No. 624,129. Patented May 2, 1899.

C. E. THURLOW.

APPARATUS FOR MAINTAINING PRESSURE IN BEER CASKS.

(Application filed Sept. 28, 1898.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

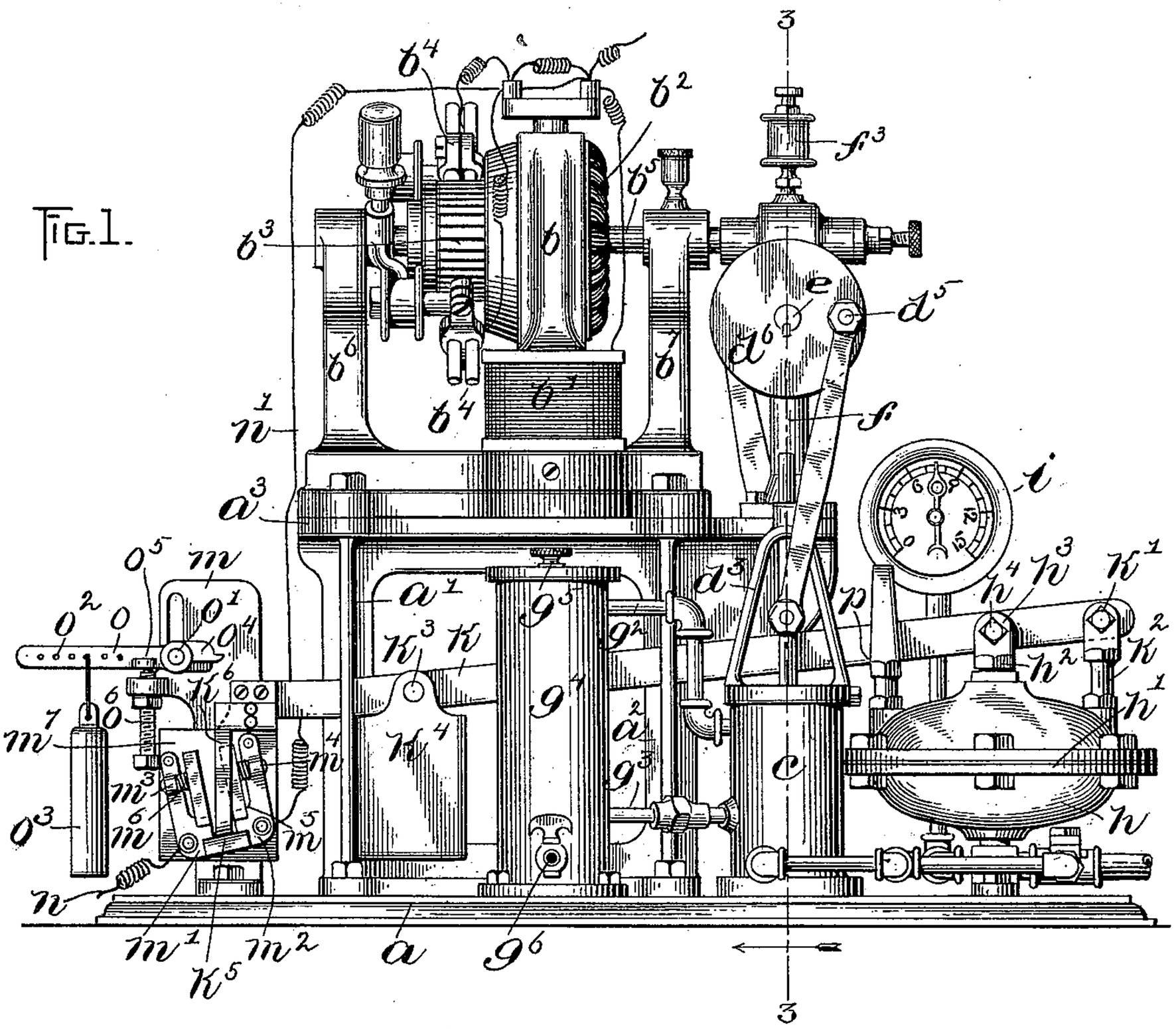
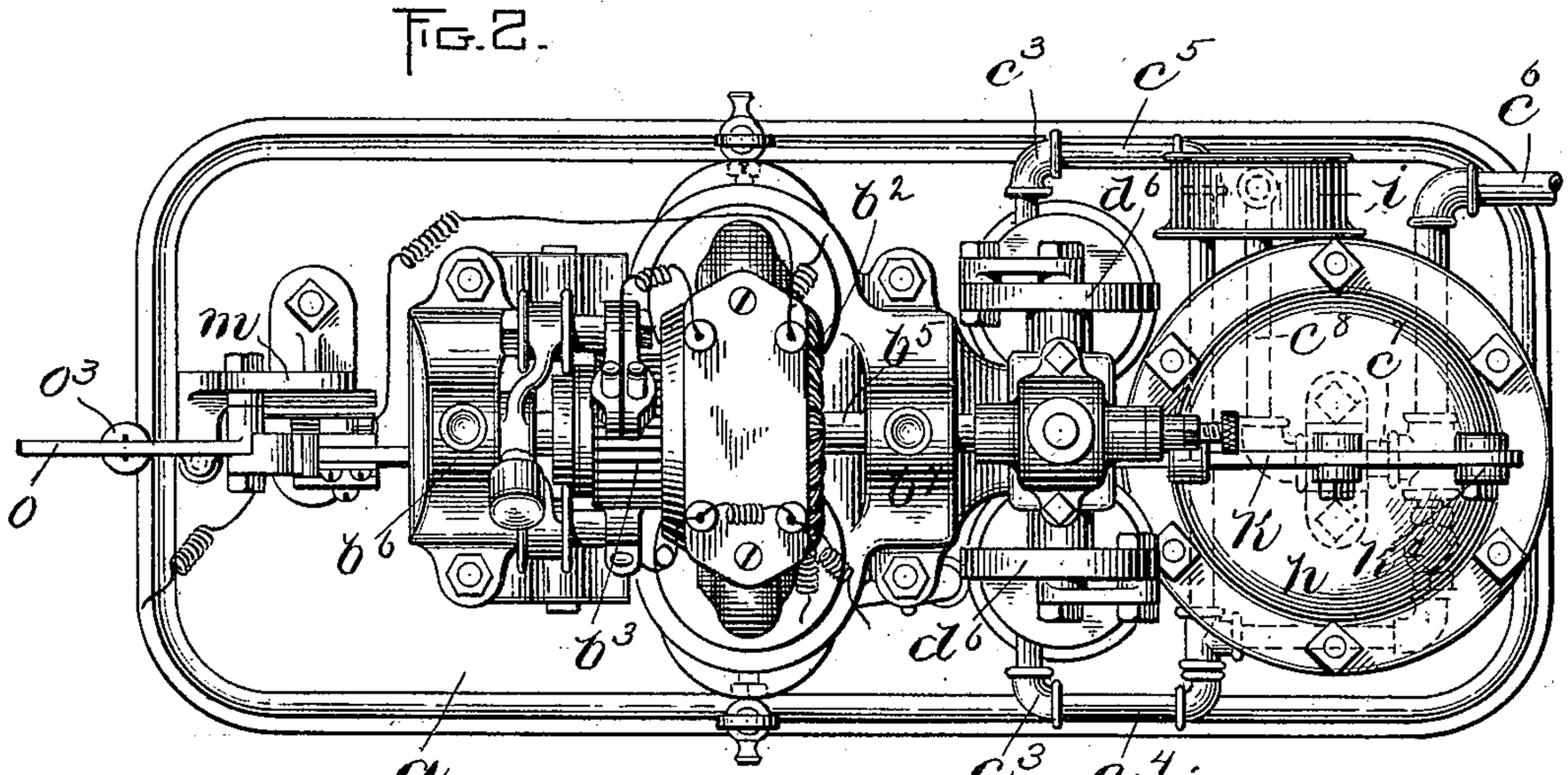


FIG. 2.



WITNESSES:
A. D. Harrison
E. Batchelder

INVENTOR:
C. E. Thurlow
by Wright, Brown & Quinby
Atty's.

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FIG. 3.

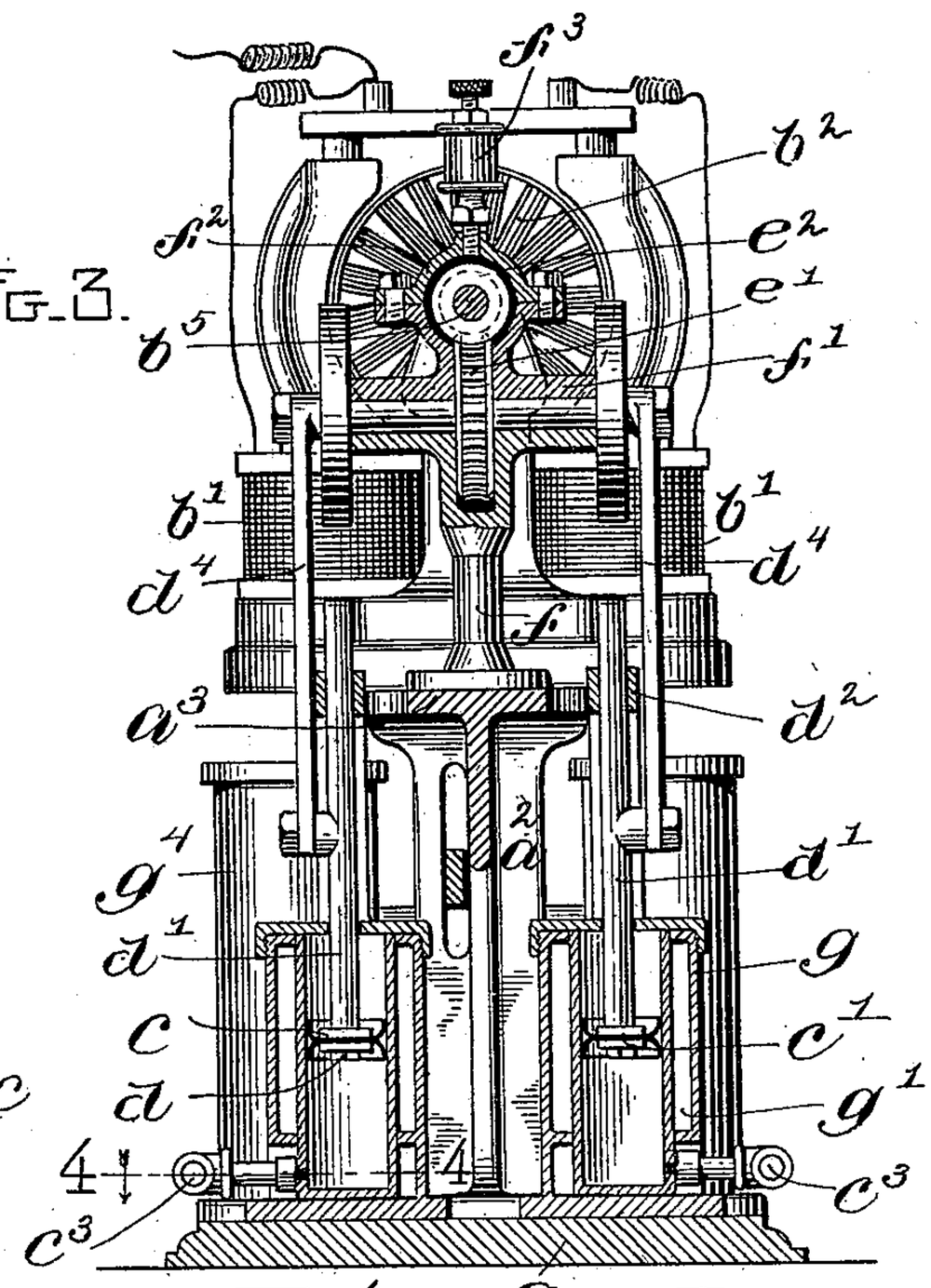


FIG. 4.

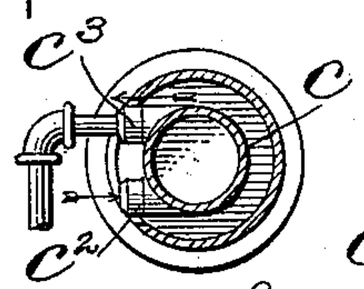


FIG. 5.

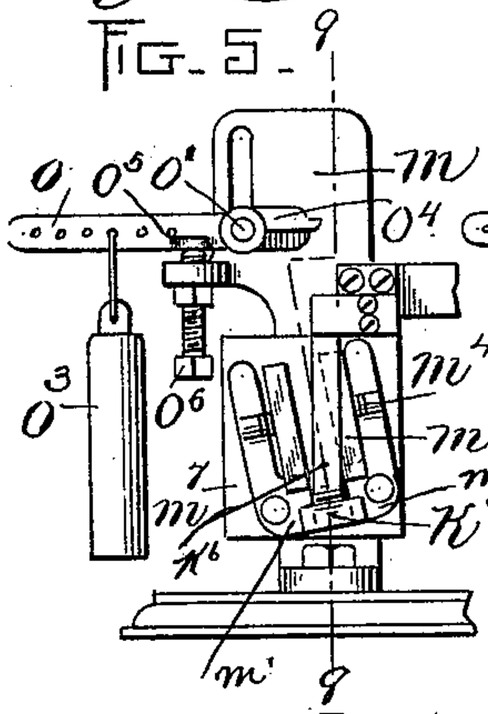


FIG. 6.

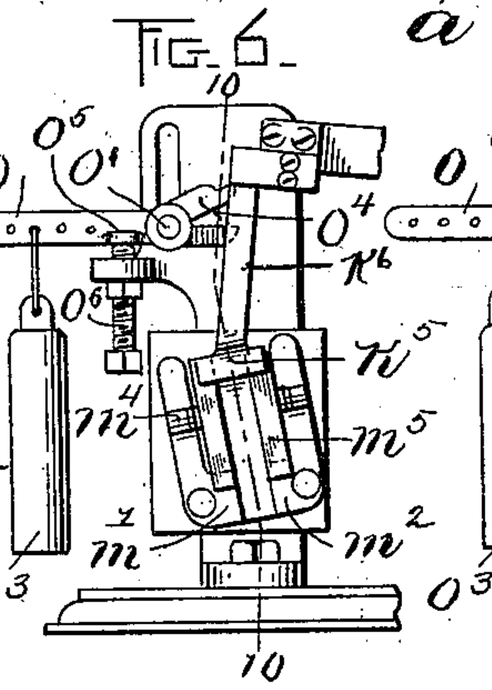


FIG. 7.

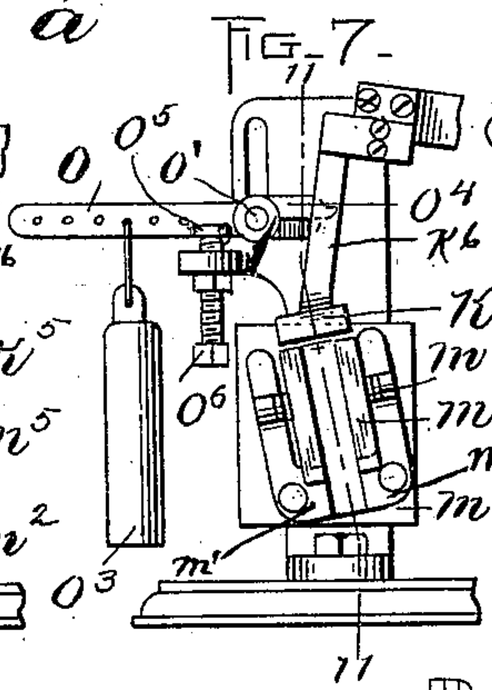


FIG. 8.

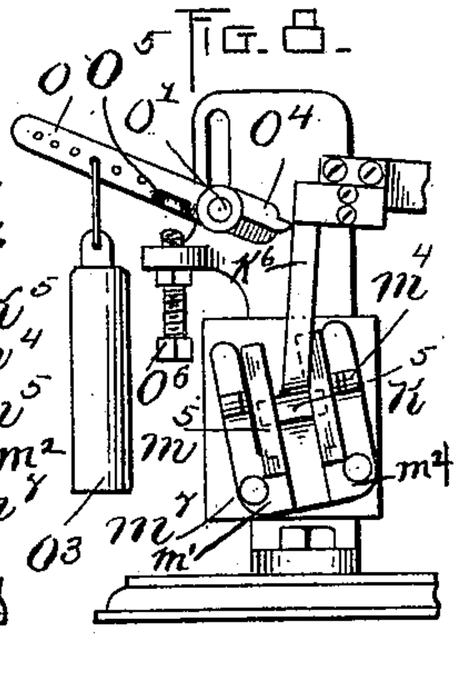


FIG. 9.

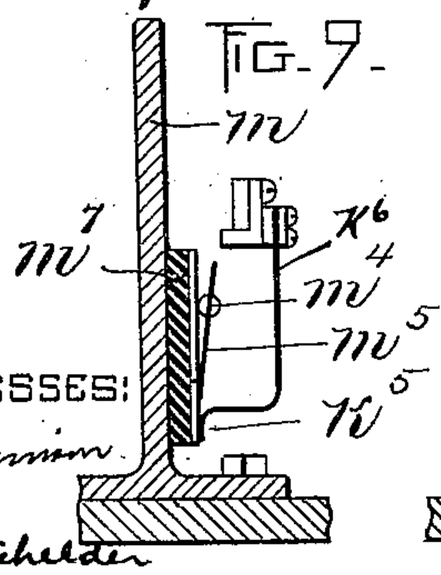


FIG. 10.

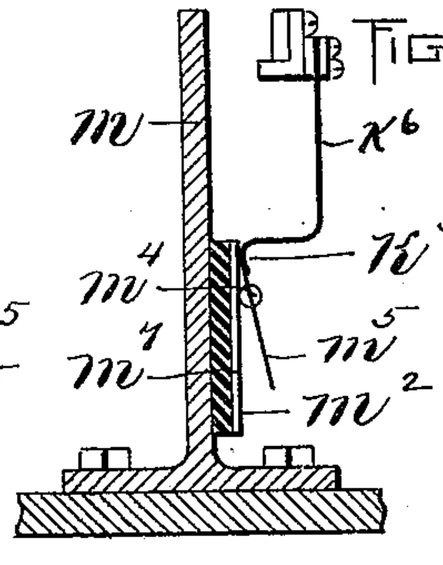
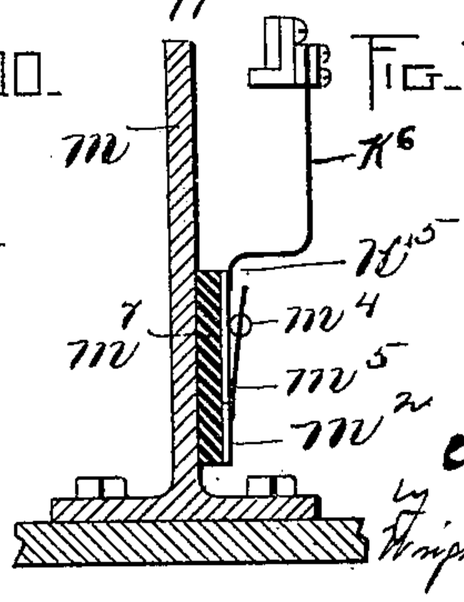


FIG. 11.



WITNESSES:
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INVENTOR:
C. E. Thurlow
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Atty's.

UNITED STATES PATENT OFFICE.

CLARENCE E. THURLOW, OF BOSTON, MASSACHUSETTS.

APPARATUS FOR MAINTAINING PRESSURE IN BEER-CASKS.

SPECIFICATION forming part of Letters Patent No. 624,129, dated May 2, 1899.

Application filed September 28, 1898. Serial No. 692,064. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE E. THURLOW, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Maintaining Pressure in Beer-Casks, of which the following is a specification.

This invention has for its object to provide an automatic mechanism for creating and maintaining a predetermined pressure in barrels for beer and other liquids, whereby the liquid may be forced upward through conduits to the faucet or point of delivery with the same degree of pressure when the barrel is nearly empty as when it is full; and it consists of a mechanism of the character described possessing certain features of construction and relative arrangement of parts, all as illustrated upon the accompanying drawings, set forth in the following specification, and pointed out in the claims hereunto appended.

Reference is to be had to the accompanying drawings, and to the letters marked thereon, forming a part of this specification, the same letters designating the same parts or features, as the case may be, wherever they occur.

Of the drawings, Figure 1 represents in front elevation an apparatus embodying my invention. Fig. 2 represents a plan view of the same. Fig. 3 represents a transverse section on the line 3 3 of Fig. 1. Fig. 4 represents a horizontal section on the line 4 4 of Fig. 3. Figs. 5 to 8, inclusive, represent different positions of the motor-controlling device or circuit maker and breaker. Figs. 9 to 11, inclusive, represent sectional views of the same.

In carrying out the invention I employ a base-plate a, upon which all of the movable and operative parts of the apparatus are supported, and upward from which rises a standard consisting of the legs a' a^2 and the flat portion or table a^3. Upon the table I support an electric motor b, having suitable field-coils b' b', a rotary armature b^2, a commutator b^3, and brushes b^4 b^4. The armature-shaft b^5 is journaled in bearings b^6 b^7 and is extended to furnish motive power to the air-compressing mechanism.

The last-mentioned mechanism comprises two air-pumps c c', each having an air-inlet c^2, provided with a check-valve, and an outlet c^3, also provided with a check-valve, both the outlets communicating by ducts or pipes c^4 and c^5 with the main duct or pipe c^6, which leads into an air-reservoir. (Not shown.) The reservoir is connected with the upper portion of the barrel or cask from which the liquid is to be withdrawn. Each pump has a piston d with suitable packing and a piston-rod d', extending through the cylinder-head and guided by a bearing d^2, supported by the yoke d^3. The piston-rods are connected by connecting-rods d^4 with crank-pins d^5, extending axially outward from disks d^6 on the ends of a shaft e.

The shaft e is journaled in the tubular arms f' of a standard f, and near its middle it is provided with a worm-wheel e', intermeshing with and driven by a worm e^2 on the shaft b^5. The standard f has chambers for receiving the worm and worm-wheel, and it has a cap f^2, with an oil-cup f^3, for supplying lubricant to the rotating parts. The crank-pins d^5 are arranged opposite to each other, so that when the shaft b^5 is being rotated and the pumps are actuated thereby one of the pistons is rising while the other is being depressed, whereby the air flows practically continuously from the main outlet through the receiving-tank.

For the purpose of preventing the pumps from becoming heated I surround their cylinders with jackets g, forming annular spaces g' for a cooling liquid, the chamber being connected by ducts g^2 g^3 with a reservoir g^4, having an inlet g^5 and an outlet or faucet g^6. As soon as the liquid in the chamber g' becomes slightly warm it escapes through the duct g^2 into the reservoir g^4 and cooler liquid enters the chamber through the duct g^3. In this way there is a constant circulation of liquid around the two cylinders and they cannot become heated, even though the pumps have been working for a long time.

The main outlet-duct c^6 is connected by a branch duct c^7 with a pressure-regulator h and by another duct c^8 with a pressure-indicator i. The regulator h is provided with a diaphragm h', upon which rests a pin h^2, having upwardly-projecting ears h^3, so that when the pressure reaches a predetermined point the diaphragm raises the pin h^2 and through

mechanism to be described controls the movements of the motor to stop the pump until the pressure has fallen below a predetermined point, whereupon the motor is again started.

A long lever k is pivoted at k' on a standard k^2, arising at one side of the regulator h, and it passes between the ears h^3, being likewise pivoted therein by a bolt h^4. The lever passes under the table a^3 and through elongated apertures in the standards a^2 a^3, lying also between the pumps and the reservoirs g^4, as indicated in Fig. 3.

On studs k^3, projecting laterally from the lever, near the free end thereof, are two weights k^4, which may be varied in size as desired. The object of this lever is to control the switch or make-and-break device, which I shall now explain.

Mounted upon a standard m, arising from the base-plate a, are two contact-plates or stationary members m' m^2, which are of the shape shown in Fig. 1 and in Figs. 5 to 8, inclusive. Their lower portions approach each other near enough to be engaged by the movable member or cross-bar k^5 on the end of the contact-strip k^6, secured to the end of the lever k, said contact-strip being insulated upon the said lever by any suitable form of insulation. The two contact-plates m' m^2 are also insulated from each other, one of them being connected with the main supply-wire n for the motor and the other being connected with the wire n', which leads directly to the motor, and hence when the lever is in the position shown in Fig. 1 the contact k^5 connects the two contact-plates and current is supplied to the motor to energize it. Each contact-plate has an upwardly-projecting lug m^3 to receive a pivot-stud m^4 for a strip m^5, which is held by a spring m^6 with its lower end against the contact-plate, being inclined as shown in Figs. 9 to 11. Consequently as the lever k rises the contact k^5 rises and slides on the strips m^5 until it is above the studs m^4, whereupon the strips yield, as shown in Fig. 10, and permit the contact k^5 to slide against the plate m^7 to break the contact and break the circuit through the motor. Then as the lever moves downward the contact k^5 slides underneath and out of engagement with the pivoted strips until it engages the lower ends of the contact-plates m' m^2, as shown in Fig. 8.

In order to make a rapid contact between the contact k^5 and the contact-plates m' m^2 in the descent of the lever, I employ mechanism for temporarily stopping it until the pressure decreases to a predetermined point, which mechanism includes a lever o, adjustably pivoted at o' to the standard m and having a series of apertures o^2 to receive a weight o^3. The lever has a latch o^4, pivoted on the stud o', with which the end of the lever k engages. As the lever moves upward the latch o^4 yields to permit its passing; but when the lever descends it engages the end of the latch and swings the lever o around its pivot. The last-mentioned lever has a lug o^5, which rests against the end of adjusting-screw o^6.

Under ordinary circumstances it is sufficient to maintain a pressure in the cask or barrel of from eight to thirteen pounds, and hence I have arranged my apparatus so that when the pressure falls to eight pounds the circuit through the motor is closed and when the pressure rises to thirteen pounds the circuit is broken.

Assuming that the pressure in the cask or barrel has by reason of the withdrawal of the liquid therefrom been reduced to eight pounds and that the lever is in the position shown in Fig. 1, the contact k^5 closes the circuit between the two contact-plates m' m^2, and the current of electricity going through the motor energizes the same to rotate the armature. The rotation of the armature-shaft drives the pump-shaft e and causes an actuation of the pumps, which force air through the ducts into the receptacle arranged to receive it or directly into the barrel or cask in which the liquid is stored. As the pressure gradually increases in said receptacle it likewise increases in the regulator h and raises the diaphragm therein, which also raises the lever k. The lever swings upward from the fulcrum k' until it slides from the ends of the movable pivoted strips n^5, as shown in Fig. 7, and breaks the circuit to the motor. The movement of the armature-shaft immediately ceases, the gage indicating the degree of pressure at that time in the cask or barrel. Then as the liquid is drawn from the latter the pressure on the diaphragm decreases and the lever is allowed to descend. As it moves downward it finally engages the end of the latch o^4 and is then held against further movement until the pressure decreases to such an extent that the weights k^4 and o^3 overcome it, and the lever is swung upon its axis to release the end of the lever k from the latch o^4, after which the lever k drops with a rapid movement into the position shown in Figs. 1 and 5. Its downward movement is cushioned by the regulator h, and the lever finally rests upon the lower wall of the slot in the vertical guide p, arising from the regulator, as shown in Fig. 1.

It is evident that by varying the weights the pressure in the barrel may be maintained at a higher or lower point than that described and that the variation in pressure between the maximum and minimum pressure may be increased or decreased, as desired.

By employing a rotary motor for driving the pumps I am enabled to obtain an even and regular movement of the pistons, and by providing two pumps operated by the same armature-shaft the pressure in the regulator increases regularly and evenly, whereby the lever which carries the contact member is actuated positively without jerking and in an easy even manner.

The whole apparatus is compact and may be inclosed in a casing to prevent access

thereto. After my invention has been installed it does not need attention, but operates automatically so long as there is any fluid in the cask or barrel.

Having thus explained the nature of the invention and described a way of constructing and using the same, though without attempting to set forth all of the forms in which it may be made or all of the modes of its use, I declare that what I claim is—

1. An apparatus of the character specified comprising an air-pump, an electric motor for actuating the same, a pressure-operated regulator, a lever controlled by said regulator, a switch, one member of which is stationary and the other of which is on the said lever, and a weighted pivoted lever for temporarily engaging said lever and then releasing it when the pressure has decreased to a predetermined point.

2. An apparatus of the character specified comprising an electric motor, an air-pump actuated thereby, a pressure-operated regulator, a weighted lever actuated by said regulator, a lever having a latch to engage and temporarily stop the weighted lever in its movement during a decrease in pressure, and a switch for the electric circuit, one member of which is carried by said weighted lever.

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

CLARENCE E. THURLOW.

Witnesses:
HORACE BROWN,
A. D. HARRISON.