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2 SHEETS—SHEET 1.

Fig. 2.

Labels: 6, 14, 15, 23, 30, 32, 35, 37, 38.

Text: Invention by A. B. C.

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SHAFT BEARING.
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2 SHEETS—SHEET 2.

1,066,541.

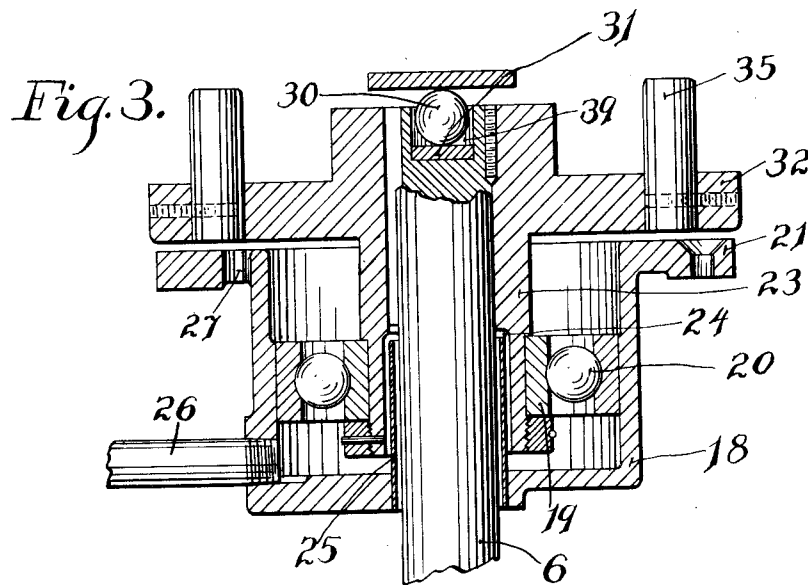
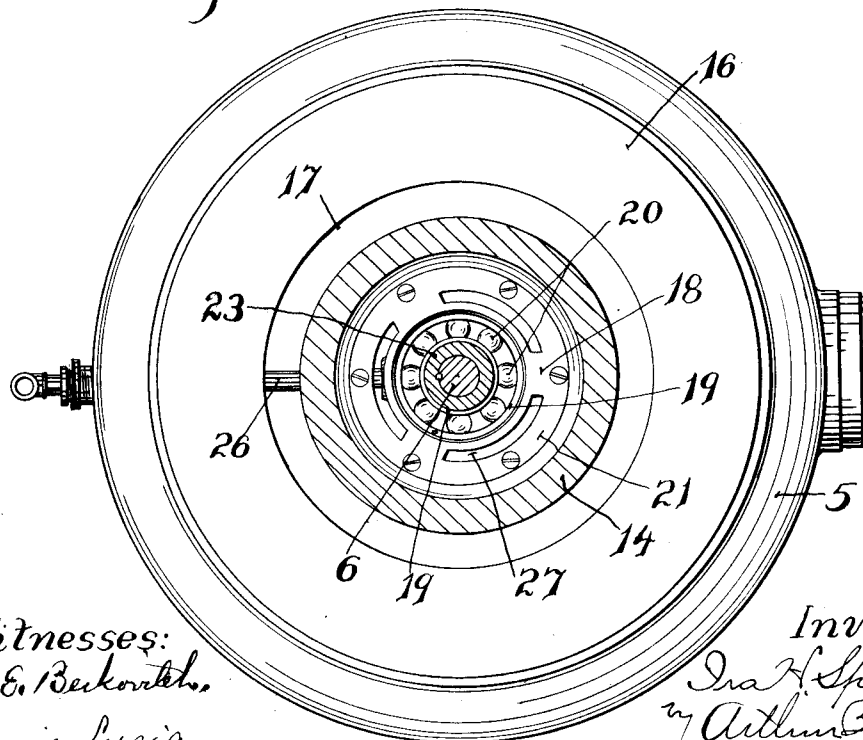


Fig. 4.



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UNITED STATES PATENT OFFICE.

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SHAFT-BEARING.

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To all whom it may concern:

Be it known that I, IRA H. SPENCER, a citizen of the United States, and a resident of West Hartford, in the county of Hartford and State of Connecticut, have invented a new and Improved Shaft-Bearing, of which the following is a specification.

My invention relates to the class of devices for supporting a rotating shaft or like part, more especially one with its axis vertically arranged, and the object of the invention is to provide a device of this class having novel features of advantage and utility.

One form of apparatus in which my invention has been embodied and in the use of which the objects sought may be attained is illustrated in the accompanying drawings, in which—

Figure 1 is a view in central vertical section through an apparatus to which my invention is applied. Fig. 2 is a view in section through a portion of the device on plane denoted by dotted line 2—2 of Fig. 1. Fig. 3 is a detail view (scale enlarged) showing the construction of the parts for retaining oil within the oil chamber. Fig. 4 is a detail view in cross-section through the device on plane denoted by line 2—2 of Fig. 1, looking downward.

My invention while not limited in its use to any specific form of apparatus, is especially applicable to mechanism for producing flow of fluid currents, and for this purpose a portion of such a device is illustrated herein, to wit., a fan for producing flow of air currents, only so much of the apparatus as is necessary to a proper understanding of the invention being shown.

In apparatus used to create a current of air it is important that the bearings for the shaft should be located without the fan chamber in order that such bearings will not be injuriously affected by dust or dirt with which the air passing to the fan must be more or less impregnated, and it is therefore essential, especially with respect to the bearing, located at the inlet side of the fan that the action of the air currents shall not remove the oil from the bearings. It is in order to guard against such action that the present invention, in part at least, is made.

Referring to the drawings, the numeral 5 indicates one end of a fan casing through

which a shaft 6 extends, this shaft having blades 7 secured thereto in any suitable manner and rotating in proximity to a wall 8 extending inward from the casing or shell 5 and having an opening 9 through which air enters the fan chamber 10, flowing from an inlet chamber 11, both of which are located within the shell or casing 5. The shaft 6 extends through the end wall of the shell or casing into a recess 13 in a cup 12 located within the chamber 11. A preferred form of construction, especially when the shaft 6 is to be driven by power applied to this end, is that the cup 12 shall form a portion of the bottom 14 of a box 15 mounted upon the end of the shell or casing; the cup projecting through an opening 17 in the end wall 16 of the casing. It is not absolutely essential to the invention, however, that the cup shall be so formed upon a part separate from the end wall 16 of the casing 5. The purpose of the box 15, employed in apparatus when the shaft 6 is driven by a force applied to this end, will be hereinafter set out.

An oil-well 18 is located within the recess in the cup 12, the shaft 6 projecting into the well, and in this well a ball bearing of any suitable construction for the shaft, may be employed. In the form shown a ball case 19 of ordinary form and construction, made in sections, is employed, balls 20 being located between the outer and inner sections of the case. The oil-well 18, in the construction herein shown, has a flange 21 secured to the bottom 14, and between the well 18 and the cup 12, the recess 13, constituting a relief chamber, is formed. Any suitable form of packing device 22 is applied to the shaft at that part where it passes into the cup 12, and a sleeve 23 is secured to the end of the shaft, this sleeve being counterbored at that end projecting into the oil-well. This counterboring forms a space 24 between the shaft and the sleeve, within which space an annular lip 25 extending upward from the bottom of the oil-well is located. A supply pipe 26 extends from outside the casing into the oil-well and affords a means for supplying oil to the well. The lip 25 does not touch any rotating part and affords an efficient means for retaining the oil at the proper height within the well and preventing its outflow under the action of gravity. In

devices of this class the opening through which the shaft passes from the inlet chamber is frequently not air tight, this defect arising from various causes, and there is therefore a current of more or less strength created through the opening about the shaft. It is the purpose of the relief chamber by providing a passage for the flow of air around, outside of the oil-well, to prevent the flow of such currents through the oil-well, as such flow would quickly draw the oil from the oil-well to the detriment of the bearing. Openings 27 are formed in the flange 21 to allow free access of air to the relief chamber 13 to supply all the air that may be needed by reason of any leak around the shaft at the point mentioned, and thus prevent its passage through the oil-well and the consequent drawing of oil therefrom. The action of the fluid upon the fans, as the fluid is drawn downward through the opening 9, tends to lift the fans and consequently the shaft 6, and in order to obtain the benefits of this lifting action on the shaft and utilize it in relieving the bearing of a motor of end thrust the construction herein shown has been devised for use in cases where the motor is connected with this end of the shaft to drive it. In adopting this construction embodying my invention I preferably employ the box 15 resting upon the shell 5 and within this box connect the motor shaft 28 of the motor 29 to the shaft 6. The end of the shaft 6, as shown in Fig. 1 of the drawings, is provided with a recess 39 within which a bail 30 is located, preferably resting upon a bearing plate 31 of hardened steel located in said recess. This ball is supported practically in the line of the shafts 6 and 28, the recess 39 being slightly larger than the ball to allow a limited lateral movement which becomes of use in securing the two shafts together. The sleeve 23 is keyed to the shaft 6, and a plate 32 is secured to this sleeve. A plate 33 is keyed to the shaft 28 and between these two plates a disk 34 of fibrous material is located. A set of connecting pins 35, preferably two in number, located on diametrically opposite sides of the plate 32, are secured to the plate and project through the disk 34 into openings 36 in the plate 33, said openings being larger in size than the diameter of the pins, and a similar set of pins 37, secured in like manner to the plate 33, project through the disk 34 into openings 38 in the plate 32, said openings being also larger than the pins and the pins in each set being arranged in a line substantially at right-angles to a line passing through the pins in the opposite set. By this construction, should the motor shaft when the motor is placed in position, not come exactly in alinement with the shaft 6, the connection allows for slight lateral ad-

justment of the motor shaft with respect to the shaft 6, so that the parts may be connected without special fitting, and the ball 30 located between the ends of the two shafts enables the force of the fluid in traveling downward and its lifting action upon the shaft 6 to be transmitted to the shaft 28, thus relieving end thrust upon the motor bearings, so that no special provision is required in the construction of the motor itself to provide for this end thrust.

I do not limit my invention and the scope of the following claims to the foregoing illustration and description of the preferred form in which it has been embodied, as such construction may be departed from to a greater or lesser extent without avoiding the invention.

I claim—

1. A casing having an inlet chamber, means for creating a partial vacuum in said inlet chamber and including a shaft projecting out of said inlet chamber, an oil well located in one wall of the chamber and with a space between it and said well and through which said shaft passes, and means for supplying air around said well to the opening through which the shaft passes.

2. A casing having an inlet chamber, means within the casing for creating a partial vacuum in said inlet chamber and including a shaft projecting through the wall of the casing, an oil well located in a wall of the inlet chamber and with a space between it and said well, and means for supplying air around said well to the opening through which said shaft passes.

3. A casing having a recess in its outer end surface, means within said casing for creating flow of a current of air and including a shaft projecting through the casing into said recess, an oil-well smaller in diameter than said recess and supported therein and at a distance from the bottom thereof, a support for said well arranged to permit free access of air between said well and the wall of the recess to the point where the shaft passes through the casing, and a bearing for the shaft located within said oil-well.

4. A casing including a fan chamber and an inlet chamber, the wall of the latter having a recess in its outer surface, means within the fan chamber for creating flow of a current of air and including a shaft projecting through the inlet chamber into said recess, an oil-well supported within said recess, said oil-well being arranged and located to permit free access of air behind it to the point where the shaft passes through the wall of the casing, and a bearing for the shaft located within said well.

5. A casing having a recess in its outer surface, means within the casing for creating flow of a current of air and including a

shaft projecting through the wall of the casing into said recess, an oil-well supported within said recess by means of a flange projecting laterally from the well and secured to the casing, said flange having openings therethrough into a space located between the oil-well and wall of the recess and extending to the point where the shaft passes into said recess, and a bearing for said shaft located in said oil-well.

6. A casing, a box located at the end of the casing and having its wall formed into a cup projecting within the casing and providing a recess opening into the box, means within the casing for creating flow of a current of air and including a shaft extending through said cup into said recess, an oil-well located in said recess and containing a bearing for said shaft, said well being located and arranged to permit free access of air around and behind it to the point where the shaft extends into the recess, a motor including an armature shaft, and a connection between said shafts, said connection being located in said box.

7. A casing vertically arranged and having an opening at its upper end, a box supported upon the casing and having a cup projecting within said opening, said cup containing a recess opening into the box, means within the casing for producing flow of a current of air and including a shaft extending through the cup into said recess, an oil-well supported in said recess and containing a bearing for said shaft, said well being located and arranged to provide free access of air around and behind it to the point where said shaft enters the recess, a motor supported upon said box, and a connection between said shafts, said connection being located within the box.

8. A casing having an inlet chamber with a recess in one wall thereof, means for creating a partial vacuum in said chamber and including a shaft projecting through said recess, an oil well located in said recess and having its wall spaced from the wall of the recess to provide a chamber about the well, said shaft projecting into said well, and means for supplying air to the chamber in said recess.

9. A casing having a recess in its outer surface at one end, means within the casing for creating flow of a current of air and including a shaft projecting through the wall of the casing into said recess, an oil-well located within said recess and containing a bearing for said shaft, and means within said recess to permit free access of

air to the point where the shaft passes through the casing into said recess.

10. A casing having an opening at one end, a shell located upon the casing and having a bottom formed into a cup projecting through said opening, means within the casing for creating flow of a current of air and including a shaft projecting through the bottom of said cup into the recess therein, an oil-well located within said recess and containing a bearing for said shaft, and means for supplying air between the walls of said cup and said oil-well freely to the point where the shaft passes through the casing.

11. A casing having an inwardly extending projection from one wall forming a cup providing a recess in the outer surface of said casing, means within the casing for producing flow of a current of air and including a shaft projecting into said recess, an oil-well supported within said recess and containing a bearing for said shaft, the opening for said shaft through said well being larger in diameter than the shaft, and a flange projecting upward from the bottom of the oil-well around the shaft to prevent outflow of oil from said well.

12. A shell having an inwardly extending projection at one end forming a cup providing an outwardly opening recess, means within the shell for producing flow of a current of air and including a shaft extending into said recess, an oil-well located within said recess and containing a bearing for said shaft, said well being arranged to provide free access of air to the point where the shaft enters said recess, a sleeve secured to the shaft and counterbored to provide a space between a portion of the sleeve and the shaft, and a flange extending upward from the bottom of the oil-well into the space between the sleeve and shaft, the opening for the shaft into the well being larger in diameter than said shaft.

13. A casing having an inlet chamber, means for producing a partial vacuum in said inlet chamber and including a shaft projecting out of said inlet chamber, an oil well located in one wall of said chamber and through which said shaft passes, and means for preventing action of the air within said chamber from exerting its effect upon the oil in said well.

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