

June 6, 1933.

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1,913,193

OIL FILTER ARRANGEMENT

Filed July 2, 1928

2 Sheets-Sheet 1

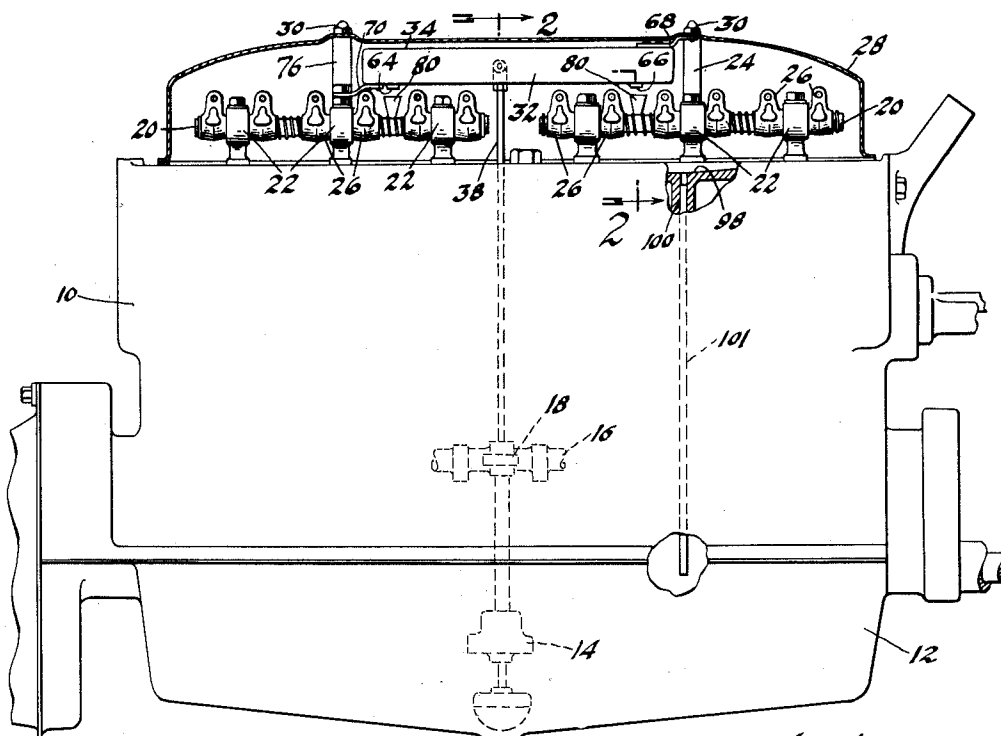


Fig. 1

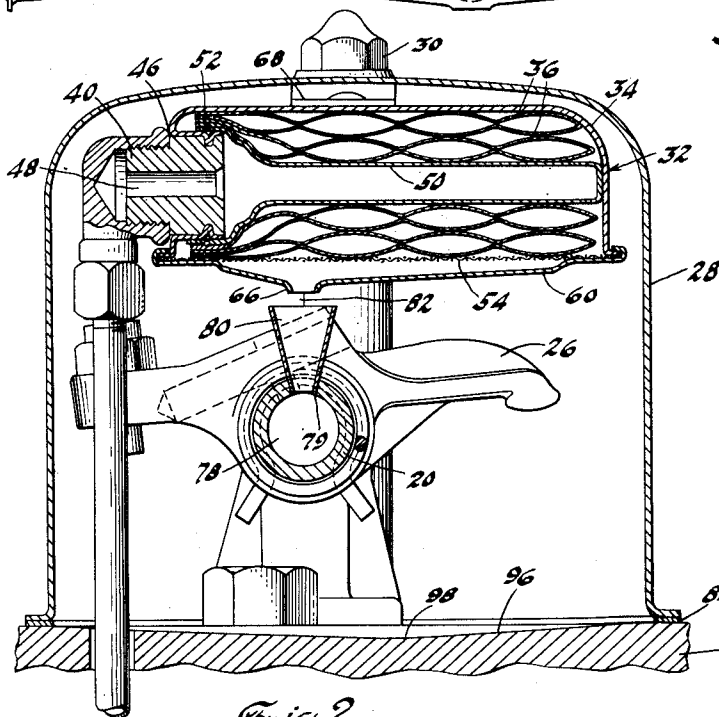


Fig. 2

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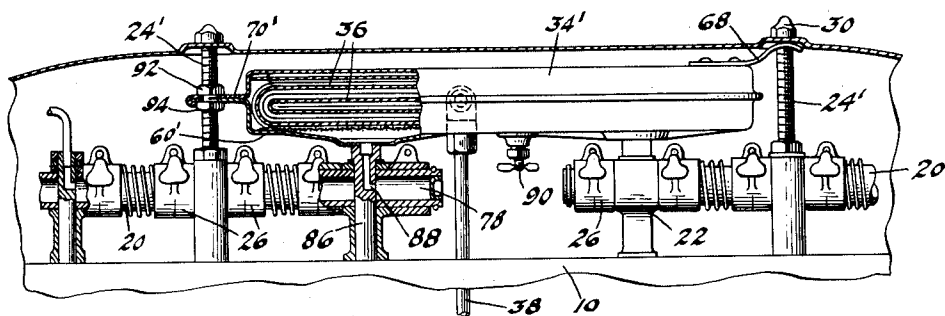


Fig. 5

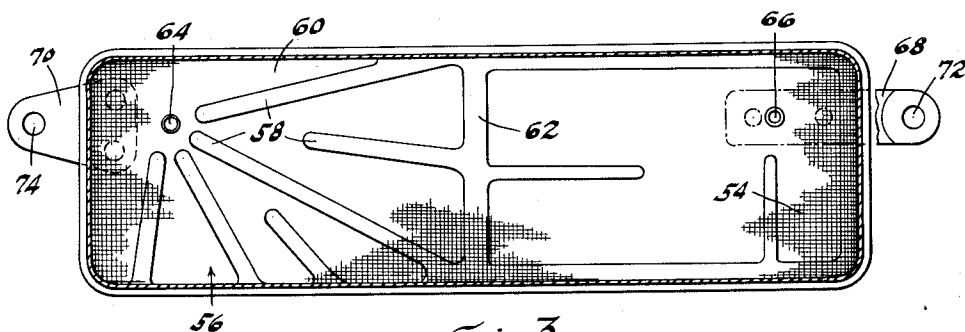


Fig. 3

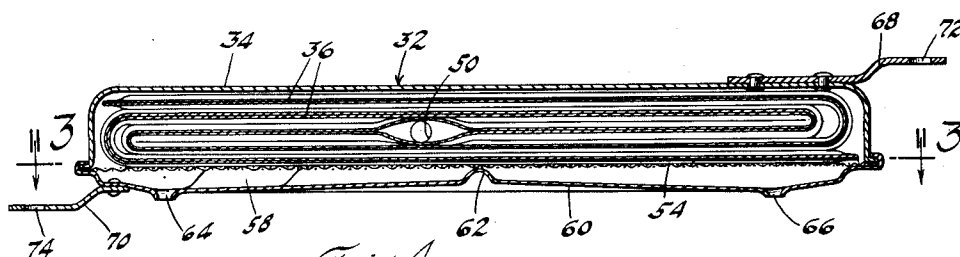


Fig. 4

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UNITED STATES PATENT OFFICE

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OIL FILTER ARRANGEMENT

Application filed July 2, 1928. Serial No. 289,968.

This invention relates to lubricating systems and has particular reference to the arrangement or positioning of an oil filter or lubricant purifier in connection with an oil filtering system used on internal combustion engines as applied to automotive vehicles.

The present type of lubricating system used in connection with automotive vehicles is of the force feed type in which a pump is used to force the flow of oil to the various bearing parts. Positioned in the path of the oil, usually at the dash, is an oil filter or lubricant purifier, which is usually adapted to receive but a portion of the oil discharged by the pump. This oil filter or lubricant purifier has been placed at the dashboard or mounted at some part of the internal combustion engine, and usually requires a considerable amount of piping to properly connect it up with the lubricating system. The filter is also exposed and the piping and filter have been found to be in the way and to interfere with the attachment of various auxiliaries connected with the engine, such as the fuel pump.

It is an object of the present invention to arrange the filter on the internal combustion engine in a position where it is out of the way and to eliminate the greater portion of the piping which the installation of prior filters has necessitated.

The object of the invention is accomplished by placing a relatively long flat lubricant purifier in a cap or housing positioned over the rocker arm shaft and rocker arms of the usual internal combustion engine. This filter has an inlet preferably at its side and comprises a filtering material preferably of the spiral bag type. The bag, instead of being wound in spirals, is wound flat but the filtering is accomplished in substantially the same manner as that obtained with a filtering material of the spiral bag type.

The bearings for the rocker arm shaft have applied thereto screw threaded bolts which

serve to hold the housing or cap in place, and also serve as a means for attaching the container of the lubricant purifier. This container preferably has arms or fingers extending away therefrom which may be applied over the bolts.

The bottom of the lubricant container has arranged therein a plurality of openings, and a plurality of grooves to conduct the oil toward the openings.

Below the purifier or filter and beneath the openings in the container there is positioned, rigid with the rocker arm shaft, a cup or conical shaped receptacle into which the oil from the filter is adapted to flow. This cup or conical shaped member is connected with the hollow interior of the rocker arm shaft, and from this hollow interior the filtered oil is distributed to the shaft bearings. From the bearings the oil will flow onto the engine head, which may be inclined from both sides toward the center so as to form a channel and permit the oil to flow back to the crankcase.

As a modification of the invention, I may cause a rigid connection to be made between the filter container and the interior of the rocker arm shaft and cause the oil to flow through a channel in this rigid connection. Inasmuch as the flow of oil with this second arrangement cannot be observed, it is necessary that a test valve be applied.

Referring to the drawings:

Figure 1 is a side view of an internal combustion engine with parts broken away and shown in section to illustrate the invention.

Figure 2 is an enlarged transverse sectional view of the upper portion of the engine taken on the line 2—2 of Figure 1.

Figure 3 is a plan view of the bottom of the filter container taken substantially on the line 3—3 of Figure 4.

Figure 4 is an enlarged longitudinal sectional view through the filter or lubricant purifier, shown in Figure 1.

Figure 5 is a view of a modification of the structure shown in Figure 1.

Referring to Figure 1, the numeral 10 indicates an internal combustion engine having an oil pan 12, and an oil pump 14. The oil pump 14 is driven from the camshaft 16 by means of a suitable gearing shown at 18. The pump has the usual screen or strainer over the inlet, as shown in dotted outline in Fig. 1.

At the upper end of the engine there is found the usual rocker arm shaft or shafts 20 positioned in the bearings 22. The bearings 22 have applied thereon the bolts or spacers 24 which extend upwardly over the rocker arm shafts 20 and rocker arms 26, and serve as a means for attaching the cap or housing 28 which incloses the rocker arm shafts and the rocker arms. The cap or housing 28 is provided with suitable openings to allow the bolts or spacers 24 to extend there-through and nuts 30 are applied to the extended ends. If desired, bolts may be used and the threaded ends of the bolts applied to the rocker arms.

Positioned over the rocker arms and within the cap or housing 28 is an oil filter or lubricant purifier indicated as a whole at 32. This purifier comprises the outer metallic container or supporting member 34 and the inner filtering material 36. The filtering material is preferably of the spiral bag type and is suitably arranged within the container 34, which is preferably substantially rectangular and somewhat elongated.

The oil pump 14 has a lead pipe 38 which delivers oil from the filter to the inlet stud 40 positioned in an opening 46 at the side of the filter container 34. This inlet stud has the bore or passage 48 which delivers the oil to a central hollow preferably coarse mesh fabric 50 attached as at 52 to the inlet stud 40. Instead of this fabric member 50 use may be made of a flat or cylindrical tube having openings to allow for the egress of the oil to the filtering material 36.

In the bottom of the container 34 there is placed a perforated metal plate or screen or wire gauze 54 which serves as a support for the filtering material 36 and also prevents the filtering material from falling into and choking up the grooves 56 formed in the bottom 60 of the filter container 34. The grooves 56 are formed by pressing upwardly ribs 58 in the bottom 60 of the container 34. The bottom 60 is further provided with the central rib 62 which serves as a dividing line between two outlets 64 and 66 of the filter container. The grooves 56 converge and direct the filtered oil to these outlets or openings 64 and 66, located at opposite ends of the bottom 60.

The container 34 is provided at its opposite ends with arms or fingers 68 and 70, the arm 68 being preferably attached to the upper portion of the container while the arm

70 is preferably attached to the lower portion of the container. The arm 68 is provided with an opening 72 which is adapted to fit over the upper portion of a spacer or bolt 24, while the arm 70 is provided with an opening 74 adapted to receive a bolt 76 which is screwed into a rocker arm bearing. By means of the arms 68 and 70 the lubricant purifier is rigidly held in place.

The rocker arm shaft 20 is hollow as shown at 78 and is provided with openings 79 to receive the cups or conical shaped members 80, which are positioned below the openings 64 and 66 to receive the oil as it drops from the filter 34. The cups 80 are not rigidly connected to the filter container 34 but a space, indicated at 82, is allowed between the bottom of the openings 64 or 66 and the cups 80, the purpose of which space is to observe the flow of oil. This construction will permit the elimination of the usual test valve for by observing the flow of the oil at the space 82, the observer will be able to determine the condition of the filter. If no oil is flowing, the filter is clogged.

A gasket 84 is preferably provided between the cap or housing 28 and the engine block 10 to form a tight connection.

As a modification of the invention, I may provide a rigid connection between the filter container 34' and the rocker arm shafts 20. This rigid connection is shown in Figure 5, and comprises a tubular member 86 having a bore 88 which communicates with the hollow interior 78 of the rocker arm shaft. The connector 86 is rigidly attached to the openings 64 or 66 in the bottom 60' of the container 34'. Inasmuch as this construction will not permit of a visible flow of oil from the container 34 to the rocker arm shaft, it is necessary to provide a test valve 90 to determine the condition of the filter. This test valve is conventional, the structure thereof per se forming no part of the invention.

In the species shown in Figure 5, the arm 68 is substantially the same as that shown in connection with the previous species. The arm or finger 70' at the opposite end of the filter is preferably formed as an integral extension of the overlapping top and bottom portions of the container 34'. This finger 70' is provided with an opening which fits over the threaded bolt or spacer 24' and is held in position by means of nuts 92 and 94 arranged above and below the arm 70' and threaded onto the bolt 24'.

By referring to Figure 2, it will be noted that the top or head portion of the engine block 10 is provided with inwardly sloping sides 96 which form a channel 98 at substantially the mid upper portion of the head of the block 10. At a suitable point along its length this channel is provided with a bore or passage 100 to which there is con-

nected a pipe 101, which allows the oil flowing from the rocker shaft bearings to return to the oil pan 12.

I claim:

5 1. In combination with an engine having a lubricating system interrelated therewith, a housing for a portion of the working parts of the engine, means for supporting the housing on the engine over the working
10 parts, and a lubricant purifier in said system and supported inside of said housing from said supporting means.

2. In combination with an engine having a lubricating system interrelated therewith,
15 a housing or cap for a portion of the working parts of said engine, means for holding the housing or cap to the engine, a lubricant purifier in said system, and means on said purifier engaging said first-named
20 means to support said purifier inside said housing or cap.

3. In combination with an engine having a lubricating system interrelated therewith, a rocker arm shaft and rocker arms on said
25 engine, a housing or cap for said engine inclosing said shaft and arms, a lubricant purifier in said system secured to said engine inside said cap or housing, said purifier comprising an outer container and an inner filtering medium, a plurality of channels or
30 grooves in said container for conducting the lubricant to openings in said container, and means on said rocker shaft to receive the purified lubricant.

4. In combination with an engine having rocker arms and a lubricating system interrelated therewith, a cap for housing the rocker arms, a lubricant purifier in said system, and means mounted on both said cap
40 and the engine for holding said purifier inside said cap.

5. In combination with an engine having a lubricating system interrelated therewith, a hollow member for housing a part of the
45 working parts of the engine, a lubricant purifier in said system, and means mounted on both said member and said engine to secure said purifier in said member.

6. In combination with an engine having a lubricating system interrelated therewith, a hollow member for housing a part of the working parts of the engine, a lubricant purifier including an outer supporting member having an
50 opening to allow the lubricant to flow to the working parts, means on said member to cause the lubricant to flow to the opening, and means to secure said purifier in said member.

7. In combination with an engine having a lubricating system interrelated therewith, a hollow member for housing a part of the working parts of the engine, a lubricant purifier in said system, said purifier including an
60 exterior supporting member having a plural-

ity of openings to allow the lubricant to flow to the working parts, means on said member to cause the lubricant to flow to said openings, and means to secure said purifier in said member. 70

8. In combination with an engine having a lubricating system interrelated therewith, a hollow member for housing a part of the working parts of the engine, a lubricant purifier in said system, said purifier including an exterior supporting member having an opening to allow the lubricant to flow to the working parts, a groove in said member to cause the oil to flow to the opening, and means to secure said purifier in said member. 80

9. In combination with an engine having a lubricating system interrelated therewith, a housing for a portion of the working parts of the engine, bolts extending away from the engine for supporting the housing on the engine over the working parts, and a lubricant purifier in said system and supported inside of said housing from said supporting bolts. 85

10. In combination with an engine having a lubricating system interrelated therewith, a housing or cap for a portion of the working parts of said engine, means for holding the housing or cap to the engine, a lubricant purifier in said system, and arms secured to the purifier and to the first-named means to support said purifier inside said housing or cap. 90

11. In combination with an engine having a lubricating system interrelated therewith, a rocker arm shaft and rocker arms on said engine, a housing or cap for said engine inclosing said shaft and arms, a lubricant purifier in said system secured to said engine inside said cap or housing, said purifier comprising an outer container and an inner filtering medium, a plurality of channels or grooves in said container, and means having a rigid connection with said rocker shaft to receive the purifier lubricant. 100

12. In combination with an engine having a valve operating mechanism and a lubricating system, means for inclosing said mechanism, an oil filter in said system secured to said means inside the same, and a plurality of means attached to the bearing portions of the valve mechanism and adapted to receive oil from the filter. 110

13. In combination with an engine having a valve operating mechanism and a lubricating system, means for inclosing said mechanism, an oil filter in said system secured to said means inside the same, and a plurality of cups attached to the bearing portions of the valve mechanism and adapted to receive oil from the filter. 115

14. In combination with an engine having a lubricating system interrelated therewith, a rocker arm shaft and rocker arms on said engine, a housing or cap for said engine inclosing said shaft and arms, a lubricant puri- 120

125 130

fier in said system secured inside said cap
or housing, said purifier comprising an out-
er container and an inner filtering medium,
means in said container for conducting the
5 lubricant to openings in said container, and
means on said rocker shaft to receive the puri-
fied lubricant.

In testimony whereof I affix my signature.
JAMES M. CRAWFORD.

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