

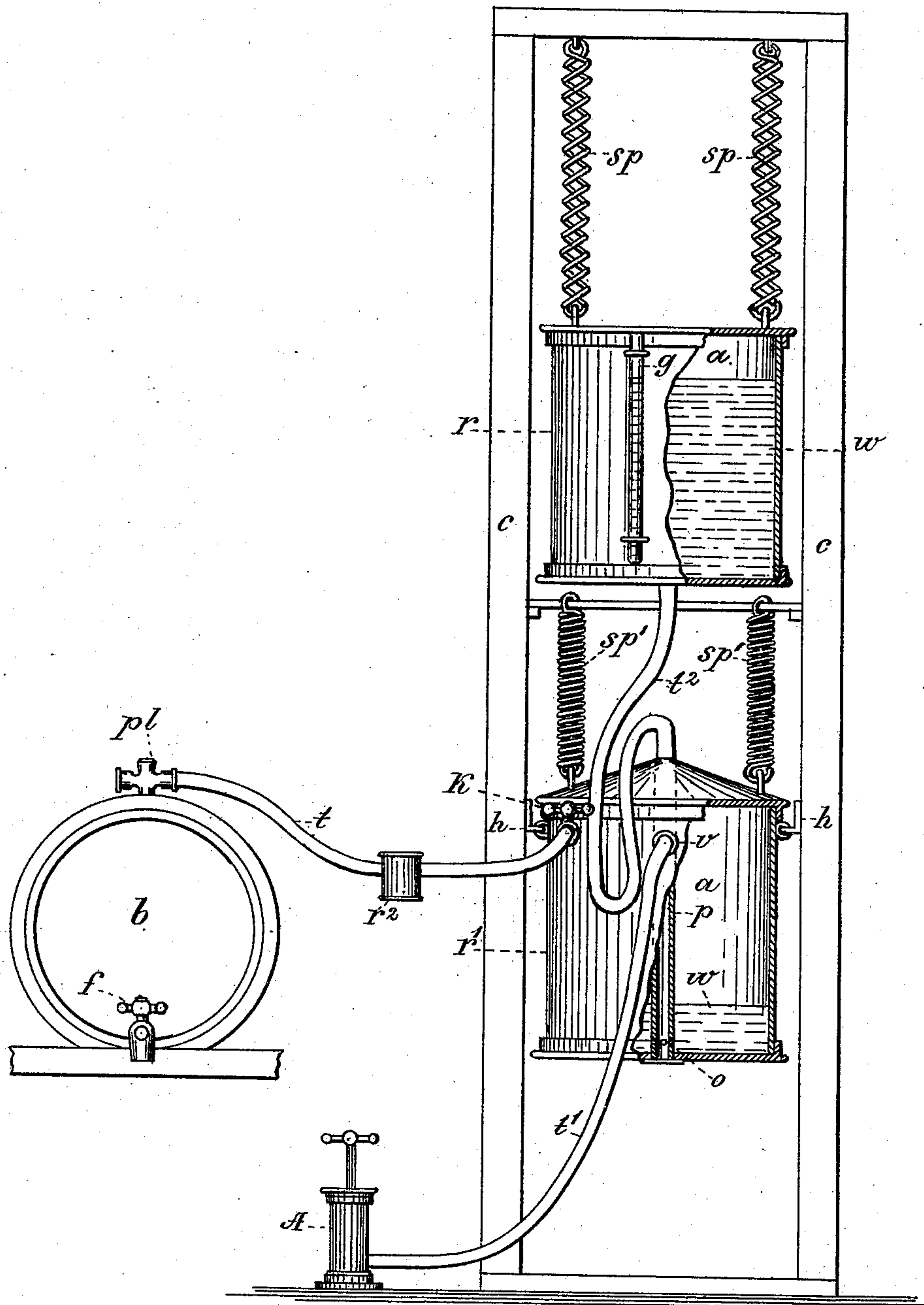
(No Model.)

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APPARATUS FOR REGULATING PRESSURE.

No. 370,766.

Patented Oct. 4, 1887.



WITNESSES.

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APPARATUS FOR REGULATING PRESSURE.

SPECIFICATION forming part of Letters Patent No. 370,766, dated October 4, 1887.

Application filed September 16, 1886. Serial No. 213,718. (No model.)

To all whom it may concern:

Be it known that I, THOMAS B. CARROLL, a resident of Indianapolis, Marion county, Indiana, have made certain new and useful Improvements in Apparatus for Regulating Pressure, a description of which is set forth in the following specification, reference being made to the accompanying drawing, in which like letters refer to like parts.

My invention relates to the construction of a device for automatically regulating the pressure upon fermenting liquids in closed vessels, and will be understood from the following description.

The drawing represents a front view of my entire device, a part of each principal reservoir being broken away to show the relative height of water and air in each of them at a certain stage of the operation.

In detail, *c* is a case or cabinet which is conveniently set up at any suitable distance from the cask containing the beer intended for use. From the top of this cabinet a reservoir, *r*, is suspended by coiled springs *sp*, fastened to its top, and on the side of this reservoir is fastened a gage, *g*, for showing the height of water at any given time. From the bottom of this reservoir a flexible tube, *t*², descends, its lower end being connected to the top of the second and lower reservoir, *r'*, which is also suspended by coiled springs *sp'* from a cross-bar extending across the cabinet. This reservoir has a pipe extending centrally through its entire length, and its extension provides the thimble over which the tube *t*² is slipped in making the connection with the upper reservoir. The lower end of this tube or pipe is provided with openings *o*, to allow water to enter and rise whenever pressure is applied above its surface by means of an air-pump, *A*, which is connected by a flexible tube, *t'*, and a collapsible valve, *v*, with an opening in the reservoir *r'*. On the side of this lower reservoir, *r'*, is attached a cock, *k*, with which a flexible tube, *t*, is connected, leading to the plug *pl* in the bung of the barrel *b*, containing the beer, and about midway of this tube *t* an air-reservoir, *r*², is provided. It is intended that the barrel *b*, a portion of the tube *t*, and the air-reservoir *r*² should be placed in an ice-box or refrigerator, so that the air in the reservoir *r*² is kept cool all the time.

h are hooks fastened to the sides of the cabinet, over which eyes attached to each side of the lower reservoir, *r'*, are slipped, when it is desired to keep the lower reservoir stationary.

w represents water in the reservoir, and *a* air.

The valve *v* is an ordinary rubber collapsible valve with a short neck extending into the opening in the side of the reservoir, and is similar to the one shown in a previous application filed by me on May 8, 1886, and allowed September 6, 1886, Serial No. 201,625, and needs no further description here, as it is not separately claimed in this application.

My device operates as follows: The reservoir *r'* is taken off the hooks and allowed to hang suspended by the springs *sp'*, and is nearly filled with water. The tube *t* is connected with the plug of the beer-keg, as shown in the drawing, and when the keg of beer is first opened it needs neither venting nor pressure until a few glasses have been drawn from the faucet *f*. After a quarter or a third of the beer has been drawn off, in order to maintain its pressure and keep the carbonic-acid gas inclosed in the fermenting liquid, it is necessary to supply air-pressure on account of the decrease of pressure in the keg. This is done by means of the air-pump *A*. By operating this air-pump air is forced through the tube *t'* and valve *v* into the reservoir *r'* above the water, and the water is forced downward and through the openings *o*, up the pipe *p*, and through the tube *t*² into the upper reservoir, *r*. As this operation takes place the lower reservoir, *r'*, decreases in weight and rises, being drawn up by the springs *sp'*, until it reaches the position shown in the drawing, and at that point the eyes are slipped over the hooks *h*, so that the lower reservoir will maintain a stationary position. At the same time the upper reservoir, *r*, gradually increases in weight and descends until it assumes the position shown in the drawing. The apparatus is now ready for use, and as the pressure in the barrel *b* decreases as the beer is drawn off the air in the lower reservoir passes out through the tube *t*, the cock *k* being open, into the barrel *b*, and the water from the upper reservoir passes downward to take the place of the air in the lower reservoir. A decrease in the weight of the water in the upper reservoir

lessens the tension of the springs sp , and the upper reservoir is drawn toward the top of the cabinet, increasing the distance between the lower reservoir and the upper one and extending the length of the water-column between them as the water passes through the flexible tube t^2 , which is considerably longer than the distance between the two reservoirs when in the position shown in the drawing, and the length of the water-column is thus increased by straightening the flexible tube, and equalizes the loss occasioned by the decrease of the water in the upper reservoir, for the water, as the reservoir rises, has a longer fall in passing to the lower reservoir. The one therefore is intended to compensate for the other—that is to say, the loss of water and weight in the upper is intended to be compensated by the increase in the length of the water-column between them by means of the rising of the upper reservoir. Whenever desired, this increase in the water-column may be additionally helped by taking the lower reservoir off the hooks h and letting it hang suspended from the springs sp' , so that the reservoir will descend, thus increasing the distance between the two reservoirs, and thereby increasing the length of the water-column.

I thus provide by my apparatus a compensation for the loss of weight in the reservoir above by increasing the length of the water-column by means of the springs from which both reservoirs are suspended in the cabinet.

The object in using the reservoir r^2 is to maintain a supply of air therein, and by keeping it cool this cool air is admitted to the beer in the keg instead of the warm air from outside.

In many cases it is not necessary to take the lower reservoir off the hooks h at all. It may remain stationary; and it is equally true that instead of the lower, the upper reservoir might be made stationary. In such case it would not be necessary to suspend it from springs at all, but it might be held up by hooks or a shelf, or any other suitable means. In many cases, however, it is desirable to use the force of the springs upon both reservoirs, as shown in the drawing. The upper reservoir is left open at the top, while the lower one is made air-tight.

I am aware that in apparatus for regulating pressure upon fermenting liquids the use of two reservoirs for holding water and air, connected by flexible tubes, is not new—as, for instance, in the device shown in Letters Patent issued to Surratt and Heyman, No. 349,012, dated September 14, 1886, and a similar apparatus has been used in Germany; but in all these the reservoirs are connected not merely by flexible tubes, but also by cords which

pass over pulleys, and as one of these rises the other falls, and one counterbalances the other. In Surratt and Heyman's device a crank is used for lowering or raising these reservoirs, and no one of these devices has any air-pump connection, nor are the tanks connected in the manner hereinbefore described in this application, nor are they suspended from the frame by coiled springs whose force operates to draw one of the reservoirs up as it becomes lighter, thus increasing the distance between the two, so that the fall will be greater. In these other devices, also, the distance between the reservoirs is the same at all points. In mine it varies as may be required. My device is much more compact than others, and is operated in connection with an air-pump; and I want it understood that I do not broadly claim as my invention the use of two reservoirs connected by a flexible tube in apparatus of this kind.

What I claim as my invention, and desire to secure by Letters Patent, is the following:

1. An apparatus for regulating the pressure upon fermenting liquids in closed casks, comprising a pair of reservoirs set one above another and connected by a tube of suitable length to allow the reservoirs to be separated a proper distance or brought near together without impairing their connection, the lower reservoir provided with an interior pipe with open end leading from near the bottom to an external connection with the tube that unites the two reservoirs, an air-pump connection near its upper end, one or both of the reservoirs suspended by elastic springs from a suitable frame-work and rising or falling so as to increase or decrease the distance between the reservoirs as the water or compressed air predominates in one or the other, with suitable connection to the cask in which pressure is desired, substantially as described.

2. In an apparatus for regulating pressure in closed casks, the reservoir r , suspended by springs sp from a suitable frame-work, connected from its under side by a flexible tube, t^2 , to a pipe, p , passing down and within a lower reservoir, r' , to near its bottom, such lower reservoir also supported from or by connection with the frame-work, and provided with a connection near its upper end by tube t' to the air-pump, and by tube t to the cask b , the intermediate air-reservoir, r^2 , between the lower reservoir, r' , and cask, all combined substantially as described.

In witness whereof I have hereunto set my hand this 13th day of September, 1886.

THOMAS B. CARROLL.

Witnesses:

C. P. JACOBS,
HATTIE MURRY.