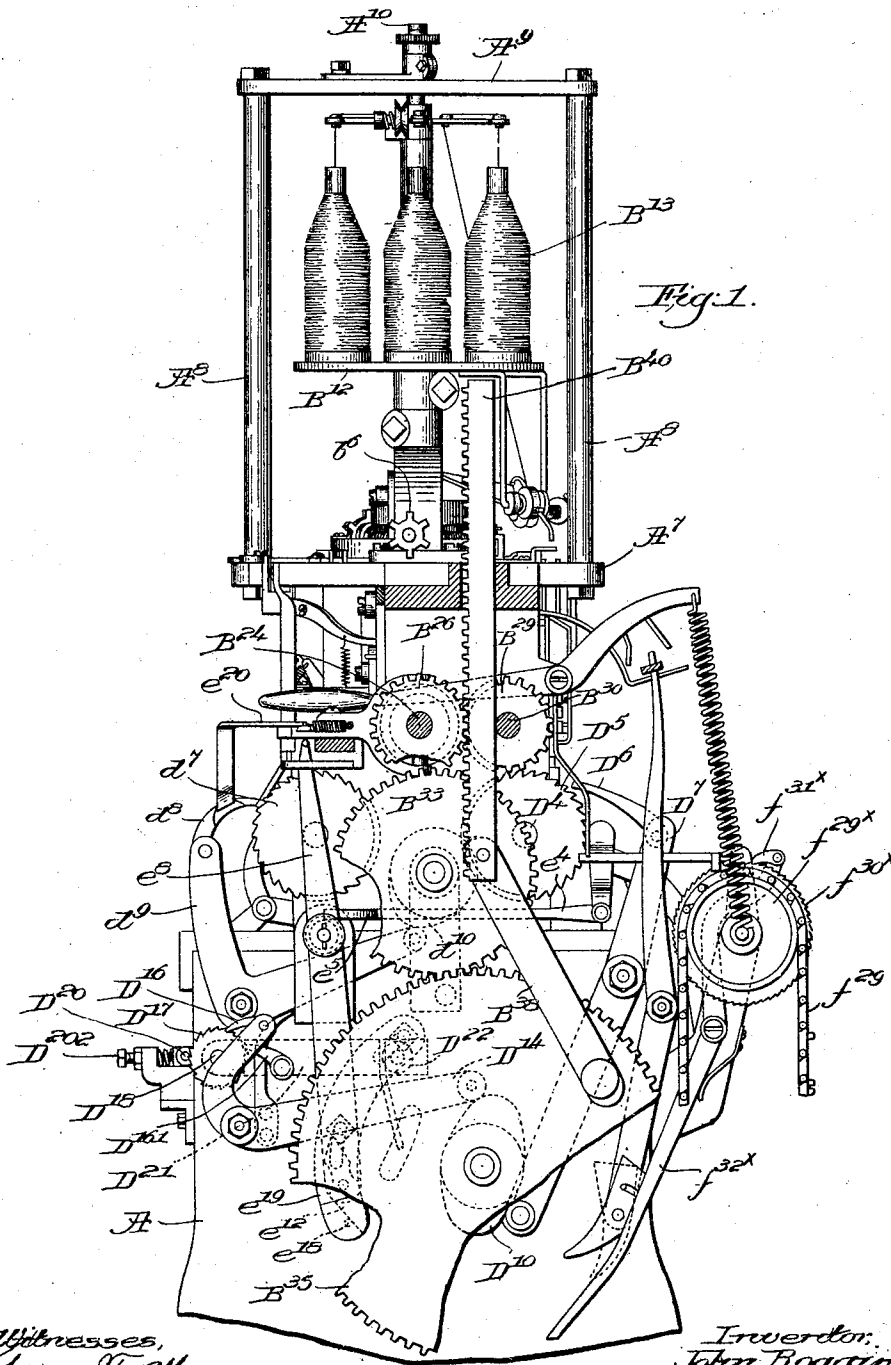


J. ROGGINGER.
FEEDING DEVICE FOR KNITTING MACHINES.
APPLICATION FILED JULY 6, 1908.

966,707.

Patented Aug. 9, 1910.

4 SHEETS—SHEET 1.



Witnesses,
Edward F. Allen.
Joseph M. Ward.

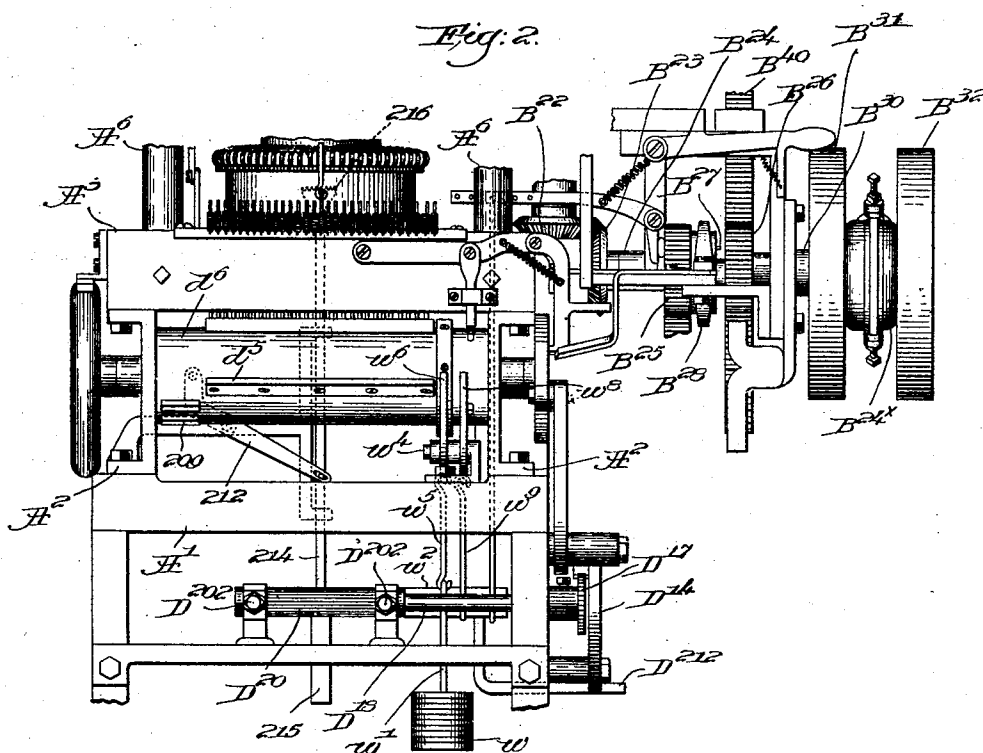
Inventor,
John Rogginger,
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4 SHEETS—SHEET 2.



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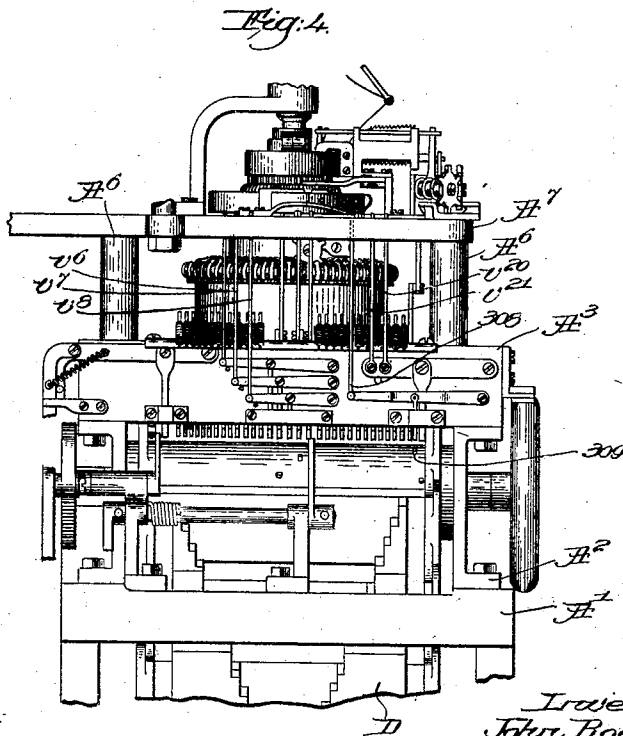
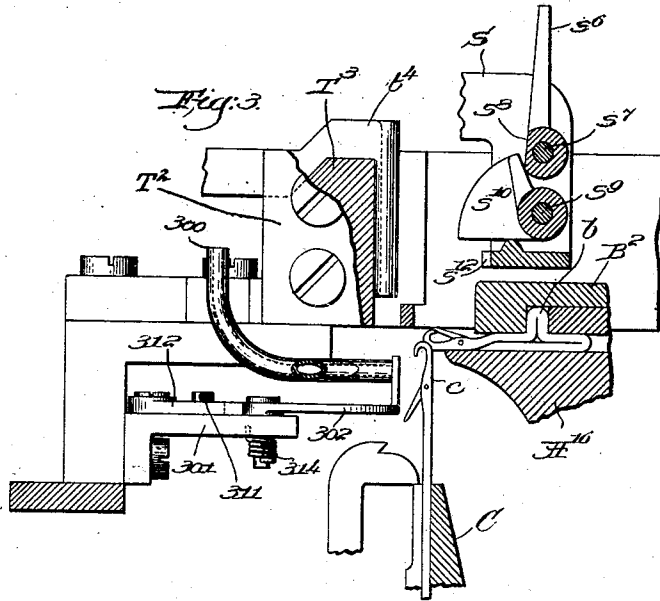
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4 SHEETS—SHEET 3.



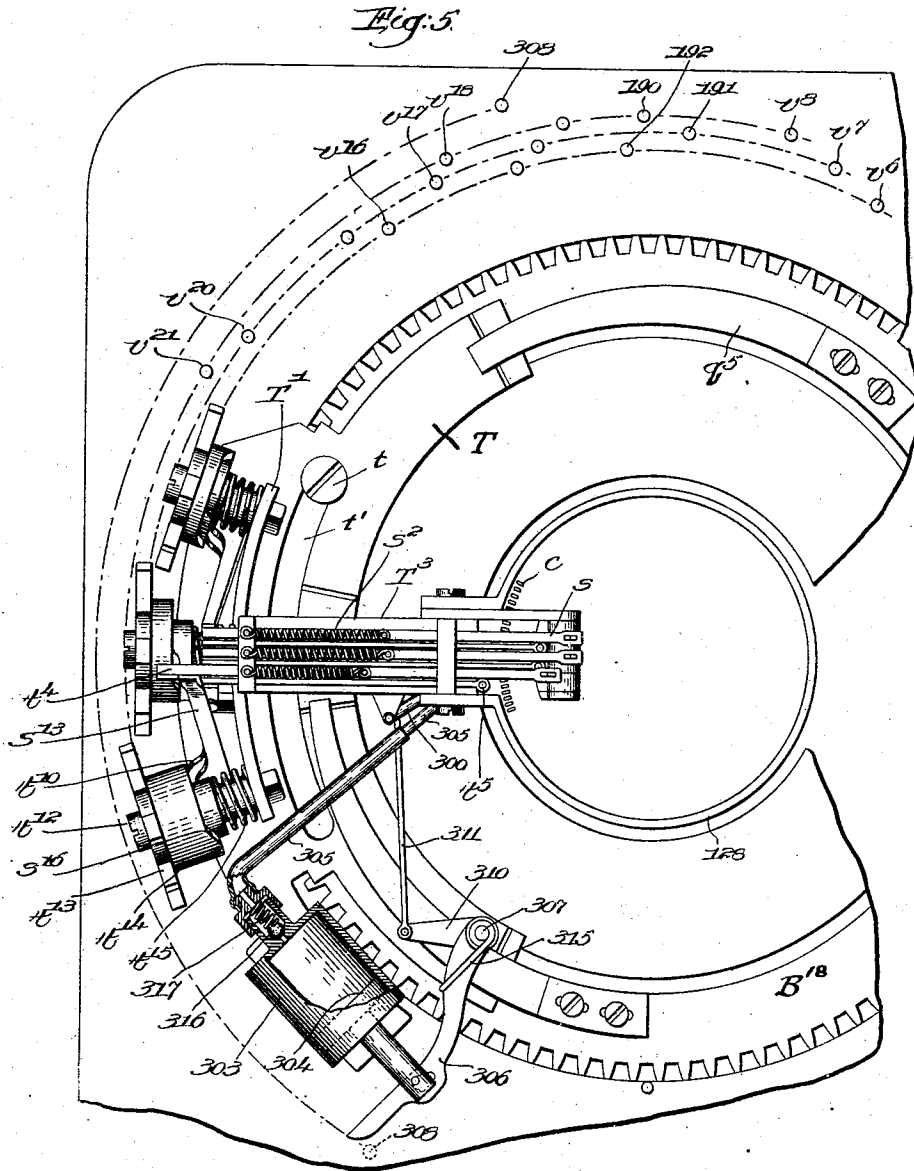
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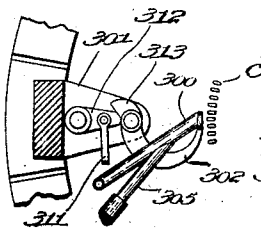
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Patented Aug. 9, 1910.
4 SHEETS—SHEET 4.



Witnesses, Fig. 6.
Edward H. Allen
Joseph M. Ward.



Inventor,
John Rogginger,
by Crosby & Gregory
attys

UNITED STATES PATENT OFFICE.

JOHN ROGGINGER, OF WAUPUN, WISCONSIN, ASSIGNOR TO PARAMOUNT KNITTING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

FEEDING DEVICE FOR KNITTING-MACHINES.

966,707.

Specification of Letters Patent.

Patented Aug. 9, 1910.

Application filed July 6, 1908. Serial No. 442,001.

To all whom it may concern:

Be it known that I, JOHN ROGGINGER, a citizen of the United States, residing at Waupun, in the county of Fond du Lac and State of Wisconsin, have invented an Improvement in Feeding Devices for Knitting-Machines, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention has for its object the production of an automatic knitting machine primarily designed for the knitting of stockings, and in which the change from plain to ribbed work is made automatically upon the same machine.

The invention comprises certain features, which in addition are adapted for use on knitting machines for doing other kinds of work.

This invention is particularly designed as an improvement upon the knitting machine illustrated and described in full in United States Patent Reissue No. 12,917, granted February 9, 1909, for knitting machine, and in certain features further illustrated and described in Patent No. 879,821, granted February 18, 1908, for thread-feeding mechanism for knitting machines. The invention of said patents, a specific embodiment of which is illustrated therein, presents an automatic machine in which are combined all the various features necessary to make a commercial stocking with a ribbed leg and reinforced toe and heel portions all of proper and appropriate weight throughout and of slightly appearance when finished and worn. Such a stocking is described in Patent No. 628,864, granted June 13, 1899, and serves as an excellent illustration of the character of work capable of being performed automatically upon the said machine.

In this machine in the form illustrated as an embodiment of the invention of the said patents, the work is preferably commenced at the toe pouch and carried on automatically to the completion of a ribbed leg stocking with the plain circular web at the top. In such a form of stocking, or in fact in the case when the knitting takes place in the opposite direction, a change of thread is necessary on the passage from

plain to ribbed work because so many more stitches are formed in forming the ribbed portion than in the plain portion that unless a lighter yarn be employed in the ribbed than in the plain a bulky and unsightly rib will be formed, but in which ever direction the knitting takes place and whenever the ratio of the stitches between the ribbed and plain sections is differently proportioned the juncture between the ribbed and plain section is a weak point in the stocking and one of less durability.

The present invention provides a knitting machine which, during a period which extends over the change from plain to ribbed work, or vice versa, or a period beginning at a predetermined point before the change and extending after the change, supplies that set of needles only employed in knitting the plain work a reinforcing thread, and at the same time provides for securing the requisite tension on the fabric being knit to secure the casting off of the stitches from the needles in action. The reinforcing thread so supplied strengthens the point of juncture between the ribbed and plain work and increases the durability of the stocking at this point. The reinforcing thread preferably extends through a few adjacent courses on each side of the juncture. In that form of stocking particularly designed to be knit on the machine before mentioned wherein the knitting proceeds from the plain to the ribbed portion the line of juncture between the plain and ribbed sections is marked by a row of holes usually quite noticeable and caused by the dial needles, or the needles thrown into position to aid in making the rib, holding up the thread, which in the case of the plain knitting passes directly across between the loops formed on the cylinder needles or the needles employed in making plain knitting.

The present invention supplies the reinforcing thread to the cylinder needles only, or the needles employed in knitting plain work only, so that when the dial needles, or the needles which in conjunction with the other set knit the ribbed work are thrown into action the reinforcing thread will still be taken only by the cylinder needles or the needles employed in knitting the plain work,

and as a result the holes referred to will be avoided and the desired reinforcement secured at the same time, because the reinforcing thread will pass directly across and fill the spaces which would otherwise appear as holes.

The specific means which is herein illustrated as one element of the machine securing the above results is of itself novel and adapted for use in other forms of knitting machines for supplying a thread to the needles.

The invention also broadly considered presents means acting automatically at predetermined desired times to supply threads as desired to two sets of needles, one set of which when in action alone forms plain work, and both sets of which when in action conjointly form ribbed work, one of the said threads being supplied only to that set which forms the plain work, and being supplied out of reach of the effective action of the other set, while another thread or threads is supplied to the needles in such position that it may be taken by both sets. Specifically considered, as in the case of a set of dial and a set of cylinder needles the invention provides means for supplying the threads above and below the dial needles so that in the one case they will be caught by both sets and in the other case by the cylinder needles alone, the time and duration of the supply being automatically determined.

The invention will be more particularly described and illustrated in the accompanying description and drawings, and more definitely pointed out in the appended claims, but while certain specific mechanisms are shown as the preferable embodiment of the invention, still the invention is a broad one and such description is not considered to constitute any limitation of the claims other than required by their terms.

The drawings represent the invention in its preferred form as embodied in a machine of the type illustrated in the above-mentioned patents.

Figure 1 is a side elevation of so much of the machine as is necessary to illustrate the invention. Fig. 2 is a front elevation of a portion of the machine. Fig. 3 is a side elevation, partially in cross-section, of a portion of the machine to illustrate the means for supplying the threads to the needles. Fig. 4 is a rear elevation of a portion of the machine generally similar to the portion shown in Fig. 2. Fig. 5 is a top plan view of a portion of the machine showing the thread-feeding mechanism. Fig. 6 is a plan view of the detailed construction concealed in Fig. 5.

The operation and construction of the entire machine (except as to features hereinafter described), is fully set forth in the above-mentioned patents, and reference may

be had thereto for a more complete understanding of the details of the machine. No more extended reference will, therefore, be made to the construction and operation of the other parts of the machine than is necessary to convey an understanding of the invention herein involved.

The main construction of the machine and its operative parts are all as shown in the aforesaid patents. The framework with the side-plates A, A, adapted to rest upon the floor, but herein shown as broken off, the tie-plate A' connecting the side plates and supporting the working parts of the machine, the stands A² erected on the tie-plate and supporting the cross-bars or beams A³, the four posts A⁴ supporting the top-plate of the machine A⁷, the uprights A⁸ erected upon the top-plate and carrying at their upper ends the rigid cross-bar A⁹, the rod A¹⁰ mounted in the cross-bar A⁹ and vertically and rotarily adjustable, the dial needle bed A¹⁰ connected to the lower end of the rod A¹⁰, the dial cam-plate B², with its groove b, the toothed wheel B⁶ governing the locking and unlocking of the dial cam-plate in the change from plain circular or reciprocating to ribbed knitting, and vice versa, the bobbin-carrier B¹², with its bobbins B¹³ for the required threads, the cam-cylinder B¹⁸, driven from the cam-cylinder moving shaft B²⁴, through the bevel gears B²², B²³, the collar-plate B²⁸, with its pins B²⁷, constituting a clutch for locking either the gear B²⁵ or B²⁶ to the shaft B²⁴, the power shaft B³⁰, the separately driven loose pulleys B³¹, B³², the clutch B^{24x} for locking either of the loose pulleys to the shaft B³⁰, the gear B²⁹ on the shaft B³⁰ engaging the gear B²⁵ on the shaft B²⁴, the gear B³³ connecting the gears B²⁵ and B³⁵, which latter gear thus receives continuous motion from the power shaft, the rack B⁴⁰, connected by the link B³⁸ to the gear B³⁵ and engaging the gear B²⁶ to give a constantly oscillating motion, the needle-cylinder C grooved to receive the latch needles c, the pattern surface chain D for controlling the putting of the needles into and out of operative position and for controlling the supplying of the threads to the needles, the shaft D⁴ driving said chain and driven through the ratchet wheel D⁵, pawl D⁶, lever D⁷, cam D¹⁰, moving with the gear B³⁵, the controller-chain f²⁰ passing over the wheel f^{20x} and driven by the ratchet-wheel f^{20x}, pawl f^{31x}, lever f^{32x}, and projection e¹⁸ on gear B³⁵, the lever e⁸ shifted by the cam projection e⁵, on the bar e⁴ from the main pattern chain, the slotted switch e¹² on the lever e⁸ moved by the pin or projection e¹⁸ from the block e¹⁹ on the gear B³⁵, the clutch-controlling lever e²⁰ operated by the lever e⁸, the pattern cylinder d⁸, the raising bar d⁵ thereon for rais-

ing the needles to inactive position, the ratchet wheel d^7 and pawl d^8 for operating the cylinder through the cam d^{10} and lever d^9 , the means for causing the rotation of the cylinder d^8 at intervals only, the means for changing the speed of the cam cylinder, the lever D^{14} , driven from the cam D^{10} and carrying the pawl D^{16} engaging the ratchet-wheel D^{17} to rotate the shaft D^{18} , the detent-pawl D^{161} to prevent the reverse rotation of the shaft D^{18} , the take-up mechanism comprising the fluted rolls, one of which is positively driven by the shaft D^{18} , and the other D^{20} of which is spring-pressed with an adjustable pressure controlled by the set-screws D^{202} against the first, the yoke D^{21} carrying the guiding roll D^{22} , directly beneath the needle cylinder, the cross-bar w^2 extending from the yoke, the suspending rod w' carrying the weights w and embracing the cross-bar w^2 , the rod w^5 connecting the suspending rod w' to a lift-lever w^3 , pivoted at w^4 and having its upper end w^6 in the path of a suitable riser or projection on the pattern cylinder d^6 , the second connecting rod w^9 engaging the cross-bar w^2 of the yoke B^{21} , and connected to a second lift lever pivoted at w^4 , and having its upper end w^8 in the path of other suitable risers on the said pattern cylinder d^6 , the arm D^{212} projecting from the yoke-frame D^{21} by means of which the yoke-frame may be raised by hand and by means of which the operation of the take-up rolls is prevented by raising the lever D^{14} out of engagement with the cam D^{10} when the yoke-frame is raised sufficiently to remove all weight from the web, the grab shown as a stem or bar 214 carrying at its upper end the claw 216, weighted at its lower end at 215, and raised at the required times by the lever 212 from the lugs 209, on the pattern cylinder d^6 , the thread-guide stand T secured to the top of the cam cylinder B^{18} by the screw t projecting through the slot t' so as to oscillate back and forth during reciprocating knitting and held at the extremes of its movement by the springs q^5 , the flange T' projecting upward from the stand T and supporting the thread-guide operating devices, the second flange T^2 supporting the frame T^3 and the ring 128, the thread-guides t^4 provided with the tubular ends t^5 , the levers t^{10} connected to the thread-guides and pivoted to the thread-guide stand, the studs t^{12} with the toothed wheels t^{13} mounted thereon and carrying the face-cams t^{14} for operating the levers t^{10} , the springs t^{15} for braking rotation of the wheels t^{13} and cams t^{14} , the thread-catcher slide arms s , the springs s^2 for pressing them in one direction and the levers s^{13} for actuating them in the opposite direction from the face cam s^{16} on the stud t^{12} , the arms s^6 actuated by the slide-arms s formed at their

lower pivotal ends to present the sleeve cams s^8 , the clamping sleeves mounted on the shaft s^9 and formed with the flanges or thread catchers s^{10} , clamping against the horizontally-arranged wall of the support s , notched at its forward end at s^{12} , the vertically movable pins v^6 , v^7 , v^8 , v^{10} , v^{17} , v^{18} , v^{20} , v^{21} , actuated by risers on the pattern-chain D at the proper times, together with the stationary pins 190, 191, 192, to secure the operation of the toothed wheels t^{13} , and the consequent operation of the thread-guides t^4 and thread catchers s , to throw in and out the desired threads, each and all are fully described and their operations set forth in the aforesaid patents.

The drawing illustrates on the thread stand bobbin carrier B^{12} places for four bobbins B^{13} , three of which are shown the other being concealed by the middle bobbin shown. Any desired number of bobbins may be employed depending upon the character of the work, but as herein illustrated four threads are provided for, first a large or coarse thread to be used in knitting the heel and toe pouches, second a medium or fine thread to be used for the top of the foot, third a still finer thread to be used for the ribbed leg portion, and fourth, a thread suitable for reinforcing the juncture between the ribbed and plain portions. The first named threads are controlled by the thread-guides t^4 and thread-catchers coöperating therewith in the manner set forth in the before-mentioned patents.

The fourth thread is controlled by a suitable mechanism whereby it is presented to the cylinder needles below or out of range of the effective action of the dial needles. The preferred form of such mechanism is illustrated in detail in Figs. 3, 5 and 6.

A thread-guide 300 mounted upon the thread-guide stand T receives the fourth thread and carries it down through the tubular end of the thread-guide to a position adjacent to the cylinder needles C and below the path of the dial needles.

A bracket 301 is mounted on the thread-guide stand T beneath the thread-guide 300 and has pivoted thereon a thread-catcher 302, preferably extending over the mouth of the thread-guide 300 and forming therewith a clamp for the thread.

An air compressor, herein shown as a cylinder 303, and piston 304, is mounted at a convenient point on the thread-guide stand T. A tube 305 connects the air compressor to the tubular portion 300 of the thread-guide, entering the same in a tangential direction as shown in Fig. 6.

An automatic means is provided for operating the air compressor and the thread clamp, herein shown as a bell-crank lever 306, 310, pivoted at 307 on the thread-guide stand, and operated by a pin 308 projected

into the path of the end thereof by a suitably placed riser 309 on the pattern chain D, as in the case of the other pins v^6 , v^7 , etc., already described.

5 The shorter arm of the bell-crank lever is connected by means of a link 311 to an arm 312, pivoted on the bracket 301. The thread-catcher 302 is provided with a cam-shaped end 313, against which the arm 312
10 operates to swing it away from the end of the thread-guide tube 300 and with a coiled spring 314 which acts to return it to clamping position. The bell-crank lever 306, 310, is also normally held by the spring 315 with
15 its arm 306 away from the air compressor. The piston 304 and air compressor is connected with the arm 306 of the lever by a pin and slot connection so that there is lost motion between the same, and as a result the
20 first movement of the lever arm 306 actuated by the pin 308 will serve to release the clamp before it moves the piston.

The air compressor is provided with a suitable valve at the mouth of the tube 305, and this valve is herein shown as a ball 316,
25 seated by a spring 317, the fit of the ball and seat being such that air may feed back slowly past the same.

In operation when it is desired to introduce the reinforcing thread, as for example
30 in one of the courses preceding the change from plain to ribbed work, the riser 309 is suitably placed on the pattern chain D so as to project at the proper time the pin 308 into the path of the arm 306 of the lever.
35 As the thread-guide stand T is carried around on the machine the curved end of the arm of the lever strikes the pin 308, swinging the lever slightly and by means
40 of the intermediate connections moving the catcher 302 away from the end of the tubular thread-guide 300, thus unclamping the thread. Immediately thereafter the continued movement of the arm 306 of the lever
45 moves the piston 304 inwardly, compressing the air which at once puffs out through the tubular end of the thread-guide and projects the thread at once into the path of the cylinder needles, below and out of reach of
50 the dial needles so that the thread is supplied only to the cylinder needles. The knitting then proceeds and the valve 316 is so arranged that the air will feed in at such a speed as to allow the piston to return and
55 with it the lever 306, 310, thus allowing the thread catcher 302 to clamp the thread against the end of the tubular guide 300 when the desired number of courses have been knit with the reinforcing thread.

60 Having described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a knitting machine, two sets of needles and operative devices to produce either
65 ribbed or plain work as desired and to effect

the change from plain to ribbed work, means automatically actuated at a predetermined point prior, and automatically thrown out of operation subsequent, to the change from plain to ribbed work, for supplying a reinforcing thread to one set of needles only. 70

2. In a knitting machine, two sets of needles and operative devices to produce either ribbed or plain work as desired and to effect the change from plain to ribbed work, means
75 automatically actuated at a predetermined point prior, and automatically thrown out of operation subsequent, to the change from plain to ribbed work, to supply another thread beneath one set of needles to the
80 other set whereby said thread being taken by one set of needles fills up the holes that would otherwise be left at the juncture between the plain and ribbed work.

3. In a knitting machine, two sets of needles and operative devices to produce either
85 ribbed or plain work as desired and to effect the change from plain to ribbed work, thread-feeding mechanism for automatically changing the threads during the knitting operation as desired, means automatically actuated at a predetermined point prior, and automatically thrown out of operation subsequent, to the change from plain to ribbed work, for supplying a reinforcing thread to
95 one set of needles only.

4. In a knitting machine, two sets of needles and operative devices to produce either ribbed or plain work as desired and to effect the change from plain to ribbed work, thread-
100 feeding mechanism for automatically changing the threads during the knitting operation as desired, means automatically actuated at a predetermined point prior, and automatically thrown out of operation subsequent, to the change from plain to ribbed work, to supply another thread beneath one set of needles to the other set whereby said thread being taken by one set of needles fills up the holes that would otherwise be left at
105 the juncture between the plain and ribbed work. 110

5. In a circular knitting machine, a set of cylinder needles, a set of dial needles, means for operating the said needles to produce
115 either ribbed or plain work as desired, thread-feeding mechanism for supplying thread above the dial needles to both the cylinder and dial needles, or to the cylinder needles alone for forming said ribbed or
120 plain work respectively, and thread-feeding mechanism for supplying thread below said dial needles to the cylinder needles only.

6. In a circular knitting machine, a set of cylinder needles, a set of dial needles, means
125 for operating the said needles to produce either ribbed or plain work as desired, means for continuously supplying one or more threads to said cylinder needles above said dial needles, means for automatically supply- 130

ing a thread to said cylinder needles below said dial needles during a predetermined period of the conjoint operation of both sets of needles.

5 7. In a circular knitting machine, a set of cylinder needles, a set of dial needles, means for operating the said needles to produce either ribbed or plain work as desired, means for continuously supplying one or more
10 threads to said cylinder needles above said dial needles and for automatically changing said threads as desired, means for automatically supplying a reinforcing thread to said cylinder needles below said dial needles during
15 a predetermined period of the conjoint operation of both sets of needles.

8. In a knitting machine, a set of needles and operative devices to produce plain work, a second set of needles and operative devices
20 to produce in conjunction with said first set ribbed work, means to effect the change from plain to ribbed work, thread-feeding mechanism including means for supplying a reinforcing thread during a predetermined
25 period extending over the change from plain to ribbed work to the needles of said first set only.

9. In a knitting machine, a set of needles and operative devices to produce plain work, a second set of needles and operative devices
30 to produce in conjunction with said first set ribbed work, means to effect the change from plain to ribbed work, thread-feeding mechanism including means for supplying a reinforcing thread during a predetermined
35 period extending over the change from plain to ribbed work to the needles of said first set only, and means for automatically increasing the tension on the fabric being knit
40 prior to the change from plain to ribbed work.

10. In a knitting machine, a set of needles and operative devices to produce plain work, a second set of needles and operative devices
45 to produce in conjunction with said first set ribbed work, means to effect the change from plain to ribbed work, thread-feeding mechanism including means for supplying a reinforcing thread during a predetermined
50 period extending over the change from plain to ribbed work to the needles of said first set only, and means automatically controlled upon the change from plain to ribbed work for securing the requisite tension on the
55 fabric for casting off the stitches from the needles in action.

11. In a knitting machine, a set of needles and operative devices to produce plain work, a second set of needles and operative devices
60 to produce in conjunction with said first set ribbed work, means to effect the change from plain to ribbed work, thread-feeding mechanism including means for supplying a reinforcing thread during a predetermined

period extending over the change from plain 65 to ribbed work to the needles of said first set only, and take-up mechanism for the fabric being knit, means for automatically controlling the action of the take-up mechanism upon the change from plain to ribbed 70 knitting to increase the tension on the fabric and secure the casting off of the stitches from the needles in action.

12. In a circular knitting machine, a set of cylinder needles, a set of dial needles, 75 means for operating the said needles to produce either ribbed or plain work as desired, means to effect the change from plain to ribbed work, means automatically actuated at a predetermined point prior, and auto- 80 matically thrown out of operation subsequent, to the change from plain to ribbed work for supplying a reinforcing thread beneath the dial needles to the cylinder needles only. 85

13. In a circular knitting machine, a set of cylinder needles, a set of dial needles, means for operating the said needles to produce either ribbed or plain work as desired, means to effect the change from plain to ribbed work, means automatically actuated at a predetermined point prior, and auto- 90 matically thrown out of operation subsequent, to the change from plain to ribbed work for supplying a reinforcing thread beneath the dial needles to the cylinder needles 95 only, and means for automatically increasing the tension on the fabric being knit prior to the change from plain to ribbed work.

14. In a circular knitting machine, a set 100 of cylinder needles, a set of dial needles, means for operating the said needles to produce either ribbed or plain work as desired, means to effect the change from plain to ribbed work, means automatically actuated 105 at a predetermined point prior, and automatically thrown out of operation subsequent, to the change from plain to ribbed work for supplying a reinforcing thread beneath the dial needles to the cylinder needles 110 only, and means automatically controlled upon the change from plain to ribbed work for securing the requisite tension on the fabric for casting off the stitches from the needles in action. 115

15. In a circular knitting machine, a set of cylinder needles, a set of dial needles, means for operating the said needles to produce either ribbed or plain work as desired, means to effect the change from plain to 120 ribbed work, means automatically actuated at a predetermined point prior, and automatically thrown out of operation subsequent, to the change from plain to ribbed work for supplying a reinforcing thread beneath the dial needles to the cylinder needles 125 only, take-up mechanism for the fabric being knit, means for automatically control-

ling the action of the take-up mechanism upon the change from plain to ribbed knitting to increase the tension on the fabric and secure the casting off of the stitches from the needles in action.

16. In a circular knitting machine, two sets of needles, one set of which when in action alone forms plain work and the second set of which when in action conjointly with the first set forms ribbed work, and operative devices in connection with said needles to produce either ribbed or plain work as desired, thread feeding mechanism operative to present thread within or out of range of the effective action of the second set of needles, and means for automatically controlling the presentation of thread by said feeding mechanism at either or both of said places as desired at or during predetermined periods.

17. In a circular knitting machine, two sets of needles and operative devices to produce either ribbed or plain work as desired, thread feeding mechanism operative to present thread above and below one set of needles, and means for automatically controlling the presentation of thread by said feeding mechanism at either or both of said places as desired at and during predetermined periods.

18. In a circular knitting machine, two sets of needles and operative devices to produce either ribbed or plain work as desired, thread feeding mechanism operative to present thread above and below one set of needles, and means for automatically controlling the presentation of thread by said feeding mechanism at either or both of said places as desired at and during predetermined periods.

19. In a knitting machine, two sets of needles, one set of which when in action alone forms plain work and the second set of which when in action conjointly with the first set forms ribbed work, and operative devices to produce either ribbed or plain work as desired and to effect the change from plain to ribbed work, and thread-manipulating means, including means for automatically actuating the same, for extending thread across the holes that would otherwise be left

at the juncture between the plain and ribbed work to close the same.

20. In a knitting machine, a set of cylinder needles, a set of dial needles, means for operating the said needles to produce either plain or ribbed work as desired, and thread-manipulating means, including means for automatically actuating the same, for extending thread across the holes that would otherwise be left at the juncture between the plain and ribbed work to close the same.

21. In a knitting machine, two sets of needles, one set of which when in action alone forms plain work and the second set of which when in action conjointly with the first set forms ribbed work, and operative devices to produce either ribbed or plain work as desired and to effect the change from plain to ribbed work, thread-manipulating means, including means for automatically actuating the same, for extending thread across the holes that would otherwise be left at the juncture between the plain and ribbed work to close the same, and means automatically controlled upon the change from plain to ribbed work for securing the requisite tension on the fabric for casting off the stitches from the needles in action.

22. In a knitting machine, a set of cylinder needles, a set of dial needles, means for operating the said needles to produce either plain or ribbed work as desired, thread-manipulating means, including means for automatically actuating the same, for extending thread across the holes that would otherwise be left at the juncture between the plain and ribbed work to close the same, and means automatically controlled upon the change from plain to ribbed work for securing the requisite tension on the fabric for casting off the stitches from the needles in action.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN ROGGINGER.

Witnesses:

JAMES MURRAY,
EARL BROWN.