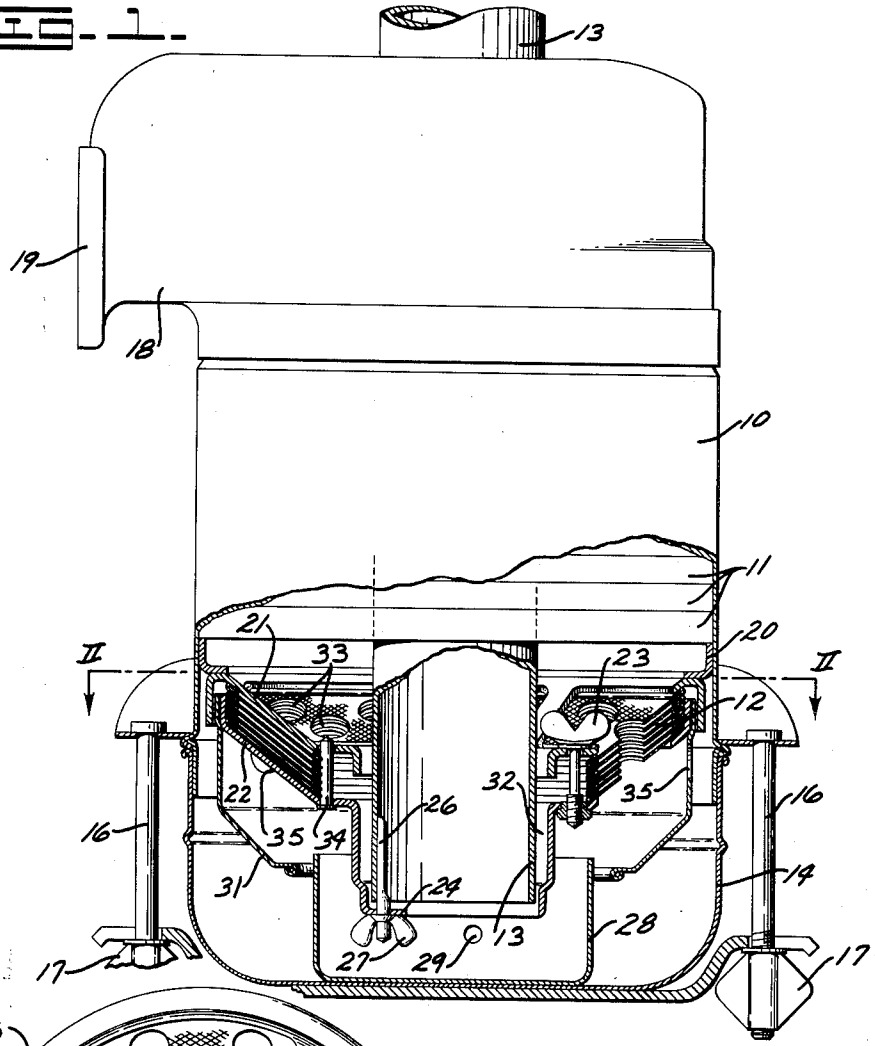
Dec. 23, 1952 J. L. DEFFENBAUGH 2,622,695

OIL BATH AIR CLEANER

Filed Jan. 17, 1951

FIG. 1.



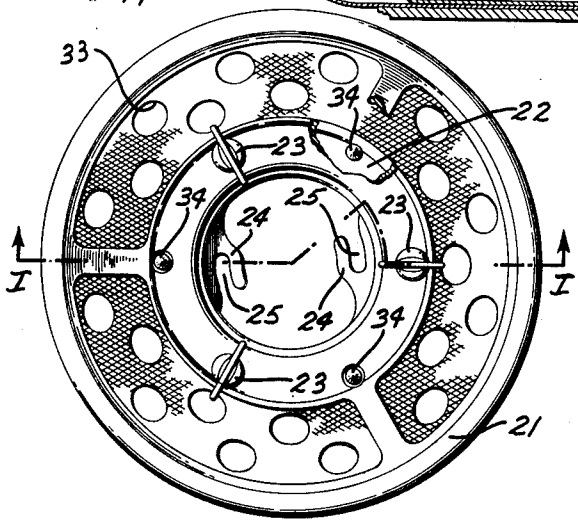


FIG. 2.

INVENTOR.
John L. Deffenbaugh
BY
Charles M. Fryer
ATTORNEY.

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OIL BATH AIR CLEANER

John L. Deffenbaugh, Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill., a corporation of California

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3 Claims. (Cl. 183—15)

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The present invention relates to an oil bath air cleaner for an internal combustion engine or the like and more particularly to means for preventing oil carry-over from the air cleaner into the engine.

In an oil bath air cleaner of the type in which the air is mixed with oil and passed through a set of relatively fine mesh pre-cleaning screens before passing through a set of relatively coarse mesh screens for collecting the oil and dirt, one of the principal difficulties encountered is that under some conditions the pre-cleaning screens become plugged and the resulting high velocity air escaping around these screens carries a large part of the oil and dirt past the collecting screens into the engine cylinders. This oil carry-over is undesirable in that the dirt formerly in the air is suspended in the oil and when it is carried into the engine cylinders causes rapid wear of the piston rings and cylinder walls. In addition, the oil carry-over frequently is the cause of the engine running away because the lubricating oil acts as fuel in the cylinders.

It is, therefore, an object of the present invention to overcome this difficulty by providing an improved pre-cleaning screen for use in such an air cleaner to eliminate complete plugging of the screen, thus preventing the condition which causes oil carry-over to the engine.

Other objects and advantages of this invention will be made apparent in the following specification wherein reference is made to the accompanying drawings.

In the drawings:

Fig. 1 is a view in side elevation of an oil bath air cleaner embodying the present invention with parts broken away to more clearly illustrate its construction; and

Fig. 2 is a plan view of the improved pre-cleaning screens with parts broken away to more clearly illustrate their construction.

In Fig. 1, an oil bath air cleaner embodying the present invention is illustrated as comprising a housing 10 enclosing a set of relatively coarse mesh screens supported in frames shown at 11 and a set of relatively fine mesh pre-cleaning screens 12 interposed between the housing and a central inlet pipe 13. The lower end of the housing is closed by a cup-like cover 14 detachably secured to the housing by bolts 16 and wing nuts 17. Adjacent its upper end, the housing is provided with an outlet 18 having a flanged end 19 for connection with the intake manifold of an internal combustion engine (not shown).

The screens 11 are held in place by a flanged

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retainer ring 20 secured to the housing as by welding or the like. The ring 20 also serves to position the set of pre-cleaning screens 12 which are disposed between upper and lower frame members 21 and 22 secured to each other by cap screws 23. The lower frame member 22 is provided with inwardly extending ears 24 having slots illustrated at 25 in Fig. 2 for the reception of studs 26 secured to and extending from the inlet pipe 13. Wing nuts, only one of which is illustrated at 27 in Fig. 1, are provided for pressing the upper frame 21 into engagement with the retainer ring 20. Thus the pre-cleaning screen unit may be removed without disturbing the screens 11. To remove the unit the cover 14 is first removed then the wing nuts 27 are taken off to permit the pre-cleaning unit including the screens 12 and frame members 21 and 22 to drop free of the housing. The screens 12 may be separated from each other to facilitate cleaning them by removing the screws 23 from the unit. A centrally located inner cup 28 is rigidly secured to the cover 14 in the path of the air discharged from the inlet pipe. The cup 28 and cover 14 are adapted to contain oil for intermixing with the air and communicate with each other by way of an opening 29 provided in the cup. Splashing of the oil is reduced by a funnel shaped splash shield 31 carried by frame member 22.

In operation, air entering the cleaner through inlet pipe 13 passes downwardly through cup 28 intermixing with the oil and then passes upwardly through the pre-cleaning screens 12 and screens 11 to the outlet 18. The removal of dirt from the air is primarily accomplished by contact with the oil, and it is imperative that good intermixing of the oil and air be obtained. In actual practice, the cup 28 is practically swept free of oil which is collected on the screens and is fed back into the entering air stream by way of the opening 29 in the cup 28 as well as over its upper edge. After the air passes through the cup, a substantial portion of the oil and dirt is collected on the pre-cleaning screens 12 and is blown outwardly toward the splash shield 31 where it is returned to the cup-like cover 14 by gravity. This oil carries a majority of the dirt formerly in the air which is permitted to settle out in the cover, and relatively clean oil is then fed back into the inner cup for recirculation through the cleaner. That part of the oil which is carried through the screens 12 is collected on the screens 11 and flows downwardly by gravity along the outside wall of the housing across

screens 12 and then downwardly through an annular space 32 between the inlet pipe 13 and the frames supporting the screens. This oil is relatively clean and is fed back into the entering air stream for recirculation through the cleaner.

In the past, one of the principal difficulties encountered with this type of cleaner was that operation in excessively dirty air for prolonged periods resulted in the screens 12 becoming plugged. As a result, all of the air going to the engine was forced to pass upwardly through annular space 32 at a high velocity. This passage of high velocity air caused channeling through the screens 11 and carried substantial quantities of oil through the outlet 18 into the engine cylinders. The passage of air through annular space 32 at a high velocity prevented the return of oil collected on the screens 11 further aggravating the condition, as well as causing the oil to become laden with abrasives which, in turn, caused rapid wear of the piston rings and cylinder walls.

This difficulty has been overcome in the present invention by the provision of a plurality of spaced openings 33 provided in the screens 12. Guide pins 34 carried in the lower frame member 22 facilitate alignment of the openings of the several screens at assembly. These openings are of such a size and are so spaced that during normal operation, only a small part of the air passes through the openings, and as a result there is a minimum of change in the air cleaning efficiency. However, in the event that the screens become plugged, the openings 33 allow air to pass through the pre-cleaning screens at a velocity below which channeling in the screens 11 occurs thus avoiding the condition which causes oil carry-over to the engine.

A further improvement includes the provision of a plurality of openings 35 adjacent the upper end of the splash shield 31 which permits the oil collected on the screens 12 to return to the cover 14 along the outside of the splash shield well out of the entering air stream. These openings are provided to avoid the possibility of dirt laden oil recirculating within the cleaner without allowing a settling out period for the dirt.

I claim:

1. In an oil bath air cleaner comprising a housing containing oil for intermixing with the incoming air, a set of relatively fine mesh screens for pre-cleaning the mixture of air and oil, and a set of relatively coarse mesh screens for collecting the oil carried through the pre-cleaning screens, said pre-cleaning screens having relatively large perforations to prohibit complete stoppage of air flow through the screens by foreign matter collected thereon and means for removing the pre-cleaning screens from the housing without removing the coarse mesh screens.

2. In an oil bath air cleaner comprising a housing containing oil for intermixing with the incoming air, a set of relatively fine mesh screens for pre-cleaning the mixture of air and oil, a set of relatively coarse mesh screens for collecting the oil carried through the pre-cleaning screens, relatively large perforations through said pre-cleaning screens to prohibit complete stoppage of air flow through the screens by foreign matter collected thereon, separable frame members for clamping the pre-cleaning screens together, and guide pins extending from one of the frame members for aligning the perforations in the screens one of said separable frame members having perforate lugs thereon and threaded securing means in the housing passing through said lugs to permit removal of the frame members and pre-cleaning screens.

3. In an oil bath air cleaner comprising a housing having a reservoir adapted to contain oil for intermixing with the incoming air, a set of relatively fine mesh screens for pre-cleaning the mixture of air and oil, a set of relatively coarse mesh screens for collecting the oil carried through the pre-cleaning screens, separable frame members for clamping the pre-cleaning screens together, a funnel shaped splash shield supported by and below the frame members, and perforations adjacent the upper part of the splash shield to allow oil collected on the pre-cleaning screens to return to said reservoir along the outside surface of the splash shield.

JOHN L. DEFFENBAUGH.

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