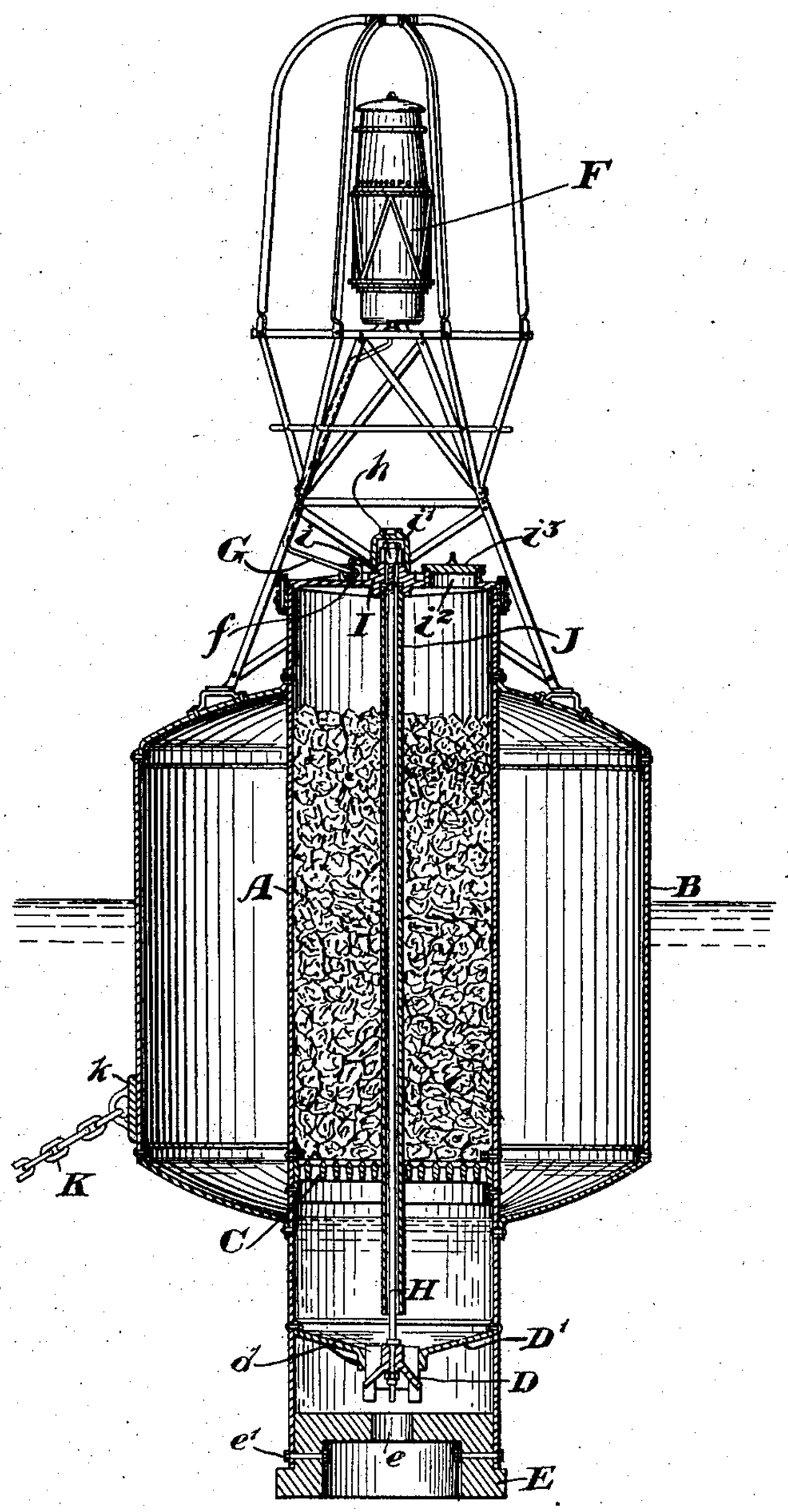
No. 791,119. PATENTED MAY 30, 1905.

T. L. WILLSON.

AUTOMATIC GAS BUOY.

APPLICATION FILED AUG. 12, 1904.



Witnesses

R. S. Smart

R M Oliver

Inventor

Thomas. Leopold Willson

by Fred. B. Fetherstonhaugh

atty

No. 791,119. Patented May 30, 1905.

UNITED STATES PATENT OFFICE.

THOMAS LEOPOLD WILLSON, OF OTTAWA, CANADA, ASSIGNOR TO THE WILLSON CARBIDE COMPANY, LIMITED, OF ST. CATHARINES, CANADA, A CORPORATION OF ONTARIO.

AUTOMATIC GAS-BUOY.

SPECIFICATION forming part of Letters Patent No. 791,119, dated May 30, 1905.

Application filed August 12, 1904. Serial No. 220,526.

To all whom it may concern:

Be it known that I, THOMAS LEOPOLD WILLSON, of the city of Ottawa, in the county of Carleton, Province of Ontario, Canada, have invented certain new and useful Improvements in Automatic Gas-Buoys, of which the following is a specification.

My invention relates to improvements in automatic gas-buoys; and the objects of my invention are to devise a combined buoy, gas-generator, and burner so arranged that when once charged with gas-producing material it will automatically operate for an extended period of time, purging itself of the accumulating lime.

Further objects are to provide convenient means for causing the operation to cease during charging and to provide means for preventing the movement of the water compressing and rarefying the gas in the generator, and it comprises a flotation-chamber of any suitable form, an acetylene-gas generator located centrally therein, an open-work support dividing the generator-chamber into two portions, a valve located at the bottom of the said chamber and adapted when open to permit the entrance of the water forced therein by the hydrostatic pressure of the surrounding water, an outlet at the top of the generating-chamber, and suitable means for burning the gas generated, the various parts of the device being constructed and arranged in detail as hereinafter more particularly described.

The drawing shows a sectional view through the center of my gas-buoy.

It is to be understood that although the present apparatus is described with reference to the use of calcium carbid (CaC_2) other metallic carbids, such as barium carbid, may be used in place thereof.

Referring to the drawing, A is the gas-generator, and B is the flotation-chamber, in which the said generator is centrally located.

C is the open-work support for the carbid, made best as a grate, located near the botton of the chamber A. The parts are so arranged that the buoy floats with the carbid-support below the level of the water, so that the water rising through a constricted opening in the bottom tends to submerge the lowest portion of the carbid. The lower part of the generator is provided beneath the grate with a partition D′, having an opening or valve-seat *d*, which may be closed by a valve D.

E is a ballast-weight secured to the gas-chamber A by suitable means, such as the screws *e*′, and adapted to ballast the buoy and keep it in an upright position. The bottom opening *e* is preferably formed in this weight.

F is a gas lamp or burner connected to an opening *f* in the top of the gas-chamber by a pipe G or other suitable means. A reducing-valve is provided in connection with this lamp to suitably reduce the pressure for burning.

The generator A is made of any suitable shape, the form shown being that of an upright cylinder.

H is a rod connected to the valve D. This rod extends upwardly through the top of the cover I. The end of the rod is provided with threads, and a nut *h* is screwed thereon. This nut seats on a shoulder on the cover, so that the valve may be raised or lowered by screwing or unscrewing the nut. A cap *i*′ is adapted to fit over this nut and screw on the boss *i*.

J is a tube adapted to fit over the rod H and protect it from the action of the calcium carbid. This tube may be secured to the cover by any suitable means, such as screwing it into the cover. An opening i^2 is provided in the cover, whereby the gas-producing material may be introduced into the generator. A cover i^3 is provided for the said opening.

The flotation-chamber B is of any suitable shape, that shown being that of an annulus substantially rectangular in section. It is made of sufficient size to support the weight of the whole buoy when placed in water. In operation the buoy is secured in the position desired by means of an anchor secured to the

buoy by suitable means, such as the anchor-chain K, secured to the lug *k*.

In starting the apparatus the gas-chamber is empty, the valve D being closed, and so shutting off the water. The calcium carbid is then introduced into the chamber A through the opening i^2, filling it to any desired level. The cover i^3 is then placed over the opening i^2 and the valve D opened. As the opening *e* is a considerable distance below the level of the body of water in which the buoy is placed, the water will be forced into the chamber by the hydrostatic pressure. The water as it rises will come into contact with the calcium carbid above the grate C and at once will begin the generation of acetylene gas. The generated gas flows through the pipes and lamp, expelling all the air. The lamp should not be lighted until the acetylene gas appears of full strength. The lamp is then lighted, and the apparatus is ready for regular operation. As the gas is rapidly given off by the decomposition of the carbid, it soon generates a pressure within the apparatus, and as soon as this pressure exceeds the hydrostatic pressure due to the outside level of the water some of the water begins to be expelled from the generator, the water being finally forced out of contact with the carbid. It is to be understood that the generation of gas continues for a considerable time after the water-level has been depressed below the mass of the carbid, since a little water remains at the surface adhering to the lumps of carbid or caught in the depressions therein, so that the generation of gas is continued, although at a reduced rate, after the water has been expelled. As this gas burns away the pressure is lowered, and the water-level rises in the generator accordingly until it finally again comes in contact with the carbid, and a renewed generation of gas occurs with a considerable increase in its pressure and a consequent forcing down of the water-level. This intermittent operation continues as long as the apparatus is in use. The decomposition of the carbid leaves lime as a residuum, and this lime is washed out by the water as it rises and falls. This automatic purging out of the residual lime is a characteristic and novel feature of my invention. All previous acetylene-generators have required to be cleaned out at intervals, which is a very difficult and troublesome operation. In my buoy the successive inflow and outflow of water through the bottom opening keeps washing out the lime which falls through the openings of the grate. This lime falls on the partition D′ or on the bottom E, any lumps of carbid which may fall before being wholly decomposed being retained here until the decomposition is completed. The constricted opening *e* in the bottom prevents the motion of the waves in rough weather from withdrawing the water quickly from the inside, thus diminishing the pressure of the gas contained therein. In a similar manner it prevents the gas being compressed by the too sudden rushing in of water. Without such constricted opening the gas would be subjected to alternate fluctuations of pressure on each motion of the waves.

When it is desired to refill the generator, the cap i' is removed and the nut *h* tightened, consequently raising the valve D and causing the admission of water to cease. The cover i^3 is then taken off. If the water has risen above the grate, it is pumped to below that level. The calcium carbid is introduced through the opening i^2, the cover is then replaced, and the valve D opened. The operation then continues as before.

In certain cases the valve D may be dispensed with. In such case when it is desired to refill the buoy it is lifted up in the water, so that the grate is above the water-level while recharging. This operation requires a derrick-boat or its equivalent.

It will thus be seen that I have invented a gas-buoy which is automatic in operation and once charged will remain so for a considerable period of time. Furthermore, it may be recharged very easily with no expensive apparatus. The advantage of this over former types of buoys is apparent, most of the previous types consisting of gas-chambers in which gas is stored at about two hundred pounds per square-inch pressure, which necessitates a very much more heavy construction, and consequently more expensive. Furthermore, in order to recharge these a special boat is necessary provided with generating or compressing apparatus, thus entailing a very heavy expense, whereas my buoy can be quite easily charged from a row-boat.

It is to be understood that in constructing my buoy various changes may be made in its details without materially departing from the spirit of my invention.

I claim as my invention—

1. A gas-buoy provided with means for carrying a supply of gas-generating material, and adapted to float with said material normally below the level of the surrounding water, and adapted to discharge the residuum automatically.

2. A gas-buoy having a generating-chamber and an open-work support for carbid therein, said buoy adapted to float with said support below the level of the surrounding water, said chamber closed above said support and having an opening beneath in normally constant communication with the surrounding water, and adapted to automatically discharge the residuum by the circulation of water through said opening.

3. A gas-buoy provided with a generating-chamber having a support for gas-generating material, said buoy adapted to float with said

support normally below the level of the surrounding water, and having a clear passage from beneath said support downward to the exterior adapted to discharge the residuum into the surrounding water automatically.

4. A gas-buoy provided with an internal support for a gas-generating material, and adapted to float with said support normally below the level of the surrounding water, and having an open passage downward from beneath said support to the exterior adapted to permit the water to wash freely in and out to wet the gas-generating material and to carry away the residuum.

5. A gas-buoy provided with a generating-chamber and a support therein for gas-generating material, and adapted to float with said support normally below the level of the surrounding water, and a substantially horizontal partition below said support for retaining small lumps temporarily to complete their decomposition, and having an opening adapted to subsequently automatically discharge the residuum.

6. A gas-buoy provided with a generating-chamber and a support therein for gas-generating material, and adapted to float with said support normally below the level of the surrounding water, and having a downward passage from beneath the support to the surrounding water of suitable size to discharge the residuum freely and automatically, and so constricted as to prevent sudden rushing of water in or out, and thereby prevent alternate fluctuations of the pressure of the gas in rough weather.

7. A gas-buoy provided with a generating-chamber and a support therein for gas-generating material, and having a valved passage below said support for the admission of the surrounding water, and an auxiliary apertured bottom below said valve.

8. A gas-buoy provided with a generating-chamber and a support therein for gas-generating material, and adapted to float with said support normally below the level of the surrounding water and to discharge the residuum automatically, and having a valve operable from above the surrounding water-level, whereby the water from the sea may be cut off to permit recharging.

9. A gas-buoy provided with a generating-chamber and a support therein for gas-generating material and adapted to float with said support normally below the level of the surrounding water, and having a downward passage from beneath the support to the surrounding water, a valve for closing said passage, and an operating-rod for said valve passing through said buoy to a point accessible from above the surrounding water-level.

10. A gas-buoy provided with a generating-chamber and a support therein for gas-generating material, and adapted to float with said support normally below the level of the surrounding water, having an aperture below said material for discharging the residuum automatically, and a conical valve D for said opening.

Signed at the city of Ottawa, in the Province of Ontario, this 9th day of August, 1904.

THOMAS LEOPOLD WILLSON.

Witnesses:
R. S. SMART,
MAY LYON.