

(No Model.)

J. McFARLANE.  
STEAM OR VACUUM PUMP.

No. 406,590.

Patented July 9, 1889.

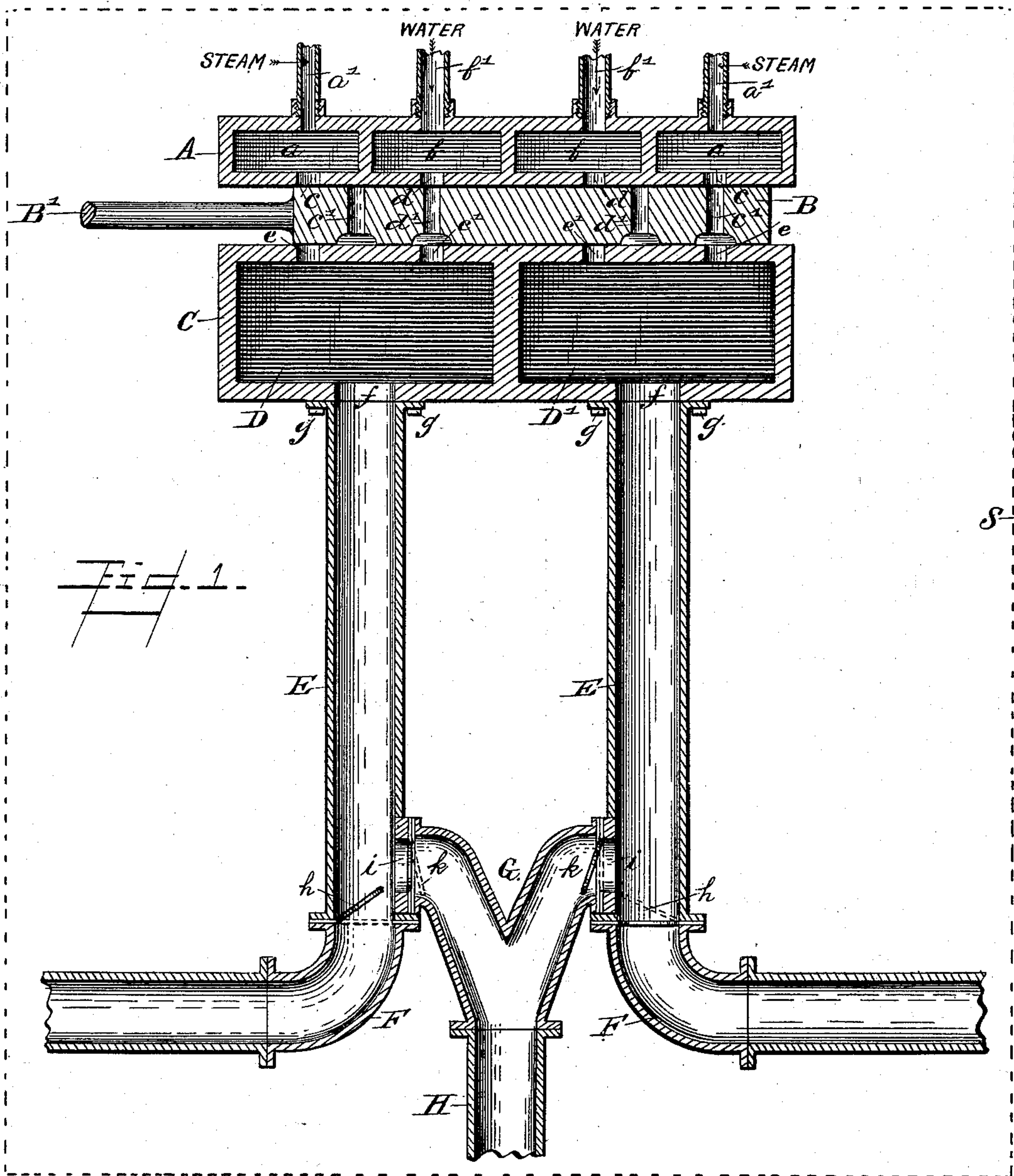
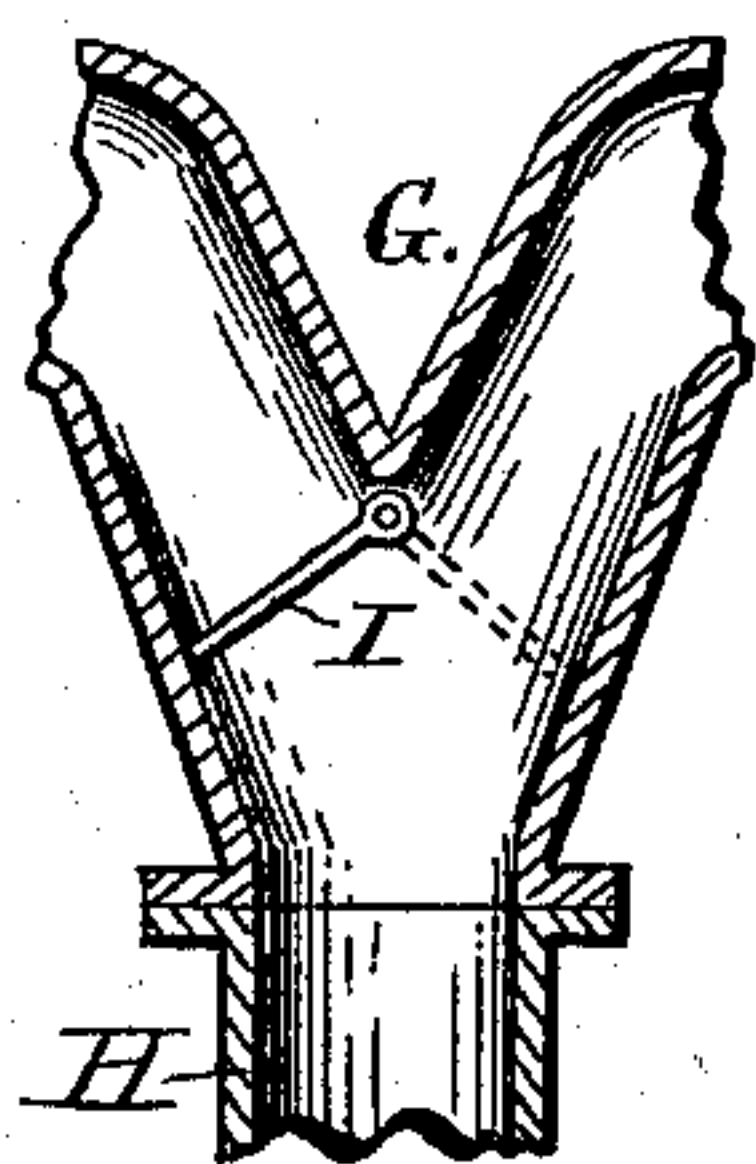


Fig. 2



WITNESSES

John Blackwood  
Wm. Clagett

INVENTOR

John McFarlane  
by Geo. G. Schroeder & Co

Attorneys.



# UNITED STATES PATENT OFFICE.

JOHN MCFARLANE, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF TWO-THIRDS TO GEORGE J. BESSLER AND HENRY WEX, OF SAME PLACE.

## STEAM AND VACUUM PUMP.

SPECIFICATION forming part of Letters Patent No. 406,590, dated July 9, 1889.

Application filed March 27, 1889. Serial No. 304,922. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN MCFARLANE, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Steam and Vacuum Pumps; 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 invention relates to certain new and useful improvements in dredgers, and more especially to the pumping mechanism of such machine. The object I have in view is to so improve the pumping mechanism of such machines that the same will perform a continuous operation, while at the same time it will occupy a convenient position on the dredger and occupy but a limited space; and a further object is to improve the construction and arrangement of the suction and discharge pipes and the valves used in connection therewith.

To the accomplishment of the above the invention consists in the novel construction and arrangement of certain parts and in the novel combination of parts, as will be fully described and illustrated and specifically claimed.

Reference will be made to the accompanying drawings, in which Figure 1 is a longitudinal section through the pumping mechanism and discharge-pipes, and Fig. 2 a sectional detail showing a modified arrangement of the valve in the discharge-pipe.

In the drawings, A represents a box or casing suitably mounted upon the dredger and divided into four compartments, the end compartments *a a* being connected with suitable steam-inlets *a' a'* and the intermediate compartments *b b* with water-inlets *b' b'*. By the provision of these compartments *a* and *b* a large volume of steam and water is always in readiness when the proper ports are in line. On the front face this box or casing A is provided with four openings or ports *c c* and *d d*, one for each compartment *a b*, the ports *c c* leading into compartments *a* and the ports *d d* into compartments *b*.

B represents a reciprocating valve provided

with a valve-rod B' and driven by any suitable engine. This valve moves between the casing A before referred to and a casing C to be described. Valve B is provided with four ports *c' c' d' d'*, the ports *c' c'* adapted to register at intervals with the ports *c c* of casing A and the ports *d' d'* with the ports *d d*. These ports of valve B are so arranged with respect to each other and to the ports of casing A that upon one stroke of the engine one port *c'* will register with its corresponding port *c* and one port *d'* with its corresponding port *d*, the remaining ports *c'* and *d'* not registering with their respective ports of casing A, while upon the return-stroke of the engine the ports of the valve before registering will be carried from their registering-ports, while those not registering at first will do so, this opening and closing of different sets of ports being continued with each stroke of the engine, the arrangement being such that there will always be communication between the valve and one water and one steam compartment.

The casing C, hereinbefore referred to, is divided into two compartments D D', and is provided on its rear face with four ports *e e* and *e' e'*, one port *e* and one port *e'* leading into each compartment. These ports are arranged in line with the ports *c d* of casing A, the ports *e e* being in line with ports *c c* and ports *e' e'* in line with ports *d d*. These ports being in line with the ports of casing A, it will of course follow that when the ports of the valve B register with the ports of such casing they will register with those of casing C, and means thus obtained for admitting water and steam alternately to each of compartments D D', the water being admitted to one compartment as steam is admitted to the other. Each compartment D D' is provided at its front end with an opening *f*, around which a pipe E is fitted, said pipes being secured to the casing C in any suitable manner, as by bolts *g*, as shown. These pipes E, which form the suction-pipes of the pump, are of any suitable size. They are arranged horizontally of the deck of the dredger, and their forward ends are each provided with a joint F, which is adapted to pass over the end of



the dredger and connected with the ordinary telescope-pipe, which is lowered into the water. At the point where each pipe is connected with the joint F a rearwardly-opening valve *h* is provided, said valves being hinged to the inside of the pipes E and having suitable seats therein. The pipes E are connected by a Y G, the arms of which are connected with the pipes E at points to the rear of the point of connection between such pipes and the joint F, and surround openings *i* formed in said pipes.

H is a discharge-pipe connected with the nozzle of Y G, and adapted to be directed to any part of the dredge where the mud is to be dumped.

The orifice *i* of each pipe E is provided with a valve *k*, arranged to swing backwardly into the Y.

In Fig. 2 I show an arrangement by which the valves *k* may be dispensed with, such arrangement consisting of a single valve I, pivoted at the apex of the arms of the Y and adapted to seat upon either of such arms.

The operation of the machine is as follows: The parts all being in position, the engine is started, and at its first stroke will bring one port *d'* of the valve B into line with ports *d* and *e'* of one compartment *b* and the chamber D, respectively, thus admitting water to such chamber, one port *c'* at the same time registering with ports *c* and *e* of one compartment *a* and the chamber D', steam being thus admitted to the last-named chamber. The return-stroke of the engine will cause the remaining port *c'* to register with the remaining ports *e* and *c*, and thereby admit steam to the chamber D, water at the same time being admitted to chamber D through the suitable ports. By the admission of the steam upon the water in chamber D any water or mud in such chamber is forced therefrom and through the pipe E, the valve *h* of such pipe being closed and the valve *k* of the Y G opened. During this operation, water having been forced upon the steam in chamber D', a vacuum is formed in such chamber, causing a suction in the pipe E, communicating with such chamber, and thereby drawing the mud

into said pipe, the valve *h* being forced open thereby and the valve *k* of the Y G closed. The following stroke of the engine will reverse the motion, drawing the mud into the pipe communicating with chamber D and forcing it from the pipe communicating with chamber D'. Where the single valve I is used in the Y the discharge through one branch of said Y will force said valve to a seat on the remaining branch or arm.

Having described my invention, what I claim is—

1. In a vacuum-pump for dredgers, the combination, with a casing divided into two vacuum-chambers and a casing divided into two sets of water and steam compartments, of a reciprocating valve provided with ports, as described, and arranged to admit water and steam alternately into each vacuum-chamber, as and for the purpose set forth.

2. In a vacuum-pump for dredgers, the combination, with a casing divided into two vacuum-chambers and a casing divided into two sets of water and steam compartments, of a reciprocating valve provided with ports, as described, and arranged to admit water and steam alternately into each vacuum-chamber, and suction-pipes communicating with the vacuum-chambers, and valves situated in such suction-pipes, as set forth.

3. In a vacuum-pump for dredgers, the combination, with a casing divided into two vacuum-chambers and a casing divided into two sets of water and steam compartments, of a reciprocating valve provided with ports, as described, and arranged to admit water and steam alternately into each vacuum-chamber, suction-pipes communicating with the vacuum-chambers, and a Y-shaped discharge communicating with such suction-pipes, and a valve situated in such suction-pipes, and a valve situated in the Y, as set forth.

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

JOHN MCFARLANE.

Witnesses:

M. J. CLAGETT,  
RICHARD W. EMMONS.