April 13, 1943. A. J. GIGLIO 2,316,648

NEEDLE COOLING APPARATUS

Filed Jan. 13, 1942

Fig. 1.

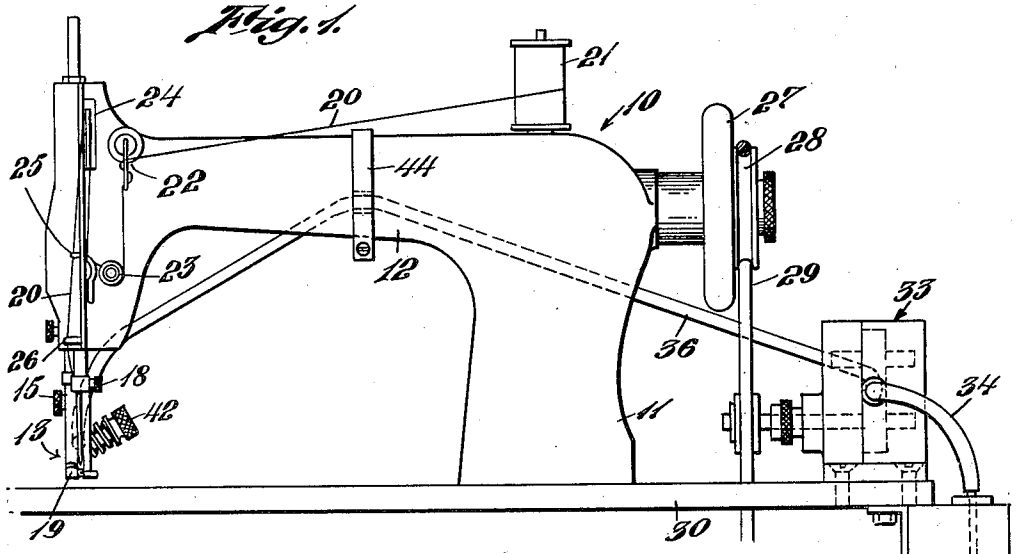


Fig. 2.

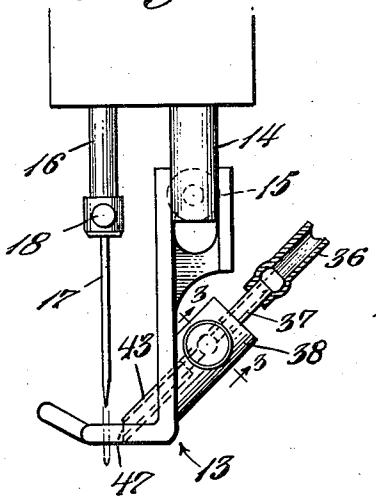
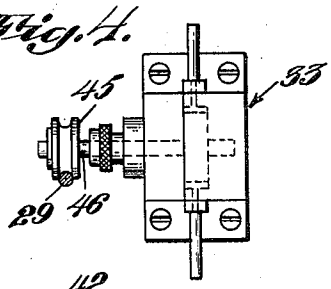


Fig. 4.



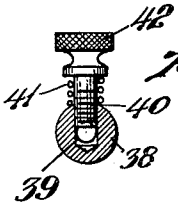
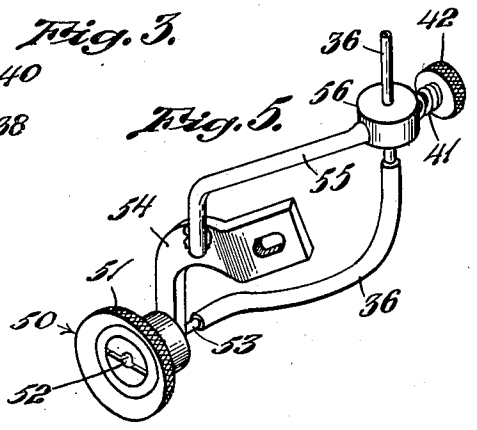


Fig. 3.

Fig. 5.



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NEEDLE COOLING APPARATUS

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Application January 13, 1942, Serial No. 426,609

4 Claims. (Cl. 112—218)

This invention relates to a sewing machine, and is a continuation in part of my prior application, Serial No. 418,250, filed November 7, 1941, and has many of the same objects in view as said application.

In the use of a fluid or liquid coolant in connection with a sewing machine for the cooling of the reciprocating needle, some difficulty frequently occurs in stopping the flow of the coolant when the reciprocating needle stops for the various requirements in stopping the machine while the work progresses.

One of the objects of this invention is to actively convey the fluid by means which actuate the reciprocating needle so that when the needle ceases to operate the fluid also ceases to flow to cool the needle, and thus the fluid will not flow at times when undesired.

Another object of this invention is to provide a cooling arrangement which may act by a direct fluid discharge from the end of a conduit without the need of some absorbing means for collecting this fluid and then transferring it to the needle.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is an elevation of a sewing machine showing a fluid reservoir and conveying means for the fluid from the reservoir to the needle, the parts being broken away and shown in section for clarity.

Fig. 2 is a view on a larger scale looking at the end of the machine and showing the reciprocating needle and the foot portion of the machine with the fluid nozzle shown as carried by this foot portion.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a top plan view of the gear pump portion of the arrangement shown in Fig. 1.

Fig. 5 is a perspective view of a modified form of foot which may be used on a machine of this character.

In proceeding with this invention the basic consideration is that of applying some fluid to the reciprocating needle which will disperse heat or evaporate and by means of its evaporation absorb the heat and more quickly cool the needle than heat would be radiated from the needle or the yarn. One of the most convenient ways which I have found of accomplishing this result is to convey fluid from a nozzle directly onto the reciprocating needle in proximity to the position of the needle as it passes through the work in order that the needle may become wet and evaporate and disperse the heat of the needle. I have positioned a reservoir for the fluid at a level below that of the needle and utilized the actuating mechanism for the needle for also actuating a pump to convey the liquid from the reservoir to the needle, so that when the needle is stopped the pump which supplies the fluid will also stop and no fluid will flow.

With reference more particularly to the drawing, 10 designates generally the frame work of the sewing machine with a standard portion 11 and overhanging arm 12. A foot designated generally 13 is carried by a reciprocating member 14 to which it is held by the clamp 15. This foot has the usual function in connection with pressing upon and feeding the work. The reciprocating guide rod 16 carries the needle 17 by means of the clamp 18 and passes through the bifurcated foot 19 in the usual manner. The thread 20 leads from the package 21 over the tension guides 22, 23, 24, 25, 26 to the eye of the needle, also in a manner well known in sewing machine operation. A flywheel 27 on the main shaft of the machine is driven by a pulley 28 and belt 29, which belt is in turn driven by some suitable source of power, such for instance as electric motor, stationed below the machine and not shown in this illustration.

Supported on the table 30 of the machine is a reservoir 31 in which there is located some suitable liquid coolant fluid 32, such for instance as water. This reservoir depends from the table 30 upon which the sewing machine is mounted, and thus is lower than the level of the reciprocating needle. The gear pump designated generally 33 is shown as mounted upon the table 30 and is connected to the reservoir 32 by a conduit 34 leading to the inlet side of the gear pump 33 while a conduit 36 leads from the outlet side of the gear pump to the tube 37 extending from the block 38 in which there is a passage 39 controlled by the valve 40, having a spring 41 and knurled thumb screw or head 42, whereby the amount of fluid passing this point may be definitely controlled. The nozzle 43 extends from the block 38 and has its discharge end 40 adjacent to the point where the needle passes into the work. A suitable holder 44, or strap, about the overarm 12 serves to support the conduit 36 in desired position.

The gear pump 33 has a pulley 45 on its drive shaft 46 which pulley is positioned so as to receive in its groove the belt 29 which drives the

pulley 28 and by reason of the belt contacting this pulley 45 this gear pump is driven so as to draw fluid 32 from the reservoir 31 through the pipe 34 and force it through the pump and through the pipe 36 so as to discharge at the nozzle 47.

A modified form of foot is designated in Fig. 5, this type being such as is usually used in sewing leather. Here the foot is circular as at 50 having a knurled work-engaging portion 51 and is provided with an axial opening 52 which aligns with a suitable conduit 53 extending axially through this foot and through the support 54 which is also provided with an arm 55 for holding the valve 56 similar to the valve shown in Fig. 3 for controlling the conduit 36 heretofore explained. This valve is controlled by the thumb nut 42 and has a coiled spring 41 about its threaded portion 40 as shown in Fig. 3.

By the arrangement which I have here shown, when the reciprocating needle stops for any reason the supply of coolant fluid also stops, inasmuch as the belt which actuates the reciprocating needle also actuates the pump which causes the supply of coolant to be moved from the reservoir to the needle.

I claim:

1. In a sewing machine, a reciprocating needle, a belt for actuating the same, a presser foot, a liquid coolant reservoir below the level of the needle, a conduit from said reservoir extending through said presser foot and opening at a location facing said needle and adjacent thereto and a pump driven by said belt for forcing the coolant through said conduit into contact with the needle whereby upon stopping of the movement of the needle the coolant supply stops.

2. In a sewing machine, a reciprocating needle, a presser foot, a fluid coolant reservoir, a conduit from said reservoir extending through said presser foot and opening at a location facing said needle and closely adjacent thereto, a pump interposed in said conduit for forcing fluid through said conduit to said needle, and a valve in said conduit for controlling the flow of fluid through said conduit.

3. In a sewing machine, a reciprocating needle, a presser foot having an opening through which said needle passes, a liquid coolant reservoir secured to said machine, a conduit from said reservoir extending through said presser foot and opening at a location facing said needle and closely adjacent thereto, a pump interposed in said conduit for forcing the coolant through said conduit to said needle, a valve in said conduit adjustable for controlling the flow of fluid through said conduit and means for operating said pump from the driving belt of said machine.

4. In a sewing machine, a reciprocating needle, mechanism for operating said needle, a belt for actuating said mechanism, a presser foot having an opening through which said needle passes, a liquid coolant reservoir secured to and depending from the table top of said machine, a conduit from said reservoir extending through said presser foot and opening at a location facing said needle and closely adjacent thereto, a pump interposed in said conduit and having a pulley thereon positioned at a location to be engaged by said belt for actuating said pump for forcing liquid through said conduit to said needle.

ANTONIO JOHN GIGLIO.