G. REGONDI.

OIL VAPORIZER AND BURNER.

APPLICATION FILED NOV. 6, 1911.

1,053,874.

Patented Feb. 18, 1913.

2 SHEETS—SHEET 1.

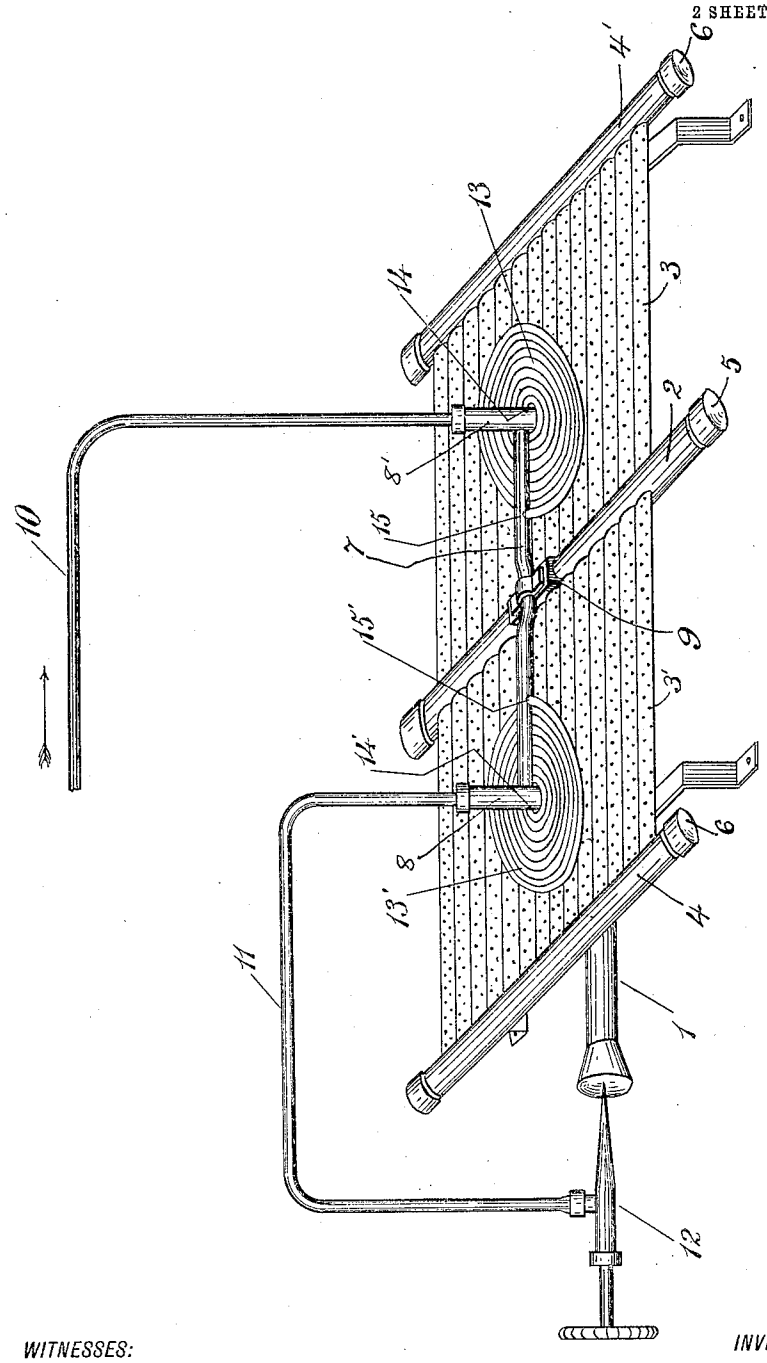


Fig. 1

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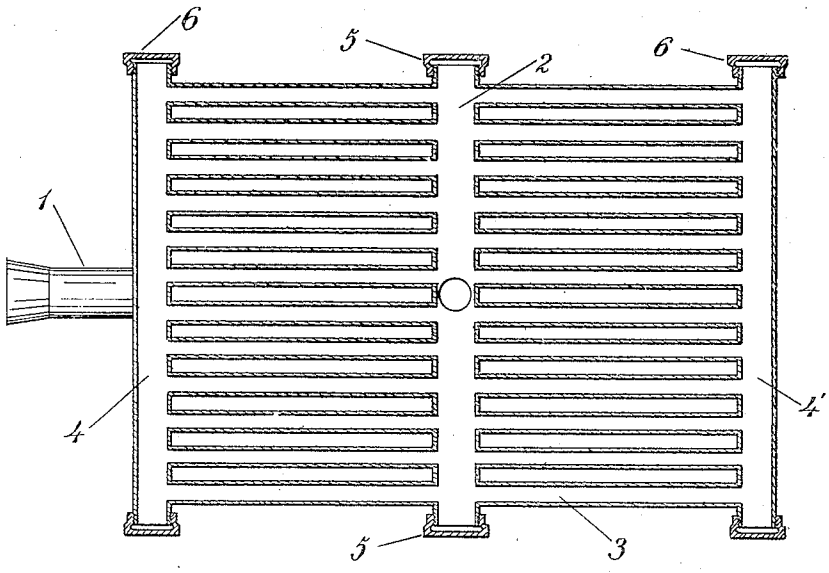


Fig. 2

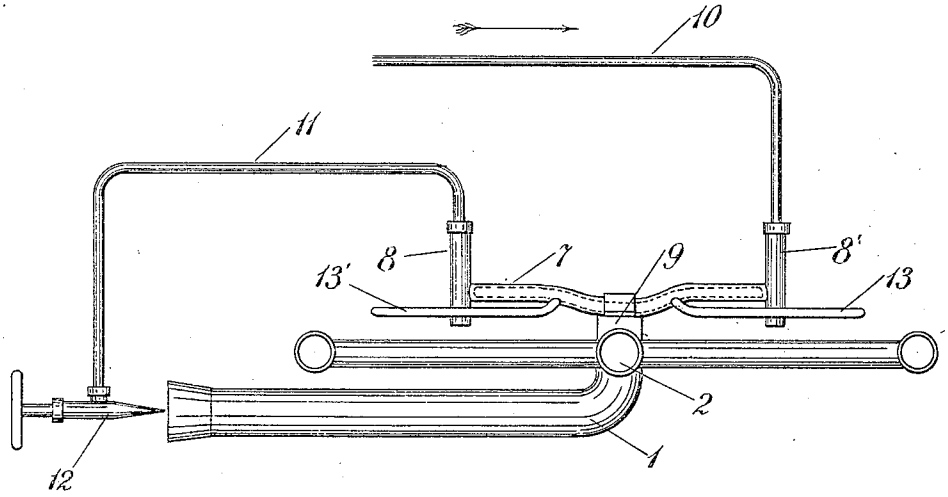


Fig. 3

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GIUSEPPE REGONDI, OF NEW YORK, N. Y.

OIL VAPORIZER AND BURNER.

1,053,874. Specification of Letters Patent. Patented Feb. 18, 1913.

Application filed November 6, 1911. Serial No. 658,908.

To all whom it may concern:

Be it known that I, GIUSEPPE REGONDI, a subject of the King of Italy, residing at New York, in the county and State of New York, have invented certain new and useful Improvements in Oil Vaporizers and Burners, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

This invention relates to apparatuses for burning oil, and especially to that class of oil burners where the oil is converted into vapor by means of heat, previous to burning; and has for its object to provide a burner of a simple construction where the heat or the flame produced by the burner itself, is utilized for heating the oil previous to burning.

A further object of this invention is to provide a disposition of a simple character, whereby the oil is forced to remain exposed for a certain length of time to the heat of the flame before being fed to the burner, thus insuring a thorough vaporization of the same without the need of any other auxiliary means, and insuring the production of a practically dry vapor under considerable pressure.

A still further object is to provide an improved construction of burner, whereby, the oil vapors fed into the same will be readily and simultaneously distributed through all the various parts of the burner, thus insuring an even intensity of flame at all points.

Oil burners of the type usually installed in steamships, locomotives, and for the operation of boilers of different kinds, are rather complicated in design, and are generally based on the mechanical atomization of the oil. This requires air or steam under considerable pressure, which is in itself a serious inconvenience; but the main source of the inconvenience to be found in these burners lies in their imperfect combustion; the combustible material not being completely burned, produces dirt and refuse which accumulates in the burner, plugging the holes, and sometimes entirely stopping its operation. When burning heavy crude oils especially, these burners prove most inefficient, and are liable to get plugged quite often; so much so, that the boiler installation is usually made much larger than necessary, in order to put a set of boilers into use while another set undergoes a thorough cleaning of the burners, and of the atomizing appliances.

In my improved device, the oil fed from a storage tank under a limited pressure, is compelled to travel in a coiled pipe of considerable length, which is exposed to the direct action of the flame, and it is thus heated and perfectly vaporized before reaching the burner. The oil vapor thus formed comes out absolutely dry, at a high pressure, and both these qualities insure a properly clean burner at all times.

Referring to the drawings, Figure 1 is a perspective view of my improved burner with regulating valve; Fig. 2 is a sectional plan view of the same, showing in detail its construction; and Fig. 3 is a side view in elevation, partly sectioned, of the same.

The apparatus is composed of a burner proper, a feeding and vaporizing coil, and a regulating valve. The burner is composed of an inlet pipe 1, leading to a distributing chamber 2, from which depart a number of tubes 3, provided with many small holes 3′ on top, distributed over all the surface of the burner. The drawings show two rows of tubes, one on each side of the chamber 2, the tubes of each row being connected at their free ends by an enlarged chamber or collector 4, 4′. At each end of central chamber 2 I provide a cover 5, removable, but which must be normally tightly fixed in place, to prevent the escape of vapors; and at each end of chambers 4, 4′, I provide a similar cover 6, for the same purpose, this disposition being most convenient for an occasional cleaning of the burner. The main advantage of this form of burner is the simultaneous distribution of the oil vapors to all the tubes, which insures an even intensity of flame at all points.

In the preferred form of construction of my device, to part 2 is clamped or otherwise attached a hollow part 7 by means of part 9; part 7 is provided at the two ends with two hollow uprights 8, 8′, not in direct communication with the inside of part 7; all these parts being substantially built, and made of a good heat conducting material. Upright 8′ is fitted with the feeding pipe 10, coming from the source of supply, and upright 8 is fitted with pipe 11, leading to the regulating valve 12, which opens right in front of inlet pipe 1. Part 7 is mounted, as shown, above burner, and the communication between uprights 8 and 8′ is estab-

lished by means of a flat coil 13 having a number of turns disposed around the center, and having its inner end attached to point 14 of upright 8′, and its outer end attached to point 15 of hollow part 7, and by means of a similar coil 13′ attached at 14′ to upright 8 and in 15′ to part 7. These coils 13, 13′ are held at a certain distance from the burner, so that the flame issuing from the latter can heat the former and the oil passing through them, in a most convenient manner; the flame gives a very powerful heat, and it is therefore advisable that coils 13, 13′ be made of a metal having good heat resisting qualities, such as copper, steel, etc.

Parts 7, 8, 8′, and 9, will contribute to keep coils 13, 13′ at a high temperature, the same being substantially built of a good heat conducting material for the purpose of storing heat.

Valve 12 can be of any suitable design, provided the same be capable of giving a good regulation.

The oil fed with a moderate pressure through pipe 10 to 8′, enters coil 13 at point 14, goes around all the turns of the same, then it enters the hollow space of part 7 at 15; at 15′ it enters coil 13, it goes around all the turns of the same, and at 14′ it enters hollow upright 8, and is led through pipe 11 to regulating valve 12. The vapor escapes from valve 12 at a considerable pressure in the direction of inlet pipe 1, through which it travels to chamber 2 to be distributed to all tubes 3, coming out from holes 3′, when it is ignited.

When the burner is in operation, the oil vapors in the piping will produce a back pressure, and it will then be necessary to increase the pressure of feeding to a point sufficient to counterbalance the same, and the frictional resistance opposed to the flow of oil.

To start the burner, it is necessary first to heat the coils and the part 7 sufficiently to produce an initial vaporization of the oil, and this can be done either by temporarily installing an alcohol burner underneath, or by feeding a combustible gas to the inlet pipe 1, through a separate source, or in any other suitable manner. Parts 7, 8, and 8′, not to be essentially of the shape shown; the same being substantially built of a good heat conducting material, will help in heating coils 13, 13′, and in maintaining the heat in the same.

I am aware that the vaporization of the oil previous to burning by means of the flame issuing from the burner itself, has been used in many types of burners; in some of these however, the mechanical arrangement is rather inefficient, with the consequence that the vaporization of heavy oils is only imperfectly obtained. This is sometimes due to the fact that the distribution of vapors in the burner takes place from one end to the other of the vapor passages. This disposition gives an intensity of flame always decreasing as the combustible gases progress through the passages, with the additional inconvenience that at a certain point the gases arrive with a lower speed and have a chance to cool and to partly condense thus producing dirt, plugging outlets, etc. For the perfect combustion of low grades of oils, I have found the disposition illustrated and described particularly well adapted, inasmuch the combustible vapors are fed at all points of the burner at practically the same time, producing an even height and intensity of flame at all points. Especial importance is attached to the fact that the vaporizing coil or coils used in connection with my present device, are held above the burner at a distance from the same. This gives free access to air underneath the coil, therefore permits the combustion of the oil vapors issuing from said part of the burner, to properly take place. Owing to this disposition, the vaporizing coil is at the same time exposed to the hottest part of the flames, and the vaporization induced in the same will therefore be more rapid and complete. The peculiar shape of the vaporizing coils is also partly responsible for the excellent results which can be obtained with my improved burner; in fact, the same being wound with several convolutions in the same plane, for a very long passage exposed to the heat of the flames, through which the coil has the possibility of being thoroughly vaporized. If the various convolutions are close one to the other, as shown in the drawing, there is the additional advantage that only part of the flames are concealed from direct action on the boiler, and that radiation of heat from the vaporizing coil is very much reduced.

My invention can be modified in many of its details without departing from the fundamental idea, governing the same; and I reserve myself the right to bring to my device such modifications and improvements which may properly enter under the scope of my claims.

Having thus described and ascertained the nature of my invention, what I claim as new, and desire to secure by Letters Patent of the United States is:

1. In an apparatus of the class described, in combination with a burner, a member provided with three hollow chambers mounted on the same, a feed pipe connected to one of said hollow chambers, a delivery pipe connected to another of said hollow chambers, and coiled vaporizing elements placed directly above said burner in a substantially parallel relation to the surface

of the same, connecting the remaining hollow chamber to each of the other two; substantially as described.

2. The combination of a burner, a hollow member mounted on said burner, and projecting above the same, comprising three hollow chambers, a feed pipe connected to one of the said chambers, a delivery pipe leading to said burner connected to another of said chambers, vaporizing coils wound in a plane substantially parallel to the surface of said burner connecting the remaining chamber with each of the other two, and a valve regulating the outflow of vapors issuing from said coils; substantially as described, and for the purposes as set forth.

GIUSEPPE REGONDI.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."