Nov. 29, 1938. E. C. SHERLIN ET AL 2,138,748

ATTACHMENT FOR KNITTING MACHINES

Filed May 19, 1936 5 Sheets-Sheet 2

Fig. 3.

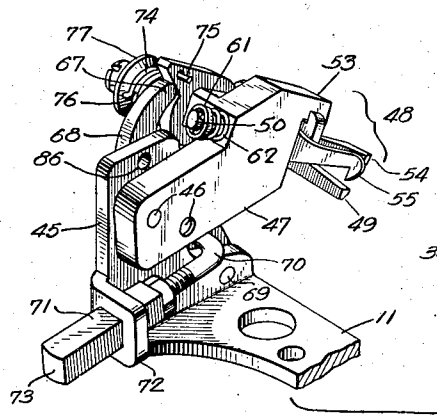
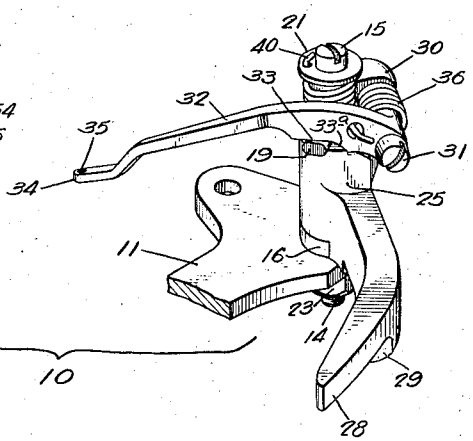


Fig. 4.



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Fig. 6.

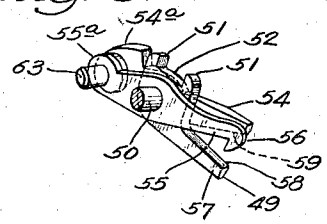


Fig. 5.

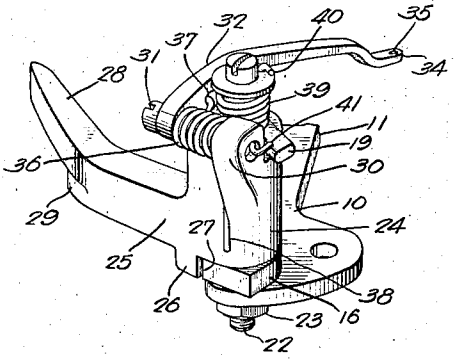


Fig. 7.

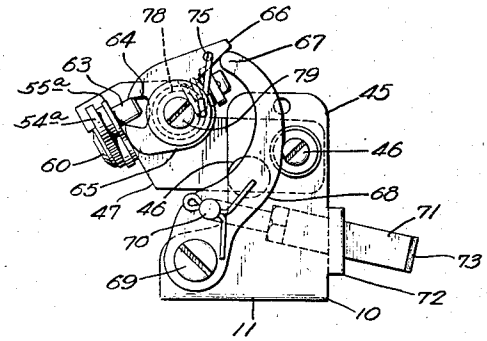


Fig. 8.

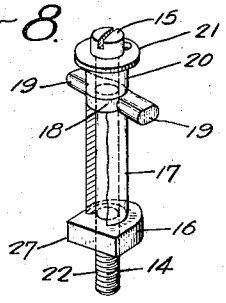
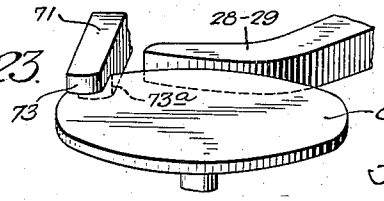


Fig. 23.



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Nov. 29, 1938. E. C. SHERLIN ET AL 2,138,748

ATTACHMENT FOR KNITTING MACHINES

Filed May 19, 1936 5 Sheets-Sheet 3

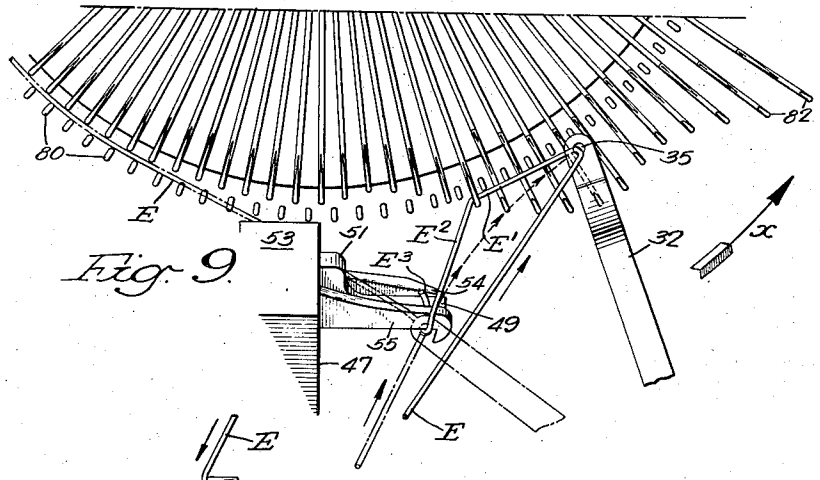


Fig. 9.

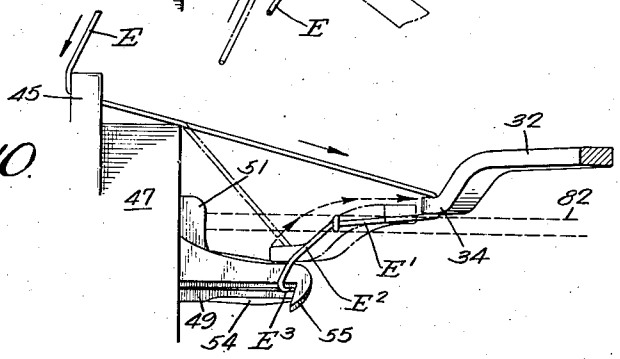


Fig. 10.

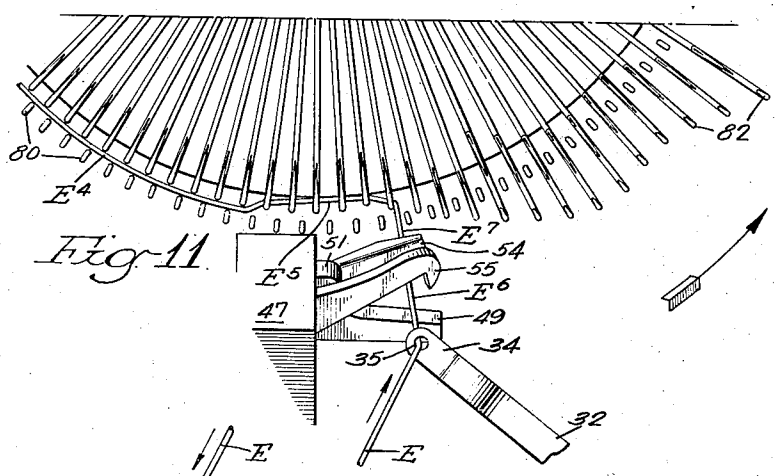


Fig. 11.

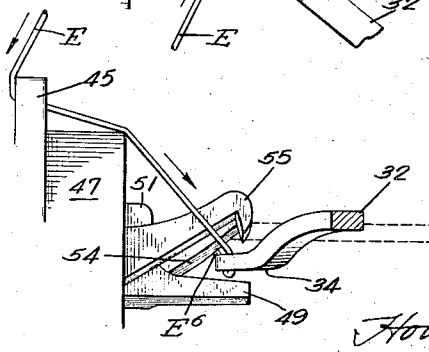


Fig. 12.

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Nov. 29, 1938. E. C. SHERLIN ET AL 2,138,748

ATTACHMENT FOR KNITTING MACHINES

Filed May 19, 1936 5 Sheets-Sheet 4

Fig. 13.

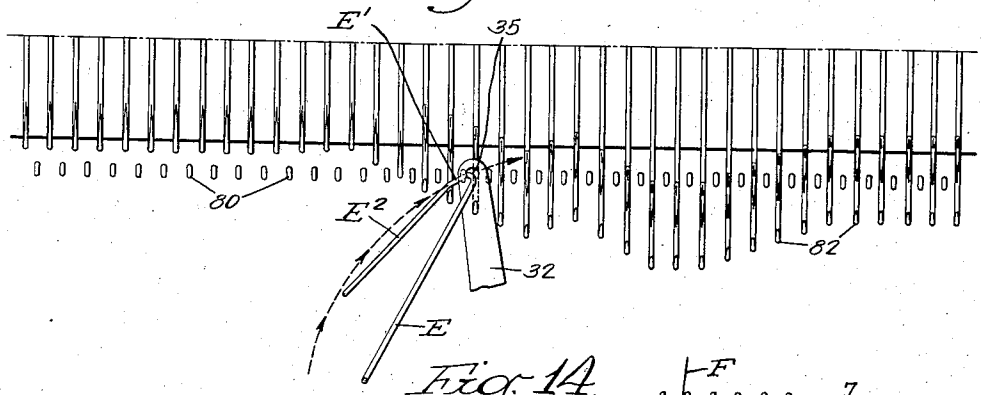


Fig. 14.

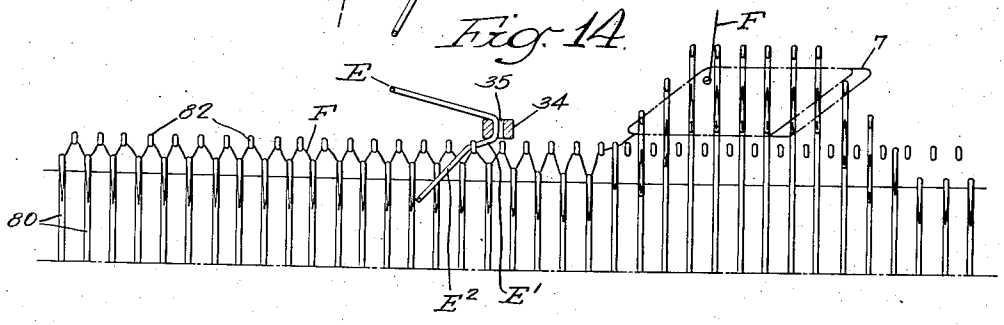


Fig. 16.

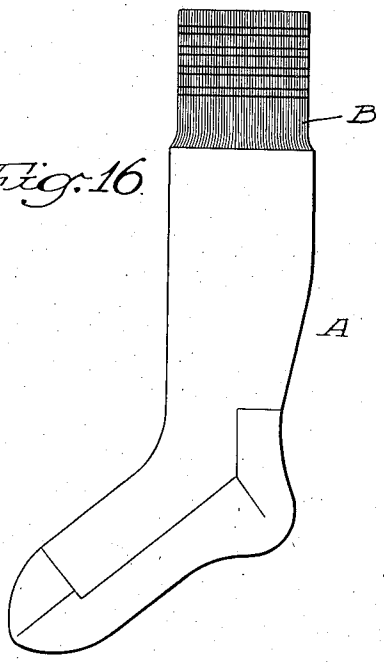
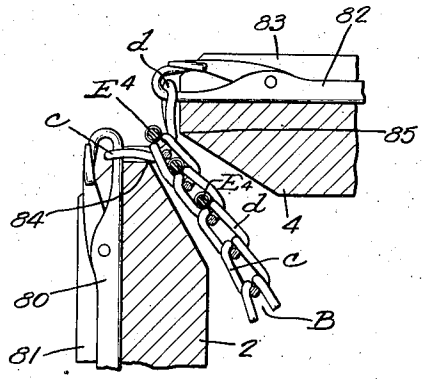


Fig. 15.



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Nov. 29, 1938. E. C. SHERLIN ET AL 2,138,748

ATTACHMENT FOR KNITTING MACHINES

Filed May 19, 1936 5 Sheets-Sheet 5

Fig. 18.

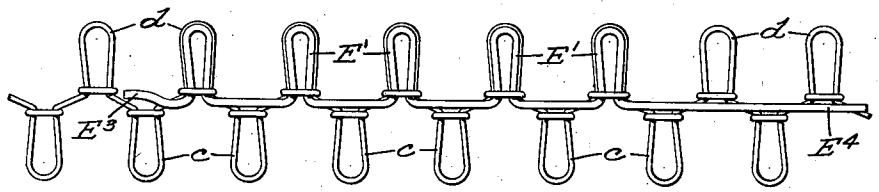


Fig. 17.

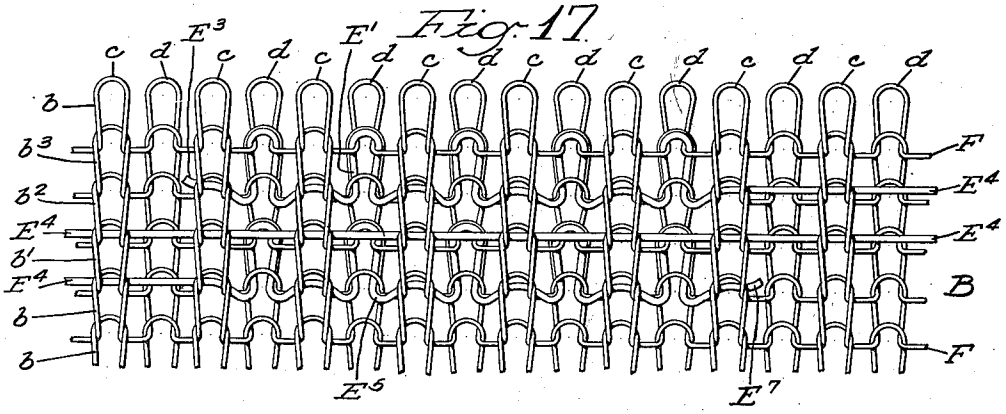


Fig. 19.

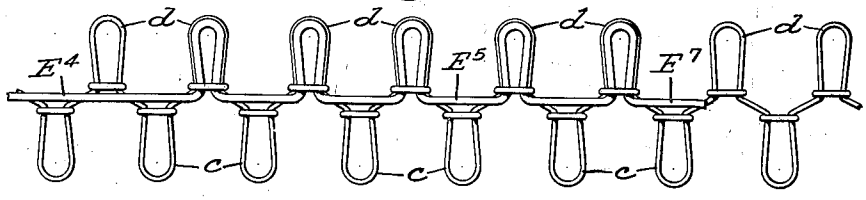
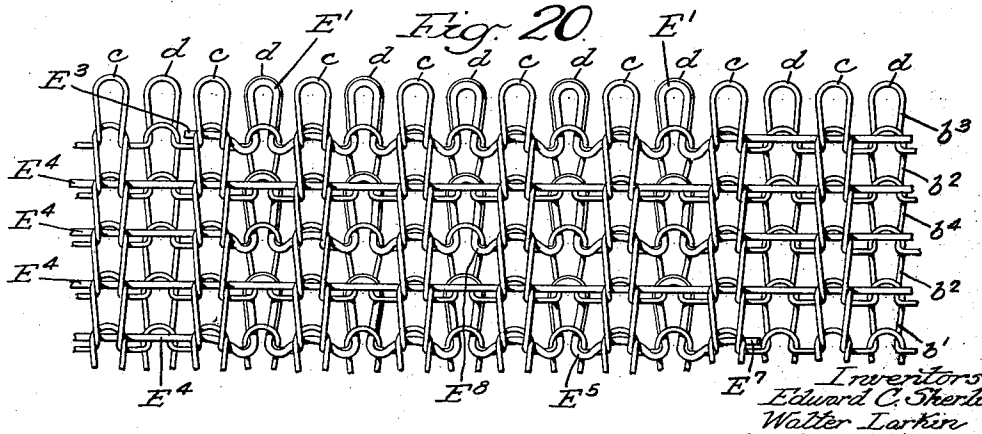


Fig. 20.



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Patented Nov. 29, 1938 2,138,748

UNITED STATES PATENT OFFICE

2,138,748

ATTACHMENT FOR KNITTING MACHINES

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Application May 19, 1936, Serial No. 80,642

15 Claims. (Cl. 66—9)

This invention relates to thread feeding attachments for knitting machines, particularly rib knitting machines of the circular type, such, for example, as the machine shown in U. S. Letters Patent No. 1,841,249, dated January 12, 1932, or others capable of producing only fabrics of a single color or fabrics with horizontal stripe effects.

The object of the present invention is to provide in addition to the regular thread feed of the machine an extra thread feeding attachment which, at predetermined times during the knitting of ribbed fabric with the regular knitting thread, will lay a rubber or other additional thread behind the cylinder needles and below the dial needles of the knitting machine in a manner to cause the additional thread to float coursewise of the fabric, between the front or cylinder stitch wales and the back or dial stitch wales of the fabric; and which, at and during the introduction of the additional thread to the knitting head of the machine, and at and during the withdrawal of the additional thread from the knitting head and, if desired, at predetermined times during the laying of the additional thread into successive courses of stitches in the fabric, will feed the additional thread to the dial needles solely, to cause the additional thread to be caught in the hooks of a number of the dial needles, whereby the additional thread will be knitted into a number of the back or dial stitches together with the regular knitting thread, and whereby the additional thread and particularly the opposite ends of a length thereof which has been laid in the fabric, and especially when the additional thread is of an elastic nature, will be maintained against slipping through the courses of stitches of the fabric in which the elastic or rubber thread, covered or bare, has been incorporated, as normally occurs when an elastic thread is merely laid in the courses between the front and back wales of the rib fabric.

Normally when an elastic thread is knitted into a plain or ribbed fabric, that is, when the elastic thread is actually formed into stitches along with the regular knitting thread, the knitting-in of the elastic thread is effected on the front wales of the fabric, i. e. those which would be formed by the cylinder needles.

The inherent tendency of the elastic thread to contract longitudinally causes the elastic thread to straighten out after it has been knit into the regular stitches and this straightening out of the elastic thread causes the regular knitting thread of these stitches to be distorted from the regular stitch formation, as a result of which the regular knitting thread is caused to bind about the elastic thread in such a manner as to anchor the elastic thread firmly in the fabric.

When the elastic thread is knitted into the front wales of the fabric, as above noted, the distortion of the regular knitting thread stitches, appearing on the face of the fabric, produces marks in the fabric which disrupt the general uniform appearance of the fabric.

The object of the present invention in anchoring the elastic thread to the dial stitches is to eliminate anchor marks on the face of the fabric.

Other features of the invention which reside in the structure of the attachment, and the operation of the attachment, will be fully disclosed hereinafter, reference being had to the accompanying drawings, of which:

Fig. 1 is a plan view, partly in section, of sufficient of a circular rib knitting machine to illustrate the operation of the attachment forming the subject matter of the present application when applied thereto;

Fig. 2 is a front elevation of the mechanism shown in Fig. 1;

Fig. 3 is a perspective view of one end of the attachment, detached from the knitting machine;

Fig. 4 is a perspective view of the opposite end of the attachment under similar circumstances;

Fig. 5 is a perspective view of that end of the attachment illustrated in Fig. 4, as viewed from a different angle;

Fig. 6 is a detached perspective view of the gripping and shearing mechanism of the attachment;

Fig. 7 is a side elevation of the shear and gripper operating mechanism;

Fig. 8 is a perspective view, partly in section, showing the pivotal mounting for the thread feeding finger of the attachment;

Fig. 9 is a fragmentary plan view illustrating the feeding finger in the act of initially introducing a rubber or other extra thread to the dial needles of the machine;

Fig. 10 is a front elevation of the mechanism shown in Fig. 9;

Fig. 11 is a view similar to Fig. 9 and illustrates the withdrawal of the extra thread from the knitting head of the machine, prior to gripping and shearing of the thread;

Fig. 12 is a front elevation of the mechanism shown in Fig. 11;

Figs. 13 and 14 are flat diagrammatic developments of the knitting head, illustrating the relation between the dial and cylinder needles during

shearing and clamping mechanism 48 of the attachment.

The shearing and clamping mechanism 48 comprises a fixed shear blade 49 which is loosely mounted on a rod 50 which is carried by a block 47, said blade 49 having parallel lugs 51, 51 between which is formed a notch or slot 52 which is adapted to receive an extension 53 of the block 47, said lugs 51, 51 engaging the opposite sides of said extension and preventing rotation of the blade 49 about the axis of the rod 50.

Pivotally mounted on the rod 50 at one side of the fixed blade 49 is the movable blade 54 of the shearing mechanism; and pivotally mounted on the rod 50 at the opposite side of the fixed shear blade 49 is a clamping blade 55, between the inner surface 56 of which and the adjacent surface 57 of the fixed shear blade 49 the extra thread or yarn is adapted to be clamped immediately prior to and after the shearing of the thread between the cooperating shear edges 58 and 59 of the fixed and movable blades 49 and 54 respectively of the shearing mechanism.

The shearing and clamping blades 49—54—55 are resiliently held in engagement with each other to effect proper shearing and clamping of the thread by means of the rod 50 being mounted for axial movement in the block 47, said rod having a head 60 on its one end which bears against the outer surface of the shear blade 54. The shank of the rod passes through the blades 54, 49 and 55 and through and beyond the block 47 and the opposite end of said rod is provided with a collar 61 between which and the block 47 and encircling the rod 50 is a spring 62 which resiliently moves the rod 50 axially to effect co-operation between the blades 49, 54, 55 in the manner above noted.

The movable blades 54 and 55 are provided with extensions 54*a* and 55*a* respectively, in which is mounted an operating pin 63. The operating pin 63 extends into a recess 64 of an operating lever 65, as clearly shown in Fig. 7, said lever having an arm 66 which is adapted to be engaged by the free end 67 of a second actuating lever 68, which latter is pivotally mounted at 69 in the bracket 45 of the frame 10.

Intermediate the pivot 69 and the end 67 of the lever 68, said lever is connected to one end 70 of a plunger 71 which latter is slidably mounted in a laterally extending portion 72 of the bracket 45.

The outer end 73 of the plunger 71 is arranged to be engaged by the bob disc 6 when said disc is in either the full line or broken line position shown in Fig. 2 and whereby the shear and clamp blades will be opened following the swinging of the finger 32 inwardly when introducing or when withdrawing the rubber thread to and from the knitting head.

The closing of the blades 54 and 55 relative to the fixed blade 49 is effected by means of a spring 74 having one end 75 anchored in the arm 66 of the operating lever 65 and its opposite end 76 anchored in an annular flange 77 of a sleeve 78 which constitutes the pivotal support for the lever 65 and which is clamped to the block 47 by means of a screw 79, said sleeve being adjustable about the screw 79 to increase or decrease the tension of the spring 74 as desired.

Referring now to Figs. 15 to 20 of the drawings, the stocking A, Fig. 16, which in the present instance is illustrated as being a man's half hose, is provided with a ribbed top B.

The ribbed top B, Fig. 17, is composed of successive courses of stitches *b*, b^1, b^2, b^3, etc., each of which includes face wales *c* which are formed by the cylinder needles 80 operating in the vertical grooves 81 of the cylinder 2 and which alternate with back wales *d* which are formed by the dial needles 82 operating in the radial grooves 83 of the needle dial 4, the fabric B passing from the needles between the upper, inner peripheral edge 84 of the cylinder 2 and the lower, outer peripheral edge 85 of the dial 4 as clearly shown in Fig. 15.

Normally the rubber or other extra thread E passes from a suitable source of supply which in some cases may be carried by the cam ring 3 or an equivalently rotating portion of the knitting machine to revolve with the cam ring 3. In other instances the supply of thread E may be supported in fixed relation to the base 1 and fed to the knitting head by suitable mechanism forming no part of the present invention and which may include means for governing the tension on the thread E as it is fed to the machine. In any case the thread E passes from the supply to and through an eye 86 formed in the upper end of the bracket 45 and from which said thread passes to the eye 35 in the outer end 34 of the thread-feeding finger 32, as clearly shown in Figs. 1 and 2 of the drawings, the thread E passing from the eye 35 to the under side of the clamp blade 55, then upwardly between the clamping surface 56 of said clamp blade 55 and the clamping surface 57 of the fixed blade 49.

After the knitting machine has normally produced a number of ordinary courses *b*, the bob disc 6 is raised from a normally low position to the broken line position shown in Fig. 2, wherein said disc engages the lower shorter lever extension 29 of the finger carrier 25 and swings the carrier 25 and the finger 32 inwardly about the axis of the vertical pivot stud 14, from the full line position in Fig. 1, and which is illustrated in broken line in Fig. 9, to the full line position in Fig. 9.

During the inward swinging movement of the finger 32, the cam surface 33*a* on the finger 32 rides over the fixed arm 19 and causes the outer end 34 of the finger 32 to rise from its normal position shown in broken lines in Fig. 10 and in full lines in Fig. 2 to the full line position shown in Fig. 10. The end 34 of the finger 32, as it swings inwardly and rises upwardly, passes over the tops of the dial needles 82 which at that point have been projected radially beyond the circle of the cylinder needles 80, 80. The latches of the dial needles at that time are open. The cylinder needles 80, at this point, are in a position with the upper ends of the hooks thereof below the plane of the dial needles 82, as clearly shown in Fig. 14. The dial needles are then retracted and during this inward movement engage the thread E and draw the engaged portion E^1 thereof inwardly to a position behind the cylinder needles, it being understood that the cylinder needles have previously drawn the regular knitting thread F from the supply thereof and pulled said regular yarn downwardly between and over the tops of the dial needles as shown in Fig. 14.

The dial needles as they move inwardly, Fig. 13, draw the regular knitting yarn and the elastic yarn into the hooks thereof and through the stitches of the previously formed course *b* which are then hanging on the dial needles. The cylinder needles rise slightly as the dial needles recede, for dividing the regular knitting yarn between

the cylinder and dial needles and relieving strain on the yarn.

The portion E^2 of the elastic yarn E during the knitting in of the engaged portion E^1 of the thread E extends from the clamp 49—55 to the first dial needle which engaged said elastic thread. The finger 32 is then in the full line position illustrated in Fig. 9.

The end of the arm 29 of the carrier 25 then rides off the bob disc 6 and swings outwardly under the action of the spring 39 carrying the outer end 34 of the finger 32 outwardly and downwardly over the top of the clamp 49—55 to the normal full line position, Fig. 1.

The bob disc 6 immediately after releasing the lever extension 29 of the finger carrier 25 engages the outer end 73 of the plunger 71 which immediately opens the clamp 49—55, releasing the clamped end E^3 of the elastic thread E.

With the cam ring 3 revolving in the direction of the arrow *x*, Fig. 9, and with the attachment being carried bodily around the stationary cylinder 2 by the cam ring 3, and with the guide eye 35 now in its outer normal position, the rubber thread E is fed directly from the eye 35 of the finger 32 over the top of the clamp and shear 49—54—55 and across in front of the extension 53 of the block 47 and tangent to the cylinder 2 and dial 4, as clearly shown in broken line in Fig. 9.

The cylinder needles being down and the dial needles being retracted with the thread E being fed at a tangent to the peripheral edge 85 of the dial 4 causes the rubber thread E to be laid in the center of the fabric, i. e. between the stitches of the outer wales *c* and the stitches of the inner wales *d*, after said elastic thread E has been knit in with the regular knitting thread F (see Fig. 17) in predetermined stitches of the back wales *d* in course b^1 while the finger 32 was being held in its inner position shown in Fig. 9.

As the regular knitting continues, the rubber thread E is laid in the fabric without being interknit with the stitches thereof in any desired number of courses b^2, as clearly shown at E^4 in Figs. 17 and 20. Such laying in of the thread may continue for any desired number of successive courses.

When it is desired to discontinue the laying in of the rubber thread E the bob disc 6 is raised from said normally low position to the elevation of the longer and higher lever extension 28 of the finger carrier 25 for engagement therewith and whereby the finger 32 is again swung from the broken line position in Fig. 9 to the full line position in said figure which causes another portion E^5 of the thread E to be engaged by the dial needles (see Fig. 11) and knit into the back stitches of the fabric together with the regular knitting thread F (see Fig. 17). However, this time, due to the longer length of the arm 28, the finger carrier 25 is not released from the bob disc 26 until the said bob disc engages the end 73 of the clamp operating plunger 71, whereby the clamp and shear blades 54 and 55 are opened with respect to the fixed blade 49 before the finger 32 swings outwardly to its normal position.

While the blades 54 and 55 are held in open position, the finger carrier 25 is released from the bob disc 6 which swings the finger 32 from the full line position in Fig. 9 to the full line position in Fig. 11, whereby a portion E^6 of the thread E is carried between said open blades. The bob disc then releases the plunger 71 and the spring 74 closes the blades. The blade 55 snubs the thread E between the surface 56 of the movable blade 55 and the surface 57 of the fixed blade 49 and substantially at the same time the cutting edge 59 of the movable blade 54 cooperating with the cutting edge 58 of the fixed blade 49 severs the thread E, freeing the end E^7 of the length thereof which has been incorporated in the fabric and leaving the end E^3 held in the clamp, as illustrated in Fig. 9, it being noted that during the second movement of the finger 32 inwardly to the position shown in Fig. 9, the end E^7 of the thread E is caught and knitted into the fabric, as clearly illustrated in Fig. 17.

In other instances where it may be desirable to anchor the rubber thread intermediate the knitted in ends E^3 and E^7 as, for example, at E^8 in Fig. 20, the bob disc is raised to the elevation of the lower, shorter arm 29 of the finger carrier 25 which throws the outer end 34 of the finger 32 into the full line position in Fig. 9 momentarily but long enough for the thread E to be caught by a number of the dial needles, after which the arm swings outwardly to the broken line position in Fig. 9, but due to the earlier movement of the arm 32 to its outer position when the bob disc engages the lower shorter arm 29 of the finger carrier 25 the outer feeding end 34 of the finger 32 has regained the broken line position of Fig. 9, from which the thread E is fed tangentially to the knitting head. before the clamp and shear is opened and as the tangential feeding of the thread to the knitting head is effected over the tops of the movable blades of the shear and clamp no shearing or clamping of the thread takes place.

When the attachment is used on a machine having a number of regular thread feeds, one attachment may be used with each of the regular thread feeds or one attachment may be used alone. In either case, it may be desirable to lay the thread E into the fabric at a point close behind the knitting point of the regular thread to avoid interference with the next regular thread feed on the machine. In such cases the guide plate 90 which is shown in Figs. 21 and 22 may be carried by the cam disc 5 in definite relation to the attachment and whereby the thread E after leaving the guide 35 in the feeding finger 32 will pass under the prong 91 of the plate 90 and feed to the knitting head through the guide notch 92. This arrangement may also be used in a wide machine having a single feed and wherein the tangential relation of the thread E to the eye 35 and periphery of the cylinder 2 and dial 4 would make the intervening portion of the thread of such great length that it may be incorrectly laid in the fabric.

As shown at 28—29 in Fig. 23, the lever extensions 28 and 29 of the finger carrier 25 may be formed in one piece and/or be of equal lengths, in which case, in order to open the clamp 54—49 just sufficiently to release the rubber thread after it has been initially introduced to the dial needles, the lower portion of the plunger 71 is cut back from the front bob disc engaging surface end 73 thereof as indicated at 73*a* and this cut back surface 73*a* is adapted to be engaged by the bob disc 6 when said disc is in the broken line position shown in Fig. 2 and wherein it would strike the lower portion of the lever extension 28—29 which corresponds to the shorter lever 29 of Fig. 2.

We claim:

1. In a knitting machine employing two sets of needles and a guide delivering a body thread

to both sets continuously for knitting complete successive normal interknit courses of stitches in front and back stitch wales alternately of a ribbed fabric, means for feeding an additional thread to only the needles knitting said back wales or between said sets of needles selectively during normal feeding of said body thread to both sets of needles and the knitting of said body thread in said front and back wales for knitting predetermined portions of said additional thread into predetermined stitches of said back wales and for laying an intermediate portion of said additional thread between said front and back wales.

2. In a knitting machine employing two sets of needles and a guide delivering a body thread thereto for knitting front and back stitch wales respectively of a ribbed fabric, means normally lying at one side of said needle sets and adapted for movement to a position adjacent said needle sets for feeding an additional thread to the needles knitting said back wales for knitting a predetermined portion of said additional thread into predetermined stitches of said back wales with said body thread, means normally gripping one end of said additional thread adjacent said needle sets, means for moving said feeding means into said feeding position, means for releasing said thread end from said gripping means, and means for moving said feeding means from said feeding position to a second feeding position for laying said additional thread in said fabric between said front and back wales thereof.

3. In a knitting machine employing two sets of needles and a guide delivering a body thread thereto for knitting front and back stitch wales respectively of a ribbed fabric, means normally lying at one side of said needle sets and adapted for movement to a position adjacent said needle sets for feeding an additional thread to the needles knitting said back wales for knitting a predetermined portion of said additional thread into predetermined stitches of said back wales with said body thread, means normally gripping one end of said additional thread adjacent said needle sets, means for moving said feeding means into said feeding position, means for releasing said thread end from said gripping means, means for moving said feeding means from said feeding position to a second feeding position for laying said additional thread in said fabric between said front and back wales thereof, and means for effecting a return of said feeding means to the first said feeding position to effect knitting in of another portion of said additional thread with the body thread in a second group of the stitches of said back wales.

4. In a knitting machine employing two sets of needles and a guide delivering a body thread thereto for knitting front and back stitch wales respectively of a ribbed fabric, means normally lying at one side of said needle sets and adapted for movement to a position adjacent said needle sets for feeding an additional thread to the needles knitting said back wales for knitting a predetermined portion of said additional thread into predetermined stitches of said back wales with said body thread, means normally gripping one end of said additional thread adjacent said needle sets, means for moving said feeding means into said feeding position, means for releasing said thread end from said gripping means, means for shifting said feeding means from said feeding position to a second feeding position for laying said additional thread in said fabric between said front and back wales thereof, means for effecting a return of said feeding means to the first said feeding position to effect knitting in of another portion of said additional thread with the body thread in a second group of the stitches of said back wales, and said feeding means being returned to said normal position at one side of said needle sets by said shifting means.

5. In a knitting machine employing two sets of needles and a guide delivering a body thread thereto for knitting front and back stitch wales respectively of a ribbed fabric, means normally lying at one side of said needle sets and adapted for movement to a position adjacent said needle sets for feeding an additional thread to the needles knitting said back wales for knitting a predetermined portion of said additional thread into predetermined stitches of said back wales with said body thread, means normally gripping one end of said additional thread adjacent said needle sets, means for moving said feeding means into said feeding position, means for releasing said thread end from said gripping means, means for shifting said feeding means from said feeding position to a second feeding position for laying said additional thread in said fabric between said front and back wales thereof, means for effecting a return of said feeding means to the first said feeding position to effect knitting in of another portion of said additional thread with the body thread in a second group of the stitches of said back wales, said feeding means being returned to said normal position at one side of said needle sets by said shifting means, shearing means adjacent said gripping means, and means for actuating said gripping and shearing means to grip the additional thread and sever said thread adjacent said normal position thereof.

6. In a knitting machine employing two sets of needles and a guide delivering a body thread thereto for knitting front and back stitch wales respectively of a ribbed fabric, means normally lying at one side of said needle sets and adapted for movement to a position adjacent said needle sets for feeding an additional thread to the needles knitting said back wales for knitting a predetermined portion of said additional thread into predetermined stitches of said back wales with said body thread, means normally gripping one end of said additional thread adjacent said needle sets, means for moving said feeding means into said feeding position, means for releasing said thread end from said gripping means, means for shifting said feeding means from said feeding position to a second feeding position for laying said additional thread in said fabric between said front and back wales thereof, and said moving means effecting a return of said feeding means to the first said feeding position at predetermined intervals to effect knitting in of additional relatively spaced portions of said additional thread with the body thread in predetermined groups respectively of the stitches of said back wales.

7. An attachment for knitting machines comprising a frame, thread-gripping and shearing means carried by said frame, a thread feeding finger having a guide eye normally disposed adjacent said gripping and shearing means, a finger carrier pivotally mounted on said frame, a pivot for said finger carried by said carrier and extending substantially perpendicular to the axis of the carrier pivot, means for swinging said carrier about its axis and means for swinging said finger on its pivot on the carrier for cooperatively

moving said guide eye across said gripping and shearing means from said normal position to a remotely disposed feeding position, and means for actuating said gripping means for releasing a thread gripped thereby and passing through said guide eye.

8. An attachment for knitting machines comprising a frame, thread-gripping and shearing means carried by said frame, a thread feeding finger having a guide eye normally disposed adjacent said gripping and shearing means, a finger carrier pivotally mounted on said frame, a pivot for said finger carried by said carrier and extending substantially perpendicular to the axis of the carrier pivot, means for swinging said carrier about its axis and means for swinging said finger on its pivot on the carrier for cooperatively moving said guide eye across said gripping and shearing means from said normal position to a remotely disposed feeding position, and means for actuating said gripping means for releasing a thread gripped thereby and passing through said guide eye, said finger carrier swinging means and said gripping and shearing actuating means being arranged in a substantially common plane for successive operation by a common actuator of the knitting machine.

9. An attachment for knitting machines comprising a frame, thread-gripping and shearing means carried by said frame, a thread feeding finger having a guide eye normally disposed adjacent said gripping and shearing means, a finger carrier pivotally mounted on said frame, an actuating element for said gripping and shearing means having an actuator engaging surface of predetermined width, a pair of arms of relatively different lengths projecting in substantially parallel closely adjacent relation to each other from said carrier within the width of said surface of said grip and shear actuating element for successive engagement by a common actuator of the knitting machine which is movable to the plane of either of said carrier arms for sweeping the guide eye carrying end of said finger across or through said gripping and shearing means with said gripping and shearing means in either an open or closed condition depending upon which of the carrier arms is engaged by said common actuator preceding the engagement of said common actuator with said surface of said grip and shear actuating element.

10. An attachment for knitting machines comprising a frame, thread-gripping and shearing means carried by said frame, a thread feeding finger having a guide eye normally disposed adjacent said gripping and shearing means, a finger carrier pivotally mounted on said frame, a pivot for said finger carried by said carrier and extending substantially perpendicular to the axis of the carrier pivot, means for swinging said carrier about its axis and means including a cam surface on said finger and a pin projecting laterally from said carrier pivot and engaged by said cam surface for swinging said finger on its pivot on the carrier for cooperatively moving said guide eye from said normal position to a remotely disposed feeding position.

11. An attachment for knitting machines, comprising a frame, thread-gripping means carried by said frame and including a pair of relatively movable jaws, means for opening and closing said jaws, thread control means mounted on said frame and including a guide eye normally disposed adjacent said gripping means, means on said frame for moving said guide eye from said normal position across said gripping means to a feeding position spaced from said normal position, means for moving said guide eye from said feeding position to said normal position along a path across said gripping means or along a path between said jaws, and means for selecting which of said paths said guide eye will travel.

12. An attachment for knitting machines, comprising a frame, thread-gripping means carried by said frame including a pair of relatively movable jaws, thread control means mounted on said frame and including a guide eye normally disposed adjacent said gripping means, means on said frame for moving said guide eye from said normal position across said gripping means to a feeding position spaced from said normal position, means for actuating said gripping means in predetermined time relation to the actuations of said thread control means for opening and closing said jaws, means for moving said guide eye from said feeding position to said normal position along a path across said gripping means or along a path between said jaws, and means for selectively varying said predetermined time relation between the actuation of said gripping means and said thread control means for determining which of said paths said guide eye will travel.

13. An attachment for knitting machines, comprising a frame, thread-gripping and shearing means carried by said frame and including a plurality of selectively movable gripping and shearing elements, thread control means mounted on said frame and including a guide eye normally disposed adjacent said gripping and shearing means, means on said frame for moving said guide eye from said normal position across said gripping and shearing means to a feeding position spaced from said normal position, means for actuating said gripping and shearing means in predetermined time relation to the actuations of said thread control means for opening and closing said relatively movable elements, means for moving said guide eye from said feeding position to said normal position along a path across said gripping and shearing means or along a path between said open gripping and shearing elements, and means for selectively varying said predetermined time relation between the actuations of said gripping and shearing means and the actuations of said thread control means for selecting which of said paths said guide eye will travel.

14. An attachment for knitting machines, comprising a frame, thread gripping means carried by said frame and including a pair of relatively movable jaws, a thread feeding finger pivotally mounted on said frame and including a guide eye normally disposed adjacent said gripping means, means on said frame for swinging said finger about its axis and thereby moving said guide eye from said normal position across said gripping means to a feeding position spaced from said normal position, means for swinging said finger to move said guide eye from said feeding to said normal position along a path across said gripping means or along a path between said jaws, and means for selecting which of said paths said guide eye will follow.

15. An attachment for knitting machines, comprising a frame, a thread-gripping and shearing means carried by said frame and including relatively movable gripping and shearing elements, a thread feeding finger having a guide eye normal-

ly disposed adjacent said gripping and shearing means, a finger carrier pivotally mounted on said frame, a pivot for said finger carried by said carrier and extending substantially perpendicular to the axis of the carrier pivot, means for swinging said carrier about its axis, means for swinging said finger on its pivot on the carrier for cooperatively moving said guide eye from said normal position across said gripping and shearing means to a remotely disposed feeding position, means for swinging said finger about the axis of said carrier to move said guide eye from said feeding to said normal position along a path across said gripping and shearing means or along a path between the open elements thereof, and means for selecting which of said paths said guide eye will travel.

EDWARD C. SHERLIN.
WALTER LARKIN.

Nov. 29, 1938. V. SKUDIES 2,138,749

HAND HARMONICA

Filed May 25, 1937 3 Sheets-Sheet 1

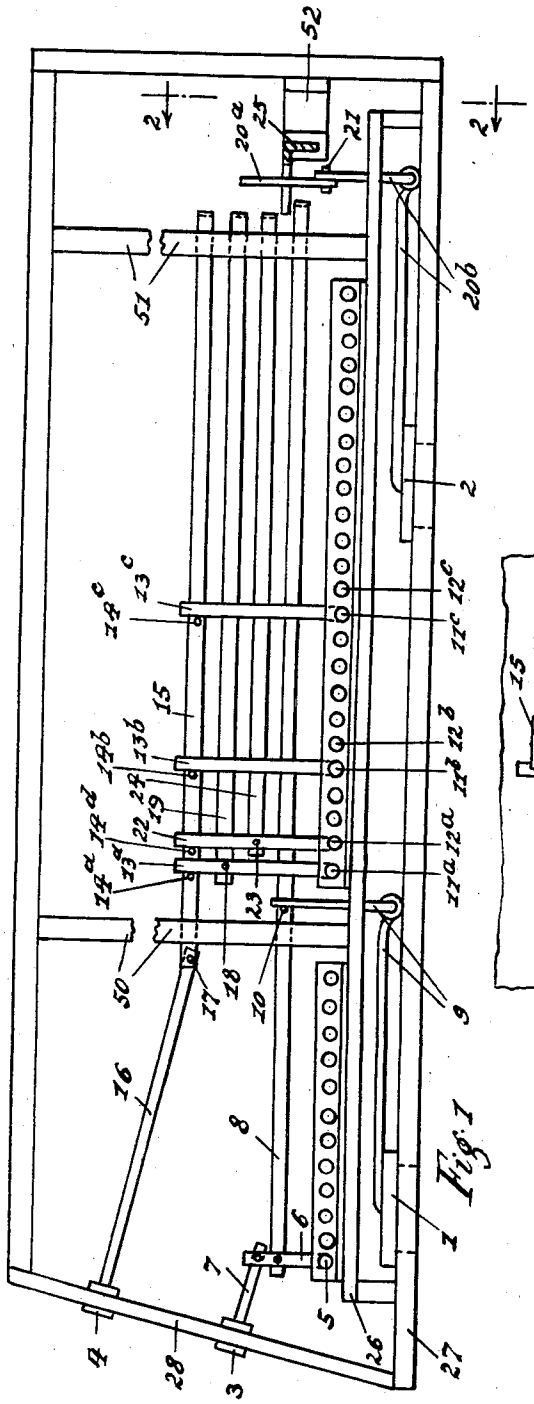


Fig. 1

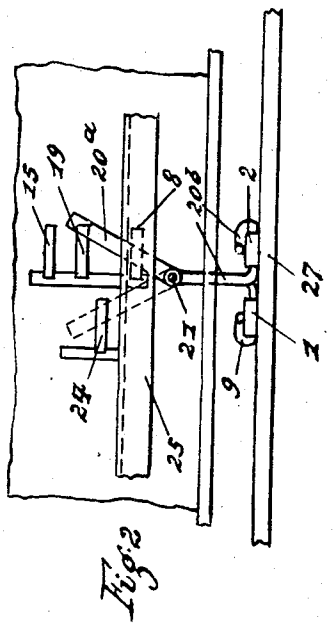


Fig. 2

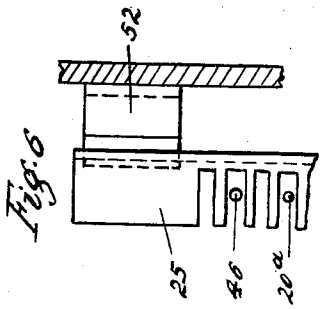


Fig. 6

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