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FILTERING USED MOTOR OILS

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It is common practice in the operation of automobile engines to by-pass a portion of the crank case lubricating oil so that it passes through a filtering material adapted to take out the small particles of metal, dirt or other impurities collected by the oil. Wool and fibrous asbestos have been suggested as suitable materials for this purpose.

We have found that improved results are obtained by the use of a fibrous or filamentous material prepared from blast furnace slag or analogous material as hereinafter defined. The general type of material is known in the trade as mineral wool. A typical analysis of a cupola slag is as follows:

	Percent
Silica	35.12
Iron oxide	1.78
Aluminum oxide	14.30
Titanium oxide	0.85
Manganese oxide	1.05
Calcium oxide	30.01
Magnesium oxide	16.42
Sulfur	0.43

This material gives a slightly alkaline reaction in water. We have demonstrated that this alkalinity is advantageous in automobile filters as it neutralizes the acidity which tends to develop in the oil.

It will be understood that the invention is not limited to the particular composition indicated above. The essential requirements for mineral wool to be used in this invention are that it shall be composed of interlaced or matted fibers capable of forming a depth filter bed which will take up the impurities throughout its mass. For best results the fllter bed should serve also to neutralize the acidity of the oil.

If in any case the slag (or equivalent artificially formed mineral fusion product) does not contain naturally enough basic material for this purpose, an adequate amount may be added in the form of a solid base (preferably anhydrous) such as sodium oxide, potassium oxide, magnesium oxide, the corresponding carbonates, and the like. It is preferred to add these materials to the slag while fused and before the blowing treatment which divides it into the filamentous or fibrous form (slag wool). However, it is within the scope of the invention to incorporate alkali into the fibres in other ways, as by commingling the same with small amounts of solid alkaline materials insoluble in oil, after the slag has been finely divided.

In some cases the slag fibres contain short pieces which are objectionable in the filter. To remove these pieces the slag fibres may be treated by gentle air blowing to displace them, or by slowly passing liquid through the material to float away the small undesired particles.

Our invention has been described particularly in connection with filling material for filters on automobiles or other self-propelled vehicles, but it will be understood that other applications of the idea are equally advantageous, for example, in filters for use in oil reclaimers and the like.

The invention is not limited to any particular form of oil filter. For example, the fibrous slag may be used in structures of the kind shown in the application of Frank A. Howard, Serial No. 597,591, filed March 8, 1932.

Although reference has been made particularly to the use of fibers from blast furnace slag, the invention is not limited to this source of material. Many types of artificially prepared mineral wool and glass wool possess the necessary interlaced filamentous structure and have, or can be supplied with, the basic character which improves the operation of the present composition. If desired minor proportions of other fibrous materials may be incorporated with the slag filaments or the like, for example cotton linters, wool, asbestos, etc.

Various changes or alternative compositions may be adopted within the scope of the present invention in which it is our desire to claim all inherent novelty as broadly as the prior art permits.

We claim:

1. Method of purifying used lubricating oil, comprising passing the same through a mass of an artificially formed mineral fusion product having a fibrous structure adapted to remove solid particles from the oil and con-

taining, as an integral part of the mass, alkaline material adapted to neutralize acidic compounds in the oil.

2. Method according to claim 1 in which the fibrous, artificially formed, mineral fusion product is fibrous basic slag.

3. Method according to claim 1 in which the fibrous, artificially formed, mineral fusion product contains alkaline material added to the fusion product before the formation of fibers therefrom.

4. Method of purifying lubricating oil while it is being circulated to and from the crank case of an internal combustion engine, comprising continuously passing the oil in increments through a mass of basic slag wool.

5. Method of purifying lubricating oil while it is being circulated to and from the crank case of an internal combustion engine, comprising continuously passing said oil through a fibrous mass of an artificially formed mineral fusion product containing a substantial quantity of alkaline material as an integral part of the fibrous mass.

6. In combination with the mechanical elements of an oil filter, a filter bed comprising fibers of an artificially formed mineral fusion product in condition to act as a depth filter when oil is passed therethrough and containing, as an integral part thereof, alkaline material adapted to neutralize acidic compounds in the oil.

7. In combination with the mechanical elements of an oil filter of the depth type for use in purifying lubricating oil circulating to and from the crank case of an internal combustion engine, a filter bed comprising fibrous slag containing, as an integral part thereof, alkaline material adapted to neutralize acidic compounds in the oil.

8. In combination with the mechanical elements of an oil filter of the depth type for use in purifying lubricating oil circulating to and from the crank case of an internal combustion engine, a filter bed comprising a mass of basic slag wool.

9. In combination with the mechanical elements of an oil filter of the depth type for use in purifying lubricating oil circulating to and from the crank case of an internal combustion engine, a filter bed comprising slag wool containing, as an integral part thereof, alkaline material added to the slag before the formation of the wool therefrom.

10. In combination with the mechanical elements of an oil filter, an oil filtering composition comprising fibrous slag from which the shorter pieces have been removed and which contains a substantial quantity of alkaline material as an integral part of the slag.

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