

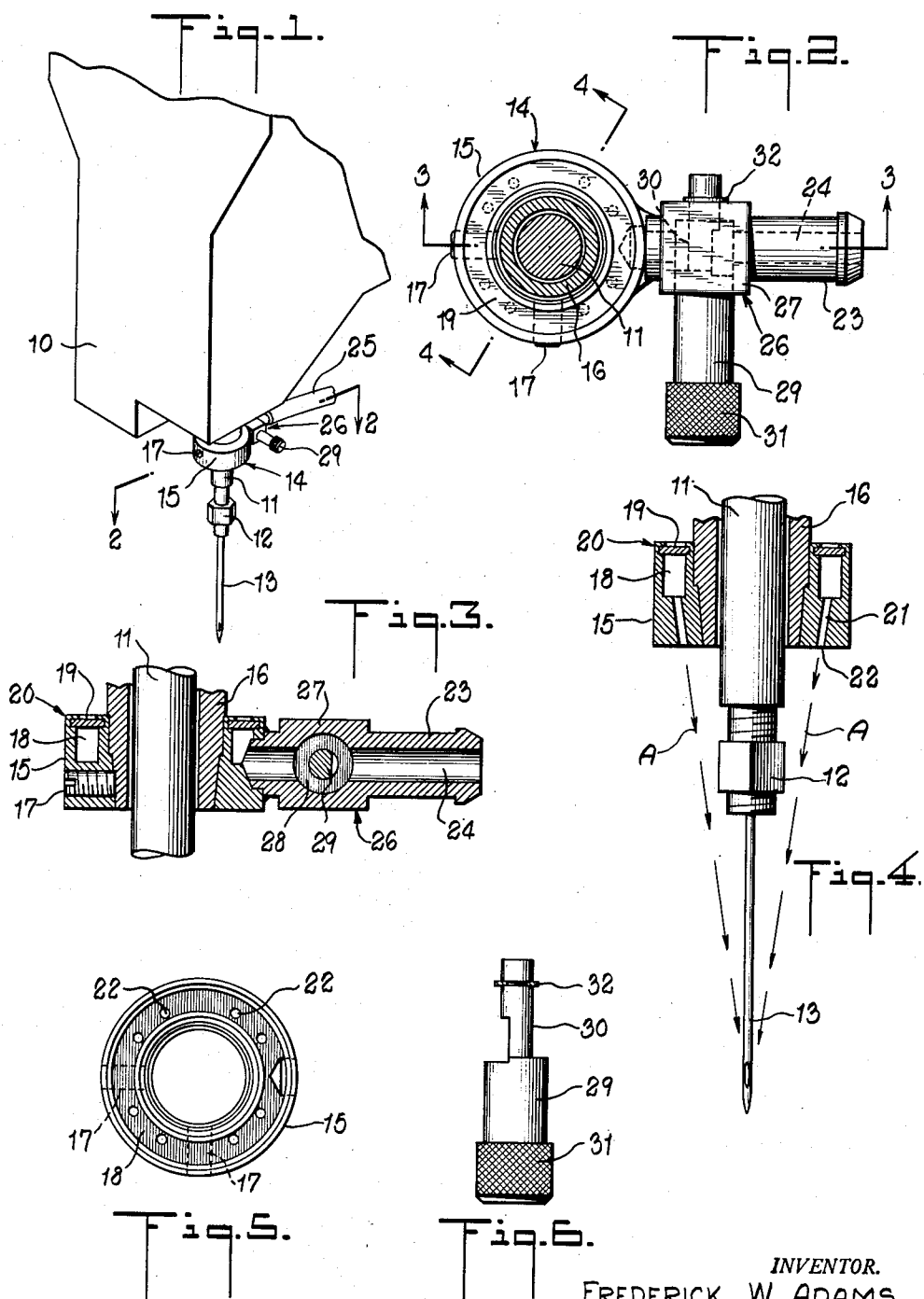
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NEEDLE COOLER

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NEEDLE COOLER

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The present invention relates to improvements in a device for cooling the needle of a sewing machine.

An object of the present invention is to provide a device for supplying continuous jets of a cooling medium to all sides of the needle of a sewing machine during the operation of the machine, which may be readily attached to the sewing machine without any alterations or changes being made therein and which does not interfere with the operator's use of the sewing machine. Another object of the invention is to provide a needle cooler in which the flow of the cooling medium may be readily turned off to permit threading of the needle or the like. In addition, a needle cooling device made in accordance with the present invention is of simple construction and is economical to manufacture.

Other objects and advantages of the invention will be apparent and best understood from the following description and the accompanying drawings in which:

Fig. 1 is a perspective view illustrating a needle cooler embodying the invention attached to a sewing machine;

Fig. 2 is a section view taken along the line 2-2 of Fig. 1;

Fig. 3 is a section view taken along the line 3-3 of Fig. 2;

Fig. 4 is a section view taken along the line 4-4 of Fig. 2;

Fig. 5 is a bottom view of a part of the needle cooler shown in Fig. 1; and

Fig. 6 is a side view of a valve member for the needle cooler shown in Fig. 1.

Referring to the drawings in detail, and to Fig. 1 in particular, there is a sewing machine head 10 in which a needle bar 11 is mounted for vertical reciprocation. The needle bar 11 carries a needle holding chuck 12 at its lower end in which the shank of a needle 13 is secured in the usual manner.

The needle cooling device, indicated generally at 14, consists of a member 15 in the form of a ring which surrounds the needle bar 11. As shown best in Figs. 3 and 4, the needle bar 11 extends through a bushing 16 which extends downwardly from the head 10 of the sewing machine and the ring 15 may be secured in a fixed position relative to the reciprocating needle bar by attaching it to the bushing 16 by set screws 17 or other suitable means.

The ring 15 contains an annular chamber 18 which surrounds the needle bar. The annular chamber has side walls and a top and bottom.

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The top of the annular chamber is formed by an annular plate 19 which forms a seal with the side walls of the chamber. The plate 19 may be held in place by spinning the top ends of the side walls of the chamber over the plate, as indicated at 20. As shown in Fig. 4, a number of spaced inclined passageways 21 extend between the bottom of the annular chamber 18 and outlet openings 22 in the bottom of the ring 15.

The passageways 21 are of a relatively small diameter and are inclined with respect to the axis of the needle 13 so as to direct converging jets of a cooling medium emerging therefrom, as indicated by the arrows A, towards a common point that coincides with the center of the ring and which is spaced from the bottom thereof. The needle 13 is centrally located with respect to the ring and the converging jets strike the needle from all sides at a point near the eye of the needle when the needle is raised. Since the ring 15 is held in a fixed position while the needle is reciprocated vertically, this point at which the jets strike the needle will vary with movement of the needle during operation of the sewing machine.

As shown in Figs. 2 and 3, an inlet pipe 23 extends outwardly from the side of the ring 15 and has a passageway 24 therein which communicates with the air chamber 18 in the ring for supplying the cooling medium thereto. One end of a flexible tube 25 is attached to the end of the inlet pipe 23 and the other end thereof is connected to a supply of cooling medium under pressure (not shown).

In order to enable the sewing machine operator to shut off the continuous jets of the cooling medium emerging from the bottom of the ring when the sewing machine is not in use or to prevent interference with the threading of the needle, a control valve 26 is provided in the inlet pipe 23. As shown in Figs. 2 and 3, the valve 26 consists of a valve body 27 formed in the inlet pipe 23. The valve body 27 has an opening 28 therein extending transversely across the passageway 24 in the inlet pipe 23. A valve plunger 29 is slidably fitted in the opening 28 and extends through the valve body. The valve plunger 29 has a portion 30 of reduced diameter intermediate its ends which may be brought into and out of alignment with the passageway 24 in the inlet pipe 23 upon sliding movement of the plunger to open or shut the passageway 24, as the case may be. To prevent removal of the plunger 29 from the valve body, the end of the plunger, extending beyond one side of the valve body, is provided with an enlarged operating knob 31 and the end of the

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plunger, extending beyond the other side of the valve body, carries a washer 32 which bears against the outside of the body when the valve is open.

The diameter and length of the converging passageways 21 in the ring 15 should be proportioned with respect to the pressure of the cooling medium so that the jets striking the needle will contain a turbulent movement of the cooling medium and will be of substantially uniform cross-section until they impinge upon the needle. This is desirable to obtain an effective and efficient cooling action.

As will be seen from the foregoing, the present needle cooler directs a plurality of continuous jets of the cooling medium against all sides of the reciprocating needle at all times unless the valve 26 is closed and because it is held in a fixed position relative to the reciprocating needle and needle bar, it will not interfere with or strike the hands of the operator of the sewing machine. It will be understood that various modifications may be made by those skilled in the art in the embodiment of the invention illustrated and described herein without departing from the scope of the invention as defined by the following claims.

I claim:

1. In a sewing machine of the type having a head, a needle bar mounted for vertical reciprocation in said head and projecting therefrom and a sewing needle carried by the needle bar, the improvement which comprises a member having an upper and a lower face with an opening extending between said faces, said member containing a

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chamber surrounding said opening and having a series of discharge outlets in the lower face thereof spaced around said opening, means for attaching said member in a fixed position on a sewing machine head with a reciprocable needle bar projecting through the opening therein, inclined passageways in said member communicating with the chamber therein and the discharge outlets, said passageways converging in a downward direction and directing converging jets of a cooling medium toward an eye of a needle carried by the needle bar at a raised position of the needle bar and toward a body portion of the needle at a lowered position of the needle bar, a fitting carried by the chambered member and communicating with the chamber therein and valve means in said fitting for controlling communication through said fitting with said chamber.

2. In a sewing machine, the improvement as defined in claim 1 wherein the chambered member is annular in shape and has a central opening therein through which the needle bar of the sewing machine projects.

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