

E. H. PEABODY.
 ATOMIZER OR SPRAYING DEVICE.
 APPLICATION FILED MAY 20, 1909.

1,007,794.

Patented Nov. 7, 1911.

Fig. 2

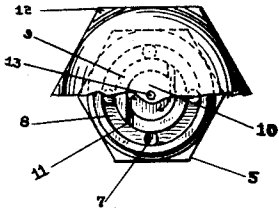


Fig. 5

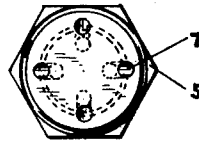


Fig. 1

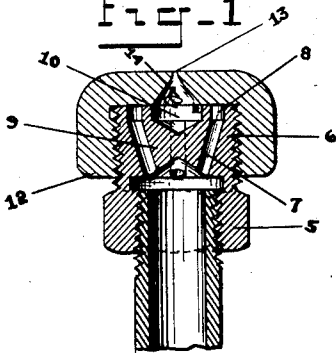


Fig. 3

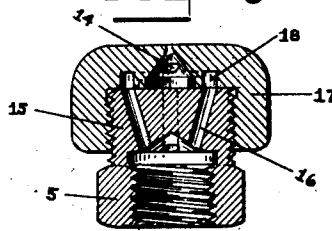


Fig. 4

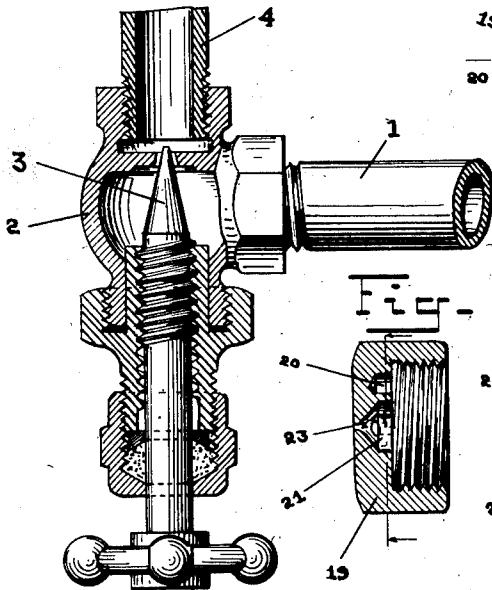
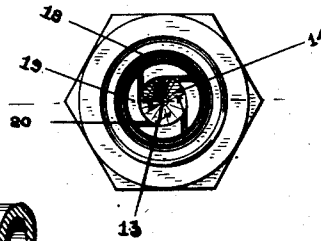


Fig. 6

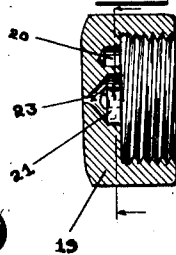
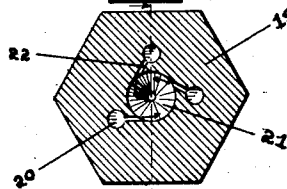


Fig. 7



WITNESSES

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ERNEST H. PEABODY, OF NEW YORK, N. Y., ASSIGNOR TO THE BABCOCK & WILCOX COMPANY, OF BAYONNE, NEW JERSEY, A CORPORATION OF NEW JERSEY.

ATOMIZER OR SPRAYING DEVICE.

1,007,794.

Specification of Letters Patent.

Patented Nov. 7, 1911.

Application filed May 20, 1909. Serial No. 497,283.

To all whom it may concern:

Be it known that I, ERNEST H. PEABODY, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, county and State of New York, have invented a new and useful Improvement in Atomizers or Spraying Devices, of which the following is a description, reference being made to the accompanying drawings, which are a part of this specification.

This invention relates particularly to improvements in atomizers used for spraying fuel oil, whereby the oil is atomized and injected into the combustion chamber of a furnace, in the form of spray, by means of mechanical action induced by pressure.

The principal feature of the invention is a nozzle or body portion, the tip containing a discharge orifice which, in combination, form an annular channel to which oil is delivered, and from which it is passed through suitable channels tangentially to the discharge orifice, thus imparting to the issuing liquid a whirling motion by which it is atomized.

Referring to the accompanying drawings, Figure 1 is a view of the complete atomizer shown partly in section. Fig. 2 is an end view, a portion of the tip being cut away to show the end of the nozzle to which it is attached, the annular channel in this instance being formed on the face of the nozzle. Fig. 3 is a section through the nozzle and tip, showing a modification in which the annular channel is formed in the tip. Fig. 4 is a view of the tip showing said annular and tangential channels in plan view. Fig. 5 is an end view showing the nozzle with the ports or passages for delivering the oil to the annular channel; and Figs. 6 and 7 are longitudinal and transverse sections, respectively, of a modified form of tip which may be used with the nozzles of either Fig. 1 or Fig. 3.

Referring to Figs. 1 and 2, the numeral 1 designates an oil supply pipe secured to the body 2 of a needle valve 3. Also secured to said valve is a pipe 4 into which the oil is delivered through the valve. The other end of pipe 4 is threaded to screw into a nozzle 5 properly threaded to receive the same. The outer end of the nozzle consists of substantially a plug 6 having passages 7 therein, said plug being machined out to provide a

central core 9. In the face of this core is formed a central chamber 10 and through the wall of this chamber are cut channels 11 connecting said chamber with the annular channel 8. The channels 11 are tangential to the wall of chamber 10, as shown in Fig. 2. The outer end of the nozzle is threaded to receive a tip 12 having a small discharge orifice 13 communicating with the conical chamber 14, the base of which is of substantially the same diameter as that of chamber 10. In this form of my invention the liquid is delivered through the passages 7 to the annular channel and from said channel it passes through the channels 11 which deliver it tangentially to the chamber 10, at the same time imparting to the liquid a whirling motion. From thence the liquid issues through the discharge orifice 13 and is injected into the combustion chamber in the form of spray.

Instead of locating the tangential channels in the nozzle 5, I may place them in the tip, as shown in Figs. 3 and 4. In this form the nozzle 5 at its outer end consists of a plug 15 having passages 16 therethrough. The inner side of tip 17 is machined to provide an annular channel 18 and in the wall 19 thus left between said channel and the central conical chamber 14, are cut channels 20 which are tangential to the latter chamber. The channel 18 registers with the passages 16 in the nozzle so that the liquid is delivered through said passages to the annular channel 18 and thence into the conical chamber 14 of the tip.

In Figs. 6 and 7 I have shown a modified form of tip designed primarily to be used in conjunction with the nozzle shown in Fig. 1. In this form the tip 19 is screwed on to the nozzle 5 provided with the openings 7 which deliver the oil to the annular channel 8, and said annular channel delivers oil to one or more holes or chambers 20 formed in the tip and so located therein as to register with the annular channel 8. These chambers 20 connect with the central chamber 21 by means of channels 22 which deliver the oil tangentially to said chamber wherein it is given a whirling motion and issues from the orifice 23 in the form of spray. In such case the tangential channels 11 of Figs. 1 and 2 will be omitted. The tip 19 may be used in connection with the nozzle 5, shown in Fig. 3, provided the open-

ings 16 in said nozzle correspond in number and location to the chambers 20 in the tip.

The nozzle and tip in the two forms above described may be said to be complementary in that when assembled they provide between them means whereby the liquid is delivered from the nozzle to the central chamber of the tip in the desired manner, and this may be accomplished by locating the tangential channels either in the nozzle or in the tip.

In atomizers of the type described, in which the liquid is atomized through centrifugal force imparted to the liquid before it is discharged, it is essential in order to obtain the maximum atomizing effect, to impart to the liquid the maximum possible whirling motion and maintain same with undiminished force until the liquid issues from the discharge orifice. This maximum whirling effect is imparted to the liquid by delivering it tangentially to the chamber immediately connecting with the discharge orifice, and it is essential that the liquid be discharged immediately thereafter to prevent diminution in the whirling effect through friction. Furthermore, the atomizer must be of simple and cheap construction, easily removable and capable of rapid alteration to meet the fluctuating requirements necessitated by use of liquids of different specific gravity and viscosity. This is obtained in the device described above by delivering the liquid to the annular chamber immediately surrounding the tip chamber connecting with the discharge orifice, and, communicating with said latter chamber by channels arranged to deliver the liquid tangentially as above described, both tip and nozzle being easily detachable and interchangeable with ports having channels of different size.

While I have described the channels 11 and 20 as tangential to the walls of the chambers 10 and 14 respectively, I desire to include any degree of eccentricity of said channels which will give to the liquid a whirling motion.

By locating the annular chamber and eccentric channels or ducts in one piece, the construction is greatly simplified and cheapened, and requires little machining.

In a companion application filed May 20, 1909, Serial No. 497,282, I have shown and described a three-part spraying device, and have confined the claims in that case to the specific structure.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In a spraying device in combination, a nozzle having passages therein, a tip secured thereto having a chamber and a discharge orifice, one of said members having formed in the body thereof an annular channel com-

municating with said passages, and channels or ducts leading from said annular channel tangentially to the tip chamber to impart to the issuing liquid a whirling motion by which it is atomized.

2. In a spraying device in combination, a nozzle having passages therein, a tip secured to said nozzle and having a discharge orifice, one of said members having an annular channel and a central chamber formed in the body thereof, a wall between said channel and chamber, and ducts in the wall leading from said annular channel tangentially to said central chamber to impart to the issuing liquid a whirling motion by which it is atomized.

3. In a spraying device in combination, a supply pipe, a nozzle having internal means of attachment to said pipe, a tip having a chamber formed in the body thereof and a discharge orifice and internal means of attachment to said nozzle, said nozzle having passages leading to the face thereof, and one of said members having passages or ducts communicating with said passages and leading tangentially to said tip chamber.

4. In a spraying device in combination, a nozzle having passages therein, a tip having a chamber and a discharge orifice and seated on the face of the nozzle, and one of said members having tangentially disposed ducts formed in the body thereof and leading to said chamber tangentially and communicating with said nozzle passages, and a supply pipe to which said nozzle is directly connected.

5. In a spraying device in combination, a nozzle having passages therein, a tip having a channel located so as to register with said passages, a central chamber in said tip, a wall between said chamber and channel, and ducts in said wall tangential to said central chamber.

6. In a spraying device in combination, a nozzle having passages therein, a tip secured to said nozzle having a discharge orifice, said tip having an annular channel registering with said passages and a central chamber, a wall between said channel and chamber, and ducts in the wall tangential to said central chamber.

7. In a spraying device in combination, a nozzle having passages extending to the face thereof, a tip having internal means of attachment to said nozzle and adapted to be seated on the face thereof, an annular channel in said tip communicating with said passages, said tip having a central chamber, a wall between said channel and chamber, and ducts in said wall tangential to said central chamber.

8. In a spraying device, in combination, a nozzle having passages therein, a tip having a central chamber and a discharge orifice, and ducts in said tip communicating

with said passages and leading eccentrically to the tip chamber to impart to the issuing liquid a whirling motion by which it is atomized.

- 5 9. In a spraying device, in combination, a liquid supply pipe, a nozzle directly secured to said pipe, a tip directly secured to the nozzle, said nozzle having passages to deliver liquid to said tip and said tip having
10 a chamber and a discharge orifice and eccentrically disposed ducts communicating with

said passages and leading to the tip chamber, whereby there is imparted to the issuing liquid a whirling motion by which it is atomized.

In testimony whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

ERNEST H. PEABODY.

Witnesses:

FRANK E. RAFFMAN,
OSCAR ASCHER.

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