Aug. 20, 1963 L. C. ROBINSON 3,101,223

JOURNAL LUBRICATOR

Filed Nov. 14, 1961 2 Sheets-Sheet 1

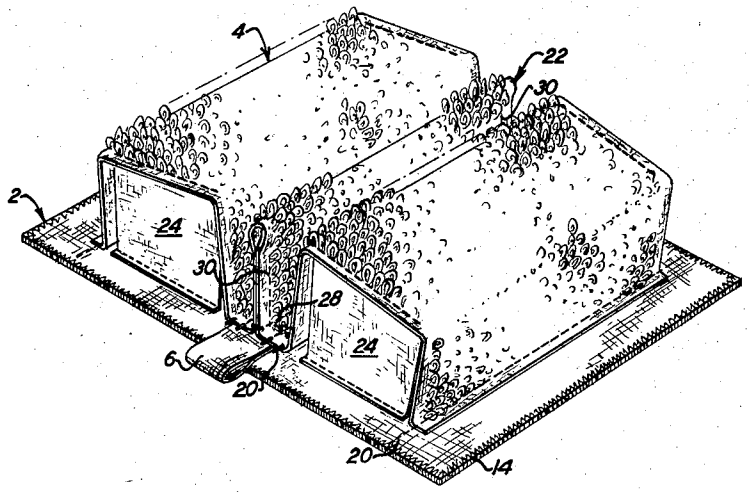


Fig. 1

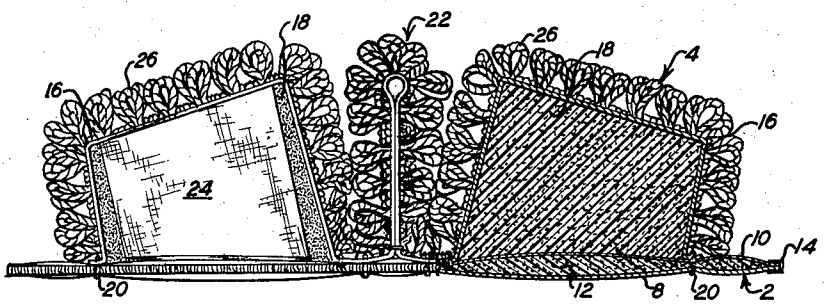


Fig. 2

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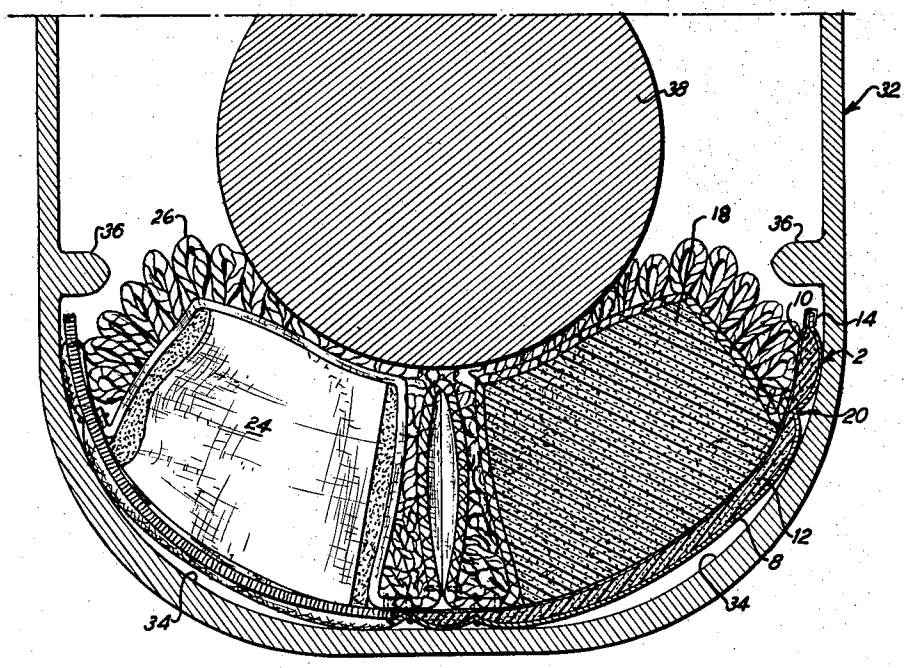


Fig 4

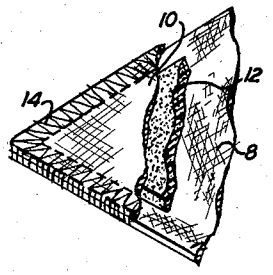


Fig 5

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JOURNAL LUBRICATOR

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4 Claims. (Cl. 308—87)

This invention relates to lubricators particularly adapted for use in the journal boxes of railway cars.

In recent years a great deal of progress has been made in the lubrication of railway journal bearings. Much of this progress is attributable to the use of preformed lubricator pads that may be inserted into the journal boxes and which serve to apply lubricating oil to the surfaces of the rotating journals. As ordinarily constructed and installed, such a pad is a resilient, oil-absorbing article that rests upon the lower walls of the journal box and bears resiliently against the journal. Lubricating oil inserted into the journal box is absorbed by the pad and transmitted by wicking action to the journal.

To be completely acceptable, a lubricator pad must be inexpensive; it must be easy to install; it must have high lubricating efficiency; and it must be sufficiently durable to give satisfactory service over a long period of time. The pads known prior to this invention have not satisfied all of these requirements as fully as might be desired. It is difficult to achieve good lubricating and durability characteristics in a low cost pad that is easy to handle during installation and inspection.

It is an object of this invention to provide an improved journal lubricator that will overcome many of the problems encountered heretofore.

A more specific object of the invention is to provide a lubricator pad having a base so constructed that it may serve as a lubricant reservoir for holding a substantial amount of oil in a position from which the oil may be transferred readily to the journal.

Another object of the invention is to provide a more durable lubricator by incorporating in a pad a base unit that will be resistant to abrasion from the rough walls of a journal box and that will give the pad improved positional stability.

A preferred form of journal lubricator pad embodying the principles of this invention includes a relatively thin, rectangular base platform adapted to conform generally to the curved lower walls of a journal box and resilient, oil-absorbing means extending upwardly from the base for applying oil to the journal. The base platform is made up of an oil-absorbing lower fabric layer, an oil-absorbing upper fabric layer and an intermediate layer of cellular material. The journal-contacting means preferably is formed by an oil-absorbing and wicking fabric jacket attached to the base and having one or more pockets receiving cores of resilient material.

The construction of the base unit of the pad is such that a substantial quantity of lubricating oil may be retained therein. The cellular material preferably is a plastic foam which will hold the upper and lower fabric layers in spaced apart relation and which will hold oil in its cells. The presence of this oil reservoir right in the base of the lubricator pad makes it possible to reduce the amount of free oil in the bottom of the journal box, so that oil losses due to pumping action and splashing are minimized. Moreover, even when the bottom of the journal box is dry, the base platform of the pad holds enough oil to provide proper lubrication of the journal bearing for many additional miles of railway car operation.

Different fabric constructions preferably are employed for the upper and lower layers of the base unit of the pad. The lower fabric layer necessarily must contact the rough surfaces of the journal box, and in order to minimize wear, it is desirable that this fabric have high abrasion resistance. The upper fabric layer is not subject to abrasion, and it need not have particularly high abrasion resistance qualities. However, it must be able to wick oil rapidly, and for this purpose an open mesh construction has been found to be desirable.

Although the lubricator pad is not fixed to the journal box during installation, its base unit does contact the curved lower walls of the journal box over a large area. The frictional forces developed between the pad and the journal box walls have been found to be sufficient to prevent displacements of the pad during operation of the railway car. In this connection, it is pointed out that undesired displacement of a lubricator pad during operation would be likely to expose some portion of the pad to the danger of being torn or distorted severely by contact with the rotating collar and fillet portions of the journal. Hence, the enhanced positional stability of the lubricator pad of this invention is a significant factor as far as the durability of the pad is concerned.

A more complete understanding of the invention, and a better appreciation of its many advantages, will be gained from a consideration of the following detailed description of an embodiment illustrated in the accompanying drawings, in which:

FIGURE 1 is a perspective view of a lubricator pad constructed in accordance with this invention;

FIGURE 2 is a rear elevational view, partly broken away, of the pad shown in FIGURE 1;

FIGURE 3 is an enlarged, broken away, perspective view of a corner portion of the base of the lubricator pad of FIGURE 1; and

FIGURE 4 is a partial cross-sectional view showing a conventional journal box having the lubricator pad of FIGURE 1 installed therein.

The lubricator pad illustrated in the drawings includes a base unit designated generally by the numeral **2** and lubricant applying means designated generally by the numeral **4**. A strong nylon pull strap **6** also is provided at a central portion of the pad, as indicated in FIGURE 1, to facilitate handling of the pad, particularly during removal thereof from a journal box for inspection or replacement.

The base unit **2** of the pad serves both as a stabilizing platform for the lubricant applying means **4** and as a lubricant reservoir. It includes a lower layer **8** of oil-absorbent, abrasion-resistant cotton duck fabric, an upper layer **10** of cotton duck fabric, and a body of polyurethane foam **12** between the layers **8** and **10**. The fabric layers **8** and **10** are secured directly together along the perimeter of the base unit by overedge stitching **14** which prevents raveling of the cotton fabrics and also gives the edge portions of the base unit **2** improved abrasion resistance characteristics. Additional stitching **20** is located inwardly of the edges of the base unit **2** to secure the sheet of foam material **12** in place between the upper and lower fabric layers **8** and **10**.

In order that the lower layer **8** of fabric may be capable of absorbing and retaining large quantities of lubricating oil and may also be highly resistant to abrasion, careful consideration should be given to the fabric construction. By way of example, it may be mentioned that a tightly woven, warp-faced, cotton fabric having a weight of 30.36 ounces per square yard has been found to be suitable. This fabric has twenty-nine warp yarns per inch and seventeen filling yarns per inch. The warp yarns are 7-ply yarns of 8.26's (cotton count) size, and the filling yarns are 5-ply yarns of 6.28's (cotton count) size.

The fabric for the upper layer **10** of the base **2** must also be selected with care. This fabric must be capable

of transferring oil readily from the base unit 2 to the oil-applying means 4. For this purpose, a relatively open mesh construction is most suitable. An example of a fabric that has been found to be satisfactory is a light cotton duck fabric weighing 11.65 ounces per square yard. This fabric includes thirty-three warp yarns per inch and twenty-eight filling yarns per inch. The warp yarns are single ply yarns of 4.5's (cotton count) size, and the filling yarns are single yarns of 3.5's (cotton count) size.

The lubricant-applying means 4 includes a fabric casing 16 and a pair of resilient cores 18. The casing 16 is secured at intervals to the base unit 2 of the pad by rows of stitching 20 so as to provide elongated pockets for the reception of the cores 18 and so as to provide a center wick structure 22. After the cores 18 have been inserted into the pockets in the fabric casing, the ends of the pockets are closed by strips 24 of oil-absorbing cotton duck fabric stitched to the base unit 2 and to the tops of the pockets.

The fabric used for the casing 16 may be a woven cotton pile fabric having loops 26 projecting from its outer surface. Although this type of fabric is preferred, it will be understood that other fabrics having the desired oil-absorbing and wicking properties may be used if desired.

The center wick structure 22 is formed by a double layer of the pile fabric casing material. These layers may be secured together at the bottom of the center wick structure 22 by means of a horizontal row of stitching 28 and at the ends of the center wick structure 22 by means of vertical rows of stitching 30.

The resilient cores 18 preferably are of trapezoidal configuration in transverse cross section, as shown in FIGURE 2, and they must be formed from a high quality elastomer. These cores are relied upon to assure firm contact between the fabric casing 16 of the journal pad and the journal lubricated thereby. Consequently, the elastomer from which these cores 18 are formed must be resilient, durable, and dependable throughout the life of the lubricator.

In selecting an elastomer for use in forming the cores 18, consideration should be given to the adverse environmental conditions that may be encountered in connection with railway car journal box service. The material should be able to withstand temperatures varying from minus forty degrees Fahrenheit all the way up to two hundred fifty degrees Fahrenheit, and it must have the desired properties of elasticity and resilience at these extreme temperatures. The material also should be capable of being compressed down to about fifty percent of its free height without permanent deformation. Finally, the material must be chemically resistant to degradation in the presence of oil, water, foreign matter, and the acids that tend to build up in the journal box of a railway car. An example of a material that meets all of these requirements is acrylonitrile synthetic rubber foam.

These exacting requirements are not applicable to the cellular material 12 in the base unit 2 of the pad. Although this material may be an elastomeric foam, it is not relied upon to provide resiliency to the pad. The base unit 2 preferably is of a thickness not greater than about one quarter of the total height of the lubricator pad, and the cores 18 are quite capable of accommodating all of the pad deflection that may be required and assuring the desired resilient contact between the pad and the journal being lubricated. Hence, the layer 12 may be formed from some inexpensive material such as polyurethane. This layer 12 serves primarily as an oil-holding reservoir, and it also adds body, weight and strength to the base platform 2.

FIGURE 4 illustrates the lubricator pad as it appears when installed in a conventional journal box 32 of the type used on railway cars. The bottom portion of this journal box 32 serves as a sump for holding lubricating oil, and its walls curve upwardly, as indicated at 34, toward inwardly projecting positioning lugs or stops 36. A

rotatable journal 38 extends into a central portion of the journal box 32, and, as is customary, a stationary bearing member (not illustrated) rests upon the top of this journal 38. The lubricator pad serves to transfer oil from the bottom of the journal box 32 onto the rotating surface of the journal 38.

As will be evident from FIGURE 4, the base unit 2 of the lubricator pad is flexible enough to permit it to conform substantially to the lower walls of the journal box 32. It also is of sufficient size to cover nearly all of the wall portions of the journal box 32 below the lugs 36. It was pointed out above that the fabric utilized for the bottom layer 8 of the base unit 2 of the journal lubricator pad may be a warp-faced fabric. It is preferred that the warp yarns or threads of this fabric be arranged so as to extend transversely of the lengths of the pockets of the pad and transversely with respect to the axis of the journal 38.

During insertion of the lubricator pad, the resilient cores 18 are compressed and they are urged toward each other by the curved walls 34 of the journal box. As the cores 18 are urged together, they press the loops 26 on the inner side walls of the pockets into contacting relationship with respect to the loops on the side walls of the center wick 22. This results in the disposition of four layers of highly oil conductive cotton loop pile fabric in a zone extending directly from the bottom of the journal box 32 to the surface of the journal 38. These layers provide a very efficient flow path for the lubricating oil and assure that the rate of transfer of lubricating oil to the journal 38 will at all times be high enough to assure proper lubrication of the journal bearing. Auxiliary oil flow paths are provided by the other fabric portions of the casing 16 and loops 26.

It should be noted also that all of these oil flow paths lead from the highly oil conductive upper fabric layer 10 of the base platform 2 of the pad. Oil stored within the base unit 2 is always available for immediate use, and it may be transferred readily to the casing 16 for delivery to the journal 38 as required. The presence of the oil storage reservoir in the base unit 2 of the pad minimizes the amount of oil that is free to splash around in the bottom of the journal box 32 during movements of the railway car.

Any tendency of the lubricator pad to move under the influence of loads applied by the journal 38 is effectively resisted by the firm engagement of the base unit 2 of the pad with the lower wall portions of the journal box 32. Moreover, the fabric 8 which constitutes the lower layer 8 of the base unit 2 is extremely resistant to the abrasive forces which result from rough spots on the walls of the journal box 32. In this connection, it will be understood by persons skilled in the art that, even though the interior walls of the journal box are illustrated in FIGURE 4 as being smooth, they are in fact quite rough, since journal boxes ordinarily are castings and their interior surfaces are not polished.

Although a single embodiment of the invention has been illustrated and described in detail, it will be apparent that various changes and modifications can be made without departing from the principles of the invention. It is intended, therefore, that the foregoing description be considered as exemplary only and that the scope of the invention be ascertained from the following claims.

I claim:

1. A lubricator adapted to be disposed in a journal box between the journal and the lower walls of the box, said lubricator comprising a base unit of a height not greater than one-fourth of the height of the lubricator and being of a rectangular shape adapted to cover a major portion of the lower walls of the box, a fabric casing secured to said base unit and providing at least one long pocket above the base unit, and a core of compressible and expandable resilient material in said pocket for urging said

fabric casing into contact with the journal, said base unit including a lower layer of abrasion resistant material, an upper layer of lubricant conducting material, and means interposed between said layers for holding portions of said layers in spaced apart relation to provide space for the storage of lubricant within said base unit.

2. In a lubricated journal box containing a journal and having lower wall portions curved upwardly on opposite sides of a vertical plane containing the axis of the journal: the improvement which comprises a lubricator having a base platform and lubricant reservoir unit of generally rectangular configuration supported by and extending upwardly substantial distances along said wall portions of said box, said unit including a lower layer of abrasion resistant, lubricant absorbing dense woven cotton fabric having its lower surface made up predominantly of warp threads extending in planes approximately at right angles to the axis of the journal, an upper layer of open mesh lubricant absorbing cotton fabric secured at its edges to said lower layer by overedge stitching, an intermediate layer of polyurethane foam between said upper and lower layers; a lubricant absorbing fabric casing secured to and contacting said upper layer of said base unit, said casing extending upwardly from said upper layer to define at least one pocket; and a compressible and expandable core of acrylonitrile synthetic rubber in said pocket for pressing said casing against the journal.

3. In a lubricated journal box containing a journal and having lower wall portions curved upwardly on opposite sides of a vertical plane containing the axis of the journal: the improvement which comprises a lubricator having a base platform and lubricant reservoir unit of generally rectangular configuration supported by and extending upwardly substantial distances along said wall portions of said box, said unit including a lower layer of abrasion resistant material, an upper layer of open mesh lubricant absorbing fabric secured at its edges to said lower layer, and an intermediate layer of cellular material between said upper and lower layers; a lubricant absorbing fabric casing secured to and contacting said upper layer of said base unit, said casing extending upwardly from said upper layer to define at least one pocket; and a compressible and expandable core in said pocket for pressing said casing against the journal.

4. A lubricator adapted to be disposed in a journal box between the journal and the lower walls of the box, said lubricator comprising a base platform and lubricant reservoir unit of a height not greater than one-fourth of the height of the lubricator and being of generally rectangular shape adapted to cover a major portion of the lower walls of the box, a fabric casing secured to said base platform and lubricant reservoir unit and providing at least one long pocket above the unit, and a core of compressible and expandable resilient material in said pocket for urging said fabric casing into contact with the journal, said base platform and lubricant reservoir unit including a lower layer of abrasion resistant material, an upper layer of lubricant conducting fabric of approximately the same size as said lower layer, stitching along the periphery of said unit securing said upper and said lower layers directly together, cellular material substantially filling the space between said layers, and stitching extending across said unit and passing through said upper and lower layers and said cellular material to secure said cellular material in place within said base unit.

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