June 25, 1946. D. J. MOSSHART 2,402,906

STOKER APPARATUS

Filed July 29, 1942 8 Sheets-Sheet 1

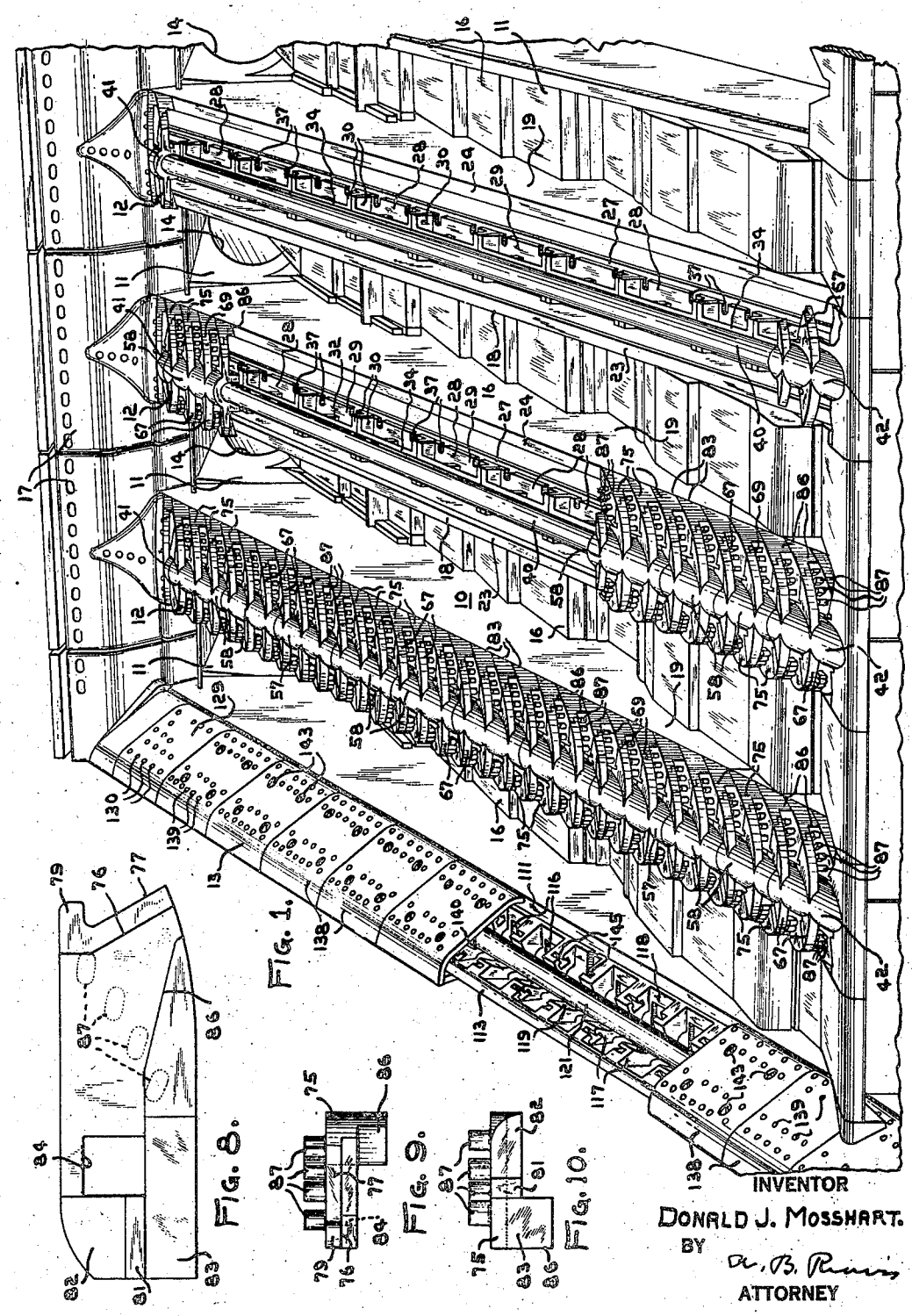

FIG. 1.



FIG. 8.



FIG. 9.



FIG. 10.

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STOKER APPARATUS

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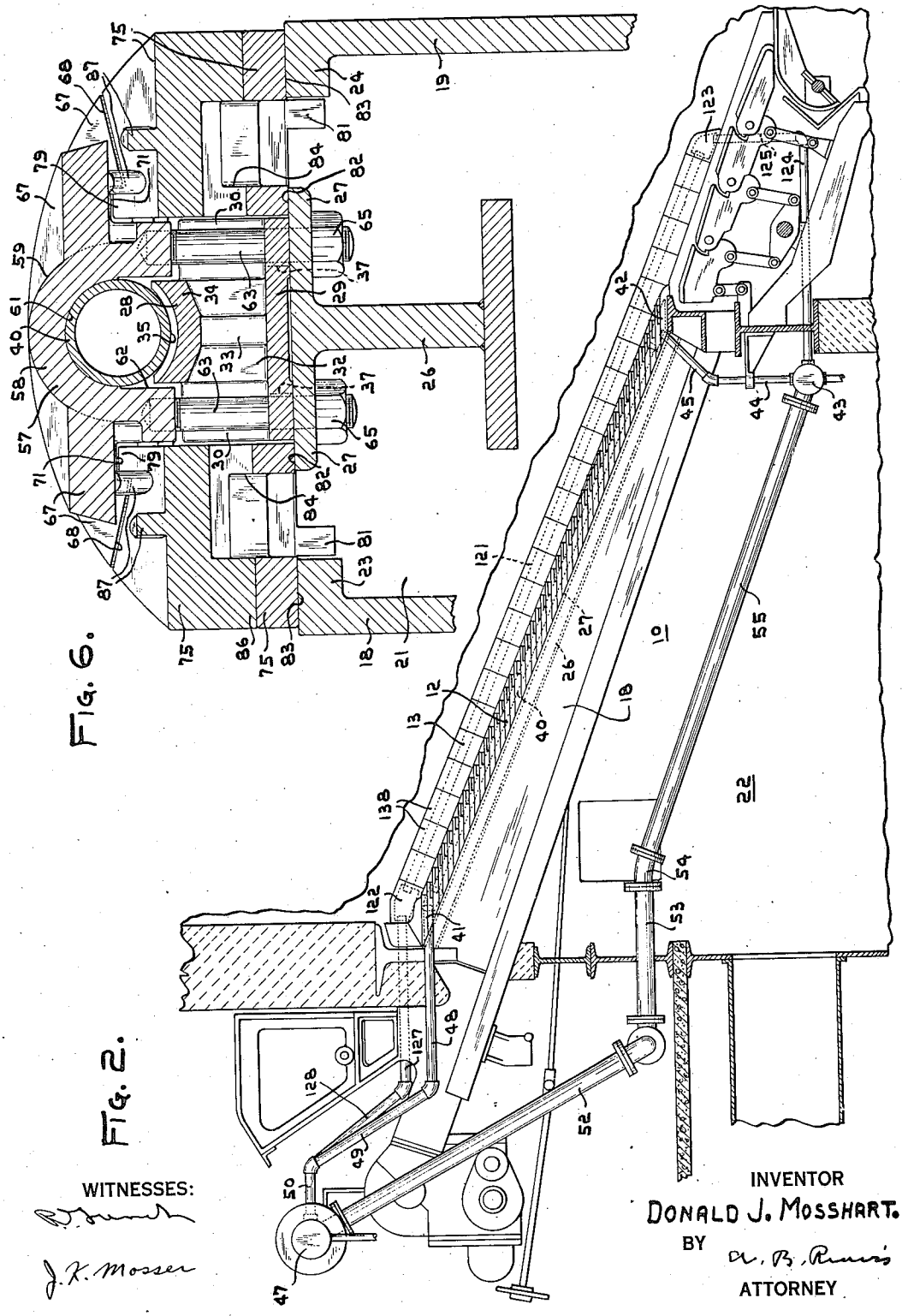

FIG. 6.

FIG. 2.

WITNESSES:

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STOKER APPARATUS

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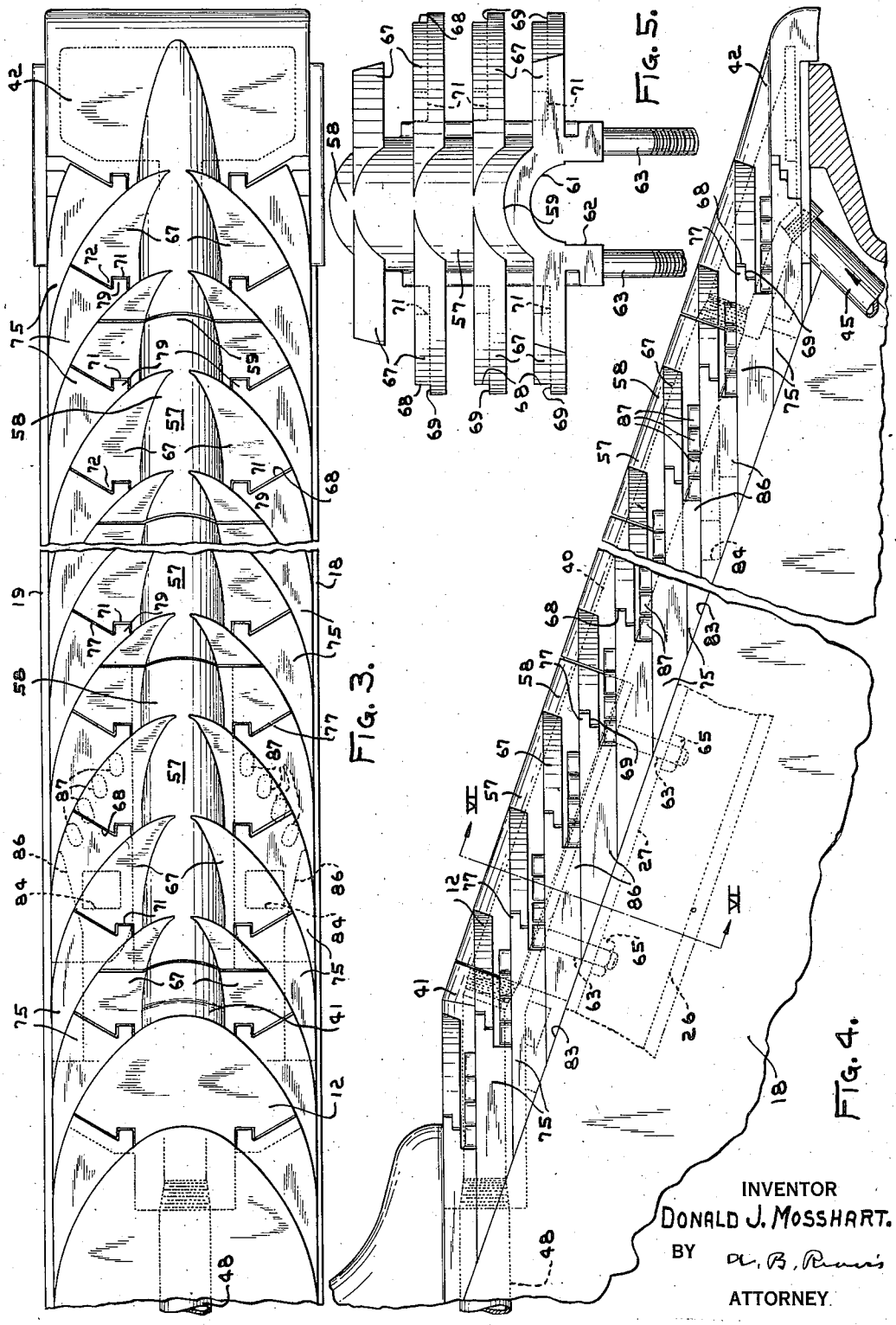

FIG. 3.

FIG. 5.

FIG. 4.

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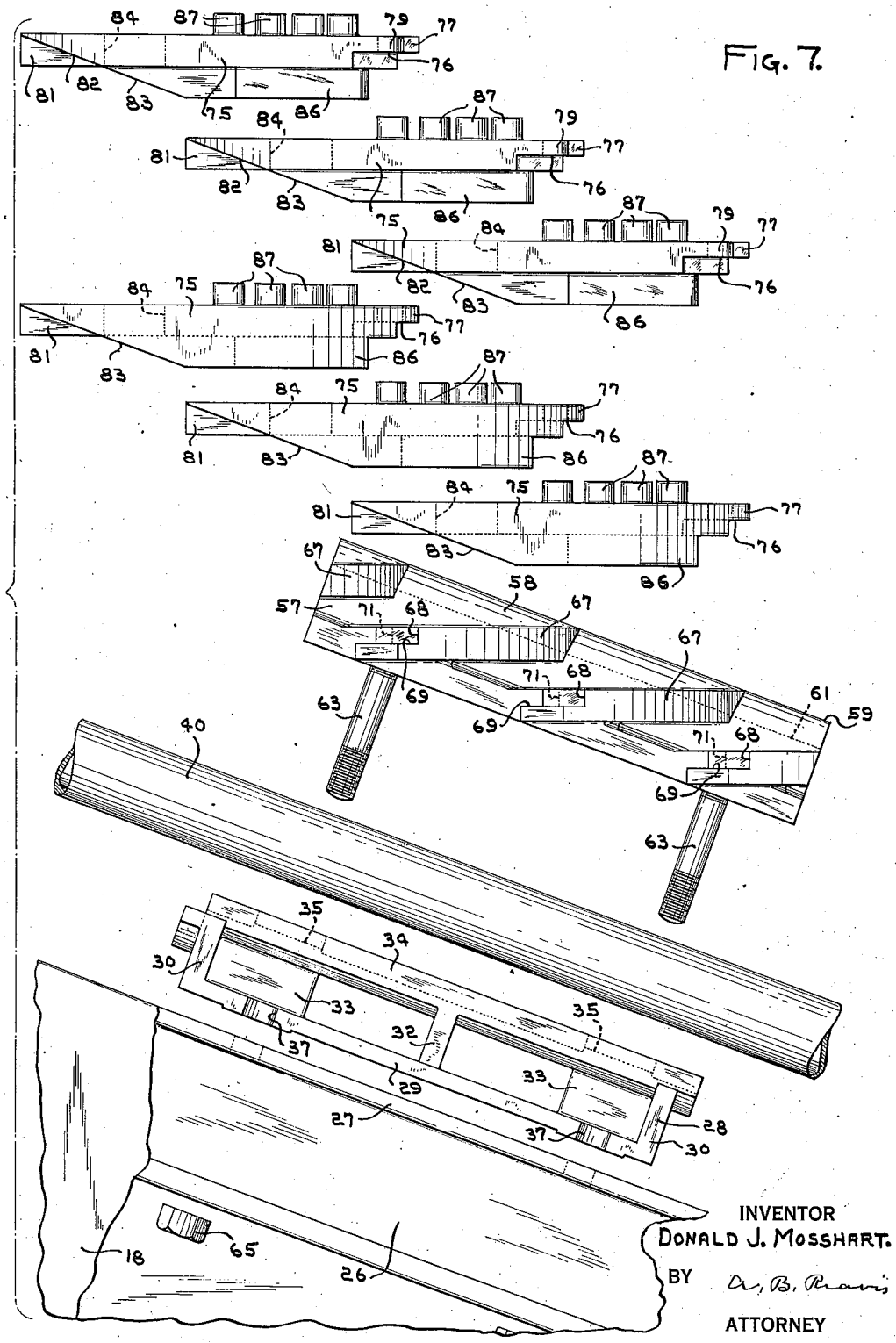
FIG. 7.

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STOKER APPARATUS

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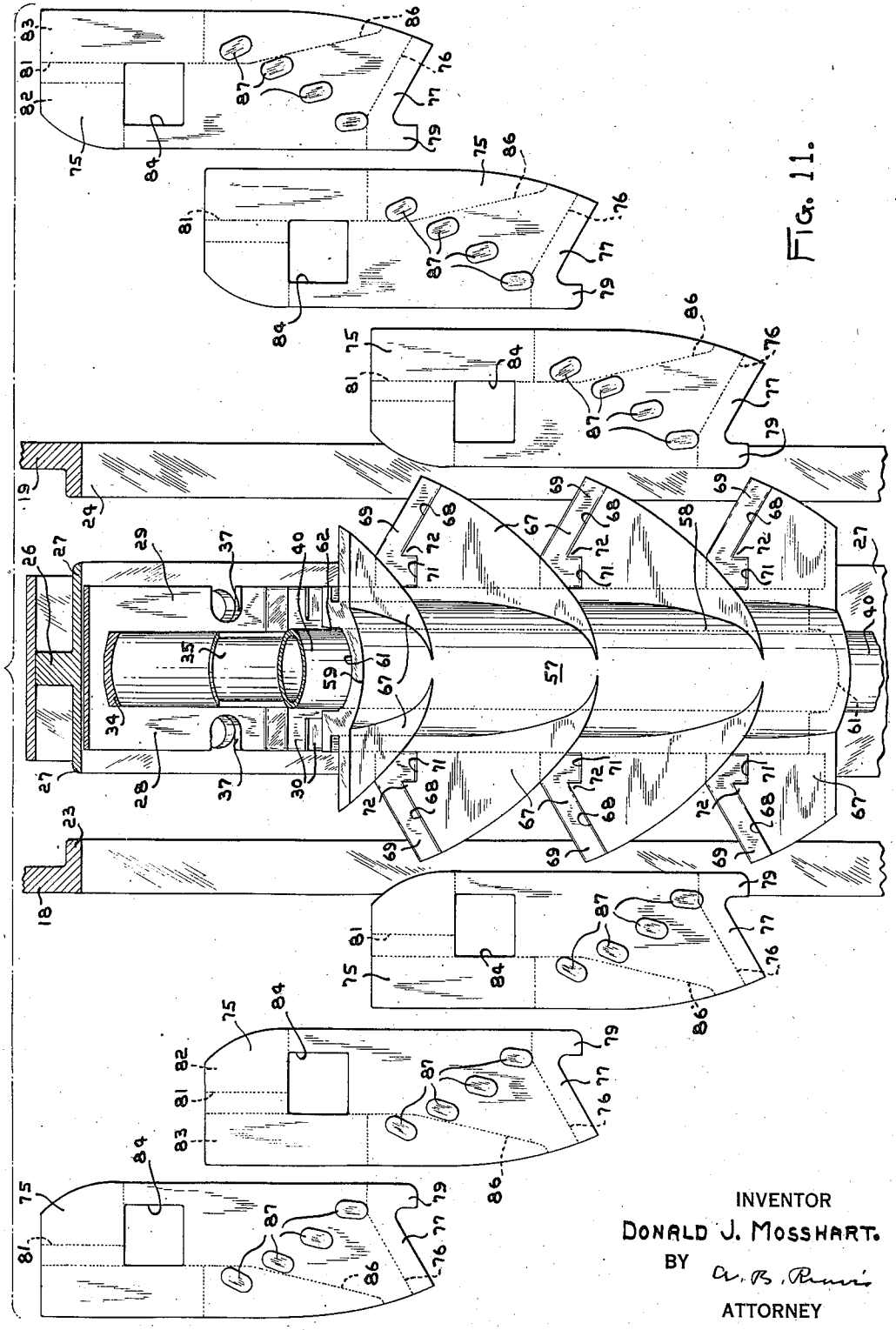

FIG. 11.

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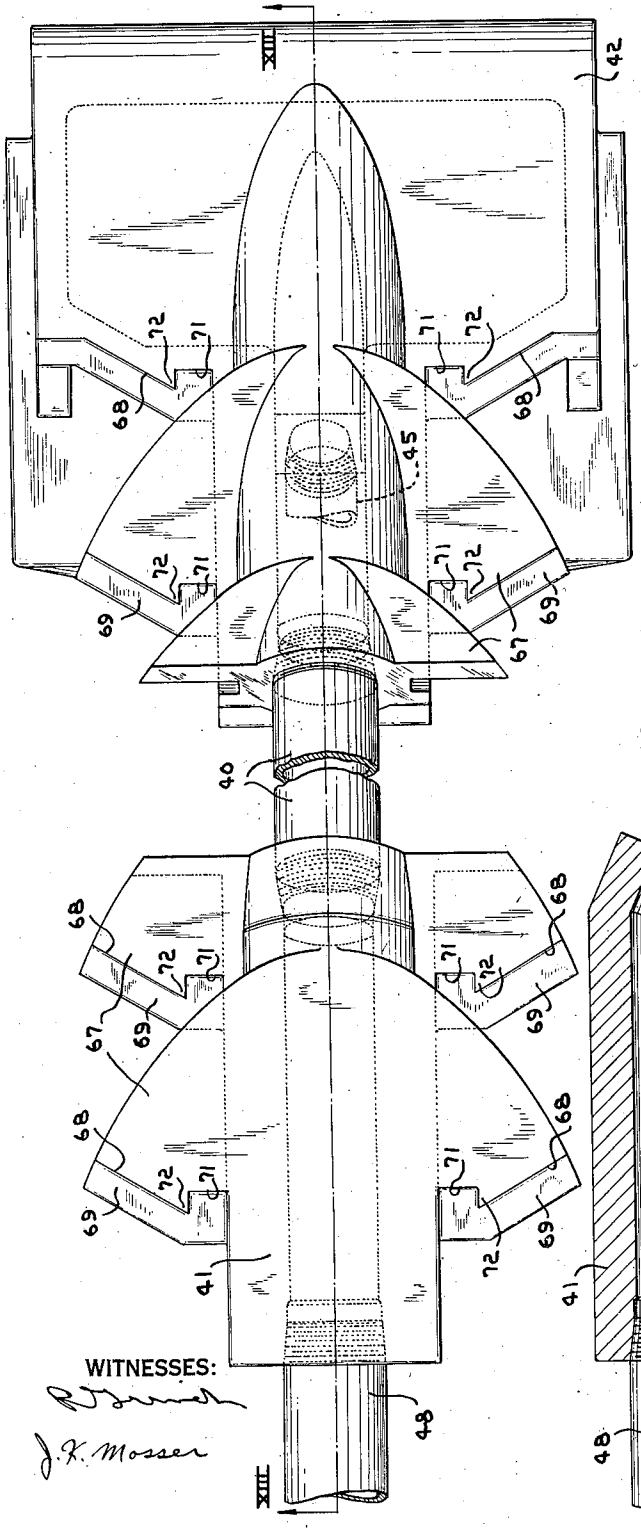


FIG. 12.

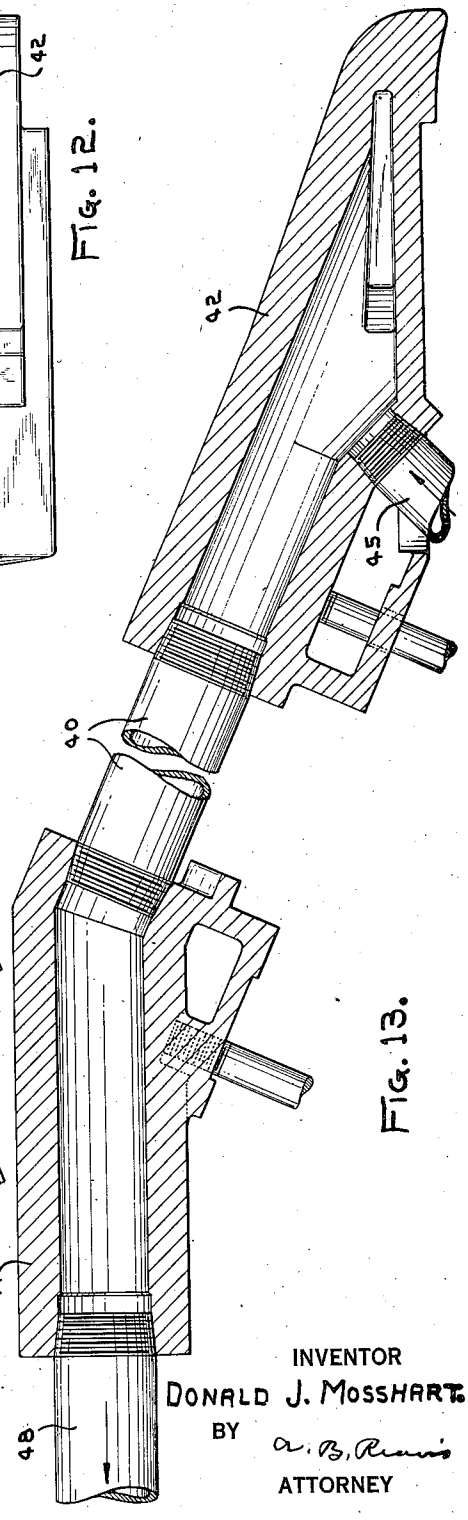


FIG. 13.

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STOKER APPARATUS

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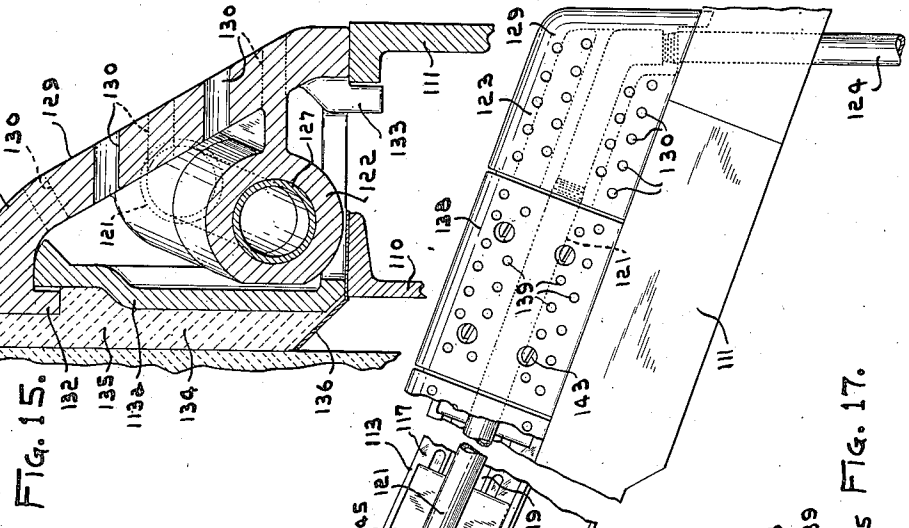

FIG. 15.

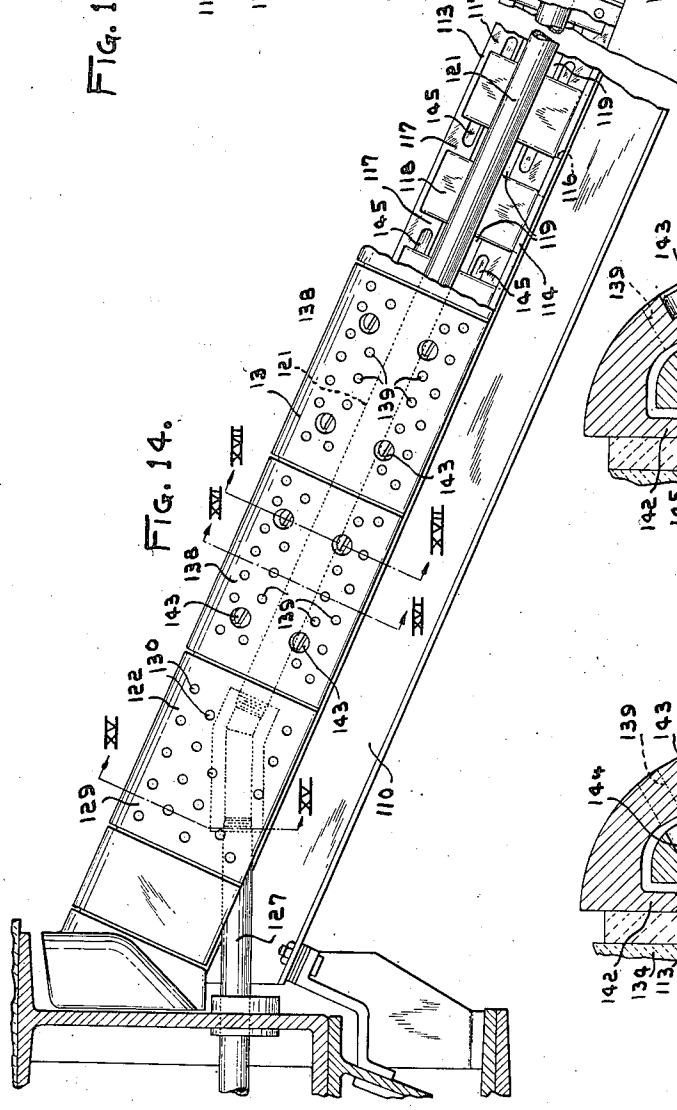

FIG. 14.

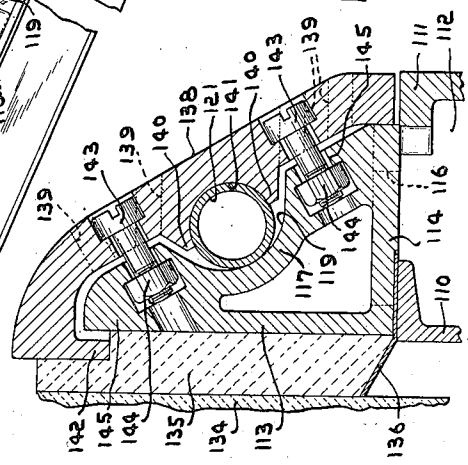

FIG. 17.

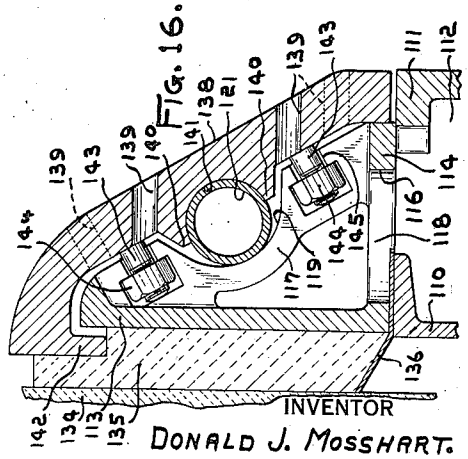

FIG. 16.

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STOKER APPARATUS

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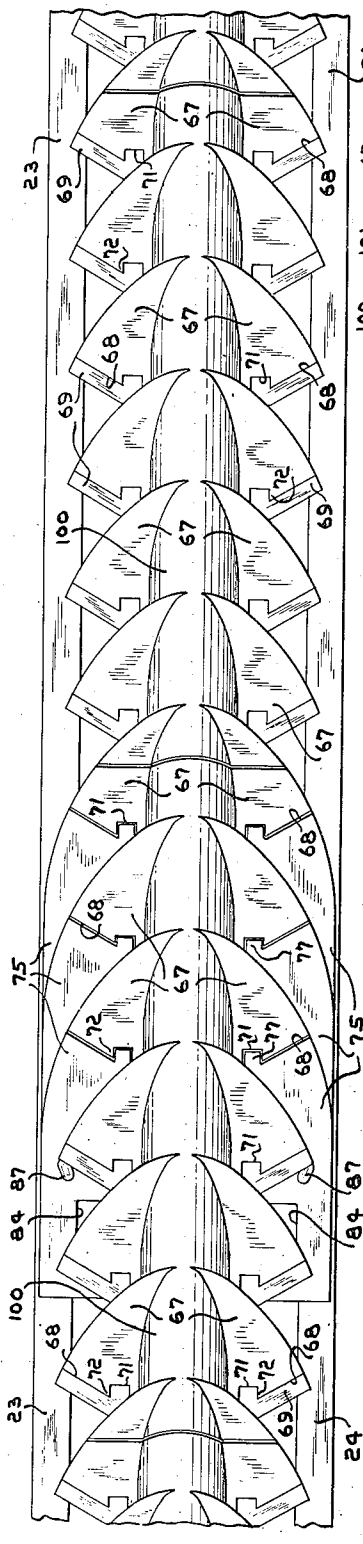

FIG. 18.

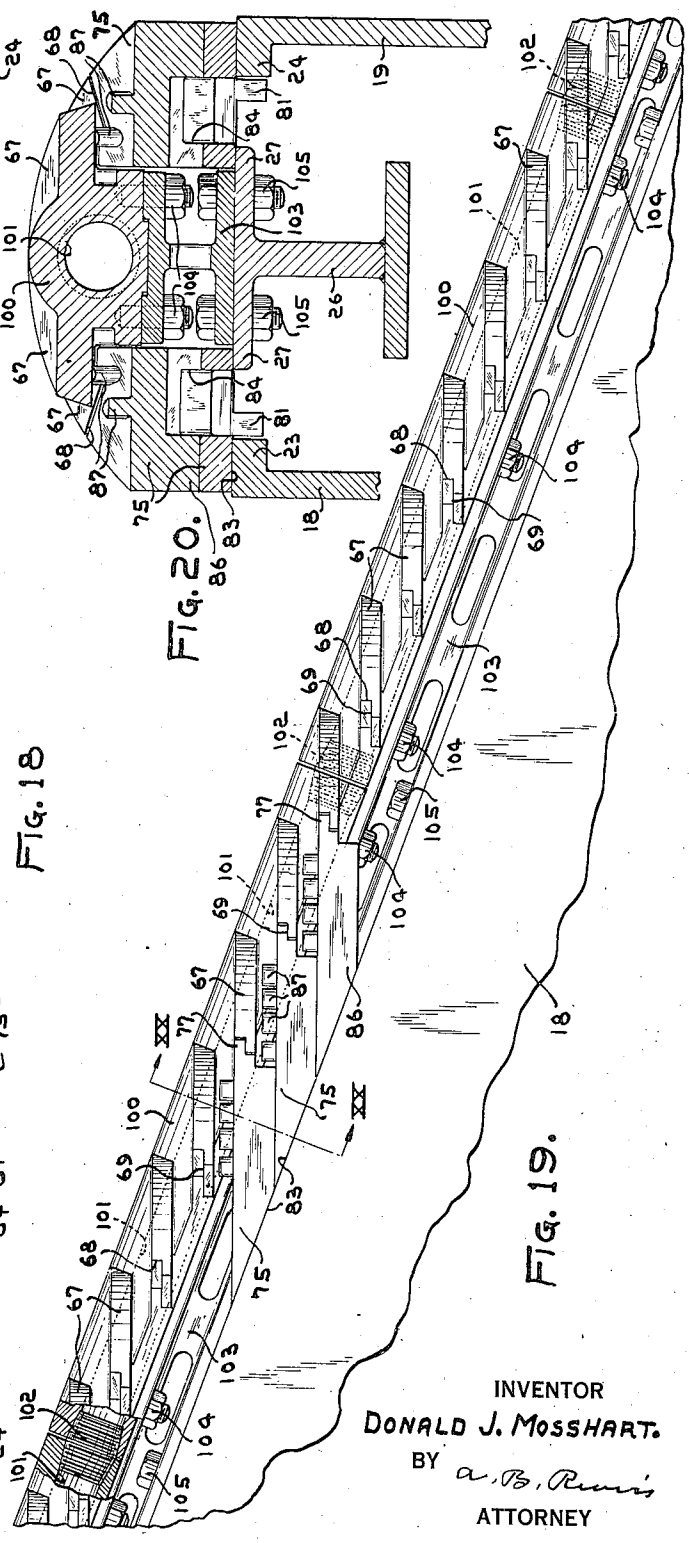

FIG. 19.



FIG. 20.

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Patented June 25, 1946

2,402,906

# UNITED STATES PATENT OFFICE

2,402,906

## STOKER APPARATUS

Donald J. Mosshart, Ardmore, Pa., assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

Application July 29, 1942, Serial No. 452,759

37 Claims. (Cl. 122—376)

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This invention relates to fluid-cooled stokers, more particularly to multiple-retort underfeed stokers, and it has for an object to provide improved apparatus of this character.

Another object of the invention is to provide, in a stoker having a plurality of cooling tubes, tuyère assemblies including tuyère center members adapted to contact and overlie the tubes and tuyère side members separate from the center members but adapted to interlock and cooperate therewith to form complete tuyère members.

A further object of the invention is to provide a composite stoker tuyère member comprising fluid-cooled center elements and complemental air-cooled side elements adapted to interlock therewith to form the complete tuyère members.

These and other objects are effected by the invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a perspective view of a multiple-retort underfeed stoker embodying the present invention, portions of the apparatus being omitted in order to more clearly disclose features of the invention;

Fig. 2 is a side elevational view, partially in section, of a stoker tuyère row together with the cooling system therefor and various associated parts;

Fig. 3 is a broken plan view of a single tuyère row;

Fig. 4 is a side elevational view of the structure shown in Fig. 3;

Fig. 5 is a front elevational view of one of the tuyère center members shown in Figs. 3 and 4;

Fig. 6 is a transverse sectional view taken along the line VI—VI of Fig. 4, looking in the direction of the arrows;

Fig. 7 is an exploded side elevational view of the structure as illustrated in Fig. 6;

Figs. 8, 9 and 10 are plan, front and rear elevational views, respectively, of one of the tuyère side members shown in Fig. 7;

Fig. 11 is a plan view of one of the tuyère center members in assembled relation with respect to its supporting structure, but with its complemental side tuyère members arranged in exploded relation thereto;

Fig. 12 is a plan view of the upper and lower end members of a tuyère row;

Fig. 13 is a longitudinal sectional view taken along the line XIII—XIII of Fig. 12, looking in the direction of the arrows;

Fig. 14 is a side elevational view of a tuyère

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side wall row, with portions thereof broken away for the sake of clearness;

Figs. 15, 16 and 17 are transverse sectional views taken along the lines XV—XV, XVI—XVI and XVII—XVII, respectively, of Fig. 14, looking in the directions of the arrows;

Fig. 18 is a plan view similar to Fig. 3, but showing a modified construction;

Fig. 19 is a side elevational view of the structure shown in Fig. 18, with portions thereof broken away for the sake of clearness; and,

Fig. 20 is a transverse sectional view taken along the line XX—XX of Fig. 19, looking in the direction of the arrows.

Referring now to the drawings more in detail, there is shown, at 10, a fluid-cooled stoker embodying the present invention and comprising alternately arranged retorts 11 and tuyère rows 12, together with side wall tuyère rows 13. Fuel is fed to the retorts 11 through the ram openings 14 at the upper ends of the retorts and is advanced along the latter to the rear of the stoker by means of secondary rams 16, which, as herein illustrated, are of conventional construction and form no part of the present invention. Air-distributing box structure 17 is provided at the upper ends of the retorts 11 and tuyère rows 12 for supplying secondary air to the combustion chamber in the usual manner.

As best illustrated in Fig. 6, each tuyère row comprises spaced tuyère row side walls 18 and 19, the space 21 therebetween being adapted to receive air from the plenum chamber 22, therebelow (Fig. 2). The side walls 18 and 19 are provided with inwardly-directed lateral flanges 23 and 24, respectively, serving as partial support for the tuyère assembly to be hereinafter described.

A structural supporting member 26 extends longitudinally of the tuyère row intermediate the tuyère side walls 18 and 19 and is provided at its upper edge with lateral flanges 27 forming an upper supporting surface, preferably lying in the plane of the upper surfaces of the flanges 23 and 24 of the tuyère row side walls.

A tube saddle member 28 (Figs. 1, 6, 7 and 11) rests upon and is supported by the flanges 27 and comprises a base 29 having end supporting walls 30 and an intermediate supporting wall 32. These walls, together with intermediate webs 33, carry a longitudinally-extending support 34, concave in cross section. The concave surface is provided with spaced, raised bearing surfaces 35 and the base 29 of the saddle member has notches 37 in its side edges for the reception of fastening means to be described later. Preferably, these

tube saddle members are of considerably less length than the overall length of a tuyère row, a plurality of such saddle members being assembled in end-to-end relation to provide a longitudinally-extending supporting structure for a tube **40** extending from end to end of the tuyère row.

The tube **40** has its terminal portions threadedly connected to and supported by upper and lower hollow end castings **41** and **42**, respectively, at opposite ends of the tuyère row (Fig. 13). Cooling fluid, for example water, is supplied to the lower end casting **42** from the header **43**, for passage through the tube **40**, by means of the connecting supply pipes **44** and **45** (Fig. 2). The cooling fluid, upon leaving the tube by way of the hollow upper end casting **41**, is conducted to a heat exchanger **47** by connecting pipes **48**, **49** and **50**. After giving up a predetermined amount of heat in the heat exchanger, the cooled water is returned to the supply header **43** by way of the return pipes **52**, **53**, **54** and **55**.

While the cooling system herein disclosed is independent of the boiler water system and involves the use of an independent heat exchanger, it will be apparent to those skilled in the art that the invention is not limited to such a system but may well include other arrangements, for example, passing boiler water through the tubes **40**. The closed cooling system with the independent heat exchanger, herein illustrated, forms no part of the present invention and is the subject matter of my copending application Serial No. 449,725, filed July 4, 1942.

Referring again to the tuyère assembly, illustrated in Figs. 1, 5, 6, 7 and 11, a tuyère cap or center member **57** is arranged in heat-transfer relationship to the tube **40** and comprises an elongated body portion **58** having a convex upper surface **59** and a concave under surface **61**, forming the bottom of a groove **62** of inverted U formation. A plurality of studs **63** are threadedly mounted in the elongated body portion **58** of the tuyère center member and extend downwardly therefrom through the side notches **37** of the tube saddle member **28**, and are secured at the under side of the flanges **27** of the supporting structural member **26**, by nuts **65** to retain the tuyère center member in heat-transfer relation to the tube **40**.

Each tuyère center member forms one section of a tuyère row, a plurality of these sections being assembled in end-to-end abutting relation to form a covering for the tube **40** and extending from the upper hollow tube casting **41** to the lower casting **42**.

Each tuyère center member includes a plurality of tuyère nose portions formed integral therewith and so positioned that their upper surfaces provide a substantially horizontal fuel-supporting structure for fuel fed thereto from the retorts **11**. Inasmuch as the tuyère row assembly, and the tube **40** with which the assembly is associated, are inclined downwardly in the direction of fuel feed, the tuyère nose portions **67** are disposed at a material angle to the longitudinal axis of the tube **40** in order that the fuel-supporting surfaces they present may be substantially horizontal.

Each tuyère nose portion extends laterally in both directions from the tuyère center member body portion **58**, the laterally-extending portions having their rearward edges rabbeted, at **68**, to provide a ledge or step **69**, for a purpose to be hereinafter explained. The rabbet **68** is formed with a reentrant portion or rearwardly-opening notch **71** for the reception of a forwardly-extending tongue **79** formed on a complemental tuyère side member **75**.

A pair of tuyère side members, one left-hand and one right-hand, is associated with each tuyère nose portion **67** to provide therewith a complete tuyère member. Each tuyère side member is provided at its forward edge with a rabbet **76** providing an overhanging lip **77** adapted to overlie the rearwardly-projecting lip **69** formed on the mating edge of the tuyère nose portion. This overlapping relation of the lip **77** and ledge **69** serves to prevent fine fuel falling through from the fuel bed to the plenum chamber at the joints between the tuyère nose portions and the tuyère side members.

The tongues **72** and the notches **71** interlock the tuyère side member with respect to the center or nose member to prevent lateral displacement of its forward end (the terms "front" or "forward" and "rear" or "rearward" are used herein in reference to the direction of fuel feed).

Each tuyère side member **75** is provided at its rear edge with a centrally-disposed depending lug **81** serving to separate an inner-inclined under surface **82** from an outer-inclined under surface **83**, the inclination of these surfaces corresponding to the inclination of the tuyère row side wall flanges **23** and **24**, whereby the rearward end of each tuyère side member is supported at its outer edge by the outer-inclined surface **83** bearing on the flange **23** or **24**, and its inner-inclined surface **82** bearing on the flange **27** of the central supporting member **26**. The depending lug **81** engages the inner edge of the flange **23** or **24** and prevents lateral displacement of the rear end of the tuyère side member.

Each tuyère side member is provided with an opening **84** therethrough for flow of air from the plenum chamber **22** and air space **21** to the fuel bed carried by the tuyère assembly. The tuyère side member has a downwardly-depending rib **86** extending longitudinally of the outer edge of its under surface (Figs. 8, 9 and 10). A plurality of upstanding lugs **87** are formed on the upper surface of the tuyère side member and serve to direct the flow of air passing upwardly through the opening **84** in said member. Flow of air laterally from the vicinity of the passage **84** is prevented by the depending flange **86** on the adjacent tuyère side member thereabove, as best illustrated by the dotted lines shown in Figs. 3 and 4.

In Figs. 18, 19 and 20, there is illustrated a modification of the construction just described, which differs therefrom in respect to the tuyère center member and its support. In this construction the tube **40** is omitted and tuyère center member **100** is provided with a longitudinally-extending bore **101**, the bores of adjacent members being connected by nipples **102** to provide a continuous passage for cooling medium from the lower to the upper end casting. Each of these tuyère center members is provided with tuyère nose portions and cooperating tuyère side members identical with those described in connection with the earlier construction.

Due to the absence of an independent tube, the support for the tuyère center member is modified and comprises an elongated H-shaped saddle member **103** to which the tuyère center member is connected by studs **104**, the saddle member being secured to the main supporting structural member **26** by bolts **105**.

Regardless of which construction is used for cooling the tuyère row assemblies, the side wall

tuyère rows may be cooled by the construction illustrated in Figs. 14, 15, 16 and 17. In this arrangement, there are provided flanged structural supporting members 110 and 111, providing therebetween an air space 112 communicating with the plenum chamber 22. An angle support member 113 has a bottom flange 114 resting upon the supporting members 110 and 111 and provided with openings 116 therethrough for flow of air from the plenum chamber. The angle support includes an inclined inner wall construction formed by spaced ribs 117 providing openings 118 therebetween, the outer surfaces of the ribs being concaved to provide cradle structures 119 for the reception of a longitudinally-extending cooling tube 121. This tube has its terminal portions threadedly mounted in and supported by an upper end casting 122 and a lower end casting 123, cooling fluid being supplied to the latter from the main supply header 43 by the connecting pipes 124 and 125 for flow through the tube. After passage through the tube 121, the cooling fluid is conducted from the hollow upper end casting 122 to the heat exchanger 47 through the discharge pipes 127 and 128.

The upper and lower end castings are substantially identical and reference is made to Fig. 15, which is a sectional view through the upper end casting, for a description of the construction of both. The casting is provided with an inner face plate 129 having a plurality of perforations 130 extending therethrough for passage of air from the plenum chamber to the fuel bed adjacent the face plate 129. The plate has depending lugs 132 at its upper edge and similar lugs 133 at its lower edge, the former being adapted to extend behind the upper edge of the angle support 113a and the lower lug hooking inside the flanged edge of the supporting member 111. The space between the angle support 113a and the furnace side wall 134 preferably is packed with suitable material 135, the latter being supported from beneath by the strip 136.

Between the upper and lower end castings, the tube 121 is covered by face plates 138 (Figs. 16 and 17) having perforations 139 therethrough for passage of air for combustion purposes. The face plates are provided on their sides adjacent the tube with parallel spaced ribs 140 having formed therebetween a concave trough 141 adapted to closely fit the tube 121 in heat-transfer relation thereto. A lug 142 depends from the upper edge of each plate and projects downwardly outside of the angle support 113, the space between the angle support and the furnace side wall 134 being filled with packing 135 retained by the supporting strip 136, as in the vicinity of the upper and lower end castings.

A plurality of bolts 143 serve to retain the face plate 138 in position with respect to the angle support 113, with the tube 121 clamped therebetween. Nuts 144, positioned in recessed slots 145 of the angle support 113, are threaded upon the bolts 143.

While the invention has been shown in several forms, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various other changes and modifications without departing from the spirit thereof, and it is desired, therefore, that only such limitations shall be placed thereupon as are specifically set forth in the appended claims.

What is claimed is:

1. A tuyère row comprising a pair of spaced side walls and a tuyère assembly bridging the space therebetween; said tuyère assembly comprising a longitudinally-extending tube, longitudinally-aligned tuyère cap members completely overlying said tube in heat transfer relation thereto, and tuyère side members cooperating with said tuyère cap members at both sides of the latter to provide fuel-supporting surfaces overlying the tuyère rows.

2. A tuyère row comprising a pair of spaced side walls and a tuyère assembly bridging the space therebetween: said tuyère assembly comprising a longitudinally-extending tube; means for supporting said tube intermediate its ends; longitudinally-aligned tuyère cap members overlying said tube, each of said tuyère cap members including one or more tuyère nose portions; means for retaining said tuyère cap members in heat transfer engagement with said tube; and a pair of tuyère side members complementally interlocked with each tuyère nose portion.

3. A tuyère row comprising a pair of side walls spaced apart to provide an air space and having their upper edges disposed in a common plane; a structural member extending longitudinally of said air space and having an upper surface whose sides lie in the plane containing the side wall upper edges; a cooling tube carried by said structural member; and a row of multiple-part tuyère plates bridging said space, each tuyère plate comprising a central part carried by said cooling tube in heat-conductive relation to the latter and lateral parts supported on the upper edges of the side walls and of the structural member.

4. Structure as specified in claim 3, including interlocking means on the central and lateral parts of each tuyère plate.

5. A tuyère row comprising a pair of spaced side walls and a tuyère assembly bridging the space therebetween; said tuyère assembly comprising a longitudinally-extending tube, means beneath said tube for supporting the same, longitudinally-aligned tuyère cap members straddling said tube and having surface-to-surface contact with its upper surface, means fastening the tuyère cap members to the tube-supporting means with the tube clamped therebetween, and tuyère side members interlocked with said tuyère cap members.

6. A tuyère row comprising a pair of spaced side walls and a tuyère assembly bridging the space therebetween; said tuyère assembly comprising a longitudinally-extending tube inclined from the horizontal, means for supporting said tube intermediate its ends, tuyère cap members disposed in heat transfer relation to said tube, each of said tuyère cap members including one or more tuyère nose portions lying in approximately horizontal planes, and tuyère side members cooperating with said tuyère nose portions and lying in the same planes as the nose portions with which they cooperate and extending generally rearwardly therefrom, considered in the direction of fuel feed.

7. Structure as specified in claim 6, including interlocking means on said tuyère nose portions and said tuyère side members.

8. A tuyère row comprising a pair of spaced side walls and a tuyère assembly bridging the space therebetween: said tuyère assembly comprising a longitudinally-extending tube; means for supporting said tube intermediate its ends; longitudinally-aligned tuyère cap members on said tube; means for maintaining said tuyère cap members and said tube in heat transfer relation, each of said tuyère cap members including one or more tuyère nose portions extending laterally

at both sides thereof; and a pair of tuyère side members complementary to each of said tuyère nose portions and extending laterally and rearwardly thereof considered in the direction of fuel feed and defining therewith complete fuel-supporting tuyère members.

9. Structure as specified in claim 8, including interlocking means on said tuyère nose portions and said tuyère side members.

10. Structure as specified in claim 8, wherein the tube is inclined with respect to the horizontal and a portion of each tuyère side member underlies an adjacent tuyère nose portion and is spaced therefrom, said structure including a plurality of upstanding spaced lugs on the upper surface of each of said underlying portions of the tuyère side members, the spaces between said lugs constituting air distributing passages.

11. Structure as specified in claim 8, wherein each tuyère side member has an opening therethrough overlying and in communication with the space between the tuyère row side walls for passage of air from said space.

12. Structure as specified in claim 8, wherein the tube is inclined relative to the horizontal and each tuyère side member is provided with an opening therethrough overlying and in communication with the space between the tuyère row side walls for passage of air from said space, and has a portion underlying an adjacent tuyère nose portion and spaced therefrom; said structure including a plurality of upstanding spaced lugs on the upper surface of each of said underlying portions of the tuyère side members, the spaces between said lugs constituting air distributing passages.

13. A tuyère row comprising a pair of spaced side walls and a tuyère assembly bridging the space therebetween; said tuyère assembly comprising a longitudinally-extending supporting member, a plurality of longitudinally-aligned saddle members carried by the supporting member and having concaved upper surfaces providing a longitudinally-extending groove, a tube disposed in said groove and supported intermediate its ends by said saddle members, a plurality of longitudinally-aligned tuyère cap members having concaved under surfaces providing a longitudinally-extending groove adapted to closely receive the upper convex surface of said tube, means for retaining said tuyère cap members in heat transfer relation to said tube, and tuyère side members extending laterally from and cooperating with said tuyère cap members.

14. Structure as specified in claim 13, wherein the means for retaining the tuyère cap members in heat transfer relation to the tube comprises stud bolts secured at one end to the lower sides of said tuyère cap members and at their other ends to the longitudinally-extending supporting member.

15. A tuyère row comprising a pair of spaced side walls and a tuyère assembly bridging the space therebetween; said tuyère assembly comprising a longitudinally-extending tube inclined downwardly in the direction of fuel feed, means for supporting said tube at a plurality of points intermediate its ends, a row of longitudinally-aligned tuyère cap members disposed in heat transfer relation to said tube, tuyère side members operatively associated with said tuyère cap members, said row of tuyère cap members and the associated tuyère side members providing a stepped tuyère formation extending downwardly in the direction of fuel feed, and each tuyère having an upper fuel-supporting surface whose inclination from the vertical is materially greater than that of the tube.

16. Structure as specified in claim 15, wherein the upper fuel-supporting surface of each tuyère is approximately horizontal.

17. A tuyère row comprising spaced side walls and a tuyère assembly bridging the space therebetween, said tuyère assembly comprising a longitudinally-extending tube inclined downwardly in the direction of fuel feed, supporting means for said tube, a row of longitudinally-aligned tuyère cap members disposed in heat transfer relation to said tube, each of said tuyère cap members including a plurality of tuyère nose portions each spaced vertically from the adjacent nose portions and projecting forwardly in the direction of fuel feed beyond the adjacent nose portion thereabove, and a pair of tuyère side members extending generally rearwardly from each tuyère nose portion and providing therewith a complete tuyère.

18. Structure as specified in claim 17, wherein said tuyère side members include means defining a plurality of generally horizontal air distribution passages between adjacent tuyères.

19. A tuyère row comprising spaced side walls and a tuyère assembly bridging the space therebetween; said tuyère assembly comprising a row of longitudinally-aligned tuyère center members, each of said members including a plurality of tuyère nose portions, a pair of tuyère side members extending generally rearwardly from each tuyère nose portion considered in the direction of fuel feed and providing therewith a complete tuyère, and means providing a conduit extending from end to end of said row of tuyère center members in heat transfer relation to said tuyère nose portions.

20. Structure as specified in claim 19, including interlocking means on the tuyère nose portions and the tuyère side members.

21. A tuyère row comprising spaced side walls and a tuyère assembly bridging the space therebetween; said tuyère assembly comprising first means providing a longitudinally-extending conduit, second means in heat transfer relation to said first means and including a plurality of tuyère nose portions, and a pair of tuyère side members extending generally rearwardly from each tuyère nose portion considered in the direction of fuel feed and providing therewith a complete tuyère.

22. Structure as specified in claim 21, including interlocking means on the tuyère nose portions and the tuyère side members.

23. A tuyère row comprising a pair of spaced walls and a tuyère assembly bridging the space therebetween; said tuyère assembly comprising a row of longitudinally-aligned hollow body members arranged end to end, means providing communication between the hollow interiors of adjacent body members whereby there is provided a continuous passage extending from end to end of the row, a plurality of tuyère nose portions formed integral with each of said body members, and a pair of tuyère side members extending generally rearwardly from each tuyère nose portion considered in the direction of fuel feed and providing therewith a complete tuyère.

24. A tuyère row comprising a pair of spaced walls and a tuyère assembly bridging the space therebetween; said tuyère assembly comprising a row of longitudinally-aligned body members arranged in end-to-end relation, said row being

inclined relative to the horizontal and each of said body members having a passage extending therethrough, means connecting adjacent ends of the passages of adjacent body members whereby a continuous conduit is provided extending from end to end of the row, each of said body members having formed integral therewith a plurality of tuyère nose portions each spaced vertically from the adjacent nose portions and projecting forwardly in the direction of fuel feed beyond the adjacent nose portion thereabove, and a pair of tuyère side members extending generally rearwardly from each tuyère nose portion and providing therewith a complete tuyère.

25. Structure as specified in claim 24, wherein said tuyère side members include means defining a plurality of generally horizontal air distribution passages between adjacent tuyères.

26. A tuyère side member adapted for assembly on a stoker of the multiple retort type, said tuyère member comprising an elongated body structure having part of the rearward portion of its lower surface inclined upwardly towards the rear edge and adapted to rest upon the correspondingly inclined upper edge of a tuyère row side wall, a forwardly-projecting lip at the front edge of the body structure adapted to mate with a ledge on a complemental tuyère center member, said lip having a recess in its front edge adapted to receive a mating projection on the complemental tuyère center member, whereby lateral displacement of the forward portion of the tuyère side member is prevented, and a downwardly-projecting lug on the inclined lower surface adapted to tbut the tuyère row side wall, whereby lateral displacement of the rear portion of the tuyère side member is prevented.

27. A tuyère member comprising an elongated body structure having a vertical opening therethrough for passage of air and having at its front end a lower bearing surface for supporting said end, means carried by said end for preventing lateral displacement thereof, means at the rear end of the body structure adapted to engage a supporting structure to prevent lateral displacement of said rear end, said body structure having an inclined lower bearing surface for supporting said rear end, and spaced air-directing means extending vertically from the upper surface of the body structure.

28. A tuyère side member adapted for assembly on a stoker of the multiple retort type, said tuyère side member comprising a body structure having part of the rear portion of its under surface inclined to mate with a correspondingly inclined support, a forwardly-projecting lip at the front edge of the body structure, and means carried by said body structure for preventing lateral displacement thereof.

29. Structure as specified in claim 28, wherein the body structure is provided with a vertical opening therethrough for passage of air, and including a plurality of air-directing elements.

30. Structure as specified in claim 28, including a plurality of spaced air-directing elements extending vertically from the upper surface of the body structure.

31. A tuyère cap adapted for assembly on a tube of a fluid-cooled stoker, said tuyère cap comprising an elongated body structure having an arcuate tube-receiving portion, and a plurality of tuyère elements extending laterally from said body structure.

32. A tuyère cap adapted for assembly on a tube of a fluid-cooled stoker, said tuyère cap comprising an elongated body structure having a tube-receiving groove in its under surface, and a plurality of tuyère elements extending laterally from said body structure.

33. A tuyère cap adapted for assembly on a tube of a fluid-cooled stoker, said tuyère cap comprising an elongated body structure having an arcuate tube-receiving groove in its under surface, a plurality of tuyère nose elements integral with said body structure and adapted to cooperate with complemental tuyère side elements to provide complete tuyère members, and means at the rear edges of said tuyère nose elements adapted to engage with and prevent lateral movement of the adjacent edges of the complemental tuyère side elements when assembled therewith.

34. A tuyère cap adapted for assembly on a tube of a fluid-cooled stoker, said tuyère cap comprising an elongated body structure having a tube-receiving groove in its under surface, a plurality of tuyère nose elements integral with said body structure and adapted to cooperate with complemental tuyère side elements to provide complete tuyère members, rearwardly-extending lips at the rear edges of said tuyère nose elements adapted to be disposed in lapping relation to mating lips at adjacent edges of the complemental tuyère side elements when assembled therewith.

35. A tuyère center member adapted for use in a fluid-cooled stoker, said member comprising an elongated body structure having a fluid passage extending therethrough from end to end, and a plurality of tuyère nose elements integral with said body structure and adapted to engage cooperatively and extending laterally from opposite sides thereof with complemental tuyère side elements to provide complete tuyère members.

36. A tuyère center member adapted for use in a fluid-cooled stoker, said member comprising an elognated body structure having a fluid passage extending therethrough from end to end and adapted to be supported in an inclined position, and a plurality of tuyère nose elements integral with the body structure and extending laterally therefrom in spaced relation at opposite sides thereof, said tuyère nose elements being adapted to present upper fuel-supporting surfaces inclined at a greater angle to the vertical than the inclination of the tuyère center member when in its supported position.

37. A tuyère center member adapted for use in a fluid-cooled progressive feed stoker, said member comprising an elongated body structure adapted to be supported in an inclined position and having a fluid passage extending therethrough from end to end, a plurality of tuyère nose elements integral with the body structure and extending laterally from both sides thereof and being adapted to present approximately horizontal upper fuel-supporting surfaces when the tuyère center member is supported in inclined position, and lips at the rear edges of the nose elements adapted to lap mating lips on complemetal tuyère side members when assembled.

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