

May 1, 1934.

G. RAYMOND ET AL

1,956,833

CLARIFICATION APPARATUS

Filed July 11, 1931

3 Sheets-Sheet 1

Fig. 2.

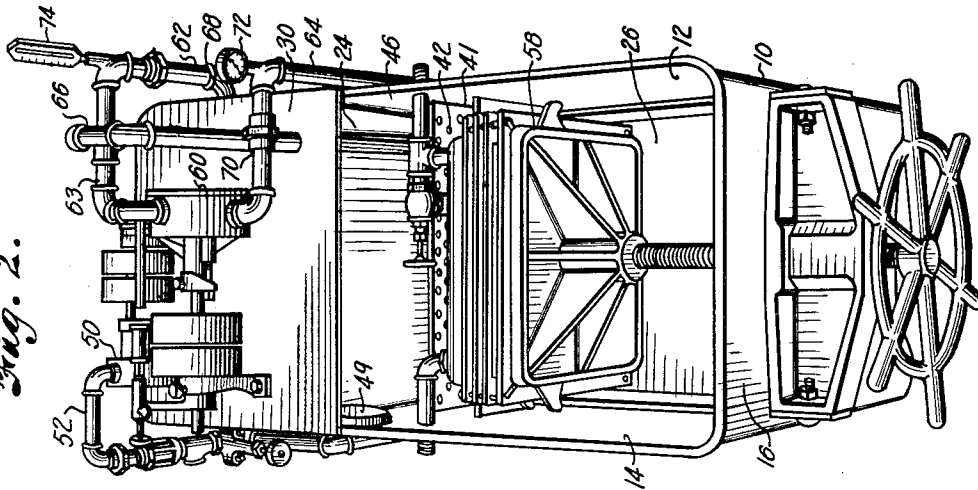
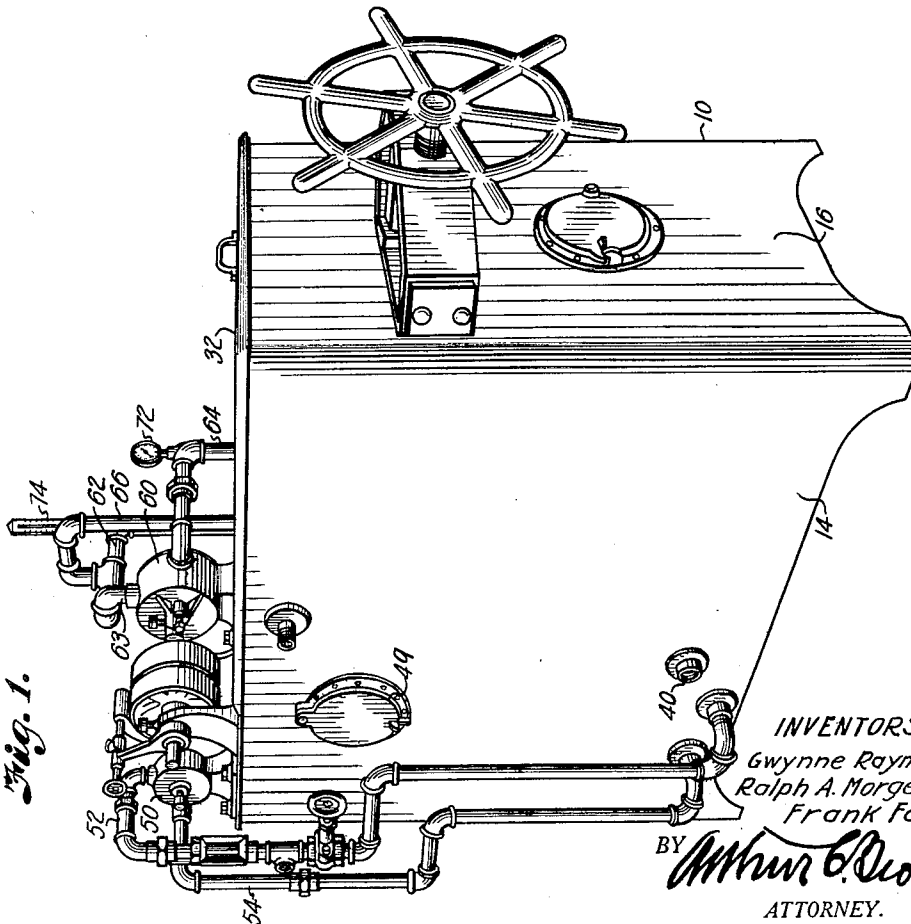


Fig. 1.



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3 Sheets-Sheet 2

Fig. 4.

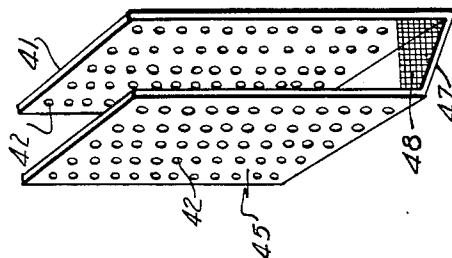
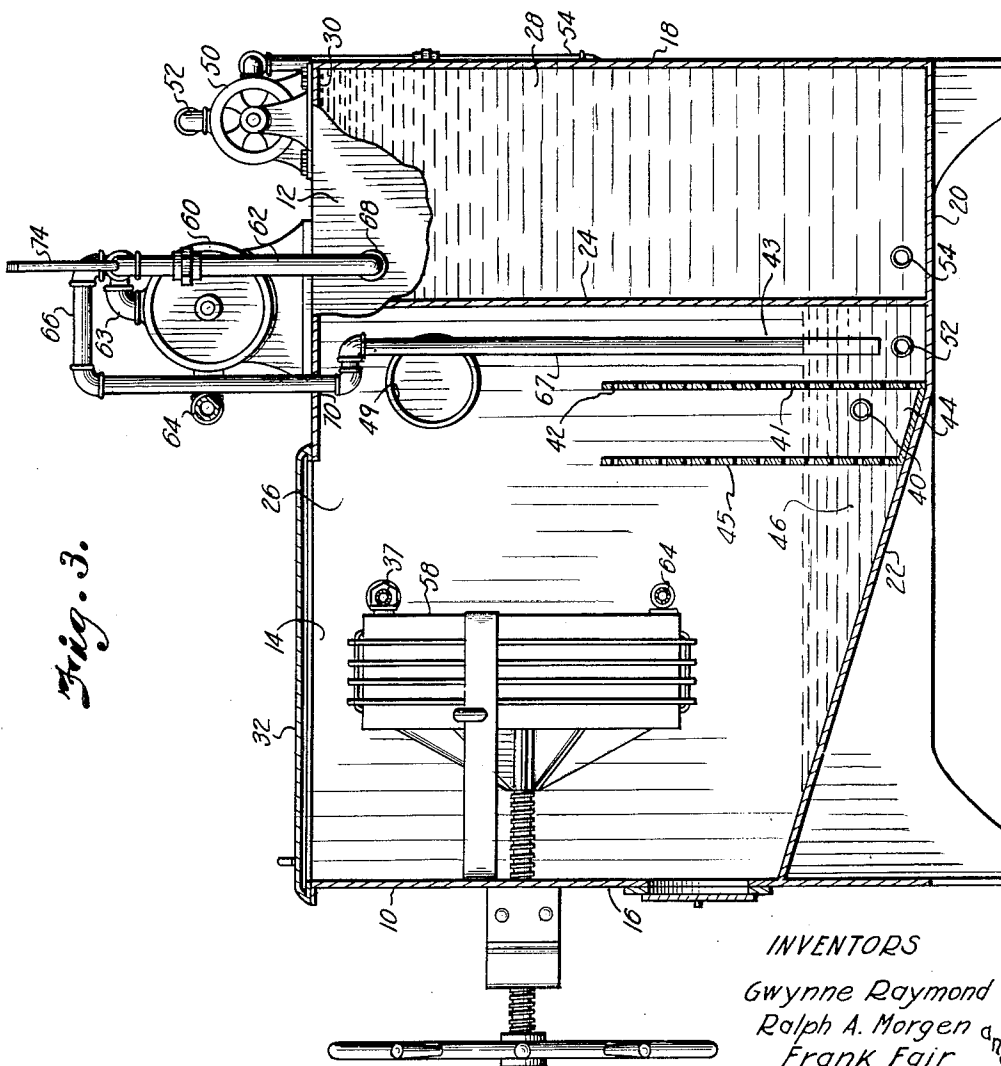


Fig. 3.



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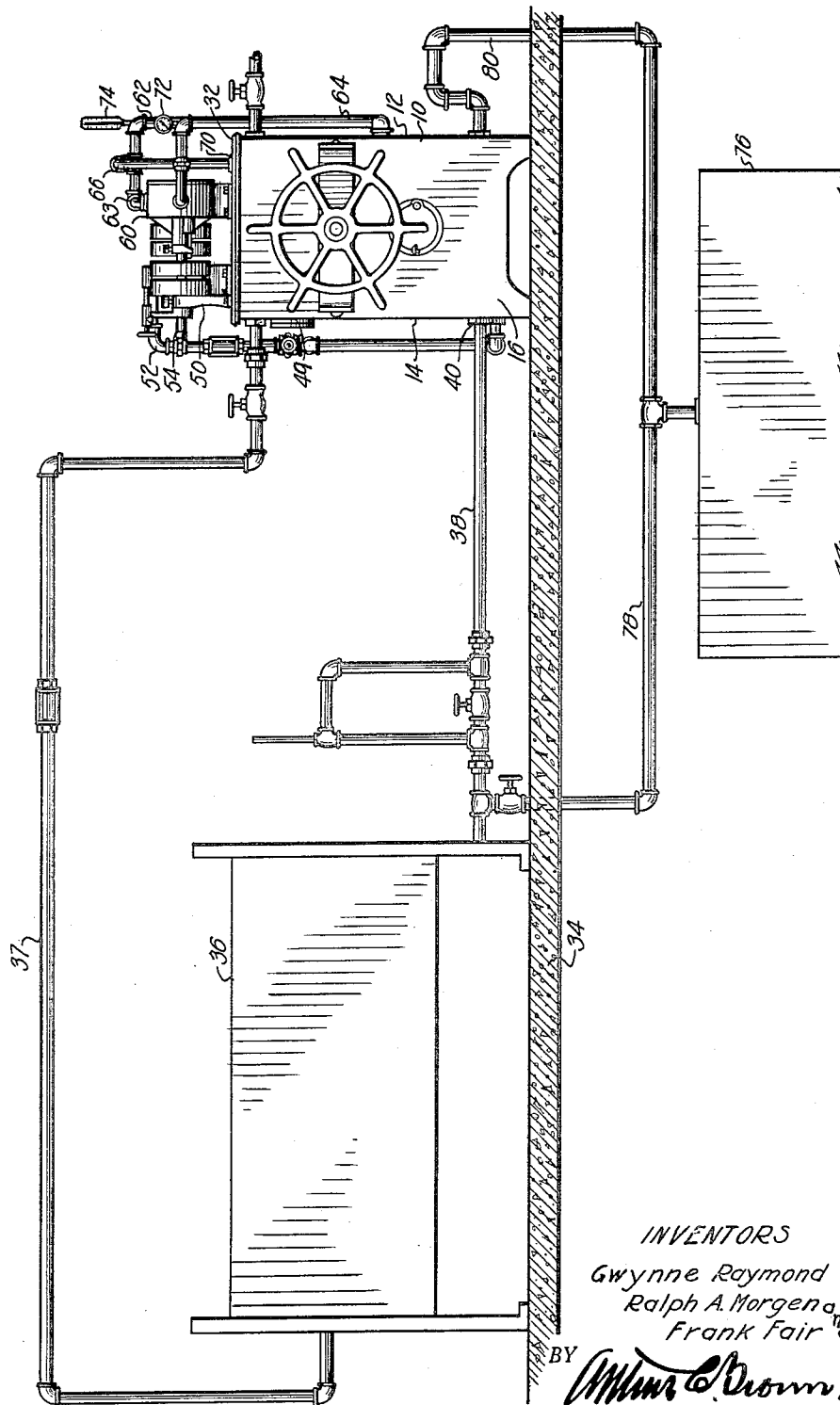
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3 Sheets-Sheet 3

Fig. 3.



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1,956,833

CLARIFICATION APPARATUS

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Application July 11, 1931, Serial No. 550,248

9 Claims. (Cl. 210-44)

This invention relates to dry cleaning systems and more particularly to clarification apparatus for purifying dirty dry cleaning fluid while the fluid is moving from a washer back to the washer.

The principal objects of the invention are to provide a single clarification unit embodying all the elements necessary for completely purifying a stream of dirty fluid and to include improved purifying chemical treating steps whereby a relatively small quantity of the fluid may be required to fill a system and no deleterious substances will be carried back to the washer in the circulating stream.

In accomplishing these and other objects of the invention, we have provided improved details of structure, the preferred form of which is illustrated in the accompanying drawings, wherein:

Fig. 1 is a perspective view of clarifying apparatus comprising a complete unit embodying this invention.

Fig. 2 is a perspective view of the apparatus taken from a point above and adjacent one end of the same the cover for the filter housing portion of the casing being removed.

Fig. 3 is a side elevation of the apparatus, the wall at the right side in Fig. 2 being broken away to expose the contained elements and conduits thus being shown in section.

Fig. 4 is a perspective view of a bent plate forming a trap in the filter housing portion of the apparatus.

Fig. 5 is a side elevation of a dry cleaning system equipped with the improved clarification apparatus, the floor on which the washer and apparatus are mounted being shown in section and a storage tank being shown fragmentarily.

Referring more in detail to the drawings:

10 designates a tank or cabinet-like casing including side walls 12 and 14, front and rear walls 16 and 18, and a bottom 20 including an upwardly forwardly inclined portion 22.

An imperforate partition 24 extending vertically transversely of the casing forms a relatively large tank portion 26 and a vertically elongated agitating or chemical treating chamber 28 relatively narrow from front to back. The chamber 28 provides a treating chamber in which a mixture of chemical agent, gaseous medium, and dirty liquid is detained sufficiently long to permit the agents to react with impurities as presently described.

A plate 30 is sealingly fixed to the upper edges of the side walls and partition, and extends forwardly from the partition, the remaining por-

tion of the casing being provided with a loosely mounted cover member 32.

The cabinet is shown located on the floor 34 of a dry cleaning plant including the washer 36, and interposed in a flow line including a conduit portion 37 through which clean fluid is delivered to the washer, and a portion 38 leading from the washer. The conduit 38 delivers dirty dry cleaning fluid by gravity through an inlet 40 in the side wall 14 to the tank portion 26 adjacent the rear end of the inclined bottom portion 22 and in spaced relation with the vertical partition 24.

A vertical transverse plate 41 having openings 41 extends a substantial distance upwardly from the rear edge of the bottom portion 22 between the inlet 40 and the partition 24 and forms a perforate partition or wall defining a collecting or mixing basin or chamber 43 and a trap chamber or sump 44 in the tank portion 26. Dirty fluid from the washer passing through the perforate partition is strained and relieved of buttons and like coarse material and the partition thus serves the purpose of the separate trap member ordinarily included in a clarifying system and inserted in the flow line between a washer and a filter.

A perforate partition 45 extends upwardly from the inclined tank bottom portion 22 in forwardly spaced relation with the trap-forming partition 41, to form the front wall of the trap chamber 44, and also defines a sump-like portion 46 of the chamber 26 into which liquid may drain from a filter as later described.

The partitions 41 and 45 are preferably integral and formed from a single plate bent to provide an intermediate imperforate web 47 connecting the partitions and seat on the rear end edge portion of the inclined bottom portion 22 of the casing.

The bent plate constitutes a removable trap having open ends and an imperforate bottom. A screen 48 is further fixed to the lower end edge portions of the partitions 41 and 45 and to the bottom as shown in Fig. 4, and has sufficient height to serve as an end wall for the trap. The trap may be lifted from the tank and tilted to drain liquid through the screen, and debris will be held in the trap by the screen for disposal.

The chemical agents may be introduced through a large opening 49 in the side wall 14.

Dirty fluid in the mixing chamber provided with chemicals fed from the opening is drawn by a pump 50 through a conduit 52 and delivered through a conduit 54 into the bottom portion of

the treating chamber 28. The inlet end of the conduit 52 from the mixing chamber and the outlet end of the conduit 54 to the treating chamber are located in the side wall 14 closely adjacent the bottom of the chambers.

The mixture of fluid and chemicals passes upwardly in the treating chamber whereby its rate of movement is materially reduced and contact between chemical and fluid is prolonged for promoting reaction between impurities carried by the fluid and the chemical agent.

The fluid is led from the treating chamber in divided streams as presently described, one of the streams being forced through a filter 58 and conduit 37 back to the washer. The filter is mounted in the tank portion 26 whereby drainage from the filter may fall into the sump formed by the sloping bottom of the casing and the front portion 45 and pass through the partition into the trap to mingle with the dirty fluid for subjection to chemical treatment and refiltering.

All of the fluid moves from the chamber 28 through a conduit 62. A branch 63 leads from the conduit 62 to the pump 60, and fluid is delivered by the pump through a conduit 64 to the filter. A second branch 66 connected with the conduit 62 conducts a divided portion of the main stream to the tank portion 26 for delivery to the mixing chamber 43.

The branch 66 preferably has a vertical portion extending downwardly through the fixed cover plate 30, and an offset continuation 67 extending downwardly sufficiently to immerse the outlet end of the branch in fluid in the mixing chamber.

The stream of fluid delivered to the branch will therefore enter the body of fluid in the chamber under pressure, and agitate the body to stir up the chemical treating material and cause portions of the chemical to pass with the fluid to the treating chamber 28.

The conduits 62 and 66 thus comprise an overflow passage from the treating chamber 28 and the filter pump 60 operates to move fluid at a slightly slower rate of gallons per minute than the pump 50, for removing from the conduit 62 less fluid than is delivered thereto by the pump 50 from the mixing and treating chambers. The fluid in the treating chamber thus constantly overflows and provides a constant stream of fluid for agitating chemicals with the body of fluid in the mixing chamber.

Since the cover portion 30 seals the top of the treating chamber, the fluid may be held therein under pressure, and the conduit portions 62 and 66 may extend vertically as shown, the former leading from the side wall 12 adjacent the top of the chamber 28 at 68, and the latter leading into the tank portion 26 through the fixed cover at 70.

Gages 72 and 74 are mounted respectively on the filter pump line and the overflow conduit, to guide operators in judging the operation of the filter and temperature of the liquid. The agitator pump moves faster than the filter pump to insure overflow of sufficient quantity of fluid for flushing and agitating material in the mixing chamber.

The system may further include a tank 76 communicating through valved conduits 78 and 80 with the washer and clarifying casing whereby the fluid in the system may be drained into the tank.

A self contained unit of clarifying apparatus constructed as above described may be interposed in the conduits of a dry cleaning system to provide all the equipment required for purifying the fluid used in the system.

The apparatus is particularly adapted for continuous flow treatment of dry cleaning fluid. A sufficient supply of powdered chemical to treat the fluid used in washing one washer load of clothes is introduced to the chamber 26 through the port 49.

The chemical used is preferably one which reacts in a dry way with dissolved impurities such as dry cleaning soaps, fats, acids and odor forming bodies. The mixture itself then acts as its own filter aid in the filter press. An example of a chemical agent such as preferably used is that described in the application of Ralph A. Morgen, Serial No. 471,436, and including a silicious material which is capable of adsorbing impurities, and a mild alkali which removes impurities from the surface of the silicious material. A filter aid is also included in the mixture, and preferably diatomaceous earth.

The filter pump will move fluid through the filter to the washer, fluid will flow by gravity into the trap chamber where buttons and the like will be collected, and thence into the mixing chamber 43 and be pumped into the chemical treating chamber. Overflow from the chemical treating chamber 28 will agitate more thoroughly and prevent collection of the chemical powder on the bottom of the mixing chamber of the machine.

The chemical and impurities will be removed by the filter and by the time the batch of washing is completed, the supply of chemical will have been exhausted.

The fluid will be in pure condition for cleaning another batch and a fresh charge of chemical may be added to the stream of liquid for chemically treating the dirty fluid.

What we claim and desire to secure by Letters Patent is:

1. Clarification apparatus including a casing, an imperforate partition in the casing defining a mixing chamber having an inlet for dirty fluid and a treating chamber, a perforate partition in the mixing chamber forming a trap, means for moving fluid from the mixing chamber through the treating chamber, and means for returning a portion of the fluid from the treating chamber back to the mixing chamber to effect mixture of a chemical with the fluid.

2. Clarification apparatus including a casing having a mixing chamber and a treating chamber, means for supplying dirty fluid to the mixing chamber, means for moving fluid from the mixing chamber through the treating chamber back to the mixing chamber to maintain a given quantity of fluid in the treating chamber, and means operating at a slower rate than said second named means for moving fluid from the treating chamber.

3. Clarification apparatus including a casing, a partition in the casing defining a treating chamber and a mixing chamber, a trap chamber in the casing having an aperture providing communication with the mixing chamber, means for delivering dirty fluid to the trap chamber for flow through said aperture to the mixing chamber, means for moving fluid from the mixing chamber to the treating chamber, and means for moving fluid from the treating chamber in divided streams including means for delivering one of said streams to the mixing chamber for agitating chemicals in the said mixing chamber.

4. Clarification apparatus including means forming a dirty fluid mixing chamber and a treating

ing chamber, a filter associated with said chambers, means for moving dirty fluid from the mixing chamber to the treating chamber, and means for passing fluid in divided streams from the treating chamber to the mixing chamber and to the filter respectively.

5. Clarification apparatus including means forming a dirty fluid mixing chamber and a treating chamber, a conduit including a pipe connected with the treating chamber for conducting a stream of fluid from the treating chamber and having a branch for conducting a part of the stream of fluid away from the apparatus and having a branch communicating with the mixing chamber for conducting the remainder of the stream back to the mixing chamber, means for moving dirty liquid from the mixing chamber into the treating chamber and maintaining pressure on fluid in said treating chamber to move fluid through said conduit and said last named branch to the mixing chamber in predetermined volume for agitating a mixture of fluid and chemicals in said mixing chamber, and means connected with the other branch and operative to move fluid away from the apparatus in less volume than the volume passing through said conduit branch to the mixing chamber.

6. Clarifying apparatus including means forming a mixing chamber and a treating chamber, a perforate partition in the mixing chamber defining a trap, means for delivering dirty dry cleaning fluid to the trap for flow into the mixing chamber, a conduit for leading fluid mixed with chemicals from the mixing chamber into the lower portion of the treating chamber, means including a pump and a conduit connected with the treating chamber for conveying treated fluid away from the apparatus, and a pump in said first-named conduit operating at faster speed than the first named pump for moving fluid from the mixing chamber to maintain a fixed quantity of fluid in the treating chamber.

7. In an apparatus of the character described including a tank having a chemical mixing chamber and a treating chamber, means for continuously moving liquid from the mixing chamber to the treating chamber and back to the mixing chamber to effect mixture of the fluid with a

chemical in the mixing chamber, a filter associated with the tank, and means independent of said first named means for pumping fluid from the treating chamber through said filter to effect filtering of the chemical from the fluid.

8. In an apparatus of the character described including a tank having a mixing chamber and a chemical treating chamber, a dirty fluid inlet pipe opening to the mixing chamber for delivering dirty fluid to the mixing chamber, a removable perforate trap in the mixing chamber covering the delivery end of said pipe to trap solid particles carried by the fluid, means for pumping the dirty fluid from the mixing chamber to the chemical treating chamber to maintain a given quantity of fluid in the treating chamber, means communicating with the treating chamber and the mixing chamber to return a portion of said fluid from the treating chamber to the mixing chamber to effect mixture of chemicals in the mixing chamber with the fluid, and means for removing the fluid in the treating chamber at a slower rate than the rate of flow from the mixing chamber to the treating chamber.

9. In an apparatus of the character described including a tank having a mixing chamber and a chemical treating chamber, a dirty fluid inlet pipe opening to the mixing chamber for delivering dirty fluid to the mixing chamber, a removable perforate trap in the mixing chamber covering the delivery end of said pipe to trap solid particles carried by the fluid, means for pumping the dirty fluid from the mixing chamber to the chemical treating chamber to maintain a given quantity of fluid in the treating chamber, means communicating with the treating chamber and the mixing chamber to return a portion of said fluid from the treating chamber to the mixing chamber to effect mixture of chemicals in the mixing chamber with the fluid, a pressure filter in the tank, and means for delivering fluid from the treating chamber to said pressure filter at a slower rate than the rate of flow of the fluid from the mixing chamber to the treating chamber.

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