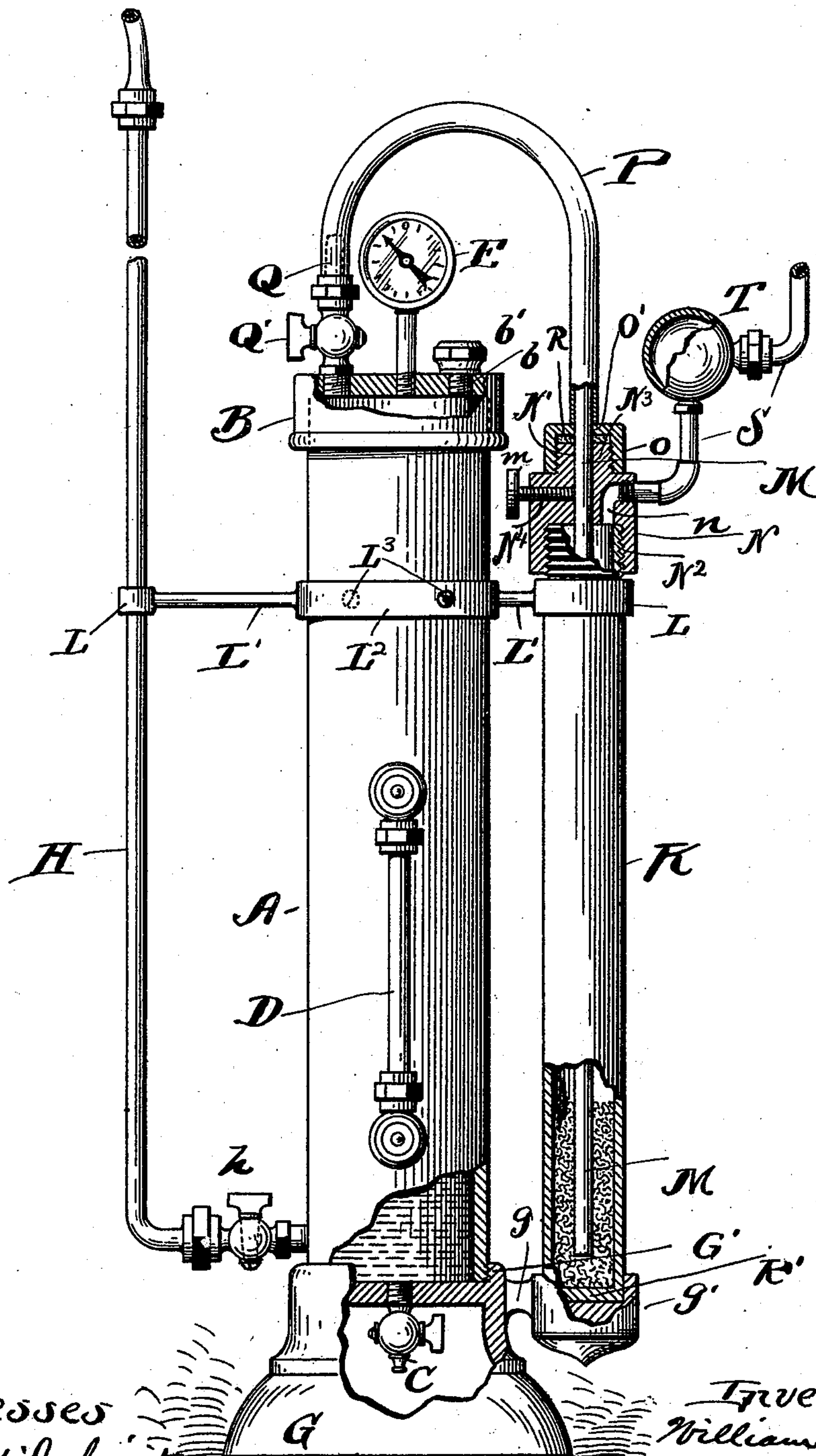


(No Model.)

W. WERLÉ.  
PRESSURE REGULATOR.

No. 516,251.

Patented Mar. 13, 1894.



Witnesses  
E. B. Gilchrist  
C. W. W. W.

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By Leggett & Leggett  
his Attorneys



# UNITED STATES PATENT OFFICE.

WILLIAM WERLÉ, OF CLEVELAND, OHIO.

## PRESSURE-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 516,251, dated March 13, 1894.

Application filed December 30, 1893. Serial No. 495,194. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM WERLÉ, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Pressure-Regulators; 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 pertains to make and use the same.

My invention relates to improvements in pressure-regulators, more especially designed for brewers' use, whereby a uniform gas pressure within the hogsheads or other closed casks or vessels for storing beer or other fermented liquors can be maintained, and my present invention appertains more especially to the development or improvement of the invention disclosed in United States Letters Patent, No. 472,241, granted to me April 5, 1892, the object being to overcome certain objectionable features of the apparatus disclosed in said Letters Patent.

With this object in view, my invention consists in certain features of construction and in combinations of parts, hereinafter described and pointed out in the claims.

The accompanying drawing is a side elevation, partly in section, of a pressure-regulator embodying my invention.

Referring to the drawing, A designates the main chambered body or water-compartment of the apparatus, through which compartment gases from the vessel or vessels containing the fermenting liquor is caused to pass, said compartment being preferably cylindrical in form, and preferably about four inches in diameter and about two and one-half feet high. Compartment A is closed at its upper end, preferably by a cap, B, that is screw-threaded internally and engages the corresponding externally-threaded upper end of the surrounding walls of compartment A. An inlet is provided at the upper end of the compartment A for introducing water into said compartment, said inlet consisting preferably of a screw-threaded hole, *b*, in cap B and adapted to be closed by a removable plug *b'*. Compartment A, at the bottom, is provided with a drain-cock, C, at which the water may be drawn off from the compartment, as required for cleaning the latter, or for other purposes.

Compartment A, at one side, is provided, in the usual manner, with a water-gage, D, and at its upper end is provided with a pressure-gage, E, said gage being preferably rigid with cap B, as shown. The bottom of compartment A is preferably integral with a foot or chambered stand, G, that, at its upper end, is provided with an internally screw-threaded annular flange G' that engages the correspondingly externally threaded lower end of the surrounding wall of compartment A.

H represents a pipe that is adapted to conduct gases received from the casks or vessels the pressure wherein is to be regulated, to compartment A, said pipe discharging preferably into the lower end of said compartment, and being provided, in suitable proximity to compartment A, with a stop-cock, *h*. An important feature consists in extending this pipe a suitable distance above the water-line that it is desired to maintain at any time within compartment A before extending the same to the vessel or vessels containing the fermenting liquors, and I prefer to extend pipe H preferably about six feet above the top of compartment A, the object being to positively prevent any water in said compartment from being conducted to the respective vessel or vessels.

At one side of body A, preferably at the side located diametrically-opposite pipe H, is provided another upright but smaller tubular-body or compartment, K, that is preferably about one and a half inches in diameter, and nearly as high as compartment A. Compartment K is closed at its lower end, as at K', and is preferably supported from foot or stand G, the bottom and lower end of the surrounding wall of compartment K being seated in a socket, *g'*, integral or rigid with an arm *g* that projects laterally from foot or stand G. Pipe H and the upper portion of the surrounding wall of compartment K are suitably supported from the surrounding wall of compartment A, preferably by collars L L that embrace pipe H and surrounding wall of compartment K, respectively, and are rigidly connected, by arms or members L' L', with a collar L<sup>2</sup> rigidly but removably held upon the surrounding wall of compartment A by means of one or more screws L<sup>3</sup>.

M designates a pipe that is located and held



centrally within compartment K. Pipe M opens into the lower end of compartment K, and thence extends upwardly through said compartment and through a cap, N, and a stuffing-box provided at the upper end of compartment K. Pipe M, at its upper extremity, is connected by a flexible tube, P, with a pipe, Q, that is secured to cap B, and opens into the upper end of compartment A, pipe Q being preferably provided with a stop-cock, Q'. Cap N is perforated vertically and centrally, as at N', to accommodate the location of pipe M, and, at its lower end, is provided with a screw-threaded bore, N<sup>2</sup>, for engaging the correspondingly-externally-threaded upper end of the surrounding wall of compartment K. Cap N is reduced in diameter and screw-threaded externally at its upper end, as at N<sup>3</sup>, for receiving the internally-threaded cap, O, the latter being perforated centrally, as at O', to accommodate the location of pipe M, and packing, R, is preferably interposed between the upper end of member N<sup>3</sup> and cap O. Members N<sup>3</sup>, O and R constitute a stuffing-box.

I would remark that, in practice, compartment A is filled preferably nearly half-full with water, and a suitable quantity of mercury is placed into the lower end of compartment K; stop-cocks *h* and Q' are opened; pipe H is placed in open relation with the casks or vessels the pressure of the gases wherein is to be regulated, and gas thereupon passes from said casks or vessels to and through pipe H into the body of water in compartment A; thence through said body of water into pipe Q; thence *via* flexible tube P, to pipe M; thence into the mercury in the bottom of compartment K; thence upwardly through said body of mercury and through compartment K and thence out of said compartment through a hole or perforation *n* in cap N. It will be observed that pipe M is held centrally within compartment K, by means of cap N, and is held in the desired adjustment vertically by means of a set-screw, *m*, that engages a correspondingly-threaded hole N<sup>4</sup> in cap N, and is adapted to engage pipe M. Should pipe M be immersed too far in the quicksilver and thereby cause a greater pressure of gases within the hogshead or vessels, and which pressure will be indicated on gage E, then pipe M is elevated vertically and adjusted within compartment K until the proper pressure is registered by the pressure-gage, for it is obvious that the pressure within the hogshead or vessel will diminish or increase in a corresponding degree with any reduction or increase in the quantity of quicksilver through which the gases have to pass. The gases passing upwardly through compartment K have a tendency to carry with them globules of mercury. It, therefore, follows that if said compartment was left open at the top, as is the case in the construction disclosed in the Letters Patent hereinbefore referred to, the mercury that was thus carried

up with the gases, would have ready egress at the top or open end of said compartment. By the provision of cap N, hereinbefore described, the escape and loss of mercury ascending compartment K is largely prevented. Occasionally, however, a globule of mercury will find its way into hole *n*, and to check any such escaping globules before they reach the discharging-end of said hole, I preferably make the hole angular, as shown. Notwithstanding this provision a globule will occasionally find its way into discharge-pipe S that leads from hole *n*, and to avoid the escape of any mercury through said pipe I interpose, in the line of said pipe a chamber T, the top wall whereof is so arranged relative to the line of said pipe that it will serve as a hood or arrester to arrest any mercury carried into said chamber and cause the same to return to its place in compartment K. Chamber T is preferably spherical or ball-shaped in form. I have found that this form of chamber is best adapted to arrest any globules of mercury that may be carried into the chamber and to facilitate the return of such globules to compartment K.

What I claim is—

1. In a pressure-regulator, the combination of an upright water-compartment A, an upright mercury-compartment K, a pipe located within and opening into the lower end of the mercury-compartment, means establishing open relation between said pipe and the upper end of the water-compartment, a pressure-gage, a pipe leading from the lower end of the water-compartment upwardly a suitable distance above the water-line desired to be maintained in the water-compartment, the mercury-compartment, at its upper end, being provided with a discharging-hole or orifice, a pipe leading from said discharging-hole, and a chamber located in the line of said pipe, the top wall of said chamber being so arranged relative to the pipe that it shall serve to arrest any globules of mercury carried into said chamber, substantially as and for the purpose set forth.

2. In a pressure-regulator, the combination of an upright water-compartment A, an upright mercury-compartment K, a pipe located within and opening into the lower end of the mercury-compartment, means establishing open relation between said pipe and the upper end of the water-compartment, a pressure-gage, a pipe leading from the lower end of the water-compartment upwardly a suitable distance above the water-line desired to be maintained in the water-compartment, the mercury-compartment, at its upper end, being provided with a discharging-hole or orifice, a pipe leading from said discharging-hole, and a spherical or ball-shaped chamber located in the line of said pipe, substantially as shown, for the purpose specified.

3. In a pressure-regulator, the combination of an upright water-compartment A, an upright mercury-compartment K, a pipe located



within and opening into the lower end of the mercury-compartment, means establishing open relation between said pipe and the upper end of the water-compartment, a pressure-gage, a pipe leading from the lower end of the water-compartment upwardly a suitable distance above the water-line desired to be maintained in the water-compartment, the mercury-compartment, in its top wall, being provided with a discharging-hole or orifice, arranged angularly, substantially as shown, for the purpose specified.

4. In a pressure-regulator, the combination of an upright water-compartment A, an upright mercury-compartment K provided at its upper end with a cap and stuffing-box, a pipe leading downwardly from a suitable point above the level of water desired to be maintained in the water-compartment and discharging into the lower end of said compartment, a pressure-gage, a pipe M located centrally of and opening into the lower end of the mercury-compartment, said pipe extending through the aforesaid cap and stuffing-box, means for establishing open relation between the upper end of said pipe and the upper end of the water-compartment, and a gas-outlet provided at the upper end of the mercury-compartment, substantially as set forth.

5. In a pressure-regulator, the combination of an upright water-compartment, an upright mercury-compartment, a pipe H leading downwardly from a point located a suitable distance above the water-line desired to be maintained in the water-compartment and discharging into the lower end of said compartment, a cap closing and forming the top wall of the mercury-compartment, said cap being provided with a discharging-hole or orifice, n, a pipe M located centrally of and

opening into the lower end of the mercury-compartment, said pipe extending upwardly through the mercury-compartment and aforesaid cap, the latter, at its upper end, terminating in a stuffing-box for said pipe, suitable means for establishing communication between the upper end of the water-compartment and said pipe M, the latter being adjustable vertically, and a set-screw for securing the same in the desired adjustment, substantially as set forth.

6. In a pressure-regulator, the combination of an upright water-compartment A, an upright mercury-compartment K, a pipe leading from a point located a suitable distance above the water-line desired to be maintained in the water-compartment and discharging into the lower end of said compartment, a pipe M leading downwardly and opening into the lower end of the mercury-compartment, and suitable means for establishing open communication between the upper end of the water-compartment and said pipe M, a foot or stand for supporting the water-compartment, and a socket for supporting the mercury-compartment and rigid with said foot or stand, a collar rigidly mounted upon the upper end of the surrounding wall of the water-compartment, collars loosely mounted upon pipe H and the surrounding wall of the mercury-compartment and rigidly connected with the aforesaid collar on the surrounding wall of the water-compartment, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 28th day of November, 1892.

WILLIAM WERLE.

Witnesses:

C. H. DORER,  
WARD HOOVER.