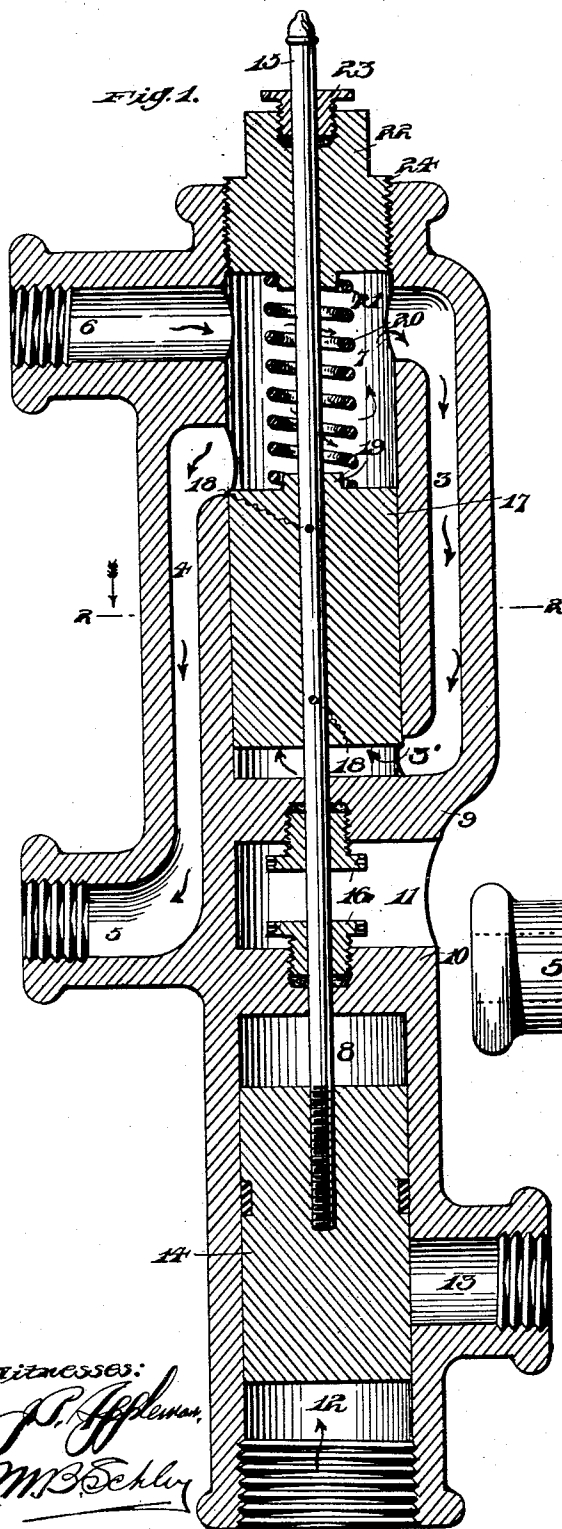
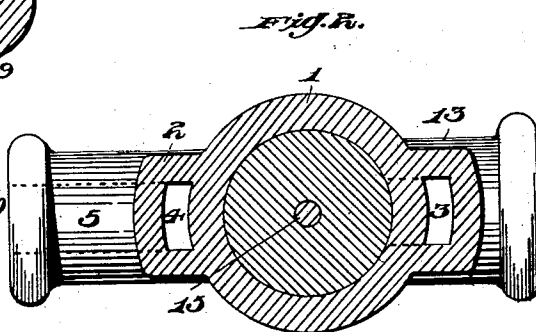


No. 735,144.

PATENTED AUG. 4, 1903.

D. W. PORTER.
AUTOMATIC STEAM GOVERNOR FOR PUMPS.
APPLICATION FILED SEPT. 22, 1902.

NO MODEL.



Witnesses:

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UNITED STATES PATENT OFFICE.

DAVID W. PORTER, OF SEWICKLEY, PENNSYLVANIA.

AUTOMATIC STEAM-GOVERNOR FOR PUMPS.

SPECIFICATION forming part of Letters Patent No. 735,144, dated August 4, 1903.

Application filed September 22, 1902. Serial No. 124,379. (No model.)

To all whom it may concern:

Be it known that I, DAVID W. PORTER, a citizen of the United States of America, residing at Sewickley, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Steam-Governors for Steam-Pumps, of which the following is a specification.

My invention relates to automatic steam-governors for hydrocarbon-pumps, and more especially to a steam-regulator which is automatic in its operation, designed for marine oil-heater pumps.

The object of my invention is to provide an automatic regulator which will not only be simple and compact in its construction, but sensitive to the slightest preponderance of either the steam or the pressure of the pump.

Another object resides in providing a common piston-rod for connecting the pistons and passing through the regulating-spring and plug which is guided in suitable packing-boxes, thereby assuring a perfect vertical alinement of the several parts.

Still another object lies in casting the regulator-casing in one piece, which expedient possesses many advantages, among some of which is in making the casting more simple and easy to produce and in adding strength and compactness.

Finally, the object of my invention is to provide an automatic steam-regulator which will be simple, strong, effective, and durable and one in which the parts will not be liable to get out of working order and also such a device as will be inexpensive to construct and operate.

Furthermore, the invention consists in the novel details of construction, a preferable embodiment of which is illustrated in the drawings and described in the specification hereunto annexed.

Figure 1 is a sectional view of my invention, showing the several parts in their relative positions; and Fig. 2 is a transverse sectional view taken on the line 2 2 of Fig. 1.

In the drawings the numeral 1 designates the casing, which may be of any suitable metal and is preferably cast in one piece. The casing is cast with integral enlargements 2, which are provided with internal steam-passages 3 and 4. The steam passage or by-

pass 3 terminates in a port 3' at its lower end, and the passage or duct 4 merges into an enlarged outlet 5, which is adapted to be connected with the pump or pumps to which the regulator is to be applied. A steam-inlet 6 is formed in the casing 1 near its upper end and connected to a steam-boiler. The casing is formed with two independent cylinders 7 and 8, which are separated from each other by the horizontal partitions 9 and 10 and the opening 11, which allows access to the packing-boxes 16, hereinafter described. A pressure-inlet port 12, communicating with the pump, is provided in the lower end of the cylinder 8, which has an outlet 13 a little below its central portion.

Working in the cylinder 8 is a piston 14, screwed onto the end of a piston-rod 15, which passes upward through the partitions 9 and 10 and the packing-boxes 16, which may be of any suitable construction, into and through the upper cylinder 7. A piston 17, working in the upper cylinder 7, is secured to the piston-rod 15 by pins 18 and is adapted to be moved upward and downward by the piston-rod to open and close the duct 4 and regulate the supply of steam to the pump. The piston 17 is formed with an annular boss 19 on its end, which is embraced by a coiled spring 20, that encircles the piston-rod 15, and is held in place at its upper end by a corresponding annular boss 21, formed on the bottom of a regulating-plug 22. This regulating-plug 22 has a central aperture through which the piston-rod loosely slides, and it is provided in its upper portion with a packing-box 23 to form a steam-tight joint for the piston-rod. The outer lower portion of the plug 22 is cut with screw-threads 24, which engage with corresponding screw-threads cut in the upper end of the casing 1, thus allowing the plug to be adjusted upward and downward to distend and compress the spring 20 between the plug and the piston 17 to vary the tension of the spring and regulate the buoyancy of the piston 17.

The operation of the regulator will be readily understood from the following: Steam being admitted from a steam-boiler by way of the inlet 6 into the cylinder 7 passes into the by-pass 3 and into the duct 4. The steam flowing into the duct 4 passes out through

the steam-outlet 5 to the pump and operates the same, while the steam flowing into the by-pass 3 passes down and out of the port 3' into the cylinder 7 and impinges against the bottom of the piston 17. The action of the steam on the bottom of the piston 17 tends to force the same upward against the tension of the spring 20, and it will thus be seen that the piston 17 is balanced between the pressure of the steam from the port 3' and the spring 20. As stated above, the steam passing out through the outlet 5 flows on to the pump and operates the same. The pressure of the pump acts on the bottom of the piston 14, entering the casing 1 through the inlet-port 12. Supposing the pump to be operating and the regulating-plug to have been adjusted so as to hold the parts in their normal positions up to a predetermined pressure, as shown in Fig. 1, now should the pressure exceed the predetermined point the piston 14 would be forced upward, thus forcing the piston 17 upward, which would gradually close the duct 4 and cut off the steam from the pump, which would have the effect of slowing the same "down" the pump, and thereby reducing the pressure. As soon as the pressure was reduced the spring would force the pistons to their normal positions, thus opening the duct 4 and supplying the pump with its normal flow of steam. The outlet 13 is an overflow-port and is provided to prevent the piston 17 from entirely closing the duct 4. This is accomplished by having the outlet 13 so positioned that the lower end of the piston 14 will uncover it before the upper end of the piston 17 entirely covers the duct 4, thereby immediately reducing the pressure and opening the said duct. It will be understood that the degree of pressure at which the regulator will slow down the pump may be varied by adjusting the regulating-

plug 22, and thus requiring more or less pressure to compress the spring and move the piston 17, which, it is understood, is balanced between the said spring and the steam flowing from the port 3'.

It will be noticed that the regulator will be sensitive to the slightest variance in the pressure of the pump and that its action will be positive and rapid, and by means of the piston-rod the pistons will be held in vertical alinement one with the other, thus assuring an easy and effective action.

I do not care to limit myself to the details of construction and operation set forth in the specification, and I may make changes in the same within the scope of my claim without departing from the spirit of my invention.

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

In a regulator, a casing provided with steam inlet and outlet ducts, independent cylinders cast in the casing, one of the cylinders being provided with pressure inlet and outlet ports, pistons working in the cylinders, a piston-rod connecting the pistons, a plug adjustable in the casing, a spring encircling the piston-rod and held between the adjustable plug and one of the pistons, and an enlargement cast integral with the casing having a by-pass therein for conducting steam to the bottom of one of the cylinders to balance the piston therein; substantially as described.

In testimony whereof I affix my signature, in the presence of two witnesses, this 16th day of September, 1902.

DAVID W. PORTER.

Witnesses:

JOHN NOLAND,
M. B. SCHLEY.