(No Model.)

E. N. DICKERSON & J. J. SUCKERT.

APPARATUS FOR GASIFYING AND CONTROLLING LIQUEFIED OR COMPRESSED GAS.

No. 582,274. Patented May 11, 1897.

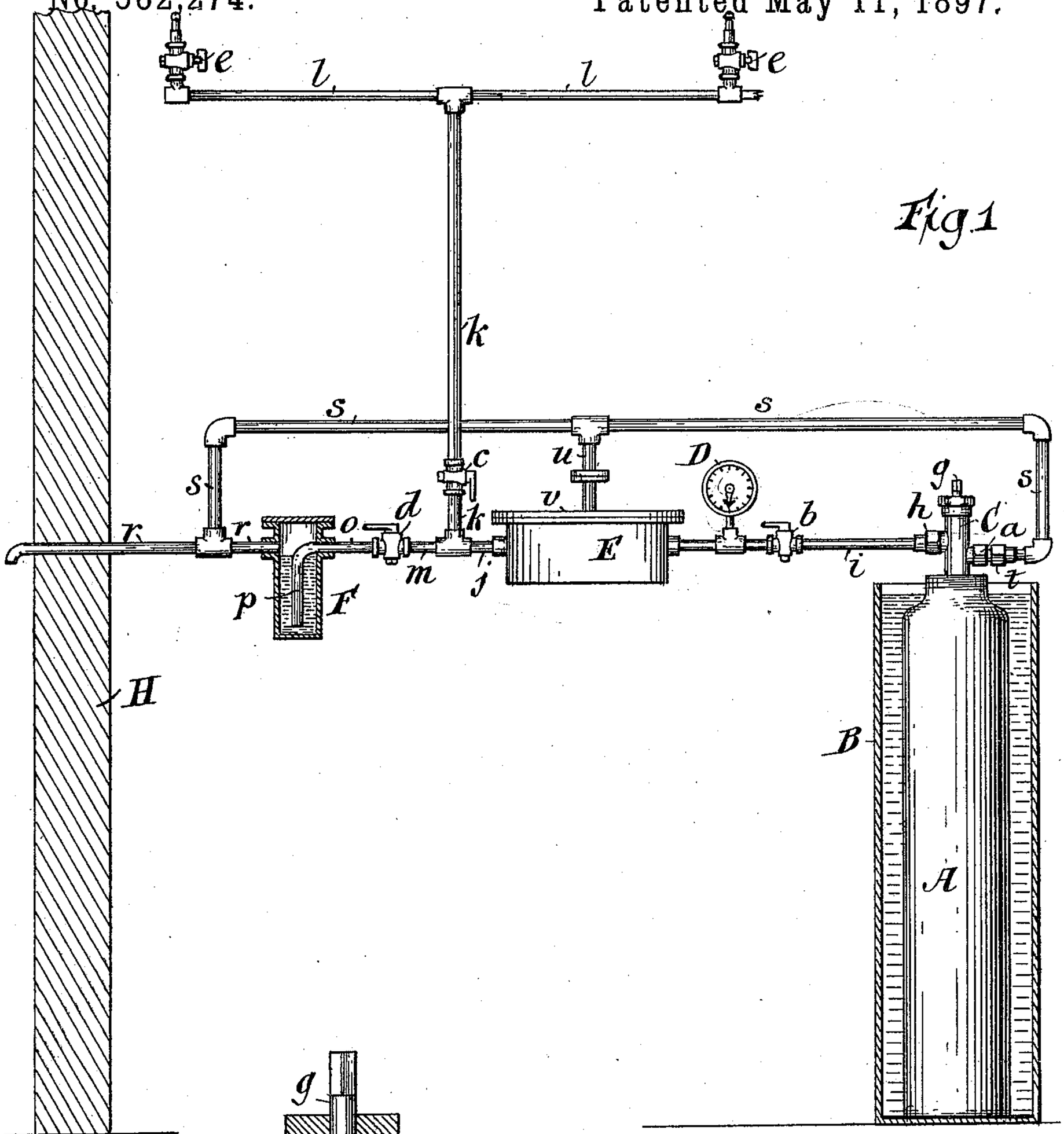

Fig 1

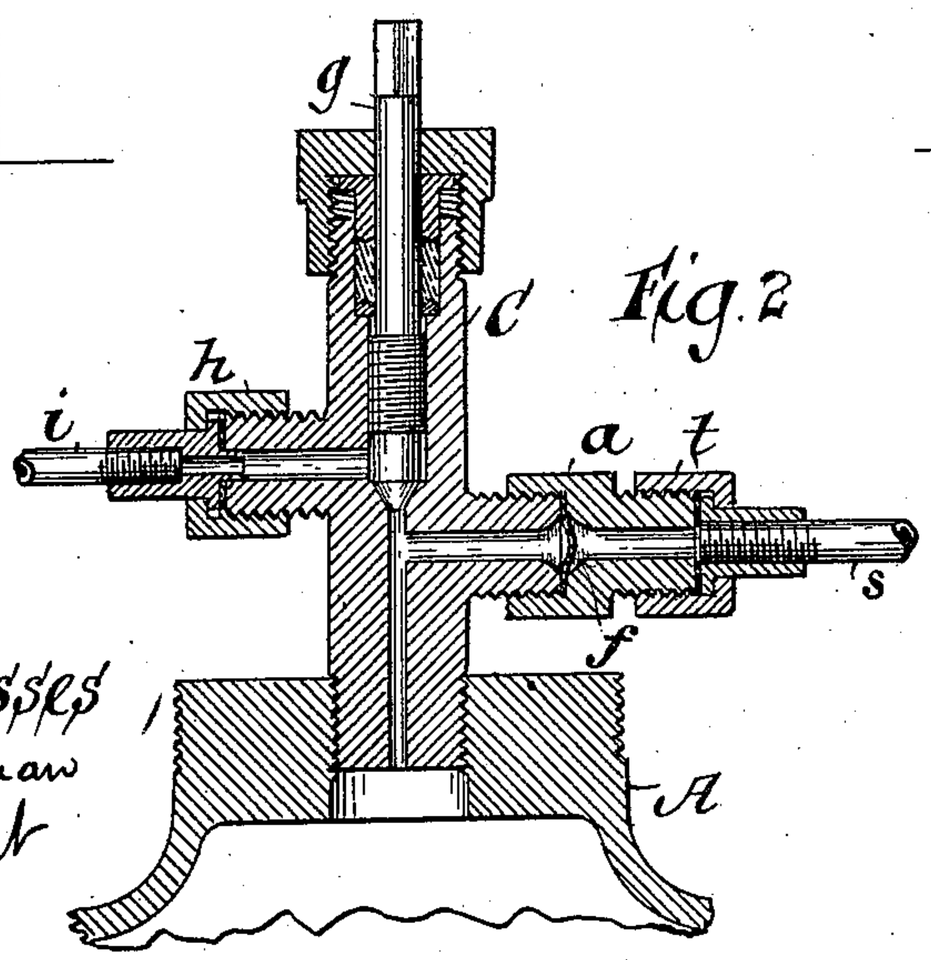

Fig 2

Witnesses,
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UNITED STATES PATENT OFFICE.

EDWARD N. DICKERSON AND JULIUS J. SUCKERT, OF NEW YORK, N. Y., ASSIGNORS TO THE UNITED STATES ACETYLENE LIQUEFACTION COMPANY, OF NEW YORK.

APPARATUS FOR GASIFYING AND CONTROLLING LIQUEFIED OR COMPRESSED GAS.

SPECIFICATION forming part of Letters Patent No. 582,274, dated May 11, 1897.

Application filed March 4, 1896. Serial No. 581,842. (No model.)

To all whom it may concern:

Be it known that we, EDWARD N. DICKERSON and JULIUS J. SUCKERT, of the city, county, and State of New York, have invented a new and useful Improvement in Apparatus for Gasifying and Controlling Compressed or Liquefied Gas, of which the following is a full, true, and exact description, reference being had to the accompanying drawings.

This invention relates to an improved mechanism for allowing the escape of liquefied gas, especially acetylene gas, into a gaseous condition or of compressed gas to a lower pressure, and controlling this operation so as to render the same safe.

In applying liquefied or compressed acetylene gas to the illumination of houses or for other purposes where the gas must be reduced in pressure to enable its practical application it is necessary to effect the reduction in pressure by mechanical appliances technically known as "reducing-valves" and ordinarily operating by means of a diaphragm or piston or float, which, when the reduced pressure exceeds the prescribed limit, closes off, by means of suitable levers, the valve feeding the compressed gas to be reduced in pressure. Again, the tanks containing the compressed or liquefied gas may at times be subjected to intense heat, whereby the pressure generated in the tanks by the expansion of the gas will exceed the bursting pressure of the tanks, thereby causing their rupture. To prevent an excess of pressure in the valve in the pipes or other apparatus connected with the reducing-valve by reason of the failure of this valve to operate, or by reason of the rupture of the diaphragm, (in case a diaphragm-valve is used,) and also to prevent an excess of pressure developing in the tank through excessive heating of the same are objects of our invention. Our apparatus may be arranged in various forms, but we have shown one embodying our invention.

In the drawings, Figure 1 represents an elevation, partly in section, of our apparatus; and Fig. 2, a sectional view of the valve C, Fig. 1.

A represents a tank containing liquefied or compressed acetylene gas, which is preferably surrounded by water or other suitable liquid contained in the tank B. The tank B may be provided with suitable mechanism—as, for instance, a float-valve—for maintaining the supply of water therein. Attached to the top of the tank A is the valve C, provided with a valve-stem *g*, which on unscrewing permits the gas to escape from the tank A to the outlet-nozzle *h* and through pipe *i* to the diaphragm reducing-valve E. The pipe *i* may be provided with valve stop-cock *b* and pressure-gage D. The gas escaping from the reducing-valve E passes through pipe *j* and can then be utilized for any purpose desired. As shown in Fig. 1, the gas is conducted through pipes *k l* to the burners *e e*, where it is ignited and used for illuminating purposes. The pipe *j* is continued by pipes *m* and *o*, provided with stop-cock *d*, to the liquid-seal trap F, in which the pipe *o* is bent downward, forming a seal, as shown at *p*. The outlet leading from the trap F connects to the pipe *r*, which leads any gas escaping through the seal of the trap through the external wall H of the building and to the outer atmosphere. The outlet *a* on valve C connects directly with the interior of the tank A and therefore enters the valve below the valve-seat, upon which the valve-stem *g* rests. This outlet *a* is provided with diaphragm *f* (shown in Fig. 2) and is connected by means of the pipes *s s* to the pipe *r*.

The diaphragm *f* is preferably made of a fusible alloy—for instance, of an alloy formed of tin, twelve parts; lead, twenty-five parts; bismuth, fifty parts, and cadmium, thirteen parts. It is made of such a thickness that it will burst when the pressure in the tank approximates the fusing-point of the alloy by reason of heat applied to that tank. For instance, if the alloy be fusible at about 150° to 160° Fahrenheit a diaphragm having an opening of one-fourth of an inch should have a thickness of about one-sixteenth of an inch. Under these circumstances, in case of heating of the tank before any excessive pressure could be generated, a double safety is provided by such diaphragm in the fact that it will both fuse and yield at about the same pressure, due to the temperature of the tank. Thus we find that a diaphragm which fuses at about 150° Fahrenheit and which bursts at about

two thousand pounds pressure will operate satisfactorily as a double-safety diaphragm under the circumstances stated.

The pipe *u* forms a connection between the pipe *s* and the flanged head *v*, forming a tight cover above the operating-diaphragm of the valve E.

The operation of our device is as follows: In case the diaphragm of the valve E fails to close the valve properly and an excess of pressure passes into the reduced-pressure side of the valve the gas will pass through the liquid seal contained in F and escape through the pipe *r* to the atmosphere. Should the diaphragm of the valve E become ruptured, the gas escaping therefrom will pass through the pipe *s* and the pipe *r* to the atmosphere. The said diagram *f* may be ruptured by an excess of pressure or by heat, as previously described. In replacing a new cylinder A the valve *b* is closed. The valves *d* and *c* also permit the closing off of portions of the apparatus when it is necessary to examine or repair them. In transportation a cap is applied in place of the coupling *t* (shown in Fig. 2) and also, if desired, in place of the coupling *h*.

It is obvious that though we have shown a diaphragm reducing-valve we intend to include thereby any other suitable form of reducing-valve, such as a float-valve having a cup moving in a seal.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination with a tank containing compressed or liquefied gas, of a diaphragm burstable at about two thousand pounds pressure and fusible at about 150° Fahrenheit, thereby providing a double-safety diaphragm which will fuse and burst at approximately the pressure and temperature of the gas due to the excessive heating of the tank.

2. The combination in a gas-reducing apparatus, of a cylinder to contain compressed or liquefied gas, a reducing-valve connected to the cylinder, and a burstable and fusible diaphragm *f*, the valve being set to close at a pressure below that at which the diaphragm will burst, substantially as described.

3. The combination in a gas-reducing apparatus, of a cylinder to contain compressed or liquefied gas, a reducing-valve, a burstable and fusible diaphragm, a safety connection *s*, and a connection *u* above the diaphragm or float of the reducing-valve and communicating with the safety connection *s*, which connection communicates with the atmosphere, substantially as described.

4. The combination with the cylinder A to contain compressed or liquefied gas, of the connection *i*, the reducing-valve E, the escape-seal F connected to the reduced-pressure side of the reducing-valve, a pipe *r*, connected to the escape-seal and communicating to the atmosphere, and a connection *u* above the diaphragm or float of the reducing-valve and communicating with pipe *r*, substantially as described.

5. The combination with a cylinder containing compressed or liquefied gas, of a reducing-valve, a pipe connecting the cylinder and reducing-valve, a valve in said pipe, an independent connection with the cylinder containing a rupturable diaphragm, and a connection between said independent connection and the reducing-valve, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

E. N. DICKERSON.
JULIUS J. SUCKERT.

Witnesses:
H. COUTANT,
ANTHONY GREF.