

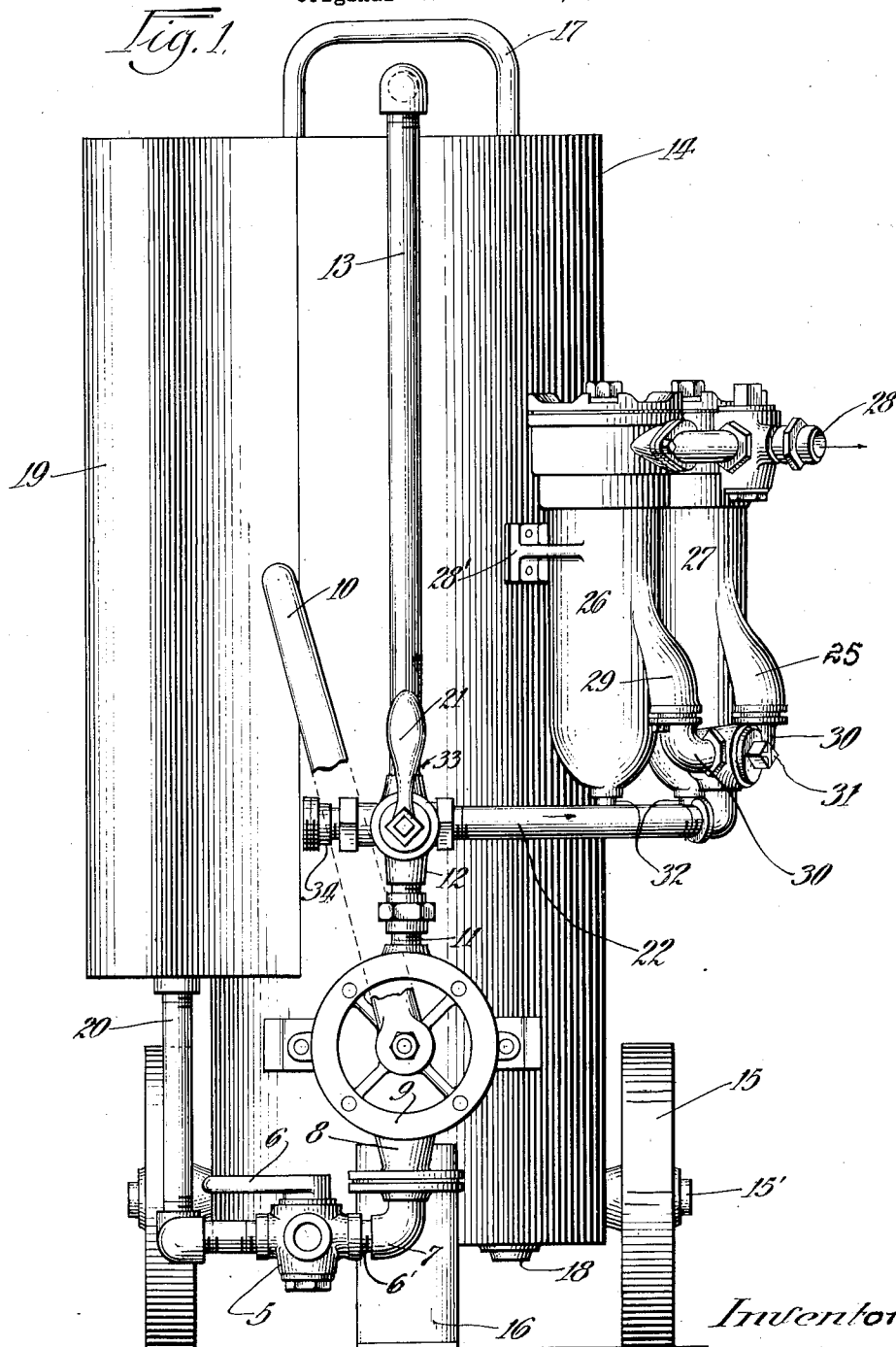
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W. L. OSBORNE

APPARATUS FOR CLEANING LUBRICANT CASES OF ENGINES

Original Filed Feb. 21, 1927 3 Sheets-Sheet 1



Witness:  
*Stephen V. Pebara*

Inventor:  
*William L. Osborne.*  
By *Frank L. Belknap*  
Att'y:

Feb. 19, 1929.

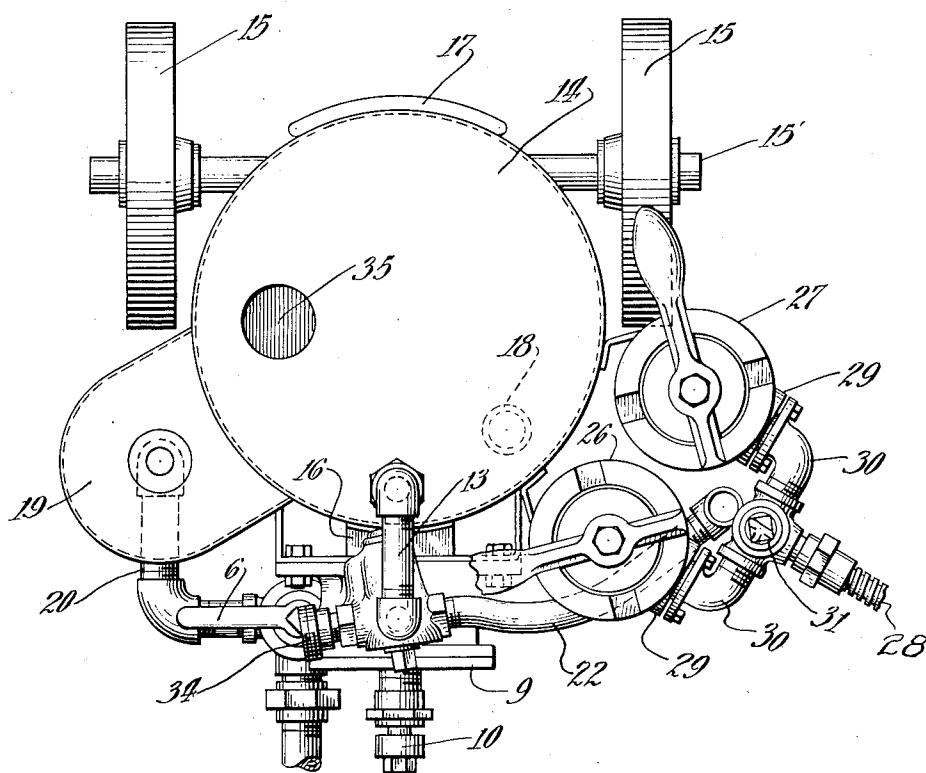
W. L. OSBORNE

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*Fig. 2.*



Witness:  
*Stephen F. Pebara*

Inventor:  
*William L. Osborne,*  
By *Frank L. Belknap*  
*Att'y.*

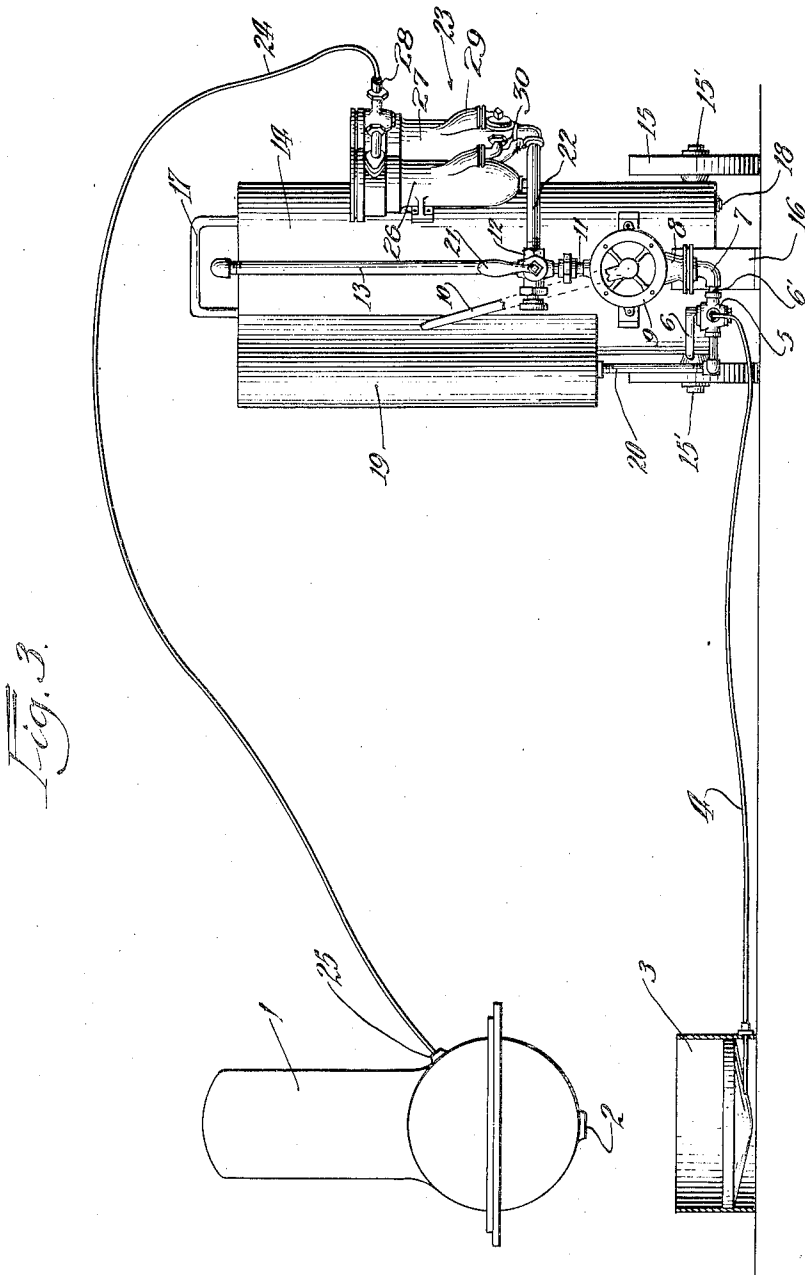
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W. L. OSBORNE

APPARATUS FOR CLEANING LUBRICANT CASES OF ENGINES

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Witness:  
*Stephen F. Reborn*

Inventor:  
*William L. Osborne,*  
By *Frank L. Belknap*  
*Att'y.*

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# UNITED STATES PATENT OFFICE.

WILLIAM L. OSBORNE, OF LOS ANGELES, CALIFORNIA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO OSBORNE PROCESS, INC., OF LOS ANGELES, CALIFORNIA, A CORPORATION OF CALIFORNIA.

## APPARATUS FOR CLEANING LUBRICANT CASES OF ENGINES.

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This invention relates to improvements in a portable device for cleaning lubricant cases of engines, and is more particularly adapted to the cleaning of transmission and differential housings of motor vehicles, such as automobiles, motor trucks, and the like. However, the invention is also adapted for use in cleaning lubricant cases of engines generally, as for example, motors on trolley cars, Diesel engines, boats, airplane engines, and the like.

The objects and advantages of the invention will hereinafter more clearly appear from the following description, but broadly speaking, the purpose is to provide a portable device to effectively and easily clean the case containing the lubricant together with the mechanism enclosed in such case. To this end the invention is carried out, first, by preferably draining off the dirty oil or used lubricant and then forcibly circulating flushing oil through the case and around the mechanism contained therein.

The device is not only relatively compact and simple to manufacture, being devoid of any mechanism or parts liable to get out of order, but is especially characterized by the facility by which it can be brought into communication with or detached from the crank case of the automobile or other part that is to be speedily cleaned.

As a feature of the present invention, the device comprises generally a storage receptacle, a pump, connections to and from the pump and the storage receptacle, an auxiliary storage tank for flushing oil, and filtering means interposed in one of the connections from the pump for filtering the flushing oil before it is returned to the lubricant containing case.

As another feature of the present invention, the filter means may take the form of a plurality of interconnected individual filters which may be hooked up either in multiple or may be used individually.

In the drawings, Fig. 1 is a diagrammatic elevational view, and

Fig. 2 is a top plan view of the device of the present invention.

Fig. 3 is a diagrammatic view illustrating the connections between the device of the present invention and a lubricant containing case.

Referring more in detail to the drawings,

and more particularly to Fig. 3, 1 designates a lubricant containing case to be cleaned. The dirty oil or used lubricant is withdrawn through the drain outlet 2 of the case 1 collecting in the pan 3 if desired. It is to be understood that if found desirable, the dirty oil or used lubricant instead of being collected in the pan 3 may be drawn off by gravity into suitable storage or may be collected in any other suitable receptacle and disposed of.

Or, the dirty oil collecting in pan 3 may pass through the line 4 which may take the form of a length of flexible tubing detachably connected to the 4-way fitting 5, which is controlled by valve 6. From one opening in the 4-way fitting 5 the oil may pass through the conduit 6', elbow 7, chamber 8 into the pump diagrammatically illustrated at 9. This pump may be hand operated by means of the handle 10 if desired, it being understood, of course, that the pump may be motor driven or mechanically operated if found more desirable. From the pump 9 the oil passes through pipe 11 into the 4-way fitting 12 communicating at one side with the line 13, which latter line communicates directly with a main storage receptacle 14. This storage receptacle 14 may take the form of a metal drum, having a capacity of, say 15 to 25 gallons, more or less, mounted on wheels 15 and axle 15', provided with a base support 16, and handle 17. A drain outlet 18 may be provided at the base of the drum 14.

It is obvious that the operation of handle 10 attached to pump 9 will create the necessary suction for withdrawing the used oil from the pan 3 through line 4 and will introduce it into the main storage receptacle 14 through the pipe 13.

After the oil has been drained out of the crank case, and as a feature of the invention, the flushing oil, which may comprise a charge of say from 1½ to 2½ gallons, more or less, may be held in reserve in the auxiliary storage tank 19, draining through the transfer pipe 20 into the 4-way fitting 5, the valve 6 having been properly manipulated to open this line 20 to communication with the pump. Through the suction induced by the pump the flushing oil will be withdrawn from auxiliary storage receptacle 19, and by the manipulation of valve 21 to close line 13 and open line 22 will be forced through the filtering means,

designated as a whole at 23. From the filtering means the filtered flushing oil may pass through the flexible hose communication 24, which may have detachable communication with the filter, to an inlet 25 of the lubricant containing case 1. It will thus be seen that a cyclic circulatory system is provided, whereby a continuous cyclic circulation of the flushing liquid takes place. The flushing liquid passes through the lubricant containing case 1 to and from the pump 9 through the lines 4 and 24, respectively, being stripped of impurities and entrained foreign particles, such as sand, grease, carbon, metal filings, and the like, by being forced to pass through the filtering means 23. It will thus be apparent that by the device of the present invention a minimum quantity, say 1 to 2 gallons, more or less, of flushing oil is continuously circulated through the lubricant containing case until the case is cleaned, thus effectively accomplishing the same purpose as if a much greater quantity of flushing liquid were used and merely subjected to agitation in the lubricant containing case, as is the present practice. The auxiliary storage tank 19 is a convenient receptacle in which a charge of flushing liquid may be contained. It is obvious, of course, that flushing liquid may be fed directly into the opening 25 in the lubricant containing case 1.

The device of the present invention is adapted to be utilized not only in the flushing of cases containing liquid lubricant, but also is particularly designed for flushing cases lubricated with a heavy or semi-heavy lubricant, such as a transmission or differential case lubricated with grease. In the use of the device, it has been found preferable to provide a separate filter for the flushing liquid being passed through the crank case and a separate filter for the flushing liquid passing through the transmission or differential housing, since the latter two cases are likely to be much dirtier than the crank case. To permit the device to have universal use, therefore, I provide two or more filters, designated 26 and 27, mounted on the wall of the main storage receptacle 14 by means of brackets 28. Each of these filters has an inlet connection along its side, illustrated at 29, with branches 30 communicating with the pipe 22, in which is interposed a valve 31, the liquid to be filtered passing upwardly in each case through the filter and out through the outlet 28. The arrangement is such that the filters may be connected and used separately, as described, or they may be connected in multiple to be used in series for certain uses. The precipitated filter-sludge collects in a quiescent body at the base of each filter to be withdrawn through either or both of the outlets 32.

A 4-way valve 33 mounted in the 4-way fitting 12 controls the passage of liquid to the

filters, to the main storage tank 14 or through the line 34 to any other suitable outlet. For instance, initially, it may not be desirable to filter the flushing liquid when cleaning lubricant containing cases which are overly dirty, for instance, transmission or differential housings which are clogged with grease. In this event the 4-way valve 33 is manipulated to divert the flushing liquid directly into the main storage receptacle 14, or the return line 24 may be detachably connected to the line 34 and the valve 33 manipulated to divert the flushing liquid therethrough.

After the flushing liquid has been circulated through the lubricant containing case for a period of time sufficient to clean the same, the valve 33 is manipulated to shut off lines 33 and 34 and the dirty flushing liquid is diverted through line 13 into the main storage tank 14. When it is desired to drain the main storage receptacle 14, the plug closing the outlet 18 may be removed and the contents drained into any suitable receptacle, or the line 4 may be disconnected from the pump 3 and dropped into the top of the main storage receptacle through the hole 35. The valves 6 and 33 are then so manipulated that upon the operation of the pump, the contents of the main storage receptacle 14 will be drawn through the conduit 4 through the pump and out through the pipe 34 to the point of disposal.

The device is characterized by being universal in use, simple in operation, and effective in accomplishing its purposes.

I claim as my invention:

1. In a portable filling station accessory for cleaning lubricant cases of engines, the combination with a storage receptacle, filter means, a connection for conducting the filtered flushing liquid from the device to the lubricant case, said filter means comprising a plurality of filters adapted through a valved control to be used individually or in multiple, means for forwarding used oil withdrawn from the lubricant case to said storage receptacle, and means for cutting off said forwarding means from said receptacle and connecting said means to the filtering means, said forwarding means being operable to maintain a cyclic circulation of a flushing liquid through the lubricant case, through the filter means and said connection back to the lubricant case, the cyclic cleansing circulation of the flushing liquid being maintained isolated from the used oil in the storage receptacle.

2. In a portable filling station accessory for cleaning lubricant cases of engines, the combination with a storage receptacle, filter means, a connection for conducting the filtered flushing liquid from the device to the lubricant case, said filter means comprising a plurality of filters adapted through a valved control to be used individually or in multiple, means for forwarding used oil withdrawn

from the lubricant case to said storage receptacle, and means for cutting off said forwarding means from said receptacle and connecting said means to the filtering means, said forwarding means being operable to maintain a cyclic circulation of a flushing liquid through the lubricant case, through the filter means and said connection back to the lubricant case, the cyclic cleansing circulation of the flushing liquid being maintained isolated from the used oil and in the storage receptacle, an auxiliary flushing oil storage receptacle mounted directly adjacent the first mentioned storage receptacle, and a connection between said auxiliary storage receptacle and the means for maintaining said cyclic circulation.

3. A portable device for cleaning lubricant cases, comprising in combination a storage receptacle, a pump, filtering means comprising a plurality of filters, a valved connection therebetween, whereby the filters may be employed individually or in multiple, a connection between the filter means and the lubricant case, a connection from the lubricant case to the device, said pump being operable to maintain a cyclic circulation of a flushing liquid to and from the lubricant case and the filtering means, an auxiliary storage receptacle for flushing liquid mounted adjacent said first mentioned storage receptacle, and a connection from said auxiliary storage receptacle to said pump.

4. A portable device for cleaning lubricant cases, comprising a main storage receptacle for used oil, an auxiliary storage receptacle for fresh flushing liquid, a pump, connections between said auxiliary storage receptacle and said pump, connections between the lubricant containing case and said pump, and a filter interposed in said latter connections, whereby flushing liquid may be withdrawn from said auxiliary storage receptacle and cyclically circulated from and to the lubricant case.

5. A portable device for cleaning lubricant cases, comprising in combination a cyclic circulatory system including a pump, connections for the inlet and discharge end of said pump adapted to have communication with the inlet and discharge of said lubricant case, filter means interposed in such connections, a main storage receptacle isolated from said cyclic circulatory system to which used lubri-

cant and cleaning oil may be passed, an auxiliary new flushing oil storage receptacle mounted adjacent the main storage receptacle, and connections between the auxiliary storage receptacle and the pump.

6. A portable device for cleaning lubricant cases, comprising in combination a pump, connections for the inlet and discharge of said pump adapted to have communication with the inlet and discharge of said lubricant case, separate filters interposed in such connections, whereby cleaning oil is caused to have a cyclic circulation through the lubricant container pump and desired filter, valved branches leading to and from said connections having communication with each of said filters whereby the desired filter may be cut into the cyclic circulatory system, and a main storage receptacle isolated from the cyclic circulatory system for the used lubricant and flushing oil, and a second auxiliary storage receptacle mounted adjacent the main storage receptacle.

7. A portable cleaning accessory for cleaning lubricant cases of engines, comprising in combination, a main storage receptacle, filter means, means for forwarding liquid withdrawn from the lubricant container to said filter means, means for conducting filtered liquid from said filter means back to the lubricant container, means in said forwarding means for cutting off the passage of liquid to said filtering device and diverting same to said main storage receptacle, and an auxiliary storage receptacle mounted adjacent said main storage receptacle.

8. A portable cleaning accessory for cleaning lubricant cases of engines, comprising in combination, a storage receptacle, filter means, forwarding means, connections associated with said filter means and forwarding means whereby flushing oil withdrawn from the lubricant container is forwarded through said filtering means and back to the lubricant container repeatedly, means whereby used lubricant or used flushing liquid withdrawn from the lubricant container may be discharged into said storage receptacle, an auxiliary storage receptacle for containing new flushing liquid, and connections between the latter and said forwarding means.

WILLIAM L. OSBORNE.