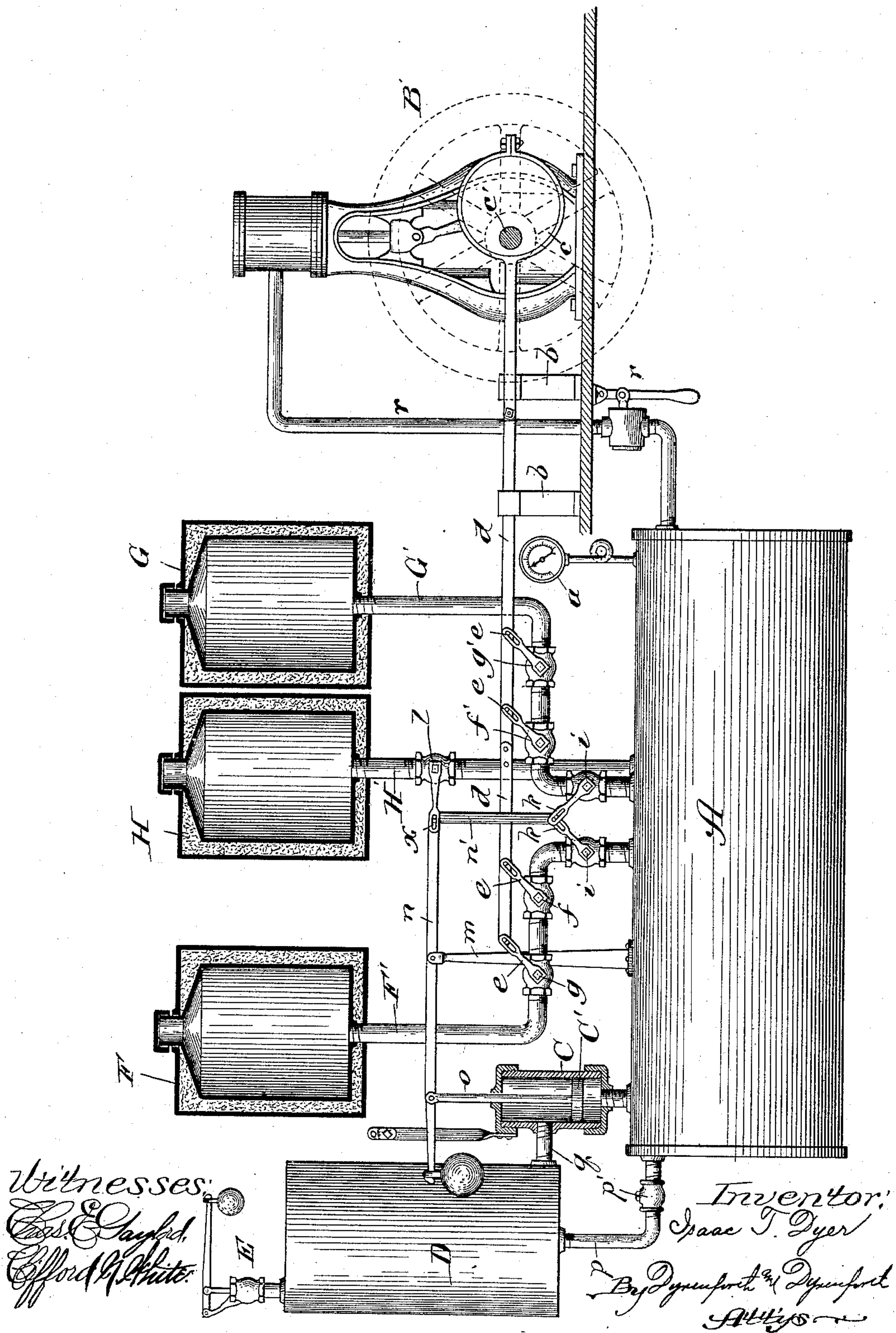


(No Model.)

I. T. DYER.
FLUID PRESSURE APPARATUS.

No. 474,059.

Patented May 3, 1892.



UNITED STATES PATENT OFFICE.

ISAAC T. DYER, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO RICARD O'S. BURKE AND JOHN R. COFFEY, OF SAME PLACE.

FLUID-PRESSURE APPARATUS.

SPECIFICATION forming part of Letters Patent No. 474,059, dated May 3, 1892.

Application filed March 20, 1891. Renewed January 2, 1892. Serial No. 416,862. (No model.)

To all whom it may concern:

Be it known that I, ISAAC T. DYER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Fluid-Pressure Apparatus, of which the following is a specification.

The object of my invention is to provide means whereby the pressure of air or other gaseous fluid in a holder from which the working pressure is supplied shall be automatically controlled without loss of gas from the holder.

My further object is to control automatically the supply of gas to the holder from the gas generator or generators or from any other source of supply to the holder by the pressure itself inside the holder.

My improved apparatus as adapted for accomplishing both my aforesaid objects is shown in the accompanying drawing by a view in elevation in the nature of a diagram.

A is a reservoir or holder into which the gas is compressed, and at B is indicated an engine as representing the work to be done or resistance to be overcome by the gas-pressure, and with which, to that end, the holder A communicates through a pipe *r*.

C is a cylinder communicating with the holder and upon which it is shown to be supported, and the cylinder C communicates from a point between its extremities, through a pipe *q*, with a chamber D, which, as will hereinafter more fully appear, affords a subsidiary holder or chamber for the surplus pressure from the holder A. The chamber D communicates through a pipe *p*, containing a check-valve *p'*, with the holder A, toward which the check-valve opens, and should be provided with a suitable safety-valve E.

Inside the cylinder C is a piston C', the rod *o* of which extends through the upper end of the cylinder, and is there connected with a lever *n* near its weighted end, the lever being fulcrumed between its ends, as on a standard *m*.

F and G are receptacles, which, as hereinafter explained, may contain the store of gas under high pressure to be supplied to the holder A, or different chemicals, such as soda and sulphuric acid, respectively, which in

uniting form a powerful gas. H is another similar receptacle, which may also contain a supply of gas under pressure like the other receptacles, or a suitable chemical to be used with that in either or both of the other receptacles. Thus it may contain, like the receptacle F, a supply of soda when the two receptacles F and H would be used alternately with the receptacle G, containing sulphuric acid, thereby enabling the one not in use to be cleaned and replenished without interrupting the operation of the device. The receptacles F, G, and H communicate with the holder A, respectively, through pipes F', G', and H'. The pipe H' contains a valve *l*, connected at its stem with the end of the lever *n* to close the passage it controls by rise of the weighted end of the lever, and with the same lever near its end, at a slot *x* therein, is connected one end of a link *n'*, connected at its opposite or lower end with the slotted ends of handles *k*, controlling valves *i* in the pipes F' and G'.

In the pipe F', behind the valve *i* therein, are two valves *g* and *f*, and in corresponding positions in the pipe G' are similar valves *g'* and *f'*, all of the said valves being connected from their stems through the medium of slotted handles *e* with a jointed horizontal bar *d*, connected with an eccentric *c* on a rotary shaft *c'* of the engine B, the bar *d* being supported in guide-bearings *b*.

The various valves mentioned as being provided in the pipes F, G, and H are of common and well-known construction and need not, therefore, be shown in detail. The setting of the valves *g* and *g'*, however, is such as to cause them to be opened by turning them in corresponding directions, while turning of the valves *f* and *f'* in that direction closes them.

The operation is as follows, presuming the holder A to have been charged with gas under the required pressure (indicated by the gage *a*) for operating the engine, and further presuming the receptacles F, G, and H to have been charged with the supply for the holder A under higher pressure than that required in such holder: The horizontally-reciprocating movement of the bar *d*, owing to the rotation of the shaft *c'* and eccentric *c*, opens in

one stroke of the bar the valves g and g' , thereby closing the valves f and f' , and admits a charge from each reservoir F and G to its respective outlet-pipe up to the closed valves therein, and the other stroke of the bar closes the valves g and g' , thereby shutting off the supply from the reservoirs and the effect of back-pressure thereon from the holder A , and opens the valves f and f' to admit the charge to the holder. The duplication of the reservoirs with their said valves permits the charging of the holder A from one while the other is disconnected by separating the proper handles e from the bar d , as for replenishing it. The valve l in the pipe H' (if the reservoir H is used at all, though it may be dispensed with) is normally open to permit a continuous supply from its store to the holder A . If the pressure introduced into the holder A exceeds that required for the work to be done, the piston C' (which is controlled by the weight w on the lever n to resist movement under the predetermined pressure in the holder) will be raised past the outlet q , thereby admitting the excess of pressure into the chamber D , wherein it is retained until (if ever) the pressure in the holder falls below it, when it may readily re-enter the holder A . The rise of the piston C entails the further result, through the consequent turning of the lever n , of closing the valve l and of depressing the link n' to close the valves i , thus shutting off the supply to the holder A until the pressure therein again becomes normal, when of course the piston C resumes its position below the outlet q , and in so doing reopens the supply-valves.

Whether the contents of the reservoirs F , G , and H be gas under pressure, or chemicals adapted by uniting in the holder A to generate the desired pressure therein, the operation is the same. Hence it requires no further description with the use of the aforesaid chemicals. It will thus be seen that the apparatus is simple in construction and thoroughly automatic in its operations of saving gas, instead of blowing it off in case of excessive pressure in the holder (though for the sake of precaution the chamber D has a safety-valve E) and of maintaining the supply to the holder A .

What I claim as new, and desire to secure by Letters Patent, is—

1. In a fluid-pressure apparatus, the combination, with a holder and means for supplying thereto gas under pressure, of a subsidiary chamber and a cylinder opening into the holder and containing a piston and communicating with the subsidiary chamber from a point between the extremities of the stroke of the piston, substantially as and for the purpose set forth.

2. In a fluid-pressure apparatus, the combination, with a holder A and means for supplying thereto gas under pressure, of a subsidiary chamber D , communicating through a pipe p with the holder, and a cylinder C , opening into the holder and containing a piston C' and communicating with the chamber D from a point between the extremities of the stroke of the piston, substantially as and for the purpose set forth.

3. In a fluid-pressure apparatus, the combination, with the holder A , of a reservoir from which the holder is supplied with gas under pressure, a cylinder C , into which the holder opens and containing a piston C' , a valve in the communication between the said reservoir and holder, and a lever n , connected with the valve and piston and actuated by the movement of the piston under excess of pressure in the holder to actuate the said valve to control the supply, substantially as described.

4. In a fluid-pressure apparatus, the combination, with the holder A and a suitable engine B , of a reservoir communicating with the holder and from which it receives its supply of gas under pressure, a pair of oppositely-working valves, and a valve i in the communicating passage between the reservoir and holder, a cylinder C , into which the holder opens and containing a piston C' , a lever n , connected at opposite sides of its fulcrum respectively with the valve i and piston, and a reciprocating bar d , actuated from the engine B and connected with the said pair of valves alternately to open and close them by its movement, substantially as described.

5. A fluid-pressure apparatus comprising, in combination, a holder A , an engine B , driven by the gas-pressure from the holder, a chamber D , communicating through a pipe p with the holder, a cylinder C , into which the holder opens and communicating with the said chamber, a piston C' in the cylinder, reservoirs F and G , communicating with the holder through pipes F' and G' , containing valves g , f , and i and valves g' , f' , and i , respectively, a reservoir H , having a pipe H' leading into the holder and containing a valve l , a weighted lever n , connected at one side of its fulcrum with the rod of the piston C' and toward its opposite end with the valves l and i , and a reciprocating bar d , actuated from the engine and connected with the valves g , f , g' , and f' , the whole being constructed and arranged to operate substantially as described.

ISAAC T. DYER.

In presence of—

W. H. DYRENFORTH,
M. J. FROST.