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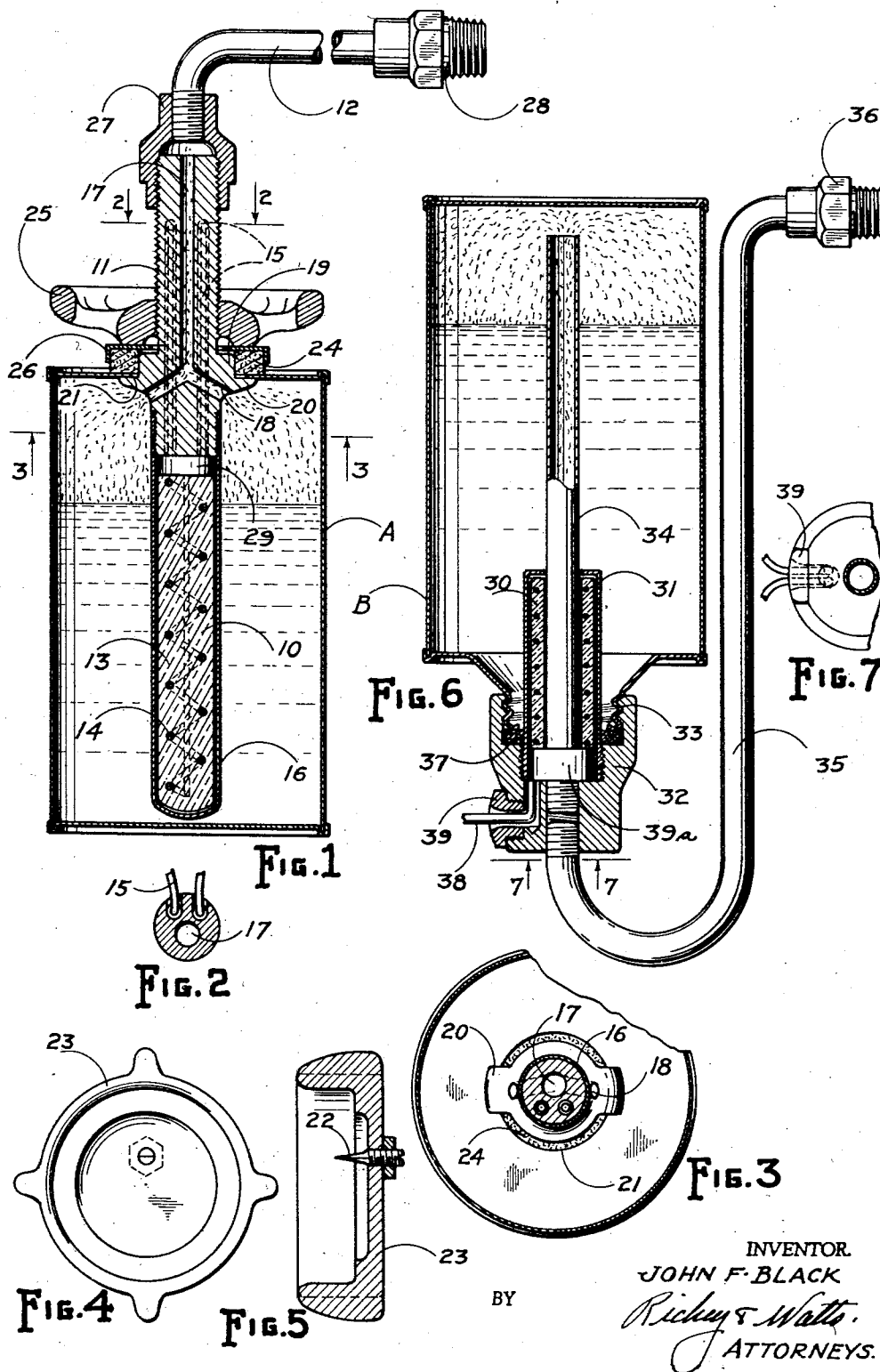
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PORTABLE DEGREASING APPARATUS

Filed Nov. 13, 1940

2 Sheets-Sheet 1



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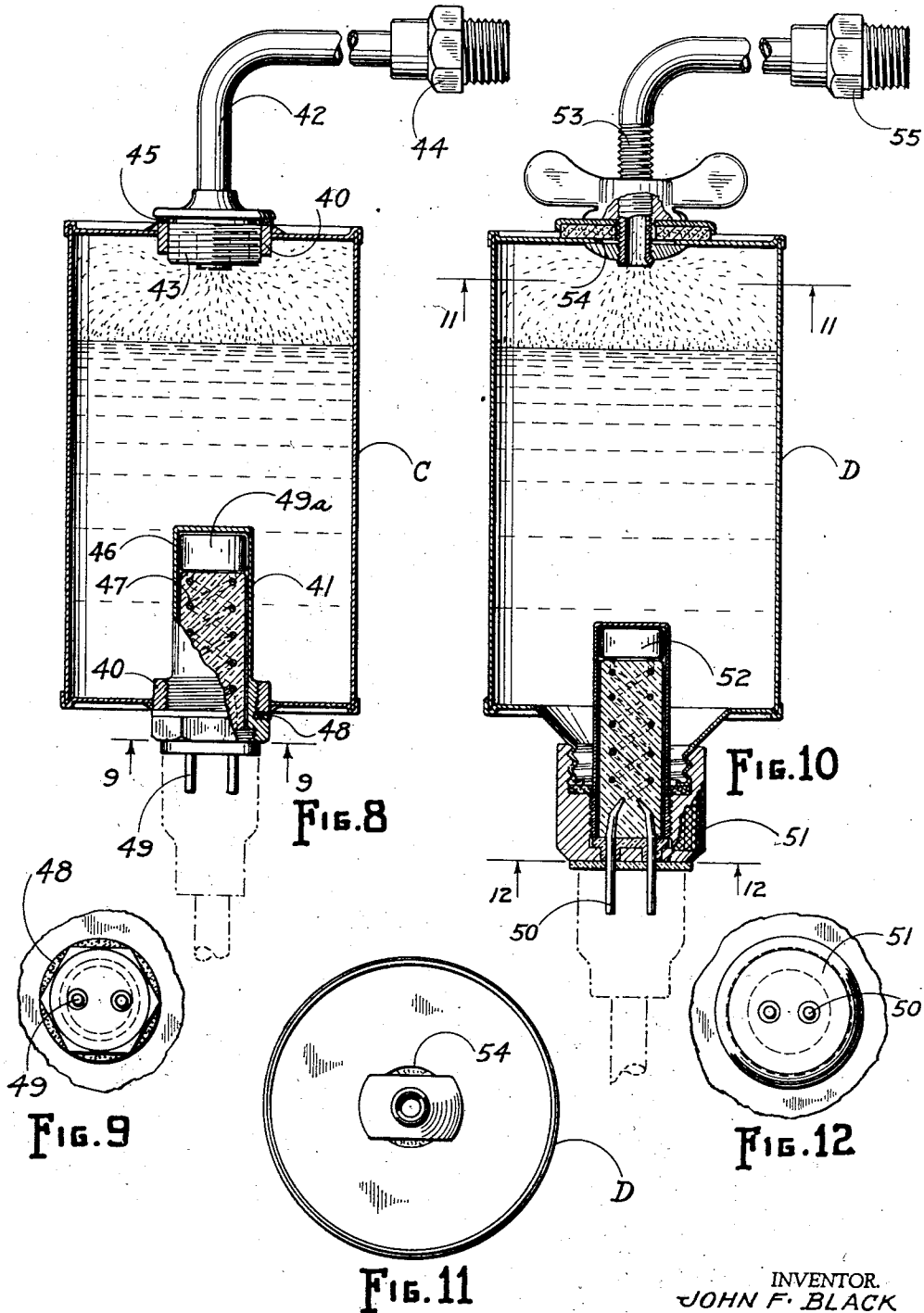
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UNITED STATES PATENT OFFICE

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PORTABLE DEGREASING APPARATUS

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5 Claims. (Cl. 184—1.5)

This invention relates broadly to degreasing apparatus and more specifically to degreasers of the type which are adapted to effect the cleaning operation in a gear case or similar closed body by the delivery of vapors from a predetermined quantity of solvent to the interior of such a body.

In my copending application Serial No. 336,635 filed May 22, 1940, I have disclosed a degreasing apparatus of the character above designated in which vapors generated in a can of solvent are conducted to a housing through a tube constituting the supporting medium for the can and in which the vaporization of the solvent is effected by means of a heating element clamped upon the base of the can.

The present invention comprehends a supporting member and heater of a structure that is an improvement of the form previously disclosed in my copending application and is directed generally towards the provision of a device of fewer parts, a device which may be assembled upon a housing with greater dispatch and a device which is more economic of manufacture and maintenance.

One of the objects of the invention is to construct a degreasing device embodying a heater and a conduit, the conduit being formed to accommodate the suspension of a can of solvent upon the housing to be cleaned and the heater being formed to accommodate the insertion thereof within a solvent can of conventional configuration.

Another object of the invention is to provide a degreasing device comprising heater and a conduit, preferably, though not necessarily, formed as a unitary structure and formed to accommodate the support of a can of solvent in fluid communication with the housing to be cleaned.

Another object of the invention is to provide an admixture of a solvent and a protective coating fluid which is susceptible of vaporization at a higher temperature than that required to vaporize the solvent so that the vapor of the coating material will be generated in order of time subsequent to the dissipation of the solvent vapors.

Another object of the invention is to provide a heater of the immersion type which is constructed for ready assembly within a can of solvent and designed to facilitate the vaporization of the solvent and the protective coating material admixed therewith.

Other objects and advantages more or less an-

cillary to the foregoing and the manner in which all the various objects are realized will appear in the following description, which considered in connection with the accompanying drawings, sets forth the preferred embodiment of the invention.

Referring to the drawings wherein the preferred embodiment of the invention is illustrated:

Fig. 1 is a vertical sectional view through one of the forms of immersion type heaters embodying the present invention;

Fig. 2 is a transverse sectional view through the stem of the heater, the section being taken on a plane indicated by the line 2—2 of Fig. 1;

Fig. 3 is a transverse sectional view through the body of the heater, the section being taken on a plane indicated by the line 3—3 in Fig. 1;

Fig. 4 is a plan view of a cutter adapted for use in conjunction with a can of the type illustrated in Fig. 1;

Fig. 5 is a transverse sectional view through the medial axis of the cutter illustrated in Fig. 4;

Fig. 6 is a vertical section through an alternate form of degreaser illustrating the application of an immersion type heater in a can of the screw cap type;

Fig. 7 is a plan view of the heater supporting member illustrated in Fig. 6;

Fig. 8 is an alternate form of a degreaser illustrating the application of a supporting tube and immersion heater in a can or receptacle designed particularly for the reception of such part;

Fig. 9 is a transverse sectional view of the base of the heating element support illustrated in Fig. 8;

Fig. 10 is a modified form of the degreaser illustrated in Fig. 6, the solvent vapor delivery tube in this embodiment being adapted for application upon the base of the can;

Fig. 11 is a transverse sectional view taken on a plane indicated by line 11—11 in Fig. 10; and

Fig. 12 is a transverse sectional view of a fragmentary portion of the apparatus illustrated in Fig. 10.

Referring to Fig. 1, the degreaser comprises a heating element 10, mounted upon a supporting member 11 which is coupled with a conduit 12 adapted for fluid communication between a can of solvent A and the housing or gear case (not shown) to be cleaned. The can A illustrated in this embodiment is of the flat headed type, the capacity thereof being proportioned to the volumetric capacity of the housing to be cleaned. The heating element comprises a core 13 hav-

ing a coiled resistance wire 14 thereon which is provided with terminals 15 adapted for connection with a suitable source of electric current. The core 13 is mounted within a shell 16 threaded upon the free end of the supporting member 11 which is drilled to receive the lead wires connected with the terminals 15. The supporting member is formed with a longitudinal bore 17 connected with a plurality of transverse openings 18 adapted for communication with the interior of the can A. A shoulder 19 having a pair of laterally disposed lugs 20 on the lower face thereof is formed on the supporting member intermediate its ends, the lugs being designed for overlapped engagement with the inner face of the marginal edge of an opening 21 in the top of the can when the supporting member is rocked into position therein. The opening 21 may be provided in the can during the fabrication thereof or may be formed by a cutter 22 which embodies a spur eccentrically mounted within a cup 23 constructed for telescopic engagement upon the top of the can. The cutting operation is performed by rotating the cap upon the can with the spur in pierced relation therewith.

When the supporting member 11 is mounted upon the can the opening 21 therein is sealed by a washer 24 preferably formed of hard felt or leather adapted for intimate engagement with the shoulder 19 and the outer face of the top of the can A. The upper portion of the supporting member 11 is threaded for the reception of a hand wheel 25 engageable with a cupped thrust plate 26 mounted upon the upper face of the washer 24, the hand wheel being adapted, in its adjusted position, to effect the securement of the supporting member upon the can. The end of the support 11 is provided with a nipple 27 threaded to support the conduit 12, the free end of which is provided with a swivel coupling 28 adapted for securement within an opening in the housing to be cleaned. A bi-metallic thermostat 29 is provided on the heating element to open the circuit at a predetermined temperature.

In operation when the electric circuit is closed and the solvent in the can A heated, the vapors arising therefrom will flow through the openings 18, 17 and thence through the conduit 12 to the housing where upon contact with the cold metal parts they will be condensed and flow with the dissolved grease from the housing.

As illustrated in Fig. 6, the solvent container or can B is of the type which is formed of a screw threaded cap. In this embodiment the heating element 30 is supported by a shell 31 threaded in the supporting member 32 which in turn is threaded upon the neck 33 of the can. The heating element is of tubular form having a pipe 34 extended therethrough and projecting upwardly within the can to a point above the fluid level when the can is adjusted in its inverted position. The pipe 34 is arranged for fluid communication with a conduit 35 formed with a loop in the lower portion thereof and with a riser extending upwardly to a point adjacent the initial fluid level in the can. The end of the conduit 35 is provided with a swivel coupling 36 formed for engagement within an opening in the housing to be cleaned. The supporting member 32 is provided with a washer 37 to effect the sealed engagement of the supporting member with the neck of the can and heater shell 31. The lead wires 38, for the resistance coil in the heating element, are supported in a plug 39 having a chamfered open-

ing therein to facilitate the insulation of the wires. A bi-metallic thermostat 39a is provided on the heating element to open the circuit at a predetermined temperature.

In operation when the electrical circuit to the heating element 30 is closed the solvent in the can B will be heated, the vapors rising in the closed container having sufficient pressure to effect the circulation thereof through the pipe 34, the conduit 35 and into the housing to be cleaned, the degreasing operation being effected in the manner heretofore described.

In the embodiment illustrated in Fig. 8, the can C is manufactured with screw threaded ferrules 40 in the opposed ends thereof, the solvent being retained in the can by plugs, not shown, threaded in the ferrules. In the use of a container of this type the plug in the top of the container may be removed and the heating element 41 mounted therein, whereupon the can is inverted, the plug in the opposed end thereof removed, and the supporting conduit 42 mounted in this opening. The conduit 42 is provided with a screw plug 43 for engagement within the threaded ferrule and with a coupling member 44 on the free end thereof for engagement in an opening in the housing to be cleaned. The connection between the screw plug 43 and the ferrule 40 is sealed by a gasket 45 supported by a flange formed in the upper portion of the plug.

The heating element comprises a shell 46 encasing the resistance coil 47 and formed with a threaded end portion engaged in the ferrule 40. The plug is provided with a gasket 48 adapted to seal the connection between the plug and the face of the ferrule 40. The lead wires 49 for the resistance coil 47 are preferably provided with pigtails of the form customarily employed in electrical connections of the push plug type. A bi-metallic thermostat 49a is provided on the heating element to open the circuit at a predetermined temperature.

In operation when the circuit is closed the solvent in the can C will be heated, the vapors rising therefrom being conducted through the conduit 42 to the housing and metal parts therein to be cleaned, the cleaning operation occurring in the manner heretofore described.

In the embodiment illustrated in Fig. 10, the can D and heating element therefor are of the type illustrated in Fig. 6 save that the lead wires 50 are extended through the base of the supporting member 51 and a bi-metallic thermostat 52 is provided on the heating element to open the circuit at a predetermined temperature. Fluid communication to the housing to be cleaned is effected by a conduit 53 having a coupling thereon of the type generally illustrated in Fig. 1, the coupling being adapted for engagement within an opening 54 formed in the can or cut therein with the instrument illustrated in Figs. 4 and 5. The free end of the conduit 53 is provided with a coupling 55 adapted for connection with the housing to be cleaned.

In the use of degreasers shown in the several embodiments illustrated herein it has been found that the metal parts will rust within a few hours unless provision is made to prevent the exposure thereof to atmospheric air. In order to avoid the objections that have been raised when this condition occurs a fluidic coating material, such as oil, is admixed with the solvent contained in the cans. The coating fluid or oil is of a character which will vaporize at a much higher temperature than the solvent so that the entire sol-

vent content may be dissipated before the vaporization of the coating fluid occurs. Hence, in the operation of the device, the solvent will first be expelled from the can then upon continued or increased application of heat the coating material remaining in the can will be vaporized, such vapors flowing into the housing and coating the surfaces of the parts cleaned in the initial step by the solvent vapors.

Although the foregoing description is necessarily of a detailed character, in order that the invention may be completely set forth, it is to be understood that the specific terminology is not intended to be restrictive or confining, and that various rearrangements of parts and modifications of detail may be resorted to without departing from the scope or spirit of the invention as herein claimed.

I claim:

1. Apparatus for degreasing a hollow body comprising a can, an electrical heater therein, a tube intermediate the can and the hollow body, a screw threaded coupling uniting one end of the tube with the can and a screw threaded coupling uniting the other end of the tube with the hollow body for suspending said can and heater assembly therefrom.

2. Apparatus for degreasing a gear case comprising a can for a solvent, an electric heater in said can, a supporting member for the retention of said heater in sealed relation with said can and a conduit communicating with the interior of said can and the interior of the gear

case and constituting a supporting medium for the suspension of the heater and can assembly from the gear case.

3. Apparatus for degreasing a gear case comprising a can for a solvent, an electric heater therein, a conduit in fluid communication with the can and the interior of the gear case, a thermostat on said heater for maintaining the temperature thereof, means for supporting said conduit in sealed relation with said can and means on said conduit for suspending said can and heater from the gear case.

4. Apparatus for degreasing a gear case comprising a can, an electric heater in said can, a supporting member therefor, a conduit communicating with the interior of said can, a supporting member therefor adapted for sealed engagement with said can, a coupling on said conduit for the connection thereof upon the gear case to be degreased, said coupling and conduit constituting the supporting medium for the suspension of said can from the gear case.

5. Apparatus for degreasing a gear case comprising a can for a solvent and a coating fluid, a heater in said can, a thermostat on said heater for controlling the temperature thereof, means for the attachment of said heater in sealed engagement with said can and a conduit in communication with the interior of the can and the gear case and constituting the supporting medium for the can.

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