Jan. 20, 1959 R. N. TOONE 2,869,343

KNITTING MACHINE

Filed Dec. 18, 1953 5 Sheets-Sheet 1

FIG. 1.

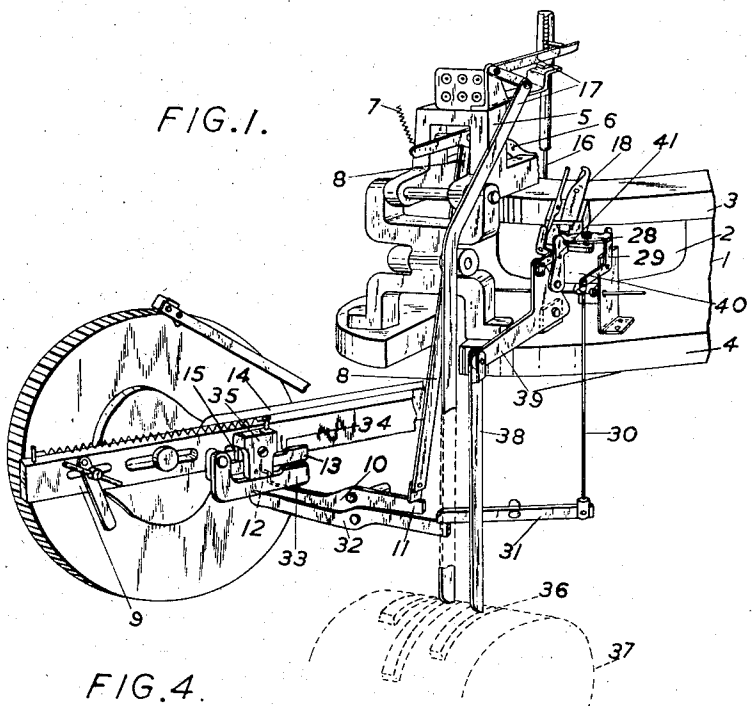


FIG. 4.

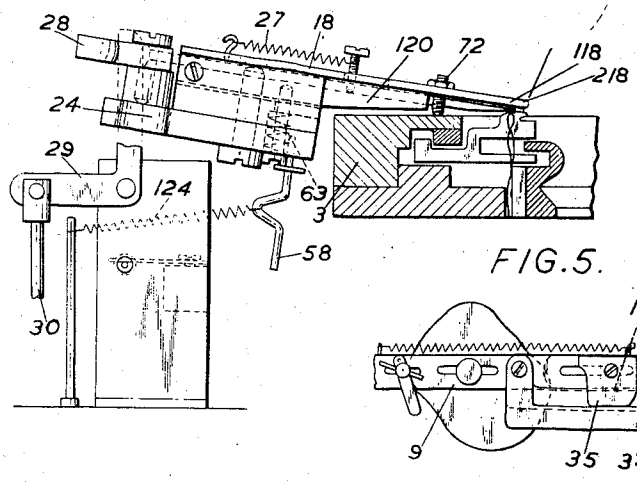


FIG. 5.

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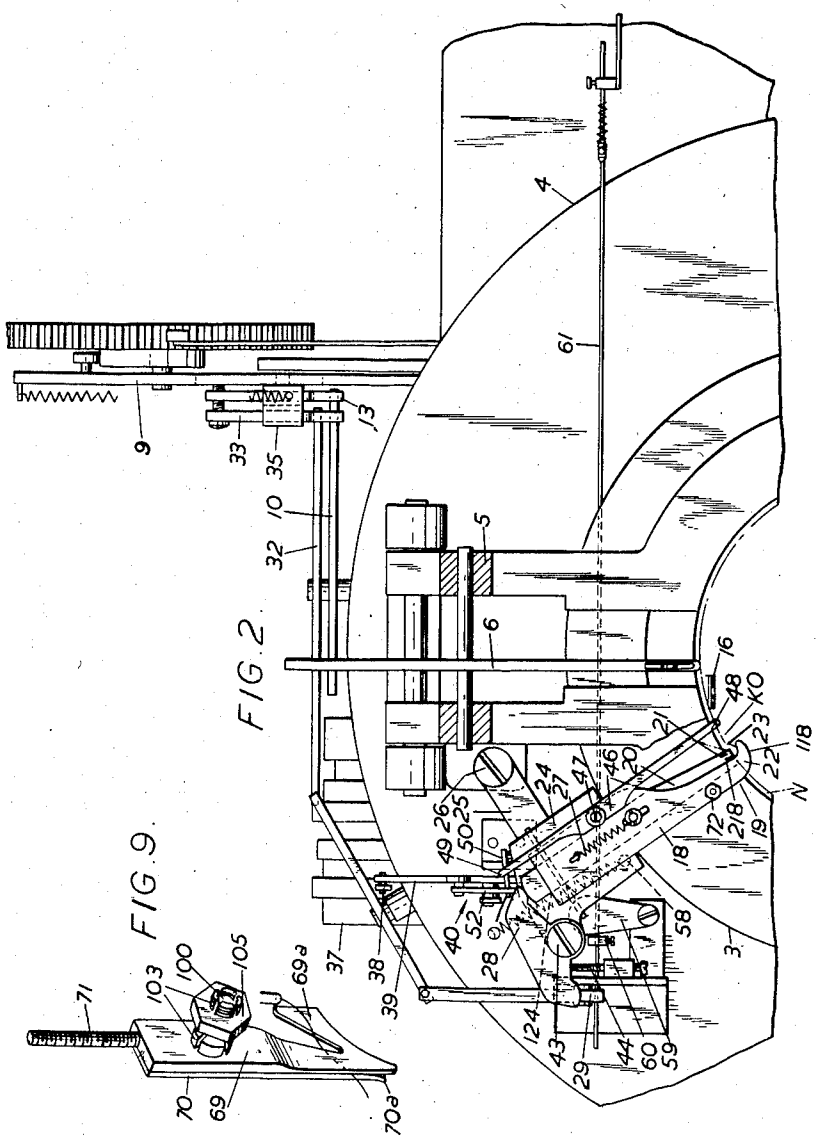


FIG. 2.

FIG. 9.

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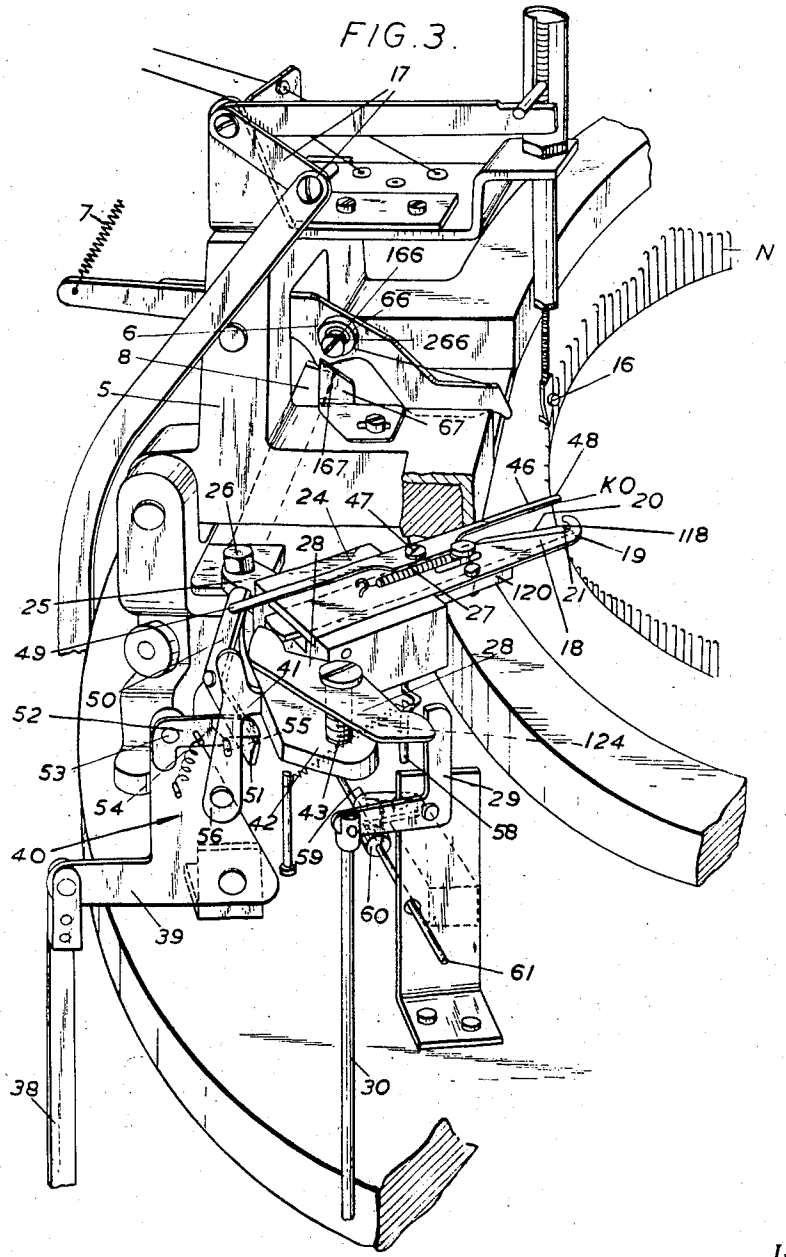
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KNITTING MACHINE

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FIG. 3.



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FIG. 6.

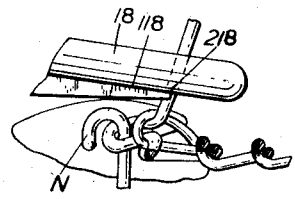


FIG. 8.

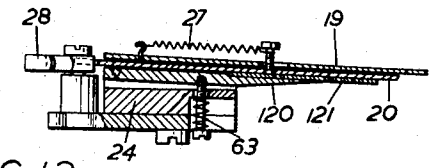
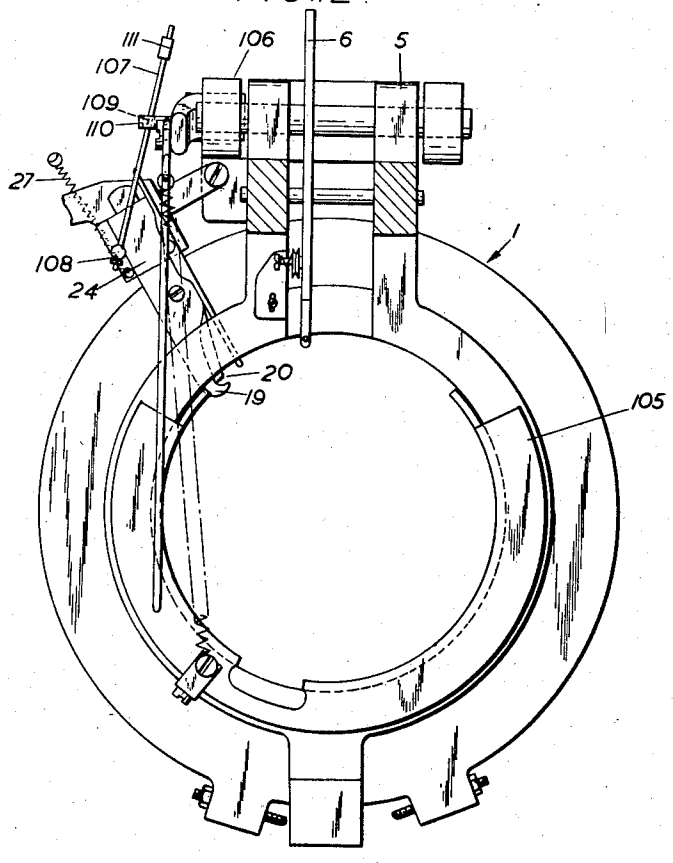


FIG. 12.



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FIG. 7.

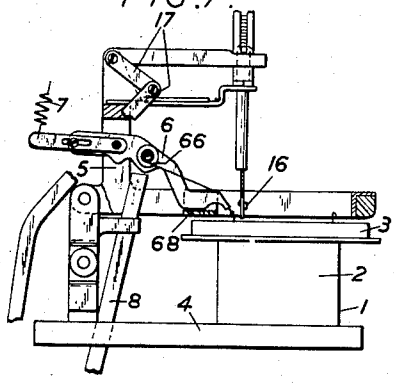


FIG. 10.

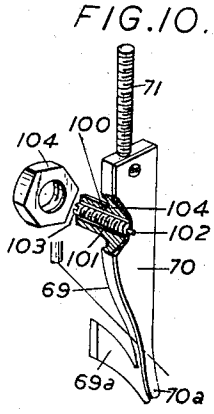
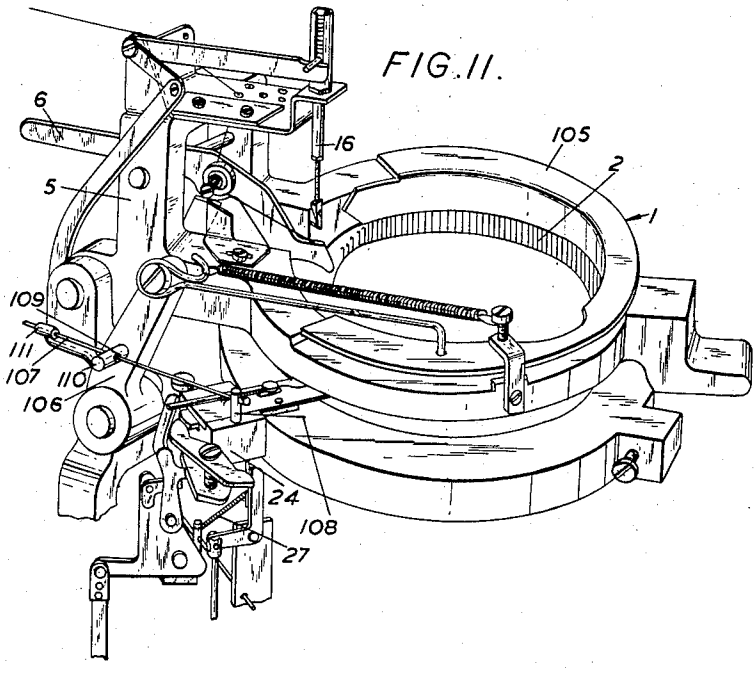


FIG. 11.



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United States Patent Office

2,869,343

Patented Jan. 20, 1959

2,869,343

KNITTING MACHINE

Ralph Norman Toone, Burton Joyce, England, assignor to B. Toone (Nottingham) Limited

Application December 18, 1953, Serial No. 399,075

Claims priority, application Great Britain February 26, 1953

11 Claims. (Cl. 66—134)

This invention is for improvements in or relating to knitting machines and is particularly concerned with cutting mechanism in a circular knitting machine primarily for the purpose of cutting splicing thread. When producing spliced areas in fabric on a circular knitting machine it is usual to introduce the splicing thread into knitting activity for a predetermined phase during knitting of each course in the spliced area and this results, during the knitting of each spliced course, in the splicing thread floating chord-like in the interior of the needle circle. These floats are, in the majority of instances, subsequently cut-out by hand but there is described in the specification of U. S. patent application No. 286,292 filed May 6, 1952, and now abandoned, a cutting device, for the purpose of cutting the thread automatically at each withdrawal thereof so that the formation of floats is avoided, comprising a substantially horizontal plate-like member within the needle circle, there being cutting edges at the periphery of the plate. When a yarn is withdrawn, it is carried round by the needles first substantially in line with the needle circle in plan view and then in an inward motion in a manner such that it would become chord-like, in plan, if it were not cut, and the location of the cutting edges of the aforesaid mechanisms has been spaced inwardly from the needles such as to receive the yarn during said inward motion of it; the result is that by the time the yarn is engaged in the cutter, and is cut, there is a length of the yarn extending from the fabric to the cutter and the shortness of this length of yarn is limited by the nature of said mechanism which will not allow disposition of its cutting edges at a closer location to the fabric.

The object of the invention is to provide cutting mechanism which is an improvement on the mechanism above referred to.

The invention provides, for a knitting machine, particularly a circular knitting machine, having means for introducing knitting yarn and for subsequently withdrawing it, cutter means fitted or adapted to be fitted to the machine with a cutter disposed at a location closely above heads of the needles and comprising a cutting part disposed or adapted to be disposed in a plane which is substantially transverse to the direction of reciprocation of the needles. Preferably said location is to the immediate rear of the hook of a needle partly raised after knock-over, and the cutter means is adapted to be operated for cutting the withdrawn yarn at that stage of motion in the machine when the joint end of the withdrawn yarn with a loop in the fabric becomes disposed at said location. The location is also preferably whereat said needle has been raised from the knock-over level to such an extent that that loop in its hook is elevated towards said cutting edge, this location being

normally just beyond the knock-over station e. g. to the extent of a group of about six needles. Said cutting part is preferably formed with relatively movable opposed cutting edges disposed in V formation when open and capable of being positioned at said location and in said plane in the machine with the mouth of the V directed along the needle circle to receive the withdrawn yarn. The machine may have sinkers and in this event the cutter means are capable of being positioned so that said cutting part is close over nibs of adjacent sinkers. There may be adjustment means for desired accurate positioning of said cutting part of the cutter means relatively to the needles by which it is evident that the withdrawn yarn may be cut at any desired short distance from the fabric. These adjustment means may be capable of adjustment of said cutting part of the cutter means circumferentially, radially and vertically of the needle circle. The cutting device may be constructed and arranged for extending from the exterior of the needle circle radially into it and the device may incline downwardly towards the needle circle for close relationship between the cutting edges and the needles.

Suitable operating means are provided for operating the cutting device in suitable timed relation with the withdrawal of the yarn and the cutting device is preferably adapted for automatic displacement into and out of operative position, conveniently by means for positive displacement of the cutting device into operative position against spring means.

There may also be provided machine stop motion operating means whereby an undesirable raised needle causes stoppage of the machine and preferably also causes displacement of the cutting device to the inoperative position.

There may also be a controller for controlling the withdrawn yarn after being cut, and also a control device for preventing undesirable retraction of the reintroduced yarn.

The machine may incorporate an automatically displaceable latch ring gap closer and there may be provided means whereby displacement of this gap closer causes displacement of the cutter device appropriately into its operative and inoperative positions.

The invention further provides a circular knitting machine fitted with cutter means as aforesaid.

The above and other features of the invention set out in the appended claims are incorporated in the constructions which will now be described, as specific embodiments with reference to the accompanying drawings in which:

Figure 1 is a perspective view of relevant parts of a circular knitting machine according to the invention.

Figure 2 is a plan view of said mechanism.

Figure 3 is an enlarged perspective view of part of said mechanism.

Figure 4 is a detail side view of part of the mechanism.

Figure 5 is a detail view of part of Figure 1.

Figure 6 is an enlarged detail view of the yarn cutting operation.

Figure 7 is a detail side view of parts of the machine.

Figure 8 is a sectional view of a cutting device.

Figures 9 and 10 are front and rear views of part of a yarn controller.

Figures 11 and 12 are perspective and plan views respectively of a modification.

Referring now to Figure 1 a circular knitting machine for producing ladies stockings is indicated at 1, with

needle cylinder 2, sinker ring 3 and bed plate 4. The customary support bracket 5 is provided for yarn guides of which a splicing yarn feeder is shown at 6 biassed by a spring 7 into operative feeding position about its axis and movable out of operation at desired intervals by a thrust bar 8 to which movement is imparted from a reciprocating bar 9 through the medium of a lever 10, one end 11 of which underlies the thrust bar 8 and the other end 12 of which under-lies an arm 13 pivoted to the reciprocating bar 9 (see also Figure 5) and which has a stepped part 14 for engagement with a fixed stop 15. This mechanism is operated to move the feeder 6 into and out of operation for splicing in known manner and as referred to in the aforesaid patent application, to which reference is directed for full details, and which briefly consists in the yarn feeder 6 being moved into and out of operation at desired intervals in each course during a splicing period to produce parallel and/or shaped splicing. The yarn feeder 6 desirably has a yarn control device associated with it (for a purpose hereafter referred to) as shown for example in Figures 3 and 8 wherein it consists of a pair of yarn gripping cymbals 66 attached to the feeder 6 by an adjusting screw 166, with a spring 266, and the cymbals being adapted to be open and closed when the feeder is moved up and down by its engagement with a cam bit 67 having a chamfered edge 167 for engaging between the cymbals and being adjustably fixed on part of the bracket 5.

There is also provided, movable into and out of operation with the yarn feeder 6 (for a purpose hereinafter to be described), a yarn controller 16 which, for the purpose, may be mounted substantially in the manner according to said specification and movable into operation by link and lever mechanism 17 from a cam drum 37. The yarn controlling lower part of the controller 16 is shown in Figures 9 and 10 from which it will be seen that it consists of thick and thin plates 69 and 70 fixed together and to a connecting screw 71 at their upper ends; the thick plate 69 has a wing part 69*a* and the thin part 70 has an out-turned lip 70*a*.

In use the yarn, when the feeder is withdrawn, enters between the plates 69 and 70 and is trapped therebetween (Figure 10) until the yarn is withdrawn therefrom by re-introduction of the feeder. Desirably, therefore, adjustment means are provided (shown assembled in Figure 9 and exploded in Figure 10) for adjusting the relationship between the plates 69 and 70 to obtain desired gripping force on the yarn, and conveniently for this purpose there is provided an adjusting screw 100 bearing at one end on the inner side of the plate 70 and conveniently having at said end a reduced part 102 projecting through a small hole in said part 70 for location purposes, and this screw 100 also has a saw gate 103, for turning by a screw driver, at its other end. A split collet 104 is fixed to the plate 69 and the screw 100 is screw fitted in it, and a nut 105 is screwed on to the collet. The co-operating screw threads of the screw 100 and collet 104 have exceptionally close pitch, say in the order of 200 threads per inch, and therefore minute adjustment of the relationship between the two plates 69 and 70 is readily effected by giving a slight turn to the screw 100, after unscrewing the nut 105, which latter is thereafter re-tightened.

For the purpose of cutting the yarn each time that it is withdrawn from operation there is provided cutter means including a cutting device 18 disposed exteriorly of the circle of needles N (Figures 2 and 3) and extending radially of the needle cylinder. The axial position of this cutting device 18 is such that its inner end or cutter 118 is disposed at a location closely above the heads of the needles and comprises a cutting part 218 disposed in a plane which is substantially transverse to the direction of reciprocation of the needles. Said location is preferably to the immediate rear of the hook of a needle N (Figure 6) partly raised after knock-over

and desirably just beyond the knock-over station KO (say to within about six needles) whereat the needles N have risen slightly so that the fabric loops thereon are elevated and whereat for a short distance round the needle circle the needles are maintained at that height.

The cutting device 18 conveniently comprises a relatively stationary part 19 with which there is slidably associated a movable cutter part 20 having a cutting edge 21 (see particularly Figures 2 and 3), and the opposite part 22 of the stationary part 19 has a co-operating cutting edge 23. The cutting edges 21 and 23 are, as shown, provided on parts of the cutting device which are substantially horizontal, parallel to and close to the fabric, and in a plane substantially transverse to the direction of reciprocation of the needles and they form a V-shaped notch substantially in line with the circle of needles round the cylinder such as to receive the yarn into it when withdrawn from operation in a manner to be more fully described hereinafter. The two cutter parts 19 and 20 are conveniently strip-like members inclining slightly downwardly towards the needles and carried at their outer parts on a carrier 120 (see Figure 8) pivoted at its rear end on a block 24 which is fixed to an arm 25 pivotally mounted at 26 to a suitable part of the machine. The relatively stationary cutter part 19 is fixed on the carrier 120 and a recess is provided in the top face of the carrier 120 for slidably accommodating the moving cutter part 20 (which is biassed upwardly to the cutter part 19 by a leaf spring 121) for axial movement radially of the needle cylinder so as to move the cutting edge 21 into and out of cutting position with the stationary cutting edge 23. A spring 27 serves to bias the moving cutter part 20 to its inoperative or withdrawn position, and for operating the cutter there is provided a pivoted lever 28 one end of which bears on the outer end of the cutter part 20 and the other end of which is engaged by a bell crank 29 which is operated by a rod 30 from a lever 31. This lever 31 is rocked intermittently in timed relation with the intermittent movement of the yarn feeder 6 through the medium of a further lever 32 one end of which engages under one end of the lever 31 and the other end of which engages under a pivoted arm 33 (see also Figure 5) which has a stepped upper edge 34 co-operating with a stationary lug 35. The pivoted arm 33 is pivoted to the aforesaid reciprocating bar 9 in the same manner as the aforesaid stepped arm 13 associated with the yarn feeder 6 so that the two arms 13 and 33 move together to operate the yarn feeder 6 and the cutter 20 in timed relation with each other (the cutter 20 being operated immediately after each withdrawal of the feeder). There may be an adjusting screw 44 for adjusting the location of the cutter arm 20 in the direction of its movement.

The cutting device 18, the carrier 120, and block 24, are normally out of operation during the production of a stocking by spring means 124 biassing them about the pivot 26 to a withdrawn position and they are movable into operative position when required for splicing through the medium of a cam bit 36 on a cam drum 37 operating a thrust rod 38 which is connected to a bell crank 39 having mounted on it a trip mechanism indicated generally at 40 (Figure 1), a part 41 of which bears on an extension plate 42 of the block 24. This extension plate 42 also carries the pivot 43 for the aforesaid lever 28 so that when the block, carrier and cutting device are moved into and out of operation this lever 28 is carried with them.

In operation it will be understood that each time the yarn feeder 6 is withdrawn, the length of yarn between the raised feeder and the fabric becomes disposed at an angle from the feeder to the fabric immediately behind the needles and, as the needles travel round, the length of yarn enters between the plates 69, 70 of the yarn controller 16 (Figure 10) and, as the needles travel round still further, that end of the length of yarn nearest the

fabric travels into the notch formed by the cutting edges **21, 23** of the cutting device **18** and is cut by operation of the cutter part **20**. More specifically, and as previously intimated, at the location of the cutting edges **21, 23** the needles rise slightly from the knock-over position and (see Figure 6) the fabric loops are slightly raised towards the already closely located cutting edges of the cutting device **18** and are maintained at this level for a short distance until they have passed the cutter device; furthermore at said location the yarn has not commenced to move inwardly in the formation of a chord of the circle of needles. In consequence of this arrangement the yarn is engaged and cut by cutting edges **21, 23** in almost any desired close relationship with the fabric according to requirements, thereby leaving a short end of the yarn of desired length projecting from the fabric after the yarn is cut.

The said cutter parts **19** and **20** are preferably biassed downwardly into position against adjustable stop means such as to enable a fine adjustment to be effected between the cutting edges of the cutter parts and the fabric for determining the length of the cut ends of yarn, and such that should any obstruction engage under the cutting edges the cutting edge part of the cutter device can be displaced against the spring means to avoid possible damage. For this purpose there may be a coil spring **63** biassing the carrier **120** downwardly, and an adjusting screw **72**, carried by the cutter part **19**, may bear on the sinker cap **3**. This spring **63** and the pivotal carrier **120** allows for automatic highering and lowering of the cutting part **218** of the cutting device **18** according to the conventional raising and lowering of the needle cylinder.

The trapping of the yarn by the said yarn controller **16** serves as a control for that cut part of the yarn intended for re-introduction to the needles by the next lowering of the yarn feeder **6** and for this purpose, see Figure 9, the yarn engages round the upper tip of the wing part **69*a*** for the latter to ensure that the end of the yarn is disposed directly across the line of needles when taken in by the needles; furthermore said part **69*a*** ensures that there is no excess looping of the yarn, any looping being taken up by the yarn wrapping round said part **69*a***. The aforesaid cymbals **66** carried by the feeder **6** ensures that the yarn is not drawn back through the feeder until the yarn is taken in by the needles because, upon withdrawal of the yarn the feeder movement causes the cymbals to grip the withdrawn yarn and hold it gripped during subsequent lowering of the feeder to reintroduce the yarn so as not to draw yarn back through the feeder, until the feeder is fully down (and the yarn end is taken in the needles) whereupon the cymbals are opened. The relationship between the movements of the feeder **6** and the location of the cutting device **18** is such that the extent of projection of this end of the yarn, when reintroduced is substantially the same as the other end.

It will be understood from the foregoing description that the cutter parts **19** and **20** have their inner ends projecting over the line of needles and it will therefore be appreciated that if there should be a faulty needle in an elevated position and passing beyond the knock over station (and preventative means are not provided) the raised needle will foul the inner ends of the cutting device **18** with undesirable results. Consequently safety means are preferably provided conveniently consisting of a pivoted detector lever **46** pivoted to the cutting device **18** at **47** and having its inner end **48** projecting over the needles at a location substantially at the knock over station i. e. in advance of the cutting device **18** with respect to the direction of travel of the needles. The other end **49** of the detector lever **46** engages one end of a bell crank **50** the other end **51** of which engages under a projecting end of a trip lever **52**, the trip lever **52** is pivoted at **53** to the aforesaid bell crank lever **39** and it is spring biassed downwardly so that a stepped part **54** thereof engages a peg **55** projecting from an arm **56** which is also pivoted to the bell crank **39** and has said part **41** engaging the plate extension **42** of the block **24**. Thus it will be seen that when the cutting device **18** is in operation it is held by the engagement of the stepped part **54** of the trip member **52** with the peg **55** of the arm **56**. Consequently if an elevated faulty needle arrives at the knock-over station, it engages the inner end **48** of the detector lever **46** thereby to move it about its pivot **47**, and this results in movement of the bell crank **50** such as to raise the trip arm **52** at its free end to release the step **54** out of engagement with the peg **55**. Thus the cutting device **18** is freed from the means holding it in operative position and it swings to safety out of operation by the aforesaid spring means **124**. In doing this it is arranged to operate a stop motion to stop the machine conveniently through the medium of a downwardly projecting pin **58** which strikes a pivoted arm **59** and moves the latter pivotally to engage a collar **60** and displace a rod **61** on which the collar is fixed. This rod **61** is connected at one end to any suitable mechanism for stopping drive to the machine.

As illustrated in Figures 11 and 12 the machine may have a latch ring gap closer **105** automatically operable by mechanism, part of which is indicated at **106**, in conventional manner such as to move the gap closer **105** circumferentially of the needle circle at required times. At such times it is desired for the cutting device **18** to be appropriately moved into and out of operative position and for this purpose there may be provided a coupling rod **107** attached to the cutting device by a connection **108** and extending freely through a hole **109** in a peg **110** fixed to an arm of said mechanism **106**, said rod **107** having an enlargement **111** fixed (adjustable if desired) on its free end. The arrangement is therefore such that initial movement of the gap closer in either direction has no effect on the cutting device **18** but upon the full movement being imparted to the gap closer in clockwise direction in plan the enlargement **111** is engaged by the peg **110** thereby to displace the cutting device **18** about its pivot to the inoperative position. From the foregoing description it will be understood that the invention is applicable to that method of splicing wherein the splicing feeder is moved into and out of feeding position in each splicing course; however the invention is also applicable to the alternative splicing method wherein the splicing feeder remains in feeding position during each splicing course and the needles are selected some to take the splicing yarn and others to miss it. In the latter method it will be appreciated that employment of the aforesaid yarn controller is of greater importance than in the former method in that it must be employed to trap the yarn for satisfactory reintroduction of the yarn to the selected active needles.

It will be further understood from the foregoing construction that the invention is applicable to a machine in which there is a single yarn feeding station. However the invention is also applicable to a machine having more than one feeding station say where there are two feeders, there being cutter means according to the invention associated with each station.

I claim:

1. The combination in a circular knitting machine of a yarn feeder, means for causing yarn from the feeder to knit and not to knit in each of certain courses, a binder inside the needle circle adjacent the feeder appropriate to receive the yarn when not knitting, a cutter blade which is in a plane substantially perpendicular to the direction of reciprocation of the needles and is closely over the immediate rear of the hook of a needle partly raised at a location just after knock over appropriately for engaging that end of the non-knitting yarn nearest the fabric, and means operating in timed relation with the change from knitting to non-knitting of the yarn for operating the cutter to cut the non-knitting yarn when said end becomes disposed at said location.

2. The combination in a circular knitting machine of a yarn feeder, means for moving the yarn feeder from a position feeding the yarn outside the needle circle to a position disposing the extruding yarn in non-knitting manner inside the needle circle wherefrom the non-knitting extruding yarn is carried round with the needles, a binder inside the needle circle adjacent the feeder appropriate to receive the non-knitting extruding yarn, a cutter blade which is in a plane substantially perpendicular to the direction of reciprocation of the needles and is closely over the immediate rear of the hook of a needle partly raised just after knock over appropriately for engaging that end of the non-knitting extruding yarn nearest the fabric, and means operating in timed relation with operation of the feeder for operating the cutter to cut the non-knitting extruding yarn when said end becomes disposed at said location.

3. The combination in a circular knitting machine of a yarn feeder, means for causing yarn from the feeder to knit and not to knit in each of certain courses, a binder inside the needle circle adjacent the feeder appropriate to receive the yarn when not knitting, a cutter blade which is in a plane substantially perpendicular to the direction of reciprocation of the needles and is closely over the immediate rear of the hook of a needle partly raised at a location just after knock over to the extent of a group of about six needles whereat the loop in said hook is elevated towards the cutter blade appropriately for the cutter blade to engage that end of the non-knitting yarn nearest the fabric, and means operating in timed relation with the change from knitting to non-knitting of the yarn for operating the cutter to cut the non-knitting yarn when said end becomes disposed at said location.

4. The combination in a circular knitting machine of a yarn feeder, means for causing yarn from the feeder to knit and not to knit in each of certain courses on a varying size group of needles, a binder inside the needle circle adjacent the feeder appropriate to receive the yarn when not knitting, a cutter blade which is in a plane substantially perpendicular to the direction of reciprocation of the needles and is closely over the immediate rear of the hook of a needle partly raised at a location just after knock over appropriately for engaging that end of the non-knitting yarn nearest the fabric, and means operated in timed relation with the change from knitting to non-knitting of the yarn on the varying size group of needles for operating the cutter to cut the non-knitting yarn, at the different positions in a course according to the size of the group of needles, when said end becomes disposed at said location.

5. The combination in a circular knitting machine of a yarn feeder, means for causing yarn from the feeder to knit and not to knit in each of certain courses, a binder inside the needle circle adjacent the feeder appropriate to receive the yarn when not knitting, a cutter device disposed radially outside the needle circle and having a cutter blade at its inner end which is in a plane substantially perpendicular to the direction of reciprocation of the needles and is closely over the immediate rear of the hook of a needle partly raised at a location just after knock over appropriately for engaging that end of the non-knitting yarn nearest the fabric, adjustment means for the cutter device to adjust the position of the cutter blade relatively to the needles, and means operated in timed relation with the change from knitting to non-knitting of the yarn for operating the cutter to cut the non-knitting yarn when said end becomes disposed at said location.

6. The combination as claimed in claim 5 including a feeler on the cutter device having a part in the path of any needle which is undesirably raised when approaching the cutter device, and stop motion operating means suitably connected to this feeler for operation if the feeler is engaged by a raised needle.

7. The combination as claimed in claim 6 having means for jointly displacing the cutter device and the feeler into and out of operative position.

8. The combination in a circular knitting machine of a yarn feeder, means for moving the yarn feeder from a position feeding the yarn outside the needle circle to a position disposing the extruding yarn in non-knitting manner inside the needle circle wherefrom the non-knitting extruding yarn is carried round with the needles, a binder inside the needle circle adjacent the feeder appropriate to receive the non-knitting extruding yarn, a cutter blade which is in a plane substantially perpendicular to the direction of reciprocation of the needles and is closely over the immediate, rear of the hook of a needle partly raised just after knock over appropriately for engaging that end of the non-knitting extruding yarn nearest the fabric, means operated in timed relation with operation of the feeder for operating the cutter to cut the non-knitting extruding yarn when said end becomes disposed at said location, a second binder carried by the yarn feeder for controlling yarn leading to the feeder, a stationary abutment for opening the binder when the yarn feeder moves to the knitting position, and spring means for closing the binder when the feeder moves to the non-knitting position.

9. The combination in a circular knitting machine of a yarn feeder, means for moving the yarn feeder from a position feeding the yarn outside the needle circle to a position disposing the extruding yarn in non-knitting manner inside the needle circle wherefrom the non-knitting extruding yarn is carried round with the needles, a binder inside the needle circle adjacent the feeder appropriate to receive the non-knitting extruding yarn and movable between operative and inoperative positions, a cutter device movable between operative and inoperative positions including relatively movable cutting edges and a cutting blade which is in a plane substantially perpendicular to the direction of reciprocation of the needles and is closely over the immediate rear of the hook of a needle partly raised just after knock over appropriately for engaging that end of the non-knitting extruding yarn nearest the fabric, stop motion operating mechanism, a feeler for actuating the stop motion operating mechanism and disposed in the path of a raised needle approaching the cutter device and movable between operative and inoperative positions, a second binder carried by the feeder and operable to bind or free the yarn leading to the feeder, and means operated in timed relation with operation of the feeder for rendering the first binder, the cutter device, and the feeler operative and inoperative, and for operating the movable edge of the cutter to cut the non-knitting extruding yarn when said end becomes disposed at said location and for operating the second binder for it to free the yarn when knitting and to bind the yarn when not knitting.

10. The combination as claimed in claim 1 including a latch ring gap closer, means for automatically displacing it, and means whereby the displacement causes displacement of the cutter blade appropriately into operative or inoperative positions.

11. The combination in a circular knitting machine of a yarn feeder, operating means for moving the feeder between knitting and non-knitting positions once in each of a group of courses, pattern control means including a cam and mechanism between the cam and the feeder for varying the period of time in each course that the feeder is in knitting position to feed to varying size groups of needles, a binder inside the needle circle adjacent the feeder appropriate to receive the yarn when not knitting, a cutter device outside the needle circle and extending radially inwards and inclining downwards to the needle circle including relatively movable cutting edges and a cutter blade which is in a plane substantially perpendicular to the direction of reciprocation of the needles and is closely over the immediate rear of the hook of a needle partly raised at a location just after knock over appro-

priately engaging that end of the non-knitting yarn nearest the fabric when carried round by the needles to the cutter, and mechanism between said cam and the cutter device for the latter's operation by the said operating means in such timed relation with the movements of the feeder to non-knitting position that the non-knitting yarn is cut each variable time, according to the variable time that the feeder is in knitting position, that said end becomes disposed at said location.

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