No. 774,294. PATENTED NOV. 8, 1904.

W. WEBER.

STEERING GEAR AND RUDDER INDICATOR.

APPLICATION FILED NOV. 2, 1903.

NO MODEL. 5 SHEETS—SHEET 1.

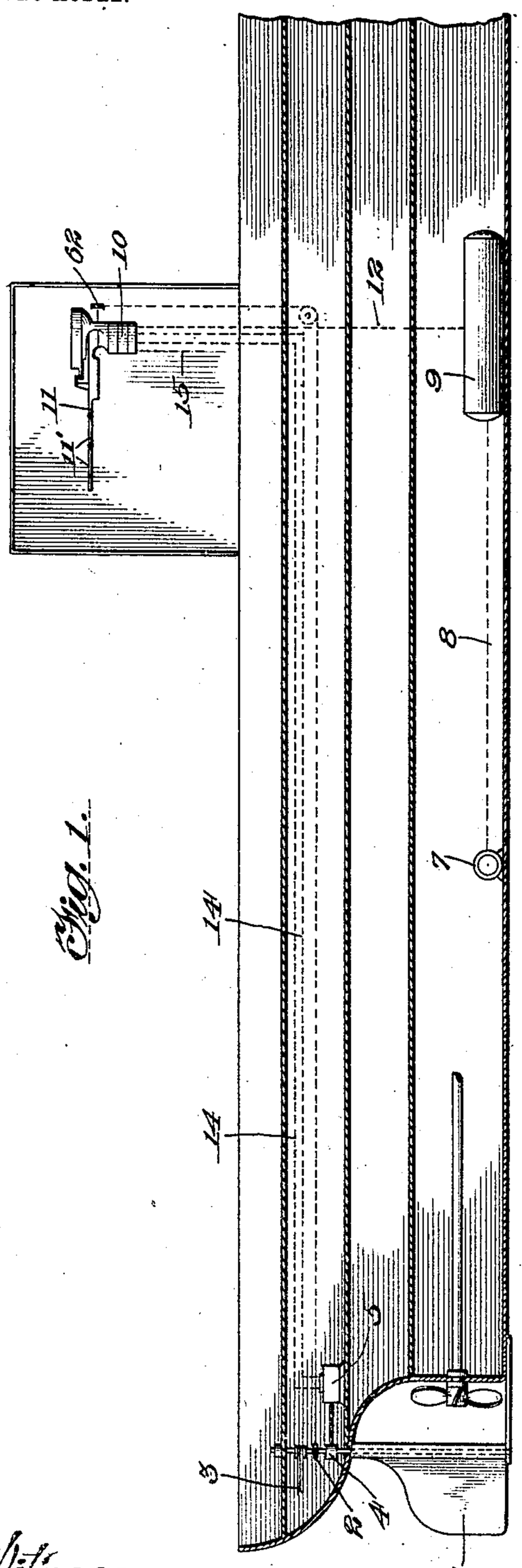

Fig. 1.

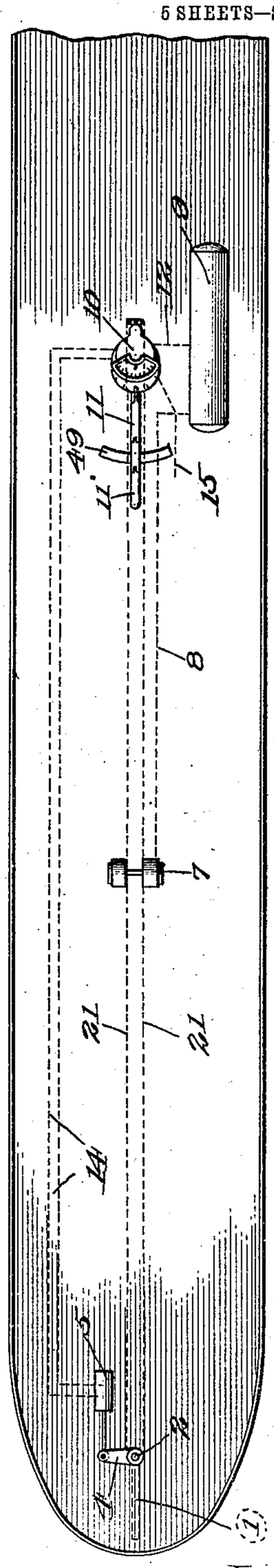

Fig. 2.

Witnesses:

Robert F. Wells

C. M. Wernick

Inventor:

William Weber,

by John W. Hill, atty

PHOTO-LITHOGRAPHED BY SACHETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

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NO MODEL. 5 SHEETS—SHEET 2.

Fig. 3.

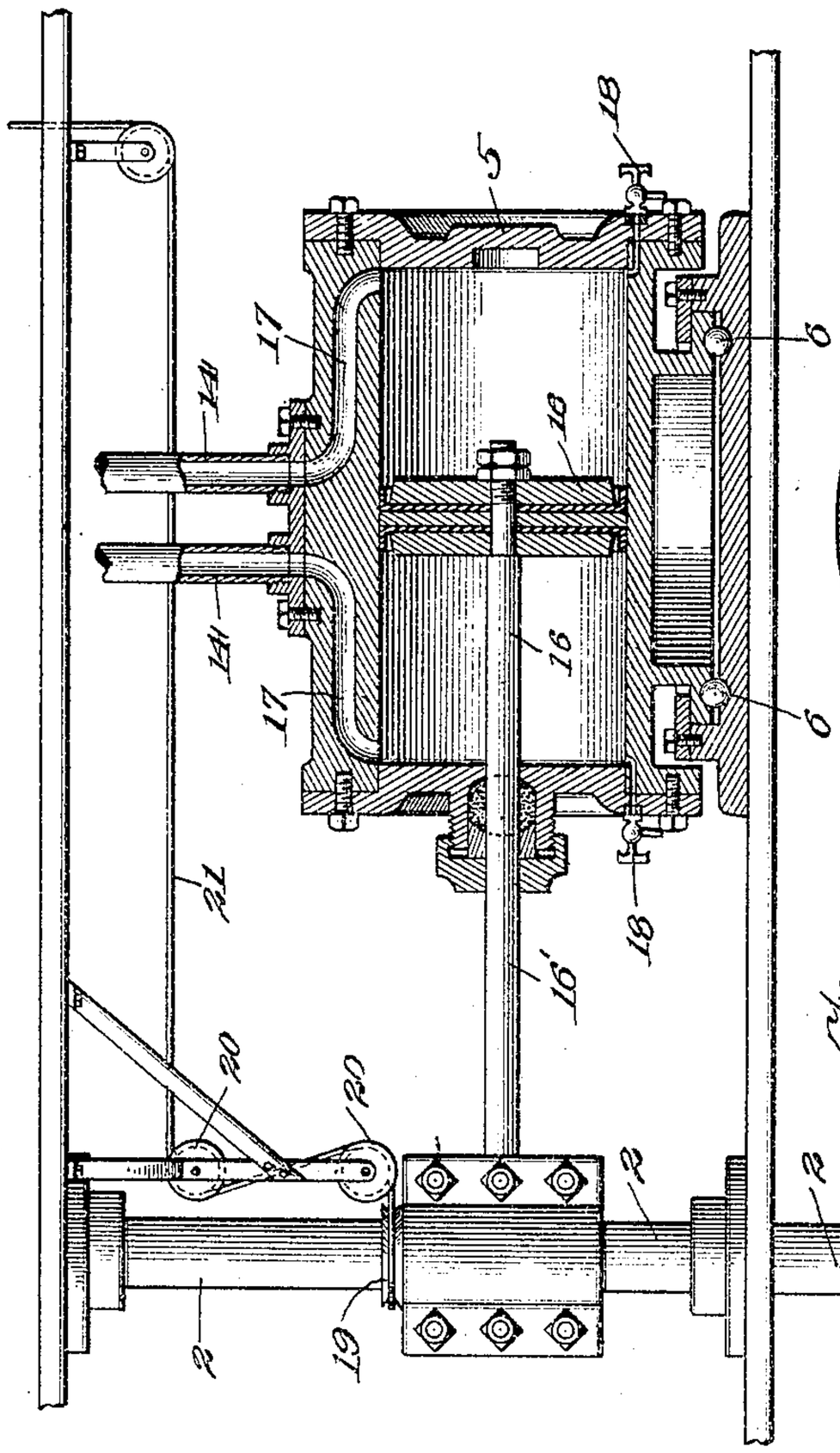


Fig. 4.

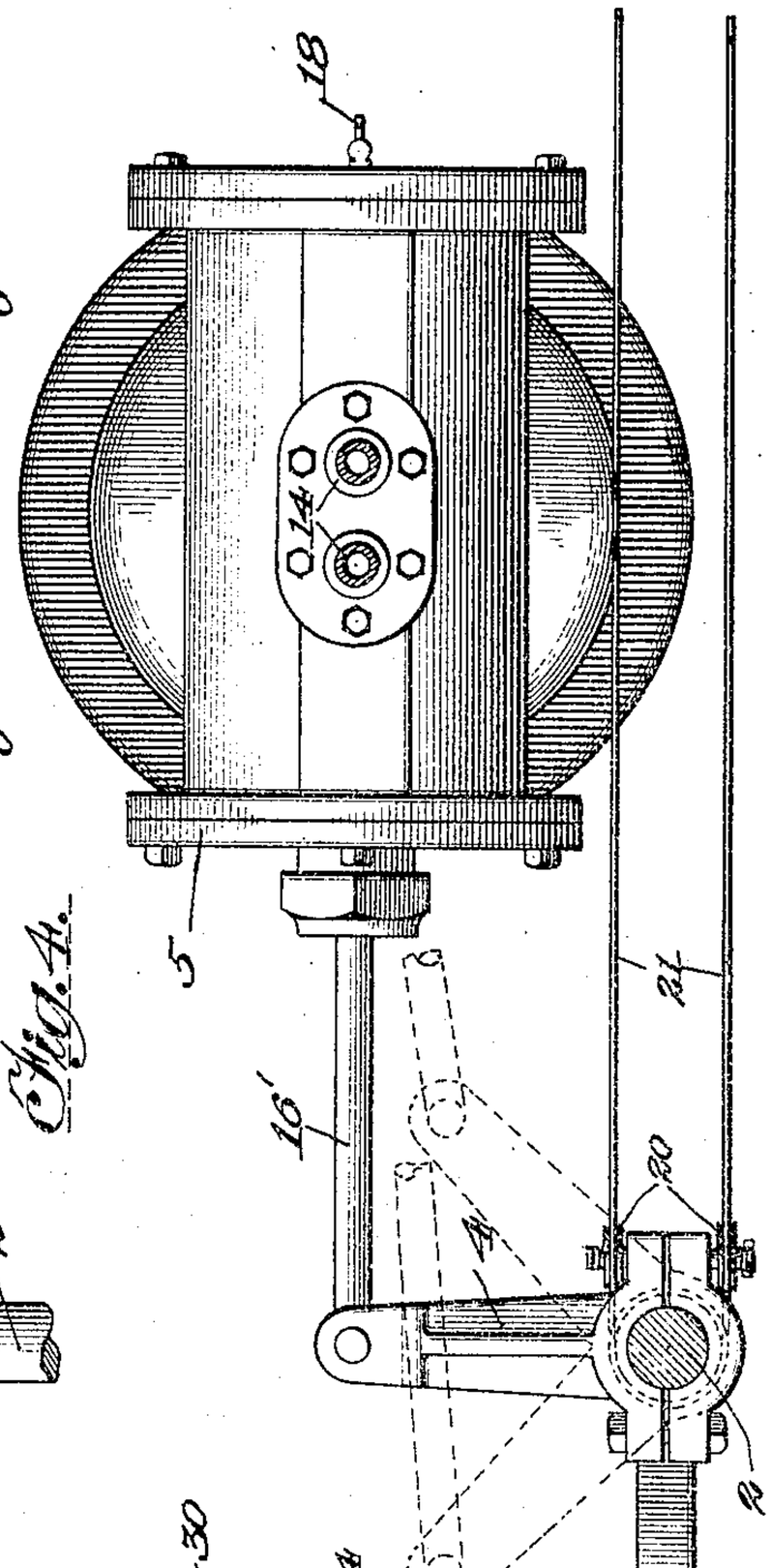


Fig. 6½.

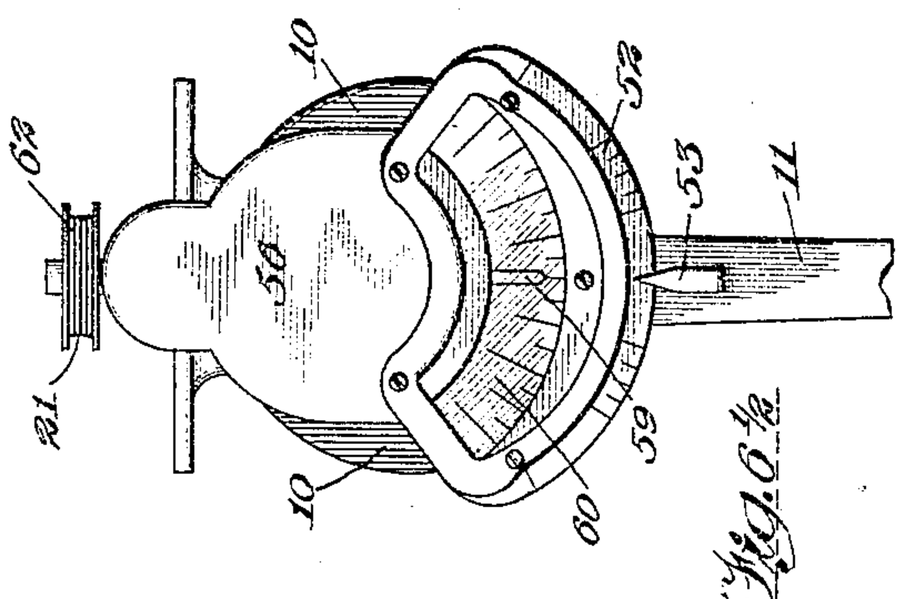
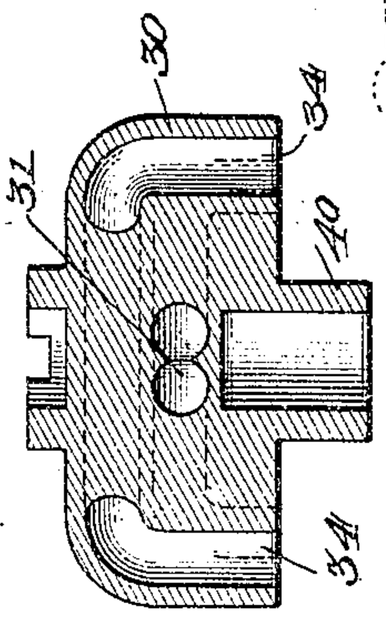


Fig. 7.



Witnesses:

Robert N. Weir

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NO MODEL. 5 SHEETS—SHEET 3.

Fig. 6.

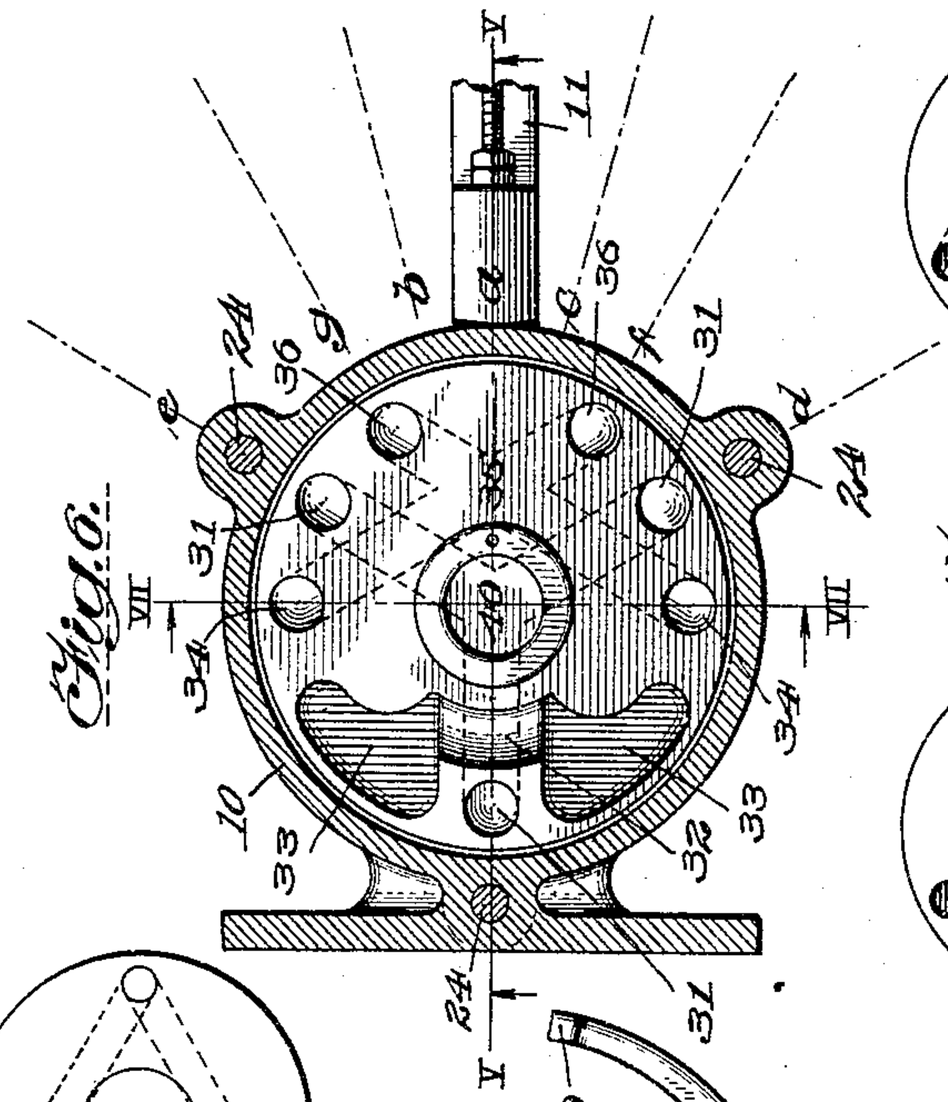

Fig. 9.

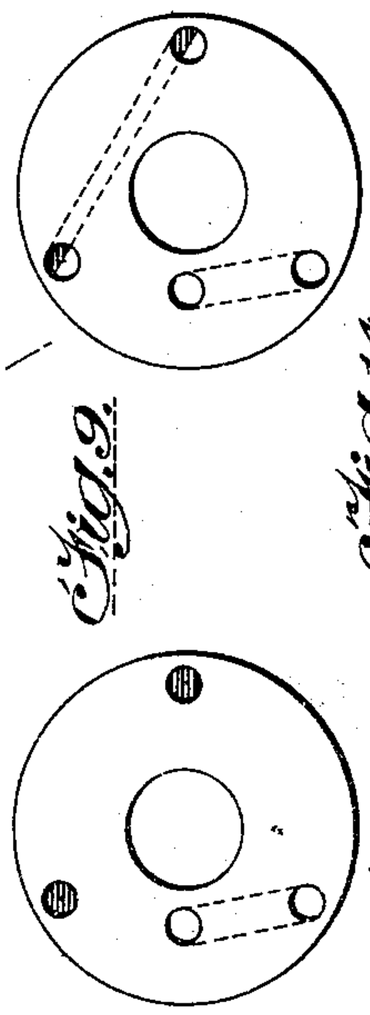

Fig. 14.

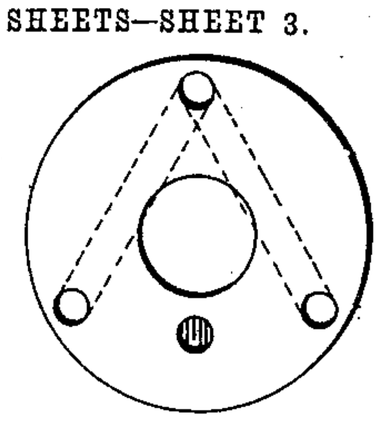

Fig. 10.

Fig. 13.

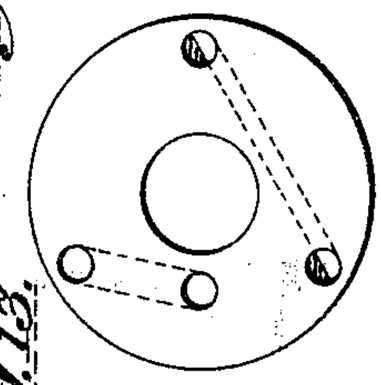

Fig. 8.

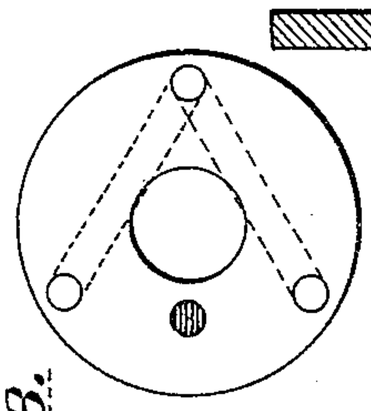

Fig. 12.

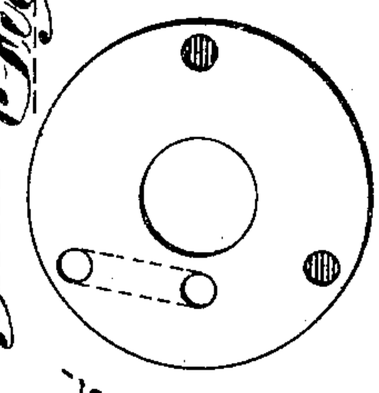

Fig. 5.

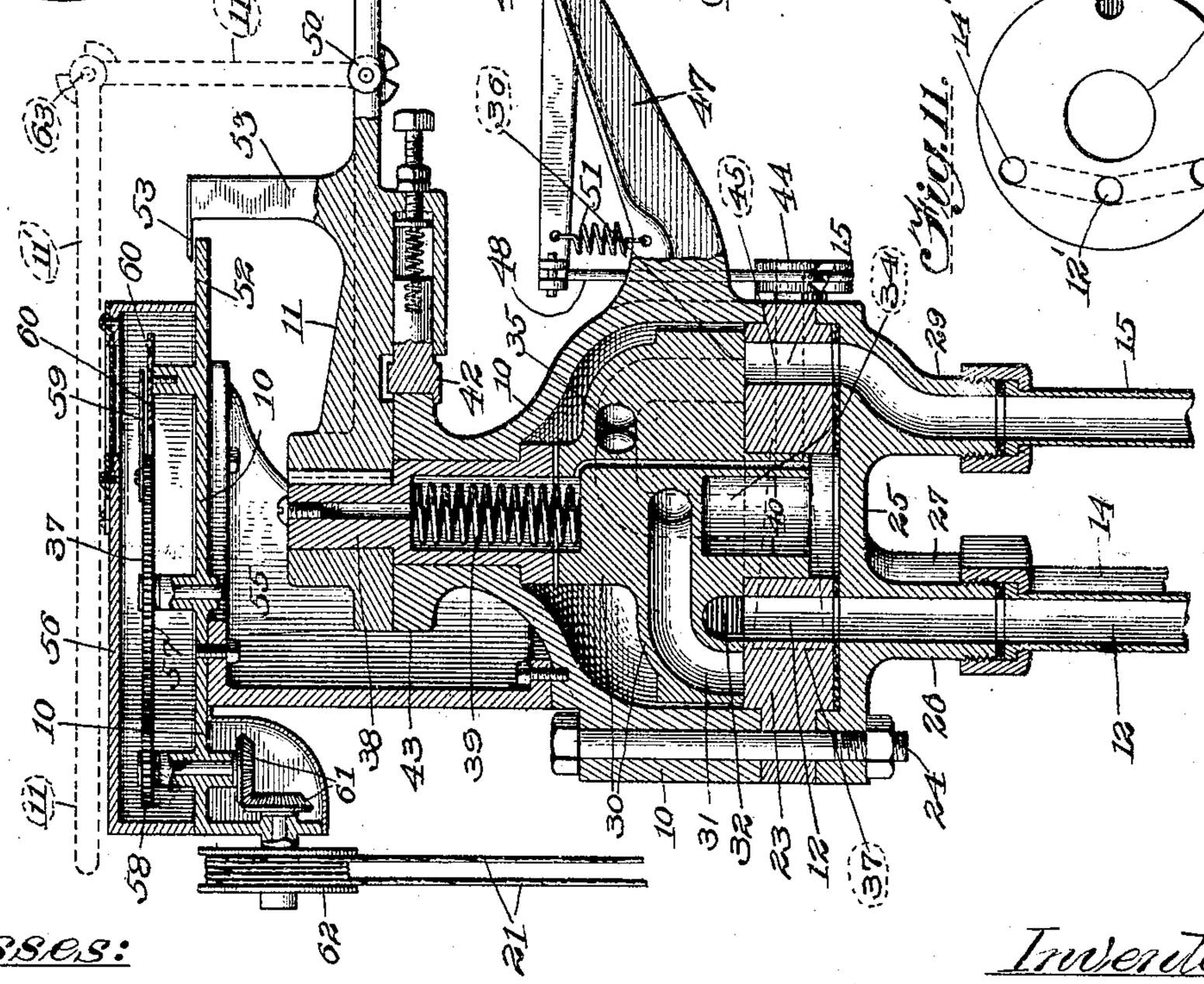

Fig. 11.

Witnesses:

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No. 774,294. PATENTED NOV. 8, 1904.

W. WEBER.

STEERING GEAR AND RUDDER INDICATOR.

APPLICATION FILED NOV. 2, 1903.

NO MODEL. 5 SHEETS—SHEET 4.

Fig. 16.

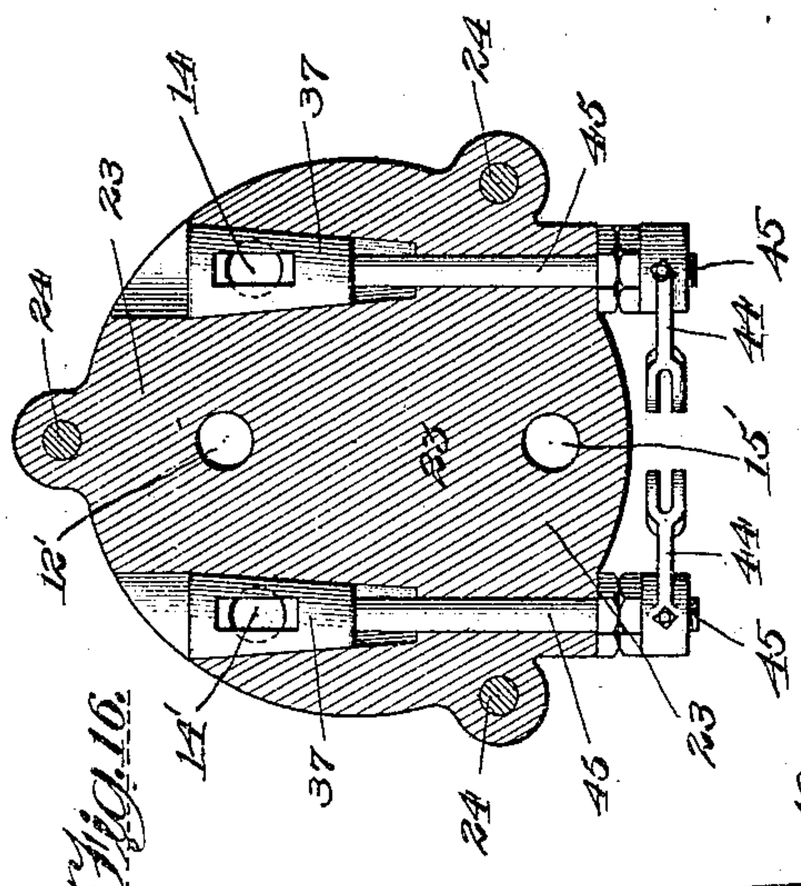


Fig. 16.

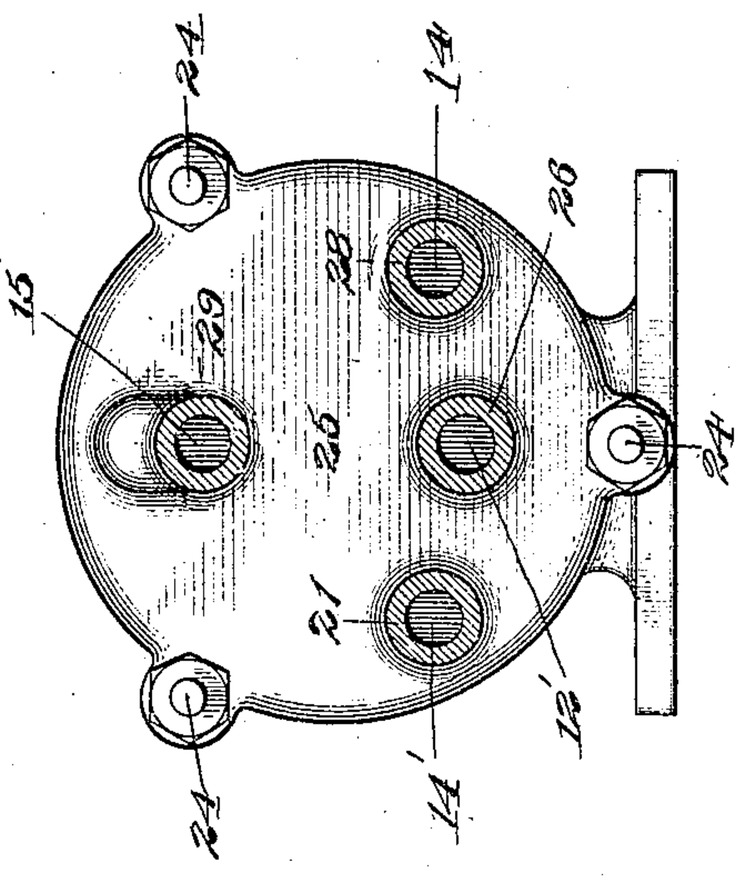
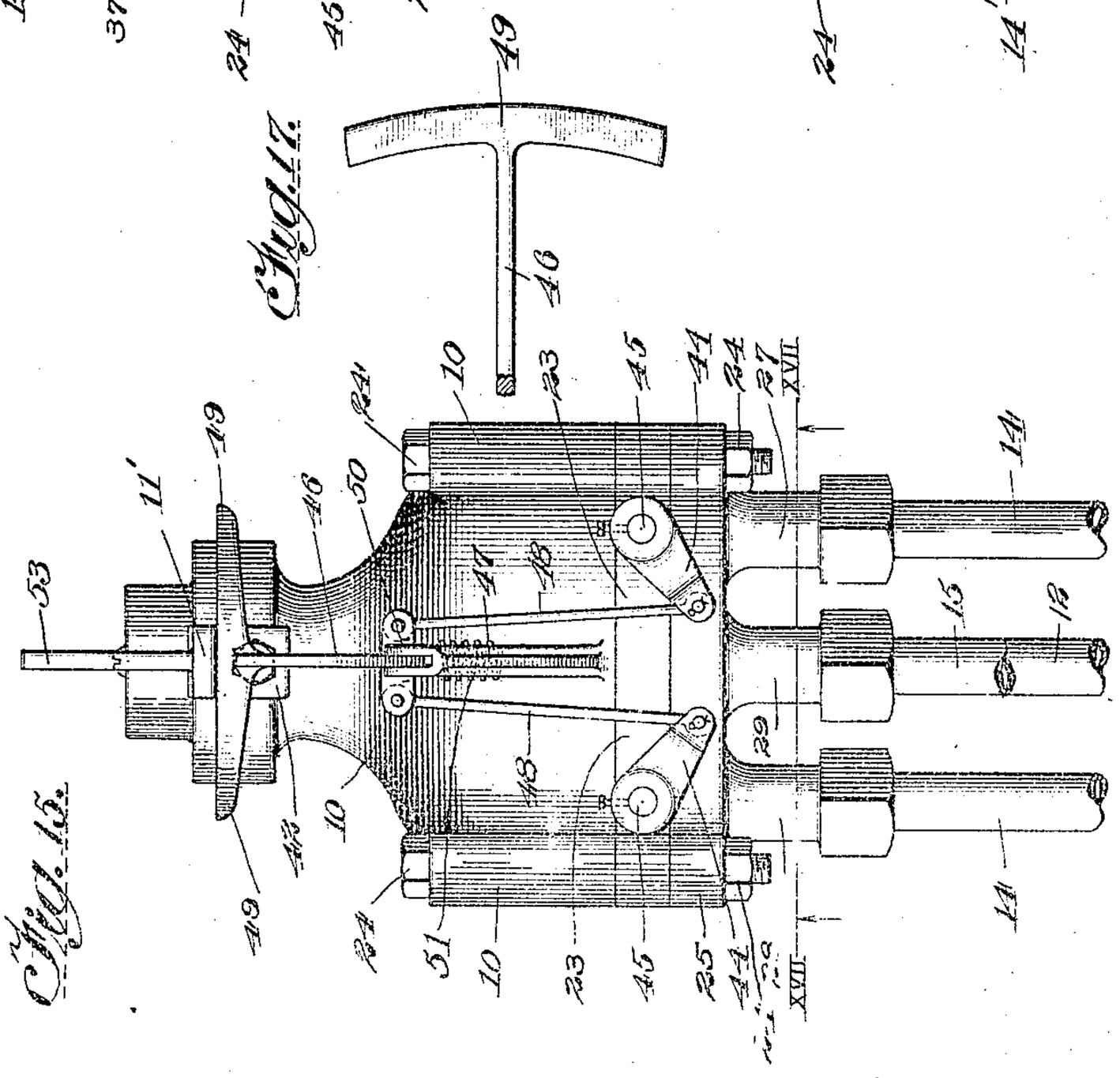


Fig. 17.



Witnesses:
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No. 774,294. PATENTED NOV. 8, 1904.

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STEERING GEAR AND RUDDER INDICATOR.

APPLICATION FILED NOV. 2, 1903.

NO MODEL. 5 SHEETS—SHEET 5.

Fig. 19.

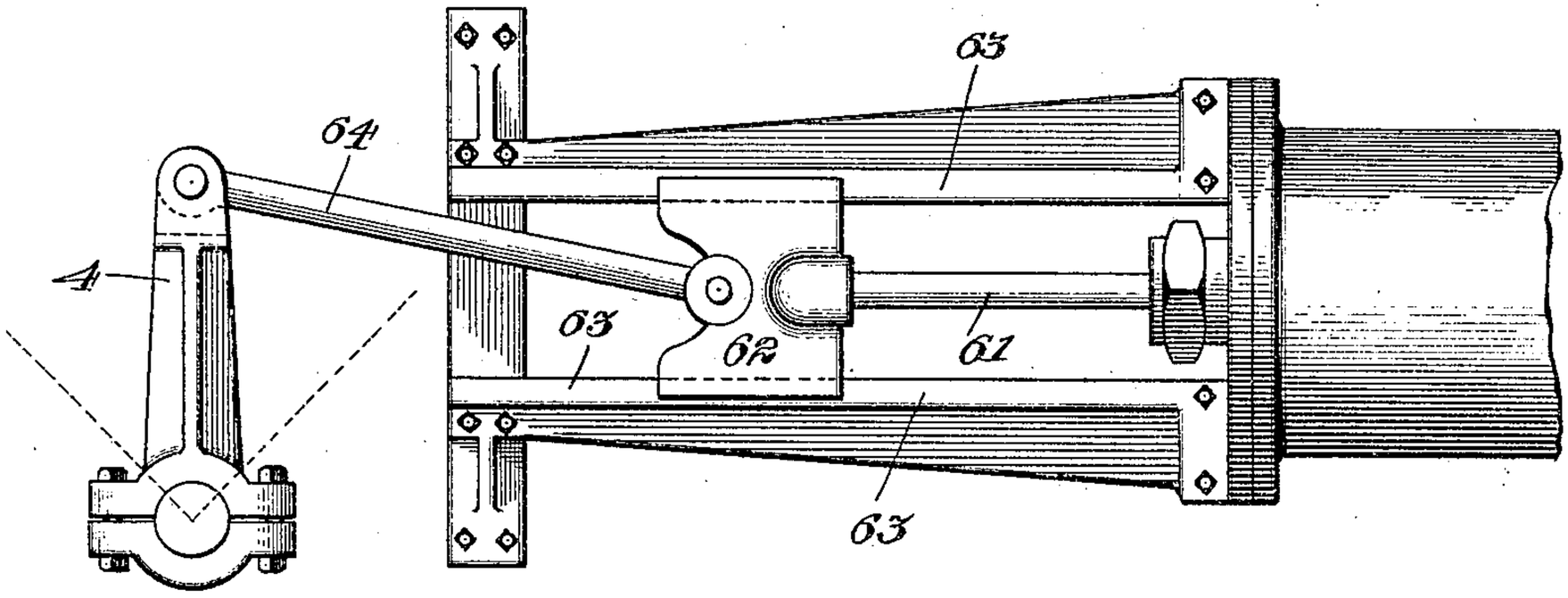


Fig. 20.

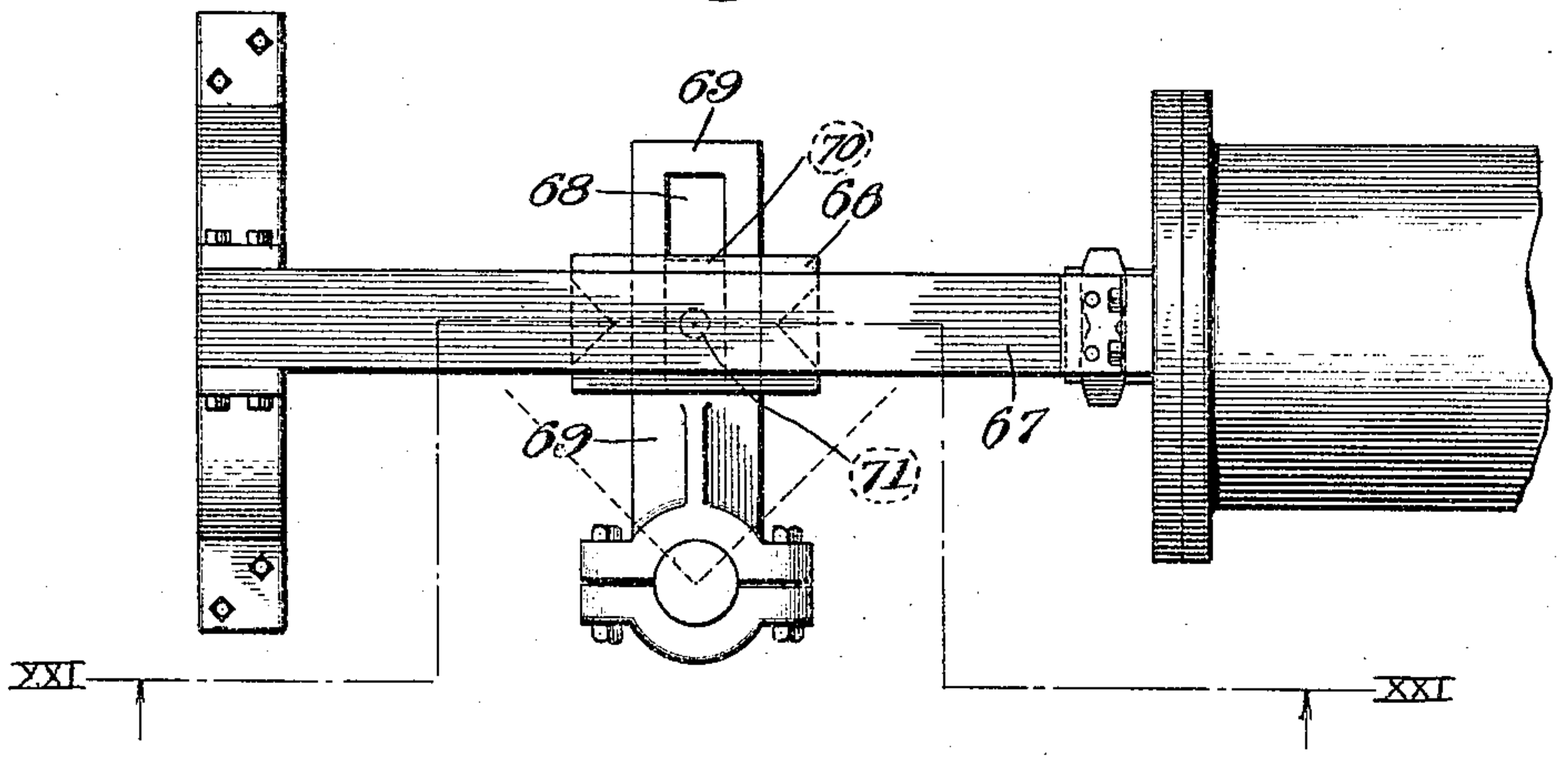
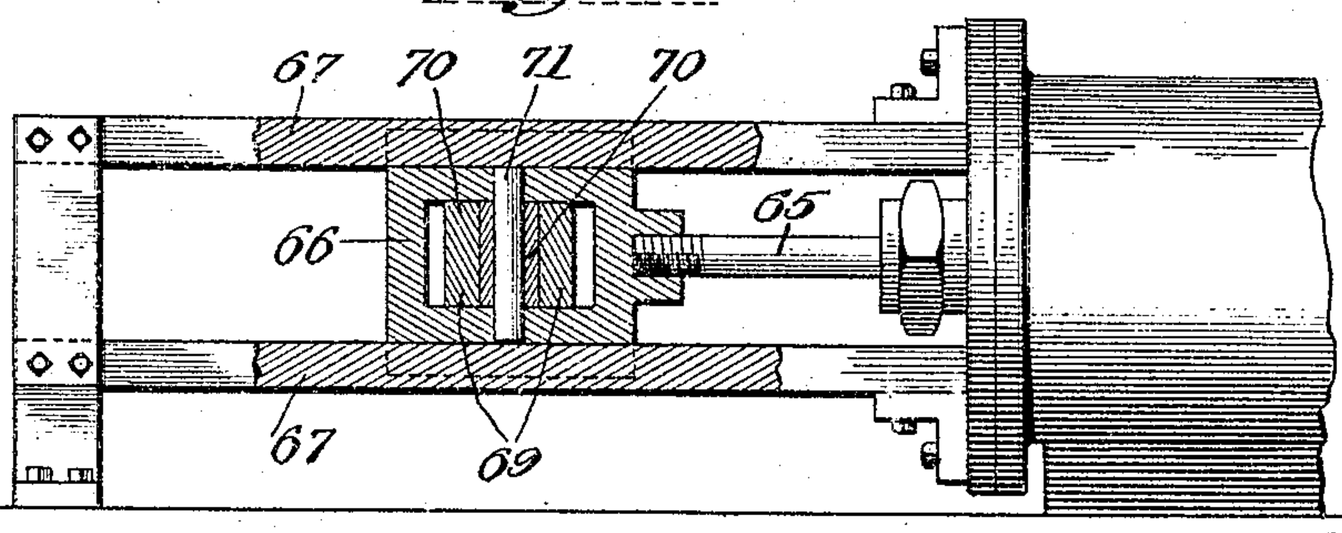


Fig. 21.



Witnesses:

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Inventor:

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No. 774,294. Patented November 8, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM WEBER, OF CHICAGO, ILLINOIS, ASSIGNOR TO DANIEL O. WARD, OF OAK PARK, ILLINOIS.

STEERING-GEAR AND RUDDER-INDICATOR.

SPECIFICATION forming part of Letters Patent No. 774,294, dated November 8, 1904.

Application filed November 2, 1903. Serial No. 179,529. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WEBER, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Steering-Gear and Rudder-Indicators, of which the following is a specification.

This invention relates to steering-gear for ships and vessels of various kinds; and the object is to provide simple and effective means by which the position of the rudder may be controlled and governed independently of or in combination with the usual hand steering apparatus.

To this end my invention consists in the novel construction, combination, and arrangement of parts, as hereinafter described and claimed.

Referring now to the accompanying drawings, wherein like reference characters indicate like or corresponding parts, Figure 1 is a diagrammatic elevational view showing the preferred arrangement of my improved apparatus. Fig. 2 is a diagrammatic plan view of the same omitting the tiller. Fig. 3 is a vertical longitudinal section of the motor-cylinder, also in elevation that portion of the rudder-shaft to which the piston is connected and a part of the indicating mechanism. Fig. 4 is a plan view of the same parts, the cylinder being partly broken away. Fig. 5 is a vertical section of the controller-valve and the rudder-indicator. Fig. 6 is a face view of the controller-valve looking up, showing the neutral position of the valve in full lines and indicating six other positions thereof by broken radial lines. Fig. 6½ is a plan view of the rudder-indicator as mounted on the controller-valve chamber. Fig. 7 is a vertical section of the controller-valve detached, taken on line VII VII of Fig. 6. Figs. 8, 9, 10, 11, 12, 13, and 14 are diagrams showing the position of the air-ports in the valve-seat and showing the different openings, closing, and connections thereof as effected by the positions of the valve indicated in Fig. 6. Fig. 15 is a front elevation of a device for operating the auxiliary valves. Fig. 16 is a plan view of said valves, the valve-seat being in section. Fig. 17 is a plan of the auxiliary-valve lever. Fig. 18 shows the four connections or nipples of the controller-valve chamber, it being a section on line XVIII of Fig. 15. Fig. 19 is a plan view of a modified mechanical connection between the motor-piston and the rudder-shaft crank. Fig. 20 is a plan view of another such modification; and Fig. 21 is a partial section of the same, taken on line XXI XXI of Fig. 20.

Referring now to Figs. 1 and 2, 1 is the rudder; 2, its post or shaft; 3, the tiller, to which the usual cables (not shown) may be connected. 4 is a crank-arm rigidly secured on the rudder-shaft 2. 5 is a cylinder set in proximity to the rudder-shaft and mounted, preferably, upon a circular bearing, which may be constructed as a ball-bearing 6, Fig. 3, which provides for the piston-rod 16′ being directly connected to the arm 4 without using a cross-head and its guides. A ball-bearing under the cylinder will cause it to turn so easily that it will not interfere with steering by the hand-wheel in the pilot-house. A stationary cylinder having its piston-rod connected to a pitman, which is in turn connected to the rudder-crank 4, may be employed in lieu of the oscillatory cylinder and direct-connected piston-rod. Such a construction is shown in Fig. 19, in which 63 is the piston-rod, 64 a cross-head, for which guides 65 are provided, and 66 is a pitman connecting the cross-head to the rudder-crank 4. In connection with a fixed cylinder a slotted rudder-crank might be employed, thereby dispensing with a pitman. Such a construction is shown in Figs. 20 and 21. 67 is the piston-rod, which is connected to a cross-head 68, for which guides 69 are provided. A longitudinal slot 70 is formed in the rudder-crank 71, and lying within said slot is a block or shoe 72, which is pivotally held in the cross-head by means of a vertical pin 73. As the piston-rod is moved either in or out of the cylinder the shoe 72 will turn upon its pin 73, and the movement imparted to the crank 71 will cause the shoe to slide along the slot 70 either toward or from the end of the crank, while lateral movement of

the piston-rod is prevented by guides 69. 7 is a pump or suitable machine for the compression of air. This is connected by a discharge-pipe 8 to an air-reservoir 9. 10 is the controller-valve, or, to be exact, is the chamber inclosing the valve, provided with an operating-lever 11 11′. A pipe 12 leads from the reservoir 9 to the valve-chamber 10. Also connected to the valve-chamber are two pipes 14, which lead to the motor-cylinder 5 and are connected to opposite ends thereof. An exhaust-pipe 15 is connected to the valve-chamber 10.

Referring now to Figs. 3 and 4, 16 is the piston of the motor. 17 17 are ports which connect the pipes 14 to the opposite ends of the cylinder. These ports act alternately as inlet and exhaust ports. The ends of the cylinder may be provided with drip-cocks 18 for draining any accumulated water from the interior of the cylinder. The bearing under the cylinder may be of any suitable or preferred construction. Fixed on the rudder-shaft above the motor-crank 4 is a sheave 19, adjacent to which are two pairs of pulleys 20, around which passes an indicator cable or wire 21, which leads to the indicator 56. (Shown in Figs. 5 and 6½.) This indicator will be described hereinafter.

The controller-valve will now be described, reference being had to Figs. 5, 6, 6½, and 7. 10 is the main valve-chamber, to the bottom of which is secured a casting 25, provided with four nipples 26 27 28 29, to which the air-pipes 12 14 14 15 are respectively connected. 24 represents bolts by which the above-named parts may be secured together. The four nipples register with four ports 12′ 14′ 14′ 15′ through the valve-seat, said ports being shown in plan in Figs. 8 to 14, inclusive. Port 12′ may be termed the "live" port, as it is connected to the compressed-air-supply pipe 12, Fig. 1. The two ports 14′ may be termed the "motor-ports," they being connected to the pipes 14, which lead to the motor-cylinder. 15′ is the "exhaust-port," as it communicates with the atmosphere at all times and may be connected to both or either of the motor-ports by turning the controller-valve 30 to certain positions, as hereinafter described. 30 is the controller-valve, which is provided with a three-way port 31 31 31. Crossing under one branch of said port is a port 32, which connects two recesses 33 in the valve. At diametrically opposite points of the face of the valve are openings 34 34 of two ports which intersect each other at 35, Fig. 5, and emerge at 36 and 36, Fig. 6.

Figs. 8 to 14 are diagrams of the valve-seat 23, showing or indicating the operations of the valve 30 in seven different positions thereof. The radial lines in Fig. 6 indicate these positions of the valve as determined by the center line of the valve handle or lever 11.

Substantially duplicate cut-off or auxiliary valves are provided for the motor air-pipes 14. Preferably said valves are seated in the valve-seat 23, as shown in Figs. 15 and 16. By means of these valves the communication between the motor-ports 14′ is closed at all times during which it is desired to hold the rudder stationary, or substantially so, as more fully referred to hereinafter. The preferred means for operating the controller-valve and said auxiliary valves is constructed as follows: The controller-valve is provided with a stem 38, Fig. 5, on the upper end of which is suitably secured a hand-lever 11 11′. An expansion-spring 39 may be housed within the stem 38 for providing a suitable pressure between the valve and its seat when the live port is closed. On the bottom of the valve is formed a concentric boss or journal 40, which fits a central opening 41 in the seat 23. The valve may be provided with a spring-pressed friction-shoe 42, which bears against the annular flange 43 at the top of the valve-chamber for the purpose of increasing the force necessary to move the valve or preventing the valve from moving too easily.

In order that the auxiliary valves 37 may be simultaneously operated by the movement of lever 11 11′, I preferably employ the device shown in Figs. 15 and 16 with rocker-arms 44 or equivalent means fixed upon the valve-stems 45, a lever 46 fulcrumed on a bracket 47, and rods 48 connecting the rocker-arms to said lever. The outer end of said lever is bent upwardly and provided with a horizontal extension 49, which is adapted to be engaged by the aforesaid hand-lever 11 11′, which is jointed at 50 to permit its being broken at that point and turned either up or down. Its downward movement actuates lever 46, draws up rods 48, and thereby rocks the valves 37. These valves are normally open; but when the hand-lever section 11′ is fully depressed they are closed, thereby cutting off the air in pipes 14 from the connecting-port 32 for the purpose of preventing the escape of air from either end of the motor-cylinder at times when the rudder is to be held. Means, such as one or more springs 51, are provided to automatically open the valves 37 when lever-section 11′ is lifted out of engagement with lever 46.

The connections effected by different positions of the controller-valve 30 are as follows, reference being had to Figs. 8 to 14, inclusive, and to Fig. 6: When the valve is in its middle position, (shown in full lines in Fig. 6,) the motor-ports 14′ are open, the live port 12′ is open and connected to the ports 14′, and the exhaust-port 15′ is closed, as indicated in Fig. 11. In Figs. 8 to 14 the shaded areas of the ports indicate closure thereof and the dotted lines indicate connections. In this position, *a*, of the valve the rudder is free to be operated by the steering-wheel in the pilot-house or by other suitable means, as the air which is expelled by motion of the rudder

from either end of the motor-cylinder will in this position of the valve pass into the other end of the cylinder through pipes 14 and connecting-port 33 32 33, Fig. 6. Supposing next that the valve has been turned to the left to position *b*, the connections formed thereby are shown in Fig. 10. One of the motor-ports remains connected to the live port; but the other motor-port has been closed and the exhaust-port remains closed. This is preparatory to forming an atmospheric connection with the motor-port that is now closed. The next position, *g*, of the valve forms the connections shown in Fig. 9. The port that was closed at *b* is now partially connected to the exhaust-port or atmosphere, thus decreasing the air-pressure upon one side of the motor-piston, and the excess of pressure upon the other side thereof causes the piston to actuate the rudder—say in the "port" direction. The next position shown (marked *e* in Fig. 6) forms the connections shown in Fig. 8. The live port is now closed and both of the motor-ports are connected to atmosphere through the three-way port 31 in the valve. This permits the air-pressure in the motor-cylinder to fall to normal, and in this position also the rudder may be controlled by hand or by electric or hydraulic steering-gear independently. Moreover, this pneumatic gear may be operated simultaneously and in connection with any other form of steering-gear. The reservoir is cut off from the atmosphere, preventing escape of air therefrom. The three right-hand positions of the valve marked *c*, *f*, and *d* in Fig. 6 correspond to the left-hand positions *b*, *g*, and *e*, and the effect upon the rudder is the same except that its movement is reversed, as from port to starboard, or vice versa.

A dial-plate 52 is mounted upon the valve-chamber 10, (see Fig. 6½ for a plan view thereof,) and the valve-lever is provided with an index 53, which in its operation will register with indicating-marks on the dial-plate corresponding to the principal positions of the valve-lever. Beyond its joint 50 the lever-section 11′ may be provided with another joint 63, (see dotted lines in Fig. 5,) whereby the outer section thereof may be laid back upon the indicator-box when not in use.

To hold the rudder in any desired position, it is only necessary to push down the section 11′ of the main lever. This will close the auxiliary valves 37, as already described, and the ends of the motor-cylinder will thus be cut off from the atmosphere, the reservoir, and from each other. The air in the cylinder and in pipes 14 being at a high pressure is practically incompressible or is compressible to such a slight extent that the piston will be held practically immovable so long as the valves 37 are closed.

The air-compressor may be provided with an automatic device for starting and stopping the same, starting it when the air-pressure falls below the required degree and stopping it when the pressure reaches or exceeds that point.

Figs. 5 and 15, in connection with Figs. 3 and 4, illustrate a novel apparatus for keeping the movements of the rudder before the eyes of the pilot or steersman. My preferred arrangement is to mount a supporting-casing 55 upon the valve-chamber 10, as shown in Fig. 5. This supports a casing 56, which contains a gear and pinion 57 and 58, to the latter being secured a pointer 59, which plays above a segmental index 60. The pinion 58 is actuated through bevel-gears 61 from a sheave 62, around which are wound one or more turns of a small wire or cable 21. This wire or cable is conducted, by means of suitable anti-friction-guides, to the aforesaid sheave 19 upon the rudder-shaft 2. I prefer to pass the cable over pulleys 20 and under pulleys 20, as shown in Fig. 3, before it passes around sheave 19. By this means every movement of the rudder will be transmitted to the pointer 59, which is distinctly visible to the steersman. The diameters of the sheave and gear-wheels might be so proportioned that the pointer 59 would follow the movements of the valve-pointer 53, above mentioned.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with a suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipes, provided with an exhaust-opening, a suitable operating-handle, and ports to connect at will either end of said cylinder to said tank while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank, or both ends of said cylinder to said exhaust-opening, and an indicator at the valve, to show the position of said power-piston.

2. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipes, consisting of a casing connected to said pipes, provided with an exhaust-opening formed therein, a movable part positioned in said casing resiliently pressed against a seat formed therein and provided with a suitable operating-handle, and ports adapted to connect at will either end of said cylinder to said tank while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank, or both ends of said cylinder to said exhaust-openings, and an indicator at the valve to show the position of the power-piston.

3. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with a suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipes, provided with an exhaust-opening, a suitable operating-handle, and ports to connect at will either end of said cylinder to said tank while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank, or both ends of said cylinder to said exhaust-openings, an auxiliary valve connected to one of said cylinder-pipes, adapted, when closed, to prevent the flow of fluid in said pipe, and an indicator at the valve to show the position of said power-piston.

4. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with a suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipes provided with an exhaust-opening, a suitable operating-handle, and ports to connect at will either end of said cylinder to said tank while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank, or both ends of said cylinder to said exhaust-opening, a plurality of auxiliary valves, connected to said cylinder-pipe, adapted, when closed, to prevent the flow of fluid in either of said pipes, and an indicator at the valve to show the position of said power-piston.

5. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with a suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipes, consisting of a casing connected to said pipes, provided with an exhaust-opening formed therein, a movable part positioned in said casing resiliently pressed against a seat formed therein and provided with a suitable operating-handle, and ports adapted to connect at will either end of said cylinder to said tank while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank, or both ends of said cylinder to said exhaust-opening, an auxiliary valve connected to one of said cylinder-pipes, adapted when closed, to prevent the flow of fluid in said pipe, and an indicator at the valve to show the position of said power-piston.

6. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with a suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipes, consisting of a casing connected to said pipes, provided with an exhaust-opening formed therein, a movable part positioned in said casing resiliently pressed against a seat formed therein, and provided with a suitable handle, and ports adapted to connect at will either end of said cylinder to said tank while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank, or both ends of said cylinder to said exhaust-opening, a plurality of auxiliary valves, connected to said cylinder-pipes, adapted, when closed, to prevent the flow of fluid in said pipes and an indicator at the valve, to show the position of said power-piston.

7. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with a suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipe, provided with an exhaust-opening, a suitable handle adapted to operate said valve and an auxiliary valve, and ports to connect at will either end of said cylinder to said tank while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank, or both ends of said cylinder to said exhaust-opening, an auxiliary valve, connected to one of said cylinder-pipes, adapted when closed to prevent the flow of fluid in said pipe, and an indicator at the valve to show the position of said power-piston.

8. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with a suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipes, provided with an exhaust-opening, a suitable handle adapted to operate said valve and a plurality of auxiliary valves, ports to connect at will either end of said cylinder to said tank while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank or both ends of said cylinder to said exhaust-opening, a plurality of auxiliary valves, connected to said cylinder-pipes, adapted when closed to prevent the flow of fluid in said pipes and an indicator at the valve to show the position of said power-piston.

9. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with a suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipes, consisting of a casing connected to said pipes, provided with an exhaust-opening formed therein, a movable part positioned in said casing resiliently pressed against a seat formed therein and provided with a suitable handle, adapted to operate said valve and an auxiliary valve, ports adapted to connect at will, either end of said cylinder to said tank

while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank, or both ends of said cylinder to said exhaust-opening, an auxiliary valve connected to one of said cylinder-pipes, adapted when closed to prevent the flow of fluid in said pipe, and an indicator at the valve, to show the position of said power-piston.

10. A device of the kind described, and in combination a tank containing a fluid under pressure, a cylinder fitted with a suitable power-applying piston, pipes connecting the ends of said cylinder with said tank, a valve adapted to control the flow of fluid in said pipes, consisting of a casing connected to said pipes, provided with an exhaust-opening formed therein, a movable part positioned in said casing resiliently pressed against a seat formed therein and provided with a suitable handle, adapted to operate said valve and a plurality of auxiliary valves, ports adapted to connect at will, either end of said cylinder to said tank while the other end is connected to said exhaust-opening, or both ends of said cylinder to said tank, or both ends of said cylinder to said exhaust-opening, a plurality of auxiliary valves connected to said cylinder-pipes adapted when closed to prevent the flow of fluid in said pipes, and an indicator at the valve to show the position of said power-piston.

11. In a device of the kind described, a valve consisting of a casing, provided with an exhaust-opening, a valve-seat, and a plurality of connections for attaching conducting-pipes, a part positioned within said casing upon said seat, a handle for partially rotating said part thereon, ports formed in said part whereby the passage of a fluid between the pipe connections and said exhaust-opening may be controlled by partially rotating said part upon said seat, in combination with an indicator attached to said casing, adapted to show the position of a movable object, whose movements are controlled by the fluid passing through said valve; substantially as described.

12. In a device of the kind described, a valve consisting of a casing, provided with an exhaust-opening, a valve-seat, and a plurality of connections for attaching conducting-pipes, a part positioned within said casing resiliently pressed against said seat, a handle for partially rotating said part thereon, ports formed in said part whereby the passage of a fluid between said pipe connections and said exhaust-opening may be controlled by partially rotating said part upon said seat, an indicator attached to said casing, adapted to show the position of a movable object, whose movements are controlled by the fluid passing through said valve; substantially as described.

13. In a device of the kind described, a valve consisting of a casing, provided with an exhaust-opening, a valve-seat, and a plurality of connections for attaching conducting-pipes, an auxiliary valve attached to one of said connections for independently controlling the flow of fluid therethrough, a part positioned within said casing upon said seat, a handle for partially rotating said part thereon, ports formed in said part whereby the passage of a fluid between said pipe connections and said exhaust-opening may be controlled by partially rotating said part upon said seat, an indicator attached to said casing, adapted to show the position of a movable object, whose movements are controlled by the fluid passing through said valve; substantially as described.

14. In a device of the kind described, a valve consisting of a casing, provided with an exhaust-opening, a valve-seat, and a plurality of connections for attaching conducting-pipes, an auxiliary valve attached to one of said connections for independently controlling the flow of fluid therethrough, a part positioned within said casing resiliently pressed against said seat, a handle for partially rotating said part thereon and operating said auxiliary valve, ports formed in said part whereby the passage of a fluid through said pipe connections and said exhaust-opening may be controlled by partially rotating said part upon said seat, in combination with an indicator attached to said casing, adapted to show the position of a movable object, whose movements are controlled by the fluid passing through said valve; substantially as described.

15. In a device of the kind described, a valve consisting of a casing, provided with an exhaust-opening, a valve-seat, and a plurality of connections for attaching conducting-pipes, a plurality of auxiliary valves attached to any of said connections, for independently controlling the flow of fluid therethrough, a part positioned within said casing upon said seat, a handle for partially rotating said part thereon and operating said auxiliary valves, ports formed in said part whereby the passage of a fluid between said pipe connections, and said exhaust-opening may be controlled by partially rotating said part upon said seat, in combination with an indicator attached to said casing, adapted to show the position of a movable object, whose movements are controlled by the fluid passing through said valve; substantially as described.

16. In a device of the kind described, a valve consisting of a casing, provided with an exhaust-opening, a valve-seat, and a plurality of connections for attaching conducting-pipes, a plurality of auxiliary valves attached to any of said connections for independently controlling the flow of fluid therethrough, a part positioned within said casing resiliently pressed against said seat, a handle for partially rotating said part upon said seat and operating said auxiliary valves, ports formed in said part whereby the passage of a fluid be-

tween said pipe connections and said exhaust-port may be controlled by partially rotating said part upon said seat, an indicator attached to said casing, adapted to show the position of a movable object, whose movements are controlled by the fluid passing through said valve; substantially as described.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM WEBER.

Witnesses:
K. M. IMBODEN,
CHARLES I. COBB.