

G. DE C. MAY.
 COOLING AND LUBRICATING DEVICE FOR VACUUM PUMPS.
 APPLICATION FILED JUNE 28, 1915.

1,156,700.

Patented Oct. 12, 1915.

2 SHEETS—SHEET 1.

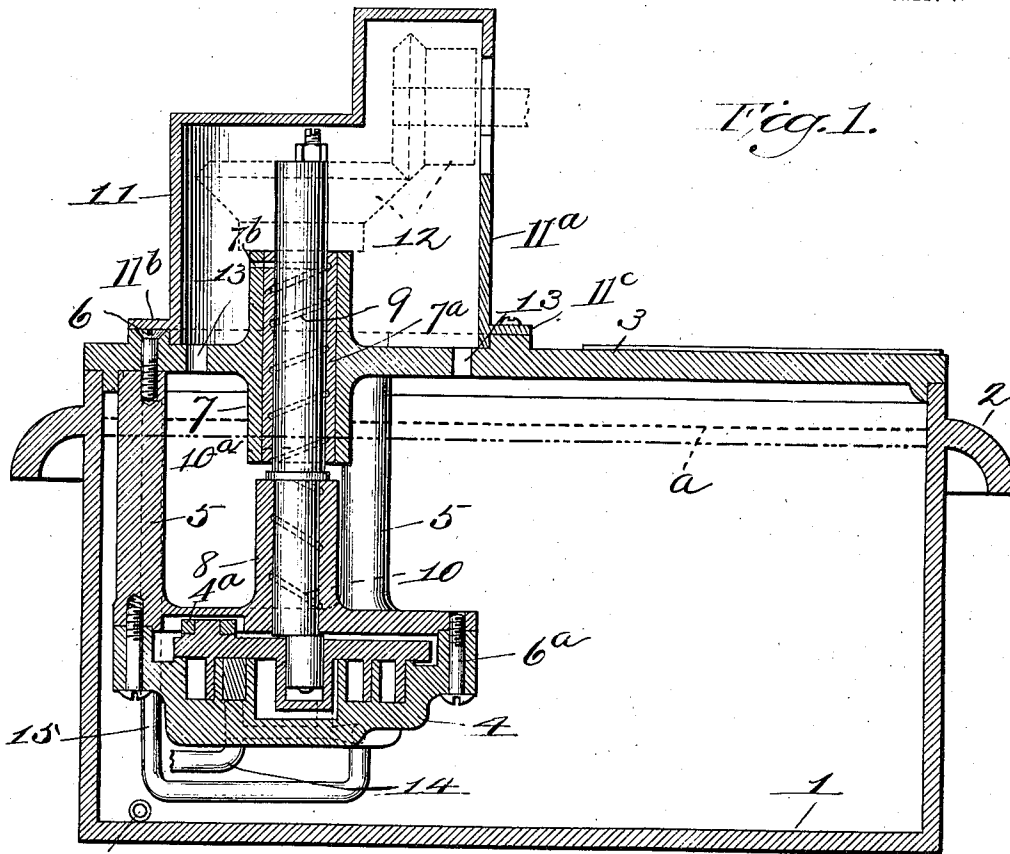


Fig. 1.

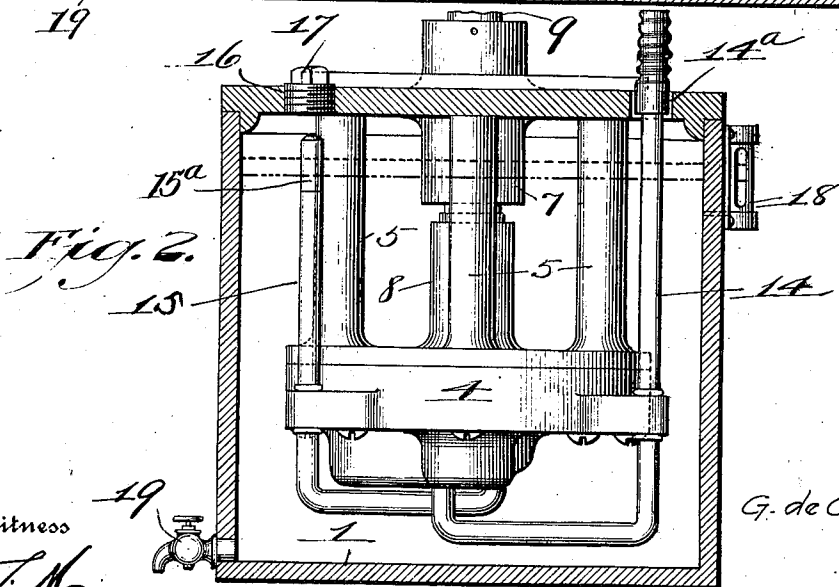


Fig. 2.

Witness

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Fig. 3.

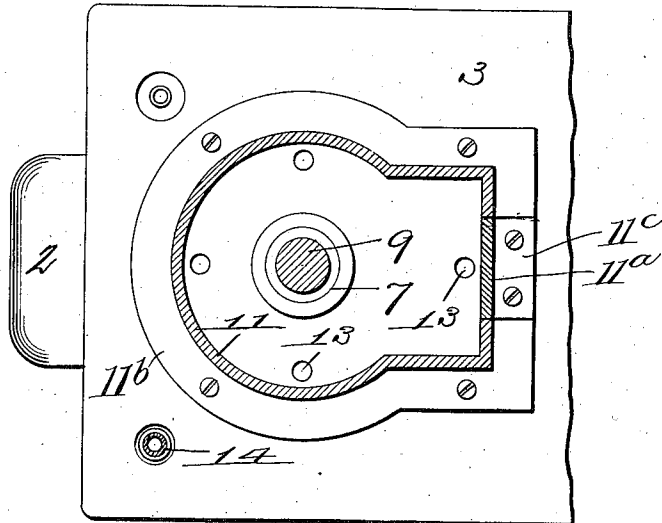


Fig. 4.

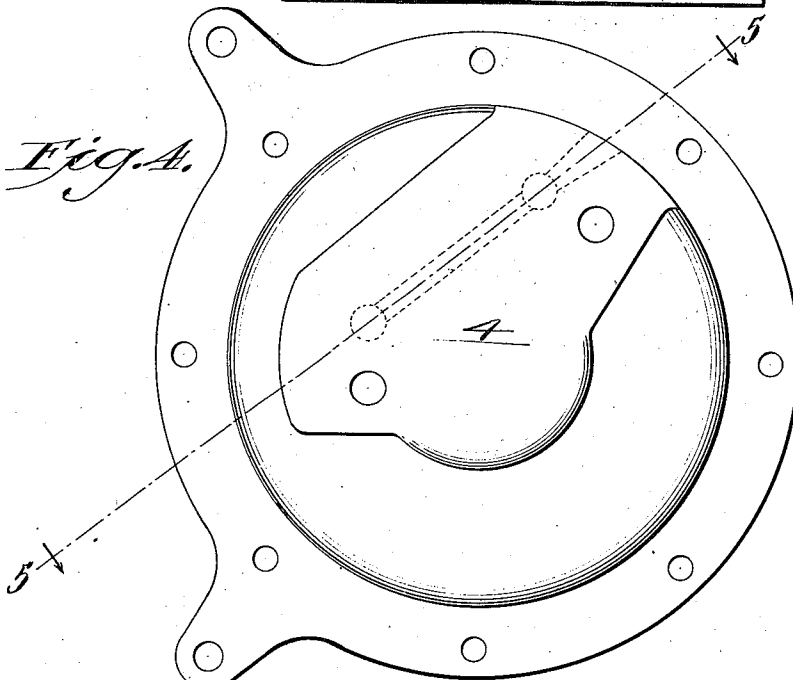
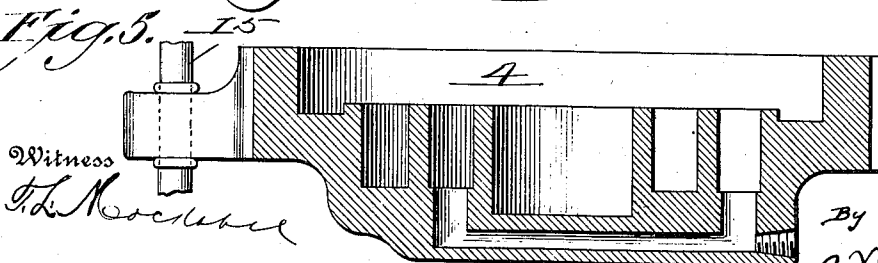


Fig. 5.



Witness

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UNITED STATES PATENT OFFICE.

GERALD DE COURCY MAY, OF WASHINGTON, DISTRICT OF COLUMBIA.

COOLING AND LUBRICATING DEVICE FOR VACUUM-PUMPS.

1,156,700.

Specification of Letters Patent.

Patented Oct. 12, 1915.

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To all whom it may concern:

Be it known that I, GERALD DE COURCY MAY, a citizen of the United States, residing at Washington, District of Columbia, have
5 invented certain new and useful Improvements in Cooling and Lubricating Devices for Vacuum-Pumps, of which the following is a specification.

This invention relates to a combined cooling and lubricating device for pumps of the May-Nelson oscillating ring type. These pumps have a very high speed and when used as a high vacuum pump quickly become very hot if run in the open air. In pumps of
15 a large size various forms of water cooling may be resorted to but I have found that for the smaller sizes much better results are obtained by submerging the entire pump in an oil bath, and this not only keeps the pump cool but also incidentally lubricates the pump, thereby accomplishing both of the desired results and avoiding the extra cost of putting in separate cooling and lubricating means.

I am aware of the fact that force pumps have been used in connection with lubricating various kinds of machinery, said pumps being arranged in an oil reservoir, but these pumps have been so placed simply for the
30 purpose of forcing the oil from the reservoir to some machinery, or bearing, located outside of the oil container. In my construction the oil remains in the casing and is not directly acted upon by the pump, and is not employed for the purpose of lubricating exterior devices.

The invention consists in the novel features of construction hereinafter described, pointed out in the claims and shown in the
40 drawings, in which:

Figure 1 is a vertical section through the pump, the oil casing and the shaft housing. Fig. 2 is a transverse section through the oil casing, the housing being removed, and
45 the pump being in elevation. Fig. 3 is a plan view of a portion of the oil casing, a housing and a pump shaft being in section. Fig. 4 is an inverted plan view of the pump, certain pipes being removed. Fig. 5 is a section on the line 5—5 of Fig. 4.

In the drawings 1 represents a suitable oil receiving casing provided at the ends with handle members 2. A cover plate 3 rests loosely upon the casing 1. Suspended in
55 said casing and entirely below the normal oil level *a* is an oscillating ring type pump

4 the construction of which is not substantially changed. Said pump is suspended by means of suitable standards 5 carried by the upper portion of the pump and preferably
60 integral with it, said standards being secured to the cover by means of screws 6. By lifting said cover the entire pump is removed from the casing 1, and can be so removed at any time without the use of any
65 tool or the removal of any securing means. The cover 3 is provided with a shaft bearing in the form of a vertical sleeve which upon the under side of the cover extends below the oil level. This sleeve is provided with a
70 suitable bushing 7^a. The pump is also provided with a suitable bearing hub 8 which extends upwardly almost to the sleeve 7, a very slight space being left between the two bearings. The pump shaft 9 extends
75 upwardly through the hub 8 and the bushing 7^a and that portion working in the hub is lubricated by means of a downwardly extending spiral groove 10 preferably formed in the bearing but which might be cut in
80 the shaft if desired. This not only oils the bearing but also the guide block 4^a of the pump and keeps the top of the impeller 4^b always covered with oil. The bearing 7 is provided with an upwardly extending spiral
85 groove 10^a and the oil carried upwardly is discharged through an opening 7^b in said bearing. On the upper end of the shaft 9 is fixed one of a set of bevel gears 12, shown in dotted lines and through which rotation
90 is transmitted to the pump shaft from any suitable source of power, preferably by mounting an electric motor on the cover 3. A suitable housing 11 rests upon the cover and incloses the gearing, and openings 13
95 are formed in the cover 3, and also within the housing, and drain back into the casing 1 the oil discharged through the opening 7^b. An end shield 11^a closes the side of the housing
100 opposite the motor.

The housing 11 serves a double purpose of protecting the operator from having parts of clothing or hands caught in the bevel gears, and of catching the oil discharged
105 through the opening 7^b, thereby insuring its return to the casing 1. Besides preventing loss of oil it protects the windings of the electric motor from oil, which oil would ultimately ruin the motor if allowed to be
110 thrown thereon, and the housing also protects the person and clothing of the operator from the discharged oil.

A suction pipe 14 passes downwardly through a suitable opening 14^a formed in the cover 3 and a discharge pipe 15 terminates just below the cover but above the oil level and contains a suitable check valve forming the upper end of said pipe as indicated at 15^a. An opening 16 is formed in the cover in vertical alinement with the pipe 15 and outside of the housing 11. A suitable gage 18 is carried by the casing and the casing is also provided with a drain cock 19.

The pump casing is formed in two sections the upper end of which carries the standards 5 and the lower one secured in place by means of screws 6^a. It will therefore be obvious that my present method of mounting the pump makes it very easy to handle and gives ready access to any part of the pump. For example as previously stated the mere lifting of the cover 3 removes every part from the casing 1 including the pipes 14 and 15. When so lifted removal of the screws 6^a disengages the lower section of the pump exposing all of the movable parts, but without disturbing the pump shaft, or the standards. By removing the screws 6 the entire pump can be disengaged from the cover 3.

When the pump is employed for evacuating non-dangerous substances the opening 16 is covered and the discharged vapor enters the casing 1. This vapor, if condensed, will settle to the bottom of the tank and can be drawn off through the drain 19 thereby restoring the normal oil level. But with dangerous gases the plug 17 is removed and a suitable rubber pipe, not shown, is fitted over the upper end of the pipe 15 and the gases drawn off.

By suspending the pump so that it will hang close to the bottom of the tank I provide for a natural circulation of the oil in the casing 1, as the oil nearest the pump will be first heated and will therefore rise to the top, thereby creating a circulation in the casing due to the continuous flow of the cooler oil toward the pump while the latter is in operation, and independent of any direct action of the pump upon the oil.

The housing 11 is provided with a suitable exterior flange 11^b and the end shield with a foot portion 11^c, and suitable screws passing through said flange and said foot portion secure the housing and shield to the cover, and this flange also normally covers the screws 6.

The electric motor which is preferably mounted on the cover 3 has not been shown

as it forms no part of the invention and it is of course not material as to how the pump is driven. The various hose connections for the suction pipe 14, and for the pipe 15 when gases are discharged at some suitable point away from the pump, are also not shown as they also form no part of the invention, but are applied as desired.

It will of course be understood that the spiral grooves 10 and 10^a may be formed in the bearings, as shown, or may be cut in the shaft as previously stated, and it is immaterial to the operation of the device which method of construction is adopted.

What I claim is:

1. In a cooling and lubricating device for pumps of the rotary type having a shaft, an oil casing, a cover therefor, a housing upon said cover, means for suspending a pump upon the under side of said cover, all portions of said pump being below the oil level and the pump shaft extending through said cover and into said housing, a bearing carried by said cover for said shaft, said bearing extending below the oil level, means for drawing oil upwardly through said bearing, means for carrying oil downwardly into said pump, means for rotating the pump shaft, a suction pipe passing through said cover and to said pump, and a discharge pipe from said pump, said discharge pipe terminating within the casing and above the oil level, said cover being provided with openings to permit drainage of oil from said housing into said casing.

2. A cooling and lubricating device for pumps comprising an oil receptacle, a cover loosely fitting thereon, depending standards detachably secured to the underside of the cover, a rotary pump supported from the lower ends of said standards, a vertically arranged bearing formed on said cover and extending downwardly into said receptacle and below the normal oil level, a pump shaft journaled in said bearing, a suction pipe passing through the cover to said pump, a discharge pipe leading upwardly from said pump to a point adjacent said cover and above the oil level, said cover having an opening in alinement with said discharge pipe, and means for normally closing said opening, as and for the purpose set forth.

In testimony whereof I affix my signature in the presence of two witnesses.

GERALD DE COURCY MAY.

Witnesses:

HENRY MAY,

M. KILECLANE, Jr.