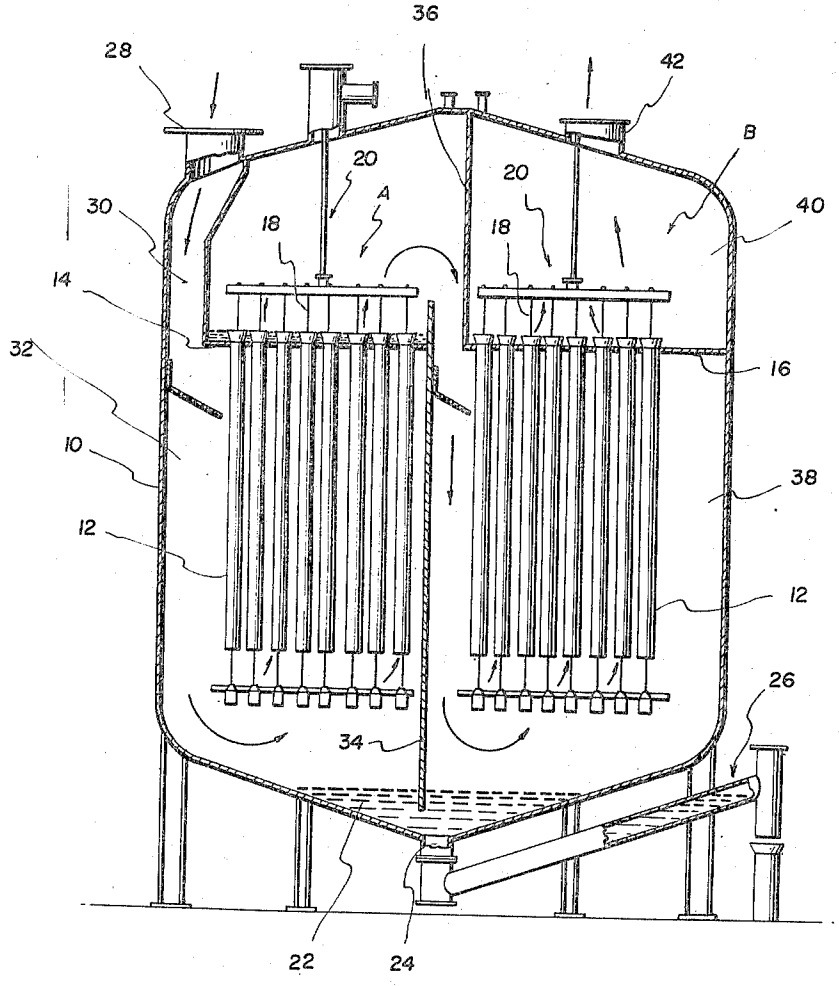
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ELECTRICAL PRECIPITATOR

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ELECTRICAL PRECIPITATOR

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This invention relates to electrical precipitators and is particularly directed to electrical precipitators having liquid flush type collecting electrodes, and wherein the gas stream to be cleaned is passed successively through a plurality of precipitating units in series.

It is an object of the invention to provide such a precipitator wherein all of the precipitating units are encased in a single housing that is relatively simple in construction, extremely compact, and has good gas distribution to the various precipitating units.

A further object of the invention is to provide such a precipitator having a single precipitate outlet for the plurality of precipitating units.

A further object is to provide such a device which minimizes the necessity for outside flues which are expensive to construct and require a substantial amount of space, which is not always available.

These and other objects and advantages are provided by an electrical precipitator which generally comprises a shell having a plurality of banks of vertical type collecting electrodes and associated discharge electrodes, horizontally disposed header means in the shell supporting the collecting electrodes, a common sump in the shell below the banks of collecting electrodes for recovering a liquid from the electrodes, outlet means maintaining a predetermined liquid level in the sump, vertical partition members between the banks of collecting electrodes extending below the liquid level at the bottom end thereof and cooperating with the header means to define inlet plenum chambers in the shell around each of the banks of collecting electrodes below the header means, further vertical partition members extending above the header means and cooperating therewith to define outlet plenum chambers in the shell above each of the banks of collecting electrodes, gas inlet means into one of the inlet plenum chambers, gas passages through the header means from the outlet plenum chambers above each of the banks of collecting electrodes into the inlet plenum chamber around an adjacent bank of collecting electrodes, and gas outlet means from the outlet plenum chamber about the last in order of the banks of collecting electrodes whereby a stream of gas entering the gas inlet means is caused to pass upward through the collecting electrodes of each of said banks in series.

The invention will be more particularly described and the principles thereof illustrated in reference to the accompanying drawing showing in elevation and in partial section an electrical precipitator embodying teachings of the invention.

Referring to the drawing, 10 is the shell of a pressure type electrical precipitator within which are supported a plurality of liquid flush type collecting electrode pipes 12. In the form of the invention shown in the drawing, the collecting electrodes are divided into two units generally designated A and B, and are vertically supported within the casing by means of header plates 14 and 16. The upper ends of the electrodes extend above the header plates and are surrounded by pools or ponds of flushing liquid supplied by means not shown in the drawing.

Fine wire discharge electrodes 18 extend centrally through the collecting pipe electrodes and are supported at their upper ends by high tension bus bar assemblies 20 as is well known in the art. The lower ends of the collecting electrodes discharge into a common sump generally indicated at 22 formed in the bottom of the precipitator shell. The sump 22 receives the flushing liquid from the electrodes and the precipitated material, which are then removed through outlet 24 and liquid seal outlet pipes 26. The outlet pipes 26 are positioned to maintain a predetermined liquid level in the sump as indicated in the drawing.

In the top of the shell 10 is a dirty gas inlet 28 which connects to a flue 30 projecting through the header plate 14 and which discharges into an inlet plenum chamber 32 for electrode set A.

The gas within the inlet plenum chamber 32 is directed upwardly through the collecting tubes 12 by the vertical partition member 34 which extends from below the liquid level in the sump 22 to a position slightly higher than the header plate 14. The portion of the partition member 34 which extends above the header plate 14 cooperates therewith and with the sides of the casing 10 to form ponds or pools about the upper extension of the collecting pipe electrode 12. This portion of the partition also aids in starting the gas to be cleaned vertically downward for the second cleaning stage. A second vertical partition member 36 extending from the top of the casing downwardly to the header plate 16 cooperates therewith to define an inlet plenum chamber 38 and an outlet plenum chamber 40 for electrode set B.

An outlet 42 for clean gas opens into the outlet plenum chamber 40.

In operation of the electrical precipitators of the invention, dirty gases enter the inlet 28, flow downwardly through conduit 30 and into the inlet plenum chamber 32 of electrode set A, up through the collecting electrodes 12 of set A, downwardly around vertical partition 34 and into inlet plenum chamber 38 of electrode set B, upwardly through collecting electrodes 12 of set B and into outlet plenum chamber 40 where the gases are discharged through outlet 42. The flushing liquid flowing downwardly through the pipes 12, removes the precipitated material from the electrodes and collects in the sump 22 from which the liquid and precipitate are removed through sump outlet 24 and pipes 26.

While the electrical precipitator hereinabove described and shown in the accompanying drawing comprises only two electrode sets, it will be evident that a plurality of such sets may be interconnected for serial flow without departing from the scope of the invention.

I claim:

1. An electrical precipitator comprising a shell, a plurality of banks of vertical pipe collecting electrodes and associated discharge electrodes, horizontally disposed header means in said shell supporting said collecting electrodes, a common sump in said shell below said banks of collecting electrodes for receiving liquid from said electrodes, outlet means maintaining a predetermined liquid level in said sump, vertical partition members between said banks of collecting electrodes extending below said liquid level at the bottom end thereof and cooperating with said header means to define inlet plenum chambers in said shell around each of said banks of collecting electrodes below said header means, further vertical partition members extending above said header means and cooperating therewith to define outlet plenum chambers in said shell above each of said banks of collecting electrodes, gas inlet means into one of said inlet plenum chambers, gas passages through said header means from the outlet plenum chambers above each of said banks of collecting electrodes into the inlet plenum chamber

around an adjacent bank of collecting electrodes, and gas outlet means from the outlet plenum chamber about the last in order of said banks of collecting electrodes whereby a stream of gas entering said gas inlet means is caused to pass upward through the collecting electrodes of each of said banks in series.

2. An electrical precipitator comprising a shell, a bank of vertical pipe collecting electrodes and associated discharge electrodes, a horizontally disposed header plate in said shell supporting said bank of collecting electrodes, a second bank of vertical pipe collecting electrodes and associated discharge electrodes, a second horizontally disposed header plate in said shell supporting said second bank of collecting electrodes, a common sump in said shell below said banks of collecting electrodes for receiving liquid from said electrodes, outlet means maintaining a predetermined liquid level in said sump, a vertical partition member between said banks of collecting electrodes extending below said liquid level at the bottom end thereof and cooperating with said header plate to define an inlet plenum chamber in said shell around said bank of collecting electrodes below said header plate, a second vertical partition member extending above said second header plate and cooperating therewith to define an outlet plenum chamber in said shell above the second bank of collecting electrodes, gas inlet means in the top of the shell and communicating with said inlet plenum chamber, a gas passage between said head plates from above the inlet plenum chamber into space below the outlet plenum chamber, and gas outlet means in the top of the shell and communicating with the outlet plenum chamber above said second bank of collecting electrodes whereby a stream of gas entering the gas inlet means is caused to pass upward through the collecting electrodes of each of the banks in series.

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