

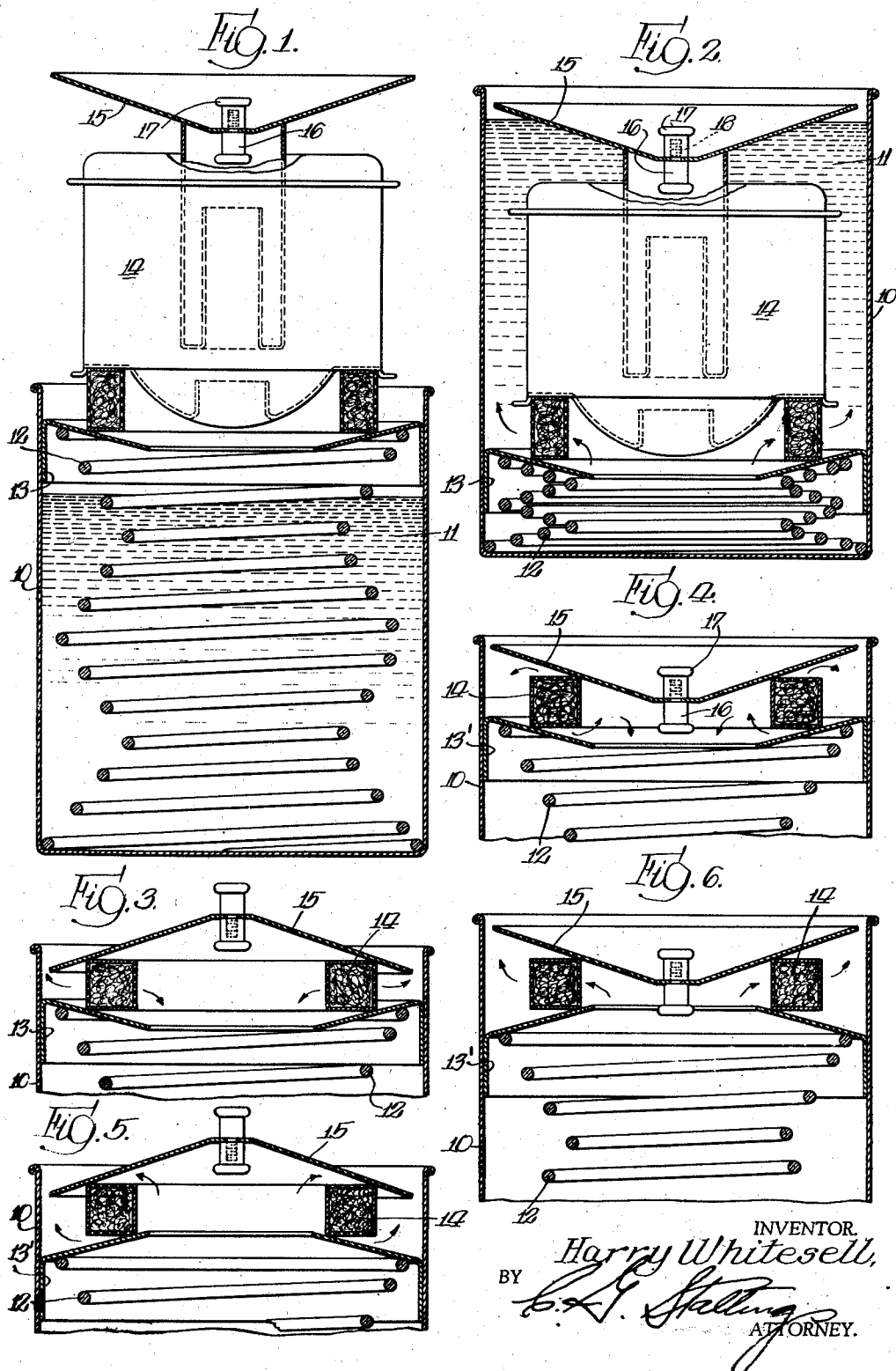
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H. WHITESELL

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CLEANING DEVICE AND THE LIKE

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INVENTOR.
Harry Whitesell,
BY *C. L. Stalling*
ATTORNEY.

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CLEANING DEVICE AND THE LIKE

Harry Whitesell, Minneapolis, Minn.

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This invention has to do with improvements in devices for cleaning such items as air filters and air cleaners for any purpose, but particularly for gasoline motors such as automobile engines, tractors, and other gasoline engines, and for air compressors and the like.

In everyday use, it is necessary to provide gasoline engines with air filters or air cleaners which are subject to clogging and contamination with the dirt and dust and other foreign substances they remove from the air. As a consequence, it is customary to periodically wash the devices and generally place a film of oil on the parts through which the air is drawn, which film of oil usually traps the dirt and dust.

Heretofore it has been very difficult to do a thorough job of either the washing of the filter or the re-oiling. One reason for this is that no means has been provided which will force the liquid through the working parts of the air filter or air washer in such a way as to effectively remove the accumulated impurities. Further, in the ordinary manner of washing these air cleaners or air filters, the solvent such as gasoline or kerosene which is used drains off rather slowly and it is difficult to re-oil in such a way as to not leave considerable excess oil or so as not to dilute the oil with the solvent, causing oil to be inadequately provided in the mesh of the filter, where most needed. In other words the solvent remains most in the mesh and so dilutes the oil that the latter drains off the mesh without properly coating it.

It is an object of my invention to provide a method and means for thoroughly and scientifically washing air filters, air cleaners, and other items falling in a similar category, and for re-oiling where desired in such a way that the solvent if any remaining on the device will be removed and displaced by the oil.

It is a further object of my invention to provide a means in connection with the cleaning means and oiling means abovementioned whereby the excess solvent or oil as the case may be drains back into the container and is saved for further use in another cleaning operation.

It is a still further object of my invention to provide a means which is simple and rapid to operate and which may be constructed of inexpensive materials by simple operations, thus making it cheap to manufacture.

Other objects and advantages of the invention will appear as the nature of the improvements is better understood, the invention consisting substantially in the novel construction, combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawing, and finally pointed out in the appended claims.

In the drawing:

Figure 1 is a side elevation sectional view of

the device forming the subject matter of this invention, showing thereon an air filter (partially in sectional view), the position of the parts being ready to start the operation of washing (or oiling as the case may be) the filter;

Figure 2 is the same as Figure 1 except that the air filter has been immersed in the solvent in washing operation;

Figure 3 is a fragmentary view corresponding to the upper portion of Figure 1 except that a different type of air filter is in position to be washed, and the cover is in reversed position;

Figure 4 is similar to Figure 3 except that a different type filter is shown and the cover is reversed from that of Figure 3;

Figure 5 is similar to Figure 4 except that the cover and diaphragm are shown in reverse position to that of Figure 4; and

Figure 6 corresponds to Figure 3 except for a reversal of the cover and diaphragm.

Referring more particularly to the drawing and the various figures therein, in the following description I will refer to the object to be cleaned as a filter, but it is to be understood that this reference covers any object suitable for cleaning in this type of device.

The container 10 is provided with a solvent 11, and has the helical coiled spring 12, which is designed so that the convolutions when not compressed bring the upper portion of the spring 12 above the position of the solvent. This spring is so constructed that the pressure built up required to compress it is reduced to a minimum; that is, if it requires for example 10 pounds to compress it one inch it would require only 25 pounds to compress it 10 inches whereas in a "straight side" coil of the same size requiring 10 pounds to compress it one inch it would require 20 pounds to compress 2 inches, 50 pounds to compress it 3 inches, etc. This arrangement of the coils makes the device easily operable by a minimum amount of pressure, but at the same time provides sufficient strength to return the device being washed to a position above the solvent 11.

The container is provided with a diaphragm or cover for the spring, hereinafter called diaphragm 13 which assumes somewhat the form of a truncated cone with depending side flanges adapted to fit in slidable relation to the walls of the container 10 to move up and down. An opening is formed in the diaphragm 13 so that the solvent may readily pass through upon depression of the diaphragm and spring, and come into washing contact with the filter 14. As indicated by arrows in the various figures of the drawings, the fluid passes through the mesh of the filter from one side only, that is from inside the filter to the outside, or from outside the filter to the inside. By referring to the fluid as moving from one side only, movement from the in-

side to the outside or from the outside to the inside as the case may be is thus indicated. In Figures 5 and 6 the modified diaphragm is numbered 13' and is shown as being of truncated cone shape, slanting upwardly toward an imaginary vertex, whereas in the other figures the diaphragm is of truncated cone shape which slants downwardly toward an imaginary vertex and is numbered 13.

I have provided a conically-shaped cover 15, which is adapted to be placed over the object to be cleaned. This cover is invertible, so that the operator may use it with the base portion of the cone upward if desired or with the peak of the cone upward. Inverting the cover 15 will cause the solvent to be forced through the filter in a somewhat different manner, and the cover will be inverted for some types of filters as examination of the drawing clearly indicates.

The cover 15 is provided with the handles 16 and 17 held in place by a bolt 18 passing through the cover 15 and secured either by threads, not shown, in the handle 17 or by a nut or other conventional means, details of which are unnecessary for the purpose of this application. In the arrangement of the parts however a handle is preferably available to the operator on either side of the cover 15.

In the various figures, the reason the diaphragm 13, or 13' as the case may be, is constructed in conical shape is readily apparent since it delineates the device to use with various sizes and types of filters.

As clearly evident in Figures 1, 2, and 4, in which the cover is inverted, the cover 15 when placed on the filter to be cleaned forms what might be called a seal with the upper portion of the filter usually on one edge, at the same time the diaphragm 13 or 13' in the constructions of Figures 5 and 6 forms a seal (usually on another edge) at the bottom. Pressing the cover 15 downward results in the whole arrangement—the spring 12, the diaphragm 13 or 13' as the case may be, the filter 14 and the cover 15—moving downwardly into the liquid. Since the cover and diaphragm form somewhat of a seal so that the liquid is trapped inside the filter, it will be forced through the mesh portions of the filter into the space outside the sealed filter, thus effectively washing the impurities from the mesh. Release of pressure on the cover 15 reverses the operation, allowing the filter to move up out of the liquid, and the impurities in the filter will receive a reverse washing action which will, particularly if repeated several times, effectively clean the filter.

The diaphragm is supported by spring tension sufficient to hold up the filter when no pressure is applied on the cover and therefore the operator may let the filter drain by leaving it supported on the diaphragm for a short while. As will be evident from the other figures, the same operation takes place with other types of filters and other positions of the diaphragm and cover, and effectively cleans the filter regardless of the location of the air passages (which have been generally herein referred to as mesh).

In ordinary practice it is usually desirable to use two units of applicant's device, mounted side by side in a suitable cabinet, one unit containing a solvent such as gasoline or kerosene and the other unit containing a suitable oil for re-oiling. With this arrangement the filter is first washed in the unit containing the solvent thus removing the accumulated impurities and then

may be drained for a short while or if the operator is in a hurry may be placed in the oil unit and forced through the same operation. The proportion of oil in the oil unit will soon remove excess solvent without materially reducing the effectiveness of the oil and the filter is ready to be replaced on the engine.

The form of the invention herein shown and described presents a preferred embodiment thereof, and delineates its adaption to practical use, but it is to be understood that the present disclosure is to be considered from the illustrative standpoint and not as imposing restriction or limitation on the invention.

While I have herein shown and described certain features of my invention, still I do not wish to limit myself thereto, except as I may do so in the claims.

I claim:

1. A conditioning device for air filters and the like, comprising a fluid container, a filter and the like supporting diaphragm of generally conical shape fitting within the container and slideable up and down, a conically shaped cover adaptable to seat over said filter and the like when the latter is supported on the diaphragm, said cover forming a substantial seal on the upper portion of the filter and said diaphragm forming a substantial seal upon the lower portion of the filter, and a liquid admitting opening in said diaphragm admitting liquid into said filter on one side of the seal with the diaphragm, whereby depression of the diaphragm forces fluid into the filter and through the filter mesh into the unfilled portion above the diaphragm, and raising of the diaphragm forces the liquid back through the mesh into the container below the diaphragm, substantially as described.

2. A conditioning device for filters comprising a container, filter supporting means resting on a helical spring within the container and movable up and down therein, said filter supporting means having a liquid admitting opening, a cover adapted to seat over said filter and form a substantial seal with the filter, the supporting means being of generally conical shape forming a substantial seal with the filter whereby movement of the cover downward forces a substantial amount of liquid through said opening and through the filter mesh in one direction, and movement of the filter support upward reverses the fluid flow through the mesh, substantially as described.

3. A device for cleaning air filters and the like comprising a container with cleaning fluid, a vertically movable generally conically shaped diaphragm within said container, shaped to form a liquid restraining seal with an air filter placed thereon, a fluid passage opening in said diaphragm positioned where an air filter on said diaphragm will be subjected to fluid passing through said opening on one side only of said air filter on one direction of movement of the diaphragm, tension means exerting pressure on said diaphragm maintaining at least a portion of the diaphragm adjacent the top of the cleaning fluid when said diaphragm is in normal rest position, and an invertible cover means of generally conical shape seating on an air filter on said diaphragm and forming a substantial fluid retarding seal with said air filter whereby submerging the diaphragm and air filter with the cover in place normally forces cleaning fluid through the air filter meshes from one side only.

HARRY WHITESELL.