

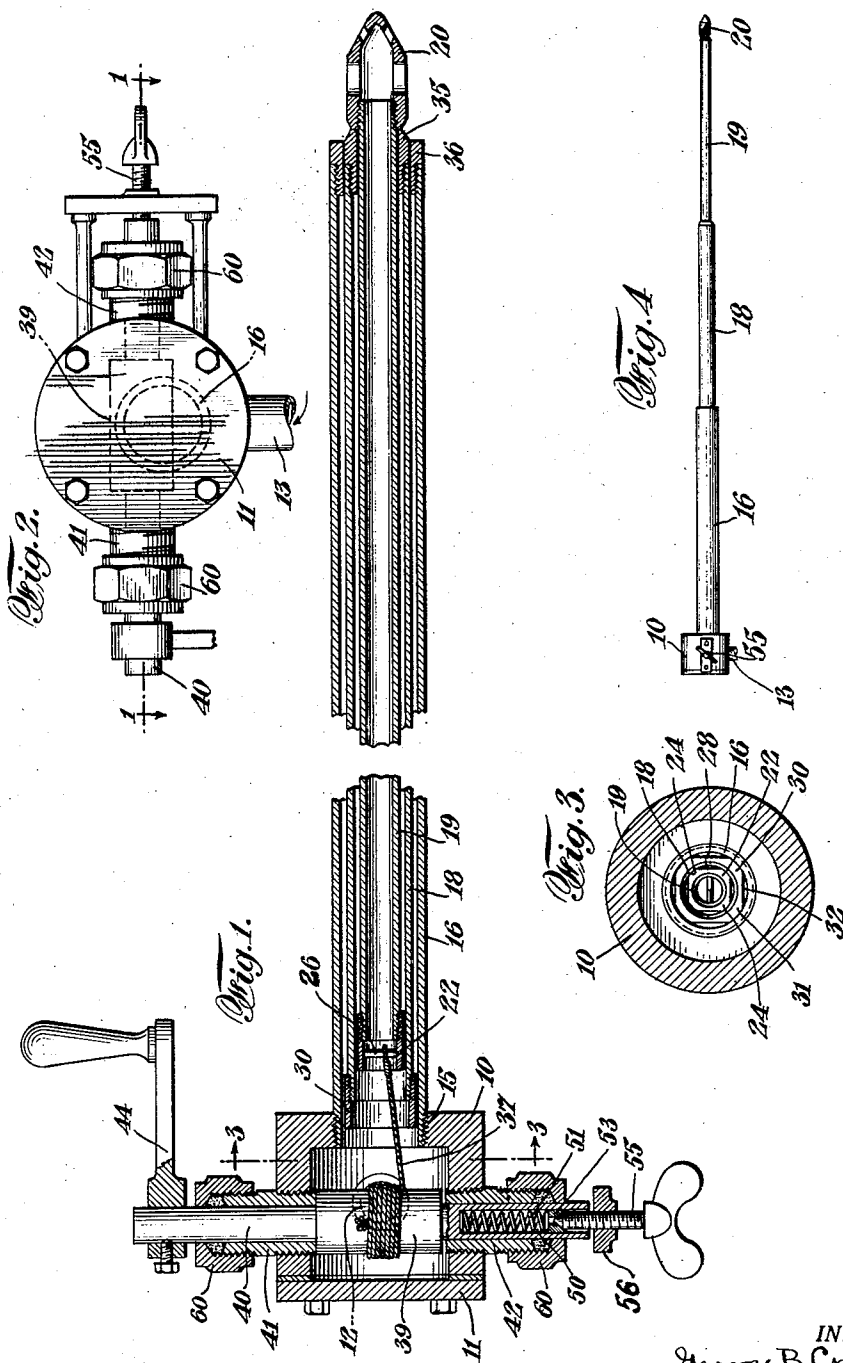
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CLEANING APPARATUS

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CLEANING APPARATUS

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This invention relates to cleaning apparatus and particularly to so-called steam tube blowers, that is, devices which are adapted to remove soot or other dirt from steam boiler tubes by means of a jet or blast of steam. More particularly this invention relates to steam tube blowers which are portable and are adapted to be held by the operator when used.

10 In using portable tube blowers it is customary to insert the blower into an opening in the boiler wall so as to direct the steam blast against the boiler tubes to clean them. In order to reach tubes which are located 15 some distance back of the boiler opening a blower of considerable length may be required. In many locations, due to the close spacing of boilers or boiler sections from one another, there is very little space available 20 outside the opening and it is often impossible to use a long blower because the limited space available does not permit a long blower to be inserted in the opening.

One object of the present invention is to 25 provide a collapsible or telescopic blower which may be adjusted so that it is relatively short and so may be easily inserted into the boiler openings even though the space outside the opening is much restricted and which 30 when inserted in the opening may be extended or elongated so that the blower nozzle may be brought into operative position relative to tubes located some distance from the boiler opening.

35 A further object of my invention is to provide a blower of this character with an improved means for extending or elongating the blower and for collapsing or shortening the same.

40 In the embodiment of my invention herein disclosed, the blower comprises a number of concentric tubes which telescope one into another. These tubes serve to direct the flow of steam or other fluid to a jet nozzle carried by one of the telescopic tubes.

45 For the purpose of moving the telescopic tubes relative to one another so as to extend or elongate the blower, I make use of the pressure of the steam as it passes through the blower. Certain of the telescopic tubes are

formed so as to constitute, in effect, pistons which operate in the outer tube of the blower, and these pistons, acting under the influence of the steam as it flows through the tubes, move outwardly through the outer tube and 55 carry the nozzle to the desired location. In order to avoid leakage or other injury to the apparatus by a too rapid movement of the tubes, I provide a suitable braking or hindering means which may be adjusted so as to 60 regulate the forward motion of the tubes as desired.

A further object of my invention is to provide in a device of the character described an improved means for retracting the tubes. 65 In the particular embodiment of my invention herein disclosed, this means consists of a manually rotatable shaft and a flexible connection, such as wire, between the shaft and tubes. Rotation of the shaft winds the wire 70 on the shaft and so retracts the tubes and nozzle carried thereby.

The blower constructed in accordance with my invention is simple and economical in construction, light in weight, easily operated and 75 strong, durable and efficient in use.

Other objects and advantages will appear from the following description taken in connection with the accompanying drawing which illustrates one embodiment of my invention and wherein; 80

Figure 1 is a longitudinal sectional view, partly in elevation and partly broken away, of a blower showing the blower tubes in their telescoped or retracted positions. 85

Figure 2 is an end elevation of the structure shown in Figure 1.

Figure 3 is a sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a side elevation of the blower, 90 showing the telescopic tubes extended.

The blower comprises a body portion consisting of a casing 10 having an inlet opening 12 in which is screw-threaded a nipple or pipe 13 adapted to conduct steam or other fluid 95 to the interior of the casing 10 and said casing also having an outlet opening 15 into which is screw-threaded a pipe or tube 16. One end of the casing 10 is closed by means of a plate 11 bolted thereto, a suitable gasket 100

being interposed between the plate and casing to insure a tight joint.

Mounted to slide in the pipe 16 are two concentric pipes 18 and 19. The inner pipe 19 carries at its outer end the steam nozzle 20 which may be of the usual form employed in a device of this character.

Screw-threaded to the inner end of pipe 19 is a nut 22 which is rounded off at its corners so as to form bearing surfaces 24 for sliding engagement with the inner wall of tube 18. Between the bearing surfaces 24, the nut 22 is spaced from the tube 18, as indicated at 28 in Figure 3, so as to permit steam from the casing 10 to flow past the nut 22, into the space between tubes 18 and 19, for a purpose which will be explained hereafter.

Similarly, tube 18, which slides in tube 16, is provided at its inner end with a nut 30, having rounded surfaces 31 for engagement with the inner wall of tube 16; there being spaces 32 between the nut 30 and the tube 16 to permit steam to enter the space between tubes 18 and 16.

The outer end of tube 18 is provided with a bushing 35 which is adapted to be engaged by the nozzle 20 when the tubes are retracted so that retraction of tube 19 will retract tube 18 and which is also adapted to be engaged by nut 22 when the tube 19 is fully extended so as to prevent the end of tube 19 moving out of tube 18. Similarly, tube 16 is provided with a bushing 36 which serves as a stop for the nut 30 and prevents tube 18 from moving entirely out of tube 16. Secured in the nut 22 and extending across the opening therethrough is a pin 26 to which is secured one end of the wire or other flexible connection 37. Wire 37 is wrapped around a drum 39 which is secured to or formed integral with a rotary shaft 40. Shaft 40 is mounted to rotate in bearing members 41 and 42 which may be formed of pipe nipples screw-threaded into the walls of casing 10. A crank 44 secured to one end of the shaft 40 serves as a means for rotating the shaft 40 and drum 39 so as to wind wire 37 on the drum, or unwind it therefrom.

The end of the shaft 40, remote from the crank or handle 44, is formed with a longitudinal bore or recess 50 in which is held a spring 51 which bears at one end against the inner wall of the recess and is engaged at its other end by a bearing block or washer 53. Washer 53 is adapted to be moved inwardly to compress the spring 51, by means of hand screw 55 which is screw-threaded through and supported by a stationary yoke or frame 56 mounted on the casing 10.

By turning screw 55 to compress spring 51, spring 51 forces the shaft 41 in an upward direction as viewed in Figure 1 and causes the upper end of drum 39 to bear against the lower end of bearing 41. Friction between the drum 39 and bearing 41

hinders the rotation of the shaft 41, thus serving as a brake for the shaft. It is clear that the amount of friction or braking action on the shaft 41 may be adjusted by turning the screw 55. If desired, the frictional bearing surfaces may be roughened so as to increase their braking effect.

Stuffing boxes 60, at the outer ends of the bearings 41 and 42, serve to prevent leakage of steam out of casing 10 along the shaft 41.

In operation the blower is inserted into the boiler or tube nest and steam from any suitable source is admitted to the casing 10 through the pipe 13. Pipe 13 will ordinarily be connected to the steam source by a flexible pipe or hose, so as to permit the blower to be moved about during the operation. If desired, the pipe 13 may be provided with a valve for controlling the supply of steam to the casing 10. The steam which enters the casing passes out through the opening 15 into the telescopic tubes and flows through the inner tube 19 to the nozzle 20. The steam pressure, acting on the inner ends of nuts 30 and 22, forces the tubes 18 and 19 outwardly to their extended position as shown in Figure 4. As the tubes move outwardly the wire 37 is unwound from drum 39, thus rotating the shaft 40. The speed of outward motion of these tubes may be controlled by the operator from crank 44 and, by stopping the rotation of crank 44, the operator may stop the motion of the nozzle 20 at any desired point. The openings 28 and 32 between the nuts 22 and 30 and the respective tubes in which they slide permit steam to escape into spaces between the tubes, thus relieving the inner ends of tubes 18 and 19 from excessive steam pressure, as otherwise the steam pressure might cause a too rapid movement of these tubes and result in breakage or other injury to the apparatus. Outward motion of the tubes 18 and 19 may also be retarded by the spring 51 which forces the drum 39 into the frictional engagement with the bearing 41.

From the above, it will be seen that the pressure of the steam in the blower is employed to extend the inner tubes 18 and 19 to any desired extent and in this manner the nozzle 20 is moved inwardly from the boiler opening to a position to direct the cleaning blast of steam onto boiler tubes located a considerable distance back of the boiler opening. To retract the telescopic tubes the crank 44 is rotated to wind the wire 37 on drum 39. The blower may then be withdrawn from the boiler opening.

Interior parts of the blower, such as tubes 18 and 19 and wire 37, are preferably formed of Monel metal or other material that is not easily eroded by contact with moving steam.

It will be understood that the embodiment of my invention herein disclosed is merely illustrative, and various changes may be made without departing from the spirit

and scope of the invention as set forth in the following claim.

I claim:

5 A portable blower adapted to be held by the operator comprising a casing having steam inlet and outlet openings, a pipe secured to said casing and communicating with said outlet opening, a second pipe telescopically movable in said first named pipe, 10 said second pipe being adapted to be moved outwardly through said first named pipe by the pressure of steam flowing through said pipes and means for moving said second pipe inwardly through said first named pipe and 15 for controlling the outward movement of said second pipe, said means comprising a rotary shaft mounted in said casing, means for preventing longitudinal movement of said shaft, a spring adapted to force said 20 shaft into frictional engagement with said last named means, means carried by said casing for adjusting the pressure of said spring on said shaft and a wire connecting said shaft and second tube and adapted to be 25 wound on said shaft.

Signed at New York city, in the county of New York and State of New York this 24th day of December, A. D. 1927.

GEORGE B. CRISP.

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