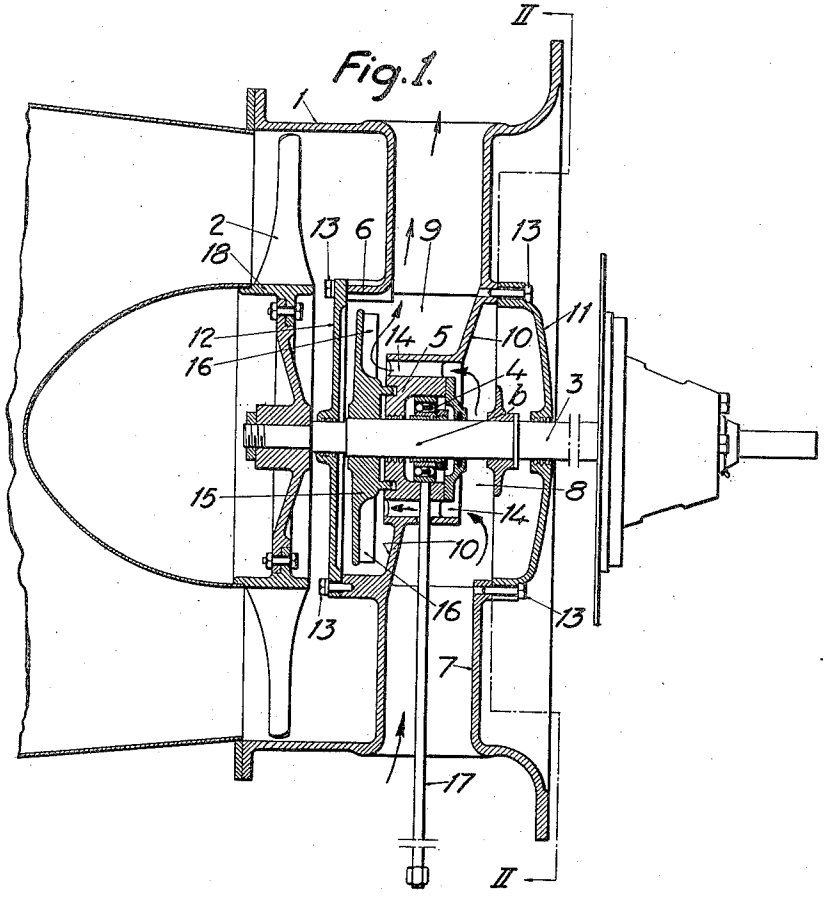
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COOLING DEVICE FOR FAN BEARINGS

Filed July 14, 1937 3 Sheets-Sheet 1

Fig. 1.



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Filed July 14, 1937 3 Sheets-Sheet 2

Fig. 2.

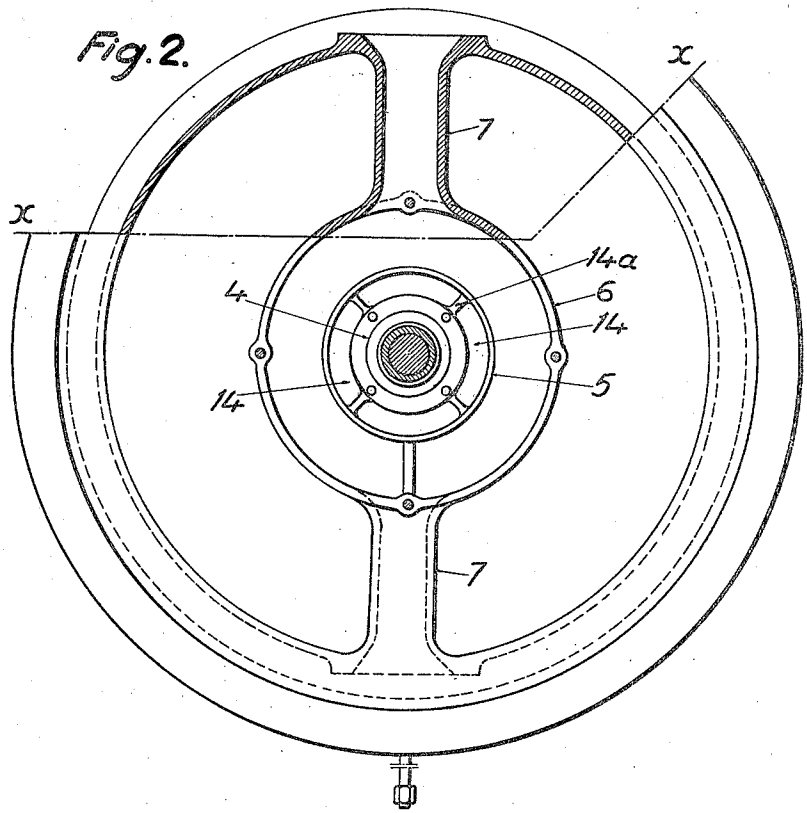
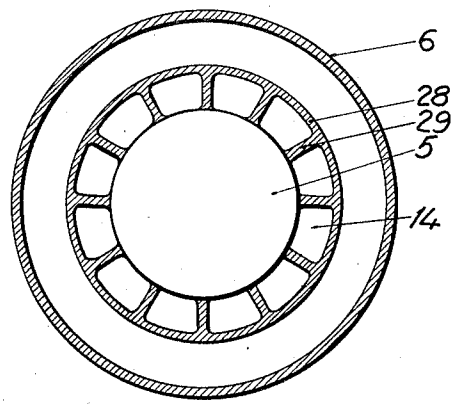


Fig. 4.



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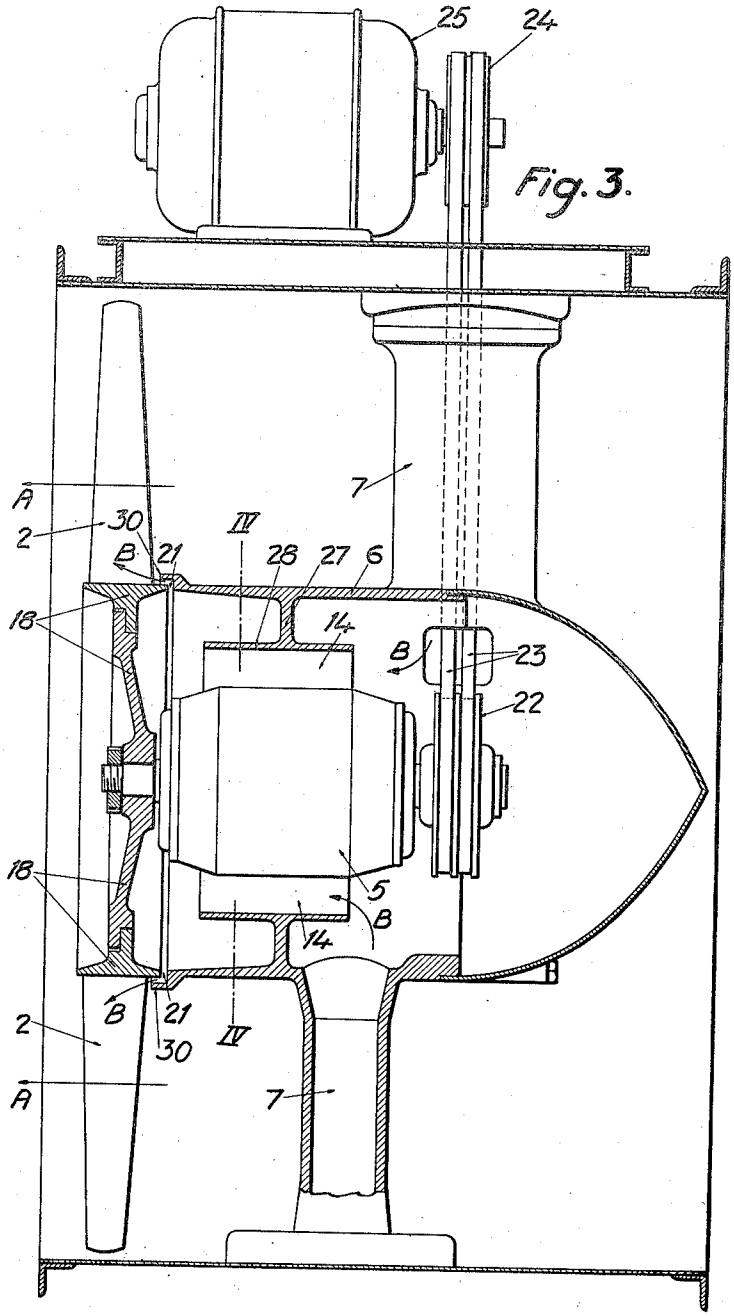


Fig. 3.

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COOLING DEVICE FOR FAN BEARINGS

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Application July 14, 1937, Serial No. 153,549
In Sweden April 30, 1935

3 Claims. (Cl. 308—77)

The present invention relates to a device for cooling fan bearings and is primarily intended to be applied to propeller fans.

The fan bearings, with which the present invention is concerned, are located in a passage for the hot gas conveyed by the fan, and the device is intended to lead cooling air through ducts around the bearing. The invention is characterized in that the bearing is provided in a cap forming a duct for the cooling air and supported by tubular arms, which also form ducts for the cooling air. The bearing cap is preferably divided into two chambers separated from each other by means of a wall carrying the bearing and communicating with each other by means of the ducts for cooling air, which are provided around the bearing, and being in inlet and outlet connection with the atmosphere by means of the tubular supporting arms. In one chamber an auxiliary fan wheel may be provided in such a manner that by means of this fan wheel the cooling air is driven from one chamber to the other through the air ducts provided around the bearing. In one of the supporting arms a tube may be mounted for supplying lubricant to the bearing in the cap in such manner that it is surrounded by the cooling air.

Two embodiments of this invention, applied to propeller fans, are shown in the accompanying drawings.

Figure 1 shows an axial section and

Figure 2 a section on the line II—II of Figure 1 of one embodiment, a portion being, in Figure 2, cut away within the line x—x.

Figure 3 shows an axial section of the other embodiment, and

Figure 4 a section along the line IV—IV of Figure 3.

In the following, the embodiment according to Figures 1 and 2 is going to be described first.

In the casing 1 of the fan, the shaft 3 of the propeller 2 is mounted, at b, in a bearing, which, according to this invention, is provided for air cooling in the following manner:

The bearing proper, indicated by 4 and shown to be constructed as a ball bearing, is built-in in a bearing body 5, which in turn is mounted in a cap 6, which by means of supporting arms 7 keeps the whole thing in the casing 1. The cap is divided into two chambers 8, 9 by means of a wall 10, in the middle of which the bearing body 5 is fastened by means of welding or in some other manner. The interior of the cap is accessible by the gables being formed as covers 11, 12 fixed to the jacket of the cap by means of screws 13. Both covers tighten against the shaft 3 by means of suitable packings or the like. Both arms 7—there may also be several such arms—are tubular and connected with the atmosphere through openings in the wall of the casing. Further, air ducts 14 are provided in the bearing body through which the chambers on both sides of the wall 10 communicate with each other. The said ducts are separated by intermediate walls 14a, which serve as cooling flanges. Through the above described system of ducts cooling air may be led to and away from the bearing. For moving the cooling air forwards, an auxiliary fan or a corresponding device may be used, for example, a cooling disc 15, provided with fan vanes 16, which in the drawings is shown to be provided on the propeller shaft and rotates with the same. The said disc also has the important function of leading away a considerable part of the heat which, by the shaft, would otherwise be led to the bearing from the propeller 2. During the rotation of the fan the cooling air is put into a rapid motion through the passages of the bearing and of the bearing body 5, respectively, by which heat is led away from bearing and shaft.

It being of importance that the lubricant supplied to the bearing also be kept cooled a pipe 17 for lubricant is in the embodiment shown provided somewhere in the path of the cooling air, for example within the arm through which the cooling air is introduced.

Of course, the above described embodiment may be modified in various ways. Thus, in certain cases a sufficient speed may be given to the cooling air also without the auxiliary fan 16, the bearing being so connected with the interior of the casing that the propeller 2 creates a vacuum in the cap 6.

In the embodiment according to Figure 3, in which the same reference characters are used for the same parts as those in Figures 1 and 2 there is, for example, no auxiliary fan 16 and instead necessary vacuum in the cap 6 is obtained by the interior of the cap 6 communicating with the space behind the propeller by means of some air passage, or passages, for example, a slot 21 between the cap and the propeller hub 18, in which space there is a vacuum during the rotation of the propeller for driving air in the direction of the arrow A. Of the propeller bearing only the outer part 5 is shown. The propeller is driven via a belt, or a chain transmission 22, 23, 24 by an electric motor 25, which is mounted

on the fan casing in such a manner that the belt or the chain 22 is able to run wholly or partly in one of the supporting arms 7. The same also serves as a duct for cooling air. The bearing is carried by the intermediate wall 27 and cooling flanges 29 between which there are passages 14 for the cooling air. The wall 27 is formed as a sleeve-like screen 28 for guiding the air along the bearing. The way of the air through the cap 6 is marked by arrows B. As will be seen from the same the air passes from outside inwards through both of the shown arms 7 and passes out of the cap through the slot 21. In order to increase the sucking action of the propeller in the slot 21 the same is surrounded by an edge 30.

Alternatively, both of the devices for moving the cooling air forwards, which occur in the above described embodiments, may be used.

In connecting the various parts with each other welding may be used to a great extent. As will be seen in the drawings the cap or casing, in which the bearing is enclosed, may be shaped in close connection with the propeller hub 13 and also, for the rest, in such manner as to offer the least possible air resistance. If several bearings, exposed to hot gases, are used also these may of course be arranged in accordance with the present invention.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an air cooled bearing for a rotatable shaft, comprising a bearing proper and a shaft supported therein, the combination of a casing surrounding said bearing in spaced manner from the sides and ends thereof and having at least the one end closed, a screen within said casing spaced from and within the side walls and ends thereof and surrounding said bearing, said screen having rigid interior radially disposed means supporting the bearing in spaced relation inside the screen so as to provide air passage means about said bearing and between the same and said screen, said air passage means being open at both ends, and partition means rigidly supporting said screen in its spaced relation within the walls of the casing and substantially transversely dividing the interior of said casing intermediate the ends thereof into two chambers succeeding each other within the casing in the axial direction with respect to said shaft, so that the air passage means disposed between the screen and the bearing will form the exclusive path open to the flow of cooling air from the one chamber to the other chamber in said casing, there being means for causing cooling air to enter said one chamber from the exterior of the casing and flow through said passage means to the other chamber and thence out again from said casing.

2. In an air air cooled bearing for a rotatable shaft, comprising a bearing proper and a shaft supported therein, the combination of a casing surrounding said bearing in spaced manner from the sides and ends thereof and having at least the one end closed, a screen within said casing spaced from and within the side walls and ends thereof and surrounding said bearing, a plurality of longitudinally arranged rigid supporting members spaced apart within said screen disposed about and supporting the bearing in spaced relation inside the screen so as to provide air passage means about said bearing and between the same and said screen, said air passage means being open at both ends, and partition means rigidly supporting said screen in its spaced relation within the walls of the casing and substantially transversely dividing the interior of said casing intermediate the ends thereof into two chambers succeeding each other within the casing in the axial direction with respect to said shaft, so that the air passage means disposed between the screen and the bearing will form the exclusive paths open to the flow of cooling air from the one chamber to the other chamber in said casing, there being means for causing cooling air to enter said one chamber from the exterior of the casing and flow through said passage means to the other chamber and thence out again from said casing.

3. In an air cooled bearing for a rotatable shaft, comprising a bearing proper and a shaft supported therein, the combination of a casing surrounding said bearing in spaced manner from the sides and ends thereof and having at least the one end closed, a screen within said casing spaced from and within the side walls and ends thereof and surrounding said bearing, a plurality of longitudinally arranged rigid partition walls within said screen disposed about and supporting the bearing in spaced relation inside the screen so as to provide a plurality of air channels about said bearing and between the same and said screen which are all open at both ends, and partition means rigidly supporting said screen in its spaced relation within the walls of the casing and substantially transversely dividing the interior of said casing intermediate the ends thereof into two chambers so that the air channels disposed between the screen and the bearing will form the exclusive path open to the flow of cooling air from the one chamber to the other chamber in said casing, there being means for causing cooling air to enter said one chamber from the exterior of the casing and flow through said air channels to the other chamber and thence out again from said casing.

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