

Jan. 8, 1957

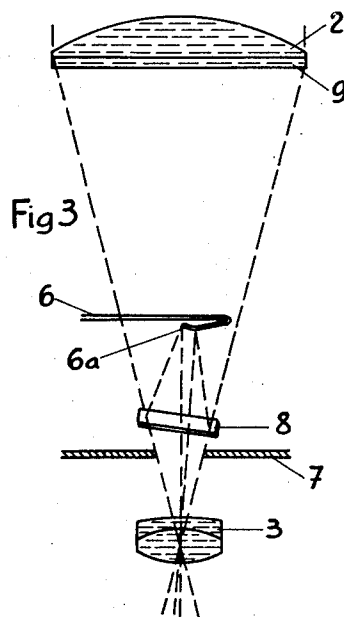
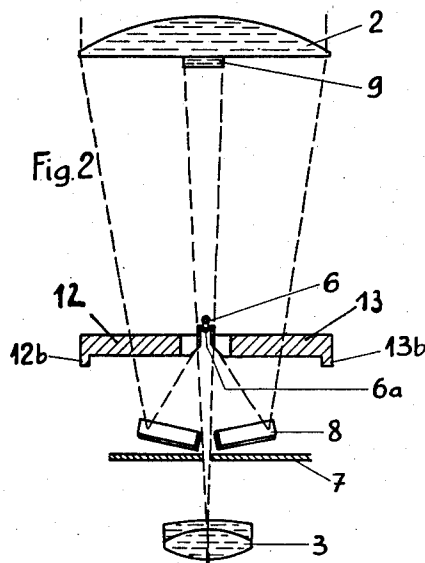
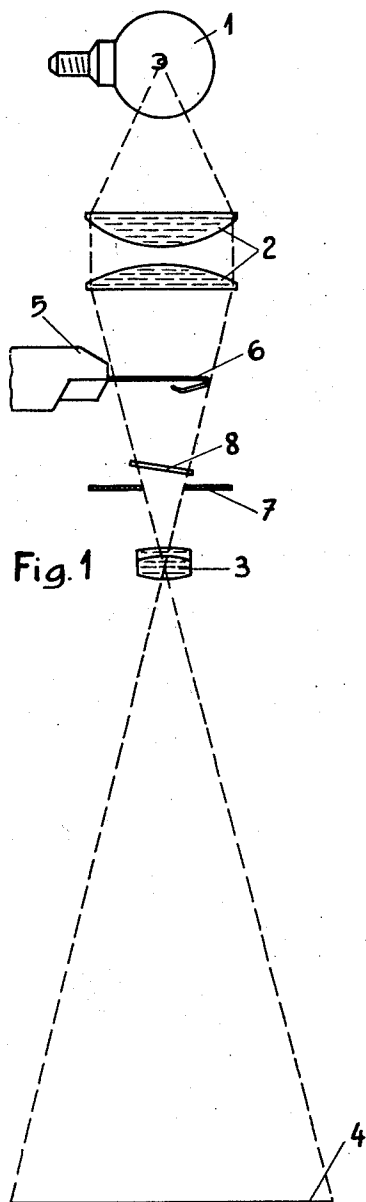
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2,776,696

METHOD FOR THE DRESSING OF BEARDED NEEDLES FOR KNITTING
MACHINES AND DEVICE FOR CARRYING OUT THE METHOD

Filed Nov. 29, 1954

4 Sheets-Sheet 1



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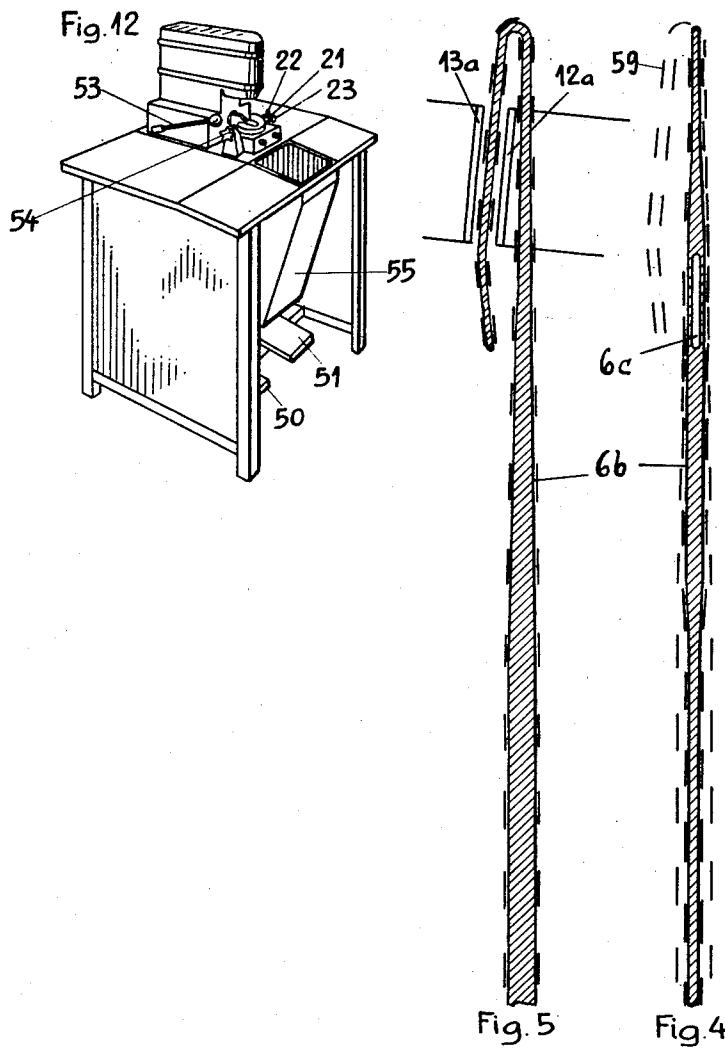
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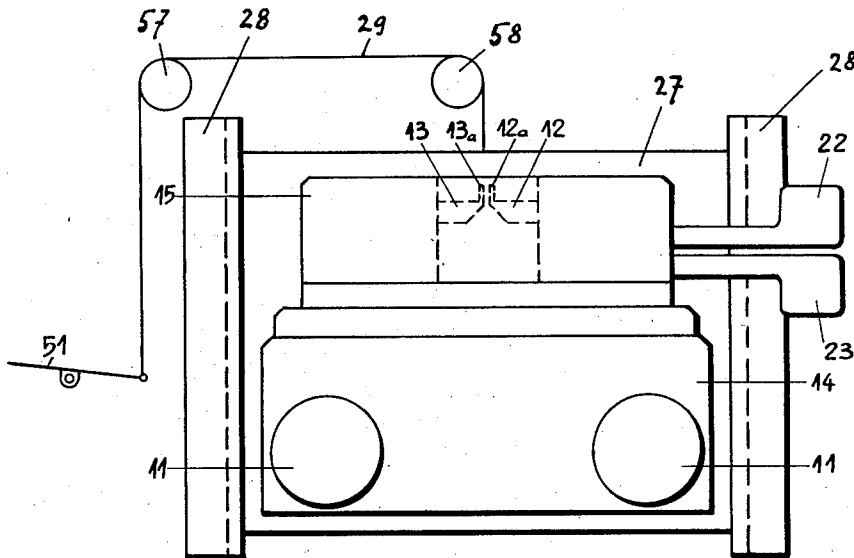


Fig. 7

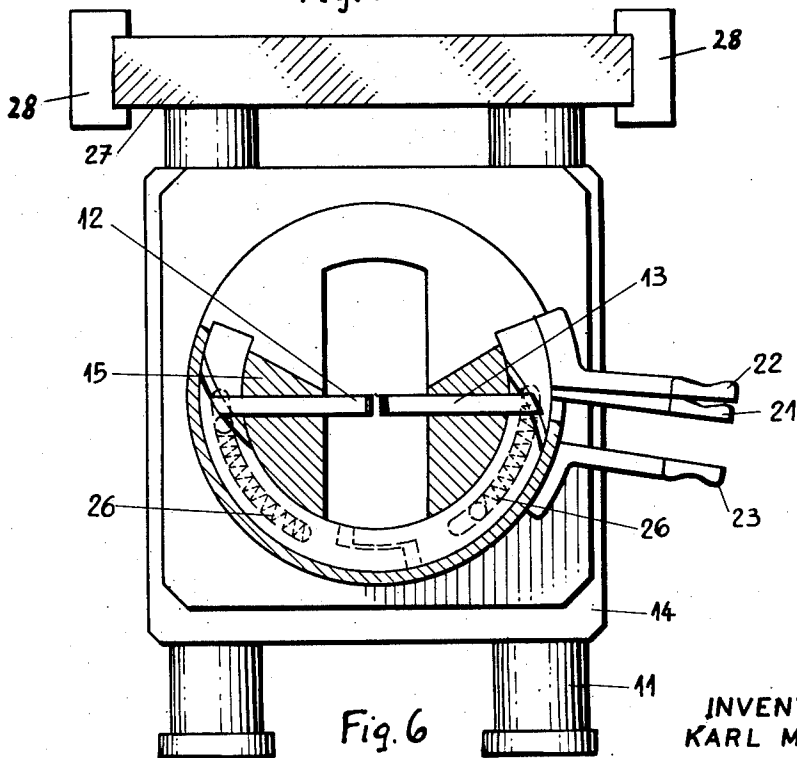


Fig. 6

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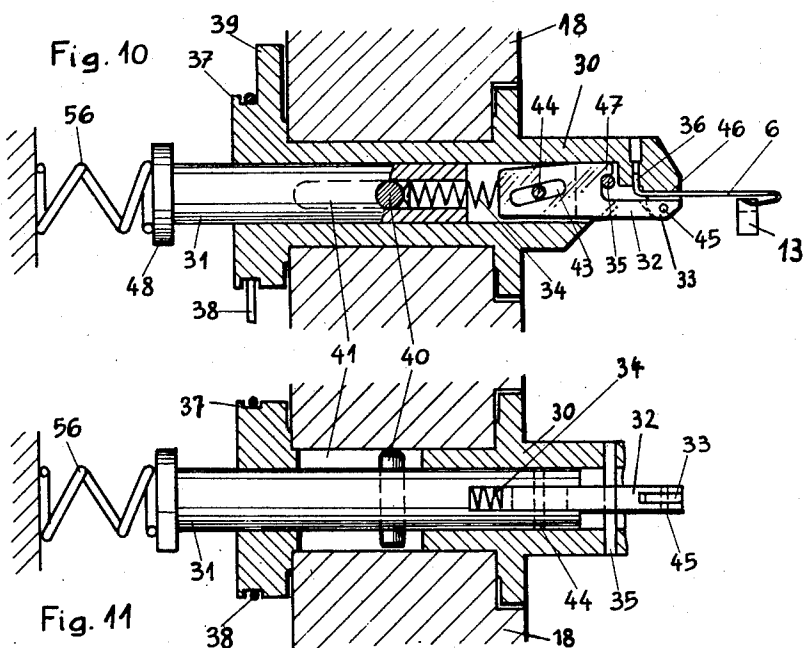
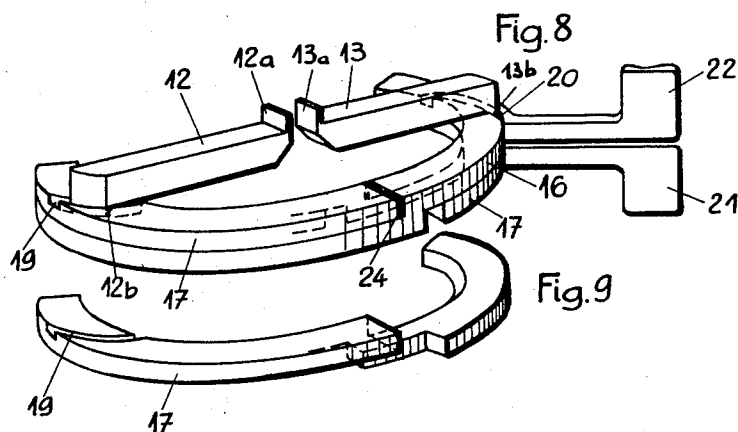
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METHOD FOR THE DRESSING OF BEARDED NEEDLES FOR KNITTING MACHINES AND DEVICE FOR CARRYING OUT THE METHOD

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8 Claims. (Cl. 153—39)

The present invention has the main object of providing a method for the dressing of bearded needles for knitting machines which allows the dressing of the beard as well as of the stem of the needle by an unskilled or semi-skilled operative.

It is another object of the invention to provide a device for the dressing of bearded needles for knitting machines which allows the dressing of the beard as well as of the stem of the needle and which is simple in construction and operation.

With these and other objects in view I provide a method for the dressing of bearded needles for knitting machines, comprising the steps of projecting the silhouette of the needle in multiple enlargement on an image screen, providing a contour drawing corresponding to the correct shape of the needle on the said screen and superimposing the said projected silhouette on the said contour drawing, illuminating the point of the beard from the opposite side making the same visible on the said screen as a bright dash within the said dark silhouette in the position of the needle in which the plane through the needle stem and beard stands at right angles to the said screen, and dressing the said needle stem and beard in the said plane and in a second plane perpendicular thereto.

A device for the dressing of bearded needles for knitting machines comprises according to the invention in combination: a profile projector, an image screen having a contour drawing corresponding to an enlarged correct shape of the needle, a clamping chuck carrying the said needle in the beam of the said projector rotatable 90° about the axis of the said needle, and a dressing device having dressing jaws for the dressing of the stem and beard of the said needle adjustable in the horizontal and vertical directions, and illuminating means illuminating the point of the beard of the needle from the side opposite to the said profile projector in that position of the needle in which the plane through the stem and beard of the needle stands at a right angle to the plane of the said screen, whereby the image of this illuminated point of the beard is made visible as a bright dash within the dark silhouette of the stem of the said needle as projected on to the said screen by the said profile projector.

These and other objects and features of the invention will be clearly understood from the following description of a preferred embodiment of a device according to the invention given by way of example with reference to the accompanying drawings, in which:

Fig. 1 is a sketch showing the principle of the profile projector,

Figs. 2 and 3 show an enlarged representation of the optical system of the profile projector as viewed from the front and from the side;

Fig. 4 shows the image of the projected needle with the illuminated point of the beard in plan view as it appears to the observer on the image screen;

Fig. 5 shows the image of the projected needle in lateral view, with the dressing jaws in the position for the dressing of the beard;

2

Figs. 6 and 7 show the dressing device in plan view and elevation, respectively;

Fig. 8 is a perspective representation of the most important components of the dressing device;

Fig. 9 shows a segment, one of the components of the dressing device illustrated in Fig. 8;

Figs. 10 and 11 show the clamping chuck in lateral elevation and plan view, respectively;

Fig. 12 is a perspective view of the needle dressing device as a whole.

The device for the dressing of bearded needles is composed basically of three main elements, the profile projector, the dressing device and the clamping chuck.

Fig. 1 shows in diagrammatic representation the optical arrangement of the device, the dressing device being omitted for clarity. A projector lamp 1 and condenser lens 2 generate a beam of light which is directed on to the needle 6 fixed in a clamping chuck 5. The silhouette of the needle is projected by the objective lens 3 on to the image screen 4 in multiple enlargement. Between the needle 6 and the objective lens 3 moreover a diaphragm 7 and two mirrors 8 are arranged, one of which only is shown in Fig. 1. The purpose of the system of diaphragm and mirrors will be clear from Figs. 2 and 3. The two mirrors 8 are fixed on both sides of the central axis of the beam of light in such a manner that they reflect part of the cone of light, which falls in from the condenser lens 2, on to the point 6a of the needle beard, when the needle is in the position illustrated, i. e. with the beard downward. The objective lens 3 thereby projects the brightly illuminated point 6a as a bright dash 6c within the dark silhouette 6b of the needle stem (compare Fig. 4). Between the mirrors 8 and the objective lens 3 there is built-in the said diaphragm 7 which has a slot-shaped aperture. The same screens off any superfluous light, and lets merely a rectangle-shaped cut-out of the image containing the needle profile be projected on to the objective lens and accordingly on to the image screen. In order that the bright dash 6c in the dark silhouette 6b of the needle stem may be visible more clearly, it has been found convenient to provide on the condenser lens 2 a colour filter 9, for example a green filter. The same has a rectangle shape corresponding to the aperture of the diaphragm 7, and is dimensioned so large that all the light directly radiated through the diaphragm is coloured green, whereas the light falling on to the mirrors 8 remains white. The silhouette 6b of the needle accordingly appears on the image screen on a green background, and the point 6a illuminated by white light, contrasts more clearly still with the silhouette of the needle stem. The mirrors 8 for the illumination of the point of the beard could alternatively be replaced by an illuminating device having its own source of light.

The dressing device (Figs. 6 to 9) comprises the two dressing jaws 12 and 13 as well as the operating mechanism thereof. The dressing jaws must be capable of performing the following movements:

(a) A clamping movement towards the axis of the needle, the two dressing plates 12a and 13a meeting one another accurately in the longitudinal axis of the needle;

(b) A longitudinal movement along the whole free length of the needle stem in order that the same can be gripped at any point;

(c) A rotary movement about a vertical central axis of the pair of dressing jaws for the bending, i. e. straightening out of the needle, towards the left or the right;

(d) A translation movement of the dressing jaws in the vertical direction, in order that the downwardly directed beard of the needle, too, can be dressed, without the dressing plates 12a and 13a contacting the needle stem, and finally

(e) An additional movement of one of the dressing

3

jaws, in order that the beard of the needle may be gripped also in the position laterally of the needle stem, and dressed.

The dressing device consists of a carriage 14 which is slidable on two round bars 11 parallel to the axis of the needle to be dressed. The carriage can be displaced either directly by hand, or in a well known manner, which accordingly is not shown in the drawing, by turning a hand wheel provided with a toothed pinion which meshes with a toothed rack. The carriage carries a guide piece 15 mounted rotatably, in which two segments 16, 17 are arranged slidably, and which serves at the same time as a guide for the two dressing jaws 12, 13. The two segments 16 and 17 (compare Figs. 8 and 9) contain two arcuate grooves 19, 20, into which engage corresponding projections 12b, 13b of the dressing jaws 12, 13. The segments 16 and 17 are provided with two control levers 21 and 22, while on the guide piece 15 a similar lever 23 is arranged. The same serves on the one hand for turning the guide piece 15 on the carriage and on the other hand as an abutment for the operator's hand when shifting the levers 22 and 21, respectively. When shifting the lever 22 towards the lever 23, the segment 16 is turned accordingly. The latter is cranked and, with its shoulder 24, carries along also the segment 17. The dressing jaws 12, 13 engaging into the grooves 19, 20 are thereby shifted inward, and accordingly perform a clamping movement. When the lever 21 is moved towards the lever 23, the segment 17 connected to it turns accordingly, whereas the cranked segment 16 is not displaced. This has the consequence that the dressing jaw 12 only is moved, while the dressing jaw 13 remains at rest as long as the lever 22 is not operated. In this manner it is attained that the dressing plates 12a and 13a may meet one another not accurately in the middle, but within a certain range laterally on the right hand side of the centre line. Restoring springs 26, which are arranged in the interior of the segments 16 and 17 (compare Fig. 6), turn these segments, and with the same also the dressing jaws, always back into their starting position. These springs have been omitted from Figs. 8 and 9 in order not to affect the clarity thereof.

The displacement of the dressing jaws in the vertical direction as referred to sub (d) is attained in that the two bars 11 carrying the carriage 14 are fixed to a plate 27 which is slidably mounted in vertical guides as shown diagrammatically in Figs. 6 and 7. The displacement can for example be effected by operating a pedal 51, which acts through a cord 29 and deflector rollers 57, 58 on the plate 27. The possibility of vertical displacement is limited to such an extent that the dressing plates 12a, 13a can grip in the upper position of the dressing device the needle stem, but in the lower position the downwardly directed beard only.

The clamping chuck illustrated in Figs. 10 and 11 has the object of arresting the needle 6 to be dressed immovably during the dressing process. It must moreover be capable of being turned 90° in order that the needle may be dressed in two planes standing at right angles to one another, and moreover the needle has to be clamped-in quickly and easily, and to be taken out after the dressing. The clamping chuck consists of a trunnion 30 of cylindrical profile which is journaled rotatably in the rear wall 18 of the profile projector. Its front end is constructed as a bed for the needle; it contains a bore 36 for taking in the needle butt cranked 90°, and a longitudinal groove 46 for taking-in the needle stem. The rear portion of the trunnion 30 is constructed as a cord pulley 37 over which passes a cord 38 connected for example to a pedal not shown in the drawing, upon operation of which the cord pulley is turned. In order that the range of turning the trunnion 30 may be limited to 90°, an abutment 39 is provided which abuts on two stops not shown in the drawing inserted in the rear wall 18 in the two dressing positions, respectively. In a bore of

4

the trunnion 30 a cylindrical clamping rod 31 is arranged which is restrained from turning by a pin 40 engaging into longitudinal slots 41 of the trunnion, which allow a displacement of the clamping rod 31 in the axial direction. A clamping jaw 32 is guided by a fork-shaped recess at the front end of the clamping rod 31. This jaw has an oblique slot 43 into which engages a pin 44 fixed to the clamping rod 31. A weak spring 34 biases the clamping jaw 32 constantly forward. At the front end of the clamping jaw 32 the clamping piece proper, 33, is mounted pivotally about a transverse pin 45, which piece clamps the needle inserted, on the needle stem. The clamping jaw 32 moreover carries a nose 47, which in the clamping position reaches under a pin 35 arranged slightly above the centre line on the trunnion 30. The clamping rod 31 is normally biased constantly forward, i. e. into the clamping position, by a spring 56.

When now the clamping bar 10 is pulled back from the clamping position shown in Fig. 10 against the bias of the spring 56, the pin 44 moves backward in the oblique slot 43. The clamping jaw 33, however, is still held by the spring 34 in its foremost position until the pin 44 has arrived at the rear end of the oblique slot 43. Thereby the clamping jaw 32 performs a tilting movement about the pin 35 which has the consequence that the clamping piece 33 is lifted off perpendicularly from the needle before being pulled backward. During the clamping movement i. e. when the clamping bar is forced forward from its rearmost position in which the clamping jaw clears the bore 36 for the needle the clamping piece 33 remains lifted off the needle stem until the foremost position is reached, and then moves perpendicularly against the same for the purpose of clamping. In this manner any damaging of the needle by the clamping piece sliding forward is obviated.

The shifting of the clamping rod 31 from the clamping position into the position for changing the needle, and back, can be effected by means known and accordingly not described in detail, for example by a lever engaging on the flange 48.

The needle dressing device is preferably constructed as a working table, as shown by way of example in Fig. 12. The turning of the clamping chuck through 90° is effected by operating the pedal 50, while the pedal 51 serves for shifting the dressing device vertically. For the purpose of opening and closing the clamping chuck, the lever 53 is operated, and for shifting the dressing device horizontally serves the hand grip 54. The image screen 4 lies at the lower end of the projection chute 55.

The method of dressing the needles is carried out in the following manner: the needle dresser operator opens the clamping chuck by tilting over the lever 53, inserts a needle and closes the clamping chuck again. He then compares the silhouette of the needle with the profile 59 (Fig. 4) drawn upon the image screen corresponding to an accurately dressed needle, for example in plan view, in which the needle is projected on to the image screen as a dark line 6b, in which the position of the point of the beard appears as a bright dash 6c. When the silhouette of the needle does not lie accurately within the drawn contour, the needle is gripped by the dressing plates 12a, 13a and is accurately dressed by turning the dressing device. Thereafter, by operating the pedal 50, the dressing device is shifted vertically into the lower position, and the beard is dressed likewise in such a manner that the bright dash lies accurately in the longitudinal axis of the dark silhouette of the needle stem. The clamping chuck is turned 90° by operating the pedal 51, so that the beard becomes visible on the image screen on the left hand side of the needle stem (Fig. 5). In fact the beard then lies on the right hand side of the needle stem, but the projection causes a symmetrical reversal of the image of the needle. The needle stem is then dressed in the same manner, and thereafter the dressing device is lowered

5

by operating the pedal 50; the left hand side dressing jaw 12 is shifted towards the right by displacing the lever 21; and the dressing device is raised again, in such a manner that the dressing plate 12a comes to lie in the interstice between the needle stem and the beard (Fig. 5). By displacing the lever 22, the beard can then be gripped by the dressing plates and likewise dressed conforming to the profile drawing. After a short checking in both dressing positions, the needle can be removed from the dressing chuck.

While I have herein described and illustrated in the accompanying drawings what may be considered as a typical and particularly useful embodiment of my said invention I wish it to be understood that I do not limit myself to the particular details and dimensions described and illustrated, for obvious modifications will occur to a person skilled in the art.

What I claim as my invention and desire to secure by Letters Patent is:

1. A method for the dressing of bearded needles for knitting machines, comprising the steps of projecting the silhouette of the needle in multiple enlargement on an image screen, providing a contour drawing corresponding to the correct shape of the needle on the said screen and superimposing the said projected silhouette on the said contour drawing, illuminating the point of the beard from the opposite side making the same visible on the said screen as a bright dash within the said dark silhouette in the position of the needle in which the plane through the needle stem and beard stands at right angles to the said screen, and dressing the said needle stem and beard in the said plane and in a second plane perpendicular thereto.

2. A device for the dressing of hooked needles for knitting machines comprising in combination: a profile projector, an image screen having a contour drawing corresponding to an enlarged correct shape of the needle, a clamping chuck carrying the said needle in the beam of the said projector rotatable 90° about the axis of the said needle, and a dressing device having dressing jaws for the dressing of the stem and beard of the said needle adjustable in the horizontal and vertical directions, and illuminating means illuminating the point of the beard of the needle from the side opposite to the said profile projector in that position of the needle in which the plane through the stem and beard of the needle stands at a right angle to the plane of the said screen, whereby the image of this illuminated point of the beard is made visible as a bright dash within the dark silhouette of the stem of the said needle as projected on to the said screen by the said profile projector.

3. A device as claimed in claim 2 wherein the said

6

illuminating means comprise a system of mirrors deflecting part of the light emitted by the said projector on the point of the beard of the needle hook from the opposite side.

4. A device as claimed in claim 2, comprising in addition: a color filter arranged in the path of that part of the light directed on to the said needle directly from the said projector, the light directed on to the point of the beard of the needle from the opposite side remaining uncolored.

5. A device as claimed in claim 2, wherein the said profile projector comprises a light source, a condenser lens, a color filter partly covering the said condenser lens, an objective lens, and a diaphragm arranged between the said needle and the said objective lens having an aperture allowing the passage of colored light only to the said objective lens, and wherein the said illuminating means are mirrors illuminated from the said condenser lens with uncolored light and reflecting the same on to the point of the beard of the needle from the opposite side.

6. A device according to claim 2, wherein the said clamping chuck comprises a trunnion journaled in the said device, control means turning the said trunnion about its axis, a clamping rod axially slidable in a central bore of the said trunnion, a clamping piece pivoted on the said rod transversely to the said axis with axial and radial moveability, and a projection of the said trunnion cooperating with the said clamping piece in clamping the said needle, the said clamping piece when releasing the said needle moving firstly radially off the stem of the needle and then axially parallel thereto at a clearance.

7. A device as claimed in claim 2, wherein the said dressing device comprises a carriage mounted horizontally adjustable along the needle stem dressing jaws, a guide piece mounted on said carriage and guiding the said dressing jaws, and a pair of segments rotatably mounted of the said guide piece, the said dressing jaws having arcuate projections engaging into complementary grooves provided in the said pair of segments in the sense of imparting a clamping movement to the said dressing jaws upon turning the said pair of segments relative to the said guide piece.

8. A device according to claim 7, wherein the said two segments are coupled with one another with a lost motion in one direction only, the second segment being positively carried along by the first segment, and the said first segment remaining at rest upon moving the said second segment.

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