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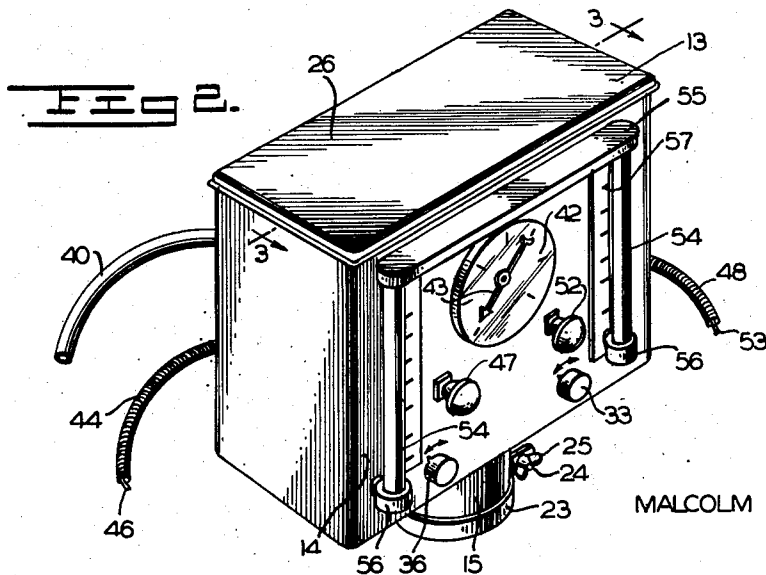
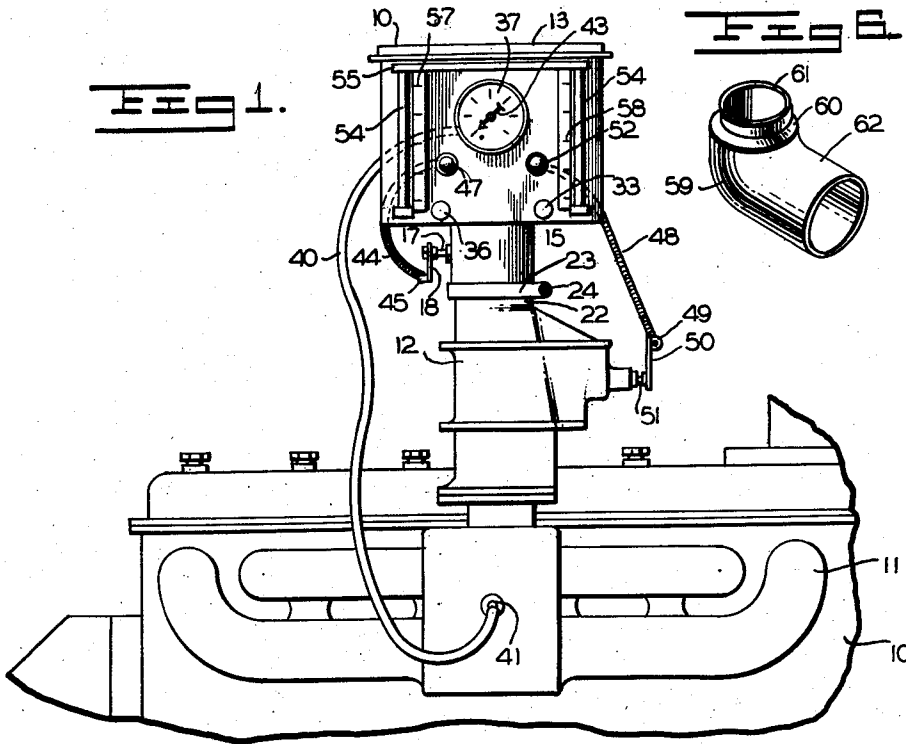
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CLEANING ATTACHMENT FOR INTERNAL-COMBUSTION ENGINES

Filed April 10, 1952

2 Sheets-Sheet 1



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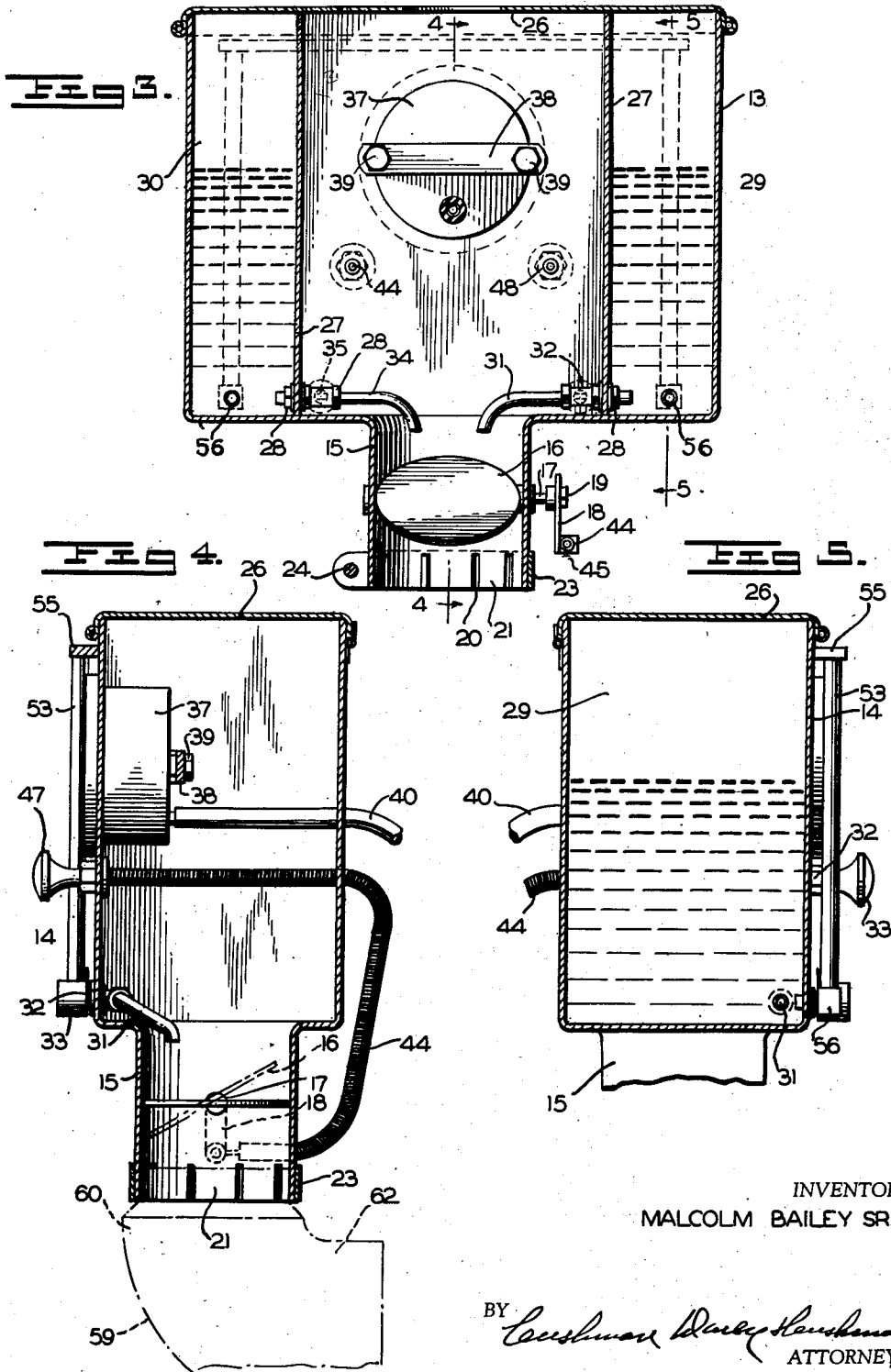
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CLEANING ATTACHMENT FOR INTERNAL-COMBUSTION ENGINES

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2 Sheets-Sheet 2



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CLEANING ATTACHMENT FOR INTERNAL-COMBUSTION ENGINES

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The present invention relates to an attachment for internal combustion engines and more particularly to a device for efficiently removing carbon and carbonaceous deposits from the engine.

An important object is to provide a simple, efficient and economical attachment for internal combustion engines which may readily be connected to the carburetor when the air cleaner or filter is removed, and which is provided with separate compartments one of which contains a suitable decarbonizing compound and the other a flushing compound, that are independently introduced into the engine during the operation of the latter so as to remove carbon deposits therefrom and thoroughly clean the same, thus increasing the efficiency of operation of the engine, reducing oil consumption and obtaining maximum gas mileage.

A further object is to provide a new and improved method of cleaning or removing carbon deposits from internal combustion engines by metering a decarbonizing liquid into the engines during the operation of the same, through the carburetor and the intake manifold into the combustion chamber so that carbon and sludge deposits on the piston rings and valves are loosened. A second or flushing fluid is then metered into the engine through the carburetor and the intake manifold so that the loosened carbon deposits are flushed free of the rings and valves and removed from the engine so as to increase its efficiency of operation and at a minimum expenditure of time, effort and cost.

Another object consists in providing adjustable adapters for connecting the cleaning attachment to carburetors so that the attachment may be conveniently used with different types and sizes of carburetors and installed on any type of motor vehicle or the like.

Other objects and advantages of the invention will become apparent from the following description when taken in conjunction with the accompanying claims and drawings.

Referring to the drawings in which is shown several preferred embodiments the invention may assume

Figure 1 is a front side view of an internal combustion engine showing the improved attachments connected thereto;

Figure 2 is a detailed perspective view of the decarbonizing attachment removed from the engine;

Figure 3 is a longitudinal sectional view taken substantially along the line 3—3 of Figure 2;

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Figure 4 is a sectional view taken substantially along the line 4—4 of Figure 3;

Figure 5 is a sectional view taken substantially along the line 5—5 of Figure 3, and

5 Figure 6 is a perspective view of one of the adjustable adapters for connecting the attachment to different sizes and types of carburetors.

Referring to the drawings, 10 indicates an internal combustion engine which may be associated with a motor vehicle or the like, not shown, and is provided with the usual intake manifold 11 to which is connected the carburetor 12.

In order to obtain maximum efficiency in operation of the engine and gas mileage, and a minimum consumption of lubricating oil, simple, efficient and economical means are provided for loosening and removing the accumulation of carbon deposits from around the valve seats and the valve stems. This means includes a removable 20 attachment generally indicated by the numeral 13 and which is arranged to be detachably connected to the carburetor when the air filter or cleaner is removed therefrom. The attachment, as shown, is in the form of a substantially rectangular, metal container 13 (Fig. 2) having a front panel 14 and a medially depending throat or tubular member 15 in which is rotatably mounted a choke or butterfly valve 16 normally maintained in its open position. The stem or shaft 17 of this valve extends outwardly from one side thereof and is connected to an operating arm or lever 18 by a threaded bolt 19 (Fig. 3). The lower end of the throat 15 may be provided with circumferentially disposed vertical slots 20 so as to provide a yieldable annular portion 21 arranged to be detachably secured to the inlet or throat 22 of the carburetor 12 (Fig. 1) by the clamping ring 23 and the threaded bolt 24 to which is connected the thumb nut 25 (Fig. 2).

40 The container 13 is preferably provided with a removable cover or lid 26 and is interiorly separated by the spaced vertical partitions 27 into separate compartments or tanks 29 and 30. The compartment 29, as shown, is arranged to receive a decarbonized liquid compound that is non-corrosive in action, such as any suitable penetrating oil. The carbon remover is arranged to be injected into the engine 10 through the throat 15 by a flexible pipe or tube 31 which extends into the throat 15 and is provided with a rotatable valve 32 (Fig. 3). The valve 32 has a manually operated handle 33 extending outwardly from the panel 14 (Fig. 2) so as to control or meter the flow of the fluid in the compartment 29 into the throat 15, carburetor 12 and intake manifold

11. The compartment 30 is arranged to receive a suitable tune-up oil and communicates with the throat 15 through a flexible pipe 34 having a control valve 35 and a manually operated knob 36 for controlling the flow of the fluid from the tank 30 into the engine through the carburetor 12 and the intake manifold 11. The pipes 31 and 34 are firmly connected to the partitions 27 in any suitable manner, such as by the clamping nuts 28 (Fig. 3).

A gauge 37 for accurately measuring the vacuum developed in the intake manifold 11 is removably mounted in the container 13 in any suitable manner such as by the transverse strap 38 and the spaced threaded retaining bolts 39 (Fig. 3). The vacuum gauge 37 operatively communicates through a flexible tubing 40 with the intake manifold 11 as at 41 (Fig. 1). The outer face of the gauge has a graduated scale 42 calibrated in inches and a rotatable dial 43 so as to indicate in terms of inches of mercury the intake manifold vacuum of the engine. The lever or arm 18 of the butterfly valve 16 is connected to a flexible member such as a loom cable 44, by the adjusting screw 45 (Fig. 3). The loom 44 has a flexible wire 46 (Fig. 2) running therethrough that is connected to a longitudinally reciprocating knob or handle 47 that extends outwardly from the panel 14 so as to provide manual means for actuating the gas throttle of the carburetor in order to control the speed of the engine 10. Similarly, a loom cable 48 has a flexible wire 53 extending therethrough and is adjustably connected at its lower end as at 49 to an operating arm 50 extending laterally from the carburetor shaft 51 (Fig. 1). Thus, means are provided for conveniently connecting the attachment to different sizes and makes of carburetors. The flexible cable 48 and wire 53 are also connected to a reciprocating knob or handle 52 that extends outwardly from the panel 14 and which is spaced in substantially transverse alignment with the knob 47. Thus, actuation of the knob 52 controls the speed of the engine. In front of the panel 14 are a pair of vertically disposed glass gravity tubes 54 which are closed at their upper ends and connected by a transverse bar 55. The lower end of each tube has an L-fitting 56, one of which communicates with the interior of the compartment 29 and the other with the compartment 30 to indicate the quantity of fluid in each compartment. The front of the panel has vertical graduations 57 and 58 shown a quarter of an inch apart and arranged to indicate the amount of fluid in each of the compartments 29 and 30.

As shown, the container 13 is directly connected to the carburetor by the throat 15 and the clamping ring 23 (Fig. 1). In order that the attachment may be readily connected to different size carburetors and makes of cars, L-shaped adapters 59 (Fig. 6) of different diameters may be provided. Each of these adapters has a vertical tubular portion 60 provided with an inlet portion 61 of standard diameter so as to be clamped to the throat 15 by the ring 23. The horizontal portions 62 of each adapter varies in diameter so as to be readily connected to the throats of carburetors of different sizes. Thus, means are provided for connecting the attachment to any size or type of carburetor at a minimum expenditure of time, labor and cost, in order to inject a compound into the engine for the purpose of loosening and removing carbon or carbonaceous deposits therefrom. It will be seen that the ver-

tical partitions 27 separate the container 13 into the end fluid compartments 29 and 30 and an intermediate compartment in which is mounted the vacuum gauge 37. Further, that the depending throat or discharge pipe 15 communicates with the intermediate compartment and has the choke valve 16 positioned so as to be located below the discharge tubes 31 and 34.

In operation, the compartments 29 and 30, 10 which may be of any suitable size, are shown arranged to each receive a pint of a suitable liquid compound. The attachment is clamped to the carburetor 12 by the rod 24 and clamping nut 25 upon the removal of the air filter. The cable 48 is connected by the screw 49 to the carburetor shaft 51 and the cable 40 to the intake manifold below the carburetor as at 41 (Fig. 1). The compartment 29 has been previously filled with a decarbonizing compound while the compartment 30 may be filled with a suitable flushing liquid. The valves 32 and 35 have been previously rotated clockwise or to the right so as to be in their closed position. The knob 47 is moved inwardly so that the choke valve 16 will be opened. The engine is started and the reading of the vacuum dial 42 is noted. The gas throttle handle 52 is pushed out until the engine speeds up to about 700 R. P. M.'s. The valve 32 is rotated counterclockwise or to the left so as to introduce a steady flow of the decarbonizing compound from the compartment 29 through the throat 15, carburetor 12, intake manifold 11 and into the engine 10. Usually, all of the penetrating oil in the compartment 29 is allowed to be run through the engine so as to loosen the carbon and sludge deposits on the piston rings and valves. The valve 32 is then returned to its closed position and while the engine is rotating at the same low speed, that is, 700 R. P. M.'s, the valve 35 is rotated to its open position so as to allow the tune-up oil to run through the carburetor and engine in order to liquify the gum and sludge. When about half the tune-up fluid in the compartment 30 has been used, as indicated by the glass tube 54, the engine is speeded up to about 1800 R. P. M.'s and the choke knob 47 is moved out to close the butterfly valve 16 and until the engine almost goes dead. This operation causes raw gas to be introduced into the engine so as to wash out all the gum and sludge that has been liquified and loosened by the penetrating oil, and may be repeated several times. The choke knob 47 is then moved inwardly so as to open the butterfly valve 16 and the knob 52 is moved so that the engine will again revolve at about 700 R. P. M.'s. The valve 36 is now opened so that the balance of the tune-up oil in the tank 30 may be utilized to lubricate the engine as it is restored to normal operation. Due to the removal of the gums and sludge from the valves and rings, the vacuum gauge 42 will now show an increase of from two to three inches, thus indicating the improved efficiency of the engine.

It will be seen that during the cleaning operation, when the butterfly valve 16 is closed, raw gas will be drawn into the engine to wash out all of the oxidation and gum deposits. Moreover, the attachment may be directly connected to the carburetor as shown in Fig. 1 or may be connected to carburetors of different sizes and models by one of the adjustable adapters 62 in the manner as shown in dotted lines in Fig. 4. In initially starting the device, the carburetor is set to run at a fast idle when the temperature of the engine is about 160° F. If the needle 43 on the

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vacuum gauge 42 jumps back and forth between 15 and 20 inches, this is an indication that the valves are sticking. On the other hand, if the needle does not come up over 12 or 14 inches, this shows that the engine has low compression and leaky valves or guides. Therefore, after the engine has warmed up, the valve 32 is rotated to its open position until there is a steady flow of the penetrating fluid going through the carburetor. It is advisable under these conditions to allow the whole pint of penetrating liquid to be fed into the engine so as to liquify all gum and sludge. The valve 32 is then closed and while the engine is operating at the same speed, the valve 35 is moved to its open position so as to allow about half of the flushing fluid or tune-up oil to run through the carburetor at a fast flow in the manner as previously described.

In cases where a hot spot develops or where the piston rings are stuck due to circulation being blocked in the water jacket, it is first necessary to check the compression on the cylinders to find which one has the low compression or stuck rings. To do this, the engine should first be heated to around 200° F. The spark plug is then removed from the low compression cylinder and two or three ounces of penetrating liquid is inserted through the spark plug opening and the spark plug is then loosely connected to the cylinder and allowed to stand for about two hours. The spark plug is then removed and the motor is turned over about ten times with the starter. The spark plug is now put back in place and the engine started after the attachment is connected to the carburetor so that the engine may be treated in the manner as previously described. The precision testing attachment is not a permanent installation mounted on the engine, but a device which may be readily detachably connected to the throat of the carburetor when the air cleaner is removed therefrom and is primarily used for checking, diagnosing and detecting the various troubles to which an internal combustion engine is subjected, such as sticky valves, manifold leaks and the like, thus providing means for causing the engine to run freer and cooler, and which reduces oil consumption and increases gas mileage so as to prolong the life of the car. The penetrating liquid and the flushing liquid each has distinct purposes to perform and could not efficiently be used singly. The choke or butterfly valve 16 also works independently from the throat in the carburetor and the vacuum guage 37 is so associated with the other parts as to work in conjunction with them efficiently to detect any engine trouble which may occur in order that the necessary steps may be taken to rectify the same. Thus it will be seen that the attachment is only temporarily connected to the engine during the checking and tuning-up operation.

Thus it will be seen that simple, efficient and positive method and attachment are provided for removing carbon and carbonaceous materials from the engine. Moreover, the vacuum guage 42, which measures accurately the vacuum developed in the intake manifold, can be checked to ascertain the efficiency of operation and when this guage shows between 18 and 21 inches of vacuum, it indicates that all gum and oxidation or sludge has been removed from the valve and valve guides and have loosened the piston rings so that they will properly contact and expand in order to increase the compression so that the

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engine is returned to its normal operating conditions. In other words, this cleaning treatment insures the engine running free, and cooler. Additionally, maximum gas mileage is obtained at a minimum consumption of oil thus increasing the life and efficiency of the engine.

It will be manifest that the forms of the invention shown and described are merely illustrative and that such changes may be made as come within the scope of the following claims.

I claim:

1. In combination with the intake manifold and carburetor of an internal combustion engine, a precision testing attachment for detecting engine trouble, said attachment including a container having separate compartments, one of said compartments arranged to receive a penetrating liquid and another a flushing liquid, said container having a depending throat, means for detachably connecting said throat to the carburetor when the air cleaner is removed therefrom, a vacuum guage mounted in said container and having means communicating with the intake manifold for accurately measuring the vacuum developed in the manifold, valve means for selectively communicating the compartments with said throat, a choke valve mounted in the throat, manual control means mounted on the container and operatively connected to the choke valve for actuating the same, and manual control means mounted on the container and operatively connected to the throttle valve of the carburetor for controlling the speed of the engine.

2. In combination with the intake manifold and carburetor of an internal combustion engine as called for in claim 1 in which each of said compartments has an exposed transparent glass tube communicating therewith for indicating the amount of fluid therein.

3. In combination with the intake manifold and carburetor of an internal combustion engine, a precision testing attachment for detecting engine trouble, said attachment including a container having three separate compartments, one of said compartments arranged to receive a penetrating liquid compound and one a flushing liquid compound, a vacuum guage mounted in the remaining compartment, means communicating the vacuum guage with the intake manifold, said container having a depending centrally disposed throat, means for detachably connecting said throat to the carburetor, valve means for selectively communicating the compartments adapted to receive the liquids with said throat, a choke valve in said throat, manually operable means mounted on the container and operatively connected to the choke valve for actuating the same, and manually operable means mounted on the container and operatively connected to the throttle valve of the carburetor for controlling the speed of the engine.

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