

K. M. DAHL.
AIR REGULATING DEVICE FOR OIL BURNING FURNACES.
APPLICATION FILED JUNE 19, 1911.

1,009,723.

Patented Nov. 28, 1911.

2 SHEETS—SHEET 1.

Fig. 2.

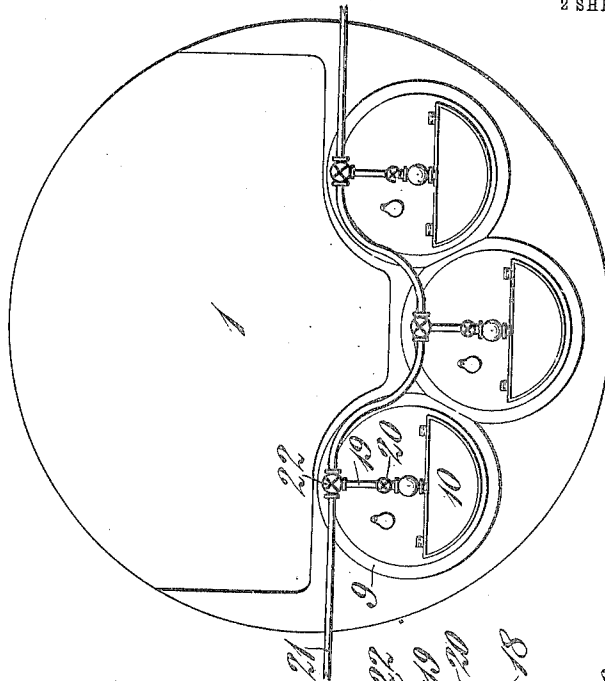
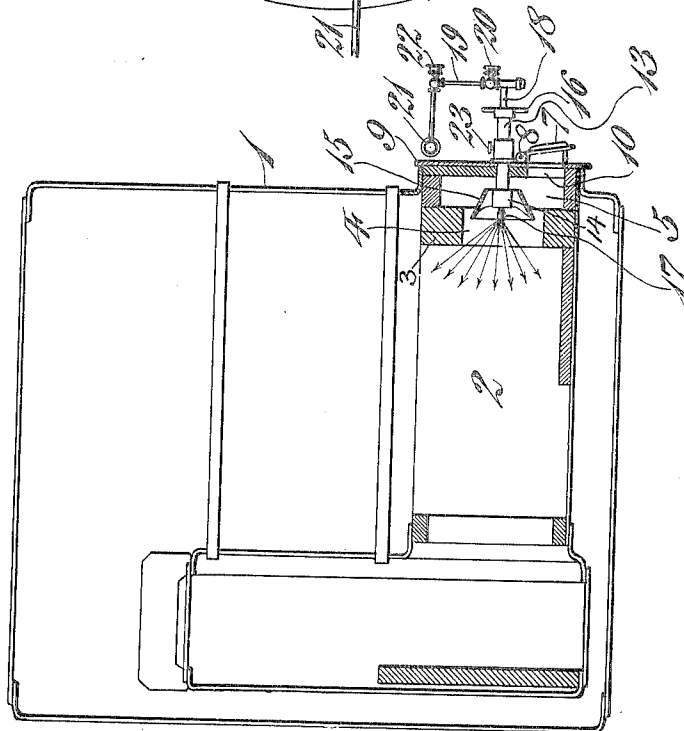


Fig. 1.



WITNESSES

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INVENTOR

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BY Wiedersheim & Gaudant

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2 SHEETS-SHEET 2.

Fig. 3.

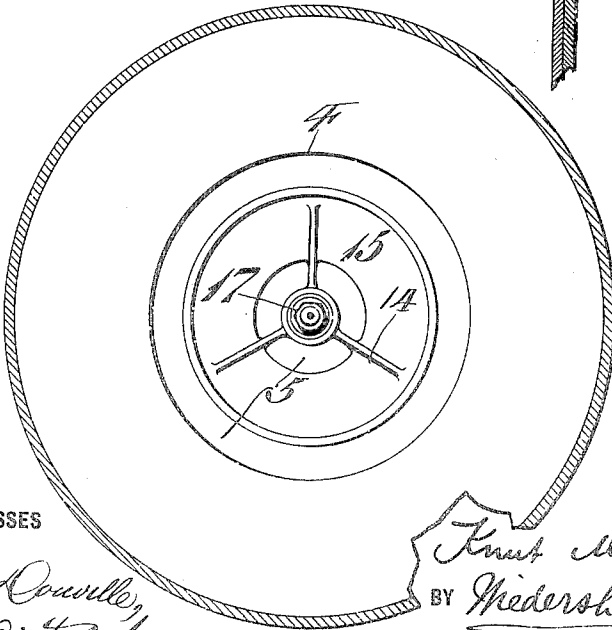
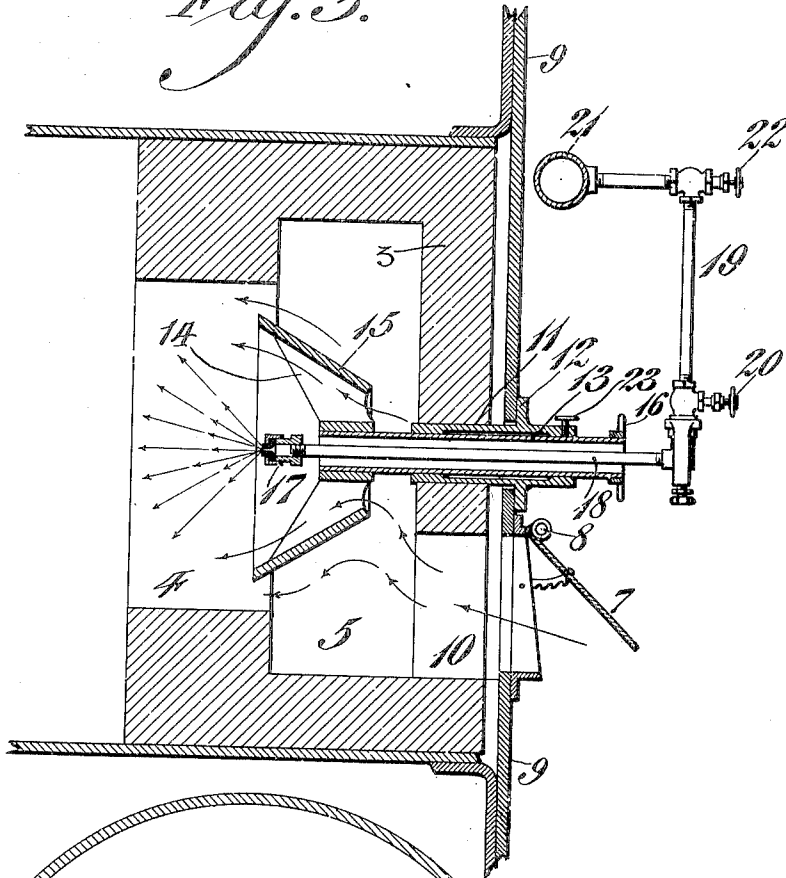


Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

KNUT M. DAHL, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO UNION IRON WORKS CO., OF SAN FRANCISCO, CALIFORNIA, A CORPORATION OF CALIFORNIA.

AIR-REGULATING DEVICE FOR OIL-BURNING FURNACES.

1,009,723.

Specification of Letters Patent. Patented Nov. 28, 1911.

Application filed June 19, 1911. Serial No. 634,038.

To all whom it may concern:

Be it known that I, KNUT M. DAHL, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented a new and useful Air-Regulating Device for Oil-Burning Furnaces, of which the following is a specification.

My present invention relates to air regulating devices for oil burning furnaces, and in conjunction with the same I prefer to show, for purposes of illustration, a novel type of fuel atomizer such as is described and broadly claimed in my copending application Serial No. 632,711 filed June 12th, 1911, although as will be apparent, my invention is not limited to use in conjunction with such a type of atomizer or burner, but may be employed to advantage in conjunction with any desired type of burner or fuel atomizer.

My invention in its broad and generic scope consists of novel means for guiding the air for combustion into proximity to the atomized fuel, and for controlling the volume of such air.

It further consists of a novel air regulating device for oil burning furnaces wherein provision is made for accurately regulating and directing the air entering the furnaces for combustion, it being understood that any desired number of burners and air regulating means may be employed.

It further consists of a novel construction of an air regulating device for oil burning furnaces wherein a novel construction of a cone damper is employed which is mounted in a novel manner and provided with novel means for adjusting the position of the same with respect to the burner, and novel means for locking the cone in its adjusted position.

It further consists of other novel features of construction all as will be hereinafter fully set forth.

For the purpose of illustrating my invention I have shown in the accompanying drawings a preferred embodiment thereof which has been found in practice to give satisfactory results, although it is of course to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and

that my invention is not limited to the exact arrangement and organization of these instrumentalities as herein set forth.

Figure 1 represents a side elevation partly in section of one type of a furnace in conjunction with which my novel air regulating mechanism may be advantageously employed. Fig. 2 represents a front elevation of Fig. 1. Fig. 3 represents a sectional elevation on an enlarged scale showing more clearly the construction of my novel mechanism. Fig. 4 represents a sectional elevation of Fig. 3.

Similar numerals of reference indicate corresponding parts in the figures.

Referring to the drawings:—1 designates a furnace of any conventional or desired type and, in the present instance, for purposes of illustration, I have shown the same as a well known Scotch boiler, said furnace being provided with a combustion chamber 2 having a wall 3 provided with a restricted inlet passage 4, forming a mixing or mingling chamber in rear of which is located a preheating chamber 5, the same being preferably of greater diameter than the mixing chamber 4.

7 designates a damper which is pivoted at 8 to the fire front 9 and controls admission of air through the air inlet 10 to the preheating chamber 5. The damper or door 7 may be controlled in any desired manner either manually or automatically depending upon the requirements and conditions met with in practice, and if the same is automatically controlled, any conventional or desired type of controlling mechanism may be employed.

11 designates a thimble or sleeve which passes through and is secured in the front wall of the furnace and is provided with the flange 12 contacting with the fire front 9.

13 designates a pipe or sleeve which is slidably mounted within the thimble or sleeve 11 and at its forward end it is provided with a spider 14 which is secured to a cone shaped damper 15, it being best seen in Fig. 3 that the sleeve 13 is provided with an operating handle 16 whereby the cone may be longitudinally adjusted relatively to a burner or fuel atomizer 17 which latter is mounted on a conduit 18 extending

through the sleeve 13. The conduit 18 is connected with a fuel conduit 19 provided with a suitable controlling valve 20, said conduit 19 being connected with the main fuel conduit 21, a suitable valve 22 being provided, if desired. The relative position of the cone damper 15 with respect to the fuel atomizer or burner 17 may be fixed by actuating the screw 23 which is mounted in the thimble 11 and engages the sleeve 13.

It will be readily apparent that the air entering the furnace for combustion through the inlet 10 and into the preheating chamber 5 will pass not only around the cone damper 15, but also therethrough, as indicated by the arrows, and by longitudinally adjusting the position of the cone damper 15 with respect to the liquid atomizer 17 the volume of air passing through the cone 15 into proximity to the burner may be regulated as desired.

I have deemed it unnecessary to describe in detail the construction and operation of the atomizer 17 since the same corresponds to that disclosed in my copending application, and since I make herein no claim to the same *per se*. In the type of burner illustrated, the fuel is atomized by the pressure of the liquid so that the liquid passes from the burner or atomizer 17 in the form of a fine spray.

Special attention is directed to the means for guiding or directing the air into proximity to the fuel atomizer 17, the construction illustrating one manner of accomplishing this being the cone shaped damper 15. If the handle 16 is actuated to move the sleeve 13 rearwardly then the cone 15 will move rearwardly thereby decreasing the volume of air passing through the cone. If however the handle 16 is actuated to move the sleeve 13 forwardly then the cone 15 will be moved forwardly and inwardly so that a greater volume of air will pass through the cone 15 in proximity to the fuel atomizer 17, the result of which is evident. It is also to be noted that the cone 15 also serves as a deflector for the air entering the furnace for combustion, so that not only is the proper amount of air admitted to the furnace, but the air is directed in such a manner that the proper combustible mixture is produced at all times, and the requisite amount of air relatively to the amount of fuel is maintained under working conditions.

It will be apparent that the air may also pass around the conduit 18 through the sleeve 13 and in the present instance I have shown such admission of air as uncontrolled.

I am aware that it has been heretofore proposed to provide a conical deflector having a discharge nozzle located wholly outside of the furnace and the outer smaller end of said deflector, but my present invention is differentiated therefrom, since I lo-

cate my novel construction of atomizer preferably within the damper or deflector and near the larger portion thereof, and I also provide means for effecting a double supply of oxygen to my atomizer, one supply being conducted to the atomizer in alignment therewith and another supply of oxygen being conducted to the outer and inner portions of my damper or deflector as well.

I am also aware of the patent to Korting, No. 800,219, of September 26th, 1905, wherein a stationary conical deflector is employed having its smaller end open to the combustion chamber but my invention is differentiated therefrom, since I employ an adjustable conical deflector or damper, having its larger end open to the combustion chamber and I also employ an annular draft passage which conducts oxygen direct to the atomizer in substantial alignment therewith and I also employ an auxiliary damper controlled passage for conducting an additional supply of oxygen to an enlarged preheating chamber and to the outer and inner portions of said deflector damper, which are novel features not disclosed in the prior art and to none of the prior art constructions do I herein make my claim.

It will now be apparent that I have devised a novel and useful construction of an air regulating device for oil burning furnaces which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description.

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

1. In a device of the character stated, a furnace having a mixing chamber and an air chamber in rear thereof of greater diameter, a fuel atomizer discharging into the mixing chamber, means for feeding fuel to said atomizer, a hollow cone shaped damper having its end of greater diameter presented to said mixing chamber and its rear end communicating with the air chamber, the rear end of said damper being capable of movement in rear of the discharge end of the atomizer, means for feeding air to said chamber and means for adjusting said damper relatively to said atomizer.

2. In a device of the character stated, a furnace having a mixing chamber and an air chamber in rear thereof of greater diameter, a fuel atomizer discharging into the mixing chamber, means for feeding fuel to said atomizer, a hollow cone shaped damper having its end of greater diameter presented to said mixing chamber and its rear end communicating with the air chamber, the greatest diameter of said damper being less than the diameter of said mixing chamber, the rear end of said damper being adapted to travel in rear of the discharge end of said

atomizer, means for feeding air to said chamber and means for adjusting said damper relatively to said atomizer.

3. In a device of the character stated, a furnace having a mixing chamber and an air preheating chamber leading thereto, an inlet for said preheating chamber, a door controlling admission of air to said inlet, a fuel atomizer discharging into said mixing chamber, a pipe for feeding fuel to said atomizer, a sleeve surrounding said pipe and having one end open to the atmosphere and the other end communicating with said mixing chamber, a cone shaped hollow damper mounted on said sleeve and having its rear end communicating with said preheating chamber, and means for adjusting said sleeve to vary the volume of air passing through said damper.

4. In a device of the character stated, a furnace having a mixing chamber and an air preheating chamber leading thereto, an inlet for said preheating chamber, a door controlling admission of air to said inlet, a fuel atomizer discharging into said mixing chamber, a pipe for feeding fuel to said atomizer, a sleeve surrounding said pipe and having one end open to the atmosphere and the other end communicating with said mixing chamber, a cone shaped hollow damper mounted on said sleeve and having its rear end communicating with said preheating chamber, means for adjusting said sleeve to vary the volume of air passing through said damper, and means for fixing said sleeve in adjusted position.

5. In a device of the character stated, a furnace having an outer wall, a mixing chamber therein, and an air preheating chamber leading to said mixing chamber, a fuel atomizer discharging into said mixing chamber, a supply pipe for said atomizer extended through said furnace wall, an adjustable sleeve surrounding said supply pipe and supported in said wall, and a damper having flaring walls mounted on the inner portion of said sleeve and movable in unison therewith, said damper having its end of greater diameter presented to said mixing chamber.

6. In a device of the character stated, a furnace having an outer wall, a mixing chamber therein, an air preheating chamber of greater area in the rear of said mixing chamber and having a damper controlled air inlet leading thereto, a stationary thimble secured in said furnace wall, a movable sleeve mounted in said thimble, a damper having diverging walls mounted on said

movable sleeve, the greatest diameter of said damper being presented to said mixing chamber and an atomizer supported within said damper.

7. In a device of the character stated, a furnace having an outer wall, a mixing chamber therein, a stationary thimble secured in said outer wall, a movable sleeve mounted in said thimble, and a flaring damper mounted on the inner portion of said sleeve, said damper being located within said furnace wall and having its end of largest diameter presented to said mixing chamber, and terminating in proximity thereto.

8. In a device of the character stated, a furnace having an outer wall, a mixing chamber therein, an air preheating chamber intermediate said outer wall and said mixing chamber, a stationary thimble secured in said outer wall, a movable sleeve mounted in said thimble, means for locking said sleeve in adjusted position, a flaring damper mounted on the inner portion of said sleeve and located in said mixing chamber, a supply pipe leading through said sleeve and an atomizer mounted on the inner end of said supply pipe and contained within the said damper.

9. In a device of the character stated, a furnace having an outer wall, a mixing chamber therein, an air preheating chamber intermediate said outer wall and said mixing chamber, a stationary thimble secured in said outer wall, a movable sleeve mounted in said thimble, means for locking said sleeve in adjusted position, a flaring damper mounted on the inner portion of said sleeve and located in said mixing chamber, a supply pipe leading through said sleeve and an atomizer mounted on the inner end of said supply pipe and contained within the said damper, in combination with an inlet for said preheating chamber, and a damper for controlling said inlet.

10. In a device of the character stated, a furnace wall having a thimble secured therein, a sliding sleeve adjustably mounted in said thimble, a flaring damper mounted on the inner extremity of said sleeve, a supply pipe for the hydrocarbon located in said sleeve, an atomizer mounted on the end of said supply pipe within said damper, and an auxiliary air inlet for conveying an additional supply of oxygen to said atomizer.

KNUT M. DAHL.

Witnesses:

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