

Aug. 20, 1935.

A. R. COLE ET AL

2,012,095

KNITTING MACHINE

Filed Jan. 30, 1934

5 Sheets-Sheet 1

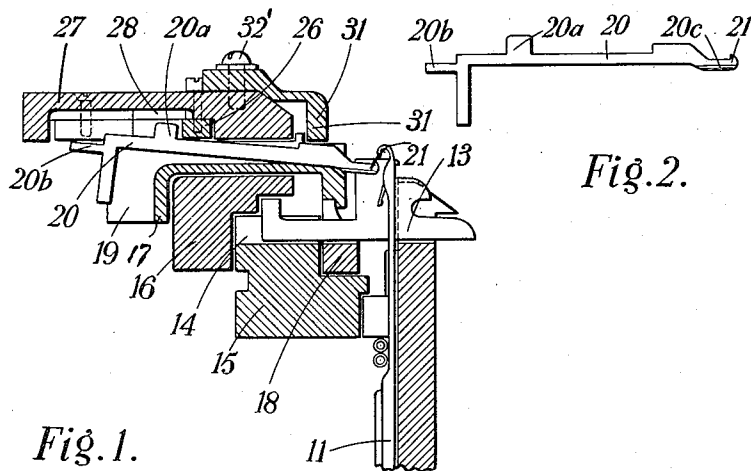


Fig. 1.

Fig. 2.

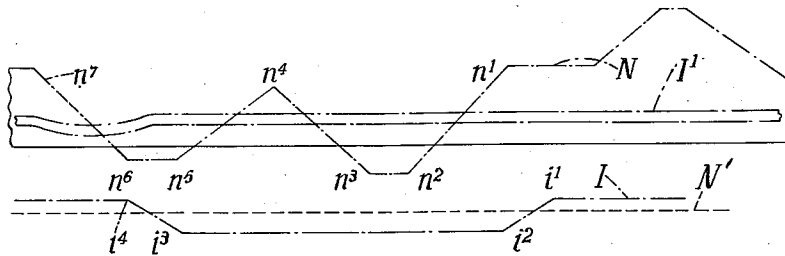


Fig. 5.

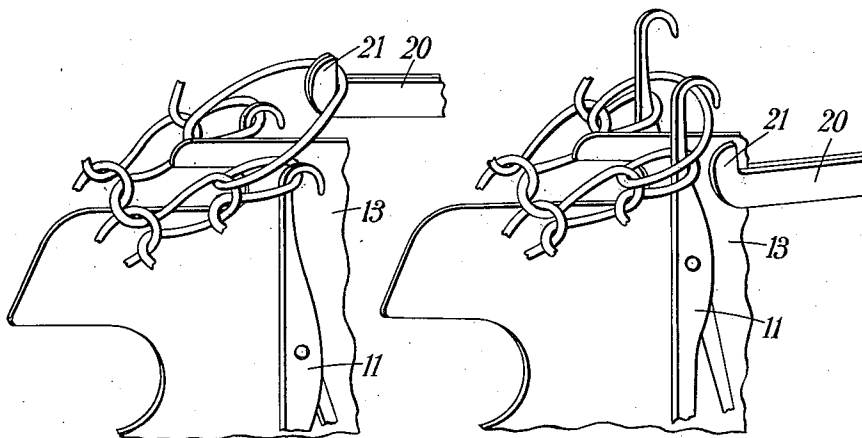


Fig. 3.

Fig. 4.

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5 Sheets-Sheet 2

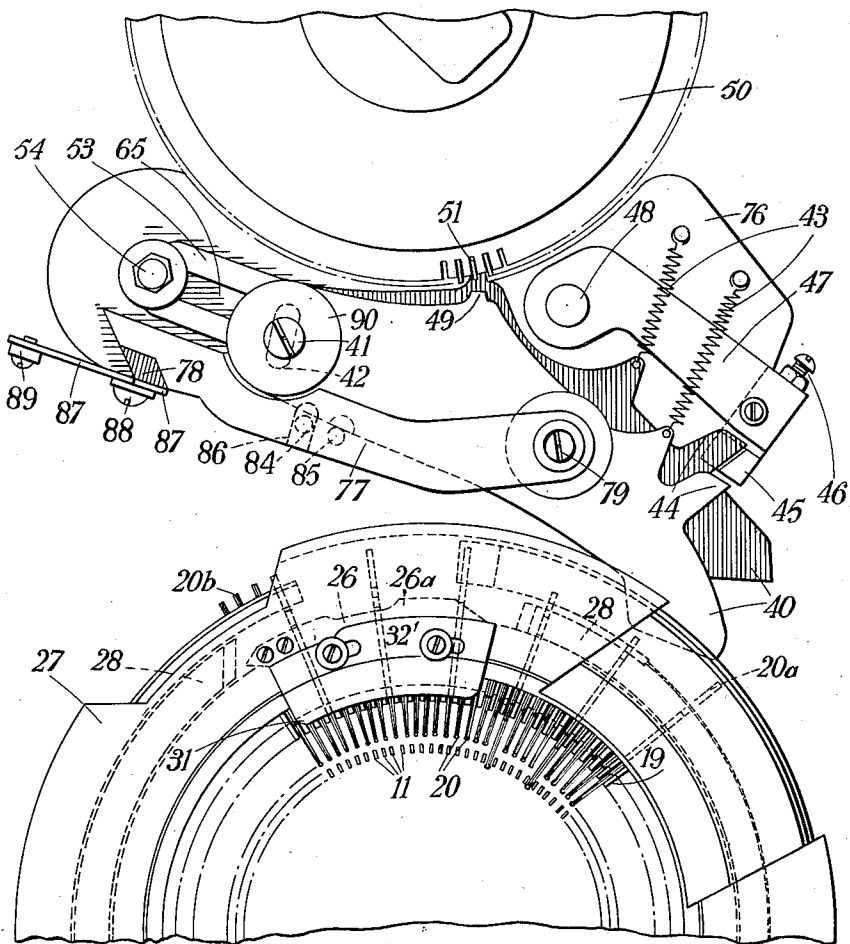


Fig. 6.

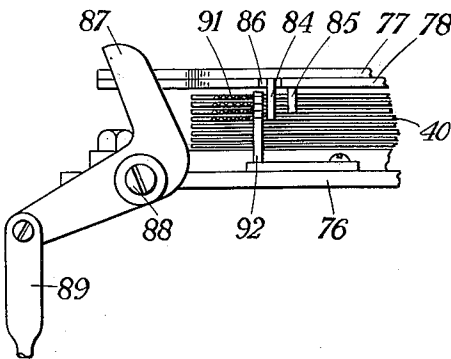


Fig. 14.

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5 Sheets-Sheet 3

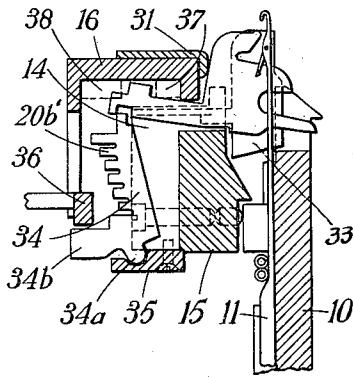


Fig. 7.

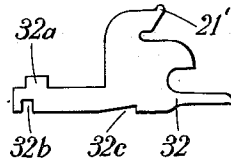


Fig. 11.

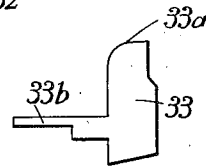


Fig. 12.

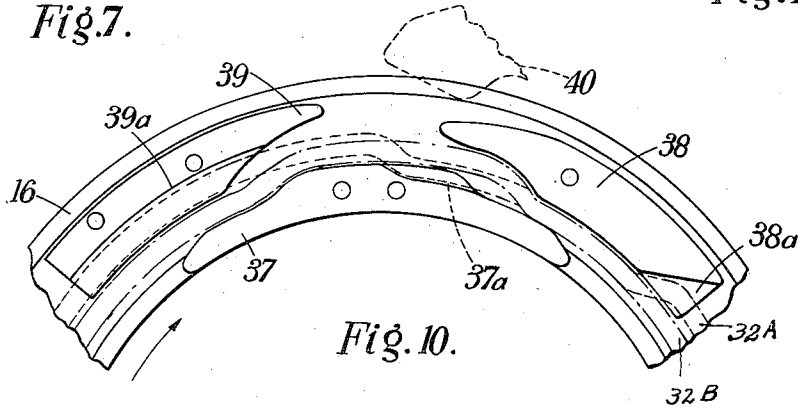


Fig. 10.

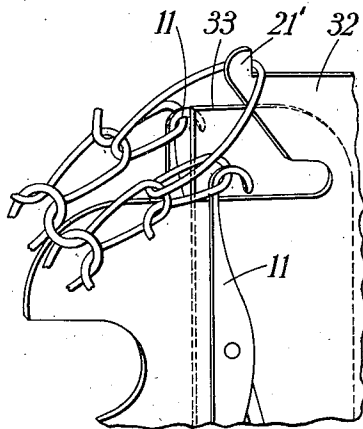


Fig. 8

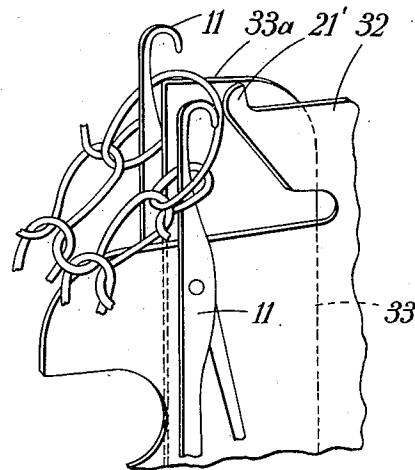


Fig. 9.

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5 Sheets-Sheet 4

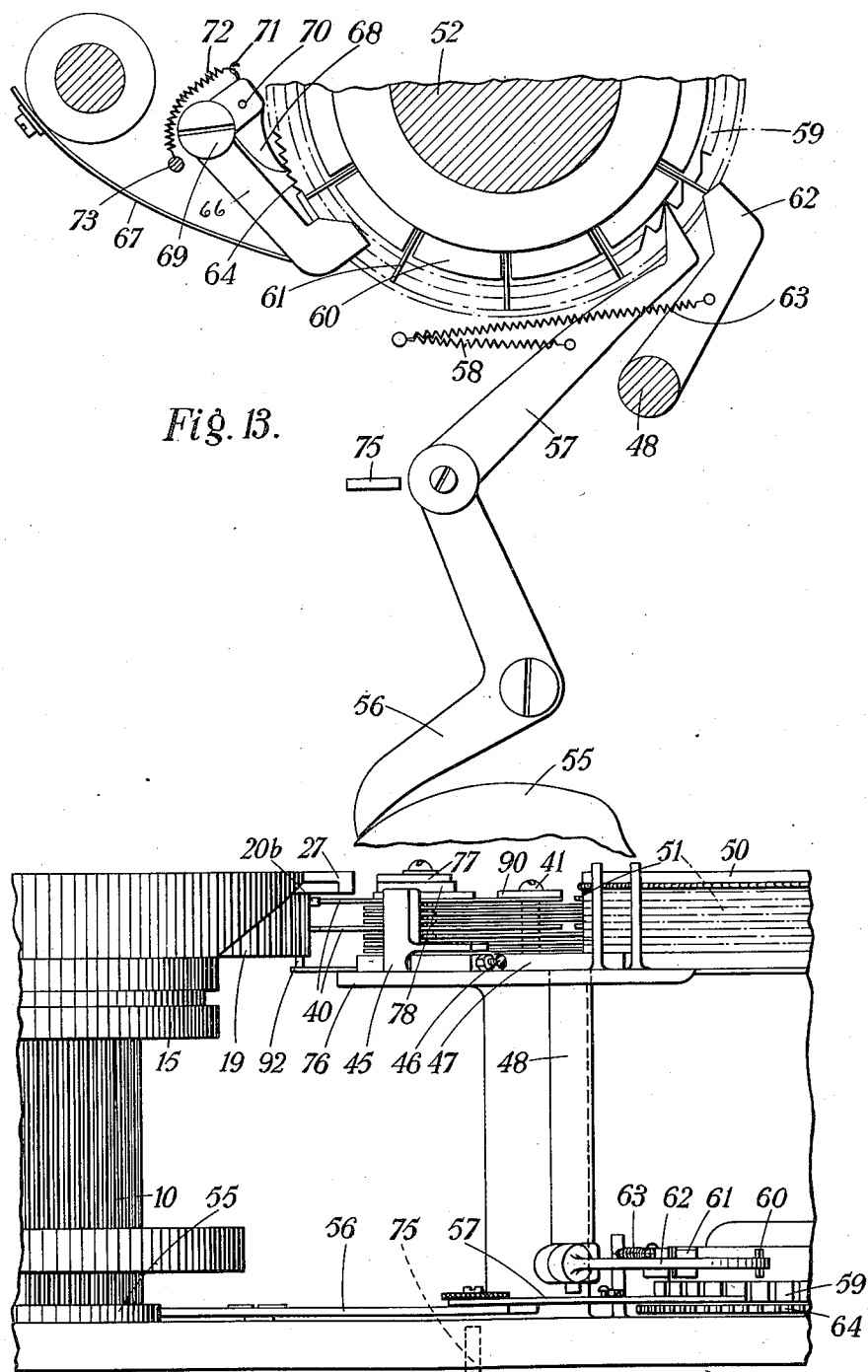


Fig. 13.

Fig. 15.

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KNITTING MACHINE

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5 Sheets-Sheet 5

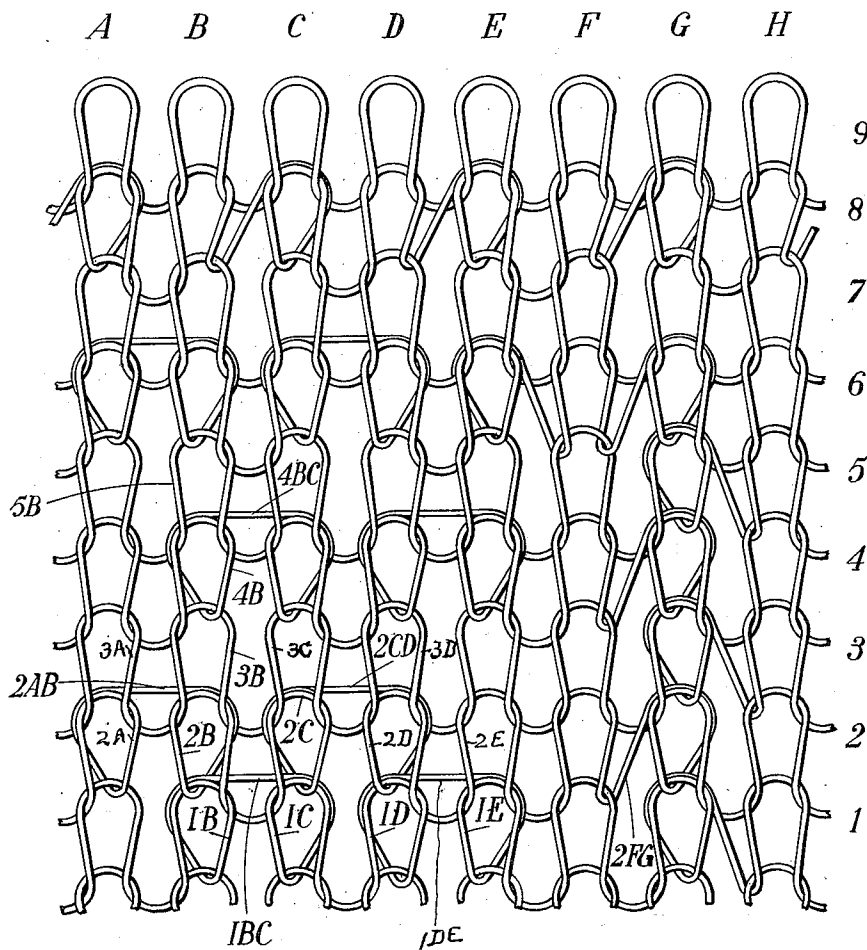


Fig. 16.

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UNITED STATES PATENT OFFICE

2,012,095

KNITTING MACHINE

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Application January 30, 1934, Serial No. 709,030
In Great Britain April 11, 1933

12 Claims. (Cl. 66—95)

This invention is concerned with knitting machines for knitting fabric incorporating pelerine stitches. As is well understood, a pelerine stitch is one wherein a sinker loop joining two needle loops is displaced sideways or widened and encircles a needle loop (in the case of a single pelerine stitch) or needle loops (in the case of double pelerine stitch) of an adjacent wale or wales in a succeeding course. Such stitches are produced by mechanism of a type comprising at least one pelerine instrument movable relatively to and transversely of the needles between a loop-receiving position, whereat it receives the sinker loop connecting two adjacent needles, and a loop-distending or displacing position whereat said loop is distended or displaced and is transfixed by one or more needles. Hitherto, after the loop has been transfixed, it has been dragged off the instrument, an operation which has deleterious effects upon the yarn and upon the appearance of the fabric produced. The present invention avoids this by providing means for lifting the loop from the instrument.

It has previously been considered essential to widen the loop mechanically by a fork or spreader on the end of the instrument, the span of which spreader is sufficient to accommodate the two needles which are to transfix the loop. This has imposed a limitation upon the number of instruments that may be employed in respect of a given number of needles and has limited the sequence in which they may be introduced into activity.

The applicants have established that forked or divergent instruments are unnecessary and that the loop can be caused to belly out without employing mechanical means for distending it. Therefore, according to a feature of this invention, non-divergent pelerine instruments may be employed, and as a result of this there may, if desired, be a pelerine instrument in respect of each sinker space, and fabric may be produced having double and/or single pelerine stitches in adjacent sinker wales and/or alternate sinker wales. Moreover, a pelerine fabric may be produced in which, considering a needle wale and the sinker wale to each side thereof, at different courses needle loops are encircled by sinker loops from different wales. Such fabrics cannot be produced on the machines heretofore constructed.

Two embodiments of this invention will hereinafter be described in detail, by way of example, with reference to the accompanying drawings in which

Figure 1 is a section showing one embodiment of the invention.

Figure 2 is an elevation of a pelerine instrument shown in Figure 1.

Figures 3 and 4 illustrate the functioning of the instrument and associated parts.

Figure 5 is a diagram showing the relative movements of the needles and the instrument.

Figure 6 shows patterning mechanism applicable to the embodiment shown in Figure 1 and to the embodiment shown in Figure 7.

Figure 7 is a section showing a further embodiment of the invention.

Figures 8 and 9 illustrate the functioning of the pelerine instrument and associated parts shown in Figure 7.

Figure 10 is an inverted view of a cam-track for said instrument and sinkers.

Figure 11 is an elevation of the pelerine instrument shown in Figure 7.

Figure 12 is an elevation of a cooperating instrument, while.

Figures 13 and 14 show further details of the patterning mechanism, while.

Figure 15 is an elevation of said mechanism.

Figure 16 shows fabric, incorporating various arrangements of pelerine stitches, that can only be produced on a machine by the exercise of this invention.

Throughout this description like reference numerals indicate like parts.

In the attached drawings, the invention is shown as applied to a circular knitting machine having a rotating needle cylinder 10, but it will be appreciated that it may equally well be applied to circular knitting machines in which the needle cylinder is stationary and the cam box rotates, or indeed to other knitting machines.

Referring to Figure 1, in the needle cylinder 10 there are needles 11, here illustrated as latch needles, movable by means of cams (not shown) and cooperating with web holders or sinkers 13 slidably mounted in tricks 14 cut in the upper surface of a sinker ring 15 rigidly secured to the cylinder. These sinkers perform their normal movements transversely of the line of the needles, being moved by cams carried in a rotatable sinker cap 16. Immediately above this cap 16, there is an instrument ring or segment 17, which is dogged to the sinker ring 15 by means of dogs at the upper surface of a part 18. This part 18 may be integral with the sinker ring 15, or may be rigidly secured thereto. The ring or segment 17 is cut with the requisite number of tricks 19, which constitute a bed in which pelerine instru-

ments 20 are mounted for sliding movement transversely of the needles, each in line with a sinker, between loop-receiving and loop-distending or displacing positions.

5 In the loop-receiving position, each instrument is so placed that its hooked end 21 lies to the inside of the needle circle with the result that when the two adjacent needles descend to draw their loops, the sinker loop which connects them is drawn over the upper edge of the instrument 20 and not over the upper edge of the associated sinker 13.

10 In the loop-displacing or distending position, the loop-engaging end of the instrument lies to the outside of the needle circle and the sinker loop is drawn outwards by the instrument into an attitude wherein it is inclined upwards and outwards, the arrangement being such that the loop is distended for or bellied out to permit one or both of the adjacent needles entering the sinker loop when they are again projected. Each needle which so transfixes the sinker loop draws its needle loop at the next course through said sinker loop to form pelerine fabric in the known manner.

15 Conveniently, the inward movements of the pelerine instruments are imparted thereto by selecting mechanism hereinafter described, which operates on butts 20b at contrasting heights on the tails of the instruments, while their outward movements may be governed by the cams, such as 26, in the interior of an instrument cam-holding ring 27. The said cam ring 27 is fixed in relation to the needle cam box and/or the sinker cam ring 16.

20 The relative movements of the needles 11 and instruments 20 are shown diagrammatically in Figure 5. In the upper part of this figure the needle movements are indicated by the chain dotted line N and those of the instrument by the dotted line I¹, both in elevation; in the lower part thereof the line of the needles is indicated in plan by the dotted line N², while the movements of the instruments (transversely of the needle circle) are indicated by the chain dotted line I.

25 Following the figure from right to left, it will be seen that as the needles rise to take the yarn the instruments lie outside the needle circle at i¹, but as the needles descend the stitch cam from n¹ to n² the instruments are projected inwards to a loop receiving position i², i³ and the needles draw their loops over them. When the loops have been drawn the needles 11 are preferably raised somewhat to n⁴ to ensure that the latches are opened by the old loops, but are then lowered to a level n⁵, n⁶, slightly above that (n², n³) to which they were previously brought by the stitch cam. At or about the time that the needles 11 reach the limit of their second descent (at n⁵), the instruments are retracted from i³ to their loop-displacing position at i⁴ and as soon as may be after their loop-engaging ends have been withdrawn to the outside of the needle circle, the needles 11 commence to rise (indicated at n⁷) thereby reducing the tension in the displaced sinker loops. Preferably at the same time the web holders 13 are retracted also, but only to a very slight extent (in a seamless hose machine; they may be retracted only through a few thousandths of an inch).

30 This retraction of the sinkers 13 also reduces the tension on the sinker loops, as will readily be appreciated by one skilled in the art, and the net result of these operations is that the sinker loop bellies out to an extent sufficient to permit

two needles 11 to be projected through it. This phase is illustrated in Figure 3. Needless to say, by delaying the projection of one of the adjacent needles at n⁷, each sinker loop can be transfixed by only one needle producing what may be termed a "single pelerine stitch".

35 When a sinker loop has been distended and transfixed by one or two needles 11, it is desirable to cast off the sinker loop from the instrument 20 either after, but preferably before, the projected needles have drawn loops in the next course. According to the present invention this casting off is preferably effected by a movement of the instrument down towards the associated needles to disengage the bight of the loop (as is indicated by a depression in the line I¹ at the left hand side of Figure 5) and the operation may be materially assisted if there is a device cooperating with each instrument and said instrument is movable to bring its upper loop-engaging edge or hook 21 below an upper loop-supporting edge of the cooperating device so that the latter lifts or removes the loop from it.

40 A construction by which this result is achieved is illustrated in Figures 1, 3 and 4. The pelerine instruments 20, each of which consists of two thin blades, are each located above and in line with a sinker 13, the lower and inner edge of each blade being chamfered, as is indicated at 20c, Figure 2, to provide a groove or guide in which the top edge of the sinker 13 works. After the loop has been transfixed by a needle or needles, the front or loop-engaging end of the instrument is tilted downwards so that the two blades comprising the instrument pass down one on each side of the associated sinker 13. In so doing the hook 21 is sunk below the top edge of the sinker, which therefore removes the loop from it as is shown in Figure 4. This arrangement has the advantage that it avoids that fraying of the yarn fibres which is an inherent disability in the previous constructions employing essentially forked instruments, in which constructions the transfixed loops are dragged off the instrument forks.

45 The aforementioned depression of the instruments may be effected in numerous ways, a convenient arrangement being illustrated in Figures 1 and 6. As the instruments 20 and needles 11 pass around in their circular paths, the instruments are selected and projected inwards to take the sinker loops as above described, and are retracted at the appropriate time by a cam 26a which engages their butts 20a. At or about the same time that, and preferably immediately after, this cam 26a comes into operation, the instruments are brought within the range of a depressing cam 31 which engages their upper edges just near their inner loop engaging ends and depresses them, the tricks within which the instruments are mounted being downwardly inclined towards the needles to permit of the instruments tilting as shown in Figure 1. When the loops have been cast off in this manner, the butts 20a are engaged by a spring plate 28 which lies within their cam race so that the instruments are again brought to the horizontal. It may here be mentioned that there is a similar spring plate in the cam race, for the butts 20a, in the region where the stitch cam comes into operation, the object of this being to prevent the instruments being tilted as the needles draw the sinker loops over them.

50 It will be realized that the depressing cam 31 bears a fixed relationship to the cams which

project the needles (the expression "fixed" as used herein does not rule out the possibility of slight circumferential adjustment of said cam 31 by means of the holding-down screws 32' and curved slots).

An important feature of this invention resides in the plane or non-divergent construction (i. e. having no lateral offset parts) of the instruments, in which they are distinguished from the essentially forked instruments which have hitherto been employed in pelerine mechanism. In other words each instrument throughout all operative periods extends between the same two needles or in line with a space between the two needles. To present this matter somewhat differently, the instruments for at least that portion of their length that passes across the line of needles in their transverse movement are of a width less than the distance between two adjacent needles. For this reason more such instruments may be employed in the needle circle than has hitherto been possible. Indeed, there may be as many instruments as there are spaces between the needles, thus permitting of the production of pelerine stitches in adjacent sinker wales (when there is an instrument for each space between the needles these instruments will be selected in an alternating sequence, say even instruments at one course and odd instruments at the next course embodying pelerine stitches), although it will generally be preferred to provide pelerine instruments only at alternate spaces, or in some instances even less frequently. It may here be pointed out that for the sake of convenience only a few of the instruments are shown in Figure 6.

This plane construction of instrument is rendered possible by the discovery that a mechanical distention or distortion, by means of forks or spreaders, of the sinker loops to permit of their being transfixed by the needles is not necessary. In this connection it may be pointed out that if when an instrument has been moved to its loop-displacing position the tension on said loop is released, the loop will belly outwards, an effect which it is believed is due in part to the inherent springiness of the yarn. This relaxation of the tension may be achieved either by retracting the web-holders or raising the needles, as hereinbefore described, or by both.

An alternative arrangement for casting off, according to this invention, is shown in Figures 7 to 12. In this arrangement, sinkers or web holders are employed as pelerine instruments. The sinkers 32 are mounted in tricks in a sinker ring 15 and are provided with butts which move in a cam race between cams such as 37, 38 and 39 in a sinker cap 16, whereby the sinkers have their normal movements imparted to them. Certain spaced sinkers, however, are provided at their upper edge with a loop engaging hook 21' and these sinkers are employed as pelerine instruments and have special movements imparted to them. Conveniently, each pelerine-sinker has a short butt 32a (the normal sinkers having longer butts), the cams 37 and 38 being reduced in thickness at appropriate places to permit of said short butts having a movement which differs from the normal movements of the long butts.

At the outer end of each pelerine sinker, on the underside, there is a recess 32b, which is engaged by a projection at the upper end of a selecting instrument 34. These selecting instruments 34 work in vertical tricks in the sinker ring 15, which tricks are in line with sinker tricks, and they are pivoted at their lower ends by means of

a part-circular projection 34a which is received in a retaining plate 35 attached to the underside of the sinker ring. In order to select the pelerine-sinkers 32 and to move them inwards to loop-receiving positions, selecting cams bear upon the butts 20b', with which the selectors 34 are provided at contrasting levels, and in order to withdraw the pelerine-sinkers 32 to their loop-displacing positions, the selectors 34 are provided with outwardly extending butts 34b, the upper edges of which are engaged by a cam 36. It may here be mentioned that the patterning scope is increased if the cam 36 is movable radially and the butts 34b with which it engages are of contrasting heights.

The movements of the sinker butts are illustrated in Figure 10, which is an inverted view of the sinker cap 16 of Figure 7, the path taken by the long butts of the normal sinkers (and the short butts of such pelerine-sinkers that are not selected to form pelerine stitches in any one course) being indicated by the dotted lines 32B, while the path taken by the short butts 32a of the operative pelerine-sinkers is indicated by the chain dotted lines 32A. The butts of the normal sinkers and of those pelerine-sinkers 32 which in any course are inoperative, pass around in relation to the cap 16 in the direction shown by the arrow and are engaged by a cam 37 and moved radially outwards, being subsequently engaged by a cam 38 and moved inwards. Those pelerine-sinkers, however, which are to function in the course under consideration are pushed inwards by selectors 40 just prior to their butts 32a being taken by the cam 38, the cam 37 being cut away locally at 37a to half the thickness to accommodate this inward movement of the short butts 32a. These pelerine-sinkers are slightly advanced by the cam 38 and then continue round while the needles are drawing their loops and while said needles are being raised to clear their latches and lowered again as is indicated in Figure 5. Subsequently, however, the pelerine-sinkers are retracted to loop-displacing positions when the retracting cam 36 (Figure 7) makes contact with the butt 34b of the rocking selectors 34 associated with said pelerine-sinkers, the cam 38 being cut away locally as at 38a to half the thickness to permit of this retraction of the short butts while preventing any outward movement of the long-butted normal sinkers. The said short butts may either be returned subsequently to the normal sinker butt path 32B, or they may continue round at the radius to which they have been retracted as described, in which case the cam 39 (which it will be understood comes into operation during reciprocation of the machine) is either of half thickness or is reduced locally, at 39a to half thickness.

The sinker loops which are engaged and displaced by the pelerine-sinkers 32 when the latter are retracted by cam 36 are caused to belly out, preferably in the manner hereinbefore described, and means are provided for casting the loops off from the hooks 21' after said loops have been transfixed. To this end, each pelerine-sinker may be mounted so that it may be tilted down or depressed within its trick, the said instrument conveniently having a notch 32c, as shown in Figure 11, to permit this tilting. As described with reference to Figure 1, there may be a depressing cam 31 which bears on the top of the pelerine-sinker, but conveniently in this alternative construction now under consideration, the pelerine-sinkers are withdrawn until a suitably located

tilting cam 31 engages the outer and more-or-less vertical edge of the upwardly projecting part of the sinker. As is clearly illustrated in Figure 7, this results in the sinker being tilted downwards.

- 5 Preferably, alongside each pelerine-sinker and conveniently in the same trick, there is a blade 33, having a tail 33b which extends outwards into the sinker trick and having an upper loop-supporting edge 33a, which because the hook 21' of the pelerine-sinker is brought below it in the aforesaid tilting motion serves to remove the transfix loop from the sinker. This operation is clearly illustrated in Figures 7, 8 and 9. It is preferred that there shall be two such blades 10 33, one on each side of the pelerine-sinker, although there may be one blade only. When one blade is employed, it may either be located at one side of the pelerine-sinker or the latter may be split vertically into two parts and the blade 33 15 may be located between said parts.

- Having now dealt with the operation of the instruments and their shape, it is convenient to describe mechanism for selecting them. Numerous forms of selecting mechanism may be devised; a form which has been found suitable in a seamless hose machine is shown in Figures 6, 13 and 14. This mechanism comprises in the main a battery of selecting cams 40, there being 25 one cam for each selecting butt 23b. In the construction illustrated, there are butts 23b at eight levels, and there are eight selecting cams 40. These cams are pivoted at 41 upon a pin which is fixed in a base plate 53, itself adjustably secured to a platform 76 by means of set-screws 30 54 and slot 65, and they are drawn by tension springs 43 towards a trick wheel or pattern wheel 50. In the periphery of this pattern wheel, there are removable bits 51, having patterning butts at eight different levels and as the said trick wheel is racked round by mechanism hereinafter described (one step for example at every third 35 course) the butts on the bits 51 come into contact with feeler projections 49 on the selecting cams 40. Any cam 40 thus engaged by a butt on the trick wheel 50 is moved so that a part 44 on it is brought into the track or range of an up- 45 standing projection 45 upon a rocking lever 47, which projection is adjustable by means of a screw 46. This lever 47 is rocked about its pivot every third course, and the vertical projection 45 thereupon engages the selected cam or cams 40 and moves them, towards the needle cylinder, into the track of the selecting butts 23a of the pelerine instruments. As these butts sweep 50 round during the rotation of the machine, they are therefore engaged by the selecting cams 40 and the associated pelerine instruments are pushed inwards at or about the time the adjacent needles pass down the stitch cam. These needles, therefore, draw their sinker loops over the pelerine instruments thus selected, as has been described.

- The mechanism by which the trick wheel 50 is racked comprises a cam 55 upon the rotatable 65 needle cylinder 10, which, once in every revolution engages a bell crank lever 56 and rocks it, so that a clawker 57 pivoted thereto moves to a large ratchet wheel 59 by one tooth. The said clawker is drawn by a spring 58 against the ratchet 59 and the latter is rotatable about the shaft 52 of the trick wheel and has attached to it a wheel 70 60 on which radially projecting blades 61 are located.

As will be observed from the drawings, it is 75 preferred that there shall be a blade at every

third tooth of the ratchet 59, although provision may be made for them at more frequent intervals. It is these blades which move the rocking lever 47 and its vertical projection 45 beforemen- 5 tioned because attached to the lever 47 there is another lever 62 which is drawn against the blades 61 by a spring 63, but they have another function. The said blades 61 also serve to rock a lever 66 which is pressed against them by a leaf spring 67 and is pivoted at 69. On an arm 10 of this lever 66, a small clawker 68 is pivoted at 70 and is drawn by means of a coil spring 72 that extends between a pin 73 and a hook 71 on said clawker into contact with the teeth on a ratchet wheel 64, the pitch of which teeth is the 15 same as that of the bits in the trick-wheel 50. The said ratchet wheel 64 is thereby racked one tooth every three courses and as it is connected to the shaft 52 of the trick wheel 50, the latter is racked similarly. 20

A fresh selection from among the pelerine instruments is therefore made every third course, but in order that selections may be made more frequently if such is desired provision may be made in the wheel 60 to accommodate a blade 25 61 opposite every tooth of the coarse pitched ratchet wheel 59. Provision may also be made for repeating any selection indefinitely, such as is often desirable, for example in making the stem of a fancy clock or in making lace net 30 fabric, particularly lace net hose, by disengaging the clawker 68. It may also be desirable to throw the whole pelerine mechanism out of operation for a predetermined number of courses. For this purpose there is a member 75 which may be moved up through the platform 76 under the control of any suitable mechanism, preferably the drum of the machine, to engage the bell-crank lever 56 and hold it away from the cam 55 on the cylinder so that neither is the ratchet 59 40 racked, nor is the cam-operating member 45 moved.

In making lace net hose, it is necessary to have pelerine instruments all round the needle circle with possibly the exception of a small arc the 45 needles in which produce a narrow vertical band of plain fabric in which a mock seam may subsequently be formed. Whatever the arrangement adopted, however, it is highly desirable that while the foot is being made, approximately half the instruments should be thrown out of action so that while the instep incorporates pelerine stitches, the sole is plain. For this purpose, means are provided for rendering certain of the selecting 50 cams 40 inoperative for a predetermined number of courses. It will be noticed that levers 77 and 78 are pivoted at 79 to the top cam 40 of the battery, which levers 77 and 78 extend back beyond the pivot 41 of the cams, being provided with part-circular recesses to clear the washer 90 at the top of said pivot 41. The lower lever 78 is provided with a pin 85 which extends downwards and makes contact with the edges of the first and third selecting cams 40, while the top lever 77 is provided with a similar pin 84 which extends 65 downwards through a slot 86 in the second lever 78 and makes contact with the edges of the second and fourth selecting cams 40. These top four cams 40 in the battery are biased outwards away from the trick wheel 50 by tension springs 70 91, the ends of which are anchored to a pin 92, there being a transverse slot 42 in said cams. When these four cams are free to move in this manner they are inoperative because although their feelers 49 are moved by the butts on the 75

trick wheel this movement is not applied to bring the projections 44 into the track of the operating member 45. On the other hand, when pressure is exercised on the outer ends of the levers 77 and 78, the pins 84 and 85 force the four top cams of the selecting battery towards the trick wheel, so that they pivot about the pin 41 and do not slide upon it. The said cams are therefore rendered operative.

10 The necessary pressure is exercised by a bell-crank lever 87, which is pivoted at 88 upon the platform 76 and is operated by means of a push-and-pull rod 89 from the drum or patterning chain of the machine. It will be noticed that the top lever 77 has its end stepped. Therefore, the bell-crank lever 87 may be moved to one position in which while it engages the end of the lower lever 78 and therefore renders the second and fourth selecting cams 46 of the battery operative, yet it does not bear upon the top lever 77 because of the step in it, or to a second position slightly further to the right as seen in Figures 6 and 14, in which it engages both levers 77, 78 and renders all four top selecting cams of the battery operative.

25 The present invention permits the production, on a machine, of novel pelerine effects, and Figure 16 (in which the courses are numbered 1, 2, 3, etc. and the needle wales are lettered A, B, C, etc.) shows some of the arrangements of pelerine stitches that may be attained. It will be observed that in course 1 the sinker loops 1BC, 1DE, that connect needle loops 1B and 1C, 1D and 1E, are distended and are passed round the needle loops 2B and 2C; 2D and 2E, while in course 2 the sinker loops 2AB and 2CD are passed round the needle loops 3A and 3B, 3C and 3D of course 3. In other words, in a plurality of consecutive courses there are pelerine loops in every wale of a group thereof, said loops being in even wales in one course and odd wales in the next course. It will also be noticed that the needle loops in the needle wale B are engaged by pelerine loops from the sinker wales from each side of it, and the same holds good about wales A, C, D, E, and G. In course 2 the needle loop 2B is engaged by the sinker loop 1BC, in course 3 the needle loop 3B is engaged by the sinker loop 2AB, and in course 5 the needle loop 5B is engaged by sinker loop 4BC.

50 The pelerine stitches shown in course 8 and also shown in sinker wales FG of courses 2, 4, 6 and 8 and sinker wales GH of courses 1, 3 and 5 are single stitches, produced by projecting one needle only through the displaced loop. Every needle loop 1G to 6G of needle wale G is engaged by a pelerine loop; in odd courses these loops are displaced from the right hand sinker wale and in even courses from the left hand sinker wale.

We claim:—

60 1. In pelerine mechanism of the type specified, the combination with a pelerine instrument and with the needles, of a further loop-engaging instrument for removing the loop from the instrument after it has been transfixed by a needle.

65 2. In pelerine mechanism of the type specified, the combination with a pelerine instrument and with the needles, of a loop-removing element associated with said instrument, and means for causing said element to engage the interior of the transfixed loop and to remove it from the instrument.

70 3. For a knitting machine, pelerine mechanism of the type specified having in combination with a pelerine instrument, a device alongside it provided with an upper loop-receiving edge, and

means for removing a transfixed loop from said instrument by sinking the latter below the edge of the said device.

4. For a knitting machine having needles and means for reciprocating them to knit, pelerine mechanism comprising a pelerine instrument having a loop-receiving part and means for moving it to-and-fro between a position in which two adjacent needles draw their connecting sinker loop over it and a position in which said loop is displaced and at least one needle is projected through it, a blade-like part lying alongside the instrument in the second position, said part having an upper-loop receiving edge, and means for causing said edge to remove the transfixed loop from the instrument.

5. For a knitting machine, pelerine mechanism of the type specified comprising a tricked bed for pelerine instruments, instruments mounted in said tricks for movement between their two positions transversely of the line of the needles, blade-like casting-off members lying alongside the instruments in the loop-displacing position of the latter, and means for causing said members to remove the transfixed loops from the instruments by depressing the latter within their tricks.

6. In a knitting machine having needles and means for operating them to knit, sinkers or web-holders movable transversely of the needles and formed each at its upper edge with a loop-engaging catch, means for advancing each said sinker or web-holder to a position in which the adjacent needles draw their connecting sinker loop over it and for retracting it to a position in which said loop is displaced by said shoulder and is transfixed by a needle, and means for releasing the transfixed loop from said catch by lowering the sinker or web-holder.

7. For a knitting machine, pelerine mechanism of the type specified comprising a pelerine instrument of thin blade-like construction and provided at its upper edge with a catch for the sinker loop, a loop-receiving member lying alongside said instrument and having a smooth upper edge, and means for transferring the transfixed loop from the instrument to the member by burying the catch below the upper edge of the said member.

8. For a knitting machine, pelerine mechanism of the type specified comprising a pelerine instrument having a loop-engaging catch at one end and split longitudinally at least at that end into two parts, means for moving said instrument between its loop-receiving and loop-displacing positions, a thin blade located in line with the split at the loop-displacing position, and means for removing the transfixed loop from the catch by the blade said means comprising means for moving the instrument in the said position until an upper edge of said blade projects upwards through the split and the catch is shielded by said blade.

9. In a circular knitting machine having needles and sinkers, the combination of pelerine instruments associated one with each of a plurality of sinkers, each instrument comprising two thin blades lying one on each side of the sinker and having at its upper edge and near its inner end a loop-engaging catch, an annular tricked bed surrounding the needle circle in which bed said instruments are slidable radially, means for moving the instruments in progression each instrument between an inner position in which its catch lies inside the needle circle and the adja-

- cent needles draw their connecting sinker loop over it and an outer position in which the catch is withdrawn to the outside of the needle circle carrying the loop with it, means for projecting at least one needle through the loop thus carried outwards which means operates upon the needles in progression with the means for moving the instruments, and means also operating on the instruments in progression with the aforesaid means for removing the transfixing loop from the catch by lowering the two blades comprising the instrument down one on each side of the sinker until the catch is sunk below the upper edge of said sinker.
10. In a knitting machine, sinkers, means for selecting them to displace the sinker loops drawn over them, means for projecting needles through said displaced loops, and means for lifting the transfixing loops from the sinkers.
11. In a circular knitting machine, instruments disposed in pairs around the needle circle, each pair in line with a needle space, selective means

operating in progression upon the instruments for moving them in relation to each other and to the needles one of a pair to take a sinker loop and displace it to permit a needle to be projected inside it and the other to remove the transfixing loop from the former, means for projecting the needles in timed relation to the operation of said selective means, and means for causing the sinker loops to belly out by relaxing tension thereon prior to the projection of the needles through them.

12. For a knitting machine, the combination of a needle bed, needles therein, a loop-displacing pelerine instrument of non-divergent character and means for disengaging the bight of the loop from the instrument, subsequent to its transfixion by a needle, arranged to move the disengaging part of the instrument toward the needles and in the direction of their length.

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