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⑤④ **A knitwork tensioning device for a knitting machine.**

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Description

This invention relates to a knitwork tensioning device for a knitting machine.

It is a well known fact that tensioning of a knitwork while being knit on a knitting machine is accomplished by means of opposed tensioning rollers which are located at a distance from the needles within the machine, as disclosed for example in Italian Patent No. 828 958, which relates to a circular knitting machine.

Such devices generally provide a tension force which is applied across the region between the rollers and needles, and hence, owing to the separation and elasticity of the intervening knitwork, can not always prevent the knitwork loops being formed from following the needle movements. Where knit fabrics are formed which have patterns including short and long knitwork loops, then a different tension is exerted on the two loop types, as due to their different elasticity, and this may easily result in faulty loops.

Moreover, in the instance of circular knitting machines adapted for knitting a fashioned open fabric, wherein the middle needles are kept in constant knitting engagement, whilst along the fabric edges the needles are driven into and out of operation to follow a required contour, tensioning can only be effected across the region where the needles are in constant knitting operation, and no tension is applied along the fabric sides.

It could be possible to obviate, at least in part, such problems by placing the tension rollers closer to the needles, but this is mostly impossible by considerations of available room, especially with dual needle bed machines.

It is a primary object of this invention to provide a knitwork tensioning device for a knitting machine, which can obviate such prior problems and limitations, it being able to hold back and effectively tension the knitwork across the formation regions thereof, and accordingly, positively prevent the exiting needles from dragging the loops therewith.

A further object is to provide such a device which is of simple construction and may be advantageously incorporated to any type, whether circular or flat, of knitting machine, and may also be used in combination with conventional roller devices.

These and other objects such as will be apparent hereinafter are achieved by a knitwork tensioning device for a knitting machine having at least one needle bed, comprising a knitwork engagement and tensioning means located within the knitting machine, the device being characterized in that said means comprises a plurality of tensioning elements of substantially plate-like configuration supported at one portion thereof and each having an opposed portion located in the proximity of the needles, said opposed portion being movable between a knitwork disengagement position and a knitwork engagement and tensioning position in cooperation with a knitwork bearing surface on said needle bed.

Advantageously, a device of the above type allows the knitwork to be held directly in the proximity of the needles, thus preventing them materially from dragging the knitwork loops therewith in their exiting movements. A somewhat elastic construction of the tensioning elements, such as in the form of reed-like flexible elements, affords advantageous flexing capabilities for such elements, thereby it becomes possible to provide, through a simple articulated support of the individual elements and a rotational movement thereof, first an engagement of the knitwork with the needle bed inner surface, and secondly, upon the elements flexing as a result of a further slight rotation, automatic application of a gentle tension on the knitwork on the needle bed inner surface. However, it would also be possible to impress on the tensioning elements a translatory movement substantially in the same direction as the needle bed, such that the knitwork being formed is engaged and tensioned by a dragging action. The construction including individual tensioning elements cooperating with a bearing surface for the knitwork being formed, advantageously enables said elements to span the whole area of knitwork formation, and to also utilize the device for contoured open fabrics, by virtue of the tensioning elements being caused to act directly on the knitwork being formed. The tensioning element width may vary according to individual requirements, with the tensioning elements being allowed to simultaneously engage several loops in one course.

Further features and advantages of the invention will be more readily understood from the following detailed description of two preferred embodiments thereof, given herein by way of example only with reference to the accompanying illustrative drawings, where:

Figure 1 is a fragmentary axial sectional view through a circular knitting machine of the cylinder and dial type, incorporating a device according to a first embodiment of the invention;

Figure 2 is a sectional view similar to that of Figure 1 but having needle beds which are more relieved inwardly;

Figure 3 illustrates diagrammatically the operation of the device shown in the preceding Figures over a developed length of the machine, together with the needle pattern diagram;

Figure 4 shows a modified embodiment of the tensioning elements;

Figure 5 is an axial sectional view similar to Figure 1, but showing a further embodiment of this device, in the rest position thereof;

Figure 6 shows the device of Figure 5 in the operating position thereof;

Figure 7 is a developed diagram of the pattern of the control cams for the device shown in Figures 5 and 6 relatively to the needle movements; and

Figure 8 is a detail view of the device of Figures 5 and 6.

In conjunction with the accompanying draw-

ings, reference will be made in the description which follows to a circular knitting machine of the type having a large diameter cylinder and dial. However, it should be appreciated that the invention is not limited to that application but may be incorporated to dialless single cylinder circular knitting machines as well as double cylinder and flat knitting machines, and to cylinder and dial circular machines for knitting open fabrics.

The knitting machine 1 (Figures 1 and 2) comprises a needle cylinder 2 and dial 3, wherein needles 4 and 5, respectively, are mounted slidably as driven in a conventional fashion. The machine 1 further comprises a means 6 for engaging and tensioning a knitwork 7, which means is located within the machine 1. Said means includes a plurality of reed-like tensioning elements 8, each supported at one end 9 inside the cylinder 2 and having an opposed end 10 located next to the needle 4, 5. Said end 10 is configured for engagement with the knitwork 7, as explained hereinafter.

In the exemplary embodiment shown in Figures 1 and 2, the reed-like tensioning elements 8 each have their end 9 attached to a respective supporting element 11 in the form of a small block pivoted at 12 to a respective supporting bracket 13, the bracket 13 being fastened under the dial 3. It may be appreciated that in the embodiment shown, the reed-like tensioning elements 8 are laid side-by-side all around the axis of the machine 1, that is, they have a limited width and their pivot axes 12 are laid along a broken line enveloping a circumference concentric with the axis of the machine 1.

On each supporting element or block 11, there are arranged a pin 14 and small pivot pin 15 acting in opposite directions. The pin 14 is movable in a respective radial seat 16 in the dial holding structure 3a and its remote end from that engaging with the block 11 is adapted to follow the profile of a cam 17 which is carried by the cam structure 3b of the machine and, accordingly, driven of relative motion to the supporting structure for the reed-like elements 8. In the example under consideration, the cam 17 is of the ring type. The small pivot pin 15 is accommodated within a blind seat 18, and is subjected to the action of a spring 19, provided in the seat 18, to keep constant the engagement of the block 11 with the pin 14 and hence the engagement of the latter with the cam 17.

In the inoperative or home position, as shown in full lines in Figure 1, each reed-like element 8 is arranged to bear on the inside bevel 3c of the dial 3, the pin 14 contacting then a depression 17a in the cam 17. One end 10 of each reed-like element 8 barely clears the outer circumference of the dial 3 without hindering the movement of the knitwork 7 through the gap between the cylinder 2 and dial 3. The knitwork 7 is pulled down by its own weight, or alternatively by a gentle action tensioner, not shown.

As at the formation area of the knitwork 7, the needles 4 of the cylinder 2 are raised (and the

needles 5 of the dial 3 thrust outwards) and the knitwork loops are to be held back to prevent them from being dragged away by the needles 4, 5, the radially outermost profile of the cam 17 becomes operative to push the pins 14 slightly outwards and cause the supporting block 11 of the respective reed-like elements 8 to perform a partial rotation. This rotational movement results in the ends 10 being moved into a position of engagement with the knitwork 7, which is clamped between said ends 10 and the internal surface of the cylinder 2 on which the knitwork 7 rests. The cam 17, and consequently the thrust on the block 11, are designed to also impress on the reed-like elements 8 a deflection (position shown in full lines in Figure 2 and dash lines in Figure 1), thereby there occurs a slight downward displacement of the ends 10 across the internal surface of the needle bed, which thing leads to a slight tension being applied to the knitwork loops. In this way, with the knitwork loops being held up and stretched in the very proximity of the needles, any movements of the loops is effectively prevented and the loops move past the respective needle latches of the exiting needles, and hence, into a position where they can be positively discharged on the successive re-entering movement of the needles 4, 5.

As shown in Figure 3, the engagement phase of the knitwork 7 is limited to the phase of outward movement of the needles 4, 5, whereas during the re-entering phase of the needles the reed-like elements 8 are returned to an inoperative condition wherein the knitwork 7 is allowed to move down prior to being re-engaged at the following course.

The relieve provided in the needle beds of Figure 2 advantageously increases the space available for inserting the knitwork between the needle beds and favors an increased pull after the clamping phase. In fact, in the disengaged position, the reed-like elements 8 are housed in the relieve of the dial 3, and in the engaged position, they engage the knitwork 7 in the relieve of the cylinder 2. Thus, the increased travel distance of the ends 10 of the reed-like elements 8 results in a stronger pull being applied on the knitwork 7.

Figure 4 illustrates a reed-like element 8' having a hooked working end which can penetrate the courses and increase the pull force.

In the embodiment shown in Figures 5 to 8, a circular knitting machine 21 has a needle cylinder 22 and dial 23, with respective needles 24 and 25. The means 26 for engaging and tensioning the knitwork 27, again located within the machine, comprises a plurality of tensioning elements 28 of substantially plate-like configuration and being each supported at one portion within the cylinder 22, each element having an opposed portion located in the proximity of the needles 24, 25.

Each tensioning element 28 is pivoted at 29 to a respective first supporting element 30 in the form of a lever pivoted, in turn, at 31 to a supporting block 32 attached to the dial holder 23a. Acting on the remote end of the lever element 30 from the

end having the tensioning element 28 pivoted thereto, is one end of a rod-like control element 33, passed vertically through the dial 23 and dial holder 23a and having its other end engaged with the bottom profile of a ring cam 34, which is attached to the cam structure 23b of the machine and hence driven of relative motion to the supporting structure for the tensioning elements 28. A spring 35 is placed between each tensioning element 28 and lever element 30 so as to pull the tensioning element 28 toward the dial 23. The spring 35 is only required to overcome the action due to the weight of the tensioning element 28, and will accordingly be a rather weak one. A more powerful spring 36 is arranged to act between the lever element 30 and a fixed point 37 to maintain the lever element 30 in contact with the rod-like element 33, and hence, the latter in contact with the ring cam 34. A stop 38 defines the home position of the lever element 30.

The lower end of each tensioning element 28 is connected, allowing a degree of play, through a respective link 39, to one end of a respective second lever element 40, pivoted at 41 to the supporting block 32 and having a peripheral section 42 in contact with one end of a rod-like control element 43. The latter is passed vertically through the dial 23 and dial holder 23a close to the rod-like element 33, and engages at its other end with the bottom profile of a ring cam 44, attached to the cam structure 23b. A spring 45 tends to hold the lever element 40 engaged with the rod-like element 43 and the latter with the cam 44.

The tensioning elements 28 are of course arranged along a broken line, similarly to the reed-like elements 8. They may also be likened to reed-like elements, but having a greater thickness than the elements 8.

The profile of the cams 34 and 44 for each yarn feed location is shown in Figure 7 where the needle pattern during the knitting phase is also shown schematically, similarly to the embodiment first-described hereinabove. The cam 34 has a profile including a substantially sharply downward sloping section 34a, a short horizontal section 34b, and a gently upward sloping section 34c followed by a long horizontal section 34d. The cam 44 has a substantially sharply downward sloping section 44a located slightly upstream of the section 34a (in the direction of movement of the needles), a horizontal section 44b as far as the end of the downward sloping section 34a of the cam 34, followed by a substantially vertical raising section 44c at the end of the downward sloping section 34a of the cam 34 and by a final horizontal section 44d.

The device shown in Figures 5—8 operates as follows.

On completion of the withdrawal movement of the needles 24, 25, the device occupies the position indicated with full lines in Figure 5, and the rod-like elements 33 and 43 engage respectively with the sections 34d and 44d of the cams 34 and 44. Thereafter, as the needles 24 barely begin to

move up, the section 34a of the cam 34 comes into operation, and the tensioning elements 28 will move into the position indicated with dash lines in Figure 5, as allowed by the play between the links 39 and lever elements 40, and the various springs provided. On reaching the lowermost point in the downward sloping section 34a, the section 44c of the cam 44 becomes operative, and owing to the springs coming into play, the position indicated with full lines in Figure 6 is reached. The working end of the tensioning elements 28 will engage the knitwork and press it against the needle bed bearing surface. With a little delay, the upward sloping section 34c of the cam 34 comes into operation and the lever element 30, together with the spring 36, begins to lower its respective tensioning element 28 to engage with the knitwork 27, at the dash-line position of Figure 6, and apply a tension on the knitwork while the needles 24 are being raised and the needles 25 are moved out of their grooves. This position is maintained throughout the needle re-enter phase, by virtue of the stops 38 acting on the lever elements 30 and of the sections 34d and 44d of the cams 34 and 44, until the section 44a comes into operation to return the device to its initial position of Figure 5.

In comparison with the embodiment of Figures 1 to 4, it may be seen that the translatory movement of the tensioning elements 28 has been enhanced in the direction of the bearing surface for the knitwork 27 on the needle bed. That enhanced movement results from the tensioning elements 28 being articulately supported on respective lever-like supporting elements, also arranged to be movable, thereby the support point for the tensioning elements performs, with respect to the supporting block 32 carried by the dial 23, a translatory movement substantially in the direction of the knitwork bearing surface on the needle bed.

It should be appreciated that this translatory movement may also be accomplished through a different means from that shown in Figures 5—8. As an example, the tensioning elements could be each attached to a small block such as the block 11 in the embodiment of Figures 1—4 to support the block in an articulated fashion at one end of a lever pivoted to the structure which carries the needles of the dial 23. Another end of the lever, as well as the block itself, would then be controlled by respective rod-like elements under the action of suitably contoured cams and against the bias force of an elastic means, so as to move the tensioning elements with a component in the direction of the knitwork bearing surface on the needle bed.

In the embodiment shown in Figures 5—8, a pressure is exerted on the knitwork by the spring 45 along with a tension supplied by the spring 36. Advantageously, the springs 45 and 36 may be made adjustable.

It will be apparent from the foregoing description that the device according to the invention is made up essentially of clamps or grippers, one

element whereof is formed by the reed-like element proper, and the other by the machine needle bed. This affords a marked simplification of the tensioning device.

The tensioning elements, which may be steel reeds, have a width dimension which depends in particular on the needle density and steepness of the lift cams therefor. More specifically, the tensioning elements will be made wider where the cams are less steep, and viceversa. In a practical embodiment with a large diameter circular knitting machine, optimum results have been obtained with reed-like elements 30 mm wide. Of course, it would be preferable to have their ends 10 follow the curved line of circular machines, at least above a certain width of the reed-like elements and below a certain diameter of the machines.

Reference has been made hereinabove to a machine having the tensioning elements supported by the dial and acting against the cylinder. It should be understood, however, that the tensioning elements could be supported by the cylinder and arranged to act against the dial. Similarly, they could hold the fabric back against the slider ring, or against some other member attached to either the cylinder or dial. It may be appreciated, moreover, that a device according to this invention may also be incorporated to flat bed machines, as the skilled person in the art will recognize from perusal of the various drawing views. In the latter case, the arrangement of the reed-like elements would be even simpler, they being all aligned therein.

It will be apparent from the description provided that with a very simple means, a proper formation of the knit fabric can be ensured, maintaining an effective tension force applied directly at the most critical area, where it would not be feasible to arrange conventional pulling means. Advantageously, moreover, the tensioning provided is not such that it can distort the knitwork loops.

The invention is susceptible to many modifications and variations without in any way departing from the scope of the inventive idea. Thus, as an example, in addition to the modifications described hereinabove, the reed-like elements 8 could have their ends 9 attached to the dial holder 3a and the pins 14 could be arranged to act directly onto the surface of the respective reed-like elements to deflect them into their working position. Return of each reed-like element to its home position would be ensured by the elasticity of the element itself.

Claims

1. A knitwork tensioning device for a knitting machine having at least one needle bed, comprising a knitwork engagement and tensioning means (6, 26) located within the knitting machine (1, 21), characterized in that said means (6, 26) comprises a plurality of tensioning elements (8, 28) of substantially plate-like configuration supported at

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one portion thereof and each having an opposed portion located in the proximity of the needles (4, 5; 24, 25), said opposed portion being movable between a knitwork disengagement position and a knitwork engagement and tensioning position in cooperation with a knitwork bearing surface on said needle bed.

2. A device according to Claim 1, characterized in that said tensioning elements comprise reed-like elements (8), and that associated with each said reed-like elements (8) is a pin (14) for moving said opposed portion (9), said pin (14) following the profile of a cam (17) driven of relative motion to the structure (3a) carrying said reed-like elements (8).

3. A device according to Claim 2, characterized in that said reed-like elements (8) are each attached to a respective supporting block (11) pivoted to one needle bed in the machine (1) and actuated by a respective one of said pins (14), on each said supporting blocks (11) there acting, in an opposite direction to said pins (14), respective spring loaded small pins (15) effective to maintain the blocks (11) in constant engagement with said pins (14) and, hence, said pins (14) with said cam (17).

4. A device according to either Claim 2 or 3, characterized in that said cam (17) is designed to impress a deflection on said reed-like elements (8) for tensioning the knitwork (7) in the engaged position subsequently to engagement proper.

5. A device according to Claim 1, characterized in that said tensioning elements (28) are supported in an articulated fashion by at least a respective lever-like supporting element (30) pivoted to a supporting block (32) made rigid with the machine structure carrying the needles (24, 25), thereby the support point of said tensioning elements (28) can perform a translatory movement substantially in the direction of the knitwork bearing surface on the needle bed.

6. A device according to Claim 5, characterized in that said tensioning elements (28) are each pivoted to one end of a respective first lever element (30), the other end whereof is subjected to the action of one end of a rod-like control element (33) passing vertically through the needle dial (23) and having the opposed end thereof held in constant engagement with the profile of a ring cam (34) attached to the machine cam structure (23b) driven of relative motion to the needles (24, 25).

7. A device according to either Claim 5 or 6, characterized in that said tensioning elements (28) are connected with a degree of play allowed therebetween, through a respective link (39), to a respective second lever element (40) having a peripheral portion (42) in engagement with one end of a rod-like control element (43) passing vertically through the needle dial (23) and having the opposed end thereof constantly engaged with the profile of a ring cam (44) attached to the cam structure (23b) driven of relative motion to the needles (24, 25).

8. A device according to Claim 6, characterized

in that said control ring cam (34) for said first lever elements (30) has, for each machine yarn feed, a substantially sharply downward sloping section (34a), followed by a short horizontal section (34b), a gently upward sloping section (34c), and a final horizontal section (34d).

9. A device according to Claims 6, 7 and 8, characterized in that said control ring cam (44) for said second lever elements (40) comprises a substantially sharply downward sloping section (44a) followed by a horizontal section (44b) at said downward sloping section (34a) of said control ring cam (34) for said first lever elements (30), a subsequent substantially vertical raising section (44c) at the end of said downward sloping section (34a) on said control ring cam (34) for said first lever elements (30), and a final horizontal section (44d).

10. A device according to any of Claims 2 to 4, characterized in that said reed-like elements are each attached to a respective block pivoted to one end of a lever in turn pivoted to a supporting block attached to the needle carrying structure, said block and said lever being actuated by respective rod-like control elements against the bias of an elastic means for moving said reed-like elements with a translatory component in the direction of the knitwork bearing surface on the needle bed.

Patentansprüche

1. Vorrichtung zum Spannen des Gestrückes an einer Strickmaschine mit wenigstens einem Nadelbett, die Einrichtungen (6, 26) zum Erfassen und Spannen des Gestrückes aufweist, die innerhalb der Strickmaschine (1, 21) angeordnet sind, dadurch gekennzeichnet, daß die genannten Einrichtungen (6, 26) aus einer Vielzahl von Spannelementen (8, 28) von im wesentlichen der Form eines Flachteiles besteht, die an einem Abschnitt gehalten sind und einen entgegengesetzten, in der Nähe der Nadeln (4, 5; 24, 25) angeordneten Abschnitt aufweisen, welcher zwischen einer Stellung, in welcher er sich außer Eingriff mit dem Gestrücke befindet, und einer Stellung, in welcher er sich in Eingriff mit dem Gestrücke zur Spannung desselben in Zusammenarbeit mit einer Abstützfläche auf dem Nadelbett für das Gestrücke befindet, bewegbar ist.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Spannelemente aus blattförmigen Elementen (8) bestehen und daß jedem der blattförmigen Elemente (8) ein Stift (14) zur Bewegung des genannten entgegengesetzten Abschnittes (9) zugeordnet ist, welcher Stift (14) dem Profil eines Nockens (17) folgt, der mit einer Relativbewegung zur die blattförmigen Elemente (8) tragenden Konstruktion (3a) angetrieben wird.

3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß jedes der blattförmigen Elemente (8) an einem jeweiligen Halterungsblock (11) befestigt ist, der an einem Nadelbett in der Maschine (1) angelenkt ist und durch einen der Stifte (14) betätigt wird, wobei auf jeden der

Halterungsblöcke (11) in entgegengesetzter Richtung zu den Stiften (14) kleine, federbelastete Stifte (15) wirken, die befähigt sind, die Halterungsblöcke (11) in Dauereingriff mit den Stiften (14) und folglich die Stifte (14) mit dem Nocken (17) zu halten.

4. Vorrichtung nach Anspruch 2 oder 3, dadurch gekennzeichnet, daß der Nocken (17) derart ausgebildet ist, daß er eine Ablenkung der blattförmigen Elemente (8) zum Zwecke der Spannung des Gestrückes (7) in der Eingriffsstellung nach dem erfolgten Eingriff bewirkt.

5. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Spannelemente (28) gelenkig an wenigstens einem jeweiligen hebelartigen Lagerungselement (30) gelagert sind, welches an einem Halterungsblock (32) angelenkt ist, der mit der die Nadeln (24, 25) tragenden Maschinenkonstruktion fest verbunden ist, wodurch der Lagerungspunkt der Spannelemente (28) eine Translationsbewegung im wesentlichen in Richtung der das Gestrücke abstützenden Fläche auf dem Nadelbett durchführen kann.

6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß jedes der Spannelemente (28) an einem Ende eines jeweiligen ersten Hebelelementes (30) angelenkt ist, dessen anderes Ende der Wirkung eines Endes eines stabförmigen Steuerungselements (33) ausgesetzt ist, das vertikal den Nadelteller (23) durchsetzt und dessen anderes Ende sich im Dauereingriff mit den Profil einer Ringkurve (34) befindet, die mit der Maschinennockenkonstruktion (23b) verbunden ist, welche mit Relativbewegung zu den Nadeln (24, 25) angetrieben wird.

7. Vorrichtung nach Anspruch 5 oder 6, dadurch gekennzeichnet, daß die Spannelemente (28) mit einem gewissen dazwischen zugelassenen Spiel über ein entsprechendes Glied (39) mit einem zweiten jeweiligen Hebelelement (40) verbunden sind, welches einen peripheren Abschnitt (42) besitzt, der mit einem Ende eines stabförmigen Steuerungselements (43) im Eingriff steht, das vertikal den Nadelteller (23) durchsetzt und dessen entgegengesetztes Ende im Dauereingriff mit einer Ringkurve (44) steht, die mit der Maschinennockenkonstruktion (23b) verbunden ist, welche mit Relativbewegung zu den Nadeln (24, 25) angetrieben wird.

8. Vorrichtung nach Anspruch 6, dadurch gekennzeichnet, daß die Steuerungsringkurve (34) für die ersten Hebelelemente (30) für jedes eingespeiste Maschinengarn einen im wesentlichen scharf nach unten abfallenden Abschnitt (34a), gefolgt von einem kurzen horizontalen Abschnitt (34b), einem leicht nach oben ansteigenden Abschnitt (34c) und einen abschließenden horizontalen Endabschnitt (34d) aufweist.

9. Vorrichtung nach den Ansprüchen 6, 7 und 8, dadurch gekennzeichnet, daß die Steuerungsringkurve (44) für die zweiten Hebelelemente (40) einen im wesentlichen scharf nach unten abfallenden Abschnitt (44a), gefolgt von einem horizontalen Abschnitt (44b) beim nach unten abfallenden Abschnitt (34a) der Steuerungsringkurve

(34) für die ersten Hebelelemente (30), einen weiteren im wesentlichen vertikalen aufsteigenden Abschnitt (44c) am Ende des nach unten abfallenden Abschnittes (34a) der Steuerungsringkurve (34) für die ersten Hebelelemente (30), und einen abschließenden horizontalen Abschnitt (44d), aufweist.

10. Vorrichtung nach einem der Ansprüche 2 bis 4, dadurch gekennzeichnet, daß jedes der blattförmigen Elemente an einem Blockteil befestigt ist, der an einem Ende eines Hebels angelenkt ist, der seinerseits an einem, an dem die Nadeln haltenden Konstruktionsteil befestigten Halterungsblock angelenkt ist, wobei der Halterungsblock und der Hebel jeweils durch stabförmige Steuerungselemente gegen die Wirkung von Federeinrichtungen zum Zwecke der Bewegung der blattförmigen Elemente mit einer Translationskomponente in Richtung der das Gestricke abstützenden Fläche auf dem Nadelblett betätigt werden.

Revendications

1. Dispositif de tension d'un tricot pour métier à tricot ayant au moins une planche d'aiguilles, comprenant des moyens d'engagement et de tension du tricot (6, 26) situés à l'intérieur du métier à tricot (1, 21), caractérisé en ce que lesdits moyens (6, 26) comprennent une pluralité d'éléments de tension (8, 28) essentiellement en forme de plaque fixés sur une de leurs parties et ayant chacun une partie opposée située dans le voisinage des aiguilles (4, 5; 24, 25), ladite partie opposée étant mobile entre une position de dégagement du tricot et une position d'engagement et de tension du tricot en coopération avec une surface d'appui du tricot sur ladite planche des aiguilles.

2. Dispositif selon la revendication 1, caractérisé en ce que lesdits éléments de tension comprennent des éléments en forme de lame (8), et qu'il est associé à chaque élément en forme de lame (8), une cheville (14) pour déplacer ladite partie opposée (9), ladite cheville (14) suivant le profil d'une came (17) animée d'un mouvement relatif par rapport à la structure (3a) portant lesdits éléments en forme de lame (8).

3. Dispositif selon la revendication 2, caractérisé en ce que lesdits éléments en forme de lame (8) sont chacun fixés à un bloc de support respectif (11) monté à rotation sur une planche d'aiguilles dans le métier (1) et actionnés par une desdites chevilles (14), de petites goupilles (15) comprimées chacune par un ressort agissant sur chacun des blocs (11), dans une direction opposée à celle des chevilles (14), afin de maintenir les blocs (11) en contact constant avec lesdites chevilles (14) et donc lesdites chevilles (14) avec ladite came (17).

4. Dispositif selon la revendication 2 ou la revendication 3, caractérisé en ce que ladite came (17) est profilée pour imprimer une flexion sur lesdits éléments en forme de lame (8) afin de tendre le tricot (7) dans la position engagée qui suit l'engagement lui-même.

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5. Dispositif selon la revendication 1, caractérisé en ce que lesdits éléments de tension (28) sont appuyés de manière articulée sur au moins un élément de support respectif en forme de levier (30) monté à rotation sur un bloc d'appui (32) solidaire de la machine portant les aiguilles (24, 25), de telle sorte que le point de support desdits éléments de tension (28) peut effectuer un mouvement de translation essentiellement dans la direction de la surface d'appui des tricots sur la planche des aiguilles.

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6. Dispositif selon la revendication 5, caractérisé en ce que lesdits éléments de tension (28) sont chacun montés à rotation sur une extrémité d'un premier élément de levier respectif (30), l'autre extrémité étant soumise à l'action d'une extrémité d'un élément de contrôle en forme de barre (33) traversant verticalement le disque des aiguilles (23) et ayant l'extrémité opposée en contact constant avec le profil d'une came annulaire (34) fixée sur la structure de came de la machine (23b) animée d'un mouvement relatif par rapport aux aiguilles (24, 25).

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7. Dispositif selon la revendication 5 ou la revendication 6, caractérisé en ce que lesdits éléments de tension (28) sont reliés, avec un certain jeu, à l'aide d'une tige respective (39) à un second élément de levier respectif (40) tangentiellement engagé sur une de ses parties (42) avec une extrémité d'un élément de contrôle en forme de barre (43) traversant verticalement le disque des aiguilles (23) et ayant son extrémité opposée engagée constamment avec le profil d'une came annulaire (44) fixée à la structure de came (23b) animée d'un mouvement relatif par rapport aux aiguilles (24, 25).

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8. Dispositif selon la revendication 6, caractérisé en ce que ladite came annulaire de contrôle (34) des premiers éléments de levier (30) a, pour chaque fournisseur de fil du métier, une section essentiellement en forte pente (34a), suivie d'une courte section horizontale (34b), d'une section remontant doucement (34c) et d'une section finale horizontale (34d).

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9. Dispositif selon les revendications 6, 7 et 8, caractérisé en ce que ladite came annulaire de contrôle (44) des seconds éléments de levier (40) comprend une section essentiellement en forte pente (44a) suivie d'une section horizontale (44b) correspondant à la section descendante (34a) de la came de contrôle (34) des premiers éléments de levier (30), suivie d'une section (44c) remontant verticalement à l'extrémité de la section descendante (34a) de la came de contrôle (34) des premiers éléments de levier (30), et d'une section finale horizontale (44d).

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10. Dispositif selon l'une des revendications 2 à 4, caractérisé en ce que les éléments en forme de lame sont chacun fixés à un bloc respectif monté à rotation sur une extrémité de levier lui-même monté à rotation sur un bloc d'appui fixé à la structure de support des aiguilles, ledit bloc et ledit levier étant actionnés par des éléments de contrôle respectifs en forme de barre agissant contre la force de rappel de moyens élastiques propres à

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animer les éléments en forme de lame d'un mouvement de translation dans la direction de la

surface d'appui du tricot sur la planche des aiguilles.

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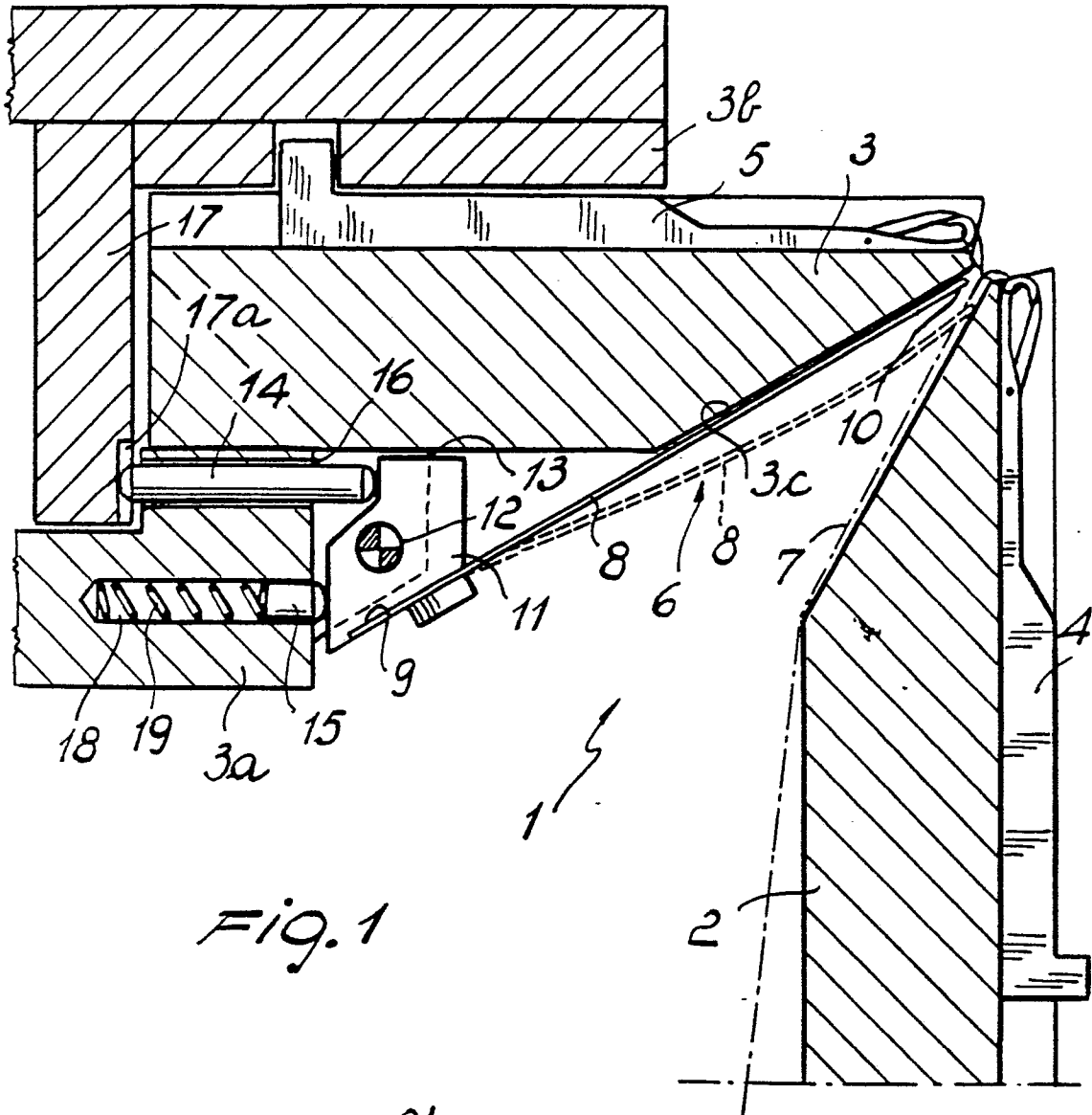


Fig. 1

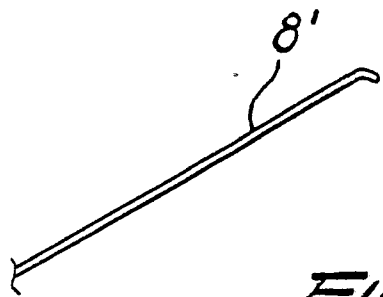


Fig. 4

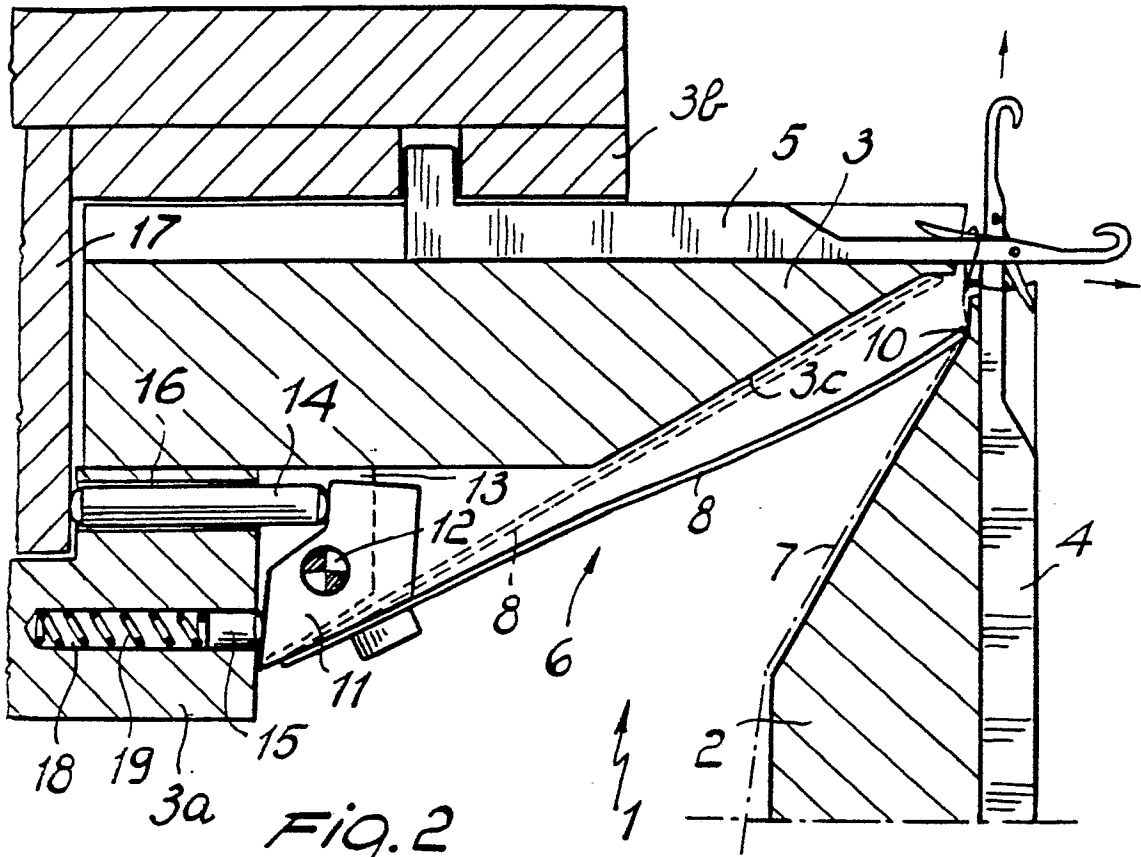


FIG. 2

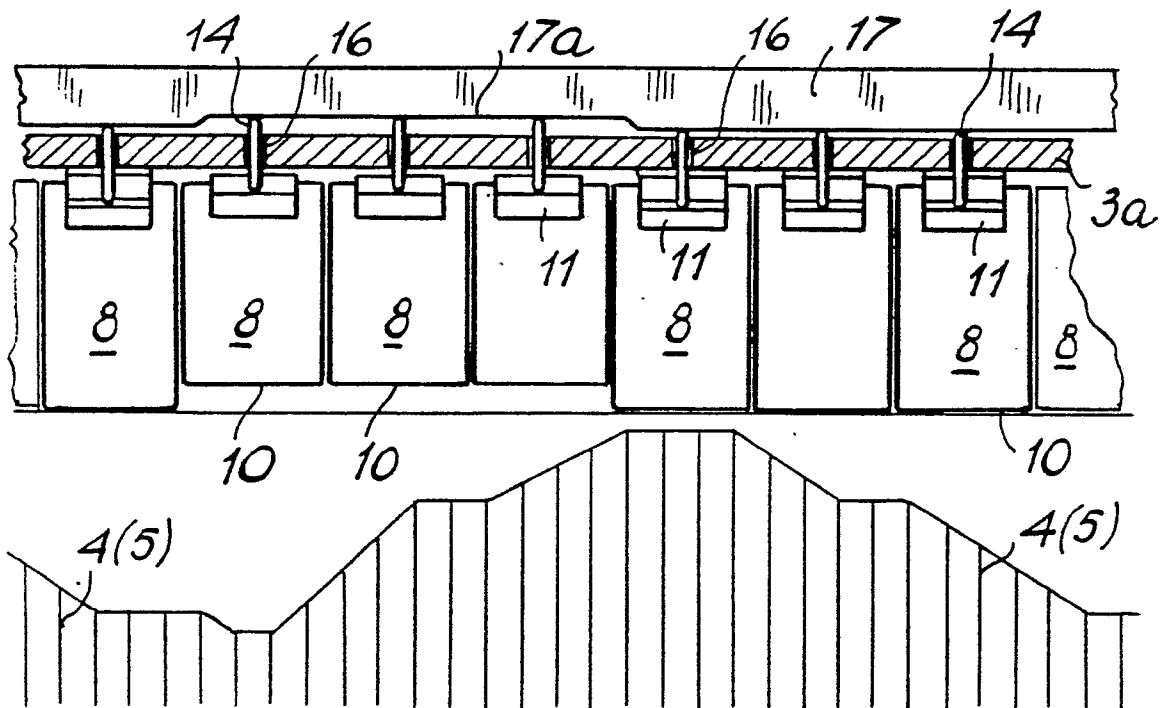
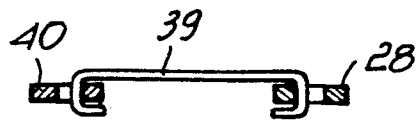
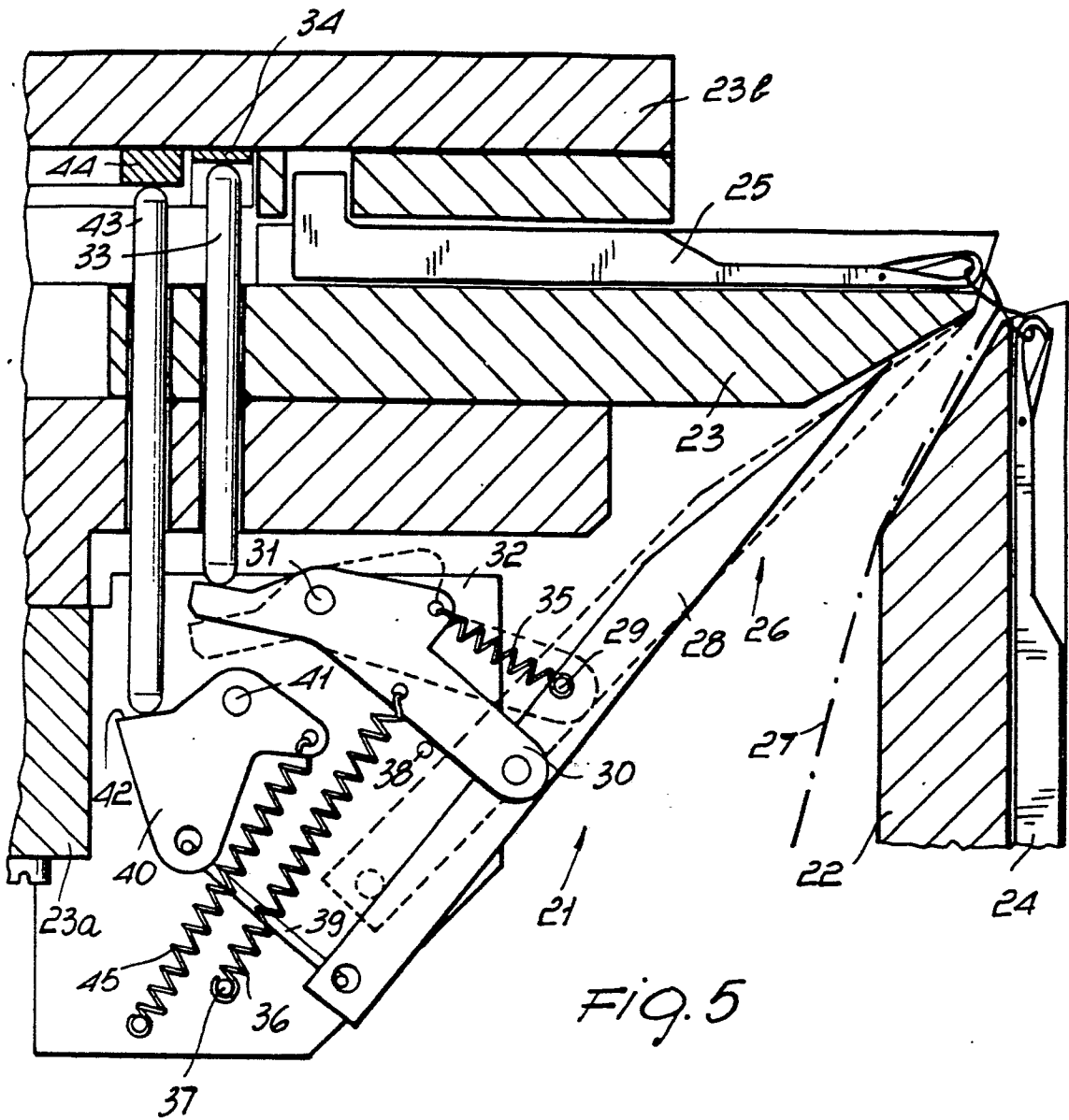


FIG. 3



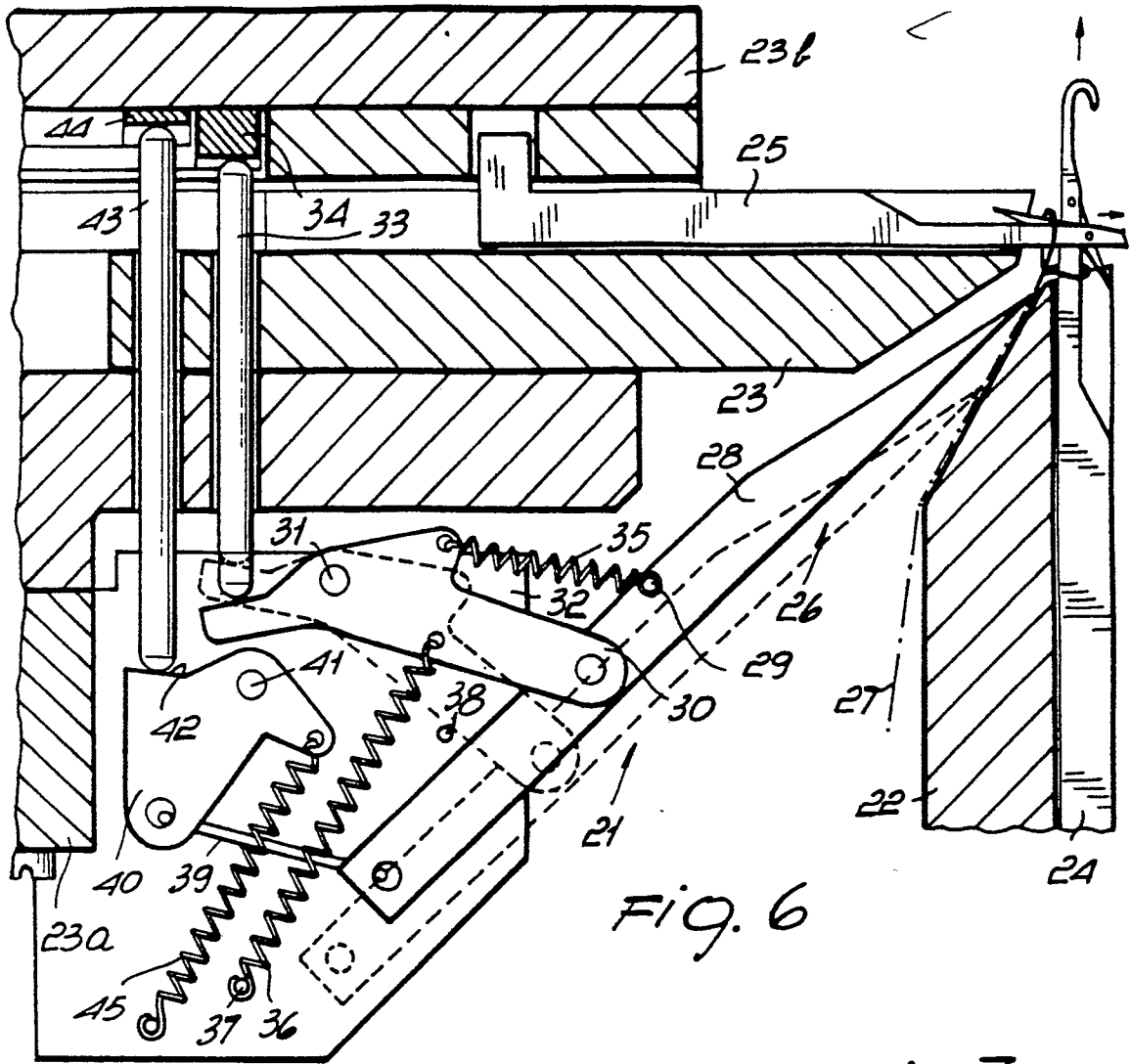


FIG. 6

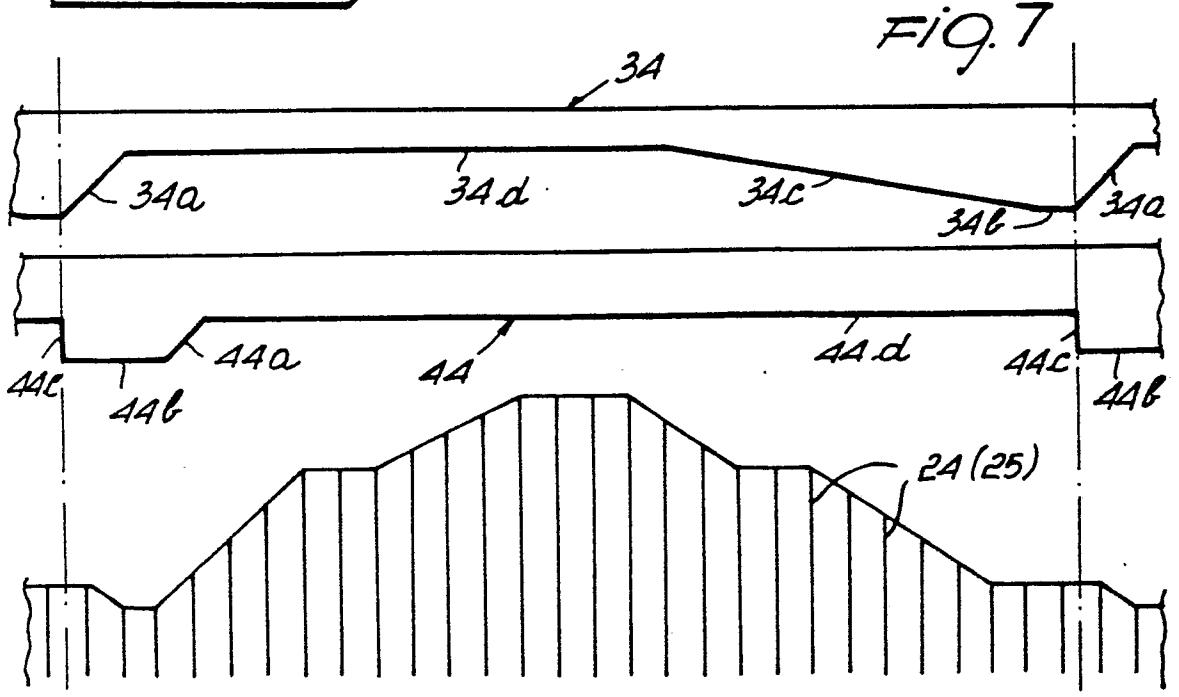


FIG. 7