

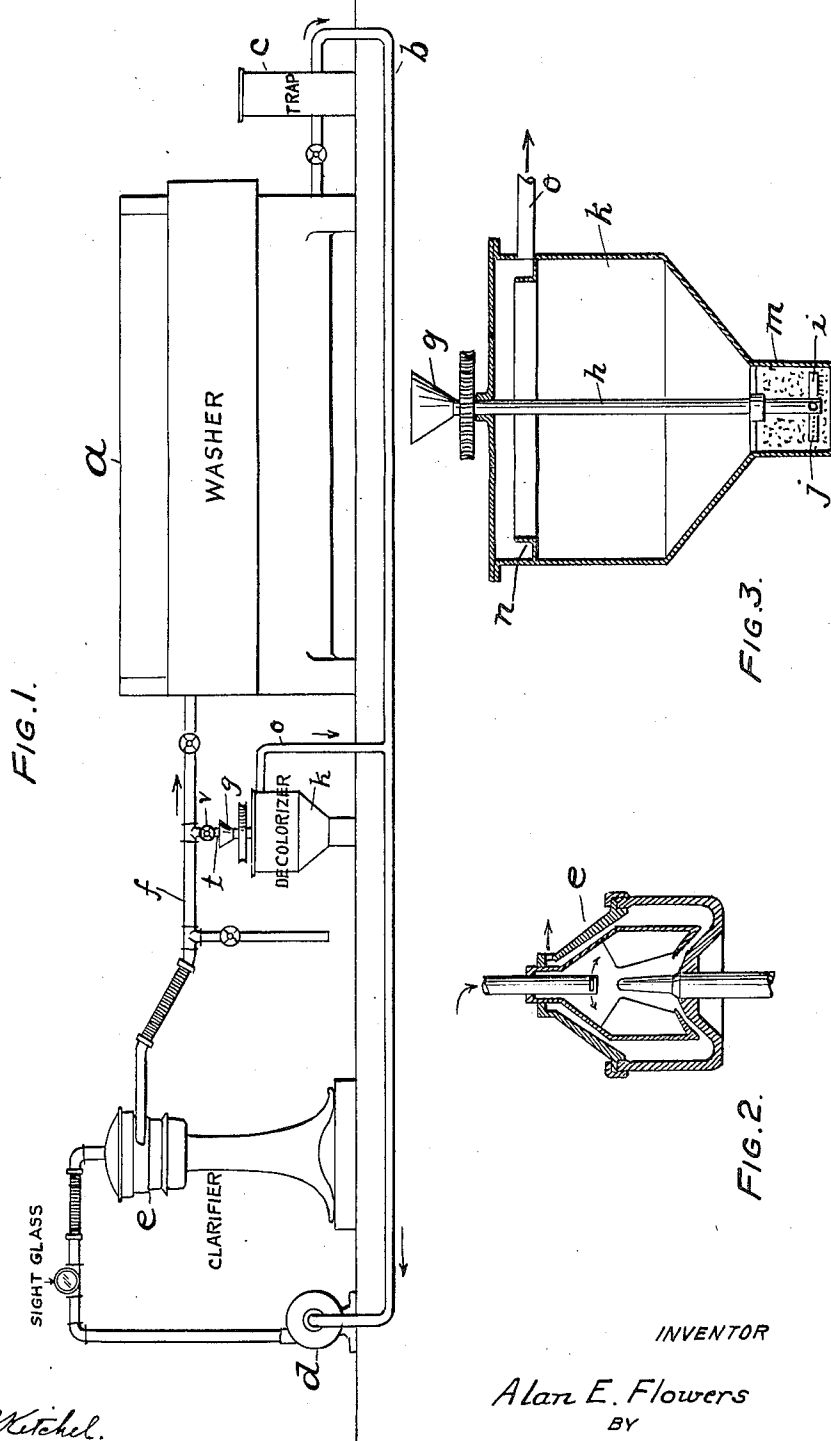
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PROCESS AND APPARATUS FOR DRY CLEANING

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WITNESS:

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UNITED STATES PATENT OFFICE.

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PROCESS AND APPARATUS FOR DRY-CLEANING.

Application filed August 5, 1924. Serial No. 730,137.

To all whom it may concern:

Be it known that I, ALAN E. FLOWERS, a citizen of the United States, residing at Poughkeepsie, county of Dutchess, and State of New York, have invented a new and useful Improvement in Processes and Apparatus for Dry-Cleaning, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

An efficient type of dry cleaner comprises a washer (which may be a rotatable or oscillatable cylinder in which the clothes to be cleaned are deposited and through which the cleaning fluid, such as gasoline, continuously circulates), a pipe through which the dirty gasoline is pumped, a centrifuge (which may be a two outlet purifier or a single outlet clarifier, wherein the dirt is removed), and a pipe for conveying the centrifugally cleaned gasoline to the washer. This continuous clarification system may be connected with a large capacity processing tank into which all the dirty gasoline in the system may be purified and then settled and bleached with caustic soda, the comparatively clean fluid being then re-introduced into the system, being passed through the centrifuge before going to the washer in order to remove any small particles of dirt which do not settle out in the processing tank and any traces of alkali or soap which may escape from the tank.

With or without the use of a processing tank, the continuous clarification system insures the passage of clean gasoline to the washer. The treatment in the processing tank is a batch treatment, and involves the withdrawal of the gasoline from the system from two to eighteen hours, which in turn involves the shutting down of the continuous clarifier system for a considerable time, or the provision of underground storage tanks for storing an extra supply of gasoline to be used in the continuous clarification system while a batch of previously used gasoline is being processed.

While the bad color which gasoline acquires after prolonged use in the continuous clarification system indicates no contamination which affects the efficiency of the gasoline as a cleaning medium, it is difficult to convince users of this fact. They demand a gasoline of good color. The object of the

present invention is to provide a process and means whereby the gasoline can be decolorized without withdrawing the gasoline from the system and without interfering with the continuity of the washing and clarification process, which requires no extra storage tanks, and is applicable to a system of any size, however small, without much increase in the cost of installation.

A preferred embodiment of the apparatus, illustrative of the preferred way of carrying out the process, is shown in the accompanying drawings, in which—

Fig. 1 is a diagram in elevation of a continuous clarification system embodying my invention.

Fig. 2 is a vertical sectional view of the centrifugal clarifier.

Fig. 3 is a detail sectional elevation of the decolorizing vessel.

From the washer *a* extends a pipe *b*, in which is interposed a trap *c* for catching and retaining large solid particles, and a pump *d*. The pipe *b* communicates with a centrifugal machine *e*, which is preferably a multiple clarifier comprising two chambers one within the other through which the dirty gasoline successively passes and on the walls of which the dirt is deposited and retained. From the clarifier the cleaned gasoline returns to the washer.

From the pipe *f* leading from the clarifier *e* to the washer *a* is a by-pass pipe *t* emptying into a funnel *g* on the upper end of a rotatable feed tube *h* extending into a tank *k*. The bottom of the tank is of reduced diameter, forming an agitating and treating chamber *m*. The tube *h* extends down through the tank to near the bottom thereof, where it is provided with radial branches *i* provided with discharge orifices *j*, which preferably are formed in that side of each branch which, in rotation, is the rear side. The chamber *m* contains a more or less finely divided decoloring agent, of which many are known. Activated carbon is preferred, but any active adsorbent, such as fuller's earth, may be substituted. Near the top of the tank is an annular trough *n* providing a weir over which the gasoline flows from the body of the tank, the gasoline discharging from the trough into a pipe *o*, which communicates with the pipe *b* between the trap *c* and the pump *d*.

By reason of the rotation of the tube *h*

and the discharge of the gasoline into the chamber *m* in a number of fine streams, the decolorizing agent and the gasoline are thoroughly agitated and mixed. The continuous upward flow of the gasoline tends to carry in the decolorizing agent along with it and to some extent does so; but while particles of the decolorizing agent are constantly rising, they are also constantly settling in counter-current to the flow of gasoline. The upper part of the body of gasoline is substantially quiescent and free of particles of the decolorizing agent and flows quickly over the weir *n* and hence out of the tank.

The size of the decolorizing tank or chamber is such that the volume of gasoline which it is capable of treating at any one time is but a fractional part of the volume of gasoline that, during the same period of time, is flowing from the the clarifier to the washer. Hence, while all the dirty gasoline flowing from the washer is clarified, only a small proportion of such gasoline, in a single circuit of travel, is decolorized. Inasmuch, however, as an objectionable deterioration of color occurs only as the result of a number of washing operations, it is obvious that the described by-passing of fractional parts of the gasoline will maintain the entire volume of good color. The by-pass pipe *f* is controlled by a valve *v*, which is set to fix the rate of flow of the gasoline through the decolorizing tank. The latter may be, therefore, of any desired maximum capacity, and its full capacity need not be utilized in the normal operation of the system.

The discharge of the decolorizing gasoline into the pipe *b* insures its subsequent centrifugation, thereby insuring the removal of any particles of the adsorbent that may be carried out of the decolorizing tank.

It will be understood that the term "clarifier" as used in the claims is intended to comprehend any means adapted to remove dirt, including settling tanks, filters and particularly a centrifuge, whether such dirt be discharged from the centrifuge, as in the case of a two outlet centrifugal purifier, or whether it be retained in the centrifugal bowl.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. In a continuous clarification dry cleaning system, the combination with a washer, a clarifier, a series of pipes and a pump, whereby cleaning liquid may be caused to circulate in an endless path through said washer and clarifier and back to the washer, of a by-pass interposed in said endless path and adapted to receive liquid from and discharge liquid to said endless path, and a decolorizing contrivance interposed in said by-pass, whereby the cleaning liquid may be de-

colorized at a rate substantially less than its rate of continuous flow through the system and without interruption of such flow.

2. In a continuous clarification dry cleaning system, the combination with a washer, a clarifier, a pipe connection through which the dirty washing liquid is conveyed from the washer to the clarifier and another pipe connection through which the cleaned washing liquid is returned to the washer, a contrivance for decolorizing the washing liquid, means to convey cleaned liquid from the second pipe connection to the decolorizing contrivance, and means to convey liquid decolorized in said contrivance back to the first pipe connection.

3. In a continuous clarification dry cleaning system, the combination with a washer, a clarifier, a series of pipes and a pump, whereby cleaning liquid may be caused to circulate in an endless path through said washer and clarifier and back to the washer, of a by-pass interposed in said endless path and adapted to receive liquid from and discharge liquid to said endless path, and a decolorizing contrivance interposed in said by-pass, said decolorizing contrivance comprising a tank having a reduced bottom to receive a decolorizing agent, a tube extending vertically through the tank and through which the by-pass liquid is conveyed to the reduced bottom, and an annular weir in the upper part of the tank over which the decolorized liquid overflows into the discharge end of the by-pass.

4. In a continuous clarification dry cleaning system, the combination with a washer, a clarifier, a series of pipes and a pump, whereby cleaning liquid may be caused to circulate in an endless path through said washer and clarifier and back to the washer, of a by-pass interposed in said endless path and adapted to receive liquid from and discharge liquid to said endless path, and a decolorizing contrivance interposed in said by-pass, said decolorizing contrivance comprising a tank having a reduced bottom to receive a decolorizing agent, a rotatable tube extending vertically through the tank and through which the by-passed liquid is conveyed downward, hollow lateral arms on the bottom of the tube communicating with its interior and orificed to discharge the liquid into the reduced bottom of the tank and effect the agitation of the liquid and decolorizing agent, and means at the upper part of the tank to skim off the decolorizing liquid and convey it to the discharge end of the by-pass.

5. The process of dry cleaning comprising establishing an endless flow of a cleaning liquid and in the course of its flow successively washing with it and clarifying it, diverting from the endless flowing stream a portion of the flowing liquid, decolorizing

the diverted liquid, and returning the decolorized liquid to the endless stream.

6. The process of dry cleaning comprising maintaining a body of cleaning liquid and utilizing said body for washing, continuously outflowing dirty liquid from said body and continuously clarifying it, dividing the flowing stream of clarified liquid into two streams of different volume, conveying the stream of greater volume continuously to said body of liquid, subjecting the stream of lesser volume to a decolorizing action, and conveying the decolorizing liquid back to the main stream of dirty liquid flowing from said body of liquid to the locus of clarification.

7. The process of dry cleaning comprising maintaining a body of cleaning liquid and utilizing said body for washing, causing, from said body, a continuous outflow of dirty liquid and continuously clarifying it, dividing the flowing stream of clarified liquid into two streams, conveying one stream continuously to said body of liquid and subjecting the other stream to a decolorizing action, and conveying the decolorizing liquid back to the main stream of dirty

liquid flowing from said body of liquid to the locus of clarification.

8. The process of dry cleaning comprising establishing an endless flow of a cleaning liquid and in the course of its flow successively washing with it and clarifying it, diverting from the endless flowing stream a portion of the flowing liquid, conveying the diverted liquid to a body of said liquid, subjecting the lower part of said body of liquid to agitation with a decolorizing agent, and skimming decolorized liquid from the upper portion of the last named body of liquid and returning it to the endless stream.

9. The process of dry cleaning comprising establishing an endless flowing stream of cleansing liquid, at one point in its flow using it for washing, at another point in its flow clarifying it, at another point diverting a portion of the stream of clarified liquid, decolorizing said portion and returning it to the stream.

In testimony of which invention, I have hereunto set my hand, at Poughkeepsie, New York, on this 31st day of July, 1924.

ALAN E. FLOWERS.