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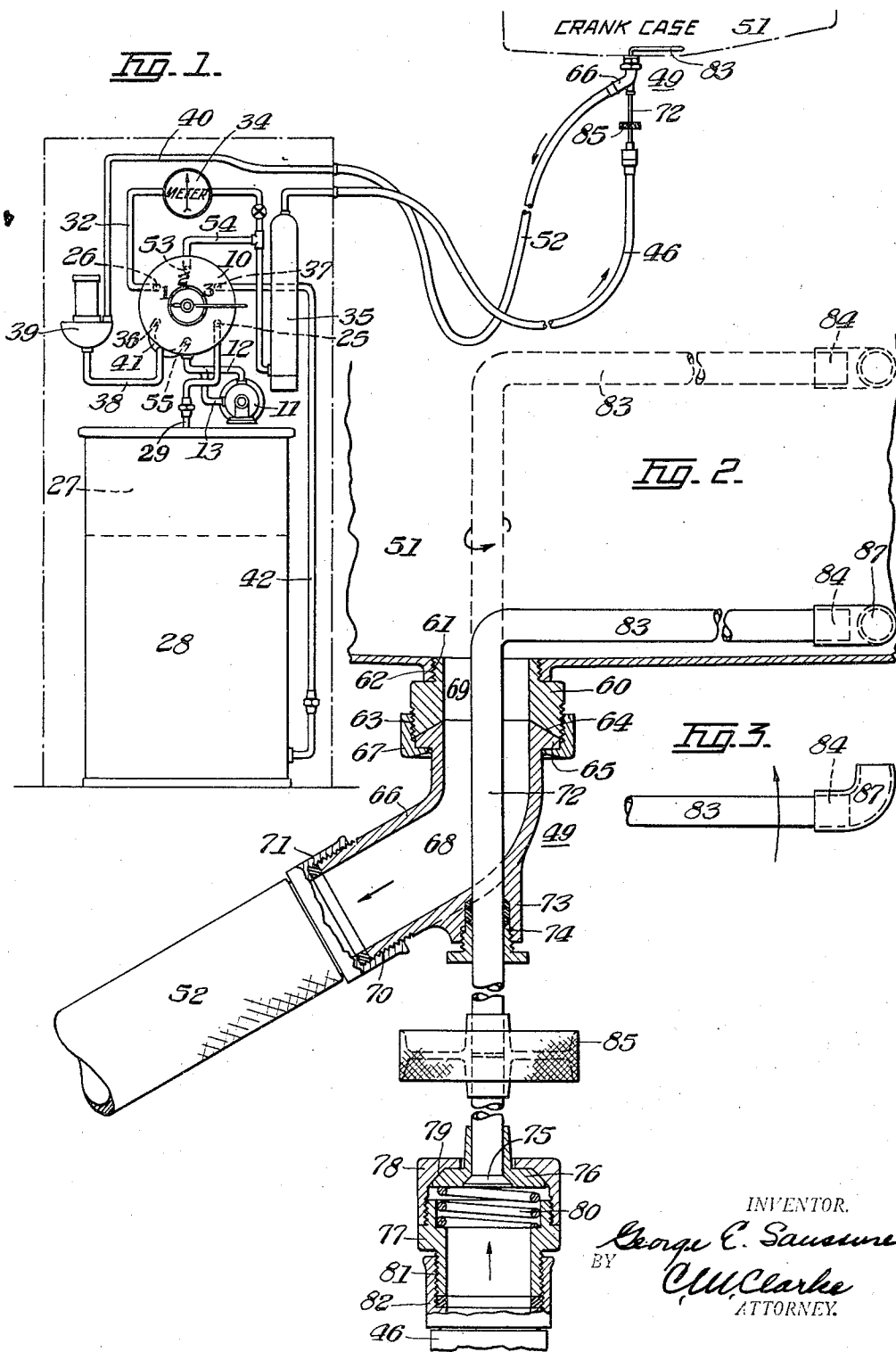
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2,240,227

APPARATUS FOR CLEANING LUBRICANT RECEPTACLES

Filed March 22, 1938

2 Sheets-Sheet 1



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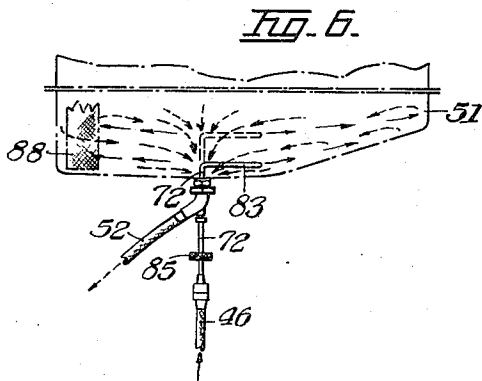
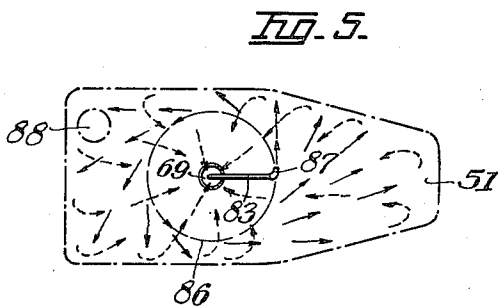
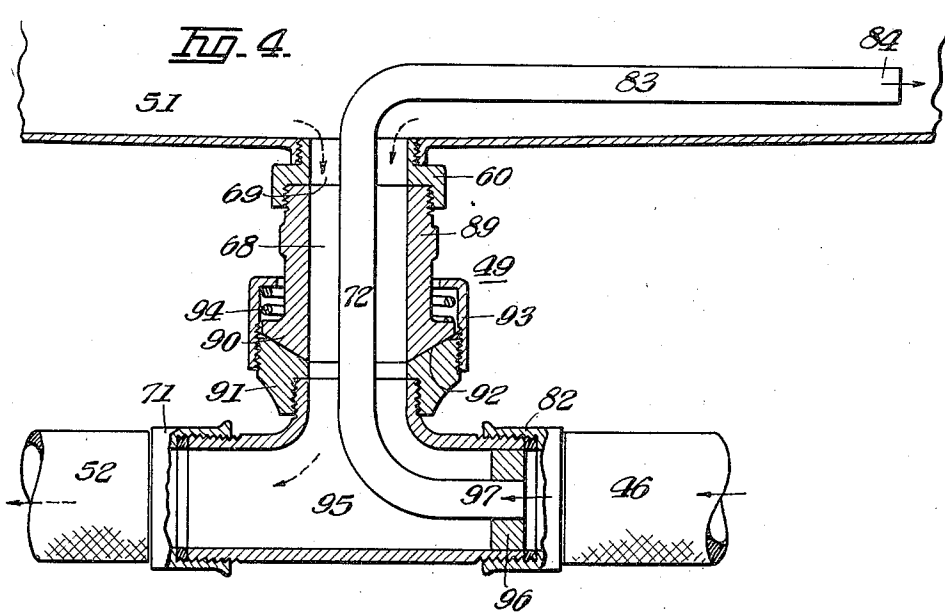
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APPARATUS FOR CLEANING LUBRICANT
RECEPTACLES

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Application March 22, 1938, Serial No. 197,430

9 Claims. (Cl. 184-1.5)

This invention relates to improvements in apparatus for cleaning lubricant receptacles and the like, and has particular relation to the art of cleansing or flushing the crank cases of internal combustion engines.

The general principle employed is that of supplying a cleansing or flushing fluid, such as oil, to the previously drained lubricant receptacle for the removal of waste and foreign matter therefrom.

My invention contemplates a directional application and distribution of the flushing fluid in relation to the receptacle being cleaned, whereby the sludge and foreign matter is positively dislodged and removed with complete uniformity.

A further aim is to provide a pressure application of fluid to the receptacle in combination with a suction withdrawal thereof, whereby the positive pressure flow does not inhibit the suction withdrawal, thus providing for complete removal of the fluid and its entrained dislodged matter.

In this connection, I prefer to utilize the usual drain opening in the receptacle for both introduction and withdrawal of the flushing fluid for simplicity and convenience, while at the same time accomplishing the features and advantages above stated.

Additional objects and advantages will become apparent from the following description taken in connection with the accompanying drawings, wherein:

Fig. 1 is an elevational view of an embodiment of my invention;

Fig. 2 is an enlarged vertical sectional view showing the adapter for introduction and withdrawal of the flushing fluid to and from a receptacle;

Fig. 3 is a fragmentary top plan view of the fluid nozzle of Fig. 2;

Fig. 4 is a view similar to Fig. 2, illustrating a modified form of the invention; and

Figs. 5 and 6 are diagrammatic longitudinal horizontal and vertical sections respectively of an engine crank case, illustrating the fluid circulation in the manner of my invention.

In the drawings, Fig. 1 illustrates a cleaning apparatus preferably utilized in practicing the present invention, which apparatus is covered in a separate application of even date Serial No. 197,428. It should be understood however, that the present invention is not to be limited thereto, as other means may be employed for supplying and motivating the fluid for circulation in the manner and for the purposes herein set forth.

Referring to the apparatus as illustrated,

designates a control device or valve having a series of pairs of ports and adjustment positions, the said valve or control device being of any suitable character or construction for selectively establishing fluid circulation with a pump 11 and any of the pairs of ports, through pressure and suction lines 12 and 13 between said device and pump. Such a valve or control device is illustrated in my separate application of even date, Serial No. 197,429.

25 and 26 designate one such pair of ports in the device 10, the former connecting the fluid supply or reservoir 27 of a filter unit 28 through conduit 29. Port 26 connects with a conduit 32 preferably having therein a meter 34, and a heater 35. A flexible service conduit or hose 46 connects the conduit 32 with an adapter 49 for connection with the lubricant receptacle or crank case 51.

Thus, in adjustment position #1 of the control device 10, with pump 11 in operation, flushing fluid is drawn from reservoir 27 and delivered to the adapter 49 through conduit 32, meter 34, heater 35 and hose 46, whereby the fluid may be introduced into the crank case as hereinafter set forth.

Upon the desired amount of fluid being delivered to the crank case 51, as determined by meter 34, the control device is adjusted to position #2, whereupon the pair of ports 53 and 55 are placed in communication with the pump 11. The port 55 is connected with a provided outlet in the adapter 49 through a flexible conduit 52, a conduit 40, a trap 39, a conduit 38 and a by-pass connection 41 at the control device, whereby the fluid delivered to the crank case may be withdrawn by the suction of the pump and returned to the crank case through ports 55 and 53, a conduit 54, heater 35 and flexible hose 46 as before.

In this manner, the selected body of fluid is recirculated through the crank case for flushing the walls thereof, and is attended by continuous trapping and removal of foreign matter flushed from the crank case, as by means of the trap 39.

The present invention has to do with the apparatus for direct application and withdrawal of the circulating flushing fluid to and from the crank case or other receptacle, and embodies features of construction and operation of the adapter 49.

Fig. 2 illustrates the preferred form of such adapter, including an apertured plug or fitting 60 having an externally threaded portion 61 of a proper size to fit the threads of the usual crank

case drain opening 62. It will be understood that a series of fittings 60 may be provided of proper sizes to fit the standard drain openings in the various engine crank cases in use.

All of said fittings 60 are preferably formed with uniform external threads 63 on a depending enlarged portion thereof, and each has a seat 64 for fitting engagement with the head 65 of an angular hollow body 66, the latter being secured by flanged nut 67 screw threaded on the threads 63.

Members 60 and 67 are preferably formed with external wrench or spanner faces for proper manipulation thereof for attachment and removal.

The hollow body 66 provides an outlet passage 68 aligned at its upper portion for communication with the crank case through passage 69 in fitting 60, and at its lower angular terminal is threaded at 70 for connection with the coupler 71 of return conduit 52.

Movably supported in the body 66 of the adapter, I provide a separate conduit 72 which extends vertically of the adapter and centrally of the vertical portion of passages 68 and 69.

A boss 73 is preferably formed in the lower wall of the body 66 and has a packing gland 74 for sealing the entrance of conduit 72 through said body wall.

Below the body 66, the lower terminal 75 of conduit 72 is flared and fixedly secured in a swivel head 76 as by brazing or the like, said swivel head being rotatably secured to the swivel sleeve body 77 by means of flanged nut 78, the latter having annular sealing engagement 79 with the head. 80 designates a spring between the head 76 and a provided shoulder on the body 77 for maintaining such sealing engagement while permitting rotation of the head 76 and its conduit 72 in relation to the body 77.

The lower end of the swivel body 77 is threaded at 81 to receive the coupler 82 of delivery conduit 46.

Conduit 72 extends upwardly into the crank case or receptacle 51 and has a laterally extending elongated arm 83, having its terminal end 84 disposed for fluid discharge in a plane extending substantially in the direction of the floor or bottom wall of the crank case.

It will be noted that the conduit or tube 72 is of reduced cross sectional area with respect to the delivery conduit 46 connected thereto, whereby the pressure of the fluid supplied by said line 46 is increased so as to provide a pressure jet upon the emission of fluid from terminal 84. Also, the mounting of conduit 72 in the adapter body 66 permits of vertical sliding adjustment of the conduit relatively to the body and the crank case, while at the same time permitting rotation of the said conduit as by a provided handle or wheel grip 85 secured to the conduit below the adapter body.

In operation, the flushing fluid is supplied through conduit 46, and enters the crank case or receptacle 51 under relatively high pressure through conduit 72. The conduit 72 may be rotated to move its arm 83 for directing the jet or stream of fluid from terminal 84 thereof laterally throughout the entire receptacle, as indicated by the annular path 86 in Fig. 5, and the full line arrows.

Terminal 84 of the rotatable arm 83 is preferably provided with an angular nozzle 87 for directing the discharging fluid in a lateral direction tangentially of the annular path of adjust-

ment thereof, whereby to more advantageously impinge the jet on and in behind and around the pump screen, diagrammatically indicated in its approximate location of 88 in Figs. 5 and 6.

The delivered fluid is thereby discharged laterally throughout the receptacle at all times from a point remote from the outlet opening 69 in said adapter, whereby the fluid is agitated and swirled about the drain. Since said drain and its return line 52 are connected with the suction side of the pump 11, the fluid and the loosened foreign matter entrained therewith are centrally drawn down through passage 69—68, as indicated by the dotted arrows, and returned through trap 39 to the pump.

Due to the remote location of the pressure discharge with respect to the outlet, the positive suction through the outlet passage is not inhibited and is completely effective to remove the foreign matter which is maintained in motion and suspension in the fluid. In effect, the incoming pressure discharge produces a vortex having a positive suction applied downwardly and centrally therein, for positive removal of the contents of the receptacle.

The downward suction induces an undercurrent inwardly along the bottom wall of the receptacle toward the drain, which positively draws all foreign matter which has become loosened to the outlet for removal thereof.

As indicated in Fig. 6, the conduit 72 and its arm 83 may be vertically adjusted for direct impingement of the pressure jet over the side walls of the crank case while maintaining the rotating adjustment as before.

The herein described process is preferably carried on while the engine is inoperative, and hence the pump screen 88 may be washed clean, there being no possibility of foreign matter being drawn to and held against said screen, as is the case when cleaning is attempted while the engine is running.

The length of the conduit 72 and its arm 83 may be properly designed for adaptation to the many standard engine crank case designs, and may be properly proportioned for ready insertion and removal, as well as for manipulation thereof in the crank cases in the manner herein set forth.

Fig. 4 illustrates a modified form of my invention embodying the rotatable feature of conduit 72, but without the vertical sliding adjustment thereof. In this form of the adapter 49, the fitting 60 connects an apertured sleeve 89, forming passages 68—69 as before. Said sleeve has a lower supporting head 90 fitting into an apertured swivel member 91 as at 92, and is held in rotatable connection therewith by flanged nut 93 and intervening spring 94.

Swivel member 91 supports a hollow T-fitting 95 by the center portion thereof, one lateral portion whereof is connected with the conduit 52 by coupler 71, and the other lateral portion being connected with conduit 46 by coupler 82. Said latter portion has a closure 96 for centrally supporting an end 97 of the conduit 72, which conduit in this form of the invention, does not extend below the adapter.

In operation, the form of Fig. 4 functions for rotatably distributing the pressure delivery of fluid by rotation of the member 95 on swivel joint 92 in either direction, the suction return to conduit 52 being through central passage

69—68 and member 95 in the same manner as before described.

Following the cleaning or flushing step herein described, the control device 10 may be adjusted to position #3, whereby the contents of the receptacle 51 may be withdrawn through passage 69—68 of adapter 49, conduit 52, conduit 40, trap 39, conduit 38, by-pass 41, port 36, through the control device and pump and back to the control device, from whence the fluid is delivered from port 37 through conduit 42 to the filter 28.

Obviously, other means of providing the pressure delivery and suction withdrawal conduits and the pump may be employed in connection with my apparatus without departing from the spirit and scope of the invention.

What I claim is:

1. An adapter for connection with the drain opening of a lubricant receptacle, said adapter having fluid inlet means and fluid outlet means, one of said means being insertable through said drain opening and being rotatably adjustable about and in concentric spaced relation to the other.

2. An adapter for connection with the drain opening of a lubricant receptacle, said adapter having fluid inlet means and fluid outlet means, said fluid inlet means being insertable through said drain opening and being rotatably adjustable about and in concentric spaced relation to said outlet means.

3. An adapter for connection with the drain opening of a lubricant receptacle, said adapter having a fluid outlet, fluid inlet means insertable through said drain opening and disposed for delivery of fluid in laterally spaced relation to the outlet, said means being rotatably adjustable about and concentric with the outlet.

4. An adapter for connection with the drain opening of a lubricant receptacle, said adapter having a fluid outlet, a rotatable inlet conduit insertable through said drain opening and having a terminal nozzle which upon such insertion is laterally spaced from the outlet for tangential fluid delivery upon rotation of said conduit and nozzle with respect to said drain opening.

5. An adapter for connection with the drain opening of a lubricant receptacle, said adapter having a fluid outlet, rotatable inlet means insertable through said drain opening for emitting fluid in laterally spaced concentric relation to the outlet, said inlet means being movable for adjustment of the plane of emission therefrom

while maintaining its concentric rotatable relation to said outlet.

6. An adapter of the character described for connection with the drain opening of a lubricant receptacle or the like, said adapter including a body having an outlet passage for communication with the interior of the receptacle, an inlet conduit supported by said body and adapted to be entered in the receptacle through the drain opening thereof, the conduit having a terminal end laterally spaced from the outlet within the receptacle, and means for rotatably adjusting said conduit to move its terminal in a fixed path about said drain opening.

7. An adapter of the character described for connection with the drain opening of a lubricant receptacle or the like, said adapter including a body having an outlet passage for communication with the interior of the receptacle, an inlet conduit rotatably mounted in the body, said conduit having an extension adapted to be entered in the receptacle through the drain opening thereof and having a terminal end rotatable with the conduit in spaced relation about the outlet.

8. An adapter of the character described for connection with the drain opening of a lubricant receptacle or the like, said adapter including a body having an outlet passage for communication with the interior of the receptacle, an inlet conduit rotatably mounted in the body, said conduit having an extension adapted to be entered in the receptacle through the drain opening thereof and having a terminal end rotatable with the conduit in spaced relation about the outlet, said conduit being adjustable to vary the plane of rotation of the terminal end thereof.

9. The combination with a lubricant receptacle having a drain opening, of an adapter for connection with said opening, said adapter having an outlet passage communicating with the interior of the receptacle, an inlet conduit extending through the drain opening into the receptacle, means for circulating fluid through the adapter and receptacle providing a pressure delivery of fluid through the inlet conduit and a suction withdrawal of fluid from the outlet, said inlet conduit being rotatably journaled for rotation relative to the adapter for emitting the delivered fluid in spaced relation to the outlet without interference with the suction withdrawal through said outlet.

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