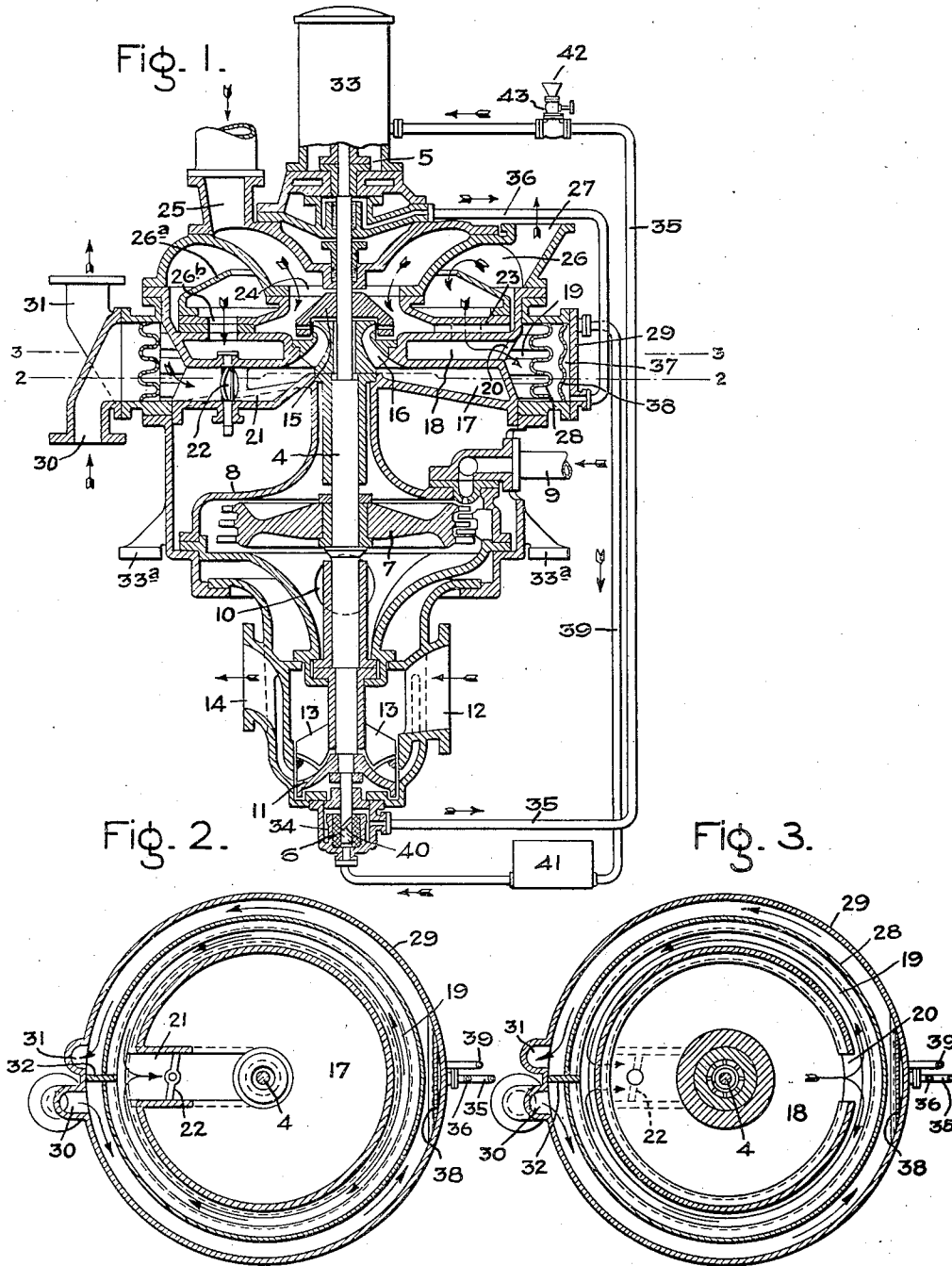


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MACHINE FOR USE IN CONDENSER SYSTEMS.
APPLICATION FILED JUNE 19, 1914.

1,246,109.

Patented Nov. 13, 1917.



Witnesses:
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UNITED STATES PATENT OFFICE.

WALTER KIESER, OF CHARLOTTENBURG, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

MACHINE FOR USE IN CONDENSER SYSTEMS.

1,246,109.

Specification of Letters Patent.

Patented Nov. 13, 1917.

Application filed June 19, 1914. Serial No. 846,147.

To all whom it may concern:

Be it known that I, WALTER KIESER, a citizen of the Swiss Republic, residing at Charlottenburg, Germany, have invented certain new and useful Improvements in Machines for Use in Condenser Systems, of which the following is a specification.

The present invention relates to machines for use in condenser systems for elastic fluid turbines or other engines and has for its object to improve their construction, particularly as related to the arrangement of the various parts going to make up the machine, and the arrangement for lubricating the same.

For a consideration of what I believe to be novel and my invention, attention is directed to the accompanying description and claims appended thereto.

In the accompanying drawing, Figure 1 is a vertical sectional view through the machine; Fig. 2 is a cross-section on line 2—2, Fig. 1; and Fig. 3 is a cross-section on line 3—3, Fig. 1.

The machine comprises an upright shaft 4 carried by the supporting bearing 5 and guided at its lower end by the guide bearing 6. The shaft is rotated by the turbine wheel 7 mounted in the casing 8. Motive fluid is supplied to the turbine wheel through conduit 9 and exhausts through outlet 10. Mounted on the lower end of the shaft is the impeller wheel 11 of a centrifugal pump which handles the water of condensation from the condenser. This water is fed to the impeller wheel through inlet 12 and guide vanes 13 and is discharged through outlet 14.

Carried by the shaft above the turbine wheel is the rotating member or impeller 15 of a centrifugal air pump of the water throwing type. The throwing water is fed to the impeller by the directing vanes 16 which in turn receive water from the chamber 17, Figs. 1 and 2. Above the chamber 17 is a chamber 18, Figs. 1 and 3, and surrounding these two chambers is the annular cooling chamber 19. The chamber 18 communicates with chamber 19 by way of passage 20 and the chamber 17 communicates with the annular chamber 19 by way of passage 21. Arranged in the passage 21 is a suitable valve 22 which may be regulated from the outside to control the flow of the throwing water therethrough. 23 is the di-

recting ring which surrounds the impeller and through which the water and entrained air and gases pass when the air pump is in operation. The space 24 surrounding the impeller 15 is in communication with the condenser through conduit 25. The directing ring delivers the mixture of water, air and gases to the chamber 26. Above the directing ring, and preferably supported thereby in chamber 26, is a device for separating the air and gases from the water. This consists of a cone-shaped wall 26^a surrounding the impeller 15 and over which the water delivered from the directing ring 23 flows. In rising up and breaking over the upper edge of this wall the air and gases escape and pass outward through conduit 27. The chamber 26 communicates with chamber 18 through the openings 26^b. The cooling water for cooling the throwing water circulates around the cooling chamber 19 between the outer wall 28 thereof and the outside wall 29 of the casing. It will be noted that the outer wall 28 is corrugated so as to present a larger cooling surface. The cooling water enters through conduit 30 and passes out through conduit 31, these conduits being located adjacent to each other and separated by the wall 32.

In operation the throwing water passes from chamber 17 up through the directing vanes 16 to the rotating impeller 15 by which it is thrown across the gap 24 to the directing ring 23. From the directing ring it passes up the outer surface of the cone-shaped wall 26^a breaking over the upper edge of the same and falling to the bottom of chamber 26. From here it flows through openings 26^b to the chamber 18 and thence through passage 20 to the cooling chamber 19. The water divides here flowing in opposite directions around the casing, as indicated by the arrows in Figs. 2 and 3, to the passage 21 through which it returns again to chamber 17.

Upon the upper end of the shaft 4 is a speed governor 33 which controls the supply of motive fluid to the turbine wheel. The machine as a whole may be supported in any desired manner as by means of feet 33^a.

Heretofore in connection with machines of this general character it has been customary to provide a separate pump for the lubricating oil used on the bearings. According to my present invention I incorpo-

rate the oil pump in the machine structure itself in a novel manner, thereby dispensing with a separate pump. To this end I provide a chamber 34 surrounding the guide bearing 6 and leading therefrom to the supporting bearing 5 is the pipe 35. A return pipe 36 leads from the bearing 5 to a small cooling chamber 37 formed by the wall 38. From this chamber the pipe 39 leads to a point below the shaft 4 and guide bearing 6. Formed in the portion of the shaft which rotates in the guide bearing are one or more helical grooves 40 running from one end to the other of the bearing, and forming with the bearing a screw pump. A reservoir 41 is preferably interposed in the pipe 39 to give additional capacity thereto, and in one of the pipes, as the pipe 35, is a filling opening 42 which can be shut off from the pipe by a stop cock 43.

When the shaft is rotating the helical groove acts as a screw pump forcing lubricant up through pipe 35 to the supporting bearing 5. The lubricant passes down over the bearing to the return pipe 36 which leads it to the cooling chamber 37 from which it passes by pipe 39 back to the guide bearing 6. By this arrangement it is insured that whenever the machine is running lubricant is being properly supplied and there is no danger of the bearing running dry. This arrangement has decided advantages over the use of a separate lubricant pump with which there is more or less danger of stopping or breaking down, thus permitting the bearing to run dry.

By arranging the parts of the machine as shown with the cooler for the throwing water concentric with the shaft and throwing pump, I am enabled to provide a compact machine and one which is symmetrical in contour and will occupy a minimum of floor space. The utilization of this cooler for cooling both the throwing water and the lubricant does away with the necessity of providing a separate cooler for each, and consequently cheapens and simplifies the arrangement.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative and that

the invention can be carried out by other means.

What I claim as new and desire to secure by Letters Patent of the United States, is:—

1. In an apparatus of the character described, the combination of a vertical shaft, a supporting bearing and a guide bearing therefor, a driving motor for the shaft, a centrifugal water throwing pump having its impeller mounted on the shaft, an annular chamber in the casing of the pump concentric with the shaft from which throwing water is supplied to the pump, an annular delivery chamber in the casing of the pump into which the throwing water and entrained gases are discharged, a cooler surrounding the throwing pump adjacent said two chambers, conduits for conveying the throwing water from the delivery chamber to the cooler and from the cooler to the first named chamber, a wall extending across one side of the cooler and forming a lubricant cooling chamber, a helical groove formed in the shaft extending from one end to the other of the guide bearing to form a lubricant pump, means for conveying lubricant from such pump to the supporting bearing, and means for conveying lubricant from the supporting bearing to the lubricant cooling chamber and from the lubricant chamber back to the pump.

2. In an apparatus of the character described, the combination of a vertical shaft, a supporting bearing and a guide bearing therefor, a driving motor for the shaft, a centrifugal water throwing air pump having its impeller carried by the shaft, a cooler surrounding the throwing pump for cooling the throwing water, a wall extending across a portion of the cooler and forming a lubricant cooling chamber, a helical groove formed in the shaft extending from one end to the other of the guide bearing to form a lubricant pump, means for conveying lubricant from said pump to the supporting bearing and from the supporting bearing back to said pump, said means including the lubricant cooling chamber.

In witness whereof, I have hereunto set my hand this 4th day of June, 1914.

WALTER KIESER.

Witnesses:

ERNEST KELLER,
WILLY NEUMANN.