

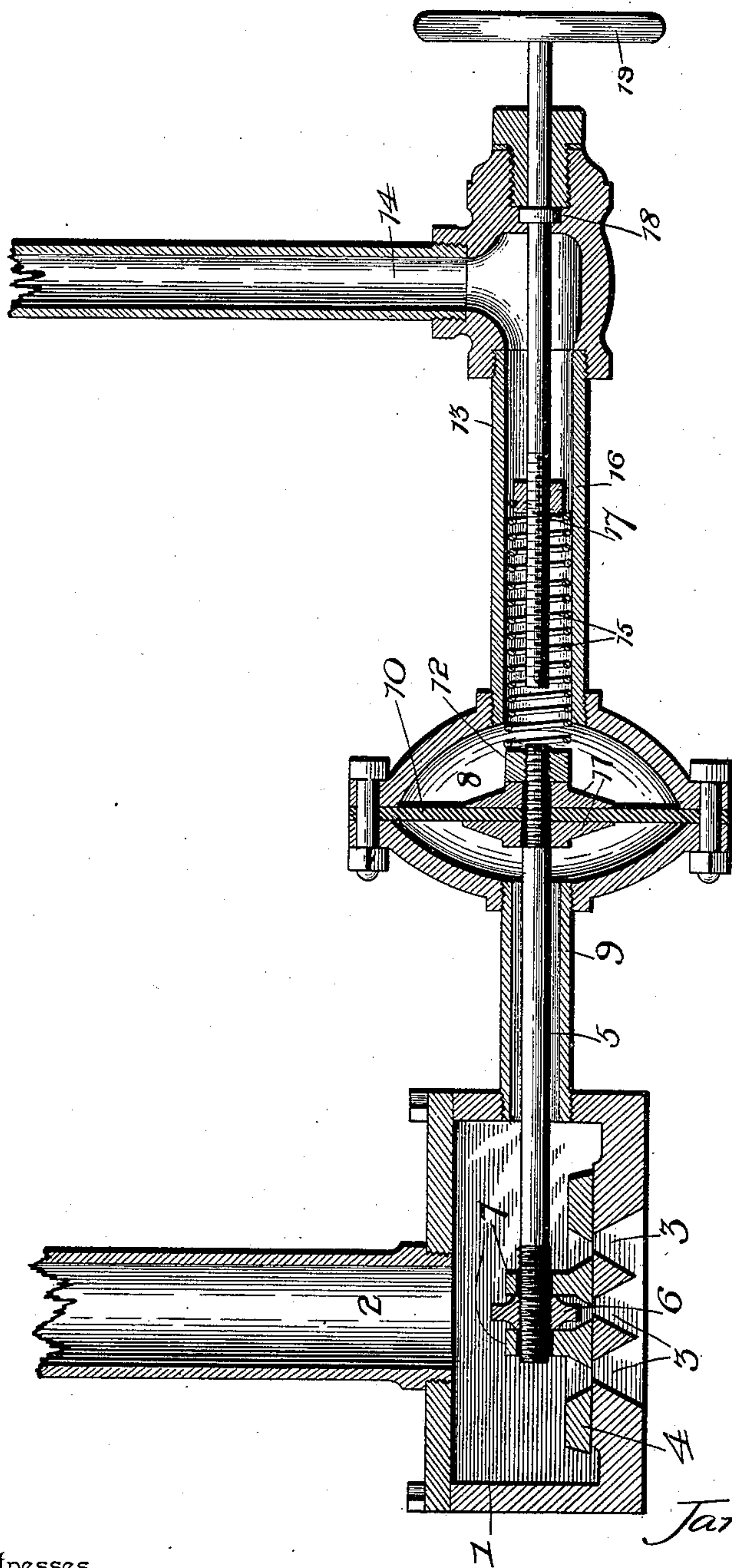
(No Model.)

J. H. MACDONALD.

PRESSURE ACTUATED GOVERNOR FOR PUMPS.

No. 601,664.

Patented Apr. 5, 1898.



Inventor
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Witnesses

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JAMES HENRY MACDONALD, OF ATHOL, MASSACHUSETTS.

PRESSURE-ACTUATED GOVERNOR FOR PUMPS.

SPECIFICATION forming part of Letters Patent No. 601,664, dated April 5, 1898.

Application filed June 10, 1897. Serial No. 640,206. (No model.)

To all whom it may concern:

Be it known that I, JAMES HENRY MACDONALD, a citizen of the United States, residing at Athol, in the county of Worcester and State of Massachusetts, have invented a new and useful Pressure-Actuated Governor for Pumps, of which the following is a specification.

My invention relates to pressure-actuated regulating devices for controlling the admission of steam or other fluid motive agent to a cylinder, whereby when a fluid under compression—such as air, gas, or water—reaches a certain predetermined pressure the valve which controls the motive agent is closed; and the object of my invention is to provide a simple and efficient construction and arrangement of parts, including means for varying the tension of the yielding resistance devices, whereby the amount of pressure necessary to actuate the mechanism and close the controlling-valve may be varied.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

The drawing represents a longitudinal section of a pump-governor constructed in accordance with my invention.

In order to fully disclose the nature of my invention, I have shown the governor applied to actuate a valve, such as those employed for controlling the admission of steam or other motive agent to a piston-cylinder, 1 representing the steam-chest or valve-box, 2 the steam-supply port, and 3 the feed-ports, of which I have shown a plurality to correspond with the number of ports in the slide-valve 4, it being obvious that by multiplying the number of ports a greater opening thereof can be attained by a given movement of the valve. The valve-stem 5 is adjustably connected to the valve by means of a nut 6, interposed between ears 7 on the valve.

Communicating with the motive-agent-supply port, preferably by way of the valve-box 1, is a diaphragm-chamber 8, a tube 9 being interposed between the diaphragm-chamber and the valve-box to form a means of communication and also to receive the valve-stem, which extends into the diaphragm-chamber.

This chamber is divided to form compartments by means of a diaphragm 10, preferably secured at its edges between the sections or members of the wall of the chamber, and to the center of the diaphragm is attached the extremity of the valve-stem 5, suitable washers 11 being arranged upon opposite sides of the diaphragm and having registering openings through which the reduced extremity of the valve-stem extends and a securing-nut 12 being threaded upon the extremity of the valve-stem.

From the above description it will be seen that fluid-motive-agent pressure is adapted to be applied continuously to the diaphragm at one face; but in order to constitute a regulator it is necessary to provide means for applying opposing pressure to the opposite face of the diaphragm, whereby when the fluid acted upon by the pump attains a certain pressure sufficient to overcome the opposite pressure of the motive agent the diaphragm will yield and the valve will be moved to a partially or wholly closed position. In the construction illustrated I have shown a conductor or casing 13, which is in communication at one end with the diaphragm-chamber upon the opposite side of the diaphragm from that which is exposed to the motive agent and in communication at the other end with a compressed-fluid-inlet port 14. It will be understood that this port 14 is adapted to be in communication with a pump or receiver of any suitable construction in which air, gas, water, or other fluid is put under pressure by the application of a motive agent to a piston-cylinder or the equivalent thereof, and it is obvious that pressure communicated to the inlet-port 14 will be applied to the diaphragm in opposition to the pressure of the motive agent.

With the parts as above described it is obvious that when the pressure admitted to the casing 13 and applied to one side of the diaphragm exceeds that of the motive agent applied to the opposite side of the diaphragm the diaphragm will be caused to yield to close the valve; but it is desirable to provide means whereby a less pressure than that of the motive agent may be applied by the compressed fluid and yet cause the actuation of the valve, thus providing for the adjustment of the

mechanism to cause the closing of the valve at any desired pressure. In the construction illustrated the means employed for accomplishing this object include a spring 15, terminally attached at one end to a fixed object on or adapted to move with the diaphragm, such as the nut 12, and at the other end to a feed-nut 16, engaged by a feed-screw 17, which is swiveled in a suitable bearing 18 in the end of the casing. It is obvious that by rotating the feed-screw the nut 16 may be moved to apply any desired tension to the spring, and thus offer any desired resistance to the pressure of motive agent, said spring being of the expansion type, and it is obvious that the greater the tension of the spring the less pressure it will be necessary to apply in opposition to the pressure of the motive agent in order to cause the movement of the valve. The exposed end of the feed-screw is preferably fitted with a hand-wheel 19, whereby the adjustment of the apparatus may be accomplished exteriorly.

By the use of a swivel for the axially-immovable feed-screw I am enabled to secure an extended adjustment of the feed-nut, and hence an extended variation in the tension of the spring, without varying the extension of the feed-screw beyond the casing. The exposure of the handle or grip remains the same at all adjustments of the spring.

A further advantage of this construction resides in the fact that the collar 18, which is seated in the casing and is held in place by means of a removable plug, forms a break-joint, and hence enables me to either wholly dispense with packing in the end of the casing or at least to avoid the use of a stuffing-box and employ a simple packing-ring or washer.

Various changes in the form, proportion, and the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. Automatic valve-adjusting mechanism including a diaphragm-chamber, a diaphragm connected with a valve to be actuated and exposed at opposite sides to the pressure, re-

spectively, of a fluid motive agent and a fluid acted upon by compressive force, the pressure of the second-named fluid being conveyed to the diaphragm-chamber by a casing disposed perpendicularly with relation to the plane of the diaphragm, a coiled spring attached at one end to an object fixed to and carried by the diaphragm, a feed-nut attached to the opposite end of said spring, and an axially-immovable feed-screw swiveled in the casing in an axial position, threaded in said feed-nut, and provided with exposed means whereby it may be turned to adjust the feed-nut to vary the tension of said spring, substantially as specified.

2. The combination with a controlling-valve provided with a plurality of ports for controlling a corresponding number of feed-ports, said valve having a stem, a diaphragm-chamber having a peripherally-secured diaphragm centrally attached to the valve-stem, means for adjusting the valve with relation to its stem and in a direction parallel therewith, said diaphragm being exposed at one side to the pressure of fluid motive agent which is adapted to be controlled in its passage through the feed-ports by said valve, a casing communicating with the diaphragm-chamber at the opposite side of the diaphragm and exposed to fluid subjected to a compressive force, a spring arranged in said casing and attached to an object carried by the diaphragm and adapted to exert a pressure in opposition to that of said motive agent, a feed-nut fixed to the opposite end of the spring, and a feed-screw swiveled in the casing and engaging the feed-nut, whereby when the feed-screw is rotated the feed-nut is moved axially to vary the tension of the spring, the feed-screw being provided with a collar or enlargement fitted in a seat in the casing and held in place by means of a removable plug substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES HENRY MACDONALD.

Witnesses:

EDGAR V. WILSON,
WILLIAM G. LORD.