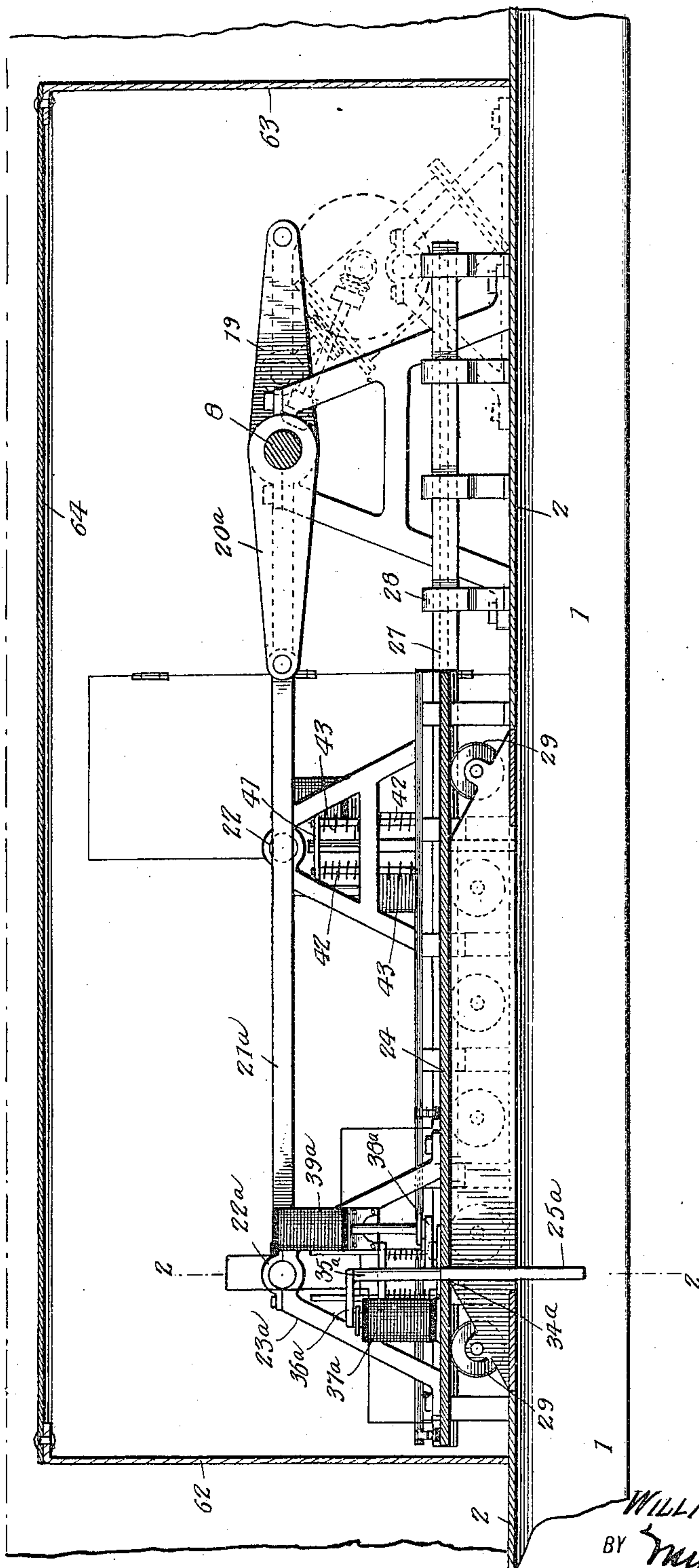


MEANS FOR THE PROPULSION OF VESSELS,  
APPLICATION FILED SEPT. 9, 1910.

Patented May 30, 1911.

3 SHEETS—SHEET 1.



WITNESSES:  
F. C. Barry  
L. S. Stanley

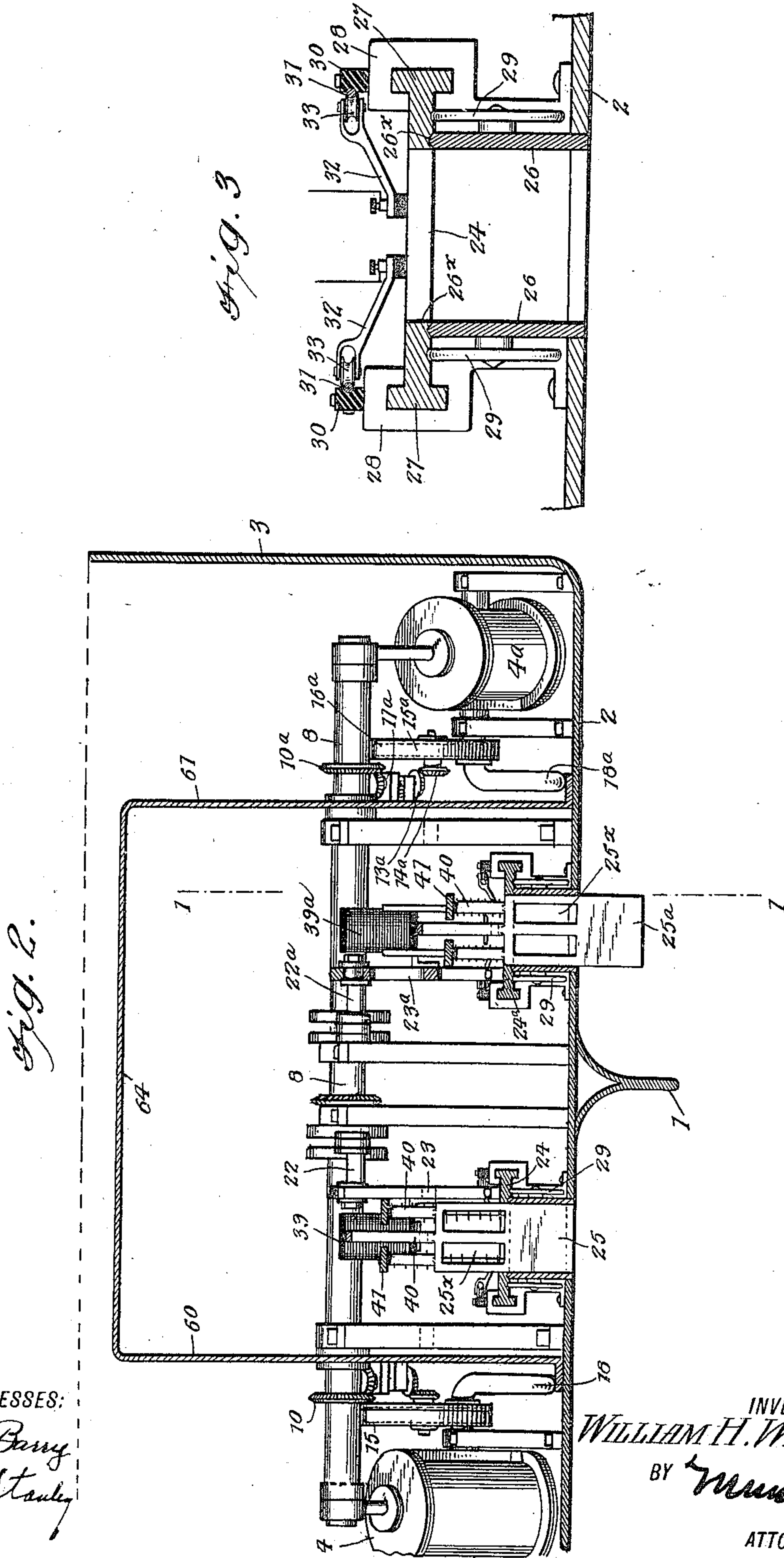
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3 SHEETS—SHEET 2.



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3 SHEETS-SHEET 3

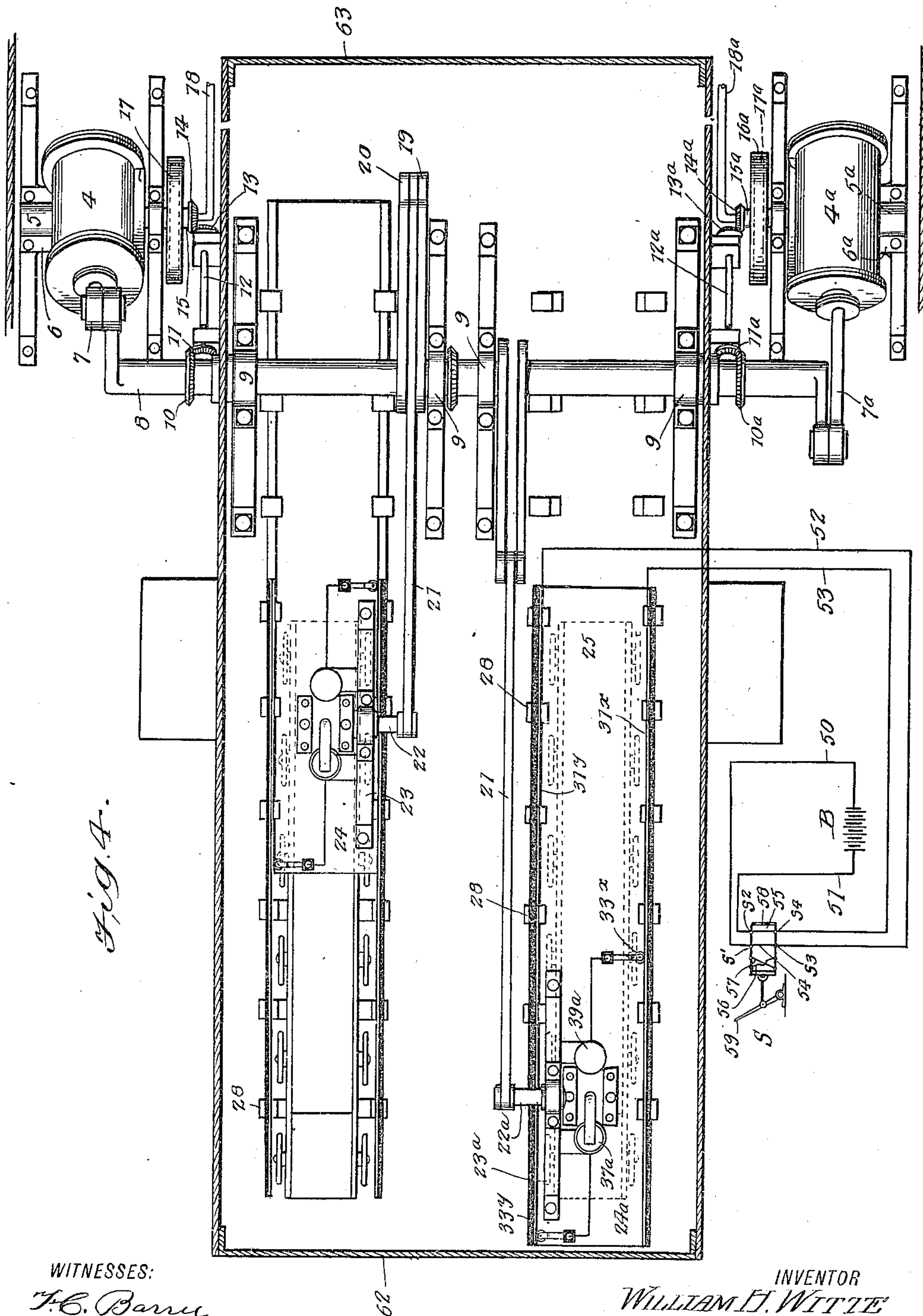


Fig. 4.

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# UNITED STATES PATENT OFFICE.

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MEANS FOR THE PROPULSION OF VESSELS.

993,933.

Specification of Letters Patent.

Patented May 30, 1911.

Application filed September 9, 1910. Serial No. 581,165.

*To all whom it may concern:*

Be it known that I, WILLIAM H. WITTE, a citizen of the United States, and a resident of Baltimore, in the State of Maryland, have made certain new and useful Improvements in Means for the Propulsion of Vessels, of which the following is a specification.

My invention relates to improvements in the means of propelling marine vessels, and it consists in the combinations, constructions and arrangements hereinafter described and claimed.

The invention consists in certain improvements over a somewhat similar device disclosed in a prior patent #516,419 of March 16, 1894.

One object of the present invention is to provide an improved form of slidable plate for carrying the driving pistons.

Another object of the invention is to do away with the friction caused by the use of inclosing pipes or chutes for the pistons.

Other objects and advantages will appear in the following specification and the novel features of the device will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this application, in which similar reference characters indicate like parts in the several views, and in which—

Figure 1 is a section along the line 1—1 of Fig. 2, Fig. 2 is a section along the line 2—2 of Fig. 1, Fig. 3 is an enlarged sectional view showing in detail the construction of the run-ways for the sliding plate, and Fig. 4 is a plan view of the sliding plates and the means for driving the same, the walls of the compressed air chamber being shown in section.

In the following specification, I shall refer briefly to those parts of the mechanism that have already been disclosed in my prior patent aforesaid, and which form no part of the present invention, and will describe at length the improvements which constitute the present invention.

Referring now to Fig. 1, I have shown therein a section of a ship or a vessel in which 1 denotes the keel, and 2 a section of the bottom part of the hull, a portion of the sides of which is shown in Figs. 2 and 3.

While I have shown a vessel having a particular form, it will be understood that other forms than that shown might be used,

without departing in the least from the spirit and the scope of the invention.

Referring now to Fig. 4, it will be seen that I have provided a pair of oscillating cylinders 4 and 4<sup>a</sup>, whose respective trunnions 5 and 5<sup>a</sup> are disposed in bearings 6 and 6<sup>a</sup>, respectively. The piston rods 7 and 7<sup>a</sup> are connected with the crank shaft 8, which is carried by the bearings 9. The crank shaft 8 is provided with a gear 10 arranged to mesh with a similar gear 11 on a shaft 12. This shaft is provided, at its opposite end, with a gear 13 arranged to mesh with a gear 14, on a sleeve 15 which enters a valve casing 16 in which there is a rotary valve 17, for supplying steam to the cylinder 4, the steam entering through a pipe 18 with which the valve is connected. This arrangement is fully described in my prior application above alluded to. On the opposite side is a similar arrangement consisting of the gears 10<sup>a</sup> and 11<sup>a</sup>, the shaft 12<sup>a</sup>, the gears 13<sup>a</sup> and 14<sup>a</sup>, the sleeve 15<sup>a</sup>, the valve casing 16<sup>a</sup>, valve 17<sup>a</sup>, and pipe 18<sup>a</sup>. The pipes 18 and 18<sup>a</sup>, Fig. 2, preferably join a common supply pipe, (not shown). Secured to the crank shaft 8 are the crank arms 19 and 20, which are pivotally connected with a pitman 21. The latter is in turn pivotally connected with an arm 22 carried by the uprights 23 borne by the sliding plate 24. In Fig. 1 a side view of the pitman 21<sup>a</sup> is shown, and the parts, 22<sup>a</sup>, 23<sup>a</sup>, and 24<sup>a</sup> are clearly illustrated. In the prior patent alluded to, the uprights, which corresponded to the members 23 and 23<sup>a</sup> were not as high as in the present device, for it will be noted that in the present disclosure the members 22 and 22<sup>a</sup> are practically in alignment with the crank shaft 8, as shown by Fig. 1. The pitmen 21 and 21<sup>a</sup> are connected with the crank arms at diametrically opposite points so that when the slide 24 is retracted the slide 24<sup>a</sup> is pushed forward and vice versa. In my former patent these slides were disposed in substantial alinement with the bottom of the vessel, at the top of downwardly extending tubes. In the present instance the plates are mounted at the top of the run-ways for the pistons or plungers 25 and 25<sup>a</sup> as shown in Figs. 2 and 3.

Referring now particularly to Fig. 3, I have shown therein a sliding plate 24, which rests on the top of the side members 26 and 27 of the run-way. The plate is provided



on each side with T-shaped flanges 27, which run in guide ways 28, so as to insure the proper running of the plate. In order to take the weight of the plate from the top of the side members 26 I provide the bearing wheels 29, which are secured to the sides 26. The guides 28 are disposed at intervals, as shown in Fig. 1. In order to reduce friction, the upper edges of the plates 26 are beveled as shown at 26<sup>x</sup> in Fig. 3 and enter grooves in the plate. Disposed on the guide members 28 are the insulating supports 30, which bear the trolley wires 31. The plate 24 carries insulated trolley arms 32 provided with the trolley wheels 33 arranged to engage the wires 31. Each of the slides 24 and 24<sup>a</sup> carries a vertically movable piston, such as that shown at 25, which is adapted to move through a slot such as that shown at 34<sup>a</sup> in Fig. 1. In this figure, it will be seen that the piston 25<sup>a</sup> is provided with an upwardly extending piston rod 35<sup>a</sup> having at its top an arm 36<sup>a</sup> which is connected with the core of a solenoid 37<sup>a</sup>. It is also provided with an arm 38<sup>a</sup> connected to the core of a solenoid 39<sup>a</sup>. The first mentioned solenoid 37<sup>a</sup> tends to move the piston downwardly, while the solenoid 39<sup>a</sup> tends to move it upwardly, as will be hereinafter explained. Each piston is provided with a pair of upwardly extending supports 40, bearing at their tops the cross heads 41, which, as seen in Fig. 1, slide on guide members 42. These guide members are provided with springs 43, which tend to keep the piston in a normally raised position. The pistons themselves have lower sections which are solid, while the upper sections are provided with openings 25<sup>x</sup> to permit the air to pass through when the piston is in its operative position.

I have described the means by which the slides are caused to reciprocate. I will now describe the means by which the pistons 25 and 25<sup>a</sup> are raised and lowered, in order that at the beginning of the stroke each piston shall be in its lower position in the water, so as to drive the boat forward in the movement of the piston from front to rear. Since both pistons are provided with similar means a description of one will suffice for the other. Let us consider then the slide 24<sup>a</sup> and the piston 25<sup>a</sup>. Referring now particularly to Fig. 4, it will be seen that I have provided a source of current B and a circuit changing device S. The circuit changing device has been fully set forth in my prior application, above mentioned, and the automatic operation thereof clearly disclosed. I will, therefore, only describe briefly the manual circuit changing device, so as to give a clear idea of the operation of the solenoids. The battery B is connected with the stationary contacts  $s'$  and  $s^2$  by the wires 50 and 51, respectively. The sta-

tionary contacts  $s^3$  and  $s^4$  are connected by the respective wires 52 and 53 to the trolley wires 31<sup>x</sup> and 31<sup>y</sup> on opposite sides of the slide 25<sup>a</sup>. The circuit changing device S is provided with a pair of parallel conductors 54 and 55 and a pair of crossed conductors 56 and 57, which are mounted on a slide 58 arranged to be moved by a lever 59 to bring either the parallel conductors 54 and 55 into the circuit or the crossed conductors 56 and 57. The trolley 33<sup>x</sup> bears on the trolley 31<sup>x</sup>, while the trolley 33<sup>y</sup> bears on the trolley 31<sup>y</sup>. These trolleys are connected with the solenoids 39<sup>a</sup> and 37<sup>a</sup>, the latter being connected in series. The solenoids are wound in opposite directions in such a manner that when one is expelling its core, the other is sucking its core in. It is obvious, therefore, that with the current flowing in one direction, the piston 25<sup>a</sup> will be raised, while with it flowing in the other direction it will be lowered. Thus, the piston will be raised if the current flows from battery B through 51, 55, 53, 31<sup>x</sup>, 33<sup>x</sup>, 39<sup>a</sup>, 37<sup>a</sup>, 33<sup>y</sup>, 31<sup>y</sup>, 52, 54, and by conductor 50 back to battery. When the slide gets to the end of its travel, the lever 59 is moved so as to bring the crossed conductors 56 and 57 into circuit. This time the current will flow from battery B through 51, 57, 52, 31<sup>y</sup>, 33<sup>y</sup>, 37<sup>a</sup>, 39<sup>a</sup>, 33<sup>x</sup>, 31<sup>x</sup>, 53, 56 and wire 50 back to battery. Obviously, the lever 59 might be moved automatically by the movement of the crank arms, as set forth in my prior application. In the improved construction, as disclosed, it will be seen that there are several distinct advantages over that form of the device shown in my prior patent. In the first place, there is no surrounding tube or pipe below the bottom of the vessel in which the pistons move. This does away with a great deal of friction. The sliding plate, instead of being near the bottom of the vessel, where it would be subject to the pressure of the water, is raised. In order to further overcome the tendency of the water to get underneath the slide plate into the body of the vessel, I provide a compressed air chamber, consisting of the side walls 60 and 61, the end walls 62 and 63 and the top 64. This compressed air chamber is disposed so as to cover both slides and a portion of the operating mechanism therefor. A certain amount of air pressure is maintained in this chamber by means of air pumps (not shown) and this tends to prevent the entrance of water, which might otherwise enter beneath the slides. Furthermore it tends to reduce the friction caused by the pressure of the water on the under side of the slides, while the pressure and friction which would be caused by the weight of the slides and pistons is taken up by the friction wheels 29, as well as by the beveled edges of the side members 26 and



the guides 28. The slide plates do not fit air tight, so that the water is driven downwardly out of the open space between the sides 26.

5 In the operation of my propelling device the slides are reciprocated alternately, as described. At each rearward stroke the piston is lowered and engages the water in the same manner as the paddle of a canoe. At  
10 the end of the stroke the piston is raised, while at the same time the piston of the companion slide, which is now at the beginning of its rearward stroke, is lowered. Thus, there is an alternate movement of the pis-  
15 tons on both sides, and the consequent forward movement of the boat. Of course, the pistons can be lowered at any point in the travel of the slide, so that the boat may be backed by lowering the pistons at the rear  
20 end of the stroke instead of at the forward end, without reversing the engine. This may be, as explained above, by a manual manipulation of the lever 59 to change the current in the solenoids.

25 I claim:—

1. The combination with a vessel provided with a longitudinal opening in its bottom, of a pair of side plates secured to the bottom of the vessel and extending up-  
30 wardly from said opening, a plate arranged to slide on the top of said side plates, said plate being provided with T-shaped flanges on its side edges, a series of guide members arranged to receive said T-shaped flanges,  
35 friction wheels carried by said side plates for supporting said slidable plate, and a piston carried by said slidable plate and adapted to move in a vertical direction.

2. The combination with a vessel provided with a pair of longitudinal openings, of propelling devices adapted to work  
40 through said longitudinal opening, each propelling device including a pair of side plates, a plate arranged to slide on the top of said side plates, said plate being provided  
45 with T-shaped flanges on its side edges, a

series of guide members arranged to receive said T-shaped flanges, friction wheels carried by said side plates for supporting said slidable plate, and a piston carried by said  
50 slidable plate and adapted to move in a vertical direction.

3. The combination with a vessel provided with a pair of longitudinal openings, of propelling devices adapted to work  
55 through said longitudinal opening, each propelling device including a pair of side plates, a plate arranged to slide on the top of said side plates, said plate being provided with T-shaped flanges on its side edges, a series  
60 of guide members arranged to receive said T-shaped flanges, friction wheels carried by said side plates for supporting said slidable plate, a piston carried by said slidable plate and adapted to move in a vertical direction,  
65 and a compressed air chamber surrounding both of said propelling devices.

4. The combination with a vessel provided with a longitudinal opening in its bottom, of a pair of side plates secured to the  
70 bottom of the vessel and extending upwardly from said opening, said side plates having beveled upper edges, a perforated plate having grooves arranged to fit over  
75 said beveled upper edges, said plate being adapted to slide on said edges and being provided with T-shaped side flanges, guide members for receiving said T-shaped side  
80 flanges, said guide members being disposed at intervals, a series of friction wheels secured to each side plate for supporting the slidable plate, a piston adapted to slide vertically through the perforation in said slid-  
85 able plate, said piston having a solid lower part and being provided with openings in its upper part, and means for raising and lowering said piston.

WILLIAM H. WITTE.

Witnesses:

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