April 25, 1939. H. E. LIPPERT 2,155,608

FUEL DISTRIBUTING APPARATUS

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Fig. 1

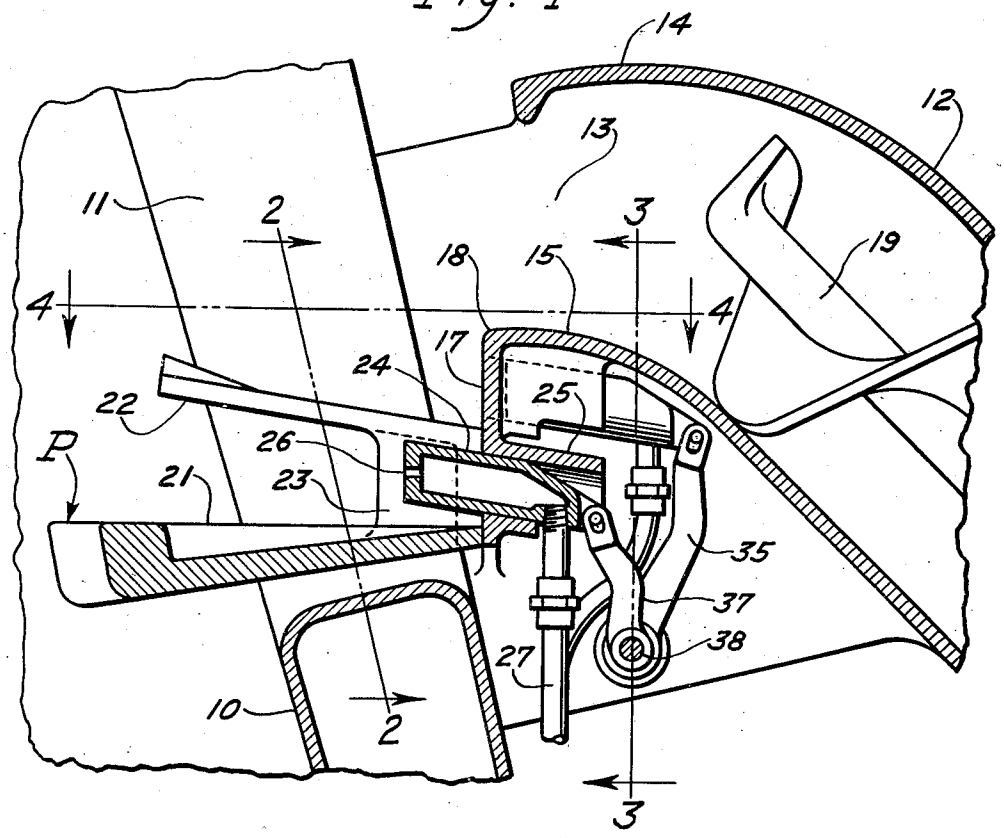
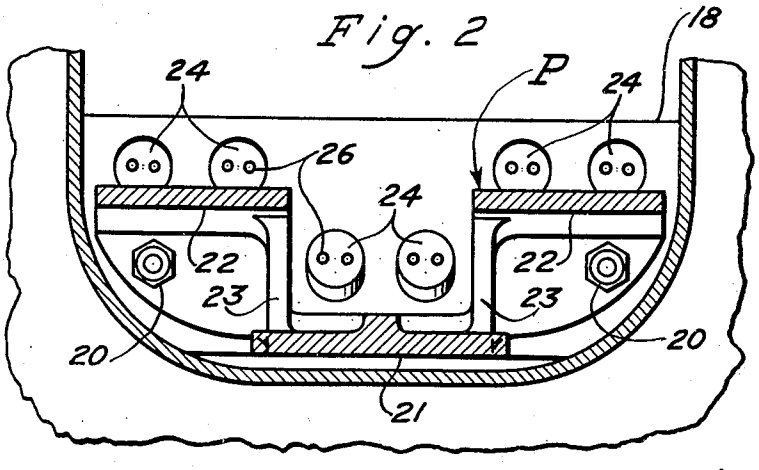


Fig. 2



INVENTOR

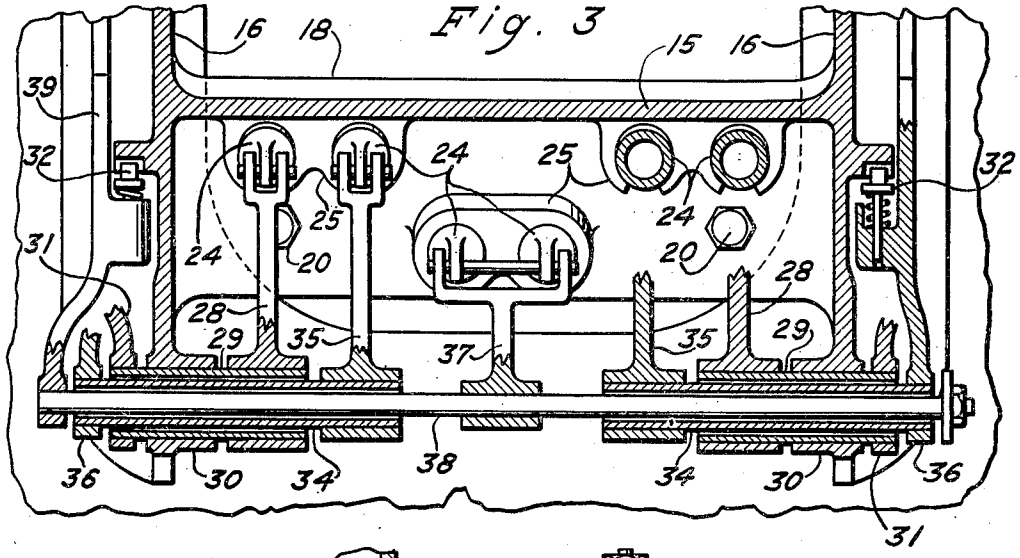
Henry E. Lippert

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FUEL DISTRIBUTING APPARATUS

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Fig. 3



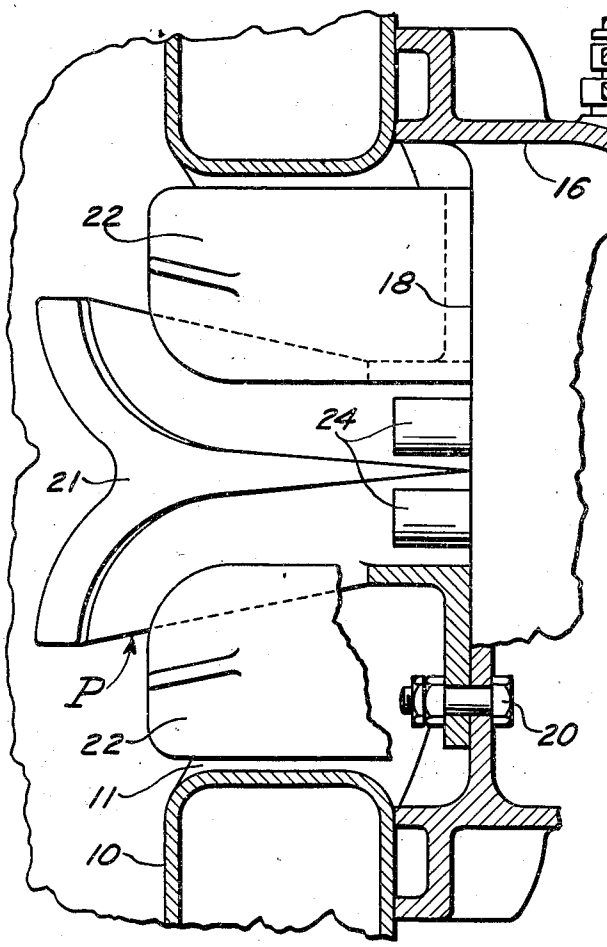
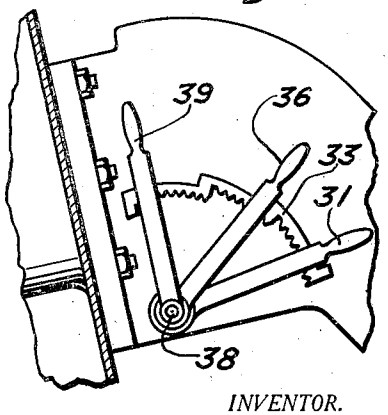


Fig. 4

Fig. 5



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FUEL DISTRIBUTING APPARATUS

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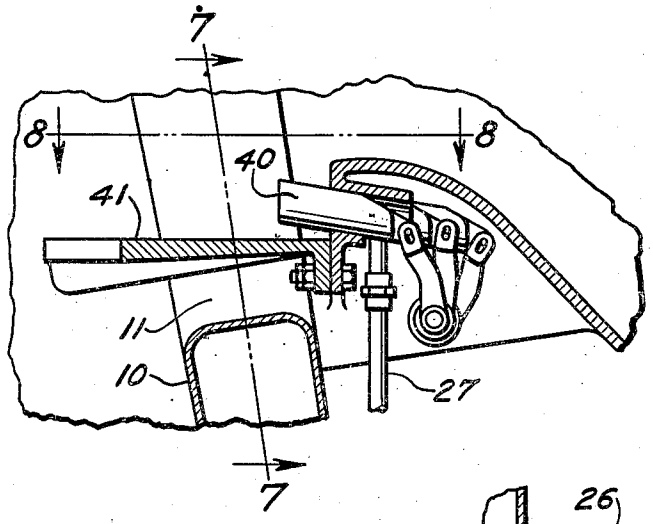
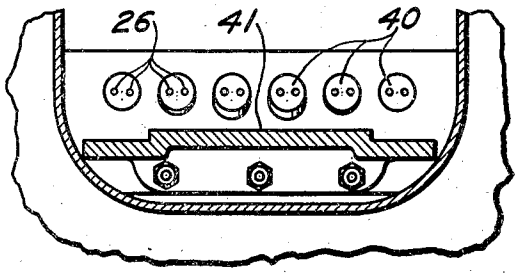


Fig. 6

Fig. 7



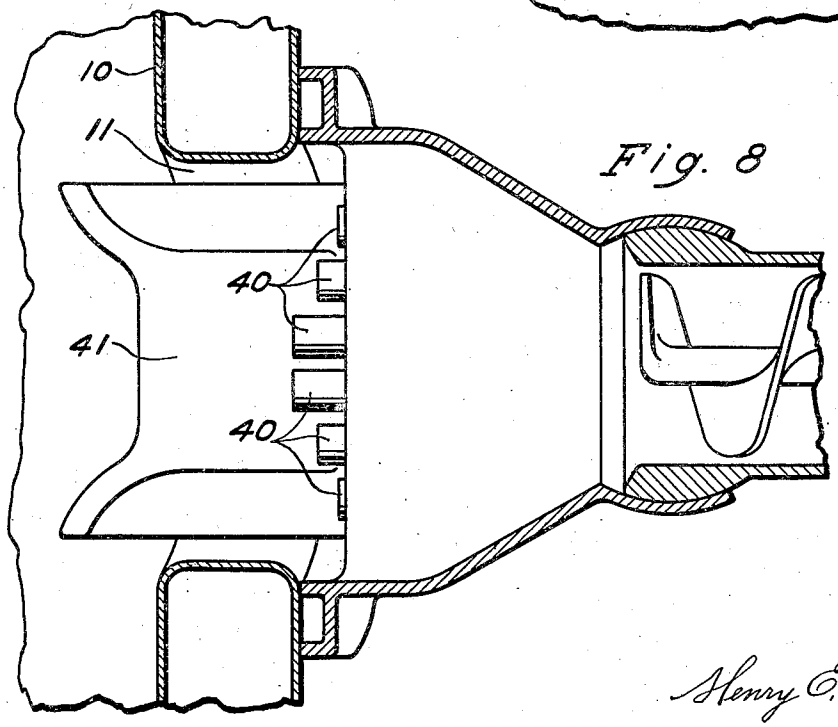


Fig. 8

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Patented Apr. 25, 1939

2,155,608

UNITED STATES PATENT OFFICE

2,155,608

FUEL DISTRIBUTING APPARATUS

Henry E. Lippert, Pittsburgh, Pa.

Application July 11, 1936, Serial No. 90,098

12 Claims. (Cl. 110—104)

This invention relates to fuel distributing apparatus, and particularly to distributing apparatus for use with a stoker which delivers fuel to an opening in a wall of a firebox.

The primary object of the invention is to provide new and improved distributing apparatus that can be manually controlled or adjusted to correct uneven distribution of fuel over a firebed, or to correct an irregular or uneven firebed. The invention consists in the provision of a plurality of manually movable distributor nozzles arranged to discharge fuel over a distributor plate, the nozzles being capable of adjustment or movement longitudinally of the distributor plate so they can be moved into or out of the path of fuel delivered to the distributing apparatus. By arrangement of the nozzles, less fuel can be discharged to a portion of the firebed having more fuel than the remaining portions, or more fuel can be discharged to a part of firebox having less fuel than the other parts, thus enabling correction of a firebed condition when there are high or heavy spots and low or thin spots.

Other objects and advantages of the invention will appear from a reading of the following description taken in connection with the accompanying drawings, forming a part hereof, in which:

Fig. 1 is a vertical longitudinal section of the delivery end of a stoker and a portion of a locomotive backhead, showing the invention applied thereto.

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1.

Fig. 3 is a transverse section taken on line 3—3 of Fig. 1 and is somewhat diagrammatic for clarity.

Fig. 4 is a horizontal sectional view taken on line 4—4 of Fig. 1 and has parts on the left side broken away.

Fig. 5 is a side elevational view, on a reduced scale, of the delivery end of the stoker.

Fig. 6 is a view similar to Fig. 1, and illustrates a modified form of the invention.

Fig. 7 is a transverse section taken on line 7—7 of Fig. 6.

Fig. 8 is a horizontal sectional view taken on line 8—8 of Fig. 6.

Referring to the drawings, the numeral 10 designates a locomotive firebox backhead or back wall having a firing opening 11 therein. A stoker conduit 12, mounted exteriorly of the firebox, extends upwardly to and communicates with the firing opening 11. The delivery end of conduit 12 is provided with a mouth portion 13 which is defined by a top wall 14, a bottom wall 15 and side walls 16. A transverse vertically disposed wall 17 projects downwardly from the forward terminus of bottom wall 15 and extends between the side walls 16. Fuel delivered through the stoker conduit by a helical screw 19 falls over a ledge 18, formed at the juncture of walls 15 and 17, in front of vertical wall 17 onto a distributor plate P.

The plate P is rigidly secured to wall 17 by bolts 20, and it extends forwardly from this wall into the lower portion of firing opening 11. The distributor plate comprises, generally speaking, a bottom portion 21 arranged centrally of the firing opening, and shelf portions 22 disposed above the bottom portion. Each shelf portion or shelf 22 is arranged on one side of the bottom portion 21 and lies adjacent a side marginal edge of the firing opening. The bottom portion at its forward end extends beyond the corresponding ends of the shelves 22. The shelves are spaced transversely from each other, and are spaced vertically a greater distance from the bottom portion 21 at their forward ends then at their rearward ends. Shelves 22 are also arranged so their top surfaces lie in the same slightly inclined plane. Each shelf is connected to the rear end of bottom portion 21 by a rib 23.

Six distributor nozzles 24 are arranged at the rearward end of plate P to discharge fuel thereover. The nozzles are slidably mounted for longitudinal movement in bearings 25 formed on the rear face of vertical wall 17. They are also arranged to move in planes parallel to the vertical medial plane of the firing opening 11, and in planes at right angles to the wall 17. Two jet apertures 26 are contained in the front wall of each nozzle for emitting blasts of pressure fluid over the distributor plate. Pipe lines 27, portions of which are flexible to move with the nozzles, serve to deliver fluid under pressure to the nozzles from any preferred source.

The nozzles are separated and spaced transversely from each other. A center pair of nozzles is arranged to discharge fuel over the plate bottom portion 21, and a pair of nozzles at each side of the central pair and disposed at a higher elevation is arranged to discharge fuel over each shelf 22. Nozzles 24 are also mounted for movement in slightly upwardly and forwardly inclined planes. Hence, the jet apertures 26 in the center pair of nozzles will be disposed at a slightly higher elevation, with reference to the top surface of plate bottom portion 21, when these nozzles are in their forward positions than when they are in their rearward positions.

Each end nozzle is hinged to an arm **28** fixed on a sleeve **29** mounted for rotation in a bearing **30** formed on the downwardly extended side walls of the stoker conduit. A hand lever **31**, on each side of the conduit, is fixed to the outside end of each sleeve **29** for manually moving an end nozzle independently of the other nozzles.

The second nozzle from each end is hinged to an arm **35** rigid with a sleeve **34** mounted for rotation within one of sleeves **29**. A hand operated lever **36**, on each side of the stoker conduit, is fixed to the outer end of each sleeve **34** for moving or adjusting each of these nozzles independently of the other nozzles.

The central pair of nozzles is hinged to a common arm **37** rigidly secured to a rod or shaft **38** mounted for rotation within sleeves **34**. A hand lever **39**, arranged on one side of the stoker conduit, is fixed to an end of shaft **38** for manually and simultaneously varying the position of the center pair of nozzles, and hence the jet apertures contained therein. Each hand lever, and therefore each nozzle, can be held in any one of a number of positions by means of a latch **32** carried by the lever and arranged to engage a notched segment **33** on the stoker conduit.

By changing the position of any hand lever, the position of the jet apertures **26** in the nozzle or nozzles which that lever controls will be varied longitudinally of the distributor plate P. The nozzles **24** are arranged for movement so that the jet blasts from the apertures **26** therein can emit from a point slightly rearward of the vertical wall **17** and ledge **18**, or from a point approximately six inches forward of this wall and ledge, or from any one of a plurality of intermediate points. The distance which each nozzle projects forward of wall **17** and ledge **18** can thus be varied.

Each nozzle **24** may be set so it will discharge all of the fuel, delivered to it over ledge **18**, to the portion of the firebox which that particular nozzle supplies, or one or more of the nozzles can be moved forward so they will discharge into the firebox only a portion of the fuel delivered to them. The excess fuel that otherwise would be discharged by the forward nozzles, passes into the range of the fluid blasts issuing from the rearward nozzles.

The distributing apparatus described herein is designed to distribute fuel evenly over a locomotive firebed of average size and shape when all of the jet apertures **26** lie in the same transverse plane, or when all of the nozzles **24** are located midway of their possible longitudinal positions. To facilitate firing a firebox of another size or shape, one or more of the nozzles can be moved into either their forward or rearward positions, as the case may require.

Should the apparatus supply less fuel to one portion of the firebed than the other parts, the nozzle which discharges fuel to that portion may be moved rearward so that the amount of fuel delivered into the range of the jet blasts therefrom will be increased, thereby increasing the amount of fuel supplied to the thin portion of the firebed. If more fuel is supplied to one part of the firebed than the remaining portions, the nozzle which discharges fuel to that part can be moved forward so that the opposite result is obtained.

The modification of the invention as shown in Figs. 6, 7 and 8 is similar to the preferred form in essential features. It differs from the above described structure in that the distributor nozzles **40** are all arranged in the same transverse slightly inclined plane, in order that the invention may be used with a distributor plate **41** of conventional design.

I claim:

1. The combination with a firebox having a firing opening, of a stoker conduit member arranged to deliver fuel to said firing opening, a distributor plate arranged to receive fuel from the delivery end of said conduit member, a wall between said conduit member and said plate in front of which fuel falls from said conduit member onto said plate, a plurality of separated, transversely spaced distributor nozzles arranged to extend through said wall, each of said nozzles having a jet aperture for emitting a blast of pressure fluid to discharge fuel over said plate, and means for varying the distance one of said nozzles extends through said wall independently of the other of said nozzles.

2. The combination with a firebox having a firing opening, of a stoker conduit member arranged to deliver fuel to said firing opening, a distributor plate arranged to receive fuel from the delivery end of said conduit member, a wall between said conduit member and said plate in front of which fuel falls from said conduit member onto said plate, a plurality of separated, transversely spaced distributor nozzles mounted in and arranged to extend through said wall, each of said nozzles being arranged for longitudinal movement in a plane substantially at right angles to the plane of said wall and having a jet aperture for emitting a blast of pressure fluid to discharge fuel over said plate, means for delivering pressure fluid to said nozzles, and separate means for varying the distance each nozzle extends through said wall.

3. The combination with a firebox having a firing opening, of a distributor plate disposed in said firing opening, a stoker conduit member arranged to deliver fuel to the firing opening and having a ledge over which fuel falls onto said plate, a plurality of separated, transversely spaced distributor nozzles mounted for longitudinal movement in planes substantially parallel to the vertical medial plane of said firing opening and being arranged to extend forward of said ledge, each of said nozzles being disposed beneath said ledge and having a jet aperture for emitting a blast of pressure fluid to discharge fuel over said plate, means for delivering pressure fluid to said nozzles, and means for varying the distance one of said nozzles extends forward of said ledge independently of another of said nozzles.

4. The combination with a firebox having a firing opening, and a stoker conduit member having a wall over which fuel is delivered to said firing opening, of fuel distributing apparatus comprising, a distributor plate, a plurality of separated, transversely spaced distributor nozzles disposed beneath said wall and mounted for longitudinal movement over the rear end of said plate, said plate being arranged to receive fuel downwardly between said nozzles from the delivery end of said conduit member, each of said nozzles having a jet aperture for emitting a blast of pressure fluid to discharge fuel over said plate, and means for varying the distance one of said nozzles extend over the rear end of said plate independently of another of said nozzles, whereby one of said nozzles can extend over the rear end of said plate a greater distance than another of said nozzles.

5. The combination with a firebox having a firing opening, and a stoker conduit member having a wall over which fuel is delivered to said

firing opening, of fuel distributing apparatus comprising, a distributor plate arranged to receive downwardly a stream of fuel from the delivery end of said conduit member, a plurality of separated, transversely spaced distributor nozzles disposed beneath said wall and mounted for longitudinal movement over the rear end of said plate, each of said nozzles having a jet aperture for emitting a blast of pressure fluid to discharge fuel over said plate, and means for varying the distance one of said nozzles extends into said stream of fuel independently of another of said nozzles, whereby one of said nozzles can extend into said stream of fuel a greater distance than another of said nozzles.

6. The combination with a firebox having a firing opening, of a stoker conduit member having a wall over which a stream of fuel is delivered to said firing opening, a distributor plate extending forwardly from said wall and arranged to receive said stream of fuel, a plurality of separated and transversely spaced distributor nozzles disposed beneath said wall and mounted for longitudinal movement into and out of the path of said stream of fuel, each of said nozzles having a jet aperture for emitting a blast of pressure fluid to discharge fuel over said plate, and means for moving one of said nozzles into and out of the path of said stream of fuel independently of the other of said nozzles.

7. The combination with a firebox having a firing opening, of a stoker conduit member arranged to deliver fuel to said firing opening, a distributor plate in the firing opening, a plurality of separated and transversely spaced distributor nozzles mounted for longitudinal movement over the rear end of said plate, said plate being arranged to receive fuel downwardly between said nozzles from the delivery end of said conduit member, each of said nozzles having a jet aperture for emitting a blast of pressure fluid to discharge fuel over said plate, and manually adjustable means on said conduit member for varying the distance one of said nozzles extends over the rear end of said plate independently of the other of said nozzles.

8. The combination with a firebox having a firing opening, and a conduit member arranged to deliver fuel to said firing opening, of fuel distributing apparatus comprising, a distributor plate extending forwardly from said conduit member into the firing opening and having an approximately horizontally disposed top surface onto which fuel is delivered by said conduit member, a slidably mounted distributor nozzle having a jet aperture arranged to emit a blast of pressure fluid for discharging fuel over said plate, means for delivering pressure fluid to said nozzle, and means for varying the position of said jet aperture vertically with reference to said top surface, said nozzle being disposed beneath the delivery end of said conduit member and mounted for movement between the rear end of said plate and the adjacent wall of said conduit member.

9. The combination with a firebox having a firing opening, and a conduit member having a wall over which fuel is delivered to said firing opening, of fuel distributing apparatus comprising, a distributor plate extending forwardly from said conduit member and arranged to receive fuel therefrom, a pluality of separated and transversely spaced distributor nozzles disposed beneath said wall and mounted for movement over the rear end of said plate, said plate being arranged to receive fuel downwardly between said nozzles, means for delivering pressure fluid to said nozzles, means supporting said nozzles in positions between said plate and said conduit member, and means for varying the position of one of said nozzles longitudinally of said plate independently of another of said nozzles.

10. The combination with a firebox having a firing opening, and a conduit member having a wall over which fuel is delivered to said firing opening, of fuel distributing apparatus comprising, a distributor plate disposed in said firing opening and arranged to receive fuel on its rear end from the delivery end of said conduit member, a plurality of separated and transversely spaced distributor nozzles disposed beneath said wall and slidably mounted on said conduit member beneath the delivery end thereof for longitudinal movement over the rear end of said plate, each of said nozzles having a jet aperture arranged to emit a blast of pressure fluid for discharging fuel over said plate, means for delivering pressure fluid to said nozzles, and means for varying the distance one of said nozzles extends over the rear end of said plate independently of another of said nozzles.

11. The combination with a firebox having a firing opening, of fuel distributing apparatus comprising, a distributor plate disposed in said firing opening, a stoker conduit member communicating with said firing opening and having a ledge over which fuel falls onto said plate, a plurality of separated and transversely spaced distributor nozzles disposed beneath said ledge and arranged for longitudinal movement between said plate and said ledge in planes substantially parallel to the vertical medial plane of said firing opening, said nozzles being arranged to extend over said plate and forward of said ledge, each of said nozzles having a jet aperture for emitting a blast of pressure fluid to discharge fuel over said plate, means for delivering pressure fluid to said nozzles, and means for varying the distance one of said nozzles extends forward of said ledge independently of another of said nozzles.

12. The combination with a firebox having a firing opening, of fuel distributing apparatus comprising, a conduit member arranged to deliver fuel to said firing opening, a distributor plate extending forwardly from said conduit member and arranged to receive fuel from the delivery end thereof, an upright wall between said plate and the delivery end of said conduit member in front of which fuel falls onto said plate, a plurality of separated and transversely spaced distributor nozzles supported by and arranged to extend through said wall, each of said nozzles also being arranged for longitudinal movement in a plane substantially at right angles to the plane of said wall and having a jet aperture for emitting a blast of pressure fluid to discharge fuel over said plate, means for delivering pressure fluid to said nozzles, and means for varying the distance one of said nozzles extends through said wall independently of another of said nozzles.

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