Nov. 14, 1950 C. G. MARKS 2,530,018

FLUID JET CLEANER FOR BOILERS

Filed Dec. 31, 1948 2 Sheets-Sheet 1

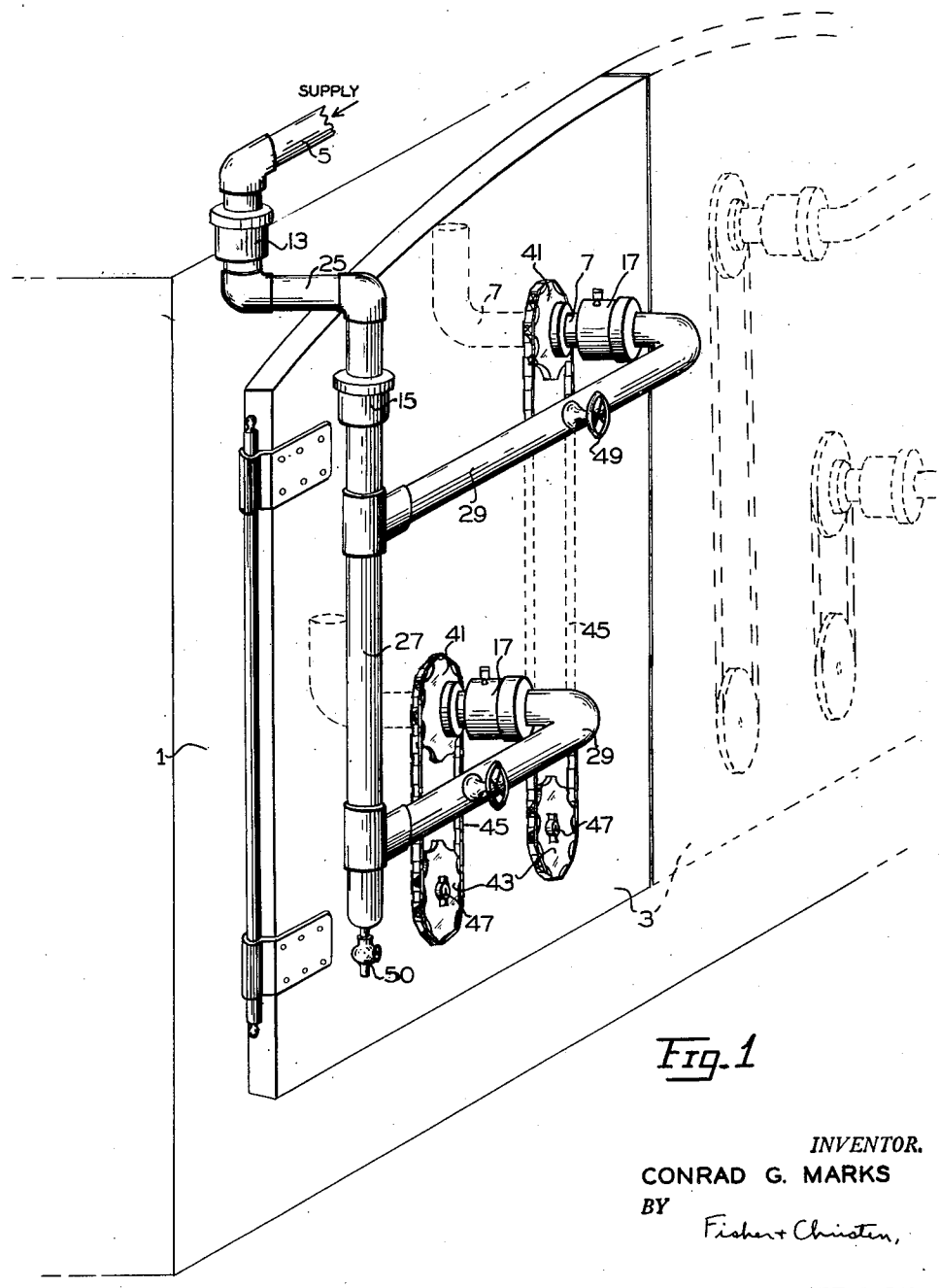


Fig. 1

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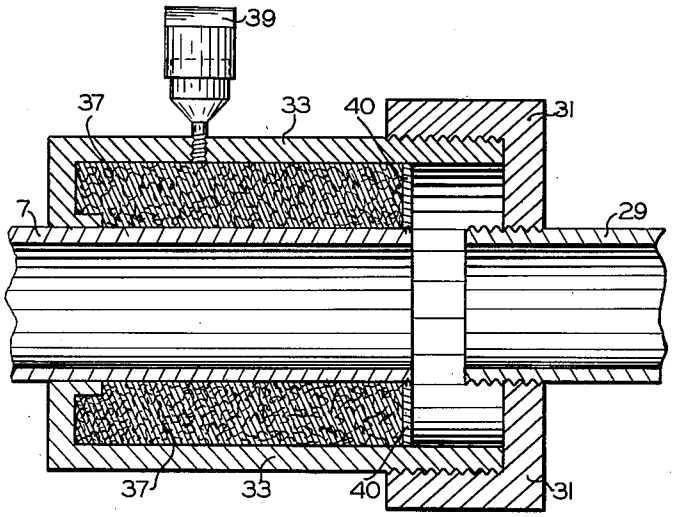


Fig. 2

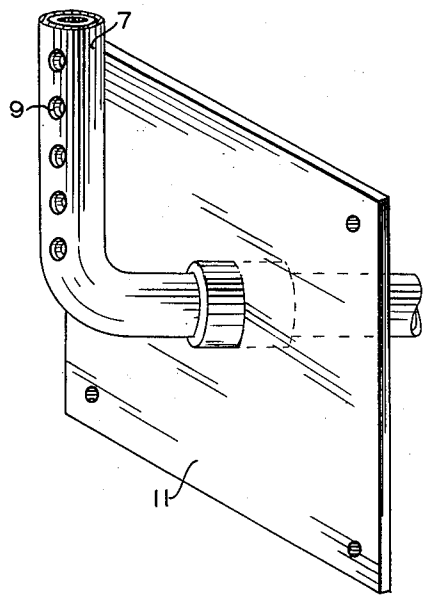


Fig. 3

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FLUID JET CLEANER FOR BOILERS

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Application December 31, 1948, Serial No. 68,700

1 Claim. (Cl. 122—391)

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This invention relates to blowers for boilers and generally provides a supply pipe system for a boiler blower including a general supply line, a swivel joint, the axis of which approaches the extended axis of the boiler door hinges so that it turns as the boiler door moves, an offset swivel joint connection, a main pipe extending from the offset swivel connection substantially the length of the boiler door and having its axis substantially parallel with the hinges of the door, tap lines leading from the main pipe to the jet arms, which in turn extend through the boiler door to the jets. A second swivel joint is provided in the main pipe between the tap lines and the offset swivel joint connection to further accommodate angular changes in the system as the boiler door is opened. The offset swivel joint is positioned slightly forward of and parallel to the axis of the door hinges. As the door rotates about the hinges and the supply pipe system rotates about the swivel joint, the difference in the arcs of rotation must be compensated. The angles formed by the boiler door, the jet arm extension, and the tap lines are always constant, thus requiring the swivel joint in the main pipe line to accommodate all angular variations. Accompanying the angular variations, and as a direct result thereof, are space variations between the boiler door and the tap lines. Telescopic swivel joints are interposed between the jet arms and the tap lines to allow rotation of the jets and to accommodate space variations caused by angular changes in the supply system in opening the boiler door. A chain and sprocket system on the face of the boiler door enables an operator to rotate jet arms of huge boilers at a convenient position, and suitable means are provided for regulating the steam or other gaseous supply to the jet arms.

More specifically, it may be regarded as an improvement on apparatus of the general type shown in United States Patent 1,053,842 issued to John McGee, February 18, 1913. The McGee patent describes a flue type boiler having doors at one end thereof and a single jet arm mounted on one of the doors so that the arm may rotate to clean all the boiler flues. The door opens to carry the jet arm therewith. No suitable connections for handling the supply of steam is disclosed in the McGee patent.

While the McGee patent describes a blower which may be satisfactory with regard to its boiler cleaning efficiency, it is difficult to install in standard existing boilers because of the lack of a suitable supply arrangement which will not interfere with the opening of the boiler doors.

Both the heat from the boiler and the necessity for a permanent installation make it desirable to have some sort of metallic supply line from the steam or other fluid to the jet arm inside the boiler door. The lack of flexibility

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of metallic piping requires a special arrangement so that the boilers may be constantly ready for use and at the same time the boiler doors may be readily operable.

It is an object of this invention to provide a supply system for a boiler blower which will be durable, flexible and simple and will permit of ready installation in existing, standard boilers.

It is also an object of this invention to provide an improved combination of structural elements whereby the efficiency of blower systems will be improved.

It is an object of this invention to provide, in a boiler blower system wherein a jet arm, having jets directed toward boiler flues to be cleaned, is positioned interiorly of a hinged boiler door, and wherein an extension of said arm extends perpendicularly through said door and means are provided for rotating said jet arm by rotation of the exterior portion of said jet arm extension, and a steam supply is provided for said jets, a steam supply unit comprising a general supply pipe terminating in an offset swivel joint with its axis approaching but apart from the extended axis of said door hinges, a main pipe extending parallel to the axis of said door hinges and outwardly spaced apart therefrom, an elbowed connection pipe connecting said swivel terminating said general supply pipe with said main pipe line, a tap line leading from said main line to said jet arm extension, said tap line being perpendicular to said main pipe line and extending parallel to said boiler door, a swivel joint interposed in said main pipe line between said tap line and said elbowed pipe connections, whereby said swivel joints accommodate angular changes caused by the difference in the positioning of the axis of said door hinges and said swivel terminating the general supply line when said door is swung open or closed, and a telescopic swivel joint interposed between said tap line and said jet arm extension, whereby the swivel allows rotation of said jet without disturbing the supply unit and the telescoping action accommodates variations in spacing of said tap line with respect to said door caused by said angular changes.

These and other objects will be readily understood by reference to the following specification and accompanying drawings in which:

Fig. 1 is a perspective view of a preferred form of the invention as installed on an existing standard boiler;

Fig. 2 is a side elevation of a preferred combined telescopic swivel joint forming a part of the present invention and,

Fig. 3 is a perspective view of a jet arm embodying the present invention, and a supporting bracket therefor.

Reference character 1 indicates a conventional flue type boiler which has hinged doors 3

at one end thereof. Leading either from an air pressure system or from the steam generated by the boiler itself, is a supply pipe indicated generally at 5. In Fig. 3, a jet arm 7 with jets or nozzles 9 is shown, as positioned on the inside of a door (not shown) in a supporting bracket 11 which may be bolted, riveted or otherwise mounted on the door. However, the jet arm may be simply mounted on the door without a bracket, as shown in Fig. 1.

Although the drawings, as shown, illustrate a plurality of jet arms mounted at various points on the door of the boiler, a single jet arm mounted at the extremity of one of the doors or any other suitable arrangement may be used, if preferred. To connect jet arms 7 with supply pipe 5, so that the door 3 is freely movable in a normal manner, swinging or swivel joints 13 and 15 are interposed at suitable points along the pipe supply system, and combined telescopic and swivel joints 17 are provided to connect jet arms 7 with tap lines 29.

Following the fluid flow from the supply line 5, steam or other suitable fluid enters swivel joint 13, offset swivel joint connection 25, main pipe line 27, tap lines 29 and telescopic swivel joints 17 in order to reach jet arms 7.

In the normally closed position, as shown in Fig. 1, the door and the supply pipe system substantially form a rectangle when viewed as an overhead elevation so that the telescopic swivel joint 17, and the offset swivel joint connection 25 form ends while the door 3 and tap line or tap lines 29 form the sides thereof. If possible, the supply system is arranged so that the axis of the swivel joint 13 lies along the extended axis of the hinges of door 3, and in this case, the above described rectangle will be retained regardless of the position of the boiler door. In such case, conventional fittings and the single swivel joint 13 are satisfactory. However, in the majority of cases, existing boiler doors are hinged in such a fashion that it is impossible to arrange steam fittings to have a common axis therewith.

In the present invention, the location of swivel joint 13 is above the door 3 and away from the boiler, but its axis should remain parallel with and approaching the extended axis of the door hinge. As door 3 swings open, it carries with it jet arms 7, telescopic swivel joints 17, the latter being perpendicular thereto, and tap lines 29 which are fixed at substantially a right angle to telescopic swivel joints 17. The entire pipe system tends to revolve around swivel 13, but swivel joint 15, located between tap lines 29 and swivel joint connection 25, is adapted to revolve and allow for any additional angular change in the system. As the angle of offset swivel joint connection 25 changes, it forces pipe lines 29 either closer to or away from door 3. The telescopic swivel joints 17 are adapted to allow such movement without strain on the pipe system. Thus, three simple joints interposed in a properly arranged supply system make possible the installation of a boiler blower in any conventional boiler without interfering with the normal manipulation thereof.

A simple, preferred form of a telescopic swivel joint is shown in Fig. 2. It consists of a reducing coupling 31, adapted to be screw threaded at one end onto the end of tap line 29, the other end being adapted to receive a main barrel 33 by means of the usual screw threaded connection. An annular opening in the opposite end of barrel 33 is adapted to slideably receive the end of jet arm 7 so that while the barrel is stationary,

the jet arm is free to rotate or to slide telescopically therein. A collar 40 on the end of jet arm 7 limits the telescopic motion and suitable packing 37 is placed in the barrel around jet arm 7 to make a steam or air tight joint. A conventional grease cup 39 is provided for lubrication and packing of the joint. Referring again to Fig. 1, sprocket wheels 41 are fixedly mounted on jet arms 7 on the exterior of door 3 for common rotation therewith. Sprocket pinions 43 are mounted on a pivot on door 3 at points convenient for use by the fireman, and sprocket chains 45 are adapted to connect the wheels 41 with the pinions 43. Slots 47 are provided in sprocket pinions 43 to receive a conventional bell crank (not shown). Suitable valves 49, shown as interposed in the tap lines 29, are provided to manually control the flow of cleaner fluid to the jets 9. A conventional petcock 50 is provided on the end of the main pipe 27 to permit removal of condensate.

It will be apparent from the foregoing description and accompanying drawings, that applicant has provided a novel boiler flue cleaning system which, in the combination disclosed, makes possible the installation thereof on existing, standard boilers without causing any change in the operation of such boilers.

I claim:

In a boiler blower system wherein a jet arm, having jets directed toward boiler flues to be cleaned, is positioned interiorly of a hinged boiler door, and wherein an extension of said arm extends perpendicularly through said door and means are provided for rotating said jet arm by rotation of the exterior portion of said jet arm extension, and a steam supply is provided for said jets, a steam supply unit comprising a general supply pipe terminating in an offset swivel joint with its axis approaching but apart from the extended axis of said door hinges, a main pipe extending parallel to the axis of said door hinges and outwardly spaced apart therefrom, an elbowed connection pipe connecting said swivel terminating said general supply pipe with said main pipe line, a tap line leading from said main line to said jet arm extension, said tap line being perpendicular to said main pipe line and extending parallel to said boiler door, a swivel joint interposed in said main pipe line between said tap line and said elbowed pipe connections, whereby said swivel joints accommodate angular changes caused by the difference in the positioning of the axis of said door hinges and said swivel terminating the general supply line when said door is swung open or closed, and a telescopic swivel joint interposed between said tap line and said jet arm extension, whereby the swivel allows rotation of said jet without disturbing the supply unit and the telescoping action accommodates variations in spacing of said tap line with respect to said door caused by said angular changes.

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