

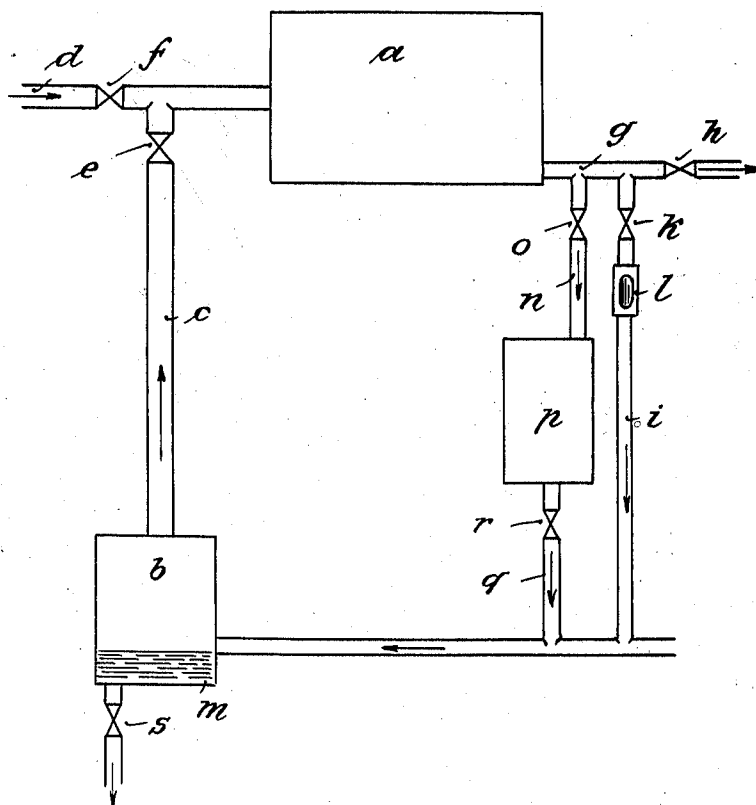
June 4, 1935.

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2,004,042

PROCESS OF CLEANING HEATING SURFACES

Filed Oct. 6, 1931



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UNITED STATES PATENT OFFICE

2,004,042

PROCESS OF CLEANING HEATING SURFACES

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Application October 6, 1931, Serial No. 567,324
In Germany November 11, 1929

1 Claim. (Cl. 87—5)

In the operation of machines which are heated by the exhaust steam from drying machines, exhausters, condensers and the like the surfaces touched by the heating steam are covered because of the oils contained in said steam with a layer of oil or with a crust of oil which resists the passage of heat and thereby lessens the heating effect.

The present invention concerns a process and means to prevent the formation or cause the removal of said layer of oil. The essential part of the invention consists in the fact that, from time to time in place of heating steam, vapors of oil dissolving media, such as carburetted hydrogen, benzol, alcohols or mixtures of such substances are fed to the heating surfaces on which scale has been formed by the heating steam and are removed as products of condensation in a mixture with the dissolved oil.

In contrast to the known processes, which feed the dissolving media in a fluid state to the heating surfaces to be cleaned, the cleaning according to my present process is an essential simplification. It offers besides the advantage that one can clean, with very small devices and using the smallest possible quantities of dissolving media, even the largest apparatus dirtied by the oil.

In order to obtain economic operation the condensed mixture can be fed back in a circulatory path to an evaporator vessel for the dissolving media in which the oil gradually settles and is thereby regained. The vapors of the oil dissolving media can be fed to the machine to be cleaned through the same pipes which otherwise serve for feeding the heating steam.

Finally, to recover the oil dissolving media a special separator can be provided. At the end of the cleaning process the evaporated regenerated oil dissolving media are fed to the cleaned machine, which in this case is used as condenser, and thereby condensed.

The drawing illustrates schematically means by which the process can be carried out.

a is the machine to be cleaned in front of which is placed an evaporator *b*. These vessels are connected by a pipe *c*. A pipe *d* connects with the pipe *c* to conduct heating steam to the machine during normal operation. Valves *e* and *f* are provided to make it possible to close and open the pipe extending from the evaporator towards the pipe *d*.

The pipe *g* for the condensate leads away from the machine *a* and can be closed by a valve *h*. From the pipe *g* branches a pipe *i* which extends into the vessel *b*, so that by the pipes *c* and *i* and

by the vessels *a* and *b* a circulation can be attained.

The pipe *i* can be shut off from the pipe *g* by a valve *k* and besides is provided with a sight window *l*, through which the state of the condensate flowing off through the pipe *i* can be observed. This condensate runs through the pipe *i* to the vessel *b* and collects in the lower part of said vessel.

From the pipe *g*, besides the pipe *i*, the pipe *n* branches off closeable by a valve *o* which pipe leads to a separator *p* from which the separated material can flow off through a pipe *q* to the pipe *i*. The vessel *p* can be shut off from the pipe *q* by a slide valve *r*. In addition the evaporator has an outlet valve *s*.

The operation of the apparatus described is generally effected in the following manner:

In the normal drying process, the heating steam flows through the pipe *d* to the machine *a* and flows off through the pipe *g* as condensate. The corresponding valves are opened. The valves *o* and *k* leading to the branch pipes are correspondingly closed. If the cleaning process is to take place a fluid oil dissolving medium for instance, benzol is evaporated in the vessel *b*, the valve *e* is opened and the valve *f* is closed. The evaporated dissolving medium is thus fed into the machine *a* where it can exercise its dissolving effect and thereby condenses. The condensate returns through the opened valve *k* through the pipe *i* into the vessel *b* whereby this condensate is correspondingly saturated with oil. The pipe *g* is meanwhile closed by the valve *h*. Through the sight glass *l* the state of the condensate can be controlled until the condensate shows no noticeable traces of oil. The cleaning process is then completed and now the separating process for the condensed dissolving medium is started by closing the valve *k* and opening the valve *o*. By this the further evaporated dissolving medium after being condensed in the machine *a* is caught in the chamber *p*. The deposit which remains after the described process in the evaporator *b* is completely freed from the dissolving medium by a corresponding raising of the temperature and can be removed through the slide *s* for further use.

The process is simple and economical. The materials can be used repeatedly and it can be changed to the cleaning process in a very short time, so that this process can take place in the short intervals of operation.

For use in different buildings the described apparatus can be made transportable.

I claim:—

- In stationary heat exchange apparatus the interior surfaces of which are normally subjected to a flow of heating steam containing oils passing therethrough, the process of removing the crust or scale formed by said heating steam on said surfaces comprising the steps of discontinuing the flow of oily steam through the apparatus, continuously heating a body of liquid organic dissolving medium for hydrocarbon crusts to drive off vapors therefrom, continuously circulating said vapors through the normal passage of flow of said heating steam in contact with the interior surfaces of said heat exchange apparatus, thereby condensing said vapors on said surfaces, continuously withdrawing from the apparatus the condensed dissolving medium together with the crust particles contained therein, continuously returning said contaminated dissolving medium to said liquid body of heated dissolving medium, revaporizing said dissolving medium, continuing the flow of said dissolving medium through said apparatus until the condensed dissolving medium withdrawn from said apparatus contains no noticeable contamination, then withdrawing said clean condensed dissolving medium from said apparatus and collecting the same in a body distinct from said heated body until substantially all of the vaporized dissolving medium has been condensed in said apparatus and accumulated in said collecting body.
- OTTO EBERHARDT.