

No. 616,211.

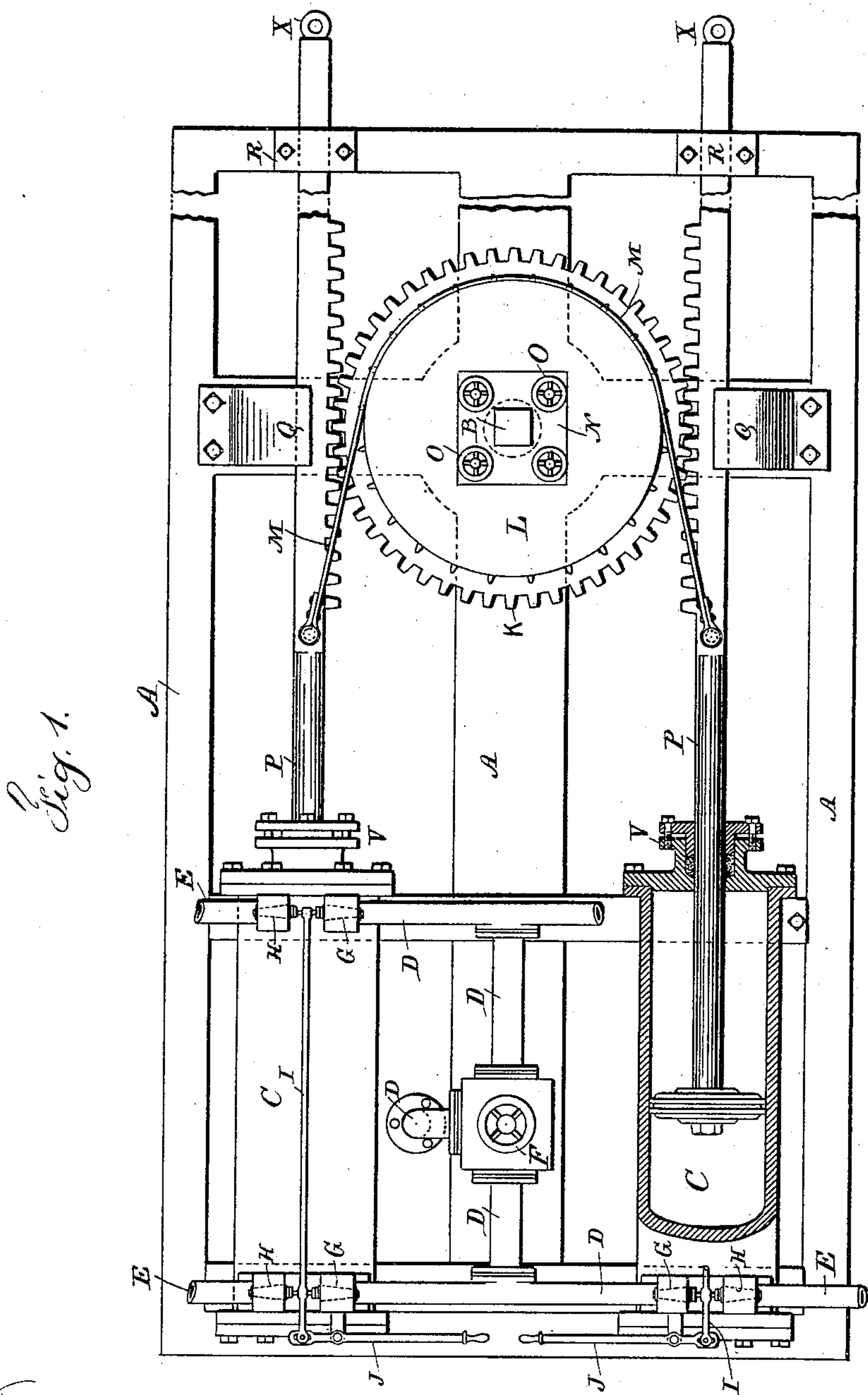
Patented Dec. 20, 1898.

A. O. TAYLOR.
STEERING GEAR.

(Application filed Dec. 20, 1897.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses

Charles Smith
J. Staib

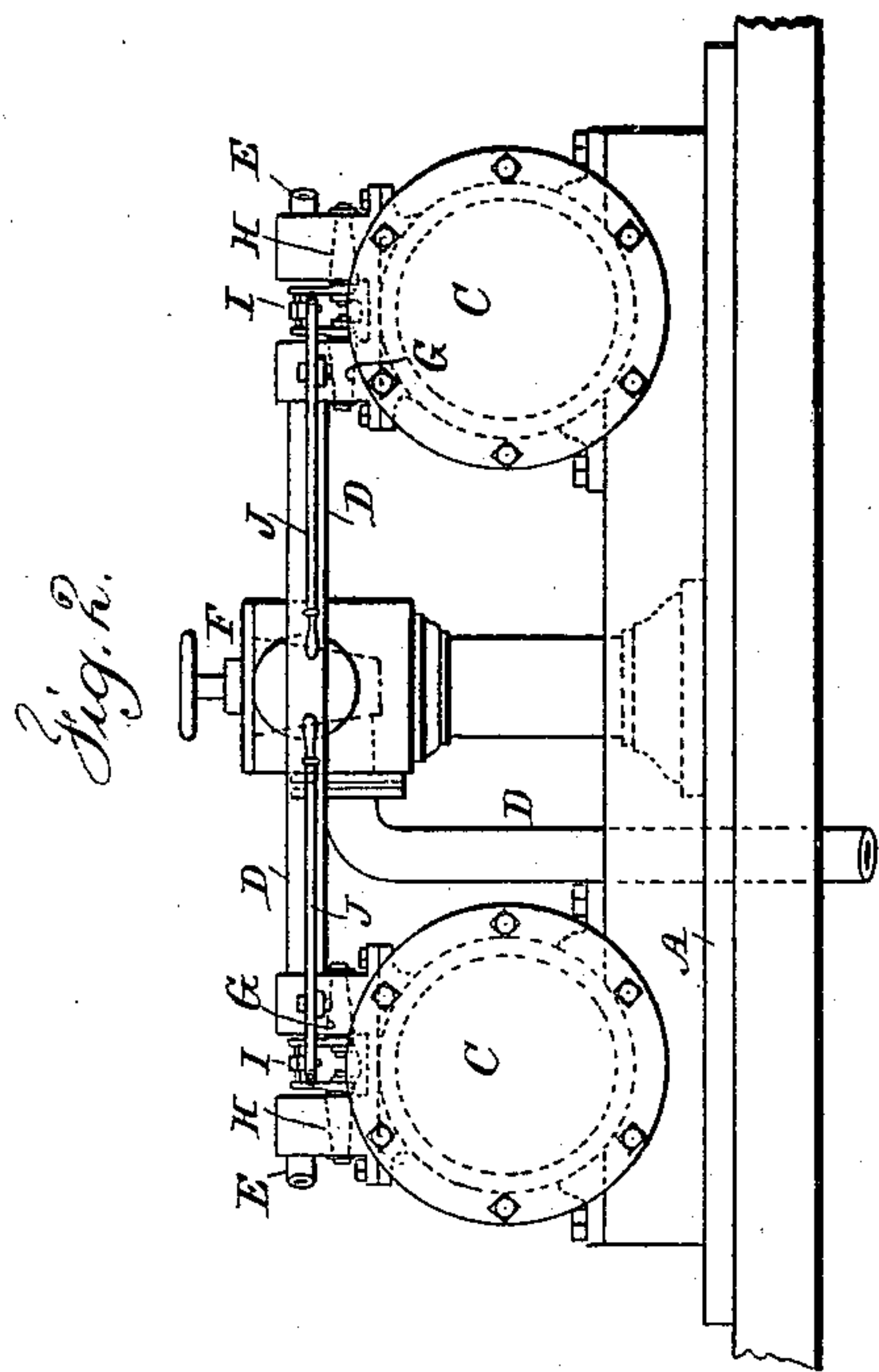
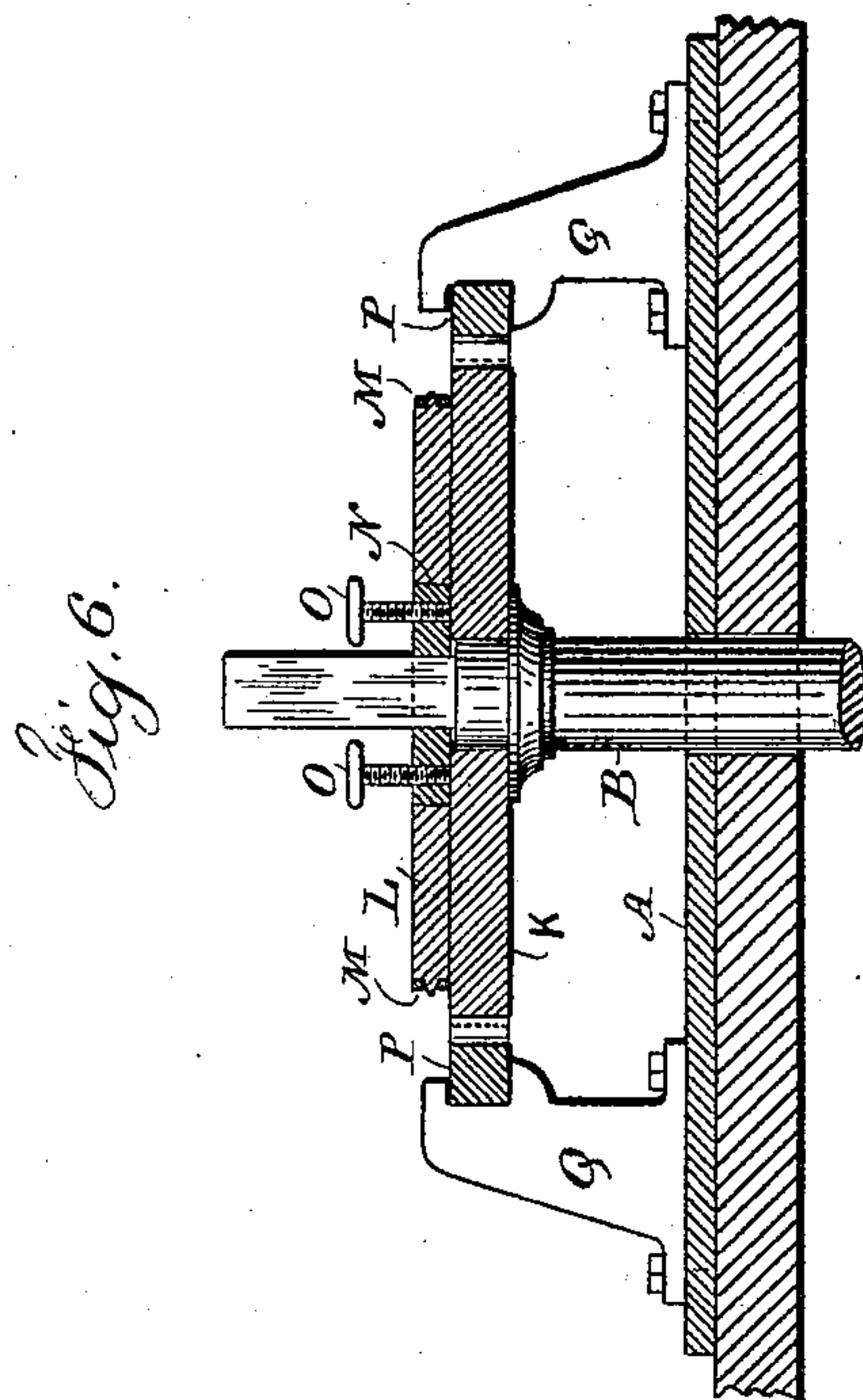
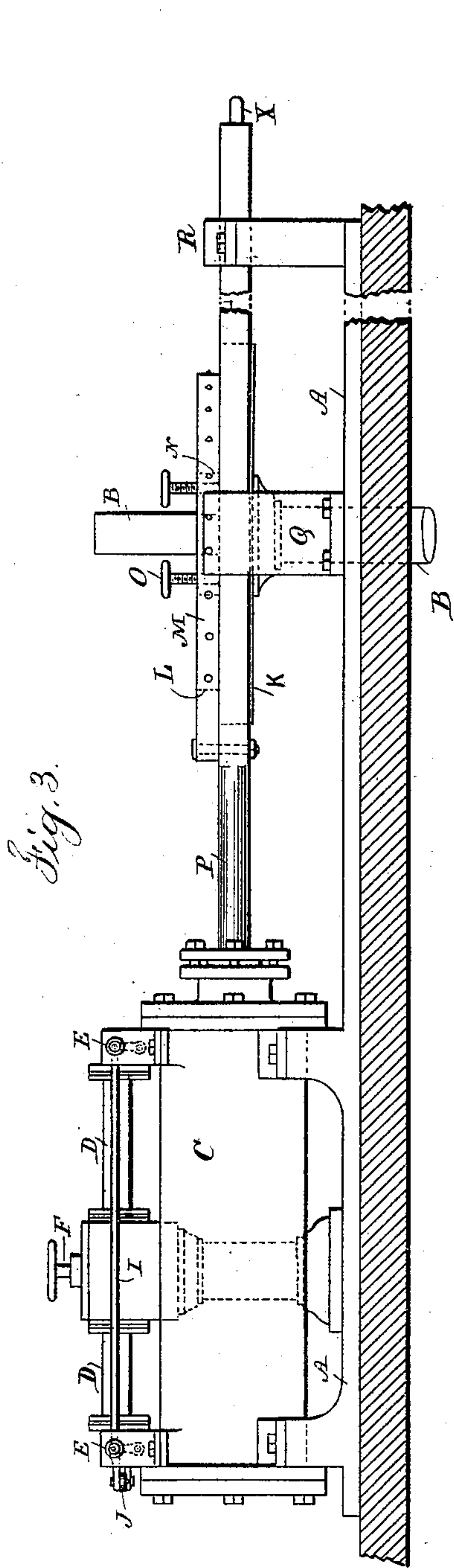
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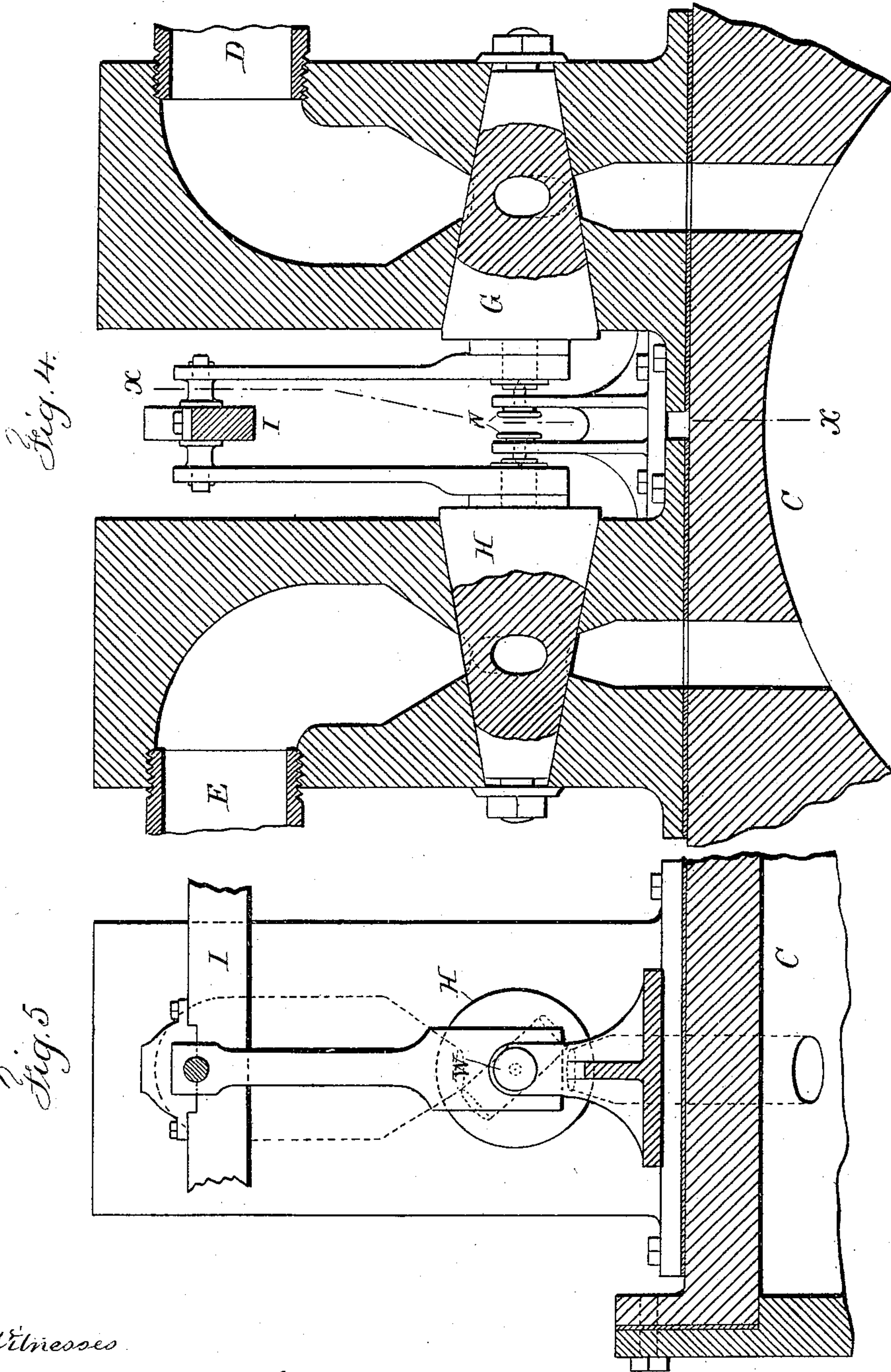
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

ARTHUR O. TAYLOR, OF NEW YORK, N. Y.

STEERING-GEAR.

SPECIFICATION forming part of Letters Patent No. 616,211, dated December 20, 1898.

Application filed December 20, 1897. Serial No. 662,766. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR O. TAYLOR, a citizen of the United States, residing at New York, (Brooklyn,) in the county of Kings and State of New York, have invented a new and useful Compressed-Air Steering-Gear for Vessels, of which the following is a specification.

My invention relates to a machine for the special purpose of steering large vessels by the combination of two cylinders, preferably resting horizontally on a frame and bed-plate and provided with pistons and piston-rods with rack ends and operated in opposite directions by compressed air and actuating a toothed and chain wheel on the rudder-stock. The piston-rods are moved in opposite directions, and two levers attached to controlling-rods open and close two sets of coned valves on each cylinder to admit the compressed air and actuate the mechanism.

The object of my invention is, first, to provide a simple and powerful direct-acting steering-gear for all classes of large vessels, where great power, quick action, and simplicity of mechanism and operation are the principal features; second, a steering-gear that can be successfully operated by any person of ordinary intelligence with but little or no exertion, and, third, a steering-gear the mechanism of which is in full view of the operator at all times or which can be operated from any part of the vessel by the use of electrical appliances, if so desired. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan of the entire machine, partially in section. Fig. 2 is an elevation at the cylinder end of the machine. Fig. 3 is a side elevation of the machine as shown in Fig. 1. Fig. 4 is a vertical longitudinal section and partial elevation of the valve system in large size, and Fig. 5 is a side elevation and section at xx of Fig. 4 and at right angles thereto; and Fig. 6 is a cross-section of the rack ends of the piston-rods and an elevation of their guides and of the toothed wheels, rudder-stock, and collar.

A is the bed-plate, of forged steel, to be securely bolted to the deck of a vessel and through which the rudder-stock B passes.

C are the cylinders; D, the service-pipe; E, the exhaust-pipes; F, the throttle-valve;

G, the coned valves to the cylinder, and H the exhaust-valves. The four valves (two service and two exhaust) of each cylinder are connected by cranks to a controlling-rod I and operated by a lever J. These parts are duplicated at the other cylinder.

When the levers J are at the center position, the valves of each cylinder are all closed, thus forming air-cushions in the opposite ends of the cylinders that maintain the parts in position. The exhaust-valves may be so set as to exhaust the air gradually or otherwise to suit the workings of the machine.

The piston-rods are preferably operated together by the separate levers J. In cases where there is any damage to either cylinder or its mechanism the mechanism of the other cylinder can be operated independently by bringing the levers to a central position in line with one another and then opening petcocks (not shown in the drawings) on the under side of and at both ends of the cylinder to remain inactive, so as to allow all air under pressure to escape therefrom. In this position the other cylinder is operated at the expenditure of greater power. Both cylinders can thus be rendered inactive and the rudder be operated in case of emergency by any usual or substitute mechanism temporarily employed.

K is a toothed wheel which is loose upon the shoulder of the rudder-stock, but is connected thereto, as hereinafter described. L is also a wheel securely bolted to the toothed wheel K and is in the form of a sprocket-wheel, part way around which a flat-linked chain or band M passes and is securely fastened at each end to the piston-rods. In the center of the sprocket or chain wheel L is a square or other shaped opening through the center of the wheel, in which a collar N, of square or similar shape, is fitted.

O are hand-screws passing through the collar N for raising the same and disconnecting the toothed wheel from the rudder-stock. The object of disconnecting the toothed wheel from the rudder-stock is to permit the application of a tiller attachment in connection with any auxiliary gear that may be desirable while the mechanism may be undergoing repairs.

P are the piston-rods. The piston-rods move

in solid-steel guides Q, set at opposite points to the rudder-stock, and said rods pass through bearings in the end of the frame of the machine, (indicated by R.) The pistons are
5 made in any well-known or desired manner.

V are packing-boxes designed so as to hold and set up the packing around the piston-rods in the cylinder-heads.

W are set-screws with lock-nuts to take up
10 wear in valves.

X are rings on the ends of the piston-rods for connecting the rudder-chains.

I prefer to employ petcocks (not shown in the drawings) on under side of and at each
15 end of the cylinders to allow all air to escape therefrom while using one cylinder or when repairs are necessary to be made.

The above-described compressed-air steering-gear is operated in the following manner:
20 By opening the throttle-valve the air-pressure is admitted as far as the conical valves G to the cylinders. Then by moving the two levers in opposite directions the service-valves are opened and exhaust-valves closed in op-
25 posite ends of the cylinders, or to render the valve system more easy of comprehension I would state that the supply-valve is opened and the exhaust-valve closed in the end of the cylinder where the air is admitted, while
30 the exhaust is opened and the supply closed at the other end of the cylinder. Thus by moving the levers in opposite directions the piston-rods are forced in opposite directions, one pushing and the other pulling the toothed
35 and chain wheels and turning the rudder-stock and rudder. By reversing the position of the levers the opposite result is attained and an air-cushion maintained in the oppo-
40 site ends of the cylinders at all times capable of resisting all wave-shock and providing an air-cushion, allowing the rudder to give slightly in either direction and return to its original position without moving the levers.

If either cylinder should need repairs, it
45 can be disconnected by bringing its lever to center position, which cuts off the supply, and opening the petcocks on the under side of the cylinder and allowing the air contained therein to escape, when the other cylinder
50 may be used to operate the gear, but at the expenditure of increased power.

The machine partly rests on the rudder-stock and tends to resist all pumping of the rudder, and by the use of a toothed and chain
55 wheel it renders the chocking of the rudder impossible, as the strain is directly on the center of the rudder-stock at all times.

I claim as my invention—

1. The combination with cylinders for com-
60 pressed air, their pistons and piston-rods, of teeth forming racks in opposite edges of projections on said rods, the rudder-stock, a toothed wheel upon the rudder-stock mesh-
ing with the rack-teeth, valves for supplying
65 compressed air to the opposite ends of the cylinders to actuate the pistons in opposite

directions, means for supplying compressed air to the valves from a common source of supply, and means for operating the valves, substantially as specified. 70

2. The combination with cylinders for compressed air, their pistons and piston-rods, of teeth forming racks in opposite edges of projections on said rods, the rudder-stock, a
75 toothed wheel upon the rudder-stock meshing with the rack-teeth, a second wheel in the form of a sprocket connected to the toothed wheel and a chain or band passing part way around the same and connected at its re-
80 spective ends to the piston-rods, valves for supplying compressed air to the opposite ends of the cylinders to actuate the pistons in opposite directions, means for supplying compressed air to the valves from a common
85 source of supply and means for operating the valves, substantially as specified.

3. The combination with cylinders for compressed air, their pistons and piston-rods and means for operating the same, of teeth forming racks in opposite edges of projections of
90 the piston-rods, the rudder-stock squared at the upper end, a toothed wheel supported upon the rudder-stock and having an open center of square or other shape and meshing with the rack-teeth, a collar upon the squared
95 end of the rudder-stock peripherally agreeing with the open center of the toothed wheel, and adapted to enter said center and effect the engagement of the wheel and rudder-stock, and means for elevating the collar and
100 disengaging the parts, substantially as specified.

4. The combination with cylinders for compressed air, their pistons, piston-rods, the rudder-stock and means actuated by the piston-
105 rods for turning the rudder-stock, of valves at the opposite ends of the cylinders, rods and cranks connecting the valves, levers for actuating the valves of the cylinders in sets, service-pipes and a throttle-valve common to
110 said pipes for supplying the valves with compressed air, substantially as specified.

5. The combination with cylinders for compressed air, their pistons, piston-rods, the rudder-stock and means actuated by the piston-
115 rods for turning the rudder-stock, of conical supply and exhaust valves in pairs at the opposite ends of each cylinder, exhaust-pipes from the exhaust-valves, service-pipes connecting the supply-valves at corresponding
120 ends of the cylinders and to a common throttle-valve or source of supply, cranks and rods connecting the pairs of valves at one end of the cylinder with those at the other end, and pivoted levers adapted to be moved in alter-
125 nate opposite directions for actuating the supply and exhaust valves, substantially as and for the purposes set forth.

ARTHUR O. TAYLOR.

Witnesses:

WALTER F. NIGHTINGALE,
EDWARD V. LEWIS.