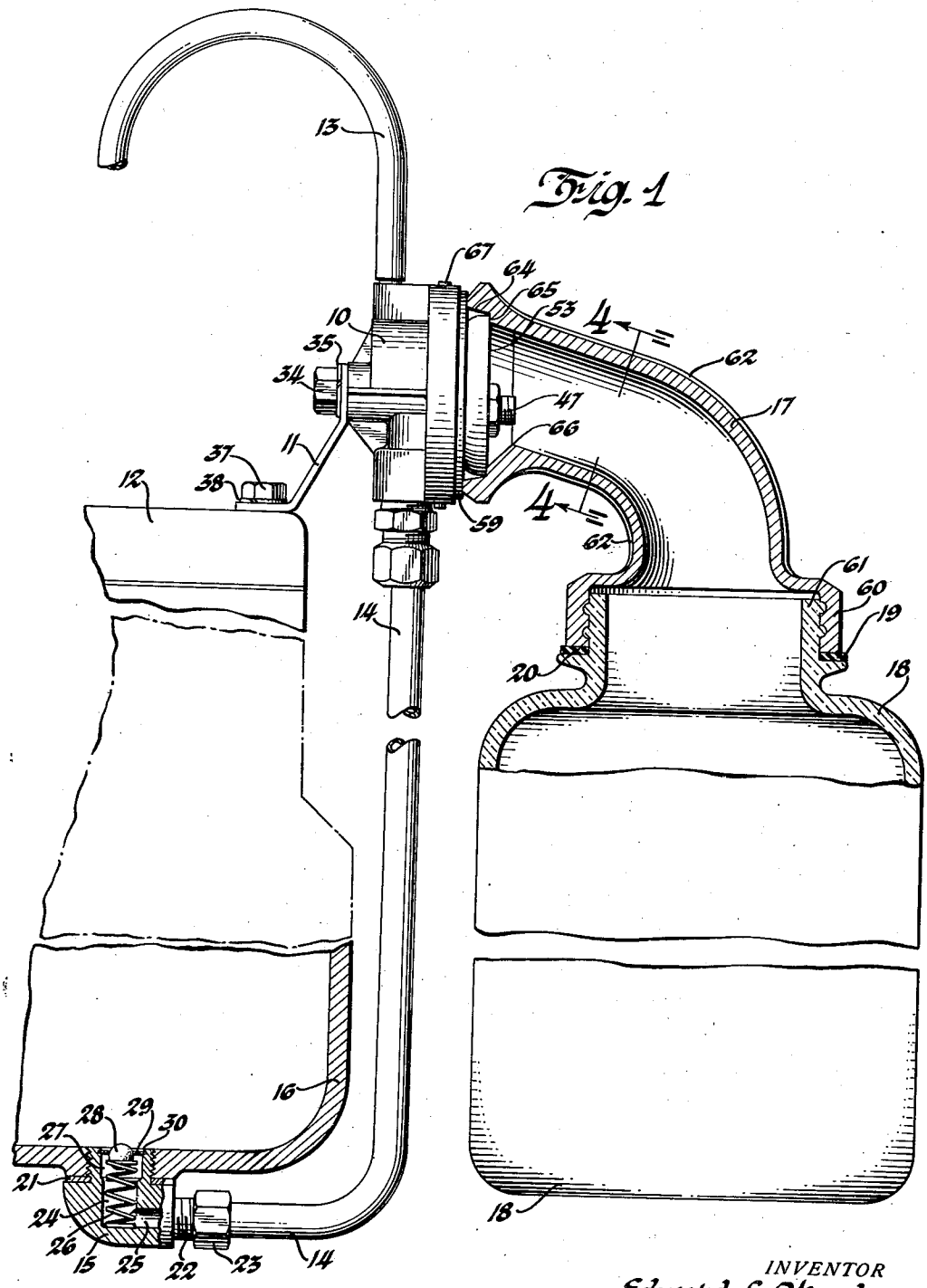
July 9, 1940. E. L. WOOD 2,206,992

POWER OIL REMOVAL UNIT

Filed Dec. 20, 1937 2 Sheets-Sheet 1

Fig. 1



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POWER OIL REMOVAL UNIT

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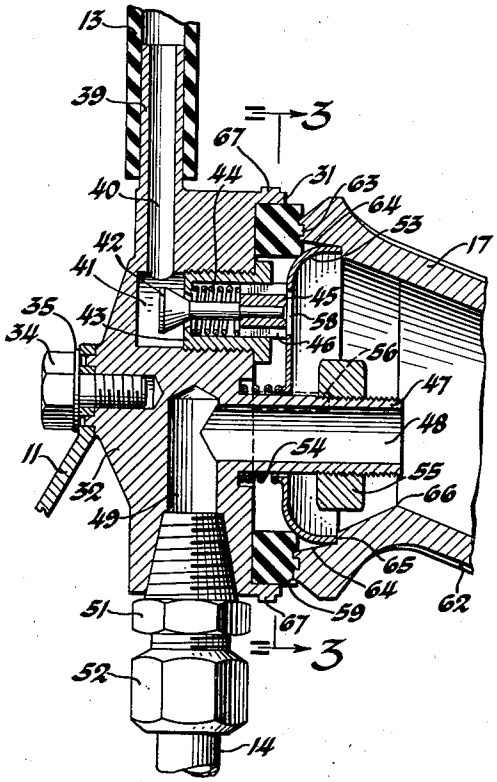


Fig. 2

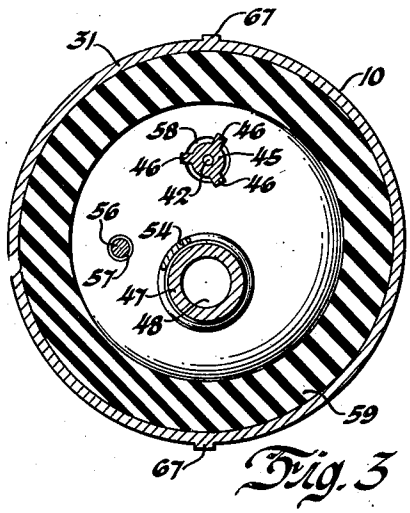


Fig. 3

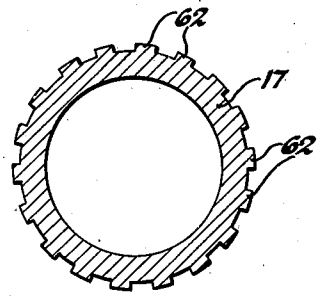


Fig. 4

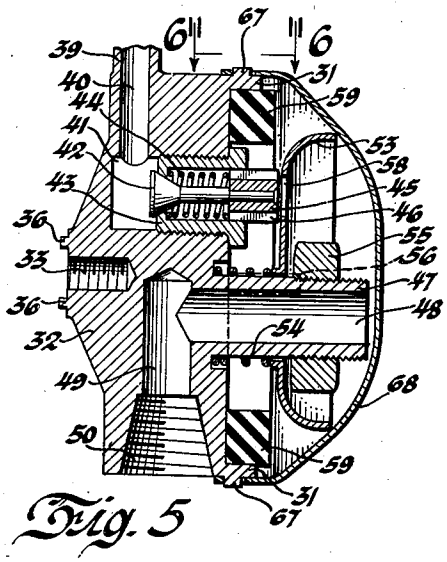


Fig. 5

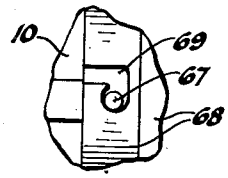


Fig. 6

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POWER OIL REMOVAL UNIT

Edward L. Wood, Detroit, Mich.

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10 Claims. (Cl. 184—1.5)

This invention relates to power oil removal units adapted to remove oil from the crankcase of internal combustion engines of automobiles and the like.

One object of this invention is to provide improved, novel, positive, inexpensive means for quickly removing oil from the crankcase of internal combustion engines and the like with a vacuum created in an oil receiver by suction from the intake manifold of the said engine when running.

Another object of this invention is to provide a connector fixed with respect to a motor vehicle having an air suction tube and an oil suction tube therefrom connected to the intake manifold and to the crankcase of the engine of the said vehicle respectively, the said connector being adapted to be hermetically engaged by an oil receiver whereupon the said engine when running creates a vacuum in said oil receiver which removes oil from the crankcase of the said engine into the said oil receiver.

Another object of this invention is to provide a power oil removal unit comprising a connector permanently fixed with respect to a motor vehicle having an air suction tube and an oil suction tube therefrom connected to the intake manifold and to the crankcase of the engine of the said vehicle respectively, the said connector unit being adapted to be engaged by an oil receiver and accurately guide the same into hermetically sealed relationship over the unconnected ends of said suction tubes whereby to apply suction from the air suction tube to the oil suction tube with the oil receiver therebetween.

Another object of this invention is to provide a power oil removal unit comprising a connector permanently fixed with respect to a motor vehicle having an air suction tube and an oil suction tube therefrom connected to the intake manifold and the crankcase of the engine of the said vehicle respectively, the air suction tube being normally closed at its unconnected end by a suitable valve, and said connector being adapted to be engaged by an oil receiver and accurately guide the same into sealed relationship over the unconnected ends of said suction tubes and open the said valve at the unconnected end of the air suction tube whereby to apply suction from the air suction tube to the oil suction tube with the oil receiver therebetween.

Another object of the invention is to provide means for removing oil from the crankcase of an internal combustion engine with a vacuum created in the said removal means by suction from the intake manifold of the said engine when running in which an oil suction tube therefrom connected to the low point of the crankcase of the said engine is normally sealed until a predetermined vacuum is created in said oil removal means whereby the accumulation of sludge and other foreign matter in said oil suction tube is avoided when the oil removal unit is not in use.

Another object of the invention is to provide means for removing oil from the crankcase of an internal combustion engine with vacuum created in the said removal means by suction from the intake manifold of the said engine when running having the oil suction tube therefrom connected to the low point of the crankcase of the said engine normally sealed until sufficient vacuum has been created in the oil receiver of said oil removal means to remove oil from the said crankcase through said oil suction tube under a high velocity whereby to avoid any possible stoppage in the said oil suction tube by the accumulation of foreign matter therein.

Other objects of the invention will become apparent by reference to the following detailed description taken in connection with the accompanying drawings, in which:

Fig. 1 is a view part in section and part in elevation showing the connector of a power oil removal unit embodying the invention mounted on and connected in operating relationship to an internal combustion engine with the oil receiver of the said oil removal unit guided into hermetically sealed relationship with the said connector.

Fig. 2 is an enlarged detailed fragmentary sectional view through the connector of the power oil removal unit showing an oil receiver accurately guided into hermetically sealed relationship therewith.

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a cross-sectional view taken on line 4—4 of Fig. 1 showing the neck of an oil receiver preferably ribbed to prevent the same from burning the hand of the operator thereof by the conduction of heat from hot oil passing therethrough.

Fig. 5 is an enlarged cross-sectional view similar to Fig. 2 showing the connector when not in use with a dust shield positioned thereover and prevented from rattling by the guiding means normally engaged by the oil receiver when the oil removal unit is in use.

Fig. 6 is an enlarged fragmentary elevational view showing the bayonet connection used between the connector unit and the dust shield therefor.

Referring now to the drawings wherein like numerals refer to like and corresponding parts throughout the several views, the embodiment of the invention disclosed therein comprises, in general, a power oil removal unit composed of a connector 10 permanently mounted by means of a suitable bracket 11 on the block of an internal combustion engine 12. Although the connector of the power oil removal unit is disclosed herein secured on the block of an internal combustion engine it is contemplated that the connector may be mounted elsewhere if desired but fixed with respect to the said engine or the body of a motor vehicle propelled thereby. The said connector 10 has an air suction line 13 therefrom connected to a source of suction such as the intake manifold (not shown) of the said internal combustion engine 12. An oil suction line 14 from the said connector 10 is preferably connected by means of a special crankcase drainage fitting 15 to the low point of the crankcase 16 of the said internal combustion engine 12. An oil receiver 17 having a suitable container 18 threaded thereto is adapted to be positioned in hermetically sealed relationship to the connector 10 over the unconnected ends of the said air suction line 13 and oil suction line 14 as best indicated in Fig. 1. A gasket 19 between the annular shoulder 20 of the said container 18 and the oil receiver 17 assures an air tight coupling therebetween.

The said crankcase drainage fitting 15 is generally elbow shaped and is threaded at its upper shouldered end into the drain aperture at the low point of the crankcase 16. A compressible gasket 21, preferably of cork and copper, provides an oil-tight joint between the said drainage fitting 15 and the bottom of the crankcase 16 when the said drainage fitting 15 is tightened thereagainst. The said compressible gasket 21 permits the said drainage fitting 15 to be properly oriented for having the suitably flared end of the oil suction tube 14 connected to the horizontally disposed threaded end 22 of the said drainage fitting 15 by a flared tube connector nut 23.

The said drainage fitting 15 is preferably provided with connecting vertical and horizontal bores 24 and 25 respectively as best shown in Fig. 1, the said vertical bore 24 being larger in diameter than the said horizontal bore 25 to accommodate a compression spring 26 and at the same time have a net area substantially equal to or greater than the area of the horizontal bore 25. The upper portion of the said vertical bore 24 is counter-bored to provide a ball check chamber 27 into which a ball check 28 is positioned. The said compression spring 26 constantly urges the ball check 28 upward into sealed relationship against the centrally apertured ball check seat 29 retained against an annular shoulder around the upper portion of the ball check chamber 27 by rolling or peening the adjacent annular edge of the drainage fitting thereover as indicated by the numeral 30 in the drawings.

The strength of the compression spring 26 is sufficient to urge the ball check 28 upwardly against its seat 29 for maintaining the aperture therethrough closed until sufficient vacuum has been created in the oil receiver 17 to remove oil from the said crankcase 16 through the oil suction tube 14 under high velocity whereby to avoid any possibility of stoppage in the said oil suction tube by the accumulation of foreign matter therein. Thus, the ball check 28 maintains the drain opening in the bottom of the crankcase 16 closed when the oil removal means is not in use whereby the accumulation of sludge and other foreign matter in the oil drainage fitting 15 and the lower portion of the oil suction tube 14 is avoided. For example, the compressive strength of the ball check spring 26 should be such as to permit about four to six inches of vacuum to be developed in the oil receiver 17 and the oil container 18 thereof before the said ball check 28 unseats whereupon oil from the crankcase 16 is drawn through the oil suction tube 14 and the connector 10 under high velocity. By thus regulating the velocity of oil passing through the oil suction tube 14 all foreign matter that passes through the ball check including metal chips and burrs will be positively drawn through the said suction tube 14 and will not accumulate therein and eventually plug the passage therethrough.

The novel construction of the connector 10 and the oil receiver 17 including the means for accurately guiding the said oil receiver 17 into hermetically sealed relationship over the unconnected ends of the air suction line 13 and the oil suction line 14 is shown in detail in Figs. 2 to 4 inclusive. Figs. 5 and 6 show the connector 10 when not in use with an anti-rattle dust shield positioned thereover and the bayonet fitting for anchoring the said dust shield thereto.

The front of the connector 10 is formed disk shaped with an annular lip 31 therearound disposed forwardly therefrom. The said connector 10 is provided with a generally vertically disposed rearward protuberance to accommodate air and oil suction connections as hereinafter described. A centrally disposed boss 32 at the extreme rear of the said connector is bored and threaded at 33 for receiving the machine screw 34 by means of which the said connector 10 is secured to the bracket 11. A suitable lock washer 35 interposed between the bracket 11 and the head of the machine screw 34 prevents the said machine screw from loosening due to vibration of the engine block 12. A pair of tabs 36 projecting from the said boss 32 fit into complementary apertures formed in the said bracket 11 and prevent the said connector 10 from rotating with respect to the said bracket 11. A machine screw 37 and lock washer 38 is preferably used to secure the said bracket 11 to the engine block 12, see Fig. 1.

A tubular projection 39 formed integral with the connector 10 and extending radially upward therefrom frictionally receives the air suction tube 13 thereover whereby a permanent connection between the connector 10 and a source of suction is accomplished. The vertical bore 40 of the said tubular projection 39 extends downwardly from the top of the said connector 10 until it communicates with the horizontally disposed bore 41 preferably located on the vertical axis of the said connector 10 positioned above the center of the said connector 10 and extending rearwardly from the disk shaped face thereof, as best illustrated in Figs. 2 and 5.

A suitable air valve 42 seated in the base of a thimble 43 threaded in the horizontally disposed bore 41 is normally maintained in its closed position by the compression spring 44. The stem of the said air valve 42 is preferably shouldered as indicated in the drawings and has a plunger 45 riveted on the end thereof, the said plunger being cylindrical shaped of a smaller diameter than the inside diameter of the said thimble 43 and has a plurality of radially outwardly dis-

posed guides 46 integral therewith and coextensive therealong which centers the said plunger 45 within the said thimble 43. The compression spring 44 reacts against the bottom of the said thimble 43 and engages the inwardly disposed ends of the said guides 46 for constantly urging the air valve 42 to its closed position seated in the bottom of the said thimble 43. The said valved horizontally disposed bore 41 serves as the unconnected end of the said air suction line 13.

A forwardly disposed tubular projection 47 formed integral with the said connector 10 preferably located on the vertical axis of the said connector 10 and spaced below the said air valve 42 serves as the unconnected end of the oil suction line 14. The horizontal bore 48 of the said forwardly disposed tubular projection 47 extends inwardly from the front of the said connector 10 until it communicates with the vertically disposed bore 49 preferably located on the vertical axis of the said connector 10 extending from the bottom of the said connector 10 upwardly a sufficient distance to communicate with the said horizontal bore 48. The bottom of the said vertically disposed bore 49 is suitably threaded as at 50 to receive a flared tube fitting 51 onto which the flared end of the oil suction tube 14 is connected by means of the flared tube connector nut 52.

A preferably disk shaped guide 53 having an outwardly disposed annular guiding edge is telescoped over the said forwardly disposed tubular projection 47 with a compression spring 54 interposed between the rear of the said guide 53 and the disk shaped front of the said connector 10 for constantly urging the said guide 53 outwardly from the disk shaped face of the said connector 10. A stop nut 55 threaded on the said tubular projection 47 in spaced relationship to the face of the connector 10 limits the outward movement of the said guide 53.

A pin 56 located in parallel spaced relationship to the said forwardly disposed tubular projection 47 extends through a suitably disposed aperture 57 through the said guide 53 to prevent the said guide from rotating with respect to the said tubular projection 47 onto which the said guide 53 is reciprocatingly mounted. The said guide 53 is also provided with an annular air passage 58 slightly larger in diameter than the plunger 45 of the air valve 42 and slightly smaller in diameter than twice the radius of the radially outwardly disposed guides 46 integral with the said plunger 45. Air may be sucked from the said oil receiver 17 into the unconnected end of the air suction line 13 through the said air passage 58 when the disk shaped guide 53 opens the air valve 42 which normally closes the unconnected end of the said air suction line 13. An annular sealing ring 59 of pliable rubber or other suitable material is suitably secured or positioned against the front of the said connector 10 radially within the forwardly disposed annular lip 31 therearound.

The said oil receiver 17 is preferably formed elbow shaped as best illustrated in Fig. 1 and has the lower bell shaped depending end 60 thereof internally threaded to permit the same to be secured in hermetically sealed relationship to the complementarily threaded neck 61 of the container 18. The throat of the oil receiver 17 is preferably provided with a plurality of longitudinally disposed circumferentially spaced ribs 62 as indicated in Figs. 1 and 4 to prevent the hand of the operator thereof from being burned by the conduction of heat from hot oil passing therethrough.

The laterally disposed open annular end of the said oil receiver 17 is of such a diameter as will permit the same to register with the sealing ring 59 and is preferably provided with an annular groove 63 to assure a hermetically sealed joint between the said oil receiver 17 and the connector 10 when placed thereagainst. The inside of the said laterally disposed open end of the oil receiver 17 is preferably tapered as indicated by the numeral 64 in the drawings toward an annular shoulder 65 having an extreme diameter substantially the same as the outside diameter of the outwardly disposed annular guiding edge of the disk shaped guide 53. When the oil receiver 17 is being positioned in hermetically sealed relationship to the connector 10, the laterally disposed open annular end of the said oil receiver 17 is positioned over the outwardly disposed annular guiding edge of the disk shaped guide 53 until the annular shoulder 65 of the said oil receiver 17 is in surface engagement with the outwardly disposed edge of the said disk shaped guide 53, and the said disk shaped guide 53 is pressed toward the connector 10 until the grooved annular laterally disposed end of the said oil receiver 17 becomes engaged in hermetically sealed relationship with the compressible sealing ring 59 of the said connector 10 as shown in Figs. 1 and 2.

The said oil receiver 17 is preferably provided with a ridge 66 disposed inwardly of the laterally disposed open end thereof a sufficient distance so as not to foul the stop nut 55 threaded on the forwardly disposed tubular projection 47 of the said connector 10 and yet is sufficiently close to the annular grooved laterally disposed end of the oil receiver 17 to cause oil drawn by suction from the bore 48 of the said tubular projection 47 which serves as the unconnected end of the oil suction line 14 to spew or drip down the throat of the connector 17 thereby preventing the accumulation of oil in the end of the oil receiver 17 adjacent to the disk shaped guide 53 and the sealing ring 59 of the connector 10 when the oil removal unit is in use.

Although the connector 10 has been shown and described with the unconnected end of the air suction line 13 and the oil suction line 14 horizontally disposed, it is readily observed that, if the connector 10 is mounted or constructed so that the said unconnected ends of the air suction line 13 and the oil suction line 14 are otherwise disposed and if the unconnected end of the oil suction line 14 is not positioned so that oil being sucked therefrom will enter the unconnected end of the air suction line 13, the device will operate perfectly requiring but a simple change in the shape of the oil receiver 17 to accommodate it to the altered disposition or location of the unconnected ends of the air suction line 13 and the oil suction line 14 or to the rearrangement of the construction of the connector 10 per se.

The outer periphery of the forwardly disposed annular lip 31 is provided with diametrically opposite preferably cylindrical tabs 67 by means of which a cup shaped dust shield 68 is removably secured over the front of the connector 10 as best illustrated in Figs. 5 and 6, the said dust shield being provided with suitable diametrically oppositely disposed bayonet slots 69 as shown in detail in Fig. 6. It will be noticed that the shape of the said cup shaped dust shield 68 is such as will engage the outwardly disposed annular

guiding edge of the disk shaped guide 53 and slightly compress the spring 54 which constantly urges the said disk shaped guide 53 outwardly from the face of the said connector 10 whereupon the said guide 53 and the spring 54 maintains the said dust shield 68 in anti-rattle relationship to and over the front of the said connector 10.

Although but one embodiment of the invention has been disclosed and described in detail, it will be understood that various changes including the size, shape, arrangement and details of the various parts thereof may be made without departing from the spirit of the invention, and it is not my intention to limit the scope of the invention other than by the terms of the appended claims.

I claim:

1. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to a source of suction and to the crankcase of the engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, a resilient seal on said connector, the unconnected ends of said suction tubes being adapted to be brought into a suction transmitting operation by applying a closure member in hermetically sealed relationship around the unconnected ends of said suction tubes, and means for guiding said closure member in uniform contact against the resilient seal on said connector.

2. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to a source of suction and to the crankcase of the engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, an air valve normally closing the unconnected end of said air suction tube, a resilient seal on said connector, the unconnected ends of said suction tubes being adapted to be brought into a suction transmitting operation by positioning a closure member in hermetically sealed relationship around the unconnected ends of said suction tubes, the said closure member being adapted to open said air valve simultaneously with being positioned around said suction tubes, and means for guiding said closure member in uniform contact against the resilient seal on said connector.

3. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to the intake manifold and to the crankcase of the engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, a resilient seal on said connector, the unconnected ends of said suction tubes being adapted to be brought into a suction transmitting operation by applying a closure member in hermetically sealed relationship around the unconnected ends of said suction tubes, and means for guiding said closure member in uniform contact against the resilient seal on said connector.

4. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to the intake manifold and to the crankcase of the engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, an air valve normally closing the unconnected end of said air suction tube, a resilient seal on said connector, the unconnected ends of said suction tubes being adapted to be brought into a suction transmitting operation by positioning a closure member in hermetically sealed relationship around the unconnected ends of said suction tubes, the said closure member being adapted to open said air valve simultaneously with being positioned around said suction tubes, and means for guiding said closure member in uniform contact against the resilient seal on said connector.

5. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to the intake manifold and to the crankcase of the engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, a resilient seal on said connector, an oil receiver adapted to be positioned in hermetically sealed relationship over the unconnected ends of the said suction tubes whereby to apply suction from the air suction tube to the oil suction tube which removes oil from the crankcase of the said engine into the said oil receiver, and means for guiding said oil receiver in uniform contact against the resilient seal on said connector.

6. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to the intake manifold and to the crankcase of the engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, an air valve normally closing the unconnected end of said air suction tube, a resilient seal on said connector, an oil receiver adapted to be positioned in hermetically sealed relationship over the unconnected ends of the said suction tubes and simultaneously open said air valve whereby to apply suction from the air suction tube to the oil suction tube which removes oil from the crankcase of the said engine into the said oil receiver, and means for guiding said oil receiver in uniform contact against the resilient seal on said connector.

7. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to the intake manifold and to the crankcase of the engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, a resilient seal on said connector, means positioned at the low point of the crankcase of the said engine which normally seals the said oil suction tube until a predetermined vacuum is created therein, the unconnected ends of said suction tubes being adapted to be brought into a suction transmitting operation when the said predetermined vacuum is created in the said oil suction tube by applying a closure member in hermetically sealed relationship around the unconnected ends of said suction tubes, and means for guiding said closure member in uniform contact against the resilient seal on said connector.

8. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to the intake manifold and to the crankcase of the said engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, a resilient seal on said connector, an oil receiver adapted to be positioned in hermetically sealed relationship over the unconnected ends of the said suction

tubes whereby to apply suction from the air suction tube to the oil suction tube and create a vacuum in said oil receiver which removes oil from the crankcase of the said engine into the said oil receiver, means for guiding said oil receiver in uniform contact against the resilient seal on said connector, and means positioned at the low point of the crankcase of the said engine normally sealing the said oil suction tube until a predetermined vacuum is created in said oil receiver.

9. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to the intake manifold and to the crankcase of the engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, an air valve normally closing the unconnected end of the said air suction tube, and means on said connector adapted to contact and open said air valve simultaneously with accurately guiding an oil receiver in hermetically sealed engagement with said connector when the said oil receiver is manually positioned over the unconnected ends of the said suction tubes.

10. In combination with a motor vehicle, a connector mounted on said motor vehicle, an air suction tube and an oil suction tube connected to the intake manifold and to the crankcase of the engine of the said motor vehicle respectively having the unconnected ends thereof mounted on the said connector, an annular sealing ring on said connector, an air valve normally closing the unconnected end of the said air suction tube having the operating plunger thereof projecting from the said connector and located within the said sealing ring, a tubular projection which serves as the unconnected end of the said oil suction tube located within the said sealing ring spaced from said air valve and extending outwardly from the said connector, a disk shaped guide reciprocatingly telescoped over said tubular projection adapted to engage the operating plunger of the said air valve, means for retaining said guide on said tubular projection, spring means constantly urging said guide out of engagement with said valve operating plunger, and an oil receiver adapted to engage said guide and cause the same to contact and open the said air valve simultaneously with being positioned by said guide concentric to the said sealing ring on said connector when being manually positioned in hermetically sealed relationship thereagainst over the unconnected ends of said suction tubes.

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