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COMPRESSOR LUBRICATION SUPPLY MECHANISM

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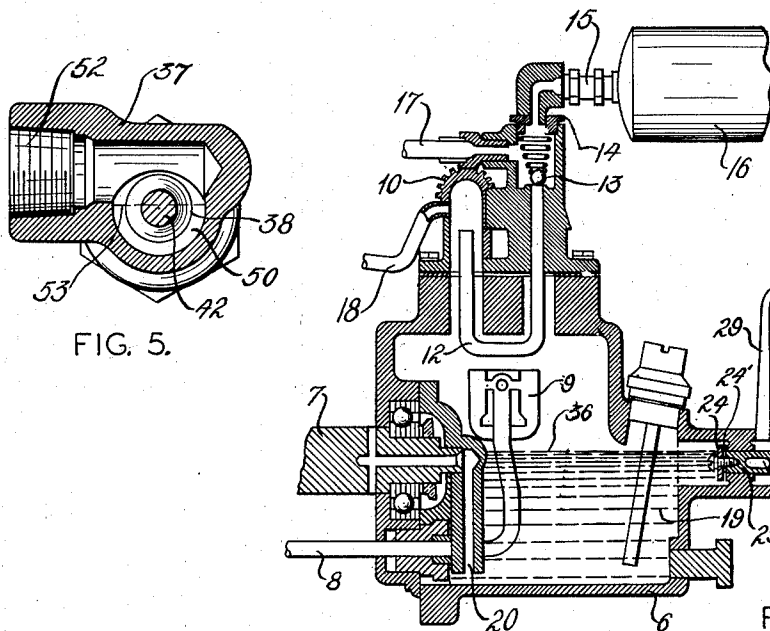


FIG. 5.

FIG. 1.

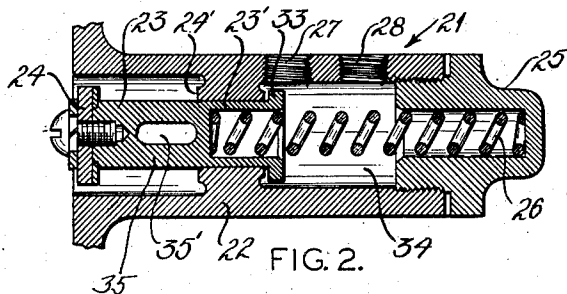


FIG. 2.

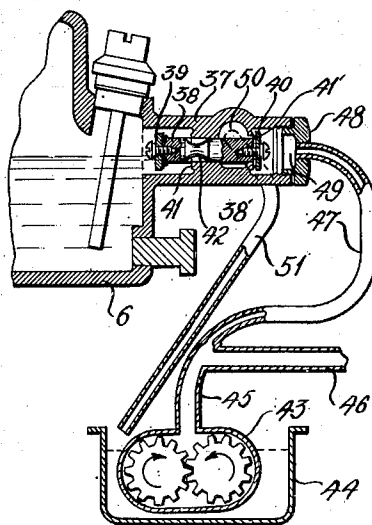


FIG. 3.

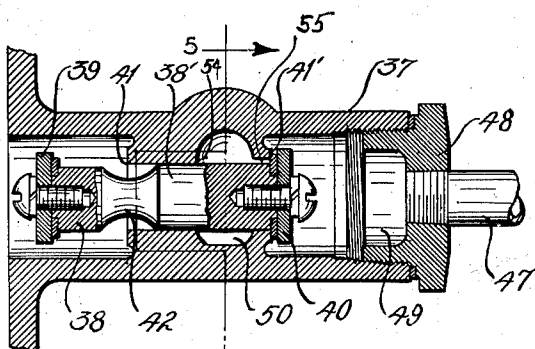


FIG. 4.

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COMPRESSOR LUBRICATION SUPPLY
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9 Claims. (Cl. 230—206)

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This invention relates to compressor lubricating means and in its more specific aspects is directed to a mechanism for replenishing the oil supply for an engine driven air compressor from the crankcase of the driving engine or other source of supply.

The object of this invention is to provide means for periodically replenishing the oil in the oil reservoir for an air compressor by means of a device mounted on the compressor casing to which oil is supplied from the crankcase of the automotive engine which drives the compressor or from any other oil source, the device being operated by pressure changes occurring in the compressor oil reservoir.

In the drawings:

Figure 1 shows a sectional schematic view of a portion of an air compressor with the lubricating device attached,

Figure 2 shows an enlarged sectional view of the lubricating device in a different position from that shown in Figure 1,

Figure 3 discloses a partial elevational sectional view of a modified form of the lubricating device,

Figure 4 discloses an enlarged view of the lubricating device and check valve shown in Figure 3, and

Figure 5 is a sectional view taken along the line 5—5 of Figure 4.

Referring now to Figure 1 of the drawings, numeral 6 designates the casing for the reservoir of an air compressor provided with a shaft 7 on which an air pump (not shown) is rotatably mounted. Compressed air passes from the air pump through conduit 8 into oil separator 9, into the reservoir in casing 6, into cooling member 10 and thence through conduit 12, past check valve 13 through the exhaust port in fitting 14, into conduit 15 and tank 16. Conduits 17 and 18 control an inlet valve and an unloading valve, respectively, (both not shown) so that the reservoir in casing 6 may be subjected to variations in pressure responsive to tank 16 pressures as is customary in air compressor operation.

The oil reservoir formed in casing 6 contains an oil supply 19 and when this supply is subjected to pressure, oil is forced through duct 20 and the connecting passageways in shaft 7 to the moving parts in the pump driven by said shaft.

Oil is supplied to the reservoir in casing 6 from an oil supply 32 in vessel 31 by an injector mechanism 21 which pumps or forces oil into the compressor reservoir. The injector comprises a housing 22 (see Figures 1 and 2) suitably secured to casing 6, and has a member provided with pistons

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23—23' reciprocally mounted in a cylinder bore in the housing. A valve seat 24 is secured to the piston 23 and is engageable with a suitable valve seat 24' formed in housing 22. A spring 26 is inserted in the bore in piston 23' and in a bore in cylinder closure 25 and holds the pistons in the position illustrated in Figure 2 when the compressor is operating under no-load or not delivering pressure fluid to the reservoir in casing 6. The casing 22 is provided with a pair of ports 27 and 28 into which conduits 29 and 30, respectively, are connected. The other end of the conduit 30 is preferably connected to the lower side of vessel 31 so that oil will flow by gravity into pump chamber 34 while the other end of conduit 29 extends into the top of vessel 31. Vessel 31 is vented to atmosphere so that the oil therein and in injector chamber 34 is at atmospheric pressure.

During the pumping operation of the air compressor, the unloading valve closes the outlet of conduit 18 and the space above the oil level 36 in casing 6 is filled with compressed air and the lubricant 19 is subject to the same pressure as tank 16. The pressure of the compressed air causes pistons 23—23' to move to the right, compressing spring 26 and seating valve 24 on valve seat 24' to prevent the escape of pressure fluid through chamber 34. As soon as the pressure requirements of tank 16 are satisfied, the compressor inlet valve is closed and the unloading valve opens the outlet of conduit 18, relieving the space above the lubricant 19 in casing 6 to atmosphere. Spring 26 now moves pistons 23—23' to the left until collar 33 engages the cooperating stop in housing 22.

The oil to be delivered into the reservoir of casing 6 occupies the space provided by a slot 35' in the connecting member 35. This slot is filled with oil and as the pistons 23—23' move to the left by the action of spring 26 to the position in Figure 2, the oil is delivered to the oil reservoir in casing 6 provided the oil level 36 is not above the uppermost part of slot 35'. The collar 33 on piston 23' limits the leftward movement of pistons 23—23' in the bore and prevents direct flow of oil from chamber 34 into the reservoir of casing 6.

A modified form of the invention is illustrated in Figures 3, 4, and 5 in which an injector housing 37 is associated with casing 6. Housing 37 has a cylindrical bore therein in which pistons 38—38' are slidable axially. Piston members 38—38' are equipped with valves 39 and 40, respectively, and are selectively seatable on appropriate seats

41 and 41'. A small diameter member 42 connects the two pistons and has the same function as the slot 35' in the connecting member 35 previously described. Oil is introduced into housing 37 from the engine oil sump 44 by oil pump 43. These latter members are preferably the oil sump and pump for the engine of the motor vehicle with which the compressor is associated. A conduit 45 is connected to the outlet side of the pump and conduit 46 connected thereto leads to the bearings and moving parts of the engine. Conduit 47 also connected to conduit 45 has a bore substantially smaller than the bore of conduits 45 and 46, permitting only a small amount of oil to pass through it. Conduit 47 is connected to a port in closure 48 of housing 37 and oil is thereby introduced into chamber 49. Chamber 49 communicates with chamber 50 formed in housing 37 by the aid of channel 55 whenever the valve 40 of piston member 38' is not contacting the seat 41'. When piston members 38 and 38' are in their left-hand position, the connecting member 42 is positioned in respect to chamber 50 as illustrated in Figure 4. It is essential that the maximum width of the circular groove formed by the small diameter member 42 is less than the distance between 41 and 54 of the cylinder bore in order to assure that the oil in casing 6 can never communicate directly with the chamber 50.

Oil supplied by conduit 47 is continuously circulated through chambers 49 and 50 when pressure exists in the reservoir in casing 6 and is returned to sump 44 through a conduit 51 secured in port 52. It is essential that the outlet member 52 is so dimensioned that under no condition the fresh oil supply furnished through pipe 47 can raise the oil level materially above the line 53 in Figure 5. The oil level in chamber 50 is maintained at the same level as the surface 53 (Figure 5) and when pistons 38-38' oscillate in the cylinder bore in housing 37, a given amount of oil is injected into the reservoir of casing 6 to maintain the oil level at the desired height 53 indicated in Figures 3 and 5.

Pistons 38-38' are forced to the right by the air pressure acting on the oil in casing 6 and they are forced to the left when the oil pressure derived from pump 43 exceeds the pressure in casing 6 or when the compressor is idling and the reservoir in the casing 6 is relieved to atmosphere.

Assuming that the unloading valve (not shown) for the air pump is closed, piston 38 will be forced to the right because of the pressure developed thereby seating valve 39 on seat 41, thus preventing pressure fluid escaping through housing 37. When the requirements of tank 16 are satisfied, the compressor inlet valve is closed, whereupon the pressure is relieved on the oil supply 19. Oil now entering chamber 49 (Figure 4) moves pistons 38-38' to the left, causing valve 40 to seat on valve seat 41' and the given quantity of oil in the space surrounding connecting member 42 and the cylinder bore is added to the lubricant supply 19. In the event that the level of the oil in the compressor reservoir 5 is higher than the overflow level 53 (Figure 5), pistons 38-38', during the succeeding right-hand movement, withdraw an amount of oil which is returned to reservoir 44 through conduit 51.

What I claim is:

1. A mechanism for replenishing the oil supply in an air compressor comprising a casing for the compressor provided with an oil reservoir

which is periodically subjected to variations in pressure; injector means to introduce oil into said casing; an oil source from which oil is supplied to said injector means; means to operate said injector means when the oil in the casing reservoir is subjected to variations in pressure to thereby inject oil into said casing reservoir; and means responsive to compressor pressure to prevent loss of pressure after each operation of said injector means.

2. A mechanism for replenishing the oil supply in an air compressor comprising a casing for the compressor provided with a reservoir containing oil which is periodically subjected to variations in pressure; an oil injector; an oil source; means to conduct oil from said source to said injector; means to operate said injector when the oil in the casing reservoir is subjected to variations in pressure to thereby inject oil into said casing reservoir; and means responsive to compressor pressure to prevent loss of pressure after each operation of said injector means.

3. A mechanism for replenishing the oil supply in an air compressor comprising a casing for the compressor provided with a reservoir containing oil which is periodically subjected to variations in pressure; an oil injector mechanism mounted on said casing; an oil source; means to conduct oil from said source to said injector mechanism; means to operate said injector mechanism when the oil in the casing reservoir is subjected to variations in pressure in order to transfer oil in said injector to said casing reservoir; and means to return some of the oil supplied to said injector mechanism to said source.

4. A mechanism for replenishing the oil supply in an air compressor comprising a casing provided with an oil reservoir having oil therein which is alternately subjected to atmospheric and compressor pressure; an injector housing associated with said casing having a bore and an oil receiving chamber therein; an oil source; a pump to transfer oil from said source to said chamber; injector means in said bore movable by pressure derived from said pump to transfer oil from said chamber into said reservoir when the oil reservoir is subjected to atmospheric pressure; and a valve associated with said injector means responsive to compressor pressure to prevent loss of compressor pressure through said housing.

5. A mechanism for replenishing the oil supply in an air compressor comprising a compressor casing provided with a reservoir having oil therein which is periodically subjected to compressor pressure or atmospheric pressure; a source of oil; an injector housing secured to said casing, said housing provided with an oil receiving chamber; means to transfer oil from said source to said chamber; a reciprocable injector member in said housing to transfer oil from said injector housing chamber to said reservoir; means to move said injector member in one direction when the oil in said reservoir is subjected to atmospheric pressure; and a valve on said injector member which is closed when said member has been moved by compressor pressure in the opposite direction to prevent the escape of compressor pressure.

6. A mechanism for replenishing the oil supply in an air compressor comprising a compressor casing provided with an oil reservoir having oil therein which is alternately subjected to atmospheric or compressor pressure; a source of oil; an injector housing associated with said casing provided with a bore and an oil receiving chamber; means to conduct oil from said source to said

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chamber; a reciprocable injector member in said bore; means to operate said injector member to transfer oil from said chamber into said reservoir when the reservoir oil is subjected to atmospheric pressure; and means responsive to compressor pressure to prevent loss of pressure from said casing through said bore when the oil in said reservoir is subjected to compressor pressure.

7. A mechanism for replenishing the oil supply in an air compressor comprising a casing provided with a reservoir having oil therein which is alternately subjected to atmospheric or compressor pressure; an injector housing associated with said casing having a bore and an oil receiving chamber therein; an oil source; a pump to transfer oil from said source to said chamber; an injector member in said bore movable by pressure derived from said pump to transfer oil from said chamber into said reservoir when the reservoir oil is subjected to atmospheric pressure and reversely movable by compressor pressure to transfer excess oil from said reservoir to said chamber; a valve associated with said injector member closable by compressor pressure to prevent loss of compressor pressure through said housing; and means to return the excess oil supplied to said housing to said oil supply.

8. A mechanism for replenishing the oil supply in an air compressor comprising a casing provided with a reservoir having oil therein which is subjected to atmospheric or compressor pressure; an injector housing associated with said casing having a bore and an oil receiving chamber therein; an oil source; a pump to transfer oil from said source to said chamber; means to operate an injector member in said injector housing when said

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reservoir oil is subjected to atmospheric pressure to transfer oil from said chamber to said reservoir; means responsive to compressor pressure to operate said injector member to transfer excess oil from said reservoir to said chamber; and a valve on said injector member closed by compressor pressure to prevent loss of compressor pressure.

9. A mechanism for replenishing the oil supply in an air compressor comprising a casing provided with a reservoir having oil therein which is subjected to variations in pressure; an injector housing associated with said casing having a bore and an oil receiving chamber therein; an injector member operable in said bore; an oil vessel disposed above said housing; means to enable oil to flow from said vessel to said chamber; a spring to move said pump member when the reservoir oil is subjected to variations in pressure to transfer oil from said chamber into said reservoir; and a valve on said injector member responsive to compressor pressure to reversely move said pump member and close said valve.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
795,676	Ammen	July 25, 1905
1,650,091	Nelson	Nov. 22, 1927
2,178,100	Gygax	Oct. 31, 1939
2,285,426	Freeman	June 9, 1942