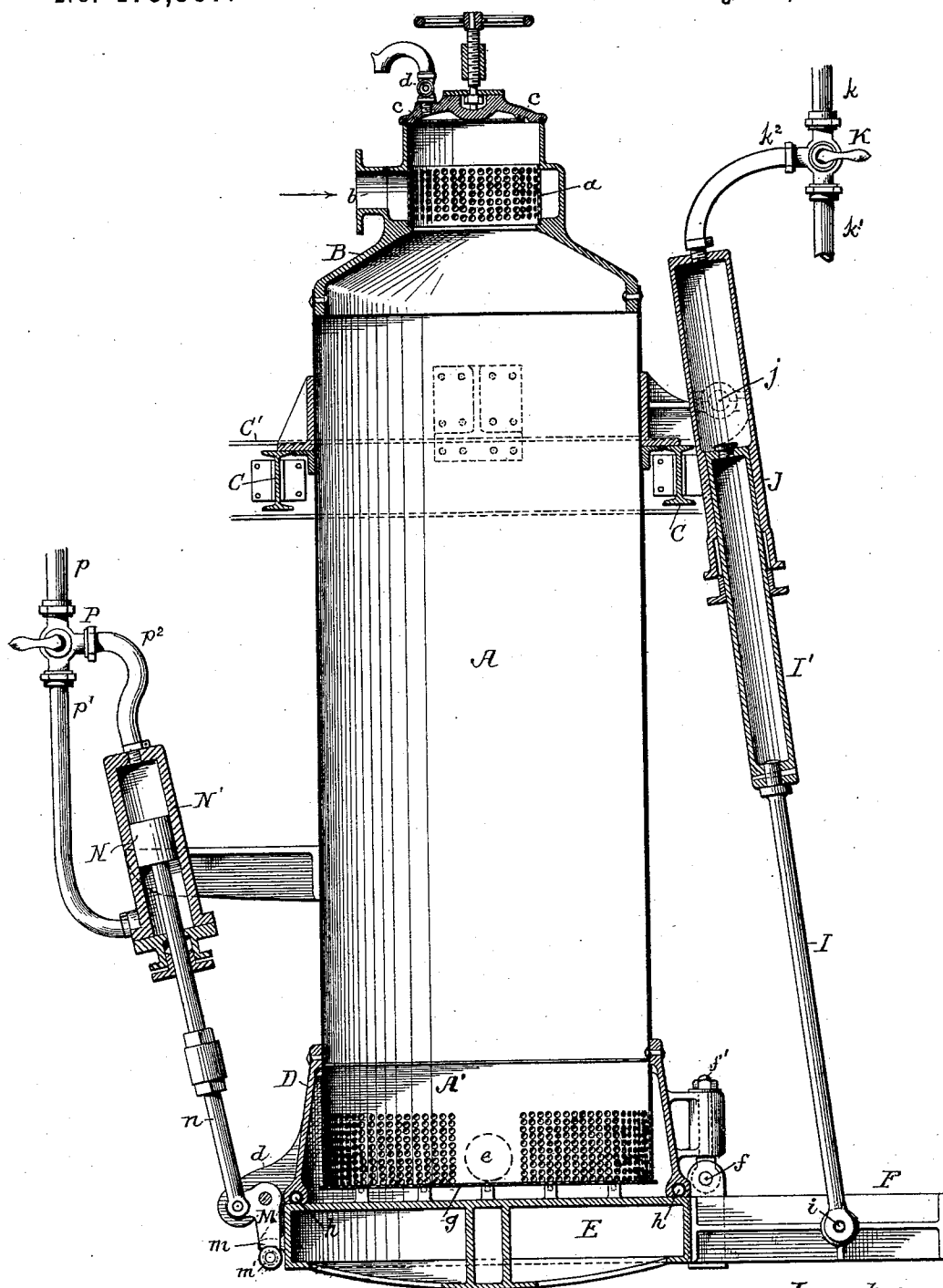


(No Model.)

G. A. MESSICK.
DIFFUSION BATTERY.

No. 475,587.

Patented May 24, 1892.



Witnesses:
William D. Bonner.
John E. Parker

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UNITED STATES PATENT OFFICE.

GEORGE A. MESSICK, OF WILMINGTON, DELAWARE.

DIFFUSION-BATTERY.

SPECIFICATION forming part of Letters Patent No. 475,587, dated May 24, 1892.

Application filed March 22, 1889. Serial No. 304,299. (No model.)

To all whom it may concern:

Be it known that I, GEORGE A. MESSICK, a citizen of the United States, and a resident of Wilmington, New Castle county, Delaware, have invented certain Improvements in Diffusion-Batteries, of which the following is a specification.

The object of my invention is to provide ready means for closing the doors of diffusion-battery cells and to securely fasten them in the closed position.

The figure in the accompanying drawing is a vertical section of a diffusion-battery cell illustrating my invention.

A is the cell, having a dome B, provided with an inlet *b* for the water or juice, this dome having a movable cap *c*, which can be removed to fill the cell with chips. In this cap is an air-cock *d* to allow for the escape of air from the cell when it is being filled with liquor from the bottom. The cell A is mounted in the present instance on suitable girders C, secured to the girders C', and to the bottom of the cell A is secured an annular casting D, having an opening *e* for the liquor. The casing A' of the cell extends into the annular casting and is perforated to allow the juice to percolate through and escape from the cell through the opening *e*. The inlet-opening is also provided with a shell *a* for the same purpose, so that the chips cannot pass off from the cell with the liquid.

Pivoted at *f* to the annular casting D is a door E, having an extension F, which acts as a counterbalance to some extent for the door. The pivot *f* is secured to the casting D through the medium of a bolt *f'*, but other devices may be employed for the purpose, if desired. The door E has a perforated portion *g*, which is raised above the face of the door and closes tightly against the under side of the perforated casing A' of the cell, the object of this construction being to allow the liquid to pass through the perforated portion *g* and escape through the opening *e*. The door E is suitably braced for strength.

Extending around the edge of the annular casting D is a water or air flexible pipe *h*, into which water or air is introduced before the door is closed, and when the door is closed

the fluid is compressed, making a tight joint between the door and the casting and preventing the escape of the liquid.

Pivoted at *i* to the counterbalanced portion F of the door is a piston-rod I, attached to a piston I', this piston being adapted to slide in a cylinder J, pivoted at *j* to the casing of the cell.

K is a three-way valve having an inlet-pipe *k* and exhaust-pipe *k'* and a flexible pipe *k*², which communicates with the cylinder J. It will be seen that when fluid under pressure is turned into the cylinder above the piston the pressure will close the door E; but when the pressure is released and the fluid in the cylinder is allowed to exhaust the door will open, as the weighted portion F will not balance the weight of the door and the weight of the chips in the cell.

To prevent any likelihood of the door falling during the diffusion process, I form a lip *m* on the side of the door opposite its hinges and pivot to a bracket *d*, projecting from the annular casting D, a two-armed lever M, having a roller *m'*, which passes under the lip *m* on the door, this lever being attached to a rod *n*, connected to a piston N in a cylinder N', pivoted to a bracket on the casing of the cell.

P is a three-way valve, similar in construction to the valve K, and *p* is the inlet-pipe, *p'* a flexible pipe attached to the lower portion of the cylinder, and *p*² a flexible pipe connecting the valve with the upper portion of the cylinder N', so that when pressure is admitted to the upper side of the piston it will tend to bring the lever M in such a position as to allow its roller *m'* to come directly under the lip or lug *m* on the door, thus preventing the door from sagging. To open the door, admit the pressure on the under side of the piston N and release it at the upper side, thus bringing the lever M in such a position that the lip *m* on the door E will pass it when said door is opened.

The operation of the battery is as follows: It will be understood that the diffusion-cell is mainly intended for extracting liquors from vegetable matter, such as cane, sorghum, or beet-roots. The chips are placed in the cell through the opening at the top and water is

allowed to enter the cell from the bottom until the cell is filled, which can be readily seen by the air-vent *d*. Water is then allowed to enter through the inlet *b* and force the water
5 through the chips and out the opening *e* at the bottom, this water extracting a certain percentage of the sugar. From the cell the liquor may be forced through a series of cells forming a battery, as circumstances require.

10 I claim as my invention—

The combination of the casing of a diffusion-battery cell, a pivoted bottom *E*, provided with a lip *m*, a counter-balance *F* for said pivoted bottom, a pivoted pressure-cylinder, a
15 piston therein, a piston-rod connecting the

piston to the counter-balance *F*, a bifurcated locking-lever for engaging with the lip and locking said pivoted bottom, and means for operating said locking-lever, comprising a pivoted pressure-cylinder, a piston therein, 20 and a rod connected to said locking-lever, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GEO. A. MESSICK.

Witnesses:

C. SOUTHERLAND,
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