Oct. 6, 1925.

1,556,495

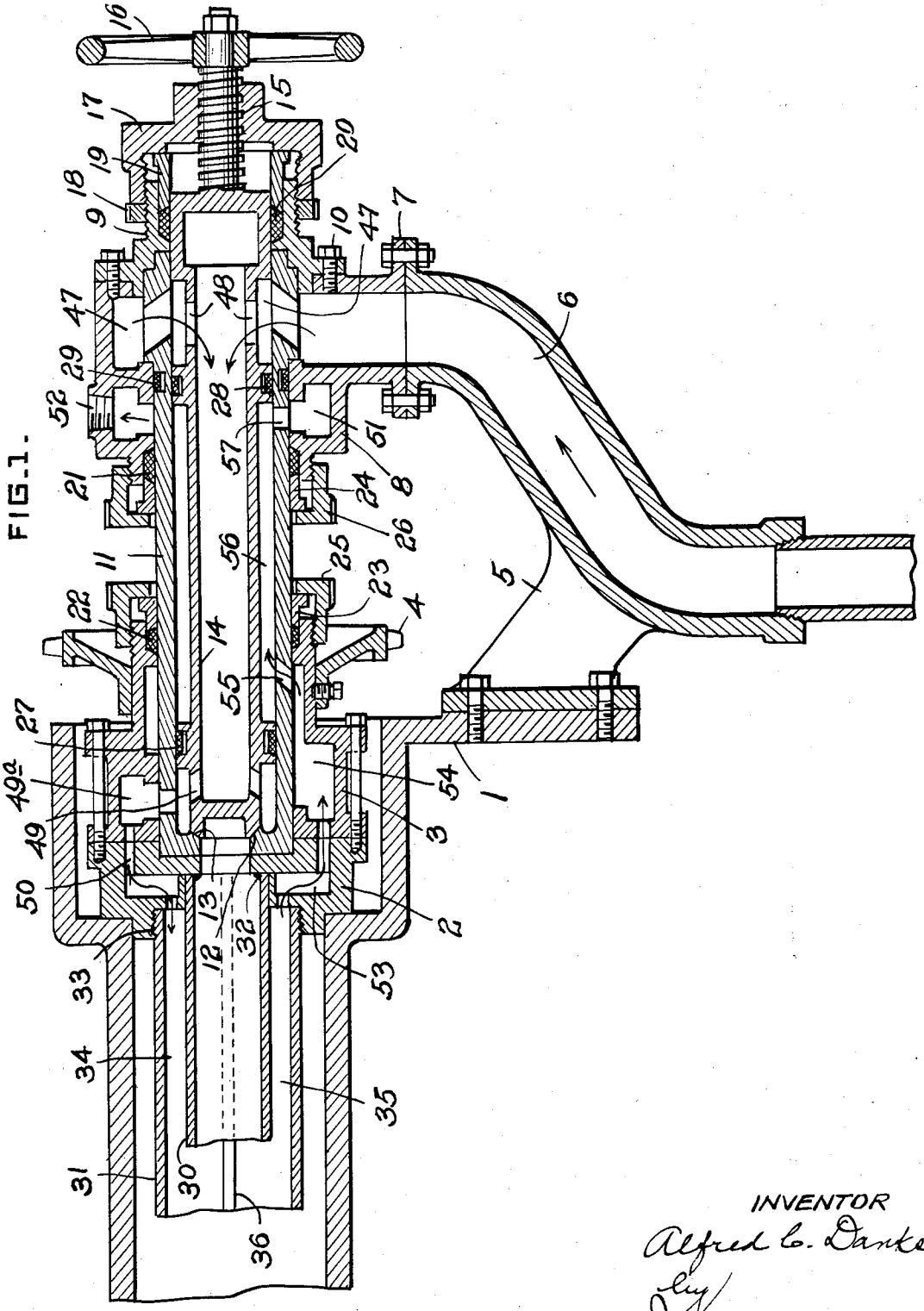
A. C. DANKS

SOOT BLOWER

Filed June 27, 1924

2 Sheets-Sheet 1

FIG. 1.



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Oct. 6, 1925.

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2 Sheets-Sheet 2

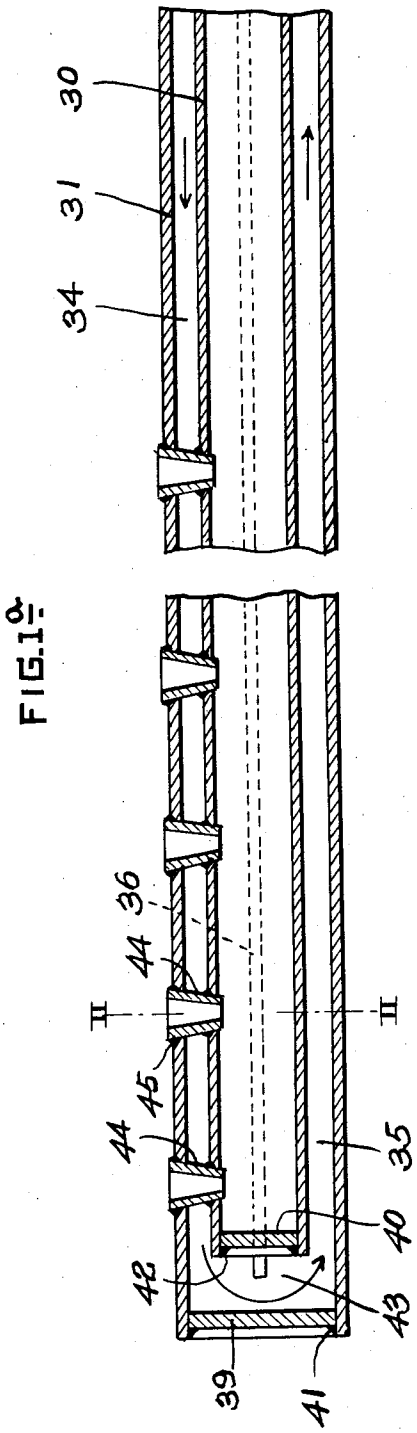


FIG. 1a.

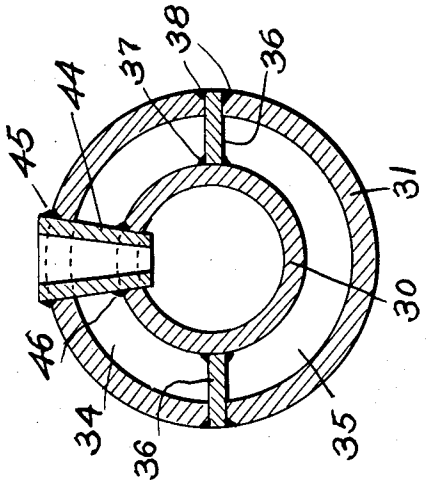


FIG. 2.

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Patented Oct. 6, 1925. 1,556,495

UNITED STATES PATENT OFFICE.

ALFRED C. DANKS, OF CLEVELAND, OHIO, ASSIGNOR TO THE ASHMEAD DANKS COMPANY, A CORPORATION OF OHIO.

SOOT BLOWER.

Application filed June 27, 1924. Serial No. 722,736.

To all whom it may concern:

Be it known that I, ALFRED C. DANKS, a citizen of the United States, and a resident of Cleveland, in the county of Cuyahoga and State of Ohio, have made a new and useful invention in Improvements in a Soot Blower, of which the following is a specification.

The invention relates to mechanical soot blowers, for use in connection with boilers, superheaters, economizers, and the like for removing the dust, soot or other foreign material which collects upon the outside of the tubes. It has for its principal objects, the provision of a device of the character specified, having (1) an improved arrangement for protecting the apparatus and particularly the blowing element so that it may be employed without injury in the heated portion of the furnace; (2) having improved means for accomplishing the foregoing object by circulating steam, as a protecting medium, and also as a cleaning medium, in such manner that any danger of condensation of steam and a collection of such condensation in the apparatus when not in use is avoided, and (3) having an improved valve construction located in the blower itself. The invention has for its further objects, the provision of a blower of simple construction, not liable to get out of order, and so constructed that it is not liable to develop cracks or leaks tending to impair its cleaning capacity and render it wasteful of cleaning fluid, such as ordinarily occurs in apparatus of this kind subject to severe conditions of service. One embodiment of the invention is illustrated in the accompanying drawings wherein:

Figure 1 is a longitudinal section through the rear portion of the blower. Fig. 1ª is a similar section through the forward end of the blower. And Fig. 2 is a transverse section on the line II—II of Fig. 1ª.

Referring to the drawing, 1 is a "wall box" or supporting casing, which is set into the brick work of the boiler, a suitable distance, and adapted to receive the cover member 2 of the casing 3, arranged for rotation, as hereinafter described, by means of the sprocket 4 bolted thereto as indicated in the drawings. The wall box or supporting casing also serves as a support for the bracket 5, bolted thereto as indicated in the drawing and provided with the steam inlet passage 6. This conduit bracket is flanged as indicated at 7, and has bolted thereto the casing 8, in which the rear end of the rotating portion of the device is journaled. The rear end of this casing is provided with a cover member 9, secured in place upon the casing by means of the bolts 10.

Mounted at its forward end in the casing 3 with a tight fit, so as to turn therewith, is the sleeve 11, the rear end of which is free to rotate in the fixed casing 8. This sleeve is provided at its forward end with a valve seat 12, which is engaged by the forward valve end 13 of the valve tube 14, such tube being mounted for reciprocation in the sleeve 11, and being operated by means of the screw 15, integral with the tube and provided with a hand wheel 16. The screw is threaded through the head 17, which in turn, is screwed onto the cover member 9 and held in adjusted locked position by means of the nut 18. The head 17 serves to tighten the gland 19 which engages the packing 20 around the rear end of the valve tube. Leakage along the sleeve 11 is prevented by means of the packing 21 and 22, engaged by the glands 23 and 24, adjusted by the gland nuts 25 and 26. Snap piston rings 27, 28 and 29 are provided between the tube 14 and sleeve 11, and between such sleeve and the casing 8.

Secured to the end of the cover member 2, are the blower tube 30 and the blower tube casing 31, the blower tube being welded to such cover member, as indicated at 32, and the casing tube being threaded to the member as indicated at 33. The construction of the tube 30 and casing 31 as a substantially integral unit constitutes one of the important features of the invention, and will be seen by reference to Figs. 1ª and 2. The annular space between the tubes is divided into two passageways 34 and 35, respectively, by means of division plates 36, 36, welded at their inner edges to the tube 30 as indicated at 37 (Fig. 2), and having their outer edges extended between the half segments which make up the tube 31, and welded as indicated at 38. The ends of the tubes are closed by the plates 39 and 40 welded, as indicated at 41 and 42, and the division plates 36, 36 terminate at 43 (Fig. 1ª) short of the plate 39, thus leaving a connection between the upper passageway 34 and the lower passageway 35.

Exits are provided from the blower tube,

in the form of the nozzles 44, which are secured to the two tubes by welding along the lines 45 and 46. The foregoing provides a construction, which is relatively strong and rigid, and not subject to leakage, even after long service under severe working conditions, due to temperature changes incident to the widely varying temperature conditions to which the apparatus is exposed in service.

In operation, the steam supplied through the passage 6 passes into the annular space 47, which in conjunction with the tube 14 acts as a distributing cavity or chamber, and thence to the passageway 34, via the ports 48, valve tube 14, ports 49, and passage 50. It then flows along the passageway 34 to the outer end thereof and down to the passageway 35, from which it flows to the annular cavity 51 and outlet 52, via the passage 53, cavity 54, port 55, passage 56 and port 57. The casing 3 is so cored that the cavity 54 is separated from the cavity 49^a. The foregoing arrangement provides for circulation of steam along the portion of the device exposed to severe temperature conditions, when the valve end 13 is closed or when it is open.

When the hand wheel 16 is rotated to open the valve, a flow of steam occurs from the conduit 6 to the blower tube 30, via the port 48, the valve tube 14, and the ports 49, the steam thus supplied to the blower tube being discharged through the nozzles 44. During the cleaning operation, the casing 3 with the blower tube 30 and casing 31 are rotated through an angle of about sixty degrees by means of the sprocket 4, although this degree of the turning movement may be varied as desired to suit conditions. This turning movement rotates the sleeve 11 and valve tube 14 carried thereby, thus slightly modifying the position of the valve end 13, due to the turning of the screw 15, in the fixed head 17, but this shifting of the position of the valve is immaterial, as the valve is opened wide enough, so that the slight variation of position, due to a partial rotation of the screw 15 is of no consequence in its effect upon the volume of steam passing the valve.

The snap piston rings 27, 28 and 29 serve to prevent communication between the steam supply for the cleaning and that for the steam jacketing or protection, it being noted, however, that it is not essential that these rings be absolutely tight, as a small leakage of steam in one of them will cause no loss of steam when the valve 13 is closed.

It will be observed that the apparatus is well protected from injury by the circulation of steam, which is provided, and which occurs continuously, both when the valve 13 is closed and when it is open, and there is no opportunity of a collection of condensation in the device when the valve is closed, as would be the case if there were no circulation of steam at such time. With this blanket of continuously flowing steam, the blower tube 30 and the casing tube 31 are protected against injury under the most severe conditions of service and the part of the apparatus to the rear of the blower unit is maintained at a relatively lower temperature than would be the case, if it were not for the continuous passage of the steam therethrough. The construction of the end unit including the tubes 30 and 31 is very rigid and serviceable, due to the welded construction in connection with the arrangement of the welded plates 36, 36 and the welded nozzles, the construction being such that it is not liable to develop cracks or leaks under the most severe service conditions, and this factor of durability is further increased as heretofore explained, by the temperature control incident to the continuous circulation of the protecting body of steam. Other advantages of the construction and operation will be readily apparent to those skilled in the art.

What I claim is:

1. In combination in a soot blower, a body portion provided with a distributing cavity, a blower tube extending forwardly therefrom and provided with a series of laterally discharging nozzles, a protecting casing tube around, but spaced away from the blower tube through which said nozzles lead, conduit means for supplying steam to said cavity, and thence through independent passages to the blower tube and also to said space between the blower tube and casing tube, an exhaust passage leading back from said space and through the body portion to provide a continuous flow of steam through such space, and a valve in the body portion for controlling the flow of steam through the passage leading from said cavity to the blower tube.

2. In combination in a soot blower, a casing tube, a blower tube therein spaced away from the casing tube and provided with a plurality of discharge nozzles leading through the wall of the casing tube, a body portion carrying said tubes and provided with a distributing cavity and with conduits leading respectively, to said blower and to said space between the tubes, and also provided with an exhaust passage leading from such space, an inlet conduit leading to the body portion for supplying steam under pressure to said cavity, and a valve in the body portion for governing the flow of steam through the cavity leading to the blower tube without interfering with the continuous flow of steam from said cavity to and through said space between the blower tube and casing tube.

3. In combination in a soot blower, a cas-

ing tube, a blower tube therein spaced away from the casing tube and provided with a plurality of discharge nozzles leading through the wall of the casing tube, division means extending longitudinally between the two tubes and dividing the space into two passages which communicate at the outer ends of the tubes, a body portion carrying said tubes and provided with a distributing cavity and with conduits leading respectively to the said blower tube and to the inner end of one of said passages, and also provided with an exhaust outlet leading from the inner end of the other of said passages, an inlet conduit leading to said cavity for supplying steam under pressure to said cavity and said conduits, and a valve in the body portion for governing the flow of steam from said cavity to the conduit leading to the blower tube.

4. In combination in a soot blower, a casing tube, a blower tube therein spaced away from the casing tube and provided with a plurality of discharge nozzles leading through the wall of the casing tube, a body portion carrying said tubes and provided with a distributing cavity and with conduits leading respectively to said blower tube and to said space between the tubes, and also provided with an exhaust passage leading from such space, an inlet conduit leading to the body portion for supplying steam under pressure to said cavity and said conduits, a valve in the body portion for governing the flow of steam through the conduit leading to the blower tube, and means for supporting the body portion for rotation about its longitudinal axis, to vary the angle of discharge from said nozzles.

5. In combination in a soot blower, a casing tube, a blower tube therein spaced away from the casing tube and provided with a plurality of discharge nozzles leading through the wall of the casing tube, a body portion carrying said tubes and provided with conduits leading respectively to said blower and to said space between the tubes, and also provided with an exhaust passage leading from such space, said body portion including a casing at its forward end and a rearwardly extending sleeve mounted for turning movement about the longitudinal axis of the sleeve, a second casing in which the rear portion of the sleeve is mounted for rotation, an inlet passage for supplying fluid under pressure leading through said second casing and the sleeve to the interior thereof, the said conduits being in communication with the interior of said sleeve, and a valve in the sleeve operable from the exterior thereof for governing the flow of fluid from the sleeve to the conduit leading to the blower tube.

6. In combination in a soot blower, a casing tube, a blower tube therein, spaced away from the casing tube and provided with a plurality of discharge nozzles leading through the wall of the casing tube, a body portion carrying said tubes and provided with passages leading respectively to said blower tube and to said space between the tubes, and also provided with an exhaust outlet leading from said space, said body portion including a casing at its forward end and a rearwardly extending sleeve mounted for turning movement about the longitudinal axis of the sleeve, a second casing in which the rear portion of the sleeve is mounted for rotation, an inlet passage for supplying fluid under pressure through said second casing and the sleeve to the interior thereof, communications through the front portion of the sleeve which are in communication with said passages, and a valve tube concentric with said sleeve and provided with a threaded stem for reciprocating it and having a valve at its forward end arranged to open and close the communication from the sleeve leading to the passage extending to said blower tube.

7. In combination in a soot blower, a blower unit, comprising a blower tube closed at its outer end and provided with a series of perforations along its side, a pair of division plates welded to the opposite sides of the tube and terminating adjacent the outer end of the tube, a casing tube in two sections fitting over the blower tube, but spaced away therefrom and having their opposing side edges engaging the faces of the division plates and welded thereto, and having a series of perforations in opposition to the perforations in the blower tube, nozzles fitting in said perforations in the two tubes and welded thereto, a closure at the outer end of the casing tube spaced away from the outer end of the blower tube, and means for supplying fluid under pressure to the inner end of the blower tube and to the inner end of one of the passages through the casing tube.

8. In combination in a soot blower, a body portion provided with a distributing cavity, means for supplying steam thereto, a blower tube having a plurality of laterally extending nozzles, a casing tube surrounding the blower tube, but spaced away therefrom, through which said nozzles lead, a conduit connecting said cavity and said blower tube, a valve in said body portion for controlling the supply of steam, and connections independent of the valve for continuously supplying steam from said cavity through the space between the blower tube and casing tube.

In testimony whereof, I have hereunto subscribed my name this 23rd day of June, 1924.

ALFRED C. DANKS.