Nov. 9, 1937. L. E. WESSELMANN 2,098,713

APPARATUS FOR TREATING CLEANING SOLVENTS

Filed May 10, 1935 2 Sheets-Sheet 1

Fig. 1.

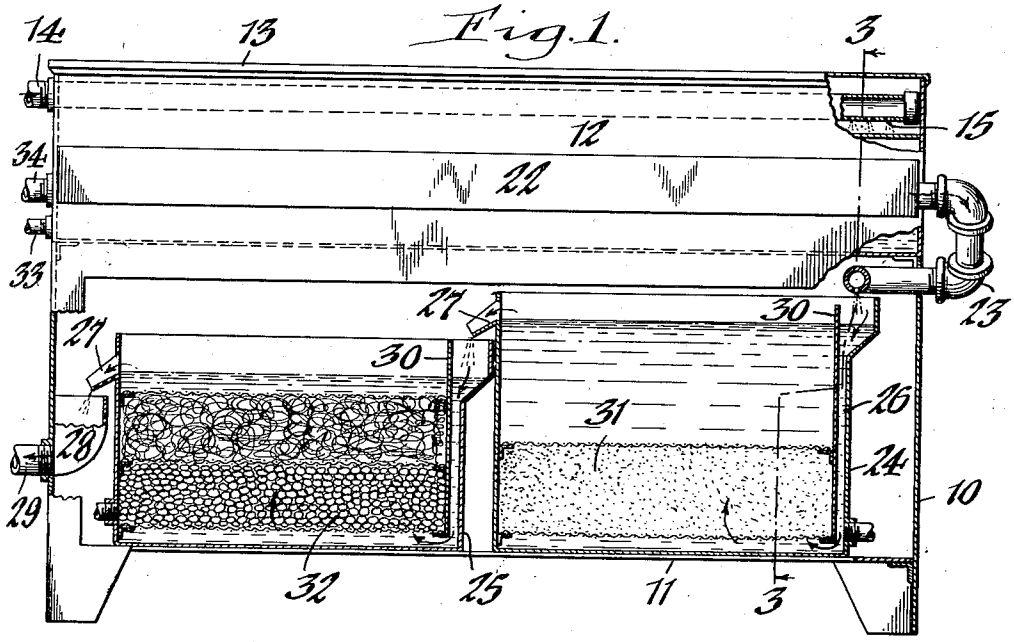


Fig. 2.

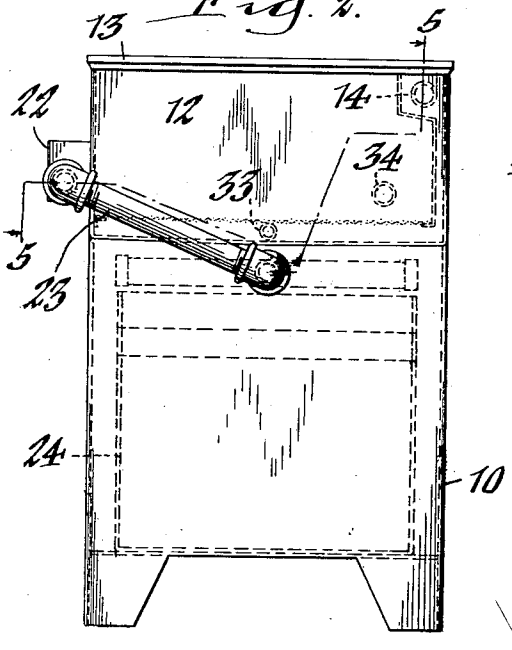
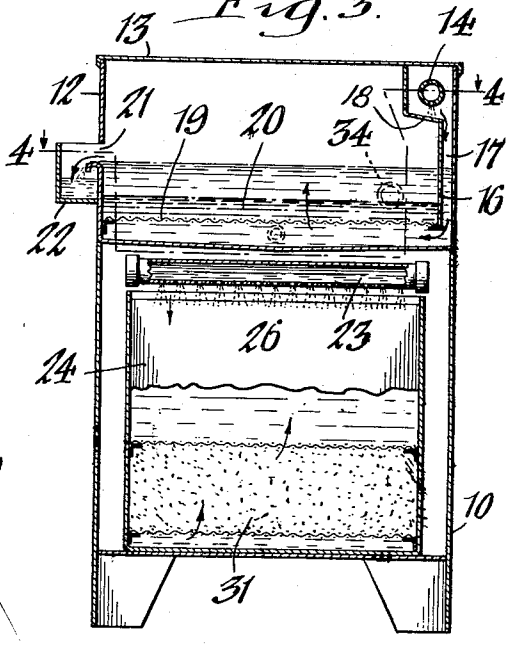


Fig. 3.



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Filed May 10, 1935 2 Sheets-Sheet 2

Fig. 4.

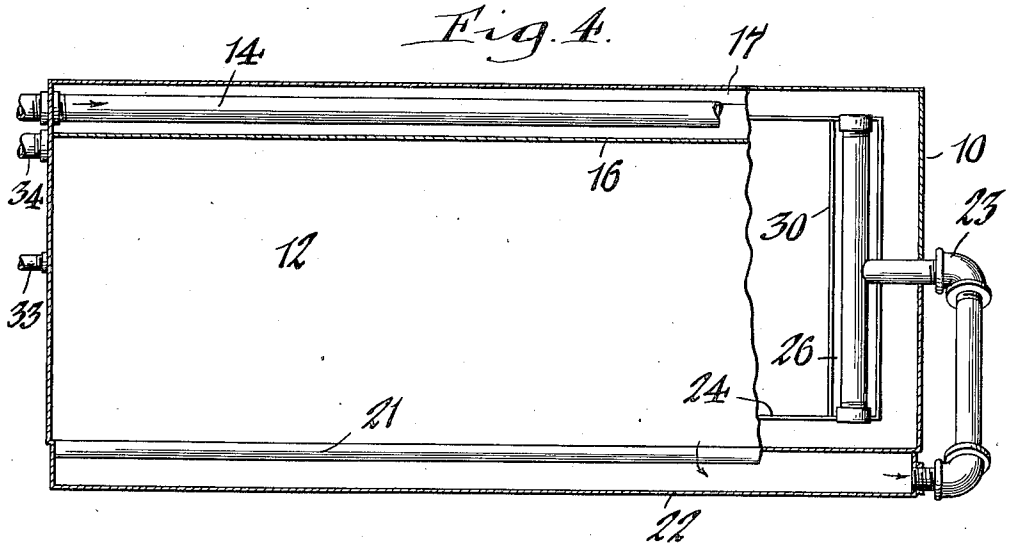
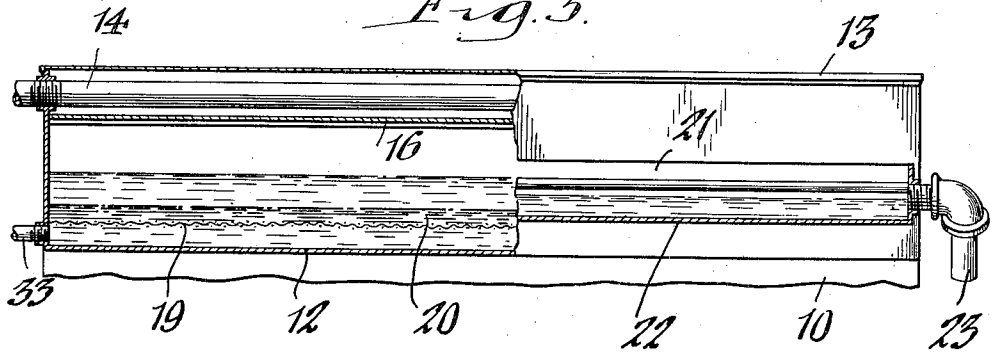


Fig. 5.



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2,098,713

UNITED STATES PATENT OFFICE

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APPARATUS FOR TREATING CLEANING SOLVENTS

Louis E. Wesselmann, Buffalo, N. Y.

Application May 10, 1935, Serial No. 20,809

3 Claims. (Cl. 196—15)

This invention relates to certain new and useful improvements in the method and apparatus for effecting the cleaning, purification and reconditioning of the solvents employed in the art of garment cleaning.

One of the objects of the invention is the provision of a process and apparatus of this character which is designed to chemically treat the solvent by a non-agitating and non-violent continuous and automatic regenerating action.

Another object is to provide a process and apparatus for reconditioning cleaning solvents which is safe and automatic in operation and always assures a supply of solvent on hand; which provides for maxium economy in the chemicals used in the solvent treatment; which eliminates any loss or waste of the solvent; and which requires no power nor mechanical agitation, thereby reducing the maintenance cost to a minimum.

A still further object of the invention is to provide a regenerating apparatus for cleaning solvents which is simple, compact and inexpensive in construction, which is reliable and efficient in operation, and which is designed to automatically control the flow of the solvent during its treatment without agitation, whereby uniform chemical action is possible without objectionable disturbances.

Other features of the invention reside in the construction and arrangement of parts hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings:—

Figure 1 is a sectional side elevation of the solvent treating apparatus embodying my invention. Figure 2 is an end view thereof. Figure 3 is a cross section taken substantially in the plane of line 3—3, Figure 1. Figure 4 is a horizontal section taken substantially in the plane of line 4—4, Figure 3. Figure 5 is a vertical longitudinal section taken in the plane of line 5—5, Figure 2.

Similar characters of reference indicate corresponding parts throughout the several views.

In carrying out my invention the solvent is taken from the washing machines and first conducted to a still of any usual and well known construction for the purpose of effecting the distillation of the solvent before introducing it to the apparatus for reconditioning or regenerating the solvent. The distilling operation, with controlled boiling points, effects the removal of undersirable oils, soaps and general soil or dirt in the solvent, as well as some coloring matter and any water contained therein. In carrying out my process it is essential that any water in the solvent be removed because the efficiency of the process depends upon the absence of water.

In its general organization my improved process and apparatus provides for a chemical treatment of the cleaning fluid or solvent, after distillation, to chemically remove the unsaturates and other causes of rancid odors by a non-agitating and non-violent action, and wherein the flow of the solvent is continuous and so controlled as to eliminate objectionable disturbances of the chemicals used in carrying out the process. The first step in the solvent treatment is that of subjecting the solvent to an acid treatment without agitation, the acid treatment effecting the removal of sulphur, unsaturates and the rancid odors present in the solvent after being used in the cleaning of garments and the like. Following the controlled, gentle acid treatment of the solvent, it is delivered to an alkali bed to neutralize the acid-treated solvent, after which it is conducted to a carbon bed to decolorize the solvent if any off color be present.

Referring now to the drawings, 10 indicates a supporting frame or casing upon which the working parts of my apparatus are supported, the lower portion thereof having a shelf 11. Surmounting this frame for ready replacement when necessary and in vertically spaced relation to its shelf 11, is an acid-treating tank 12 having a cover 13 which may be removed when desired to observe the action of the apparatus. Extending into the upper portion of the acid-treating tank adjacent one side thereof, say the rear side, is a solvent feed pipe 14 which is adapted for connection with the source of the solvent to be treated and which is provided along its bottom with a series of outlets or jets 15 whereby the solvent is discharged slowly and in a thin stream into the upper portion of the tank. The numeral 16 indicates a partition wall spaced from the rear side wall of the tank 12 and extending from end to end of the latter to provide a comparatively narrow upright channel-way 17 into which the solvent is delivered after being discharged from the feed pipe through its parts 15. As seen in Figure 3, the upper portion of the partition 16 is offset inwardly to extend in spaced relation about the bottom and the adjoining side of the feed pipe 14, whereby the solvent discharged from the latter drops onto the resulting ledge 18 formed by the offset construction of the partition and thence flows in a cascading-like fashion into the channel-way 17. This partition terminates at its lower end short of the bottom of the tank 12 to permit the solvent to flow laterally into the same, and extending across the tank in spaced relation to its bottom is a screen or like element 19. Disposed over the screen is an acid pool 20, preferably of concentrated sulphuric acid, through which the solvent, discharged from the pipe 14 and thence through the channel way 17, is adapted to slowly rise and be acted upon by the acid to remove the unsaturates and other causes of rancid odors present in the solvent.

By introducing the solvent to be treated in this manner, it flows gently and continuously with a non-agitating and non-violent action, through the acid pool, and at the same time, by this controlled flow, the solvent is given plenty of time to respond to the acid to insure a maximum reaction and the effectual removal of sulphur, unsaturates and other foreign matter which are responsible for the rancid odors of the solvent when removed from the garment cleaning apparatus.

A substantial depth of the acid-treated solvent remains in the tank **12** above its acid pool before it is allowed to continue its controlled flow through the alkali and carbon beds. As seen in Figure 3, the front wall of this tank, at a suitable distance above the acid pool **20**, is provided with a longitudinal discharge slot or passage **21** through which the acid-treated solvent flows in a gentle cascading manner into a trough or receiver **22** disposed horizontally on the front side wall of the tank. Connected to one end of this trough is a discharge pipe **23** extending downwardly therefrom to conduct the solvent, first, to the alkali-treating tank which acts to neutralize the acid-treated solvent, and second, to the carbon-treating tank, which tends to decolorize the solvent if any off-color should be present and which acts further as a polishing bath to give a sparkle to the solvent.

The alkali and carbon-treating tanks or receptacles are indicated at **24** and **25**, respectively, and are disposed side by side for independent removal on the casing shelf **11**, as shown in Figure 1. As these tanks are identical in construction a description of one will suffice for both. Each tank is provided at its intake side with an upright feed channel **26**, including a ledge or cascading wall, similar to that of the channel **17** in the acid tank, and at its outlet side with a discharge or overflow spout **27**. The spout of the tank **24** directs the alkali-treated solvent into the feed channel of the tank **25** and the spout of the latter directs the completely re-conditioned solvent into a receiver **28** which is connected with a discharge pipe **29** for conducting the solvent to a storage tank (not shown) from which it is drawn for re-use. The feed channel **26** is formed by an upright partition wall **30** disposed alongside the intake side of the respective tank and terminating at its lower end short of the bottom of the tank to permit the solvent to flow laterally into the bottom of the same and thence upwardly through the respective dry alkali and carbon beds indicated by the numerals **31** and **32**, respectively.

The acid tank **12** is preferably provided with an acid-drain **33** and a solvent-drain **34**, so that when it is desired to wash or repair the tank its contents may be conveniently removed.

In operation, the solvent to be treated is first distilled to remove the undesirable oils, soap and general soil present in the solvent when dumped from the garment cleaning apparatus, as well as any water contained therein. After distilling, the solvent is delivered to the feed pipe **14** and thence to the acid-treating tank **12** into which it flows slowly and continuously in such a manner as to create no disturbance or agitation but yet insure a maximum chemical reaction to remove the unsaturates and like matter which are the cause of the rancid odors present in the solvent. In its final treatment the solvent passes through the alkali and carbon beds which act to neutralize the acid condition of the solvent and restore it to its natural color and sparkle. In passing through these various stages of re-conditioning, the flow of the solvent is effectually controlled by its respective levels in the several treating tanks **12**, **24** and **25**, the solvent flowing gently and continuously and without agitation to assure its maximum reaction to the regeneration steps to which it is subjected. Furthermore, the process is practically free from air disturbances, thereby eliminating bubbling through the tanks which would otherwise carry any impurities to the surface and making for a uniform chemical action on the solvent without disturbance of any kind.

I claim as my invention:—

1. An apparatus for treating solvents, comprising a substantially rectangular tank having an acid pool therein adjacent its lower end and spaced from the bottom thereof, a substantially upright partition spaced from and coextensive with one of the side walls of the tank to provide a comparatively narrow inlet channel for the controlled flow of the solvent to be treated, the lower end of said partition terminating short of the tank bottom to provide a lateral opening for the controlled flow of the solvent into the tank beneath its acid pool and the upper end of said partition terminating in a laterally-offset, cascading-like wall, means for feeding the solvent onto said offset partition-wall, one of the other walls of the tank having an overflow discharge above the acid level thereof, and a receiver in communication with said discharge and into which the acid-treated solvent flows.

2. A solvent treating apparatus of the character described, comprising a supporting frame, and an acid-treating tank for the solvent surmounting said frame and having an acid pool therein adjacent its lower end and spaced from the bottom thereof, said tank having at one side thereof means including a cascading-like wall and channel-way for conducting the solvent to be treated in a substantially thin sheet to the bottom of the tank and below its acid pool, said tank having at its opposite side a discharge disposed at the normal level of the solvent in the tank to effect the controlled flow of the acid-treated solvent from the tank.

3. A solvent treating apparatus of the character described, comprising a supporting frame, an acid-treating tank for the solvent surmounting said frame and having an acid pool therein adjacent its lower end and spaced from the bottom thereof, said tank having at one side thereof means including a cascading-like wall and channel-way for conducting the solvent to be treated in a substantially thin sheet to the bottom of the tank and below its acid pool, said tank having at its opposite side a discharge disposed at the normal level of the solvent in the tank to effect the controlled flow of the acid-treated solvent from the tank, and a plurality of independent, intercommunicating treating tanks for the solvent supported in said frame beneath said acid-treating tank.

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