

Jan. 9, 1945.

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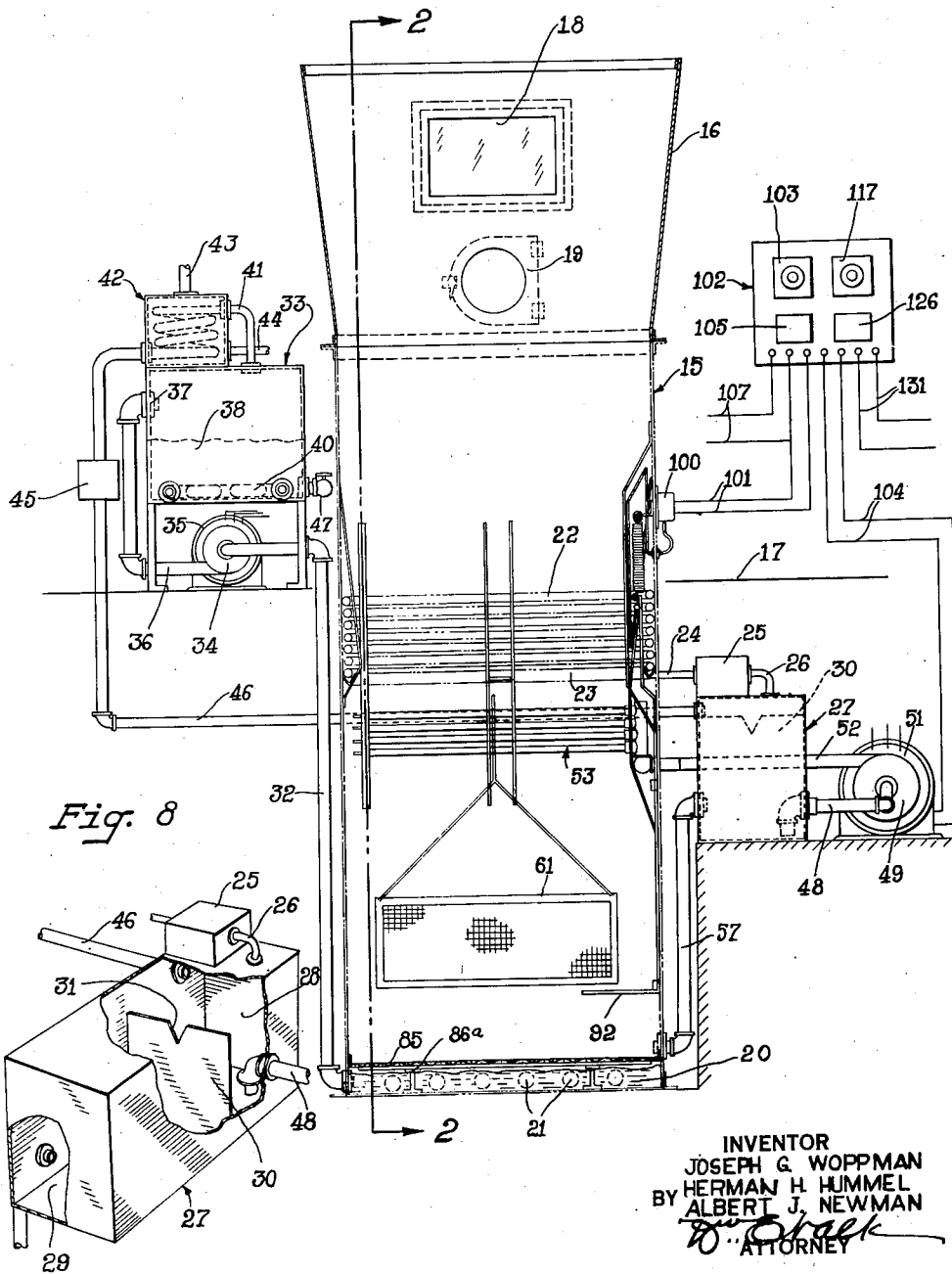
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DEGREASING APPARATUS

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5 Sheets-Sheet 1

Fig. 1



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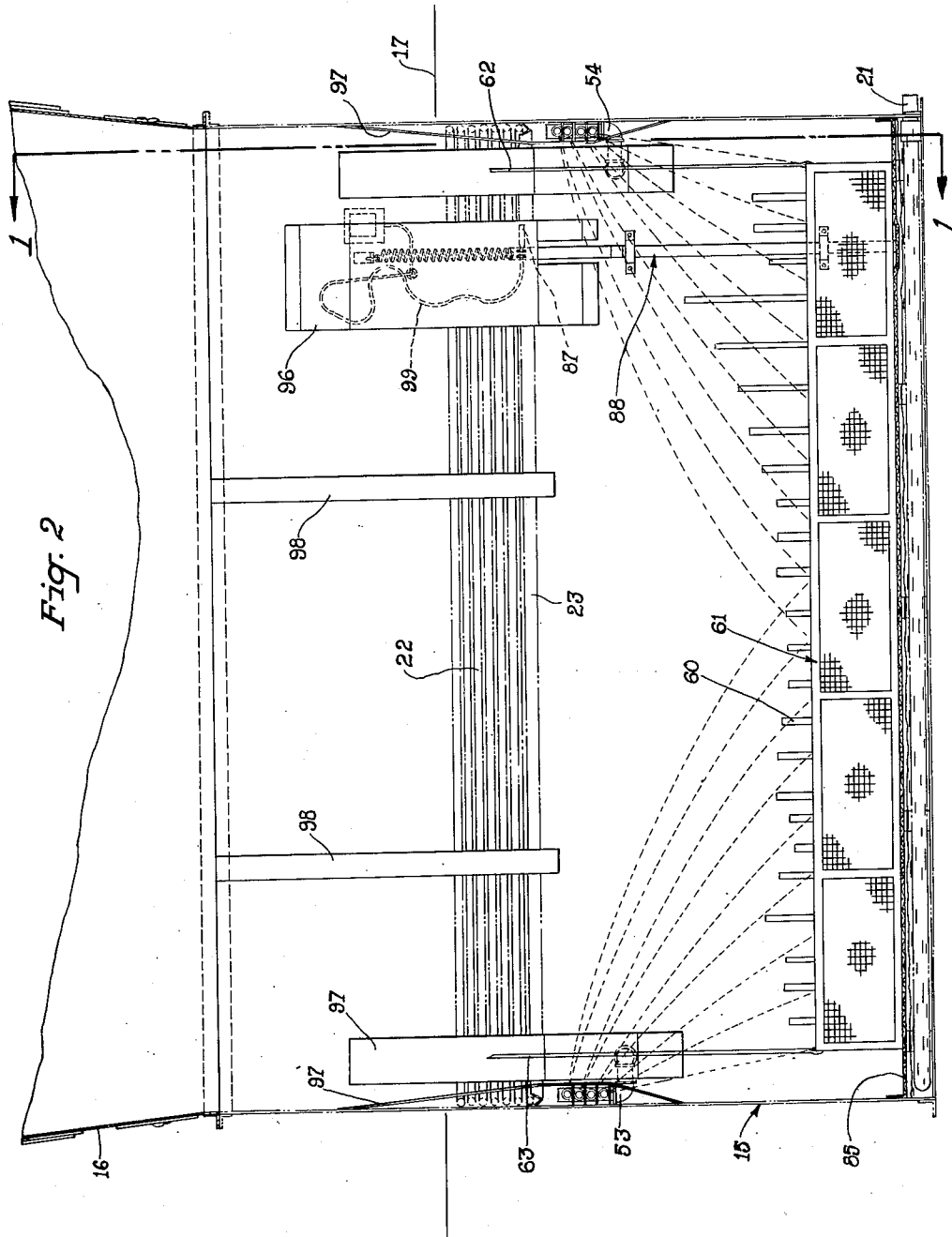
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5 Sheets-Sheet 2



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Fig. 4

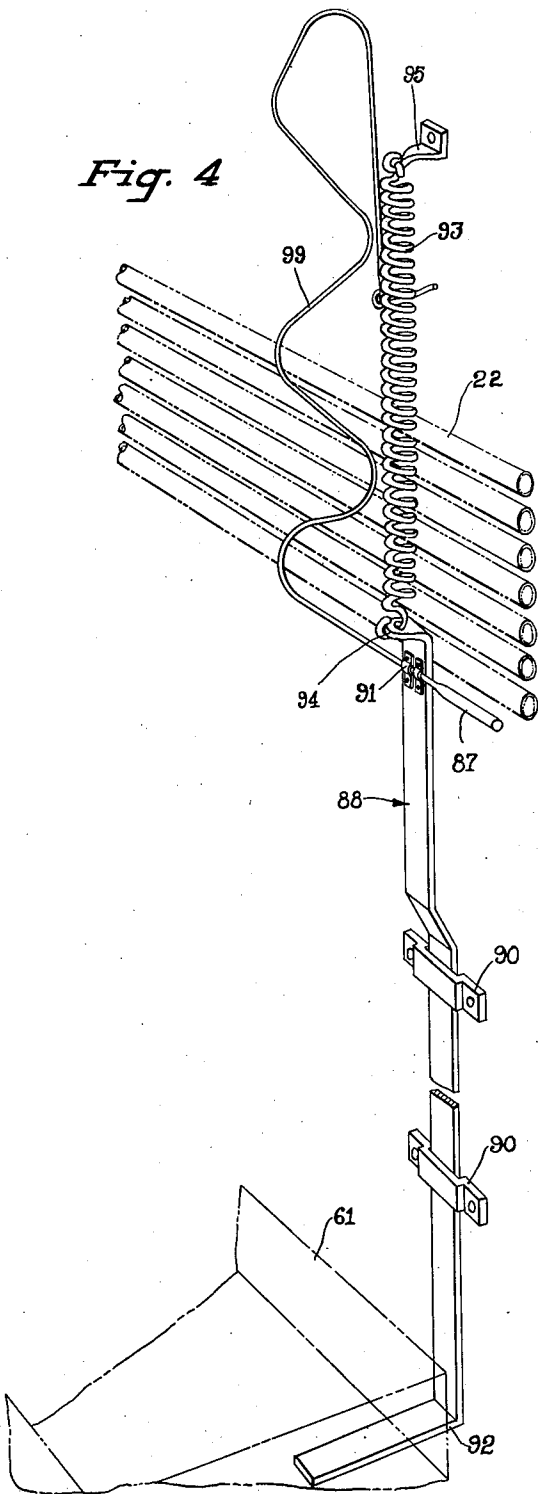
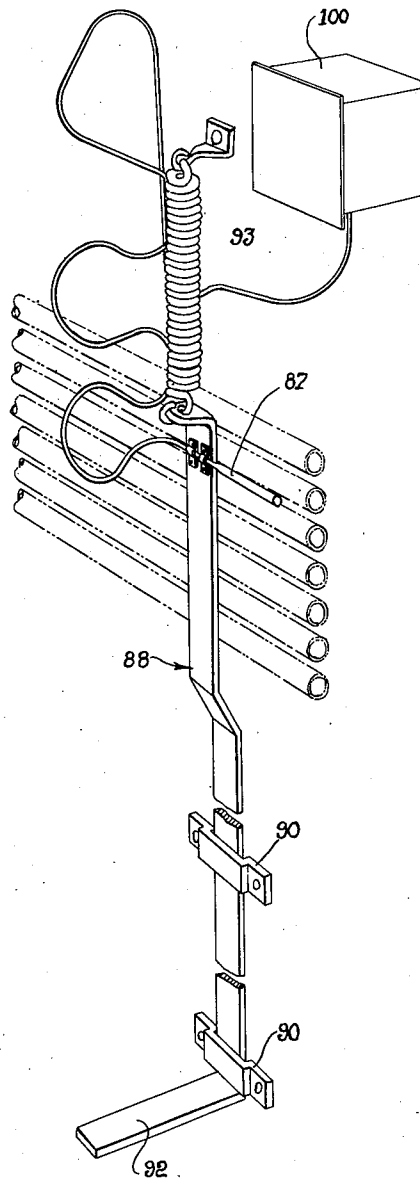


Fig. 3



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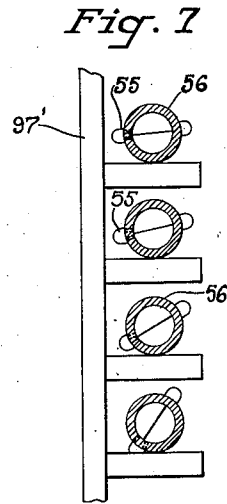
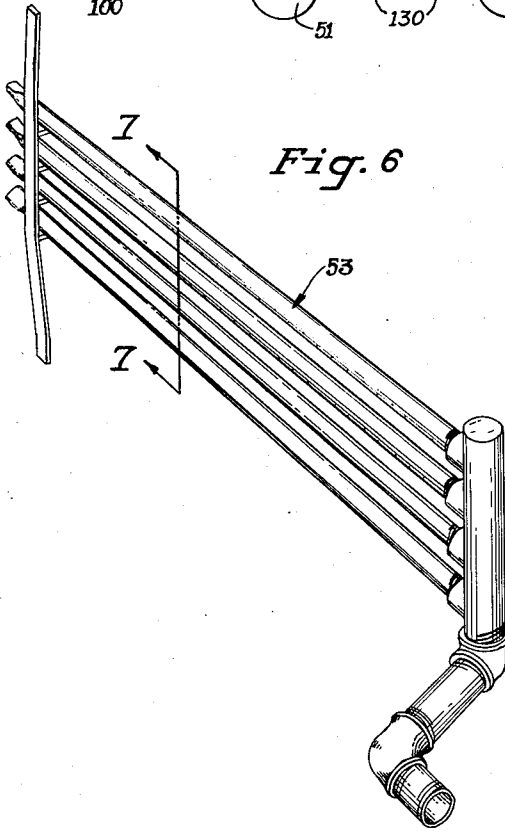
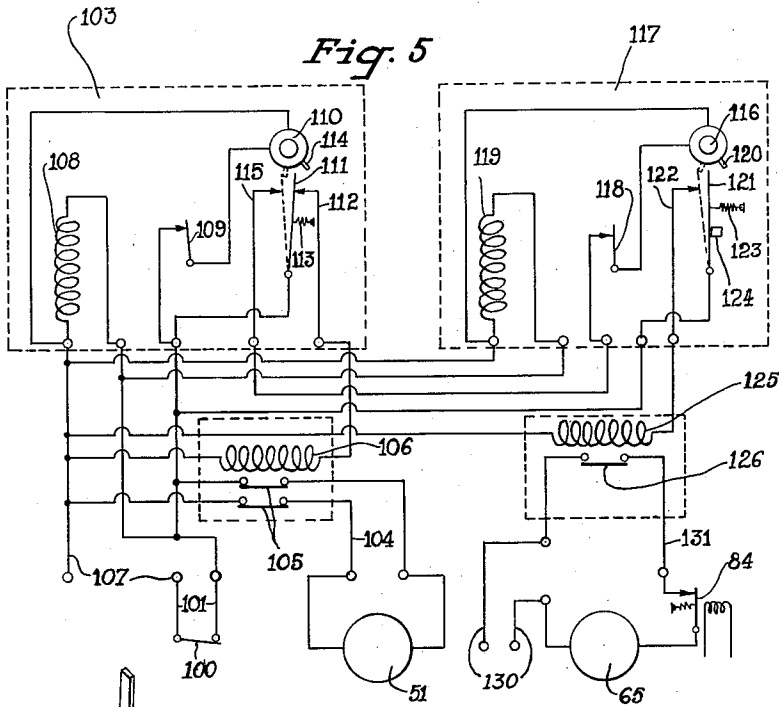
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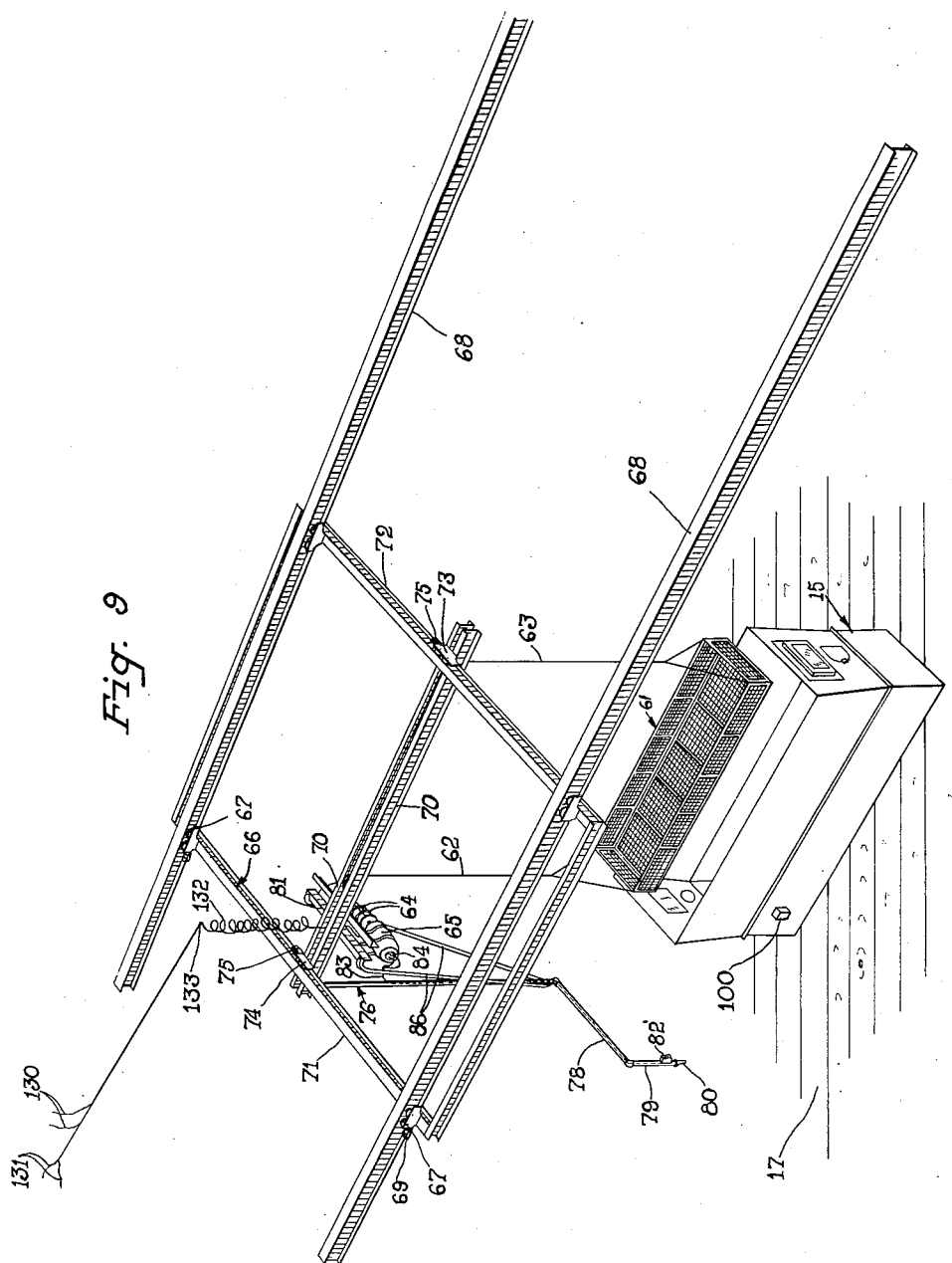
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DEGREASING APPARATUS

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,366,949

DEGREASING APPARATUS

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Application January 29, 1943, Serial No. 474,028

9 Claims. (Cl. 202—170)

This invention relates to the apparatus for removing grease and the like from articles which are in the process of fabrication, in order that they may be more readily handled and prepared for a covering of paint and the like.

Heretofore, degreasing apparatus, utilizing solvents adapted to be vaporized and allowed to deposit or condense upon the articles being cleaned, have been more or less manual in their operation. The timing for the keeping of these articles within the solvent vapors has been dependent upon the operator in control of the apparatus. Very often the articles were left in the degreasing vapors considerably longer than was necessary, the time usually required being only such time as it takes to return the vapor to its original state or temperature after the relatively cool articles have been placed within the same. Once the articles have been completely coated with the condensate, the cleaning operation is practically finished, except for the rinsing operation which is often necessary for the removal of insoluble particles adhering to the articles. This rinsing is often done with the condensate of the vapor.

Further, with such apparatus, the tanks have been open, and due to the misjudgment of the operator in failing to maintain the hand spray lance within the vapor at the time of spraying, considerable fumes have been created about the apparatus which have been extremely objectionable to the operators, the operators at times refusing to work on the apparatus for this reason. The chemical or solvent often used in this process, is trichlor-ethylene, which in small quantities may not be particularly harmful, but when contact is made with the heated or more concentrated fumes of the same, considerable harmful effects result to the operators.

Also the system utilized heretofore for the replenishing of solvents within the degreasing apparatus has necessitated the often closing down of the apparatus for a periodic thorough cleaning of sludge and oil from the apparatus which necessitated the putting of the same out of commission for a considerable duration. No means was provided for keeping a clean and unsour vapor within the tank, and the condensate with the grease in it being used over and over again.

It is an object of the present invention to provide a degreasing apparatus in which the cycle of operation is made automatic and put out of the control of the operator once the initial movement is made by the operator to start the cycle.

It is another object of the invention to pro-

vide an arrangement of the parts of the degreasing apparatus wherein the fumes escaping from the same will be kept at a minimum and not dependent upon the skill of the operator, and more particularly wherein the spraying device is rigidly retained at a location within the vapor region of the degreasing tank.

It is still another object of the invention to provide a degreasing apparatus with a means wherein the degreasing condensate is constantly kept substantially pure whereby the vapors will be readily maintained at the proper consistency and wherein a maximum degreasing effect will be maintained at all periods of operation.

According to the present invention, the typical degreasing or cleaning apparatus of this type using degreasing vapors for the effecting of the cleaning operation, has been made automatic. The operator need only to start the hoisting or conveyor apparatus to begin the cycle of operation. The hoisting apparatus will deliver the articles to the vapor where the vapors will be condensed on the same. Since the state of the vapors is temporarily changed, due to submersion of the cooler articles into the vapor, means responsive to the return of these vapors to the original state is provided to start the spraying operation and the automatic withdrawal of the articles from the degreasing vapors. Once the vapors have returned to their original state the condensation on the articles is complete. The spray is then used for effecting a rinsing operation in order to take care of the insoluble particles adhering to the articles. After the spraying operation is completed, an automatic time delay is effected to permit the articles to drain before the hoisting or removing apparatus comes into play to effect the automatic removal of the articles. The spraying device is arranged to maintain the spray well within the degreasing zone so that obnoxious fumes which resulted from the hand spraying operations are eliminated.

Also apparatus is provided for maintaining the degreasing solvent in as pure a state as possible at all times. A supply of clean and purified condensate is maintained ready for delivery by the spray pumps at all times. This supply is obtained from two sources, one being a distilling apparatus which continually draws a condensate from the bottom of the degreasing tank and delivers its distilled condensate to the pump supply. The second source of supply is a condenser within the tank which is employed for maintaining the degreasing vapors within the same at a definite level. Condensate forms on the coils of the con-

denser and drops into a trough from which it is delivered to the pump supply reservoir. Means within the pump supply reservoir is provided for always maintaining a proper level so that the spraying pump will always receive sufficient condensate to satisfactorily perform the rinsing operation. An abundant supply of the cleaned condensate is arranged for so that the supply for the pump is always assured. The surplus condensate fed over the baffle of the supply tank is collected within another compartment of the supply tank. It is finally drained off into the degreasing tank where it is again turned into vapor and returned to the degreasing zone. Adequate water separators are used in the system.

For other objects and for a better understanding of the invention, reference may be had to the following detailed description taken in connection with the accompanying drawings, in which Figure 1 is a sectional view of the degreasing apparatus and of the distilling apparatus associated therewith, the section being taken along lines 1-1 of Fig. 2, which is a sectional view in elevation of the degreasing tank as viewed in the direction of the arrows 2-2 of Fig. 1.

Figs. 3 and 4 are detailed perspective views of the thermally responsive apparatus used for controlling the spraying operation and the withdrawal of the articles from the degreasing vapor, the said apparatus being movable into the degreasing vapor zone to assume the position illustrated in Fig. 4, and also being movable out of the vapor zone to the unextended position illustrated in Fig. 3.

Fig. 5 is a wiring diagram of the automatic electric control mechanism utilized for effecting the automatic operation of the degreasing apparatus.

Fig. 6 is a detailed perspective view of one of the sets of spraying pipes such as located at the ends of the tank.

Fig. 7 is the sectional view through the pipes, taken in the direction of the arrows 7-7 of Fig. 6 and illustrating the location of the spray openings of the different pipes arranged vertically, one above the other.

Fig. 8 is a perspective view, with portions broken away, of the cleaned condensate supply tank from which the spray condensate and the condensate for replenishing the tank is obtained.

Fig. 9 is a three-point perspective view taken from above the hoisting apparatus and looking upon the same and upon the degreasing tank, the basket for the lowering of the articles into the degreasing tank being properly centered in position above the same.

Referring now particularly to Figs. 1 and 2, there is shown a degreasing tank 15 having an outwardly flared opening portion 16 in its top. A portion of the tank 15 is located well below the floor level indicated at 17. The portion of the tank and the flared portion 16 which is above the floor level is of a height considerably higher than that of a man, so that the man is kept from the top of the tank where he might receive any stray fumes coming from the same. If it is necessary for him to look into the tank, he may do so through a glass 18, located at about the level of his eyes, through which he can look down into the tank and observe the action taking place. Also in the portion 16 is an opening door 19 through which, if necessary, adjustment of the articles within the tank may be made in times of emergency, and through which a new supply

of the solvent may be added to replenish the system.

A supply of solvent as indicated at 20, is kept within the bottom of the tank 15. Within this supply there is provided heating coils 21 which are maintained hot at all times for effecting evaporation of the solvent in order that degreasing vapors be maintained above the same. The vapors rise from the solvent 20 upwardly in the tank to a point where they contact cooling coils 22 nested in the tank and surrounding the inside of the same. These cooling coils serve as means for preventing the fumes from leaving the top of the tank. By means of these coils a definite region or zone of the vapors is always maintained in the bottom of the tank. The condensate of the vapor, which drains off the coils 22, is collected in a trough 23 and is delivered by means of a pipe 24 to a water separator 25, and thence by means of a pipe 26 to a condensate supply tank 27 located outside of the tank 15 and beneath the floor level 17.

As viewed particularly well in Fig. 8, it will be noted that this supply tank 27 is divided into two compartments 28 and 29 by means of a baffle wall 30 having a notch 31 therein for the flow of condensate in the one compartment, upon obtaining a definite level, to pass to the other compartment.

Out of the bottom of the tank and in communication with the solvent 20 therein, is a vertically extending pipe 32 which delivers the condensate therefrom to a distilling apparatus 33 located at the side of the tank and at the floor level. This delivery of the solvent is made possible by means of a constantly driven pump 34, dependent upon its operation on an electric motor 35. The solvent leaves the pump through a pipe 36 and is delivered to the top of the distilling apparatus at a location indicated at 37. The condensate within the distilling apparatus 33 is indicated at 38 and this is kept constantly in a boiling condition by a heating coil 40 located in the bottom of the still. Clean or distilled vapors pass off through the top of the still into a pipe 41 which passes through a condenser 42 which is kept supplied with cooling water entering a pipe 43 and leaving a pipe 44. The vapors, on leaving the condenser 42, are substantially condensed to liquid form, whereupon they pass through a water separator 45 for delivery through a pipe 46 to the compartment 28 of the condensate supply tank 27. The oil sludge remaining in the bottom of the still is occasionally drained off through a valve controlled outlet 47.

It should now be apparent that the compartment 28 of the condensate supply tank 27 receives distilled condensate from two sources, and that such condensate has been deprived of its water content. From this compartment 28, the condensate for the spraying of the articles is taken. A pipe 48 extends into the compartment 28 and connects with a motor driven pump 49, operated by an electric motor 51, and through pipe 52 clean condensate is delivered to the sets 53 and 54 of spraying pipes located respectively at opposite ends of the tank 15. Enlarged views of these spraying pipes are shown in Figs. 6 and 7, and they are so arranged as viewed particularly in Fig. 7, and in Fig. 2, as to produce respectively spraying streams at different angles, in order that they may reach all articles as located in the tank for satisfactory cleaning of the same. As seen in Fig. 7, spray outlets are shown at 55 and it will be noted therein that these spray outlets

of different pipes 56 serving to make up the set, are at different angles with the horizontal. For instance, the pipe located at the bottom of the set is angled to deliver spraying fluid close to the end of the tank, whereas the pipe at the top of the set has its supply opening angled to deliver the condensate to the articles more removed to the end of the tank and well within the middle of the same.

It should be particularly noted that the sets of the spraying pipes are located vertically below the cooling pipe 22 and hence well within the region or zone of the degreasing vapors. By having the spraying pipe so located, any tendency to create fumes during the spraying operation tending to leave the tank 15, is kept to a minimum, and is by no means dependent upon the human element for the keeping of a manual spray within the degreasing zone, such as was necessary when the spraying was done by the operator with a hand spray lance.

In order to insure having adequate supply of condensate with which to spray the articles, the baffle 30 is provided in the condensate supply tank 27. This baffle 30 will at all times maintain a definite height of condensate within the compartment 28 before any of the condensate is allowed to pass through the notch 31 to the compartment 29 where it is allowed to automatically return to the bottom of the tank 15 through a downwardly extended pipe 57.

It should now be apparent that an adequate quantity of clean condensate is kept at all times available for use by the spray, and that the supply 20 within the bottom of the tank 15 is also maintained in a clean state. The oil sludge is taken from the still at the location removed from the bottom of the tank 15 and thus sludge is not allowed to cool in the bottom of the tank 15 whereby it would be necessary to shut down the apparatus in order that this sludge be taken from the same. The only necessity for shutting down the apparatus for the present system is when broken articles have collected in sufficient quantity on the bottom of the tank.

Referring now to Fig. 9, there is shown hoisting apparatus, used for inserting the articles to be cleaned into the degreasing tank. Articles such as indicated at 60 in Fig. 2 are loaded into a basket 61 which is suspended from pulley cables 62 and 63, Fig. 9, adapted to be operated by motor driven reels 64 carried on a hoisting motor 65 which is suspended from a movable frame 66. This frame 66 has trolley wheels 67 which run respectively over parallel disposed track rails 68 which may be connected to the superstructure of the building which houses the degreasing apparatus. The frame 66 is movable along these track rails 68 to locate the basket 61 longitudinally of the tank 15. When the frame 66 has abutted against stops 69 on the track rails 68, the basket 61 is automatically located or centered in proper vertical alignment with tank opening.

The motor 65 with its reels 64 is more directly carried on longitudinally extending channel members 70 which are connected to the end members 71 and 72 of the frame 66 for transverse movement therealong. The members 70 carry trolley wheels 74 adapted to be respectively run over the frame members 71 and 72. In order to properly locate the basket 61 in transverse alignment as well as in vertical alignment with the tank 15, there is provided on the end frames 71 and 72 the necessary stops 75.

Extending downwardly from the channel mem-

bers 70 and into a position where the same may be reached by the operator standing on the floor 17, is an enlarged pipe member 76 which is turned to extend transversely as indicated at 78 and thence downwardly as indicated at 79 to locate its handle 80 well within reach of the operator of the degreasing apparatus. This pipe 76 is braced to a motor supporting bracket 81 on the channel member 70 by means of brackets 86. By means of this pipe the operator can physically or manually move the hoisting apparatus to properly locate the basket in either its position over the tank or in a position removed from the same and wherever he desires to deposit the basket for loading or unloading the articles therefrom.

Once the operator has located the basket 61 with articles therein over the tank, the cleaning cycle of operation can be started. On the downwardly extending portion 79 of the pipe 76 and near to the handle 80, is an electric press button switch 82' which is connected by cable 83 shown by dotted lines extending through the pipe 76, to a switch control box 84 on the motor 65. The hoisting motor is started and the lowering operation of the basket 61 begins. From this point on, the cycle of operation is completely out of the hands of the operator. The control from this point is completely automatic and until such time as the basket is returned to its position above the tank.

The motor control box 84 may include a limit control contact for automatically stopping the motor after the descent of the basket has been completed.

The basket 61 is lowered to the bottom of the tank and allowed to rest on the screen 85 in the bottom of the tank and supported on the upwardly-extending shelf elements 86a. The screen 85 serves to collect any scrap pieces which may fall out of the basket or may negligently be allowed to get into the tank. When it is desired to clean the tank of these scrap pieces, this screen may be removed or raised to a location where the scrap pieces may readily be removed from the screen and all without the necessity of the man having to go down into the tank.

Carried on the inside of the tank 15 and at the side wall thereof, is a thermal element 87. Means for carrying this thermal element 87 is that of a movable member 88 adapted to slide through guide plates 90 secured to the side wall of the tank 15. The thermal element 87 is connected to the movable member 88 as indicated at 91. The lower end of the movable member 88 is turned inwardly as indicated at 92 so that it will be engaged in the bottom of the basket in a manner as illustrated in Figs. 1 and 4 to travel downwardly with the basket until it engages the screen 85 in the bottom of the tank. This downward movement of the member 88 is against the action of a spring 93 secured at its upper end to the movable member as indicated at 94, and to the side wall of the tank 15 by means of a bracket 95.

It would be noted as viewed in Fig. 4 that the thermal element 87 has been brought down well below the cooling pipes 22 and thus into the region of the cleaning vapors where it will be acted upon by the same. As viewed in Figs. 1 and 2 it will be seen that a protecting plate 96 is arranged over the thermal element 87 whereby the same will be protected from the basket 61 as it is lowered into the tank. Other guiding elements 97, 97', and 98 are also provided for the basket so that the same will be swung free and clear of the cooling coils 22 and spray pipes 53 and 54

and in order to make its descent into the tank 15 without interference with obstructions within the tank.

The thermal element 87 contains an expansible fluid and is connected by a flexible tube 99 to a switch box 100 having a switch therein responsive to the movement of the fluid within the tube 99. This switch may be of any known type, but is preferably of mercury contact type adapted to be thrown over readily into a position for the making of an electrical circuit. Wires 101 extend from this switch 100 to a control board 102 as shown in Fig. 1.

The vapors within the bottom of the tank 15, as has been stated before, are maintained constant and kept to the level of the cooling coils 22. The temperature of these vapors is of the order of 190° F. and when the basket with the articles having a lower temperature and substantially that of the room surrounding the degreasing apparatus, is lowered into the vapors, a condensate will form on the articles to start the degreasing operation. Much of the vapor temporarily disappears, but automatically as the vapor returns and the temperature of the articles is brought to the temperature of the vapor, the vapor will be brought back or returned to its original state or temperature. The thermal element 87, before it is projected into the vapors, will have substantially the same temperature of the articles and it will be brought up to the temperature of the vapors at substantially the same time the articles are brought up to that temperature. At this time the thermal element will be sufficiently expanded to operate its switch 100, which, in turn starts the spraying motor 51 to effect rinsing of the articles, the cleaning action by condensation having been completed. This is accomplished through the control board 102 on which is mounted a time motor unit 103 serving to become effective for the turning off of the spray motor 51. This timing motor is preferably set to permit spraying for a period of fifteen seconds, though any other amount of time may be used.

The spray motor 51 is connected by the wires 104 with the control board 102 and as viewed in Fig. 5, they are connected to an electrically operated switch 105. This switch 105 is operated automatically upon operation of the thermal switch 100 to start the spray motor. A coil 106 of the switch 105 is connected with the time motor unit 103.

If it be considered that the wires 107 be supplied with a 110-volt supply, a clutch coil 108 will automatically receive current as the thermal switch 100 is closed. This clutch coil 108 forming the part of the time motor unit 103 will cause the closing of a switch contact 109 to place a time motor element 110 across the electric circuit of the electric supply 107. The time element 110 is associated with a contact 111 which is normally maintained against a terminal 112 by a spring 113. This terminal 112 extends to the coil 106 of the spray motor control switch 105. Thus simultaneously with the starting of the spray motor 51 the timing element 110 is started to operate. Since, as pointed out, the timing motor 110 is operable at the end of fifteen seconds, it will put its element 114 in engagement with the switch 111 to throw the same over into contact with a terminal 115. As this is done, the spray motor will be stopped from operating, and current will no longer pass through coil 106 to maintain the switch 105 closed.

It is now necessary that a time lag be had to

permit the proper draining of the spraying condensate from the articles which have thus been sprayed. If the switch element 111 is thrown over to contact with the terminal 115, current will then be passed from one of the supply wires 107 to start operation of a timing element 116 forming a part of a time delay apparatus 117 on the control board 102. This has been made possible by a previous operation of a switch 118 by a clutch coil 119 similar to the clutch coil 108 of the time switch 103. This coil 119 is connected across the same wires as the coil 108 and as the thermal switch 100 is operated, the switches 109 and 118 are simultaneously closed.

The time motor element 116 is set to operate for approximately forty-five seconds, though any other length of time may be allowed. It is found that forty-five seconds is sufficient for the proper draining of the articles after the rinsing operation. When the forty-five seconds are up, an element 120 on the time motor element 116 causes a switch arm 121 to be brought against a terminal 122 against the action of a spring 123 normally holding the switch arm 121 against a stop 124. As this is done, current is allowed to flow from the supply wires 107 through a coil 125 of a motor control switch 126 which starts up the hoisting motor 65 to automatically effect the withdrawal of the articles from the tank. The hoisting operation continues until the basket has reached a height well above the tank 15 whereupon the limit switch 84 of the motor 65 will automatically operate to stop the hoisting motor 65. This portion of the limit switch, which may effect this operation is indicated diagrammatically in Fig. 5. Such limit switches are well known in the art and may be readily rigged up to effect this result. The electric motors 51 and 65 are adequately provided with the necessary switching equipment for controlling the operating current for these motors. The motor 65 may receive its power from the cables 130 as viewed in Fig. 9, which, together with control cables 131, extend through a single flexible cable housing 132 downwardly to the motor 65. The upper end of the flexible cable may be connected as indicated at 133, to a fixed point within the building housing the degreasing apparatus. As the motor 65 and the hoisting apparatus is moved, its movement will be permitted relative to the point 133 by this flexible portion 132.

It should now be apparent that there has now been provided a degreasing apparatus which may be operated with safety and free of obnoxious fumes which would otherwise be injurious to the health of the operator, and that this apparatus, once the cycle of operation has been initiated by the operator, is entirely automatic and free of the operator's judgment in its operation, whereby more efficient and more satisfactory cleaning of the greased articles will be effective. It should also be apparent that in cooperation with this degreasing apparatus, there has been provided an arrangement for always maintaining a clean and unsour condensate for the cleaning operation, thereby further adding to the efficiency of the arrangement.

While various changes may be made in the detailed arrangement of the apparatus, it shall be understood that such arrangements shall be within the spirit and scope of the present invention as defined by the appended claims.

We claim as our invention:

1. In a cleaning apparatus, a tank containing a region of vapor, means for inserting articles to

be cleaned into the region of the cleaning vapor, means for spraying the articles with the vapor condensate, means responsive to the condition of the vapor for controlling the operation of the spraying device including means automatically incident to movement of the inserting means for pre-setting the control means, said control means being effective only upon the return of the vapor to a predetermined state to effect the automatic operation of the spraying device.

2. In a cleaning apparatus, a tank, means for maintaining a region of cleaning vapor within the tank, means for inserting articles in the vapor region, a device adapted to effect a spray of the vapor condensate upon the articles within the cleaning vapor, thermally responsive means for controlling the operation of the spraying device including a thermal element adapted for movement into and out of vapor region, means engageable by the article inserting means for moving the thermal element into the vapor region to thereby render effective the controlling means.

3. In a cleaning apparatus, a tank containing a region of cleaning vapor, means for maintaining the cleaning vapor within the tank up to a fixed level, means for inserting articles to be cleaned into the region of the cleaning vapor, the articles being of lower temperature than the temperature of the vapor causing the vapor to be condensed on them, a spraying device having its nozzle located within the vapor region, and a thermally responsive device movable into the vapor region with the articles and operable upon the vapor being returned to its original state to effect the automatic operation of the spraying device.

4. In a degreasing apparatus, a tank, means for maintaining degreasing vapor at a predetermined level within the tank to thereby provide a degreasing zone into which articles are to be introduced, means for moving the articles into and out of the degreasing zone, the articles being of lower temperature than the temperature of the degreasing vapor causing a temporary change in the state of the vapor, a spraying device for rinsing the articles being cleaned, and automatic means responsive to the return of the vapor to its original state for effecting operation of the spraying device and subsequent operation of said second mentioned means to move the articles out of the degreasing zone.

5. In a degreasing apparatus, a tank having a top opening, means for maintaining a region of degreasing vapor within the tank, a hoisting device for lowering and raising the articles through the tank opening into and out of said region, control means for initiating the lowering of the hoisting device to position the articles in said region, the articles being of lower temperature than the vapor in said region causing the deposit of vapor condensate on the articles and the consequent temporary change of state of the degreasing vapor, automatic means for stopping the hoisting device when the articles are properly located within the vapor region, and means responsive to the return of the vapor to its original state for automatically effecting the operation of the hoisting device to raise the articles out of the vapor region.

6. In a degreasing apparatus, a tank having a top opening, means for maintaining a region of degreasing vapor within the tank, a hoisting device for lowering and raising the articles through the tank opening into and out of said region, said

hoisting device including an electric motor, an up and down limit switch, and an electric switch to start the lowering of the articles into the tank and to start the degreasing cycle, said limit switch serving to stop automatically the hoisting motor when the descent of the articles into the region of the degreasing vapor has been completed, the articles being of a lower temperature than that of the degreasing vapor causing a temporary change in the state of the vapor, means for spraying the articles within said region, automatic means responsive to the return of the vapor to its original state for starting the operation of said second mentioned means, and time delay means for shutting off the spraying device after a predetermined interval of time and for pre-setting a second time delay means, said second time delay means being arranged to start the hoisting motor after a predetermined time is allowed to drain the articles which have been sprayed, said motor limit switch also serving to stop the hoisting motor when the articles have been raised out of the tank, whereby once operation of the hoisting device has been initiated the degreasing cycle and return of the articles out of the tank is entirely automatic.

7. In a cleaning apparatus, a tank open at its top and having a cleaning zone, means for introducing vapor into said zone, mechanism for lowering articles to be cleaned into, and for supporting them in, said zone, thereby changing temporarily the state of the vapor in said zone, a motor for operating said mechanism, and means which is operative automatically a predetermined interval after said vapor returns to its normal state for energizing said motor and actuating said mechanism to withdraw said articles from said zone, said last mentioned means being responsive to the normal temperature of said vapor.

8. In a cleaning apparatus, a tank having a cleaning zone, means for introducing into said zone a cleaning agent in its vapor phase, means for introducing articles to be cleaned into said zone, thereby changing temporarily the temperature of the vapor in said zone in accordance with the characteristics of said articles, normally inoperative means for spraying a cleaning agent in its liquid phase upon said articles, and means for automatically rendering said last mentioned means operative upon the return of the vapor in said zone to its normal temperature, said last mentioned means being responsive to the normal temperature of said vapor.

9. In a cleaning apparatus, a tank having a cleaning zone, means for introducing into said zone a cleaning agent in its vapor phase, mechanism for introducing articles to be cleaned into said zone, thereby changing temporarily the state of the vapor in said zone in accordance with the characteristics of said articles, means for spraying a cleaning agent in its liquid phase upon said articles, means for automatically rendering said spraying means operative upon the return of the vapor to its normal state, timing means for automatically rendering said spraying means inoperative after a predetermined interval, and means which is automatically operative after said articles have been permitted to drain for a predetermined period for rendering said mechanism operative to withdraw said articles from said zone.

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