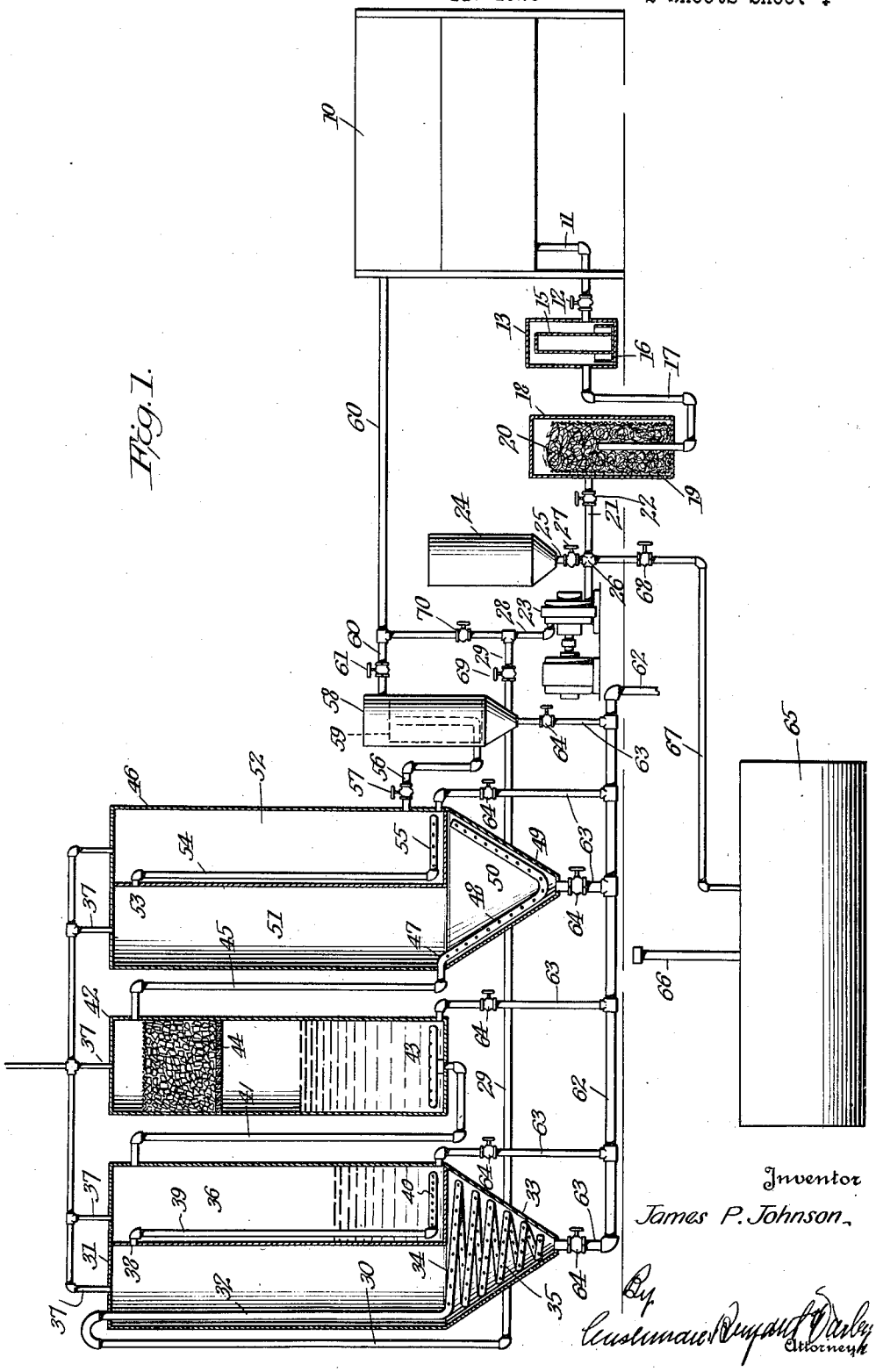
March 6, 1928. 1,661,478

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APPARATUS FOR PURIFYING GASOLINE

Filed Dec. 11. 1926 2 Sheets-Sheet 1

Fig. 1.



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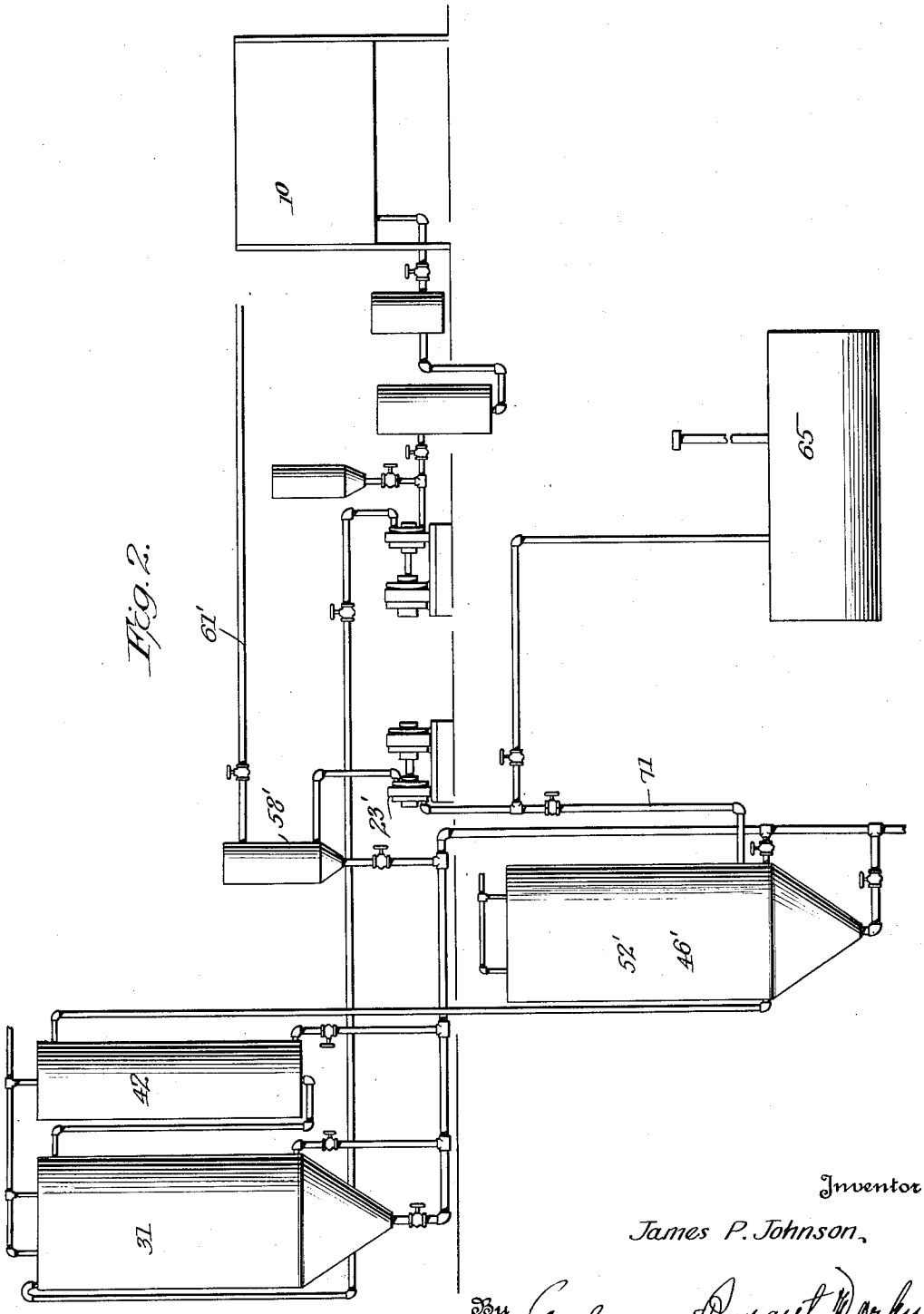
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Fig. 2.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR PURIFYING GASOLINE.

Application filed December 11, 1926. Serial No. 154,251.

The present invention relates to a process and apparatus for the cleaning and purifying of materials such as liquids which are generally employed in the process of garment cleaning, as for example, where the clothes are subjected to a dry cleaning operation using gasoline as the removing fluid.

The invention, while particularly designed for treating gasoline after it has been used upon the clothes, may, however, be employed in connection with other fluids or it may be employed for the treatment of gasoline and fluids regardless of their particular usage.

It is always a factor of considerable importance in cleaning processes to be able to use the cleaning fluid over and over, since such fluids are very often a considerable item of expense.

It is equally necessary that there shall be a continuous withdrawal of the dirty fluid and a similar automatic supply of clean fluid to the tank, and that the treatment of the fluid shall be conducted in a closed system, of which the washing tank forms a part.

In the present instance, the fluid with grease and sediment is passed continuously through a plurality of traps and filters and is further given a thorough spraying and washing in contact with both water and certain chemicals whereupon the clean fluid is directed to a supply tank for admission to the washer in accordance with the requirements.

Since gasoline, for example, is a highly explosive fluid, it is well to keep the supply tanks in remote locations, as contemplated by the present invention.

In order to make sure that the flow of cleaning fluid is continuous and automatic, a suitable pumping means is employed together with valve arrangements which enable the device to be operated with extreme simplicity and without any previous knowledge or practice.

In the drawings,

Fig. 1 is a side elevational view.

Figure 2 is a similar view differing from Figure 1 in that the supply tank is located below ground and provided with an auxiliary pump.

Referring to Figure 1, the numeral 10 designates a washer of the type usually employed for the cleaning of clothes.

After a garment has been cleaned, the gasoline containing sediment is withdrawn through the pipe 11 having a valve 12 and passes into the trap 13 which is in the nature of a box containing a screen 15 and sediment receptacle 16. This box 13 will catch such things as buttons and other relatively large particles as well as much of the sediment.

From the box 13 there leads a pipe 17 to a muck filter 18. This filter 18 is in the nature of a cylinder, and contains a screen basket 19 which is filled with waste 20. It is to be observed that pipe 17 projects up through the bottom of the cylinder 18 and into the waste 20. A pipe 21 having a valve 22 thereon leads from the cylinder 18 to a pump 23.

At this point, it is often desirable to treat the fluid with some chemical such as caustic soda or any strong alkali, and to this end a container 24 is provided having an outlet pipe 25 communicating with the pipe 21 by branch 26. The outlet pipe 25 has a valve 27 thereon.

The pump 23 serves to withdraw the gasoline from the washer 10 after it has been used and through the trap 13 and filter 18, and also acts to draw chemicals from the container 24.

The material is then passed through the pump and through pipes 28 and 29 to a vertical pipe 30, which pipe leads over the upper end of a cleaning tower 31. The extension 32 of the pipe 30 leads down to the bottom of the tower as shown.

The tower is substantially cylindrical, but has its lower portion formed as a cone, as shown at 33. The extension 32 of the pipe 30 is coiled substantially in the form of a cone 34 to fit within the similar shaped bottom 33 of the tank 31.

It is to be observed that the cone 34 of the pipe 32 is perforated as at 35.

The tower 31 is also provided with a compartment indicated at 36.

Water is admitted to the main compartment of the tower 31 and to the second compartment 36 in small quantities, as required, through suitable supply pipes 37.

Also in this tower 31 there is placed caustic soda or strong alkali, if required, while in the compartment 36 there is employed a chemical, such as alum and alcohol or sal soda as exigencies may demand. Thus the liquid from the pump is sprayed from the coil 34 at the bottom of the tower 31 into contact with the chemicals contained in the tower, and since the liquid has already been chemically treated, the result is a separation of the grease, oils and sedimentary material which remain at the bottom of the tank. By reason of the spraying of the gasoline into the bottom of the tower, and employing a coil spray, a very complete separation of the undesirable materials carried with the gasoline is obtained.

While the heavy substances such as the grease and oil and sediment are in suspension in the chemical solution, in the lower part of the tank, the purified gasoline rises to form an upper layer. This upper layer forming in the main compartment of the tower 31 flows from such compartment through an opening 38 into the compartment 36 where it is lead to the bottom of such compartment by a pipe 39. The lower end of the pipe 39 is disposed adjacent the bottom of the compartment 36 and is fitted with a spray opening 40 whereby the material delivered from the tower 31 to said compartment is sprayed out in the bottom of the compartment. This second spraying of the partially purified gasoline into contact with the chemical solution in the compartment 36 serves to remove the major portion of the remaining foreign matter contained in the fluid. As in the previous instance, the purified gasoline rises in the compartment 36 above the solution containing the sedimentary material and is permitted to flow from the compartment 36 by means of a pipe 41 into a filter 42. The pipe 41 enters the filter 42 through the bottom thereof and the cleaned fluid is emitted into the tank through the spray 43 which is a perforated plate or a circular pipe. This filter 42 contains a suitable quantity of water supplied thereto through a pipe 37 which serves to wash the gasoline initially discharged through the spray 43 at the bottom of the filter. As the gasoline rises in the filter 42 it is brought into contact with an auxiliary carbon filter 44 which, as shown, is disposed in the upper portion of the filter 42. After the gasoline has passed above the filter 44, it flows through a pipe 45 into the lower end of a tower 46 which may be similar in contour and structure to the tower 31 previously referred to.

It will be understood that the carbon filter 44 is in the nature of a decolorizer removing posionous materials, as well as acting to give the fluid its natural shade.

Thus when the fluid passes through the pipe 45 into the tower 46 it is practically clean, but I propose to give it a further washing in order to assure that it may be reused not only without danger, but also that it may possess its full purity, and consequently be efficient as a reused product.

To this end the pipe 45 enters the lower end of the tower 46 as shown at 47, and terminates in a conical spray 48 which fits the conical bottom 49 of the tower. This spray 48 is in the form of a hollow cone having perforations 50 therein. The tower 46 has a compartment 51 and a second compartment 52, as in the case of the tower 31. Water is supplied to the compartment 51 through a pipe 37 and as the cleaned gasoline is sprayed through the bottom of the tower it is thoroughly washed in the water. The gasoline rises as in the previous tower and filter, and passes from the chamber 51 through an opening 53 communicating with a pipe 54 which passes down through the compartment 52 and emits the cleaned gasoline in the bottom thereof through a spray 55. The spray may be in the form of a perforated plate or a ring pipe.

The gasoline delivered to the tank 46 is practically free of water and chemical, and is substantially as pure as the gasoline originally employed. It is maintained in the compartment 52 of the tower 46 which serves therefore as a supply tank.

A pipe 56 having a valve 57 leads from the bottom of the tower 47 into a filter 58. This filter contains a strainer 59 within which is placed some moist filtering substance and it is to be observed that the pipe 56 passes within the strainer and moist material. The gasoline is drawn off from the filter 58 through a pipe 60 having a valve 61, which pipe 60 leads to the upper portion of the washer whence the fluid may be passed into communication with clothes to be treated.

The tower 31 with its compartment 36, the filter 42, the tower 46 with its compartments 51 and 52 and the filter 58 all communicate at their lower portion with a sewage disposal pipe 62, in each case pipes 63 leading from the lower ends of the respective chambers to the said pipe 62 and each of said pipes being provided with a valve 64.

Arranged below the towers and filter and the washer, as for example, in the ground is a gasoline supply tank 65. This tank is employed to give the initial supply of gasoline and to make up for natural losses which occur during the washing of the clothes, and the passage of the fluid through the closed system just described, although there is very little loss in this latter treatment. A supply pipe 66 is employed to replenish the supply in the tank 65.

Leading from the upper part of the tank

65 is a pipe 67 having a valve 68 therein which communicates by means of a branch with the pipe 21. At this point, it will be noted that the pipe 29 has a valve 69 and the pipe 28 has a valve 70.

In order to initially supply gasoline to the system, the valve 68 is opened, while the valves 22, 27, 61 and 69 are closed. The valve 70 is also opened and the pump started. The gasoline will thus flow from the tank 65 through pipe 67 into pipe 21 through branch 26 into the pump 23 from whence it will be forced through pipe 28 into pipe 60 and thence to the washer.

Thereafter, the valves 68 and 70 are closed and the valves 22, 27, 61 and 69 are opened.

Thus gasoline containing undersirable ingredients is withdrawn from the washer 10 through the pipe 11 into and through the traps 13 and 18 past the chemical supply tank 24 and to the pump 23 from whence it is delivered to the pipe 29 and then through the towers and filters as described.

It will be understood that the sedimentary material collecting in the bottom of the several chambers such as the grease, oil and particles of sediment, are withdrawn through the pipe 63 by opening the valves 64 at suitable intervals.

Since the system is designed to be continuous a continuous supply of dirty fluid is passed to the tower 31 and the supply of clean fluid is maintained fairly constant in the compartment 52 of the tower 46.

From the tower 46 the cleaned gasoline passes through the filter 58 and pipe 60 to the washer in accordance with the demands of the machine. Thus so long as the machine is being used and the pump 23 is being operated, gasoline may be withdrawn from the washer and automatically replaced as required.

All that is necessary is to open the valve 12 to permit the gasoline to escape from the washer and to operate the valve 57 to permit it to flow from the chamber 52 through the pipe 60 to the washer.

Therefore, a very simple and efficient apparatus is evident and one which will operate without confusion and without the need of skilled labor.

Referring to Figure 2, it will be seen that the tower 46′ is located below the level of the remainder of the apparatus as is the gasoline tank 65, these two tanks being preferably disposed in the ground for safety purposes. This is advisable in some instances because the gasoline delivered to the tower 46 is practically pure and the compartment 52 serves as a supply tank for gasoline to be reused in the washer. To this end, therefore, a second pump 23′ is interposed between the compartment 52′ of the tower 46′ and the moist filter 58′ so that clean gasoline is pumped from the compartment 52′ through the pipe 71 and pump 23′ into the filter 58′ from whence it is forced into the pipe 61′ and to the washer 10.

It is to be observed that with the apparatus disclosed in Figure 1, there is a gravity feed of the pure gasoline from the chamber 52 to the filter 58 and washer 10, while in the disclosure in Figure 2, by reason of the placement of the tower 46′ a pump is employed to deliver the cleaned gasoline to the filter and washer.

In the disclosure in Figure 2, the operation is similar to that previously described.

It will be understood that in some cases where no chemical treatment or extensive washing of the gasoline is necessary, that by closing certain of the valves described, the fluid may be led from the washer through the trap and filter to the pump and then pumped directly to the pipe 60 and back to the washer. This is possible where the garments are not very soiled and hence effects considerable saving in time and material.

What I claim is:

1. In an apparatus of the class described, a source of fluid to be cleaned, a pump acting upon the fluid, a trap, a filter, and a chemical tank interposed between the pump and source of fluid supply and cleaning means communicating with said pump, said means comprising a chamber for chemically treating the fluid, a filter communicating with said chamber, a washing chamber communicating with the filter, and an additional filter interposed between the last mentioned chamber and the point of use for the fluid.

2. In an apparatus of the class described, a source of fluid to be cleaned and means for cleaning the fluid comprising a tower containing a purifying agent, said tower having a conical bottom, a compartment containing a treating medium in said tower above said bottom and communicating with the tower near its upper end, and a pipe carrying fluid to be cleaned to said tower and terminating in a conical perforated spray arranged adjacent the conical bottom wall of said tower whereby the fluid is sprayed into contact with the purifying agent to agitate the mass, the purified fluid rising in said tower and being received in said compartment.

3. The process of purifying a cleaning fluid which consists in preliminarily removing the major portion of the suspended matter therein, acting upon said fluid with a chemical, pumping the mixture of fluid and chemical to a chemical tank, subjecting the fluid to the action of the chemical while agitating the mass, again subjecting the material to a further chemical treatment, washing the fluid and filtering it through a decolorizer, again washing the fluid with agitation and filtering the cleaned fluid before it is returned to a washing machine.

4. The process of purifying a used cleaning fluid which comprises removing the contained matter, introducing a chemical into the fluid, mixing the chemical with a fluid and subjecting the mixture to further chemical treatment and washing the fluid so treated to make it capable of re-use.

5. The process of purifying a used cleaning fluid which comprises removing the contained matter, introducing a chemical into the fluid, mixing the chemical with the fluid and subjecting the mixture to a plurality of treatments including further chemical treatment, washing, and filtration.

6. In an apparatus of the class described, a source of fluid to be cleaned, a pump acting upon said fluid, means for removing contained matter from said fluid, a chemical supply means interposed between said pump and cleaning means for introducing a chemical into the fluid whereby the cleaning fluid is treated and mixed with chemical, cleaning means communicating with said pump comprising a chamber in which the mixture is subjected to further chemical treatment, and a washing chamber.

7. In an apparatus of the class described, a source of fluid to be cleaned, a pump acting upon said fluid, means for removing contained matter from said fluid, a chemical supply means interposed between said pump and said cleaning means whereby the cleaned fluid is treated and mixed with the chemical, cleaning means communicating with said pump comprising a chamber in which the mixture is subjected to further chemical treatment, a washing chamber, and means for filtering the fluid.

In testimony whereof I have hereunto set my hand.

JAMES P. JOHNSON.