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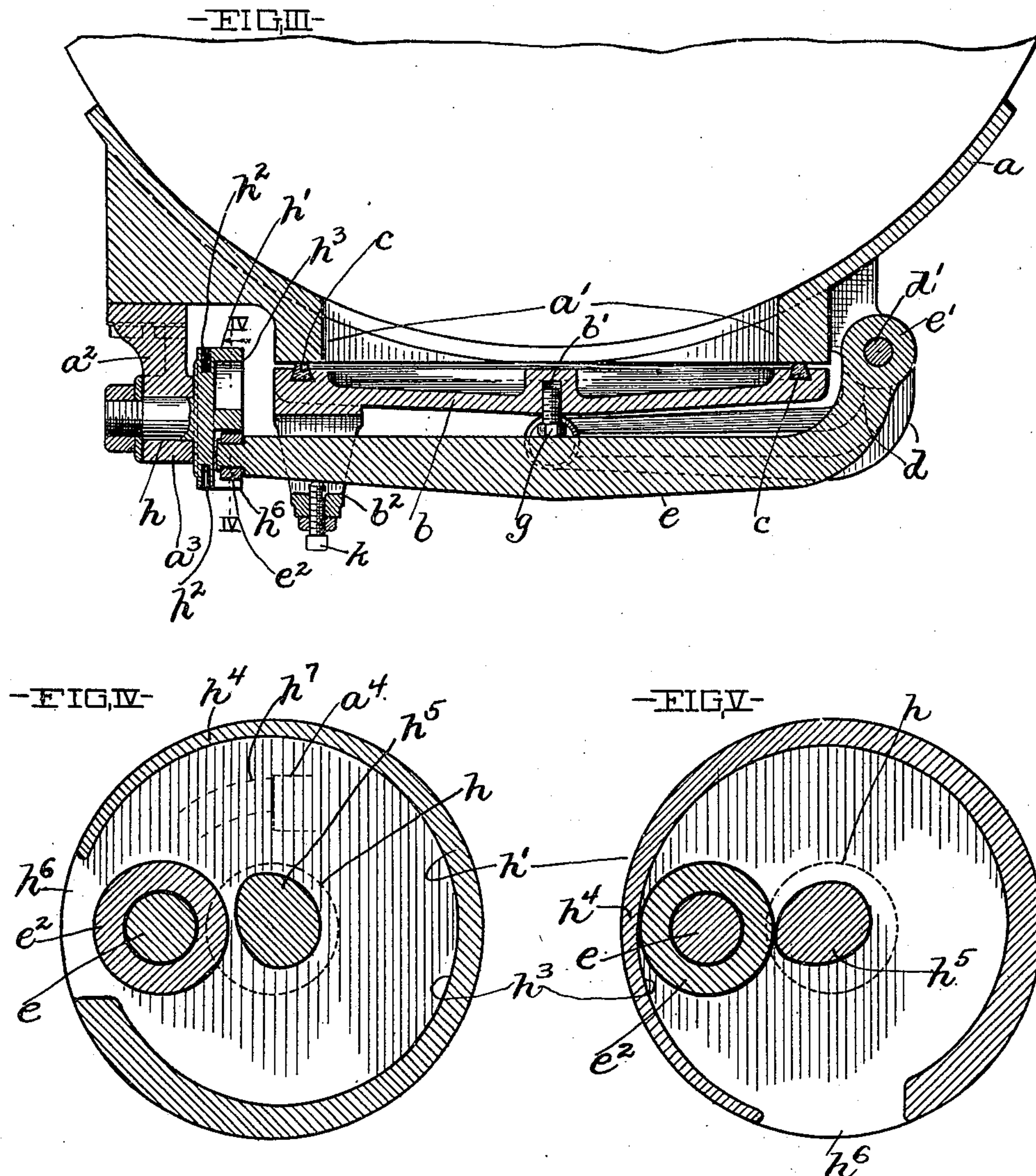
J. TAYLOR.

LOCKING DEVICE FOR DIFFUSION CELLS.

(Application filed July 26, 1899.)

(No Model.)

2 Sheets—Sheet 2.



WITNESSES:

Daniel E. Daly.

A. H. Parratt.

INVENTOR

John Taylor

BY

Richard Dorer & Donnelly  
his ATTORNEYS



# UNITED STATES PATENT OFFICE.

JOHN TAYLOR, OF CLEVELAND, OHIO, ASSIGNOR TO THE KILBY MANUFACTURING COMPANY, OF SAME PLACE.

## LOCKING DEVICE FOR DIFFUSION-CELLS.

SPECIFICATION forming part of Letters Patent No. 667,747, dated February 12, 1901.

Application filed July 26, 1899. Serial No. 725,137. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN TAYLOR, a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented certain new and useful Improvements in Locking Devices for Diffusion-Cells; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in door-locking mechanism more especially designed for effectually locking the door that closes a discharge-opening in a tank or container—such, for instance, as a diffusion-cell—containing liquid or other matter under considerable pressure.

The object of this invention is to provide a lock that is capable of being quickly and conveniently operated, whose operation is gradual, and that during its operation is under perfect control of the operator, that is simple and durable in construction, and has other advantages hereinafter appearing.

With this object in view the invention consists in certain features of construction and combinations of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure I is front side elevation of a portion of a diffusion cell, tank, or container that is provided with a discharge-opening closed by a door capable of being locked in its closed position by locking mechanism embodying my invention. Fig. II is a top plan relative to Fig. I. Fig. III is a top plan, mostly in horizontal section, on line III III, Fig. I. Fig. IV is a transverse section on line IV IV, Fig. III. Fig. V is a section corresponding with Fig. IV, except that in Fig. V the cam, arranged to engage and actuate the door-locking bar of the locking mechanism into its operative position and hold the same in the said position, is shown in an operative position, whereas in Fig. IV the said cam is shown in its inoperative position. Figs. IV and V show the parts on a larger scale than the scale to which the corresponding parts are drawn in the remaining figures.

Referring to the drawings, *a* designates a portion of the diffusion cell, tank, or con-

tainer, having a lateral discharge-opening *a'*, at which the material that is being treated or participates in the treatment of other material within the container under pressure is discharged from the container, and *b* represents a door that is arranged to close the said opening. Door *b* within its inner side is provided with a layer or strip *c* of compressible and elastic material—such, for instance, as rubber—which strip or layer extends completely around the discharge-opening, as shown in dotted lines, Fig. I, and in the closed position of the door engages the outer edge of the surrounding wall of the said opening and forms a fluid-tight joint between the door and the container. The said layer or strip *c* projects beyond the inner surface of the door, so as to accommodate the compression of the layer or strip upon tightly locking the door in the latter's closed position. Hence an elastic and compressible strip or layer of material is interposed between the door and the exterior of the container in the closed position of the door. The door is hinged at one end to a container in any approved manner, as at *d*, preferably by means of a hinge having a vertical axis, so that the door, when it is actuated in opening or closing the same, swings laterally in a horizontal plane.

A bar *e* is arranged horizontally and extends centrally across the forward or outer side of the door. The bar *e* is hinged to the container at the hinged end of the door. Preferably the said bar is provided at the hinged end of the door with an eye or sleeve *e'*, that embraces the axial pin *d'* of the hinge connection between the door and the container. The bar *e* is capable, therefore, of swinging laterally in a horizontal plane with the door during the opening and closing of the door and has its rear or inner side engaging the forward end of a forwardly or outwardly projecting member *g* of the door. Member *g* in the case illustrated is a set-screw that engages a correspondingly-threaded hole *b'*, formed in and centrally of the door. By this construction it is obvious that when the bar *e* is forced or crowded inwardly in closing the door and effectually locked, so as to retain the door in its tightly-closed position, the force that is exerted inwardly by the said bar upon



the door is applied centrally of the door, where it is most effective without liability to injure or unduly strain any of the parts.

The means employed for actuating the bar *e* into its door-locking position and retaining the bar in the said position and assisting in releasing the bar preparatory to opening the door constitutes a very important and valuable part of my invention and comprises, preferably, the following construction: A manually-operated cam-shaft *h* is arranged horizontally and at right angles or approximately at right angles to the discharge-opening of the container at and centrally of and at a suitable distance laterally from that side of the opening that is opposite to the hinge connection between the door and the container. The shaft *h* has bearing in a sleeve or box *a*<sup>3</sup>, formed upon the outer end of a laterally-projecting bracket *a*<sup>2</sup> of the container. The shaft *h* at the inner end of the sleeve *a*<sup>3</sup> is provided with a cam-disk or cam-wheel *h'*, arranged to engage the free end of the aforesaid bar and render the latter operative or inoperative, according as the door is to be locked in its closed position or is to be released preparatory to opening the same. Cam-wheel *h'* is preferably integral with the shaft and is provided with holes *h*<sup>2</sup>, extending inwardly from its periphery, which holes are arranged radially and at suitable intervals circumferentially of the wheel and are open at their outer ends to accommodate the application of a bar or lever instrumental in turning the cam-wheel by hand. The said wheel is chambered within its outer end, as at *h*<sup>3</sup>, to form two cams *h*<sup>4</sup> and *h*<sup>5</sup>. The chamber *h*<sup>3</sup> extends circumferentially of the axis of the wheel, and the outer wall and the inner wall of the said chamber have the trend required to form the two cams *h*<sup>4</sup> and *h*<sup>5</sup>, respectively. The chamber between the two cams is open at the inner end of the wheel and has a lateral inlet *h*<sup>6</sup> between the ends of the outer cam *h*<sup>4</sup>. It is obvious, therefore, that the outer cam *h*<sup>4</sup> does not extend completely around the axis of the wheel, but has its ends separated far enough to form the inlet *h*<sup>6</sup> and accommodate the introduction of the free end of the bar *e* at the said inlet into the chamber formed between the two cams. The arrangement and trend of the outer cam *h*<sup>4</sup> relative to the free end of the bar *e* is such that in the normal position of the parts the opening formed between the ends of the said cam shall be opposite the free end of the bar *e* to accommodate the introduction, as already indicated, of the said bar into the cam-wheel, and by thereupon turning the wheel in a forward direction the said cam shall engage the forward side of the said bar's free end and actuate or crowd the latter inwardly, so as to tightly close the door and securely lock the bar in the tightly-closed position of the door. The compressible and elastic layer *c* is of course compressed during the locking of the door, so as to form a most effective fluid-tight

joint between the door and the container. The arrangement and trend of the inner cam *h*<sup>5</sup> of the cam-wheel is such relative to the door-locking bar that the latter during its actuation by the outer cam shall remain close to the inner cam, so that the inner cam upon turning the cam-wheel rearwardly when the door is locked in its closed position will assist in releasing the bar preparatory to unlocking the door.

A lug *a*<sup>4</sup> is formed upon the shaft-bearing sleeve and has the arrangement required to render its forward side capable of being engaged by a lug *h*<sup>7</sup>, formed upon the inner end of the cam-wheel when the latter is in its normal or inoperative position. The said lugs form, therefore, a stop for limiting the rotation of the cam-wheel in a rearward direction and prevent the rotation of the wheel beyond its normal or inoperative position upon turning it rearwardly from its operative position into its inoperative position.

The free end of the bar *e* is provided with an antifriction-roller *e*<sup>2</sup>, that constitutes a member of the bar.

By the construction hereinbefore described it is obvious that the door will not be caused to fly open by the pressure within the container immediately upon relieving the door from its tightly-closed position; but the door before it is entirely released by the door-locking mechanism will have been relieved from its tightly-closed position to an extent sufficient to cause it to leak, and thereby relieve the pressure within the container, so that when the door is fully released there is no liability of the door flying open with such force as to result in injury to itself or to the operator or to a bystander who may have approached too closely to the door.

The door is provided at its free end with an outwardly-projecting bracket *b*<sup>2</sup>, whose outer end overlaps the outer side of the bar *e* and is provided with a set-screw *k*, that engages a correspondingly-threaded hole formed in the said bracket and is arranged to engage the outer side of the aforesaid bar. The set-screws *g* and *k* accommodate the required adjusting of the bar *e* relative to the cam-wheel and are instrumental in holding the said bar in the desired adjustment.

What I claim is—

1. The combination with a tank or container having an opening; a door arranged to close the said opening and hinged at one end, and a layer or strip of compressible and elastic material interposed between the door and the container and extending around the opening in the closed position of the door: of a bar extending across the outer side of the door, which bar is hinged at one end at the hinged end of the door, and has its opposite and free end provided with a roller, and a suitably-supported and suitably-operated cam arranged to engage the said roller in the door's closed position and force and hold the door tightly against the container.



2. The combination with a tank or container having an opening; a hinged door arranged to close the said opening, and a layer or strip of elastic and compressible material  
5 interposed between the door and the external surface of the container, and extending entirely around the aforesaid opening in the door's closed position; of a bar extending across the outer side of the door and hinged  
10 at one end at the door's hinge, and a cam-shaft supported from the container at the discharge-opening that is opposite to the hinged end of the aforesaid bar, a cam-wheel operatively connected with or formed upon the  
15 shaft and having the outer cam  $h^4$  and the inner cam  $h^5$ ; the chamber  $h^3$  formed between the said cams, and the lateral opening or inlet  $h^6$  leading to the said chamber, all arranged and operating substantially as shown, for the  
20 purpose specified.

3. The combination with a tank or container having an opening, a door arranged to close the said opening and hinged at one end to the container, and a layer or strip of elastic and compressible material interposed between the door and the external surface of the

container and extending entirely around the aforesaid opening in the door's closed position: of a bar extending across the outer side of the door and hinged at the hinged end of  
30 the door; a bracket projecting outwardly from and rigid with the container at the discharge-opening's side that is opposite to the hinged end of the aforesaid bar and terminating, at  
35 its outer end, in a sleeve; a cam-shaft having bearing in the said sleeve and provided with a cam-wheel that has the arrangement required to render it capable of forcing or crowding the bar inwardly; a lug formed upon the  
40 aforesaid bracket adjacent to the cam-wheel, and another lug formed upon the said wheel and arranged to engage the forward side of the first-mentioned lug in the wheel's inoperative position, substantially as and for the purpose set forth.

Signed by me at Cleveland, Ohio, this 23d  
45 day of June, 1899.

JOHN TAYLOR.

Witnesses:

C. H. DORER,  
A. H. PARRATT.