United States Patent

[11] 3,566,892

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[21] Appl. No. **773,559**
[22] Filed **Nov. 5, 1968**
[45] Patented **Mar. 2, 1971**

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[54] **OIL FILTER CLEANER INCLUDING ARRANGEMENT FOR CLEANSING OF CLEANER SOLVENT**
8 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **134/102,** 134/103, 134/111, 134/166
[51] **Int. Cl.** **B08b 3/00,** B08b 9/02
[50] **Field of Search** 134/102, 109, 110, 111, 166, 103; 68/189, 198; 8/155.1

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ABSTRACT: In an oil filter cleaner including a container segmented into three separate compartments, and having a tubular member extending vertically through each compartment, the oil filter to be cleaned mounts upon the upper end of the tubular member and air under pressure discharges into the lower compartment forcing the solvent settled therein to pass up through the tubular member and be discharged into and pervade throughout the oil filter for effecting its cleaning. A filtering element is disposed intermediate the upper and middle compartments of the container so that as the solvent discharges from the oil filter, it is cleaned as it passes into the middle compartment for temporary disposition before it drains back into the lower compartment for reusage. The upward end of the tubular member may be formed as a diffuser and cooperate with support means for mounting various sizes and embodiments of oil filters during the cleaning process.

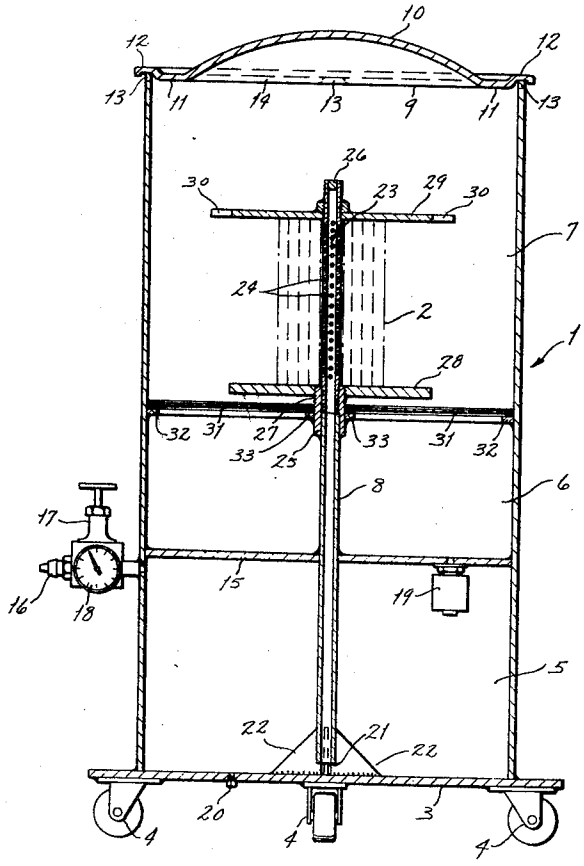
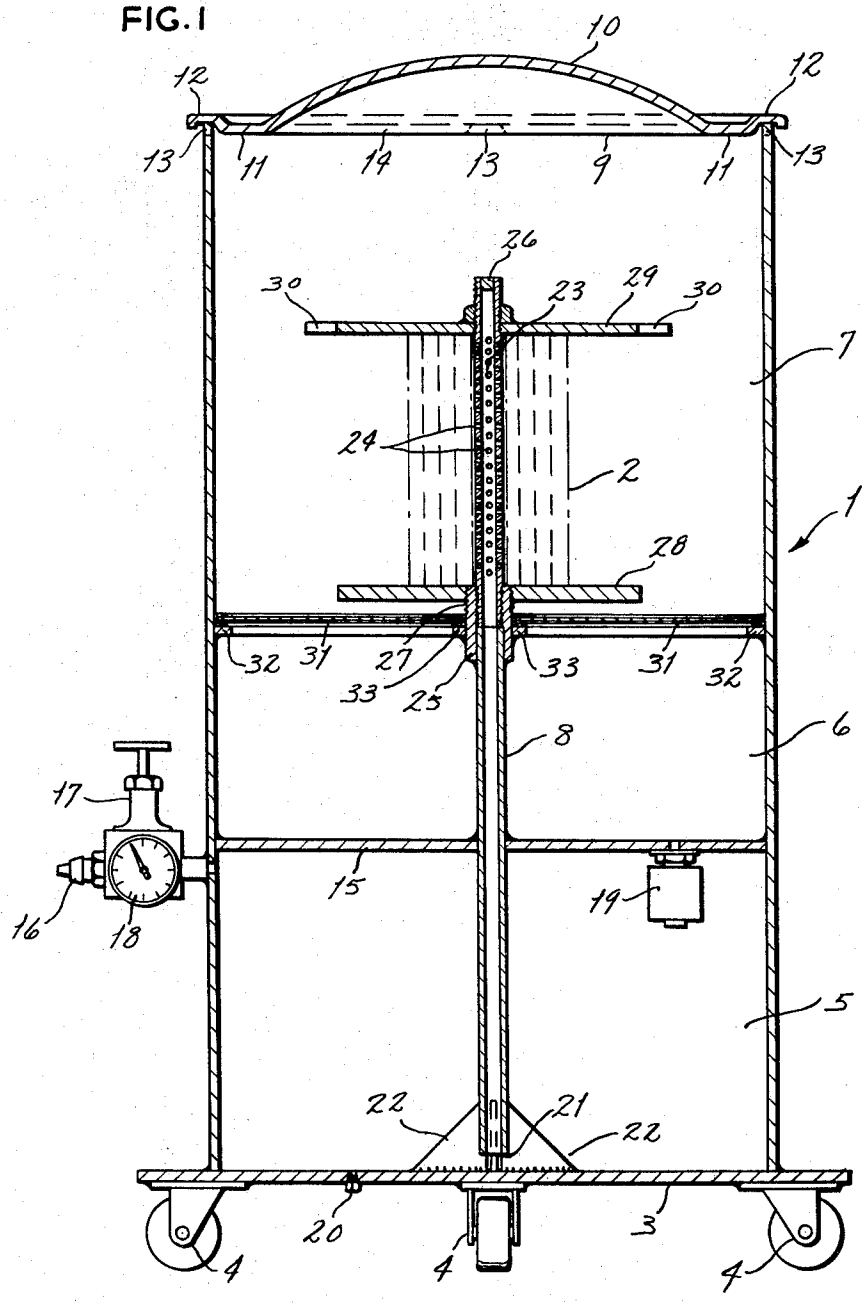


FIG. 1



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FIG. 2

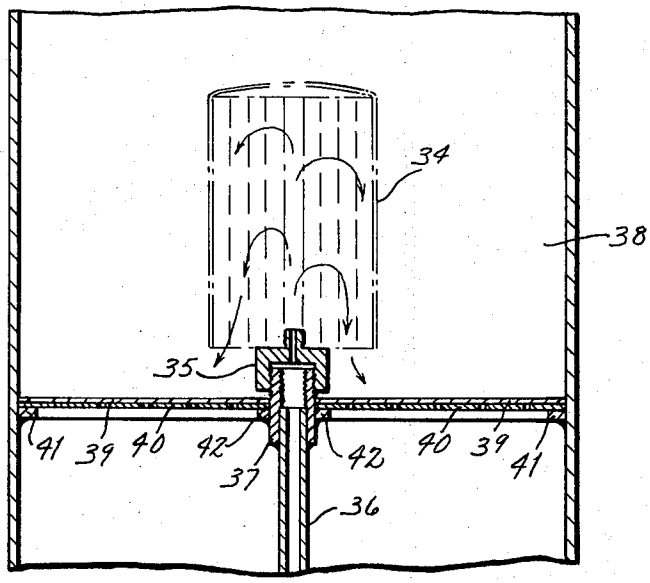
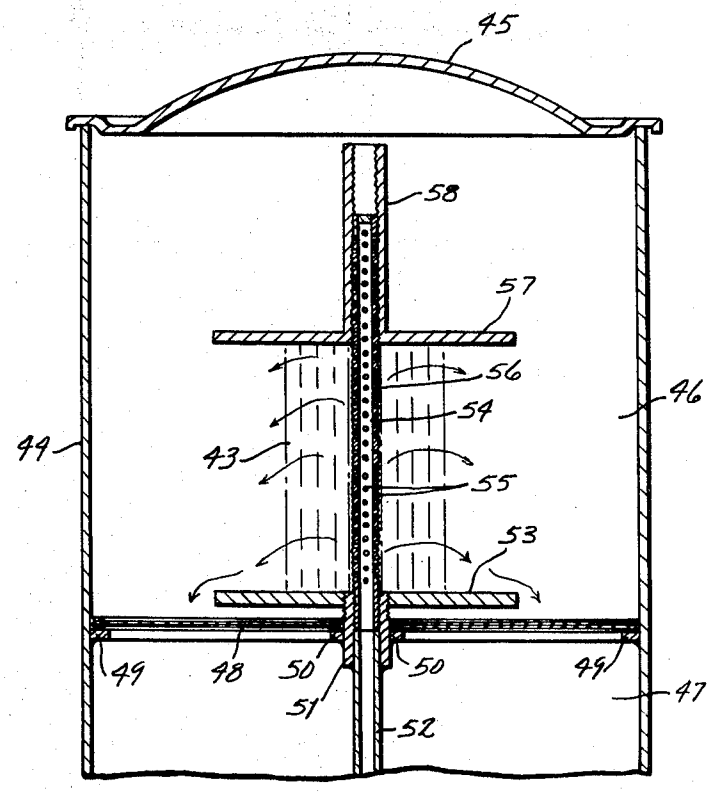


FIG. 3



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OIL FILTER CLEANER INCLUDING ARRANGEMENT FOR CLEANSING OF CLEANER SOLVENT

BACKGROUND OF THE INVENTION

This invention relates in general to an oil filter cleaner, and particularly, pertains to an apparatus that functions to cleanse various size filters through use of a gas-conveyed solvent which likewise is cleaned continuously during the filter cleaning process.

It is standard practice in the maintenance of an automobile that periodically the car owner must change the oil used in lubrication of the motor. Generally, this oil change must be performed every few thousand miles, according to the instructions of the manufacturer, and it is not too infrequent that this operation will be handled by the average car owner approximately two to three times a year. Usually a change of the dirty oil likewise necessitates a change of the existing oil filter and at an expense which substantially adds to the cost of annual maintenance of the automobile. As background technical information regarding oil filters, the filters are essentially constructed either in an integral unit, or as a cartridge type replacement filter for inserting within an incasement, with both of these embodiments formed having central cavity through which the used oil enters and immediately flows laterally into its filter portion. These filter portions are mainly constructed of a fibrous material usually resembling corrugated paper, so that when the oil encounters the filter its fine pores remove the dirt and carbon impurities from the oil, discharging for reuse a clearer oil back into the oil pan or motor of the internal combustion engine. The standard oil filter is generally constructed of substantial size, and at any time during operation usually confines approximately a quart of oil, therefore if the oil held in a motor block should be changed without a change in the filter, approximately one quart of the impure oil remains in the filter and will commingle with any fresh oil added to the engine during the change. The detriment of this arrangement is readily apparent. Therefore, it becomes essential that either the oil filter itself must be replaced during an oil change, a process in itself which usually doubles the cost of the change, or the oil filter should be cleaned before any fresh oil is added to the motor block. The purpose of this invention, therefore, is to provide an oil filter cleaner which will accomplish, swiftly and economically, the latter process.

The oil filter cleaners thus far designed an in use generally incorporate a complex system of valves and interengaging tubings which provide simply for the conveyance of a cleaning fluid through the oil filter, with none of these prior-art devices directing any attention to a most significant factor in the cleaning of an oil filter, and that is, a filter cleaner which may function to clean the oil filter in a minimum amount of time and without excessive use of labor. Most of the filter cleaners heretofore in operation simply direct a continuous stream of the cleaning fluid through the filter, without providing additional cleansing of the used fluid or solvent after it has been once passed through said filter. Obviously, the effectiveness of such a filter cleaner becomes somewhat reduced after each use since the solvent or cleaning fluid itself eventually becomes too diluted with the removed residue and impurities accumulated from previously cleaned filters. One way this problem can be remedied is to continuously change the solvent after cleaning each oil filter, but this routine in itself would entail excessive labor time and expense.

It is, therefore, the principal object of this invention to provide an oil filter cleaner which not only functions to rapidly clean a used oil filter, but additionally also filters the cleaning solvent after each pass through the oil filter being flushed.

It is another object of this invention to provide a cleaning apparatus which is readily adaptable to clean oil filters of any size, regardless whether the filters be of the cartridge type or those formed as an integral structure.

It is a further object of this invention to provide an oil filter cleaner which is assembled as an integral unit incorporating all features combined to perform its principle of operation within a singular container.

It is still another object of this invention to provide an oil filter cleaner which functions to effectively flush all the impurities collected within a used filter by means of passage of a liquid solvent therethrough, and then subsequently, but automatically, pass a stream of fresh compressed air or gas through the filter to remove any excess solvent thereby substantially drying the cleaned filter.

It is yet a further object of this invention to provide an oil filter cleaner wherein the solvent used to clean the oil filter is itself simultaneously filtered to remove any of the collected residue, with this solvent filter being readily accessible for removal and replacement after a cleaning of each oil filter.

It is an additional object of this invention to provide an oil filter cleaner which is constructed as a compact unit, easily assembled and handled, and employed with a minimum of labor participation.

Other objects will become apparent to those skilled in the art in the light of the following summary, description and accompanying drawings.

SUMMARY OF THE INVENTION

In accordance with the teachings of this invention, a design for an oil filter cleaner is disclosed comprising a container which supports all of the components that cooperate to perform the precess of cleaning a used filter. In addition, the container of this filter cleaner is conveniently segmented into separate and distinct compartments, one of which is arranged to provide for easy access so that the filter may be quickly mounted pending the cleaning process with the remaining compartmentalized area furnishing closed interim and normal storage areas for the solvent following a cleaning operation. As disclosed in the drawings, these latter two storage areas are disposed vertically beneath that compartment in which the filter is cleaned during the flushing operation, and therefore, as the liquid cleaner or solvent is discharged after passage first through the oil filter and then through the solvent filter, it falls by gravity initially into the temporary storage space before being admitted back into the lower compartment of the container. Under this arrangement, as the solvent itself is discharged from the oil filter, and usually conveys the dirty residue and deposits of the filter with it, the solvent is filtered substantially clean of this dirt before it settles back down into storage. Consequently this process for cleaning oil filters is enhanced and expedited because not only may an oil filter be facilely mounted to the cleaning apparatus, but a readily disposable filter paper or the like used to filter the cleaning solution may be replaced after each cleaning operation, if necessary. These conveniences significantly reduce the amount of labor time and effort that must be expended during usage of this oil filter cleaner.

The principle of operation of this particular filter cleaner is to induce a solvent under pressure from compressed air or gas to flow through the air filter and dislodge the dirt particles along with accumulated oil. Therefore, the container as constructed for use in this cleaning apparatus must be built to withstand the operating pressures, and this is particularly so when the air under pressure is first released into the container and allowed to build up for the purpose of urging the solvent to rise up to and through the positioned oil filter. A container constructed of materials calculated to withstand 100 pounds of pressure is adequate, especially since the operating pressures of the apparatus normally achieve pressures in the vicinity of 20 to 40 p.s.i. The various pressure gauges and valves built into this filter cleaning apparatus likewise should be selected for their ability to function at or above the foregoing revealed pressure levels.

The means employed for tenaciously holding the oil filter during the cleaning operation functions additionally to be a

benefit to the process not only from the standpoint of reducing the amount of time that must be employed in fastening the filter tightly to the cleaner, but also holds the full length of the filter directly contiguous to the diffuser that discharges the solvent thereby assuring that solvent permeates to all internal portions of the oil filter. More specifically, the tube member employed in directing the solvent under pressure upwardly to its integral diffuser portion threadedly engages with the plate means that embrace tightly upon the oil filter when supported in the container. And, since this diffuser is of substantial length so as to provide for the mounting of filters of varying dimensions thereupon, regardless of the length of oil filter being cleaned, the diffuser will accommodate the same and discharge its cleaning solvent only from that portion of the diffuser which is in contact with the interior of the oil filter. This arrangement insures efficient use of the solvent. The plate that embraces the upward portion of the filter to secure it in place upon the diffuser is so constructed as to prevent the needless discharge or waste of any of the solvent from that portion of the diffuser which projects above the seated filter. Therefore, it can be stated that the diffuser portion of the tube member employed in this invention not only functions to mount the filter in place during the flushing process, but also efficaciously determines the limits of discharge of the solvent into the soiled filter.

The type of solvents or cleaning fluids employed in this particular apparatus may be generally of the type which are useful for dissolving or eliminating the diverse sludge, oil deposits, or other residue which accumulate within an oil filter after extended usage. Illustrative of the various solvents which may effectively dissolve oil or dirt deposits are the various hydrocarbon solvents, such as gasoline, benzene or kerosene. Other cleaners, such as of the detergent type, may be useful in cutting dirt. These cleaning fluids, when not in use, are automatically disposed within the substantially closed compartment formed in the lower portion of the container of the apparatus, and therefore, the likelihood that the solvent may become diluted with other moisture or evaporate is rather negligible. The only time the cleaning fluid becomes exposed to any quantity of air is when the pressurized air released into the closed compartment forces first the solvent and then air upwardly through the tube and its integral diffuser for discharge into the oil filter. But, immediately after the fluid passes through the oil filter and is discharged from the same, it is itself immediately filtered to remove any residue and eventually returned to the closed compartment pending reusage. In this manner the oil filter cleaner allows for repeated usage of the solvent or cleaning fluid without necessitating frequent change of the same.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 provides a transverse sectional view of the oil filter cleaner of this invention;

FIG. 2 is a fragmentary sectional view of modification in the oil filter cleaner showing the means for mounting the integral-type oil filter in place; and

FIG. 3 is a partial sectional view of the oil filter cleaner showing a modification in the means for mounting the cartridge-type oil filter during the cleaning process.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring now to FIG. 1 of the drawings for an illustrative embodiment of the oil filter cleaner of this invention, reference numeral 1 generally depicts that the apparatus comprises a container being vertically disposed and arranged for supporting interiorly the various components employed to clean an oil filter, herein shown to be of the cartridge type oil filter 2. The container is disclosed to be supported on its base 3, and to facilitate movement of the cleaning apparatus a series of casters 4 mount to the underside of the base and support the apparatus moveably upon the ground. The container is herein shown being segmented into three separate compartments 5, 6, 7, with a tubular member 8 being vertically disposed substantially through the aforesaid segments of the container. Resting upon the upper edge 9 of the container in an arcuate or dome shaped lid 10 which is useful for covering the container during the filter cleaning operation thereby preventing the undesirable escape of any of the cleaning solvent as it is discharged under pressure after passing through the oil filter. The lid 10 although effective in preventing the loss of any of the discharged solvent as through splashing, or the like, effectively allows the release of any pressurized air as it also discharges simultaneously from the oil filter. To achieve such, the lid 10 has near its periphery a depressed portion 11 that blends integrally into the marginal lip 12. When the lid 10 is seated upon the container, the lip 12 rests and is supported upon the upwardly projecting bosses 13 that rise from the upper edge 9 of said container. Through this arrangement it can be readily seen that a space 14 is formed intermediate the marginal lip 12 of the lid and the upward edge 9 of the container, and in this manner the air under pressure being released from the oil filter as it is being cleaned is free to escape from the apparatus, but to the contrary, the solvent is restrained from following the same course.

The lower segment 5 of the container, more descriptively defined as a substantially closed compartment, is partitioned from the compartment 6 by means of a hermetic upper wall 15. The outer wall of the container 1 forming this closed compartment has mounted thereto an inlet 16 through which the air under pressure enters into the compartment 5, with this inlet being controlled by means of an adjustable valve 17, allowing for manual control of the air passing into said compartment. A meter 18 mounted integrally upon the inlet valve provides a visual indication of the quantity of air pressure entering into the compartment at any given moment during operation of this oil filter cleaner. Mounted within the closed compartment 5, and more specifically attaching to its upper wall 15 is a check valve 19 which is useful for allowing the drainage of the collected solvent, temporarily retained within the area 6, back into the lower compartment 5, as upon termination of a cleaning operation. By, this check valve precludes the flow of solvent in the manner as just described when any degree of air pressure is retained in the compartment, while simultaneously checking the release of said pressurized air from the compartment 5 through the valve. This lower compartment 5 is provided with a drain plug 20 which may be removed from its threaded engagement with the base 3 as when it is desired to drain any solvent from this compartment.

As previously described, the tubular member 8 extends into the lower compartment 5, but its lower and open end 21 is arranged slightly above the base 3. This lower end of the tubular member is stabilized structurally by means of a series of gussets 22 which are rigidly affixed to both the proximate tubular member and the base 3, as by the common welding process. This tubular member 8 extends upwardly from the compartment 5, into and through the area 6 of said container, and projects upwardly into the operating area 7 of the filter cleaner. A portion of the tubular member that projects into the area 7 is disclosed being constructed into the form of a diffuser 23, having a series of apertures, such as at 24, being provided along its length. Although the diffuser 23 and tubular member 8 are herein disclosed as separable members which are held together by means of the adapter 25, it is conceivable that these two parts may comprise an integral unit with the diffuser simply being formed in the upward portion of said tubular member. The upward end of the diffuser 23 is shown to be plugged, as in 26, so as to prevent the discharge of any solvent from this end. The adapter 25 is shown having external threads 27 formed at its upward portion, and these threads are disposed for engagement with a base plate 28 which provides the means for support of the filter cartridge 2 during its cleaning process. To stabilize the filter in its seating upon the diffuser, an upper plate 29 threadedly engages with the upward portion of said diffuser, and is turned until it engages and

binds tightly upon the filter, holding it in place during the cleaning. The plate 29 is provided with slots 30 which may be conveniently gripped with fingers as when it is desired to rotate the plate onto or remove it from the diffuser.

Intermediate the areas 6 and 7 of the container there is provided a supplemental filter 31 which is useful for removing any of the impurities entrained in the solvent by reason of its having just passed through the dirty oil filter. This filter 31 may be constructed as any standard type of filtering device, such as of fine mesh screen, fiber, or the like, which is useful for filtering those type impurities which normally collect within a used oil filter. The filter is held within the container by means of concentric ring supports 32 and 33 which connect, respectively, to the inner side of the container wall 1 and to the adapter 25.

In operation, the apparatus of this invention functions to clean the components of an oil filter, such as the cartridge type 2, as herein shown, and then immediately subsequently filter the impurities from the solvent as it just passes through and discharges from the cleaned oil filter. Normally, the solvent or cleaning fluid will be statically stored within the closed compartment 5, and an oil filter 2, requiring cleaning, will be seated upon the diffuser 23, and held in place by means of the cooperating plates 28 and 29. Under this arrangement the cleaner is prepared for operation. Then, the valve 17 of the inlet 16 may be opened sufficiently to allow for that quantity of pressurized air to pass into the compartment 5 for inducing the solvent disposed therein to move upwardly within the tubular member 8 and to said diffuser. At the inception of this step the check valve 19 will close under the pressure of the air thereby precluding release of air from the same, while at the same time preventing any further solvent, if any remains in area 6, from draining back into compartment 5. As the solvent under pressure moves upwardly into the diffuser, it is discharged laterally through its apertures 24 and into the filter 2, pervading throughout the same, thereby reacting within the oil deposits or impurities contained therein to effectuate their discharge from the filter. After a sufficient quantity or most of the solvent has passed through the filter, most of the sludge and impurities previously contained therein will have been conveyed from the same. As the quantity of solvent within the compartment 5 reaches a level below the lower end 21 of the tubular member, immediately pressurized air will commence to rise within the tubular member 8, and itself be discharged from the diffuser 23. This process will be continued until such time as it becomes apparent that sufficient pressurized air has passed through the oil filter for that length of time necessary to force any remaining impurities out of the filter, and also to accomplish a driving out and drying of any of the remaining solvent that may have been detained by the filter. In the meantime, all of the solvent discharged after passing through the filter falls upon the supplemental filter 31 and filters through the same. But, during its passage, any of the impurities or sludge that may have accumulated within the solvent will itself be strained by this filter thereby allowing only a cleaner solvent to fall into the area 6 for temporary deposit. Subsequently, when it is determined that the filter 2 has been thoroughly cleansed and dried sufficiently, the valve 17 may be closed, thereby allowing the check valve 19 to once again providing for drainage of the solvent back into the closed compartment 5, and ready for reusage in flushing another oil filter. The efficacy of this process in passing first a solvent sand then compressed air through the filter to effect its cleaning should be readily apparent, and the sequence of operation of the cleaning apparatus wherein the solvent itself is filtered for subsequent usage during performance of the cleaning operation certainly is an attribute of an effective operation.

A modification in the means for mounting an oil filter within the cleaning apparatus is disclosed in FIG. 2, wherein an oil filter 34, being of the integral type wherein its filter element is permanently enclosed within an encasement, is shown mounted by means of the adapter 35 to the upward portion of the tubular member 36. A sleeve 37 may be provided for facilitating the connection of the adapter to the tubular member, or the tubular member 36 itself may project slightly upwardly into the cleaning area 38 and be threadedly engaged to said adapter 35. Filters constructed in the manner of the integral type filter 34 allows the cleaning solvent to pass upwardly through its central cavity, permeate its filtering element, and then be discharged through the outlets contained in its lower portion. After the solvent is discharged from the filter it may then pass through the filtering element 39, which is herein shown being formed as the fibrous or paper type and which may be readily removed and disposed of after each cleaning of an oil filter. The filter 39 is supported by means of an apertured plate 40 which in turn is held in place by means of the concentric ring supports 41 and 42 which are secured, respectively, to the container wall and the adapter.

A further modification in this apparatus is disclosed in FIG. 3, wherein the oil cleaner is adapted to mount a variety of sizes in the cartridge type oil filters, such as the oil filter 43 shown. The container 44 of the apparatus is constructed similarly to those previously described, and includes a lid 45 which may or may not be mounted flush with the upper edge of the container, and which also can be tightly secured to said container by any type of fastening means. The lid can be of transparent or opaque material as desired. Separating the container into the various sections 46 and 47 is a filter element 48 which is supported by the concentric rings 49 and 50 that connect, respectively, to the container wall and the adapter element 51. The adapter is firmly secured to the upward end of the tubular members 52 which extends downwardly into the substantially closed compartment, not shown in this embodiment, with the adapter projecting upwardly into the area 46, and having external threads for engagement with the base plate 53. Further engaging with the adapter is a diffuser 54 which includes both a series of apertures, as at 55, throughout its entire length, and additionally is externally threaded, as along 56, throughout this same dimension. For securing the cartridge filter in place during the cleaning operation, there is provided an upper plate 57 which may be turned downwardly upon the diffuser until it engages with the filter and tightens against the same. The plate 57 has projecting upwardly therefrom a length of sleeve 58 which is also threaded for engaging with the diffuser. This sleeve is of substantial length, and consequently, may be turned downwardly for some distance upon the diffuser to function primarily in preventing the escape of any of the solvent from the covered apertures that are in contiguity with the sleeve 58. Through this arrangement, oil filters of varying lengths may be inserted upon the diffuser, and the sleeve portion 58 of the upper plate 57 turned downwardly upon the diffuser until such time as the plate tightens against the oil filter. A single diffuser having some length may be secured in the apparatus and need not necessarily be changed over to a different length each time an oil filter of different size requires cleaning. Eliminating this one detrimental feature present in most of the prior art filter cleaners benefits this invention, and expedites its use. Furthermore, since the diffuser is apertured throughout its length, regardless of the size of the oil filter placed upon the same, the solvent will flow only from that portion of the diffuser that is in contact with the filter, and not just from a short length of the diffuser that only partially projects into the filter, as shown in many earlier cleaners. The present arrangement produces a thorough cleaning of a used oil filter, and not just a partial cleansing.

Numerous variations in the construction of the oil filter cleaner of this invention, within the scope of the appended claims, will occur to those skilled in the art in light of the foregoing disclosure. The embodiments shown herein are merely illustrative, and are presented to display examples of how the principle of this particular invention operates.

We claim:

1. A filter cleaner for use in flushing by means of a solvent an oil filter of the type normally used in conjunction with an internal combustion engine comprising a container, said container having a substantially closed compartment formed integrally in its lower portion and arranged for normally retain-

ing the solvent used in cleaning the oil filter, the upward portion of the container providing an area for retention of the oil filter during the flushing process, there being an area formed intermediate the upper and lower portions of the container for providing temporary disposition of the solvent after it passes through the oil filter, said upper, intermediate and lower portions being integrally formed of the container and being vertically arranged upon each other, tube means supported in said container and extending from proximate the lower regions of the closed compartment at its downward end and opening into the upward area of the container at its other end, means rigidly supporting an oil filter associated with the end of the tube means projecting into said upper area of the container, means admitting gas under pressure into the closed compartment thereby forcing said solvent and the gas through the tube means and into and through the supported oil filter, means allowing discharge of the compressed gas from the upward area of the container, a supplemental filter arranged between said upward and intermediate areas of the container for filtering the cleaning solvent discharge from the oil filter and before its temporary depositing within said intermediate area, and a valve communicating between said intermediate areas and the closed compartment for providing drainage of the filtered solvent back into said closed compartment.

2. The filter cleaner of claim 1 wherein the filter arranged between the upward and intermediate areas of the container is formed of fibrous material and is disposable after each cleaning of an oil filter.

3. The filter cleaner of claim 1 wherein a segment of the tube means extending into the upper area of the container is formed as a diffuser, said oil filter seating upon this diffuser segment of the tube means thereby directing the solvent and compressed gas to enter into and pervade throughout the oil filter during the flushing operation, and the means supporting said oil filter confining the flow of solvent substantially through said filter while preventing its discharge from the filter ends.

4. A filter cleaner for use in flushing by means of a solvent an oil filter of the type normally used in conjunction with an internal combustion engine comprising a container, said container having a substantially closed compartment formed integrally in its lower portion and arranged for normally retaining the solvent used in cleaning the oil filter, the upward portion of the container providing an area for retention of the oil filter during the flushing process, there being an area formed intermediate the upper and lower portions of the container for providing temporary disposition of the solvent after it passes through the oil filter, tube means supported in said container and extending from proximate the lower regions of the closed compartment at its downward end and projecting upwardly and opening into the upper area of the container at its other end, means rigidly supporting an oil filter associated with the end of the tube means projecting into said upper area of the container, said tube means projecting into the upper area of the container being formed as a diffuser, said oil filter seating upon this diffuser segment of the tube means thereby directing the solvent and compressed gas to enter into and pervade throughout the oil filter during the flushing operation, the diffuser segment of the tube means being externally threaded, base means provided proximate the lower end of the diffuser for holding said oil filter upon the diffuser, a plate threadedly engaging with the diffuser for use in tightening against the upper end of said oil filter thereby furnishing its rigid support during the flushing operation, means admitting gas under pressure into the closed compartment thereby forcing said solvent and a gas through the tube means and into and through said diffuser and supported oil filter, means allowing discharge of the compressed gas from the upper area of the container, a supplemental filter arrangement between said upper and intermediate areas of the container for filtering the cleaning solvent discharged from the oil filter and before its temporary depositing within said intermediate area, and a valve communicating between said intermediate area and the closed compartment for providing drainage of the filtered solvent back into said closed compartment.

5. The filter cleaner of claim 4 wherein the plate is provided with means for grasping and facilitating its rapid turning during its threaded engagement with the diffuser.

6. The filter cleaner of claim 4 and further characterized by a sleeve integrally connecting with the plate and projecting axially upward from its surface thereof, said sleeve being threadedly engaged with that portion of the diffuser inserting within the sleeve thereby preventing discharge of the solvent from this contiguous portion of the diffuser.

7. A filter cleaner for use in flushing by means of a solvent an integral type oil filter of the kind normally used for end mounting with an internal combustion engine comprising a container, said container having a substantially closed compartment formed integrally in its lower portion and arranged for normally retaining the solvent used in cleaning the oil filter, the upper portion of the container providing an area for retention of the oil filter during the flushing process, there being an area formed intermediate the upper and lower portions of the container for providing temporary disposition of the solvent after it passes through the oil filter, said upper, intermediate and lower portions being integrally formed of the container and being vertically arranged upon each other, tube means supported in said container and extending from proximate the lower regions of the closed compartment at its downward end and opening into the upper area of the container at its other end, means rigidly supporting an oil filter associated with the end of the tube means opening into the upper area of the container, said means comprising an adapter that threadedly engages with said end of the tube means, said adapter being disposed for threadedly engaging with an end of the oil filter, means admitting gas under pressure into the closed compartment thereby forcing said solvent and the gas through the tube means and adapter and into and through the supported filter, the seating of said oil filter upon said tube means and adapter providing for the directing of the solvent and compressed gas to enter into and pervade throughout the oil filter during the flushing operation thereby confining the flow of solvent substantially through said filter, means allowing discharge of the compressed gas from the upper area of the container, a supplemental filter arranged between said upper and intermediate areas of the container for filtering the cleaning solvent discharged from the oil filter and before its temporary depositing within said intermediate area, and a valve communicating between said intermediate area and the closed compartment for providing drainage of the filtered solvent back into said closed compartment.

8. The filter cleaner of claim 7 wherein the filter arranged between the upward and intermediate areas of the container is formed of fibrous material and is disposable after each cleaning of an oil filter.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,566,892 Dated March 2, 1971

Inventor(s) Russell F. Logue et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 5, lines 58 and 59, "once again providing" shou read -- once again open providing --; line 62, "sand" shoul read -- and --.

Signed and sealed this 14th day of September 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Pa