May 29, 1962 M. L. ABEL ET AL 3,036,870

JOURNAL BOX LUBRICANT PAD

Filed Nov. 16, 1959

3 Sheets-Sheet 1

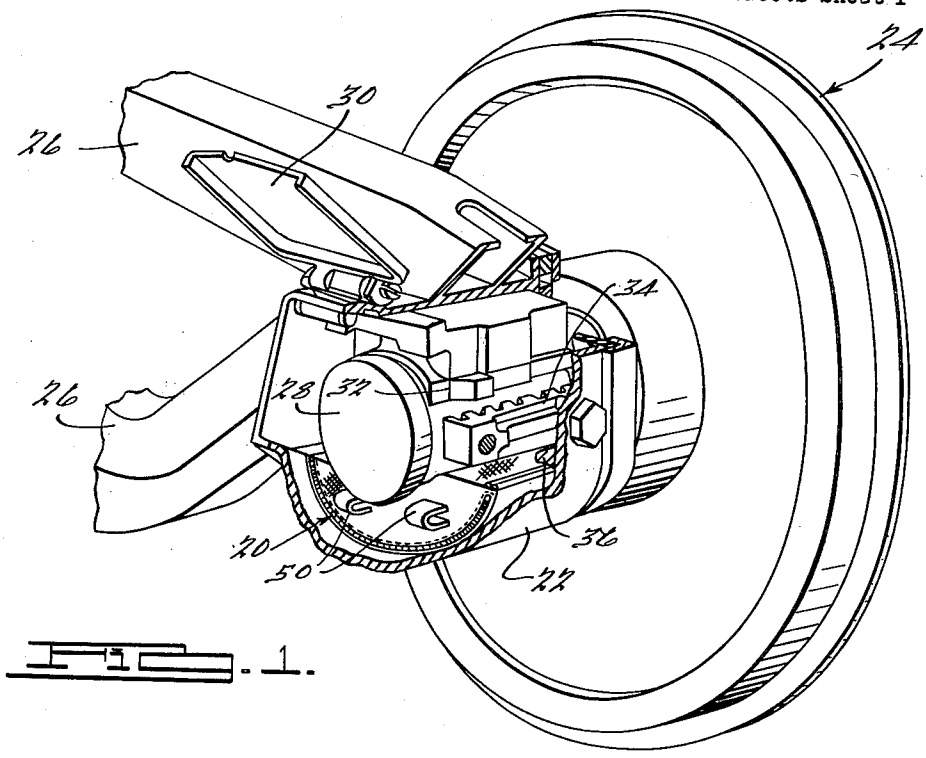


FIG. 1.

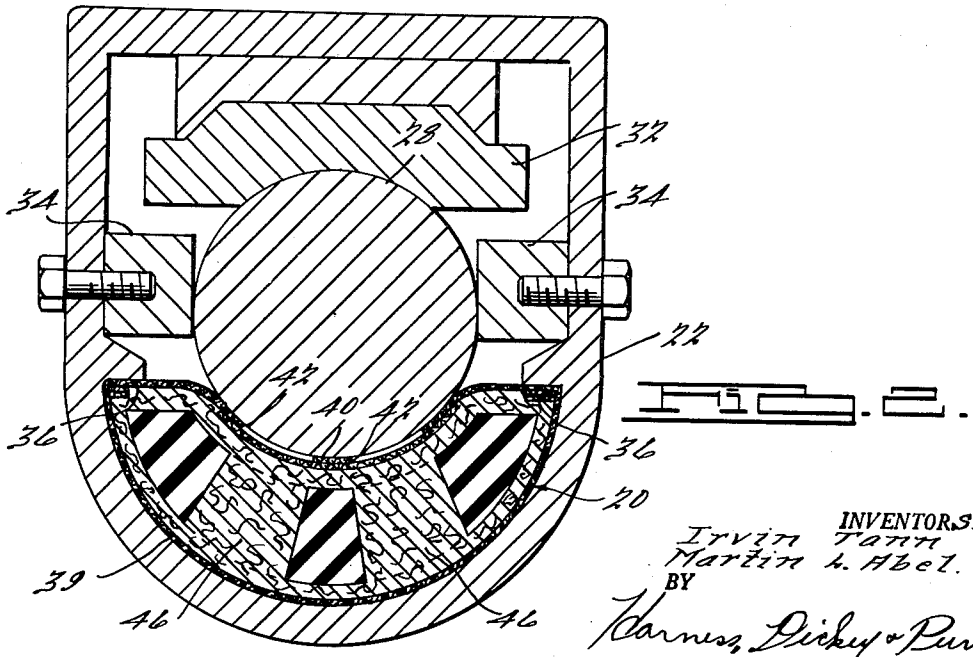


FIG. 2.

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3 Sheets-Sheet 2

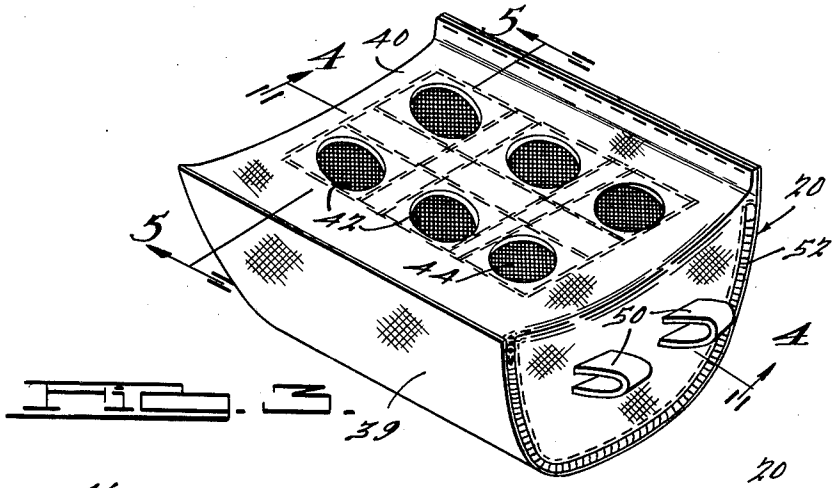


FIG. 3.

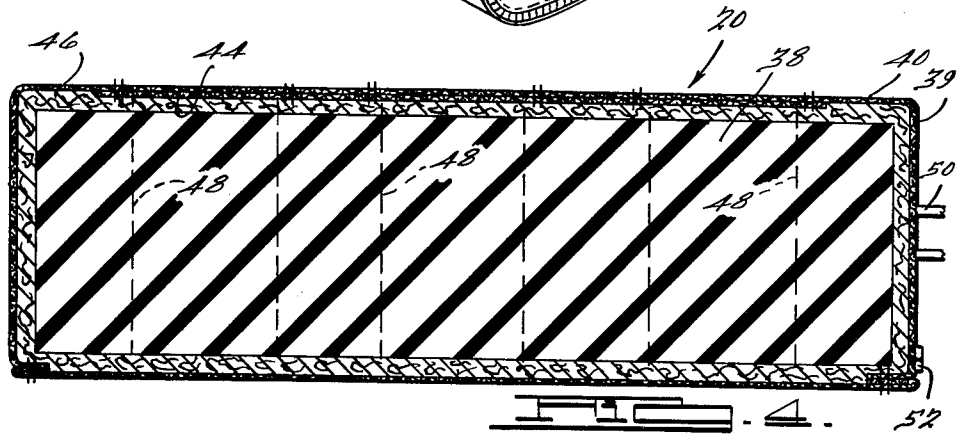


FIG. 4.

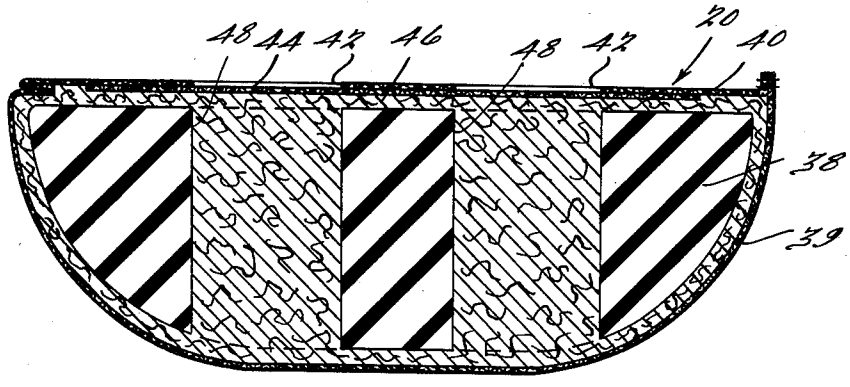


FIG. 5.

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JOURNAL BOX LUBRICANT PAD

Filed Nov. 16, 1959 3 Sheets-Sheet 3

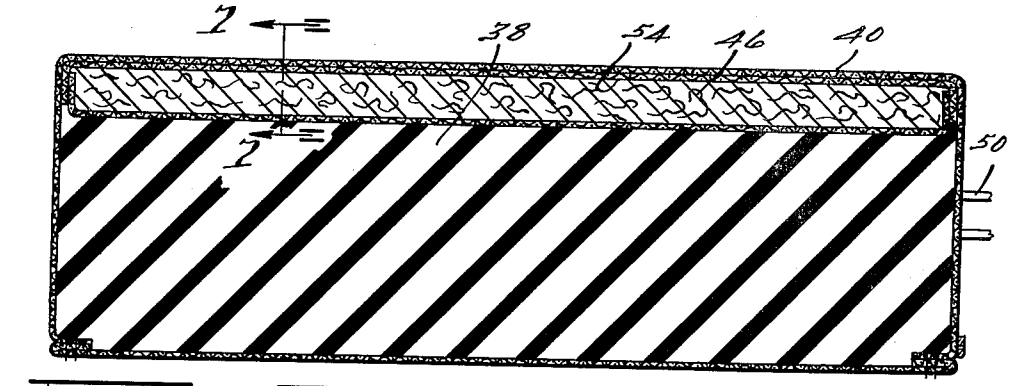


Fig. 6.

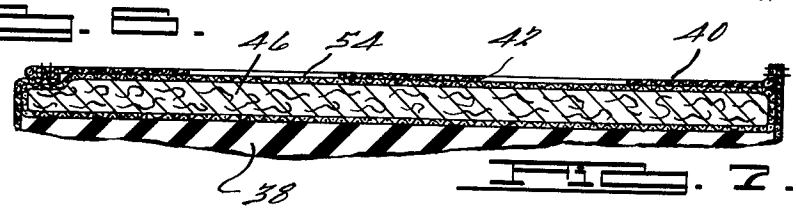


Fig. 7.

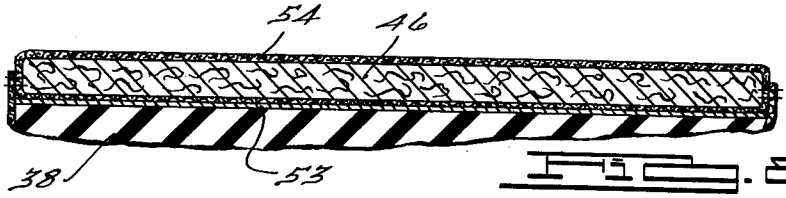


Fig. 8.

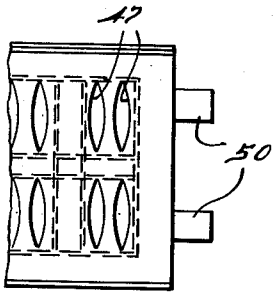


Fig. 9.

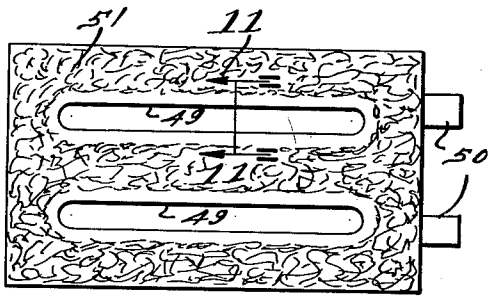


Fig. 10.

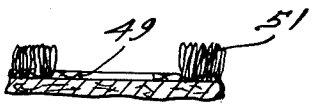


Fig. 11.

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United States Patent Office 3,036,870 Patented May 29, 1962

3,036,870

JOURNAL BOX LUBRICANT PAD

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Filed Nov. 16, 1959, Ser. No. 853,280
10 Claims. (Cl. 308—88)

This invention relates to lubricating pads and particularly to a lubricating pad for a journal box of a railroad car.

In the early development of the art, most railway journals were lubricated by stuffing masses of yarn saturated with a fluid lubricant into the journal boxes to supply the lubricant to the journal bearing surfaces by capillarity. A substantial amount of development work is now being expended on developing a lubricating pad comprising a resilient sponge-like body enclosed in a bag of some suitable material wherein a large number of relatively heavy strands of yarn are interlaced through the bag and form a plurality of loops on opposite sides of the bag. The loops are compressed against the rotating journal by the resilient body and provide the capillarity for lifting a fluid lubricant lying in a pool in the bottom of the journal box to the surface of the rotating journal.

There are serious objections to lubricating a journal in this manner, one of which is that the amount of fluid lubricant that can be deposited on the rotating journal is limited by the capillarity of the particular yarn involved, and another of which is that the changing conditions in which the lubricating pad must operate adversely affects the capillarity of the yarn.

It is one object of the present invention to provide a self-contained lubricating pad having a lubricated wicking material inside the pad wherein the fluid lubricant is pumped out of the wicking material onto the rotating journal in large quantities compared to prior art pads, and thereafter recirculated back to the wicking material within the pad.

It is another object of the invention to provide a self-contained lubricating pad that will deliver large quantities of fluid lubricant to the rotating journal without having to be placed in contact with, or saturated in, a separate pool of fluid lubricant in the bottom of the journal box.

It is a further object of the invention to provide a lubricating pad for the journals of railway cars which retains the advantages of prior art pads, but improves thereon by pumping the material onto the rotating journal rather than relying entirely on capillarity for delivering the fluid lubricant to the rotating journal.

It is a still further object of the invention to provide a method for lubricating a rotatable journal of a railroad journal box comprising pressing a pad containing a lubricated wicking material covered by a pumping layer against the rotatable journal, rotating the journal relative to the pad to pump the lubricant onto the journal, and delivering the lubricant from the journal back to the edges of the pad where it is picked up by the lubricated wicking material and returned to the central portion of the pad in position to be pumped back onto the rotatable journal.

It is a still further object of the invention to provide a self-contained lubricating pad of the foregoing type which can be easily installed and removed from a journal box for inspection and maintenance purposes, is simple and economical to manufacture and highly efficient and dependable in operation.

Other objects and features of novelty of the invention will be specifically pointed out or otherwise become apparent when referring, for a better understanding of the invention, to the following description taken in conjunction with the accompanying drawings wherein:

FIGURE 1 is a perspective view of a railroad car wheel and journal box, with the journal box partially broken away to more clearly illustrate the components therein;

FIG. 2 is an enlarged cross-sectional view of the journal box of FIG. 1, taken along the line 2—2 thereof;

FIG. 3 is a perspective view of the lubricating pad illustrated within the journal box of FIGS. 1 and 2 and embodying features of the present invention;

FIG. 4 is an enlarged sectional view of the pad of FIG. 3, taken along the line 4—4 thereof;

FIG. 5 is an enlarged sectional view of the pad of FIG. 3, taken along the line 5—5 thereof;

FIG. 6 is a sectional view similar to that of FIG. 5 illustrating a modification of the invention;

FIG. 7 is a sectional view of the structure illustrated in FIG. 6 taken along the line 7—7 thereof;

FIG. 8 is a sectional view similar to that of FIG. 7 illustrating another modification of the invention;

FIG. 9 is a reduced, broken plan view of a lubricating pad illustrating another modification of the invention;

FIG. 10 is a reduced plan view of a lubricating pad illustrating another modification of the invention; and

FIG. 11 is an enlarged sectional view of the pad illustrated in FIG. 10, taken along the line 11—11 thereof.

Referring to FIG. 1, a lubricating pad **20** embodying features of the present invention is illustrated in position for lubricating a journal box **22** on a railroad car wheel **24**. The journal box and manner in which it supports a car frame **26** on a journal **28** projecting axially from and rotating with wheel **24** is entirely conventional and, therefore, will not be described in detail. Briefly, however, the journal box includes a pivotally mounted cover **30** for enclosing the open end thereof, and a brass half bearing **32** engaging the upper surface of the rotating journal **28** and supporting the frame **26** and journal box thereon. A pair of guide members **34** are mounted on either side of the journal shaft to prevent the journal box from shifting laterally relative to the rotating journal **28** should the journal box move upwardly a limited distance when the railroad car is jolted severely. When railroad cars are humped, the shock of one car striking another is transmitted through the frame **26** to the journal box **22** and oftentimes lifts the journal box **22** relative to the journal **28**.

Referring to FIG. 2 as well as FIG. 1, it will be observed that the lubricating pad **20** is supported in the bottom of the journal box **22** with the upper edges thereof slipped under shoulders **36** projecting inwardly from either side of the journal box. Since the pad is relatively flexible and resilient the upper surface thereof will conform to the bottom of the rotating journal **28**. The shape of the lubricating pad before it is inserted in the journal box is more clearly illustrated in FIGS. 3–5. Referring specifically to FIGS. 3–5, one embodiment of the lubricating pad of the present invention comprises a resilient pad **38** preferably made of a neoprene sponge rubber material encased in a suitable bag or container **39** preferably made of tightly woven canvas fabric. The upper layer **40** of the container is provided with a plurality of spaced apertures **42**, and an open mesh fabric layer **44** is secured to the underside of the upper layer in position to cover the apertures **42**. The fabric layer **44** is preferably made of nylon or Teflon (polytetrafluoroethylene) fabric or similar materials since the fabric layer may contact the rotating journal **28** and these materials have low friction properties and will resist wear and deterioration.

The space around the resilient pad is filled with a lubricated wicking material **46** which preferably comprises a mass of very small cellulose fibers of the type described and claimed in my copending application Serial No. 686,638 filed on September 27, 1957, now abandoned,

which can be saturated with and retain large quantities of the lubricating oil which is to be used for lubricating the rotating journal **28**. The particular oil to be used as determined by the bearing application, and one skilled in the art can readily pick out a good oil for lubricating the journal **28**. Of course, there are also other types of wicking materials and yarns or waste on the market which could be satisfactorily used in place of the cellulose fibers. The main function of the wicking material is to retain large quantities of the selected oil, preferably without dripping, and give this oil up to the rotating journal **28** as will be described. If desired, the resilient pad **38** may also be provided with a plurality of spaced holes **48** which may also be filled with the lubricated wicking material **46** to enable a greater quantity of lubricated material to be carried in the container.

When in use the lubricating pad **20** is inserted in the journal box **22** beneath the rotating journal **28** as illustrated in FIGS. 1 and 2 with an annular flange on the end of the journal overlapping the outer end of the pad, the pad being flexible and resilient enough to enable it to be stuffed under the rotating journal in this manner. The resiliency of the resilient pad **38** conforms the upper layer **40** to the under surface of the rotating journal **28** and the surface of the shaft completely covers each of the apertures **42** and provides a seal thereabout. Rotation of the journal **28** will then create a suction or reduced pressure at the apertures **42** in the upper layer **40** to suck or pump the oil from the lubricated wicking material **46**, through the open mesh fabric layer **44** and on to the surface of the journal **28**. As the journal rotates its entire surface will be coated with lubricant in this manner so as to lubricate the bearing surface between the brass bearing **32** and the upper surface of the rotating journal **28**. As the journal makes one complete revolution in a counter-clockwise direction as viewed in FIG. 2, for example, the oil on the surface thereof will be returned to and saturate the fabric container **39** and the lubricated wicking material **46** at the upper left portion thereof. It will then be wicked by the container **39** and the wicking material **46** so as to be redistributed through the wicking material and eventually again pumped through the apertures **42** back onto the surface of the rotating journal **28**. Thus, a recirculating system is provided, wherein the oil is pumped from the lubricated wicking material, through the apertures **42** onto the lower surface of the journal, carried in a counter-clockwise direction to lubricate the bearing surface of the brass bearing **32**, and thereafter returned to the lubricated wicking material in the pad. In this manner the upper layer **40** with the apertures **42** therein acts as a pumping layer that pumps the oil from the wicking material. It is apparent that the upper layer could also be made of an impervious flexible material, such as a suitable plastic or resin, and still function as the pumping layer as long as the apertures **42** are provided therein.

The pumping action that is obtained by virtue of the journal **28** rotating past the apertures **42** is believed to result from the aforementioned reduced pressure created at the apertures **42** which enables the pressure in the atmosphere surrounding the lubricating pad to force the oil from the lubricated wicking material through the apertures. This phenomenon also occurs in metal bearings, such as porous sintered metal bushings which support a rotating shaft and wherein a lubricated wicking material is contained in a reservoir surrounding the bushing. The oil in the lubricated wicking material will pass through the small interstices of the porous sintered bushing due to capillarity and will wet the surface of the shaft. However, as soon as the shaft begins to rotate, a pumping action is created which literally sucks the oil from the interstices on one-half of the inner surface of the bushing to provide larger quantities of oil for lubricating the shaft than can be provided by capillarity alone. Applicants have discovered that this phenomenon can also be advantageously applied to the fabric lubricating pad illustrated in the drawings as well.

In the preferred embodiment of the pad the apertures **42** are approximately one to one and one-half inches in diameter, and the openings in the mesh of the fabric layer **44** are approximately one millimeter square, the individual fibers being approximately 1.33 millimeters in thickness with 23/45 fibers p.s.i. Of course, these dimensions may vary considerably and still provide the desired pumping action and, therefore, it is to be understood that they are only given by way of example of a preferred embodiment which appears to provide the best pumping action.

If desired, the size of the apertures **42**, as well as the number of apertures can be varied to regulate the amount of oil which is pumped onto the rotating journal, and the holes in the pad may also be placed in predetermined positions to control the quantities of oil pumped onto different portions of the journal. Further, the configuration of the holes may be changed to a teardrop shape **47** as illustrated in FIG. 9, or slots **49** as illustrated in FIG. 10, or other suitable configurations. It is believed that when the teardrop shape of the holes is employed, the narrow ends of the holes provide an increased capillarity for wetting the journal **28** regardless of whether it is rotating and the wider center portion of the holes facilitates the pumping action when the journal begins to rotate. Also, if desired, the upper layer **40** of the pad may be provided with loops of yarn **51** to enhance the wicking action between the slots **49** in the pad which provide the pumping action. The pad **20** may also be provided with suitable tabs **50**, or the like, to facilitate its removal from the journal box and, if desired, a zipper **52** may be provided on the end of the pad to provide access to the materials within the pad.

It is also noted that the pumping action described above can also be accomplished if the entire upper layer **40** is removed to expose and place only the open mesh fabric layer **44** against the rotating journal **28**. The small openings in the fabric are analogous to the apertures **42**, and create the pumping action to draw the lubricating oil from the wicking material **46**. The amount of oil which is drawn from the wicking material may be smaller, but for some applications it may be desirable to rely solely on the pumping action created by the fabric layer **44**. Therefore, in its broadest form the present invention teaches the lubrication of a bearing surface by placing a lubricated wicking material against the bearing surface to be lubricated with a flexible, apertured barrier layer therebetween which cooperates with the moving bearing surface to create the pumping action for drawing the oil from the wicking material. Consequently, although the present invention is illustrated in the form of a lubricating pad for a journal box, it is apparent that in its broader aspects the invention can find application in other types of bearings.

By way of example, the lubricated wicking material can be advantageously employed by placing it in a fabric container or sleeve of suitable material, such as nylon, having the open mesh weave as previously described. The container can then be suitably retained against a movable bearing surface and will create the desired pumping action for drawing the oil from the wicking material, the apertures in the container preferably being small enough to prevent the wicking material from being pulled out of the container, but large enough to provide the desired pumping action.

An example of such a fabric container or sleeve is illustrated in FIG. 8 wherein a relatively flat rectangular sleeve **54** of the previously described open mesh nylon material is filled with the lubricated wicking material **46** and positioned on top of the resilient pad **38**. In this embodiment the resilient pad **38** is not provided with the holes **48** and the sleeve **54** contains the lubricated wicking material **46** so that it can be retained in position on top of the resilient

pad 38 so that it can engage the rotating journal 28 directly to create the pumping action. If this arrangement is employed, a nylon or Teflon fabric material, or the equivalent, would preferably be employed in making the sleeve 54 to reduce friction and resist deterioration. If desired, the upper fabric layer 40 having the apertures 42 therein may also be provided as previously illustrated in FIGS. 1–7. From the foregoing it is apparent that the specific configuration of a lubricating pad illustrated in the drawings may be varied considerably, and that pad can assume a number of configurations and still accomplish the primary requirement of the present invention, i.e., that means be provided maintaining the lubricated wicking material against the rotating journal 28 with the apertured fabric barrier layer therebetween to create the pumping action. It is also apparent that if the present invention is used for a bearing application wherein the bearing member that is equivalent to the journal 28 does not shift laterally, it would not be necessary to provide the resilient pad 38. Another feature of the present invention is illustrated in FIG. 8 wherein a layer of impervious material 53 is positioned between the sleeve 54 and the resilient pad 38 to prevent lubricating fluid being drawn or leaking from the wicking material 46 into the resilient pad. When the small cellulose fibers mentioned above as the preferred lubricating wicking material is employed, the lubricant will not tend to drip or be drawn from the wicking material and, therefore, the impervious layer 53 need not necessarily be provided.

While it will be apparent that the preferred embodiments herein illustrated are well calculated to fulfill the objects above stated, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. In a railroad journal box surrounding a rotating journal, a lubricating pad adapted to be positioned within the journal box beneath the rotating journal comprising a core of resilient material, a layer of lubricated wicking material on the upper side of said core, a flexible covering encasing said core and the lubricated wicking material thereon, the upper layer of said covering comprising a flexible pumping layer having a plurality of relatively large apertures therein adapted to cooperate with the journal when it rotates to create a pumping action for drawing lubricating fluid from the lubricated wicking material, and an open mesh fabric layer secured to the underside of said upper layer and covering the apertures therein to prevent the wicking material from escaping while enabling the lubricating fluid to freely pass therethrough.

2. A lubricating pad adapted to be positioned within a journal box beneath a rotating journal therein comprising a core of resilient material, a sleeve filled with a lubricated wicking material positioned on the upper side of said core, a flexible covering enclosing said core and said sleeve, the upper surface of said sleeve comprising an open mesh fabric having a plurality of openings therein small enough to prevent the wicking material from escaping and large enough to enable the lubricant to pass therethrough, a portion of said covering extending over the upper surface of said sleeve and having a plurality of large apertures therein adapted to cooperate with the rotating journal to create a pumping action to draw the lubricating fluid from the lubricated wicking material.

3. The invention as defined in claim 2 including a layer of impervious material positioned between said resilient core and the sleeve to prevent lubricant from dripping or being drawn from the wicking material into the resilient core.

4. A lubricating pad adapted to lubricate a rotating journal comprising a layer of lubricated wicking material, means for encasing said lubricated wicking material, one face of said encasing means comprising a flexible pumping layer adapted to conform to the surface of said journal, aperture means in said pumping layer adapted to cooperate with the journal when it rotates to create a pumping action for drawing lubricant from the wicking material, means positioned between said one face and the lubricated wicking material and covering said aperture means so as to prevent the wicking material from passing therethrough but enable the lubricant to pass therethrough, and means within said encasing means for urging said lubricated wicking material against said one face and for urging said one face against the surface of said journal.

5. A lubricating pad adapted to lubricate a rotating journal or the like comprising a layer of lubricated wicking material made up of a plurality of finely macerated cellulose fibers impregnated with a bearing oil, a flexible fabric-like means for encasing said lubricated wicking material, one face of said fabric-like means comprising a flexible pumping layer adapted to conform to the surface of said journal, aperture means in said pumping layer adapted to cooperate with the journal when it rotates to create a pumping action for drawing lubricant from the wicking material, means positioned between said one face and the lubricated wicking material and covering said aperture means so as to prevent the wicking material from passing therethrough but enable the lubricant to pass therethrough, and resilient means within said fabric-like encasing means for urging said lubricating wicking material against said one face and for urging said one face against the surface of said journal.

6. A lubricating device comprising a flexible container filled with a lubricated wicking material made from finely macerated cellulose fibers impregnated with a bearing oil, at least a portion of one face of said container providing a pumping layer having a plurality of openings therein, said openings being large enough to enable both the oil and the wicking material to readily pass therethrough and to cooperate with a moving bearing surface slidably engaged by said one face to create a pumping action for drawing lubricant from said wicking material, and material covering said openings which enables the bearing oil to pass therethrough but prevents the wicking material from passing therethrough.

7. In a railroad journal box surrounding a rotating journal, a lubricating pad adapted to be positioned within the journal box beneath the journal comprising a core of resilient material, a layer of lubricated wicking material on at least the upper side of said core, a tightly woven fabric covering encasing said core and the lubricated wicking material thereon, said fabric including an upper layer extending over said lubricated wicking material and adapted to slidably engage the rotating journal, said upper layer having aperture means therein adapted to cooperate with the journal when it rotates to create a pumping action for drawing lubricating fluid from the lubricated wicking material.

8. The invention as defined in claim 7 including an open mesh fabric covering said aperture means, said open mesh fabric being pervious to the flow of lubricating fluid therethrough but preventing the wicking material from passing therethrough.

9. A method of lubricating a rotatable journal in a journal box of a railroad car, which includes the steps of, providing a lubricating pad having aperture means in the central portion of the upper surface thereof and a lubricated wicking material therein extending beneath said upper surface, positioning the pad in the journal box with the apertured central portion of the upper surface pressed against the under side of the rotatable journal and the side portions of the upper surface extending laterally outwardly from the journal, creating a pumping action by rotating the journal past the aperture means to draw the lubricant from said lubricating wicking material through the aperture means and onto the surface of the journal, delivering the lubricant which escapes from the surface of the journal to the side edge portions of the pad and the lubricated wicking material therebeneath, and redistributing the lubricant from the side edegs portions through

the lubricated wicking material back to the central portion of the pad where it can be pumped back through the aperture means and onto the surface of the rotating journal in a manner to provide a completely self-contained recirculating system.

10. A method of lubricating a rotatable journal in a journal box of a railroad car, which includes the steps of, providing a self-contained lubricating pad having a lubricated wicking material therein and aperture means in the central portion of the upper surface thereof, positioning the pad in the journal box with said central portion pressed against the under side of the journal, rotating the journal past the aperture means to create a pumping action to draw the lubricant from said lubricated wicking material through the aperture means and onto the surface of the journal, delivering the lubricant which escapes from the surface of the journal to the side edges of the pad, and

redistributing the lubricant from the side edge of the pad through the lubricated wicking material back to the central portion of the pad where it can be pumped back through the aperture means and onto the surface of the rotating journal in a manner to provide a completely self-contained recirculating lubricating system.

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UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,036,870 May 29, 1962

Martin L. Abel et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 3, line 3, for "as" read -- is --; column 6, line 26, for "lubricating" read -- lubricated --; same column 6, line 75, for "edegs" read -- edge --.

Signed and sealed this 11th day of September 1962.

(SEAL)
Attest:

ERNEST W. SWIDER
Attesting Officer

DAVID L. LADD
Commissioner of Patents