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O. SAUGSTAD.

DAMPER REGULATOR AND MOTOR THEREFOR.

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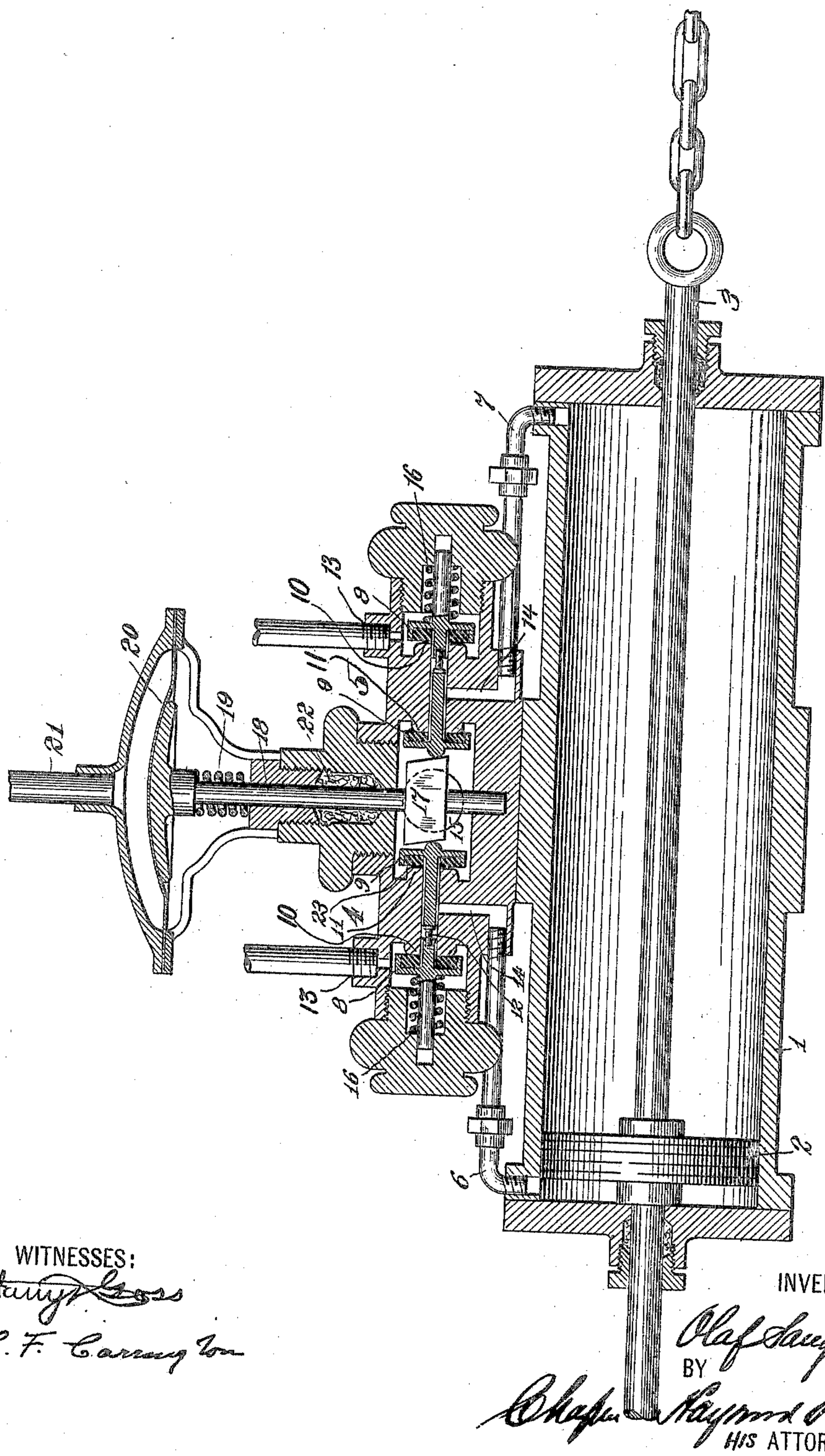

WITNESSES:

Harry L. Goss

C. F. Carrington

INVENTOR

Olaf Saugstad

BY

Chapin Raymond Noble

HIS ATTORNEYS.

UNITED STATES PATENT OFFICE.

OLAF SAUGSTAD, OF PLAINFIELD, NEW JERSEY, ASSIGNOR TO WILLIAM B. WADSWORTH, OF PLAINFIELD, NEW JERSEY.

DAMPER-REGULATOR AND MOTOR THEREFOR.

No. 817,277. Specification of Letters Patent. Patented April 10, 1906.

Application filed April 12, 1905. Serial No. 255,175.

To all whom it may concern:

Be it known that I, OLAF SAUGSTAD, a citizen of the United States of America, and a resident of Plainfield, county of Union, State of New Jersey, have invented certain new and useful Improvements in Damper-Regulators and Motors Therefor, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

My present invention relates to damper-regulators and motors therefor, and particularly to improvements in the motor-controlling means.

My invention consists principally in a certain novel arrangement and construction of the valves for admitting an exhausting motive fluid to and from the cylinder, and in the means for operating the said valves.

I will now proceed to describe an apparatus embodying my invention and will then point out the novel features in claims.

The figure of the drawing shows, in central vertical longitudinal section, a damper-regulator motor and valve mechanism therefor embodying my invention.

For simplicity of illustration I have omitted the various connections from the device to the damper and to the governor as forming no part of the present invention.

The drawing shows a cylinder 1, in which is mounted a piston 2, arranged to reciprocate therein. The piston-rod 3 is arranged to connect with the damper and operate same through any suitable connections such as are common and well known.

The valve mechanism for controlling the movement and position of the piston 2 comprises two sets of inlet and exhaust valves 4 and 5, one set for each end of the cylinder. A pipe 6 leads from the set of valves 4 to the cylinder at one end, and a pipe 7 leads from the set of valves 5 to the other end of the cylinder. Each set of valves comprises an inlet-valve 8 and an exhaust-valve 9. The said valves are arranged oppositely and longitudinally in a line with each other and are arranged to coact with corresponding valve-seats 10 and 11, facing outwardly in opposite directions. The valves may be provided with faces 23, of soft or yielding material, so that, if desired, the valves may all be closed when in an intermediate position. Upon a movement, however, of the valves compressing one valve-face the valve opposed thereto will be opened. The stems of the valves 8 and 9 abut, and an adjusting-screw 12 is preferably provided, whereby the relationship of the valves with respect to each other may be accurately regulated. A connection 13 for each set of valves admits motive fluid, which may in this case conveniently be water under pressure, while a distributing-passage 14 communicates from a point between the two valves to the pipes leading to the opposite ends of the cylinder. The exhaust or discharge valves 9 open into a chamber 15, from whence discharge fluid may be carried away.

Springs 16 operate to press both sets of valves inward, and suitable means is provided for forcing the valves outward against the tension of the springs, as may be desired. The means in the present instance is an operating-head 17, mounted upon a stem 18, said stem spring actuated by means of a spring 19 in one direction and moved by fluid under pressure operating upon a diaphragm 20 in the other direction. This fluid under pressure may be admitted through a pipe 21 from any suitable governor or other device. The stem 18 reciprocates freely in bearings formed in the casing and passes through a stuffing-box 22, whereby passage of fluid from the chamber 15, except through the regular discharge-passage, will be prevented.

The head 17 has two oppositely-arranged cam-surfaces adapted to coact with the exhaust-valves of opposite sets. In its uppermost position, in which position the parts are shown in the drawing, the cam 17 will have pressed against the discharge-valve 9 of the set of valves 5, so as to close the said valve and to open the admission-valve 8 of said set. This will admit fluid under pressure through the pipe 7 to the end of the cylinder with which the said pipe connects. At the same time the cam-surface upon the opposite side of the operating-head 17 will have permitted the set of valves 4 to move inward under the pressure of the spring 16, so as to close the inlet-valve 8 and open the discharge-valve 9 of that set. This will permit the discharge of fluid through the pipe 6 and chamber 15 from the end of the cylinder with which the pipe 6 connects. When fluid is admitted through pipe 21 to the diaphragm-chamber to force the stem 18 downward against the tension of the spring 19, the position of the

operating head or cam will be reversed, and fluid under pressure will then be admitted through pipe 6 and discharged through pipe 7. The piston under such conditions will move toward the opposite end of the cylinder. The balance of pressures between the fluid-pressure operating upon the diaphragm 20 and the pressure of the spring 19 will bring the head 17 to an intermediate position, and in an intermediate position both the exhaust-valves 9 will be closed, but their faces will not have been compressed sufficiently to open the inlet-valves 8. In such position, then, neither inlet nor exhaust is permitted.

It will be readily understood that a device constructed in accordance with my invention will be very sensitive and easily operated, while at the same time the movements of the piston will be very sensitive. Further, the piston may readily be held in any intermediate position desired, because an intermediate position of the operating head or cam 17 will have the effect of causing all the valves to close.

What I claim is—

1. In an apparatus of the class described, the combination with a cylinder and a piston therein, of two sets of opposed inlet and exhaust valves, arranged axially in a line, one set for each end of the cylinder, and fluid-pressure-actuated means for operating the said valves, said means including an operating-head located between the two sets of valves, and engaging same, substantially as set forth.

2. In an apparatus of the class described, the combination with a cylinder and a piston therein, of two sets of opposed inlet and exhaust valves for the opposite ends of the cylinder, an exhaust-chamber in which the exhaust-valves are located, an operating-head arranged in said exhaust-chamber and engaging said exhaust-valves, and pressure-operated means for actuating the said operating-head.

3. In an apparatus of the class described, the combination with a cylinder and a piston therein, of two sets of opposed inlet and exhaust valves arranged axially in a line, one set for each end of the cylinder, springs pressing the valves in one direction, an operating-head arranged between the valves, arranged upon a movement in one direction to move one of the sets of valves against the spring tension, and upon a movement in the other direction to move the other set of valves against their spring tension, and means controlling movements of the operating-head.

4. In an apparatus of the class described, the combination with a cylinder and a piston therein, of two sets of valves 4 and 5, arranged axially in a line, one set for each end of the cylinder, each set of valves comprising an inwardly-opening exhaust-valve 9 and an outwardly-opening inlet-valve 8, inlet connections 13 for the inlet-valves, distributing-passages 14 connecting with points between the valves, a discharge-chamber 15 in which the exhaust-valves are mounted, an operating-head mounted in the chamber 15, and means for controlling movements of the said operating-head.

OLAF SAUGSTAD.

Witnesses:
JOSEPH B. WADSWORTH,
D. HOWARD HAYWOOD.