

April 26, 1938.

H. B. CUNNINGHAM ET AL

2,115,457

LUBRICATING DEVICE

Original Filed April 13, 1932 3 Sheets-Sheet 1

Fig. 1.

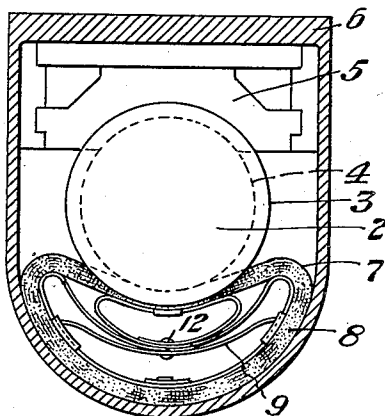


Fig. 2.

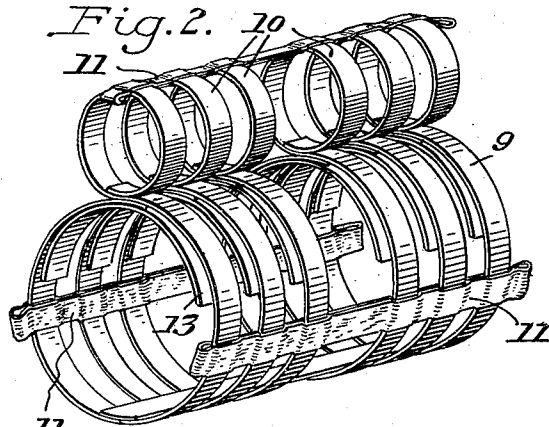


Fig. 5.

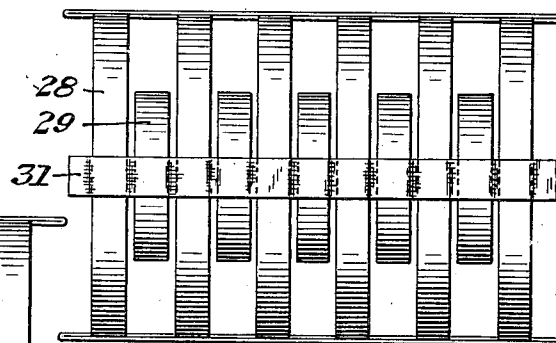


Fig. 3.

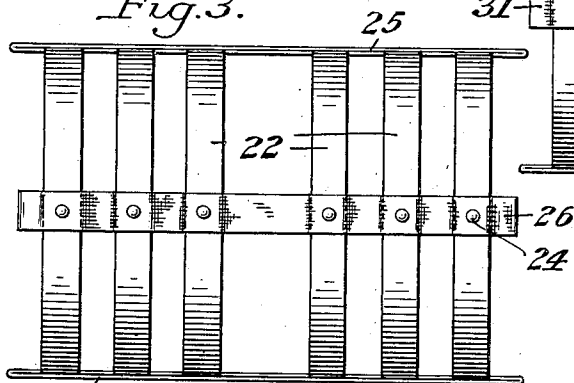


Fig. 6.

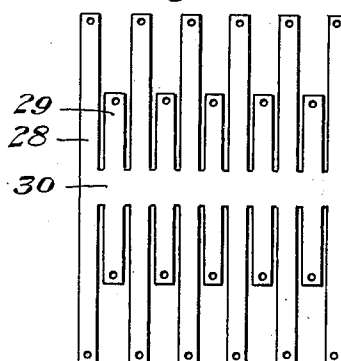
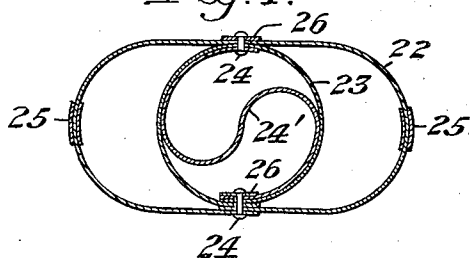


Fig. 4.



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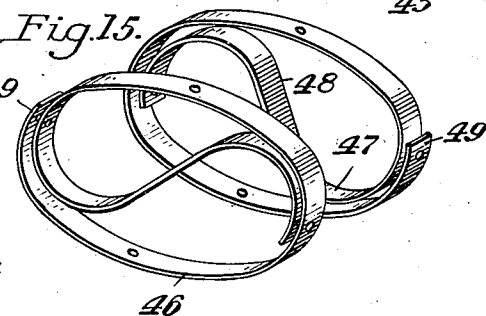
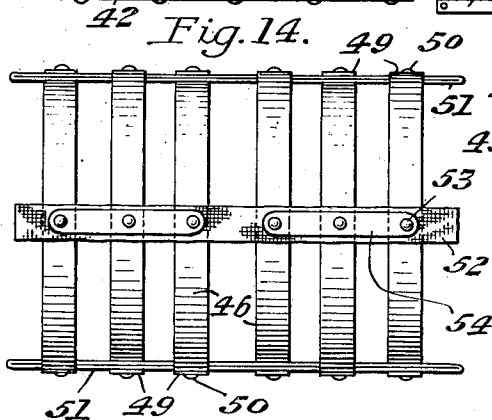
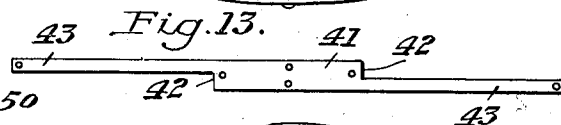
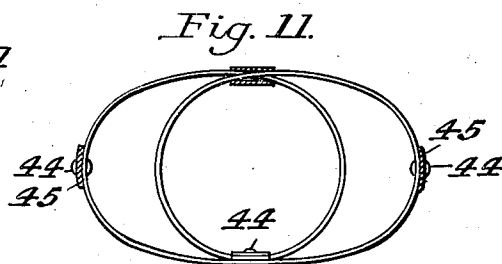
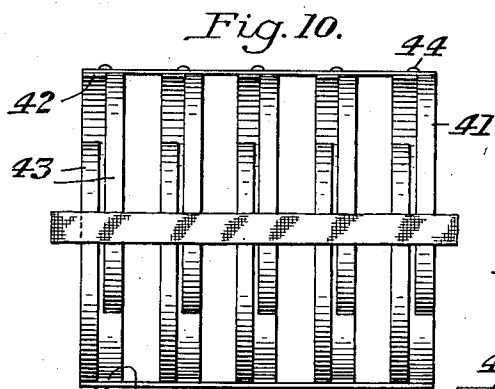
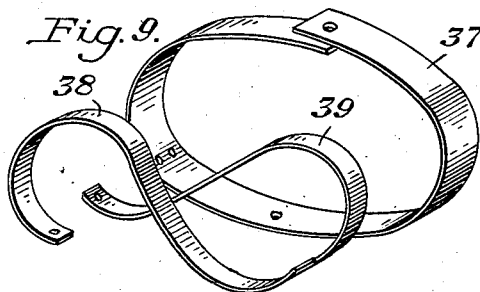
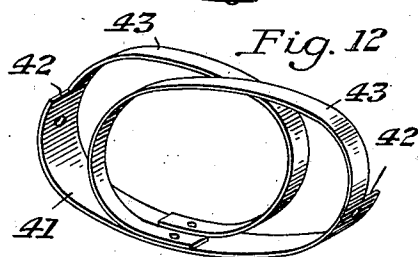
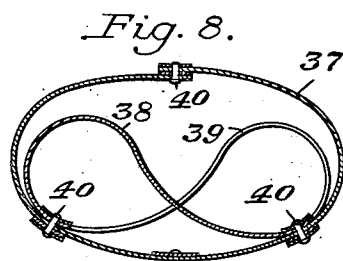
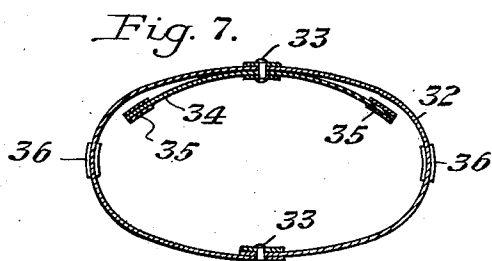
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LUBRICATING DEVICE

Original Filed April 13, 1932 3 Sheets-Sheet 2



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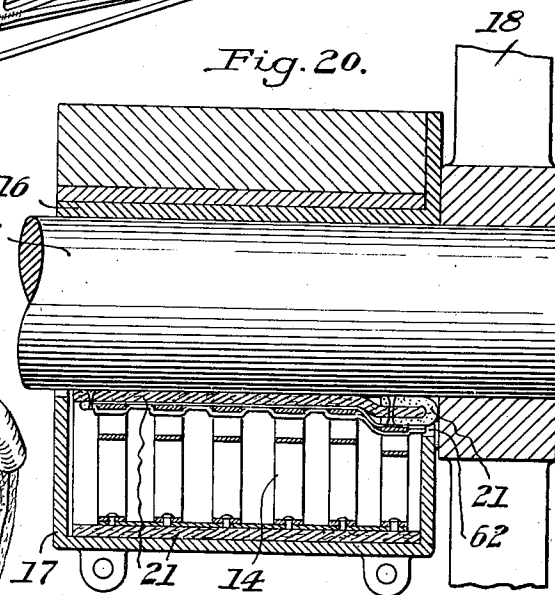
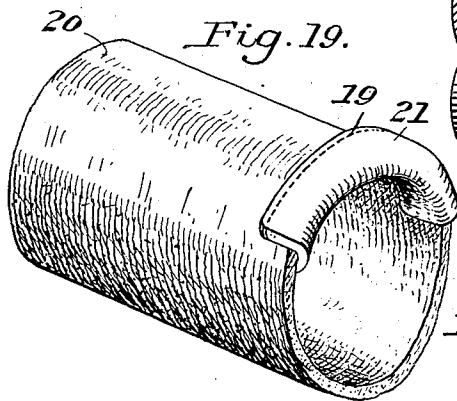
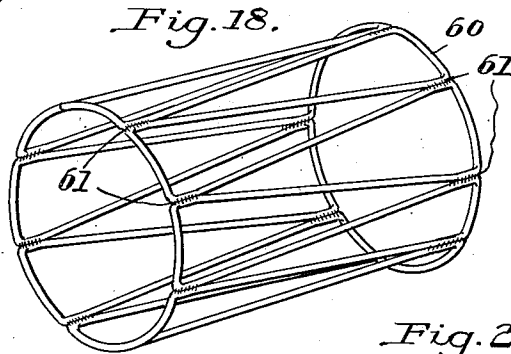
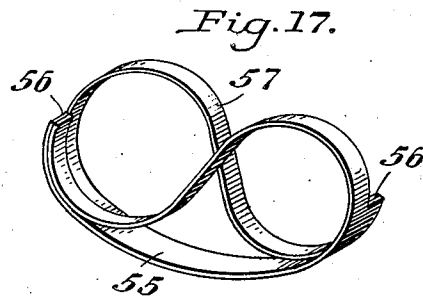
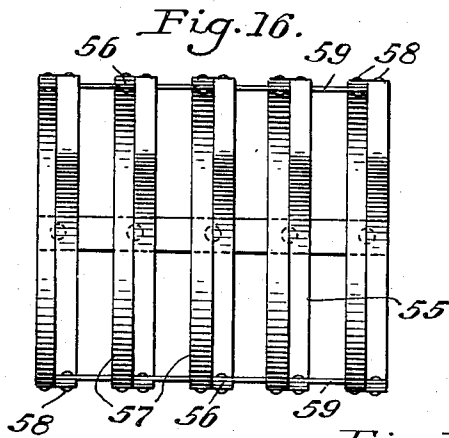
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LUBRICATING DEVICE

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UNITED STATES PATENT OFFICE

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LUBRICATING DEVICE

Homer B. Cunningham, Connellsville, and James
W. Tucker, Pittsburgh, Pa.Continuation of application Serial No. 605,082,
April 13, 1932. This application April 28, 1934,
Serial No. 722,820

6 Claims. (Cl. 308—88)

This invention relates broadly to lubricating devices, and more particularly to lubricating devices for rotating parts such as axles, journals, bearings, etc. The invention relates still more particularly to lubricators of the type employing a lubricating pad and having supporting mechanism for maintaining the pad in cooperative relationship with the part to be lubricated.

This application is a continuation of our copending application Serial No. 605,082, filed April 13, 1932, and includes features disclosed in our copending application Serial No. 587,434, filed January 18, 1932.

Lubricators for journals of the type comprising a pad and a supporting structure therefor are well known, but such lubricators have not prior to the present invention gone into actual commercial use to any appreciable extent. One reason for this is the relatively great expense of manufacture and another reason is the difficulty of applying the lubricators, particularly in the journal boxes of American railway rolling stock, which require a lubricator which is flexible or bendable, particularly in the longitudinal direction, that is to say, in the direction generally parallel to the axis of the axle or journal to be lubricated. A lubricator which is not freely flexible in the longitudinal direction cannot readily be applied in American railway journal boxes as the bottom of the box opening is at an elevation almost as high as the axis of the axle, and the lubricator has to be applied by passing it in a more or less circuitous path downwardly within the box and then inwardly around the end of the axle. To do this requires a longitudinally bendable or flexible lubricator, and lubricators of the same general type heretofore known which have possessed the requisite strength to properly do their work have in general been open to the objection that they are either physically incapable of application within American railway journal boxes or, if forced into place therein, will be so permanently deformed that their utility is practically destroyed.

We provide a lubricator eliminating the disadvantages above mentioned and which is ideally suited for use in the journal boxes of American railway rolling stock, as well as for numerous other uses. Our lubricator may be manufactured at low cost and is capable of very economical manufacture in quantity production. Tests have proved it highly efficient in use and it is found to stand up remarkably well under exacting conditions imposed by use in the journal boxes of American railway rolling stock.

Other details, objects and advantages of the invention will become apparent as the following description of certain preferred embodiments thereof proceeds.

In the accompanying drawings we have shown certain preferred embodiments of the invention, in which—

Figure 1 is an end view of an axle, such as of a railroad car or other like vehicle, showing diagrammatically the bearing and the journal box, the latter in vertical cross section, and illustrating one way of applying a lubricator;

Figure 2 is a detail perspective view of a lubricator supporting means;

Figure 3 is a plan view of a modified construction;

Figure 4 is a vertical transverse cross-sectional view through the form shown in Figure 3;

Figure 5 is a bottom plan view of a further modified construction;

Figure 6 is a plan view of a metal stamping which may be used to form the supporting means shown in Figure 5;

Figure 7 is a vertical transverse cross-sectional view through a further modified form;

Figure 8 is a vertical transverse cross-sectional view through a still further modified form;

Figure 9 is a perspective view showing in disassembled relationship parts used in making the form shown in Figure 8;

Figure 10 is a plan view of a further modified form;

Figure 11 is a vertical transverse cross-sectional view through the form shown in Figure 10;

Figure 12 is a perspective view of a portion of a further modified form;

Figure 13 is a plan view of a metal stamping which may be used to form the supporting means shown in Figure 12;

Figure 14 is a plan view of a further modified form;

Figure 15 is a perspective view of portions of the form shown in Figure 14 and in disassembled relationship;

Figure 16 is a plan view of a further modified form;

Figure 17 is a perspective view of a portion of the supporting means shown in Figure 16;

Figure 18 is a perspective view of a still further modification;

Figure 19 is a perspective view of one form of lubricating pad; and

Figure 20 is a vertical longitudinal cross-sectional view through a journal box showing a lubricator applied therein.

The various forms of supporting mechanism which have been selected for illustration by way of example are simply certain of the forms which have been devised and are no more advantageous or desirable than other forms which might be used in their place to perform the same function. The supporting mechanism for the lubricating pad is preferably resilient so as to be adapted to exert pressure, for example between the bottom of a journal box and a journal to be lubricated, and press the lubricating pad firmly but yieldingly against the journal. Strip metal is well adapted for this purpose, and in certain of the forms of supporting mechanism shown in the drawings metal strips or strip-like metal members arranged in side by side relationship are used to form the supporting mechanism. The supporting mechanism may conveniently be made up of a series of strip metal sections which may be closed or substantially closed upon themselves, the respective sections extending transversely of the axis of the journal. The sections may be connected together in various ways, such as integrally as shown in Figure 6, by fabric strips or tapes as shown in Figure 2, or by flexible metal connecting pieces as shown in Figure 14.

For some uses a fairly stiff pad supporting mechanism may be desirable. In Figure 18, for example, there is shown a pad supporting device in the form of a wire frame which, however, depending upon the size and quality of the wire, may be made resilient. For most purposes, however, and particularly for lubricators adapted for use in the journal boxes of American railway rolling stock, a relatively high degree of longitudinal flexibility is desired. This is because in the journal boxes of American railway rolling stock the bottom of the box at the outside of the journal curves upwardly fairly close to the journal to a vertical position close to the journal axis. It is therefore necessary in inserting the lubricator to first introduce it in a generally downward direction between the inside of the journal box and the outer collar of the journal and then to move the lubricator around the collar, which, on account of the relatively small space available, requires the lubricator itself during such movement to be turned through an angle approaching 90°. For such purposes we at present prefer to join together or space apart the sections of the supporting mechanism non-rigidly, and we prefer to use entirely separate supporting mechanism sections and to apply the same to the lubricating pad in such manner that the lubricator thus formed is freely bendable in the longitudinal direction.

One desirable way of applying to the lubricating pad the sections of the supporting mechanism is by means comprising stitching. The respective sections of the supporting mechanism may be stitched individually directly to the lubricating pad or they may be assembled by means comprising stitching and then associated with the pad.

The sections of the supporting mechanism may be connected together or spaced apart in the desired flexible manner by the use of fabric such, for example, as in the form of fabric strips or tapes as shown in Figure 2. The fabric may be connected with the sections of the supporting mechanism in various ways, as by stitching, riveting, as shown, for example, in Figures 3 and 4, etc.

The assembled supporting mechanism, if it is assembled prior to association with the lubricating pad, may be associated with the pad in various ways, either by direct connection, either temporary or permanent, or by frictional connection, such, for example, as in cases in which a tubular pad is used. When a pad of this type is used and the supporting mechanism is assembled before association thereof with the pad the assembled supporting mechanism may simply be inserted within the pad and maintained therein by friction. It is desirable in most cases, however, even though a tubular type pad is used and the supporting mechanism is first assembled and then inserted within the pad, to attach the supporting mechanism to the pad as by stitching. It is found most satisfactory to preassemble the supporting mechanism by the use of fabric either in the form of strips or, particularly for lubricators of relatively small size, in the form of a tubular fabric core, the sections of the supporting mechanism being non-rigidly spaced apart by the fabric, and then to apply the assembled supporting mechanism to the pad, and to connect the same thereto by stitching together the fabric and the pad. This produces a permanent unitary lubricator which is highly efficient in operation and sufficiently rugged to withstand long use in an American railway journal box, for example, and which is at the same time bendable or flexible in the longitudinal direction so as to render the same readily applicable within an American type journal box.

The lubricating pad is made of suitable absorbent material, such, for example, as felt, which we find highly satisfactory. We prefer to use a tubular type pad as such a pad is more efficient in use than a non-tubular pad both with respect to the supplying of lubricant to the surface to be lubricated and with respect to wear. The pad is preferably soaked in lubricant so as to become thoroughly impregnated therewith before it is applied to a surface to be lubricated and the pad will gradually supply lubricant to such surface by capillary action, the lubricant being withdrawn as it is needed and lubricant in more remote parts of the pad moving toward the withdrawal area.

A lubricant impregnated lubricator may be used until the available lubricant is substantially used up, or additional lubricant may be applied either by removing the lubricator and reimpregnating it or by simply introducing additional lubricant to the pad while in place, such, for example, as within a railway journal box. It is not contemplated that the pad should stand in a pool of lubricant, although it is equally well adapted to this purpose if desired. A pad may be applied within a railway journal box and left in place indefinitely, additional lubricant being supplied to the box as necessary. The life of the pad is remarkable, although when one side becomes worn it may be turned over and the other side applied to the journal.

The pad supporting mechanism if made of strip metal of proper quality retains its resiliency indefinitely, and if a pad becomes worn out its supporting mechanism may be utilized in a new pad. Removal of the supporting mechanism from an old pad and application thereof to a new pad is easily facilitated if the connection between the supporting mechanism and the pad is simply frictional, as above suggested. However, the life of a pad is ordinarily long enough to warrant permanent connection between the support-

ing mechanism and the pad, which is considered more satisfactory for most purposes.

Although the supporting mechanism preferably comprises closed or substantially closed sections, as of strip metal, the sections may be substantially open and still perform the desired function. For example, a section may comprise opposite disconnected strips joined together or spaced apart non-rigidly by fabric and so arranged that when associated with a pad the strips will perform the desired function.

Referring now more particularly to the drawings, there is shown in purely diagrammatic manner in Figure 1 an axle 2 having an end flange 3 providing a journal 4. A journal bearing 5 is carried by the journal in usual manner and in turn carries a journal box 6. The journal, bearing and box may be of well known or standard construction.

Applied within the journal box 6 is a lubricator 7 comprising a lubricating pad 8 and an inner supporting structure 9. The lubricating pad 8 is of tubular form and the supporting structure is applied within the same. The supporting structure 9 is shown per se in Figure 2. It comprises a plurality of metal strips 10 arranged in side by side relation, each bent substantially into the form of a figure 8. The respective strips 10 form sections which are non-rigidly joined together and spaced apart by fabric tapes 11 arranged as shown in Figure 2, each of the tapes being stitched about each of the sections of the supporting mechanism. Each section may be maintained in its desired form by a rivet 12, and a supplemental spring member 13 may also be applied within the lower portion of each section as shown.

The primary purpose of the supporting mechanism, whether it be constructed as shown in Figure 2 or as shown in other of the figures, or otherwise, is to provide a vertically resilient longitudinally bendable or flexible device which will maintain the lubricating pad in place with respect to the journal to be lubricated and which may be applied within an American type journal box. The supporting mechanism is preferably preassembled as shown in Figure 2 and then inserted within a tubular felt lubricating pad in which it may be stitched if desired, the fabric tapes 11 providing a ready means of stitching the same in place. If it is desired not to use the tapes 11 the individual sections of the supporting mechanism may be separately applied within the pad and each of such sections may, if desired, be separately connected with the pad, as by stitching or by the use of fabric and stitching, the fabric being applied coincidentally with the supporting section. Also the tapes, sections of the supporting mechanism and pad may be assembled and all stitched together when in assembled relationship.

When fabric is used it is preferably employed in double thickness, as shown in Figure 2, so as to pass on both sides of the metal strips. The two thicknesses of the fabric may be stitched together intermediate the metal strips, thus non-rigidly spacing such strips apart.

Figures 3 and 4 show a modified form of supporting mechanism comprising sections 22 of oval form arranged in spaced side by side relationship each having disposed centrally therein a circular ring 23 and an S-shaped resilient member 24, the members 22, 23 and 24 being fastened together by rivets 24. The respective sections are connected together by fabric webbings or strips 25 and 26 which non-rigidly space the same apart.

The supporting mechanism shown in Figures 3 and 4, as well as those of the other figures to be described, may be substituted for the supporting mechanism 9 within the tubular pad 8 shown in Figure 1.

A further modified form is shown in Figures 5 and 6. In these figures there are shown alternately arranged members 28 and 29 spaced apart and unitarily connected by connecting portions 30, the whole being formed by stamping out of sheet metal. The members 28 and 29 are turned either in the same direction or in opposite directions into generally circular form with their ends overlapped and riveted together. Tapes 31 may be applied as in the forms previously described, such tapes being connected with the sections either by riveting as shown in Figure 3 or by stitching as shown in Figure 5.

In the form of Figure 7 there are provided sections 32 of oval form made up of strip metal members riveted together by rivets 33 as shown. There is included an arched leaf spring 34 to the ends of which are applied tapes 35, there also being applied to the members 32 additional tapes 36.

A further modification is shown in Figures 8 and 9. In such figures the loop member 37 has fitted therein the spring members 38 and 39 which are riveted thereto by rivets 40 as shown in Figure 8.

A further form is shown in Figures 10, 11, 12 and 13. Each member 41 is a metal stamping, as shown in Figure 13, such members being deformed and assembled as shown in Figures 10, 11 and 12. Each member 41 has a stamped out recess 42 at each of two opposite corners, the end portions 43 being bent as shown in Figure 12 and riveted together at 44 as shown in Figure 11. Tapes 45 are provided as in the other forms.

A further modification is shown in Figures 14 and 15 in which each section of the supporting mechanism comprises a member 46 bent to form the reverse curves 47 and 48 and with its ends 49 riveted at 50, together with a tape 51. Other tapes 52 are provided which are riveted to the sections at 53, together with short flexible metallic strips 54.

A still further modification is shown in Figures 16 and 17 in which each section 55 of the supporting mechanism is cut away at 56 to provide relatively thin end portions 57 which are bent as shown in Figure 17 and riveted at 58, together with tapes 59.

The supporting mechanism shown in Figure 18 is different than the other forms in that it is made of round wire 60 bent as shown and having opposite portions welded together at 61. This device may be made out of flexible wire of proper quality and may have the desired degree of flexibility for the purpose intended.

A lubricating pad 20 is shown in Figure 19. This pad is of tubular or generally cylindrical construction and is made out of absorbent material, such as felt. There is applied to the pad an extension 21 which may be stitched thereto at 19 and which is for the purpose of delivering lubricant to a point adjacent a wheel mounted on the axle to which the lubricant is applied. The manner in which such extension functions is illustrated in Figure 20.

In Figure 20 the pad is shown at 20 and the extension at 21. The supporting mechanism 14 for the pad may be of any of the forms above described or of some other form. The axle being lubricated is shown at 15, the bearing at 16, the box at 17 and the wheel at 18. The con-

struction of Figure 20 may, for example, be of a locomotive driving wheel which is disposed outside the lubricator rather than inside as is the case with car wheels. The box has an opening 5 62 through which the projection 21 extends into contact or proximity with the inner face of the wheel 18 to which it delivers lubricant. An extension of this character is particularly desirable where there is thrust or end play between the 10 wheel and the bearing or the box, as it serves to furnish lubricant between such parts and prevent undue friction therebetween.

Provision is made for preventing rotation of the lubricating device due to movement of the 15 surface being lubricated. For example, there is a tendency for a hollow journal lubricating pad to tend to rotate due to rotation of the journal and the frictional engagement between the journal and the pad. There is also a tendency for 20 the pad to tend to follow the journal up the side of the journal box. We provide for counteracting these tendencies by the provision of means for preventing rotation of the pad and for maintaining the pad in fixed relation to the surface 25 being lubricated. Such means are shown, for example, in each of Figures 1, 4, 7, 8, 9, 11, 12, 15 and 17. In each of the constructions shown in said figures means are provided within the pad supporting structure, preventing rotation 30 thereof, as will be obvious. For example, referring to the construction shown in Figure 1, rotation is prevented by the portions of the supporting structure extending across the hollow 35 of the pad. Any tendency of the pad to rotate one way or the other is positively counteracted and the pad will remain in place and in fixed relation to the journal.

While we have shown and described certain preferred embodiments of the invention, it is to 40 be distinctly understood that the same is not limited thereto but may be otherwise variously embodied within the scope of the following claims.

We claim:

45 1. A lubricating device comprising a flexible lubricant applicator, a plurality of metal spring members for urging the applicator against a member to be lubricated, said metal spring mem- 50 bers being connected with the applicator at spaced points therealong so that the device is bendable therebetween, and fabric means for maintaining said metal spring members in spaced 55 apart relation.

2. A lubricating device comprising a hollow 60 peripherally closed flexible lubricant applicator,

a plurality of means within the applicator extending generally transversely laterally of the applicator for urging the applicator against a member to be lubricated, and means for connecting said first mentioned means with the applicator in spaced apart relation, the lubricating 5 device being freely bendable generally in a plane containing its longitudinal axis without permanent deformation.

3. A lubricating device comprising a hollow pe- 10 ripherally closed flexible lubricant applicator, a plurality of metal spring members within the applicator for urging the applicator against a member to be lubricated, and means for connecting said metal spring members with the appli- 15 cator in spaced apart relation, the lubricating device being freely bendable generally in a plane containing its longitudinal axis without permanent deformation.

4. A lubricating device comprising a hollow pe- 20 ripherally closed flexible lubricant applicator, a plurality of means within the applicator extending generally transversely laterally of the applicator for urging the applicator against a member to be lubricated, and means for connecting said 25 first mentioned means with the applicator in spaced apart relation, the lubricating device being freely bendable generally in all planes containing its longitudinal axis without permanent deformation.

5. A lubricating device comprising a hollow pe- 30 ripherally closed flexible lubricant applicator, a plurality of metal spring members within the applicator for urging the applicator against a member to be lubricated, said metal spring mem- 35 bers being connected with the applicator at spaced points therealong so that all parts of each of said metal spring members are free to move toward and away from each metal spring member adjacent thereto, and means comprising 40 stitching cooperating with a non-metallic portion of the device for maintaining said metal spring members in spaced apart relation.

6. A lubricating device comprising a hollow 45 peripherally closed flexible lubricant applicator, a plurality of flat metal springs extending generally transversely laterally of the applicator for urging the applicator against a member to be lubricated, said springs being solely individually 50 connected with the applicator at spaced points therealong, the lubricating device being freely bendable generally in a plane containing its longitudinal axis without permanent deformation.

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