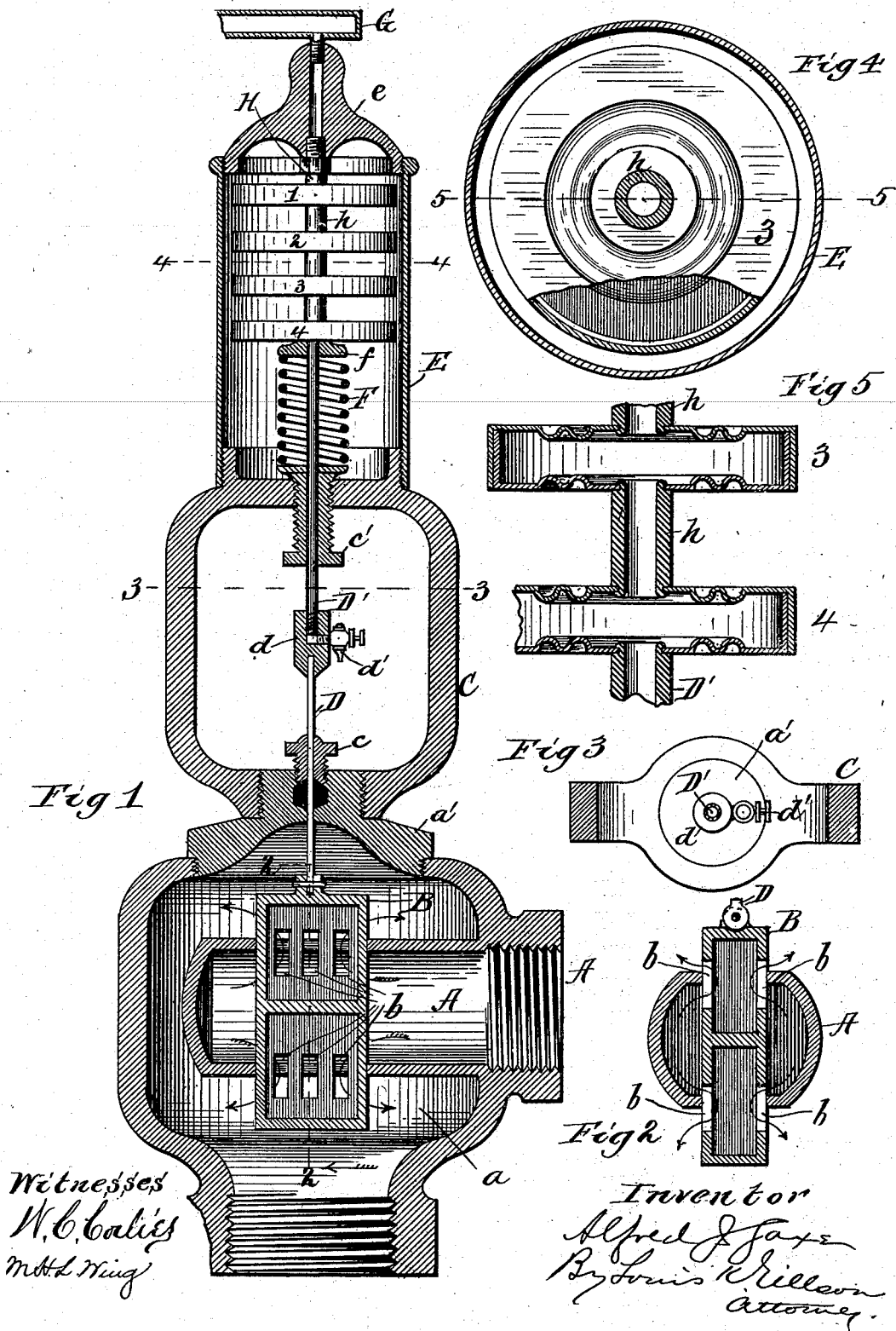


(No Model.)

A. J. SAXE.
PUMP GOVERNOR.

No. 503,776.

Patented Aug. 22, 1893.



UNITED STATES PATENT OFFICE.

ALFRED J. SAXE, OF CHICAGO, ILLINOIS.

PUMP-GOVERNOR.

SPECIFICATION forming part of Letters Patent No. 503,776, dated August 22, 1893.

Application filed February 10, 1893. Serial No. 461,766. (No model.)

To all whom it may concern:

Be it known that I, ALFRED J. SAXE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Pump-Governors; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to pump governors or regulators and has for its object the construction of a simple and thoroughly reliable automatic regulator for steam pumps.

The invention consists of the use of a number of hollow expansible diaphragms in communication with the pressure tank and forming an integral part of the valve stem so that by their expansion and contraction under the varying pressure in the tank, the stem will be lengthened and shortened, and the valve in the steam pipe closed and opened.

Figure 1 is a vertical section of the entire device. Fig. 2 is a cross section of the valve and its seat upon the line 2, 2, of Fig. 1. Fig. 3 is a plan section on the line 3, 3, of Fig. 1. Fig. 4 is a plan section of the case for inclosing the diaphragms, taken on the line 4, 4, of Fig. 1. Fig. 5 is a vertical section on the line 5, 5, of Fig. 4.

I show at A, a continuation of the steam pipe entering the globe or chamber *a*, and being vertically apertured so as to afford a seat for the piston valve B, which is adapted to reciprocate within this aperture. The valve B, is provided with two series of vertical ports *b*, within its walls, one series being adapted to open within the chamber *a*, above the pipe A, and the other below the said pipe—the two series being so disposed that the dropping of the piston closes communication between the pipe and the chamber simultaneously as to each side. If the valve B, is hollow, as shown, its chamber should be divided by a transverse partition for the reason that the upper series of ports are open to the pipe A, and the lower series to the chamber *a*, when the valve is closed.

A yoke or frame C, is mounted upon the top of the globe for the purpose of supporting the outer mechanism of the device. A rigid valve stem D, extends through a stuffing box *c*, in the upper wall of the globe, and is rigidly fixed to a block *d*. The valve stem is continued upwardly by means of a tube D', rigidly fixed to the block *d*. The upper end of the valve stem consists of a number of hollow diaphragms as 1, 2, 3, and 4, the lower one of which is centrally attached to the tube D'. The several diaphragms are connected by short nipples *h*, and the upper one is provided with a nipple H, which is tightly secured into a cap *e*, mounted upon the upper end of a case or cylinder E, which incloses the diaphragms and which is carried by the yoke C. The nipple H, enters a duct in the cap *e*, which leads to a pipe G, which in turn is in communication with the pressure tank.

A spiral spring F, is placed upon the tube D', and interposed between the lower diaphragm 4, and the top of the yoke C. The tension of this spring is adjusted by means of an externally screw threaded sleeve *c'*, encircling the tube D', and fitting within the aperture in the upper end of the yoke C, through which the tube passes. A washer *f*, is preferably interposed between the top of the spring F, and the diaphragm 4. The lower end of the sleeve *c'*, is provided with a square or hexagon head for the engagement of a wrench.

At *d'*, is shown a drain cock entering the side of the block *d*, and communicating with the tube D'.

For convenience in adjusting the valve to its seat as well as in making repairs, it is desirable that the upper wall of the globe or chamber *a*, should be in the form of a cap as shown at *a'*, held to its place by means of screw threads. The several parts of the device are so adjusted relatively that when there is a minimum pressure in the tank, the valve B, will be opened. As the pressure in the tank is raised it tends to expand the diaphragms 1, 2, 3, and 4. Inasmuch as the upper end of the valve stem is rigidly fixed, the entire expansion must be in a downward direction and it therefore tends to lengthen the valve stem and close the valve. As the pressure in the tank is reduced the diaphragms

return to their normal shape, and the valve is thereby again opened. It is obvious that the sensitiveness of the device will vary with the thickness of the walls of the diaphragms—
5 the greater their rigidity the greater will be the pressure necessary to their expansion.

The device may be regulated so as to operate at any desired pressure by the adjustment of the spring F, by means of the sleeve
10 c'. Sediment may be washed out of the diaphragms by the drain cock d'. While I show four diaphragms it is obvious that the number may be varied at pleasure. These diaphragms may be constructed in any desired
15 manner. I prefer to form them of a pair of flanged disks of such relative size that the flange of one will fit snugly within that of the other. The two disks are soldered together. It is desirable that the disks be annularly
20 crimped as shown in Fig. 5, so as to allow of their free expansion. The tubes entering these diaphragms have their ends inserted within central apertures. If desired, solder may be used to make a close joint.

25 I claim as my invention—

1. The combination with a governing valve of a steam pump, of a valve stem having its outer end rigidly fixed and being adapted to actuate the valve by its expansion and contraction, a series of internally connected hollow expansible diaphragms forming an integral part of the stem and in position transverse to its length, and means of communication between the pressure to be regulated and the diaphragm chambers whereby the action
30 of the valve is varied with the variations of the pressure, substantially as described, and for the purpose specified.

2. The combination with a steam pump having a regulating valve adapted to be closed by the lengthening and opened by the shortening of its stem, of a series of hollow expansible diaphragms forming a part of the valve stem and rigidly united by tubular connections, the remoter end of the valve stem being
45 rigidly fixed and being tubular and connecting the remotest diaphragm with the pressure tank, substantially as described and for the purpose specified.

3. The combination with a steam pump having a regulating valve adapted to be closed and opened by the longitudinal expansion and contraction of its stem and with a series of hollow, rigidly united and internally connected expansible diaphragms forming a part
55 of the valve stem and being in communication with the pressure tank, of an adjustable spring tending to resist the expansion of the diaphragms, substantially as described and for the purpose specified.

4. The combination with a regulating valve of a steam pump, of a hollow valve stem having its chamber in communication with the pressure tank and being adapted by its longitudinal expansion to control the valve, and
65 a drain cock leading from the valve stem chamber whereby the pressure in the tank may be utilized to cleanse said chamber, substantially as described.

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

ALFRED J. SAXE.

Witnesses:

M. H. L. WING,
L. K. GILLSON.