Oct. 27, 1936. H. B. AARONSON 2,059,076

STRIPER FOR KNITTING MACHINES

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Fig. 2.

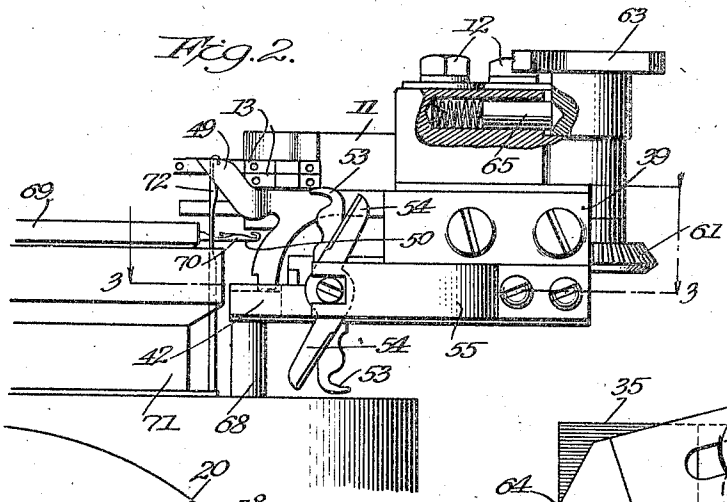


Fig. 1.

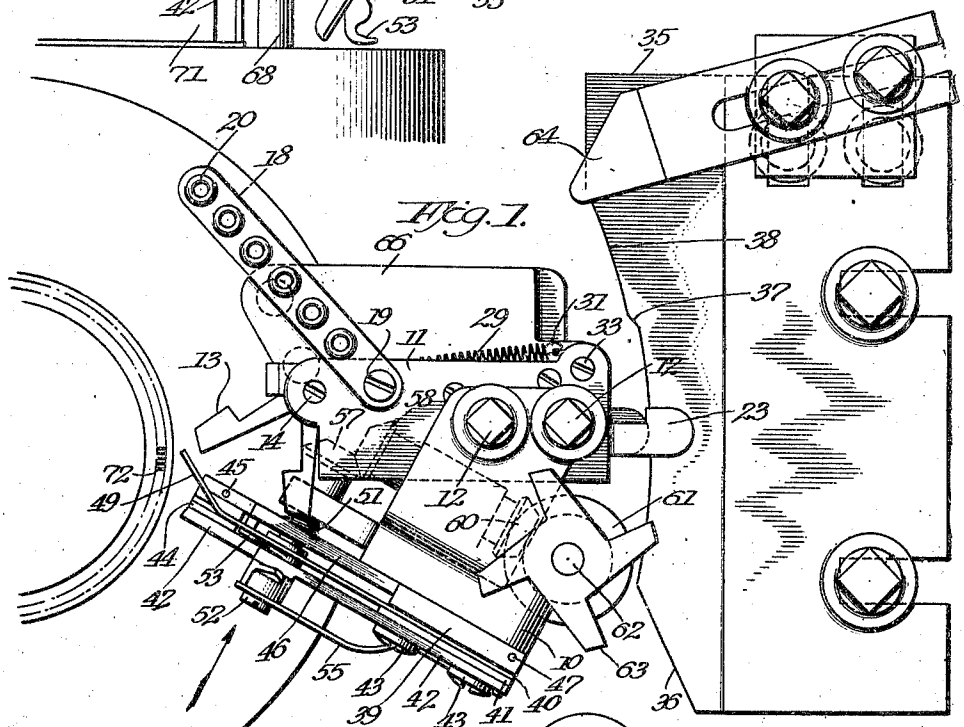


Fig. 3.

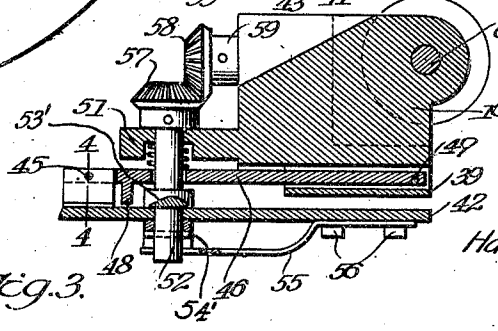
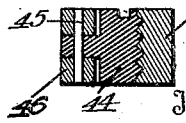


Fig. 4.



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Fig. 5.

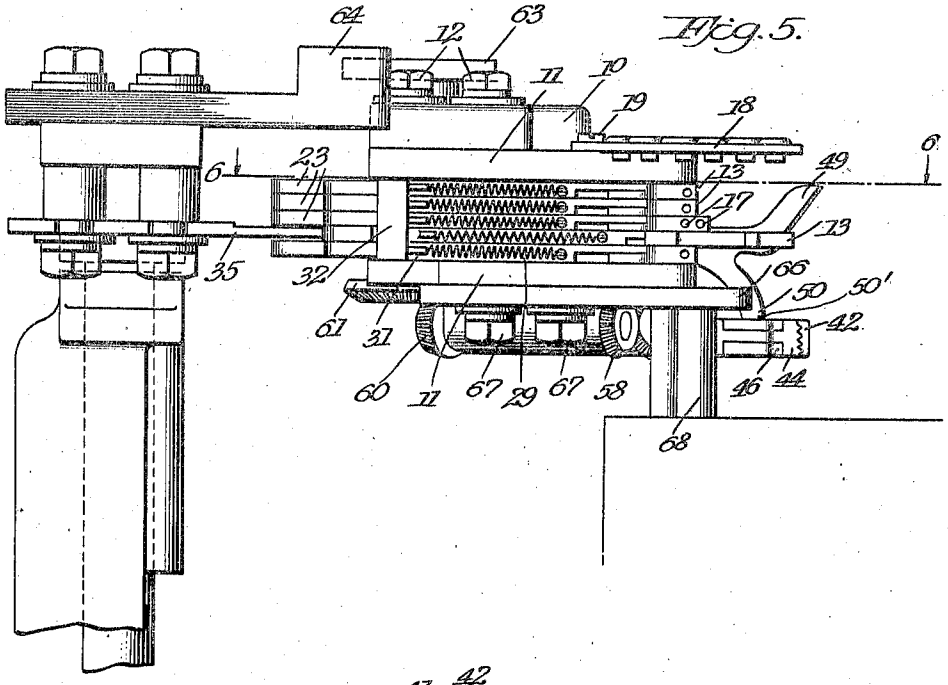
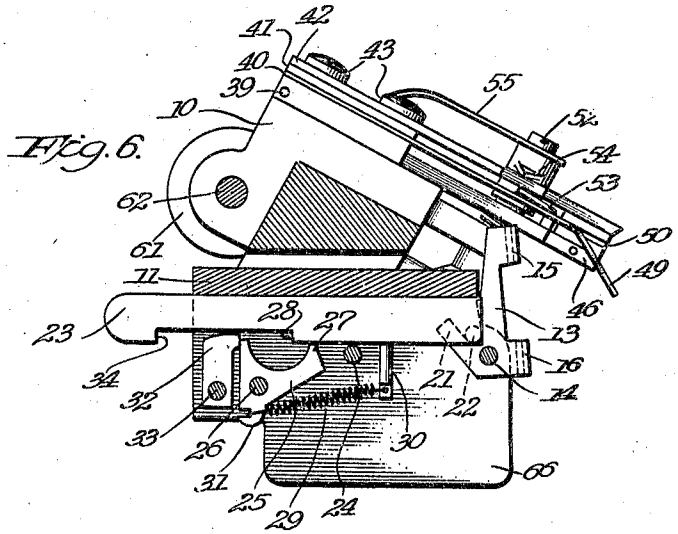


Fig. 6.



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Fig. 7.

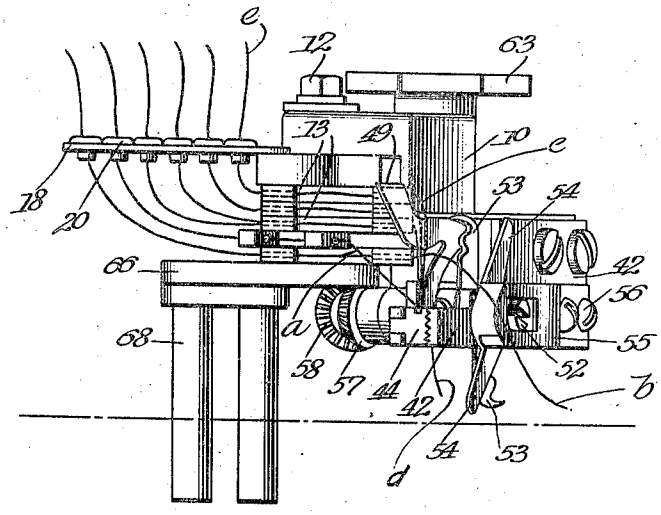
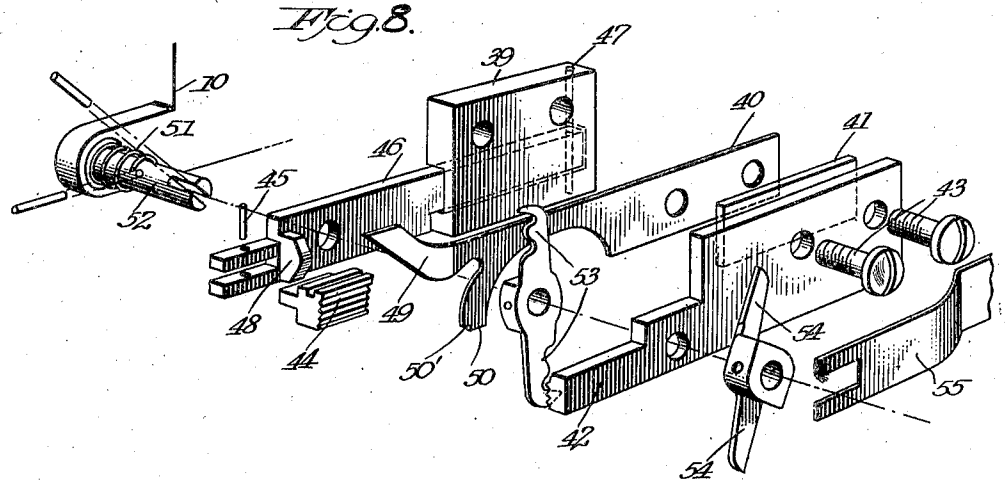


Fig. 8.



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UNITED STATES PATENT OFFICE

2,059,076

STRIPER FOR KNITTING MACHINES

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Application June 28, 1932, Serial No. 619,758

25 Claims. (Cl. 66—140)

My invention relates to a yarn changer and it is an object thereof to provide an improved yarn changer particularly adapted for horizontal striping on a circular ribber of the dial and cylinder type, though it is not limited to such use. It is an object of my invention to provide a device of this character wherein the new yarn, from a yarn finger that has just been moved into feeding position, is caught by the dial needles and drawn into proper feeding position relative to both sets of needles, the usual practice heretofore having been to have the new yarn caught by the cylinder needles and drawn into feeding relation.

Another object of the invention is to provide improved means for positioning any yarn finger in feeding position with releasing means common to all the fingers.

Another object of the invention is to provide an improved plating finger.

Another object of the invention is to provide improved cutting and clamping means for the idled yarns.

Referring to the drawings, which are made a part of this application and in which similar reference characters indicate similar parts:

Fig. 1 is a plan of part of a knitting machine, showing my improved devices in position thereon,

Fig. 2, an elevation of parts shown in Fig. 1, looking in the direction of the arrow, which arrow also indicates the direction of rotation of the cam ring (not shown) and the yarn feeding means about the stationary needle beds,

Fig. 3, a horizontal section on line 3—3 of Fig. 2 illustrating details of operating means for the yarn clamp and cutter,

Fig. 4, a section through the yarn clamping means on line 4—4 of Fig. 3,

Fig. 5, an elevation of my improved devices looking in the opposite direction to the arrow in Fig. 1,

Fig. 6, a section on line 6—6 of Fig. 5, looking in the direction of the arrows.

Fig. 7, an elevation looking radially outward from the axis of the machine, and

Fig. 8, a dissembled view of the cutting and clamping means.

In the drawings, reference character 10 indicates a casting of irregular shape to which are attached units that can readily be removed therefrom, as for repairs or replacements. One of these units is shown at 11, this unit being substantially U-shaped in section and being attached to a horizontal arm of the castings by screws 12, said unit supporting the various yarn fingers and yarn guiding means and certain controlling elements now to be described.

The yarn fingers are indicated at 13, the set of fingers being pivoted at 14 for movement in horizontal planes and the outline of a finger being plainly shown in Fig. 6. Each finger has lateral extensions with yarn guiding apertures indicated at 15 and 16 in Fig. 6 and one of the fingers, which is particularly designed for plating, has two sets of apertures, as indicated at 17 in Fig. 5. An arm 18 is secured to the unit 11 by a screw 19 and the various yarns lead from a suitable source of supply through eyes 20 to the apertures 15 and 16 of the respective yarn fingers and thence to the needles or to the clamp hereinafter described. Each of the yarn fingers has a lug 21 extending behind a pin 22 on a slide 23, there being a group of such slides each individual to a yarn finger, as best shown in Fig. 5, these slides being guided in the unit 11 which has a transverse pin 24 extending crosswise thereof above the slides for holding them in place. Detents 25 are pivoted at 26 and their noses 27 are adapted to engage shoulders 28 on the slides 23 for holding the slides in forward position after they have moved a yarn finger from the idle position shown in Fig. 6 to the feeding position illustrated in Fig. 1.

Springs 29, corresponding in number to the slides and their detents, are each attached at one end to a lug 30 on a slide and at the other end to a hook 31 on a detent 25 whereby they urge the detents in counterclockwise direction, (shown in Fig. 6) and also urge the corresponding slide toward the left in said figure or into a position for idling the corresponding yarn finger, it being noted that the connection between a slide and its finger is such that the finger is positively urged either toward or from a feeding position by appropriate movement of its slide. At the rear of the detents 25 there is a releasing device consisting of a block 32 pivoted at 33 which block can be engaged by shoulders 34 on each of the slides 23 for releasing any detent which is in engagement with a shoulder 28 of a slide that is holding its yarn finger in feeding position so as to release the detent of any such slide and permit it to move its finger to idle position.

For moving the slides to the right in Figs. 5 and 6, to bring the corresponding fingers into operative position, I have provided a cam plate 35, best shown in Fig. 1, this cam plate being on the fixed frame of the machine and being movable vertically under the control of pattern mechanism (not shown). This plate is provided

with a cam face at 36 which moves a selected slide inward to the position illustrated in Fig. 5 and it also has another cam face at 37 which moves this slide farther inward to a point where its shoulder 34 strikes the block 32, moving said block farther inward to tilt all the detents 25 and release all the slides that may be held in their inward position by detents 25, thereby releasing all said slides and permitting their yarn fingers to move into idle position, the selected slide and its yarn finger being held in feeding position by the cam face at 38 on plate 35 until the yarn changer has passed the plate, when the selected slide and its finger are held in place by the corresponding detent 25.

It will be noted as to the plating yarn finger that the two yarns from this finger will feed in plating relation to the needles whereby one yarn appears on one face of the fabric and the other on the other face in well known manner.

In addition to the yarn changing means, my invention includes yarn cutting and clamping means, the essential elements of which constitute a unit attached to one side of the casting 10. These elements (best shown in Figs. 3 and 8) include a block 39, a plate 40, a spacer 41 and a plate 42, all secured to casting 10 by screws 43. The plate 42 at its outer end is provided with longitudinally extending teeth indicated in Fig. 4, which teeth cooperate with similar teeth on a fiber block 44 pivoted at 45 on an arm 46 which is pivoted at 47 on the fixed block 39 and which has a lateral extension at 48 provided with a cam face. The plate 40 at its inner end is formed into two forks 49 and 50 with a notch between them to receive an idled yarn. The arm 46 is forced toward clamping position by a coil spring 51 surrounding the shaft 52 and bearing at its rear end against the part of the casting 10 in which said shaft is journalled.

The shaft 52 is also journalled in the forward part of plate 42 and at one side of said plate carries a pair of hooks 53 whose function is to engage a yarn which is in the notch between forks 49 and 50 and to carry it down between the corrugated faces of the clamping elements as the shaft 52 rotates, in which movement a cam face at 53' (Fig. 3) on the hook engages the cam 48 to separate the clamping members by moving the arm 46 about its pivot 47. The shaft 52 also has secured thereto a pair of shear blades 54 by means of a pin 54' (Fig. 3) passing through a slot (Fig. 8) in shaft 52, said blades cooperating with a shearing edge on the plate 42 to cut off a yarn extending from the clamp to the needles. A leaf spring 55 is secured to plate 42 by screws 56 and this spring is provided at its forward end with forks engaging the hub of the shear blade to force the hub in a direction to maintain operative engagement between said blades and the cooperating fixed blade.

For operating the cutting and clamping devices above described the shaft 52 has at its inner end a pinion 57 coacting with a pinion 58 on a shaft 59 which in turn has a pinion 60 (Fig. 1) engaging a pinion 61 on a shaft 62 provided at its upper end with a star wheel 63 which is rotated step-by-step by means of an abutment 64 positioned when raised to engage the star wheel at each rotation of the cam ring. A spring-pressed detent 65 engages recesses in the hub of the star wheel so as to position it correctly at the end of each quarter revolution.

A plate 66 is secured to the under face of the unit 11 by screws 67 and this plate has depending pins 68 engaging a suitable support on the cam ring or a part rotating therewith, for holding the yarn changer in position.

The position of the device on the machine is shown generally in Figs. 1 and 2 wherein 69 indicates the dial of the machine carrying dial needles 70 and wherein 71 indicates the cylinder carrying the cylinder needles 72.

From the foregoing it will be seen that when a yarn, e. g. that shown at *a*, is to be carried from idle position to the feeding position the plate 35 is brought into position for forcing the corresponding slide 23 inward into position to be held by a detent 25 which can swing into position for engagement with the shoulder 28 of the slide at the proper time when the finger 13 has been moved clockwise to operative position. Immediately thereafter the shoulder 37 of the cam plate moves this slide slightly farther in, so as to turn block 32 on its pivot, releasing all detents and permitting any other slide or slides which may be in inward position to move outward, thereby moving their guides counterclockwise into idle position, the yarn of an idled guide moving approximately into position *b* and lying directly in the notch between forks 49 and 50. The finger which is to become operative is held in place by engagement of cam face 38 with its slide until after it passes said face, whereupon its detent 25 holds that slide in place. Directly after the yarn change has taken place the abutment 64 engages the star wheel 63 and through shafts 62, 59, and 52 it moves the hook 53 and shear blade 54 counterclockwise in Fig. 2, the hook moving the idled yarn from the position of yarn *b* into the clamp and opening the clamp to release the end of yarn fed to the needles. The hook also lays the idled yarn across the fixed shear blade on plate 42 and carries a bight of the yarn down between the corrugated faces of the clamping members, the base of the hook having acted on cam 48 to open the clamp. Each shear blade 54 is positioned a little back of the adjacent hook so as to cut off the yarn after it is carried safely down into the clamp and the cut-off end of the idled yarn will then be in the position indicated at *d*. The upper hook member 49 is bent so as to secure early engagement with an idled yarn and insure its proper position and the lower fork 50 has a notch at 50' (Fig. 8) to provide additional room for a plurality of idle yarns which may be held by the clamp at the same time. The yarn which is carried into active position extends across from the clamp to the end of the yarn finger until released by engagement of cam 53' with cam 48 and is thus carried across the plane of the dial needles and between such needles, whereupon it is grasped by the hook of the dial needle immediately at the rear of the yarn position and is drawn into position to be taken by the hooks of the descending cylinder needles. The opening of the clamp facilitates the withdrawal of the end of said yarn from the clamp by the relative rotation of the needle beds and the needle cams.

It will be obvious to those skilled in the art that various modifications may be made in my device without departing from the spirit of the invention, therefore I do not limit myself to what is shown in the drawings or described in the specification but only as indicated in the appended claims:

Having thus fully described my said invention,

what I claim as new and desire to secure by Letters Patent is:

1. In a dial and cylinder knitting machine, a yarn changer comprising a plurality of yarn fingers pivoted to swing in planes parallel to the plane of the dial needles and positioned above such plane, a plurality of slides individually related at one end to said yarn fingers each acting directly on a yarn finger, detents for holding the individual yarn fingers in feeding position, means for selective engagement with the other ends of said slides to actuate the yarn fingers, and means operated by an actuated slide for releasing the detent of any yarn finger which is in operative position and thereby permitting the yarn finger to move to idle position.

2. In a dial and cylinder knitting machine, a yarn changer comprising a plurality of yarn fingers pivoted to swing in planes parallel to the plane of the dial needles and positioned above such plane, a plurality of slides individually related to said yarn fingers, detents for holding the individual yarn fingers in feeding position, means for actuating said slides selectively, and springs each connected respectively to a slide and to its detent said springs tending to move the detent into position to hold a slide in forward position and also tending to retract said slide.

3. In combination, a yarn finger movable into either idle or feeding position, a pattern controlled slide for actuating the yarn finger, a pivoted detent for engaging the slide to hold the same in one position, and a single spring connected to the slide and the detent said spring serving to move the detent into engagement with the slide and also serving to retract the slide upon disengagement of the detent.

4. In a yarn changer, a pivoted yarn finger, a tail extending rearwardly from the finger in inclined relation to the body thereof, an actuating slide for the finger movable in a plane intersecting the axis of the finger, and a lug on said slide extending into the notch between the body of the finger and said tail whereby the finger may be moved positively into or out of feeding position.

5. In a knitting machine, a plurality of yarn fingers, actuating means therefor including parallel slides operatively engaged with individual yarn fingers, pattern controlled means for selectively advancing the slides to move their yarn fingers into feeding position, individual detents for holding the slides in actuated position, a releasing device common to said detents, means on each slide whereby excess advancing movement of the slides actuates the releasing device, and means in connection with said pattern controlled device for imparting such excess movement to a slide.

6. In a knitting machine, yarn changing means, yarn clamping means, a forked member between the yarn changing means and the clamp positioned to receive an idled yarn between its forks, and means for engaging an idled yarn in such position and forcing it into said clamp.

7. A device as in claim 6, said last-named means comprising a rotary hook for engaging the yarn, and means moving with the hook for opening the clamp.

8. In a knitting machine, a stack of yarn guides mounted on a common vertical pivot, yarn clamping means in advance of said yarn fingers, a forked stationary member between said yarn fingers and said yarn clamp for receiving an idle yarn between its forks, a hook movable relatively to said forked member for engaging an idled yarn and moving it into the clamp and a cutter operating in timed relation to said hook for cutting off the idle yarn after it is entered in the clamp.

9. In a knitting machine, a stack of yarn guides mounted on a vertical pivot, yarn clamping means in advance of said yarn fingers, a bifurcated stationary member between said yarn fingers and said yarn clamp for engaging an idle yarn at an intermediate point, a hook movable relatively to said guide member for engaging an idled yarn and moving it into the clamp, and a cutter operating in timed relation to said hook for cutting off the idled yarn after it is entered in the clamp, said clamp including a fixed clamping member and a pivoted member and said hook including means for moving the pivoted member away from the fixed member to permit the idled yarn to enter between said members.

10. In a knitting machine, a stack of yarn guides mounted on a vertical pivot, yarn clamping means in advance of said yarn fingers, a bifurcated stationary member between said yarn fingers and said yarn clamp for engaging an idled yarn, a hook movable relatively to said guide member for engaging an idled yarn and moving it into the clamp, a shaft on which said hook is mounted, pattern controlled means for idling a yarn and then rotating said shaft to cause the hook to carry the idled yarn into the clamp and cutting means for severing the idled yarn after it has been entered in the clamp.

11. In a knitting machine, yarn changing means, a yarn clamp for idle yarns comprising a fixed jaw having parallel corrugations, a pivoted jaw having corrugations interfitting with those of the fixed jaw, and a support for said movable jaw said support being pivoted on an axis parallel to that of the jaw.

12. A device as in claim 11, combined with a cam on said support, means for entering an idled yarn between said jaws, and means acting on said cam for opening the jaws in connection with the entering of an idled yarn between them.

13. A device as in claim 11, the corrugations on said jaws extending transversely of the plane of the pivot of the movable jaw.

14. In a knitting machine, yarn changing means, a yarn clamp having a fixed jaw and a pivoted jaw, and a support for the movable jaw said support being pivoted on an axis parallel to that of the movable jaw, substantially as set forth.

15. A device as in claim 14, in combination with a cam on said pivoted support, and means for engaging the cam to open the clamp.

16. In a yarn changer, a set of pivoted yarn fingers mounted on a vertical axis, a tail extending rearwardly from each finger in inclined relation to the body thereof, an actuating slide for the finger movable in a plane intersecting said axis, a lug on said slide extending into the notch between the body of the finger and said tail whereby the finger may be moved positively into or out of feeding position, and a pattern-controlled element adapted to be positioned for selective engagement with said slides for moving the respective yarn-fingers into operative position.

17. In a knitting machine, yarn clamping means for an idle yarn comprising a fixed jaw, a movable jaw, a shaft extending through said jaws, a pair of hooks at opposite sides of said

shaft for engaging an idle yarn and forcing it between the clamping jaws, means movable with the shaft for opening the jaws, yarn-cutting means including a pair of blades at opposite sides of said shaft, and a fixed blade coacting therewith.

18. A device as in claim 17, the cutting jaws being so located with reference to said hooks as to cut off a yarn only after it has been introduced into the clamp.

19. In a knitting machine having a needle cylinder and a cam carrier, a set of yarn fingers, a rotary shaft, a plurality of shear blades extending radially from said shaft, a shearing element fixed with reference to the cam ring said shearing element being positioned to receive the yarns of said fingers and to coact with the blades on said shaft, and means on said shaft adjacent each blade for positioning the yarns preliminary to the cutting operation.

20. In a knitting machine, the combination with yarn clamping means comprising a fixed clamping jaw and an oscillatory clamping jaw coacting therewith, of a yarn cutting means comprising a fixed shear blade, a rotatable element having radial shear blades thereon, means rotating with said element for opening the clamping means as each radial shear blade approaches the fixed shear blade, and means for guiding idled yarns into said clamping and cutting means.

21. In a knitting machine, having a needle cylinder and a cam carrier, the combination with yarn cutting means comprising a rotary shear element having a radially extending shear blade thereon and a fixed shear blade on the cam ring, of yarn clamping means, and means rotating with said shear element serving to open the clamp and enter an idled yarn therein.

22. In a knitting machine, the combination with yarn changing means, of means for severing idled yarns, and means for holding the end of an idled yarn comprising a pair of jaws, one of said jaws having a slot and being movable toward and from the other jaw to open and close the clamp, and a resilient member for guiding idled yarns into said clamp, the lower end of said member extending into the slot in said movable jaw and bearing against a wall of the slot so as to resist the opening of the clamp.

23. A device as in claim 22, wherein the part engaging in said slot is of substantial width and is cut away adjacent the jaw to provide space for a plurality of idled yarns.

24. In a circular independent needle knitting machine, a stationary needle cylinder, a stationary dial, rotary cam carriers for actuating the needles in the cylinder and dial, a yarn changer comprising a plurality of yarn fingers above the plane of the dial needles, said fingers being individually movable in planes approximately parallel to the plane of the dial needles from an idle position remote from the cylinder needle circle to an active position close to said circle, means below said plane for severing idled yarns and holding the ends of such yarns, whereby a yarn upon its introduction to the needles is taken first by the dial needles and is then drawn into position to be taken by the cylinder needles, and means for engaging an idled yarn between its finger and the needles, said means carrying said yarn into position to be severed and held until again called into action substantially as set forth.

25. In a knitting machine, a set of yarn fingers, yarn clamping means, a forked member for guiding an idled yarn toward said clamping means, rotary means adjacent said forked member for engaging an idled yarn to move it into said clamping means and yarn severing means operating in timed relation to said rotary means for severing said idled yarn.

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