is inserted in the socket come into contact each with one of the plates in the socket and connects the motor-circuit of the boat to the towing vessel. When any

barge is disconnected, the removal of the plug member permits the circuit-closing current to move into contact with the several plates carried by the socket and close the circuit, so that all of the boats remaining in the fleet may be operatively connected to the towing vessel.

If desired, a separate switch may be employed for each motor in the fleet, so that the pilot on the towing vessel may be able to operate any particular blade without moving the entire series.

In some cases the switch-lever may be yielding to such an extent as to enable one or other of the spring-contacts to be removed from engagement with its contact-block by merely pressing the lever to one side or the other.

It will be understood that while I have shown and described the employment of a dynamo any other form of energy—such, for instance, as a secondary battery—may be employed for operating the motor.

In the claims the term "towing-steamer" has been employed to designate the head vessel; but it will be understood that the vessel may be propelled by electrical or any other power without departing from the invention.

Having thus described my invention, what I claim is—

1. A fleet of vessels comprising a towing vessel and a line of following barges, steering and speed-retarding devices carried by each barge, and means for connecting such devices to the towing vessel.

2. A fleet of vessels comprising a towing vessel and a line of following barges, a steering device arranged at each side of each barge, and means for connecting all of the steering devices on the port side for simultaneous operation, and for connecting all of the steering devices on the starboard side for simultaneous operation.

3. A fleet of vessels comprising a towing vessel and a line of following barges, steering devices arranged on the port side of each barge and connected to the vessel for simultaneous operation, a series of steering devices arranged on the starboard side of the barges and connected to the vessel for simultaneous operation, and means for operating such steering devices either simultaneously or independent of each other.

4. A fleet of vessels comprising a towing vessel and a following line of barges, steering devices arranged on both sides of each barge, an independent motor for actuating each steering device, a source of electrical energy on the vessel with which the port and starboard motors are connected in two independent series, and a controlling-switch for energizing one or other or both series of motors.

5. A fleet of vessels comprising a towing vessel and a following line of barges, steering devices arranged on both sides of each barge,

motors for operating the steering devices, the motors of each side being connected in separate series, a source of electrical energy on the steamer, a switch for controlling the flow
5 of the current to the motors, and a variable resistance under the control of the switch.

6. In combination, a fleet of vessels comprising a towing vessel and a following line of barges, steering devices arranged on both
10 sides of each barge, an independent motor for actuating each steering device, a source of electrical energy on the vessel with which

the port and starboard motors are connected in two independent series, and means carried by each of the barges for automatically closing the circuits when a following barge is detached. 15

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

IRA H. LARR.

Witnesses:

P. H. BLUE,
M. COULSON.