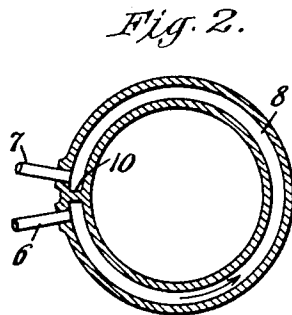
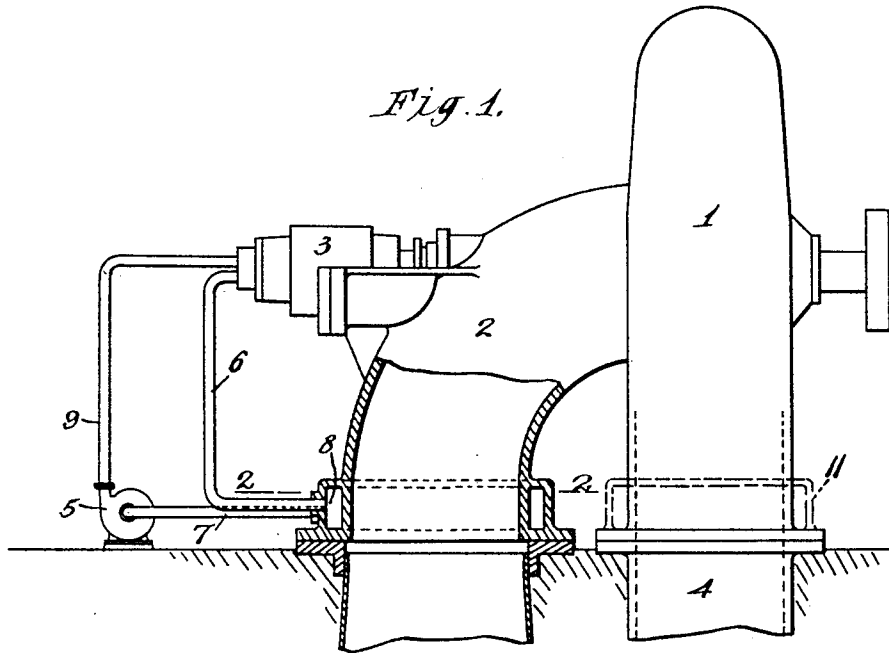


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WATER TURBINE AND THE LIKE.
APPLICATION FILED OCT. 11, 1920.

1,396,327.

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WATER-TURBINE AND THE LIKE.

1,396,327.

Specification of Letters Patent.

Patented Nov. 8, 1921.

Application filed October 11, 1920. Serial No. 416,222.

To all whom it may concern:

Be it known that I, MAX HAEBERLEIN, a citizen of the United States, residing at Mountain Lakes, county of Morris, and State of New Jersey, have invented certain new and useful Improvements in Water-Turbines and the like, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to means for cooling the oil supplied to bearings in water turbines and other hydraulic machinery.

The cooling of bearing oil in such water turbines and the like, has been accomplished heretofore only with more or less loss of efficiency in the operation of such machinery, whether cooling is effected by continuous diversion of a portion of the pressure water through a cooling coil around which the hot oil is caused to flow, or by causing a portion of such pressure water to flow through a hollow shaft, or by positioning a cooling coil through which the hot oil flows in the draft tube of the turbine and thus obstructing the free flow of the discharge water therefrom.

It is the especial object of the present invention to provide a simple and efficient cooling means for bearing oil, so positioned with respect to a water passage or conduit of a water turbine or the like, that it will not impede the action thereof by diverting water or obstructing the flow of the pressure or discharge water, and which shall also be wholly automatic and free of regulating valves.

For a full understanding of the invention, a detailed description of a construction embodying the invention in a preferred form, as applied to a hydraulic turbine of common type, will now be given in connection with the accompanying drawings forming a part of this specification, and the features forming the invention then specifically pointed out in the claims.

In the drawings—

Figure 1 is a side elevation of a hydraulic turbine and oil circulating system, with the draft elbow thereof and my improved oil cooling means in partial section, and

Fig. 2 is a section on the line 2—2 of Fig. 1.

Referring now to the drawings, the numeral 1 indicates the casing of a water turbine of a well-known type, 2 the draft elbow

thereof carrying bearing 3; 4 is the draft tube, 5 the circulating oil pump, 6, 7 oil inlet and outlet pipes leading to and from the oil reservoir, and 9 the connection from the oil pump for carrying the cooled oil back to the bearing.

In order to effectively cool the oil as it is continuously circulated by the pump 5, I provide an annular chamber or reservoir 8, preferably on the draft elbow of the turbine casing and exteriorly thereof, this chamber being provided with a wall or partition 10 (Fig. 2), on opposite sides of which the pipes 6, 7 are tapped into the annular chamber 8, so that the oil flows through the entire circuit of the chamber.

It will be observed that the cross-sectional area of the annular chamber or reservoir 8 is somewhat larger than that of the inlet and outlet pipes 6, 7, thus causing a comparatively slow movement of the heated oil after it enters the chamber 8 from pipes 6 and until it reaches the pipe 7 leading to the circulating pump. This slow movement of the oil through the annular chamber or reservoir is important in securing the maximum oil-cooling effect of the water-cooled wall of the draft elbow, with which the oil is in contact during its movement through the annular chamber, and it will be found that after the hot oil coming from the turbine bearing has passed slowly once around the draft elbow it will be sufficiently cooled for re-use in the bearing.

It will be obvious that the hot oil may be caused to pass around the draft elbow, or other part of the turbine casing to which the oil reservoir may be applied, more than once, by simply making the annular chamber a helix with two or more turns around such draft elbow or other part, and that the cooling reservoir or chamber 8 may be formed on the draft elbow 2 or other part of the draft tube, or some other water cooled part of the apparatus, or on the discharge side of the turbine, if desired, as indicated in dotted lines at 11.

While the invention has been shown and described as applied to a water turbine, it will be understood that it is applicable also for cooling bearing oil in other water wheels, centrifugal and other pumps, and various classes of hydraulic machinery where advantage can be taken of the cooling effect of the liquid passing through the apparatus.

What is claimed is:

1. The combination with the water conduit of a water turbine or the like, of an oil-cooling chamber located on the exterior thereof and one of the walls of which is formed by said conduit, a bearing, and oil circulating connections between the bearing and chamber.
2. The combination with the water conduit of a water turbine or the like, of an oil chamber thereon at a point where cooling of a wall of said chamber by the liquid passing through the conduit is effective, an oil pump, and oil circulating pipes from the turbine bearing and oil pump at opposite ends of the oil chamber.
3. The combination with the water conduit of a water turbine or the like, of an annular chamber formed on the exterior of the conduit, a partition in said annular chamber, and inlet and outlet pipes for said chamber on opposite sides of said partition and connecting respectively with the turbine bearing and an oil circulating pump.

In testimony whereof I have hereunto set my hand.

MAX HAEBERLEIN.