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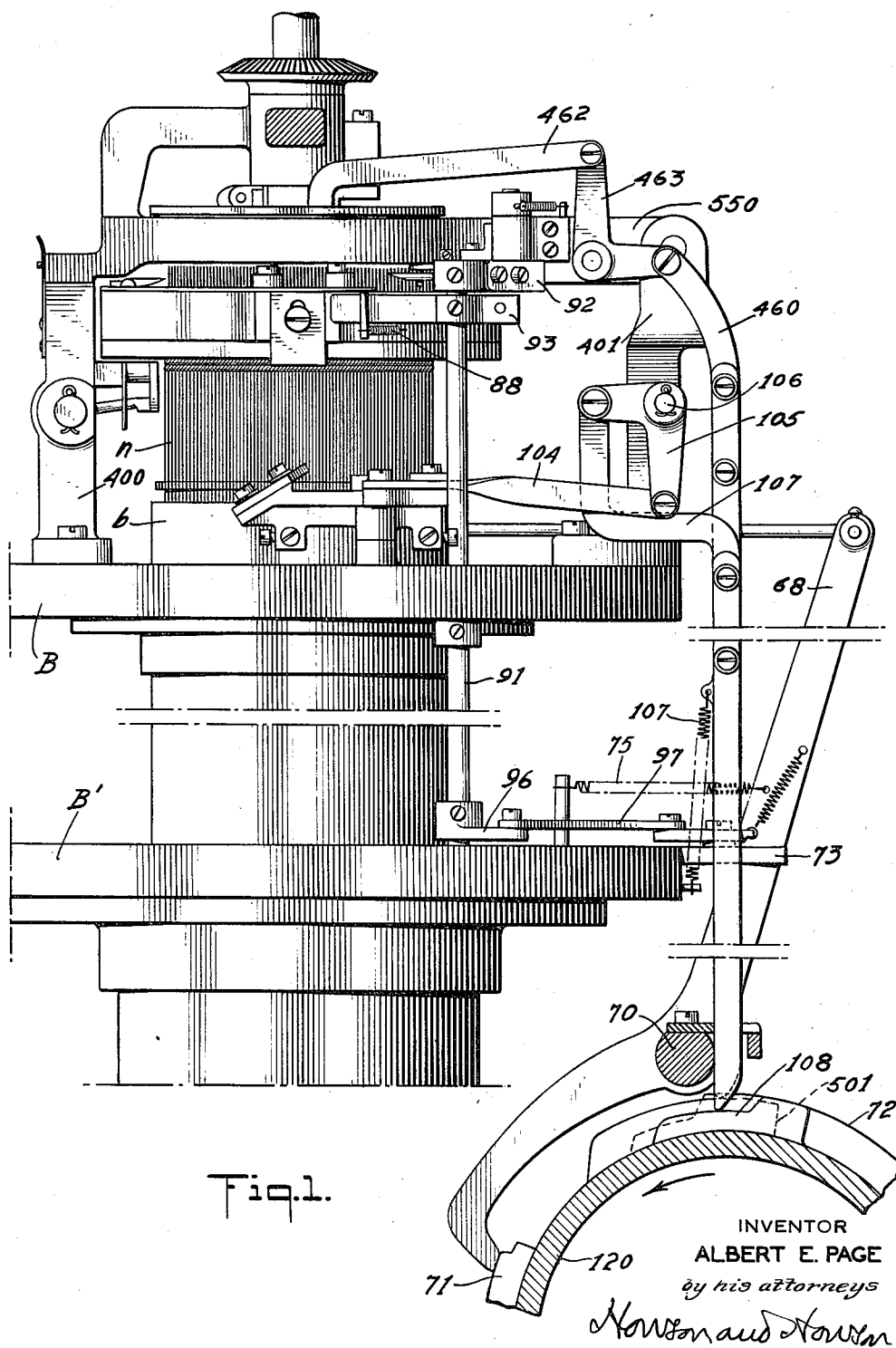
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1,990,416

KNITTING MACHINE

Filed Aug. 6, 1931

6 Sheets-Sheet 1



Feb. 5, 1935.

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1,990,416

KNITTING MACHINE

Filed Aug. 6, 1931

6 Sheets-Sheet 2

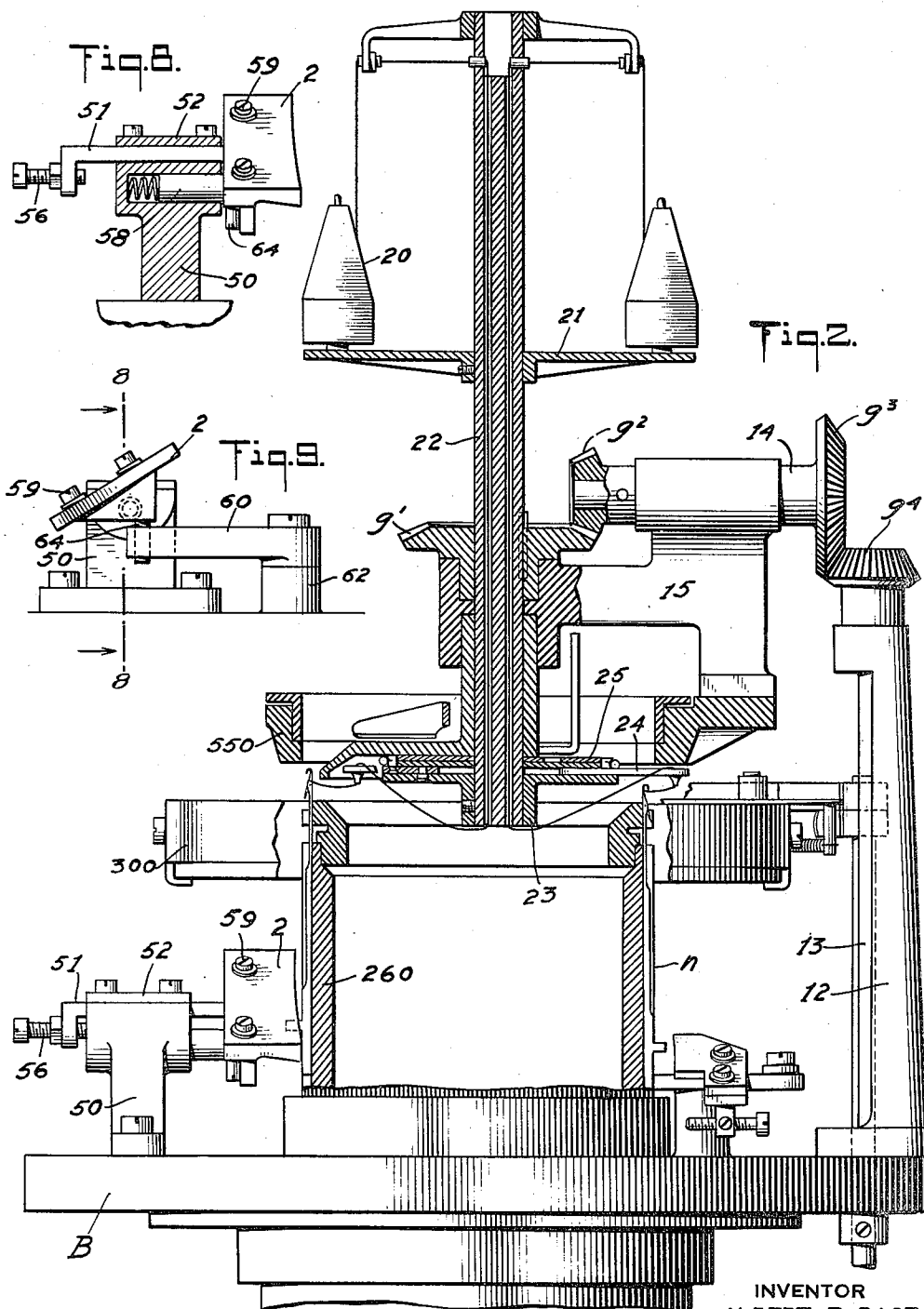


Fig. 2.

Fig. 8.

Fig. 9.

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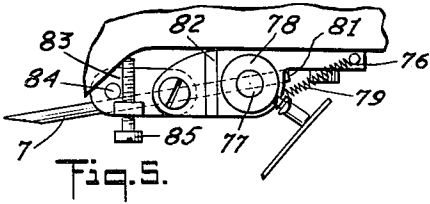
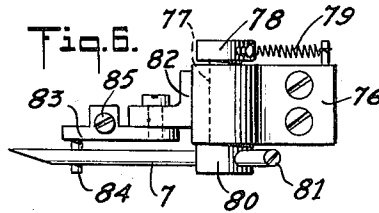
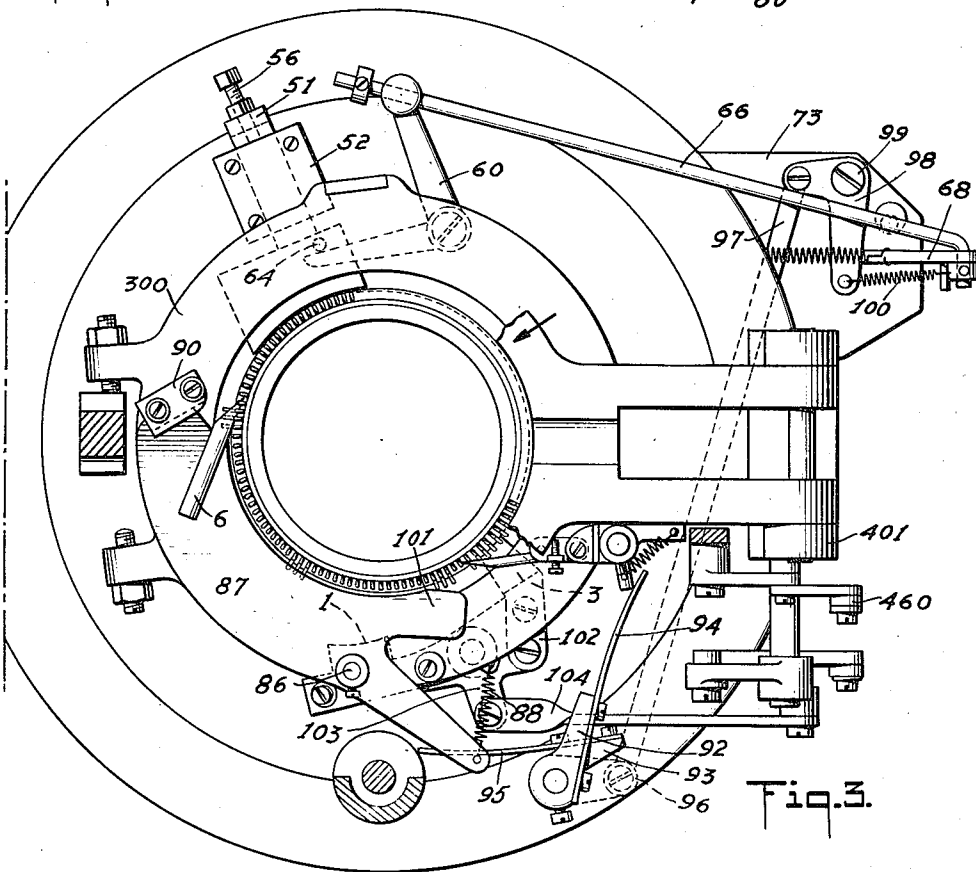
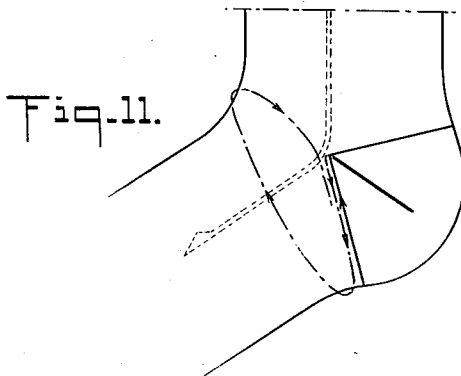
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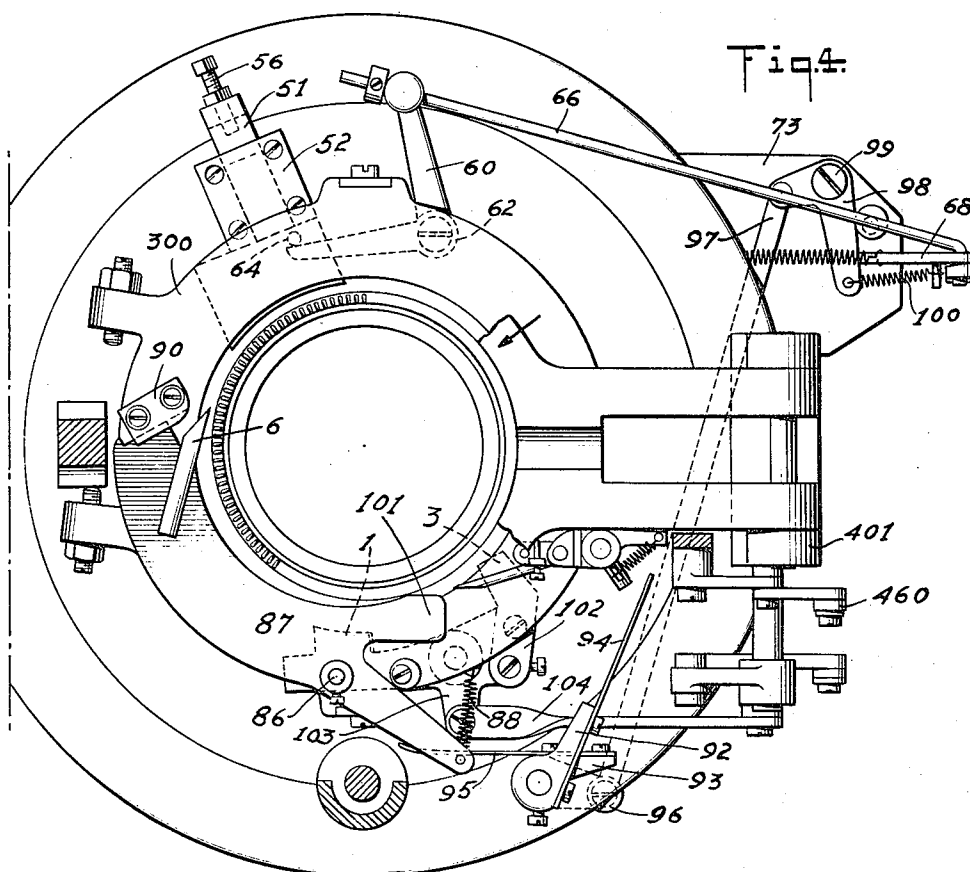
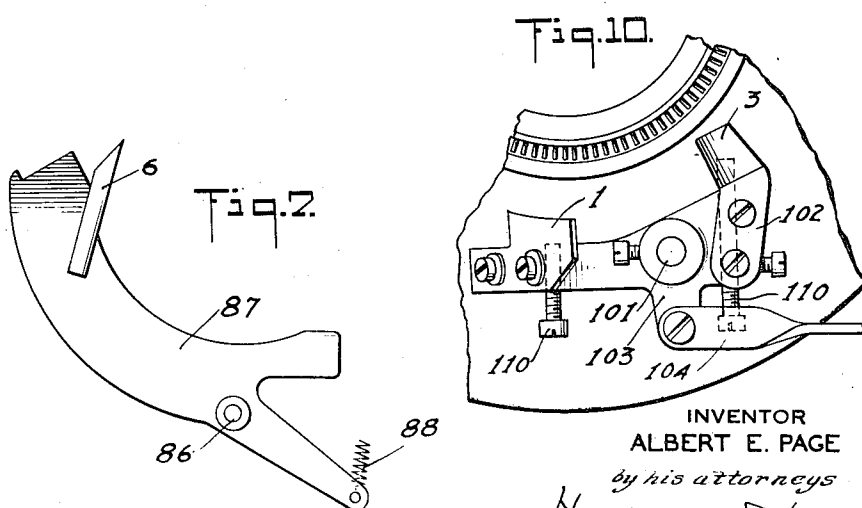
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6 Sheets-Sheet 4



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KNITTING MACHINE

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6 Sheets-Sheet 5

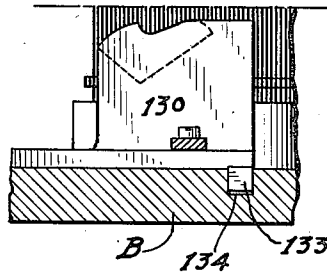


Fig. 12.

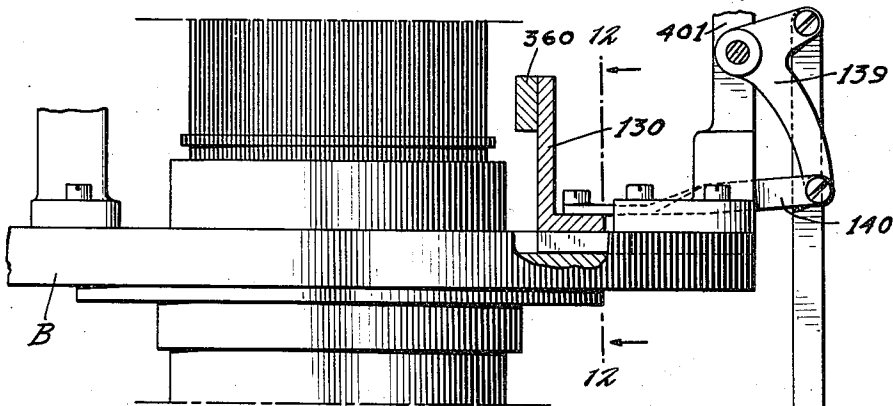


Fig. 13.

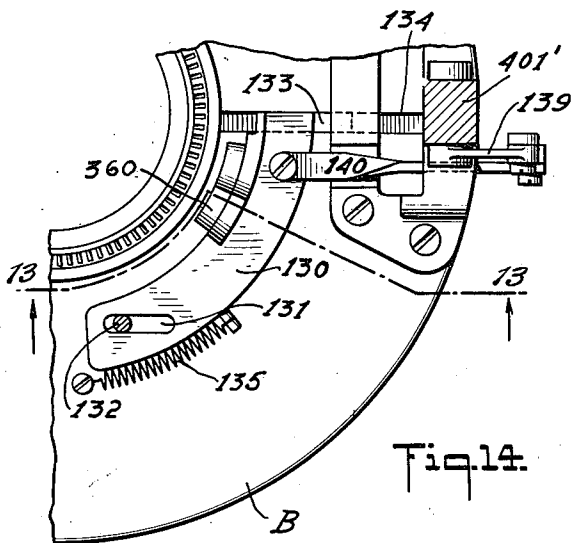
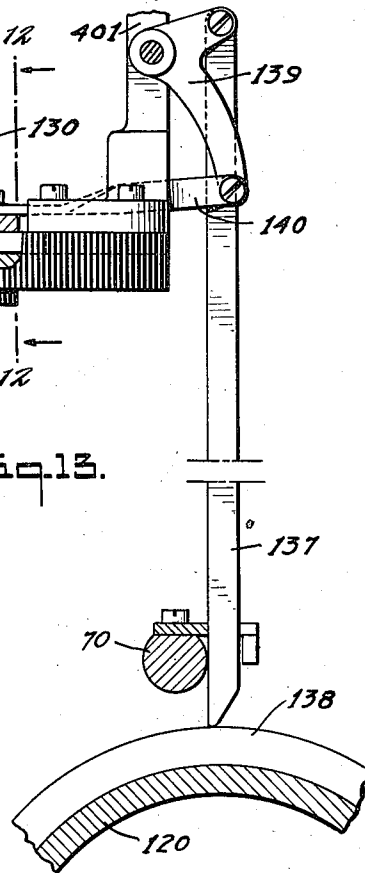


Fig. 14.



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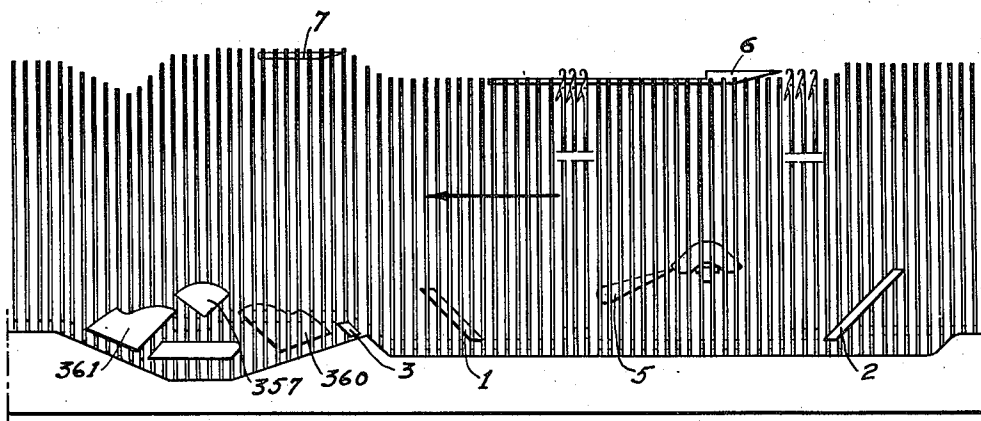
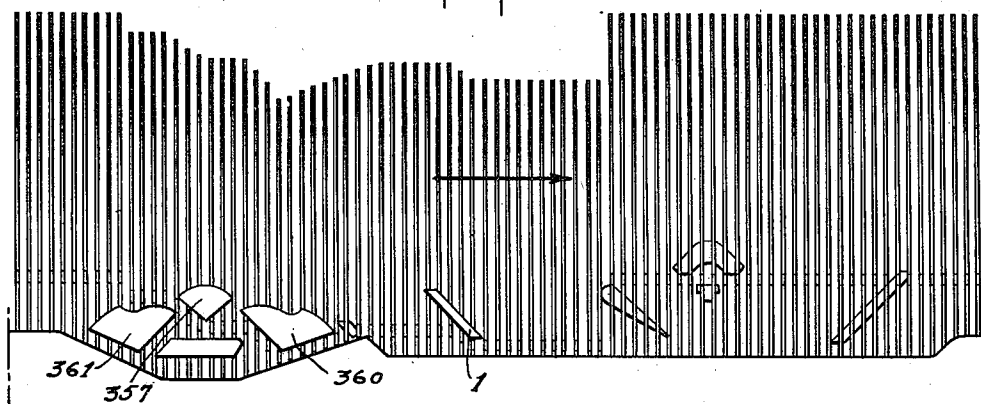
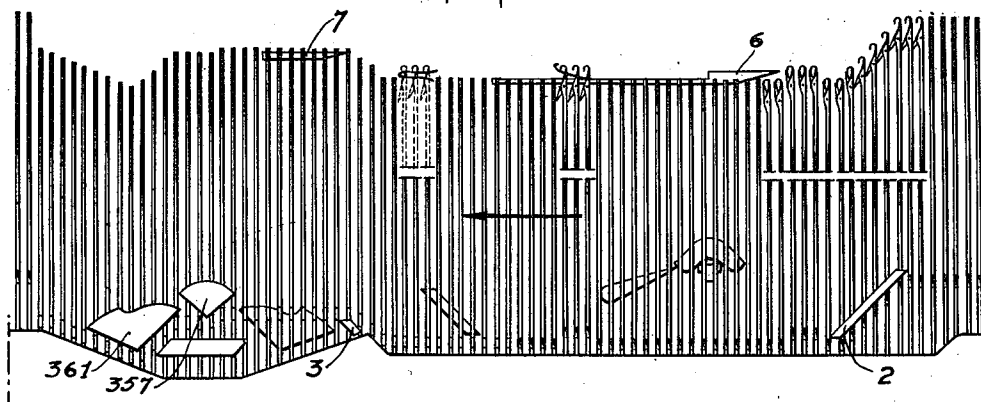
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KNITTING MACHINE

Filed Aug. 6, 1931

6 Sheets-Sheet 6



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UNITED STATES PATENT OFFICE

1,990,416

KNITTING MACHINE

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Application August 6, 1931, Serial No. 555,579

19 Claims. (Cl. 66—135)

This invention relates to knitting machines and more particularly to lap stripe knitting machines in which the mechanism for wrapping striping yarns about selected needles is mounted below the latch ring and it is an object of this invention to provide means whereby the stripes knit by such machines may be extended continuously from the leg onto the instep. It is also an object of this invention to provide means for rendering the needles which receive the wrapping yarns operative to receive and knit such yarns during the first revolution of circular knitting after coming off the heel. It is also an object of this invention to provide means for bringing raised needles down to a latch closing position prior to a yarn feeding position in order to permit operation of the wrapping yarn guides.

In the drawings—

Figure 1 is a broken view in elevation of part of a knitting machine constructed in accordance with this invention, some parts being broken away to show other parts more clearly and a pattern drum being shown in section to more clearly illustrate the manner of operation of certain of the parts;

Figure 2 is a view partly in vertical section and partly in elevation of the upper portion of the knitting machine head shown in Fig. 1 and the bobbin bracket carried thereby;

Figure 3 is a top plan view of the head shown in Fig. 1, parts being broken away to show the cam operating means more clearly and the cams being positioned inwardly as for initiating round and round knitting after coming off the heel;

Figure 4 is a view similar to Fig. 3 with the cams withdrawn as in reciprocating knitting;

Figures 5 and 6 are detail views in plan and elevation, respectively, of the latch opening mechanism for certain of the needles;

Figure 7 is a plan view showing the means which opens the remainder of the latches, that is, the latches of the needles which receive the wrapping yarn in the first round of round and round knitting after coming off the heel;

Figure 8 is a view in elevation of the lowering cam which positions the needles for selection of the wrapped needles, the support for the cam being shown in section taken as on line 8—8 of Figure 9;

Figure 9 is a view in elevation looking from the right in Figure 8 showing the lowering cam and the operating means therefor;

Figure 10 is a plan view showing the special leading knitting cam and the lowering cam for the needles used in reciprocating knitting;

Figure 11 is a diagrammatic view in which the arrows indicate the region of the hosiery to which this invention is particularly related;

Figure 12 is a fragmentary view taken as on line 12—12 of Figure 13 showing the usual lead-

ing knitting cam arranged for movement with respect to the needle cylinder;

Figure 13 is a view showing the relation of the knitting cam of Figure 12 and its operating mechanism to the machine head; the cam being shown in section taken as on the line 13—13 of Figure 14;

Figure 14 is a fragmentary top plan view showing the knitting cam and operating means of Figure 13; and

Figures 15, 16 and 17 are diagrammatic views showing the needle circle and operating cams developed into a single plane, the active cams of each view being shown as in front of the needles and the inactive cams as in back of the needles with Figure 15 showing the relative positions of needles and cams in the usual round and round knitting; Figure 16 the positions during the last reverse stroke of reciprocating knitting in coming off the heel; and Figure 17 the positions during the first movement in round and round knitting after coming off the heel.

In the drawings the invention is shown applied to a lap stripe knitting machine of the type shown in the application of James L. Getaz, Serial No. 472,354, filed August 1, 1930 (Patent 1,891,204, issued Dec. 13, 1932) and comprising a lower bed plate B' and an upper bed plate B supported by a suitable frame (not shown). Supported by the bed plate B is the usual rotating needle cylinder 260 having needles n while standards 400 and 401 on bed plate B support the latch ring 550 and position the sinker ring 300 in the usual manner. On the latch ring 550 is mounted a bracket 15 which rotatably supports the hollow tube 22 carrying the wrapping yarn bracket 21 on which are mounted the yarn spools 20. A shaft 13 mounted in standard 12 and driven in any suitable way drives tube 22 through mitre gears g^4 and g^3 , shaft 14 journaled in bracket 15 and mitre gears g^2 and g^1 . Tube 22 extends through bracket 15 to the region of the sinker ring 300 and at its lower end carries bracket 23 which serves as a support for the wrapping fingers 24 pivotally mounted thereon. The wrapping fingers 24 are controlled by the cam member 25 which is operated to control movement of the fingers 24 to operative and inoperative positions by means of a link 462 connected through bell crank lever 463 pivotally mounted on latch ring 550 to a push rod 460 operated by cam 501 on a drum 120 which drum may be the main pattern drum or some other suitably operated drum.

In the machine shown it will be noted that the wrapping of the yarns for the lap stripes takes place below the latch ring and as it is usual in this machine to raise the inactive or long butt needles during the knitting of the heel the heads of the inactive needles are opposite the latch

ring during the knitting of the heel and high enough to prevent the wrapping yarn fingers from wrapping selected needles to provide lap stripes. At the end of the knitting of the heel the raised or long butt needles would normally not be drawn down into action during the first revolution after knitting the heel until the needles are drawn down by the draw down cam located shortly before the leading stitch cam so that a pattern stripe continued on to the instep is broken as the long butt needles which take the wrapping yarns are not lowered in time to permit the selection of the needles and the wrapping of the pattern yarn on the selected needles on the first course of round and round knitting after knitting the heel. There is provided, therefore, a cam 2 which is moved to operative position during the last reverse movement during the knitting of the heel and is in operative position at the beginning of the first revolution of round and round knitting after the knitting of the heel and which, as shown in Figure 17, draws down the raised or long butt needles in time to permit of the selection of the needles for receiving the wrapping yarn. As the latches are at this time closed a latch opener 6 which opens the latches of the selected needles is positioned following the positioning of the cam 2.

On machines of this type it is necessary to raise the needles just prior to the knitting point sufficiently to clear the latches of the loops of the previous course but the needles must not be raised far enough to clear the yarns just put on the needles. To prevent the last applied yarns getting below the latches at the knitting point the leading stitch cam 360 is arranged to be withdrawn and a special clearing cam 3 moved into position to engage with both the long and short butt needles. The special clearing cam 3 elevates the needles the distance necessary for clearing the latches without causing the last applied yarns to be cleared.

As shown in Figure 15 during round and round knitting the needles are all brought down into position for selecting the needles to receive the wrapping yarn by the cam 2 and the raising of the selected needles is effected in any desired manner as for example in the manner shown in the patent to Ivan W. Grothey, No. 1,678,385, issued July 24, 1928. The clearing cam 3 raises the needles to clear the latches and the knitting is completed by the usual stitch cams 357 and 361.

During the knitting of the heel by reciprocatory knitting the long butt needles are raised so as not to be operated by the stitch cams, the division being effected by the pivoted dividing cam 5 as usual. The knitting of the heel by reciprocatory knitting will take place on the usual stitch cams with the short butt needles active in the usual manner. On the last clock-wise or reverse movement of the needles before coming off the heel the draw down cam 1 is positioned to engage the short butt or active needles as shown in Figure 16 and draw these needles down to a position which will permit of the wrapping fingers 24 being swung out to wrapping position on the first revolution of round and round knitting when changing off the heel and brings the butts down below the cam 2 which has been inserted at about the same time as cam 1, its upper end bearing against the ends of the butts of the long butt needles until they pass beyond it to the right of Figure 16 when it snaps into position to draw the long butt needles down on the beginning of the first revolution of round and round knitting as

shown in Figure 17. At the beginning of the first revolution of round and round knitting when changing off the heel the leading stitch cam 360 and the draw down cam 1 have been withdrawn and clearing cam 3 has been positioned to engage the needle butts. Simultaneously with the positioning of cam 3 the latch openers 6 and 7 are placed in operative position. As shown in Figure 17 the draw down cam 2 returns the inactive or long butt needles from the raised or inactive position held by these needles during the knitting of the heel to the lowered position in which the needles which are to be wrapped are selected or raised and the latch opener 6 opens the latches of the selected needles so that they can receive the wrapping yarns prior to the knitting wave in this first revolution after coming off the heel. Clearing cam 3 will raise the needles to clear the latches of the loops knit on the previous course without clearing the last acquired yarns and the latch opener 7 opens the latches of all the long butt needles not opened by the latch opener 6. In this way the pattern or lap stripes are made in the first revolution of round and round knitting after coming off the heel and there is no break or interruption of the stripe at the ankle. The latch openers 6 and 7 are not necessary after the first revolution of round and round knitting and they are withdrawn at that time but the cams 2 and 3 and the stitch cams 357 and 361 continue to function during the round and round knitting.

To operate the various cams, to the bed plate B there is secured a bracket 50 slotted to slidably receive the slide or carrier 51 which is held in the slot by a cover plate 52 and has cam 2 attached to its inner end by screws 59. The outer end of the slide 51 is bent downwardly and provided with a threaded opening in which is mounted an adjustable stop 56 which limits the inward movement of the cam 2 by engagement with the bracket 50. The cam 2 is moved inwardly to engage with the needle butts by a spring pressed plunger 58 mounted in the bracket 50 and is moved outwardly away from engagement with the needles by a bell crank lever 60 pivotally mounted at 62 on the bed plate B and having one arm engaging a downwardly projecting pin 64 carried by the inner end of the slide 51. The other arm of the bell crank lever 60 has pivotally and slidably connected thereto one end of a link 66 the other end of which is pivotally connected to the upper end of a lever 68 pivotally mounted on the guide frame 70 and having its other or lower end positioned to contact with cams 71 and 72 on the drum 120. A bracket 73 attached to the bed plate B' has a slot 74 which forms a guide for the lever 68 and a spring 75 connected to the lever 68 and bed plate B' holds the lower end of the lever in contact with the cams or drum.

To the latch ring 550 there is attached a bracket 76 rotatably supporting a vertically positioned pin 77 having a collar 78 adjustably mounted on the upper end thereof. To the collar 78 is attached one end of a spring 79 the other end of which is connected to the bracket 76. On the lower end of the pin 77 is mounted a collar 80 carrying the latch opener 7 and the operating pin 81. An extension 82 attached to the bracket 76 pivotally supports a finger 83 carrying a pin 84 which projects into the path of the latch opener 7. The finger 83 is also provided with a threaded opening to receive an adjustable stop 85 which engages the latch ring 550 and limits the inward movement of the latch opener 7. Piv-

totally mounted at 86 on the sinker ring 300 is a plate lever 87 which carries the latch opener 6 at one end thereof and has a spring 88 connected between the sinker ring 300 and a pin 89 projecting downwardly from the opposite end thereof. A stop 90 mounted on the sinker ring 300 engages the end of the lever 87 adjacent the latch opener 6 and limits the movement of the lever 87 and latch opener 6 inwardly towards the needles. The plate lever 87 has its edge adjacent the needles formed as part of a circle concentric with the needle circle and when the latch opener 6 is in operative position opening the latches of the selected needles the plate lever 87 is positioned to prevent the closing of these latches by centrifugal force so that the selected needles can receive the wrapping yarn.

To operate the latch openers 6 and 7 to the positions in which they engage the needle latches there is provided a shaft 91 journaled on the bed plate B' and extending through the bed plate B and carrying at its upper end the adjustably mounted arms 92 and 93 to which are attached the spring fingers 94 and 95 which operatively engage with the pins 81 and 89 carried by the collar 80 on pin 77 and the lever 87, respectively. A crank arm 96 attached to the lower end of the shaft 91 is connected to one end of a link 97 the other end of which is connected to one arm of a bell crank lever 98 pivotally mounted at 99 on the bracket 73. The other arm of the bell crank lever 98 projects in front of the lever 68 to be operated thereby and a spring 100 connected between the bell crank lever 98 and the lever 68 holds the bell crank lever in engagement with the lever 68 and causes the bell crank lever 98 to follow the outward movements of the lever 68.

Pivotally mounted at 101 on the bed plate B is a lever 102 carrying at one end the cam 3 and at the other end the cam 1. The lever 102 is provided with an arm 103 to which is connected one end of a link 104 the opposite end of which is connected to one arm of a bell crank lever 105 pivotally mounted on pin 106 carried by the standard 401. The other arm of the bell crank lever 105 is connected to one end of an adjustable push rod 107 which is operated by cams 108 on drum 120. A spring 109 connected between the push rod 107 and bed plate B' holds the push rod in contact with the cams and drum and adjustable stop members 110 mounted in lugs on the lever 102 contact with the flange b of the bed plate B and limit the inward movements of the cams 3 and 1 toward the needles.

To provide for shifting the leading knitting cam 360 to operative and inoperative positions the cam is mounted on a slide 130 supported by the base plate B and having at one end a guide slot 131 which receives a guide pin 132 fixed in the base plate B. At the other end the slide 130 has a lug 133 which travels in a groove 134 in the base plate B. A spring 135 connected to the slide 130 and the base plate B is arranged to move the slide 130 inwardly so as to place the cam 360 in operative position with respect to the needle butts. The slide 130 is moved to and held in a position in which the cam 360 does not engage the needle butts by means of a push rod 137 guided by the guide frame 70 and positioned so that its lower end contacts with a cam or cams 138 on a suitably operated drum as the main drum 120. The upper end of the push rod 137 is connected to one arm of a bell crank lever 139 which is pivotally supported, as by standard 401, and has its other arm connected by a link 140 to the slide 130. As

shown in Figure 13 when the push rod 137 is raised by a cam 138 on the drum 120 the cam 360 is withdrawn from operative position and when the cam 138 permits the lowering of the push rod 137 the spring 135 will return and hold the cam 360 in operative position with respect to the needle butts.

As shown in Figure 1 the cam 108 which controls push rod 107 and cams 1 and 3 is stepped to provide three positions for the push rod 107. When the push rod is in its lowest position or in engagement with the drum 120 the cam 3 is in operative position and the cam 1 is in inoperative position. When the push rod 107 is on the intermediate level, the position shown in Figure 1, the cams 1 and 3 are both withdrawn to the inoperative position and when the push rod 107 is on the highest level of the cam 108 the cam 1 is in operative position and the cam 3 is in inoperative position. The cams 71 and 72 on the drum 120 are on the same track and through lever 68 control the cam 2 and both latch openers 6 and 7. Both cams 71 and 72, it will be noted, are stepped and when the lever 68 engages with the highest level, the position shown in Figure 1, the cam 2 and both latch openers 6 and 7 are in inoperative positions. When the lever 68 engages the intermediate levels of the cams 71 and 72 the cam 2 is in operative position and the latch openers 6 and 7 are in inoperative positions and when the lever 68 engages the lowest level or drum 120 the latch openers 6 and 7 are in operative positions and the cam 2 is in operative position. With the lever 68, and push rod 107 positioned as in Figure 1 the cams 1, 2 and 3 and the latch openers 6 and 7 are all in inoperative positions. This is the position held by the operating means for the cams and latch openers during the knitting of the heel. The next forward movement of the drum will place the lever 68 on the intermediate level of cam 71 and the push rod 107 on the highest level of cam 108. This movement which comes at the beginning of the last course coming off the heel places cam 1 in operative position while cam 3 and the latch openers remain in inoperative positions, cam 1 drawing the active needles down so that their butts pass beneath the cam 2 and cam 2 being moved inwardly and riding on the butts of the inactive needles until they have passed whereupon the spring plunger 58 snaps cam 2 into position to engage the butts of the inactive needles and draw these needles down to the position for selecting the needles for the wrapping yarn. This movement of the drum 120 is a normal racking and it is almost immediately followed by an abnormal racking of the drum which cannot be made by the usual quadrant pawl but may be made by an eccentric cam on the main shaft as shown in Figure 1 of the patent to Scott, No. 1,148,055, issued July 27, 1915 or other suitable means.

The next forward movement of the drum 120, that is, the movement brought about by the abnormal racking brings both the lever 68 and the push rod 107 into engagement with the drum 120 and in this position the cams 2 and 3 and the latch openers 6 and 7 are in operative positions. This is the position held during the first revolutions of circular knitting after coming off the heel, that is, during the knitting of the courses indicated by the arrows in Figure 11. In this position, as shown in Figure 17, the cam 2 draws down the needles which were inactive during the knitting of the heel to the position in which the

needle selection is made and the needles raised to receive the wrapping yarn, the needle latches being closed by the lowering movement of the needles. Cam 3 raises all needles to a point where the latches are cleared of the fabric loops previously knit but not of the yarns just applied, latch opener 6 opens the latches of the selected needles in time for them to receive the wrapping yarn and latch opener 7 opens the latches of the remaining needles which were inactive during the knitting of the heel. In this position, it will be noted the regular clearing cam 360 which was in operative position during the knitting of the heel, has been withdrawn and the clearing of the latches is accomplished by cam 3. It will be noted that while cam 3 raises all needles to a latch clearing position, the latches of the needles inactive during the knitting of the heel were cleared when the needles were raised to inactive position and the latches of these needles are not cleared by cam 3 in the first course after coming off the heel but are cleared by cam 3 in all subsequent courses of round and round knitting with the balance of the needles. The operation of cam 360 and the cam controlling the wrapping yarn fingers is synchronized so that the cam 360 is withdrawn and the wrapping yarn fingers advanced at the proper times.

The movement of the drum 120 has meanwhile brought the cam 501 and push rod 460 into such relation that the cam controlling the wrapping yarn fingers has been shifted to cause the fingers to cross the needle circle in wrapping relation to the raised needles.

A further movement of the drum 120 brings the lever 68 on to the intermediate level of the cam 72 in which position the cam 2 is in operative position and the latch openers 6 and 7 are moved to inoperative position. The push rod 107 remains in contact with the drum 120 keeping cam 3 in operative position and cam 1 in inoperative position. This is the position retained during the normal circular knitting as shown in Figure 15.

What is claimed is:

1. In a lap stripe circular knitting machine means lowering the needles inactive during the knitting of a heel, pattern mechanism operating said means to needle engaging position during the last reverse movement in the knitting of the heel and means lowering the active needles to pass their butts below the lowering means for the inactive needles.

2. In a lap stripe circular knitting machine, a cam lowering the needles inactive during the knitting of a heel, said needles having their latches closed in the lower position, means selecting needles to take wrapping yarns, a latch opener for the selected needles, pattern mechanism operating said cam to operative positions during the last reverse movement in the knitting of the heel and means placing the latch opener in operative position.

3. In a knitting machine having inactive needles raised to a position in which the loops are below the latches during the knitting of the heel and means for feeding an additional yarn or yarns to the needles in advance of the usual yarn feeding position, means lowering the raised needles to a latch closing position while retaining the loops on said needles upon the return of said inactive needles into action in advance of the feeding position of said additional yarn or yarns and means opening the latches of selected needles of said inactive needles to take said additional

yarn or yarns in the first course of round and round knitting after coming off the heel.

4. In a knitting machine having the needles inactive during the knitting of the heel raised to a position in which the loops on said needles are below the needle latches, means lowering said inactive needles for needle selection for an additional yarn, said needles retaining their loops and having their latches closed in the lower position, a latch opener opening the latches of said selected needles to receive an additional yarn and pattern means rendering said lowering means and latch opener operative in the first revolution of round and round knitting after coming off the heel.

5. In a knitting machine having the needles inactive during the knitting of the heel raised to a position in which the loops on said needles are below the needle latches, means lowering said inactive needles for needle selection for an additional yarn, said needles retaining their loops and having their latches closed in the lower position, separate latch openers to open the latches of said selected needles to receive an additional yarn and to open the latches of the remainder of said inactive needles and pattern means rendering said lowering means and said latch openers operative during the first revolution of round and round knitting after coming off the heel.

6. In a knitting machine having the needles inactive during the knitting of the heel raised to a position in which the loops on said needles are below the needle latches, means lowering said inactive needles for needle selection for an additional yarn, said needles retaining their loops and having their latches closed in their lower position and spaced latch openers to open the latches of said selected needles to receive an additional yarn and to open the latches of the remainder of said inactive needles during the first revolution of round and round knitting after coming off the heel.

7. In a knitting machine having the needles inactive during the knitting of the heel raised to a position in which the loops on said needles are below the needle latches, means lowering said inactive needles for needle selection for an additional yarn, said needles retaining their loops and having their latches closed in their lower position, spaced latch openers to open the latches of said selected needles to receive an additional yarn and to open the latches of the remainder of said inactive needles and means feeding additional yarns to said selected needles driving the first revolution of round and round knitting after coming off the heel.

8. In a knitting machine having the needles inactive during the knitting of the heel raised to a position in which the loops on said needles are below the needle latches, means lowering said inactive needles for needle selection for an additional yarn, said needles retaining their loops and having their latches closed in their lower position and means opening the latches of said selected needles to receive additional yarns in the first revolution of round and round knitting after coming off the heel.

9. In a lap stripe knitting machine having wrapping mechanism which wraps below the latch ring and needles inactive during the knitting of the heel raised to a position in which the loops on said needles are below the needle latches, means lowering said needles to a position for selecting needles for wrapping in which the needle latches are closed and the loops retained on the

needles and means opening the latches of the selected needles to receive yarn from the wrapping mechanism in the first revolution of round and round knitting after coming off the heel.

5 10. In a lap stripe knitting machine having wrapping mechanism which wraps below the latch ring and needles inactive during the knitting of the heel raised to a position in which the loops on said needles are below the needle latches, means lowering said needles to a position for
10 selecting needles for wrapping in which the needle latches are closed and the loops retained on the needles, means opening the latches of the selected needles to receive yarn from the wrapping mechanism in the first revolution of round and round
15 knitting after coming off the heel and pattern means operating said lowering means to operative position during the last reverse movement of the needles in the knitting of the heel.

20 11. In a knitting machine having inactive needles raised to a position in which the loops are below the needle latches and means for feeding an additional yarn or yarns to said needles in advance of the usual yarn feeding point, means
25 lowering the raised needles to a latch closing position in which the loops are retained on said needles in advance of the feeding position for said additional yarn or yarns in returning the inactive needles into action and separate latch
30 opening means opening the latches of different groups of said inactive needles in advance of and subsequent to the feeding position for said additional yarn or yarns.

35 12. In a knitting machine having inactive needles raised to a position in which the loops are below the needle latches and means for feeding an additional yarn or yarns to said needles in advance of the usual yarn feeding point, means
40 lowering the raised needles to a latch closing position in which the loops are retained on said needles in advance of the feeding position for said additional yarn or yarns in returning the inactive needles into action and latch openers co-
45 operating with different groups of said needles to open the latches of some needles in advance of the feeding point of said additional yarn or yarns and to open the latches of other needles between the feeding point of said additional yarn or yarns and the usual yarn feeding point.

50 13. In a lap stripe knitting machine having yarn guides for wrapping selected needles, a cam lowering the needles inactive during the knitting of the heel to clear the wrapping yarn guides
55 during the first revolution of round and round knitting after coming off the heel, said needles retaining their loops and having their latches closed in their lowered position, means selecting
60 needles for wrapping and means opening the latches of the selected needles to receive wrapping yarns prior to the knitting wave in said first revolution.

65 14. In a lap stripe circular knitting machine having yarn guides for wrapping selected needles, means lowering the needles inactive during the knitting of the heel to clear the wrapping yarn guides during the first revolution of round and
70 round knitting after coming off the heel, said needles retaining their loops and having their latches closed in their lowered position, means selecting needles for wrapping, a latch opener for the selected needles and pattern means rendering said lowering means and latch opener op-

erative to permit wrapping of the selected needles during said first revolution.

15 15. In a lap stripe circular knitting machine having yarn guides for wrapping selected needles, means lowering the needles inactive during the knitting of the heel to clear the wrapping yarn guides during the first revolution of round and round knitting after coming off the heel, said
20 needles retaining their loops and having their latches closed in their lowered position, means selecting needles for wrapping and spaced latch openers for the needles inactive during the knitting of the heel to open the latches of said
25 needles to receive wrapping and body yarns prior to the knitting wave in said first revolution.

16. In a lap stripe knitting machine having yarn guides for wrapping selected needles, a cam lowering the needles inactive during the knitting of the heel to clear the wrapping yarn guides during the first revolution of round and round
20 knitting after coming off the heel, said needles retaining their loops and having their latches closed in their lowered position, means selecting needles for wrapping and means opening the latches of the selected needles to receive wrapping
25 yarns prior to the knitting wave in said first revolution and means moving said cam and latch opener to operative positions for the beginning of said first revolution.

30 17. In a lap stripe knitting machine having yarn guides for wrapping selected needles, a cam lowering the needles inactive during the knitting of the heel to clear the wrapping yarn guides during the first revolution of round and round
35 knitting after coming off the heel, said needles retaining their loops and having their latches closed in their lowered position, means selecting needles for wrapping, latch openers for said needles whereby said needles receive the wrapping
40 yarns and body yarn during said first revolution and means moving said cam and latch openers to operative positions at the beginning of said first revolution, said means shifting said latch openers to inoperative positions after said
45 first revolution.

18. In a lap stripe circular knitting machine having wrapping yarn guides, means placing the wrapping yarn guides into action after the knitting of a heel, means lowering the needles inactive during the knitting of a heel to clear the
50 wrapping yarn guides prior to the usual point of selecting needles for wrapping in the first revolution of round and round knitting after coming off the heel, said needles having their latches closed in their lowered position, a latch opener
55 for said selected needles and means operative to shift said latch opener to operative position to open said latches and to inoperative position after said latches have been opened during said first revolution.

60 19. In a lap stripe circular knitting machine, means for lowering the needles inactive during the knitting of a heel, pattern mechanism operating said means into contact with the butts of the inactive needles during the last movement in
65 the reverse direction in the knitting of a heel and means shifting said needle lowering means into position to operate said needles during movement in round and round knitting after the passage of the inactive needles in the last movement
70 in the reverse direction.

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