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D. GREGG

1,784,433

SUPERCHARGER OILING SYSTEM

Filed June 4, 1928

2 Sheets-Sheet 1

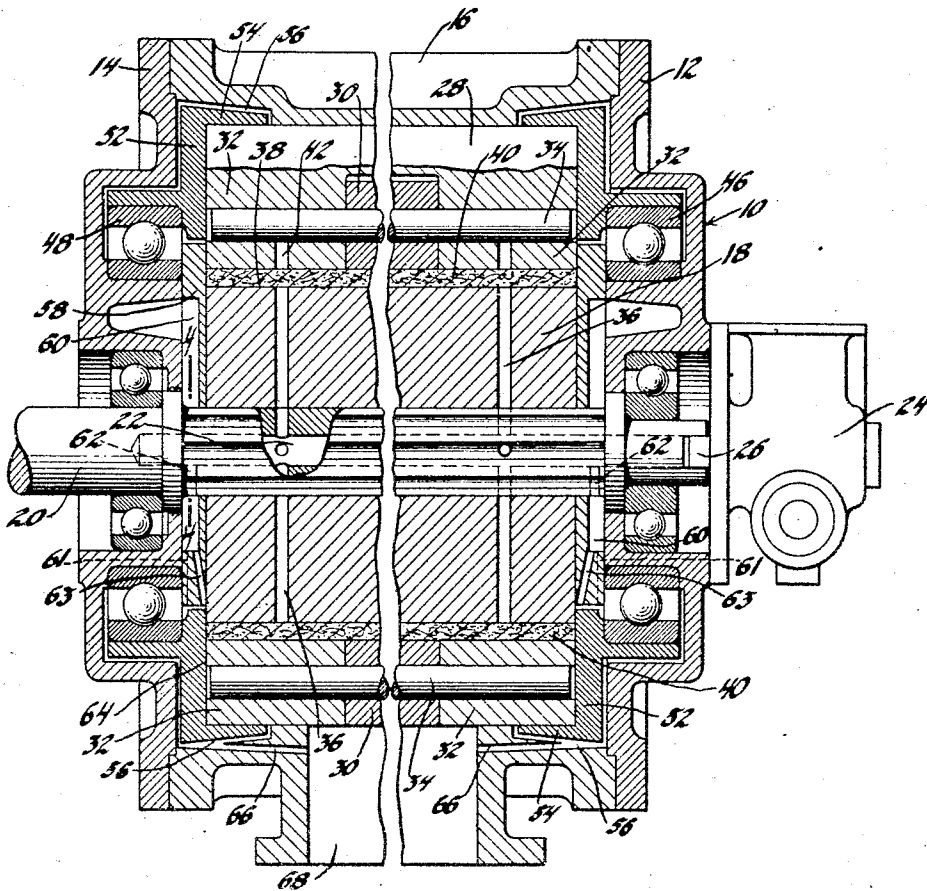


Fig. 1.

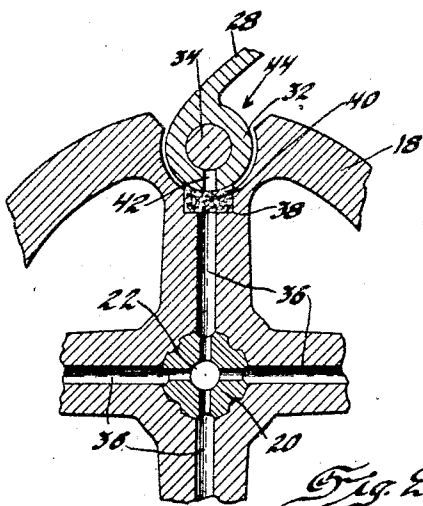


Fig. 2.

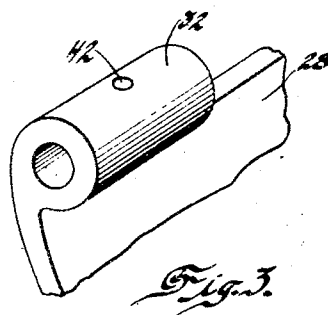


Fig. 3.

Inventor
David Gregg

By *Blackman, Spencer & Finch*
Attorneys

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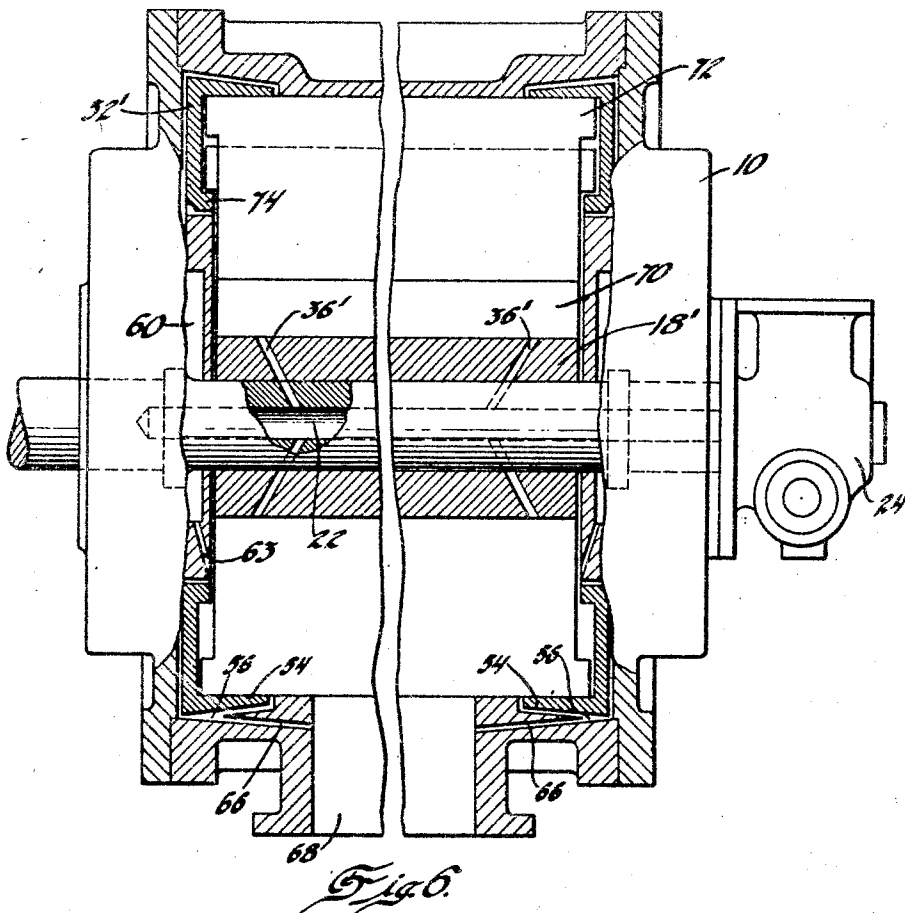
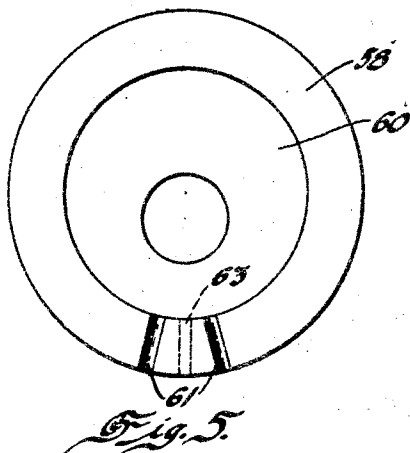
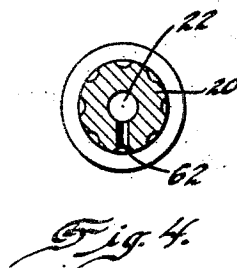
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Inventor
David Gregg

By Blackmore, Spencer & Finch
Attorneys

UNITED STATES PATENT OFFICE

DAVID GREGG, OF FLINT, MICHIGAN, ASSIGNOR TO A C SPARK PLUG COMPANY, OF FLINT, MICHIGAN, A COMPANY OF MICHIGAN

SUPERCHARGER OILING SYSTEM

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This invention relates to a system of lubrication for superchargers used in connection with internal combustion engines applied to automotive vehicles.

In the past some difficulty has been experienced in properly lubricating superchargers due to their excessive speed and the large amount of heat developed. There has also been experienced considerable difficulty in supplying the proper amount of oil; or in cases where an excess of oil has been supplied, it has been more or less of a problem to satisfactorily and conveniently dispose of the excess oil.

The present invention eliminates these difficulties of prior constructions and incorporates in a supercharger of the blade type a system of oiling which will adequately lubricate all parts with substantially the proper amount of oil and at the same time make a convenient and useful disposal of any possible excess oil which may seep past the lubricating parts.

The object of the invention is accomplished by providing a bore through the center of the rotor which moves the blades of the supercharger. From this rotor there lead a plurality of passages which conduct the oil to the bearings for the supercharger blades as well as to the rotor bearings. Each end of the supercharger housing is provided with a chamber having passages at its bottom portion from which the oil is allowed to flow to the inner portion of the supercharger housing against a pair of floating rings, one positioned at each end of the casing.

Each floating ring has a flange which takes the load off the tips of the blades and between the flange and the supercharger housing there is provided a space for the trapping of the excess oil. From this space a passage leads from each side of the supercharger to the supercharger inlet and when the oil reaches the inlet opening the air suction due to the rotation of the blades will cause the lubricant to be drawn inside and thrown about the supercharger housing to cause a further and adequate lubrication of the parts.

A pump is preferably used to force the

lubricant and the system may be applied to a supercharger of either the pivoted blade type or the radially slidable blade type.

On the accompanying drawing,

Figure 1, is a sectional view through a supercharger showing the lubricating system applied thereto.

Figure 2, is a transverse sectional detail through a portion of the rotor illustrating the metering means for the journal connection of the rotor blades.

Figure 3, is a perspective view of the end of one of the blades showing the oil opening.

Figure 4, is a section on the line 4-4 of Figure 1.

Figure 5, is a detailed view of one of the end plates inside the supercharger.

Figure 6, is a sectional view similar to Figure 1 of a modification.

Referring to the drawing, the numeral indicates a supercharger as a whole, the supercharger comprising the end portions 12 and 14 and the central cylindrical portion 16. Within the supercharger there is mounted the rotor 18, secured to a shaft 20, provided with a central bore 22, which receives oil from a pump 24 secured to and operated from the rotor shaft as at 26. At its outer periphery the rotor 18 is provided with ears 30 to which are journaled the blades 28 which have ears 32 on their ends conforming to the rotor ears 30. The ears 30 and 32 are united by means of a hinge pin 34 which serves as an axle for the swinging movement of the blades 28.

Leading from the bore 22 of the shaft or axle 20 of the rotor is a plurality of radial passages 36 which terminate at a groove 38 near the outer periphery of the rotor. In the groove 38 there is positioned the felt pad 40 which soaks up the oil from the passage 36 and lubricates the bearing surface of the ears 32 at the pad. Each ear 32 is provided with an opening 42 and through this opening a certain portion of the oil from the pad 40 is allowed to pass. From the opening 42 the oil will reach the hinge pin 34 and lubricate the connection between the pin and the blade 28. An opening similar to the opening 42 may be provided in each

rotor ear 30. The ears 32 of each blade 28 as well as the hinge pin 34 are held in recesses 44 formed at the outer surface of the rotor.

At each end on the inside of the rotor casing there are provided the bearings 46 and 48 on each of which there is seated the annular oppositely directed peripheral flange 54 the purpose of which is to receive the centrifugal weight or force of the blades 28 when the rotor is in operation. The flanges 54 extend into spaces 56 provided at the edge of the rotor housing.

At each end of the rotor and against the lower race of the bearings 46 and 48 there are secured the discs or end plates 58 provided with recessed portions 60 which, in connection with the end members 12 and 14, form lubricating chambers.

The bore 22 in the axle 20 of the rotor is provided with suitable auxiliary passages 62 which deliver oil to the chambers 60 at the end of the supercharger housing. Each disc or plate 58 is provided with passages 61 and 63 at its lower portion the purpose of the passages 61 being to permit oil to flow to the end bearings 46 and 48 while the passage 63 allows oil from the chambers 60 to flow down over the inner faces 64 of the floating rings 52. As the oil reaches the face 64 the centrifugal force of the rotor will fling the oil against the flange 54. Any excess oil will eventually reach the space 56 between the flange 54 and the rotor casing.

Provided at the lower portion of the supercharger housing at each side thereof are passages 66 which lead from the space 56 to the inlet opening 68 of the supercharger. Any excess oil which reaches the space 56 will flow through the passage 66 to the inlet opening 68 and be drawn by the suction force of the supercharger into the rotor and be thrown by the blades 28 against the various moving parts inside the casing 10.

The operation of the lubricating system is as follows:

The oil will be forced by the pump 24 into the bore 22 of the axle 20 from where it will flow through the passages 36 and 62 to the respective working parts. From the passage 36 the oil will reach the pad 40 which will soak up the oil and allow a portion to pass through the opening 42 to the hinge bolt 34 to properly lubricate the same. The oil flowing from the opening 62 will be received in the chambers 60 from where it will flow through the passage 61 to the end bearings 46 and 48 and from the passage 63 down the inner side 64 of the ring 52 to the outer periphery of the rotor. Excess lubricant will flow to the space 56 and into the passage 66 and be discharged into the opening 68 to be drawn inside the housing by the suction force of the supercharger and be thrown about by the movable blades.

Referring to the species in Figure 6, the

structure of the bearings and passages is substantially the same. The difference in the two species resides in the fact that in Figure 6 a supercharger of a sliding vane type is used.

In Figure 6 the numeral 70 indicates the slots in the rotor 18' while 72 denotes the blades moving radially in and out of the slots 70. The rotor has the passages 36' which conduct the oil from the central bore 22 to the slots 70 to lubricate the friction surface between the blades 72 and the slot sides.

In Figure 6, the floating rings 52' are provided with a projection or annular flange 74 on which the oil from the opening 63 flows as it leaves the chamber 60.

The operation of the construction shown in Figure 6 is substantially similar to that shown in Figure 1.

In both species of the invention substantially the exact amount of oil required to adequately lubricate the supercharger may be supplied to the working parts by properly gauging or proportioning the size of the various passages or bores.

I claim:

1. In a lubricating system for a supercharger having a rotor having blades operating in a housing, a pump for moving the lubricant through the system, a lubricant passage through said rotor, an auxiliary passage leading from said rotor passage to conduct the lubricant to a rotor bearing, and means including a passage in the walls of said housing for conveying the lubricant from said auxiliary passage to the tip of the blades.

2. In a lubricating system for a supercharger having a rotor operating in bearings in a casing, a freely disposed blade supporting ring in said casing, a lubricant passage through said rotor to conduct lubricant, and a passage in said supercharger to conduct lubricant to the inner periphery of the casing and to the ring.

3. In a lubricating system for superchargers having a blade moving rotor mounted in bearings in a casing, a freely rotatable blade supporting ring at each end of the casing, a lubricant passage in said rotor, and passages in said supercharger adapted to receive lubricant from said rotor passage and to conduct the lubricant to the rotor bearings, the ring and the tips of the blades.

4. In a lubricating system for a supercharger, a rotor having blades and mounted in bearings in a casing, a pump for moving lubricant through the system, a passage in said rotor for conducting the oil from the pump, a plate secured at each end of the supercharger, a freely mounted or floating ring at each end of the rotor held in position by said plates, and passages in said plates for conducting lubricant from said rotor passage to the floating ring and rotor bearings.

5. The structure of claim 4, said plates and casing walls defining lubricant chambers and said plate passages connected with said chambers.

6. In a lubricating system for a supercharger having a rotor having blades operating in a housing, a pump for moving the lubricant through the system, a lubricant passage through said rotor, an auxiliary passage leading from said rotor passage to conduct the lubricant to a rotor bearing, means for conveying the lubricant from said auxiliary passage to the tip of the blades, and means for conducting excess lubricant to the supercharger inlet.

7. In a lubricating system for a supercharger having a rotor operating in bearings in a casing, a freely disposed blade supporting ring in said casing, a lubricant passage through said rotor to conduct lubricant, a passage in said supercharger to conduct lubricant to the inner periphery of the casing and to the ring, and means in said casing to conduct excess lubricant to the supercharger inlet.

8. In a lubricating system for a supercharger having a rotor operating in bearings in a casing, a freely disposed blade supporting ring in said casing, a lubricant passage through said rotor to conduct lubricant, a passage in said supercharger to conduct lubricant to the inner periphery of the casing and to the ring, and an additional passage in the supercharger for conducting lubricant to the rotor bearings.

9. In a lubricating system for a supercharger having a rotor operating in bearings in a casing, a freely disposed blade supporting ring in said casing, a lubricant passage through said rotor to conduct lubricant, a passage in said supercharger to conduct lubricant to the inner periphery of the casing and to the ring, and a passage in said casing for conducting excess lubricant to the supercharger inlet.

10. In a lubricating system for a supercharger having a rotor operating in bearings in a casing, a freely disposed blade supporting ring in said casing, a lubricant passage through said rotor to conduct lubricant, a passage in said supercharger to conduct lubricant to the inner periphery of the casing and to the ring, and a flange on said ring to take the centrifugal load of the rotor blades, said supercharger passage supplying lubricant to the contacting surfaces of said blades and ring.

11. In a lubricating system for superchargers having a blade moving rotor mounted in bearings in a casing, a freely rotatable blade supporting ring at each end of the casing, a lubricant passage in said rotor, passages in said supercharger adapted to receive lubricant from said rotor passage and to conduct the lubricant to the rotor bearings, the

ring and the tips of the blades, and means in the supercharger casing for conducting the excess lubricant to the supercharger inlet.

12. In a lubricating system for superchargers having a blade moving rotor mounted in bearings in a casing, a freely rotatable blade supporting ring at each end of the casing, a lubricant passage in said rotor, passages in said supercharger adapted to receive lubricant from said rotor passage and to conduct the lubricant to the rotor bearings, the ring and the tips of the blades, and means in said rotor for conducting lubricant from said rotor passage to the frictional surfaces between the rotor and blades.

13. In a lubricating system for superchargers having a blade moving rotor mounted in bearings in a casing, a freely rotatable blade supporting ring at each end of the casing, a lubricant passage in said rotor, passages in said supercharger adapted to receive lubricant from said rotor passage and to conduct the lubricant to the rotor bearings, the ring and the tips of the blades, and a pump for forcing the lubricant through the system.

14. In a lubricating system for superchargers having a rotor, a plurality of blades hinged to the rotor, a lubricant passage in the rotor, a plurality of passages connecting with said rotor passage and extending radially to the hinged connection of the blades with the rotor, a passage in the blade at the hinged portion to lubricate the same, and a pad at the hinged connection to distribute the oil and serve as an air seal.

In testimony whereof I affix my signature.
DAVID GREGG.