

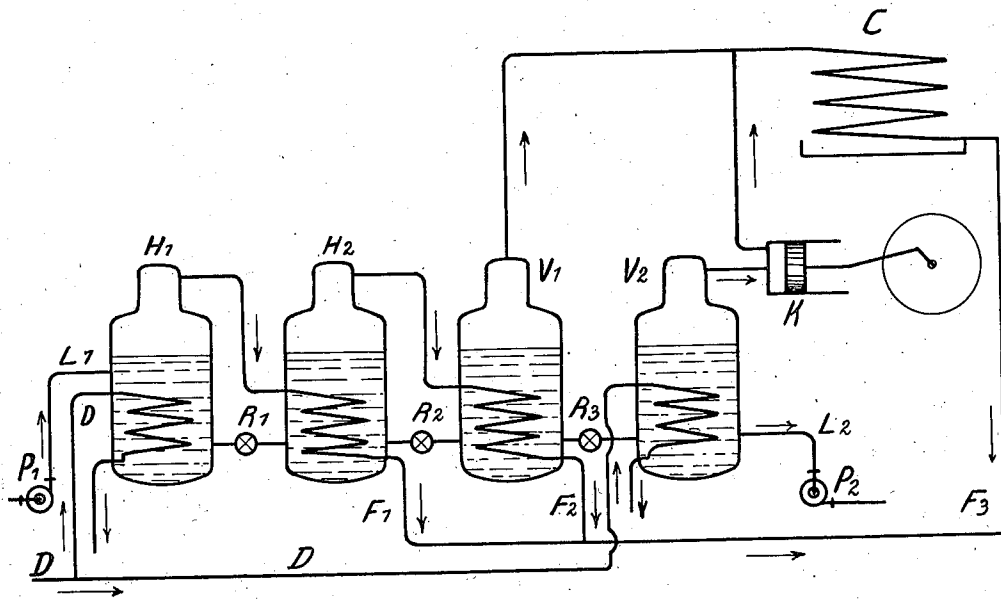
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PROCESS FOR RECOVERY OF SULPHUR DIOXIDE FROM OILS CONTAINING SAME

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PROCESS FOR RECOVERY OF SULPHUR DIOXIDE FROM OILS CONTAINING SAME

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In the refining of mineral oils and other hydrocarbon compounds with liquid sulphur dioxide the separation of the sulphur dioxide used as a solvent from the refined product and from the extract is effected by evaporation in closed vessels, after which the sulphurous acid is liquefied in a condenser so that it can be used again. The heating required for evaporation is in most cases supplied by the exhaust steam from the steam engine used for driving the plant, which may be insufficient when very large quantities of sulphurous acid are involved.

The object of the invention is to effect a saving in the amount of heat to be supplied by introducing high pressure evaporation.

In the accompanying drawing an arrangement for carrying out the process is shown by way of example. The evaporators V^1 and V^2 , the condenser C , the compressor K , the pumps P^1 and P^2 and the pipes L^1 and L^2 operate in the usual manner. The new feature consists in the arrangement of one or more evaporators placed before the apparatus and working at a higher pressure than the condenser pressure, the two high pressure evaporators H^1 and H^2 being shown by way of example. The pressure in the high pressure evaporator H^1 is greater than the pressure in the high pressure evaporator H^2 and the pressure in the latter is greater than the pressure in the evaporator V^1 . By the pump P^1 and the pipe L^1 the solution of extract and sulphurous acid is fed to the first high pressure evaporator H^1 . This evaporator is heated directly by a fire or indirectly by a system of pipes, into which for instance exhaust steam is supplied from the engine driving the apparatus, and the heat supply is regulated in such a manner that the required high pressure and the correspondingly high temperature are obtained when evaporating the sulphurous acid from the solution. During this process the solution is freed from a portion of the sulphur dioxide and flows through a

pipe with a regulating valve R^1 into the high pressure evaporator H^2 which is at a lower pressure. Owing to the expansion which takes place the temperature of the solution will drop, a corresponding proportion of the sulphur dioxide being evaporated. In the high pressure evaporator H^2 is a system of pipes, the interior of which is connected to the vapour space of the high pressure evaporator H^1 by a pipe. As the temperature of the solution in the high pressure evaporator H^2 is lower than the temperature of the sulphurous acid vapours in the high pressure evaporator H^1 , a liquefaction of the sulphur dioxide vapours coming from the high pressure evaporator H^1 will take place in the system of pipes within the high pressure evaporator H^2 , the heat liberated during the liquefaction being transmitted to the solution in the high pressure evaporator H^2 and causing a corresponding evaporation of sulphur dioxide in the high pressure evaporator H^2 . The sulphur dioxide liquefied in the heating system of the high pressure evaporator H^2 is conveyed through a pipe F^1 to a collecting vessel. Between the high pressure evaporator H^2 and the evaporator V^1 , the pressure in which is equal to that of the condenser, the operation of evaporation and condensation of sulphur dioxide is repeated in an analogous manner to what took place between the high pressure evaporators H^1 and H^2 . The solution which has been freed in the high pressure evaporator H^2 from a further portion of sulphur dioxide flows through the connecting pipe with the regulating valve R^2 into the evaporator V^1 , whereby it is cooled down. The sulphur dioxide vapours formed in the high pressure evaporator H^2 are condensed in the heating system in the evaporator V^1 , while the sulphur dioxide vapours formed in the evaporator V^1 from the solution flow to the condenser C , where they are liquefied by the action due to the temperature of the cooling water. From

the evaporator V^2 the solution, which is by this time freed from the greater part of the sulphur dioxide, flows through a pipe containing a regulating valve R^3 into one or more subsequent evaporators, in which a reduced pressure is produced by suction for removing the last traces of sulphur dioxide. It is only possible in exceptional cases to use the sulphur dioxide vapours produced in the evaporator V^1 for heating the subsequent evaporators V^2 and so on, as in general a higher temperature is necessary for driving out the last traces of sulphur dioxide. Hence in the arrangement shown in the drawing provision is made for heating the subsequent evaporator with a heating medium supplied from the outside (for instance exhaust steam).

The pipe systems which act both as condensers for the sulphurous acid vapours formed in one of the high pressure evaporators and as a means for heating the subsequent evaporator, may be located outside the evaporators and may for instance be constructed as double pipe apparatus, for instance in the manner of the condensers used in refrigerating plants.

One part of the sulphur dioxide vapours formed in the high pressure evaporators H^1 , H^2 and so on may be made available for other heating purposes by being conveyed away through a branch pipe, for instance for evaporating the sulphurous acid dissolved in the refined product.

A further advantage obtained with the arrangement described besides the saving in heating is that the condenser C is smaller and that less cooling water is required.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A process of recovering liquid sulphur dioxide from oils treated therewith which comprises heating a body of oil containing sulphur dioxide, said heating being under pressure, and condensing the evolved vapors of sulphur dioxide while in heat exchange relationship with another body of oil whereby the second body of oil is heated and the sulphur dioxide vapors are liquefied.

2. The process of recovering liquid sulphur dioxide from oils containing the same which comprises heating the oil under pressure to vaporize the sulphur dioxide, condensing the sulphur dioxide vapor while in heat exchange relationship with another body of oil under a pressure less than that of the first mentioned body of oil whereby the oil is heated and the sulphur dioxide vapors are liquefied, passing the evolved sulphur dioxide vapors from the second body of oil into heat exchange relationship with a third body of oil whereby the sulphur dioxide vapors are liquefied and condensing the sulphur dioxide

vapors liberated from the third body of oil.

3. In the process of recovering liquid sulphur dioxide from oils containing sulphur dioxide, the step which comprises heating a body of oil under pressure to evolve sulphur dioxide therefrom and passing said sulphur dioxide in heat exchange relationship with another body of oil to be heated whereby the sulphur dioxide is liquefied for re-use.

In testimony whereof I affix my signature.
GIUSEPPE CATTANEO.