

[54] **ENGINE OIL PAN**
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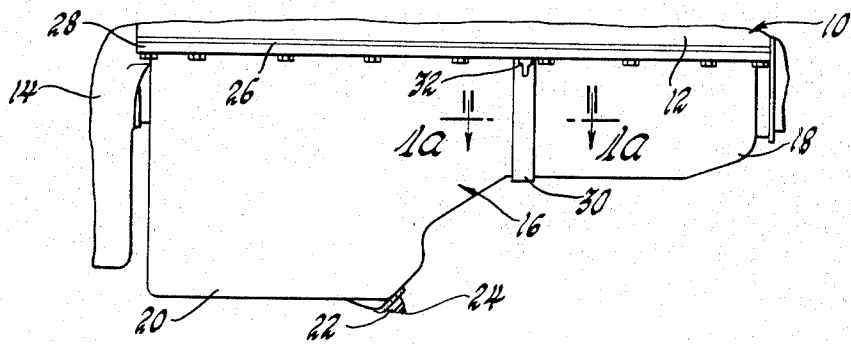
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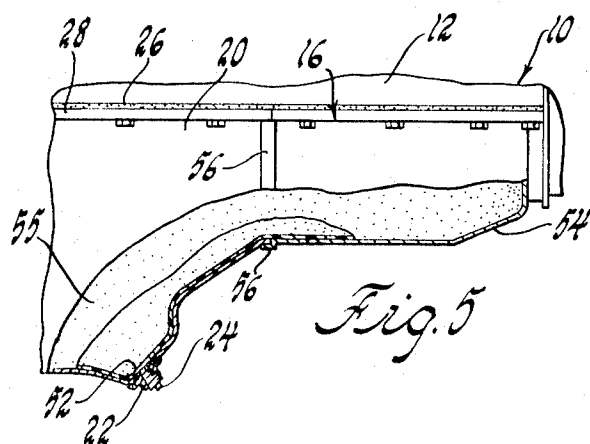
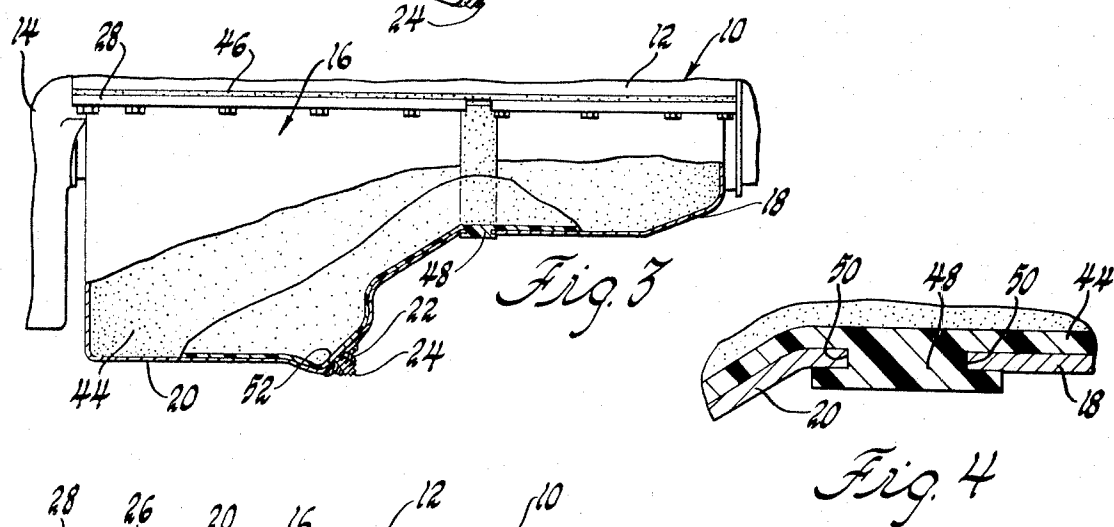
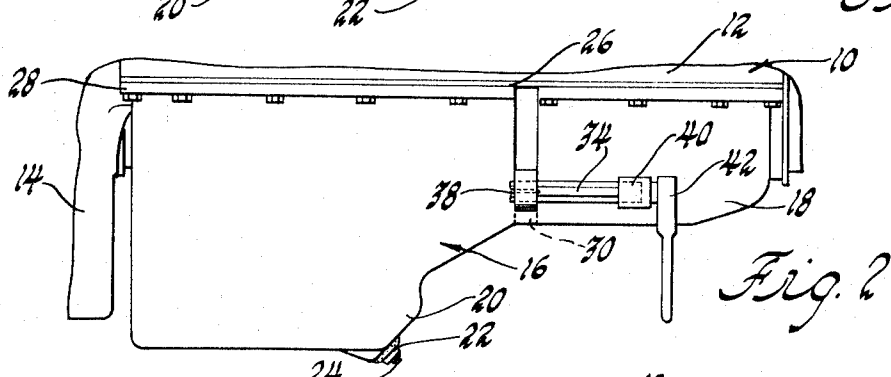
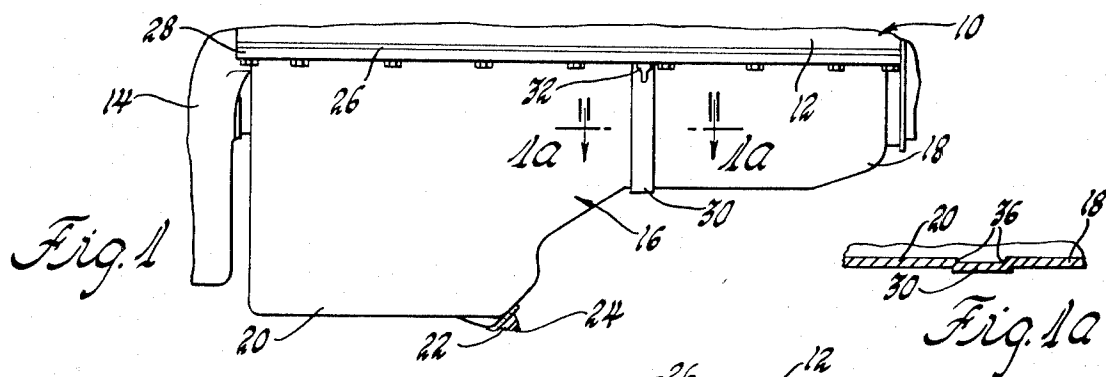
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[57] **ABSTRACT**

An engine oil pan is provided with a tear strip to separate the pan into two portions for ease of removal of the pan when its engine is installed in a vehicle. A flexible plastic liner is used upon reinstallation of the separated portions of the pan to provide an oil containing structure. The liner may also act as a gasket and may include a thickened portion to fill the gap caused by removal of the tear strip.

6 Claims, 6 Drawing Figures





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ENGINE OIL PAN

BACKGROUND OF THE INVENTION

This invention relates to engine oil pans and, more particularly, to an integral pan structure which is separable for removal from the engine and may be provided with a flexible liner upon reinstallation.

In many automobiles of recent manufacture, the arrangement of the engine in relation to the structural and other components of the vehicle frame has required that the engine be either removed from the vehicle or raised from its mounts in order to remove the oil pan or to replace its gaskets. In some instances this requirement has caused additional time and expense which it would be desirable to avoid.

SUMMARY OF THE INVENTION

The present invention provides an oil pan construction which, in its originally installed form, is an integral unit that can be used in the conventional manner and assembled to the engine with standard tooling. The pan is, however, provided with a transverse tear strip, by means of which the pan may be separated into front and rear portions while mounted on a vehicle-installed engine. The pan portions may then be removed from the vehicle without the need to disturb the engine mounting.

Reinstallation of the separate portions of the oil pan is accomplished by adding a preformed flexible plastic liner which cooperates with and is supported by the separate pan portions to provide an oil-tight pan assembly. The plastic liner may take the place of the usual oil pan gasket and may include a thickened portion at the gap created by removal of the tear strip with means to interlock the liner with the separate pan portions.

These and other features and advantages of the invention will be more readily understood from the following description of certain preferred embodiments, taken together with the accompanying drawing.

BRIEF DESCRIPTION OF THE DRAWING

In the drawing:

FIG. 1 is a side elevational view of an internal combustion engine having an integral oil pan formed according to the invention;

FIG. 1a is a cross-sectional view taken in the plane generally indicated by the line 1a—1a of FIG. 1 and showing in detail one form of tear strip;

FIG. 2 is a side elevational view of the engine of FIG. 1 illustrating the manner of removal of the tear strip for separating the oil pan portions;

FIG. 3 is a side elevational view partially in cross section showing the engine with the oil pan sections reinstalled with a flexible plastic liner;

FIG. 4 is an enlarged fragmentary view of a portion of FIG. 3 showing the manner of interlocking the thickened portion of the plastic liner with the separate pan portions; and

FIG. 5 is a fragmentary side elevational view partially in cross section showing an alternative embodiment wherein a flanged replacement portion is used for one section of the oil pan upon reinstallation with the plastic liner.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In the drawing, numeral 10 generally indicates an internal combustion engine having a cylinder block 12 of conventional construction, to one end of which is attached a transmission 14. Along the bottom surface of cylinder block 12 and enclosing the crankshaft and internal mechanism of the engine, not shown, there is provided an oil pan 16 which is formed of sheet metal and is generally conventional in appearance.

Oil pan 16 includes a front portion 18 which is relatively shallow and connects about midway of the length of the engine with a rear portion 20 which is deeper to form a sump for the engine lubricating oil. At a low point in the rear portion 20 a threaded boss 22 is secured, providing a drain opening which is conventionally closed by a pipe plug 24. Gaskets 26 are provided between the upper flanges 28 of the pan and the engine block 12 to prevent leakage of oil through the bolted joint.

Between the front and rear portions 18, 20 of oil pan 16 there is provided a tear strip 30 which extends transversely across and around the central portion of the oil pan. A tab 32 is preferably provided extending from one end of the tear strip so that it may be engaged by a special tool 34, by means of which the tear strip may be rolled up and removed from the oil pan while it is in place on the engine in a vehicle, thereby separating the front and rear portions 18, 20 of the pan.

Tear strip 30 may be formed in any suitable manner. In the preferred embodiment, tear strip 30 is formed by embossing the strip section 30 so that its edge connections 36 with the adjacent portions of the oil pan are reduced in thickness, as shown in FIG. 1a. In this manner, the tear strip is made easily removable when desired, although it must retain sufficient structural strength to maintain the integral character of the unitary oil pan before installation, as well as thereafter in operation on the engine until such time as it is desired to separate the front and rear portions of the oil pan for removal from the engine. The forming of the tear strip may be accomplished by any suitable embossing or other process through which there are formed weakened edge connections of the tear strip to the front and rear pan portions. Also, the tear strip may be formed during the forming of the oil pan structure or at an earlier stage in the preparation of the material from which the pan structure is formed.

When it is desired to remove the oil pan 16 from the engine for service to the engine interior or for replacement of the oil pan gaskets, the pan may, of course, be removed in the conventional manner by removing the engine from the vehicle or lifting it from its mounts sufficiently to permit dismounting the oil pan in a single piece. Alternatively, however, and in accordance with the present invention, the engine may be left in place and the tear strip 30 removed by means of the special tool 34 onto which it is rolled by an action similar to that of the well-known coffee can key. Removal of the tear strip separates the oil pan front portion 18 from the rear portion 20 so that the separate portions may then be individually removed from the engine without, in most cases, disturbing its position in the vehicle.

Any suitable tool may be used for removal of the tear strip 30. However, a simple device found useful for such a purpose is formed from a hexagonal rod which is slit as at 38 to receive the tab 32 of the tear strip. Such a tool 34 may then be turned by a conventional socket 40 with the aid of a suitable ratchet wrench handle 42 or by other appropriate means.

Upon completion of the desired service work, the oil pan front and rear portions 18, 20 may be re-used in cooperation with a suitable preformed flexible plastic liner 44. Liner 44 may be deformed as necessary to position it in place under the engine cylinder block 12 and is then maintained in place by securing the separate oil pan portions 18, 20 in their original positions on the cylinder block. Preferably, the plastic liner includes flange portions 46 along its upper edges which are adapted to act in the manner of a gasket and avoid the need for installation of these additional parts.

At the gap remaining between the front and rear portions of the oil pan due to the removal of the tear strip, the flexible liner preferably includes a thickened portion 48 which is slotted at 50 along its edges to receive the edges of the front and rear pan portions so as to maintain the liner in position along the full length of the gap and prevent any damage thereto.

Alternatively, it should be recognized that other means of protecting the liner at the gap could be provided, such as, for example, a separate support strip which could be secured at the opposite flanges and extend around the oil pan covering the exposed surface of the liner.

In order to provide for drainage of oil from the pan through the originally provided opening closed by plug 24, it is preferable to provide an opening 52 in the plastic liner 44 which, upon installation, is aligned with the opening provided in boss 22. The leakage of oil between the liner and the rear pan portion 20 may be prevented by cementing the portion of the liner around opening 52 directly to the sheet metal surface of the pan before reinstallation on the engine. Alternatively, any other suitable means may be provided for forming a sealed drain opening in the liner that will extend through and be closable by closure means openable from the pan exterior. Also, if desired, the liner need not be provided with a drain opening, as it is well known that the oil can be removed by pumping it out the oil dip stick opening in the crankcase, as is commonly done in marine installations.

FIG. 5 illustrates an alternative embodiment in which a modified front portion 54 is used upon reinstallation of the rear pan portion 20 with a modified flexible liner 55. The replacement front pan portion 54 is made suffi-

ciently long to close the gap caused by the removal of the tear strip 30 and additionally includes a flange portion 56 which extends around the front edge of the rear portion 20. In this way, the inner liner is solidly supported along its entire length and may be made without the thickened portion 48 provided in the liner 44.

While the invention has been disclosed by reference to certain preferred embodiments, it should be apparent that numerous changes could be made within the scope of the inventive concepts disclosed. Accordingly, it is desired that the invention not be limited except by the language of the following claims.

I claim:

1. An engine oil pan comprising an integral formed sheet metal body adapted to be secured to the lower portion of an engine cylinder block or the like to receive and retain lubricant, said sheet metal body having a strip thereof extending transversely across and around the central portion of said body and dividing said body into front and rear portions, said strip having its edge connections with said front and rear portions weakened by embossing or the like to permit subsequent removal of said strip by tearing to separate said body portions for removal from such engine while such engine is installed in a vehicle.

2. An integral sheet metal engine oil pan having spaced front and rear portions and a transverse tear strip connecting said portions and capable of being removed from the main body of the pan while it is installed on an engine in a vehicle to separate said oil pan portions for ease of removal of the oil pan from such engine.

3. An engine oil pan assembly comprising separate front and rear sheet metal portions and a flexible impervious inner liner supported by said front and rear portions upon their being secured to an engine cylinder block or the like.

4. The combination of claim 3 wherein said sheet metal front and rear portions include flanges adapted to be secured to such cylinder block and said inner liner includes a flanged edge engagable by the flanges of said front and rear portions and adapted to act as a gasket between said flanges and such cylinder block.

5. The combination of claim 3 wherein said front and rear portions are spaced, leaving a gap as installed upon such cylinder block, said assembly including means to bridge said gap and prevent damage to said liner.

6. The combination of claim 5 wherein said gap bridging means comprises a thickened portion of said flexible liner, said thickened portion having slots along its edges to receive the sheet metal edges of said front and rear portions.

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