

Jan. 7, 1941.

W. BLACKMORE

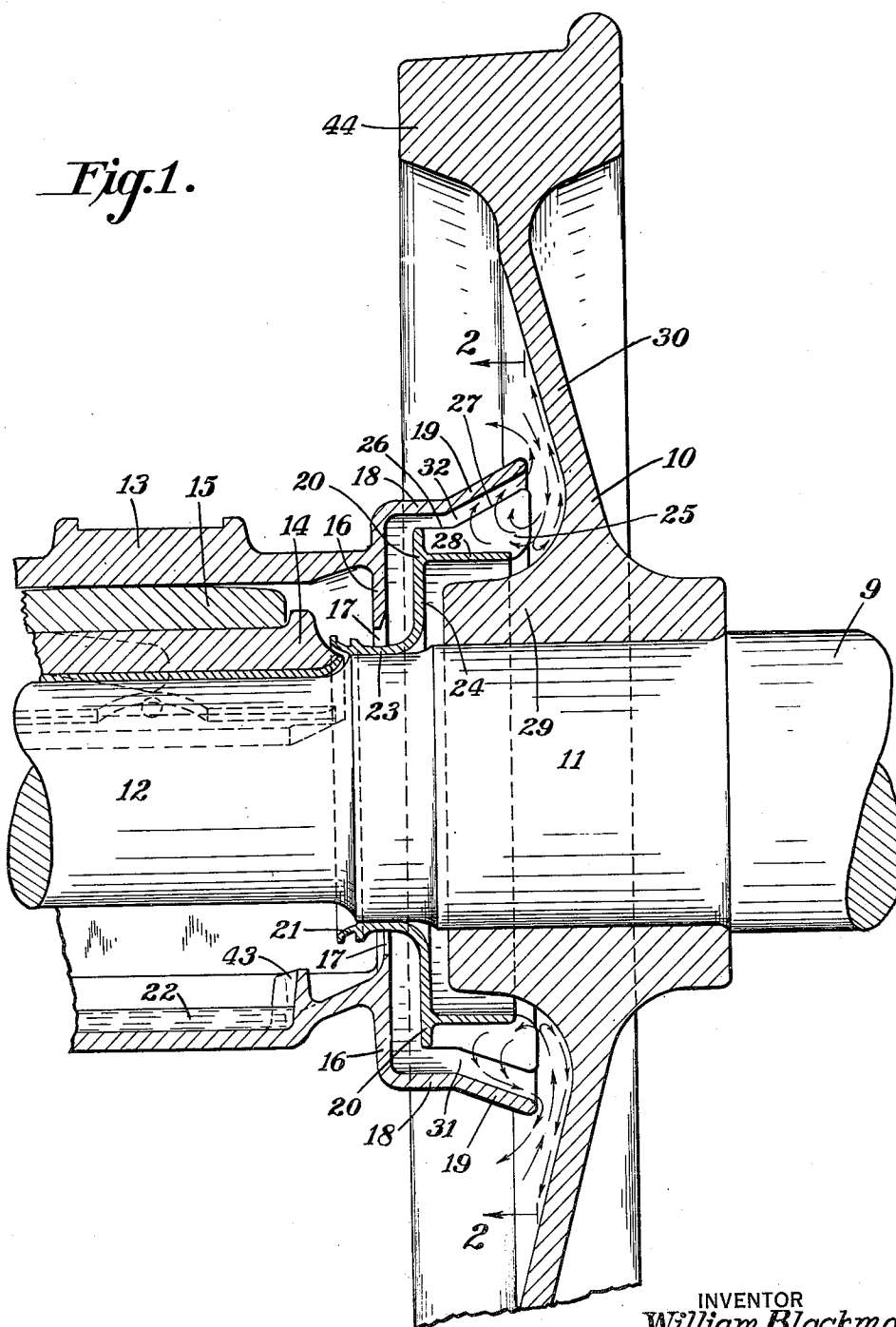
2,227,922

DUST GUARD

Filed July 7, 1936

2 Sheets-Sheet 1

Fig. 1.



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Fig. 2.

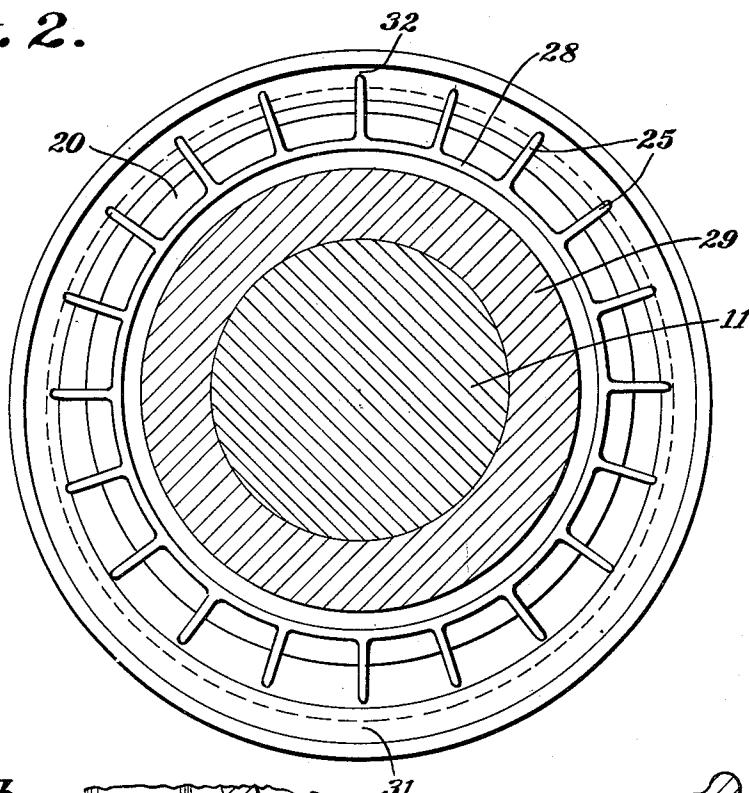


Fig. 3.

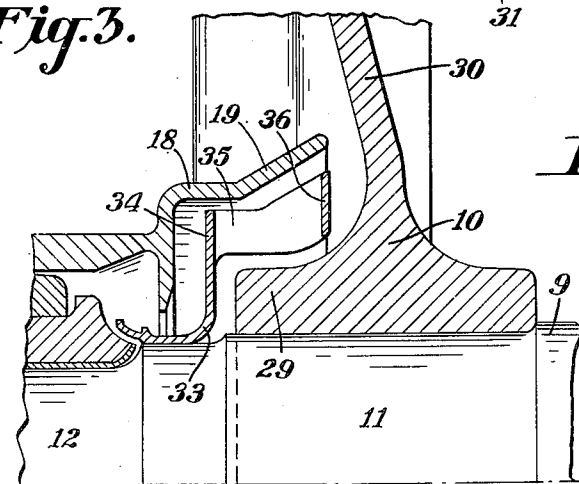
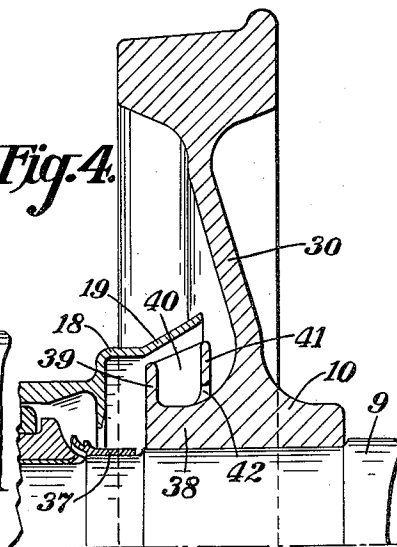


Fig. 4.



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DUST GUARD

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Application July 7, 1936, Serial No. 89,288

14 Claims. (Cl. 286—5)

This invention pertains to a novel dust guard for journal boxes, and more particularly concerns an arrangement whereby the dust is blown away from the rear of the box and thus prevented from entering the interior thereof.

The usual type of dust guard comprises a member fitted into a slot formed at the rear of the journal box and provided with an opening snugly receiving the journal. In other arrangements the dust guard member is formed of a plurality of elements pressed against the journal by resilient means so as to prevent entry of dust into the box. In all of these forms the dust guard must fit tightly in the dust guard slot but still be capable of moving with the journal as it shifts relative to the box. Thus, reliance must be placed on a snug fit between rubbing parts to keep the dust out of the box. As wear takes place due to the rubbing action more and more play will develop until in time there will be sufficient clearance between the dust guard, the dust guard slot and the journal to allow dust and dirt to find its way into the box and contaminate the oil, with consequent damage to the journal bearing surfaces.

One object of my invention comprises means rotating with the journal, creating a circulation of air at the rear of the box in such a manner that the dust-laden air is thrown away from the rear of the box and the dust prevented from entering the interior thereof and contaminating the oil. Another object is the provision of a series of elements rapidly passing a given point at such speeds as to effectively block the opening into the rear of the box. A further object is the provision of means adjacent the rotating means for guiding the dust-laden air radially outward away from the interior of the box as it is circulated by the rotating means. The invention also contemplates a dust guard constructed in such a manner that the rotating parts are not subject to wear and still effectively prevent the dust from entering the box. Other objects and advantages of the invention will be pointed out in the following description taken in conjunction with the drawings, in which:

Figure 1 is a longitudinal vertical sectional view through my improved dust guard and a portion of the associated journal box.

Figure 2 is a transverse vertical sectional view taken on line 2—2 of Fig. 1.

Figure 3 is a partial, longitudinal vertical, sectional view showing a modification of my invention; and

Figure 4 is a view similar to Fig. 3 but showing a further modification of the invention.

Referring to Figs. 1 and 2, the journal 9 has the usual wheel 10 pressed over the portion 11 thereof. The end 12 of the journal extends into the journal box 13 and between the top of the box and the journal are positioned suitable bearing members such as the usual brass 14 and wedge 15. The rear of the box is formed with a substantially vertical wall 16, provided with an opening 17 through which the journal passes. Extending rearwardly from wall 16 is a substantial cylindrical housing 18 formed at its open end with an outwardly flaring portion 19. Mounted on the journal and within the housing is a fan member 20 which may be formed at one end with an obturating ring or oil slinger 21. Any oil that works its way along the journal toward the rear of the box and reaches the obturating ring is thrown by centrifugal force onto the adjacent walls of the box from which it is carried by gravity back to the oil reservoir 22.

The obturating ring is joined to a cylindrical portion 23 of member 20, which is pressed or otherwise secured onto the journal. Extending radially outward from portion 23 is a web 24 and projecting rearwardly from this web are a plurality of fan elements 25, the radial extremities of which are formed by axially extending surfaces 26 and angularly disposed surfaces 27 conforming respectively to the portions 18 and 19 of the housing member. A cylindrical reinforcing rib 28 overlying the hub 29 of the wheel joins the bottoms of the fan elements 25 to hold them in position and to prevent their being bent out of shape.

It will be noted that there is clearance between the free ends of fan elements 25 and the hub 29 and the web 30 of the wheel. As the member 20 rotates, the fan action of the elements 25 forces the air outwardly and with it, of course, any dust that may be carried thereby. I have found by the use of a small rubber hose connected to a manometer that the air flows outwardly along the hub and web portions of the wheel and also along the inner surface of the portion 19 of the housing and that the incoming flow of air passes between the two outflowing currents. This is illustrated by the arrows in Fig. 1. In the above manner the air adjacent the rear of the box is caused to circulate and is positively forced away from the opening 17 in the box which receives the journal. The flaring portion 19 of the housing materially assists in directing the flow of air radially outward toward the

rear or open end of the housing. I have found, by experiment, that the action of the fan maintains the inside of the box and hence the lubricating oil free of dust even though dust is actually thrown at the outer side of the web 30 of the wheel. In addition to the air currents produced by elements 25, these elements themselves, when rotating rapidly in service, constitute effective means for preventing the passage of larger particles such as cinders, sand, etc. For example, at a train speed of 60 miles per hour and with 20 fan elements as illustrated in the drawings, there will be 200 elements passing a given point per second. Any such particles coming within range of the rapidly rotating fan elements will be thrown away from the rear of the box.

It will be noted that the cylindrical web 28 overlaps hub 29 of the wheel so that when the wheel is at rest any water striking the outside of web 30 will follow along the web and hub portions and radially inward of web 28 and drop by gravity to a lower level where it can flow away without entering the box. When the wheel is rotating, centrifugal force will throw any water striking web 30 outwardly toward the periphery thereof, thereby preventing it from entering the box. Furthermore, the housing extends inwardly so that it is overlapped by the tread portion 44 of the wheel. In this manner protection is offered against particles thrown radially inward from outside the tread. In addition, the outer surface of flared portion 19 directs any particles thrown thereagainst forwardly of the box and away from the opening between the end of the housing and web 30 of the wheel.

In order to provide the necessary amount of relative vertical movement between the journal box and the fan member for assembly and removal of the brass 14 and wedge 15, sufficient clearance must be maintained as at 31 between the bottom of the housing and the member 20. The amount of clearance at 32 necessary between the top of the housing and the fan member is not as great and need only be such as will prevent contact between these parts after normal wear of the bearing member and journal. I have therefore shown greater clearance at 31 than at 32.

It has been found that a fine oil vapor is usually present within the housing and dust particles contacting this vapor form an accumulation of dust and oil that eventually sticks to the flared wall 19 and in time may fill up all of the space between the housing and the outer surfaces of the fan elements. While such a blocking of this opening is not necessary to prevent dust from entering the box, due to the action of the fan, it does reduce the clearance between the housing and fan and provides an additional safeguard for sealing the opening at the rear of the box.

I have shown my invention applied to a free oiling type of journal box such as is described in my copending application Ser. No. 79,447, filed May 13, 1936, but it may be just as effectively used with any other type of box in which it is necessary to seal an end thereof against dust and dirt. If the fan mechanism is used with boxes other than the free oiling type, the obturating ring 21 can be omitted. Furthermore, the obturating ring may, if desired, be made separate from the fan member.

In Fig. 3 the fan member 33 is formed with a radially extending web 34 having fan elements 35 projecting rearwardly therefrom. The inner ends of these elements are joined by a web 36 parallel to the web 34. In this form air passages are pro-

vided whereby the air coming along the web 30 of the wheel passes beneath the web 36 of the fan elements and is then forced radially outwardly between webs 34 and 36 until it contacts the housing and is guided by flared portion 19 thereof away from the journal box.

In Fig. 4 the obturating ring 37 is made separate from the fan member and the latter is formed integral with the hub 38 of the wheel by means of a radially extending web 39 and rearwardly projecting fan elements 40. Another web 41 may join the inner ends of the elements 40 and be spaced slightly, as at 42, from the hub 38 so as to form an air passage in the same manner as is shown in Fig. 3. In both Figs. 3 and 4 the journal box and housing member are the same as that shown in Figs. 1 and 2.

It will be appreciated that my invention enables maintenance of a clean supply of oil within a journal box. The fan structure constitutes means for preventing dust from entering the rear of the box and contaminating the oil while the obturating ring 21 has proven very effective in maintaining the oil in the journal box. In addition, one or more baffles, such as shown at 43 in Fig. 1, may be used to prevent oil splashing out through the bottom of opening 17. It will be observed that the arrangement of the fan blades is such that the desired air movements will be created regardless of the direction of rotation of the journal relative to the box.

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What I claim is:

1. A journal box, a journal mounted in said box for rotation therein and adapted to move axially relative thereto, a rear wall on said box extending toward said journal, a wheel on said journal having a projecting hub, a housing extending from said rear wall toward said wheel and surrounding and overlapping a portion of said hub and spaced radially therefrom, air circulating means mounted for rotation with said journal and comprising a disk-like member provided with fan blades between said rear wall and hub and extending into the space between said hub and housing, said air circulating means being normally spaced from said rear wall to provide for axial movement of said journal relative to said box.

2. A journal box, a journal mounted in said box for rotation therein and adapted to move axially relative thereto, a rear wall on said box extending toward said journal, a wheel on said journal having a projecting hub, a housing extending from said rear wall toward said wheel and surrounding and overlapping a portion of said hub and spaced radially therefrom, a fan member mounted for rotation with said journal between said rear wall and hub and extending into the space between said hub and housing, said fan member being constructed and arranged to circulate air toward said wheel and being normally spaced from said rear wall to provide for axial movement of said journal relative to said box.

3. In a structure of the class described a journal box, a journal extending into said box, a housing at the rear of said box, said housing

comprising a substantially cylindrical portion adjacent said journal box and an outwardly flaring portion extending from said cylindrical portion, and fan elements in said housing rotating with said journal for directing a flow of air against said portions of said housing, the radial extremities of said elements being shaped to conform to the cylindrical and flared portions of said housing.

4. In a device of the class described a journal box, a journal extending into said box, a member secured to said journal for rotation therewith comprising a hub portion and a radially extending disc portion, a cylindrical portion extending away from said journal box and from said disc portion and of lesser diameter than said disc portion, radial blades formed on the outer face of said cylindrical portion and secured to said disc portion adjacent the periphery thereof, and a housing surrounding said member adapted to direct air circulated by said member away from said journal box.

5. In a device of the class described a journal box, a journal extending into said box, a wheel on said journal having web and hub portions, a housing extending from said box over said hub and terminating adjacent said web portion, a fan member mounted for rotation with said wheel and interposed between said housing and hub portion and having a continuous flange extending over said hub portion, and radially extending blades formed on said continuous flange terminating in close proximity to said housing.

6. In a device of the class described a journal box, a journal extending into said box, a wheel on said journal having web and hub portions, a housing extending from said box over said hub and terminating adjacent said web portion, a fan member mounted for rotation with said wheel and interposed between said housing and hub portion and having a continuous ring portion surrounding said hub portion, and radially extending blades connected with said continuous ring portion and terminating in close proximity to said housing.

7. In a structure of the class described including a journal-box equipped with a dust guard, a traction wheel including a hub, a rim, and a web integrating said rim with said hub, and a journal extending from said wheel into said journal-box; the refinement herein described in which said dust guard comprises a body including a tubular portion extending axially from said journal-box and encompassing the hub on said wheel, and a circumferential flange portion flaring radially outward from said tubular portion and from the walls of the journal-box and extending adjacent to the web of said wheel, said tubular portion and said flange portion being free from frictional contact with said journal, hub and rim of the wheel.

8. In a structure of the class described including a journal-box equipped with a dust guard, a traction wheel including a hub, a rim, and a web integrating said rim with said hub, and a journal extending from said wheel into said journal-box; the refinement herein described in which said dust guard comprises a circumferential flange carried by said journal-box and extending radially outward with respect to the axis of said hub, said flange being spaced from said web and providing an air channel having a circumferentially extending mouth formed between the periphery of said flange and the body of the wheel radially within the wheel's rim, and a clearance

between the surface of said journal and the wall of said journal-box, which clearance establishes communication between the bearing chamber within said box and said air channel, together with a baffle secured to rotate with said journal and extending radially outward with respect to the journal beyond the periphery of the journal-box wall through which said journal extends, and providing in the line of communication between said bearing chamber within the journal-box and said air channel auxiliary dust-excluding means.

9. In a structure of the class described including a journal box equipped with a dust guard, a journal extending into said journal box, and a wheel connected with said journal having a hub, and a web extending outwardly therefrom, the improvement in which said dust guard comprises an outwardly flaring, circumferential flange carried by said journal box, said flange extending over said hub and being spaced therefrom and from said web to provide an air channel, the outer end of said flange forming with said web a circumferentially extending mouth for said channel.

10. In a structure of the class described including a journal box equipped with a dust guard, a journal extending into said journal box, and a wheel connected with said journal having a hub, and a web extending outwardly therefrom, the improvement in which said dust guard comprises an outwardly flaring, circumferential flange carried by said journal box, said flange extending over said hub and being spaced therefrom and from said web to provide an air channel, the outer end of said flange forming with said web a circumferentially extending mouth for said channel, and a baffle member disposed within said channel and secured for rotation with said journal.

11. In a structure of the class described including a journal box equipped with a dust guard, a journal extending into said journal box, and a wheel connected with said journal having a hub, and a web extending outwardly therefrom, the improvement in which said dust guard comprises an outwardly flaring, circumferential flange carried by said journal box, said flange extending over said hub and being spaced therefrom and from said web to provide an air channel, the outer end of said flange forming with said web a circumferentially extending mouth for said channel, and a baffle member disposed within said channel and secured for rotation with said journal, said dust guard, wheel and baffle member being constructed and arranged to produce an outward flow of air through said mouth for said channel.

12. In a structure of the class described including a journal box equipped with a dust guard, a traction wheel including a hub, a rim, and a web integrating said rim with said hub, and a journal extending from said wheel through an opening in the wall of said journal box; the refinement herein described in which said dust guard comprises a body including a tubular portion extending axially from said journal box and encompassing the hub on said wheel, and a circumferential flange portion flaring radially outward from said tubular portion and extending adjacent to the web of said wheel, said two portions of the guard being spaced from said web and said hub of the wheel and providing a passage, having a circumferentially extending mouth formed between the periphery of said flange por-

tion and the body of the wheel radially within the wheel's rim.

13. In a structure of the class described including a journal box equipped with a dust guard, a traction wheel including a hub, a rim, and a web integrating said rim with said hub, and a journal extending from said wheel into said journal box; the refinement herein described in which said dust guard comprises a circumferential flange carried by said journal box and extending radially outward with respect to the axis of said hub, said flange being spaced from said web and providing an air channel having a circumferentially extending mouth formed between the periphery of said flange and the body of the wheel radially within the wheel's rim.

14. In a structure of the class described including a journal box equipped with a dust guard, a

traction wheel including a hub, a rim, and a web integrating said rim with said hub, and a journal extending from said wheel into said journal box; the refinement herein described in which said dust guard comprises a circumferential flange carried by said journal box and extending radially outward with respect to the axis of said hub, said flange being spaced from said web and providing an air channel having a circumferentially extending mouth formed between the periphery of said flange and the body of the wheel radially within the wheel's rim, and a clearance between the surface of said journal and the wall of said journal box, which clearance establishes communication between the bearing chamber within said box and said air channel.

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