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Marforio

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[54] **LUBRICANT PURIFICATION FILTER FOR SEWING MACHINES**

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[52] **U.S. Cl.** **112/256**

[51] **Int. Cl.** **D05f 71/00**

[58] **Field of Search** .. 210/167, 168; 184/6.24, 6.15, 184/6.14; 112/256

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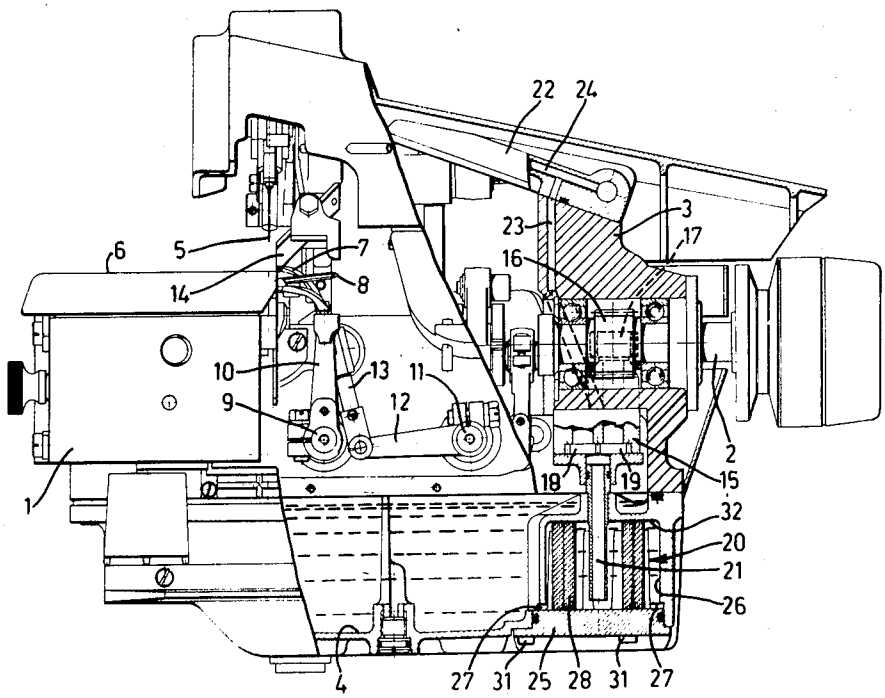
[57] **ABSTRACT**

An improved filtering device for use in sewing machines which comprises a member having a plurality of upstanding pegs disposed in two concentric series. This element is mounted on a supporting plug which seals the chamber contacting the lubricating fluid. A quantity of filtering material is supported between the rows of pegs.

3 Claims, 4 Drawing Figures



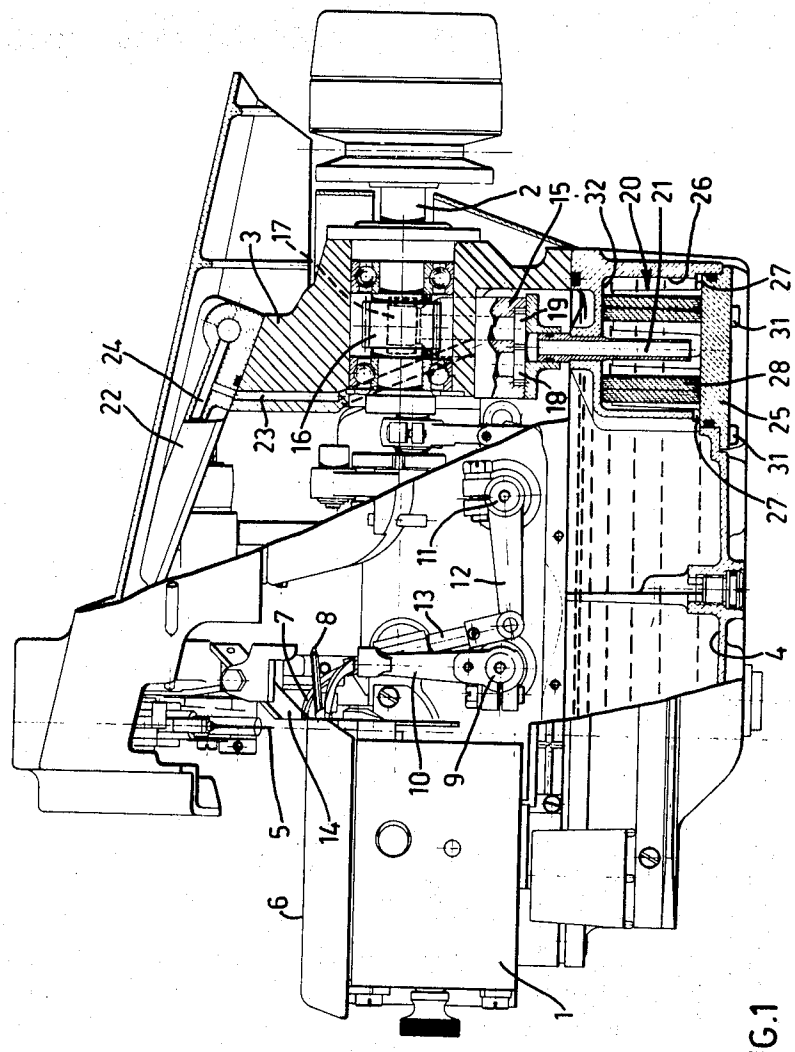

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FIG.1

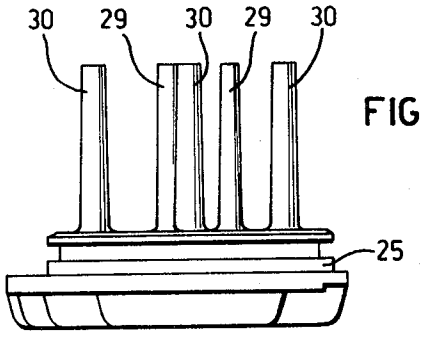

FIG. 4

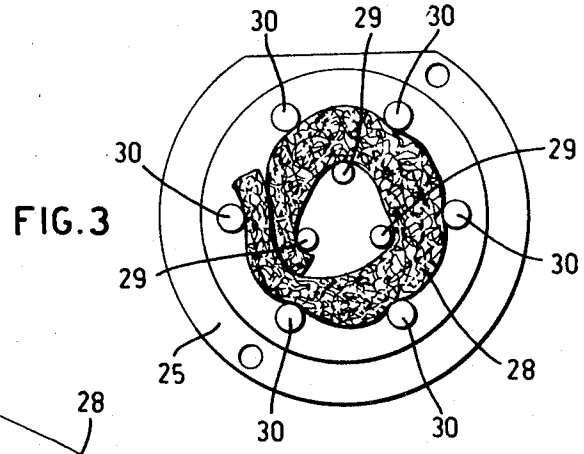

FIG. 3

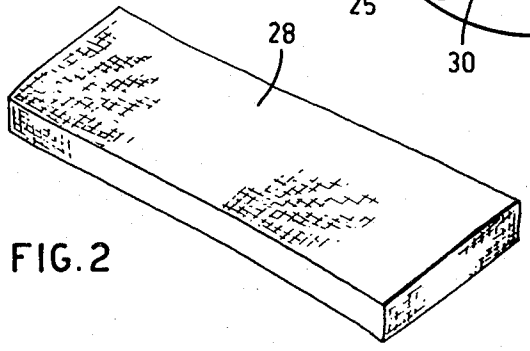

FIG. 2

LUBRICANT PURIFICATION FILTER FOR SEWING MACHINES

BACKGROUND OF THE INVENTION

The present invention relates to a lubricant purification filter for sewing machines.

As is well known, purification filters represent an essential part of a sewing machine's lubrication system, and if eliminated, the efficiency of the system is highly jeopardized. Without a filter, the circulating lubricant will deposit impurities in the more restricted areas so that an eventual buildup will reduce the size of these areas through which the lubricant must flow and of course, reducing gradually the quantity of lubricant intended to flow therethrough.

Another trouble which can be seen if there is no purification filter or in the case of a faulty one, is the formation of deposits on the internal walls of the machine due to the continuous depositing of foreign bodies and impurities thereon which will subsequently create a thermal insulation that will substantially reduce the necessary loss of heat created by the various moving components within the machine.

For these reasons, purification filters are a necessary element in lubrication systems and to perform their function satisfactorily, their maintenance and replacement should be attended to at regular intervals.

A preferred type of filter should adequately purify the lubricant in circulation; be of inexpensive, replaceable material and with long service life expectancy.

A filter, regardless of quality, must be periodically replaced and must therefore be readily accessible and easily replaced.

Known types of filters in the sewing machine art function with a degree of success but present certain conditions which are considered undesirable such as convenience for their maintenance, insufficient purification after a short period of use, limited filtering surface, as well as an excessive cost in comparison with their intended function.

The filters most used in the sewing machines are usually formed by a frame on which felt discs, or discs of another filtering material, are mounted and it is desirable to use as many layers of felt as possible in order to obtain the most advantageous results thereof.

As a matter of fact, and on the other hand, it must be kept in mind that the size of the filter must be held within certain limitations to avoid interference with the parts of the machine, so that there exists an unsurmountable limit as to the number of possible layers of felt and the size of each disc.

Considering the particular work to which sewing machines are subjected and the amount of lubricant they require a considerable amount of impurities picked up by the lubricant which requires periodic changing of the filter which must therefore be readily accessible and easily replaceable.

It is therefore an object of the invention to provide a filter whose replacement is an easy, quick and inexpensive operation and with increased filtering surface operative within the size limitations of the areas in which well-known filters function. The filter comprising the present invention is formed by a strip of felt wrapped between two concentric series of pegs bounding a tubular cavity and mounted on a supporting plug.

An advantage of the filter according to the present invention is the lack of moving parts with the exception of the plug which directly acts as a support of the felt and which can be easily removed and replaced from the machine, which provides a greater simplicity and ease in the replacement of the filter. Another advantage of the filter according to the present invention is the manner in which the filter is wrapped causing entry of the lubricant perpendicular to the surface of the said filter, thus providing a greater filtrating surface by comparison with the discs filters and therefore a larger volume of filtering per unit of time with a reduced load on the pump.

A further advantage is that the filter according to the present invention is not affected by a possible fall in the lubricant level within the lubricant reservoir because the feeding occurs from below, and the vacuum created by the pump makes it possible for the internal level in the filter to be higher than the outside one so as to affect all or at least the greatest part of the filtering surface.

The mentioned advantages and other characteristics of the filter according to the present invention are those which are inherent and will become apparent from the following detailed description of a preferred embodiment referred to the accompanying drawings, wherein:

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic longitudinal and partially sectioned view of a sewing machine with a purification filter according to the invention applied thereto.

FIG. 2 is a perspective view showing a strip of the filtering element to be inserted into the filter according to the present invention.

FIG. 3 is a plan view of the supporting plug for the filter according to the present invention; and

FIG. 4 is a view in side elevation of the plug shown in FIG. 3.

DETAILED DESCRIPTION OF THE DRAWINGS

With reference to FIG. 1, a sewing machine is usually formed by a frame having a base 1, a main driving shaft 2 for all the moving parts of the machine, a vertical standard 3 mounted on the base 1, and a lower reservoir 4 in which the lubricant for the lubrication of these parts is collected. The standard houses the driving devices to actuate the needle 5 of the machine, which function in cooperation with a work plane 6 placed at the side of the standard 3 and above that portion of base 1 containing the usual feeding parts (not shown). The feeding parts are employed to move the work forward as it is sewn by the needle 5 in cooperation with the secondary and primary loopers 7 and 8, respectively. The loopers are operated through the main shaft 2 by means of proper driving devices (normally connecting rod and crank rod units) which are contained in the central part of the machine and transmit their motion to transmission elements, visible in the FIG. 1, such as the transversal shaft 9, primary looper 8, support 10, transversal shaft 11, rocking arm 12, secondary looper 7 and support 13. To complete the driving devices of a sewing machine, there is a fabric trimmer unit 14 and the lubricant pump 15 which is of the gear type which is schematically shown in FIG. 1.

The pump is driven by a unit made up of a worm 16 keyed in the main shaft 2 and a worm gear 17.

The rotation of the gear wheels **18** and **19** forming a pump **15** causes a lubricant contained in the reservoir **4** to be drawn through the filtrating unit **20** and a withdrawal pipe **21.** The lubricant drawn by the pump is sent under pressure to the various parts to be lubricated in a well-known manner.

In FIG. **1** there is schematically shown as a preferred form of the lubrication system in which the lubricant is directed through a duct **23** and then through another duct **24** to the various elements which require lubrication. The lubricant as it is directed to the points of lubrication encounters and collects a great quantity of impurities, such as the fluff from the sewing operations created by the friction between the needle, its sewing thread and the fabric. The impurities are carried to a reservoir **4** and would pass again into the system if there was no filtrating unit indicated generally in FIG. **1** by numeral **20.** This unit includes a plug **25** mounted on the lower part of the reservoir **4,** which has a cavity **26** that is of substantially ellliptical configuration within which the withdrawal pipe **21** of pump **15** extends. The chamber **26** is connected with the inside of the reservoir **4** by means of peripheral slots **27** formed around the base of the chamber in the vicinity of the connection area with the plug **25.** These peripheral slots **27** allow the lubricant to fill the inside of the chamber **26** and pass through a filter member **28** placed in a ring-like manner around and spaced from the withdrawing pipe **21.** This filter **28** is formed by a strip of felt or other filtrating material (FIG. **2**) which is wrapped around the plug **25** and within the tubular space formed by two concentric series of vertical pegs **29** and **30** (FIGS. **3** and **4**), which keep said filter **28** in its position without the necessity of other supporting parts.

When the filtrating unit **20** is assembled in its operating position by the tightening of screws **31** on the bottom of the machine (FIG. **1**), the filter **28** is pressed between the pegs **29** and **30** by the upper wall **32** of the chamber **26** and the plug **25** in the lower side thus compelling the lubricant drawn by the pump to the inside of the chamber **26** to pass through substantially all areas of said filter **28.**

The height of the filter **28** is preferably a little greater than that of the pegs so that, during its assembly within the chamber **26,** the tightening of the plug **25** by means of the screws **31,** the felt material is compressed between the upper wall **32** of the chamber **26** and the base of the plug **25,** thus forming a seal between the inner and outer portions of said chamber which necessitates passage of the lubricant through the filter **28.**

As it is shown in the drawings and described in the foregoing description, the filtrating surface of the present invention is much larger than that of the known disc type filters. The filtrating surface is provided by the vertical disposed substantially circular wall formed by the wrapped felt, while in the past with the filters made up of a number of discs of filtrating material one over the other the passage of the lubricant is perpendicular to the surface of the said discs, whose size must be governed by the limitations of space available for assembly in a sewing machine. Unlike the known forms of filters, the filter according to the present invention can be very easily replaced, as there is no screw, or other supporting parts to hold the felt in its operating position.

One simply has to loosen the screws **31** and take out the plug **25** and slip the strip of filtering material from the retaining pegs while the operation to replace the filters of the well known disc type requires a complex operation because of the numerous positioning parts of the filtering discs between the discs and their supporting structure.

Possible additions and/or modifications can be made by those conversant in the sewing art to the filtrating unit according to the present invention within the context of the said invention.

There can be changes in some construction particulars, such as the number of the pegs **29** and **30,** the form of the supporting plug **25** and the chamber **26** and so on. Finally the purification filter according to the present invention can form a part of the lubricating systems of sewing machines which are unlike the one to which the present description defines.

I claim:

1. In a sewing machine of the type having a lubricant reservoir and a pump member for drawing lubricant from the reservoir and distributing it within the machine to lubrication points of motion transfer members housed therein, a lubricant purification filter construction comprising:

a. a supporting plug detachably assembled to the lubricant reservoir;

b. a filter material;

c. two concentric elements mounted on said supporting plug and defining a space between said elements into which said filter material can be placed; and

d. said two concentric elements being formed to expose substantially the entire outer surface of the filter material to the lubricant of the reservoir with the inner surface thereof defining a receptacle for the lubricant passing through the filter material under the influence of the pump member.

2. The purification filter construction according to claim **1** wherein said two concentric elements define two concentric series of peg members.

3. The purification filter according to claim **1** wherein the filter material is of a size exceeding the length of said two concentric elements for compressing the material to seal the ends thereof when assembled within the lubricant reservoir.

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