Oct. 25, 1949. E. A. FURKERT 2,486,018

FLUID FUEL BURNER HAVING LATERALLY DIRECTED FLAME PORTS

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Fig. 1

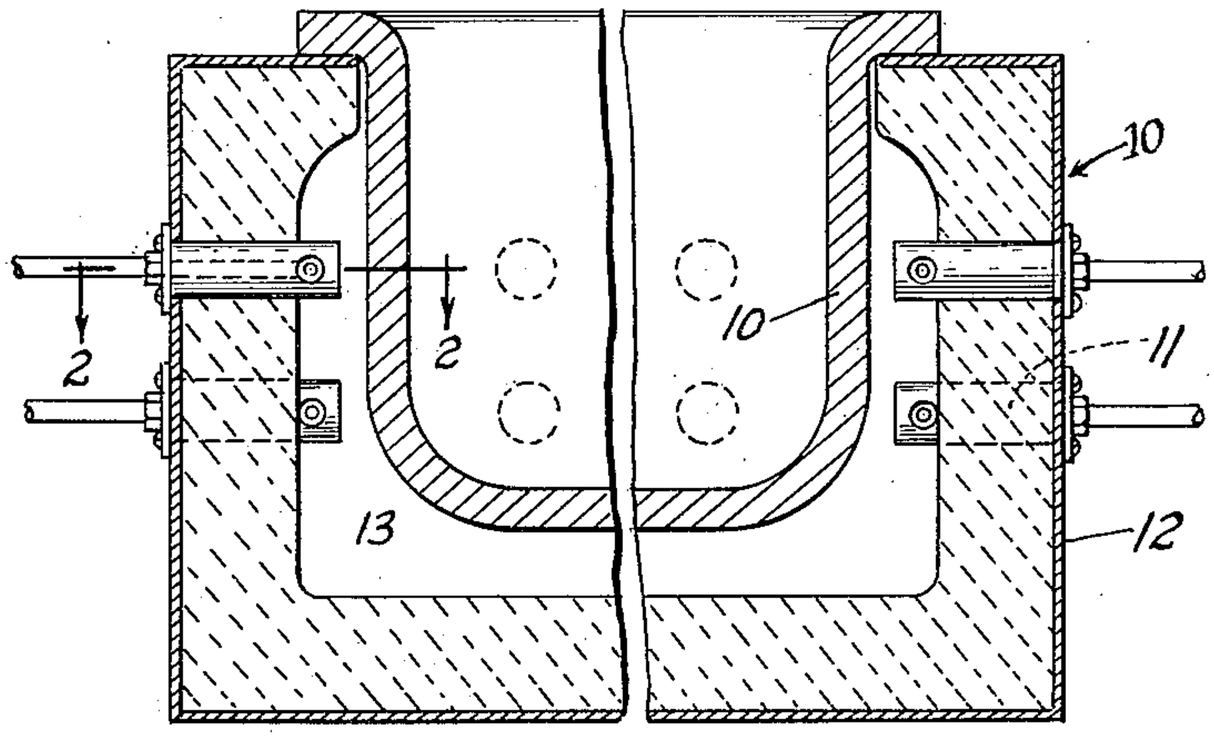


Fig. 2

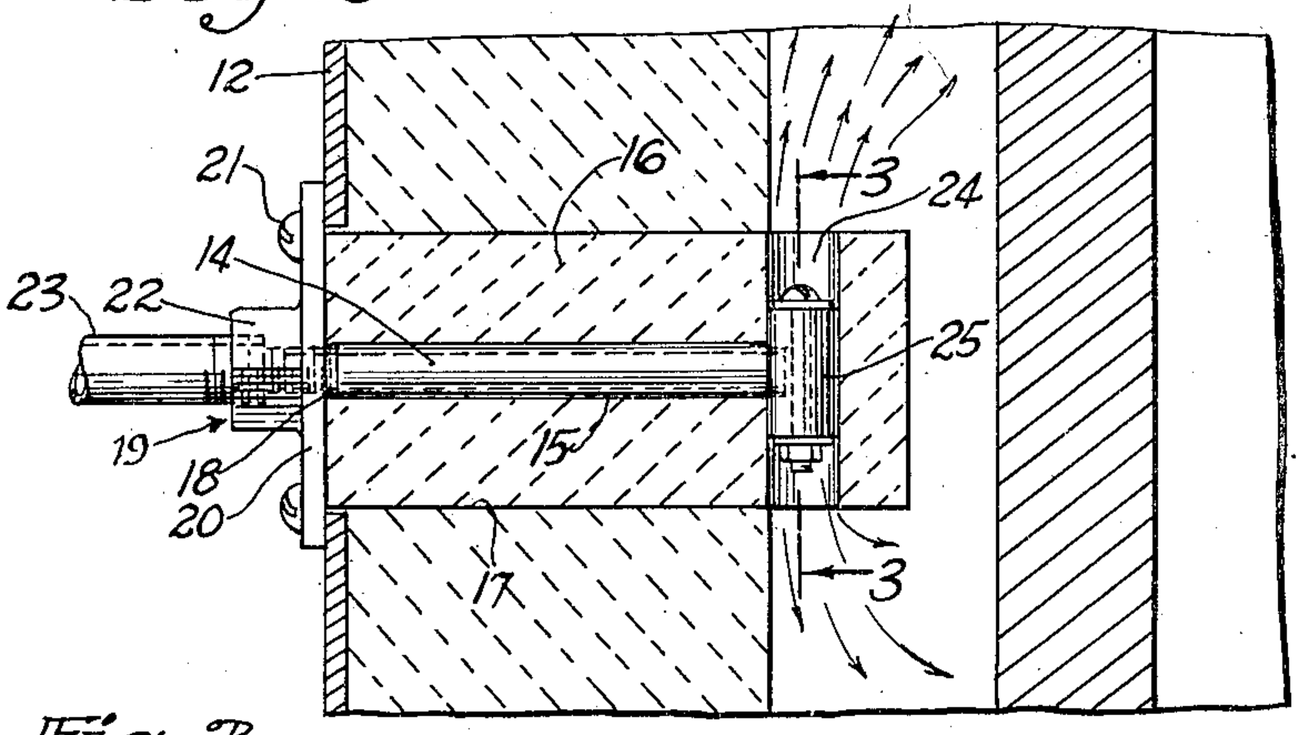


Fig. 3

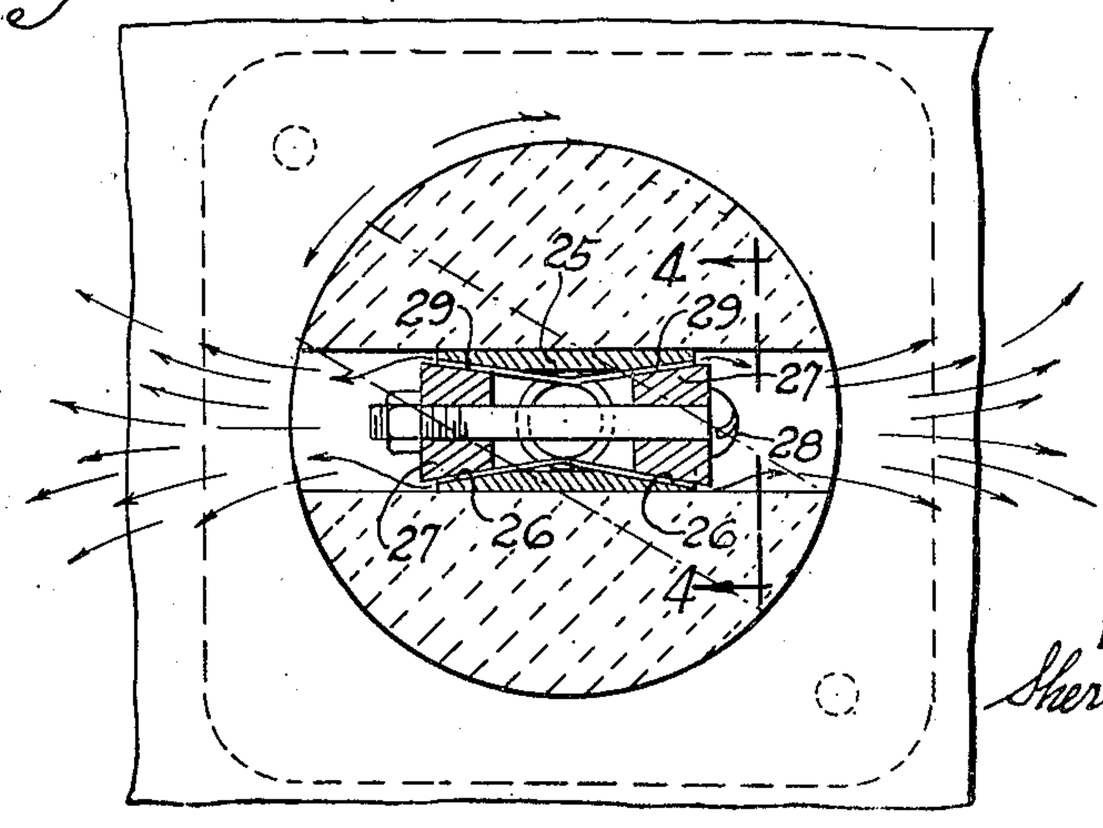
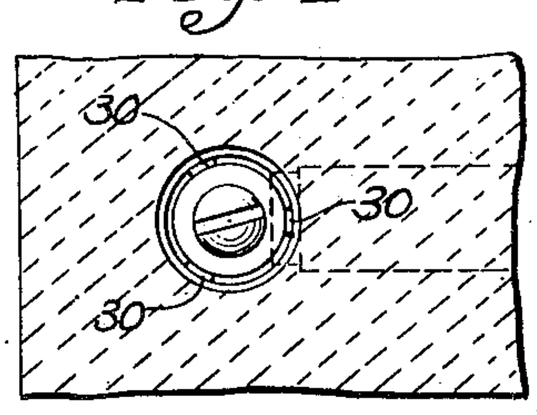


Fig. 4



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FLUID FUEL BURNER HAVING LATERALLY DIRECTED FLAME PORTS

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4 Claims. (Cl. 158—7)

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This invention relates to improvements in heating apparatus and particularly to gaseous fuel burners for such apparatus.

Gaseous fuel burners used for heating melting pots, such for example, as large steel pots in which zinc is melted for use in galvanizing sheets, generally extend through heat insulating walls that support the pots. The flames from the burners in impinging against the outer wall of the spots have been found to cause disintegration of the inner surfaces of the pots in many instances. In such instances, depressions or cavities form in the inner surface of the pots opposite the burners possibly by electrolytic action, which in time develop into openings through the pot wall, necessitating repairs or replacement of the pots.

One object of the present invention is to provide an improved burner that is insertable in an opening in a refractory or insulating wall for a melting pot but which burner directs a flame, not against the exterior surface of the pot, but in a lateral direction or directions into the space between the insulating wall and the pot, thereby avoiding the damage to the pot resulting from the excessive heating of a spot or portion of the pot by flames impinging directly upon the pot.

An additional object of the invention is to provide an improved burner unit adapted to project a flame or flames laterally with respect to the longitudinal axis of the unit, the direction of the flames being determined by the positioning of the burner within a receiving opening in the insulating wall about the pot.

A further object of the invention is to provide a burner structure that is formed of simple parts that can be readily assembled or disassembled and which can be arranged to project flames in opposite radial directions or to project a single flame in a selected direction.

Other objects of the invention relate to various features of construction and arrangement of parts which will be apparent from a consideration of the following specification and accompanying drawing wherein

Figure 1 is a broken vertical sectional view through a melting pot installation illustrating a heat insulated wall equipped with burners that are illustrative of the present improvements;

Fig. 2 is an enlarged sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional view taken on line 3—3 of Fig. 2;

Fig. 4 is a broken sectional view taken on line 4—4 of Fig. 3.

In the drawings, 10 indicates generally a melting pot which may be of the type used for melting zinc or other metal or substances and is supported, in the structure shown in Fig. 1 by a surrounding wall 11 of insulating material. The wall is shown as a monolithic structure but which

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may be formed of refractory or insulating bricks or the like.

In Fig. 1 the structure is shown with a surrounding metal casing 12 while the inner surface of the insulating wall is spaced from the exterior surface of the pot to provide a heating chamber 13 surrounding the major portion of the exterior surface of the pot.

Where such pots are heated by individual gas burners, it has been common practice to provide openings in the insulating walls within which the burners are inserted, the burners directing the flames or hot combustion products against the exterior wall of the pot. In accordance with the present invention, the burners are likewise mounted in openings in the insulating wall but the burners are so constructed that the flames are directed in lateral directions within the chamber 13 rather than directly toward the adjacent pot surface. Use of the improved burners avoids pot disintegration of the character mentioned above.

As illustrated in the drawing, the burner comprises a tubular duct 14 fitting snugly within a longitudinal opening 15 provided in an insulating brick 16 preferably of cylindrical form which is adapted to be seated within a similarly shaped opening 17 provided in the wall 11. The outer end of the tube 14 is shown as threaded at 18 for attachment to a mounting plate 19 which has a flange 20 of an area sufficient to overlie the outer end of the opening 17 and is provided with screws 21 or the like for attachment to the casing 12 of the wall. The plate 19 also is provided, in the form illustrated, with an internally threaded boss 22 by means of which a fuel duct 23 is attached for delivering gaseous fuel to the burner. The fuel generally is a gas, such as city gas, (artificial, natural or mixed), having the requisite quantity of air mixed therewith to provide a completely combustible fuel not requiring the addition of supplemental or secondary air within the chamber 13. The brick 16 has a transverse passage 24 at the inner end portion thereof which end, as shown in Fig. 2, projects inwardly beyond the inner face of the wall. Within the passage 24 is a burner head comprising a tubular member 25 that is screw threaded to the adjacent end of the tube 14. As illustrated in Fig. 3, the inner walls of the two end portions of the head 25 flare outwardly as indicated at 26. Positioned within the two ends of the head are frusto-conical plugs 27 the exterior walls of which are shaped to conform to the outward divergence of the inner walls 26 of the head. The plugs 27, in the form shown, are provided with axial passages for receiving a bolt 28 by means of which the plugs are retained in the positions shown in Fig. 3. The plugs 27 are spaced from the walls 26 to provide annularly arranged fuel outlets or gas passages 29. The spacing mentioned may be effected by ribs inte-

gral either with the walls **26** or with the conical walls of the plugs but preferably the spacing is effected by the use of a plurality of narrow metallic strips **30**, as of brass or copper, which are inserted in the head between the interior wall thereof and the plugs before the latter are tightened in position by the bolt **28**. The thickness of the strips, three being shown arranged 120° apart, is such as to determine the radial dimension of the fuel ports **29** through which the fuel from the tube **20**, after dividing, issues from the head in opposite directions into the chamber **13**.

The flames and hot products of combustion that issue from the heads do not impinge upon the pot and hence do not effect excessive heating of spots or localized areas of the pot which produce disintegration of the pot interior as mentioned above. The directions in which the flames from the burner are directed is determined by the position in which the burners are installed in the wall openings **17**, and as will be seen, the flames can be horizontal, vertical, or at various angles to the vertical. As many burners are employed as are necessary to give the heating capacity demanded in a given installation. By employing strips **30** of a length to space but one plug **27** from the adjacent flaring wall of the head, the other plug can be drawn by the bolt **28** snugly into sealing contact with the corresponding tapered wall of the head to eliminate combustion at that end of the head and thus reduce the heating capacity of that particular burner. With several burners having one end inoperative and such burners having their flames correlatively directed, predetermined circulation of the hot gases can be set up within the chamber **13** which in some instances may be desirable in correcting or reducing lack or uniformity in heat absorption by the pot.

Any appropriate means may be employed for igniting the fuel issuing from the burners, such as the usual peep holes, not shown, provided in the insulating wall through which a torch may be inserted for ignition purposes.

The improved burner structure is simple and adapted for economical manufacture as will be observed, the tube **14** serving as a tie between the head **25** and the plate **20** and retaining the assembled parts together as a unit for purposes of handling installation or removal.

While I have shown the preferred construction of the improved burner changes in structural details thereof may be made within the spirit and scope of the invention as defined by the accompanying claims.

I claim:

1. A gaseous fuel burner comprising a tubular fuel delivery member, a transversely arranged tubular head secured intermediate the ends thereof to the outlet end of said member for receiving fuel therefrom, the inner end portions of said head being outwardly flaring, frusto-conical shaped plugs each positioned within one end of said head, a plurality of annularly spaced strips within the head between the inner wall thereof and the exterior wall of the plugs for spacing said walls apart to provide gas ports at the ends of the head, and means securing said plugs in wedging contact with said strips for retaining the plugs and strips against displacement relative to the head.

2. A burner structure adapted for insertion within an opening in the wall of a heating chamber comprising a refractory brick dimensioned to fill the opening and at the inner end to extend inwardly beyond the inner surface of the wall, said brick having a transverse passage through the inner end thereof and a longitudinal passage extending from the outer end of the brick into communication with said transverse passage, a tubular burner head disposed within said transverse passage and provided with burner ports in the ends thereof for directing flames and products of combustion in directions laterally of the inner end of the brick, a tubular fuel delivery member in said longitudinal passage connected to and communicating with said head intermediate the ends thereof for delivering fuel thereto, and a mounting plate secured to the delivery member at the outer end of the brick whereby said delivery member secures said head, plate and brick in an assembled relation.

3. A burner structure adapted for insertion within an opening in the wall of a heating chamber comprising a refractory brick dimensioned to fill the opening and at the inner end to extend inwardly beyond the inner surface of the wall, said brick having a transverse passage through the inner end thereof and a longitudinal passage extending from the outer end of the brick into communication with said transverse passage, a tubular burner head disposed within said transverse passage and provided with burner ports in the ends thereof for directing flames and products of combustion in directions laterally of the inner end of the brick, a tubular fuel delivery member in said longitudinal passage connected to and communicating with said head intermediate the ends thereof for delivering fuel thereto and a mounting plate at the outer end of the brick and of greater area than said end of the brick and adapted to be attached to the wall of the heating chamber and secured to said delivery member whereby the latter retains the head, brick and plate together in an assembled unit.

4. A gaseous fuel burner comprising a tubular burner head provided with outwardly flaring internal surfaces adjacent the ends thereof, means for supplying gaseous fuel to the interior of said burner head, a pair of axially apertured plugs having flaring exterior surfaces enabling the plugs to seat within the ends of said head, means spacing said surfaces apart to provide fuel outlet ports at the ends of the head, and a member extending axially through said head and through the apertures of said plugs for retaining the same in position in said head.

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