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SPRAY BURNER

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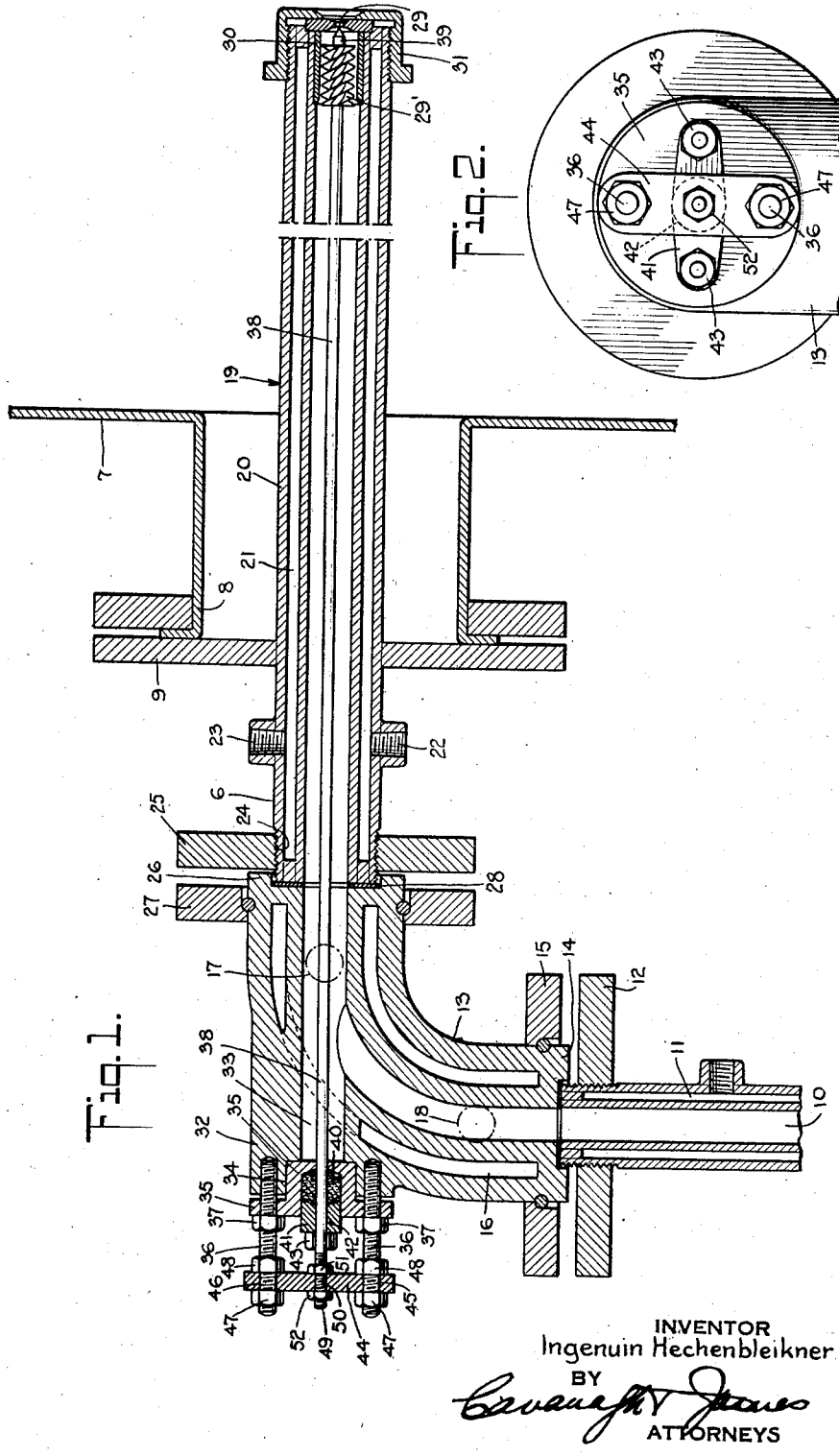


Fig. 1.

Fig. 2.

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SPRAY BURNER

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This invention relates to spray burners for liquids, such as molten sulfur, fuel oils and other similar combustible material.

It is an object of my invention to provide a burner for combustible material wherein solids, semi-solids or other reaction materials of fuels may be fed to a reaction zone or furnace in the condition of a spray to obtain maximum efficiency in combustion or other decomposition or reaction process and includes structural features to assure a continuous running of the process without necessity for dismantling apparatus. It is contemplated by my invention to provide a burner for materials such as sulfur, fuel oil or semi-solid liquids or other combustible material which will feed these materials in through a needle jet to produce a spray, the apparatus including structural features whereby a continuous run is assured by avoiding any accumulation of any solids which will tend to vary the character of the spray or the flow of the combustible material and thereby vary the efficiency of the combustion or reaction process.

Another object of my invention resides in the provision of a spray burner for such materials as molten sulfur, fuel oil, liquid material which may be maintained in a degree of fluidity for functioning with maximum efficiency, the material being fed through fine openings or jets to procure a spray and the apparatus including means to adjust the openings or jets to procure predeterminedly formed sprays and further includes means to clean the jets and free them of material which may clog the jet opening, without shutting down the apparatus or dismantling the same.

It is contemplated by my invention to provide a burner which includes a jet having means to adjust a needle valve in reference to the jet to a predetermined setting for forming a spray, the needle valve being so mounted that it may be quickly moved to cleanse the jet seat and be repositioned without discontinuing the process or dismantling the apparatus.

Other objects of my invention reside in the provision of a burner including a jet and spiral fuel feed for forming a spray which may be used with materials which may readily clog or impair the efficiency of the jet, as when using such materials as molten sulfur, fuel oil and the like, the apparatus including means to quickly cleanse the jet or replace the parts forming the spray with maximum dispatch, minimum effort and the parts are returned to a predetermined setting to maintain maximum efficiency and continuous operating conditions.

To attain these objects and such further objects as may appear herein, or be hereinafter pointed out, I make reference to the accompanying drawings, forming a part hereof, in which

Figure 1 is a sectional view of my apparatus as assembled with a portion of a furnace;

Figure 2 is a fragmentary, enlarged end view of the same.

Making reference to the drawings, I have illustrated my device 6 in connection with a sulfur furnace 7, wherein molten sulfur is prepared in a fine spray and burned in the furnace. My device projects within a flanged opening 8 and is affixed in position by a plate 9, upon which my device is mounted by bolting the same thereto. In the views, a feed line 10, jacketed at 11, is headed in a flange 12 and connected to the elbow casting 13 at its lower end 14 by the flange 15. The elbow casting is also preferably provided with a jacket 16, having inlets and outlets 17 and 18, respectively.

The forward end of the elbow has connected thereto the nozzle assembly 19 comprising the piping 20, suitably jacketed at 21, and provided with an inlet 22 and an outlet 23. This piping has the rearmost end 24 headed in the flange 25 and is held against a faced groove 26 of the branch of the elbow casting by bolting to the flange 27, preferably interposing a gasket 28, such as of asbestos, in the groove 26 previously mentioned.

Frontally of said nozzle there is disposed a burner jet 29, with the orifice thereof concentrically disposed with said piping and faced over a sleeve 30, fitted with said piping. The jet is held in position against the sleeve

by the cap 31, screw threaded to the externally threaded piping 20.

Extending from the elbow 13 there is provided the flange 32 having a central opening 33 in alignment with the opening of the elbow extending in the upper branch thereof.

The flange 32 is counter bored at 34, into which there is fitted the stuffing box 35, the latter being mounted in position by the stud bolts 36 and the nuts 37. Disposed through the stuffing box there is extended the rod 38, which at the nozzle end is provided with a needle point or tip 39, adapted to cooperate with the jet orifice 29 to limit the flow of liquid therethrough. A helical or worm fitting 29′, mounted upon the rod within the sleeve 30, serves to center the rod and at the same time impart a whirling movement to the liquid flowing through the jet.

The portion of the rod 38 extending outwardly from the stuffing box is provided with packing 40, such as of asbestos, which is firmly forced in engagement to seal the rod by the strap 41, including a gland extension 42, and held in position on the flange 32 by the bolts 43.

Mounted upon the stud bolts 36 there is disposed a holder or anchoring plate 44, which is orificed at 45 and 46 to freely slide upon the bolts 36. Outer nuts 47 and inner jamb nuts 48 firmly anchor the holder or plate 44 in position.

The free end 49 of the rod 38 is threaded and this is passed through a central threaded orifice 50 in the holder or plate 44.

Adjustment of the needle point or tip 39, relatively to the jet 29, may be made by rotating the rod, the threaded engagement in the orifice 50 of the plate 44, serving to give the setting to get a spray of predetermined characteristics which, with the material such as molten sulfur, fuel oil, liquid material or other combustible material, will give maximum efficiency.

This setting is then fixed by the lock nuts 51 and 52 on said rod at the end 49, which lock nuts are disposed to either side of the holder or plate 44.

It will be observed that the holder 44 as mounted upon the bolts 36 and to which the free end 49 of the rod 38 is fixed, is sufficiently spaced from the stuffing box mounting to allow substantial movement of this assembly. Should the tip 29 become clogged for any reason, for purposes of cleansing the same the inner jamb nuts 48 are loosened for a sufficient distance and then the plate or holder 44 is sharply driven forward to force the point or tip 39 upon the jet 29. This serves to clean or punch out of the orifice any material tending to stop it up or clog it, without the necessity of further dismantling of the apparatus, and the original adjustment is regained by merely again tightening the plate 44 in position by means of jamb nuts 48.

Furthermore, it will be observed that should it become necessary to remove or replace the worm or helical fitting 29′, the rod 38 may be withdrawn through the flange 32 by bodily removing the stuffing box 35, by releasing the bolts 36 holding the same in position. The stuffing box assembly carrying the rod 38 may then be slipped out to cleanse or replace the helical or worm fitting 29′.

It will thus be observed that I have provided an efficient spray burner which may be efficiently used in connection with combustible materials, the material so used being capable of being maintained fluid, as in the case of sulfur, or, for purposes of increasing the fluidity of viscous materials, such as heavy fuel oils, by providing a burner and feed line thoroughly jacketed for heating the same. Also, it will be observed that I may utilize the jacketed spaces so provided for purposes of heat insulating as well as heating where a previously heated material is fed through the pipe line.

It will also be observed that I have provided a spray burner capable of extreme refinement of adjustment or setting, which adjustment need not be lost should the burner become clogged due to any obstruction and, furthermore, have provided means for readily cleansing the jet and returning the needle adjustment to the original setting, which will give the predetermined maximum efficiency of combustion or spray.

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

1. In a sprayer of the character described, a nozzle and a raw material feed line therefor, a jet included by said nozzle and a needle valve or tip cooperating with said jet for regulating the spray through said nozzle, mounting means for said last named spray regulating means for maintaining a predetermined setting thereof, said mounting including independent means permitting a jet cleansing movement of said regulating needle into said jet without losing the said predetermined setting at the mounting means.

2. In a sprayer of the class described, a nozzle and a raw material feed line therefor, a jet included by said nozzle, a needle valve or tip for regulating the flow of raw material through said jet, external mounting means for said tip whereby it may be relatively adjusted to regulate the flow, and additional means whereby they may be bodily moved relatively to each other to cleanse the jet opening.

3. In a sprayer of the class described, a nozzle and a raw material feed line therefor, a jet included by said nozzle, a needle valve or tip including a portion suitably shaped to whirl the material through said jet and regu-

late the spray thereof, mounting means for mounting said valve in the sprayer, said mounting means including adjustment means and an additional member slidable thereon and permitting said valve to be bodily moved to and from said jet in order to clear the jet opening.

4. In a sprayer of the character described, a nozzle and a raw material feed line therefor, a jet included by said nozzle, a needle valve or tip formed at one end of a rod within said nozzle cooperating with said jet to regulate the flow of the material therethrough, mounting means for said rod whereby the opposite end may be exteriorly disposed of said nozzle, anchoring means for the end of said rod so exteriorly disposed including means setting the rod and the valve carried thereby, and independent means for movably adjusting the anchoring means.

5. In a sprayer of the character described, the combination which comprises a nozzle and a raw material feed line therefor, branching thereinto, a jet included by said nozzle, a rod extending into said nozzle opening and including at its end a liquid whirling and jet regulating tip, means for mounting said rod in sliding engagement within said nozzle to regulate the jet opening, a stuffing box for sealing said rod in the aforesaid sliding engagement, means for mounting said stuffing box whereby the same may be bodily disengaged and the liquid whirling and regulating tip made exteriorly accessible.

6. In a sprayer of the character described, the combination which comprises a nozzle and a raw material feed line therefor, branching thereinto, jacketing walls for said nozzle and feed line, a jet included by said nozzle, a rod extending into said nozzle opening and including at its end a liquid whirling and jet regulating tip, means for mounting said rod in sliding engagement within said nozzle to regulate the jet opening, a stuffing box for sealing said rod in the aforesaid sliding engagement, means for mounting said stuffing box whereby the same may be bodily disengaged and the liquid whirling and regulating tip made exteriorly accessible.

7. In a sprayer of the class described, a nozzle and raw material feed line therefor, a jet disposed at the end of said nozzle for regulating the flow of the raw material from said feed line through said nozzle, a needle valve extending into said nozzle, a side branch in alignment with said nozzle opening including a needle valve mounting assembly, means on said assembly for slidably disposing said needle valve to obtain predetermined setting of the opening through said jet, said means including an anchoring holder for determining the said setting, and mounting means for said holder permitting bodily sliding of the holder, whereby an obstruction in said jet may be knocked therefrom by movement of said needle valve without losing the said predetermined setting.

8. In a sprayer of the class described, a nozzle and raw material feed line therefor, a jet disposed at the end of said nozzle for regulating the flow of the raw material from said feed line through said nozzle, a needle valve extending into said nozzle, a side branch in alignment with said nozzle opening including a needle valve mounting assembly, means on said assembly for slidably disposing said needle valve to obtain predetermined setting of the opening through said jet, said means including an anchoring holder, adjusting means on said holder for determining the setting of said valve, mounting means for said holder, and adjusting means permitting bodily sliding of the holder, whereby an obstruction in said jet may be knocked therefrom by movement of said needle valve without losing the said predetermined setting.

9. In a sprayer of the class described, a nozzle and raw material feed line therefor, a jet disposed at the end of said nozzle for regulating the flow of the raw material from said feed line through said nozzle, a needle valve extending into said nozzle, a side branch in alignment with said nozzle opening including a needle valve mounting assembly, means on said assembly for slidably disposing said needle valve to obtain predetermined setting of the opening through said jet, including an anchoring holder and mounting means for said holder to move the same and the needle valve carried thereby quickly against the jet whereby an obstruction in said jet may be knocked therefrom by movement of said needle valve without losing the said predetermined setting.

10. A sprayer for sulphur or like combustible material maintained fluid by heating, comprising a nozzle, a feed line for the combustible material connected thereto, heat jacketing walls surrounding said nozzle and feed line in order to prevent solidification of the combustible material within the nozzle, a jet at the end of said nozzle, a reciprocable needle valve or tip cooperating with said jet in order to regulate the spray, a holder for said rod for maintaining a predetermined setting of said tip, and independent means permitting a jet cleansing movement of said rod and tip into said jet without losing the aforesaid setting at the holder.

11. A sprayer for sulphur or like combustible material maintained fluid by heating, comprising a nozzle, a feed line for the combustible material connected thereto, heat jacketing walls surrounding said nozzle and feed line in order to prevent solidification of the combustible material within the nozzle, a jet at the end of said nozzle, a rod extending through said nozzle and having at one end a liquid whirling needle valve or tip, a

holder for said rod determining the setting of said tip, and means permitting a jet cleansing movement of said rod and tip without losing the aforesaid setting.

12. A sprayer for molten sulphur maintained fluid by heating, comprising a nozzle, a feed line for the molten sulphur connected thereto, heat jacketing walls surrounding said nozzle and feed line in order to prevent solidification of the sulphur within the nozzle, a jet at the end of said nozzle, a rod extending through said nozzle and having at one end a liquid whirling needle valve or tip, a holder for said rod determining the setting of said tip, means permitting a jet cleansing movement of said holder and tip without losing the aforesaid setting, and means permitting bodily removal of the tip from the nozzle in order to make the same accessible.

Signed at Charlotte in the county of Mecklenburg and State of North Carolina this 20th day of Nov. A. D. 1928.

INGENUIN HECHENBLEIKNER.