Feb. 14, 1956 E. M. ZESCH 2,734,360

STRAIGHT KNITTING MACHINE

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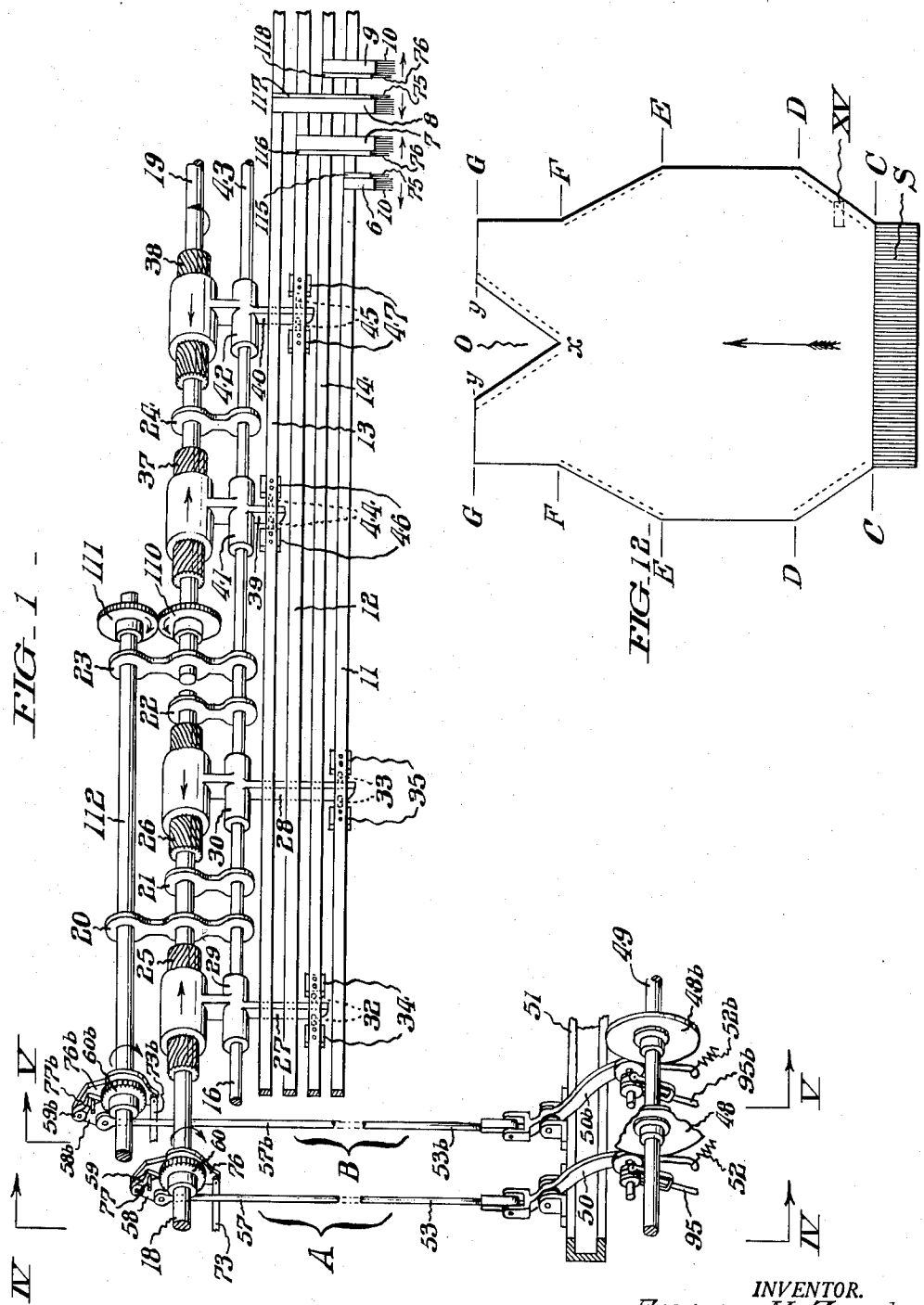


FIG. 1

FIG. 12

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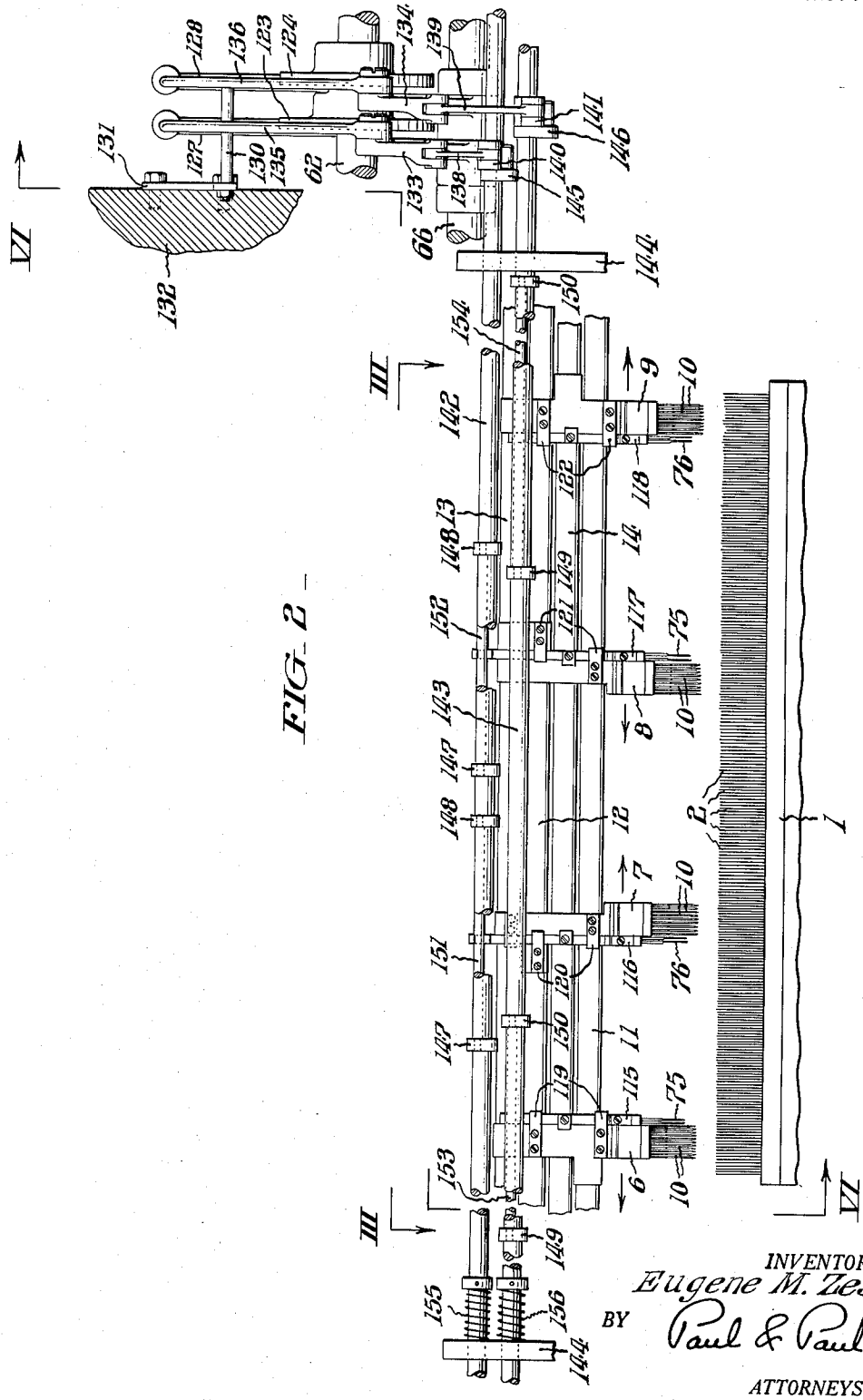


FIG. 2

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STRAIGHT KNITTING MACHINE

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FIG. 3

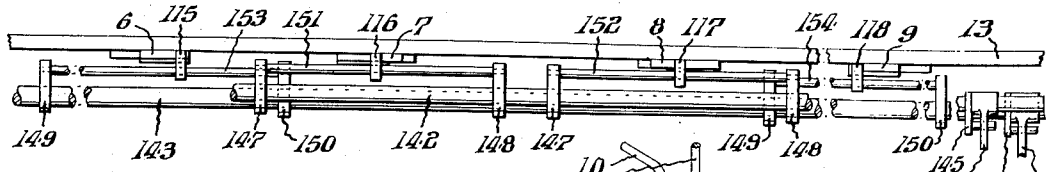


FIG. 10

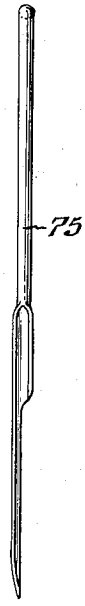


FIG. 11

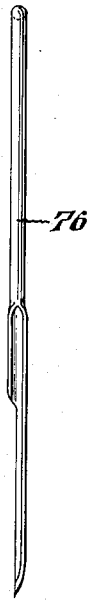


FIG. 13

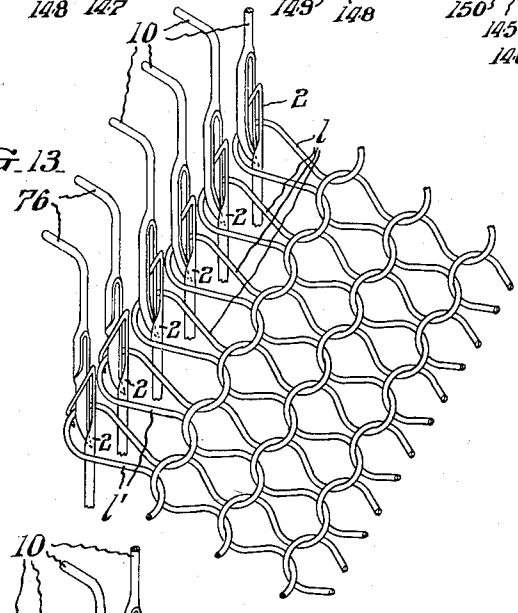
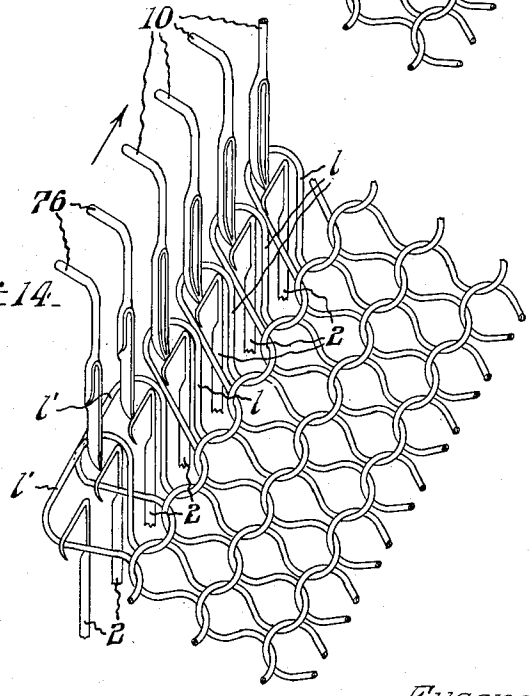


FIG. 14



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STRAIGHT KNITTING MACHINE

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FIG. 4.

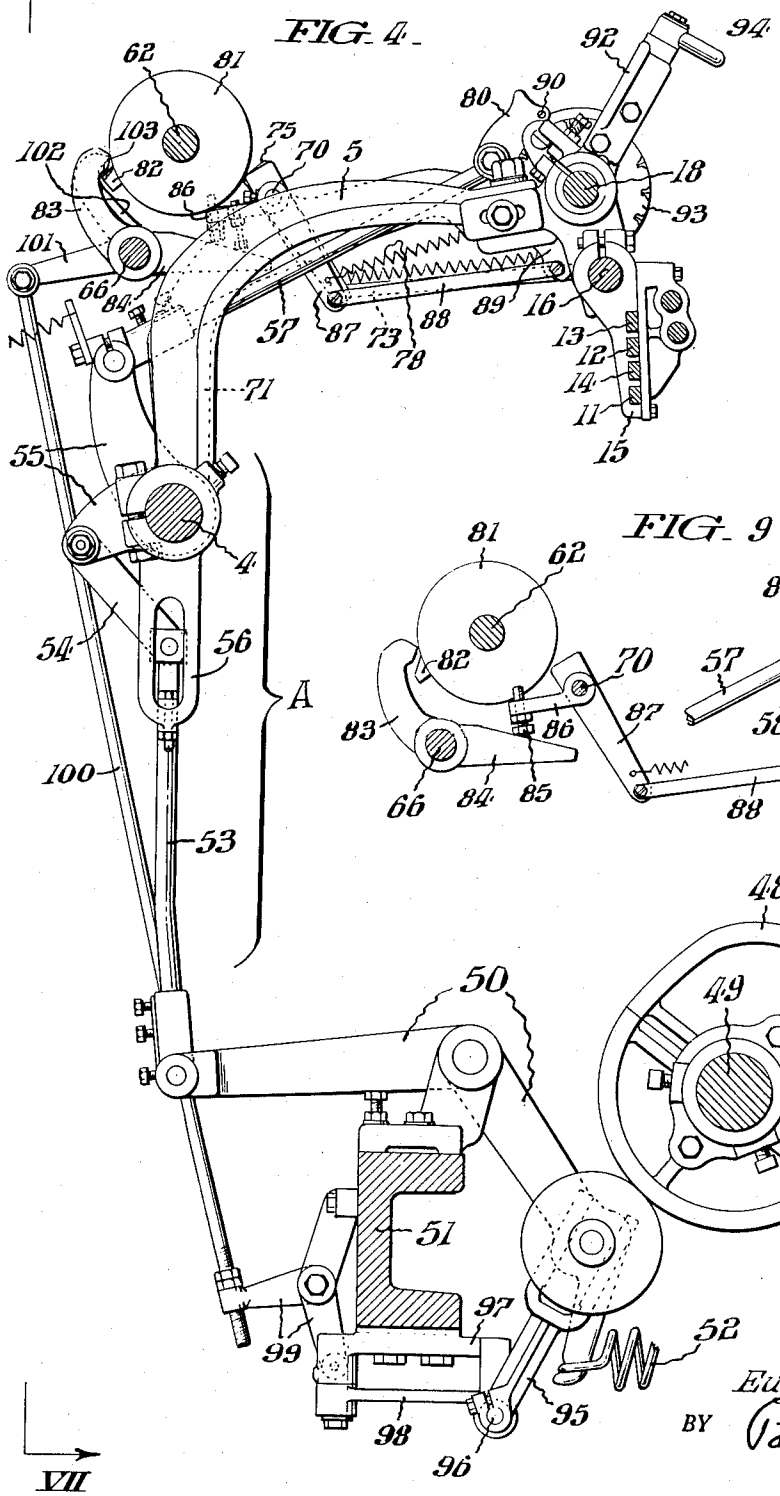


FIG. 9.

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STRAIGHT KNITTING MACHINE

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FIG. 5

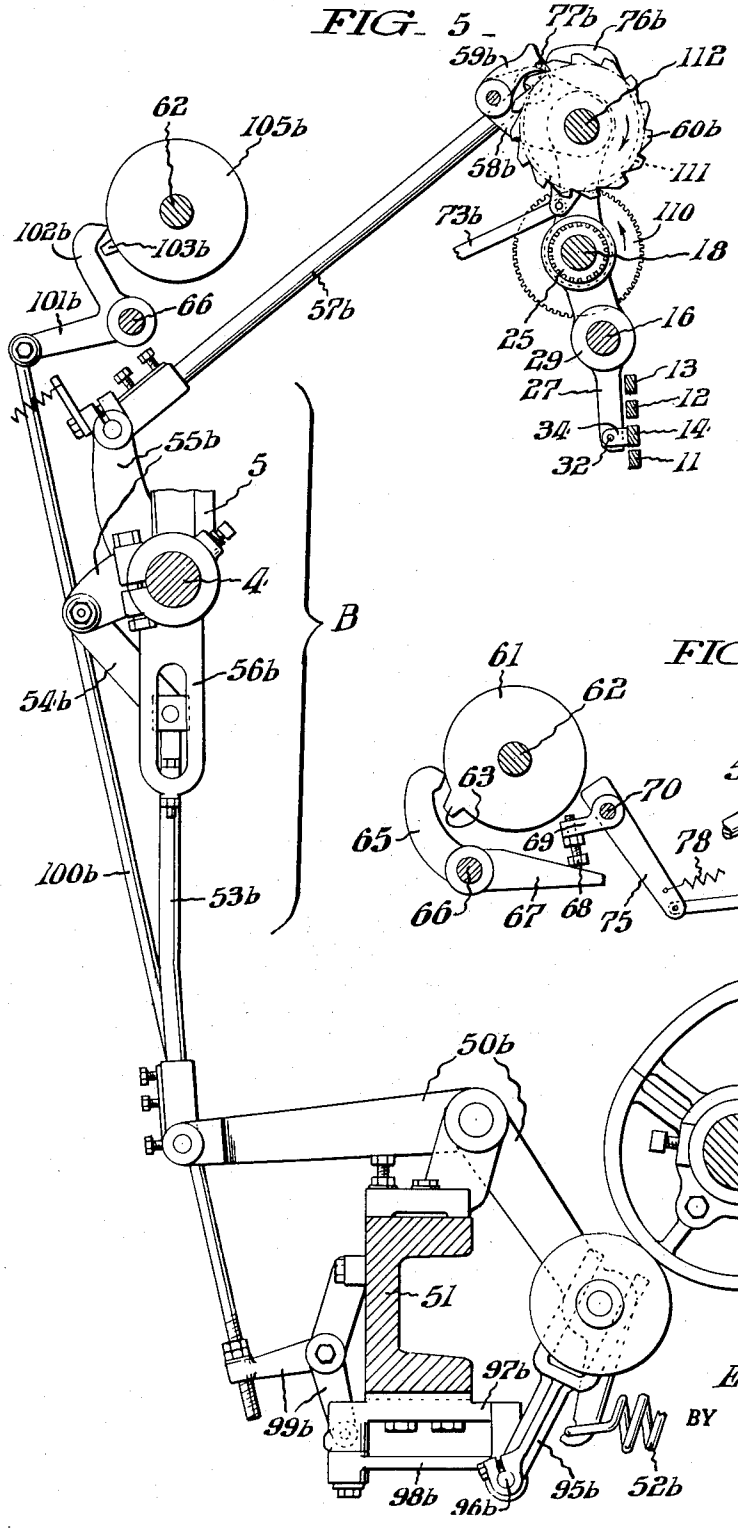


FIG. 8

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STRAIGHT KNITTING MACHINE

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FIG. 6.

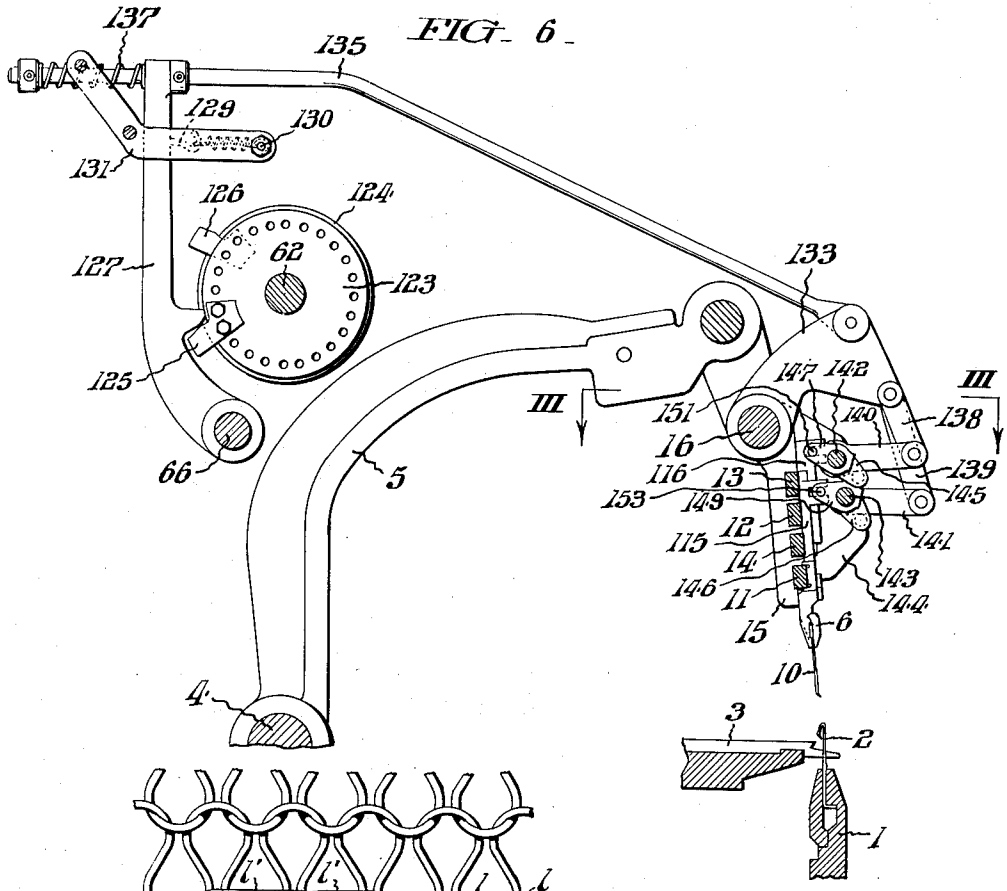
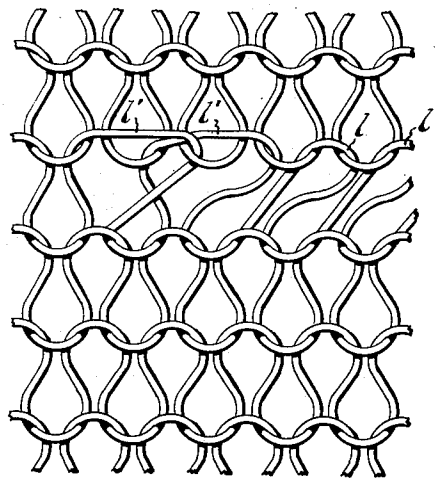


FIG. 15.



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STRAIGHT KNITTING MACHINE

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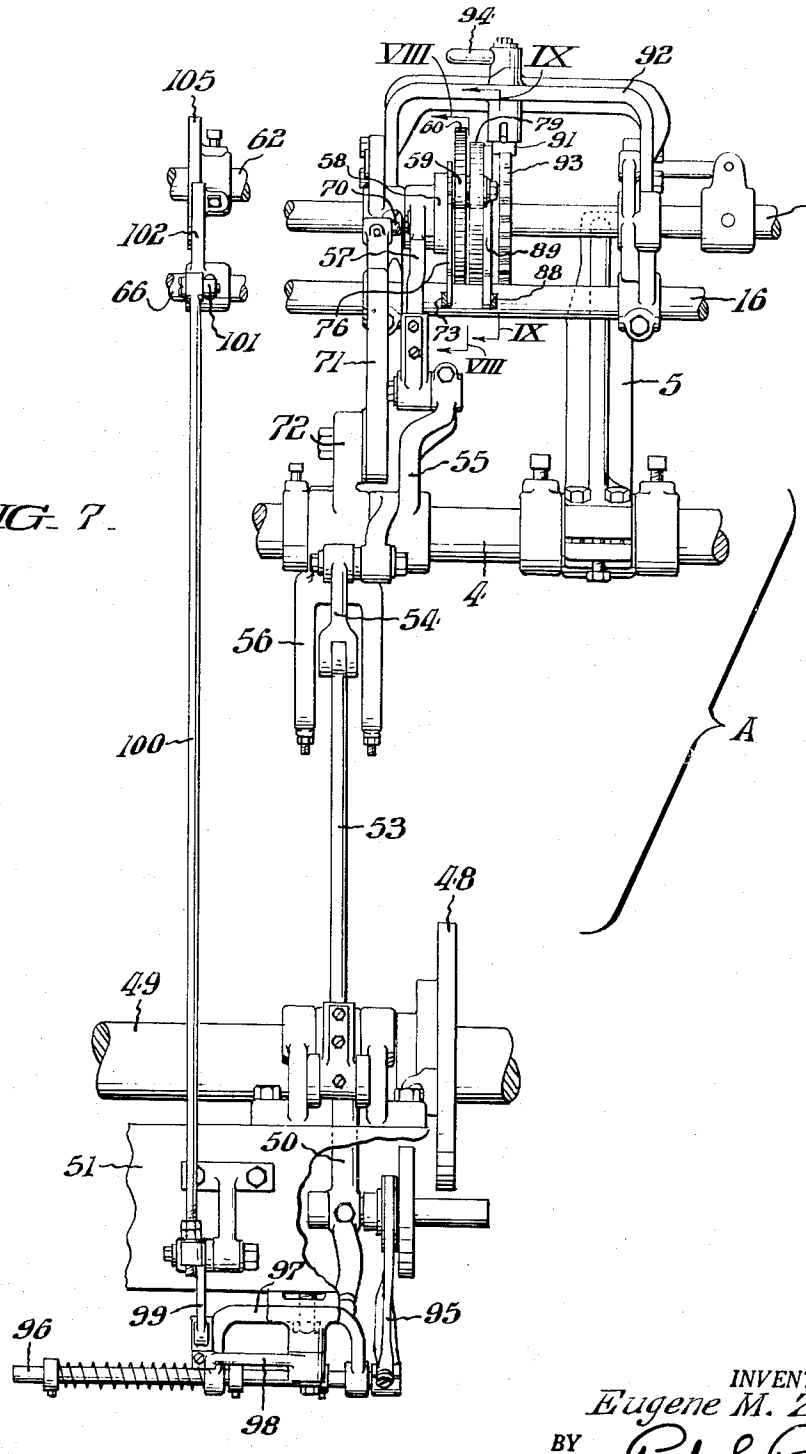


FIG. 7.

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STRAIGHT KNITTING MACHINE

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FIG. 16.

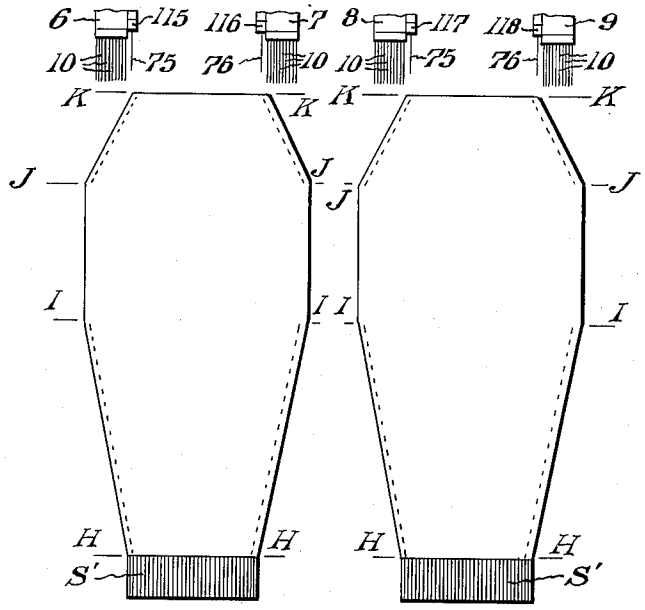
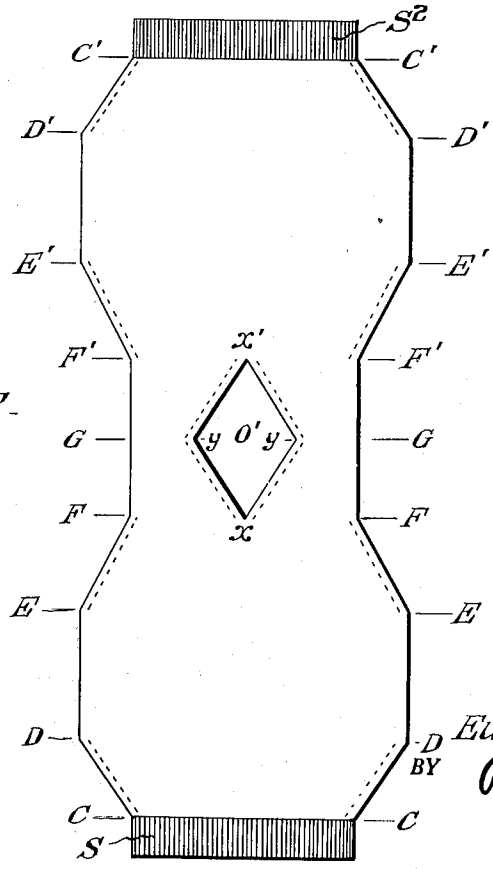


FIG. 17.



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United States Patent Office 2,734,360 Patented Feb. 14, 1956

2,734,360

STRAIGHT KNITTING MACHINE

Eugene Max Zesch, Shillington, Pa., assignor to Karl Lieberknecht, Inc., Reading, Pa., a corporation of Pennsylvania

Application February 3, 1955, Serial No. 485,856

14 Claims. (Cl. 66—89)

This invention relates to straight knitting machines, particularly to straight knitting machines of the cotton type.

The chief aim of my invention is to enable, through provision of relatively simple and reliable improved means or mechanism such as hereinafter fully disclosed in detail, whereby objectionable holes or eyelets, ordinarily formed during widening phases of the knitting, are closed and the suture junctures thus rendered less conspicuous.

A further aim of my invention is to make it possible to produce, in a knitting machine with mechanism operative upon the above principle on one set of needles, for example, flat fashioned sweater blanks having widened and narrowed body portions and shoulder portions either with central V-shaped notches for neck openings or with diamond shaped medially located openings, wherein the different inner as well as the outer widened selvages are devoid of eyelet holes; or to produce at one time on the one blank of needles, several widened and narrowed sweater sleeve blanks whereof the widened selvages are likewise devoid of holes or eyelets.

Other objects and attendant advantages will appear from the following detailed description of the attached drawings, wherein:

Figs. 1 and 2 respectively are fragmentary elevational views which, taken together, show the front of a straight knitting machine of the "cotton" type conveniently embodying my invention in one form.

Fig. 3 is a fragmentary view in top plan looking as indicated by the angled arrows III—III in Figs. 2 and 6.

Figs. 4 and 5 are fragmentary views in transverse section taken as indicated respectively by the angled arrows IV—IV and V—V in Fig. 1 and drawn to a larger scale.

Fig. 6 is a fragmentary view in cross section taken in the staggered plane indicated by the angled arrows VI—VI in Fig. 2, likewise drawn to a larger scale.

Fig. 7 is a fragmentary view partly in elevation looking as indicated by the angled arrows VII—VII in Fig. 4 with certain parts omitted and others shown in cross section.

Figs. 8 and 9 are fragmentary detail views taken as indicated respectively by the angled arrows VIII—VIII and IX—IX in Fig. 7.

Figs. 10 and 11 are enlarged views of two types of special points used in the machine to laterally transfer half loops during the widening phases of the knitting.

Fig. 12 shows a form of sweater blank produced in the machine.

Figs. 13 and 14 are fragmentary perspective views showing sucessive steps by which transfer operations are effected during widening phases of the knitting in accordance with my invention.

Fig. 15 is a diagrammatic view showing fragment of widened fabric in the area XV of the sweater blank in Fig. 12.

Fig. 16 shows a pair of sweater sleeves such as can be produced simultaneously in the machine, and

Fig. 17 shows another type of sweater blank for the production of which the machine is adapted.

With more specific reference, first to Figs. 1–9 of these illustrations, the supporting bar designated **1** for the needles **2** is moved up and down and in and out relative to the sinkers **3** (Fig. 6) after common practice during the knitting by suitable mechanism which may be of any well known construction, and which, for this reason, has been omitted from the drawings. The dipping (narrowing) frame of the machine of which the fulcrum shaft **4** and certain arms only is shown in Figs. 4–8. The means (not illustrated) for actuating the dipping frame may likewise be of standard construction. For the use of the machine in the production of shaped individual blanks for sweater blanks such as exemplified in Fig. 12 having shoulder portions with central notches for neck openings, I have provided two outer selvage narrowing-widening point combs **6** and **9**, and two inner selvage narrowing-widening point combs **7** and **8**, each with groups of the usual types of full loop transfer points **10**. These combs **6**, **7**, **8** and **9** are secured respectively to longitudinally-extending bars **11**, **12**, **13** and **14** which are supported, with capacity for endwise shifting, independent guide brackets **15** at the distal ends of the arms **5** of the dipping frame, horizontal tie rods such as designated at **16** in Fig. 4 extending between different pairs of said arms.

For the purpose of periodically shifting the bars **11**, **12** and **13**, **14** contrariwise in the narrowing and widening phases of the knitting, I have further provided, as shown in Fig. 1, means including a pair of axially-aligned horizontal screw spindles **18** and **19** which are rotatively supported in bearings **20**, **21**, **22** and **23**, **24** respectively at the distal ends of different arms **5**. Engaged upon oppositely threaded portions **25** and **26** of the spindle **18** are follower nuts **27** and **28** whereof the pendent fingers have bosses **29** and **30** arranged to slide along the rod **16** which serves as a guide for said fingers and which is supported between the distal ends of certain of the arms **5**. The lower ends of the fingers **27** and **28** respectively engaged between adjustable screws **32** and **33** in lugs **34** and **35** at the backs of the bars **14** and **11**. Similarly engaged with oppositely-threaded portions **37** and **38** of the spindle **19** are follower nuts **39** and **40** having bosses **41** and **42** which are arranged to slide along a guide rod **43** suported between the distal ends of others of the arms **5**, the lower ends of the fingers of said follower nuts engaging respectively between set screws **44** and **45** in lugs **46** and **47** at the backs of the bars **13** and **12** whereto the point combs **8** and **7** are affixed.

For impartation of rotary shifts to the screw spindle **18**, I have devised the means comprehensively designated A in Figs. 1, 4, 7, 8 and 9, said means comprising a rotary cam **48** (Fig. 4) on the main cam shaft **49** in the lower part of the machine to act upon a roller on one arm of a bell crank lever **50** which is fulcrumed in a bracket on a rear horizontal **51** of the machine frame and which is subject to a pull spring **52**. Through a pair of coupled links **53** and **54**, oscillatory movements are imparted from the roller arm **50** to a bell crank rocker **55** free on the shaft **4**, the pivotal connection of said links being constrained to up and down movement in the slot of a guide arm **56** affixed to said shaft. Through the medium of a horizontal link **57**, the bell crank **55** imparts oscillatory motion to a rocker arm **58** (Fig. 8) free on the shaft **18**. Pivoted on the rocker arm **58** is a push pawl **59** for picking a ratchet wheel **60** affixed to the spindle **18** for impartation of intermittent clockwise movement to said spindle. The activity of the pawl **59** is governed by a rotary cam **61** fast on a horizontal shaft **62** rotatively supported in the upper rear part of the machine by a portion (not illustrated) of the machine frame. As shown, the cam **61** has a circumferential lug **63** on its

periphery arranged to actuate a finger 65 free on a horizontal shaft 66 also borne in the machine frame immediately below the shaft 62. The tail projection 67 of the finger 65 underreaches a set screw 68 in a short arm 69 on a rock shaft 70 which is fulcrumed in a bracket 71 (Figs. 4 and 7) bolted to an upward projection 72 of the guide 56. A horizontal link rod 73 connects another arm 75 fast on the rock shaft 70 with a guard plate 76 free on the spindle 18, said guard plate having a cam rise for engaging a stud 77 on the pawl 59 from beneath to lift the latter away from the ratchet wheel 60. Under the pull of the spring indicated at 78 and effective upon the arm 75, the set screw 68 on the arm 69 is maintained yieldingly engaged with the tail 67 of the finger 65 and the latter in engagement with the rotary cam 61 on the shaft 62. Secured to the screw spindle 18, adjacent the ratchet wheel 60, is a similar but oppositely pitched ratchet wheel 79 which is arranged to be picked to intermittently rotate said shaft counterclockwise in Fig. 5 during the narrowing phases of the knitting, by a hook pawl 80, see Figs. 4, 7 and 9, also carried by the rocker arm 58. The activity of the pawl 80 is governed by second rotary cam 81 on the shaft 62 having a circumferential lug 82 which is operative upon another follower in the form of a finger 83 free on the shaft 66, said finger having a tail 84 which underreaches a set screw 85 on the short arm 86 of another arm 87 free on the shaft 70. By means of a horizontal link 88, the arm 87 is connected with a guard disk 89 free on the spindle 18 alongside the ratchet wheel 79, said disk having a cam rise adapted to engage beneath a lateral stud projection 90 on the pawl 89 to lift said pawl from said ratchet wheel 79. Overthrow of the screw spindle 18 during the racking is prevented by cooperation of a spring pressed detent 91 in a yoke 92, with a wheel 93 which is affixed to said shaft and which has peripheral notches corresponding in number to the teeth of the ratchet wheels 60 and 79. The detent 91 is retractable by means of a cam lever 94 when the spindle 18 is to be manually turned, by suitable means not illustrated, to starting position for each new knitting cycle of the machine.

To prevent racking of the spindle 18 during knitting of parallel outer selvage edge portions of the fabric, the racking means is rendered inoperative through shifting of the roller of the bell crank lever 50 laterally out of the range of the cam 48 on the main shaft 49, by a fork 95 affixed to a slide rod 96, which latter, see Figs. 4 and 7, is constrained to endwise movement in guide bracket 97 bolted to the frame horizontal 51. Shifting of the rod 96 is accomplished through a horizontally swingable bell crank lever 98 which is fulcrumed on the bracket 97 and is connected to one arm of another bell crank lever 99, the other arm of the latter being connected, by a vertical link rod 100, to the tail 101 of another follower in the form of a finger 102 free on the shaft 66. As shown, the finger 102 is arranged to be actuated by a circumferential lug projection 103 of another rotary cam 105 on the shaft 62.

The screw spindle 19 (Fig. 1) is driven through a pair of spur gears 110 and 111 from another horizontal shaft 112 supported for rotation in the bearing members 20 and 23. The means comprehensively designated B in Fig. 1 for intermittently rotating the shaft 112 and the screw spindle 19 is identical with that hereinbefore described for the screw spindle 18 and is shown partially in detail in Fig. 5. In order to preclude the necessity for repetitive description, the components of the mechanism B having their counterparts in the mechanism A, are designated by the same reference numerals previously employed with addition however in each instance of the letter *b* for convenience of more ready distinction.

Associated respectively with the transfer point combs 6, 7, 8 and 9, see Figs. 1 and 2, are slides 115, 116, 117 and 118 which are held assembled with the combs and constrained to up and down movement relative to said combs by guide straps 119, 120, 121 and 122.

As shown, the slides 115 and 118 are disposed at the inner ends of the combs 6 and 9, and the slides 116 and 117 at the outer ends of the combs 7 and 8. As further shown, the slides 115, 118 and 116, 117 are provided respectively with special right and left hand half-loop transfer or spreader points 75 and 76 such as are illustrated on a larger scale in Figs. 10 and 11 respectively. Normally, the slides 115, 116 and 117, 118 are retracted relative to the combs 6, 7 and 8, 9 with the spreader points 75 and 76 of said slides well above the regular transfer points of said combs. For controlling the slides 115—118, I have affixed on the shaft 62 two juxtaposed disks 123 and 124 having peripheral cam lugs 125 and 126, and associated follower arms 127 and 128 which are independently rockable about the shaft 66. Each follower arm 127, 128 is yieldingly maintained in engagement with its cam disk by a helical spring, such as the one shown in Fig. 6, in tension between a hook 129 on the arm and a pin 130 anchored in bracket 131 secured to a fixed portion 132 of the machine frame. Free for oscillation about the tie rod 16 are rockers 133 and 134 which, by means of overreaching horizontal link rods 135 and 136, are yieldingly connected to the arms 127 and 128 respectively, with interposition of springs such as the one designated 137 in Fig. 6. Through the medium of drop links 138 and 139, the rocker arms 133 and 134 are connected respectively, in turn, to outwardly projecting levers 140 and 141 which are independently free on parallel rock shaft 142 and 143 journalled in the brackets 144 on certain of the arms of the dipping frame 5. The levers 140 and 141 bear upon studs in short arms 145 and 146 respectively secured to the shafts 142 and 143. Also affixed to the shafts 142 and 143 in spaced relation are pairs of short inwardly projecting arms 147, 148 and 149, 150, the respective pairs of said arms being connected by rods 151, 152 and 153, 154 wherewith the notched upper ends of the spreader point slides 117, 118 and 115, 116 are respectively engaged. Torsion springs, indicated at 155 and 156 in Fig. 2 tend to turn the shafts 142 and 143 counterclockwise in Fig. 6 so that the studs on the arms 145 and 146 are yieldingly held in engagement with the levers 140 and 141 and the slides 115, 118 and 116, 117 are yieldingly held normally raised as in Fig. 2.

In the knitting of a sweater blank, such as exemplified in Fig. 12, two carriers are employed to feed individual yarns to the needles of the machine, and it is to be understood that any mechanism (not illustrated) of well known construction may be incorporated in the machine for variantly traversing the carriers as may be required to shape the sweater blank. In preparation for the knitting, a strip S of rib fabric may be first impaled upon the bare needles of the machine, and the machine is thereupon started. As the knitting proceeds, fabric formed from yarn fed by one of the carriers is progressively widened at the outer selvage from the starting course C—C to a course D—D, the transfers being effected by occasional operation of the dipping frame and outward shifting of the point combs 6 and 9, with incidental depression of the special point slides 115 and 118 associated respectively with said combs. At the first dip of the dipping frame during each widening phase of the knitting, the regular transfer points 10 and the spreader points 76 enter individual loops 1 and 1′ respectively on individual needles 2, as instanced in Fig. 13. By the succeeding lift of the dipping frame and outward shift of the point comb 9 and a second dip of said frame, full loops 1 are transferred to needles adjacent those from which said loops were taken, and the loops 1′ are concurrently spread by the points 76 to needles adjacent those upon which said loops were originally drawn, all in a manner which will be readily understood from Fig. 14. As a consequence, it will be seen from Fig. 15, that holes or eyelets such as ordinarily result during widening phases of the knitting are avoided. After the course D—D is reached in Fig. 12, a parallel edged

portion is produced to the course E—E, whereupon progressive narrowing is resorted to by periodic inward shogging of the point combs 6 and 9 in the usual way, i. e. without the use of the special points associated with said combs. After the course F—F, a parallel edged neck portion with a central V-shaped notch O for the neck is formed to the terminal course G—G, one of the extensions of the bifurcation being knitted from the yarn fed by one of the carriers, and the other extension being formed from the yarn fed by the second carrier. In producing the neck portion of the blank, the outer selvage combs 6 and 9 are kept idle and the inner selvage combs 7 and 8 only are employed. In the interval between the courses F—F and G—G, the combs 7 and 8 are outwardly shifted occasionally, and narrowed inner selvages are thereby produced for the V notch without the aid of the spreader points respectively associated with said combs. Two of such blanks are of course required for the sweater, these being united by sewing or looping together the corresponding outer selvages of the blanks from C to E, and also looping together the corresponding segments of their terminal courses G—G.

To simultaneously produce two arm blanks for the sweaters, the combs 6, 7 and the combs 8, 9 respectively are utilized as pairs to widen and narrow the fabrics at the selvages. For the respective arm blanks, strips S' of pre-knitted rib fabric are separately impaled upon well spaced groups of needles on the needle bar and the knitting is begun at the courses H—H. As the knitting proceeds with yarn separately fed by the two carriers, the combs 6, 7 and 8, 9 are shifted outward relative to each other at suitable intervals to widen the fabric, with incidental employment of the special points 75, 76 for eyelet closing, to the courses I—I at relatively steep angles. From the courses I—I to the courses J—J, a length of parallel edged fabric is formed, and from courses J—J to the terminal course K—K, the fabric is narrowed at a more rapid rate than the widening from H—H to I—I, by inward shifting of the combs 6, 7 and 8, 9 at suitable intervals, without the employment of the special points 75, 76. After removal from the machine, the finished arm blanks are longitudinally folded and their coinciding opposite side edges united from the bottoms to the courses J—J by sewing or looping to tubularize the blanks. To complete the sweater of which the body is produced as above described in connection with Fig. 12, the selvage segments I—J of the sleeves are united to the selvage segments E—F of the body blanks and the terminal edges J—K of the sleeves united to the selvage edge segments F—G of the united body blanks, likewise by sewing or looping.

The sweater balnk of Fig. 17 is formed in the same way as the half body blank of Fig. 12 from the course C—C to the course G—G after which the procedure is reversed. In other words, as the knitting proceeds from the course G—G, with both yarn carriers in operation, the inner combs 7 and 8 are progressively shifted toward each other, with incidental employment of the respectively associated special points 76 and 75, to form widened inner selvages Y—X' to the course F'—F' while the combs 6 and 9 are kept dormant. As a result, a diamond shaped opening O' is formed medially of the blank. From the course F'—F' to the course E'—E' the fabric is widened by outward shifting of the combs 6 and 9, with incidental use of the associated special points for eyelet closing at the outer selvage segments F'—E', the widening being here accomplished at the same rate as the narrowing of the outer selvages at E—F. A parallel edged portion is next knitted from the course E'—E' to the course D'—D', this portion corresponding in length and width to the portion between the courses D—D and E—E. From the course D'—D' to the terminal course C'—C' the fabric is narrowed at the outer selvages at the same rate as the widening in the portion between the course C—C and

the course D—D. The blank is thus symmetrical with regard to the mid course G—G. After pressing off the fabric at the course C'—C' a pre-knitted strip S^2 of rib fabric corresponding to the strip S is sewed or looped thereto. For completion of the sweater body the blank is folded upon itself about the course G—G and the coincident opposite edge portions C—E and E'—C' thereof are united by sewing or looping. Sleeves may be thereafter attached to the completed sweater body in the same manner as hereinbefore set forth in connection with the first described sweater.

It is to be understood, that my improved machine is not necessarily limited to the production of sweater blanks or sleeves since it may be used in other instances where it is desirable to narrow and widen both outer and inner selvages of blanks for other purposes, as will be readily understood by those schooled in the knitting art.

Having thus described my invention, I claim:

1. In a straight knitting machine, a row of needles for formation of looped fabric; a dipping frame movable up and down relative to the needles; a comb with a series of regular loop transfer points carried by the dipping frame and shiftable laterally relative to the needles; a normally-retracted slide for at least one special loop spreader point disposed alongside one of the endmost regular transfer points of the comb and constrained to vertical movement relative to the comb in the plane of the latter; and control means, operative during widening phases of the knitting, to depress the slide so as to bring the spreader point to the level of the regular points whereby, upon a first dip of the frame, the spreader point is entered into a loop on one of the needles concurrently with entry of the regular points of the comb into individual loops of the same course of the fabric on others of the needles so that, upon subsequent lateral shifting of the comb and a second dip of the frame, a loop is spread from said one needle over an adjacent needle while full loops of said course are transferred by the regular points to needles adjacent those from which the latter loops were taken.

2. A knitting machine, according to claim 1, further including a screw spindle and means for intermittently rotating it in one direction to shift the point comb laterally during the widening phases of the knitting, and for intermittently rotating it in the reverse direction to oppositely shift the point comb during narrowing phases of the knitting.

3. A knitting machine according to claim 1, wherein the control means for the spreader point slide includes a longitudinal rock shaft on the dipping frame, an arm on the rock shaft operatively connected to the slide, an intermittently rotated shaft with a rotary cam thereon, a cam follower adapted to be moved by the cam, and intermediate operating connections between said rock shaft and the cam follower.

4. A knitting machine according to claim 1, wherein the control means for the slide includes a longitudinal rock shaft on the dipping frame, a rearwardly-projecting arm on the rock shaft operatively connected to the slide, a rocker freely fulcrumed on the dipping frame and connected by a vertical link to a forwardly-projecting actuating lever on the rock shaft, an intermittently-rotated shaft journalled in the rear upper part of the machine and having a rotary cam mounted thereon, a follower arm for cooperation with the cam, and an overreaching horizontal link connecting the rocker to the cam follower arm.

5. A knitting machine according to claim 1, wherein the control means for the slide includes a longitudinal rock shaft on the dipping frame, a rearwardly-projecting arm on the rock shaft operatively connected to the slide, a rocker freely fulcrumed on the dipping frame and connected by a vertical link to a forwardly-projecting actuating lever on the rock shaft, an intermittently-rotated shaft journalled in the rear upper part of the

machine and having a rotary cam mounted thereon, a follower arm adapted to be actuated by the cam, an overreaching horizontal link connecting the rocker to the cam follower arm, and spring means influential upon the rock shaft to normally maintain the spreader point slide yieldingly in raised retracted position.

6. A knitting machine according to claim 1, wherein the control means for the slide includes a longitudinal rock shaft on the dipping frame, a rearwardly-projecting arm on the rock shaft operatively connected to the slide, a rocker freely fulcrumed on the dipping frame and connected by a vertical link to a forwardly-projecting actuating lever on the rock shaft, an intermittently-rotated shaft journalled in the rear upper part of the machine and having a rotary cam mounted thereon, a follower arm adapted to be actuated by the cam, an overreaching horizontal link connecting the rocker to the cam follower arm, spring means influential upon the rock shaft to normally maintain the special transfer point slide yieldingly in raised retracted position, and yielding means embodied in the connection between the horizontal link and the cam follower arm.

7. In a straight knitting machine, a row of needles; a dipping frame movable up and down relative to the needles; a pair of outer selvage transfer combs, each with a group of regular full loop transfer points, carried by the frame and independently shiftable laterally relative to the needles; a normally-retracted slide with at least one loop spreader point disposed at the inner end of each of the combs and constrained to up and down movement in the plane of the comb; and control means operative during widening phases of the knitting to depress the slides so as to bring the spreader points to the level of the regular transfer points whereby, upon a first dip of the frame, the special points are entered into individual loops respectively on single needles concurrently with entry of the regular points of the comb into individual loops of the same course of the fabric on others of the needles, so that, upon subsequent lateral outward shifting of the combs and a second dip of the frame, loops are spread from said single needles over respectively adjacent needles by the spreader points over adjacent needles while full loops are transferred at the same time by the regular points of the combs to needles adjacent those from which the latter loops were taken.

8. In a straight knitting machine, a row of needles; a dipping frame movable up and down relative to the needles; a pair of outer selvage transfer combs, each with a group of regular full loop transfer points, carried by the frame and independently shiftable laterally relative to the needles; a pair of inner selvage transfer combs, each with a group of regular full-loop transfer points, also carried by the frame and independently shiftable laterally relative to the needles; a normally-retracted slide with at least one special loop spreader point disposed at the inner end of each of the outer selvage combs and constrained to up and down movement in the plane of such comb; a similar normally-retracted slide, with at least one loop spreader point, disposed adjacent the outer end of each of the inner selvage combs and constrained to up and down movement in the plane of the comb; and control means operative during widening phases of the knitting to depress the several slides to bring the spreader points to the level of the regular transfer points whereby, upon a first dip of the frame, the spreader points are entered into individual loops respectively on single needles, so that upon subsequent lateral outward shifting of the outer selvage combs and shifting of the inner selvage combs toward each other, and upon a second dip of the frame said individual loops are spread by the spreader points over respectively adjacent needles while full loops of the same course of the fabric are concurrently transferred by the regular points of the respective combs to needles adjacent those from which said full loops were taken.

9. A knitting machine according to claim 8, wherein the control means for the spreader point slides associated respectively with the outer and inner selvage transfer point combs includes a pair of longitudinal rock shafts on the dipping frame, arms on the respective rock shafts connected respectively to the spreader point slides associated with the inner and outer selvage combs, an intermittently-rotated shaft with a pair of rotary cams thereon, separate cam followers adapted to be actuated by the respective cams, and intermediate operating connections respectively between the aforesaid rock shafts and the cam followers.

10. A knitting machine according to claim 8, wherein the control means for the spreader point slides associated respectively with the outer and inner selvage transfer point combs includes a pair of longitudinal rock shafts on the dipping frame, rearwardly-projecting arms on the respective rock shafts operatively connected with the spreader point slides respectively associated with the outer and the inner selvage combs, rockers independently fulcrumed on the dipping frame and connected by separate vertical links to forwardly-projecting actuating levers on the respective rock shafts, an intermittently-rotated shaft journalled in the rear upper part of the machine and having a pair of rotary cams mounted thereon, upright follower arms adapted to be actuated by the respective cams, and horizontally-arranged overreaching links operatively connecting the respective rockers with the respective cam follower arms.

11. A knitting machine according to claim 8, wherein the control means for the spreader point slides associated respectively with the outer and inner selvage transfer point combs includes a pair of longitudinal rock shafts on the dipping frame, arms on the respective rock shafts connected respectively to the spreader point slides associated with the inner and outer selvage combs, an intermittently-rotated shaft with a pair of rotary cams thereon, separate cam followers adapted to be actuated by the respective cams, intermediate operating connections respectively between the aforesaid rock shafts and the cam followers, and spring means independently influential upon the rock shafts to yieldingly maintain the corresponding spreader point slides normally in raised retracted position.

12. A knitting machine according to claim 8, wherein the control means for the spreader point slides associated respectively with the outer and inner selvage transfer point combs includes a pair of longitudinal rock shafts on the dipping frame, arms on the respective rock shafts connected respectively to the spreader point slides associated with the inner and outer selvage combs, an intermittently-rotated shaft with a pair of rotary cams thereon, separate cam followers adapted to be actuated by the respective cams, intermediate operating connections respectively between the aforesaid rock shafts and the cam followers, torsion spring means independently influential upon the rock shafts to yieldingly maintain the corresponding spreader point slides normally in their raised retracted positions, and spring means embodied respectively in the connections between the horizontal links and the corresponding cam follower arms.

13. In a straight knitting machine according to claim 8, for producing sweater blanks and the like, having V notched shoulder portions, including a pair of screw spindles respectively with oppositely threaded portions; follower nuts respectively engaged with the oppositely threaded portions of the screw spindle; connections respectively between the follower nuts on one of the screw spindles and the outer point combs; connections respectively between the follower nuts on the other screw spindle and the inner combs; means for intermittently rotating one of the screw spindles in one direction to shift the outer point combs away from each other during widening phases and for intermittently rotating said one spindle in the other direction to shift the outer point comb

toward each other during narrowing phases in knitting the body portions of the blanks; and separate means for intermittently rotating the other screw spindle in one direction to shift the inner point combs away from each other during narrowing phases in forming V notches in the shoulder portion of the blanks.

14. A straight knitting machine, according to claim 8, for producing sweater blanks with central diamond shaped neck openings, further including a pair of screw spindles respectively with oppositely threaded portions; follower nuts respectively engaged with the oppositely threaded portions of the screw spindles; connections respectively between the follower nuts on one of the screw spindles and the outer point combs; connections respectively between the follower nuts on the other screw spindle and the inner point combs; means for intermittently rotating one of the screw spindles in one direction to shift

the outer point combs away from each other during widening phases and for intermittently rotating said one spindle in the other direction to shift the outer point combs toward each other during narrowing phases in knitting the body portions of the blanks; and separate means for intermittently rotating the other screw spindle in one direction to shift the inner point combs toward each other during widening phases and for intermittently rotating said other screw spindle in the opposite direction to shift the inner point combs away from each other during narrowing phases in forming the neck openings of the blanks within the width of the fabric produced in the machine.

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