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APPARATUS FOR SEPARATING OIL FROM AIR IN AIR COOLED SYSTEMS FOR MACHINERY.

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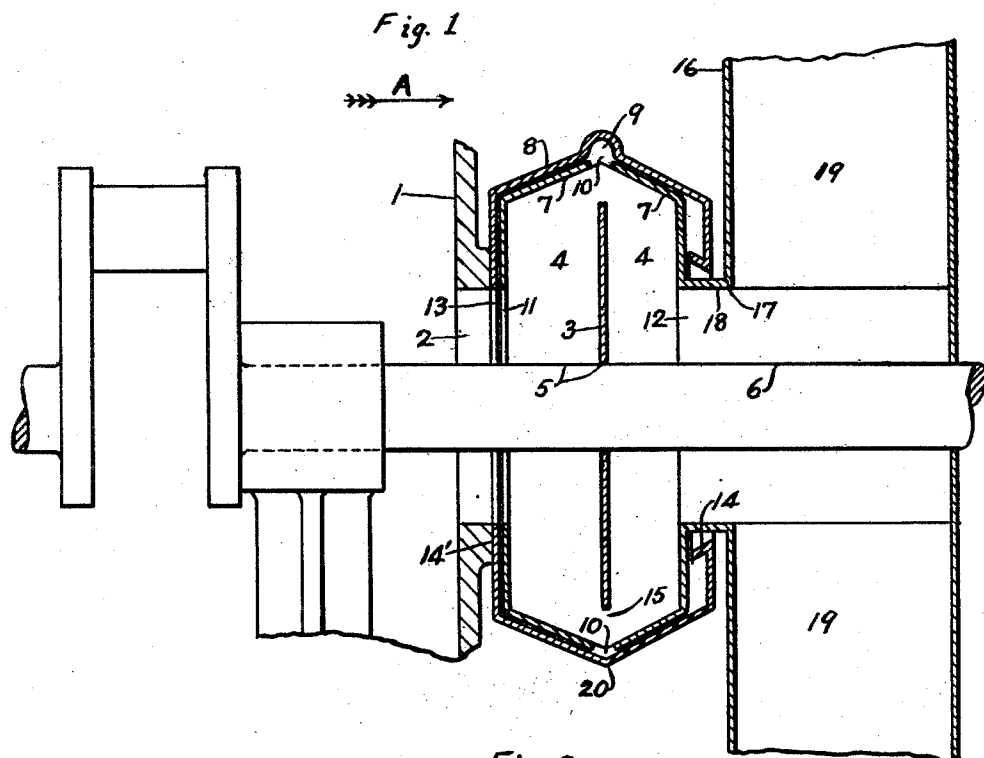
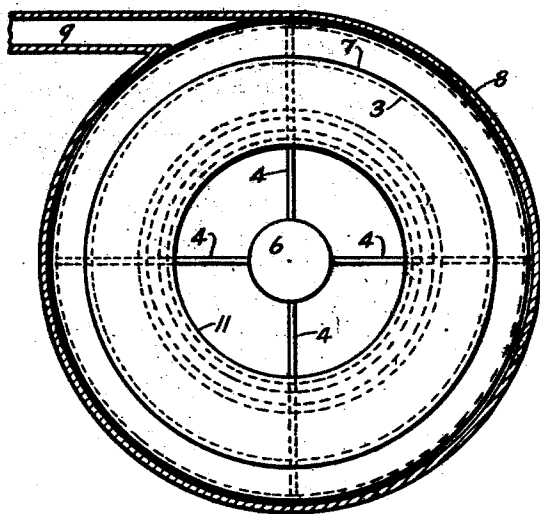


Fig. 2



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APPARATUS FOR SEPARATING OIL FROM AIR IN AIR-COOLED SYSTEMS FOR MACHINERY.

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Specification of Letters Patent.

Patented May 6, 1919.

Application filed May 22, 1918. Serial No. 235,998.

To all whom it may concern:

Be it known that we, WILLIAM PATRICK KELLY, a subject of the King of Great Britain, residing at Slaney Place, Enniscorthy, co. Wexford, Ireland, and DENIS CLEMENT SLATTERY, a subject of the King of Great Britain, residing at Slaney Place, Enniscorthy, co. Wexford, Ireland, have invented certain new and useful Improvements in Apparatus for Separating Oil from Air in Air-Cooled Systems for Machinery, of which the following is a specification.

Our invention relates to an apparatus for separating oil from air in air cooled systems for machinery and as herein shown and described, we have illustrated the same as applied to cooling the crank case and cylinders of an internal combustion engine, although as will be understood, it may be applied with equal advantage to any apparatus in which the parts are lubricated by oil and cooled by a current of air, the air being moved by a suitable fan or blower and admitted to the chamber or casing containing the parts to be cooled through suitable ports so as to be directed against the parts to be cooled. Furthermore, the construction is such, that after the oil has been separated from the air, it may be returned to the oil circulating system.

In illustrating our invention, we have shown the same as preferably comprising a housing fixed in position and provided with a discharge outlet and within which there is mounted a revoluble casing inclosing a plurality of vanes and a disk or interceptor mounted on a shaft by which they are adapted to turn the casing. The periphery of the casing is preferably tapered and open circumferentially and in which, as well as in the housing, there is an inlet opening at one side and a discharge opening at the other side, which will be hereinafter more particularly described.

Said means for cooling crank case and cylinders of internal combustion engine constructed and arranged to operate in accordance with our said invention is more fully described hereinafter with reference to the accompanying drawing; and the same reference numbers are used for the same parts throughout.

In the drawing, Figure 1 shows a longitudinal sectional elevation of said device and centrifugal fan applied to the crank case

of an engine, and Fig. 2 shows a transverse sectional elevation through the said gutter with part outside view of said disk, radial vanes and annular casing.

The said means for cooling crank case and cylinders of internal combustion engines, comprises air inlet ports suitably arranged at advantageous positions in the known way in the crank case and provided with tubes or nozzles suitably arranged and disposed in the known way to direct the incoming air current into the engine cylinder or cylinders and against the bearings or other moving or stationary parts, in combination with a device, with or without a centrifugal fan, adapted to separate or remove from the crank case oil which has been mixed with air, said device being in open communication with the engine crank case 1 by means of the air port 2, said device consisting of a disk 3 with radial vanes 4 all rigidly keyed or fixed at 5 to the engine crank shaft 6 or to spindle geared to it, said radial vanes having a divided and open annular casing 7 adapted to be driven by the engine or equivalent in a corresponding annular and fixed oil gutter 8 having one or more tubes 9 tangentially arranged and adapted to discharge the separated oil back to the oil circulation or oil pump, as the case may be. As shown, the radial vanes 4 are slotted to fit over sides of the disk 3, and in said annular casing and said oil gutter of V-shape, the annular casing being open at 10 and 11 and 12.

The oil gutter 8 is in open communication at 13 with the engine crank case and is suitably fixed to the latter at 14 by means of countersunk rivets or bolts or the like or this side of the split casing may be integral with the crank case. Said gutter is provided with an annular shelf 14 which is intumed as shown, and adapted to prevent oil drip. An open space 15 is provided between the periphery of the disk 3 and the apex of the radial vanes 4 and the annular casing 7 to allow of air circulation. In Fig. 1, the oil discharge tube 9 for the sake of clearness is shown on a higher plane than in Fig. 2. In open communication with the said device and with the engine crank case is optionally provided the known kind of centrifugal fan 16 which when used is detachably flanged and fixed at 17 to the annular extension 18 of said casing, the vanes 19 of said centrifugal fan

gal fan being suitably arranged at any angle to cause the mixture of air and oil to be drawn through said crank case and into said device so that the air is discharged through the said fan. When said centrifugal fan is not used or not required as in the case of air craft engines it is cut short of the annular extension 18 or from the annular casing 7. For convenience in assembling, said oil gutter is divided at 20 and the parts suitably connected, and the annular casing 7 is suitably fixed to said radial vanes by sweating or brazing or the like. The rotatable parts of the said device revolve toward the discharge tube 9 which latter may be arranged at the top or bottom or other position of said device. In the case of air craft engines, said centrifugal fan can be dispensed with when owing to the speed of the air craft the velocity of the current of air passing through the engine crank case is sufficient without the aid of said fan, but in other cases such as for stationary internal combustion engines or motor cycle or vehicle engines said fan is optionally used to produce a better cooling effect on the engine and to facilitate the separation of the oil fog or vapor mixed with the air.

Said device operates as follows:—

When driven by the engine shaft or equivalent the mixture of oil and air passes in the direction of the arrow A as the air enters through said air ports or nozzles in crank case, and passes through the openings 2, 13 and 11 into the said device in which the oil is intercepted by the disk 3 and the radial vanes 4 and thrown by centrifugal force on to the annular casing 7 and thence through the opening 10 into the oil gutter 8 from whence it is discharged through the discharge tube 9, the more or less pure air passing through the opening 15 and out through the opening 12 into the centrifugal fan when used, or directly into the atmosphere when the said fan is not used.

By means of our said device used with or without a fan as found desirable, and in combination with the engine crank case, cooling of the engine is facilitated thereby increasing its efficiency and reliability as there is less carbon deposit and less oil consumption owing to the reduced temperature obtained, and water radiators, water pumps, water jackets and piping and water for same may be dispensed with thus reducing cost of

manufacture and in the case of air craft engines increasing the effective weight carrying capacity of such air craft, while in all cases further economy is effected by separating the oil from the air and using the former over again in the oil circulation.

Having described our invention, what we claim is:—

1. In an apparatus of the type described, a shaft, a disk mounted on said shaft, a plurality of vanes associated with the disk, a casing having a tapered periphery with the apex thereof open circumferentially, the said casing having secured thereto the said disk and vanes, a housing surrounding the said casing with its periphery conforming to the periphery of the casing and having an outlet therein, there being an inlet port in the said casing for admitting a mixture of air and oil, and an outlet port for the discharge of the air.

2. In an apparatus of the type described, a shaft, a disk mounted on the said shaft, a plurality of vanes associated with the said disk, a casing having a tapered periphery at the apex of which there is an opening, the said casing being secured to the said disk and vanes, a housing surrounding the said casing, there being an inlet port in the said casing for admitting a mixture of air and oil, and an outlet port for the discharge of the air and a drip flange associated with the said housing adjacent the air discharge port in the casing.

3. In an apparatus of the type described, a shaft, a disk mounted on the said shaft, a plurality of vanes associated with the said disk, a casing having a tapered periphery at the apex of which there is an opening, the said casing being secured to the said disk and vanes, a housing surrounding said casing, there being an inlet port in the said casing for admitting a mixture of air and oil, and an outlet port for the discharge of the air, a drip flange associated with the said housing adjacent the air discharge port in the casing, and a discharge connection for the oil leading from the said housing.

Signed by us this 30th day of April, 1918.

WILLIAM PATRICK KELLY.
DENIS CLEMENT SLATTERY.

Witnesses:

WILLIAM EVERT DOYLE,
JOHN F. CLAFFEY.