

Sept. 25, 1945.

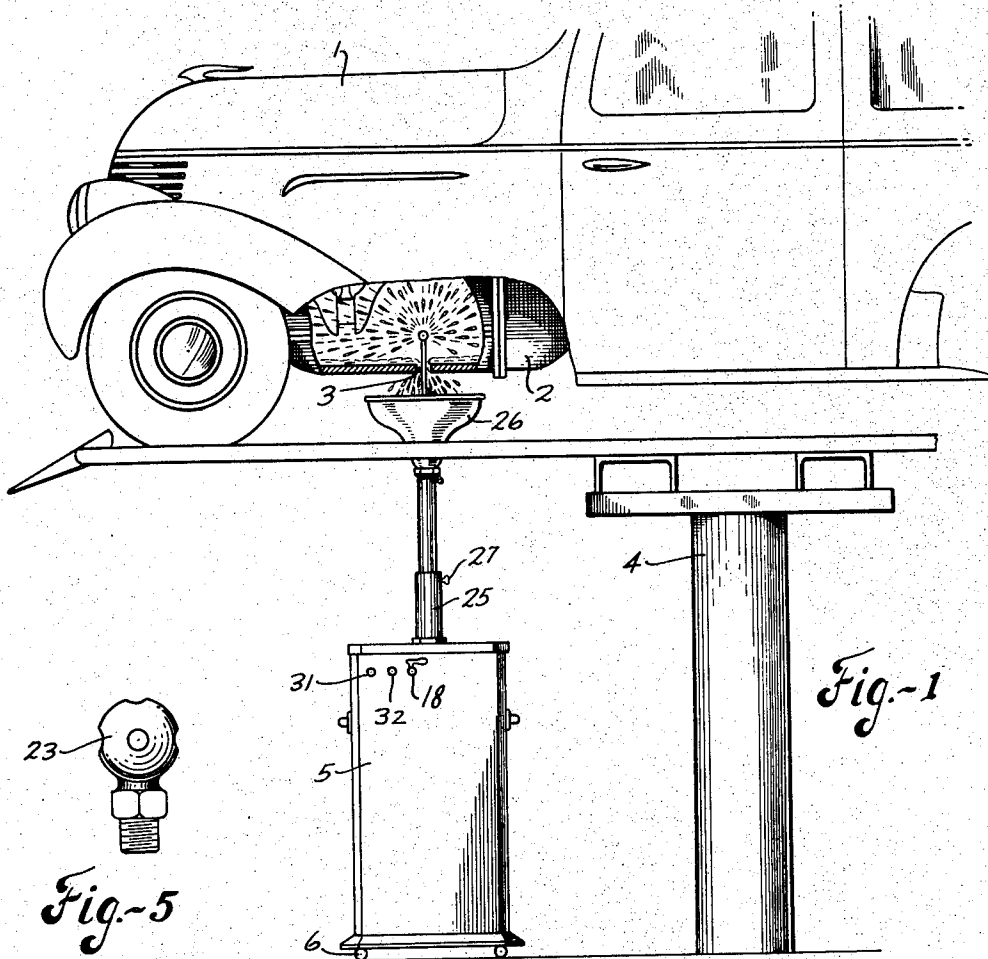
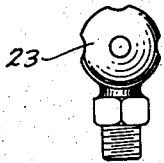
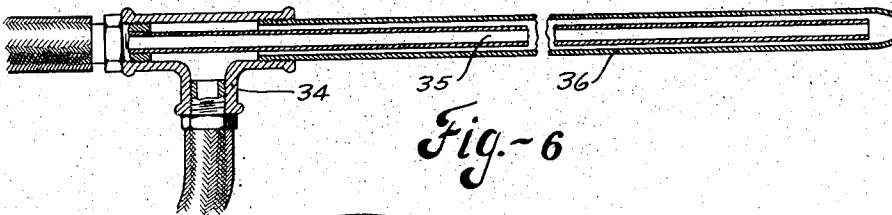
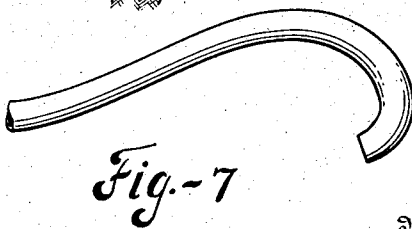
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2,385,393

CRANK CASE FLUSHER

Filed March 13, 1941

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

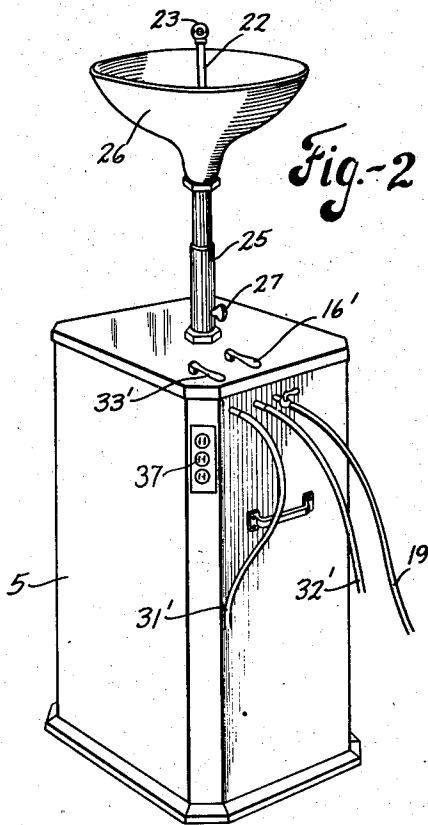


Fig.-2

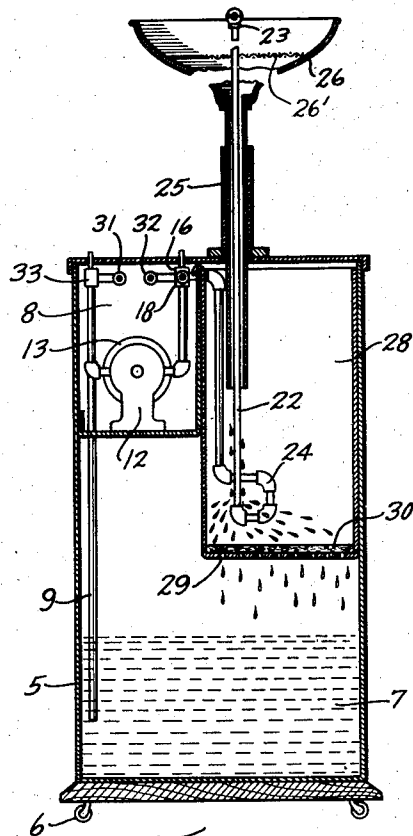


Fig.-3

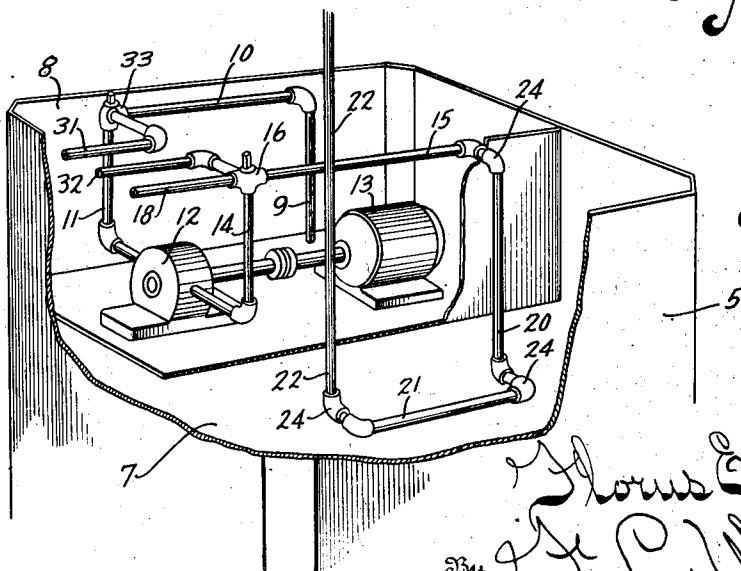


Fig.-4

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UNITED STATES PATENT OFFICE

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CRANKCASE FLUSHER

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3 Claims. (Cl. 184—1.5)

This invention pertains to apparatus for and method of automobile crank and gear case servicing, and more particularly to a power washing and flushing apparatus, wherein cleansing fluid is discharged into an engine crank case or the like under pressure and in a more or less volatilized condition.

It is found in practice although flowing kerosene, light oil, or other cleansing fluid into and out of the crank case does remove accumulated sludge and residue of oil therefrom, it does not reach the vital parts of the engine and fails to dislodge adherent particles of grit, gum and foreign material. To overcome the difficulty and enable thorough cleansing of remote surfaces and crevices, the present apparatus is adapted to discharge the cleansing fluid thoroughly intermixed with air under relatively high pressure, whereby a considerable portion of the cleansing material is forcibly discharged inside the crank case cavity in a fine mist or as a vapor. Such mist or vapor being driven under pressure into the minute recesses of the engine loosens the adherent matter which is then washed from the chamber by the more liquid portions of the discharged cleansing fluid.

By the present apparatus and method of operation the cleansing fluid drawn from a supply reservoir is discharged into a crank case or differential housing under high pressure while intermixed with a relatively large quantity of air also under pressure, and the spent cleansing fluid is drained back to the supply reservoir through a suitable filter, by which the fluid is reconditioned for further use. The fluid is discharged through an extendible and retractible discharge conduit positioned coincident with a return drain passage, whereby the unit, which is portable, may be conveniently positioned beneath an automobile for the simultaneous discharge and return of the cleansing fluid through a single opening in the crank case or differential housing.

The object of the invention is to simplify the construction, as well as the means and mode of operation of automobile servicing units, whereby they may not only be economically constructed and conveniently operated, but will be more efficient in use, automatic in operation, uniform in action, having relatively few operating parts, and unlikely to get out of repair.

A further object of the invention is to provide a portable cleansing and flushing assembly which will be compact in form and easily moved from place to place.

A further object of the invention is to provide

an improved mode of operation of automobile servicing units by entraining a high pressure air supply with a high pressure supply of cleansing fluid, and causing a considerable portion of the cleansing fluid to be forcibly discharged in a partially volatilized or finely sub-divided mist or vapor.

A further object of the invention is to enable flushing and cleansing of remote surfaces and otherwise inaccessible crevices and recesses of the engine structure which may be beyond range of the usual direct stream of liquid cleanser.

A further object of the invention is to provide an automobile servicing unit which possesses the advantageous structural features and inherent meritorious characteristics of the present unit cooperating in the manner and mode of operation herein mentioned.

With the above primary and other incidental objects in view as will more fully appear in the specification, the invention intended to be protected by Letters Patent consists of the features of construction, the parts and combinations thereof, and the mode of operation, or their equivalents, as hereinafter described or illustrated in the accompanying drawings.

In the drawings, wherein is illustrated the preferred but not necessarily the only form of embodiment of the invention,

Fig. 1 is a side elevation of a portion of a motor vehicle and a hoist apparatus upon which the vehicle is supported, in relation with which an automobile servicing unit embodying the present invention is operatively positioned.

Fig. 2 is a perspective view of an assembled servicing unit incorporating the present invention.

Fig. 3 is a vertical sectional view thereof.

Fig. 4 is a perspective view of a portion of the unit with the cabinet broken away to display the power pumping and conduit assembly.

Figs. 5, 6 and 7 are detail views of interchangeable discharge nozzles of different shapes.

Like parts are indicated by similar characters of reference throughout the several views.

It is generally recognized that much grit and road dust is drawn into automobile motors through the air intake to the carburetor or fuel supply system and through the breather vent or oil filler opening, notwithstanding various forms of air filters in common use. Furthermore, much fine metallic grit accumulates from the wearing in of bearing surfaces, especially in new cars. Also, adherent gummy substance accumulates in the casings. Much of such foreign material col-

lects in remote crevices and pockets, which are inaccessible or out of range under ordinary flushing and cleansing methods.

By the present method of operation, wherein cleansing fluid and air, both under relatively high pressure, are simultaneously discharged in an intermixed or entrained condition, the fluid enters the crank case or housing in the form of a dense white fog or mist, which penetrates in all directions into remote recesses which are out of range of a discharged stream of cleanser. By condensing upon such otherwise inaccessible surfaces, such areas are washed and cleaned much more thoroughly than can be accomplished by discharging a solid stream of cleansing fluid into the chamber.

Referring to the drawings, 1 indicates a portion of an automobile, of which 2 is the crank case of the motor partly broken away. The crank case has in its bottom the customary drain outlet 3. The vehicle is shown in elevated position upon a conventional hoist or lift rack 4, which enables convenient access to the under portion of the vehicle. The present servicing unit is adapted to be positioned beneath the elevated vehicle, and is enclosed in a cabinet 5 mounted on casters 6, except the discharge outlet and collector which project from the top of the cabinet.

The lower portion of the cabinet 5 forms a supply reservoir 7 for cleansing fluid. The power pump and associated conduits are contained in a compartment 8 in the upper portion of the cabinet. Extending upwardly from the supply reservoir 7 within the cabinet is a suction pipe 9 connected through a horizontal pipe 10 and down pipe 11 (see Fig. 4) with the intake side of a rotary pump 12. The pump 12 is driven by an electric motor 13. It discharges upwardly through the pipe 14, which communicates with a horizontal pipe 15, through a multi-way valve 16. Also communicating with the discharge pipe 15 through the valve 16 is an air supply pipe 18 connected by a flexible hose 19 outside the cabinet, with an external source of air under pressure. In the usual automobile service station, this air supply is the same source of air under pressure which is used for tire inflation purpose and for operating the hoist in the event the latter is of the pneumatic type. If such air supply is not of sufficient pressure, a separate high pressure air source may be provided or a booster air pump may be installed to increase the air pressure to the present unit. The air supplied under pressure through the conduit 19 and pipe 18 is intermixed with the cleansing fluid supplied under pressure from the pump 12 through the pipe 14, and become entrained with each other as they pass through the pipe 15. The pipe 15 for passage of the intermixture of air and cleansing fluid under pressure is connected through flexibly joined pipe sections 20 and 21 with an upstanding discharge pipe 22, to the upper end of which is attached a suitable nozzle 23. By means of a series of flexible joints 24, connecting the pipe sections 20 and 21 with the supply pipe 15 and the discharge pipe 22, the latter is capable of vertical adjustment through a considerable range of aligned movement by which it may be thrust into and withdrawn from the drain opening 3 in the bottom of a motor crank case beneath which the unit is positioned.

The upright discharge pipe extends through a telescopic tubular drain standard 25 projecting from the top of the unit 5 and carrying at its top a bowl shaped drain receptacle or funnel 26 surrounding the discharge pipe and above which

the latter projects. The telescopic sections of the drain standard 25 are engageable in adjusted relation by a thumb screw 27. The lower end of the telescopic drain standard 25 communicates with a filter box 28 suspended in the top of the cabinet beside the pumping unit compartment. The bottom of the filter box 28 is perforated at 29 and within the compartment 28 are a number of layers of felt 30 or a bed of granular filter material through which the returning cleansing fluid percolates into the supply compartment.

When in use, the unit is positioned beneath an elevated motor vehicle as illustrated in Fig. 1 and the drain standard is adjusted so that the receptacle 26 at its top is adjacent the under side of the crank case and immediately beneath the drain outlet 3. The upright discharge pipe 22 is pulled upwardly, which adjustment is enabled by flexing of the joints 24, until the nozzle carried thereby is thrust through the drain outlet 3 into the interior of the crank case 2. By operation of the motor driven pump the cleansing fluid and entrained air under pressure is forcibly discharged into the crank case. As before mentioned, a considerable portion of the cleansing fluid will be vaporized and will circulate within the crank casing as a mist or fog, which penetrates crevices and recesses and loosens and displaces foreign matter, while the remainder of the liquid discharged in a more or less solid stream washes the sides and bottom of the crank casing to remove the debris, sediment and sludge. The condensate and surplus cleaning fluid in liquid form drains out of the casing through the opening 3 around the discharge pipe 22 into the receptacle 26 and thence into the filter compartment 28. All fine material and sludge collects on the filter bed 30 while the reconditioned fluid percolates through the filter bed into the supply compartment 7 for re-use.

In order that the present servicing unit may optionally be used other than for flushing crank cases, as for example, emptying, flushing and subsequently refilling differential and transmission housings, branch suction and discharge conduits 31 and 32 are connected with the pump intake and discharge conduits 11 and 14 through the multi-way valves 33 and 16. These branch conduits project through the side of the cabinet 5 and are connected with corresponding flexible hose continuations 31' and 32'. When it is desired to empty a differential housing of spent lubricant, the conduit 31' is introduced into the housing, and the multi-way valves are adjusted to connect the branch suction conduit 31 with the pump intake 11 and disconnect the pipe 10, and to correspondingly connect the branch discharge conduit 32 with the pump outlet 14 and simultaneously disconnect the pipe 15. The operation of the pump 12 will then withdraw the grease from the differential housing through the conduits 31', 31 and 11 to the pump which will discharge it into any convenient receptacle through the conduits 14, 32 and 32'. When the differential housing has been emptied and it is desired to flush and cleanse it, the valve 33 is adjusted to again connect the suction side of the pump 12 through the pipes 11, 10 and 9 with the supply reservoir 7 of cleansing fluid. The spent cleansing fluid will be drained into the receptacle 26 and returned to the filter compartment. In lieu thereof, the discharge pipe 22 or a hose connected therewith may be introduced into the differential or transmission housing, in which event the valve 16 is adjusted to shut off the branch conduit 32

and connect the outlet 14 with the pipe 15 as before described. When it is desired to refill the thoroughly cleaned differential and transmission housings with fresh lubricant, the valves 16 and 33 are again adjusted to connect the branch conduit 31—31' with the suction side of the pump and the branch conduit 32—32' with its discharge side. The auxiliary conduit 31' is then inserted in a lubricant supply receptacle and the conduit 32' is introduced into the housing. Fresh lubricant is thus pumped directly from the lubricant supply into the housing. The valves 16 and 33 are adjustable from the exterior of the cabinet by means of the handles 16' and 33'. Various shapes and sizes of nozzles may be employed upon the respective conduits 22, 31', and 32'. In lieu of supplying air under pressure through the conduit 18 for intermixture with the cleansing fluid, a mixer nozzle 34 may be provided upon the upright discharge conduit 22 or on a hose connected therewith, having axially disposed therein a shorter nozzle 35 of smaller diameter connected laterally with a supply conduit 36 of air under pressure. In such arrangement the cleansing fluid and the air both under pressure would be simultaneously discharged and intermixed with each other in the nozzle. The relation of cleansing fluid and air discharge may be reversed and the former discharged through the inner nozzle and the latter in concentric relation thereabout through the larger nozzle tube.

While grit, finer particles of foreign matter and sludge are removed from the returned cleansing fluid and collected by the filter 30, larger bits of metal, stones, hard carbon and the like are intercepted by a screen diaphragm 26' within the collecting bowl 26 from which they are easily removed. For supplying current to the actuating motor 12, a plurality of socket connections 37 for conventional electrical terminal plugs are provided in the cabinet. These sockets are connected in multiple with the motor and with each other, whereby an electrical supply cable plugged into either of the sockets 37 will supply current to the motor and will also supply current to a portable lamp, blower, air compressor, or other auxiliary electrical apparatus, the supply cable of which may be connected into either of the other sockets 37.

From the above description it will be apparent that there is thus provided a device of the character described possessing the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportions, detail construction and arrangement of parts without departing from the principle involved or sacrificing any of its advantages.

While in order to comply with the statute, the invention has been described in language more or less specific as to structural features, it is to be understood that the invention is not limited to the specific features shown, but that the means and construction herein disclosed comprise the preferred form of several modes of putting the invention into effect, and the invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the appended claims.

Having thus described my invention, I claim:

1. In a servicing system for an automobile or the like, a power driven pump, an actuating motor therefor, suction and discharge conduits leading to and from the power pump, including

branch intake and branch discharge conduits to which the power pump is common, and adjustable valves controlling the interconnection of various branch conduits with the suction and discharge conduits communicating with the pump, including a suction branch conduit connectable with a mechanism chamber of an automobile for exhausting spent lubricant therefrom and discharging the exhausted lubricant through a branch discharge conduit to waste, a suction branch conduit communicating upon corresponding adjustment of the valves with a source of supply of cleansing fluid from which cleansing fluid is drawn for discharge by the power pump through a branch discharge conduit other than that before mentioned into the mechanism chamber from which the lubricant was before exhausted, and an air supply conduit communicating with the last mentioned branch discharge conduit for intermixing air under pressure with the cleansing fluid passing therethrough for discharge in an atomized condition into the mechanism chamber of the automobile to be cleaned, the adjustment of said valves enabling the first mentioned suction branch conduit and discharge branch conduit to be again interconnected for delivering fresh lubricant from a source of supply thereof into the mechanism chamber from which the spent lubricant was before exhausted through the same branch conduits, and into which the aerated cleansing fluid has previously been discharged through the other said valve interconnected branch conduits, said reinterconnection of the first mentioned suction and discharge branch conduits by adjustment of said valves for purpose of supplying fresh lubricant to the mechanism chamber being also preparatory to removal of spent lubricant from a succeeding mechanism chamber of an automobile.

2. An automobile servicing system, including a cleansing fluid storage compartment, a motor driven pump, a branched intake conduit leading to said pump, one branch of which communicates with the storage compartment, and the other branch of which is optionally connectable with a lubricant receiving compartment of an automobile or with a lubricant supply receptacle, a control valve interposed in said branched intake conduit for optionally connecting the pump with the storage compartment through the first of said branches, or with the lubricant receiving compartment of the automobile or the lubricant supply receptacle through the second of said branches, a branched outlet conduit leading from said pump, one branch of which discharges into the lubricant receiving compartment of the automobile to be cleansed, and the other branch of which is disposed so as to optionally discharge into the lubricant receiving compartment of an automobile or exteriorly of the latter as desired, a conduit connected to the first named branch of the outlet conduit for conducting air under pressure thereto so as to intermingle with and assist in the forcible discharge of the cleansing fluid flowing from the pump into the automobile lubricant compartment to be cleansed, and a control valve interposed in said branched outlet conduit for optionally directing the flow of cleansing fluid and air to the automobile lubricant compartment through the first-named branch of the outlet conduit or the flow of lubricant from the automobile compartment to the exterior of the latter.

3. An automobile servicing system, including a cleansing fluid storage compartment, a motor

driven pump, a branched intake conduit leading to said pump, one branch of which communicates with the storage compartment, and the other branch of which is optionally connectable with a lubricant receiving compartment of an automobile or with a lubricant supply receptacle, a control valve interposed in said branched intake conduit for optionally connecting the pump with the storage compartment through the first of said branches, or with the lubricant receiving compartment of the automobile or the lubricant supply receptacle through the second of said branches, a branched outlet conduit leading from said pump, one branch of which discharges into

the lubricant receiving compartment of the automobile to be cleansed, and the other branch of which is disposed so as to optionally discharge into the lubricant receiving compartment of an automobile or exteriorly of the latter as desired, and a control valve interposed in said branched outlet conduit for optionally directing the flow of cleansing fluid to the automobile lubricant compartment through the first-named branch of the outlet conduit or the flow of lubricant from the automobile compartment to the exterior of the latter.

FLORUS E. WILSON.