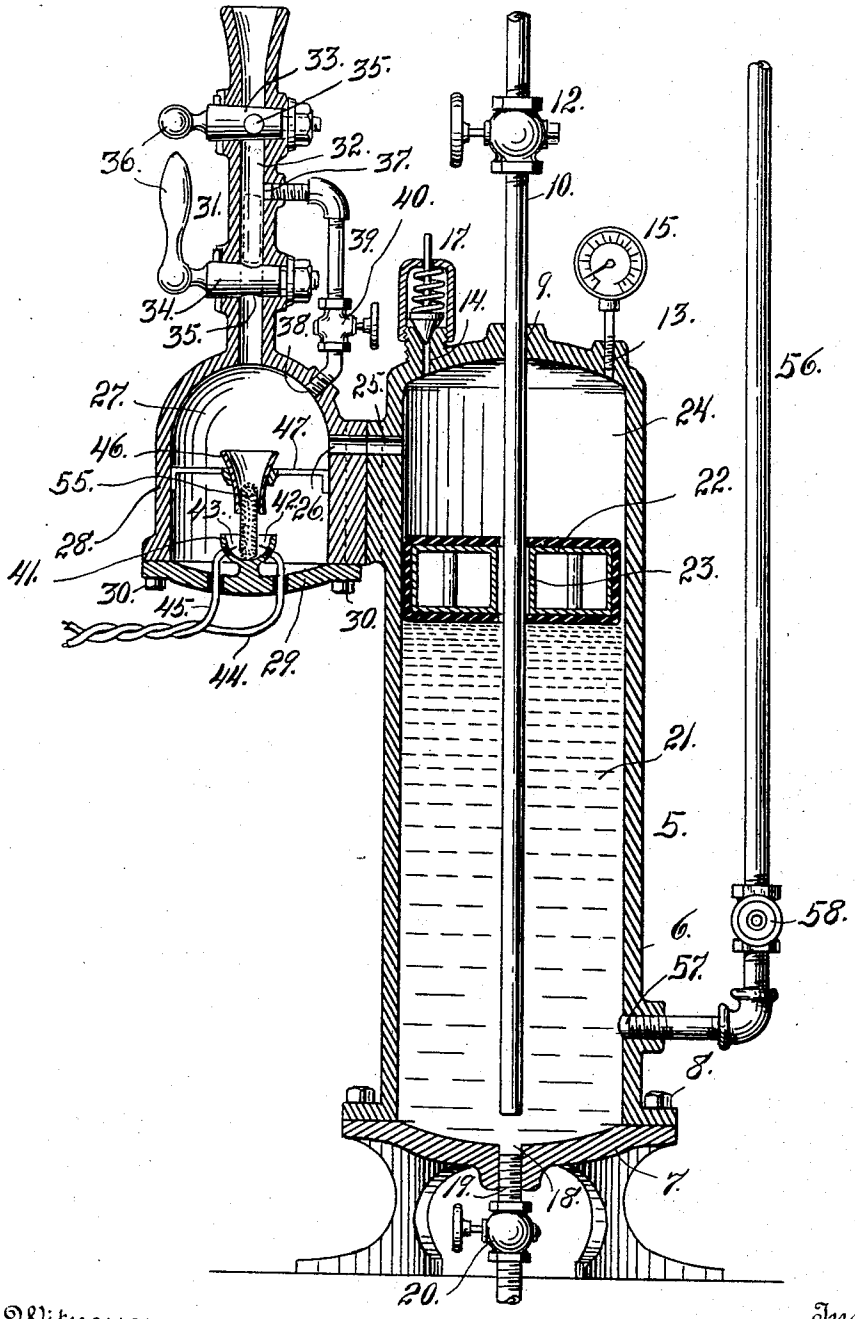
W. J. REILLY.

PRESSURE PRODUCING APPARATUS.

APPLICATION FILED JUNE 18, 1914.

1,219,867. Patented Mar. 20, 1917.



Witnesses

Otto E. Hoddick.

Robert O'Brien

Inventor

William J. Reilly.

By A. J. O'Brien

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM J. REILLY, OF DENVER, COLORADO.

PRESSURE-PRODUCING APPARATUS.

1,219,867. Specification of Letters Patent. Patented Mar. 20, 1917.

Application filed June 18, 1914. Serial No. 845,996.

To all whom it may concern:

Be it known that I, WILLIAM J. REILLY, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Pressure-Producing Apparatus; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to apparatus for producing pressure, being more especially intended for use in ejecting liquid in connection with hydraulic cartridges for breaking down coal, or other material, in mines or other localities.

My improvement consists in providing means for confining a gas producing medium, subjecting it to treatment, whereby gas is generated, renewing the medium at intervals, if required, and repeating the gas generating treatment, whereby pressure may be produced intermittently, continuously or cumulatively, as may be desired.

The apparatus comprises an auxiliary chamber in communication with a liquid containing chamber, provided with a piston and having an outlet conduit passing through an opening in the center of the piston, whereby the latter, as it is actuated by the pressure generated in the auxiliary chamber, slides downwardly in the conduit as a guide and ejects the liquid through the conduit, whose lower extremity, which is close to the bottom of the main chamber, is open for the purpose. The auxiliary chamber is provided with a neck having a passage for the introduction of gas producing media in such quantities as may be required. This neck is provided with two valves, the upper of which has an opening through which a quantity of gas producing substance may be passed, the said substance being stopped by the second valve, which is then closed. The first, or uppermost valve is then turned to the closed position, after which the lower valve is opened to allow the gas producing substance to enter the auxiliary chamber. The object of the two valves is to make it practicable to admit a quantity of the gas producing substance, while a pressure greater than atmospheric is maintained within the auxiliary chamber; and in order to make this practicable, a valve controlled by-pass is provided which connects the upper part of the auxiliary chamber with the portion of the passage in the neck of said chamber between the two valves.

Having briefly outlined my improvement, I will proceed to describe the same in detail, reference being made to the accompanying drawing, in which is illustrated an embodiment thereof.

In this drawing, which consists of a single view, let the numeral 5 designate the main chamber, having a casing 6 secured to a base 7 by means of bolts or cap screws 8. The upper extremity of the casing is perforated as shown at 9, to receive a conduit 10, whose lower extremity is open and extends into the chamber close to the bottom thereof. Beyond the chamber, or above the upper part of the casing, the conduit is equipped with a valve 12. The upper extremity of the casing is also provided with ducts 13 and 14, which are connected in operative relation with a pressure gage 15 and a safety valve 17, respectively.

The lower extremity of this casing is provided with an exit port 18 with which is connected a valve controlled drainage conduit 19, the valve being designated 20.

Resting upon the liquid 21 within this conduit, is a floatable piston 22 centrally perforated as shown at 23, to receive the conduit 10, which passes therethrough and forms a guide for the piston. It is unnecessary that this piston should fit closely within the casing, since the pressure in the upper part 24 of the casing will in any event, act to eject the liquid regardless of the piston. The object of the piston is to act as a shield when the gas or air under pressure in the upper part of the liquid containing chamber is sufficiently hot that it would vaporize the liquid as water. To this end, the piston is exteriorly coated with non-combustible material, as asbestos, which is also a poor conductor of heat. Under such circumstances, the piston should fit closely within the casing and also should closely engage the conduit 10 in order that the hot air or gas may not come in direct contact with the water, or other liquid employed.

The upper part of the casing 6 is provided with a port 25 which registers with a port 26 leading to an auxiliary chamber 27 inclosed by a casing 28 which is suitably

connected with the adjacent part of the casing 6. This casing 28 is provided with a bottom 29 secured thereto by cap screws 30 or other suitable fastening devices. The upper part of the auxiliary casing is provided with a neck 31 having a passage 32 therethrough. This neck is relatively long and is intersected by upper and lower valves 33 and 34, each of which is provided with an opening 35. These valves are rotatably mounted and equipped with manipulating handles 36. The neck at a point approximately midway between its extremities, is provided with a port 37 which is connected with a port 38 in the upper part of the casing 28, by means of a conduit 39 forming a by-pass between the neck-passage and the upper part of the auxiliary chamber, the said by-pass being controlled by a valve 40. The bottom of the casing 28 is equipped with an interiorly located cup-shaped member 41, which is provided with two electrodes 42 and 43 to which lead circuit wires 44 and 45, respectively. Centrally supported in this cup between the two electrodes is a quantity of combustible or other gas producing material 55, which, when in cartridge form as illustrated in the drawing, has its upper extremity supported by an open-ended device 46, the latter being supported within the auxiliary chamber by spider arms 47.

From the foregoing description, the manner of carrying out my process as well as the manner of operating the apparatus employed in connection therewith, will be readily understood.

Assuming that the chamber 5 contains a suitable quantity of liquid and it is desired to eject the same through the conduit 10, a cartridge composed of powder or other suitable combustible material in solid form, or other suitable substance adapted to generate gas or sufficient heat, may be introduced into the upper part of the neck 31 of the auxiliary chamber and the valves 33 and 34 so adjusted as to allow the cartridge or other gas producing substance as the case may be, to pass downwardly through the neck into the auxiliary chamber and into the position of the cartridge 55, as illustrated in the drawing. The valves are then both closed, after which the electric circuit in which the conductors 44 and 45 are located, is closed. This will result in producing an arc between the electrodes 42 and 43, which will act to ignite the powder or other suitable gas producing substance.

As soon as the gas pressure has reached the proper degree within the auxiliary chamber 27, it will pass into the upper part of the chamber 5 and act upon the liquid therein, through the medium of the piston 22, and force the same out of the chamber 5 through the conduit 10, and into the hydraulic cartridge or other locality or destination where it is desired to use the liquid, as water, under pressure. It will be observed that by the employment of my invention, any desired pressure may be obtained. It is well known that in breaking down coal, for instance, by the use of hydraulic cartridges, a very high pressure is required. This is preferably obtained through the medium of a hydraulic intensifier, which may be used in connection with my invention to good advantage, thus obviating the necessity of producing the maximum pressure within the apparatus described, and obviating the necessity of constructing the device to give the required strength to resist such pressure.

As soon as one cartridge or quantity of gas generating substance is exhausted or just before such exhaustion takes place, if there is a necessity for a continuation of the pressure, an additional cartridge or piece of gas producing material, may be introduced, by first opening the upper valve 33, while the valve 34 remains closed, and drop the cartridge or piece of gas producing material through the opening in the upper valve and into the position indicated by dotted lines in the drawing. The upper valve is then closed and the valve 40 in the by-pass 39 is opened, to equalize the pressure within the neck and body of the auxiliary chamber. The valve 34 is then opened to allow the cartridge or piece of gas producing material to pass from the dotted line position in the drawing, through the opening of the valve 34 and into proper position within the auxiliary chamber, after which the valve 34 is closed and the cartridge or gas producing substance subjected to the same treatment as heretofore explained. In this way, a pressure may be produced intermittently, continuously or cumulatively. In other words, where a predetermined pressure is required intermittently, it may be obtained. Again, where it is necessary that a predetermined pressure shall be sustained for any desired length of time, additional cartridges or quantities of gas producing material of any kind may be introduced in order to produce the desired result. Again, where it is necessary to commence with a predetermined pressure, this pressure may be gradually increased, as circumstances may require.

In the event that the upper portion 24 of the chamber is sufficiently hot to vaporize the liquid passing through the conduit 10, which condition is liable to exist in view of the fact that the conduit 10 is ordinarily relatively small, the valve 12 may be closed and the ejected liquid may be discharged through an exteriorly located conduit 56 which is in communication with the lower

portion of the liquid containing chamber, as shown at 57. This conduit 56 is provided with a controlling valve 58. When the conditions are such that the conduit 10 may be employed, the valve 58 may be closed and the valve 12 opened. Again, when it is desired to discharge the liquid through the conduit 56, the valve 12 will be closed and the valve 58 opened, in which event, the conduit 10 will serve only as a guide for the piston 22.

Having thus described my invention, what I claim is: —

1. The combination of a liquid containing chamber, a floatable piston therein, a conduit entering the chamber and open for the escape of liquid, the piston having an opening through which the conduit passes, an auxiliary chamber in communication with the upper portion of the main chamber above the liquid and means for successively exploding combustible gaseous material within said auxiliary chamber to produce the desired pressure above said floatable piston and liquid.

2. The combination of a liquid containing chamber having a conduit projecting thereinto and open for the escape of liquid, an auxiliary chamber in communication with the upper part of the first named chamber, the auxiliary chamber having a neck, valves located therein and suitably spaced, the said valves being independently operable for the introduction of a gas producing medium, the space between the valves being sufficient to hold a quantity of such medium and permit the upper valve to be closed, and the lower valve to be opened, to allow the said medium to enter the auxiliary chamber, the upper part of the auxiliary chamber and the portion of its neck between the two valves being connected by a valve-controlled by-pass.

3. The combination of a liquid containing chamber, a floatable piston therein, a conduit entering the chamber and open for the escape of liquid, the piston having an opening through which the conduit passes, an auxiliary chamber in communication with the upper portion of the main chamber above the liquid, the auxiliary chamber being equipped to support a gas generating cartridge in the upright position, a valve controlled passage for the entrance of said cartridge, and means connected with the auxiliary chamber for igniting the cartridge for gas generating purposes, substantially as described.

4. The combination of a liquid containing chamber having a valve-controlled drainage outlet in the bottom and a safety valve and a pressure gage at the top, a conduit in communication with said chamber and open for the escape of liquid, a floatable piston within the chamber having an opening through which the conduit passes, an auxiliary chamber in communication with the portion of the first named chamber above the liquid, the auxiliary chamber having a relatively long neck, spaced valves mounted on said neck for controlling the passage therethrough, the said valves being independently operable, and a valve controlled conduit connecting the portion of the neck passage between the valves with the auxiliary chamber, the said conduit being equipped with a controlling valve, substantially as described.

5. The combination of a liquid containing chamber, a conduit entering the chamber and open for the escape of liquid, an auxiliary chamber in communication with the first named chamber above the liquid in the latter, the auxiliary chamber being equipped with a cartridge holder, the auxiliary chamber having a controlled opening for the introduction of the cartridge, and electrodes mounted on the cartridge holder and suitably spaced, and an electric circuit in which the electrodes are located, for the purpose set forth.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM J. REILLY.

Witnesses:
MAZE KIRBY,
A. EBERT O'BRIEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."