(No Model.) 2 Sheets—Sheet 1.

H. E. BAILEY.

APPARATUS FOR FORCING BEER, &c., FROM BARRELS, CASKS, &c.

No. 364,885. Patented June 14, 1887.

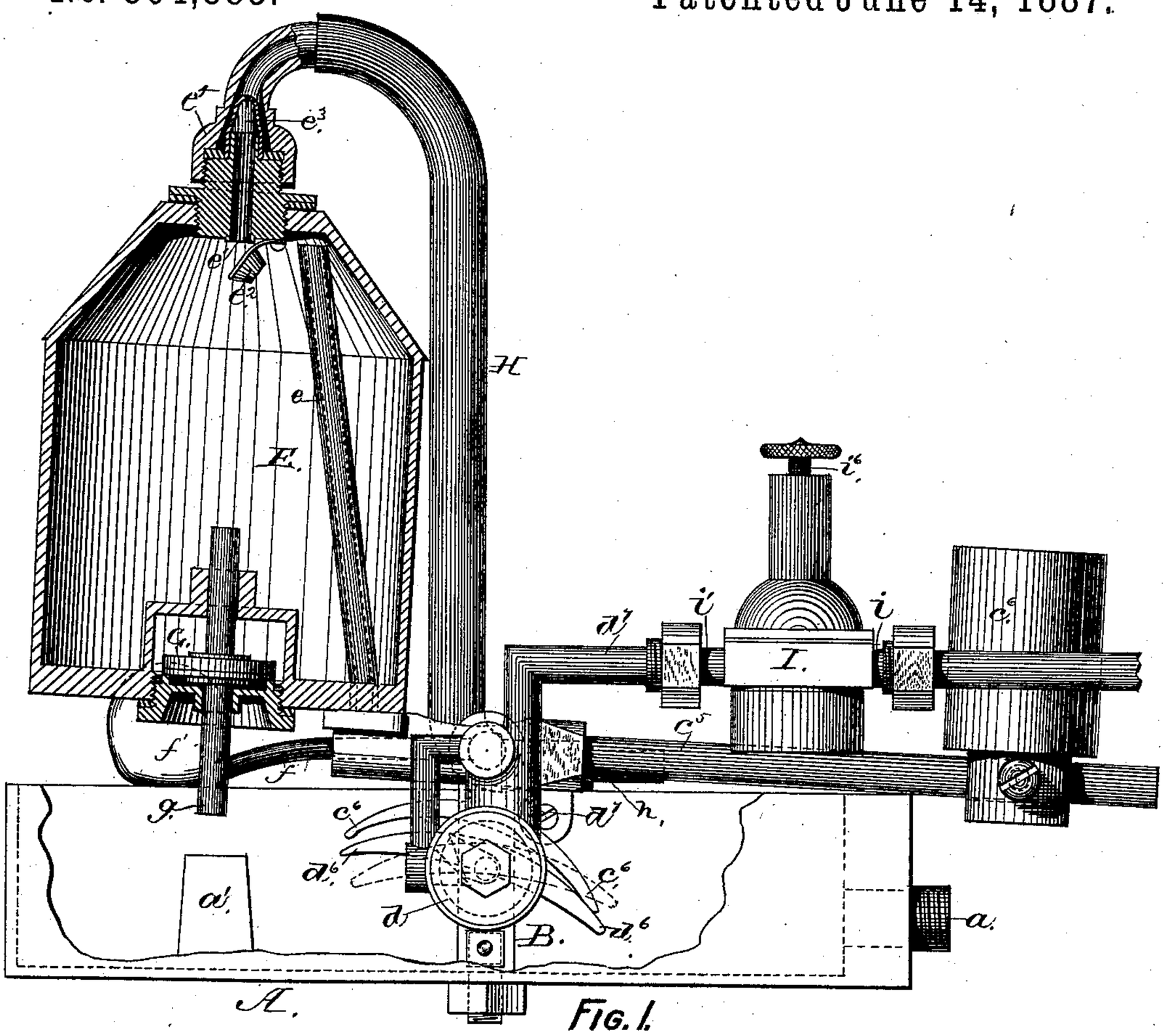

FIG. 1.

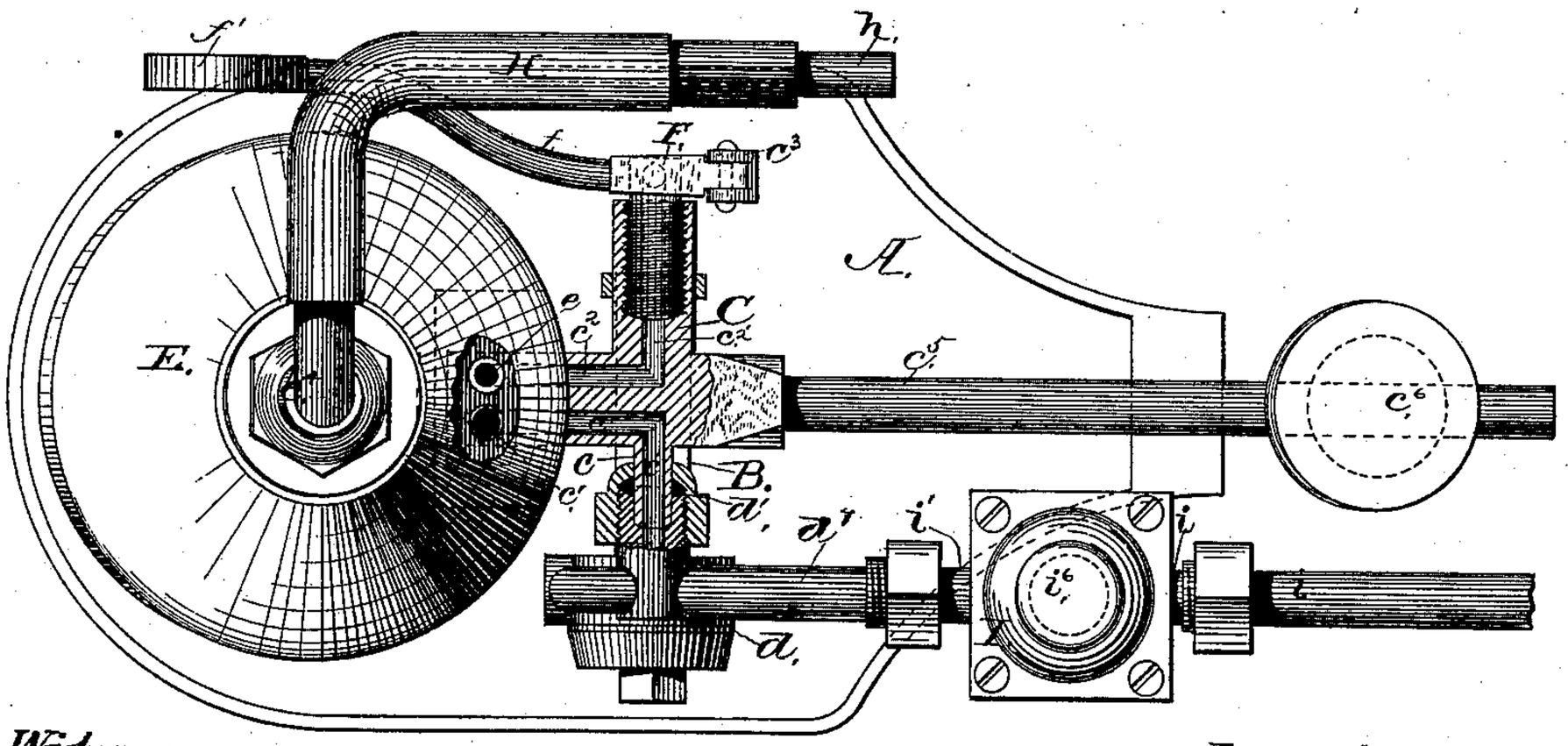

FIG. 2.

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Inventor:
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by William N. Lowe,
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(No Model.) 2 Sheets—Sheet 2.

H. E. BAILEY.

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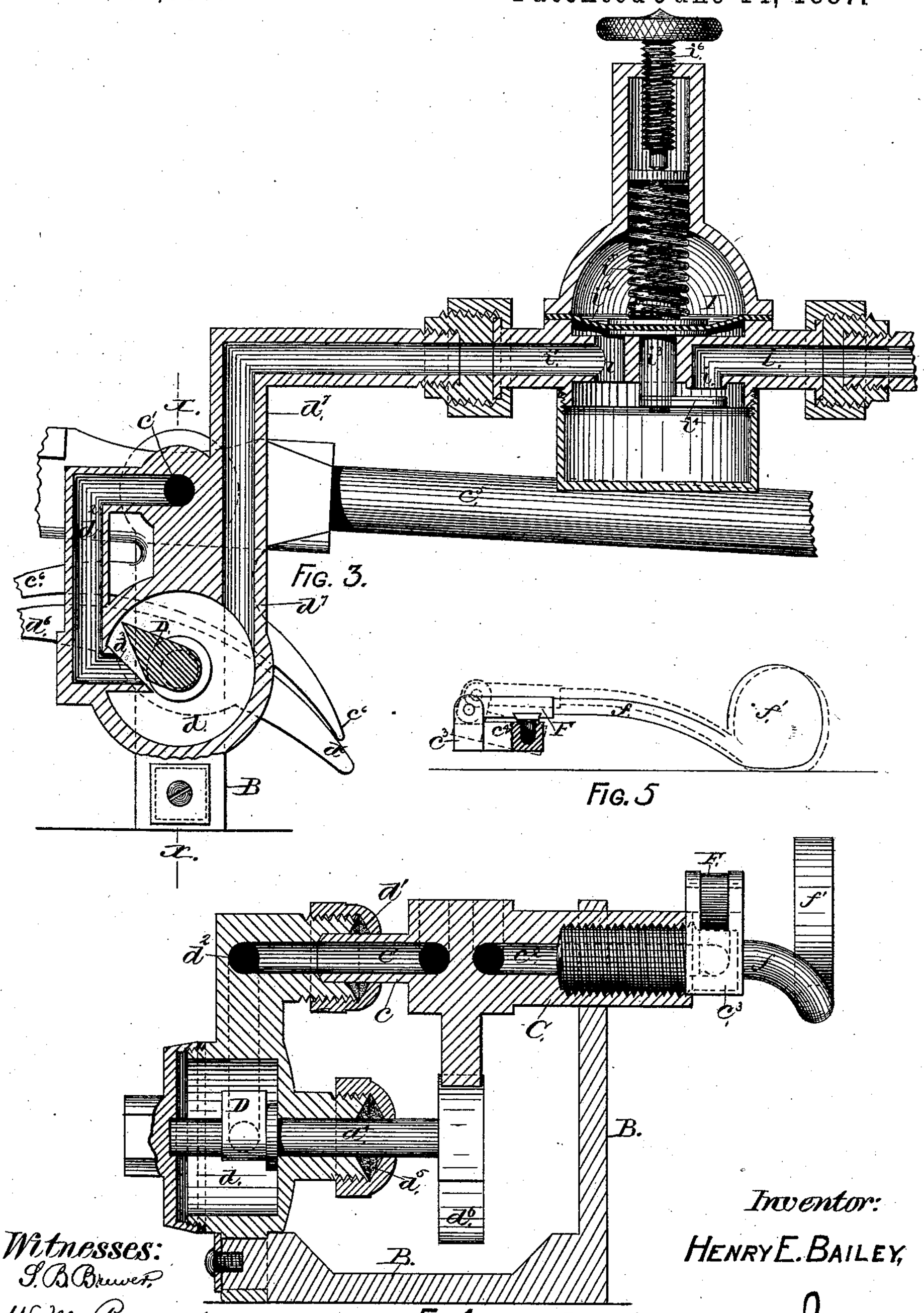

FIG. 3.

FIG. 5

FIG. 4.

Witnesses:
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UNITED STATES PATENT OFFICE.

HENRY E. BAILEY, OF ALBANY, NEW YORK, ASSIGNOR TO JOHN COX, OF SAME PLACE.

APPARATUS FOR FORCING BEER, &c., FROM BARRELS, CASKS, &c.

SPECIFICATION forming part of Letters Patent No. 364,885, dated June 14, 1887.

Application filed May 28, 1886. Serial No. 203,509. (No model.)

To all whom it may concern:

Be it known that I, HENRY E. BAILEY, of the city and county of Albany, in the State of New York, have invented new and useful Improvements in Apparatus for Forcing Beer and other Liquids from Barrels, Casks, &c., of which the following is a specification.

My invention relates to improvements on the class of apparatus for forcing beer from the vessel wherein it is contained, in which the compression of the air is effected by means of a column of water under pressure.

The object of my invention is to provide a simple and effective device for forcing compressed air into a vessel containing beer or other liquid, for the purpose of forcibly discharging the liquid from said vessel; and I attain this purpose by means of the mechanism illustrated in the accompanying drawings, which, being herein referred to, form part of this specification, and in which—

Figure 1 is a side elevation of my apparatus with the compressed-air chamber in vertical section and part of the bed-piece broken away to expose its contained parts; Fig. 2, a plan view with the inlet air and water branch pipe shown in horizontal section, and a part of the compressed-air chamber broken away to show underlying parts; Fig. 3, an enlarged and detached section of the water-inlet pipe and valve and pressure-regulating valve; Fig. 4, a transverse section at the line *x x* of Fig. 3, and Fig. 5 a detached side elevation of the automatic vent-valve.

As represented in the drawings, A is the bed-piece of my apparatus, made in the form of an open-top box and provided with a waste-water pipe, *a;* B, a bracket secured to the bottom plate of the bed-piece and forming a bearing, in which one end of the oscillating branch pipe C rocks. The valve casing *d* for the water-inlet valve D is also secured to said bracket, and forms a bearing for the opposite end of said branch pipe, and for the latter purpose the said valve-casing is provided with a stuffing-box, *d'*, in which the hollow stem *c* fits to form a water-tight joint. The passage *c'* of the stem *c* forms a continuation of the outlet-passage d^2 of the valve-casing *d*. The oblique valve-seat d^3 is formed on an inwardly-projecting end of the outlet-passage d^2, and the face of the valve D is beveled to fit the angle of said seat.

The valve D has a rock-shaft, d^4, which works through a stuffing-box, d^5, of the valve-casing *d*, and the outer end of said shaft is provided with lateral toes d^6, for the purpose of affording means for oscillating said rock-shaft. On the under side of the branch pipe C wipers c^6 are formed to extend at right angles to the axis on which said branch pipe oscillates. Said wipers coact with the toes d^6 on the rock-shaft d^4 by striking against said toes, so as to effect the opening and closing movements of the inlet-valve D. The valve-casing *d* is provided with a water-inlet pipe, d^7, to which the pressure-regulating valve, hereinafter described, is attached.

The branch pipe C is attached to the compressed-air chamber E, and the passage *c'* of said branch pipe leads directly into and through the bottom of said air-chamber, so that all water passing through the valve-chamber *d* will pass into said air-chamber and forcibly displace the air therefrom. Thereby the air is compressed and injected into the vessel containing the beer or other liquid. A standing vent-pipe, *e*, is secured in the bottom of the air-chamber E and extends upward to near the top of said chamber. Said standing pipe communicates with a vent-passage, c^2, formed in the branch pipe C, so that when the vent-valve is open air will be admitted into the air-chamber E, to facilitate the discharge of water therefrom.

The outer end of the vent-passage c^2 is governed by an automatic vent-valve, F. Said valve is faced with rubber, and is hinged to an offset-arm, c^3, that is formed on the valve-seat c^4. An arm, *f*, projects from said valve, and is provided with a weight, *f'*, which presses the rubber-faced valve closely to its seat and stops the admission of air into the vent-passage c^2. The weight *f'* is adapted to strike against the standing flange of the bed-piece or some other standing point, so that when the rock-shaft *c* is tilted by the downward movement of the air-chamber E the valve F will be raised, as indicated by the dotted lines in Fig. 5.

An arm, c^5, fixed on the branch pipe *c*, extends in a direction opposite to the air-cham-

ber E, and is provided with a weight, c^6, which counterpoises the air-chamber and its charge of water. A waste-water valve, G, is fixed in the bottom of the air-chamber E for the purpose of permitting the water to escape from said air-chamber into the bed-piece A, from whence it is discharged through the waste-water pipe *a*. The valve G has a pendent stud, *g*, which, when the air-chamber E is thrown downward by the weight of its contained water, strikes upon the stud *a'* and raises said valve from its seat, so as to permit the water to escape from the air-chamber. At the top of said chamber is an air-outlet passage, e', having at its lower end a water-check valve, e^2, and at its upper end an air-check valve, e^3.

The water-check valve is provided with a cork or other buoyant body, which before the water attains sufficient height to enter the passage e' will cause the valve e^2 to close over the inner end of the passage e' and prevent the water from entering the said passage. The air-check valve e^3 is made of india-rubber in the form of a dome or nipple, and with a slit in its outer end, so that when the pressure of air is applied on its inner side the slit will open to permit the air to pass out; but when the excess of pressure is on the outer side of said nipple the slit will be pressed together and prevent the air from re-entering the air-chamber E. A goose-neck coupling, e^4, covers the air-check valve e^3, and an air-pipe, H, is attached to said coupling. The air-pipe H is made of flexible material to accommodate the oscillations of the air-chamber E. The opposite end of the air-pipe H is connected to a stationary air-pipe, *h*, that is secured to the bed-piece A, and the last-named pipe is connected by means of any suitable hose or pipe to the vessel containing the liquid to be drawn.

The pressure-regulating valve I is attached to the water-inlet pipe d^7, and consists of a casing having an inlet-passage, *i*, and outlet-passage *i'*. A flexible diaphragm, i^2, is held between the upper and lower sections of the casing, and is connected by means of a stem, i^3, to a valve, i^4, which, when it rises to a sufficient height, will close over the inlet-passage *i* and prevent the inflow of water through the pressure-regulating valve. A spring, i^5, is fitted to press upon the upper side of the diaphragm i^2, and a set-screw, i^6, is arranged to bear upon the upper end of said spring to increase or diminish the effect of said spring on the diaphragm, as occasion may require. The operation of said pressure-regulator is as follows: Water under pressure flows through the inlet-passage *i*, and when the pressure in the regulator becomes excessive it acts upon the under side of the diaphragm i^2, and after overcoming the power of the spring it forces said diaphragm to bend upward, thereby causing the valve i^4 to rise and cover the inner end of the inlet-passage *i*, so as to stop the flow of the water into the pressure-regulator. As soon as the pressure in the regulator falls below the required point, the spring i^5 will force the diaphragm to move downward, and thereby the valve i^4 will be carried down clear from the inlet-opening *i*, so as to permit the water to again flow through the regulator.

The operation of my air-compresser is as follows: The water-supply pipe is connected with the inlet-passage *i*, or, when the pressure-regulator is dispensed with, with the inlet-pipe d^7, and the air-pipe *h* is connected by a proper pipe or hose to the vessel containing the beer which is to be forced out. After said connections are made the water under pressure is permitted to enter the apparatus while it is in the position shown in Fig. 1, the valve D being open, as shown in Fig. 3. The pressure of the water compresses the air in the air-chamber E, and forces the compressed air to pass from said chamber through the outlet-pipe H and its connections into the vessel containing the beer, and the latter is by the pressure of the air forced from said vessel whenever a proper cock is opened for that purpose. When the air-chamber has received sufficient water to overcome the effect of the counter-weight c^6, that end of the branch pipe C to which the air-chamber is attached will tilt downward, and by so doing will cause the water-inlet valve D to be closed and the vent-valve F and waste-water valve G to be opened, thereby permitting the water to escape from the air-chamber E and the latter to be again filled with air. As soon as the air-chamber E drops downward, the air-pressure within it falls below that in the vessel containing the beer, and to prevent any wastage of pressure from said vessel the air check-valve e^3 is instantly closed by the excess of pressure on its upper side. When the air-chamber E becomes sufficiently emptied, the counter-weight c^6 causes the branch pipe C to rock in its bearings, and thereby restores the air-chamber E and the several parts to a position for a repetition of the operation just described, and in this manner the device will continue to operate automatically as long as the supply continues to flow into it.

I claim as my invention—

1. The air-chamber E and its counterbalance-weight, in combination with a branch tube rocking therewith, tappets carried by said branch tube, a rock-shaft provided with feet which are struck by said tappets, a water-inlet valve governed by said shaft, and an air-pipe extending from said air-chamber to the beer-barrel, substantially as set forth.

2. The air-chamber E and its counterbalance-weight, in combination with the branch pipe C, rocking therewith, and having passages c' c^2, the water-inlet communicating with said air-chamber through one of said passages, and the air-vent pipe allowing the escape of air therefrom through the other, substantially as set forth.

HENRY E. BAILEY.

Witnesses:
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S. B. BREWER.