June 24, 1930. G. E. TASKER 1,767,324

AIR CLEANER FOR INTERNAL COMBUSTION ENGINES

Filed July 5, 1927

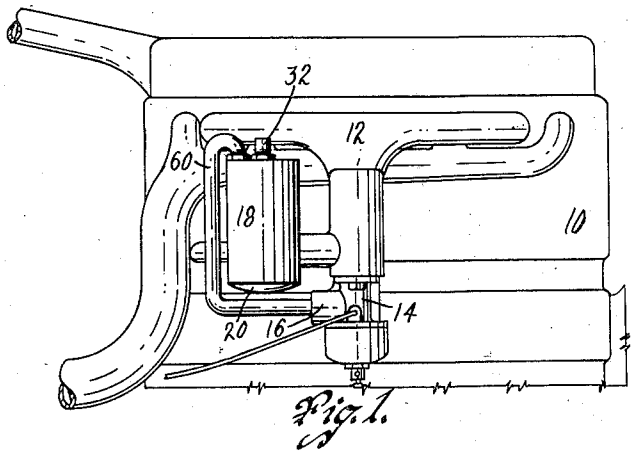


Fig. 1.

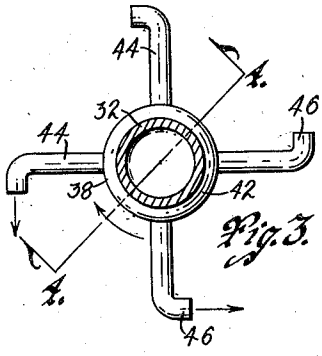


Fig. 3.

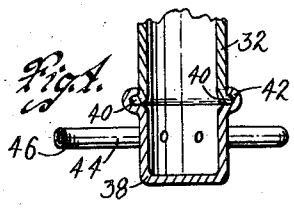


Fig. 4.

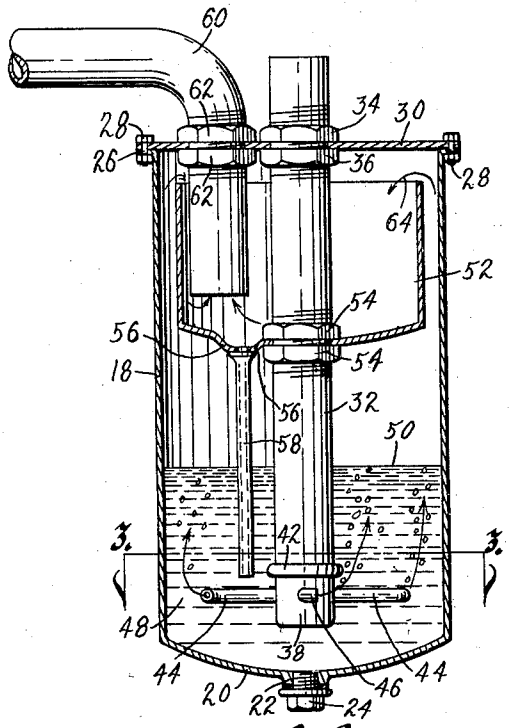


Fig. 2.

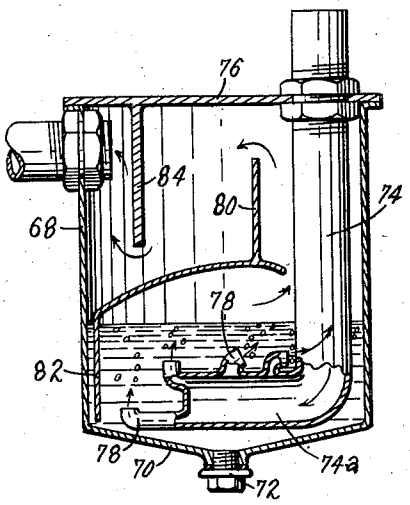


Fig. 5.

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Patented June 24, 1930

1,767,324

UNITED STATES PATENT OFFICE

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AIR CLEANER FOR INTERNAL-COMBUSTION ENGINES

Application filed July 5, 1927. Serial No. 203,355.

My invention relates to air cleaners for use with internal combustion engines.

The purpose of my invention is to provide an air cleaner for internal combustion engines, which cleaner comprises a chamber or container adapted to contain a suitable cleansing liquid, which is to be maintained at approximately a certain height. An intake pipe projects into the container and has below the assumed liquid level a plurality of spaced, discharge nozzles. Above the assumed liquid level, there is provided what may be called a separating compartment arranged with its upper part in communication with the interior of the container, a drain tube leading from the bottom of said compartment to the lower part of the container, a vent pipe extended from said compartment preferably from the lower part thereof through a wall of the container.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of my air cleaner, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claim, and illustrated in the accompanying drawings, in which:

Figure 1 shows a side elevation of an internal combustion engine of the kind used for instance in motor vehicles as equipped with an air cleaner embodying my invention.

Figure 2 is a vertical, sectional view through my improved air cleaner illustrated in one form.

Figure 3 is a detail, sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a vertical, sectional view of the lower end of the intake pipe; and

Figure 5 is a vertical, sectional view through a modified form of my improved cleaner.

It is well known that it is desirable to cleanse the air supplied to the carburetor of an internal combustion engine. This is particularly true of automobile engines which travel over dusty roads and of the engines of tractors which are used in agricultural operations.

My improved cleaner is used in connection with an internal combustion engine, the block of which has been indicated in the accompanying drawings by the reference numeral 10. I have shown the engine 10 provided with the ordinary intake manifold 12.

Communicating with the intake manifold 12 is the carburetor 14, which has the ordinary air intake inlet 16.

For cleaning the air admitted to the inlet 16 and therethrough to the carburetor for mixing with the fuel, I have provided a cleaner, one form of which is shown in Figures 1 to 4 inclusive, and the other form of which is shown in Figure 5.

The first and perhaps the preferred form of my device includes a container 18, preferably having the form of a hollow cylinder, the bottom of which is concave on its inner surface, as shown at 20 in Figure 2, for causing heavy particles to gather at the center of the bottom, and for permitting suitable and convenient drainage of the container 18 through the hole 22, which is normally closed by the plug 24.

The container 18 is provided with a peripheral flange 26 at its upper end to which is detachably fastened by means of bolts or the like 28 a removable cover 30.

An intake pipe 32 is extended through the cover 30 and is provided with lock washers 34 and 36 on opposite sides of the cover.

The intake pipe extends into the lower part of the container 18 and is provided at its lower end with a rotatably mounted end member or cup 38, which may be rotatably connected with the pipe 32 for free rotation thereon as by means of the flange 40 and channel 42 or any other suitable means.

It will, of course, be understood that the cup 38 forms the lower end of the pipe 32.

Communicating with and projecting radially from the cup 38, I provide a plurality of discharge pipes or tubes 44, which are circumferentially spaced on the cup 38 with relation to each other and project radially therefrom and terminate at their outer ends in horizontal, substantially right-angled extensions 46.

The container 18 is intended to receive a suitable cleansing liquid 48, which may be arranged to stand approximately at the height

50 shown in Figure 2, substantially above the bottom of the container 18 and substantially below the compartment 52.

The compartment 52 may be of any suitable size or shape adapted for the purpose and as illustrated in Figure 2 comprises a cup-shaped member mounted on the pipe 32. The pipe 32 extends through the bottom of the compartment 52 and is provided with lock nuts 54 on opposite sides thereof.

The compartment 52 is preferably open at its upper end and closed at its lower end, except that it is provided with a low spot 56 at its lower end from which there leads downwardly a drain tube 58, extending below the normal liquid level 50.

A vent or outlet pipe 60 is extended through the top 30 and secured thereto by means of lock nuts 62. The inner end of the vent pipe 60 projects downwardly into the compartment 52 as clearly illustrated in Figure 2.

I will now describe the practical operation of the air cleaner illustrated in Figures 1 to 4 of my drawings.

It will be assumed that the vent pipe 60 is connected with the air inlet 16 of the carburetor 14 and that the outer end of the pipe 32 is open to the air.

Then when the engine is started, the suction from the engine and through the carburetor will draw air through the pipe 60 and thence from the interior of the container 18.

Normal air pressure will then force air through the intake pipe 32 and the discharge tubes 44 and the nozzles 46 at the ends thereof into the lower part of the cleansing liquid 48. As the air passes upwardly from the nozzles 46 through the liquid 48, the air will be cleaned.

I have provided the cup 38 rotatably mounted on the pipe 32 and the arms 44 with the discharge nozzles 46 arranged preferably in a horizontal plane, so that when air is being discharged through the nozzles 46, the tubes 44 and the cup 38 will rotate in the fluid for thus causing a more thorough mixing of the incoming air with the cleansing liquid and insuring the cleaning of the air.

The air passes upwardly from the liquid and around the compartment 52 and over the upper edge thereof as indicated by the arrows at 64, and thence downwardly into the compartment 52 to the lower end of the pipe or tube 60, and thence through the tube 60 to the carburetor.

If the air carries any liquid into the compartment 52 that liquid will be almost entirely deposited in the compartment 52 and will return from thence through the drain tube 58 to the body of the liquid 48.

By means of the compartment 52, I am able to reduce the likelihood of carrying of any excessive amount of the liquid 48 into the carburetor.

A device of this kind could, of course, be used for an air moistener.

My construction is such as to insure the thorough mixing of the air with the liquid 48, the convenient carrying of the air from the container 18 after the air has been cleaned, and the taking out of the air passing from the liquid 48 any excessive amount of such liquid which the air may carry out with it.

In Figure 5, I have shown a slightly modified form of my device intended for use where it is desirable to have a narrow casing to fit into certain small spaces.

Instead of the container 18, I have shown, in the form of the device illustrated in Figure 5, a flat thin container 68, having a tapered bottom 70 provided with a removable drain plug 72 and an intake passage 74 along the one wall of the container 68 extending nearly to the bottom of the container 68.

The container 68 has a removable top 76 which is generally similar to the top 30 and may be fastened to the container 68 in the same way that the top 30 is fastened to the container 18.

At the lower end of the passage 74 that passage is provided with a right-angled projection 74[a] extending horizontally and provided with a plurality of spaced discharge tubes or nozzles 78, which serve to break up the air into smaller streams, and thus insure the more thorough mixing thereof with the liquid 48, which is assumed to be the same in both forms of my device.

At one side of the device shown in Figure 5 and spaced above the bottom thereof and above the assumed liquid level therein is a separating compartment indicated generally at 80, which at its upper part communicates with the upper interior of the container 68.

A drain passage 82 leads from the lowermost part of the compartment 80 toward the lower part of the interior of the container 68.

An outlet passage 84 has its intake end near the bottom of the compartment 80 and spaced thereabove and it emerges from the side wall of the cleaner container adjacent to the top thereof.

The operation of the device shown in Figure 5 is similar to that of the one heretofore described with the exception of those differences that would inhere in and follow from the differences in structure.

Air comes into the pipe 74 and thence to the various nozzles 78, where the air is diffused for more conveniently and certainly effecting a thorough mixture.

It will be understood that the nozzle may be made with or without the rotatable feature. By using a plurality of separate, spaced discharge points, as shown, there will be such

diffusion of the air throughout the water, as is desirable.

Some changes may be made in the construction and arrangement of the various parts of my improved air cleaner, and it is my intention to cover by my claim any modified forms of structure or use of mechanical equivalents, which may be reasonably included within its scope.

I claim as my invention:

An air cleaner for use with internal combustion engines comprising a closed container adapted to receive a cleansing liquid, an intake pipe for discharging air into said liquid and into the lower part of said container, said intake pipe being supported by and depending from the top of said container and having at its discharge end a plurality of reduced nozzles, a cup-shaped separating compartment arranged in the container above the assumed level of the liquid therein having its bottom surrounding and attached to said intake pipe and communicating at its open upper part with the container, and an air outlet passage leading from a position spaced above the bottom of said cup-shaped compartment upwardly therefrom and thence to a point outside the container.

Des Moines, Iowa, June 20, 1927.

GUY E. TASKER.