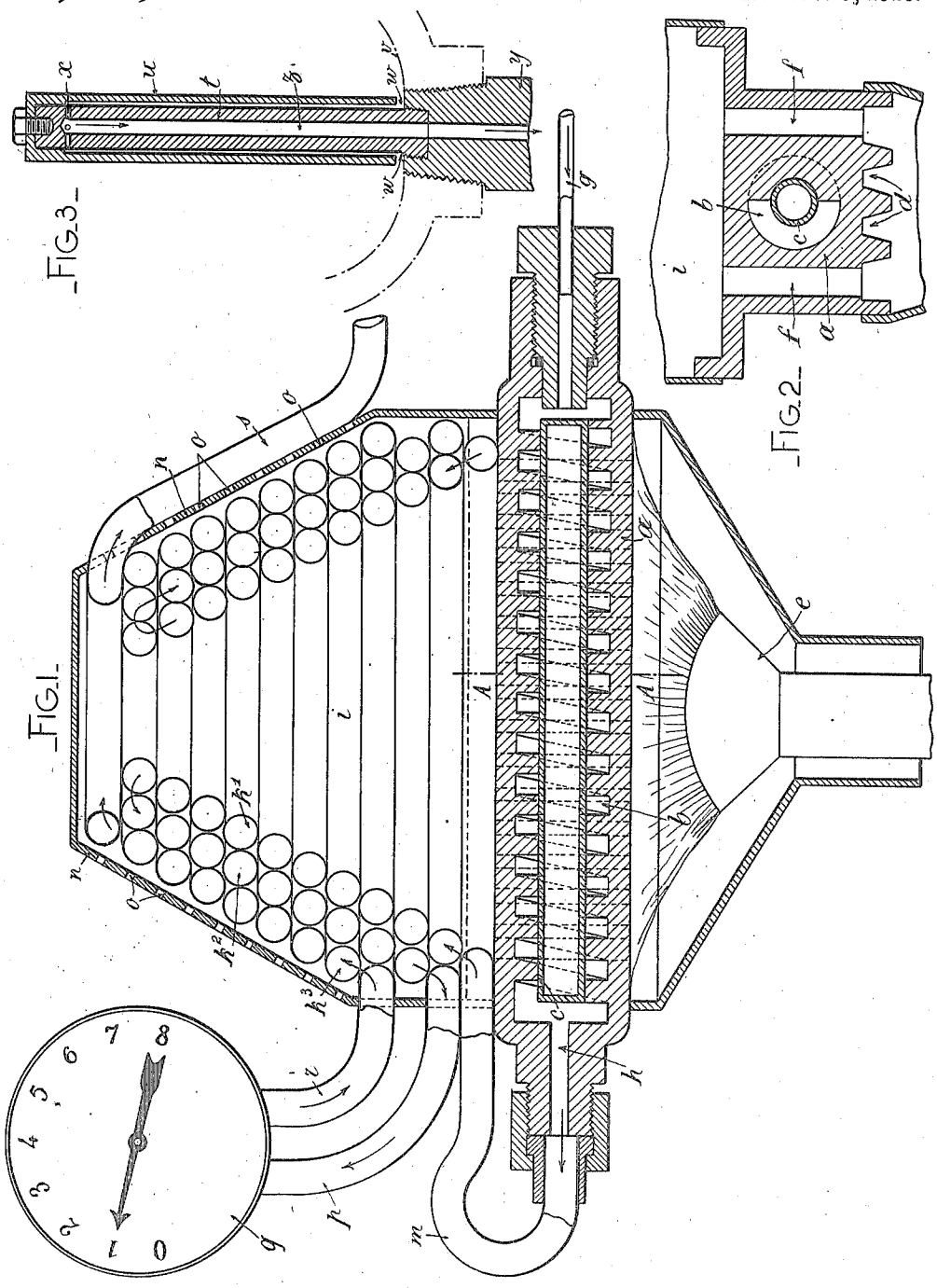
F. LÉVY.

APPARATUS FOR GASIFYING LIQUID GASES.

APPLICATION FILED JUNE 23, 1914.

1,283,823.

Patented Nov. 5, 1918.



Witnesses:-
J. Langner
M. Ward

Fortunato Lévy,
Inventor
by Lawrence Langner
Attorney.

UNITED STATES PATENT OFFICE.

FORTUNATO LÉVY, OF PARIS, FRANCE, ASSIGNOR TO GENERAL CARBONIC CO., OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

APPARATUS FOR GASIFYING LIQUID GASES.

1,283,823. Specification of Letters Patent. Patented Nov. 5, 1918.

Application filed June 23, 1914. Serial No. 846,321.

To all whom it may concern:

Be it known that I, FORTUNATO LÉVY, subject of the Empire of Turkey, residing at 3 Villa Etex, Paris, in the Republic of France, have invented new and useful Improvements in Apparatus for Gasifying Liquid Gases, of which the following is a specification.

This invention has for its object to provide an improved apparatus for gasifying liquid gases more particularly liquid carbonic acid, the said apparatus being adapted to transform the gas—which comes from a reservoir containing a liquefied gas and which cannot be used in the state in which it leaves the reservoir—into a gas at a normal temperature which can be used as motive power. The gas produced by the above mentioned apparatus is adapted more especially to pulverize or atomize liquids, more particularly liquid paints.

The apparatus in accordance with my invention is adapted to permit of expanding the gas to reduce its pressure within commercially usable limits and at the same time to prevent the interruption of the expansion due to freezing. The object of the invention is therefore to provide an improved construction of means for expanding liquid gas which will be commercially utilizable and will permit of providing a continuous flow of expanded liquid gas from a liquid gas container.

In an apparatus according to this invention the liquid to be gasified, for instance liquid carbonic acid is passed through a conduit in the form of a spiral provided in a massive metal part, hereinafter called the gasifier. This part which is arranged horizontally, is pierced with a series of vertical conduits through which pass the hot gases produced by a burner arranged underneath. The gasified acid issuing from the end of the helical conduit is caused to pass through coiled pipes arranged in a peripheral manner in a heating chamber which receives directly the hot gases that have just passed through the gasifier.

The walls of this heating chamber may be of trapezoidal shape which causes the heat to become concentrated in the middle of the chamber, and which allows the hot gases to escape only after having passed around all the coiled pipes.

Another important feature of this invention consists in that the resulting gases are again heated ofter passing through an expander which reduces the gasified liquid to the pressure desired for use.

One practical form of this invention is illustrated by way of example in the accompanying drawings:

Figure 1 is a longitudinal section of the improved apparatus comprising both gasifier and heater.

Fig. 2 is a section of the gasifier on the line A—A of Fig. 1.

Fig. 3 is a vertical axial section of the device for discharging the flasks containing the liquefied gas.

The gasifier consists of a horizontal beam-like metal member a of retangular shape in section, in which there is formed longitudinally a helical passage b produced by tapping one or more square threads and bounded internally by a cylindrical hollow member c closed at both ends. The liquid acid arrives at one end of the passage b by means of a pipe g and its passes out at the other end in the gaseous state through an outlet h.

Grooves d (Fig. 2) are formed in the lower face of the part a for the purpose of increasing the surface that is directly exposed to the burner e placed underneath. The burner e is preferably of the flat flame mineral-oil blow-pipe type, delivering into the center of a chamber having the shape of an inverted truncated pyramid, the base of which is formed by the part a. By this means a good distribution of the heat produced by the burner is obtained.

The hot gases pass through vertical passages f formed in the thickness of the part a and opening directly into the chamber i containing coiled pipes k^1, k^2, k^3, (which may be three in number as in the example shown) for heating the gasified liquid.

These coiled pipes are connected to the outlet h of the gasifier by means of a pipe m.

The chamber i is of trapezoidal form in section as shown in Fig. 1, and the coiled pipes k^1, k^2, k^3, . . . are arranged parallel to the inclined outer walls n of the chamber i which are pierced with holes for the escape of the hot air. This arrangement has the advantage that it concentrates the heat in the conical middle part of the chamber and allows the hot gases to escape only after they have passed around all the coiled pipes.

The gasified liquid arriving through the pipe m rises in the coiled pipe k^1 and passes down again through the coiled pipe k^2 in the direction of the arrows (Fig. 1). At the end of the coiled pipe k^2 the gas passes out of the heating chamber through a pipe p and enters the expander q which reduces the gas to the desired pressure for use.

An important feature of this invention consists in again heating the gas after it has left the expander, in order to counteract the cold produced by this fresh expansion.

The gas on leaving the expander q through a pipe r passes into the lower part of a coiled pipe k^3 through which it flows in the direction of the arrows; it passes finally from the heating chamber through a pipe s on its way to the point of use.

Fig. 3 is an axial section of the device to be adapted to the taps of the flasks containing the liquid gas for enabling them to be discharged by turning up the flask and without freezing either in the bottle or in the tap.

The device comprises a central tubular member t and an outer casing or inverted jar-shaped member u communicating at its lower end with the flask v through passages w, and at its upper end with the said tubular member by means of passages x. The tubular member t is fixed by screwing on the plug y which keeps the whole assemblage vertical inside the flask. The liquefied gas rises in the annular space comprised between the casing u and the tubular member t, passes through the passages x, and flows down through the central passage whence it passes to the gasifier through the pipe z.

Having now described my invention what I claim as new and desire to secure by Letters Patent is:

1. A gas treating apparatus for gasifying liquid gas such as liquid carbon dioxid, a horizontal beam-like gasifier pieced longitudinally with a helical conduit for the passage of the liquid to be gasified and transversely with a series of vertical ducts, a heating burner below said gasifier, a coiled pipe in communication with the outlet end of the gasifier and arranged above the same, and means for concentrating the heat of the hot products of the burner upon the coiled pipe, substantially as described and for the purpose set forth.

2. A gas treating apparatus for gasifying liquid gas such as liquid carbon dioxid, a gasifier formed by a hollow beam-like member open at both ends and formed with an internal screw thread, a hollow cylindrical member closed at both ends in contact with the screw thread so as to form in the gasifier a helical conduit for the passage of the liquid to be gasified, said gasifier being also provided with a series of vertical ducts, a heating burner below said gasifier, a coiled pipe in communication with the outlet end of the gasifier and arranged above the same and means for concentrating the heat of the hot products of the burner upon the coiled pipe, substantially as described and for the purpose set forth.

3. A gas treating apparatus for gasifying liquid gas such as liquid carbon dioxid, a horizontal beam-like gasifier pierced longitudinally with a helical conduit for the passage of the liquid to be gasified and transversely with a series of vertical ducts, a heating burner below said gasifier, a coiled pipe in communication with the outlet end of the gasifier and arranged above the same, and a chamber of trapezoidal shaped section inclosing said coiled pipe and pierced with holes for the escape of the hot products, substantially as described and for the purpose set forth.

4. A gas treating apparatus for gasifying liquid gas such as liquid carbon dioxid, a conduit, means for feeding the liquid gas to said conduit, a heating burner to the action of which the conduit is directly subjected, a coiled pipe in communication with the outlet end of the conduit at one end and a gas expander at the other end and another coiled pipe in communication with the outlet of the expander, both coiled pipes being so arranged as to be heated by the hot products of the burner, substantially as described and for the purpose set forth.

5. A gas treating apparatus comprising in combination a heating device, an elongated passage in proximity to and subjected to the action of the heating device, a pressure-reducing means connected with said elongated passage, and a return passage from said pressure-reducing means subjected to the action of said heating device.

6. A gas treating apparatus of the kind described, comprising in combination a gas container; a gasifier; a heating means; a re-heating means; a pressure reducing means; a connection between said container and said gasifier; and means connecting the gasifier with the pressure reducing means and connecting the pressure reducing means with the re-heating means.

7. A gas treating apparatus of the kind

described, comprising in combination a gas container; including a heating coil, means connecting said coil with said container; a pressure reducing means; a re-heating coil; and means connecting the said heating and re-heating coils with the pressure reducing means.

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

FORTUNATO LÉVY.

Witnesses:
LOUIS MOSES,
CHAS. P. PRESSLY.