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[54] **MERCURY PURIFYING PLANT**
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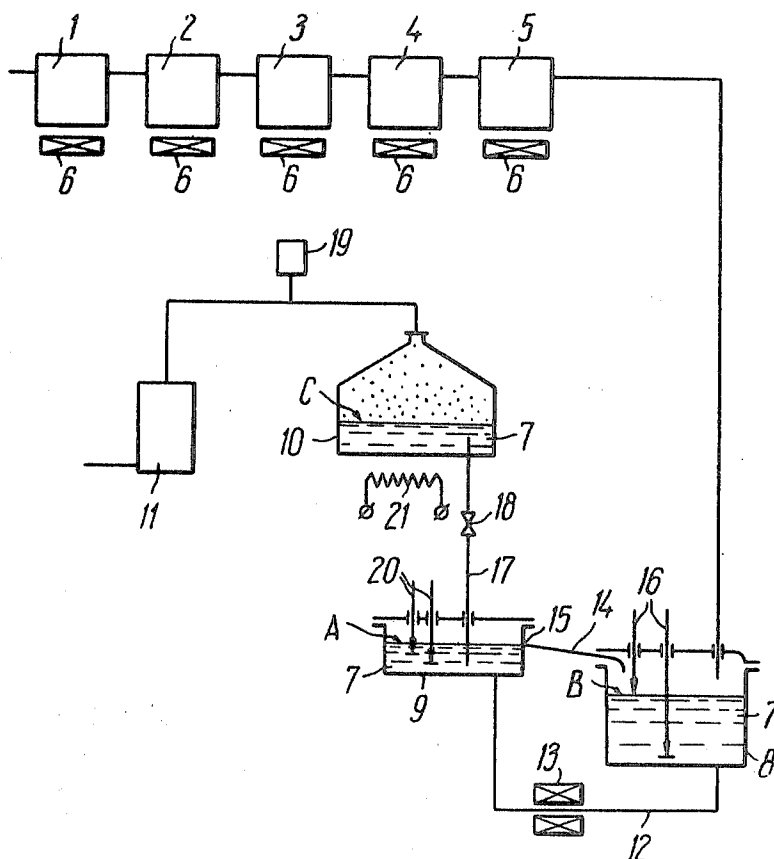
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ABSTRACT: A mercury purifying plant ensuring chemical or electrolytic purification of mercury followed by vacuum distillation, comprising a number of consecutively connected purifiers, an accumulating vessel, a vacuum evaporator, and a condenser. The vacuum evaporator of the plant is equipped with means for maintaining a constant mercury level in it, which ensures a high efficiency of the purification process and increases the output of the plant.



MERCURY PURIFYING PLANT

The present invention relates to mercury purifying plants utilizing either a chemical or an electrolytic purification process followed by vacuum distillation.

Known in the art are mercury purification plants consisting of a number of consecutively connected purifiers, a vacuum evaporator and a condenser; by passing mercury through these units, it is cleaned of mechanical, organic, metallic and gaseous impurities.

However, in such prior art plants the level of mercury entering the vacuum evaporator from the purifiers fluctuates continuously which impairs the stability of evaporation of mercury in the vacuum evaporator and the efficiency of its purification. Thus, when the mercury level drops, evaporation of mercury is intensified because of a temperature rise in the vacuum evaporator at a given vacuum; besides, the impurities are also evaporated and their vapors enter the condenser together with the mercury vapors, thus polluting the resulting mercury. Conversely, when the mercury level rises, evaporation ceases because the temperature of mercury drops below its evaporation point.

An object of the present invention resides in eliminating the aforesaid disadvantages.

A particular object of the invention resides in providing a mercury purifying plant which ensures reliable operation of the vacuum evaporators and of the entire plant, a sufficient tightness of the mercury processing plant, and automation of the process.

This object is achieved by providing a mercury purifying plant comprising consecutively connected purifiers, an accumulating vessel, a vacuum evaporator and a condenser, wherein the vacuum evaporator is provided with special devices for maintaining a constant level of mercury in it.

The devices meant to maintain a constant level of mercury in the vacuum evaporator can be in the form of an intermediate vessel which is installed between the accumulating vessel and the vacuum evaporator in such a manner that the vacuum evaporator is supplied from the intermediate vessel owing to a difference of pressures between them, the intermediate vessel being equipped with devices for maintaining a constant mercury level in it.

It is expedient that the intermediate vessel be installed so that the mercury level in it would be higher than that in the accumulating vessel and the level-maintaining device would be a supply pipe communicating with the accumulating vessel and a discharge pipe whose inlet hole is located at the height at which the mercury level in the intermediate vessel has to be maintained.

The level-maintaining device of the intermediate vessel can be in the form of a level gauge installed in that vessel and controlling the supply of mercury from the accumulating vessel into the intermediate vessel.

Now the invention will be described by way of example with reference to the accompanying drawing which schematically depicts a mercury purifying plant according to the invention.

The mercury purifying plant shown in the drawing comprises a number of consecutively connected purifiers 1—5 of which vessel 1 decreases and cleans mercury of organic impurities, vessel 2—washes mercury to clean it of the remaining reagent and impurities dissolved in it, vessel 3 dissolves the organic impurities not dissolved in the preceding vessel 2 and washes mercury to clean it of the metallic impurities, vessel 4—washes mercury with distilled water to remove the remaining reagent, and vessel 5—dries the mercury.

The purifying vessels 1 through 5 are fitted with inductors 6 designed to mix the mercury with the reagent owing to the interaction of the inductor magnetic fields with the currents induced in the mercury being purified.

An accumulating vessel 8 installed after the purifiers is designed to accumulate purified mercury 7 and is in communication via an intermediate vessel 9 with a vacuum evaporator 10 which, in turn, communicates with a condenser 11.

The intermediate vessel 9 is installed so that the mercury level A in it is higher than the level B in the accumulating vessel 8, the intermediate vessel 9 communicating with the accumulating vessel 8 through a pipe 12 supplying mercury into the intermediate vessel 9 by means of an electromagnetic pump 13, and through a discharge pipe 14 whose inlet hole 15 is at the height at which the level A of mercury 7 in the intermediate vessel 9 has to be maintained.

Installed in the accumulating vessel 8 are level gauges 16 which control the supply of mercury into the purifying vessels 1 through 5 (the system of purifier control is omitted in the drawing).

The intermediate vessel 9 communicates through the pipe 17 and valve 18 with the vacuum mercury evaporator 10 in which a certain vacuum is maintained by the vacuum pump 19.

This design of the mercury purifying plant may comprise more than one vacuum evaporator 10 supplied with mercury 7 from the intermediate vessel 9.

The intermediate vessel 9 may have level gauges 20 which control the operation of the electromagnetic pump 13, thus maintaining the required level A in the vessel 9. In this case the mercury level maintained in the intermediate vessel may be lower than the level determined by the location of the hole 15 of the discharge pipe 14.

The purifying plant functions as follows.

The mercury to be purified enters the purifier vessel 1 where it is cleaned of organic impurities, then it passes into the vessel 2 for removing the remaining reagent together with the impurities dissolved in it, then, after a certain period of time, into the vessel 3 for removing metallic impurities and any organic impurities, that have not been removed in the preceding vessels. On completion of the purification process, mercury is delivered into the vessel 4 for washing, then into the vessel 5 for drying. The dry mercury 7 is accumulated of the accumulating vessel 8, the mercury level in which is maintained at the desired height by means of the level gauge 16.

As the level reaches a predetermined maximum mark, the level gauge 16 stops the supply of mercury from the purifying vessel 5 and conversely, starts supplying it when the level drops to a predetermined minimum.

The electromagnetic pump 13 feeds mercury 7 continuously through the pipe 12 into the intermediate vessel 9 and the surplus mercury flows back into the accumulating vessel 8 through the discharge pipe 14. Thus, a constant level A of mercury is maintained in the intermediate vessel 9. As we have pointed out before, the required level of mercury in the intermediate vessel 9 can be maintained by means of the level gauges 20. The capacity of the electromagnetic pump 13 is controlled to suit the number of the functioning vacuum evaporators 10. The mercury flows from the intermediate vessel 9 through the pipe 17 and shutoff valve 18 into the vacuum evaporator 10. The difference between the level B in the vacuum evaporator 10 and the level A in the intermediate vessel 9 which is equal to the column of mercury formed owing to the difference of barometric pressures in the vacuum evaporator 10 and intermediate vessel 9, is maintained constant automatically due to a continuous supply of mercury from the intermediate vessel 9 with a constant level to make up for the mercury evaporated in the vacuum evaporator 10.

The vacuum and the temperature (240°—250° C.) in the vacuum evaporator 10 are maintained constant by the vacuum pump 19 and the heater 21, respectively. If necessary, the vacuum evaporators 10 can be disconnected from the intermediate vessel 9 by closing the valve 18.

The mercury evaporates and its vapors enter the condenser 11 where they are condensed while the impurities settle on the bottom of the vacuum evaporator 10.

The purified mercury flows from the condenser 11 into a vacuum pouring unit (not shown in the drawing).

The mercury purifying plant disclosed herein increases considerably the speed and efficiency of purification of mercury and precludes its reprocessing which is required in the plants known heretofore.

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The daily capacity of the present plant reaches 6 to 8 tons and the processed mercury is noted for a high cleanness, the content of impurities ranging from 0.001 to 0.0001 percent of the total amount of metal.

The use of electromagnetic pumps makes the plant more hermetic, thus considerably reducing the pollution of air in the industrial premises.

The present plant ensures a complete automation of the mercury purification process.

What we claim is:

1. A mercury purifying plant comprising purifier means having an outlet, an accumulating vessel including an inlet and an outlet, means communicating said inlet of said accumulating means with said outlet of said purifier means, vacuum evaporator means including an inlet and an outlet, means communicating said inlet of said vacuum evaporator means with said outlet of said accumulating vessel, means for maintaining a constant level of mercury in said vacuum evaporator means, and condenser means including an inlet, means communicating said inlet of said condenser means with said outlet of said vacuum evaporator means.

2. A mercury purifying plant according to claim 1, wherein said means for maintaining a constant level of mercury in said

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vacuum evaporator means includes an intermediate vessel installed between said accumulating vessel and said vacuum evaporator means so that said vacuum evaporator means is supplied from said intermediate vessel owing to a difference of pressures in said vacuum evaporator means and said intermediate vessel, said intermediate vessel including means for maintaining a constant level of mercury in it.

3. A mercury purifying plant according to claim 2, wherein said intermediate vessel is installed in such a manner that the level of mercury in it is higher than that in said accumulating vessel and said means for maintaining a constant level of mercury in said intermediate vessel includes a supply pipe communicating with said accumulating vessel and a discharge pipe including an inlet hole to be maintained in said intermediate vessel.

4. A mercury purifying plant according to claim 2, wherein said means for maintaining a constant level of mercury in said intermediate vessel includes a level gauge installed in said intermediate vessel and controlling the supply of mercury passing from said accumulating vessel to said intermediate vessel.

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