L. E. ECKELMANN.

VAPORIZER.

APPLICATION FILED APR. 26, 1918.

1,325,559.

Patented Dec. 23, 1919.

3 SHEETS—SHEET 1.

Fig. 1.

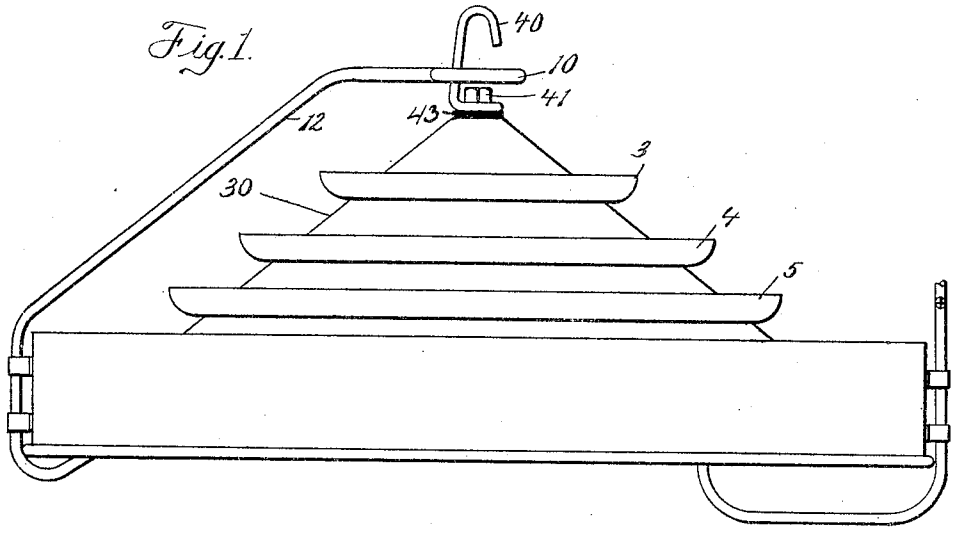


Fig. 4.

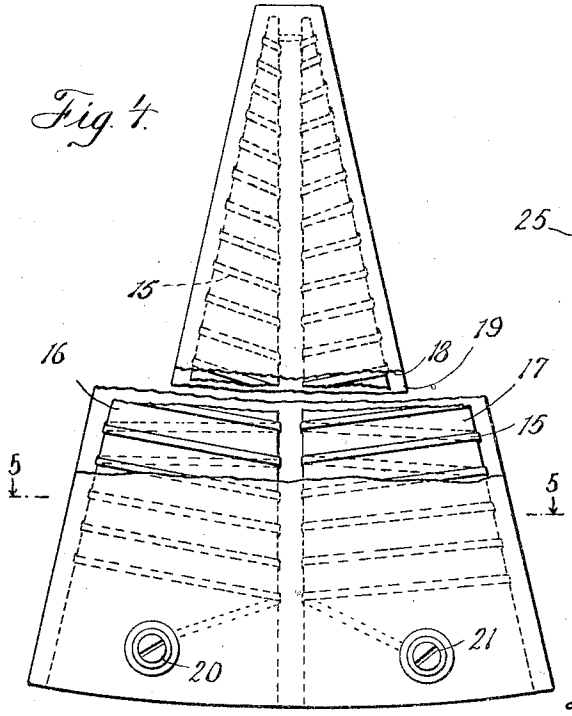
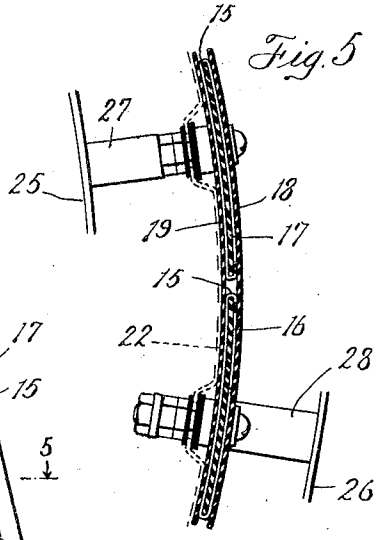


Fig. 5



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3 SHEETS—SHEET 2.

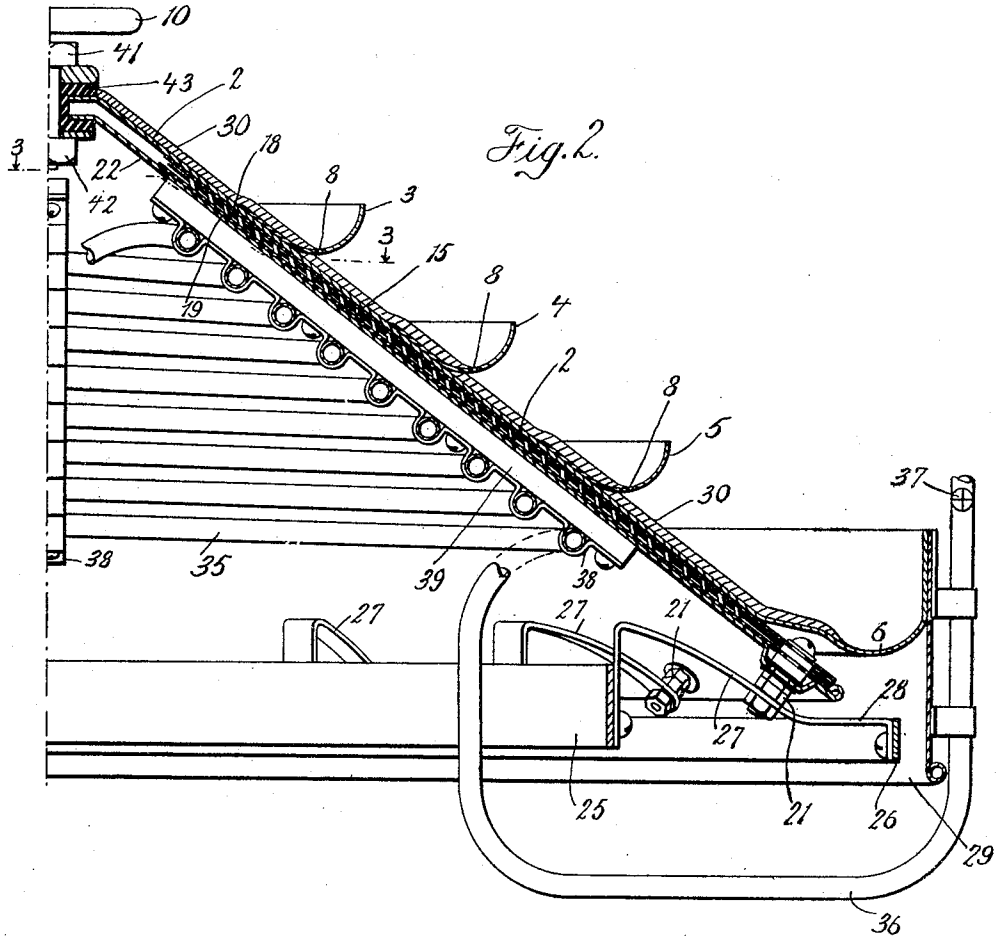


Fig. 2.

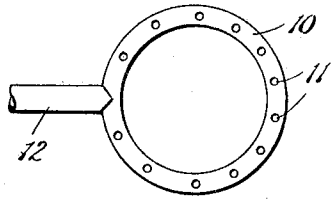


Fig. 6.

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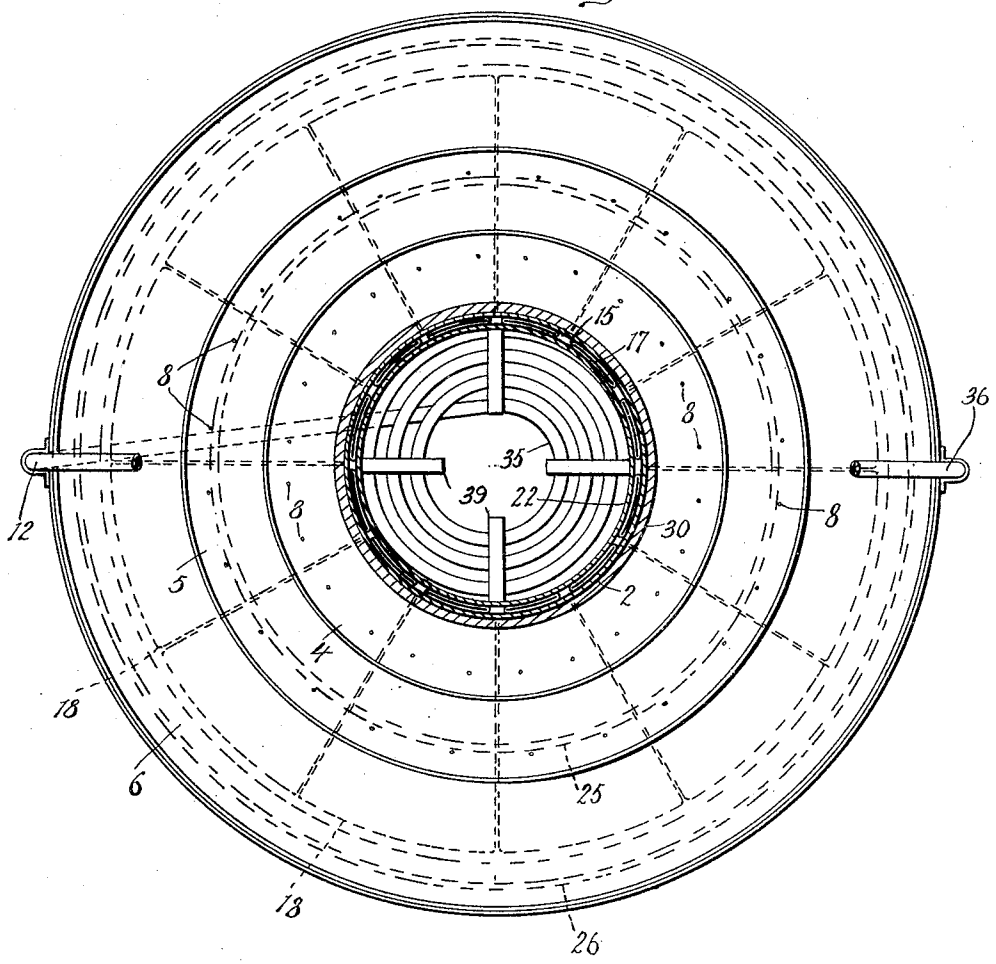
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

LUIS E. ECKELMANN, OF NEW YORK, N. Y., ASSIGNOR TO PYRENE MANUFACTURING COMPANY, A CORPORATION OF DELAWARE.

VAPORIZER.

1,325,559. Specification of Letters Patent. **Patented Dec. 23, 1919.**

Application filed April 26, 1918. Serial No. 231,051.

To all whom it may concern:

Be it known that I, LUIS E. ECKELMANN, a citizen of the United States, and resident of the city, county, and State of New York, have invented certain new and useful Improvements in Vaporizers, of which the following is a specification.

This invention relates to a vaporizer primarily intended for use in connection with fire extinguishing liquids, although not necessarily confined to such use.

The general object of the invention is to produce a vaporizer designed to secure the maximum and most efficient service from the elements thereof, of simple and unitary construction having a compact arrangement of its various parts.

Another object is to provide a vaporizer constructed to insure the most efficacious distribution of the liquid to be vaporized over a heated surface.

A further object is to provide a vaporizer in which the heating means may also be employed to effect a preliminary heating of the liquid before the latter is discharged upon the vaporizing surface.

For further comprehension of the invention and of the objects and advantages thereof, reference will be had to the following description, taken in connection with the accompanying drawings illustrating a preferred embodiment of the invention, the various novel features being more particularly pointed out in the appended claims.

Figure 1 of the drawings is a side elevation of the vaporizer.

Fig. 2 is an enlarged sectional view of one half of the vaporizer.

Fig. 3 is a sectional plan view, taken on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged detail view of one of the heating units.

Fig. 5 is a horizontal section on the line 5—5 of Fig. 4, showing also the connection of the heater wires to the main feed rings for electrically heating the device.

Fig. 6 is detail bottom plan view of the liquid distributing ring.

As here shown, the vaporizer comprises a conical shell, 2, which may be of copper or other suitable material, whose exterior is provided with a series of horizontal annular troughs, shown at 3, 4, 5 and 6, these troughs being secured to the shell 2 in any manner to insure a liquid tight joint between the engaging surfaces of the shell and troughs, the lower trough 6 being, in the present instance, formed by bending up the lower edge of the conical shell 2 while the troughs 3, 4 and 5 are formed from independent rings fitted over the shell.

The bottom of each of troughs 3, 4 and 5 is provided with a series of outlet openings 8 for the liquid to be vaporized. The liquid is discharged upon the shell from an annular ring 10 disposed above and co-axially therewith and having a series of perforations 11 in its underside, as shown in Fig. 6, this ring being connected to a supply pipe 12 leading from a suitable source of supply.

The outlet openings 8 in the troughs are preferably spaced evenly around the same and in each trough present collectively just sufficient area to permit the proper amount of liquid to flow through to the lower surfaces with the pressure due to a very slight collection of liquid in the trough, as may be determined by experiment.

These perforated troughs serve to collect and redistribute the liquid and insure a spreading of the same over the expanding vaporizing surface presented by the cone 2 from apex to base. They also slightly retard the flow of liquid over the cone and present an interruption to the downward continuity of the inclined vaporizing surface thereof.

In the present instance the vaporizer is electrically heated, the heating device comprising a number of segmental units, shown in detail in Figs. 4 and 5, each consisting of a suitable metallic tape 15 wound upon a pair of laterally separated insulating supports, 16 and 17, and covered by sheets 18 and 19, also of insulating material, such as mica, the terminals of the tape 15 being connected to binding posts 20 and 21. These units when assembled cover the interior surface of the conical shell 2, as shown in Figs. 2 and 3, and are supported in position by an inner conical shell 22, the coils being thus arranged collectively in conical formation. By this arrangement of the heating device the source of heat is placed as closely as possible to the surface to be heated.

Each of the heating units above described is connected in parallel to a common current

supply circuit, this being here effected by connecting the respective terminals of each unit to rings 25 and 26, located below the shell 2, by the connectors 27 and 28, the main feed and return wires leading to the rings 25 and 26, as will be understood. The base of the heater may be surrounded by a band 29 to protect these rings.

To prevent the liquid, when discharged upon the heated shell, from being thrown off in particles by the expansive action of the gas formed, I have shown the heating surface as covered by a thin layer 30 of absorbent material, such as asbestos, which has been found to prevent this "spitting" action while not interfering with the vaporizing action of the heater.

I do not claim this feature of providing the asbestos covering as being my invention, nor do I claim the particular construction of the heating units, *per se*, as my invention, except in so far as the general arrangement of electrical heating coils is concerned. It will also be understood that I do not limit myself to the use of any particular heating means.

To obtain a maximum efficiency from the vaporizer I preferably provide means whereby the liquid may be preheated by the heating device prior to discharge upon the vaporizing surface. To accomplish this the supply pipe 12 is connected to one end of a spirally conically coiled tube 35 secured to and adjacent the inner shell 22, the opposite end of this coil having connected thereto a feed pipe 36 leading from any suitable tank or other source of supply. I have indicated on this pipe a valve 37 whereby the flow of liquid may be controlled. The tube 35 may be secured in place by any suitable means, such as the straps 38 which clamp it upon the bars 39 attached to the inner shell 22.

As a convenient way of mounting the heater, a hook 40 is secured to the apex of the heater by a bolt 41 passing through a suitable opening at the top of the conical shells 2 and 22 and having a nut 42 threaded on its lower end, the bolt being preferably insulated from the body of the heater by insulation 43.

The operation of the vaporizer will, it is thought, be apparent from the foregoing description. The heating current is preferably turned on before starting the flow of liquid, and the flow of the latter gaged according to the predetermined vaporizing capacity for a given current. The continuously expanding vaporizing surface presented by the conical shell produces an extremely rapid evaporation of the liquid as it spreads thereover in its downward flow.

As will be apparent, this improved vaporizer is characterized by a simple and compact arrangement of parts designed to secure the maximum service and efficiency from the various elements thereof and that by reason of its ready application to remote locations it will be peculiarly suitable for use in generating a fire-extinguishing gas at any desired point, particularly at points not readily accessible with the ordinary extinguishers.

What I claim is:

1. A vaporizer comprising a conical shell presenting a surface expanding continuously from top to bottom thereof, means for delivering a liquid to the exterior surface of said shell, and means for heating said shell.

2. A vaporizer comprising a conical shell presenting a surface expanding continuously from top to bottom thereof, means for delivering a liquid to the exterior surface of said shell, and means for heating said shell, said means comprising electrical coils arranged in similar cone formation to the shell within the latter and in close proximity to the wall thereof.

3. A vaporizer comprising an annular shell, a feed pipe for delivering a liquid to the surface of said shell arranged in an annular coil spaced a distance inwardly from the wall thereof, and a heat generating device surrounding said coil.

4. A vaporizer comprising a conical shell, a feed pipe for delivering a liquid to the surface of said shell arranged in spiral formation a short distance inwardly of the wall thereof, and electrical heating coils arranged collectively in conical formation between said feed pipe coil and the wall of the shell.

5. A vaporizer comprising a conical shell presenting a vaporizing surface expanding continuously from top to bottom thereof, a number of horizontal troughs formed on said vaporizing surface, and means for heating said surface.

6. A vaporizer comprising a conical shell presenting a vaporizing surface expanding continuously from top to bottom thereof, one or more troughs extending across said vaporizing surface and interrupting the downward continuity thereof, and means for heating said surface.

Signed at city, county, and State of New York, this 25th day of March, 1918.

LUIS E. ECKELMANN.