

[54] **DEVICE FOR ACTUATING THE
NARROWING POINTS OF TWO
NEEDLE BED KNITTING MACHINES**

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[58] Field of Search.....66/70, 76, 96

[56]

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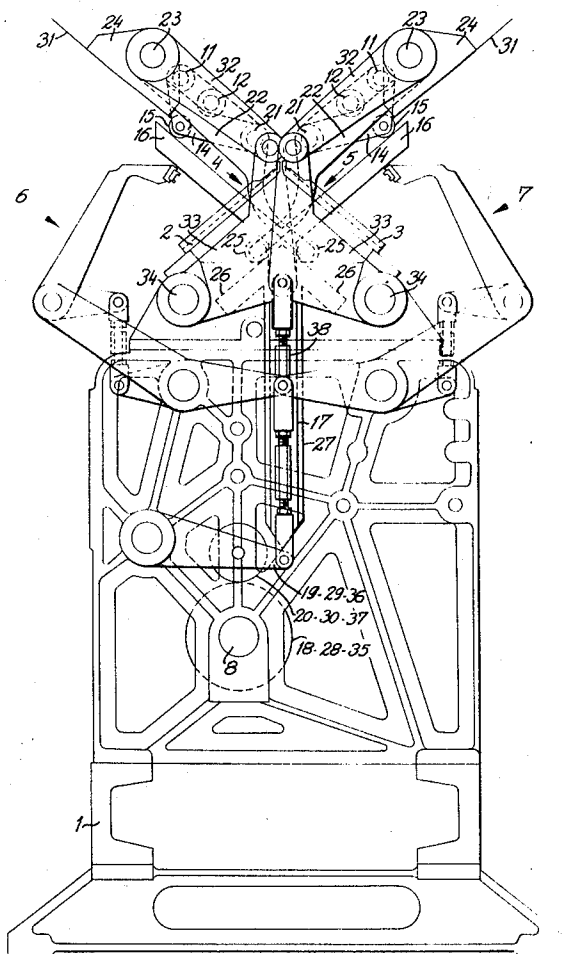
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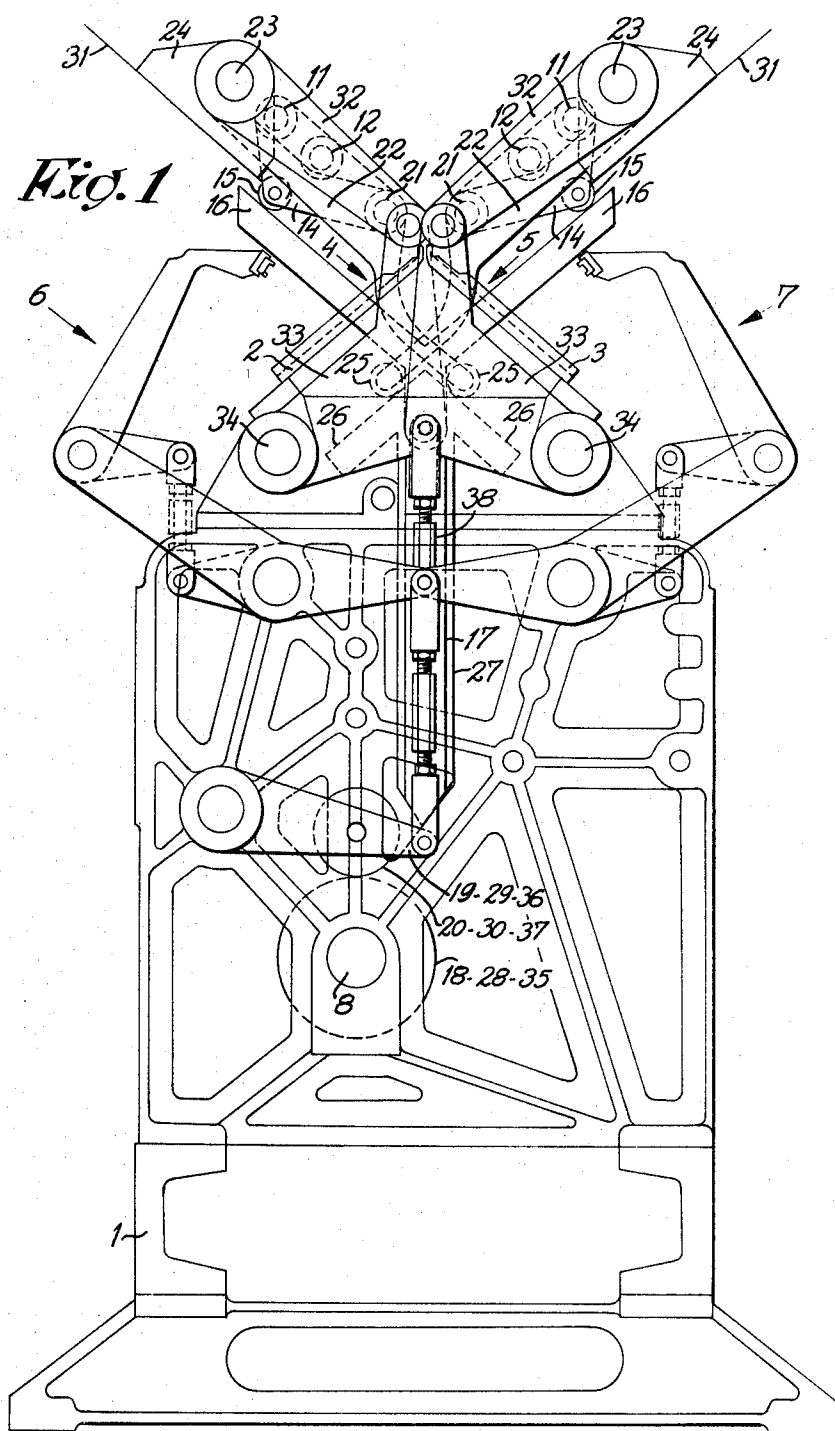
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ABSTRACT

A device for actuating the narrowing points of two needle bed knitting machines, having first means for imparting, to the points, a movement in a direction parallel to the plane of the associated needle bed, second means for varying the distance of said points relative to the said plane and third means for imparting, to the said points an angular shifting about an axis passing through the tip of the latter.

1 Claim, 22 Drawing Figures





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Fig. 2

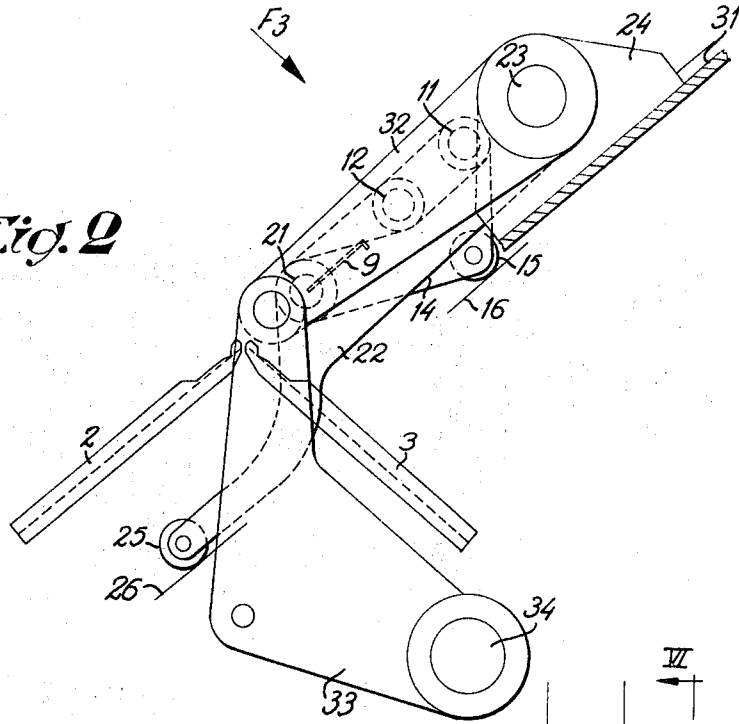
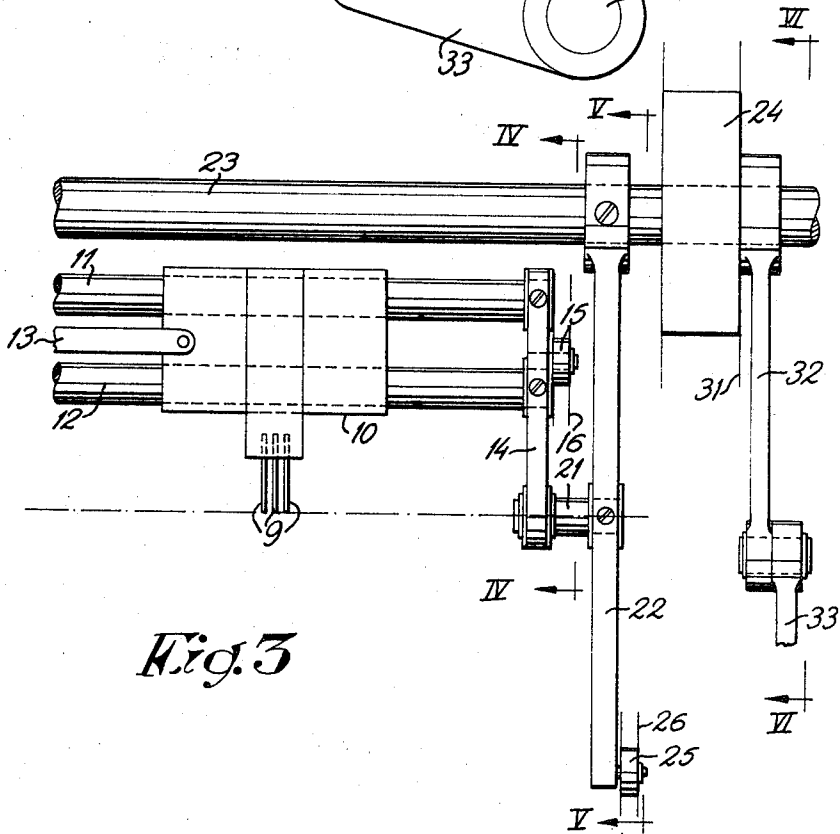


Fig. 3



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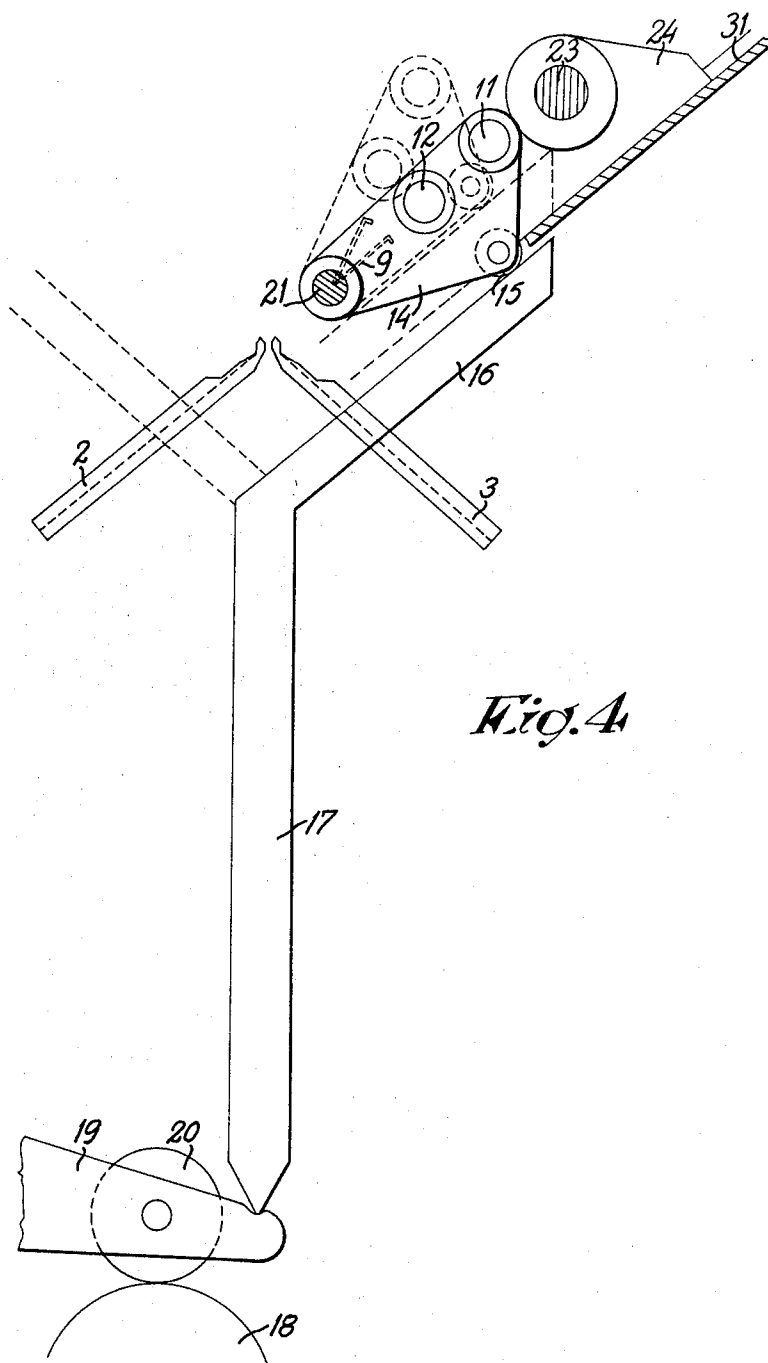


Fig. 4

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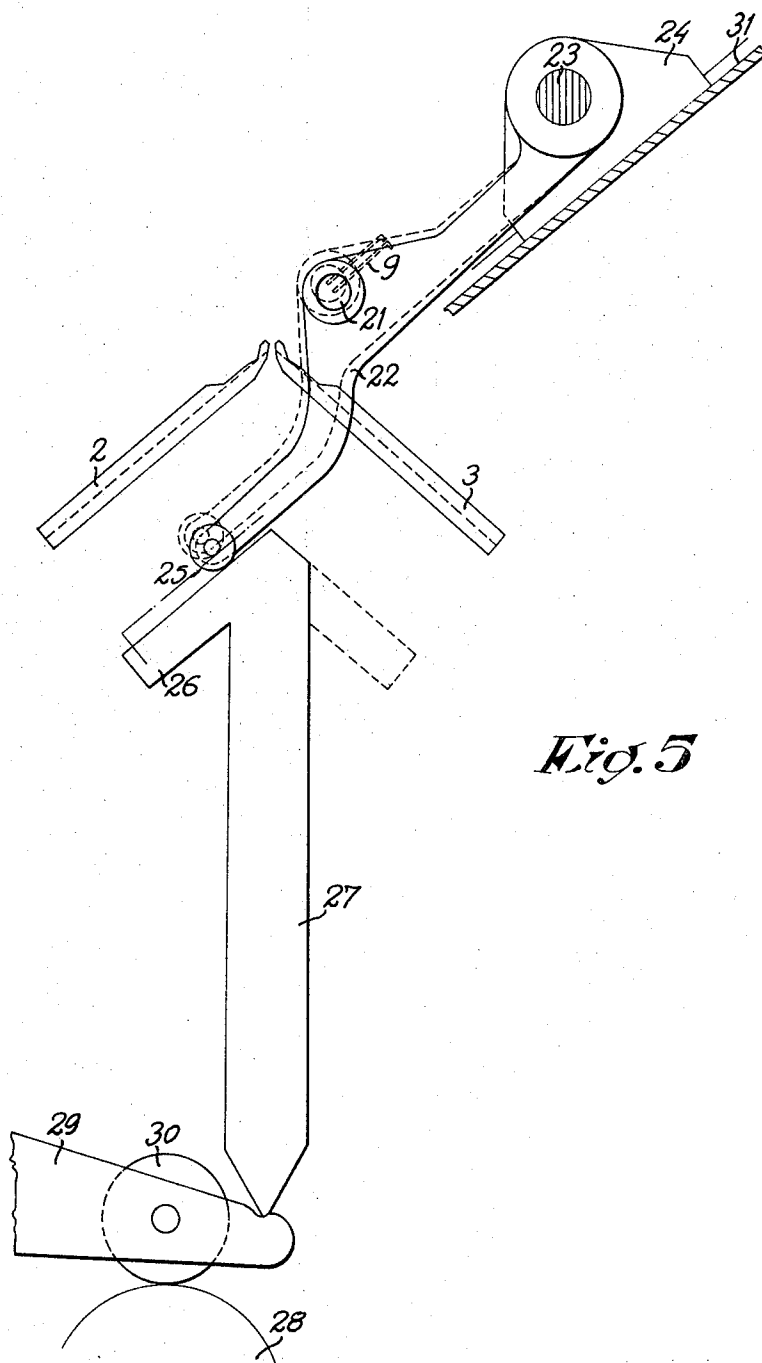


Fig. 5

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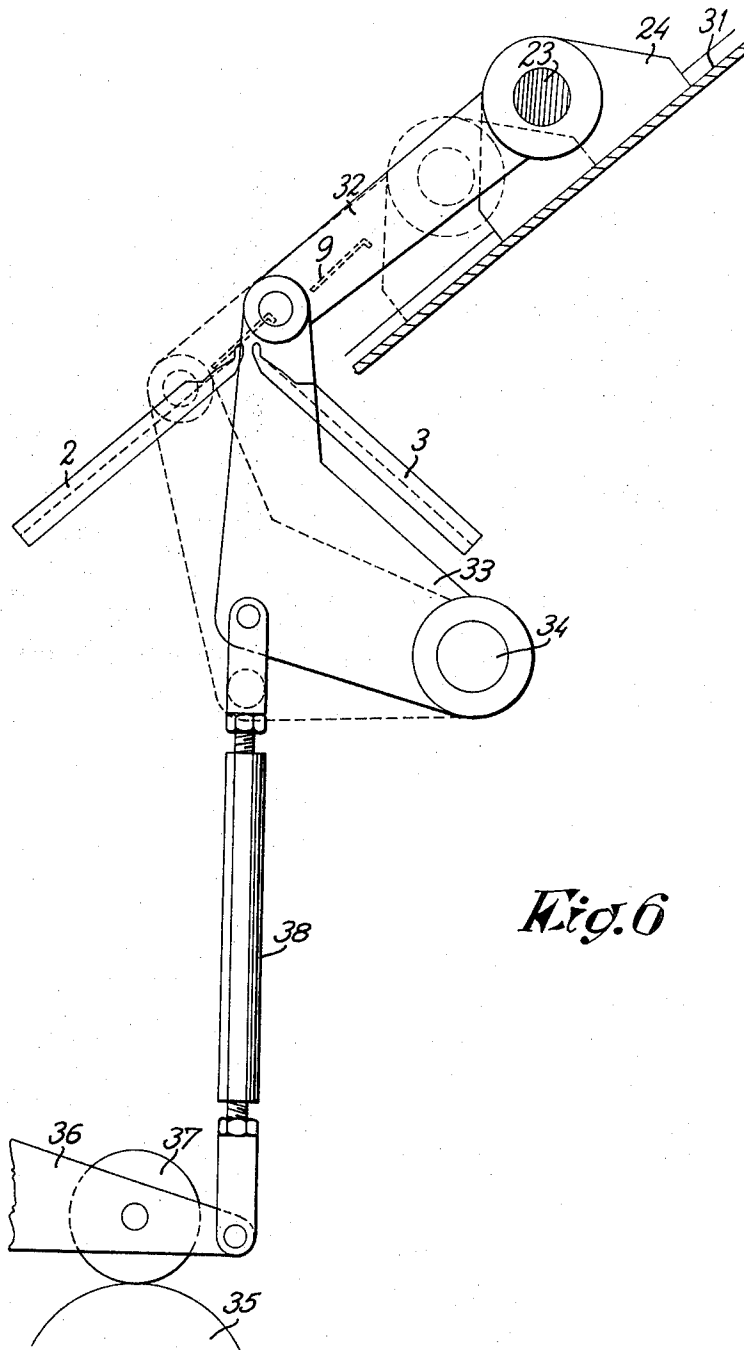
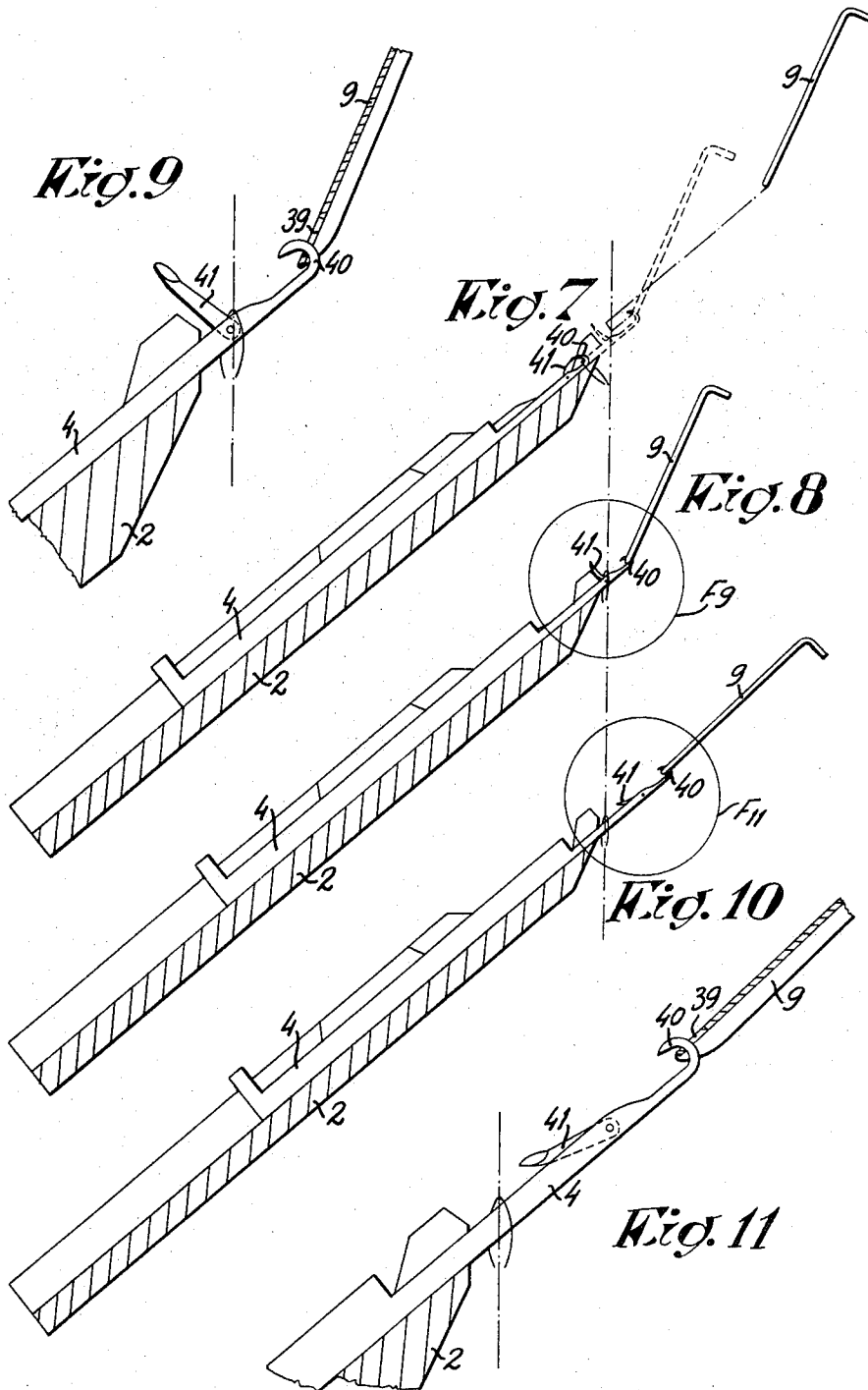
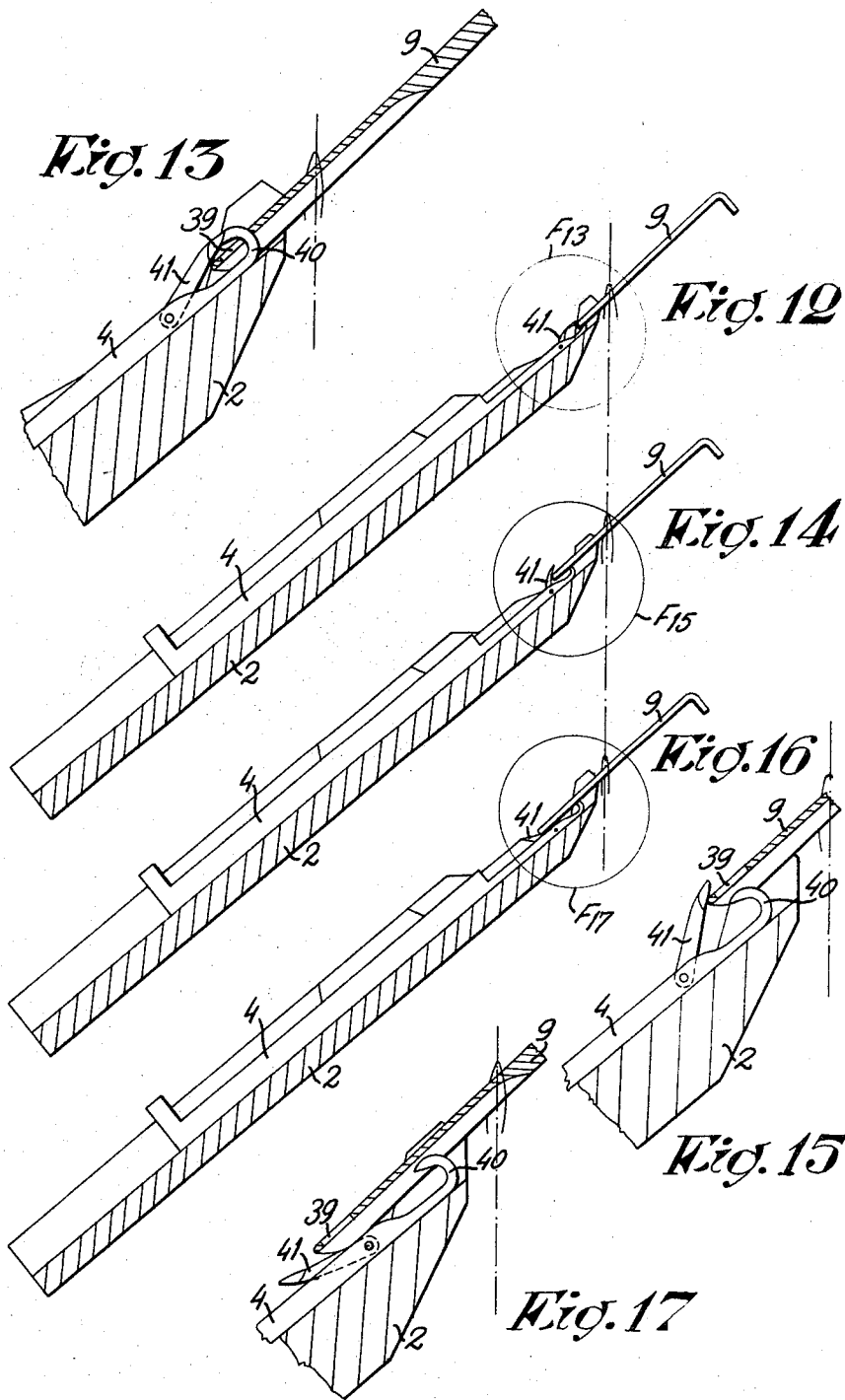


Fig. 6

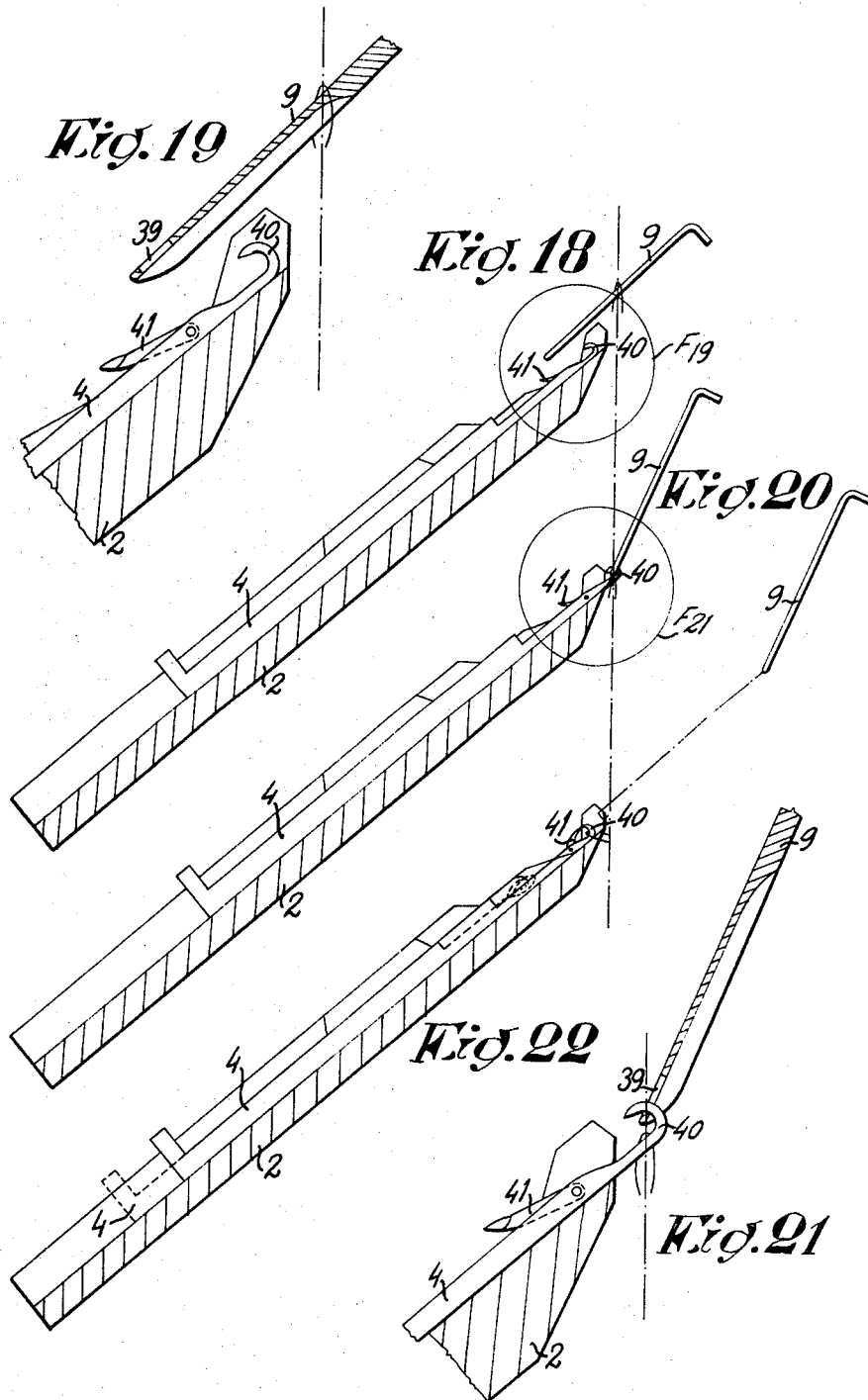
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DEVICE FOR ACTUATING THE NARROWING POINTS OF TWO NEEDLE BED KNITTING MACHINES

This invention relates to a device for actuating the narrowing points of two needle bed knitting machines. Such machines are generally provided with narrowing points which, under the control of the programming device of the machine, are brought in front of some needles for sinking the loops carried by the latter and are then shifted for transferring said loops to other needles.

Heretofore, to allow these narrowing or widening operations, it has been necessary to cancel or to substantially reduce the pulling action exerted upon the knitted goods. This necessity implies the presence of a device for reducing the pulling action, thereby extending substantially the time required for effecting these operations. On the other hand, the absence of a pulling action upon the knitted goods during the transfer operations makes the latter more problematical since it is then more difficult to control the loops.

It is an object of the present invention to avoid these drawbacks by providing a device for actuating said narrowing points, said device being very accurate and operating normally with the knitted goods under a pulling action. Thus, the output of a machine provided with such device is substantially increased, this improvement being additionally accompanied by a simplified construction of the machine.

According to this invention, this object is attained by a device of the intended type comprising combination of first means for imparting, to the point, a movement according to a direction substantially parallel with the plane of the associated needle bed, second means for varying the distance between said points and said plane of the associated needle bed and third means for imparting, to said point, an angular shifting about an axis passing through the tips of the latter.

The features of this invention will be more apparent by the following detailed description of an embodiment thereof given by way of illustration and without any limitation, reference being made to the attached drawings wherein:

FIG. 1 is a diagrammatic cross-section of a two needle bed machine provided with a device according to the invention;

FIG. 2 shows, on an enlarged scale, the portion of the mechanism indicated in F_2 on FIG. 1;

FIG. 3 is a view according to the arrow F_3 of FIG. 2;

FIGS. 4 to 6 are respectively sections on the lines IV—IV to VI—VI of FIG. 3;

FIGS. 7, 8, 10, 12, 14, 16, 18, 20 and 22 show diagrammatically different characteristic positions of the points and the needles during the operation of the device according to FIGS. 1 to 6;

FIGS. 9, 11, 13, 15, 17, 19 and 21 show, on an enlarged scale, the portions indicated respectively in F_9 , F_{11} , F_{13} , F_{15} , F_{17} , F_{19} and F_{21} on FIGS. 8, 10, 12, 14, 16, 18 and 20.

The machine shown diagrammatically in FIG. 1 comprises a general frame 1 supporting needle beds 2 and 3 which contain needles 4 and 5 respectively. These needles may be brought in high position by a conventional tipping mechanism 6 and 7 respectively, the latter being driven from the general cam shaft 8.

The device according to the invention comprises two identical portions, one for each needle bed; only one of said portions will be described hereafter.

The narrowing or widening points 9 are carried by a carriage 10 (FIGS. 2 and 3) which may be shifted along two guiding rods 11 and 12 in response to the controls given by the programming device of the machine by a kinematic connection one portion of which is shown diagrammatically at 13 on FIG. 3, all of which is well known by those skilled in the art so that no detailed description thereof is given.

The guiding rods 11 and 12 are supported, at each end, by a shoe 14 to which they are rigidly fastened, said shoe being provided in its lower portion with an idle roller 15 bearing on an inclined plane 16 mounted at the end of a vertical lever 17 (FIG. 1). The latter may be vertically shifted under the action of a cam 18 of shaft 8 by a lever 19 provided with a roller 20 bearing on the same cam.

At its inner end relative to the longitudinal axis of the machine, the shoe 14 is pivoted at the end of a pivot 21 fixed on a lever 22. The extended axis of said pivot 21 passes through the tips of the points 9. Said lever 22 is fastened at its outer end on a shaft 23 rotatively supported by slides 24, whereas the other end of said lever 22 is provided with a roller 25 bearing on an inclined plane 26 mounted at the end of a vertical lever 27. The latter may be vertically shifted under the action of one cam 28 of shaft 8 by a lever 29 provided with a roller 30 bearing on said cam.

The slides 24 may be each shifted in a slideway shown diagrammatically at 31 by means of the kinematic connection shown on FIG. 6. The latter comprises a lever 32 pivoted at one of its ends about the shaft 23 and linked, at its other end, on the end of a leg of a bent lever 33 the other leg of which is pivoted, at its end, about a stationary pivot 34. Said lever 33 may be angularly shifted under the action of a cam 35 of shaft 8 by a lever 36 provided with a roller 37 and the adjustable rod 38.

Reference being made to the general definition of the device according to the invention given by way of introduction, it should be noted that said first means imparting, to the point, a movement in a direction parallel with the plane of the associated needle bed are shown on FIG. 6, the second means for varying the distance of said points relative to the plane of the associated needle bed are shown on FIG. 5, whereas the third means for imparting, to said point, an angular shifting about an axis passing through the tips of said points are shown on FIG. 4.

The above described device operates substantially as follows: When a narrowing or widening operation must be carried out, the conventional programming device induces the shifting of the carriage 10 to bring each point 9 in a vertical plane containing the needle the loop of which it must sink and transfer, said shifting being effected as known per se.

As soon as the points are in alignment with the corresponding needles (FIG. 7), the cam 35 controls the shifting of the points toward the needles 4, the tipping device 6 bringing simultaneously the needles 4 in high position. When, in response to said movements, the eye 39 of each point has crossed the hook 40 of the corresponding needle, the cam 28 induces a slight lowering of the points, whereas cam 35 induces the partial raising of the points to bring the latter, according to the path shown diagrammatically in dot-dash lines on FIG. 7, into the position represented in FIG. 8. It will be observed that, owing to the raising of said needles, the latches 41 thereof are opened (FIG. 9).

Then, the cam 18 induces the rotation of points to bring them in the plane of the needles, whereupon the cam 35 actuates the points so that the latter are pulling the corresponding needles to bring them in a raised position as shown in FIGS. 10 and 11. Owing to this shifting, the loops of the knitted goods, which are carried by the considered needles, are running past the opened latches 41. The cam 35 induces then the downwards shifting of the points which are driving back the associated needles, while collecting the loops carried by the latter (FIGS. 12 and 13). The cam 28 induces in due time a slight raising of the points (FIGS. 14 and 15), whereas the downward movement of the points continues under the effect of cam 35, the considered needles being slightly raised by the tipping mechanism 6. The latch 41 of the considered needles is then completely opened (FIGS. 16 and 17).

Then, the cam 28 raises the points 9 (FIGS. 18 and 19) and the carriage 10 is shifted to bring said points bearing the previously sunk loops, each in a vertical plane containing the needle to which the transfer must be effected. Then, the cams 35 and 28 are respectively inducing the raising of the slides 24 and the lowering of lever 22, whereas cam 18 rotates the shoe 14 thereby bringing the points in the position shown in FIGS. 20 and 21. The meshes carried by the points are then falling on the hooks 40 of the associated needles.

Finally, the cams 35 and 28 are shifting points according to the path indicated in dot-dash lines on FIG. 22, the points being brought to their initial position shown in FIG. 7.

In this way, the transfer in view of a narrowing or widening operation is completed. In case of narrowing, the needles the loops of which have been sunk, are brought in an inactive low position by the corresponding tipping device, said position being indicated in dotted lines in FIG. 22.

During all the above described operation, the knitted goods have been kept under a pulling action, thereby providing a better sinking and a better transfer of the loops.

It is apparent that numerous modifications may be brought as well to the various elements described hereabove as to their mutual positions and their cooperation, provided the points are passing substantially through the different characteristic positions shown in the drawings.

What I claim is:

1. A device for actuating the narrowing points of two needle bed knitting machines, comprising in combination with a point carrying carriage having guiding rods, a shaft, a cam carried by said shaft, slides, inclined slideways carrying said slides, means actuated by said cam and shifting said slides upon said

slideways for imparting to the points a movement in a direction substantially parallel to the plane of the associated needle bed, another cam carried by said shaft, levers articulated on said slides, means actuated by said other cam and controlling the angular position of said levers for varying the distance of the points relatively to said plane of the associated needle bed, the last-mentioned means comprising an inclined support vertically shifted by said other cam, and a roller pivoted on one of said levers and engaging said support; other levers articulated on the first-mentioned levers and supporting said guiding rods, a third cam carried by said shaft, and means actuated by the third can and controlling the angular position of the last-mentioned levers for imparting to the points an angular shifting about an axis passing through the tips of the points, the last-mentioned means comprising an inclined support vertically shifted by the third can and a roller pivoted on one of the last-mentioned levers and engaging the last-mentioned supports.

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