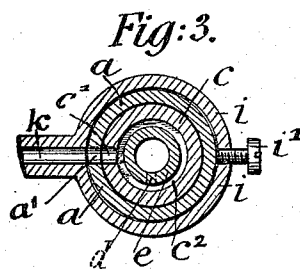
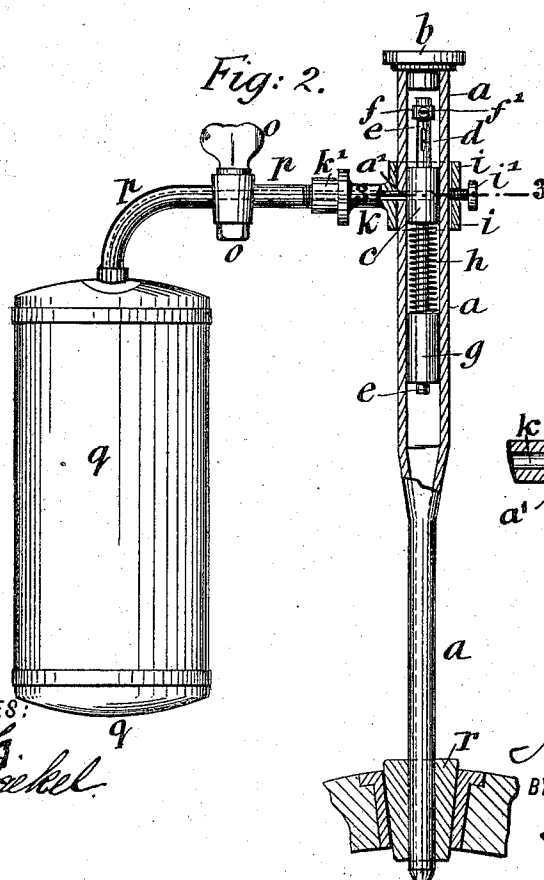
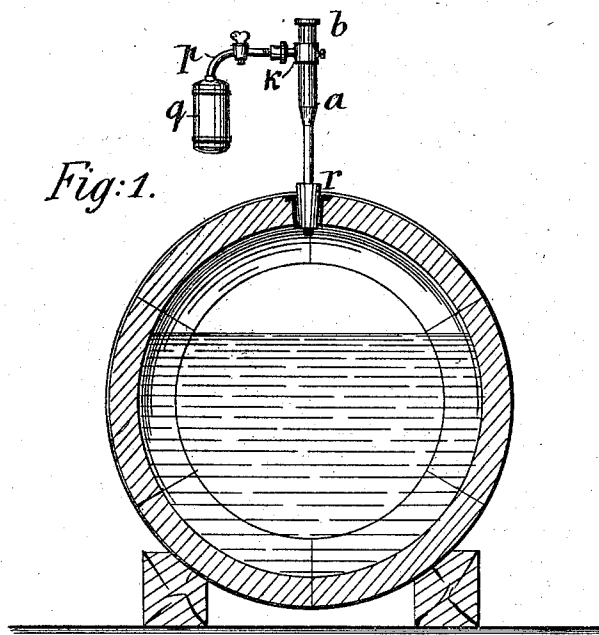


(No Model.)

K. M. STAHL.
AUTOMATIC GAS PRESSURE REGULATOR.

No. 572,838.

Patented Dec. 8, 1896.



WITNESSES:
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UNITED STATES PATENT OFFICE.

KARL M. STAHL, OF NEW YORK, N. Y.

AUTOMATIC GAS-PRESSURE REGULATOR.

SPECIFICATION forming part of Letters Patent No. 572,838, dated December 8, 1896.

Application filed March 5, 1896. Serial No. 581,920. (No model.)

To all whom it may concern:

Be it known that I, KARL M. STAHL, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Automatic Gas-Pressure Regulators, of which the following is a specification.

This invention relates to an improved gas-pressure regulator of that class by which fermented and other liquids can be drawn off for use under uniform pressure of carbonic-acid or other gas; and the invention consists of an automatic gas-pressure regulator which comprises a main tube that is inserted into the bung or cork of the vessel containing the liquid to be acted on, a receiver for the liquid carbonic-acid gas, a valved supply-pipe connecting the receiver with the main tube, a holder for attaching said tube to the main tube, a stationary sleeve at the interior of said main tube provided with a radial channel communicating with the gas-supply tube and an interior annular groove communicating with said channel, a vertically-sliding regulating-tube guided in said sleeve, closed at its upper end and open at its lower end, said tube being provided with an adjustable collar or stop at its upper end, a slot below said stop, and with a piston at its lower end, and a helical spring interposed between said piston and the stationary sleeve. The upper end of the main tube is provided with a detachable plug having an enlarged head for driving the main tube, the removable plug permitting the detaching of the holder with the receiver from the main tube and the replacing of the same thereon, as will be fully described hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 represents a side elevation of my improved automatic gas-pressure regulator, shown as used in connection with a beer-keg. Fig. 2 is a side elevation, partly in vertical section, of my improved gas-pressure regulator drawn on a larger scale; and Fig. 3 is a detail horizontal section on line 3 3, Fig. 2.

Similar letters of reference indicate corresponding parts.

My improved gas-pressure regulator consists of three main parts, namely, a main tube *a*, with its accessories, a stationary sleeve

c in said main tube, a spring-actuated regulating-tube *e*, guided in the same, a receiver *q* for the liquid carbonic-acid gas, and a valved supply-pipe *p*, connecting the receiver with the main tube. The main tube *a* is made of brass, galvanized iron, or other suitable metal, the lower part of which is preferably reduced in diameter, so that it can easily be driven into the bung *r*. A plug *b* is fitted closely into the upper end of the main tube *a* and provided with an enlarged head, so as to permit the use of a mallet for forcing the lower tapering end of the main tube into the bung. The stationary sleeve *c* is located at the interior of the upper wider part of the main tube *a* and is made of any suitable metal. The sleeve *c* serves to guide the regulating-tube *e* in its reciprocating motion. The regulating-tube *e* is closed at its upper end and provided below the same with an adjustable collar or stop *f*, secured to the tube *e* by a set-screw *f'*. Below the collar a slot *d'* is arranged, which communicates with the interior of the regulating-tube *e*.

To the lower end of the tube *e* is attached a piston *g*, between which and the stationary sleeve *c* is interposed a helical spring *h* of considerable strength which exerts its pressure on the upper end of the piston, so as to keep the regulating-tube in its lowermost position, with the collar or ring *f* abutting against the upper end of the stationary sleeve *c*.

The threaded end of the valved supply-pipe *p* is screwed into an interiorly-threaded socket *k'* of a holder *k*, which is provided with a sleeve *i*, which is fitted closely to the upper part of the main tube *a* and which is firmly retained thereon by means of a set-screw *i'* or other suitable fastening device. The supply-pipe *p* has a cock or valve *o*, upon opening which gas is permitted to pass from the receiver *q* through a bore of the holder *k* to the interior of the stationary sleeve *c* and from the same to the main tube *a*.

When it is desired to charge the receiver *q*, the sleeve *i* of the holder *k* is disconnected from the main tube *a* by loosening the set-screw *i'*. The plug *b* is then removed and the receiver *q*, with the holder *k* and sleeve *i*, detached from the main tube *a*. The holder *k* is then unscrewed from the supply-pipe *p* and the receiver *q* charged with liquid car-

bonic-acid or other gas under pressure, after which the cock is closed and the socket *k'* of the holder *k* screwed up again on the end of the supply-pipe *p*. The sleeve *i*, with the receiver *q*, is then replaced on the main tube *a*, clamped by the screw *i'* in position thereon, and the plug *b* replaced in position at the upper end of the main tube *a*. The main tube is provided with an opening *a'*, which registers with an opening *c'* in the sleeve *c* and with the bore of the supply-pipe *p*, the registering of said bore with the holes being brought about by suitable marks on the upper edge of the ring *i* and on the main tube *a*. The hole *c'* in the stationary sleeve communicates with an interior annular groove or channel *c²*, which is shown in Fig. 3, and by which the gas under pressure is supplied to the slot *d* in the regulating-tube *e* as soon as the stop-cock *o* is opened. To produce the gas-tight connection between the supply-pipe *p* and the screw-socket *k'* of the holder *k*, a rubber gasket is inserted between the end of the supply-pipe and the socket. By tightly drawing the set-screw *i'*, which is located at a point diametrically opposite to the registering openings in the holder, main tube, and sleeve, a tight connection between the sleeve *i* and the main tube is obtained, which can, however, if required, be tightened in a still more reliable manner by suitable packing-rings interposed between the sleeve *i* and main tube *a*.

The operation of my improved gas-pressure regulator is as follows: The main tube *a* is driven into the bung of the keg or other vessel the contents of which are to be drawn off. The plug *b* is then removed and the holder *k* of the receiver *q* placed in position on the main tube so that the interior bore of the holder *k* registers with the openings *a'* of the main tube *a* and *c'* of the stationary sleeve *c*. This is easily accomplished by the setting-marks on the sleeve *i* and main tube *a*. The receiver *q* can also first be attached to the main tube and the latter then forced into the bung *r*. The stop-cock *o* is then opened so that a certain quantity of gas is supplied through the tube *a*, holder *k*, openings *a'* *c'*, annular channel *c²*, and slot *d* of the regulating-tube *e* to the interior of the main tube and to the interior of the keg or other vessel. The pressure which is produced by the entering of gas into the vessel acts on the lower end of the piston and lifts the latter, with the regulating-tube, against the tension of the spring *h* until the slot *d'* is placed out of register with the annular channel *c²*. The supply of gas to the receiver *q* is thereby interrupted and the liquid in the vessel kept at a certain pressure. As soon as some of the liquid is withdrawn the pressure is gradually diminished and the spring *h* begins to act on the piston of the regulating-tube until the slot *d'* registers again with the interior channel *c²* and establishes connection with the receiver, so that a new quantity of gas is ex-

panded into the vessel, which, acting on the lower end of the piston, raises the same and again interrupts the supply of gas. This alternating play is continued until the liquid in the vessel is entirely drawn off. It is obvious that the power of the spring *h* may be set for any amount of pressure, either by changing the spring for one of greater or smaller power or by providing means for regulating the tension of the spring. The receiver may be also connected by different means with the main tube and the regulator variously modified in minor particulars without departing from the spirit of my invention.

The advantages of my improved gas-pressure regulator are, first, that any vessel containing liquids under pressure can be kept at a suitable pressure without losing any portion of its gas in the same, so that the liquid can be dispensed to the last drop without losing any of the gas originally contained in the same; secondly, that the pressure-regulating device can be readily transferred from one vessel to another and used for days or weeks until all the liquid carbonic acid in the receiver is used up. This takes considerable length of time, as a comparatively small quantity of gas is required only for a keg; thirdly, my improved gas-pressure regulator enables the retailers to sell fermented liquors in better and sweeter condition than when they are drawn off without pressure of carbonic-acid gas.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination of a main tube provided with a stationary interior guide-sleeve, a regulating-tube guided in said sleeve closed at the upper end, said regulating-tube being provided with an adjustable collar at its upper end, and a slot below said collar, a piston at its lower end of the regulating-tube, a helical spring interposed between the stationary sleeve and the piston, a receiver containing carbonic acid under pressure, means for supporting said receiver on the main tube, and a valved supply-pipe connecting said receiver with the main tube, substantially as set forth.

2. The combination, of a main tube provided with a stationary interior guide-sleeve, a sliding and spring-actuated regulating-tube closed at its upper end, an adjustable collar at the upper end of the regulating-tube and a slot below said collar, a piston at the lower end of the regulating-tube, a receiver for carbonic-acid gas or other gas under pressure, a holder applied to the upper end of the main tube and provided with a bore registering with openings in the main tube and stationary sleeve, and a valved gas-supply tube connecting the receiver with said holder, substantially as set forth.

3. The combination of a main tube having a detachable plug at its upper end, a stationary sleeve in the upper part of the main tube,

a regulating-tube guided in said sleeve, closed at the upper end and provided with a collar at its upper end and with a slot below said collar, a piston at the lower end of the regulating-tube, a helical spring interposed between the stationary sleeve and the piston, a holder provided with a sleeve, means for attaching said sleeve to the main tube, a receiver for carbonic-acid gas under pressure, and a valved gas-supply pipe connecting the receiver with the holder, said holder having

a bore connecting the supply-tube with registering openings of the main tube and stationary sleeve and with an interior annular channel in said sleeve, substantially as set forth. 15

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

KARL M. STAHL.

Witnesses:

PAUL GOEPEL,
GEO. W. JAEKEL.