Dec. 29, 1936. E. PFLEIDER 2,066,014

SOOT BLOWER

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Fig. 1.

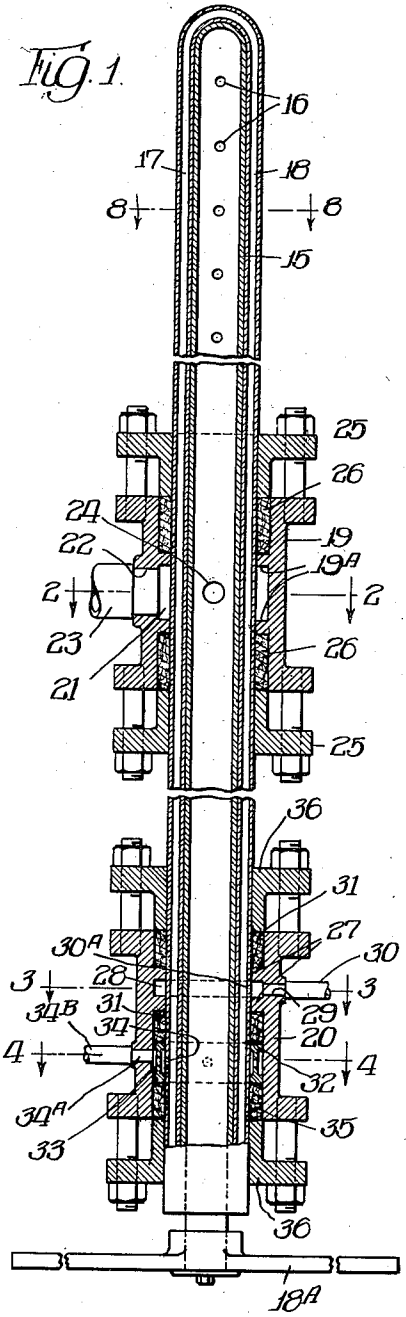


Fig. 2.

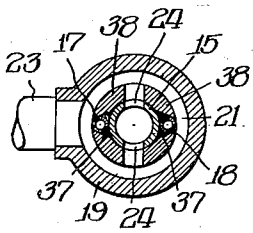


Fig. 5.

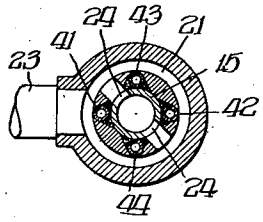


Fig. 3.

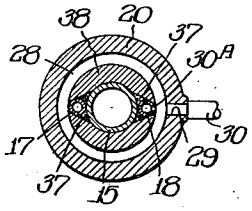


Fig. 6.

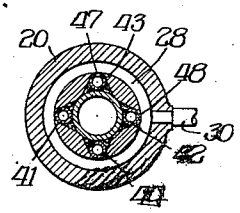


Fig. 4.

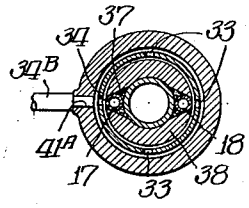
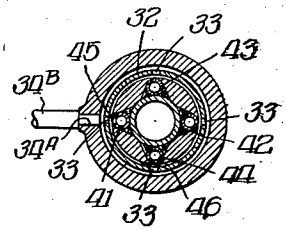


Fig. 7.



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Fig. 8.

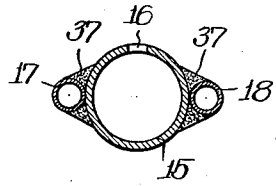


Fig. 9.

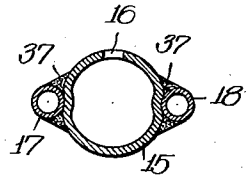


Fig. 10.

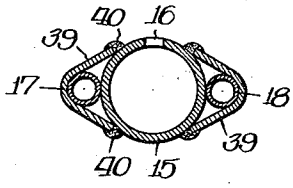


Fig. 11.

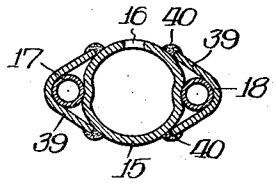


Fig. 12.

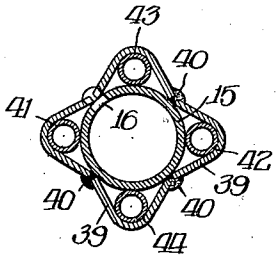
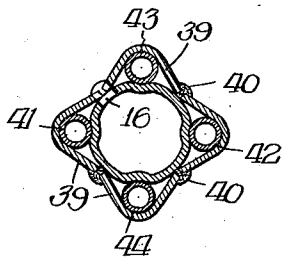


Fig. 13.



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UNITED STATES PATENT OFFICE

2,066,014

SOOT BLOWER

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Application September 2, 1933, Serial No. 687,939

7 Claims. (Cl. 122—392)

The present invention relates to improvements in soot blowers.

In certain water tube boiler installations means have been provided for blowing steam or other fluid medium upon the tubes to remove soot or other forms of incrustation therefrom. Such devices have included tubes permanently located within the boiler, said tubes being provided with apertures for the delivery of steam into engagement with the tubes to be cleaned. Such installations are termed soot blowers. The tubes referred to are of course subjected to very high temperatures, and it has been proposed to cool such tubes by means of circulation of water therethrough.

The present invention contemplates a soot blower which may be mounted as a permanent part of a boiler which is rotatable so that jets of steam may be projected in selectable directions and which will be water cooled to prevent destruction thereof by the high temperatures encountered in service. A primary object of the present invention is the provision of such a soot blower construction.

A further object is to provide a relatively simple soot blower which is efficient in service and which is relatively cheap to manufacture.

A further object is to provide a water cooled soot blower having efficient means for rotatably mounting said soot blower, together with improved means for conducting cooling water to said soot blower and discharging said water from said soot blower.

Further objects will appear as the description proceeds.

Referring to the drawings—

Figure 1 is a view in longitudinal section of one embodiment of the present invention;

Figure 2 is a sectional view taken along the plane indicated by the arrows 2—2 of Figure 1;

Figure 3 is a sectional view taken along the plane indicated by the arrows 3—3 of Figure 1;

Figure 4 is a sectional view taken along the plane indicated by the arrows 4—4 of Figure 1;

Figure 5 is a view similar to Figure 2 but showing a modified distribution of cooling tubes;

Figures 6 and 7 are views similar to Figures 3 and 4, respectively, but showing the modifications attendant to the use of the modified distribution of cooling pipes illustrated in Figure 5;

Figure 8 is a sectional view taken along the plane indicated by the arrows 8—8 of Figure 1 and showing the distribution of cooling pipes in accordance with the construction illustrated in Figure 2;

Figures 9, 10 and 11 are views similar to Figure 8 but show slight modifications from the structure shown in Figure 8; and

Figures 12 and 13 are sectional views similar to Figure 8 but showing two slightly different modifications involving the distribution of cooling pipes as shown in Figures 5, 6 and 7.

The numeral 15 indicates a tube closed at its two ends but provided with the apertures 16—16 adjacent to one of its ends through which steam may be projected. Said tube 15 is provided with a plurality of cooling tubes extending therealong parallel with the axis of said tube 15. According to the constructions illustrated in Figures 2, 3, 4 and 8 to 11 inclusive, a pair of longitudinally extending tubes 17 and 18 are provided which are connected together at one end of the tube 15. Means are provided for directing cooling water out through one of said tubes and back through the other thereof. The tube 15 is provided at its extremity distant from the apertures 16—16 with the turning means 18A, which may take the form of a lever, chain wheel, or other preferred turning means.

The present invention contemplates stationary bearing means for supporting the rotatable soot blower including the pipe 15 and the cooling tubes 17 and 18, and for this purpose that portion of the soot blower which is in engagement with the bearings has a cylindrical contour, which will be described presently.

Stationary bearings 19 and 20 are provided. The bearing 19 is provided with means for admitting steam to the interior of the tube 15. To this end the bearing 19, which is stationarily mounted, is provided with the spaced annular ribs 19A—19A adapted to rotatably receive the cylindrical contour of the pipe 15 and cooling tubes 17 and 18. Said annular ribs provide between them the annular steam space 21, which through the opening 22 in the bearing 20 has communication with the steam supply pipe 23. The pipe 15 of the soot blower is provided with the openings 24—24 communicating with the steam space 21. Steam may therefore be admitted through the steam supply pipe 23 through the openings 24—24 and will be delivered from the pipe 15 through the apertures 16—16. The bearing 19 is provided with the glands 25—25, which in cooperation with the gaskets 26—26 prevent the escape of steam from around the bearing 19.

The bearing 20 is provided with the annular ribs 27—27, which provide between them the annular water space 28, which through the port

29 communicates with the water pipe 30. The water tube 18 is provided with the port 30A communicating with said water space 28. Gaskets 31—31 are disposed upon the opposite sides of said ribs 27—27 for cooperation with said ribs. Disposed upon the lower side of the lower gasket 31 as the parts are viewed in Figure 1 is the sleeve member 32, which is illustrated as being of I-shaped contour in cross section. The web of the sleeve member 32 is provided with a plurality of ports 33—33. The water tube 17 is provided with the port 34 disposed in proximity to the web portion of the sleeve member 32. The bearing 20 is provided with the port 34A through which communication is had to the water pipe 34B. Disposed below the sleeve member 32 is the gasket 35. Glands 36—36 serve to hold the gaskets 31—31 and 35 in compressed condition whereby escape of water from within the bearing 20 is prevented. The pipe 15 and the water tubes 17 and 18 are closed at their extremities adjacent to the turning member 18A.

In order that the soot blower comprising the pipe 15 and the tubes 17 and 18 may be turned within the bearings 19 and 20, the present invention contemplates a structure in which the assembly of said pipe 15 and tubes 17 and 18 is built up into cylindrical form at the regions thereof journaled within said bearings 19 and 20. The cross sectional views appearing in Figures 2, 3 and 4 illustrate the fact that the tubes 17 and 19 are joined to the pipe 15 both physically and thermally by means of the metallic deposits indicated by the numerals 37—37. These deposits 37—37 are represented by relatively dense cross sectioning.

The material for forming the cylindrical contour of the soot blower is indicated by the numerals 38—38, it being noted that access to the ports 24—24 is not interfered with. By reason of the I-shaped contour of the sleeve member 32, access between the tube 17 and the water pipe 34B is insured regardless of variations within limits in the degree of compression of the gasket 35 and the gasket 31 adjacent thereto. In other words, the I-shaped member 32 may vary considerably in its axial position without interfering with access between the water pipe 34B and water tube 17. The illustrated construction is cheap and obviates the necessity for niceties in manufacture.

In the operation of the embodiment of the invention illustrated in Figures 1 to 4 inclusive, steam for soot blowing purposes is admitted through the pipe 23 and enters the pipe 15 through the port 24. The steam jets pass out through the apertures 16—16. The soot blower may be turned by means of the turning member 18A so that said jets may be directed in any desired direction radiating from the axis of the tube 15.

Water for cooling purposes may be admitted through the pipe 34B and will pass through one of the ports 33 into the annular space within the web of the sleeve member 32. From said annular space the cooling water will enter the port 34 in the tube 17 and pass along said tube to the other extremity thereof into the tube 18. The water will be discharged from the tube 18 through the port 30A into the water space 28 and through the pipe 30.

Figures 8, 9, 10 and 11 illustrate slightly different constructions of the assembly of pipe 15 and tubes 17 and 18 in the regions thereof upwardly of the bearing 20 as the parts are viewed in Figure 1. According to Figure 8 the tubes 17 and 18 are connected to the pipe 15 both physically and thermally by means of the deposits of welded metal 37, the tube 15 being of cylindrical contour. According to the construction shown in Figure 9, the tube 15 is swedged slightly inwardly at the regions adjacent to the tubes 17 and 18 whereby to increase the area of physical contact between the tubes 17 and 18 and said pipe 16. The deposits of welded metal 37 serves, in the manner previously discussed, to connect the tubes 17 and 18 both physically and thermally to the pipe 15.

Figure 10 illustrates a construction in which the tubes 17 and 18 are held in position relative to the pipe 15 by means of the angle members 39, which are bowed to conform to the contour of the tubes 17 and 18 and which are united to the pipe 15 by means of the deposits of welded metal 40—40.

Figure 11 is similar to the construction shown in Figure 10 but shows the pipe 15 swedged inwardly to conform to the adjacent contours of the tubes 17 and 18, whereby to increase the area of contact between the pipe 15 and the tubes 17 and 18.

Figures 5, 6, 7, 12 and 13 illustrate a construction in which four tubes are provided for carrying cooling water in thermal communication with the pipe 15. The four tubes for cooling water are indicated by the numerals 41, 42, 43 and 44. As shown in Figure 5, said tubes 41, 42, 43 and 44 are disposed in position symmetrical with each other and with the axis of the pipe 15 and are so disposed circumferentially of the pipe 15 that they leave the ports 24—24 unobstructed. By reference to Figure 7 it will be noted that the pipes 41 and 44 are provided with the ports 45 and 46 communicating with the annular space within the web of the sleeve member 32, whereby cooling water entering from the cooling pipe 34B may, through the ports 33—33, have access to said tubes 41 and 44. The water will flow upwardly through said tubes 41 and 44 and will flow downwardly through the tubes 43 and 42, respectively. By reference to Figure 6 it will be noted that said tubes 43 and 42 are provided with the ports 47 and 48, respectively, having communication with the water space 28, whereby the water, after having performed its cooling functions, may pass out through the water tube 30.

It will be understood, of course, that the water tubes 41, 42, 43 and 44 may be connected both physically and thermally with the pipe 15 by means of the deposits of welded metal, as illustrated in Figures 8 and 9.

Figures 12 and 13 show means for connecting the tubes 41, 42, 43 and 44 to the pipe 15 by means of angle members, after the fashion illustrated in Figures 10 and 11, respectively, in which an angle member 39 is provided for each of the cooling tubes, and has each of its edge portions firmly united to the pipe 15 by means of deposits of welded material, indicated by the numerals 40—40.

Though certain preferred embodiments of the present invention have been described in detail, many modifications will occur to those skilled in the art. It is intended to cover all such modifications that fall within the scope of the appended claims.

What is claimed is—

1. In a soot blower, in combination, a steam pipe and water tube means extending longitudinally thereof in thermal communication with said pipe, means for conducting steam to said

pipe, a bearing for said pipe and tube means, said pipe and tube means being provided with a cylindrical portion cooperating with said bearing, said bearing providing a water space in cooperation with said pipe and tube means, said tube means having a port communicating with said water space, gaskets in said bearing, and a sleeve member within said bearing encircling said pipe and tube means, said sleeve member having a portion of I-shaped contour, said portion of I-shaped contour being provided with ports, said tube means being provided with another port spaced from said first mentioned port and communicating with the space on one side of the web of said portion of I-shaped contour, said sleeve member being adapted to move longitudinally of said pipe in cooperative relationship with said gaskets, said bearing having a water port communicating with the space on the other side of said web.

2. In a soot blower, in combination, a steam pipe and water tube means extending longitudinally thereof in thermal communication with said pipe, means for conducting steam to said pipe, a bearing for said pipe and tube means, said pipe and tube means being provided with a cylindrical portion cooperating with said bearing, said bearing providing a water space in cooperation with said pipe and tube means, said tube means having a port communicating with said water space, gaskets in said bearing, a sleeve member within said bearing encircling said pipe and tube means, said sleeve member having a portion of I-shaped contour, said portion of I-shaped contour being provided with ports, said tube means being provided with another port spaced from said first mentioned port and communicating with the space on one side of the web of said portion of I-shaped contour, said sleeve member being adapted to move longitudinally of said pipe in cooperative relationship with said gaskets, said bearing having a water port communicating with the space on the other side of said web, and means for communicating a turning movement to said pipe.

3. In a soot blower, in combination, a pipe having perforations in a wall thereof, means for turning said pipe, and a pair of tubes disposed along said pipe having their axes parallel with the axis of said pipe and having their adjacent extremities connected together, deposits of welded metal connecting said tubes thermally and physically to said pipe, a portion of the length of said pipe and tubes having welded metal so deposited thereon as to provide a cylindrical contour for said portion, and bearing means cooperating with said portion of cylindrical contour and provided with inlet means for steam to said pipe and inlet and outlet means for water to said tubes.

4. In a soot blower, in combination, a pipe having perforations in a wall thereof, means for turning said pipe, and a pair of tubes disposed along said pipe having their axes parallel with the axis of said pipe and having their adjacent extremities connected together, a portion of the length of said pipe and tubes having welded metal so deposited thereon as to provide a cylindrical contour for said portion, and bearing means cooperating with said portion of cylindrical contour and provided with inlet means for steam to said pipe and inlet and outlet means for water to said tubes, said pipe being provided with longitudinal grooves in its wall, said tubes being seated within said grooves.

5. In a soot blower, in combination, a pipe having perforations in a wall thereof and a pair of tubes extending along said pipe in contact with the exterior of the wall of said pipe, an end of one of said tubes having communication with an end of the other of said tubes, and means for holding said tubes in thermal and physical connection with said pipe, said means including deposits of welded material extending longitudinally of said pipe, bearing means for said pipe providing access of steam to said pipe and access of water to one of said tubes and from the other of said tubes, and means for turning said pipe in said bearing means.

6. In a soot blower, in combination, a pipe, said pipe having perforations in a wall thereof and tubes extending longitudinally of said pipe in contact with said wall, straps engaging said tubes, said straps having portions engaging said pipe on the two sides of each of said tubes, and deposits of welded material extending along said pipe and the edges of said straps for holding said straps in fixed position relative to said pipe.

7. In combination, in a soot blower, a pipe having perforations in a wall thereof, water tube means thermally connected to said pipe and extending longitudinally thereof, bearing means for said pipe and tube means, said bearing means providing a steam space surrounding said pipe and tube means and an inlet to said steam space, said pipe having a port communicating with said steam space, said bearing means also providing a pair of water spaces surrounding said pipe and tube means, said tube means having a pair of ports communicating with said water spaces, said bearing means also providing an inlet and an outlet for said water spaces, and means for turning said pipe and tube means within said bearing means, said pipe having grooves in its wall within which said tubes are seated.

ERNST PFLEIDERER.

CERTIFICATE OF CORRECTION.

Patent No. 2,066,014. December 29, 1936.

ERNST PFLEIDERER.

It is hereby certified that error appears in the above numbered patent requiring correction as follows: In the heading to the drawings, the name of the patentee is erroneously written and printed as "E. Pfleider" whereas said name should have been written and printed as E. Pfleiderer; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 16th day of March, A. D. 1937.

Henry Van Arsdale
Acting Commissioner of Patents.

(Seal)