

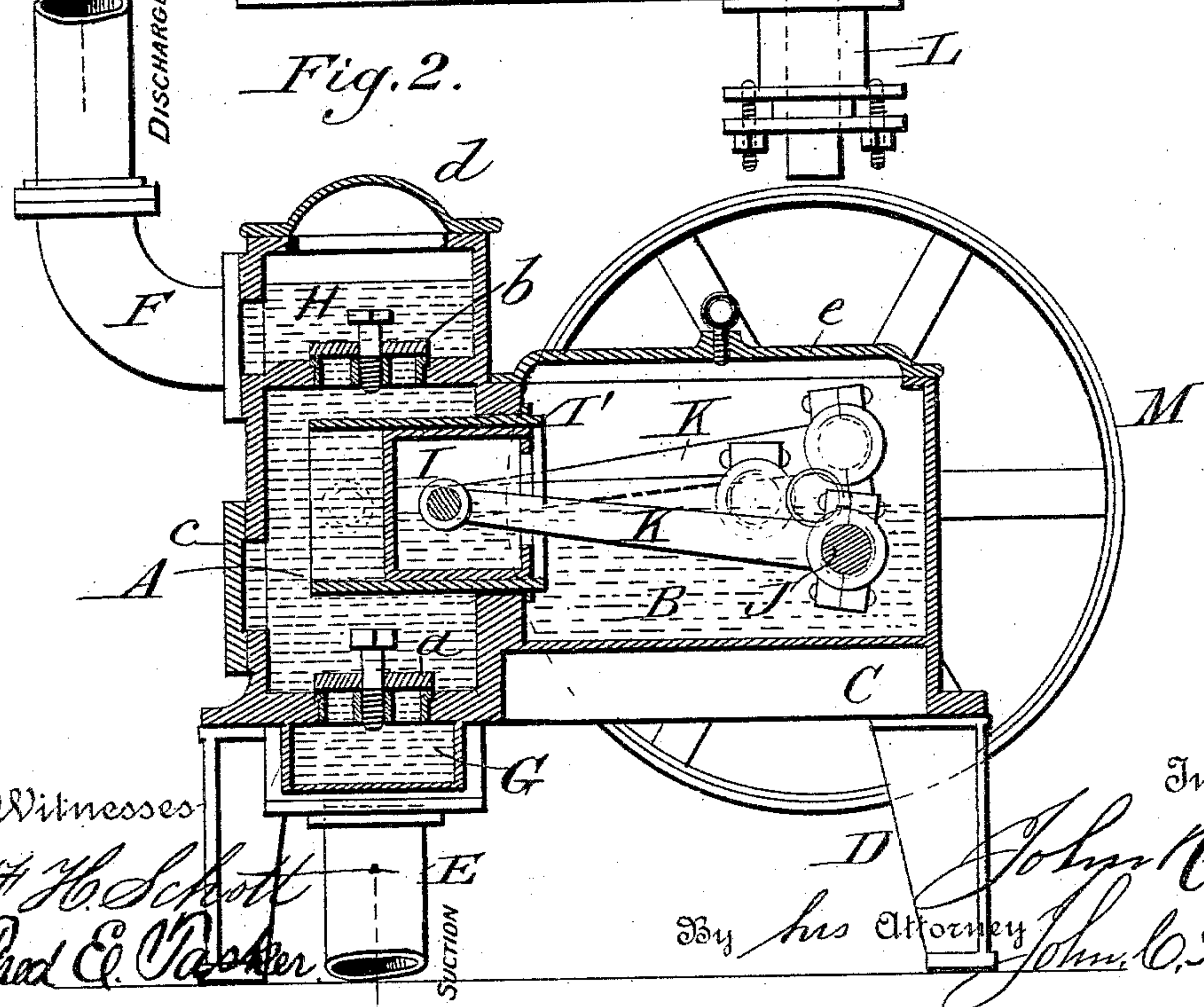
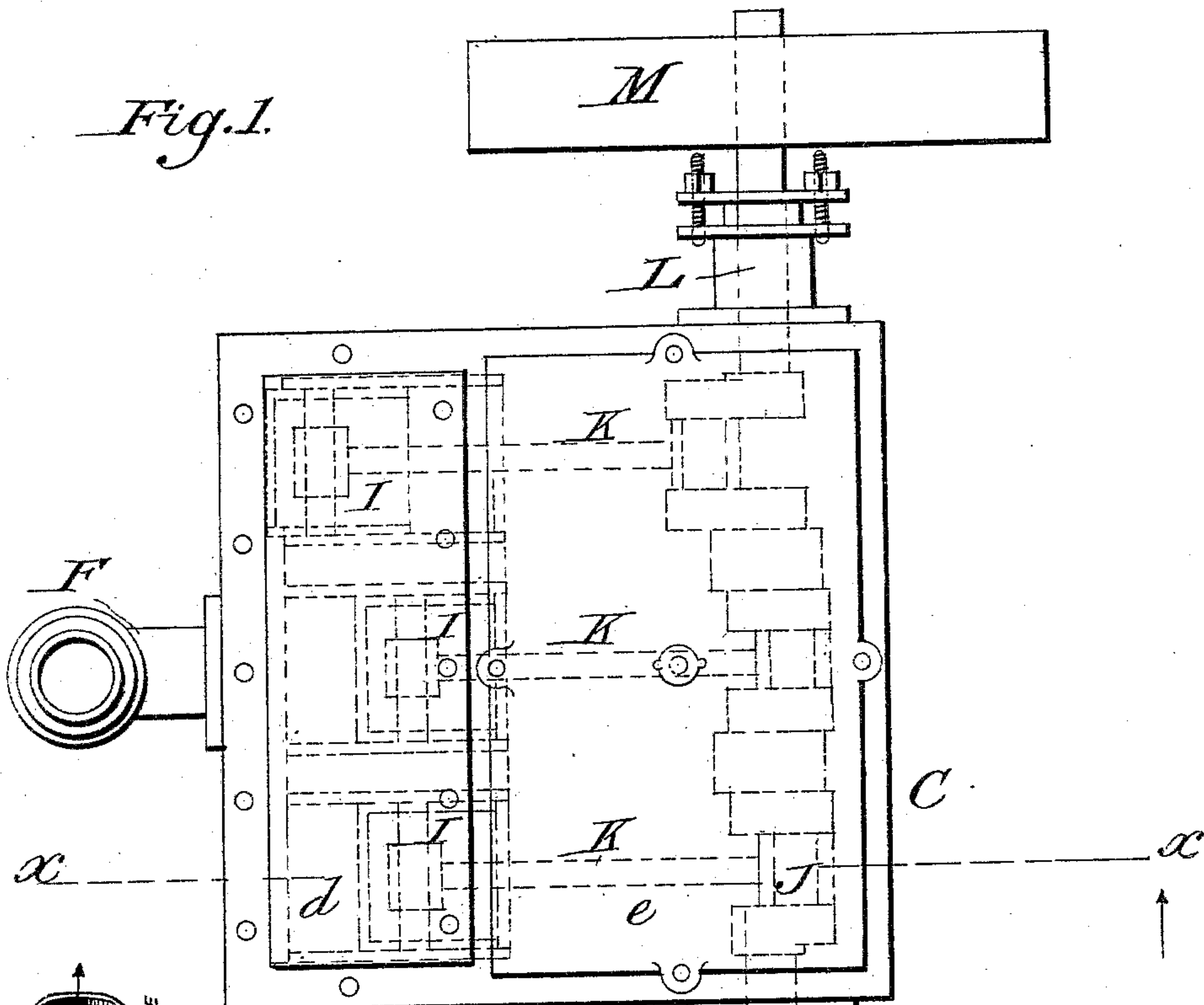
(No Model.)

2 Sheets—Sheet 1.

J. RICHARDS.  
PUMPING MACHINE.

No. 411,680.

Patented Sept. 24, 1889.



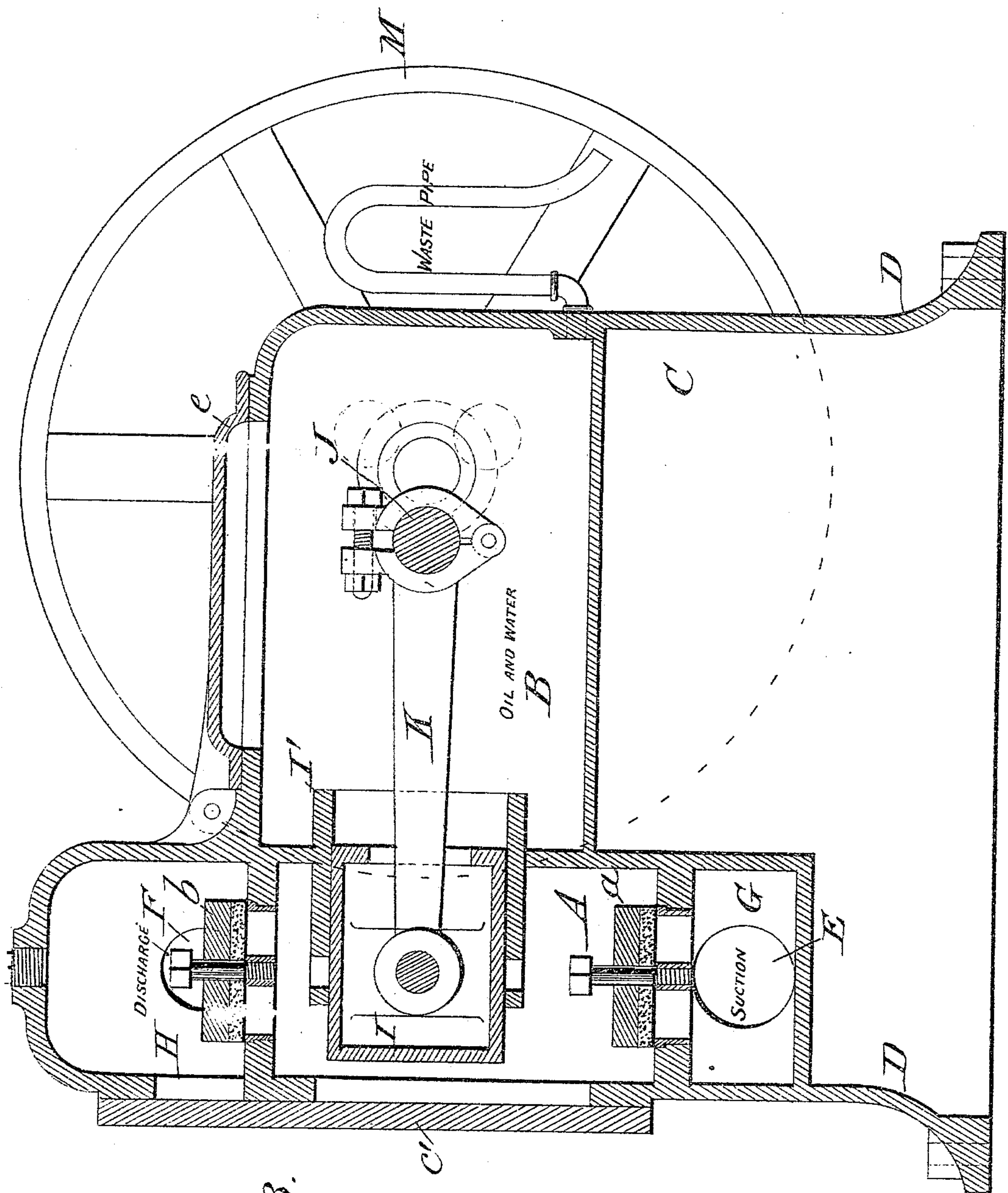
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# UNITED STATES PATENT OFFICE.

JOHN RICHARDS, OF SAN FRANCISCO, CALIFORNIA.

## PUMPING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 411,680, dated September 24, 1889.

Application filed March 27, 1888. Serial No. 268,606. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN RICHARDS, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Pumping-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention has reference to a pumping-machine or forcing-pump for liquids, the object thereof being to construct a water-raising machine which will offer a constant and uniform resistance to the driving-power, one that will operate without noise or jar, and will maintain without attention a constant lubrication of the pistons and actuating mechanism.

The invention consists, essentially, in a pump casing or frame having separate chambers for the fluid which is being pumped and the lubricating-fluid, the interiors of both of said chambers being readily accessible by the provision of suitable removable plates or covers.

It consists, also, in a multiple, triple, or double single-acting piston connected to and actuated by a single-crank shaft and its connections, said shaft being inclosed in the chamber which contains the lubricating-liquid, so as to be partially submerged in the oil and water or other lubricating mixture in like manner with the shaft shown and described in my former patent, No. 350,446, granted October 5, 1886. The lubricating-liquid during the rotary action of the crank-shaft is dashed into all the journal-bearings and also thrown forcibly into the pump-cylinders, so that the piston or pistons will be subjected to a constant, thorough, and complete lubrication. The pump-pistons are exposed on the one side to a mixture of oil and water or other lubricating-fluid, while on the other side they are exposed to the liquid which is undergoing the process of being pumped. The pump-pistons are therefore located and have their seat of action midway between the two chambers above mentioned—to wit, the one containing

the fluid which is being pumped and that containing the lubricant.

The invention furthermore comprises the feature of a pump-chamber with its pistons in connection with a lubricant and crank-shaft-containing chamber, both of which are covered, provided, or furnished with removable plates or covers which afford access to the valves of the pump, the cranks, crank-shaft pistons, lubricating material, and other things within said chamber.

It also consists in a vertically-located fluid-containing chamber having induction and eduction valves arranged vertically one above the other, so that the water may be enabled to maintain nearly a straight course while passing through the machine, the upper or eduction valve being covered with a concave plate in such a manner as to form an air-vessel above said valve.

In addition to these general characteristic and essential features of my improved triple single-acting pumping-machine it may be stated that the invention covers certain other peculiarities and details in the construction, arrangement, and combination of parts, substantially as will be hereinafter fully described, and then particularly pointed out in the appended claims.

In the accompanying drawings, illustrating my invention, Figure 1 is a plan view of my improved pumping-machine. Fig. 2 is a vertical section of the same on the line  $x x$  of Fig. 1. Fig. 3 is a similar view to Fig. 2, showing a modification in the construction of the machine.

Similar letters of reference designate corresponding parts throughout the different figures.

C denotes the frame of the pumping-machine. Its general form is that of a rectangular box-frame mounted on standards D D, which may be of any desired height. The form and structure, however, of the frame used to support the several parts of my pumping-machine may vary within wide limits from the example depicted in the drawings, since I am confined to no special structure in the frame-work or any specified mode of mounting it. The box-frame contains two



main chambers located contiguous to each other, one of which A contains the fluid which is being pumped, while the other B contains the actuating mechanism for the pistons and likewise the lubricant for oiling said mechanism. A suction-pipe E enters the bottom of chamber A and through it water enters said chamber. The suction-pipe may be arranged in many different ways beneath the machine since the standards or supports D elevate the machine to such an extent as to give freedom to the arrangement of the suction-pipe and its connection with the machine.

From the upper portion of the chamber A extends a discharge-pipe F, which conveys water away from the machine and through which water is forced by the action of the pumping machinery. At the bottom of the chamber A is formed a small chamber G, which is entered by the suction-pipe E and which communicates with the main interior of chamber A by a valve *a*. Water drawn in through the suction-pipe will first enter, therefore, the compartment G and pass thence through the valve *a* into the interior of chamber A. In the upper portion of chamber A is a compartment H, from which the discharge-pipe leads outward, said compartment H communicating with the main interior of chamber A through the valve *b*. The induction-valve *a* and the eduction-valve *b* are located in line vertically with each other, so that the water in passing through the machine pursues a straight course. The chamber A is furnished with a plate or cover *c*, whereby easy access is had to the induction-valve. (See Fig. 2.) The upper end of the compartment H is provided with a removable plate *d*, by means of which access can be had to the eduction-valve. This plate is concaved on the interior, so that a sort of an air vessel or chamber of greater or less size is provided above the water contained within chamber A and upper compartment H.

In order to force the water inward from the suction-pipe through the induction-valve and then out through the eduction-valve into the discharge, I provide a piston or pistons, which are preferably arranged to reciprocate horizontally, said piston or pistons being single or multiple, as desired.

In the example of my invention shown in the drawings I have chosen to represent a triple-piston pumping-machine consisting of three pistons I I I, located and operating within removable sleeves I', sustained and upheld in a horizontal position in the framework of the machine between the chambers A and B. These sleeves are really pump-barrels, and they connect the chambers A B and contain the pump-pistons. The pistons I are connected by means of links or connecting-rods K to a three-throw crank-shaft J, journaled horizontally in boxes L L, carried by the frame, and provided with packing-glands to make a tight joint and prevent the escape of the lubricating-fluid with which

the chamber B is partially filled, in a manner and for the purpose to be presently explained.

The crank-shaft J is rotated by the application of driving-power to a pulley M, secured upon said shaft, or it may be actuated in any other convenient manner.

The upper side of the chamber B is provided with a plate or cover *e*, so that easy entrance is had to the crank-shaft and its connections, as also to every part of the interior of the lubricant-chamber. Chamber B contains a sufficient quantity of oil or mixed oil and water or other approved lubricating-fluid to cause a thorough and complete lubrication of all the mechanical parts within chamber B during their operation, for as the crank-shaft revolves and the pistons reciprocate, and the connecting-links vibrate, all of said parts moving in contact with the lubricating-liquid, this must of necessity be dashed into all the bearings and splashed among all the moving parts, so as to accomplish a most complete and perfect lubrication. It will be noted that the pistons I I, which it has been seen reciprocate within guide sleeves or barrels supported midway of the contiguous chambers A B, are exposed on one side to contact with the lubricant, which splashes in all directions within the chamber B during the movement of the mechanical parts therein, while on the other side these pistons are acting on the water within the chamber A and causing it to be inducted through the suction and expelled through the discharge.

In Fig. 3 are shown various modifications in the structure of the rectangular box-frame and the details in the arrangements of the several chambers thereof; but all these details are only differences in mechanical construction and involve no departure from the radical principles and leading features of the invention, as already indicated in the statement of invention and outlined in the description.

In Fig. 3 the suction-pipe E, instead of entering the compartment G through the bottom, enters it through the side. The discharge-pipe F is made to emerge from compartment H on a different side from that in Fig. 1. The induction and eduction valves *a* and *b* are of different construction; but this simply shows that I may employ either the style of valve shown in Fig. 1, or that shown in Fig. 3, or any other style which may seem best adapted and suited for the purpose.

In Fig. 3, instead of having a small opening in the chamber A, closed by a plate *c*, said opening serving simply to give access to the induction-valve, the entire outside wall of chamber A, including the wall of compartment H—that is to say, the entire outside wall of said chamber on the side opposite to chamber B—is open and adapted to be covered by a plate *c'*. By the removal of this single plate, therefore, it will be observed that access can be had not only to the induc-



tion-valve but also to the eduction-valve, and in fact to the entire interior of chamber A.

Instead of having a removable plate *d*, located above the air-vessel and covering the upper end of compartment H, the compartment H is made solid with no opening except a central bore containing a screw-plug, and said compartment being large enough to afford an air-space in the upper interior.

In Fig. 1 the pump barrels or cylinders I' are removable. In Fig. 3 I find it preferable to make them solid and integral with the frame.

In Fig. 3 the chamber B is provided with a waste-pipe.

Other immaterial changes in the structure may be discerned upon further inspection of Fig. 3; but it is unnecessary now to refer to them in fuller detail than has already been stated.

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

1. In a pumping-machine, the fluid-chamber having ingress and egress valves arranged in line vertically with each other, in combination with a lubricant-chamber, single or multiple pistons located between the chambers, and actuating mechanism therefor arranged in contact with the lubricating-liquid, substantially as described.

2. In a pumping-machine, the combination of the supporting box-frame, the fluid-chamber having ingress and egress valves located in vertical line with each other, the lubricant-chamber contiguous to the fluid-chamber, the horizontally-reciprocating pistons operating in guide-sleeves between the chambers, and the actuating mechanism for the pistons, consisting of a crank-shaft and connecting-links arranged in the lubricant-chamber, in the manner and for the purpose substantially as described.

3. In a pumping-machine, the chamber containing lubricating-liquid, in combination with the horizontally-moving pistons of the pumping mechanism, the crank-shaft, and the connecting-links, said parts operating within the lubricant, substantially in the manner and for the purpose specified.

4. In a pumping-machine, the combination of the fluid-chamber, the lubricant-chamber contiguous thereto, and multiple single acting pistons, operating in sleeves supported between the two chambers, as shown, said pistons being exposed on one side to contact with the lubricant and on the other side to contact with the fluid which is being pumped, substantially as described.

5. In a pumping-machine, the two chambers, one containing the fluid to be pumped,

the other a lubricant, in combination with pump-barrels between these chambers and pistons operating therein, said pistons being exposed on one side to pumping-fluid and on the other to the lubricant, substantially as described.

6. In a pumping-machine, the combination of the fluid-chamber, the upper and lower compartments therein, as specified, the discharge and suction pipes entering said compartments, respectively, the ingress and egress valves between said compartments and the main interior of the fluid-chamber, the lubricant-chamber, the multiple pump-pistons, the sleeves or barrels within which they operate, and actuating mechanism for said pistons, substantially as described.

7. In a single or multiple pumping-machine, the combination of the supporting frame-work of the machine with two contiguous chambers, one serving as a fluid-chamber and containing the ingress and egress valves, and the other being used as a lubricant-chamber and containing the actuating mechanism of the pump, all substantially as described.

8. The combination of the supporting-frame, the fluid-chamber containing ingress and egress valves vertically in line with each other and provided with a removable plate for access to the ingress-valve and another removable plate for access to the egress-valve and having also an air-chamber above the egress-valve, the lubricant-chamber having a removable plate for access to its interior, and the pumping-pistons, arranged substantially as described.

9. The combination of the rectangular box-frame C, the contiguous chambers A and B, said chamber A having compartments G and H and valves *a* and *b*, the pistons I, crank-shaft J, and link-connections K, all substantially as described.

10. The combination of the fluid-chamber A, lubricant-chamber B, pump barrels or sleeves I', pistons I, crank-shaft J, link-connections K, and a driving-power for the crank-shaft, all substantially as described.

11. The combination of the frame C, having supports D, the chamber A, with discharge F and suction E, the valves *a* and *b*, and compartments G and H in said chamber A, the chamber B, containing lubricant, pump-barrels I', pistons I, shaft J, and links K, substantially as described.

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

JOHN RICHARDS.

Witnesses:

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ALFRED A. ENQUIST.