

No. 639,197.

Patented Dec. 12, 1899.

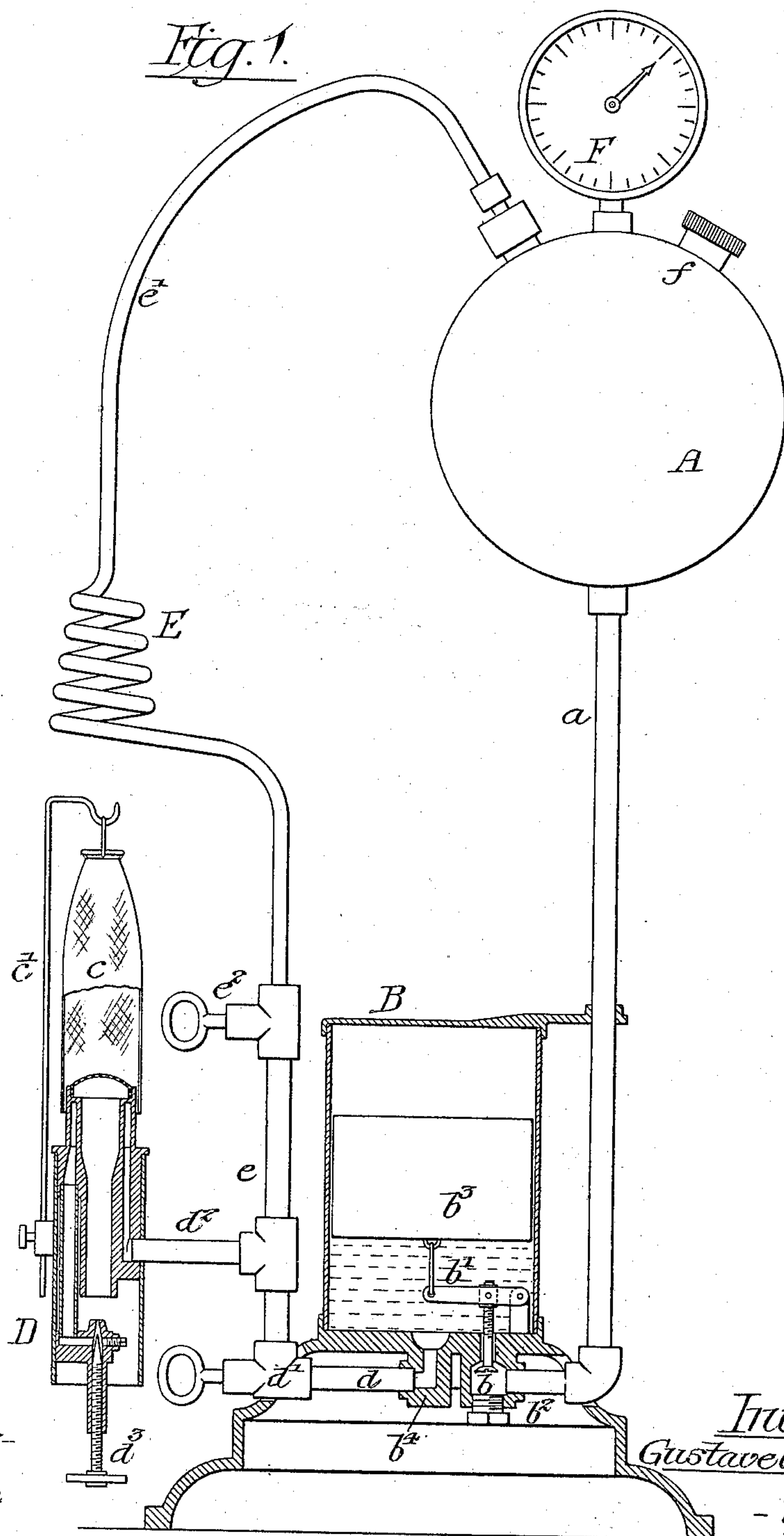
G. A. LOEBEN.  
PRESSURE DEVICE FOR BURNERS.

(Application filed Oct. 23, 1899.)

(No Model.)

2 Sheets—Sheet 1.

*Fig. 1.*



*Witnesses:-*  
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*- by -*  
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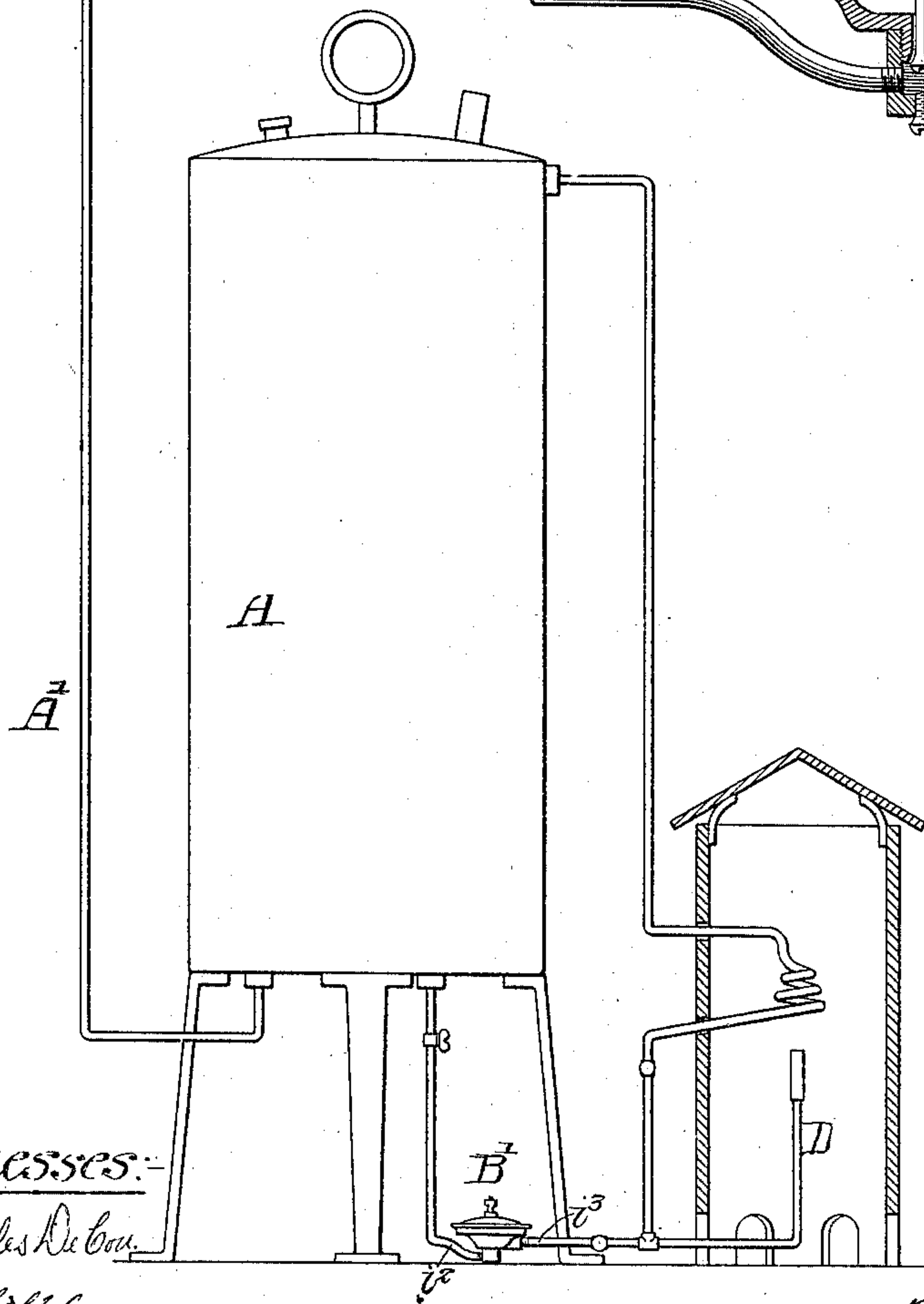
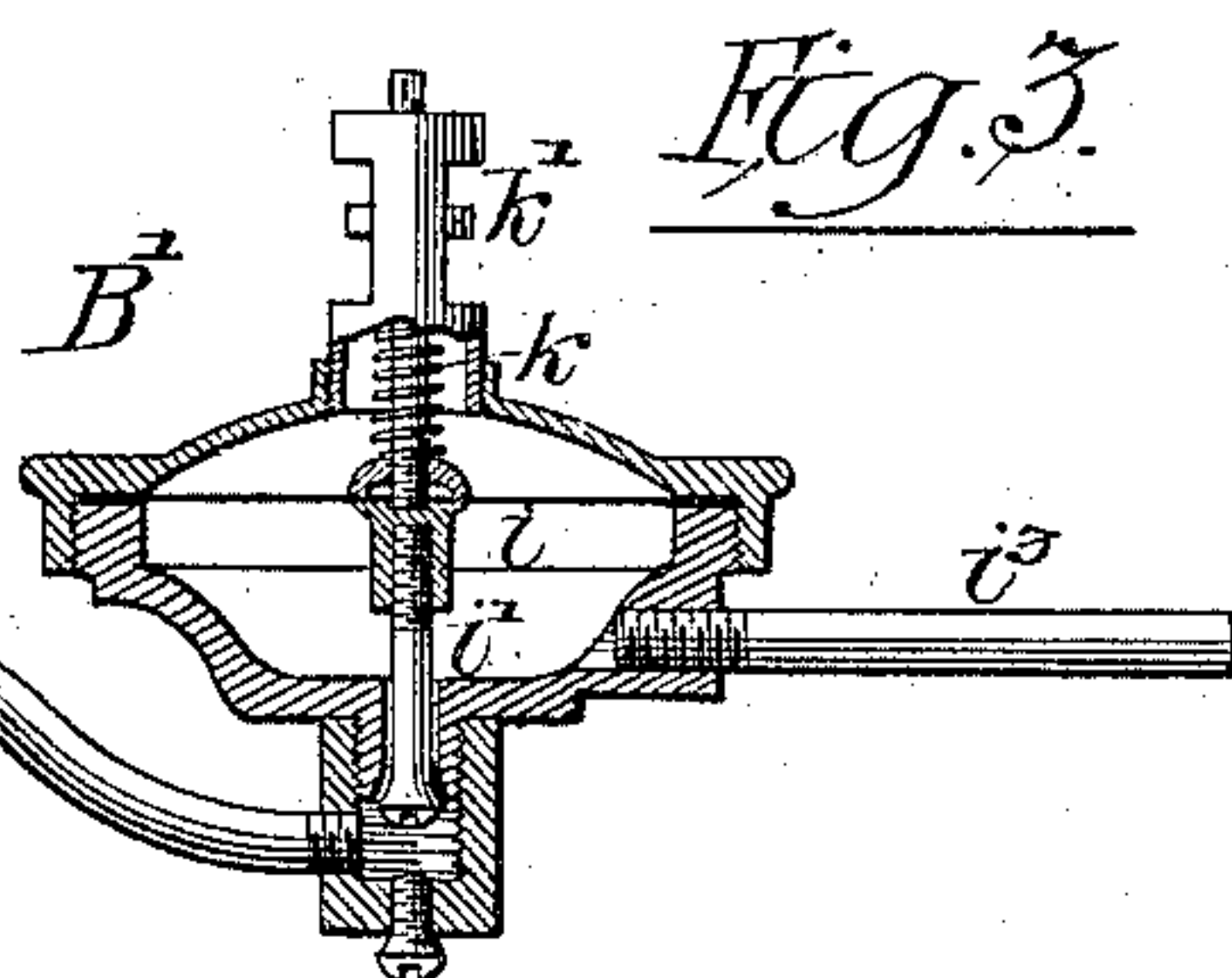
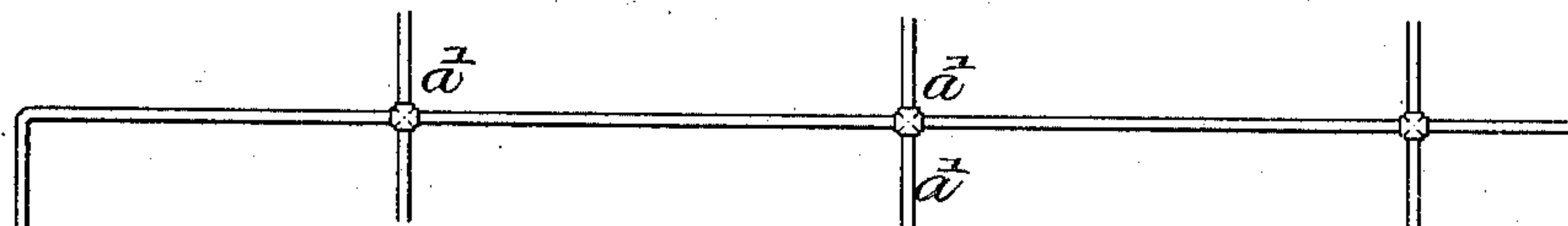
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2 Sheets—Sheet 2.

*Fig. 2.*



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# UNITED STATES PATENT OFFICE.

GUSTAVE A. LOEBEN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF  
ONE-HALF TO ALBERT L. A. TOBOLDT, OF SAME PLACE.

## PRESSURE DEVICE FOR BURNERS.

SPECIFICATION forming part of Letters Patent No. 639,197, dated December 12, 1899.

Application filed October 23, 1899. Serial No. 734,576. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAVE A. LOEBEN, a subject of the Emperor of Germany, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Pressure Devices for Burners, of which the following is a specification.

The object of my invention is to automatically regulate the pressure in an apparatus for supplying fluid to a burner or a series of burners.

My invention is especially applicable to burners using hydrocarbons or other fluids capable of being gasified.

In the accompanying drawings, Figure 1 is a view of a lamp, partly in section, illustrating my invention. Fig. 2 is a view showing my invention as applied to a central supply-tank connected to a number of pipes, and Fig. 3 is a view of a diaphragm-regulator.

Referring in the first instance to Fig. 1, A is the reservoir, from which extends a pipe  $a$ , connected to the inlet  $b^2$  of a regulator B. This regulator in the present instance is of the float type, having a valve  $b$  attached to a lever  $b'$ , coupled to a float  $b^3$ , and above the float is an air-chamber forming a cushion. The valve can be adjusted on removing a plug in the bottom of the inlet  $b^2$ . The valve can be turned, as it is in the form of a screw.  $b^4$  is the outlet, which is connected to a tube  $d$ , having a valve  $d'$ . This tube  $d$  is connected by a branch  $d^2$  with the burner D. This burner in the present instance is so constructed that the liquid in passing through the burner to the outlet will be vaporized or gasified. The burner has a suitable valve  $d^3$  for regulating the flow of vapor or gas. Above the burner in the present instance is an incandescent mantle  $c$ , carried by a support  $c'$  of the ordinary type. Coupled to the pipe  $d$  is a tube  $e$ , extending to the expander E. This expander in the present instance is simply a continuation of the tube  $e$  and is coiled in any suitable form directly above the mantle and within the heat zone of the same. The tube is extended in the form of a branch  $e'$  and is attached to the upper portion of the reservoir A.  $e^2$  is a valve to regulate the flow of the liquid through the tube  $e$ . In this view I have shown a gage F, although this can

be dispensed with in most instances.  $f$  is a capped opening through which the reservoir can be charged with liquid.

In operating the lamp shown in Fig. 1 the reservoir is charged with any suitable ignitable fluid, such as any of the ordinary hydrocarbons, and the section of tubing between the valves  $d'$ ,  $d^3$ , and  $e^2$  is heated in any suitable manner—by a torch, for instance—the valve  $d'$  being closed and the valves  $d^3$  and  $e^2$  opened. The liquid in this portion of the tube will be heated and in time vaporized or gasified, and the gas escaping from the burner can be then ignited, heating the mantle to incandescence, and the liquid flowing into the expander will be at once vaporized or gasified and pressure will be developed in the upper portion of the reservoir. The valve  $d'$  is opened after the section of tubing is heated, so that the fluid under pressure will flow to the burner and to the expander.

In some cases the air in the expander may be heated at first, so that the expanded air will create a certain pressure on the liquid in the reservoir prior to the gasifying of the liquid passing to the pipe  $e$ . As the pressure in the reservoir increases the air in the regulator will be compressed and the float will be raised and will reduce the passage leading from the reservoir to the burner and expander, and when the pressure reaches the point at which the regulator is set the flow of liquid will be entirely cut off. As soon as the pressure is reduced the valve will open, allowing the liquid to flow through the regulator and into the pipe  $d$  and to the burner and gasifier. In time the regulator will be set, so that a constant pressure is maintained in the reservoir.

In Fig. 2 I have shown an apparatus somewhat similar to that shown in Fig. 1, with the exception that the construction illustrated in Fig. 2 is intended for a central reservoir for use at a central point, from which a line of pipe coupled to any number of burners may be attached—such, for instance, as in a building using one reservoir for a number of hydrocarbon-burners. In this construction a special burner  $D'$  is used to heat the expander. A diaphragm-regulator  $B'$  is shown in this instance instead of the float-regulator



shown in Fig. 1, the one being the equivalent of the other. A pipe A' leads from the reservoir A to a series of branch pipes a', having any of the ordinary forms of burners attached.

In Fig. 3 I have shown one form of diaphragm-regulator that I may use. *i* is the diaphragm carrying a valve *i'*, similarly located to the valve *d*, Fig. 1, the liquid-inlet pipe being designated by the letter *i*<sup>2</sup> and the outlet from the pressure-chamber by *i*<sup>3</sup>, while a spring *k* is shown encircling the diaphragm-rod, and the pressure of this spring may be regulated by adjusting the screw-threaded cap *k'*, which in the present instance is adapted to the casing of the regulator.

It will be understood that when the device is used in connection with a heating-furnace the arrangement of parts will be modified; but in all cases the regulator must be situated between the supply-reservoir and the expander and the expander must connect with the upper portion of the reservoir.

In a separate application, Serial No. 704,550, I have claimed, broadly, the means for securing and maintaining constant pressure in the reservoir, the present application being confined to the special combination of the reservoir, the burner, and the expander with the regulator.

I claim as my invention—

1. The combination of a reservoir, a burner, a passage leading from the reservoir to the burner, a regulator connected to said passage and controlling the flow of liquid there-through, an expander within the heat zone of a burner connected to the passage between the regulator and the burner, and connected to the upper portion of the reservoir, substantially as described.

2. The combination of a reservoir, a burner, a passage leading from the reservoir to the burner, a regulator connected to said passage, the valve of the regulator controlling the flow of liquid through the passage, an expander within the heat zone of the burner, connected to the passage between the valve of the regu-

lator and the burner, and connected to the upper portion of the reservoir, substantially as described.

3. The combination with a lamp, of a burner, a reservoir, a tube extending from the reservoir to the burner, and within the heat zone of the burner, a regulator for regulating the passage of fluid through the tube, a pipe extending from the discharge side of the regulator and coupled to the upper portion of the reservoir, and extending within the heat zone of the burner, whereby a given pressure will be maintained in the reservoir, substantially as described.

4. The combination in a burner, of a reservoir, a conduit leading from the reservoir to the burner, and two valves in said conduit, that portion of the conduit which is between the valves being susceptible of being heated to gasify the liquid and start the burner, and said intervening portion of said conduit having a pipe connection with the reservoir, a portion of which connection is within the heat zone of the burner, whereby initial pressure is exerted upon the liquid in the reservoir, substantially as described.

5. The combination of a reservoir containing liquid hydrocarbons or other gasifiable fluids, a burner, a pipe leading from the reservoir to the burner, a regulator controlling the flow of fluid to the pipe, a valve in the burner and a valve in the pipe, a pipe coupled to the first-mentioned pipe between the two valves, and extending within the heat zone of the burner and connected to the upper portion of the reservoir and having a valve between its connection with the pipe and the point where it is in the heat zone of the burner, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GUSTAVE A. LOEBEN.

Witnesses:

WILL. A. BARR,  
JOS. H. KLEIN.