

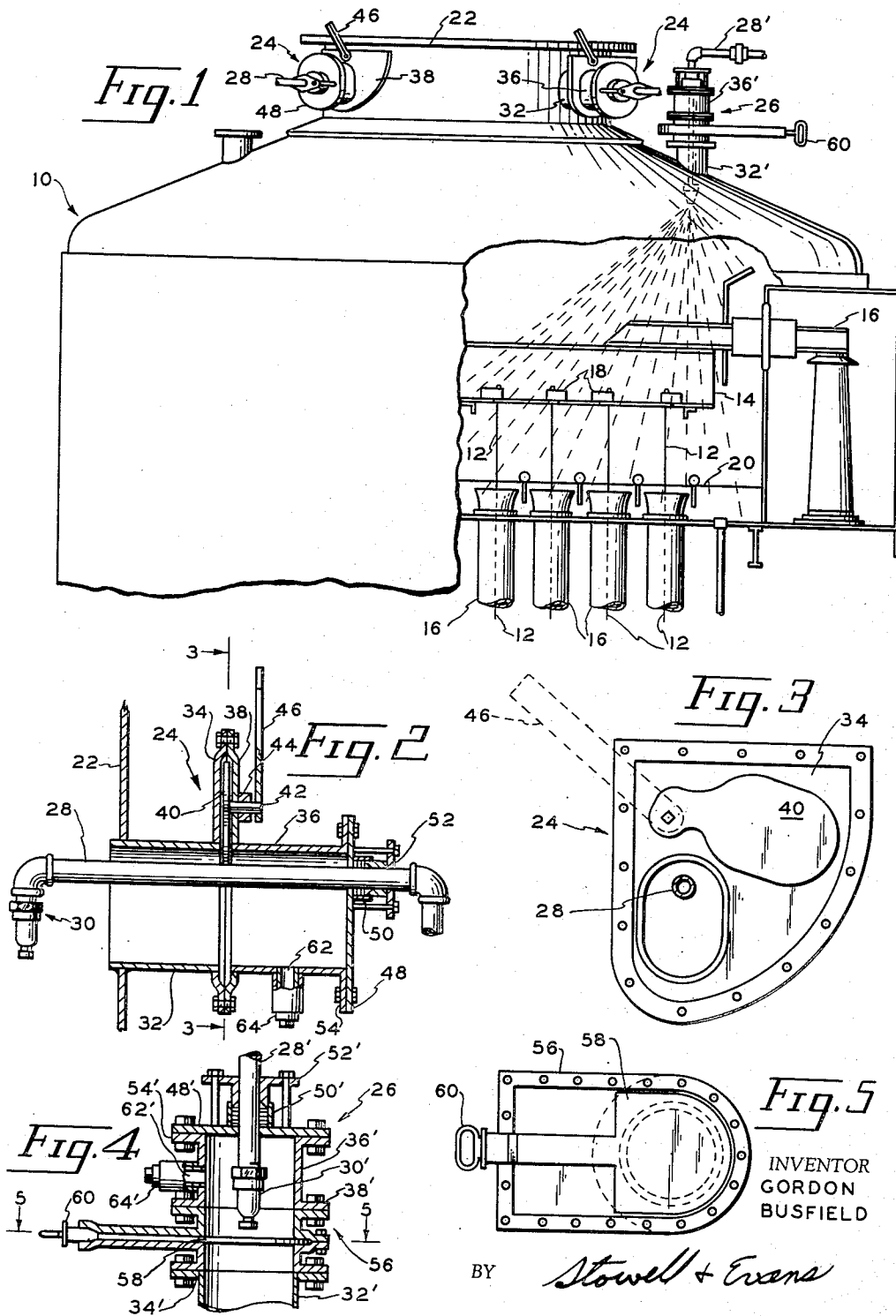
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GASLOCK FOR SPRAY NOZZLES

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## GASLOCK FOR SPRAY NOZZLES

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This invention relates to gas treating and conditioning apparatus and more particularly to gaslocks for spray nozzles in electrical precipitators.

In many gas cleaning processes employing electrical precipitators it is necessary to regulate the moisture contact of the gases to be cleaned, to adjust their temperatures or to flush precipitated material from the electrical discharge and collecting electrodes in order to provide for efficient operation.

It has been the general practice when spray devices are needed as above pointed out to provide spray heads which project through the sides of the precipitator shell and are controlled by liquid supply valves located on the outside of the precipitator.

In the past, generally no provision has been made for the inspection and cleaning of the spray heads except when the precipitator was taken out of service. The periods of operation normally run from six to twelve months, and it has been found that the spray heads often become plugged and cease to operate whereby a precipitator unit may operate for months without proper operation of the spray system, thereby permitting excessive build up of precipitated material and causing low precipitator efficiency.

This has been particularly true on installations where the gases to be treated are in their nature combustible or poisonous and the removal of a spray nozzle and supply pipe from the gas-filled precipitator shell could not be effected during operation without introducing contaminating air or permitting escape of the gas.

It is therefore a principal object of the invention to provide gaslocks for spray nozzles whereby the spray nozzles and supply pipes may be periodically inspected or removed from the precipitator shell without danger of introducing contaminating air or escape of the gas within the precipitator.

A further object is to provide such a device that is simple as to its parts, inexpensive to manufacture, and dependable in operation.

These and other objects and advantages are provided by the invention which generally comprises in a gas treating chamber, in combination with liquid spray mechanism, including a spray head within the chamber and a liquid supply line connecting the spray head with a liquid supply outside of the chamber, a gaslock whereby the liquid spray head may be inserted or withdrawn from the chamber without ingress or egress of gas from the chamber comprising a tubular

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member secured to a wall of the chamber and surrounding the spray mechanism opening, a head removably secured to the outer end of the tubular member and having an orifice adapted to receive the liquid supply line, and gate means carried by the tubular member between the head and the open end thereof for selectively closing a portion of the tubular member from the gases within the chamber.

The invention will be more particularly described with reference to the illustrative embodiments of the invention shown in the accompanying drawings as applied to an electrical precipitator having an electrode flushing system of the pond flushing type in which

Fig. 1 is a fragmentary view of an electrical precipitator including the gaslock device of the invention, with portions broken away for clarity;

Fig. 2 is a sectional view of one form of the gaslock for spray nozzles of the invention;

Fig. 3 is a sectional view on line 3—3 of the device shown in Fig. 2;

Fig. 4 is a sectional view of another form of the gaslock of the invention; and

Fig. 5 is a sectional view on line 5—5 of the device shown in Fig. 4 of the drawings.

Referring to the drawings, 10 is the shell or casing of a vertical flow electrical precipitator. Within the casing parallel discharge electrodes 12 are shown supported vertically within the tubular collecting electrodes 16 by an electrode supporting frame 14.

The upper ends of the discharge electrode frame 14 are connected to the high tension electrical system of the precipitator through busbar 16.

At the top of the discharge electrodes are cup-shaped members 18; and at the top of the collecting electrodes, members 20 form pond partitions, the cups and ponds providing positive flushing of the discharge and collecting electrodes respectively.

In the top portion of the precipitator shell and about the periphery of the gas outlet 22 are provided liquid spray devices adapted to feed the cups and ponds and to provide the electrode flushing fluid generally.

Each spray unit is provided with a gaslock generally designated 24 and 26 whereby the spray device may be readily and conveniently inspected or removed for cleaning or replacement.

With particular reference to Figs. 2 and 3 of the illustrative embodiments of the invention wherein the details of gaslocks 24 are shown, 28 is a liquid supply pipe provided with a spray head

or nozzle 30 at one end. The head 30 as shown in Fig. 2 projects within the side wall of the gas outlet 22, the opening in the side wall being great enough to permit the unobstructed entry and removal of the supply pipe and its connected spray head. Bolted or welded to the side wall of the gas outlet about the periphery of the spray pipe inlet is a tubular member 32 provided with a flange 34 secured at its outer end. A second tubular member 36, which may be of the same cross section as member 32, is provided at one end with a flange 38. The outer rims of flanges 34 and 38 are shaped to provide, when the rims are bolted together, a slot like pocket to receive the blade 40 of a swing gate valve. The blade of the valve being pivotally mounted at one end of a shaft 42 journaled in a boss 44 secured to one face of flange 38. A handle 46 is secured to the other end of the shaft 42 whereupon rotation of the handle, the blade may be swung to an "open" position as shown in Fig. 3 of the drawings or to a "closed" position whereby the blade effectively seals the opening between tubular members 32 and 36.

A cover plate 48 bored to receive the supply pipe 28 and provided with a packing gland 50 and a removable cap 52, is bolted to the outer flange 54 of tubular member 36 to complete the gaslock assembly.

With the precipitator in operation, the spray head and supply pipe would be in a position substantially as shown in Fig. 2. When it is desired to inspect, clean or replace the spray nozzle, the retaining cap 52 is loosened and the supply pipe is withdrawn from the precipitator until the spray head is entirely within the tubular member 36. The liquid supply to the spray head need not be cut off during this portion of the operation and in some cases it has been found to be desirable to keep the spray in operation during this initial stage as the liquid flow from the spray washes all accumulated material from about the gate valve and the interior of tubular member 36. When the spray head is well within the outer chamber, blade 40 is swung downwardly to close the opening between tubular members 32 and 36. With the blade 40 in the closed position the operating engineer may then unbolt the cover plate 48 and completely remove the supply pipe and spray head without the introduction of air into the precipitator shell or the escape of gases therefrom. To reinstall the spray device the above procedure is repeated in the reverse order.

In order to facilitate the inspection of the spray nozzle without necessity of removing the cover plate 48, an inspection orifice 62 having a removable cap 64 may be conveniently located in the side wall of the member 36 of the gaslock device. Thus, after the spray head has been drawn into the tubular member 36 and the blade 40 positioned to seal the opening between tubular members 32 and 36, the cap 64 may be removed and the spray head inspected through orifice 62 without removing the cover plate 48.

From the foregoing description, it will be seen that the length of the tubular member 32 is not critical; however, the outer member 36 must have an axial length at least great enough to accommodate the spray head and its connected pipe between the blade 40 and cover plate 48.

In Figs. 4 and 5 of the drawings there is shown a modified form of the gaslock of the invention wherein a standard slide valve, for example a "Rockwell Blast Gate" valve is used instead of the swing gate valve hereinbefore described.

With particular reference to Figures 4 and 5, 28' is the liquid supply line having a spray head or nozzle 30' at one end.

The lower portion of the gaslock comprises a tubular member 32' provided with a flanged end 34'. Member 32' is secured, such as by welding, to an opening in the top of the precipitator shell, with the flange end outwardly. The central portion of the gaslock comprises a valve unit 56 having a sliding gate 58 provided with an operating handle 60. One end of the valve unit is bolted to the flange 34' of member 32', while at the other end is bolted tubular member 36'. Member 36' is preferably of the same cross section as member 32' and has end flanges 38' and 54'. To complete the assembly a cover plate 48' is bolted to the flange 54'; the cover plate being bored to receive the supply pipe 28' and is provided with a packing gland 50' and a removable cap 52'.

Conveniently located in the side wall of tubular member 36' is an inspection orifice 62' having a removable cap 64'. Thus, after the spray head has been drawn into the tubular member 36' and handle 60 of the valve has been moved inwardly so that gate 58 seals the opening between tubular members 32' and 36', the cap 64' may be removed and the spray head inspected through orifice 62' without removing the cover plate 48' whereby the inspection time of the spray nozzle is substantially reduced.

From the foregoing description it will be seen that the present invention provides a novel gaslock for spray devices for electrical precipitators and gas conditioning towers whereby the aims, objects and advantages of the invention are fully accomplished.

I claim:

In a gas treating chamber, in combination with liquid spray mechanism, including a spray head within the chamber and a liquid supply line connecting the spray head with a liquid supply outside of the chamber, a gaslock whereby the liquid spray head may be inserted or withdrawn from the chamber without ingress or egress of gas from the chamber comprising an elongated tubular member secured to a wall of the chamber and surrounding the spray mechanism opening, a head removably secured to the outer end of the tubular member and having an orifice adapted to receive the liquid supply line, means defining a chamber in said elongated tubular member adapted to receive the spray head, said means including a gate valve carried by the tubular member between the head and outside of the chamber for selectively enclosing the spray head in the chamber out of contact with the gas in the chamber, means for inspecting the spray head within the chamber comprising a boss surrounding an opening in the tubular member between the head and the gate valve, and a cap removably secured to said boss.

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