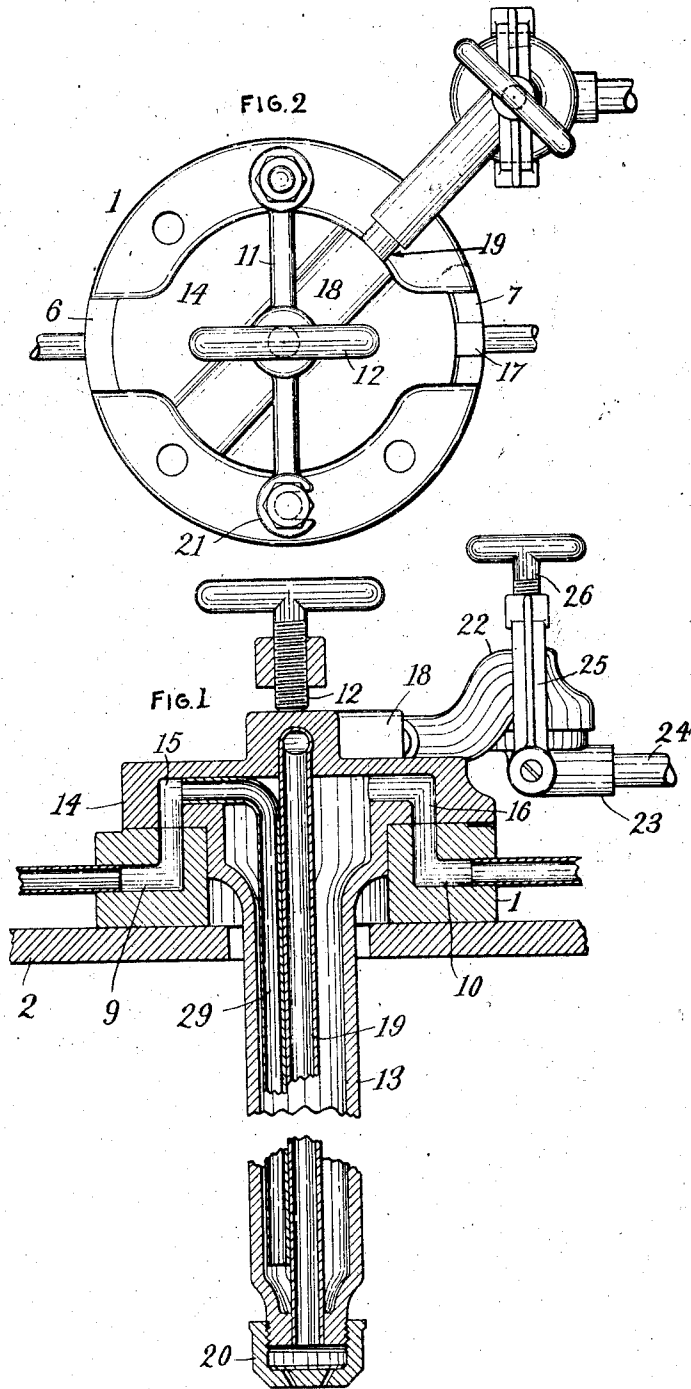


H. L. DOHERTY.  
 APPARATUS FOR SPRAYING LIQUIDS.  
 APPLICATION FILED JAN. 11, 1905.

901,597.

Patented Oct. 20, 1908.  
 2 SHEETS—SHEET 1.



Witnesses:

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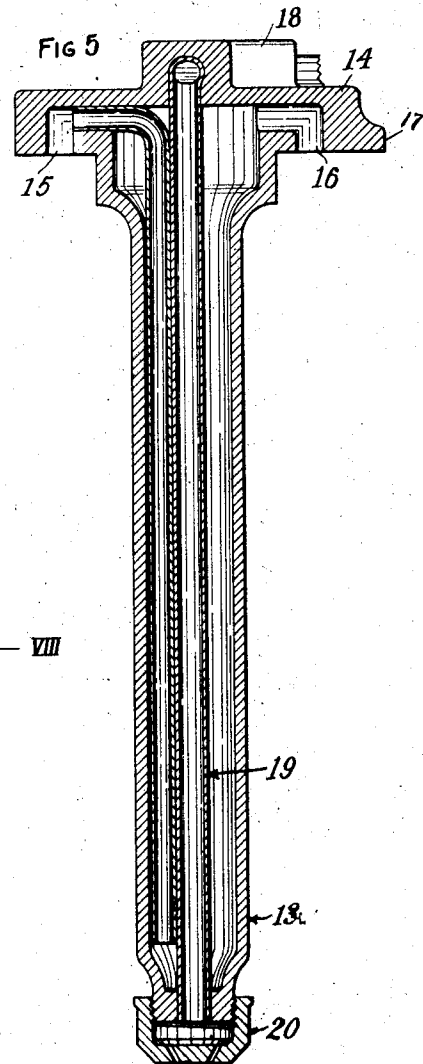
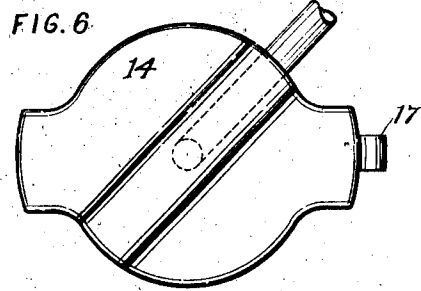
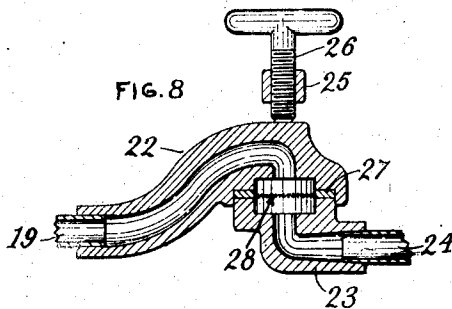
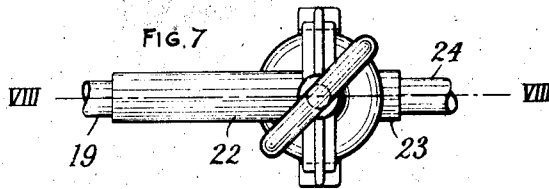
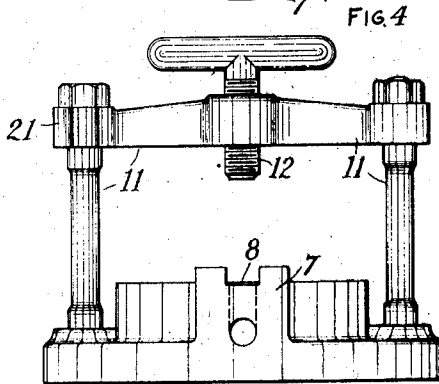
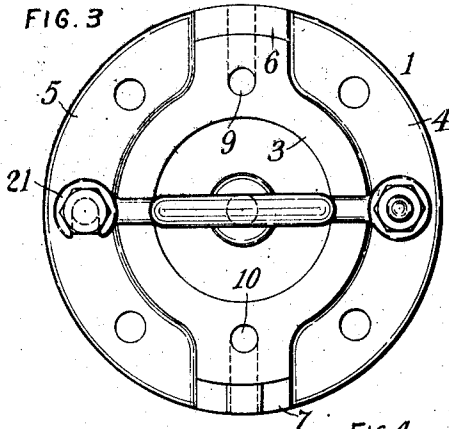
*Henry L. Doherty, Inventor*

*by Kerr, Page & Cooper Att.*

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Witnesses:  
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*S. S. Dunham*

*Henry L. Doherty, Inventor*  
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# UNITED STATES PATENT OFFICE

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## APPARATUS FOR SPRAYING LIQUIDS.

No. 901,597.

Specification of Letters Patent.

Patented Oct. 20, 1908.

Application filed January 11, 1905. Serial No. 240,540.

*To all whom it may concern:*

Be it known that I, HENRY L. DOHERTY, a citizen of the United States, residing at Madison, in the county of Dane and State of Wisconsin, have invented certain new and useful Improvements in Apparatus for Spraying Liquids, of which the following is a specification, reference being had to the drawing accompanying and forming part of the same.

My invention relates to the art of spraying or atomizing liquids, particularly for the purpose of spraying or atomizing fuel oils, and has for its object to provide a spraying apparatus which shall be highly efficient, yet simple and inexpensive in construction, and having its parts readily accessible for cleaning, repairs, etc.

To these and other ends the invention consists in the novel features, arrangements of parts, and combinations of elements herein-after described, and more particularly set forth in the claims.

The preferred embodiment of my invention is shown in the accompanying drawings, in which

Figure 1 is a vertical, central section. Fig. 2 is a plan view. Fig. 3 is a plan view of the device which carries the spraying apparatus. Fig. 4 is a side elevation of the same. Fig. 5 is a central, vertical section of the spraying devices. Fig. 6 is a plan view of the same. Fig. 7 is a plan view of the union used to connect the liquid supply with the spraying devices. Fig. 8 is a section on line VIII—VIII, of Fig. 7.

The apparatus consists generally of two parts, namely, a spraying nozzle adapted to be introduced into a furnace or other chamber in which the spray is to be utilized, and a device for securing the former in operative position.

The latter in its preferred form consists of a carrying ring 1, bolted or otherwise fastened over an aperture in the wall of the furnace or other chamber, 2. Around the center of the ring is formed a seat 3, having upstanding ribs 4, 5, on either side, connected by narrower flanges 6, 7, the latter of which is notched, as shown at 8, Fig. 4. Extending from the periphery of the carrying ring to the seat 3, at points located between the ends of the ribs 4, 5, are passages 9, 10, for a purpose to be explained hereinafter. Across the carrying ring is a yoke 11, having a clamping screw 12.

The spraying devices embrace a tubular member 13, integral with or secured to a chambered plate 14, which fits the seat 3 of the carrying ring 1. In the plate 14 are passages 15, 16, so located as to register with the passages 9, 10, respectively, in the carrying ring, when the plate is seated in the latter. In order to insure that the proper passages register when assembling the apparatus, one end of the plate is provided with a lug or projection 17, which fits into the notch 8.

On the chambered plate 14 is a rib 18, through which extends a liquid supply pipe 19, reaching down through the tubular member 13 to the end of the same, as shown in Figs. 1 and 5. On the latter is a spray cap 20, of any suitable form, and having two or more inclined discharge passages located in any suitable position. The liquid issues from the cap in fine streams, which impinge on each other and are thereby dissipated in the form of a mist, as will be readily understood.

In assembling the apparatus the top piece of the yoke 11 is swung, to one side, such movement being permitted by the slotted end 21. The tubular member 13 is thrust through the aperture in the carrying ring, into the chamber in which the spray is to be utilized, and the plate 14 is properly arranged on the seat 3, after which the yoke 11 is brought back into position and the clamp 12 turned down to press the plate 14 firmly on its seat. The pipe 19 is then connected in any suitable way with the liquid supply, and the apparatus is ready for use.

For the purpose of so connecting the pipe 19 I prefer to use a coupling or union of novel form, shown in detail in Figs. 7 and 8. It consists of a member 22, attached to the pipe 19, and a member 23, connected with the liquid supply by a pipe 24. The two members are provided with seating faces, and for the purpose of detachably clamping the two together, one or the other, as for example the lower member, 23, is provided with a pivoted yoke 25, carrying a clamping screw 26, adapted to engage the other member and force the two firmly together. If desired a gasket, as 27, may be interposed between the seating faces of the union members. A screen 28, of wire gauze, or other suitable material, may also be similarly located, for the purpose of intercepting solid matter suspended in the liquid, to prevent

the same from reaching and possibly choking up any of the discharge orifices in the spray cap 20. The pipe 24 may be a flexible tube, so that the spray nozzle 13 may be withdrawn from its operative position, for cleaning or other purposes, merely by unjointing the plate 14 and carrying member 1, the tube 24 being sufficiently yielding to permit such withdrawal. The flexible tube 24 also permits the members of the coupling to be separated without disarranging the spraying apparatus.

In using the apparatus for spraying fuel oils into a furnace it sometimes happens that the oil "carbonizes" in the cap 20 or pipe 19. Also, when the oil is cut off the heat of the furnace may burn the spray cap or other parts. To overcome these possible disadvantages a cooling agent may be circulated through the tubular member 13. The cooling agent enters through the passages 9 and 15, and is conducted to the end of the nozzle 13 by a pipe 29, from whence it issues into the annular space around the supply pipe 19, passing back through the said annular space it absorbs heat from the adjacent parts and finally leaves the apparatus through the passages 16 and 10.

It will be noted that the pipe 29, is arranged closely adjacent the pipe 19, throughout substantially the entire length thereof, so that the latter pipe is cooled to a considerable degree. The pipe 29, is also arranged out of contact with the tubular member 13, so as not to be heated from the latter, and so that a column or film of the cooling liquid exists between said pipe 29 and the inner wall of said member.

From the foregoing it will be seen that my invention provides a simple apparatus for spraying liquids, and that the same is adapted for use in a great variety of ways. Extensive practical use has demonstrated its high efficiency. The form herein specifically described is the preferred embodiment, but the same may be varied almost indefinitely without departure from the proper scope of my invention.

What I claim is:

1. The combination with a chamber wall having an aperture therethrough, of an apertured carrying plate secured on said wall with the apertures in register, a spray nozzle separable from the carrying plate extending through the apertures into the chamber and having a lateral flange resting on the carrying member around the aperture therein, said plate and flange being provided with communicating ports forming a passage-way from the exterior of the carrying plate to the interior of the nozzle, a yoke carried by the carrying plate, and a clamping device carried by the yoke to secure the nozzle removably in place, as set forth.

2. The combination with a chamber-wall

having an aperture therethrough, of an apertured carrying plate secured to the wall with the apertures in register and provided with two ports or passages, a spray nozzle extending through the apertures into the chamber and having a lateral flange resting on the carrying plate, said flange being provided with ports or passages registering with the first named passages, both of said passages through the flange being in communication with the interior of the nozzle, and means for removably securing the nozzle in the carrying plate.

3. The combination of a carrying plate having a central aperture extending there-through, and two ports, or passages, leading from its periphery to its outer face, a spray nozzle extending through the aperture and having a lateral flange abutting against said face of the carrying plate, said flange being provided with two ports, or passages, registering with the ports in the carrying plate, one of said passages in the flange being in direct communication with the rear end of the nozzle, and a pipe in communication at one end with the other of said passages in the flange and at its opposite end with the interior of the nozzle adjacent the discharge end of the latter.

4. The combination with a tubular member, a spray cap carried thereby and a liquid supply pipe extending through the tubular member to the spray cap, of means for circulating a cooling agent within the tubular member and around the liquid supply pipe including a pipe arranged within the tubular member having its discharge end located adjacent the forward end of said chamber, said pipe for introducing the cooling agent being disposed adjacent to the liquid supply pipe, and out of contact with the tubular member.

5. The combination with an apertured carrying member, having a seating face around the aperture therein and having passages in the body of the said member extending to the seating face, of a tubular member extending through said carrying member and provided with a lateral flange bearing on said seating face, the flange being provided with passages registering with the passages in the carrying member, a pipe inside the tubular member, extending from one of the said passages and discharging inside the said member adjacent to its outer end, the other of said passages being in communication with the interior of the tubular member, a spray cap on the tubular member, and a liquid supply pipe extending through the tubular member to the spray cap, as set forth.

6. The combination with an apertured carrying member, having a seating face around the aperture therein and having passages extending through the body of the said

member to the seating face, of a tubular member having a flange provided with passages in communication with the inside of the tubular member and registering with the passages in the carrying member, a spray cap on the tubular member, and a liquid supply pipe extending through the tubular member to the spray cap, as set forth.

7. In combination, a spray nozzle comprising, a tubular member having a flange at one end, said flange being provided with two ports opening out through the lower side of the flange and in communication at their inner ends with the interior of the tubular member, a supply pipe extending through the tubular member and a spray cap mounted on the tubular member and in communication with the supply pipe, and an apertured carrying member having a seating face for the flange of the nozzle, said carrying member being provided with two ports each leading from said seating face to the periphery of the member and registering respectively with the openings into the first named ports, at the bottom of the flange of the spray nozzle.

8. In combination, a spray nozzle comprising a barrel and flanged head, a supply pipe extending axially of the barrel, a passage through the head in communication with one end of said pipe, the forward end of the barrel being closed about the pipe, a spray cap mounted on the last named end of the barrel, ports in the flange of the head each having parts disposed radially and transversely in reference to the flange and opening out respectively into the interior of the barrel and the bottom of the flange, and a carrier plate adapted to be interposed between the bottom of the flange and the wall of the chamber into which the nozzle extends, said carrier plate having a seat for the flange and being provided with ports leading out through its periphery and registering with the ports in said flange, and means for holding the nozzle within the carrier plate.

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Witnesses:

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