This invention comprises a novel and useful automatic crankcase drain attachment and more particularly relates to a means to facilitate the changing of lubricant and the draining of the latter from an engine crankcase.

Owing to the inaccessibility of the crankcase drain plugs of modern, low slung automobiles, it is frequently very difficult for the owner to drain the lubricant from the crankcase in order to change the oil of the engine. It is the primary purpose of this invention to provide a means which will greatly facilitate this operation and enable the owner, with a minimum of effort and with a complete freedom from grease and the like, to easily drain the oil from the crankcase and replenish the oil supply of the engine.

It is a further object of the invention to provide a kit containing the necessary tools and equipment to enable the owner to readily service his own engine for this purpose.

Still another object of the invention is to provide a drain attachment which may be permanently secured to the engine crankcase in place of the conventional crankcase drain plug and which shall be operable to effect draining of the crankcase oil therefrom whenever desired.

A still further object of the invention is to provide a drain attachment in accordance with the immediately preceding object wherein the attachment shall include a valve body or fitting adapted to be replaced but permanently secured in the drain opening of a crankcase in place of the conventional crankcase drain plug and which fitting shall have therein a manually operable rotatable drain valve controlling the discharge of oil from the crankcase through the attachment and which valve shall have an operating means preferably in the form of a non-circular enlarged head which shall be disposed in such a manner that it shall be capable of being horizontally engaged with a horizontally extending wrench or tool by which rotation of the valve is effected from a position lying beyond the end or sides of the vehicle in which the engine is mounted.

Still another object of the invention is to provide a drain attachment in accordance with the preceding objects wherein there is provided an adequate sealing against the escape of lubricant from the crankcase through the connection of the attachment therewith and further through the drain valve of the attachment.

And a final specific object of the invention to be specifically enumerated herein resides in the provision of a crankcase drain attachment which shall be capable of being readily attached to the crankcase drain plug opening or any other suitable opening in the sump of the crankcase regardless of the disposition of such opening and yet wherein the attachment shall be readily and easily accessible for operation by a horizontally extended drain valve operating tool.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view illustrating somewhat schematically an internal combustion engine with the associated vehicle structure being removed therefrom, in order to illustrate the manner in which the filling funnel, the drain pan, the crankcase drain attachment and the operating tool therefor may be simultaneously employed in the operation of changing the crankcase oil;

FIGURE 2 is an enlarged view in vertical central section through a portion of the sump of the crankcase and of the drain attachment applied thereto and showing the engagement of the drain valve operating tool with the drain valve of the attachment;

FIGURE 3 is a fragmentary view of a portion of FIGURE 2 but showing the position of the drain valve during the draining of lubricant from the crankcase;

FIGURE 4 is a view in vertical section showing the use of the filling funnel of the kit of this invention;

FIGURE 5 is a view in vertical transverse section through a drain pan forming a part of the kit of this invention;

FIGURE 6 is a view partly in elevation and partly in central section, parts being broken away, of the drain valve operating tool forming a part of the kit of this invention; and

FIGURE 7 is an exploded perspective view of the drain valve attachment of this invention.

In the accompanying drawings, the numeral 10 designates generally a conventional internal combustion engine of the type employed in power plants and automotive vehicles, tractors and the like, and which is provided with the usual crankcase filler spout or opening 12 together with the usual crankcase 14 having a sump portion 16 thereof and which sump portion as shown in FIGURE 2 is provided with the usual drain opening 18 which may include an internally threaded boss or enlargement 20 in which is received the conventional removable drain plug, not shown. It will be understood that the engine illustrated is of any desired type, and it is immaterial whether this engine is mounted in the chassis of a vehicle or tractor, or whether it is carried by other support means.

In the interest of simplicity and clarity and illustrated in the manner in which the lubricant drain kit of this invention is utilized in connection with such an engine, there has been omitted from the engine its connection with a vehicle or other supporting structure.

It is to be further understood that the engine crankcase sump 16 may be provided with the opening 18 at various locations thereon as upon the bottom wall 22 of the sump as shown in FIGURE 2, or upon a side or vertical wall thereof. In accordance with this invention, a replacement attachment consisting of a drain valve assembly and indicated generally by the numeral 30 is seated in this opening in place of the conventional drain plug and is intended to remain permanently in place therein to provide a control means capable of easy operation, to permit opening and closing of the drain opening of the crankcase.

Although the principles of the invention are not necessarily restricted thereto it is preferred to provide a complete kit containing all of the elements and implements necessary to effectively carry out the operation of changing the lubricant in the engine and the crankcase.

For this purpose there is provided the previously mentioned drain valve attachment 30, a filling funnel indicated generally at 32, a drain pan indicated at 34 to receive the lubricant or oil expelled from the crankcase by this device and a drain valve operating tool shown at 36. It is intended to include these four elements in a single package kit so that the purchaser may in one transaction obtain all of the equipment necessary to easily drain the oil from the crankcase; collect the drained oil, and then refill the crankcase with fresh lubricant.

Referring first primarily to FIGURES 2, 3 and 7 it will be understood that the drain valve attachment consists of a valve body 40 which may conveniently be of a cubical shape, and which has projecting from one face...
thereof a tubular neck 44 having a closed axial bore or passage therein and provided with external threads as at 46 and a diametrically reduced portion 48 comprising or defining a circumferentially extending annular groove at the junction of the neck with the face 42.

Upon another face 50 of the body 40 there is provided an internally threaded bore or passage 52 which constitutes a chamber for receiving the rotatable drain valve indicated generally by the numeral 54. This valve includes a tubular stem 56 having intermediate its ends a port or aperture 58 comprising the discharge or drain opening of the valve. The valve further includes at one end a non-circular enlarged head 60 and which constitutes sealing means enabling a controlled rotation to be imparted to the valve.

Referring now especially to FIGURE 2, it will be seen that the externally threaded stem 46 of the valve body 40 is adapted to have a deformable sealing means such as a gasket or ring of suitable material 62, this sealing means being disposed on the previously mentioned groove 48. The sealing means, as shown, includes annular opposed surfaces, one of which is adapted to engage against the external annular surface of the boss 20 and also seat upon the flat face 42 of the valve body. Thus, when the drain valve attachment 30 is engaged in the crankcase drain opening 18, the deformable sealing means 62 will be convectively engaged and sealed with the end of the boss 20, across the screw threaded engagement of the opening 18 and the stem 46, against the side of the stem and against the face 42 thereby insuring a fluid-tight seal at this location. This feature of the invention is important in that there is thus assured a fluid-tight seal despite any necessary rotational adjustments of the body with respect to the boss 20 in order to position the face 50 with the drain valve 54 attached thereto at the desired angular positions with respect to the drain opening 18.

As previously mentioned, the externally threaded stem 56 of the valve 54 is engaged in the internally threaded bore 52 which extends transversely of the valve body 30 and is disposed angularly with respect to the axis of the neck 46, it being preferably perpendicular thereto. Further, the bore 52 extends from the face 50 of the valve body 40 completely across the axial passage or bore in the tubular neck 46 and terminates beyond the latter as shown clearly in FIGURES 2 and 3. This is a further important feature of the invention in that it enables the cylindrical wall of the stem 56 to be disposed entirely across the bore or passage through the neck 46 as shown in FIGURE 2 in such a manner that the exit end of this axial bore in the neck 46 is completely closed by the solid wall of the stem as shown in FIGURE 2. At the same time, the discharge portion 58 of the valve is completely covered by its disposition within the bore 52. Thus there are provided two positive seals between the interior of the crankcase and the atmosphere in the closed position of the valve, the first of these seals consisting of the closure of the axial bore through the neck 46 by the solid wall of the valve stem 56, and the second consisting of the closure of the discharge port 58 by its embedment or recession into the bore 52.

This is the position of the part as shown in FIGURE 2 and it will be observed that with the valve body in this position escape of fluid from the crankcase is prevented first by the closure of the axial bore through the neck 46 by the solid wall of the stem; second by the masking of the discharge port 52 by the wall of the bore 56; and finally by the engagement of the underside of the head 60 against the face 50. If desired, a further sealing means may be provided between the head 60 and the surface 50 in order to further improve the sealing engagement. However, as shown in FIGURE 3, when the valve is rotated and unscrewed to an open position, the uncovering of the port 58 by its emergence from the bore 52 will enable fluid in the sump of the crankcase to flow through the axial bore of the neck 46, through the stem 56 and escape through the opening 58 into the drain pan 34 disposed therebeneath.

As so far described it will now be apparent that regardless of the location of the drain opening 18 and the drain boss 20, whether on a bottom wall or on a side wall of the sump, the drain valve body 50 may be attached thereto and so positioned that the axis of rotation of the drain valve 54 may lie in a horizontal plane. This location is important in that it greatly facilitates the ease of attachment of the tool 36 to the head or operating means of the valve as illustrated in FIGURES 1-3. Referring now especially to FIGURE 6 it will be observed that the tool 36 may conveniently consist of an elongated tube or rod of separable sections 70, 72, having fastening means 74 by which the same may be attachably assembled in end to end relation, and being provided with a handle 76 to facilitate rotation of the tool. At the outer end of one of these sections remote from the handle 76, the tool is provided with a terminal fitting or member 78 having a shank 80 received in the open end of the section 70 and being retained therein as by a fastener 82 of any desired nature. This fitting 78 terminates in furlcations 84 in which is mounted a universal type of socket wrench 86 of a character more clearly shown in FIGURE 2 which is of a conventional type. This socket wrench is adapted as shown in FIGURES 2 and 3 to be readily engaged upon the head 60 of the valve whereby rotation of the tool will effect rotation of the valve between its closed and open position shown in FIGURES 2 and 3, respectively.

It will be understood that during this operation the user may stand well outside of or beyond the sides or ends of the vehicle or other support for the engine, without the necessity for stooping or crawling therebeneath and may then engage the tool upon the valve head and effect opening or closing of the valve as desired. For this operation the drain pan 34 may be readily positioned beneath the drain opening, and may be either readily mounted upon the side frame members if the engine is mounted in a vehicle, or upon the ground or other support surface.

After the lubricant has been drained from the crankcase or during its operation if desired, the filling funnel 32 with its flexible spout 90 may be inserted through the filler opening or neck 92 of the engine in readiness for the refilling of the engine with lubricant.

In some instances, as for example, when the opening in the crankcase sump has its axis lying in a horizontal plane, it may be possible to directly thread the valve member stem 56 into this opening with the valve body 40 being omitted therefrom. However, an important advantage of this invention is the inherent ability of the drain valve attachment to be applied to all positions of drain openings and still enable the axis of rotation of the valve 54 to be disposed in a horizontal plane thereby facilitating the application of the drain valve operating tool 36 thereto.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A drain attachment for an engine crankcase comprising a valve body having a tubular externally threaded neck with a closed axial bore therein and adapted to be seated in a crankcase drain opening as a replacement
for the conventional crankcase drain plug, said body
having an internally threaded bore therein communicat-
ing with the interior of said neck and extending entirely
across the axial bore in said neck and terminating in a
closed end in the valve body, a valve including an ex-
ternally threaded open ended stem receivable in said
threaded bore and movable into said closed end of said
axial bore and controlling flow through said axial and
threaded bores, said valve including a passage having con-
tinuous communication with said threaded bore and hav-
ing a discharge port disposed for selective covering and
uncovering by the wall of said bore upon turning of said
stem in said bore.

2. The combination of claim 1 wherein said valve has
a non-circular diametrically enlarged head thereon remote
from said valve body for receiving a wrench whereby to
open and close said valve.

3. The combination of claim 1 wherein said neck axial
bore is open at one end for continuous communication
with the interior of an engine crankcase, said threaded
bore having continuous communication at its mid-portion
with said axial bore at the closed end of the latter, said
stem being movable in said threaded bore to a position
closing off communication of said axial bore with said
threaded bore.

4. The combination of claim 3 including a diametri-
cally reduced portion on said neck and immediately ad-
jacent said valve body defining an annular groove, a de-
formable sealing ring seated in said groove and extending
radially beyond said neck and providing opposed annular
surfaces for respective sealing engagement with a crank-
case and with said valve body.

5. The combination of claim 1 including a diametri-
cally reduced portion on said neck and immediately ad-
jacent said valve body defining an annular groove, a de-
formable sealing ring seated in said groove and extending
radially beyond said neck and providing opposed annular
surfaces for respective sealing engagement with a crank-
case and with said valve body.

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