

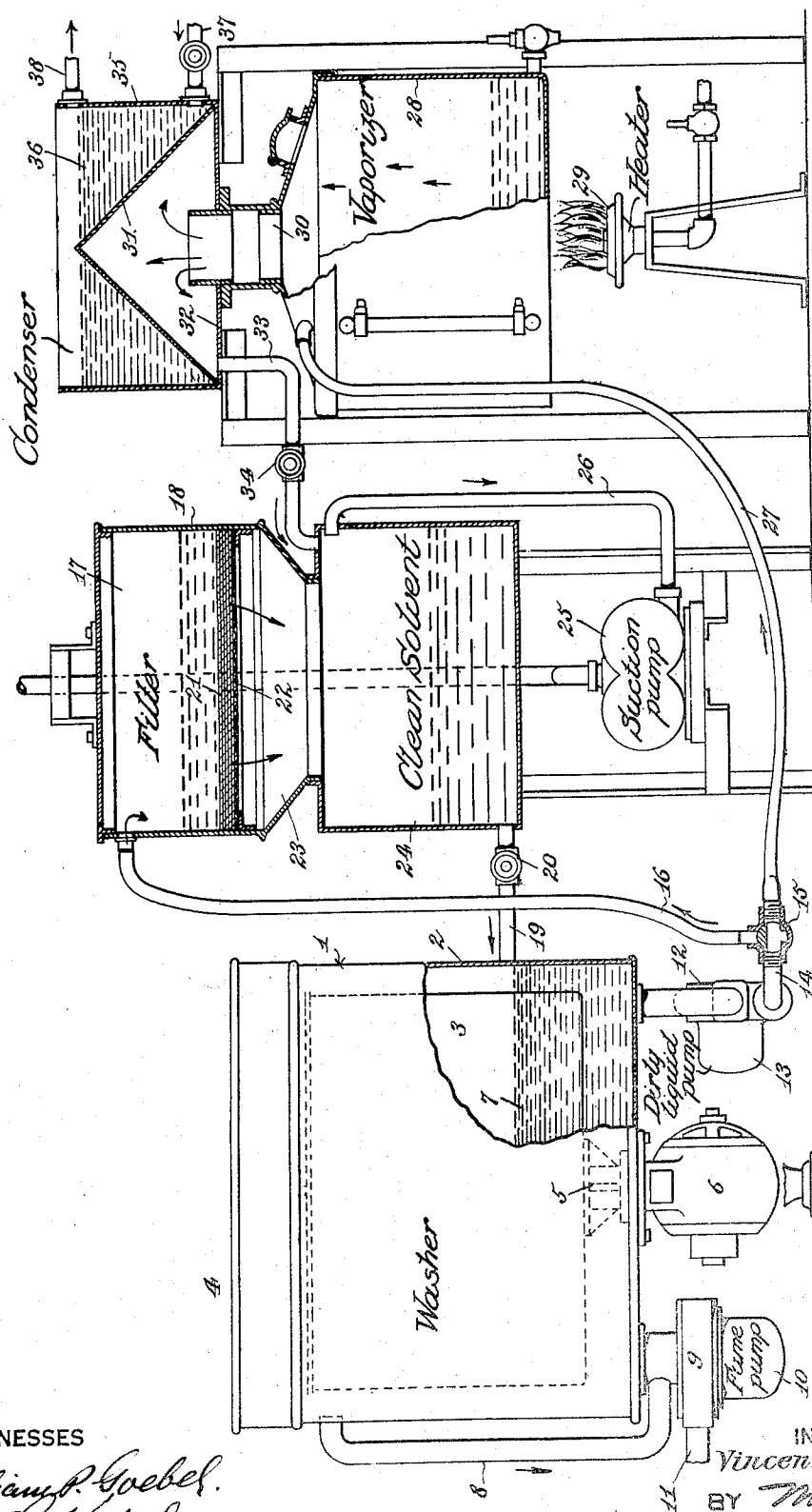
Sept. 1, 1936.

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2,053,103

DRY CLEANING APPARATUS

Filed Sept. 26, 1929



WITNESSES

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2,053,103

DRY CLEANING APPARATUS

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Application September 26, 1929, Serial No. 395,384

5 Claims. (Cl. 68—38)

The present invention relates to an improvement in dry cleaning apparatus in which provision is made to clean articles such as clothing and the like in a washer by means of a suitable cleaning liquid, to filter and/or reclaim the dirty liquid and to use the liquid for repeated cleaning operations. In using such apparatus, the dirty liquid is withdrawn from the washer, cleaned by a filter, and returned to the washer as required, and/or the used liquid may be reclaimed by distillation in a still and returned to the washer. One object of my invention has been to accomplish these cycles of operation by the use of relatively simple apparatus more particularly suited to small cleaning establishments. To this end, the washer has a single outlet with controls for directing the dirty liquid either to the still or to the filter, and a single inlet through which to return the filtered or distilled liquid or both.

A further object of the invention has been to provide suitable connections and control valves to render operation of the device as simple as possible, having in mind that persons ordinarily employed in retail cleaning or tailors' shops are not necessarily expert in the handling of cleaning machines.

One form of apparatus embodying my invention is illustrated in the accompanying drawing in which—

The single figure is a schematic view partly in section and with portions broken away.

Referring to parts of my improved apparatus identified in the accompanying drawing by numerals, 1 indicates a washing machine of any approved type, as for instance, a machine similar to the machine known on the market as the "Savage washer and dryer" which is substantially as shown by Dunham in Patent No. 1,842,154. This machine is provided with an outer casing 2 and a container or basket 3 preferably of foraminous material and designed to receive the clothes to be washed or dried. A suitable lid 4 is slid over the top of the casing 2, so that the washing machine will be substantially air-tight. The basket 3 is mounted on a suitable support 5, and to this support is connected the armature shaft of a motor 6, or, in fact, any suitable driving mechanism which may be turned on and off, whereby the basket 3 will be rotated. When the clothes are to be washed they are placed in the basket 3 and a desired quantity of cleaning liquid 7 is placed in the casing 2, said liquid naturally overflowing to a greater or less extent the clothes in basket 3. As motor 6 functions the clothes are rotated with the basket and are subjected to the

cleaning action of the liquid 7. After the clothes have been subjected to the cleaning liquid a desired length of time the liquid is drawn off and the basket 3 rotated a predetermined number of times for drying the clothes. The apparatus and manner of use thus far described are known in the art but under some conditions of operation permit the escape of fumes in addition to presenting other objectionable features which the proper use of a suitable embodiment of my invention is intended to overcome. In using the apparatus illustrated in the appended drawing, during both the washing and drying operation the fumes are drawn off through pipe 8 which at the upper end is in free communication with the upper part of the interior of casing 2, and at the lower part is in free communication with an air pump 9 driven by any suitable power as, for instance, electric motor 10. The pump 9 discharges through pipe 11, and pipe 11 is lead to a point outside of the building in which the device is mounted, so that the fumes are disposed of continually and when lid 4 is removed none of the fumes will pass into the room. Preferably, after each washing operation where the batch method is employed the liquid 7 is drawn off by a pump 12 driven by any suitable means, as for instance, a suitable electric motor 13. This pump forces the liquid 7 through outlet pipe 14 into the three-way valve 15, and thence through branch pipe 16 to the inlet side of a suitable filter, as to the chamber 17 forming part of the filter 18. After the liquid has been drawn off, the clothes may be dried as heretofore described. After the clothes have been removed and a new batch inserted the filtered liquid is discharged back into the washing machine through pipe 19 by merely opening the valve 20. The liquid, as soon as the same is discharged into the chamber 17, will immediately begin to pass through the filtering cloth or other medium 21 and through the wire mesh or foraminous sheet 22 into the tapering section 23 of filter 18 and thence into the reservoir 24. In order that the liquid may be made to pass through the filtering element of the filter more rapidly, I provide suitable means for applying a force thereto, such for example as the pressure pump 12 for exerting pressure if desired on liquid at the inlet side of the filtering element or a suction pump 25 which is connected through pipe 26 to the upper part of the reservoir 24, whereby when the device is in operation pump 25 will create a pressure differential between the inlet side and the discharge side of said filtering element, or partially exhaust the reservoir 24 and thereby

cause the cleaning fluid to pass more quickly through the filtering medium 21 and the screen 22. The pump 25 may be driven by a motor or from any other suitable source of power.

5 During the operation of washing, the solvent or cleaning liquid becomes fouled, not only with dirt, but also with other foreign matter such as oil, grease or the like which ordinary filtering will not effectively remove. When this condition ap-
10 pears, the solvent is reclaimed or separated from its non-filterable contents by distillation. For this purpose I provide a still having a boiler 28 into which the used liquid is fed from the washer by a pump 12 through pipe 14 and branch pipe
15 27 which is controlled by valve 15. Vaporizing heat is applied to the contents of the boiler by any suitable means such as a burner 29 where the solvent is noninflammable. As the liquid becomes heated, it vaporizes and the vapor passes
20 out of the boiler through the outlet 30 and into any suitable condenser, the drawing illustrating diagrammatically a conventional type in which a cooled wall 31 is arranged in the path of the vapor. The resulting condensate collects on the
25 floor 32 and passes therefrom into pipe 33 and thence into the reservoir 24 when the valve 34 is open. In order to bring about a sufficiently lowered temperature to produce effective condensation of the vapor in the condenser shown
30 in the drawing, the walls 31 are enclosed in a tank 35 and in contact with a supply of water or other cooling fluid supplied thereto. Effective circulation of this water or other cooling liquid is maintained by providing an inlet pipe 37 and a
35 discharge pipe 38. It will be apparent that any other suitable form of condensing device may be used in place of the one illustrated in connection with a suitable boiler to reclaim the used cleaning fluid by distillation. In the illustrated ap-
40 paratus, the reclaimed liquid flows by gravity to a reservoir 24 and thence into the washer through pipe 19 when valve 20 is open. It will thus be seen that according to one mode of operation pump 12 lifts the liquid to the filter and to the
45 reclaiming apparatus but the returning fluid passes by gravity back into the washing machine. If desired, after a batch of clothes has been cleaned the fluid 7 may be passed through the filter, but preferably it is not passed through the
50 reclaiming apparatus until three or more batches of clothes have been cleaned. In either instance all of the fluid is retained, as there is no place where the same can escape, and consequently, the filtering and reclaiming do not reduce the
55 quantity of fluid but effectively remove dirt and all foreign matter therefrom. During the washing operation there is a certain amount of fumes created. This is comparatively small but objectionable, if allowed to be released in a room
60 where the apparatus is positioned, and consequently, these fumes are drawn off by pump 9 and finally discharged out of the window or some other place.

In operating the device any desired dry clean-
65 ing liquid may be used, as for instance, trichlorethylene. By using this fluid or some other suitable dry cleaning fluid the clothes may be dry cleaned in a very short time, as the fluid is maintained clean either through the use of the
70 filter or the reclaiming apparatus or both. It will be apparent that, under some conditions, filtering and distilling may take place simultaneously with each other and/or with the washing by properly manipulating or regulating valves
75 15, 20 and 34. Accordingly, although the ap-

paratus is capable of being operated effectively as a batch apparatus, it may also be operated as a continuous apparatus in the sense that filtered and/or reclaimed solvent may be returned to the washer during washing to replace an
5 equivalent amount of dirty or fouled solvent withdrawn therefrom during washing for purification by filtering, by distillation or both, the particular mode of operation being determined by manipulation of the several valves hereinabove described. 10

What I claim is:—

1. Dry cleaning apparatus comprising a washer employing a dry cleaning liquid, filtering means for dirty liquid, means for causing dirty
15 liquid to pass from the washer to the filtering means, a clean liquid receptacle immediately below and opening into said filter for receiving the filtered liquid, a reclaimer, means for directing dirty liquid from the washer to the reclaimer,
20 means for directing the reclaimed liquid to said receptacle, and valve controlled means for directing said liquid from the receptacle back to the washer.

2. Dry cleaning apparatus comprising a washing machine adapted to wash clothes in a dry
25 cleaning liquid, a filter positioned at one side of but above said washing machine, a clean liquid receptacle positioned immediately below said filter and with its upper part in free communication with the outlet of said filter, and the bot-
30 tom approximately on a line midway between the top and the bottom of said washing machine, a valve controlled pipe extending from said receptacle near the bottom thereof into the wash-
35 ing machine near the center thereof, whereby the liquid from the receptacle may flow by gravity into the washing machine, a still positioned with the bottom of its condensation chamber above said receptacle, a valve controlled pipe
40 leading from the bottom of said chamber whereby liquid may flow by gravity from said condensation chamber into said receptacle, a pump having its inlet connected to the bottom of said
45 washing machine, a pipe extending from the discharge outlet of said pump to the inlet part of said filter, a pipe leading from said pump to the inlet part of said still, and valve means for controlling the flow of liquid to both of the pipes
50 leading from the discharge end of said pump.

3. Dry cleaning apparatus including a washer, a filter, a still, conduit means for directing liquid from the washer to the filter, conduit means
55 for directing liquid from the washer to the still, a clean liquid receptacle having operative connection with the filter and with the still to receive liquid direct therefrom, a pump operatively
60 arranged with the filter for producing rarefaction on the discharge side of the filter to facilitate the passage of liquid through the filter, another pump operatively connected with said
65 washer and with said conduit means for pumping liquid to the filter and to the still, valve means for optionally controlling the passage of liquid through said conduit means to the filter or to the still, and a pipe arranged to discharge liquid from the clean liquid receptacle into the washer.

4. Dry cleaning apparatus comprising a washer, a clean liquid receptacle, a valve controlled
70 discharge pipe from the receptacle to said washer, a filter having an outlet positioned to discharge filtered cleaning liquid into said receptacle, a still having a condenser, a discharge pipe
75 arranged to discharge distilled liquid by gravity

from said condenser into the receptacle, a pump having its inlet connected to said washer, a pipe from the outlet of said pump to said filter, a pipe from the outlet of said pump to said still, and valve means for controlling the feed of liquid from said pump to said filter and said still.

5. Dry cleaning apparatus comprising a washer, a still, a clean liquid tank, a filter having an outlet to discharge filtered liquid into said tank, a plurality of pumps, one of which is connected to the washer to move dirty liquid therefrom to

one side of said filter and to the still, another of said pumps being connected to reduce pressure at the opposite side of said filter whereby liquid is drawn therethrough and into said tank, a valve arranged to control the feed of liquid from said first mentioned pump to said filter or to said still at will, a pipe for discharging distilled liquid into the tank, and a pipe for discharging clean liquid from the tank into the washer.

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