2 Sheets--Sheet 1.

J. C. KENNEDY.

Apparatus for Charging Beer with Gas.

No. 165,004. Patented June 29, 1875.

Fig. 1

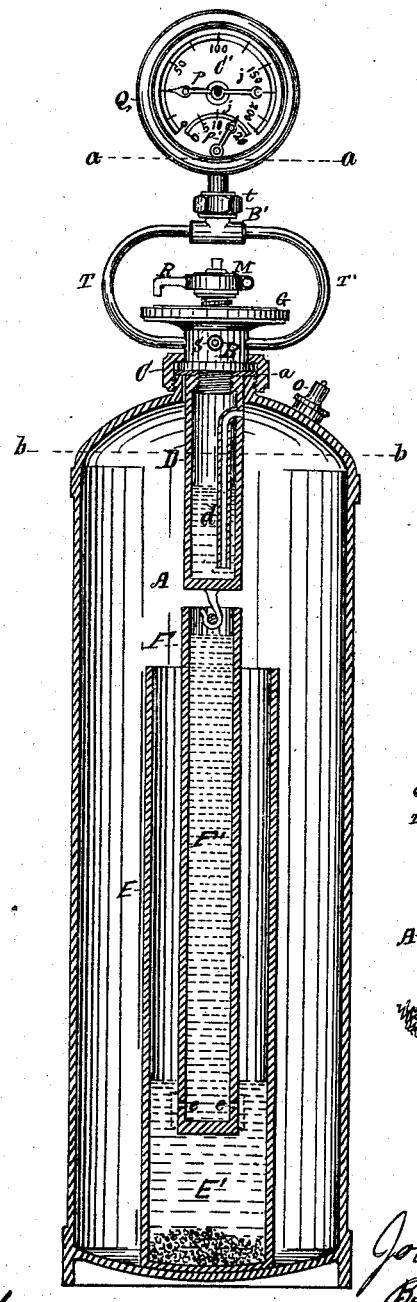


Fig. 2

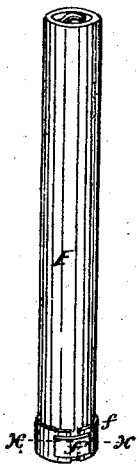


Fig. 3

Fig. 5

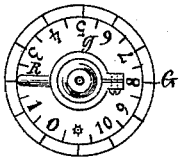
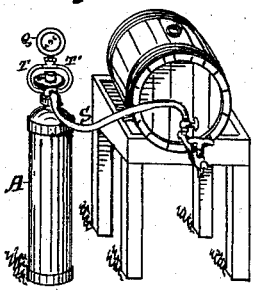


Fig. 4



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2 Sheets--Sheet 2.

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Apparatus for Charging Beer with Gas.

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Fig. 6

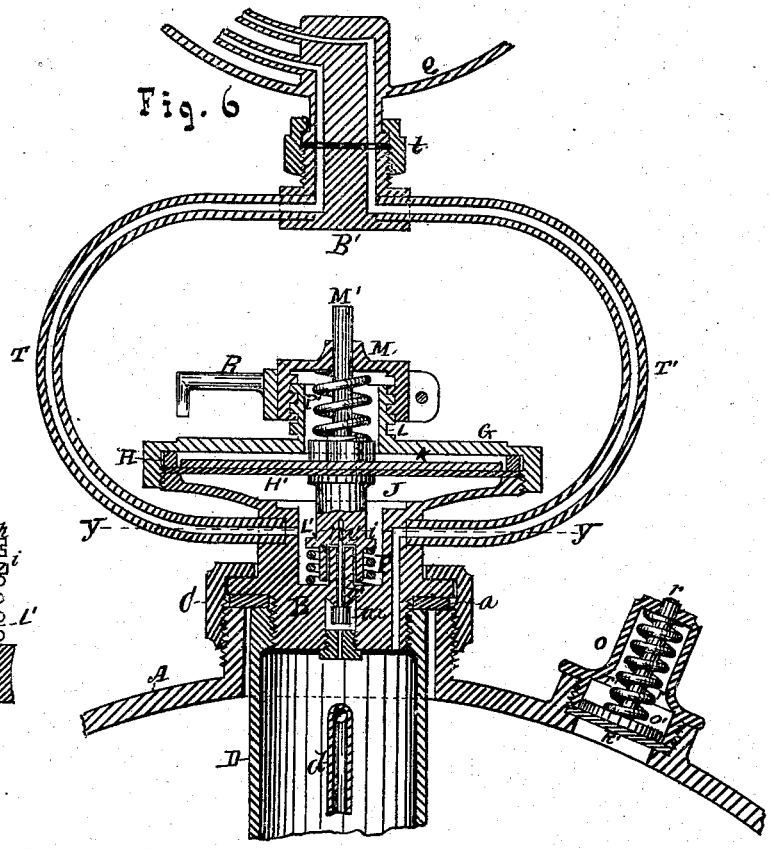


Fig. 8

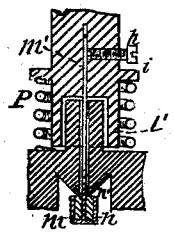
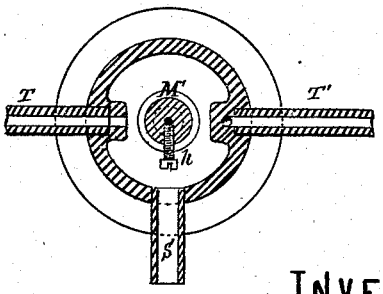


Fig. 7



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UNITED STATES PATENT OFFICE.

JOHN C. KENNEDY, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF HIS RIGHT TO HENRY KILEY, OF TOLEDO, OHIO.

IMPROVEMENT IN APPARATUS FOR CHARGING BEER WITH GAS.

Specification forming part of Letters Patent No. **165,001**, dated June 29, 1875; application filed June 4, 1875.

To all whom it may concern:

Be it known that I, JOHN C. KENNEDY, of Chicago, in the county of Cook and State of Illinois, have invented an Improved Apparatus for Charging Beer with Gas; and I do hereby declare the following to be a full, clear, and exact description thereof, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1, Sheet 1, is a sectional elevation of my said invention. Fig. 2, Sheet 1, is a perspective view of the receptacle containing the acid. Fig. 3, Sheet 1, is a sectional plane of the same taken on the line *x x* drawn across Fig. 2. Fig. 4, Sheet 1, is a perspective view of the apparatus proper, showing the manner of connecting it to the cask. Fig. 5, Sheet 1, is a top view of the indicator determining the pressure of gas in the case. Fig. 6, Sheet 2, is an enlarged vertical central section of a portion of the apparatus taken between the lines *a b*, Fig. 1. Fig. 7, Sheet 2, is a sectional plan taken on the line *y y* drawn across Fig. 6; and Fig. 8, Sheet 2, is an enlarged vertical central section of the valve and valve-seat employed to determine the flow of gas.

Similar letters of reference indicate like parts in the several figures of the drawings.

It is well known that the escape of gases from beer-casks as the contents are gradually drawn off renders the beer stale, flat, and unpalatable—difficulties which may be obviated by keeping up the supply of gases within the cask. It is for this latter purpose that my invention is designed; and it consists in the several combinations of parts constituting the mechanism employed for generating the gas and to determine its flow and pressure within the cask, as will be more fully understood from the following description and claims.

In the drawing, A represents the main or outer case of the generator proper, which is made from any suitable sheet metal, and of the requisite dimensions to contain the required supply of gas. B is a cylindrical disk, which is centrally secured to the cap or dome of the case A by means of a screw-threaded collar, C. The joint at the connection of the disk with the cap is provided with a suitable packing, *a*, the object of which is to prevent the escape of the gases within the case. D is a depending tube attached to the lower and central portion of the disk, as shown in Fig. 1. This tube is made tight at its lower end, and provided internally with an open-ended depending tube, *d*, communicating with the chamber of the main case at a point near the lower surface of the cap, and extending downward to a point near the lower end of the outer tube D. E is an inner vertical case, which is permanently attached to the bottom of the main case A, centrally within the same, and extending upward to a point slightly below the lower end of the tube D. This case is made open at its upper end and tight at its lower end, forming a chamber, E′, into which is deposited the water and soda, marble-dust, or other suitable material forming part of the ingredients from which the gas is generated. The diameter of this case is less than the diameter of the outer or main case A, forming a chamber or reservoir to receive the gas as it is generated. F is a vertical tube, which is suspended from the lower end of tube D, within case E, and arranged to extend downward to a point near the lower end of the same, as shown in Fig. 1. This tube is made open at its upper end and tight at its lower end, forming a chamber or receptacle, F′, within which the acids used are deposited, and is provided at a point near its lower end with a series of openings, *e*, through which the acids gradually flow into chamber E′.

To prevent the immediate flow of acid into chamber E′, consequently the generating of gas during the adjustment of tube F, and the securing of the cover on the main case, I cover the openings *e* with a band of india-rubber, *f*, united at its ends by a strip of paper or other suitable material, *f′*, which will disconnect itself from the band when properly saturated by the water in chamber E′. The upper and enlarged portion of disk B is made hollow, and screw-threaded externally, as shown in Fig. 6. G is an annular plate, which is mounted upon the upper end of the disk, forming a cap covering the entire surface of the same. H is an

annular ring, which is fitted loosely into the depending flange of the cap. H′ is an elastic diaphragm, which is secured between the end of the disk and lower end of ring H, forming an equalizing-chamber, J. K is an annular plate, which is loosely fitted into ring H immediately over the diaphragm.

The upper surface of cap G is provided at its center with an external screw-threaded collar, L, shown in Fig. 6. M is a screw-threaded cap mounted on the upper end of collar L, and so arranged as to admit of being turned to the right or left, by which means the same is raised or lowered, as may be required. M′ is a vertical spindle centrally arranged within the disk. This spindle is stepped at its lower end to the base of the disk, as shown at L′, and passes upward through diaphragm H′ and plate K to and through collar M, and is so arranged as to admit of a free and easy ascending or descending movement. This spindle is permanently attached to the diaphragm and plate, and is so arranged as to move upward with them as the latter are lifted by the excess pressure of gas in the equalizing-chamber. M is the valve for determining the flow of gas from the main case into the equalizing-chamber J. This valve consists of a disk of soft rubber or other flexible material, secured within an annular metal ring, *n*, permanently attached to the stem *m′*, this stem extending upward through the valve-seat *n′* and step on which the spindle is secured to and into the lower end of the spindle, and is permanently secured therein by a set-screw, *h*, shown in Fig. 7. The face of the valve-seat is made conical, and the area of its bearing-surface is less than the area of ring *n;* consequently when the valve is lifted to its seat the converging edge of the latter takes into the flexible face of the valve, thus preventing further flow of gas into the equalizing-chamber. P is a coiled spring loosely secured upon and around the lower end of the spindle, between shoulder *i* of the latter and the upper surface of the base of disk B. P′ is a similar coiled spring, loosely secured around the upper portion of the spindle, between the upper surface of plate K and the lower surface of cap M, the object of which is to graduate the pressure of gas in chamber J. The upper surface of cap G is provided with an indicating-dial, *g*, shown in Fig. 5. R is the indicator, which is clamped around cap M, and so arranged as to admit of being turned to any desired point thereon, and permanently secured in a fixed position.

The object of making this indicator adjustable on the cap is to allow the same to be turned back to correspond with the tension of the spring relative to the figures on the dial. The arrangement of these springs is such that when adjusted to an equal tension the valve is held against its seat by the tension of the spring P and the indicator points to zero on the dial.

To determine the pressure of gas in the equalizing-chamber collar L is turned so that the indicator points to the figure on the dial corresponding with the number of pounds per square inch in the chamber, which overbalances the pressure of spring P, and the valve is forced down, allowing the gas to flow into the equalizing-chamber through the opening around the valve-stem. When the pressure in the chamber against the diaphragm exceeds the limit allowed, spring P′ yields and the diaphragm ascends, closing the valve on its seat, preventing further inflow of gas in the chamber, and when the pressure in said chamber is reduced below the pressure of the spring P′ by the escape of gas into the cask the overbalanced pressure of the spring again forces the diaphragm and spindle downward, disengaging the valve from its seat, and the gas in the case instantly flows into the equalizing-chamber.

S is the escape-pipe, through which the gas passes from the equalizing-chamber into the cask. T and T′ are curved tubes, which are each permanently connected at the lower end to disk B below the diaphragm, and at the upper ends to a disk, B′, secured to the base of the indicator-case Q by a screw-coupling, *t*, shown in Figs. 1 and 6.

This case Q is provided with a dial-plate, C′, provided with two separate indicating-dials, *j j*, shown in Fig. 1, arranged respectively to indicate the pressure of gas in the main case and equalizing-chamber. The case Q is provided with two separate devices (not shown) for actuating the hands *p p′* of the indicating-dials. These dials communicate respectively with tubes T T′, and may be of any known construction. The arrangement of these tubes is such that the cavity of tube T communicates directly with the equalizing-chamber J, and the cavity of tube T′ communicates direct with the main case through tubes *d* and *d*, as shown in Fig. 6, and the arrangement of the respective parts actuating the dial-hands are such that as the pressure of gas in the main case and equalizing-chamber is increased or decreased it is indicated by the hands on the respective dials showing the amount of pressure per square inch in the main case and in the equalizing-chamber; consequently, in the cask. O is a cylindrical cup, which is attached to the dome of the main case, and communicating with the interior of the same, as shown in Fig. 6. O′ is an annular metal plate, which is loosely secured within the base of the cup. R′ is an elastic diaphragm, secured under plate O′ over the opening, in the dome of the main case. *r* is a vertical spindle permanently attached to the center of plate O′, and arranged to pass loosely through the cap of the cup. Mounted upon and around this spindle, between the plate and cap of the cup, is a coiled spring, *r′*, so adjusted as to hold the plate against the diaphragm.

The tension of this spring is such as to yield

and allow the diaphragm to expand as the pressure of gas in the main case increases, by which means the pressure per square inch may be practically ascertained by compressing the spindle when the indicating-dials are removed.

Having thus described my invention, I claim—

1. In combination with the main case A, the depending tubes D and F, tube D provided with the open-ended tube *d* internally arranged and communicating with the chamber of the main case, as specified.

2. In combination with the main case A, the inner case E, adapted to receive the ingredients from which the gas is generated, and arranged to form the reservoir receiving the gas between it and the walls of the main case, as specified.

3. The elastic band *f*, arranged to close the openings *e* in tube F, the ends of the band connected by a strip of paper or other material, which will allow the band to disengage itself from the tube when saturated by the water in case E, as and for the purpose specified.

4. In combination with cap G, provided with the indicating-dial *g*, the elastic diaphragm H′, spring P′, and cap M, carrying the indicator R, arranged to graduate and determine the flow of gas into the equalizing-chamber, as specified.

5. The indicator R, adjustably connected to cap M, whereby the same is adjusted to correspond with the tension of spring P′, relative to the figures on the dial, as specified.

6. The soft-rubber or flexible valve *m*, arranged within the metal ring *n*, and attached to stem *m′*, in combination with the inverted conical valve-seat *n′*, as specified.

7. The combination of tubes T and T′, arranged to communicate with the equalizing-chamber J, and interior of the main case A, and the mechanism for actuating the indicator-hands, whereby the pressure of gas in the main case and equalizing-chamber is indicated respectively on one dial-plate, as specified.

8. In combination with the main case the cup O, provided with the elastic diaphragm R′, plate O′, spindle *r*, and spring *r′*, arranged to indicate the pressure of gas in the main case, as specified.

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Witnesses:

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T. T. LOOMIS.