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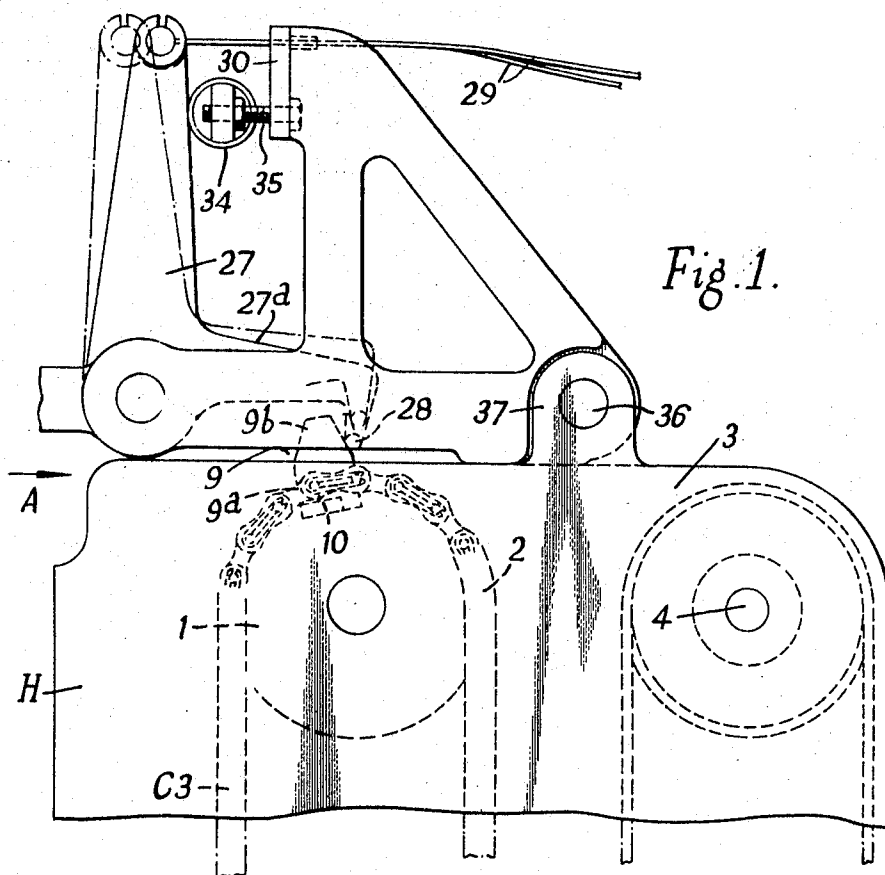
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PATTERNING MECHANISMS FOR WARP KNITTING MACHINES

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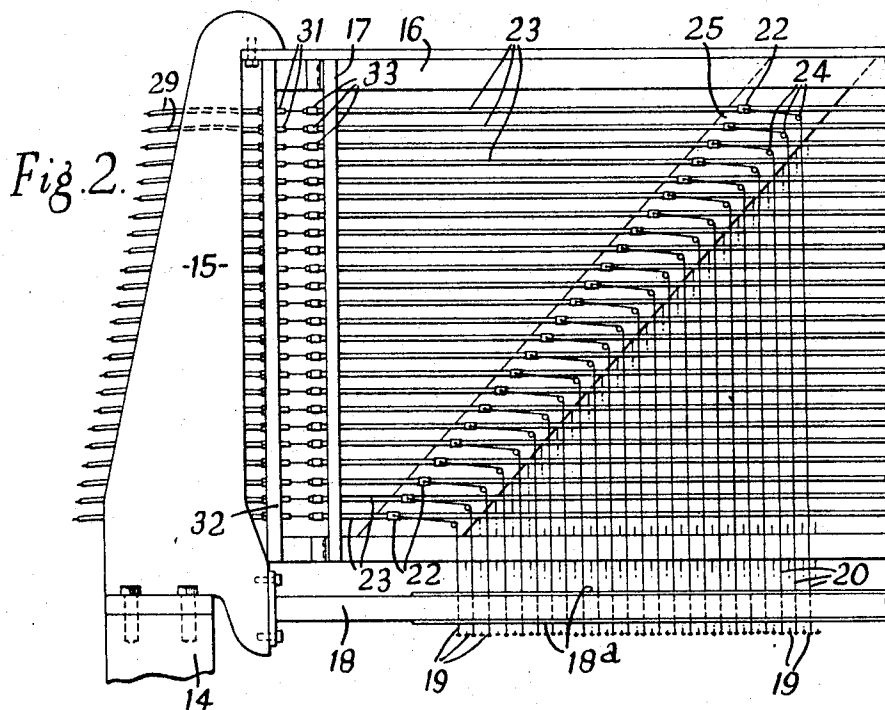
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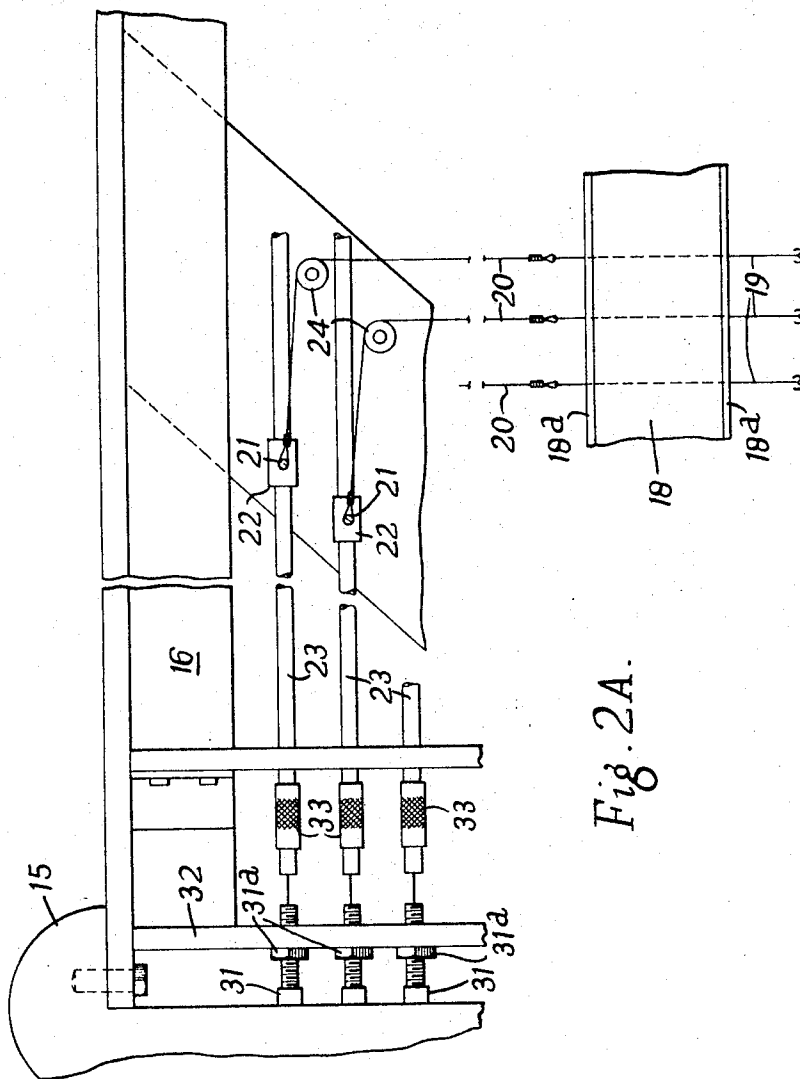


Fig. 2A.

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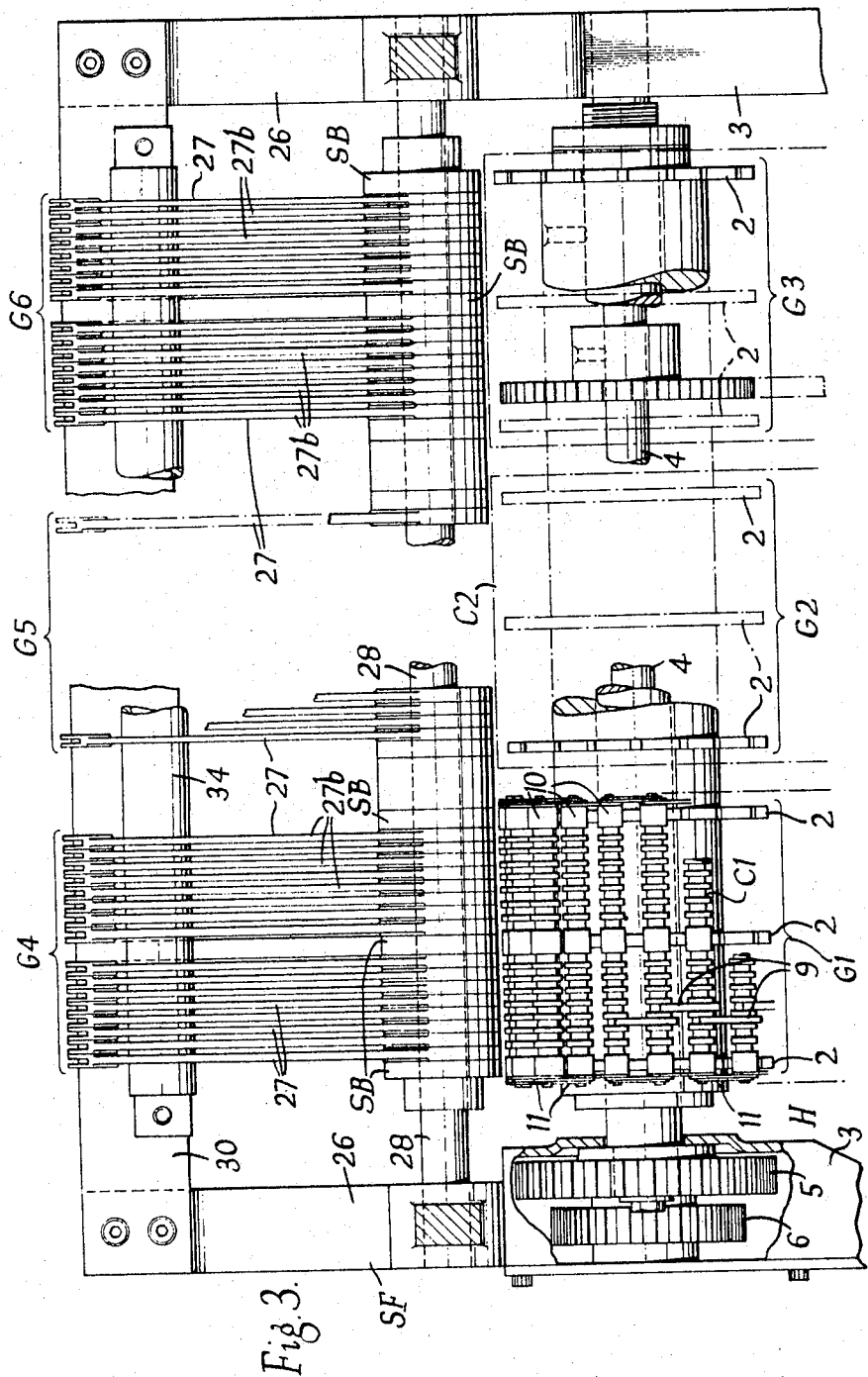
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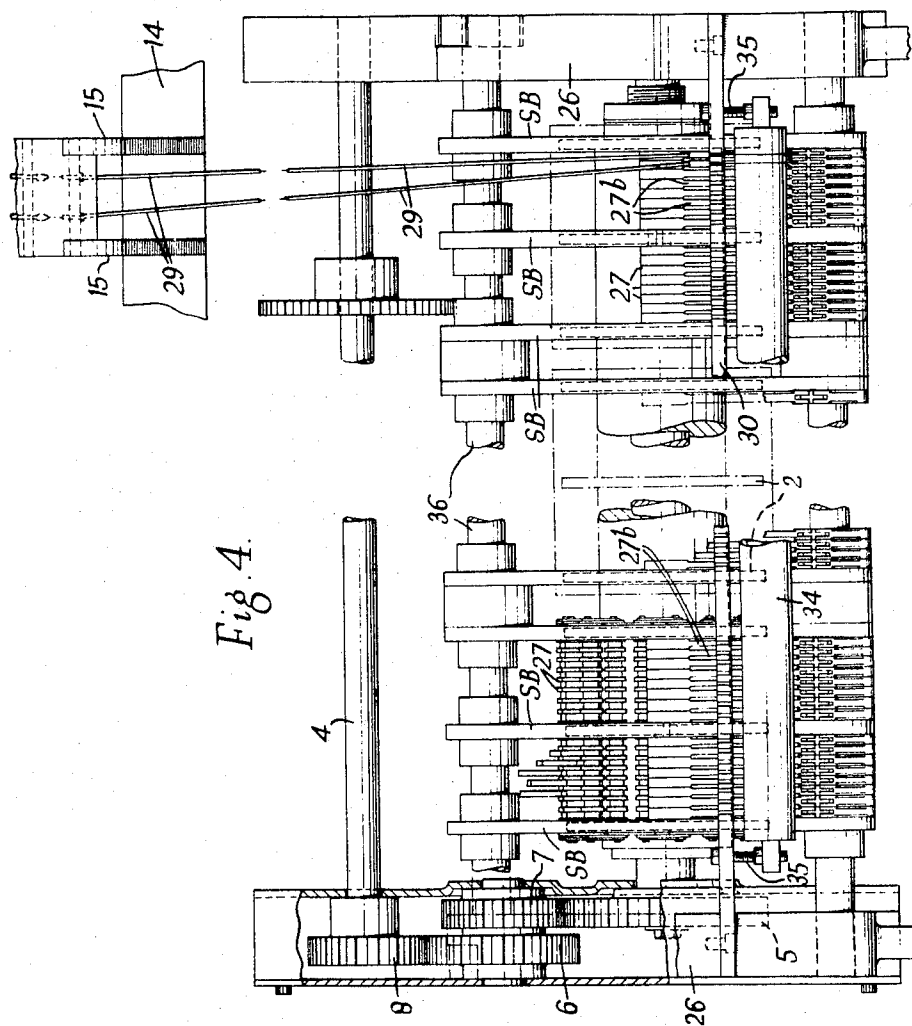
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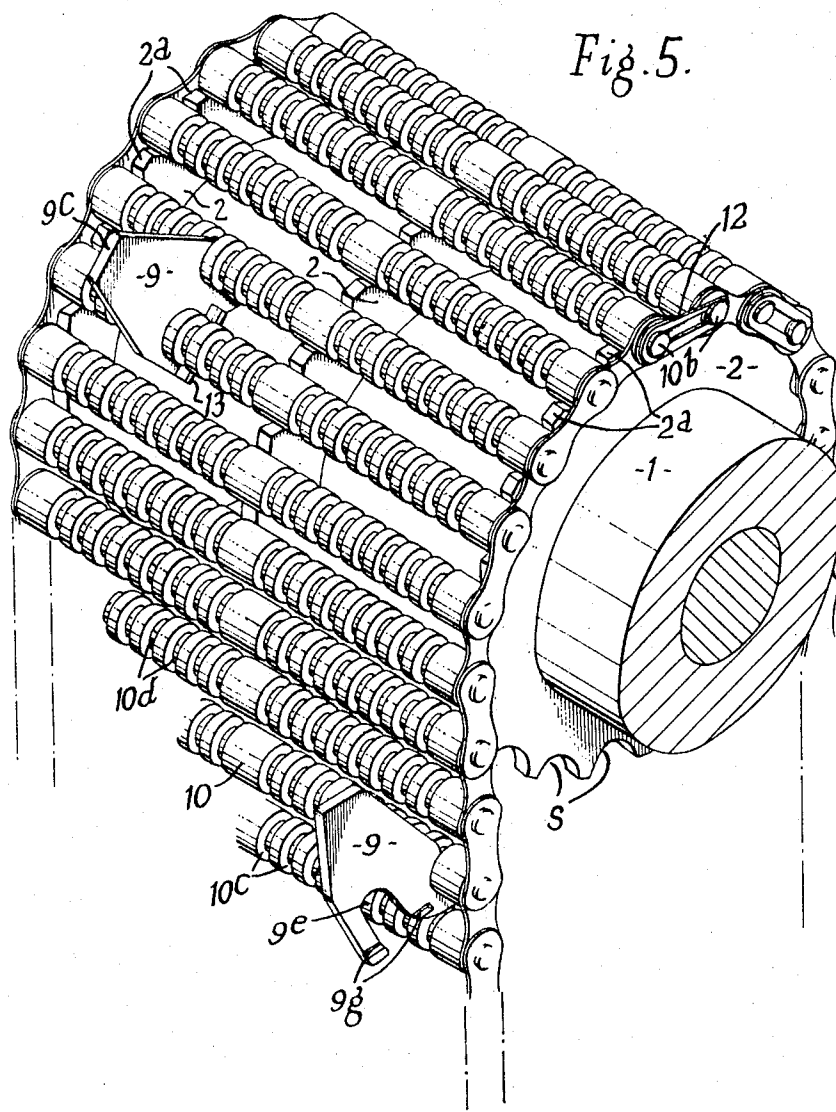
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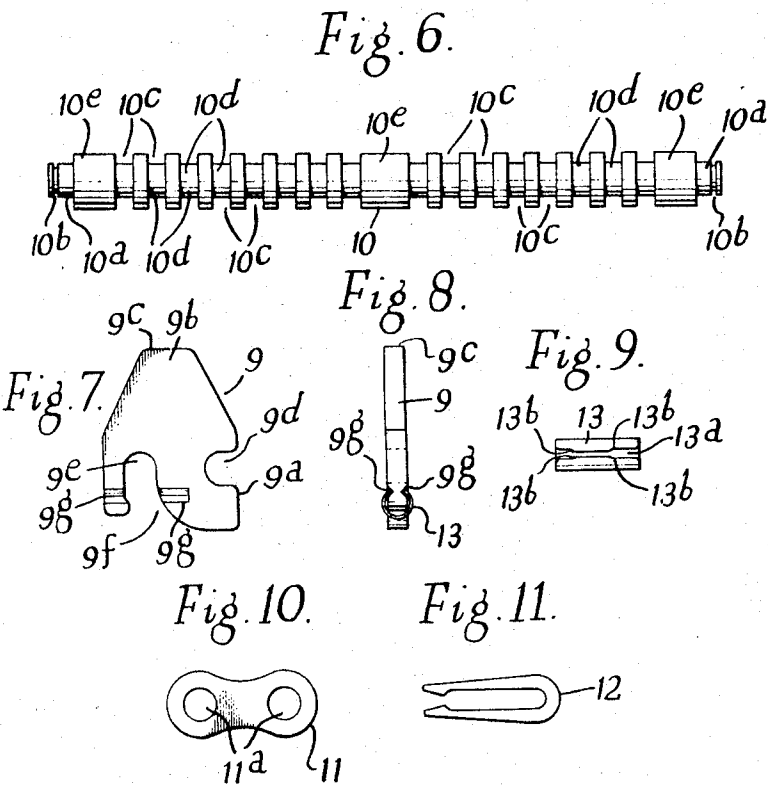
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**PATTERNING MECHANISMS FOR
WARP KNITTING MACHINES**

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4,049/66

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15 Claims

ABSTRACT OF THE DISCLOSURE

A patterning chain furnished with planar studs selectively acting upon jacks in a mechanism controlling the run-in of selected warp ends in a warp knitting machine. The chain comprises parallel spaced pins adjacent pairs of which are connected at their ends by links, each pin having therein axially spaced annular grooves in line with the selector jacks. Each pattern stud, retained on a pin by a spring clip, has therein two recesses enabling it to be fitted upon aligned grooved portions of two adjacent transverse pins.

In our prior United States Letters Patent No. 3,063,272 there is described and claimed a warp knitting machine having patterning mechanism which is arranged to control the rate of run-in of the warp ends thereby to produce patterned warp knitted fabrics. The machine may be used to perform a method, also described and claimed in the aforementioned complete specification, of producing a fabric which is patterned by predetermined dispositions therein of "false spots" produced by controlling the rate of run-in of selected warp ends by the patterning mechanism. However, the machine described in the complete specification aforesaid may also be employed to effect a method of producing a patterned warp knitted fabric which is knitted of two contrasting yarns merged to create a background and wherein at predetermined locations upon this background there are raised loop effects produced by varying the run-in of selected warp ends of one or the other of the said two yarns.

The present invention is concerned exclusively with the provision, in or for a warp knitting machine, of patterning mechanism arranged to control the rate of run-in of the warp ends to produce patterned warp knitted fabrics.

Now the patterning mechanism described in our prior U.S. patent aforesaid comprises a patterning component in the form of a chain which passes around a toothed drum and is furnished with pre-arranged lugs, studs or like elements.

Manifestly, whenever it is desired to change the pattern of the fabric to be produced on the machine, the arrangement of the lugs, studs or like elements upon the chain has to be altered. Although a plurality of chains with respectively different arrangements of elements thereon could be provided at considerable expense, the customary practice heretofore has been to re-arrange the elements upon a chain permanently provided in the patterning mechanism. But having regard to the fact that such a chain is normally of substantial length and width and carries a large number of elements a re-arrangement of the latter is a time-consuming operation.

The object of the present invention is to provide an improved patterning mechanism including a chain having elements which can be readily mounted thereupon and readily detached therefrom.

The patterning mechanism according to this invention is characterised by a patterning chain comprising, in com-

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ination, a plurality of pins extending parallel to one another transversely of, and regularly spaced apart along, the length of the chain, the ends of adjacent pairs of pins being connected by articulated links and the said pins having formed therein annular grooves spaced apart axially therealong, i.e. across the width of the chain; a plurality of pattern elements mounted in predetermined positions upon the chain and each consisting of a cam plate having a profiled edge upstanding from the chain and in which there are two recesses enabling the element to be fitted in position upon aligned annularly grooved portions of two adjacent transverse pins; and spring clips securing and retaining the said pattern elements in position upon the relevant pins.

For convenience in the following further description and the appended claims, the cam elements will be referred to as "pattern studs," albeit that each of them is preferably in the form of a suitably profiled plane cam plate.

Thus, the idea is that the pattern studs can be expeditiously mounted upon the chain in predetermined positions in which they are positively retained by means of the spring clips. Conversely, whenever the positions of some or all of the pattern studs require to be changed, the relevant spring clips are released to permit of removal from the chain of the corresponding pattern studs. The removed studs can then either be left off the chain or, if still removed, can be readily placed and retained in their new positions.

The portion of each pattern stud defining the first recess therein is prevented from moving perpendicularly with respect to the chain by virtue of the fact that, when the stud is turned into its position of use, the portion thereof at one side of this recess will be located at the underside of, and hooked beneath, the relevant pin, at the inner side of the chain. Moreover, any movement of the pattern stud relatively to the chain in the longitudinal direction thereof is prevented by engagement of that portion of the stud having therein the second recess with an annularly grooved and thus reduced portion of the adjacent pin. The spring clip of each pattern stud is fitted at the inner side of the chain to close the second recess and thus prevent the stud from turning and moving perpendicularly with respect to the chain. In this way, removal of pattern studs from the chain is positively prevented.

In a convenient embodiment of the invention, the two recesses in each stud are formed in adjoining edge portions thereof and extend at a right angle or substantially so to one another suchwise that when the stud has been mounted in its required position the first of said recesses extends in the longitudinal direction of the chain whereas the second of the recesses extends perpendicularly to the chain. Thus, to position a pattern stud upon the chain, it is first inserted into a selected annular groove in the appropriate pin so that the reduced portion of the latter produced by the presence of that groove is received in the first of the aforementioned recesses. That is to say, the portion of the pattern stud defining this first recess straddles the said reduced portion of the pin. The stud is then turned in its own plane for approximately 90° in a direction to bring the portion of the pattern stud defining the second recess therein into the aligned annular groove in the next adjacent transverse pin so that the relevant reduced portion of the pin is received within the second recess. That is to say, the portion of the stud defining the second recess therein straddles the last mentioned reduced pin portion.

The opposite ends of each of the transverse pins of the chain may advantageously be reduced, these reduced ends extending through complementary holes in the links and having formed therein narrow annular grooves adapted to receive generally U-shaped spring clips where-

by the links are retained in position as in a conventional roller chain.

In order that the invention may be more clearly understood and readily carried into practical effect, a specific example thereof will now be described with reference to the accompanying drawings, wherein;

FIGURE 1 is a side elevational view of a pattern drum around which patterning chains of the improved form are passed, and showing also selector jacks operable by pattern studs on the said chains,

FIGURE 2 is a side view of fragmentary portions of a jacquard frame illustrating mechanism adapted for use in conjunction with a warp loom for interfering with the controlled run-in of selected warp ends,

FIGURE 2A is an enlarged detail view corresponding to the upper portion of FIGURE 2,

FIGURE 3 is a broken rear view of the pattern drum, the patterning chains and groups of selector jacks as seen in the direction of the arrow A in FIGURE 1,

FIGURE 4 is a fragmentary plan view corresponding to a combination of FIGURES 1 and 2,

FIGURE 5 is a detail perspective view of a portion of one of the patterning chains, illustrating the manner in which a pattern stud is mounted in position thereon,

FIGURE 6 is an elevational view of one of the annularly grooved transverse pins per se,

FIGURE 7 is a detail side view of one of the pattern studs,

FIGURE 8 is a rear view of such a stud with a securing clip engaged therewith,

FIGURE 9 is a detail perspective view of one of these clips per se,

FIGURE 10 is a side view of one of the chain links, and

FIGURE 11 is a side view of one of the spring clips used to retain the links in position upon the ends of the annularly grooved transverse pins.

Referring to the drawings, it will be seen that the illustrated patterning assembly includes a rotary pattern drum 1 which is provided therealong with axially spaced chain sprockets 2 and is thereby adapted to constitute a chain support. The particular drum shown is designed to carry three identical chains arranged side by side. For this purpose there are provided on the said drum three sprocket groups G1, G2 and G3 each comprising three of the sprockets 2 (see FIGURE 3). The pattern drum 1 is mounted to rotate in suitable bearings in side frame members 3 of a drum housing H, and is adapted to be driven from a driven shaft 4 through the medium of a train of change speed gears such as 5, 6, 7, 8 etc. The shaft 4 is provided with a chain sprocket 4a, thereby adapting it to be chain-driven from any appropriate power source.

Small portions of two of the three chains are indicated at C1 and C2 in FIGURE 3. Similarly, a fragmentary portion of another of these chains is represented at C3 in FIGURE 1. The actual chain construction is shown more clearly in FIGURE 5. Each such chain has tracks for sixteen pattern studs such as 9, so that the three chains can have studs mounted thereon at any desired ones of forty eight positions across the combined widths of the chains and at any desired positions along the lengths of the latter.

Each of the three chains C1, C2 and C3 comprises a plurality of transverse pins 10 of mild steel having reduced ends 10a (FIGURE 6) which enter complementary holes 11a in flat links 11 (see FIGURE 10) connecting the ends of adjacent pairs of such pins. These links 11 are retained in position upon the ends of the pins 10 by U-shaped spring clips 12 engaging in annular grooves 10b formed in the reduced end portions 10a of the adjacent pairs of the rods. Each of transverse pins 10 is formed with two groups each of eight annular grooves 10c of identical dimensions located at regularly spaced intervals therealong and thus providing sixteen

reduced portions 10d. As a consequence of reducing its opposite end portions 10a and forming in it two slightly spaced groups each of eight annular grooves 10c, each transverse pin 10 has thereon three widely spaced portions 10e of the full diameter of the initial rod from which the pin was formed; these three portions 10e of each pin 10 are so axially spaced and dimensioned as to be capable of engaging in spaces S between the teeth 2a on the three chain sprockets of the relevant group. That is to say, as the pattern drum 1, gear-driven from the shaft 4, rotates successive ones of the linked transverse pins 10 of the three side-by-side chains C1, C2 and C3 engage in successive spaces S between the teeth of the chain sprockets 2 of the three groups G1, G2 and G3 respectively.

For mounting upon the chains in any desired positions there are provided a plurality of the identical pattern studs 9. Each of these studs comprises a plane plate having, as shown in FIGURE 7, a basically square portion 9a adapted to be fitted within the relevant chain and an adjoining trapezoidal portion 9b tapering to a short edge 9c and constituting the cam portion of the stud. The convergent edges of the portion 9b merge with the ends of the short edge 9c to provide smooth passage of the cam portion over the members to be controlled. Formed in the front edge of the stud constituting one side of the square portion 9a thereof is a first recess 9d of a shape and size to fit over and receive a reduced portion 10d of a transverse pin 10. In the edge constituting the adjoining side of the square portion 9a of each stud 9 is a second recess 9e of the same width as the recess 9d but somewhat deeper than the latter. The recess 9e has an arcuately flared entrance 9f, the centre of curvature of which is coincident with the centre of the first recess 9d.

In mounting a pattern stud 9 upon a chain, the first mentioned recess 9d is engaged with a selected one of the reduced portions 10d of a transverse pin 10 so that the portion of the stud defining that recess straddles the said reduced portion, with the stud extending lengthwise in the direction of length of the chain as depicted in FIGURE 5. The plate-like stud is then turned through approximately 90° in the relevant direction about the reduced portion 10d to bring the other recess 9e into engagement with the aligned reduced portion 10d of the adjacent transverse pin 10. As a result, the pattern stud 9 is now disposed in its position of use with its length, i.e. heightwise dimension, extending perpendicularly with respect to the length of the chain. In this way the square portion 9a of the stud is located between the adjoining transverse pins 10 with the trapezoidal cam portion 9b upstanding from the chain. The opposite faces of the portions of the stud 9 flanking the second recess 9e, are formed with aligned V-section grooves 9g. In order to retain any one of the pattern studs upon the relevant chain, a spring clip 13 is engaged with the stud by axial movement of the clip to bridge and close the recess 9e. As shown in FIGURE 9, each of these clips 13 is in the form of a longitudinally split spring metal tube; this tube is of almost circular cross-section but has therein a narrow slot 13a of varying width extending longitudinally from end to end thereof. The longitudinal edges of the tubular clip 13 flanking the slot 13a are slidably engaged in the V-section grooves 9g and under the action of the inherent resiliency of the said clip the edges grip the grooved portions of the stud. Moreover, the opposite ends of the slot 13a are of increased width, so that the intermediate opposed portions of the clip flanking and defining the intermediate section of the slot are closer together than the end portions suchwise as to form shoulders 13b at the opposite ends of these intermediate portions. Thus, when a clip 13 is slidably engaged with a stud 9, the said intermediate portions of the clip are engaged in the recess 9c with their shoulders 13b abutting against the respectively opposite sides of the said recess in order to retain the clip upon the stud.

Whenever a pattern stud 9 is to be removed from one of the chains, the clip 13 is slid axially off the stud, the intermediate portions flanking the narrow portion of the slot being forced apart so that the clip can be removed. The stud is then turned in the opposite direction to that in which the stud was turned when being applied to the chain and can then be removed from the chain and, if required, replaced in a new position.

A patterning mechanism incorporating the three pattern chains C1, C2 and C3 are suitable for practising the "dragging thread" technique will now be described with reference more particularly to FIGURES 1, 2, 2A, 3 and 4. It is considered unnecessary to illustrate any of the warp knitting loom—apart from a portion 14 of the framework thereof by which the patterning mechanism is carried (see FIGURES 2 and 4). The mechanism now to be described is very similar to that disclosed in United States Patent No. 3,063,272, to which reference may be made, and is based on the fact that a reduction of the normal rate of run-in of selected warp ends can be effected by temporarily lifting the said ends in a controlled fashion at points between the source of the warp supply (not shown) and the needles of the loom.

Brackets such as 15, supported from the framework 14, in turn serve to support structures 16 including stiffening elements such as 17 for a purpose hereinafter to be described. At their lower ends the brackets 15 have attached thereto a horizontal rail 18 of hollow section combined with strips 18a drilled to receive, and function as guides for a longitudinal series of vertically disposed and slidable warp and lifting hooks 19 of the double-headed form shown in FIGURE 2A. Each hook 19 is adapted to receive a predetermined warp end or two or more of such ends, according to requirements. Although this is of little importance so far as the present invention is concerned there are, in fact, two parallel series of the lifting hooks 19 for engagement respectively with two sets of warp ends threaded through the front guide bars of the loom. This only necessitates the provision of two side by side rails 18. The upper end of each lifting hook 19 is attached to the lower end of a length of nylon cord 20 constituting a flexible drive-transmitting element. The upper end of each nylon cord 20 is, as shown more clearly in FIGURE 2A, formed with a loop which is engaged with a locking screw 21 serving to secure a sleeve 22 in an axially adjusted position along a horizontal actuating rod 23. There are two groups of these actuating rods to correspond respectively with the two parallel series of the warp end and lifting hooks 19. The rods 23, which are freely shiftable horizontally, are supported by and guided in appropriate members of the structures 16. An upper end portion of each nylon cord 20, extending from the corresponding locking screw 21, is passed over a grooved pulley 24 and from thence extends vertically downwards. In FIGURE 2, cords 20 at one side of the mechanism are represented in full lines, whereas cords at the opposite side of the mechanism for attachment to a set of actuating rods similar to those shown are represented in dotted lines. The pulleys 24 of each of the two groups involved are rotatably mounted on an inclined support member 25 of the structure 16. The constructions and arrangement are accordingly such that by moving any one of the actuating rods 23 longitudinally i.e. horizontally and laterally with respect to the loom, the lifting hook(s) 19 connected, through the medium of a cord(s) 20, with that particular rod will be lifted vertically to engage and impart the required tension to the relevant individual warp ends.

The actuating rods 23 are movable longitudinally against the action of compression springs (not shown) and, when released, resume their normal positions under the spring action. Tension rods (not shown) may be suspended beneath the rail 18 to determine the amount of tension in the lifted warp ends.

The hereinbefore described patterning mechanism, with its three chains C1, C2 and C3 and pattern studs 9 in pre-

determined positions thereon is, of course, for controlling the actuating rods 23. The pattern studs 9, in fact, act selectively upon individually movable selector jacks 27 connected with the actuating rods.

The chains C1, C2 and C3 may be of any appropriate length to provide a practically unlimited patterning range. The selector jacks 27 are in the form of bell-cranks which are fulcrumed upon a jack support shaft 28 fixed at its ends in the side frame members 26 of a pivoted subsidiary frame SF mounted upon top of the pattern drum housing. Of the said jacks there are three groups G4, G5 and G6 each comprising sixteen jacks in two sets of eight to correspond respectively with the sixteen pattern stud tracks (two eights) of the corresponding pattern chain—all as seen in FIGURE 3. The horizontal limb 27a of each selector jack 27 is furnished at its outer end with a small roller 28 to be acted upon by the cam portions 9b of any pattern studs 9 in the corresponding stud track. The upper end of the vertical limb 27b of each jack has attached thereto a Bowden cable 29 which, after passage through a cable support bar 30 fixed to the subsidiary frame SF, extends across to the structure 16 and thence through adjustable tubular guides 31 fixed by lock nuts 31a in members such as 32 of the said structure. Finally, the cables 29 are attached to the relevant ends of the actuating rods 23 by means of screwthreaded attachment devices 33.

Spacing bars SB are arranged between the groups of selector jacks 27. Upon the back of the cable support bar 30 is mounted a stop bar or rod 34 which is adjustable back and forth by manipulation of screws 35 and is arranged to determine the normal inoperative positions of the jacks 27. That is to say, when a jack is inoperative, the front edge of its vertical limb 27b is in contact with the stop bar or rod 34; thus is the position to which a jack, after moving off a pattern stud 9, automatically returns to release the corresponding actuating rod 23 and permit it to return to the right (as seen in FIGURE 2) under spring action. The stop bar or rod 34 enables the profile of the pattern studs 9 either to be fully used to impart maximum turning movement to jacks or to be only partly used. In FIGURE 1, the stud 9 is about to make contact with the roller 28 on the jack 27 at a point which enables the full profile of the cam portion 9b of the stud to be used. Assuming that change gears were selected to produce an eight course "false spot" repeat, this would, be taken up as follows:

- (i) Two courses to raise a jack from the inoperative or neutral position to its highest position on a stud.
- (ii) Two courses during which the jack dwells whilst pattern chain rotates.
- (iii) Two courses during which jack rolls off top of the stud and is permitted to resume its inoperative position against the stop bar or rod 34.
- (iv) Two courses to allow recovery of slack yarn prior to commencement of another cycle.

To enable all of the selector jacks to be lifted up away from and clear of the patterning chains, as occasion demands, the subsidiary frame SF is pivotally mounted upon the top of the drum housing H. In this connection it will be seen that a swing shaft 36, which is passed right through the frame SF, is engaged at its ends in bearings such as 37 (FIGURE 1) mounted upon the housing H.

For convenience of illustration in FIGURE 4, the left-hand side of the subsidiary frame SF has been omitted, as also has the bearing for the corresponding end of the swing shaft 36.

I claim:

1. In a warp knitting machine having a patterning mechanism to control the rate of run-in of selected warp ends, a patterning chain engageable with chain sprockets on a rotary drum and having in predetermined positions thereon upstanding pattern studs, said chain being characterised in that it comprises, in combination, a plurality of pins extending parallel to one another transversely of

and regularly spaced apart along the length of the chain, said pins having formed therein annular grooves spaced apart axially therealong across the width of the chain; articulated links connecting the ends of adjacent pairs of said pins; a plurality of pattern studs each consisting of a cam plate having a profiled operative edge and in which there are first and second recesses enabling the stud to be fitted in position upon aligned annularly grooved portions of two adjacent transverse pins; and spring clips engaged with the pattern studs for retaining the latter in position upon the said two pins, wherein the portion of each pattern stud at the inner side of the first recess is hooked beneath the relevant transverse pin at the inner side of the chain to assist in preventing movement of the stud perpendicularly with respect to the said chain.

2. A patterning chain according to claim 1, wherein the portion of each pattern stud having formed therein the second recess straddles an annularly grooved, and thus reduced portion of the transverse pin next to that engaged by the first recessed portion of the stud, thereby preventing any movement of the said stud relatively to the chain in the lengthwise direction of the latter.

3. A patterning chain according to claim 2, wherein there is one spring clip to each pattern stud, this clip being so fitted on the stud at the inner side of the chain as to bridge and close the second recess, thereby preventing the stud from turning and moving perpendicularly with respect to the chain.

4. A patterning chain according to claim 2, wherein the two recesses in each pattern stud are formed in adjoining edge portions thereof and extend at a right angle or substantially so to one another suchwise that when the stud has been mounted in its required position, the first recess extends in the longitudinal direction of the chain whereas the second recess extends perpendicularly with respect to the chain.

5. A patterning chain according to claim 4, which is so formed that to position a pattern stud thereon the said stud is first inserted in a selected annular groove in the appropriate transverse pin so that the reduced portion of the latter produced by the formation of that groove is received in the first recess; then the stud is turned in its own plane through approximately 90° in a direction to bring the portion of the stud defining the second recess therein into the aligned groove in the next adjacent transverse pin so that the relevant reduced portion thereof is received within the second recess.

6. For a patterning mechanism of a form adapted to control the rate of run-in of selected warp ends in a warp knitting machine, a patterning chain engageable with chain sprockets on a rotary drum and having in predetermined positions thereon upstanding pattern studs, said chain being characterised in that it comprises, in combination, a plurality of pins extending parallel to one another transversely of and regularly spaced apart along the length of the chain, said pins having therein annular grooves spaced apart axially therealong across the width of the chain; articulated links connecting the ends of adjacent pairs of said pins; a plurality of pattern studs each comprising a cam plate which has a profiled operative edge and in which there are two recesses formed in adjoining edge portions thereof and extending substantially at a right angle to one another suchwise that the stud can be fitted in position upon aligned annularly grooved portions of two adjacent transverse pins with one recess extending in the longitudinal direction of the chain and the portion of the stud at the relevant side of the recess hooked beneath the relevant transverse pin at the inner side of the chain so that movement of the stud perpendicularly with respect to the chain is prevented, and with the other recess extending perpendicularly with respect to the portion of the stud which has this recess formed therein, straddling the other transverse pin so that movement of the stud relative to the chain in the lengthwise direction of the latter is prevented; and spring clips securing and retaining

the said pattern studs in position upon the relevant pins, whereby to fit each pattern stud on the chain, it is first engaged with a selected annular groove in the appropriate transverse pin so that the reduced portion of the latter produced by the formation of that groove is received in the first recess, and then the stud is turned in its own plane through approximately 90° in a direction to bring the portion of the stud defining the second recess into the aligned groove in the next adjacent transverse pin so that the relevant reduced portion thereof is received within the second recess.

7. A patterning chain according to claim 6 wherein there is one spring clip to each pattern stud, this clip being so fitted on the stud at the inner side of the chain as to bridge and close the second recess, thereby preventing the stud from turning and moving perpendicularly with respect to the chain.

8. A patterning chain according to claim 6, wherein the opposite ends of each of the transverse pins is reduced in diameter, these ends extending through complementary holes in the links and having formed therein narrow annular grooves adapted to receive generally U-shaped spring clips whereby the links are retained in position.

9. A patterning chain according to claim 6, wherein each of the pattern studs consists of a plate having a basically square portion adapted to be fitted within the chain and an adjoining trapezoidal portion which tapers to a short edge and constitutes a cam portion upstanding from the chain, a first recess being formed in the front edge of the square portion and a second recess of the same width as but deeper than said first recess being formed in the adjoining inner edge of said square portion.

10. A patterning chain according to claim 9, wherein the second recess in each pattern stud has an arcuately flared entrance the centre of curvature of which is coincident with the centre of the first recess.

11. A patterning chain according to claim 10, wherein the opposite faces of the portions of each pattern stud flanking the second recess therein are formed with aligned V-shaped grooves wherein are received opposed longitudinal edges defining a longitudinal slot in a tubular spring clip which is engaged by axial sliding movement with the inner margin of the square portion of the clip.

12. A patterning chain according to claim 11, wherein the opposite ends of the longitudinal slot formed in the spring clip engaged with each pattern stud are of increased width so that the intermediate opposed portions of the clip flanking and defining the corresponding section of the slot are closer together than the end portions suchwise as to form shoulders at the ends of the aforesaid intermediate clip portions whereby when the clip is slidably engaged with the stud the said intermediate portions are engaged in the second recess with their shoulders abutting against the respectively opposite sides of the said recess in order to secure the clip upon the stud.

13. In a warp knitting machine, a patterning mechanism adapted to control the rate of run-in of selected warp ends comprising, in combination, a series of selectively operable warp end lifting hooks; spring-influenced hook actuating rods movable back and forth under control; cords by means of which the said rods are connected to the lifting hooks; selector jacks one to each actuating rod; Bowden cables connecting these jacks with the actuating rods; a driveable rotary pattern drum provided with chain sprockets; at least one patterning chain which is engaged with said sprocket; and pattern studs fitted and secured in predetermined positions on the chain for action selectively upon the selector jacks; said patterning mechanism being characterised by the provision therein of an improved patterning chain comprising a plurality of pins extending parallel to one another transversely of and regularly spaced apart along the length of the chain, said pins having formed therein annular grooves spaced apart axially therealong across the width of the chain; articulated links connecting the ends of adjacent pairs of said

pins; a plurality of pattern studs each consisting of a cam plate having a profiled operative edge and in which there are first and second recesses enabling the stud to be fitted in position upon aligned annularly grooved portions of two adjacent transverse pins; and spring clips engaged with the pattern studs for retaining the latter in position upon the said two pins, the annularly grooved portions of the said transverse pins, upon predetermined ones of which the pattern studs are fitted, being arranged in line with respective selector jacks, wherein the portion of each pattern stud at the inner side of the first recess is hooked beneath the relevant transverse pin at the inner side of the chain to assist in preventing movement of the stud perpendicularly with respect to the said chain.

14. A patterning mechanism according to claim 13, wherein the selector jacks are in the form of bell-cranks one limb of each of which is furnished with a roller arranged to be actuated upon by pattern studs whilst the other limb has attached the appropriate end of the corresponding Bowden cable.

15. A patterning mechanism according to claim 13, wherein the pattern drum is adapted to support a plu-

ality of patterning chains arranged side by side, there being a group of selector jacks to each of such chains.

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