July 28, 1942. E. S. MILLER 2,291,483

LUBRICATOR

Filed Dec. 18, 1939

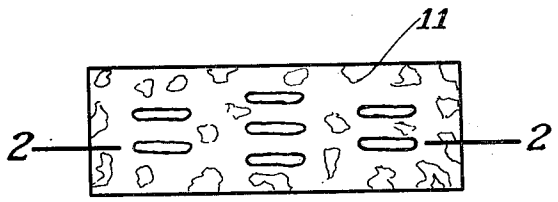


Fig. 1

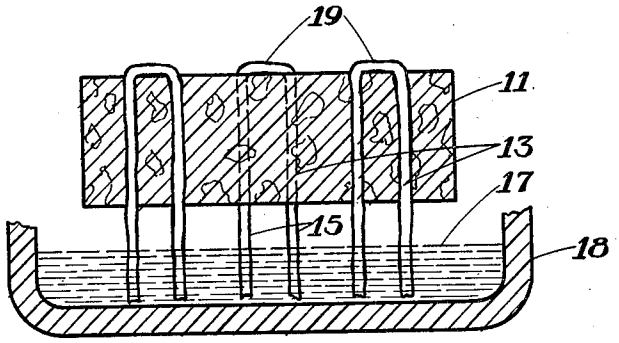


Fig. 2

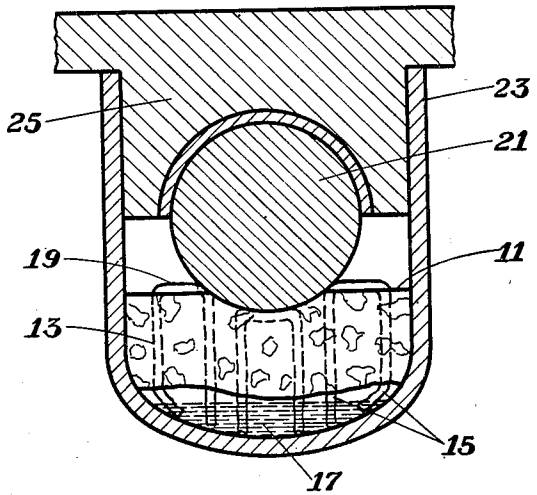


Fig. 3

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LUBRICATOR

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3 Claims. (Cl. 308—243)

This invention relates to an improved lubricating device for lubricating shafts, journals, gudgeons and the like.

In the lubrication of journals, shafts and other like frictionally engaged movable members, various forms of lubricating methods and devices have been used to supply lubricant to the frictionally engaged surfaces. Some of the better known methods and devices are hand oiling, sight feed lubricators, inverted bottle oilers, automatic mechanical lubricators and wick oilers, the latter being but one type of a number of devices which depend on capillary action of the device to supply liquid lubricant to bearing surfaces. It is with this type of lubricating device that this invention is primarily concerned.

Probably the oldest and best known method of supplying lubricant to bearing surfaces by capillary action is the use of masses of wool yarn either alone or mixed with cotton waste or other materials having a thread-like structure and saturated with the fluid lubricant to be applied. The use of such material is reasonably cheap and effective for many applications, although the cost of the wool yarn may be rather high if the wool yarn is used alone or in a mixture with cotton waste in which the wool yarn is preponderant. However, there are several disadvantages inherent in this type of lubrication. Any rough surface or projection on a revolving journal or shaft which is lubricated with lubricant supplied by contact with a packing of oil-soaked wool yarn and/or cotton waste is likely to engage one or more of the threads of the packed mass and wrap it around the journal, thus either fouling the journal or causing the loosely packed mass to become tightly packed against one side of the journal. When yarn becomes packed into a tight wad against a revolving surface, the yarn will rapidly become glazed and hard on that portion that is adjacent the revolving surface and lubricant will cease to flow through the glazed portion to the surface to be lubricated. Excessive bearing temperatures are also incurred. These lead to lubrication failures with resulting injury to the mechanism being lubricated.

Another disadvantage of lubricating frictionally engaged surfaces by means of oil-soaked yarn packing is that there is very little control over the amount of lubricant supplied to the journal, the amount of lubricant present in the packed mass of wool yarn. There is a further difficulty in maintaining packed masses of wool yarn at all times in contact with the surface to which lubricant is to be supplied, without packing the wool yarn so tight as to cause undue friction against the moving surface and/or glazing and hardening of the portion of the yarn which contacts the moving surface. In the event the yarn packing fails to contact the moving surface, complete failure of lubricant supply results.

It is an object of this invention to provide a simple and practical device for continuously feeding liquid lubricant direct to moving surfaces to be lubricated.

It is another object of this invention to provide an improved lubricating packing having a greatly reduced tendency to mat or glaze and which will last indefinitely.

It is a further object of this invention to provide an improved lubricating device by which the feed of lubricant to journals may be readily controlled.

Other objects of this invention will appear from the following description thereof and from inspection of the accompanying drawing which forms a part of this specification and in which

Figure 1 represents the top view of one form of a device in accordance with the invention;

Figure 2 is a vertical longitudinal section taken on line 2—2 of Figure 1 and includes a conventional lubricant reservoir; and

Figure 3 is a vertical transverse section of a conventional journal and journal box showing an application of a device in accordance with the invention.

Referring more particularly to the device illustrated in Figures 1 and 2, the numeral 11 represents a rectangular shaped sponge. This sponge may be a natural sponge or a synthetic cellulose sponge or any other type of synthetic sponge capable of absorbing and retaining fluid lubricant, such as mineral oil and mineral oils compounded with various additives, in a manner substantially the same as that exhibited by synthetic cellulose sponges. Synthetic cellulose sponges are preferable because of the readiness with which fluid lubricants are absorbed and retained, and because of the availability of the synthetic sponges in various sizes and shapes which may be adapted to conform to any bearing surface or lubricant reservoir. Strands of wool, 13, or of some other fibrous material capable of collecting and carrying lubricant, such as cotton or jute, are laced through the sponge for the purpose of collecting and conveying lubricant from the sponge and/or a lubricant reservoir to the frictionally engaged surfaces. The yarn may be inserted into the sponge in various ways, but it has been found that the simplest and most effective manner com-

prises having continuous loops of yarn laying flat against the sponge on the side which is placed in contact with the surface requiring lubricant and the opposite ends of the strands of yarn dangling free from another side of the sponge, preferably in contact with a supply of lubricant. While there are a number of fibrous materials available for this purpose, wool is generally preferred because of its availability and because it readily and quickly transmits fluid lubricant longitudinally of the strands. The ends 15 of the strands may project beyond the sponge a suitable distance and dip into fluid lubricant 17 in lubricant reservoir 18. The top portions 19 of the strands are preferably continuous in the form of loops and when in use are in contact with the surface to be lubricated. In order to minimize the tendency of the yarn to foul the bearing, the loops may be made to lie contiguous with the surface of the sponge.

Referring more particularly to Figure 3, a conventional journal is indicated at 21, a journal box at 23 and a top bearing brass and cradle frame generally at 25. In operation the journal rotates and in so doing it contacts the top portion of the sponge and the top continuous portions 19 of the strands 13 and in this way is continuously wetted with fluid lubricant from the reservoir 17. The rate at which lubricant is supplied to a surface may be varied within rather wide ranges by simply varying the diameter and number of strands which are laced through the sponge. While it is possible to have the ends 19 of the strands 15 severed and still feed lubricant to the bearing surface, the opportunity for fouling the bearing surface by having loose ends in contact therewith is greatly increased and it is therefore preferable to have the portions of the yarn that are in contact with the bearing, continuous. Operation of this device may be accomplished without a separate oil reservoir, the sponge itself acting as an oil reservoir, but in this case more frequent manual attention is required in order to maintain an adequate supply of the lubricant in the sponge in order that the rate of feed of the lubricant will remain reasonably constant. In the latter case it is unnecessary that the ends 15 project beyond the sponge. It is also possible to feed lubricant to the bearing surfaces without the aid of fibrous strands of material laced through the sponge, particularly when construction permits mounting the sponge on the top side of the journal to be lubricated. In the latter case a plentiful supply of lubricant is maintained in the sponge by manual additions of lubricant and the lubricant feeds by gravity through the capillary system of the sponge to the surface to be lubricated. However, even in his case vastly superior results may be obtained by having a few strands of wool yarn or other suitable fibrous material laced through the sponge in the manner indicated. This result is apparently due to co-acting capillary characteristics of the sponge and yarn whereby fluid lubricant in the sponge is gathered by the yarn and greatly augments the rate at which lubricant may be supplied to a bearing surface. This feature is of still greater importance when the sponge is below the bearing surface since in this case the ability of the sponge alone, that is, without the aid of gravity or yarn, to feed lubricant to a bearing surface, is generally inadequate for proper lubrication.

Since synthetic cellulose sponges are admirably suited for use in this device, it is possible to have sponges supplied in a wide variety of shapes and sizes, thus having the sponges conform to the contour of the bearing surface and/or to the contour of the oil reservoir. The inherent elasticity possessed by sponges is such that the sponge may be readily compressed for packing against a bearing or other moving surface and the force exerted by the sponge tending to reassume its natural shape is sufficient to maintain the sponge against the bearing surface. It is apparent that natural sponges may be cut to various shapes and sizes but this is an expensive and time-consuming procedure. In order to utilize smaller sponges or to supplement the natural tendency of the sponge to expand against the surfaces to be lubricated, springs may be used in order to hold the sponge more firmly against the bearing surface.

The aforementioned lubricating devices are readily installed and are adaptable to a wide variety of installations. The remarkable resistance of sponges to wear, under the conditions of use described, makes such devices even more economical than the wadded packings of wool yarn and cotton waste which have found extensive use in the lubrication of bearing surfaces in the past. Furthermore the sponges have little or no tendency to foul the surfaces against which they are held in contact. The amount of wool yarn required for adequate lubrication varies between rather wide limits depending on such factors as the amount of lubricant required and viscosity of the lubricant. In one particular example 7 strands of wool yarn of approximately ⅛'' diameter laced through a cellulose sponge in an area of approximately 3 square inches was found entirely adequate to supply lubricant to a journal.

Wherever the word "sponge" is used in this specification it is meant to include natural sponges, synthetic cellulose sponges and any other type of synthetic sponge that exhibits substantially the same absorbent properties for mineral lubricating oil as synthetic cellulose sponges. Similarly, "yarn" is intended to include any spun or woven fibrous materials such as cotton, silk, jute, etc., or mixtures of these materials, which exhibit substantially the same capability of collecting and carrying mineral lubricating oil as ordinary wool yarn.

Various modifications in details and arrangements will be apparent to those skilled in the art without departing from the scope of the invention as defined in the following claims.

What is claimed is:

1. A device of the character described consisting of a synthetic cellulose sponge having strands of yarn interlaced therethrough in such manner that yarn projects from opposite sides of said sponge, free ends of the yarn freely projecting from one side and the yarn projecting from another side in the form of loops which are contiguous to the sponge.

2. An article of manufacture consisting of a sponge having strands of yarn interlaced therethrough at spaced intervals and continuous portions of said yarn projecting from said sponge at a plurality of spaced points.

3. An article in accordance with claim 2 where the projecting portions of yarn project from only one side of the sponge in the form of continuous loops and from the opposite side in the form of free ends.

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