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CHAMBER CLEANING DEVICE

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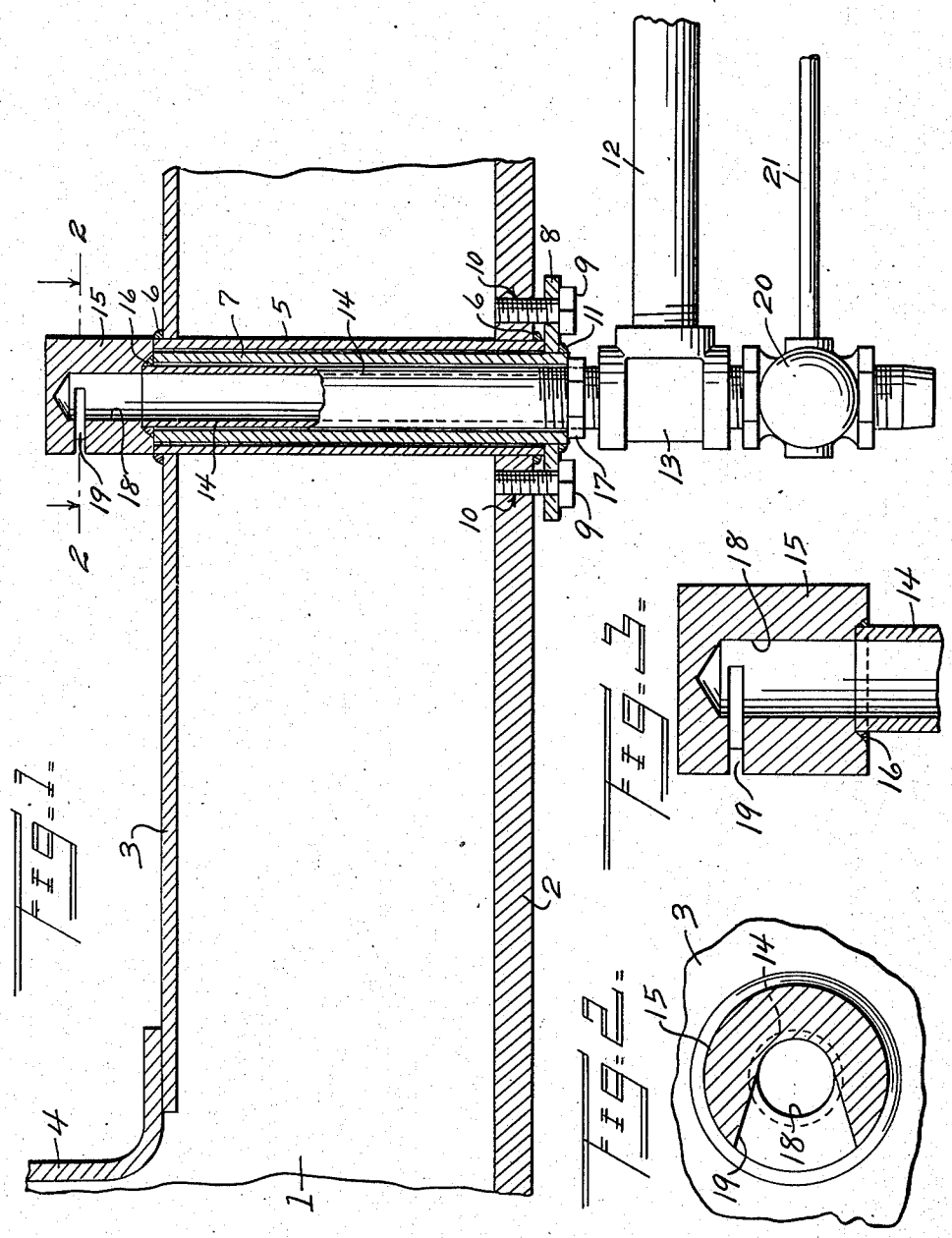



FIG. 1.




FIG. 3.




FIG. 2.

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## CHAMBER CLEANING DEVICE

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5 Claims. (Cl. 122—391)

This invention relates to a boiler tube cleaner and it is one object of the invention to provide a device of this character including a tube adapted to be mounted through a stay tube of a water leg of a boiler in order that steam or air under pressure may be delivered into the combustion chamber of the boiler and directed towards the tube sheet for passage through the boiler tubes and removal of soot from the tubes.

Another object of the invention is to provide a device of this character wherein the tube through which steam is discharged into the combustion chamber is so mounted through the stay tube of the boiler that leakage of steam will be prevented.

Another object of the invention is to provide the discharge tube with a nozzle at its inner end of such formation that the steam will be discharged therefrom in a film or sheet which spreads out in the combustion chamber and covers a large area of the tube sheet.

Another object of the invention is to provide a device of this character which is simple in construction, capable of being very easily installed, and not liable to work loose or leak during use.

The invention is illustrated in the accompanying drawing wherein:

Fig. 1 is a sectional view showing the improved cleaner installed.

Fig. 2 is a sectional view upon an enlarged scale taken transversely through the nozzle along line 2—2 of Figure 1.

Fig. 3 is a sectional view taken longitudinally through the nozzle.

This improved boiler cleaner is intended for use upon a locomotive boiler but its use is not limited to this particular type of boiler. A fragment of the boiler is shown in Figure 1 and includes the usual water leg 1 having outer and inner walls 2 and 3, the outer wall being the shell of the boiler and the inner wall constituting the side wall of the combustion chamber. There has also been provided the usual tube sheet 4 through which tubes are mounted in the usual manner. It will be understood that the usual number of stay-bolts are provided, one being omitted and a stay tube 5 used in place thereof. This stay tube passes through the walls 2 and 3 and secured at its ends by electric welds 6 so that it will be firmly held in place and water prevented from leaking about the tube. A sleeve 7 passes through tube 5 and at its outer end carries a collar or plate 8 which is secured against the outer end of tube by screws 9 passed through the plate and screwed into openings 10 formed in the boiler shell 2. An electric weld 11 about the outer end of the sleeve holds the sleeve and the plate 8 firmly in engagement with each other.

The steam by means of which the flues or boiler tubes are to be cleaned is obtained from a manifold or other suitable source of supply through a pipe 12 and this pipe carried a T-coupling 13 into the upper end of which is screwed a discharge tube 14 which has one end protruding from the inner end of the sleeve and carrying a nozzle 15 which is welded to the tube as shown at 16. The threaded outer end portion of the discharge tube which is screwed into the coupling 13 is threaded and carries a nut 17 which is screwed tight against the outer end of the sleeve and firmly holds the tube in place and, by pressure, forms a tight joint between the nozzle and the inner end of the sleeve 7. It will thus be seen that leakage of steam through the sleeve will be prevented.

The nozzle 15 is of such length that it projects into the combustion chamber an appreciable distance, as shown in Figure 1. This nozzle is formed of suitable metal and has a bore 18 which leads from the lower end of the nipple and terminates in spaced relation to the outer end of the nipple. A slot 19 is formed transversely of the nipple near the upper end thereof and communicates with the upper end portion of the bore 18. This slot constitutes an outlet mouth for the bore of the nipple, and upon referring to Figure 2 it will be seen that the slot gradually increases in width towards its outer end. Therefore as steam is discharged through the slot or mouth 19 it will have a tendency to spread and form a flat film of steam of gradually increasing width. This film of steam strikes the tube sheet 4 over a wide area and passes through a number of boiler tubes. It will be understood that as many of the improved cleaners may be installed as found necessary. Condensed steam is drained from the cleaner through a drain valve 20 which is screwed into the lower end of the coupling 13 and extends downwardly therefrom. This valve has a stem 21 for opening and closing the valve, and the valve stem may be of such length that it can be conveniently operated by the engineer or some other occupant of the cab of the engine.

Having thus described the invention, what is claimed is:

1. In combination with a boiler structure including a water leg having outer and inner walls and a stay tube mounted through the said walls; a sleeve passing through said stay tube, a plate mounted about the outer end of said sleeve, fasteners passing through said plate and screwed

into the outer wall of the water leg, a supply pipe, a coupling carried by said pipe, a discharge tube carried by said coupling and extending through said sleeve, a nozzle carried by the inner end of said discharge tube and bearing against inner ends of the sleeve and the stay tube, said nozzle having a bore communicating with said discharge tube and being formed with a transverse slot communication with the bore near the upper end thereof, said slot gradually increasing in width towards its outer end and constituting a discharge mouth for the nozzle, and a nut screwed upon the outer portion of said discharge tube and engaging the outer end of the sleeve to firmly hold the discharge tube in place and form a tight joint between the nozzle and inner ends of the sleeve and the stay tube.

2. In combination with a boiler structure including a water leg having outer and inner walls and a stay tube mounted through the said walls; a sleeve mounted through said stay tube, a discharge tube extending through said sleeve, a nozzle at the inner end of said discharge tube bearing against inner ends of the sleeve and the stay tube, a nut screwed upon the outer end portion of said discharge tube and engaging the outer end of the sleeve, said nozzle being formed with a longitudinal bore registering with the inner end of the discharge tube and a transverse slot communicating with the bore and constituting an outlet mouth gradually increasing in width towards its outer end for discharging a flat stream of steam from the nozzle, and a coupling for connecting the outer end of the discharge tube with a supply pipe.

3. A boiler tube cleaner comprising a sleeve of dimensions adapting it to pass through a stay tube of a boiler, means for firmly securing the sleeve in place through the stay tube, a discharge tube passing through said sleeve and having a threaded outer end portion, a nozzle carried by the inner end of said discharge tube and bearing against the inner end of the sleeve, and a nut upon the threaded outer end portion of said discharge tube screwed tightly against the outer end of said sleeve, said nozzle being formed with a bore communicating with said discharge tube, there being a slot formed transversely in the nozzle and communicating with the bore thereof, said slot gradually increasing in width towards its outer end and constituting a flaring outlet mouth for the nozzle.

4. A boiler tube cleaner comprising a sleeve adapted to be mounted through a stay tube of a boiler, a discharge tube passing through said sleeve and having a threaded outer end portion, a nozzle carried by the inner end of said discharge tube and bearing against the inner end of said sleeve, said nozzle being formed with a bore leading from the discharge tube and with a transverse slot communicating with the bore near the upper end thereof, said slot increasing in width towards its outer end and constituting a flaring mouth for the nozzle, and a nut screwed upon the threaded outer end portion of said discharge tube and abutting the outer end of said sleeve.

5. In combination with a boiler structure including a water leg having outer and inner walls and a stay tube mounted through said walls, a sleeve carried in the stay tube a plate mounted about the outer end of said sleeve, fasteners passing through said plate and screwed into the outer wall of the water leg, a discharge tube extending through said sleeve, a nozzle at the inner end of said discharge tube bearing against the inner ends of the sleeve and stay tube, means carried by the nozzle tube and engaging the sleeve to maintain the nozzle in place and force the nozzle against the inner end of the sleeve to form a tight joint, said nozzle being formed with a bore registering with the inner end of the discharge tube, and a slot communicating with the bore and flared outwardly to discharge a flat stream of steam from the nozzle, and a connection between the outer end of the discharge tube and a supply pipe.

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