

Aug. 2, 1932.

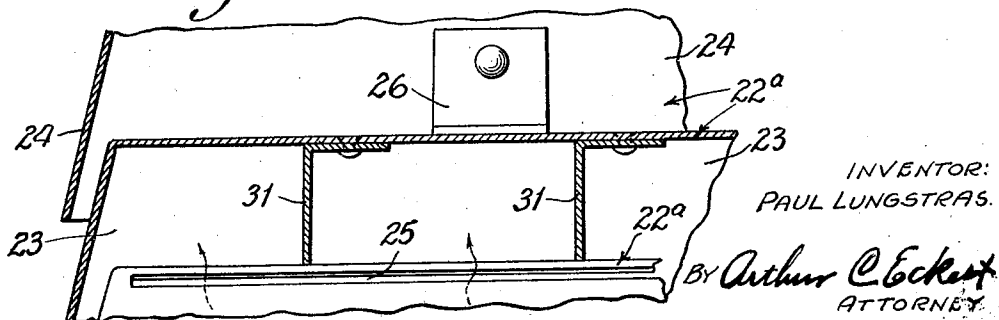
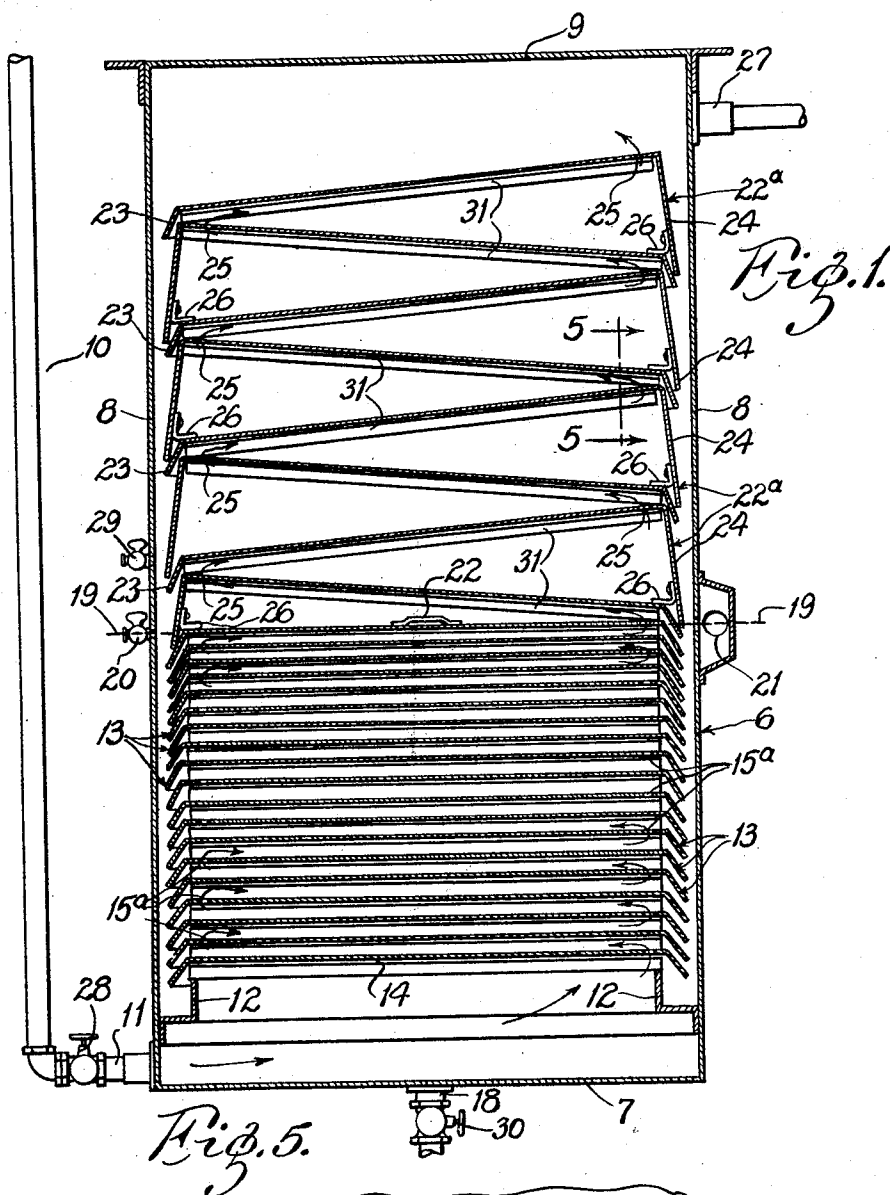
P. LUNGSTRAS

1,869,758

SCRUBBER

Filed May 1, 1931

2 Sheets-Sheet 1



INVENTOR:
PAUL LUNGSTRAS.

BY *Arthur C Eckert*
ATTORNEY

Aug. 2, 1932.

P. LUNGSTRAS

1,869,758

SCRUBBER

Filed May 1, 1931

2 Sheets-Sheet 2

Fig. 2.

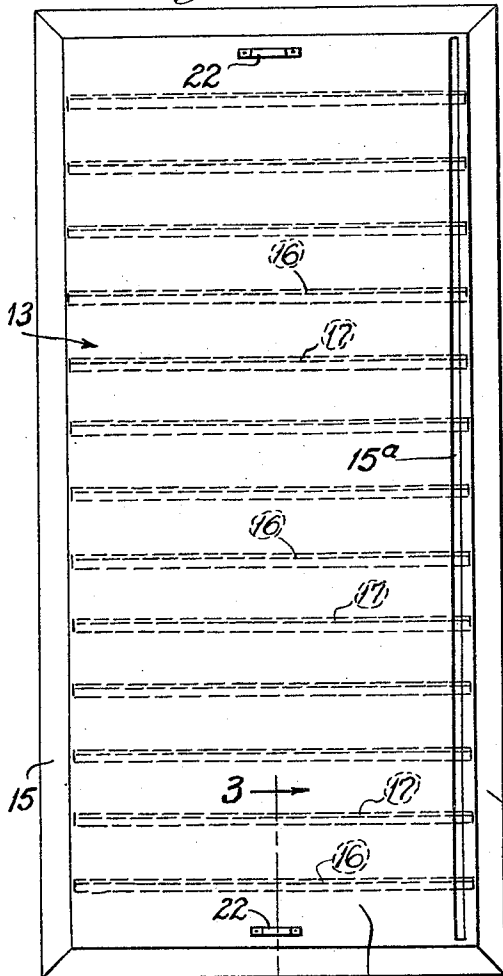


Fig. 4.

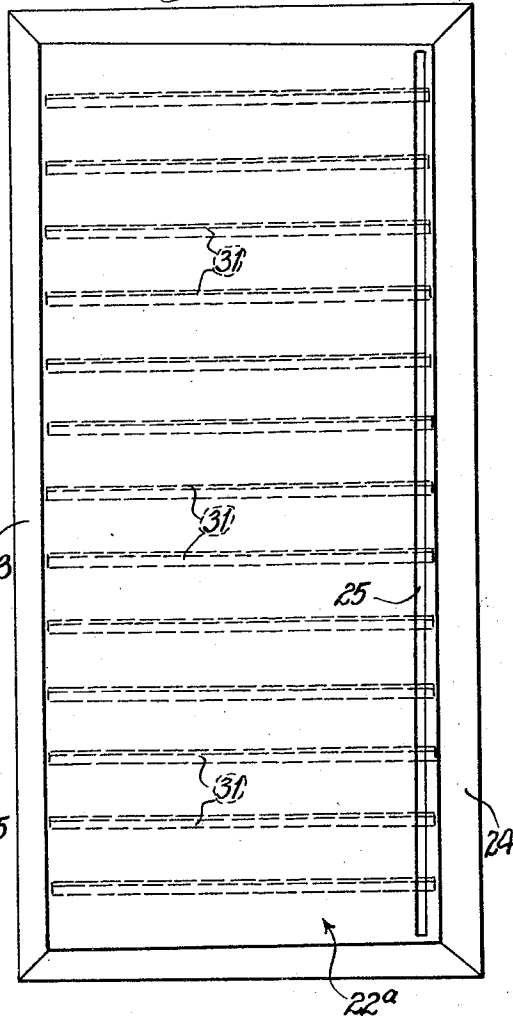
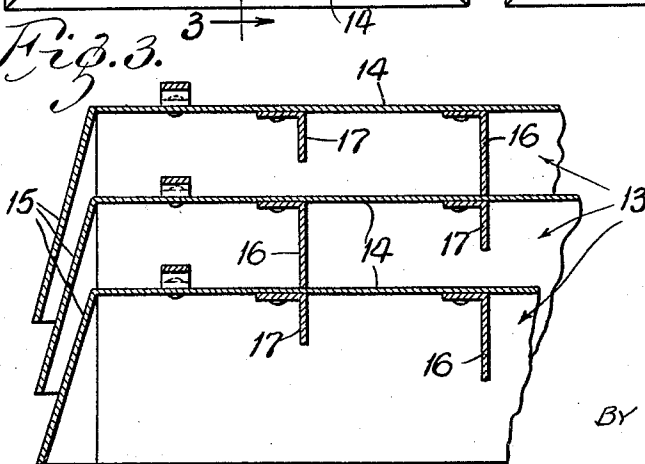


Fig. 3.



INVENTOR:
PAUL LUNGSTRAS.

BY *Arthur Eckert*
ATTORNEY.

UNITED STATES PATENT OFFICE

PAUL LUNGSTRAS, OF CLAYTON, MISSOURI, ASSIGNOR TO LUNGSTRAS DYEING AND
CLEANING COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF DELAWARE

SCRUBBER

Application filed May 1, 1931. Serial No. 534,192.

The object of my invention is to make a scrubber; that is a device used for the purpose of cleaning gasoline or other solvents used particularly in a dry cleaning plant.

5 A further object is to provide a device of the character described, in which the gasoline is passed through and in contact with water, so that the impurities and precipitates in the gasoline are either dissolved or
10 held in suspension in the water and carried away, or these impurities and precipitates are deposited on pan surfaces, which form a part of the device.

15 A further object is to so design a scrubber that the gasoline is forced through the device by static pressure and by flotation of the gasoline or solvent on the surface of the water.

20 Among the further objects of my device are to provide a scrubber in which the pans are detachable and may be easily removed from the device for cleaning purposes. Without this feature, the device is of practically no value, because it is necessary to
25 clean these pans at regular frequent intervals.

30 The device may be made of few and simple parts that lend themselves readily to multiple production and may be cheaply made and assembled.

35 With these and other objects in view, my invention has relation to certain novel features of construction and arrangement of parts, as will be hereinafter more fully described, pointed out in the claim and illustrated in the drawings, in which

Fig. 1 is a vertical sectional elevation of my device.

40 Fig. 2 is a transverse sectional elevation of the bottom tier of pans used in my device.

Fig. 3 is an enlarged fragmental sectional elevation on the line 3—3 of Fig. 2.

Fig. 4 is a view similar to that of Fig. 2 showing the upper tier of pans.

45 Fig. 5 is an enlarged fragmental sectional elevation on the line 5—5 of Fig. 1.

50 Numeral 6 designates a tank of rectangular section having the bottom 7, the side walls 8 and the cover plate 9. The cover plate 9 is held in frictional engagement on

the top of the tank 6 and may be easily removed by lifting it from the tank 6.

Numeral 10 designates the pipe through which the fluid to be cleaned is conducted to my device. The pipe 10 is placed in fluid communication with the inside of the tank 6 by means of the pipe 11 passing through one of the side walls 8, near the bottom 7. The pipe 10 extends above the cover plate 9 so that when the pipe 10 is filled with the liquid to be cleaned, there is a static pressure in the pipe 10 sufficient to force the liquid upwardly through the tank 6 through the pans to be subsequently described.

Numerals 12 designate double L castings secured to the side walls 8 as shown in Fig. 1.

Numerals 13 designate pans having the bottom 14 and the flaring lateral flanges 15. There are 19 such pans shown in Fig. 1. In each pan 13 is formed a slot 15^a near one of the flaring lateral flanges 15, parallel to the edge of the pan and extending for the entire width of the pan. The pans are positioned in the tank 6 in an inverted position as shown in Fig. 1. The pans are also so positioned that the slots 15^a are staggered between succeeding pans, that is, if the slot in the lowest pan 13 in Fig. 1, is at the right side the slot in the next upper pan will be at the left side and the slot in the next upper pan will again be at the right side, so on upwardly with the succeeding pans. The pans 13 are secured in spaced relationship by means of the angle irons 16, which are secured to the bottom of the pans 13, as best shown in Fig. 3. Each pan is, therefore, supported on the pan immediately beneath it, by means of the angle irons 16. These angle irons further act as baffles in the flow of the fluid to be cleaned through the machine, as will be subsequently described.

Numerals 17 designate angle irons similarly secured to the bottoms of the pans 13, but not suspending the same distance as the angle irons 16. For this reason there is no contact between the angle irons 17 and the pan immediately beneath the angle iron. The purpose of the angle iron 17 is to further act as baffles to the passage of the fluid to be cleaned through the device.

It will be noticed that when the pans 13 are positioned, as has been indicated, that the flaring lateral flanges 15 will all be parallel to each other. Since the bottom 7 is placed horizontally and all the angle irons 16 are of the same length, the pans 13 are spaced horizontally and in a state of parallelism. Numeral 18 designates a drain in the bottom 7. The water line is designated by the numeral 19. It is a horizontal line at the same distance from the bottom 7 as is the upper surface of the uppermost pan 13. In one side wall 8 at the water line 19 is secured the water cock 20. On the opposite side of the wall 8 at the water line 19 is the pipe 21, which is in fluid communication with the inside of the tank 6. Numerals 22 designate handles secured to the upper sides of the bottoms of the pans 13 to provide means for facile manual grasp of the pans 13. Immediately above the uppermost pan 13, in the tank 6, is positioned a series of pans 22^a. The pans 22^a are alike, having a flaring flange 23 formed at one side and a right angular flange 24 formed at the opposite side. In the bottom of each pan near the right angular flange 24 is formed a slot 25. The first and lowest pan 22^a is positioned immediately above the uppermost pan 13, so that the right angular flange 24 rests on the flaring lateral flange 15 of the uppermost pan 13 and the flaring flange 23 rests on the opposite flaring lateral flange 15. The right angular flange 24 is considerably longer than the flaring flange 23.

Numeral 26 designates an angle iron riveted or otherwise, secured to the right angular flange 24 of each pan 22^a. In positioning the second pan 22^a on the lowest pan 22^a, the angle iron 26 supports the one side of the pan 22^a on the uppermost surface at the edge of the bottom of the lowermost pan 22^a. The pans are positioned as best shown in Fig. 1. The direction of flow of the fluid through the tank 6 and through and between the pans 13 and 22^a is indicated by the arrows in Fig. 1. When the fluid to be cleaned passes through the last slot in the uppermost pan 13, it proceeds to the left in Fig. 1 beneath the lowermost pan 22^a and then upwardly through the slot in the lowermost pan 22^a, thence to the right to the slot in the next succeeding pan and thence to the left, until the liquid passes through the slot in the uppermost pan 22^a. From this position, the liquid fills the tank 6 to the lower surface of the pipe 27, through which the cleaned fluid passes.

In operation, the tank 6 is first filled with water to the water line 19, thereby immersing the pans 13. During this operation, the valve 28 in the pipe 11 is closed. When this operation is completed, the valve 28 is opened and the liquid to be cleaned is permitted to take the path previously indi-

cated and shown by the arrows in Fig. 1. The liquid to be cleaned, which is usually gasoline and which has a specific gravity less than one now enters the tank 6 from the bottom and mixes with the water in the tank, and on account of the static pressure in the pipe 10, the fluid in the tank 6 is forced upwardly through and between the pans 13. This movement upwardly of the gasoline is also facilitated on account of the flotation of the gasoline on the water, due to the specific gravity of the gasoline and its surface tension. During this process, the liquid in the tank 6 will be raised above the water line 19. Since it is desirable to have the water line 19 remain constant, it is necessary to open the water cock 20 and permit a sufficient amount of fluid to be drawn from the tank 6 in order to maintain the proper fluid level. When the gasoline and water has passed through and between the pans 13, it passes upwardly and between the pans 22, as previously described, the gasoline remaining on the top of the water until the liquid reaches the uppermost pan 22, by which time practically all of the dirt and foreign matter has been either dissolved by the water or precipitated into the pans 13 and 22^a. During the entire process of travel of the fluid upwardly, through the device, the water is being left behind until when the fluid reaches the pipe 27, it is practically pure gasoline. Numeral 29 designates a water cock, similar to the water cock 20 and placed in the same side wall 8, above the water cock 20, as best shown in Fig. 1. If it is desired to determine the height of the fluid, without disturbing the water line, the cock 29 is opened before the valve 28 is opened. Obviously if no liquid passes out of the water cock 29, the water line 19 is between its true position and the plane of the water cock 29, if on the opening of the water cock 20, water passes out. The water cock 29 is simply a check for maximum height of water in the tank. When it is desired to clean the apparatus, the valve 28, of course, is closed and the drain 18 opened. The cover plate 9 is opened and the pans 22 are first removed and then the pans 13. The pans must be thoroughly scrubbed, because they will be covered with dirt and sludge, which has been removed from the gasoline. The cleaning process may be carried on equally well with any other dry cleaning fluid, such as carbon tetra chloride. The only requirement being that the specific gravity of the fluid to be cleaned should be less than one. After the pans 22 are removed, the pans 13 must be similarly removed and cleaned. The assembly after cleaning the pans 13 and 22 is obvious from the description given herein. Numeral 30 designates a valve in the drain 18.

When the fluid in its movement reaches one of the angle irons 16, it is forced to

change its direction, which greatly aids in the precipitating process and prevents the fluid from surging against the sides of the tank 6.

5 Where water has been indicated potassium per-manganate or other chemicals may be used.

When solvents having a specific gravity greater than one are used, the process is reversed to the extent that the solvent is conducted to the upper most reversed pan first, and is permitted to gravitate through the water or other chemical, thereby forcing the water or other chemical upwardly, and permitting the cleaned solvent to be collected at the bottom.

In order to facilitate the cleaning of the device, water may be run through it from below through the pipe 11, between, through and over the pans and permitted to pass out through the pipe 21. This washes the slime and precipitate from the pans. However at regular intervals, the pans must be removed for a thorough cleaning by scrubbing. The angles 31 in pans 22^a perform a service similar to angle irons 16 and 17.

What I claim is:

In a device of the character described a tank, pans secured in said tank, slots secured in said pans, angle irons secured to said pans for holding said pans in spaced relationship, secondary angle irons secured to said pans to form baffle plates in the passage of a liquid between said pans.

35 In testimony whereof I affix my signature.
PAUL LUNGSTRAS.

40

45

50

55

60

65