No. 796,086. PATENTED AUG. 1, 1905.

H. L. PYLE.

LOCKING DEVICE FOR CARBID HOLDERS AND VALVES OF ACETYLENE GAS GENERATORS.

APPLICATION FILED DEC. 20, 1902. RENEWED DEC. 21, 1903.

2 SHEETS—SHEET 1.

Fig. 1.

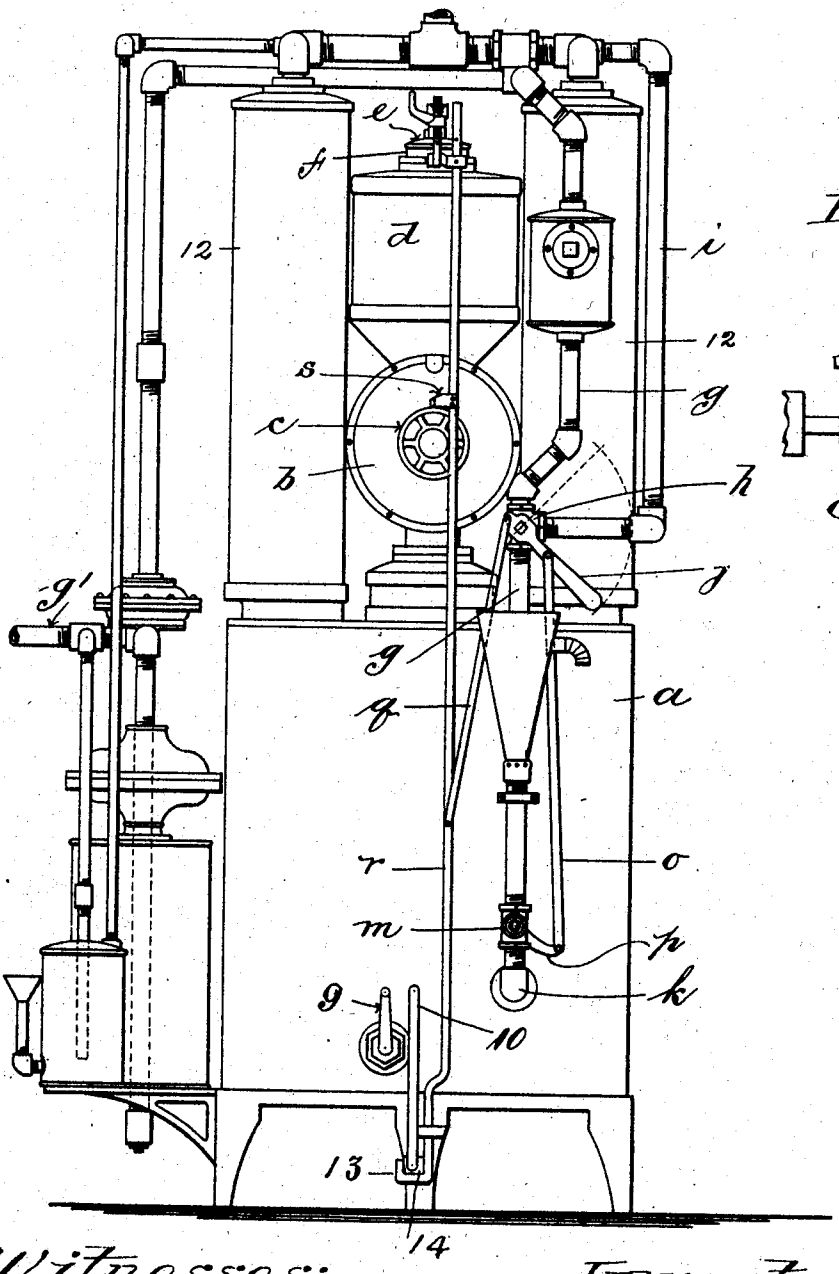
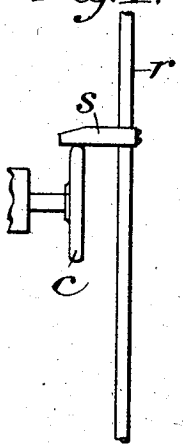


Fig. 4.



Witnesses:
J. V. Garfield
R. D. Clemons

Inventor:
Howard L. Pyle
by Chapin & Co.
Attorneys.

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

No. 796,086. PATENTED AUG. 1, 1905.

H. L. PYLE.

LOCKING DEVICE FOR CARBID HOLDERS AND VALVES OF ACETYLENE GAS GENERATORS.

APPLICATION FILED DEC. 20, 1902. RENEWED DEC. 21, 1903.

2 SHEETS—SHEET 2.

Fig. 2.

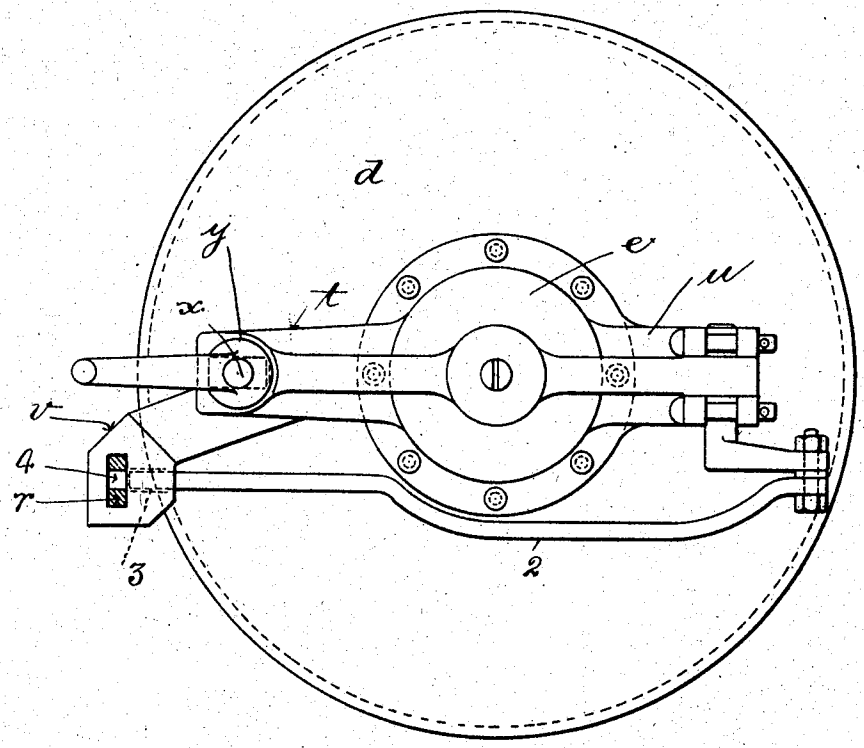
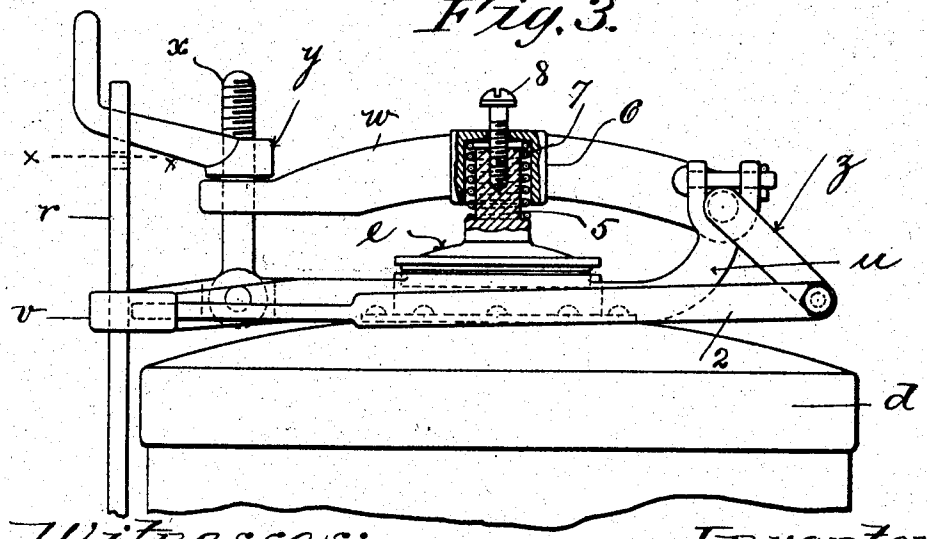


Fig. 3.



Witnesses:
J. D. Garfield
H. S. Clemons

Inventor:
Howard L. Pyle
by Chapin & Co.
Attorneys

ANDREW B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

HOWARD L. PYLE, OF WILMINGTON, DELAWARE.

LOCKING DEVICE FOR CARBID HOLDERS AND VALVES OF ACETYLENE-GAS GENERATORS.

No. 796,086. Specification of Letters Patent. Patented Aug. 1, 1905.

Application filed December 20, 1902. Renewed December 21, 1903. Serial No. 186,128.

To all whom it may concern:

Be it known that I, HOWARD L. PYLE, a citizen of the United States of America, residing at Wilmington, in the county of Newcastle and State of Delaware, have invented new and useful Improvements in Locking Devices for Carbid Holders and Valves of Acetylene-Gas Generators, of which the following is a specification.

This invention relates to acetylene-gas-generating machines, and has particular reference to the construction of locking devices for the cover of the carbid-holder and for the various valves of the apparatus, all arranged and cooperating as hereinafter fully described.

The object of the invention is to produce a locking device of the general type specified so organized that a locking or retaining pressure must be applied to the cover of the carbid-holder before the other coöperating parts can be brought to such position as will permit the valve between the carbid-holder and the generating-chamber of the machine to be opened, and, conversely, this carbid-valve must be closed before the controlling parts can be operated to permit the unlocking of the cover of the carbid-holder.

In the drawings forming part of this application, Figure 1 is a side elevation of an acetylene-gas-generating apparatus having my invention applied thereto. Fig. 2 is an enlarged top plan view of the carbid-holder and its locking devices. Fig. 3 is a side elevation, partly in section, of the parts shown in Fig. 2. Fig. 4 is a side elevation of the hand-wheel which operates the cut-off valve and a rod constituting the part of the locking device supported thereby.

Referring to the drawings, *a* indicates the generating-chamber containing water, into which the carbid is fed through a suitable valve operated by a diaphragm *b*, movement being imparted to the latter by the gas-pressure in the generating-chamber. This diaphragm may be operated (and the carbid-valve thus opened or closed) by a hand-wheel *c* independently of the gas-pressure in the usual manner.

The carbid-holder is indicated by *d* and has an opening in its upper end, which is closed by the cover *e*, which fits over or into the upper edge of a vertical flange *f*, surrounding said opening, the latter and the cover being preferably circular.

The generating-chamber *a* is entered by a pipe *g*, through which the gas is carried to the distributing-main through the usual scrubbing devices, which are illustrated in the drawings, but a description of which is not called for herein. In this pipe *g* there is a valve, (indicated by *h*,) and a waste-pipe *i* enters this pipe at the valve, the latter being of that type whereby when the valve is turned in one direction the gas in the generating-chamber *a* will pass through the waste-pipe *i* and when said valve is turned in another direction the escape through the waste-pipe *i* will be cut off and a straight passage through the valve provided, whereby the gas in the generating-chamber will pass through the pipe *g* and on through the distributing-main, the latter being indicated herein by *g'*. The valve *h* is provided with a handle *j*.

Through the pipe *k* water is introduced in the generating-chamber *a*, in which pipe is a valve *m*.

Located in the bottom of the generating-chamber is a sludge-valve which may be opened when it is desired to flush out the generating-chamber to clear out the lime deposits. This valve is not shown in the drawings, and it may be assumed to be a common plug-valve having a handle or stem extending out to the side of the generator and thence upwardly to constitute a handle whereby the plug may be rotated. This handle will be referred to farther on.

When the machine is in operation, there is always gas under pressure in the generating-chamber *a*. Therefore it is obvious that neither the sludge-valve nor the valve *m* in the water-supply pipe *k* or the cover of the carbid-holder should be capable of being opened while such pressure is on the machine. To the end therefore that this may be rendered impossible the locking devices for the cover *e* of the carbid-holder and locking devices for the sludge-valve and the valve *m* are provided and are all interconnected, whereby when it is desired to remove the cover of the carbid-holder—for example, to introduce a new supply of carbid or to clean out the generating-chamber *a* or to introduce a new supply of water to said chamber—it is first necessary to move the handle *j* of the valve *h* to such position as will close the passage through the pipe *g*, and thus prevent the escape of any gas in the main, and simultaneously open the waste-pipe *i* to permit the escape of whatever gas remains in the generating-chamber. This movement of the handle *j* to open the waste-pipe *i* will effect the

opening of the valve *m* by means of a connecting-rod *o*, extending from the handle *j* to an arm *p*, connected to the stem of the valve *m*, and another connecting-rod *q* is connected to a rod *r*, extending from the top to the bottom of the machine. When the handle *j* is moved as described to close the pipe *g* and to open the waste-pipe, or vice versa, this rod *r* has imparted to it vertical movements, and when the handle *j* is swung from the position shown in Fig. 1, say through a quarter of a circle, as indicated in dotted lines shown thereon, this rod *r* will be forced downwardly, and said downward movement will permit the locking devices of the cover *e* of the carbid-holder to be manipulated to permit the removal of said cover and will also permit the sludge-valve to be opened to clean out the generating-chamber, and, as described, this same movement of the handle *j* will open the valve *m*. It is essential, however, that all of the before-mentioned parts should be immovable until the carbid-valve between the generating-chamber and the carbid-holder and operable by the hand-wheel *c* has been closed to the end that no carbid shall be permitted to drop into the generating-chamber while the latter is open at any point, either through the valve *m* or through the top of the carbid-holder. Therefore on the rod *r* there is secured an arm *s*, which extends over the hand-wheel *c* in such position that downward movement of the rod is impossible until the hand-wheel *c* has been turned in to close the carbid-valve. This valve-closing movement carries the hand-wheel *c* out from under the arm *s*, thus permitting the rod *r* to be moved downward by the upward swing of the handle *j*.

It is clear from the foregoing description that in order to open either the valve *m* or to remove the cover of the carbid-holder it is first necessary to close the carbid-valve by means of the hand-wheel *c*, which until it has been rotated is an obstruction to the downward movement of the rod *r*. Furthermore, it is clear that any attempt to open the apparatus at either of the points mentioned must be preceded by such movement of the handle *j* as will provide a free escape for any gas in the generator through the waste-pipe *i* and incidentally prevent any backflow from the distributing-main into the machine. Again, the construction of the locking devices for the carbid-holder are such that the cover *e* must be not only placed in position to close the carbid-holder prior to the operation of the locking devices which secure it in place, but these devices must be operated to securely lock the cover in position and tightly seal the carbid-holder before the locking devices of the carbid-valve or the valves *h* and *m* can be moved to cause either the valve *h* to open the passage from the generator to the distributing-mains to the pipe *g* or to close the valve *m* or to lock the sludge-valve in its closed position.

A locking device for the valve *h* has just been referred to. This is not a device which is attached to or located near the valve *h*; but the locking devices for the cover of the carbid-holder are of such a nature as to constitute an obstruction to the operation of the valve *h* and the other valves mentioned which are operated by the handle *j*, all as will now be described, reference being had principally to Figs. 2 and 3 of the drawings.

There is secured to the vertical flange *f*, on which the cover *e* is secured, a casting which serves as a base on which the movable parts of the locking device for the cover *e* are supported. This casting has a hub-like central portion which fits over and is secured to the flange *f* and on diametrically opposite sides of which two arms extend, (indicated, respectively, by *t* and *u*,) and from said arm *t* another arm *v* branches off diagonally, said arm being integral with or secured to the arm *t* and having therethrough a vertically-disposed perforation to receive the rod *r*.

The arm *u* is upwardly turned at its end, and there is formed therein a bearing in which a swinging arm *w* is supported. This arm swings centrally over the cover *e* and is adapted to bear thereon, the free end of the arm being perforated to receive the bolt *x*, which slips freely therethrough. On said bolt is a nut *y*, having thereon a crank-arm whereby it may be rotated, and which arm has the further function of locking the nut against rotation by the interference therewith of the rod *r*, whose upper end intercepts the path of rotation of said arm on the nut after the latter has been screwed down on the bolt *x* far enough to bring sufficient pressure to bear on the cover *e* to securely hold the latter against the maximum pressure of gas in the apparatus. It is to be observed, however, that this locking device of the cover of the carbid-holder is so organized that the rod *r* cannot be passed up through the perforation in the arm *v* again until such time as the nut *y* has been screwed down on its bolt *x* to a position which will insure the application of the requisite locking pressure to the cover *e*, because of the fact that the said rod *r* is blocked automatically by the upward movement of the swinging arm *w*. This is effected as follows: On the axis of the arm *w* there is fixed another arm *z*, which hangs below the axis and a little to the rear thereof and is, in effect, a crank-arm, to the free end of which is pivoted the arm 2, which extends across the top of the carbid-holder and into a slot 3 in the end of the arm *v*, which intercepts the perforation through said arm in which the rod *r* is located. Near the upper end of the latter is a transverse perforation, (shown in dotted lines in Fig. 3 and in section in Fig. 2,) which is indicated by 4. This per-

foration through the rod is adapted to receive the end of the arm 2, said rod when in its lowermost position coming to a position of rest at a point which causes said perforation to register with the slot 3.

While it is not absolutely essential that the connection between the arm *w* and the cover *e* should be made, as shown in Fig. 3 of the drawings, I prefer to connect the parts in the manner shown—that is, a boss 5 is located axially of the cover and extends upwardly into an annular cavity formed in the hub-like center 6 of the arm *w*. On this boss 5, which is provided with a suitable shoulder at its base, is a spiral spring 7, the upper end of which bears against the end of the cavity in the hub 6 and the opposite end on the shoulder referred to at the base of the stud. The hub 6 is centrally perforated axially of the boss 5, and a screw 8 passes freely through the hole bored in said hub and enters a suitably-threaded hole in the end of said boss, said screw being long enough to permit a certain amount of play of the arm *w* vertically between the head of said screw and the top of the boss 5. The result of this construction permits the application of a yielding pressure to the cover *e*, and, furthermore, the action of the spring when the nut *y* is screwed off of its bolt causes the arm *w* to move upward, and thus automatically swing the arm 2, causing the end thereof to enter the slot 4 in the upper end of the rod *r*, and thus automatically lock the rod in its lowermost position and hold it locked until such time as the arm *w* has been swung over the carbid-holder and the cover *e* placed over the opening in the latter and the nut *y* screwed down on the bolt *x* far enough to cause the arm 2 to be retracted out of the slot 4 in the rod *r*, and thus liberate said rod. It is thus apparent that none of the valves of the machine which depend upon the manipulation of the rod *r* to effect or permit their opening and closing movements can be so opened or closed unless the cover *e* is in proper position to permit the necessary vertical movement of the rod *r*—that is, only when the cover *e* is tightly screwed down—and as a further safeguard this rod is obstructed in its vertical movement by the hand-wheel *c* of the carbid-valve, if the latter is open.

9 indicates the handle of an agitator-rod which extends into the generating-chamber and has short arms attached thereto, whereby when the rod is rotated the sediment within the generating-chamber is stirred up. The turned-up end of the stem of the sludge-valve is indicated by 10, and on the horizontal portion of said stem is a square block 14, adapted to be engaged by the bent-up end 13 of the rod *r* when the valve is closed and the rod *r* in its most elevated position. The arm 10 is made long enough to interfere with the rotation of the crank-arm 9 until the arm 10 has been swung downwardly to open the sludge-valve.

I am aware that locking devices for the closures of various openings leading into gas-generating apparatus (which operate together to relieve the apparatus of gas-pressure before the closures to said openings can be manipulated) have already been devised; but so far as I am aware in all devices of this character heretofore known the closures have been brought into such position as adapt them to be simultaneously locked or unlocked by the locking devices.

In the present invention the locking devices for everything, except the cover of the carbid-holder, are governed by the actual locked or unlocked position of this cover and not governed by the fact that this cover is in a position to be locked or unlocked by the operation of the other devices. This is an essential difference in that, for instance, before the carbid-cover can be removed the passage from the holder *d* to the generating-chamber must be absolutely closed, and after it has been so closed and the rod *r* dropped, so that the carbid-cover *e* can be removed, the act of removal insures the locking of the carbid-valve automatically until the cover *e* has not only been replaced in its position, but actually secured in its position by being screwed down against the top of the flange *f*. Therefore it follows that when the carbid-holder *d* is opened it will be impossible to open the carbid-valve, for the rod *r* will be locked in its lowermost position by means of the arm 2, which at that time will have been forced through the opening 4 in said rod, and the arm *s* will block the hand-wheel *c*. It is seen that the rod *r* cannot thus be possibly manipulated while the cover of the carbid-holder is removed or even during the time when locking pressure is not applied to the cover *e*. It is thus seen that these devices make it impossible to open or close any of the openings leading into the generator either through carelessness or by design to injuriously affect the operation of the generator, whereby it can be rendered in any way dangerous to the occupant of any building in which it may be located.

The generator is provided with the usual relief-columns 12, in which the water of the generating-chamber *a* may rise under pressure of gas in said chamber, the height of these columns determining the maximum pressure which may be accumulated in said chamber.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an acetylene-gas machine, the combination with the generating-chamber and the carbid-holder, of a cover for the holder, a locking device for the cover, a cut-off valve for the carbid-holder, and a suitably-actuated safety

device having a locking and unlocking connection with said locking device for the cover, and also having a member adapted to be supported by said cut-off valve when the latter is open, and to lie in an obstructing relation to such valve when the latter is closed, said safety device when supported by the cut-off valve being arranged to lock or obstruct the locking device for the cover to prevent opening of the latter, and vice versa.

2. In combination, an acetylene-gas-generating chamber, a carbid-holder, a valve for the latter between said chamber and holder, a gas-distributing pipe and a waste-pipe entering said chamber, a valve for said waste-pipe and distributing-pipe, a movable member to open the passage through the waste-pipe simultaneously with the closing of the passage through the distributing-pipe, and coacting with the carbid-valve whereby when the latter is open said member is inoperative, together with a locking device for the cover of the carbid-holder, said movable member serving to obstruct the unlocking movement of the cover-locking device, when the carbid-valve is open.

3. A carbid-holder for an acetylene-gas generator, a removable cover for one end, and a valve for the other end of the holder; a locking device for the cover, and means coacting with the locking device to obstruct the operation of the latter; a waste-pipe connected with the generating-chamber of the machine, a valve connected with said obstructing means adapted to be locked in open position by the unlocking movement of said locking device.

4. The combination with the carbid-holder of an acetylene-gas generator, of a cut-off valve for the carbid, and a valve in an escape-pipe leading to the generating-chamber; a locking device for the cover of the carbid-holder, and means coacting with said valves and with said locking device, so organized as to block the movement of said valves during the locking or unlocking movement of said cover-locking device.

HOWARD L. PYLE.

Witnesses:
WM. H. CHAPIN,
K. I. CLEMONS.