F. W. LINAKER.

TUBE CLEANER.

APPLICATION FILED MAR. 3, 1915.

1,152,423.

Patented Sept. 7, 1915.

2 SHEETS—SHEET 1.

Fig. 2.

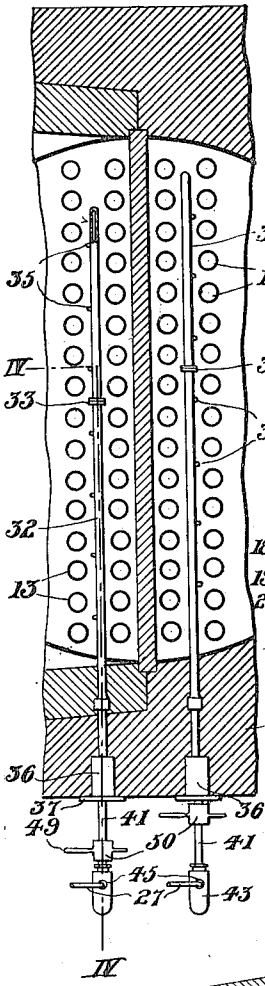


Fig. 1.

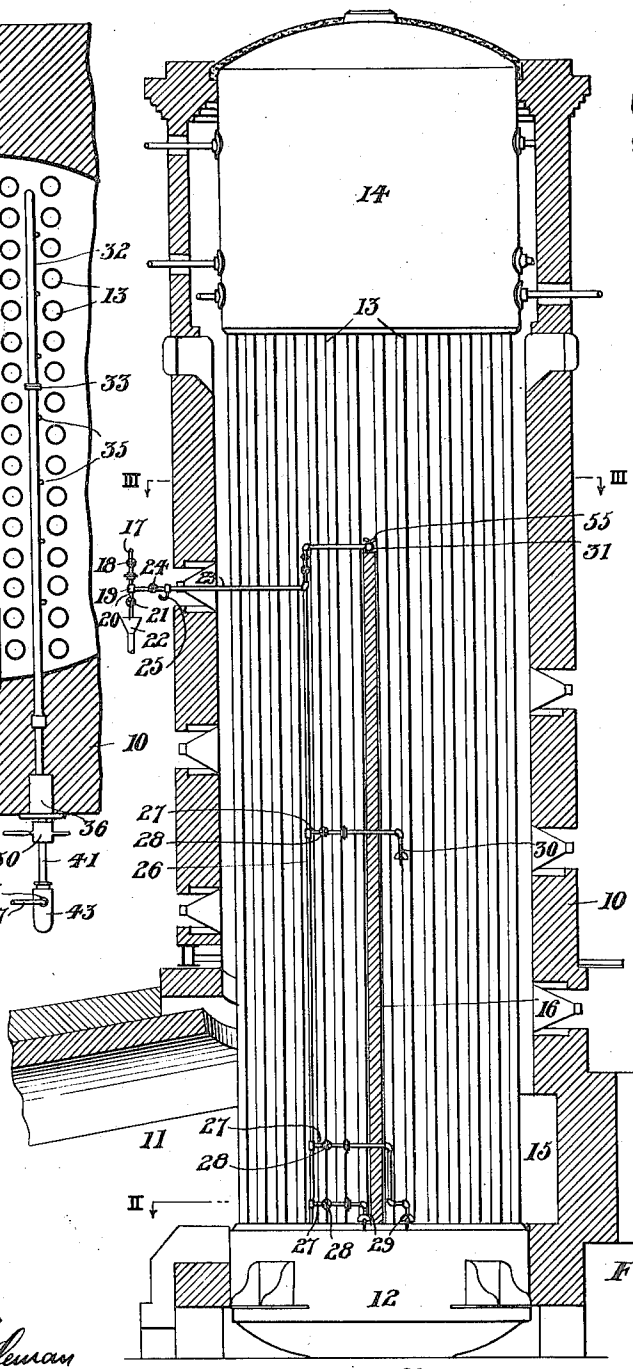
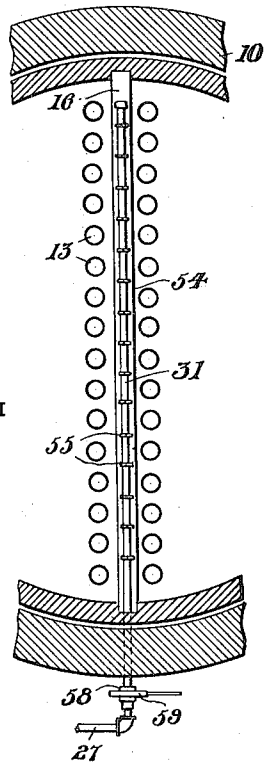


Fig. 3.



Witnesses

A. P. Fleming

G. Notes

Inventor

Frederick W. Linaker

By A. M. Wilson

Attorney

F. W. LINAKER.

TUBE CLEANER.

APPLICATION FILED MAR. 3, 1915.

1,152,423.

Patented Sept. 7, 1915.

2 SHEETS—SHEET 2.

Fig. 4.

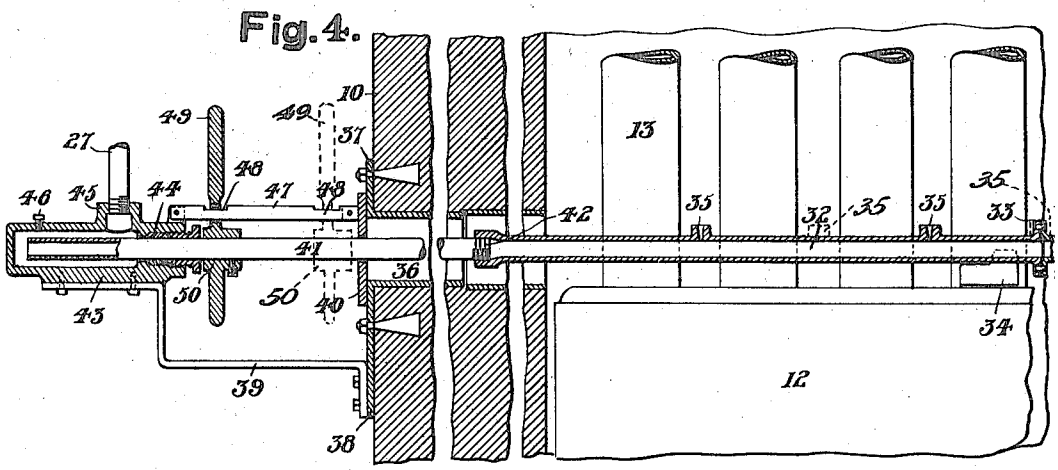


Fig. 5.

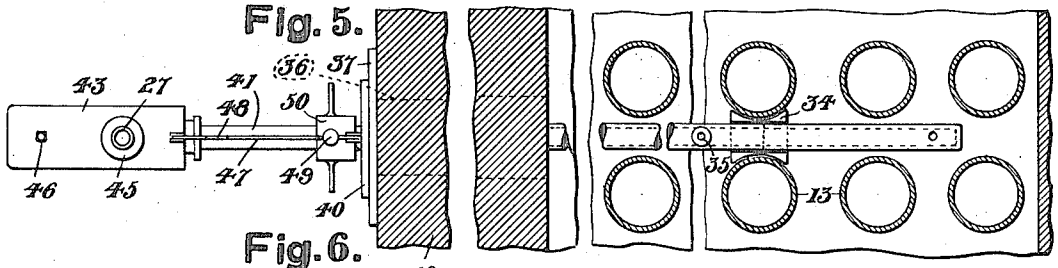


Fig. 6.

Fig. 7.

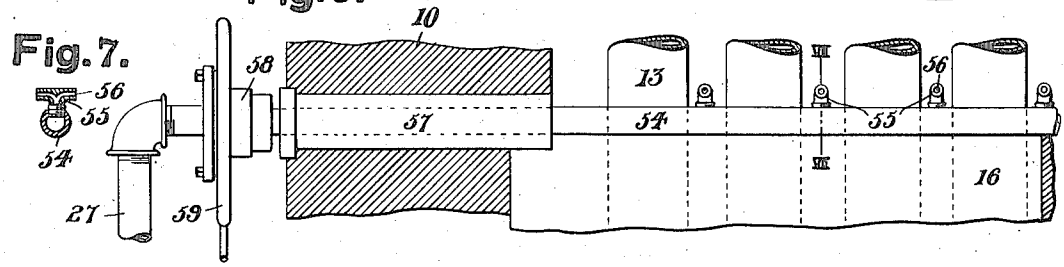


Fig. 8.

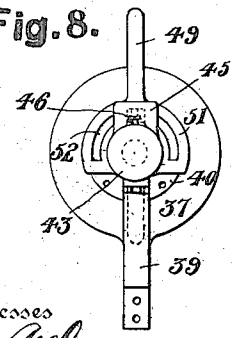


Fig. 9.

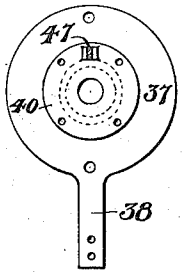
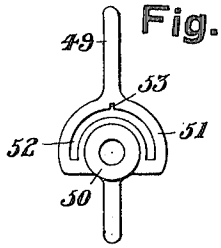


Fig. 10.



Witnesses

J. R. Appleman,

G. Notes

Inventor

Frederick W. Linaker

By

A. M. Wilson

Attorney

UNITED STATES PATENT OFFICE.

FREDERICK W. LINAKER, OF DUBOIS, PENNSYLVANIA, ASSIGNOR TO THE VULCAN SOOT CLEANER CO. OF PITTSBURG, PA., OF DUBOIS, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

TUBE-CLEANER.

1,152,423. Specification of Letters Patent. Patented Sept. 7, 1915.

Application filed March 3, 1915. Serial No. 11,899.

To all whom it may concern:

Be it known that I, FREDERICK W. LINAKER, a subject of the King of England, residing at Dubois, in the county of Clearfield and State of Pennsylvania, have invented certain new and useful Improvements in Tube-Cleaners, of which the following is a specification.

This invention relates to tube cleaners and has special reference to a fluid blast tube cleaner adapted particularly for cleaning tubes which are set very closely together so that the fluid supply pipe is necessarily of a small diameter.

In cleaning the tubes of boilers and other like elements where water tubes are employed and these tubes are set close together, much difficulty has been heretofore experienced by reason of the fact that sufficient space does not obtain between the rows of water tubes to permit the installation and utilization of a fluid distributing pipe of sufficient diameter to furnish enough cleaning agent under pressure to blow off the accumulation of soot from the tubes.

One object of the present invention is to provide means by which a distributing pipe of small diameter may be utilized for cleaning the tubes of such a boiler or like element.

A second object of the invention is to provide means for efficiently utilizing a relatively small number of distributing pipes in a multitubular boiler or like device.

In cleaning the tubes of a water tube boiler or like device it is necessary, in order to produce the most efficient results, that the distributing pipe which extends between such tubes be provided with properly formed jet nozzles, since mere openings in the pipe are inefficient for the purpose.

A third object of the invention is to provide means whereby a distributing pipe provided with such nozzles may be rotated so that the blast from these nozzles may be caused to cover a wide segment of the tube area while the distributing pipe may be positioned so that the nozzles will slip between the tubes as the distributing pipe is moved longitudinally to place the nozzles in position to clean other tubes or other parts of the same tubes.

A fourth object of the invention is to provide means for locking the distributing pipe against longitudinal movement when in cleaning position and against rotative movement while being adjusted so that the chance of damaging either the tubes or nozzles when moving the distributing pipe from one cleaning position to another is eliminated.

Difficulty has been experienced heretofore in cleaning the upper parts of the tubes in such water tube boilers as have the tubes extending vertically and separated into a plurality of sets by a vertical baffle extending upward from the bottom drum to a point below the top drum, the boilers being of or similar to the well known boiler designated commercially as the "Wickes" boiler.

A fifth object of the invention is to provide a novel arrangement of fluid pressure tube cleaner especially adapted for use in such a type of boiler.

A sixth object of the invention is to provide a novel form of distributing nozzle for use in connection with such a tube cleaner.

With the above and other objects in view, the invention consists in general of certain novel arrangements of parts, combinations of elements, and specific details hereinafter fully described, illustrated in the accompanying drawings, and specifically claimed.

In the accompanying drawings, like characters of reference indicate like parts in the several views, and Figure 1 is a vertical sectional view through a vertical water tube boiler of the "Wickes" type showing the invention applied thereto. Fig. 2 is an enlarged detail section on line II—II of Fig. 1. Fig. 3 is an enlarged detail section on the line III—III of Fig. 1. Fig. 4 is an enlarged detail section, certain of the parts being broken away, on the line IV—IV of Fig. 2. Fig. 5 is a detail plan view of the apparatus shown in Fig. 4, the boiler being shown in section. Fig. 6 is a detail view showing a section of the boiler at the top of the baffle in order to disclose the arrangement for cleaning the upper parts of the tubes. Fig. 7 is a section on line VII—VII of Fig. 6. Fig. 8 is a detail end view of the exterior parts of such a device as is shown in Fig. 4. Fig. 9 is a face view of a certain sleeve used in connection with the cleaner. Fig. 10 is a detail elevation of the operating lever used with the cleaner.

Referring now to Fig. 1, there is disclosed

a boiler or like power producing device having a casing 10 and provided with a fire-box 11. The boiler proper consists of a bottom water drum 12 which is connected by vertical water tubes 13 to a steam drum 14. Extending upward from the drum 12 between the fire-box 11 and smoke flue 15 is a vertically disposed baffle 16 which terminates in spaced relation to the drum 14. It is to be noted that in Fig. 1 the main supply and branch pipes with their connected parts are shown in full lines although these parts are exterior to the boiler. In this figure the main supply pipe is indicated at 17 and is controlled by a valve 18. This supply is connected to an elbow 19 from which extends a drain 20 controlled by a valve 21 and communicating with a drain funnel 22. Extending laterally from the elbow 19 is a pipe 23 which is controlled by a valve 24 and is provided with a suitable automatic drain 25. This pipe 23 communicates with a feed pipe 26 from which extend branch pipes 27 controlled by valves 28. The lowermost of these branch pipes 27 and the one immediately thereabove communicates with distributing pipes indicated in general at 29 in Fig. 1 and located on opposite sides of the baffle adjacent the drum 12.

While there has been shown only one branch pipe 27 between the top and bottom of the baffle adjacent the middle thereof, it will be obvious that a plurality of such pipes may be provided and each of these pipes communicates with a distributing pipe indicated in general at 30 in Fig. 1. The uppermost branch pipe 27 communicates with a distributing pipe indicated in general at 31 Fig. 1 and located at the upper edge of the baffle 16.

All of the pipes 29 and 30 are similar in construction and the construction of these pipes is illustrated in Figs. 2, 4, 5, 8, 9, and 10, these figures also showing their connections with the branch pipes 27. Each of the pipes 29 and 30 comprises an inner section indicated at 32, which inner section may be in one piece, or may consist of a plurality of lengths connected by suitable flanges 33. These inner sections rest on bearing blocks 34 to prevent sagging and are provided with nozzles 35, said nozzles being preferably spaced at such distance as to skip one or more of the tube intervals as indicated clearly in Fig. 4. Extending through the wall of the tubular casing is a tubular member 36 having a flange 37 from which projects downwardly an arm 38. This flange fits against the outer part of the wall of the boiler casing and to the downwardly extending arm 38 is secured a bracket 39. Moreover, to this flange is secured a perforated plate 40 through which extends the outer portion 41 of the distributing pipe, this outer portion being screw connected to the inner portion 32 as at 42. Preferably this outer portion is made of seamless drawn tubing. On the bracket 39 is supported an elongated casing 43 provided with a stuffing box 44 through which the pipe 41 is slidable and in which said pipe is rotatable. This casing 43 is connected as at 45 with one of the pipes 27 and is also provided with an automatic air valve as indicated at 46, the valve preferably being of the type disclosed in the patent to De Los E. Hibner #984,919 and issued on the 21st day of February, 1911. Extending between the casing or head 43 and the plate 40 is a bar 47 provided with spaced notches 48.

49 designates an operating lever which is formed integral with a hub 50 fitted on and secured to the pipe 41. This operating lever is provided with a segmental portion 51 having therein an arcuate slot 52 provided centrally or at one side with a notch 53. The notch 53 is arranged in alinement with the nozzles 35.

Referring now to Figs. 4 and 5. In Fig. 4 the pipe 32 is shown in position to clean certain of the surfaces of the tubes 13. It will be obvious that if steam be supplied through the pipe 27 it will flow through the pipes 41 and 32 and issue from the nozzles 35. By oscillating the lever 49, which is permitted because the width of the bar 47 corresponds to the width of the slot 52, the nozzles are caused to move in arcs of circles and the issuing steam or other fluid jet sweeps across the tubes. It is not found possible in the case of closely set water tubes to provide a nozzle for each steam space on account of the small diameter of the pipe 32. When it is wished to clean the spaces which are shown in Fig. 4, as not provided with nozzles, the lever 49 is moved to vertical or other position as the case may be, whereupon, by reason of the notch 53, the lever 49 may be pushed toward the boiler until the inner notch 48 coincides with the slot 52. These notches 48 are spaced at a distance equal to the spaces between successive tubes so that at this time the nozcles 35 assume the position shown in dotted lines in Fig. 4. When in this position the lever 49 may be again oscillated and the unclean spaces cleaned.

It will be obvious that by a mere extension in length of the bar 47 and the provision of suitably spaced notches 48 the nozzles 35 may be spaced for any desired number of tube spaces.

In order to clean the upper parts of the tubes a somewhat different provision is made since it is not found convenient to place double pipes at this point. In this case there is provided in the pipe 31 an inner section 54 which is provided between each pair of pipes with a T shaped or two-way nozzle 55 having oppositely disposed outlets 56. This

inner section passes through a sleeve 57 in the wall of the boiler casing and is provided exteriorly with a swivel joint 58 by means of which it is connected to the pipe 27, the moving part of the swivel joint being provided with a suitable operating lever 59. In this case, it will be observed that when the lever is moved into one position, the pipe 27 being opened, one of the branches of each nozzle 55 will point upward and clean the upper part of one set of tubes, while the other points downward and cleans the parts of the other set of tubes below the top of the baffle. When the position of the lever is changed the reverse will, of course, take place.

It is thus seen that there has been provided a peculiarly efficient device of the kind described and for the purpose specified. It is obvious that many minor changes may be made in the form, and construction of this invention without departing from the material principles thereof. It is not therefore desired to confine the invention to the exact form herein shown and described, but it is wished to include all of such that properly come within the scope claimed.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:—

1. In a tube cleaner, the combination with a vertical water tube boiler having spaced rows of vertical tubes, of a revoluble fluid distributing pipe mounted in the boiler setting and extending transversely of the boiler between two adjacent rows of tubes thereof and provided with discharge nozzles, said pipe shiftable longitudinally to space the nozzles thereof in line with different spaces between the rows of boiler tubes whereby each nozzle projects fluid into different spaces.

2. In a tube cleaner, the combination with a vertical water tube boiler having spaced rows of vertical tubes, of a revoluble fluid distributing pipe extending transversely of the boiler between two adjacent rows of tubes thereof and provided with discharge nozzles, said pipe shiftable longitudinally to space the nozzles thereof in line with different spaces between the rows of boiler tubes, and means to hold the pipe against revolving during the longitudinal shifting thereof.

3. In a tube cleaner, the combination with a vertical tube boiler having spaced rows of vertical tubes, of a plurality of revoluble fluid distributing pipes extending transversely of the boiler at different points in its height, each pipe provided with discharge nozzles less in number than the number of spaces between the rows of tubes, and each pipe shiftable longitudinally independently of the other pipes to aline the nozzles with spaces between different rows of tubes, a fluid supply pipe common to all the distributing pipes, and connections between the fluid supply pipe and the several distributing pipes.

4. In a tube cleaner, the combination with a vertical tube boiler having spaced rows of vertical tubes, of a revoluble distributing pipe extending transversely of the boiler between two adjacent rows of tubes and provided with discharge nozzles, the nozzles being less in number than the number of spaces between the rows of tubes and the pipe being shiftable longitudinally to space each nozzle opposite different tube-spaces, and means exteriorly of the boiler for shifting the pipe.

5. In a tube cleaner, the combination with a vertical tube boiler having spaced rows of vertical tubes, of a revoluble distributing pipe extending transversely of the boiler between two adjacent rows of tubes and provided with discharge nozzles, the nozzles being less in number than the number of spaces between the rows of tubes and the pipe being shiftable longitudinally to space each nozzle opposite different tube-spaces, means exteriorly of the boiler for shifting the pipe, and means holding the pipe against revolving while being shifted.

6. In a tube cleaner, the combination with a vertical tube boiler having spaced rows of vertical tubes, of a revoluble and longitudinally shiftable distributing pipe extending transversely of the boiler between two adjacent rows of tubes and provided with discharge nozzles, a hollow head exteriorly of the boiler into which the outer end of said pipe telescopes, a fluid supply communicating with said head, and operating means on the pipe between the head and boiler for revolving the pipe and also shifting the same longitudinally.

7. In a tube cleaner, the combination with a vertical tube boiler having spaced rows of vertical tubes, of a revoluble and longitudinally shiftable distributing pipe extending transversely of the boiler between two adjacent rows of tubes and provided with discharge nozzles, a hollow head exteriorly of the boiler into which the outer end of said pipe telescopes, a fluid supply communicating with said head, operating means on the pipe between the head and boiler for revolving the pipe and also shifting the same longitudinally, and means holding the pipe against revolving while being shifted longitudinally.

8. In a tube cleaner, the combination with a vertical tube boiler having spaced rows of vertical tubes, of a revoluble distributing pipe extending transversely of the boiler between two adjacent rows of tubes and provided with discharge nozzles, a fluid supply, a connecting member between the pipe and

the fluid supply for maintaining constant communication between the pipe and supply, said pipe shiftable on its longitudinal axis to aline the nozzles thereof with different spaces between the rows of tubes, and means for preventing rotation of the pipe at all points other than when the nozzles aline with spaces between rows of tubes.

9. In a tube cleaner, the combination with a vertical tube boiler having spaced rows of vertical tubes, of a distributing pipe extending transversely of the boiler between two adjacent rows of tubes and provided with discharge nozzles, said pipe being shiftable longitudinally to aline the discharge nozzles thereof with different spaces between the rows of tubes, a connecting member into which the outer end of said pipe telescopes, a fluid supply connected to said connecting member, and means for shifting the pipe to bring the nozzles in desired position without breaking the communication between the supply pipe and distributing pipe.

10. In a tube cleaner, the combination with a vertical tube boiler having spaced rows of vertical tubes, of a distributing pipe mounted in the boiler setting and extending transversely of the boiler between two adjacent rows of tubes and provided with discharge nozzles, said pipe being shiftable longitudinally to aline the discharge nozzles thereof with different spaces between the rows of tubes to effect cleaning of different tubes by fluid discharged from each nozzle, and means for shifting the pipe to position the nozzles opposite desired spaces between the rows of tubes.

11. In a tube cleaner, the combination with a vertical tube boiler having spaced rows of vertical tubes, of a distributing pipe extending transversely of the boiler between two adjacent rows of tubes and provided with discharge nozzles, said pipe being shiftable longitudinally to aline the discharge nozzles thereof with different spaces between the rows of tubes, a fluid supply in communication with the distributing pipe, and means for shifting the pipe to position the nozzles opposite desired spaces between the rows of tubes without interrupting the communication between the distributing pipe and fluid supply.

12. In tube cleaner, a fluid distributing pipe having discharge nozzles rotatably-mounted in a boiler and shiftable on its longitudinal axis, a hollow head into which the outer end of said pipe telescopes, a lever on said pipe for shifting the same longitudinally and for rotating the pipe, and means engaging the lever and holding the pipe against rotation during its longitudinal shifting.

13. The combination with a vertical water tube boiler; of a rotatable distributing pipe extending transversely of the boiler between rows of tubes thereof and changeable in position to clean selective sets of the tubes of said boiler, a hollow head supported exteriorly of the boiler and into which the outer end of said pipe telescopes and with which it is in communication, a fluid supply communicating with said head, and means to prevent rotation of the cleaner element while changing the same from one position to another with respect to said tubes.

14. The combination with a vertical water tube boiler; of a cleaner element including an oscillatory distributing pipe extending transversely of the boiler between rows of tubes of the boiler and provided with spaced jet nozzles, means to move said pipe longitudinally between the rows of tubes to position the nozzles opposite different spaces between rows of tubes and to rotate the pipe, and means to prevent rotation of the distributing pipe during longitudinal movement thereof.

15. The combination, in a flue cleaner, of a head, a distributing pipe telescopically connected to said head and adapted to extend transverse a power producing element, nozzles on said distributing pipe, and means to rotate said distributing pipe and telescope the same in and out of said head.

16. The combination, in a flue cleaner, of a head, a distributing pipe telescopically connected to said head and adapted to extend transverse a power producing element, nozzles on said distributing pipe, and means to rotate said distributing pipe and telescope the same in and out of said head, said means being arranged to prevent rotation of the distributing pipe during longitudinal movement.

17. In combination, a power producing multitubular element, a fluid pressure supply head supported on said element, a distributing pipe provided with spaced nozzles and arranged to telescope within said supply head and extending between the tubes of the power producing element, a guide bar provided with spaced notches, an operating lever fixed to said pipe and provided with an arcuate slot concentric with the pipe and having less width than the body of the guide bar and substantially of the same width as the guide bar at the notches thereof, said operating lever being further provided with a notch extending from said slot to permit longitudinal movement of the pipe and operating lever with reference to the guide bar when the notch in the operating lever is opposite a notch of the guide bar.

18. The combination with a power producing element having a vertically disposed baffle therein; of a rotatable distributing pipe extending along the upper end of said baffle, and nozzles carried by the distributing pipe and having outlet branches extending in opposite directions, the outlet branches

limiting the rotary movement that may be imparted to the pipe.

19. The combination with a vertical multitubular power producing element provided with a vertically disposed baffle, of a rotatable distributing pipe extending across said element in line with the upper end of the baffle, and T-shape nozzles on said distributing pipe between the spaces of the tubes of the element.

20. In a device of the kind described, a rotatable distributing pipe and a plurality of nozzles spaced along and communicating with said distributing pipe, each of said nozzles comprising a body portion extending in a substantially radial relation to the distributing pipe and oppositely directed outlet branches extending at right angles to the body portion.

21. In a soot cleaner, in combination, a vertical multitubular boiler, a rotatable distributing pipe extending transversely of the tubes and shiftable in the plane of its longitudinal axis to different operative positions, and means to prevent the rotation of the pipe while same is being shifted longitudinally.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK W. LINAKER.

Witnesses:
RUTH L. FYE,
DEE SOBER.