Sept. 16, 1930. E. W. MISHAW 1,776,190

DRY CLEANING APPARATUS

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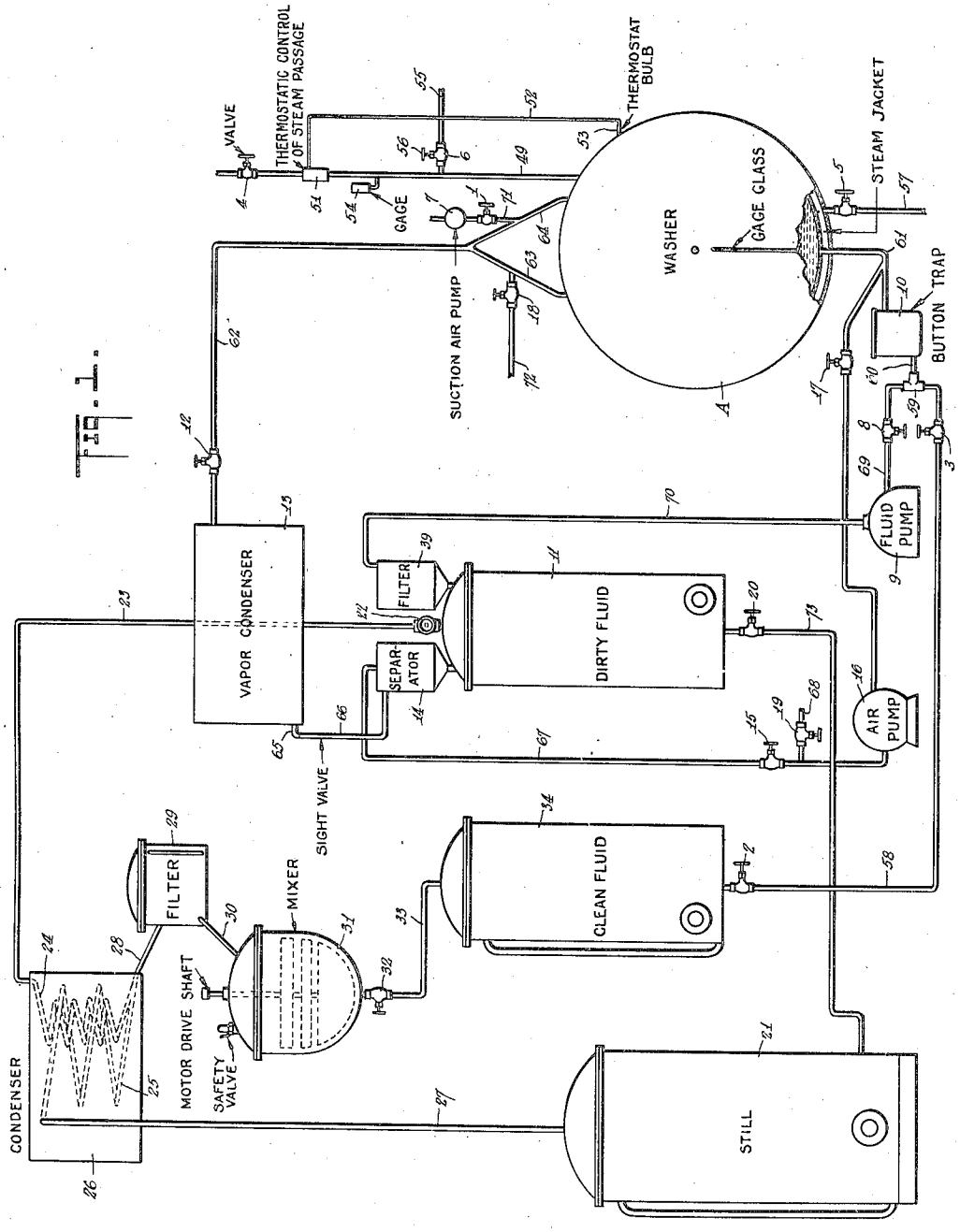

Fig. 1.

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Fig. 2.

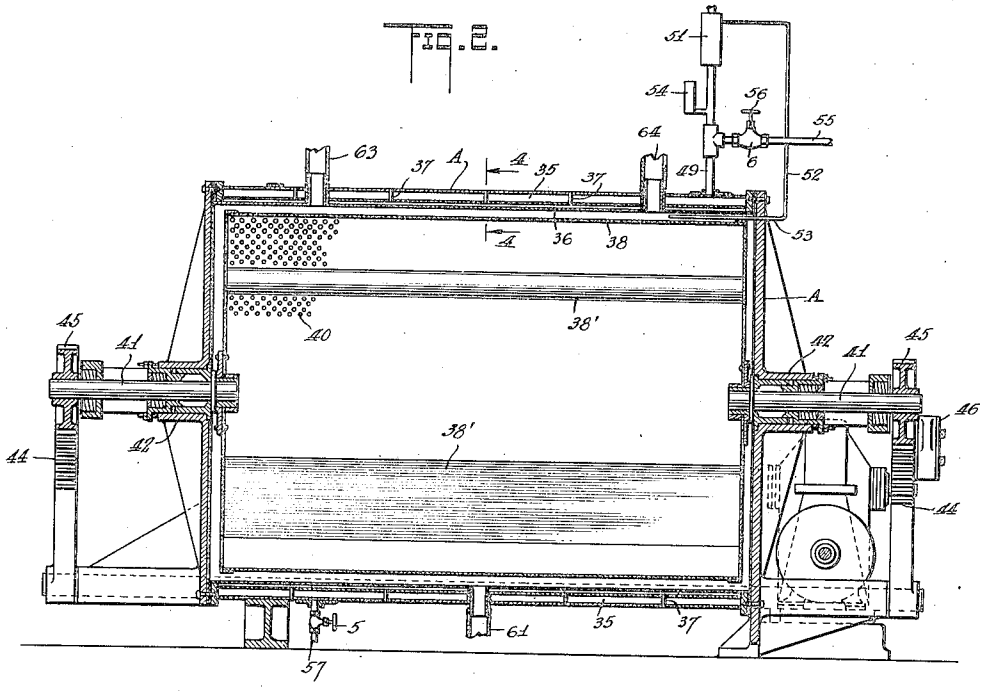


Fig. 3.

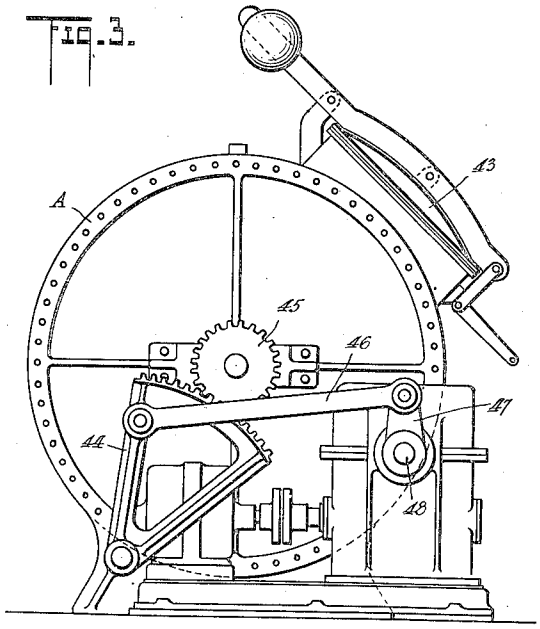
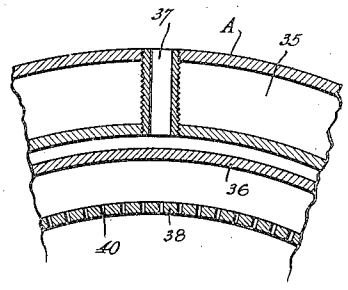


Fig. 4.



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UNITED STATES PATENT OFFICE

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DRY-CLEANING APPARATUS

Application filed November 18, 1927. Serial No. 234,277.

This invention relates to a dry cleaning apparatus.

An object of the invention is to provide an apparatus which removes moisture from clothes or other articles when they are placed in the washer, then cools the washer, then thoroughly washes the clothes with a fluid, then after the fluid is removed from the washer heats the washer; then removes from the clothes and the washer all vapors; then condenses the vapors to recover the fluid and thoroughly dry the clothes; and then cools the clothes by cooling the washer, and then aerates the clothes in the washer to remove odors, so that the clothes when removed are completely cleaned, dried, cooled and aerated, and are ready for pressing.

The apparatus also includes means for cleaning the fluid after it is recovered from the washer, and this cleaning includes the provision of a still, a condenser, a filter, and also a mixer, which latter insures the proper commingling of the ingredients of the fluid which may become separated by the washing operation.

My invention also includes means within the washer for agitating the clothes or, in other words, causing the clothes to elevate and fall during the washing operation as well as during the recovery of the liquid and the vapor, and during the drying and aerating operations, so that throughout the entire operation of cleaning, recovering the fluid and aerating, the clothes or other articles are agitated.

With these and other objects in view, the invention consists in certain novel features of construction and combination and arrangements of parts which will be more fully hereinafter described and pointed out in the claim.

In the accompanying drawings—

Figure 1 is a view in elevation, more or less diagrammatic, showing my complete apparatus;

Figure 2 is a view in longitudinal section through the washer;

Figure 3 is an end view of the washer and its operating means;

Figure 4 is an exaggerated fragmentary view in section illustrating a detail of the construction of the washer, the view being taken on the line 4—4 of Figure 2.

My apparatus includes the provision of a washer A, a clean fluid tank 34, a dirty fluid tank 11, a still 21, condensers 13 and 26, filters 29 and 39, a mixer 31, a separator 14, a button trap 10, a fluid pump 9 and an air pump 16, all of which are connected by pipes in a complete circuit, as will be hereinafter explained.

First of all, however, I will describe the construction of the washer in so far as it pertains to the apparatus as a whole.

The washer A is preferably in the form of a cylindrical metal casing having a steam jacket 35, and in the washer a lining 36 is provided of a metal which will resist the action of the fluid employed and which is in the form of a drum or cylinder slipped into the casing, and while this lining neatly fits the casing there is necessarily an air space between the lining and the wall of the washer.

This air space is connected to the atmosphere by a plurality of tubular rivets or stay bolts 37, and this permits any air in the space between the lining and the wall of the washer to be in constant communication with the atmosphere.

These tubular rivets or stay bolts will indicate any leakage in the lining as either the fluid, the vapor or the odor therefrom will pass through the stay bolts and give notice of leakage. Furthermore, they prevent any distortion of the lining by reason of the expansion of air between the lining and the wall of the washer. Another important feature is that this communication with the outside air prevents the lining from becoming heated to the point where it might scorch the clothes or other articles in the washer.

A rotary drum 38 is mounted to turn freely in the washer and is preferably of metal, perforated as shown at 40, and secured to trunnions 41 and on its ends mounted to turn in suitable packed bearings 42 at the ends of the washer casing.

It is of course to be understood that the drum 38 will be equipped with doors or closures of any kind for the admission and exit of the clothes or other articles, and the washer

A will also be equipped with a suitable door 43, as shown.

Motion may of course be transmitted to the drum in any approved manner, but I have shown for the purpose a pivoted segment 44 meshing with the pinion 45 on one of the shafts 41 and connected by a link 46 with the crank arm 47 of a drive shaft 48 to which motion may be imparted from any desired source of power.

A steam supply pipe 49 communicates with the steam jacket 35 and has a manually controlled valve 4 therein to open and close the pipe. This pipe 49 is also provided with an automatic thermostatic control device, indicated by the reference character 51, which is connected by a tube 52 with a thermostatic bulb 53 extending into the washer.

A gage 54 may be provided in the steam pipe 49 and a cold water supply pipe 55 also connects with pipe 49 and has a valve 56 therein. A drain pipe 57 communicates with the lower portion of the steam jacket and has a valve 5 therein.

A pipe 58 connects the bottom of the clean fluid tank 34 with a T-coupling 59, and has two valves 2 and 3 therein. The valve 2 is located adjacent the bottom of tank 34 and is merely an emergency valve to shut off the liquid in the event that it is desired at any time, the valve 3 being used to control the flow of fluid from the clean fluid tank 34.

A short pipe 60 connects the T-coupling 59 with the button trap 10 and a pipe 61 connects the button trap 10 with the lower portion of the washer. A pipe 62 located above the washer A has a pair of branch pipes 63 and 64 both of which communicate with the interior of the washer at the upper portion thereof. This pipe 62 connects the washer with the condenser 13 and has a valve 12 therein.

At the outlet end of the condenser 13 I provide a sight tube 65 so that the operator can observe whether or not the liquid is passing through this sight tube, and said sight tube is connected by a pipe 66 with a separator 14, the outlet of the separator communicating with the top of the dirty fluid tank 11.

The function of the separator is to separate the vapor from the liquid, the liquid passing into the dirty fluid tank and the vapor escaping through a pipe 67 which is connected with the pipe 61 above referred to.

In the pipe line 67 the air pump 16 is located and a valve 17 is located in the pipe 67 between the air pump 16 and the pipe 61. In the pipe 67 between the separator 14 and the air pump 16 a valve 15 is located, and a pipe 68 communicates with pipe 67 and has a valve 19 therein.

The fluid pump 9 is connected by a pipe 69 with the T-coupling 59 and has a valve 8 therein. A pipe 70 connects the fluid pump 9 with the upper end of filter 39, and the lower end of said filter 39 discharges into the top of dirty fluid tank 11.

An air outlet pipe 71 communicates with the branch pipe 64 of pipe 62 and has an air pump 7 therein operated in any approved manner to draw air from the washer, and this pipe 71 is provided with a valve 1 between the pump 7 and the washer. A pipe 73 connects the bottom of dirty fluid tank 11 with the still 21, and has a valve 20 therein.

The pipe 27 extends upwardly from the still 21 and communicates with a main coil 25 in a condenser 26, and this coil 25 drains through a pipe 28 into the filter 29 and from the filter 29 through a pipe 30 into a mixer 31. The mixer drains through a pipe 33 into the top of clean fluid tank 34 and has a valve 32 therein.

23 is a pipe communicating with the top of dirty fluid tank 11 and having a coil 24 in the condenser 26 communicating with the main coil 25, and a valve 22 is provided in this pipe, which may be opened or closed as occasion may desire.

The drum 38 is preferably provided with blades or vanes 38′ which cause the clothes to be elevated and allowed to drop during the operations of the drum.

Throughout the specifications and claim I use the term "clothes" to indicate articles to be washed, but it is perfectly obvious that the invention is adapted to wash articles of any type, such as wool in bags, etc., and hence I use the term "clothes" in its broadest sense to cover any articles which may be cleaned in this dry cleaning apparatus.

The operation is as follows:

The clothes are placed in the drum of the washer and the washer closed and made air-tight. The first step is to remove all moisture from the clothes and all surplus air from the apparatus. To accomplish this the drum 38 is operated and valves 4 and 5 are opened to allow the steam to circulate through the steam jacket and heat the washer. The valve 1 is then opened and air pump 7 operated to draw off the moisture and the excess air. The valves 1 and 4 are then closed and the valve 56 is opened to allow cold water to flow through the pipe 19 and through the steam jacket and escape through pipe 57 to cool the washer.

After the washer is cooled valve 56 is closed and when the steam jacket is thoroughly drained the valve 5 is closed.

The next operation is to open the valves 2 and 3 and allow the desired amount of cleaning fluid to flow into the bottom of the washer A.

Valves 2 and 3 are then closed and the oscillation or other movement of the drum containing the clothes is started and continues

throughout the operation of washing the clothes, recovering the liquid and vapor and drying and aerating the clothes.

The clothes are agitated for the desired length of time and then valve 8 is opened and fluid pump 9 started to draw the liquid through the button trap 10 and force the same through pipe 70 into the filter 39, from which it flows into the dirty fluid tank 11. The valve 8 is then closed and the fluid pump 9 stopped.

The next operation is to heat the washer and this is accomplished by opening valves 4 and 5, allowing the steam to flow freely through the steam jacket, the temperature and pressure being under control through the medium of the apparatus above described.

The next operation is to open valves 12, 15 and start the air pump 16. This draws the vapor from the top of the washer through the branch pipes 63 and 64 and through pipe 62 to the condenser 13 and from the condenser through the sight tube 65, pipe 66 and separator 14. This separator causes the liquid to flow downwardly into the dirty fluid tank and the vapor is drawn upwardly from the separator through the pipe 67 to the air pump and back into the washer. This operation is continued until the sight tube shows that no liquid is passing from the condenser when it is apparent that the vapor has been recovered from the clothes.

The valves 12 and 15 are closed and also the steam inlet valve 4 is closed.

The water inlet valve 56 is then opened to allow cool water to flow through the steam jacket and cool the washer and at the same time cool the clothes in the washer.

The air inlet valve 19 is then opened, and valve 17 is opened and also valve 18 is opened. The air pump is then operated to suck the air in through pipe 68 and through the pipe 67 to the lower portion of the washer and out through pipe 72 to the atmosphere to thoroughly aerate the clothes and remove any odor of the cleansing fluid therefrom.

All valves are then closed and the washer may be opened and the clothes removed.

The operation of cleaning the fluid is as follows:

Valve 20 is opened to allow the fluid in the dirty fluid tank 11 to flow into the still 21. Vapor rising from the still passes through the pipe 27 and through the main coil 25 and condenser 26, and the liquid flows through pipe 28 into filter 29 and from the latter through pipe 30 into mixer 31 where it is collected.

The filter 29 is a precautionary measure in order to catch any lint or foreign matter which may not be removed by the distilling operation.

When the mixer is full valve 20 is closed and the operation of the still is stopped. The mixer is then operated to mix or cause the ingredients of the fluid to thoroughly commingle, and then valve 32 is opened allowing the fluid to flow back into the clean fluid tank 34.

Various changes and alterations might be made in the general form of the parts described without departing from my invention and hence I do not limit myself to the precise details set forth but consider myself at liberty to make such changes and alterations as fairly fall within the spirit and scope of the appended claim.

I claim:

A dry cleaning apparatus, including a washer, a lining in the washer, an agitator in the washer, a steam jacket around the washer, and tubular stay bolts extending through the steam jacket and maintaining the space between the lining and the jacket in open communication with the atmosphere.

Signed at New York, in the county of New York and State of New York, this 17th day of November, A. D. 1927.

EGBERT W. MISHAW.