May 15, 1951 J. C. SIMMONS ET AL 2,552,742

PATTERN CONTROL MEANS FOR KNITTING MACHINES

Filed Aug. 2, 1948 6 Sheets-Sheet 1

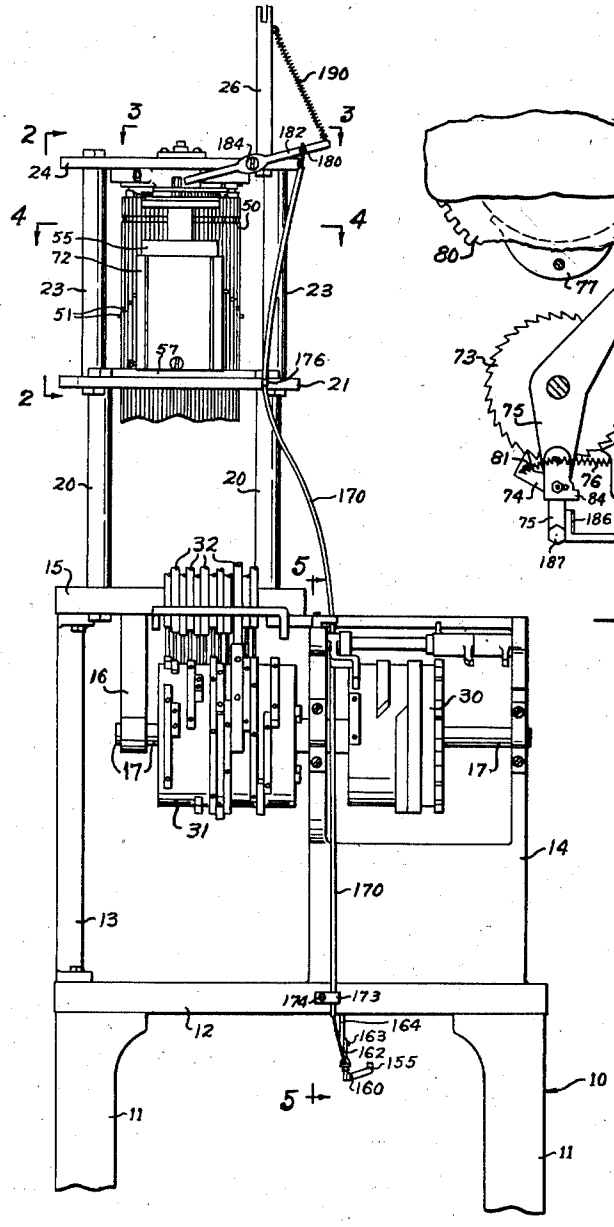


Fig - 1

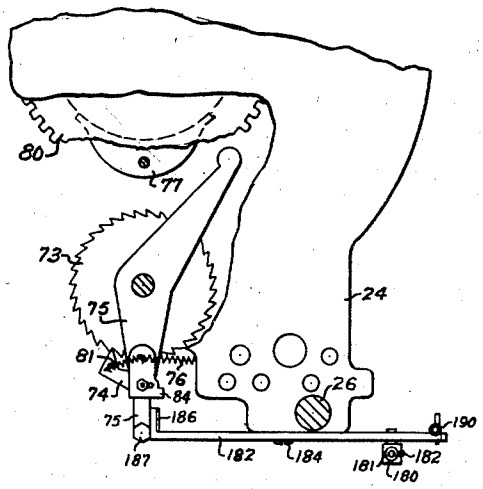


Fig - 11

JOHN C. SIMMONS
DAVID H. SETZER
and
DWIGHT E. MULL,
Inventors.

By

Attorney

May 15, 1951 J. C. SIMMONS ET AL 2,552,742

PATTERN CONTROL MEANS FOR KNITTING MACHINES

Filed Aug. 2, 1948 6 Sheets-Sheet 2

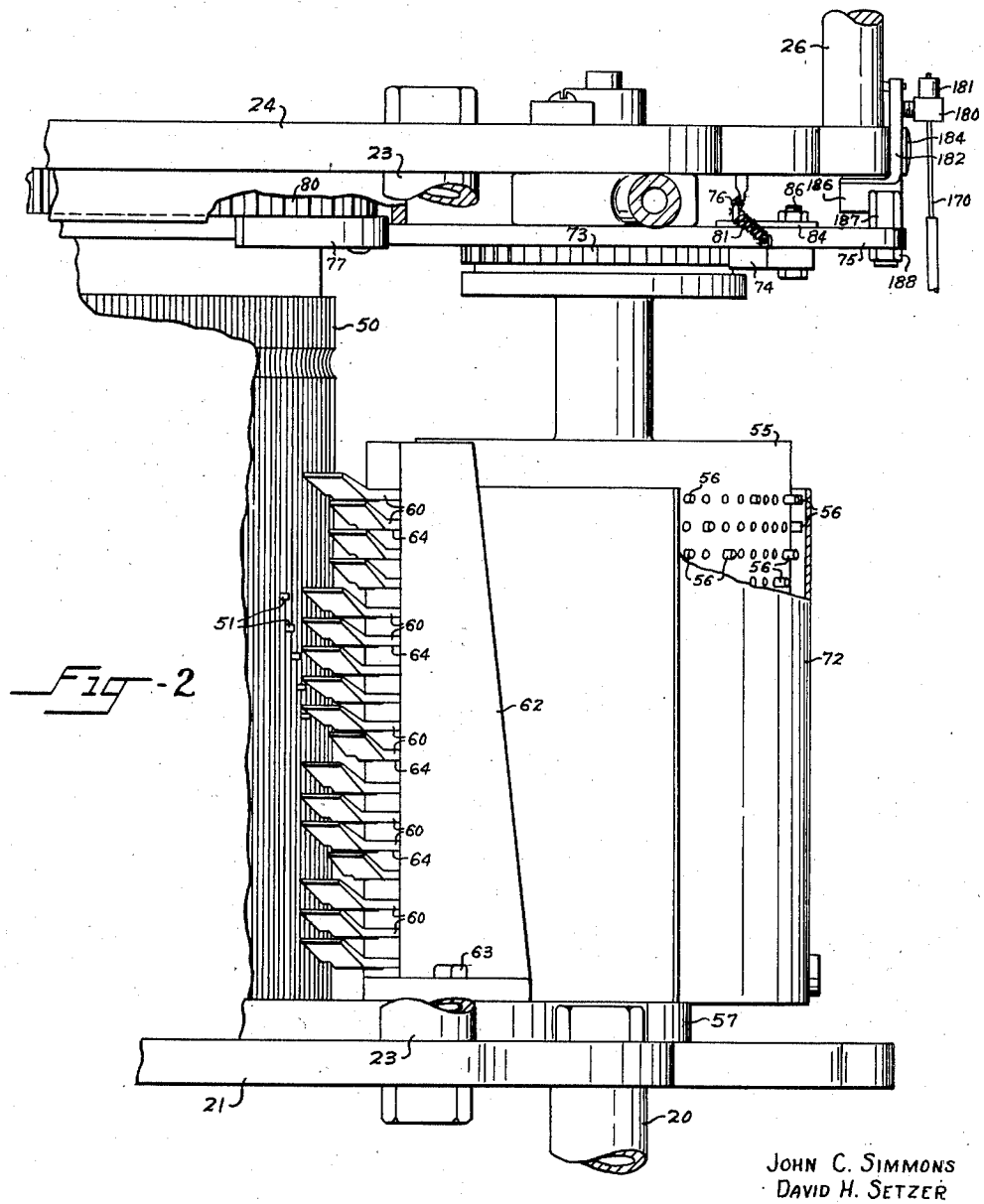


Fig-2

JOHN C. SIMMONS
DAVID H. SETZER
and
DWIGHT E. MULL,
Inventors

By

Attorney

May 15, 1951 J. C. SIMMONS ET AL 2,552,742

PATTERN CONTROL MEANS FOR KNITTING MACHINES

Filed Aug. 2, 1948 6 Sheets-Sheet 3

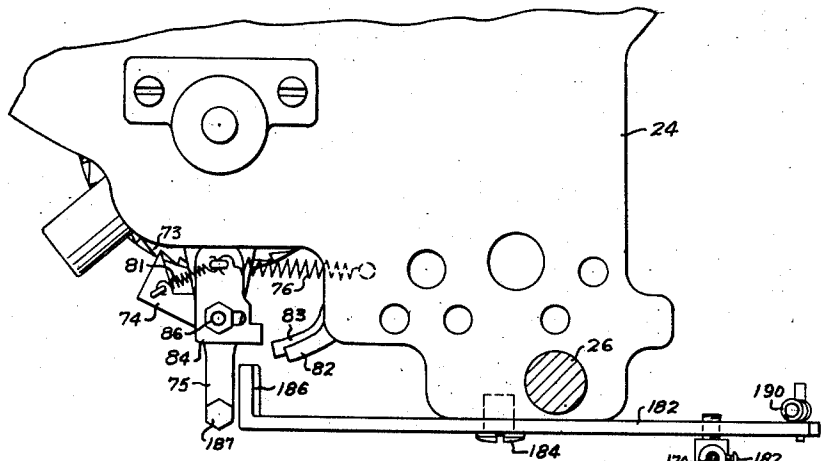


Fig - 3

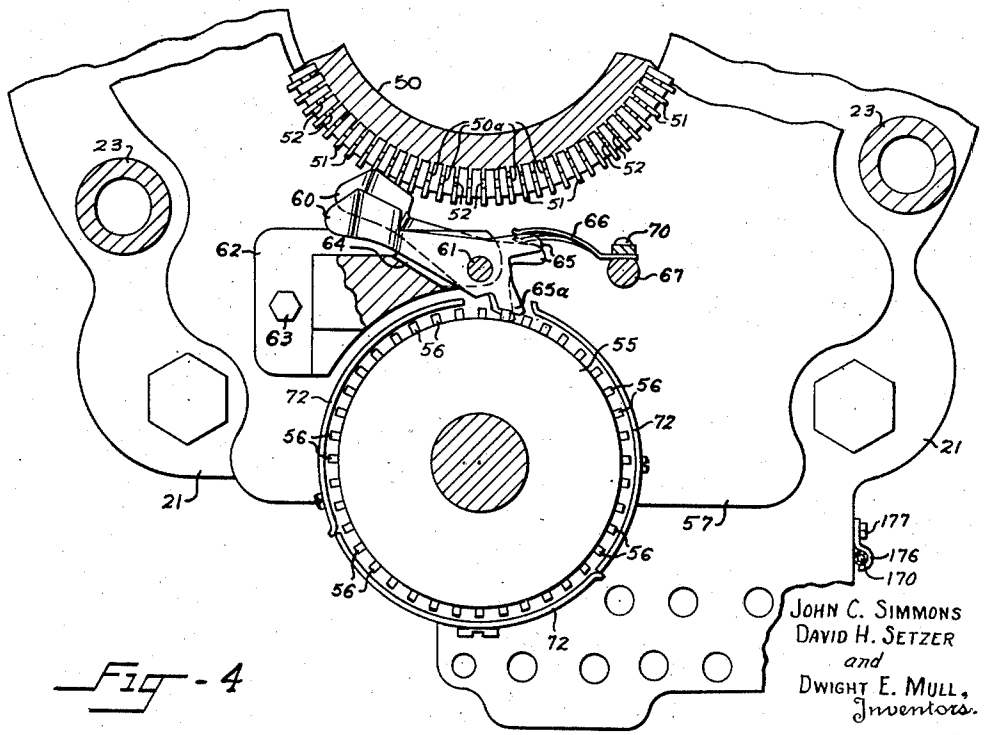


Fig - 4

JOHN C. SIMMONS
DAVID H. SETZER
and
DWIGHT E. MULL,
Inventors.

By

Attorney

May 15, 1951 J. C. SIMMONS ET AL 2,552,742

PATTERN CONTROL MEANS FOR KNITTING MACHINES

Filed Aug. 2, 1948

6 Sheets-Sheet 4

Fig. 5

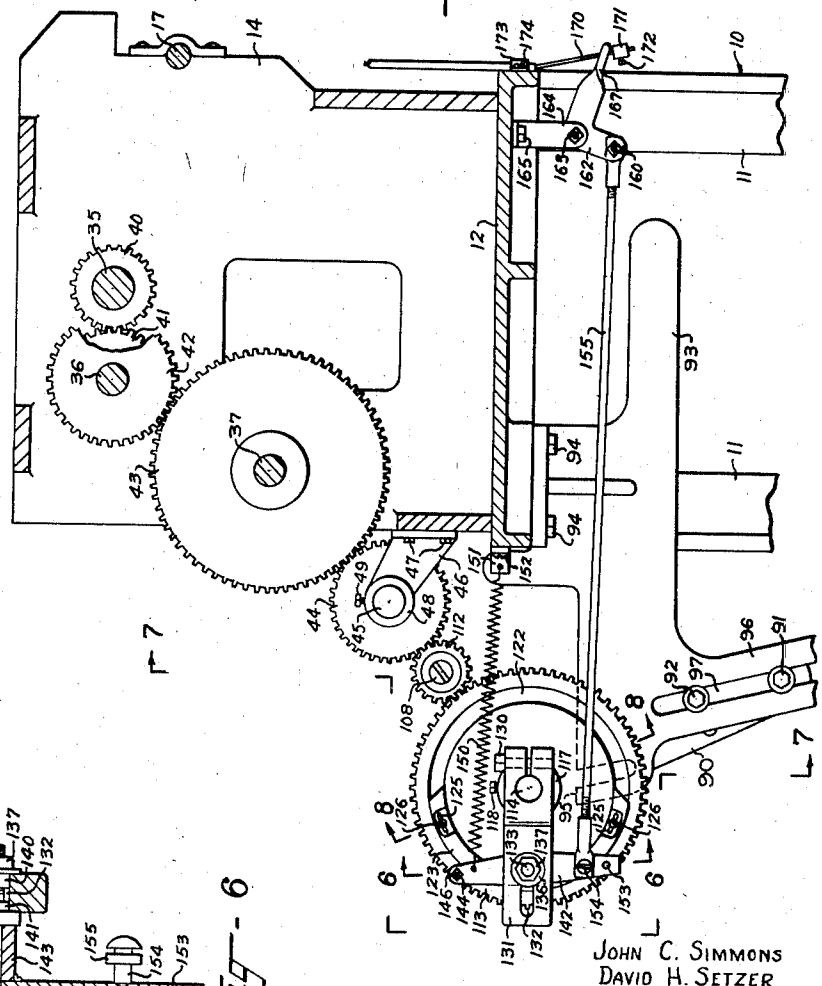
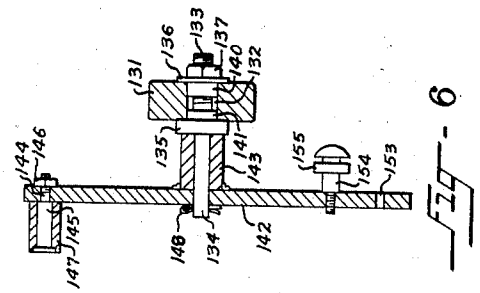


Fig. 6



JOHN C. SIMMONS
DAVID H. SETZER
and
DWIGHT E. MULL,
Inventors.

By

Attorney

May 15, 1951 J. C. SIMMONS ET AL 2,552,742

PATTERN CONTROL MEANS FOR KNITTING MACHINES

Filed Aug. 2, 1948 6 Sheets-Sheet 5

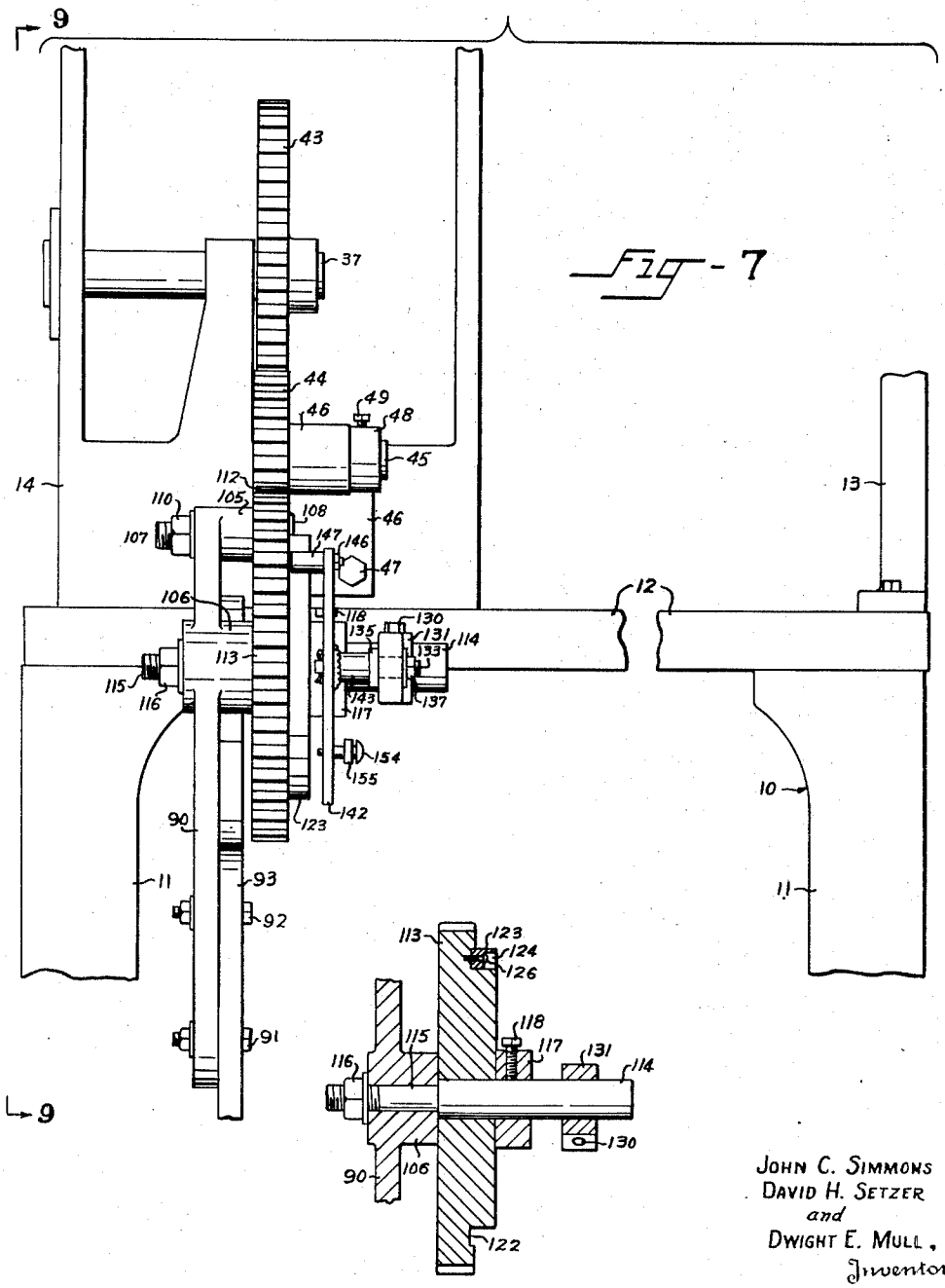


Fig - 7

Fig - 8

JOHN C. SIMMONS
DAVID H. SETZER
and
DWIGHT E. MULL,
Inventors.

By Paul & Eaton
Attorney

May 15, 1951 J. C. SIMMONS ET AL 2,552,742

PATTERN CONTROL MEANS FOR KNITTING MACHINES

Filed Aug. 2, 1948 6 Sheets-Sheet 6

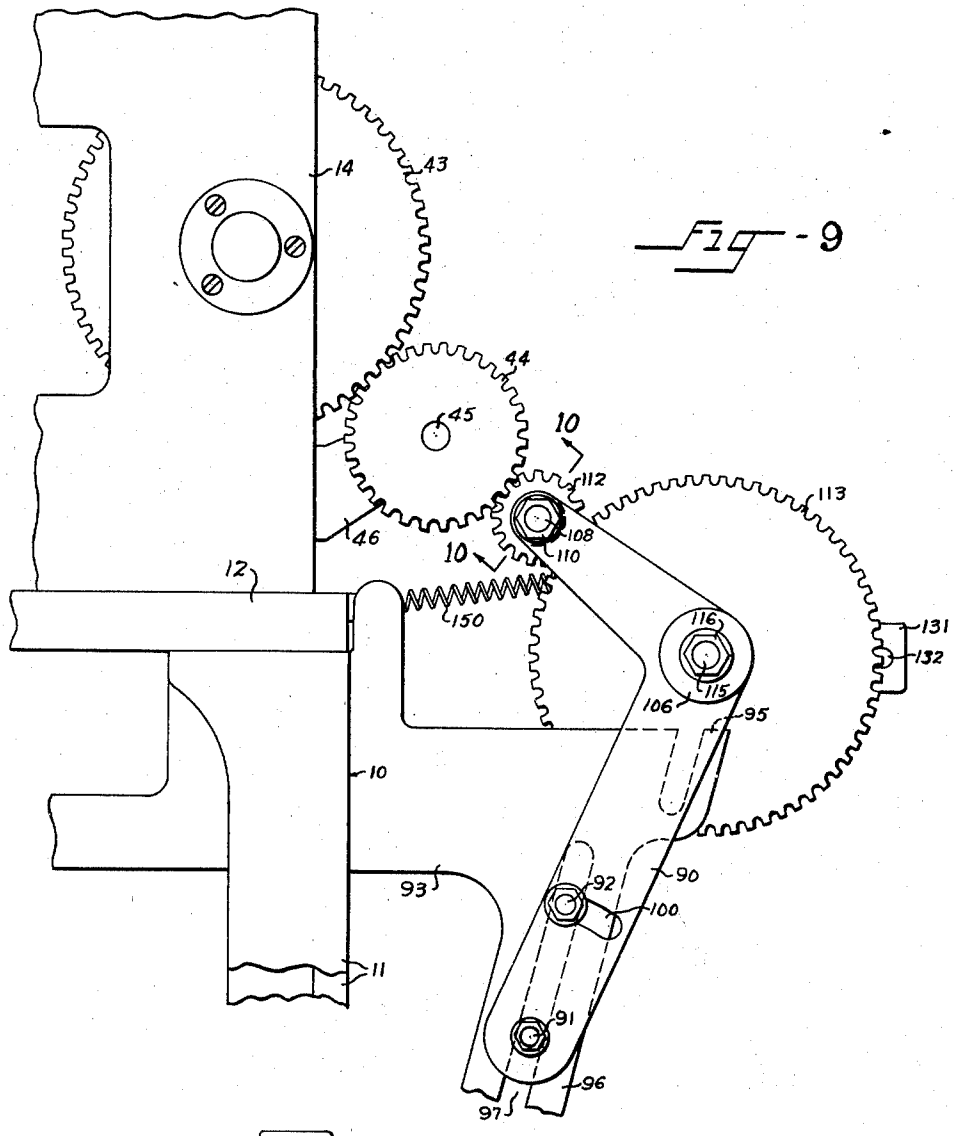


Fig - 9

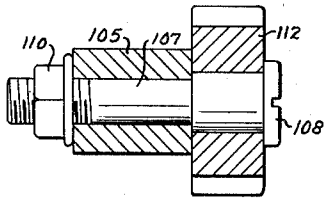


Fig - 10

JOHN C. SIMMONS
DAVID H. SETZER
and
DWIGHT E. MULL,
Inventors.

By

Attorney

Patented May 15, 1951

2,552,742

UNITED STATES PATENT OFFICE

2,552,742

PATTERN CONTROL MEANS FOR KNITTING MACHINES

John C. Simmons, David H. Setzer, and Dwight E. Mull, Valdese, N. C., assignors to Waldensian Hosiery Mills, Incorporated, Valdese, N. C., a corporation of North Carolina

Application August 2, 1948, Serial No. 41,984

6 Claims. (Cl. 66—50)

1

This invention relates to circular knitting machines and more especially to a pattern range multiplier attachment which is more especially adapted to circular knitting machines such as the Scott and Williams Komet, Links and Links double indexing circular knitting machine.

It is a well known fact to those familiar with the art that machines of this type are provided with an upper needle cylinder having a plurality of spaced longitudinally extending grooves in its periphery and in which conventional selectors have vertical sliding movement, there being a connection between the selectors and the needles of the needle cylinder. The selectors are adapted to be engaged by certain of selector fingers oscillatably mounted adjacent a selector drum disposed adjacent the needle cylinder and in which a plurality of pattern pins are disposed for actuating the selector fingers and to thereby move certain of these fingers into the path of certain of the butts of the selectors to thus move the same downwardly in a knitting operation.

The selector drum with the pattern pins therein is rotated in step by step relation with each revolution of the needle cylinder. This arrangement normally permits a maximum of two identically knitted courses with each progressive step of the selector drum, there being two courses knitted with each revolution of the needle cylinder.

It is therefore the primary object of this invention to provide means for increasing the number of courses per step of the selector drum, as desired, thereby increasing the range of the pattern drum proportionally to the increased number of courses beyond its normal capacity.

It is another object of this invention to provide an adjustable cam wheel mounted adjacent and driven by the main drive shaft of a circular knitting machine of the type described, and to provide a lever arm pivotally mounted adjacent the conventional selector drum racking pawl, there being a connection between the cam wheel and the lever arm to thus move one end of the arm into the path of the selector drum racking pawl after it has completed one stroke, to generate one step in the step by step rotation of the selector drum, and to thus prevent the selector drum racking pawl from returning to where it may start another stroke for a predetermined length of time and to thereby allow the needle cylinder to rotate a predetermined number of revolutions in addition to its normal single revolution before the selector drum is advanced another step.

2

Some of the objects of the invention having been stated, other objects will appear as the description proceeds, when taken in connection with the accompanying drawings, in which:

Figure 1 is a front elevation of a circular knitting machine with parts omitted and other parts being broken away and showing the invention mounted thereon;

Figure 2 is an enlarged elevation of the conventional selector drum associated with a portion of the upper needle cylinder and is taken substantially along the line 2—2 in Figure 1;

Figure 3 is a top plan view of a portion of the knitting machine with parts in section and is taken substantially along the line 3—3 in Figure 1;

Figure 4 is a sectional plan view of the front portion of the machine and is taken substantially along the line 4—4 in Figure 1;

Figure 5 is a vertical sectional view taken along the line 5—5 in Figure 1 and showing parts of the knitting machine schematically;

Figure 6 is an enlarged vertical sectional view taken substantially along the line 6—6 in Figure 5;

Figure 7 is an enlarged elevation taken along the line 7—7 in Figure 5;

Figure 8 is an enlarged vertical sectional view taken along the line 8—8 in Figure 5;

Figure 9 is an enlarged elevation taken along the line 9—9 in Figure 7;

Figure 10 is an enlarged vertical sectional view taken along the line 10—10 in Figure 9;

Figure 11 is a top plan view similar to that shown in Figure 3 but being made on a smaller scale and showing various parts broken away for purposes of clarity.

Referring more specifically to the drawings, the numeral 10 broadly designates the cast frame of a circular knitting machine. The frame 10 is comprised of legs 11 which support a conventional oil tray 12 having the lower edges of the lower bed plate support members 13 and 14 secured thereto, and the upper ends of the bed plate support members have a lower bed plate 15 secured thereon on which the lower ends of intermediate bed plate supporting pillars 20 are mounted. The upper ends of the pillars 20 have a conventional intermediate bed plate 21 mounted thereon. The intermediate bed plate 21 has the lower ends of vertically disposed upper bed plate supporting pillars 23 mounted thereon, on the upper ends of which is secured a conventional upper bed plate 24.

The upper bed plate 24 has the lower end of a

conventional take-up lever pivot post 26 secured therein, as by a pressed fit, and extending upwardly therefrom. The lower bed plate 15 has a bearing member 16 secured thereto which extends downwardly. The bed plate support member 14 and the bearing member 16 have a horizontally disposed shaft 17 journaled therein on which a conventional clutch drum 30 and a quality drum 31 are fixedly mounted, and this quality drum 31 engages the lower ends of a plurality of conventional operating rods 32 which extend upwardly and slidably penetrate the intermediate and upper bed plates 21 and 24, but which are shown in Figure 1 as being broken away immediately above the lower bed plate 15, for purposes of clarity. These rods 32 operate various instrumentalities such as yarn feed fingers.

The vertical member 14 of the frame 10 has a conventional drive shaft 35 and conventional shafts 36 and 37 (Figure 5) journaled therein, in a conventional manner, and the shaft 35 has a pinion 40 thereon meshing with a pinion 41 fixedly mounted on the shaft 36 and the shaft 36 also has a pinion 42 fixedly mounted thereon which meshes with a gear 43 fixedly mounted on the shaft 37. The gear 43 meshes with a conventional striper racking gear 44 fixedly mounted on a stub shaft 45, as by a pressed fit. The shaft 45 is rotatably mounted in a bearing block 46 secured to the rear surface of the frame 10 (Figure 5), as by screws 47. The shaft 45 has a collar 48 fixedly mounted thereon, as by a set screw 49, to prevent endwise movement of the shaft 45.

The upper bed plate 24 has the upper end of a conventional upper needle cylinder 50 rotatably mounted therein (Figures 1 and 4). The needle cylinder extends downwardly and freely penetrates the intermediate bed plate 21 and is rotated on its axis by conventional connections from the main shaft 35 of the machine, not shown. The upper needle cylinder 50 has a plurality of spaced grooves 50*a* in its periphery and a plurality of spaced butts 51 extend from the same, which are a portion of conventional selectors 52 (Figure 4) which have vertical sliding movement in the spaced grooves 50*a* in the periphery of the needle cylinder 50.

Mounted adjacent the upper needle cylinder 50 is a conventional selector drum 55 which is rotatably mounted on a stud, not shown, projecting upwardly from a plate 57 (Figures 1, 2 and 4) secured to the intermediate bed plate 21. The peripheral surface of the selector drum which is sometimes called a pattern drum, is, in practice, provided with a number of holes in which suitable selector pins 56 are inserted in accordance with the pattern to be produced in the knitted fabric.

These pins 56 cooperate with a series of selector levers or fingers 60 (Figure 4) by the aid of which a selective action is performed upon the needles in the needle cylinder as is clearly shown in Patent Number 2,070,762 of February 16, 1937, and Patent Number 2,019,396 of October 29, 1935. The selector fingers 60 are oscillatably mounted on a vertically disposed rod 61 fixedly mounted in a block 62, secured, as by screws 63, to the plate 57 secured to the top surface of the intermediate bed plate 21. This block 62 has a plurality of slots 64 therein, each of which is slidably penetrated by one of the fingers 60 to thus hold the fingers 60 in spaced relation to each other.

It may be observed in Figure 4 that the fingers 60 each have a projection 65, each of which is adapted to be engaged by a leaf spring member 66 secured to a vertical rod 67 as by screws 70. The vertical rod is secured, in a conventional manner, in the upper and lower bed plates 15 and 21, respectively. The leaf spring members 66 are provided to urge one end 65*a* of the selector fingers 60 into engagement with the periphery of the selector drum 55 and the selector pins 56 projecting therefrom, as shown in Figure 4 and to thus urge the free ends of the selector fingers 60 outwardly into the paths of the butts 51 which project from the periphery of the needle cylinder 50. In the construction shown in the drawings, the selector pins 56 are protected by a cylindrical guard 72 which has adjacent the ends 65*a* of the fingers 60 a vertically disposed slot formed in it to enable the ends 65*a* to extend into the paths of the pins 56.

Referring to Figures 1, 2, 3 and 11, it may be observed that the selector drum 55 has, disposed on its upper end, a ratchet wheel 73 which is adapted to be engaged by a conventional selector drum racking pawl 74 pivotally mounted on a pawl-carrying lever 75 which is mounted to swing upon the axis of the selector drum 55 and is oscillated in one direction by a tension spring 76 and in the reverse direction by a cam member 77. A tension spring 81 tends to maintain the pawl 74 in engagement with the ratchet wheel 73. The cam member 77 is secured to a conventional gear wheel 80 connected to the upper end of the needle cylinder 50, in a conventional manner, and which is instrumental in transmitting rotation to the needle cylinder from the drive shaft 35. It is thus seen that the cam member 77 rotates about the axis of the needle cylinder 50 with the gear wheel 80.

By referring to Figure 3 there may be observed the free ends of conventional pawl-controlling fingers 82 and 83 which are controlled, by conventional parts, not shown, connected to the quality drum 31 in Figure 1, and in accordance with the desired pattern, in such a manner as to engage the edge of a block 84 secured, as by a bolt 85, to the pawl-carrying lever 75 to thus prevent the tension spring 76 from moving the pawl-carrying lever 75 from left to right at its front end in Figures 3 and 11. The fingers 83 and 84 are shown in Patent Number 2,070,762. These fingers 82 and 83 are caused to engage the block automatically at the beginning of the knitting of the heel pouch of a hose, by conventional means, not shown in the drawings, but which are shown in Patent Number 2,070,762, to thereby stop rotation of the selector drum 55, and during which time the rotation of the needle cylinder is stopped automatically and the needle cylinder 50 is caused to oscillate until the end of the heel pouch knitting operation and, by conventional means, not shown in the drawings, but shown in Patent Number 2,070,762, the fingers 82 and 83 are then moved out of engagement with the block 84 to thus permit the tension spring 76 to move the ratchet pawl 74 from left to right in Figures 3 and 11 to resume its normal operation.

The parts heretofore described are conventional parts of a stitch-over-stitch circular knitting machine, and it is with these parts that this invention is adapted to be associated.

Although the action of the fingers 82 and 83 has been described, this description is made by way of comparison, inasmuch as this invention performs a similar operation to the fingers 82 and 83, but at an entirely different time, that is during the knitting of the body of the hose rather than

during the knitting of the heel pouch as is the case with the fingers 82 and 83.

Referring to Figures 5, 7, 8 and 9, it may be observed that there is an inverted L-shaped bracket 90 secured, as by bolts 91 and 92, to the rearmost end of a chain rack bracket 93 which is a conventional part of this knitting machine, and is secured to the lower surface of the conventional oil tray 12, as by screws 94 (Figure 5). This chain rack bracket 93 normally has an upwardly extending portion thereon but this bracket must be cut off along the line indicated at 95 (Figure 9) so as to not interfere with the installation of this attachment.

The chain rack bracket 93 has a downwardly extending portion 96 having a substantially vertically disposed slot 97 therein, which is penetrated by the bolts 91 and 92. The inverted L-shaped bracket 90 has an arcuate slot 100 therein which is penetrated by the bolt 92 in Figure 9 for adjusting the upper end of the bracket 90 relative to the striper racking gear 44.

The inverted L-shaped bracket 90 has bosses 105 and 106 integral therewith and the boss 105 has slidably penetrating the same a restricted threaded portion 107 of a shoulder bolt 108 which is secured in the boss 105 by a nut 110 (Figure 10). The shoulder bolt 108 has an idler pinion 112 rotatably mounted thereon, which is in engagement with the striper racking gear 44 in Figures 5, 7 and 9. The pinion 112 also engages a gear wheel 113 rotatably mounted on a shaft 114 having a restricted portion 115 (Figure 8) which slidably penetrates the boss 106 and has a nut 116 threadably mounted on the other end thereof to thus secure the shaft 114 to the bracket 90.

The stud shaft 114 also has a collar 117 fixedly secured thereon, as by a set screw 118, and the gear wheel 113 is prevented from having lateral movement on the shaft 114 by being mounted between the boss 106 and the collar 117 (Figure 8). The gear 113 has an annular groove 122 in one side thereof in which a semi-circular cam member 123 is mounted and projects outwardly therefrom. This semi-circular cam member 123 has cavities 124 therein the depths of which are equal to about one-half the thickness of the cam member 123 and slots 125 penetrate the cam member 123 in the cavities 124. These slots 125 are slidably penetrated by screws 126, the other ends of which are threadably imbedded in the gear wheel 113 to adjustably secure the cam member 123 to the gear wheel 113.

Although the cam member 123 is shown in Figure 5 as being semi-circular, it is obvious that this cam member may be quarter-circular or three-quarter-circular or of any other desired arcuate length to increase or decrease the length of the period in which the selector drum racking pawl 74 remains stationary, in the manner to be later described.

The stub shaft 114, on which the gear wheel 113 is rotatably mounted, has clamped thereon, as by a screw 130 (Figures 5 and 7), a rearwardly extending bar 131 having an elongated slot 132 therein which is loosely penetrated by a threaded portion 133 of a shaft 134 (Figure 6). This shaft 134 also has an enlarged portion 135 which engages the surface of the bar 131 adjacent the gear wheel 113 and the opposite surface of this bar 131 is engaged by a washer 136 secured against the bar 131 by a nut 137 threadably mounted on the portion 133. It will be noted that the washer 136 has a collar portion 140 integral therewith and the portion 135 has a

shoulder portion 141 integral therewith and the shoulder portion 141, as well as the collar 140 are snugly fitted into the slot 132 in the bar 131 to thus support the shaft 134 in a horizontally disposed position.

The shaft 134 has a lever arm 142 oscillatably mounted thereon having a hub portion 143 integral therewith and this lever arm 142 is confined on the shaft 134 by a cotter key 146, which penetrates the left-hand end of the shaft 134 in Figure 6. The lever arm 142 is disposed in a substantially vertical plane and the upper end of the same is slidably penetrated by a restricted portion 144 of a shoulder bolt 145 and this portion 144 is threadably engaged by a nut 146 to thus secure the shoulder bolt 145 to the lever arm 142.

The shoulder bolt 145 has a cam follower 147 rotatably mounted thereon, and the cam follower 147 is adapted to engage the outer periphery of the semi-circular cam member 123 and is urged into engagement with the same by a tension spring 150, the rear end of which is connected to the lever 142 and the front end of which is connected to a spring perch 151 (Figure 5) secured to the conventional oil tray 12, of the frame 10, by any suitable means such as a screw 152.

The lower portion of the lever arm 142 has a plurality of spaced threaded holes 153 therein, any one of which is adapted to be threadably penetrated by one end of a shoulder screw 154 on which the rearmost end of a connecting link 155 is pivotally mounted. This connecting link 155 extends forwardly, or from right to left as observed in Figure 5, and its front end is pivotally connected, as at 160, to one end of a strap iron bell crank lever 162 pivotally mounted, as at 163, in the lower end of a downwardly extending inverted L-shaped bracket 164 secured, as by a screw 165, to the lower surface of the oil tray 12, of the frame 10. The bell crank 162, is twisted at right angles, as at 167, and the outer end of the same is loosely penetrated by the lower end of a Bowden wire 170.

The lower end of the Bowden wire 170, in Figure 5, has a collar 171 fixedly secured thereon, as by a set screw 172, and the housing of the Bowden wire is fastened to the front surface of the oil tray 12, of the frame 10, by a clamp member 173 secured to the oil tray 12, by any suitable means such as a screw 174 (Figure 5). It may be observed in Figure 1 that the Bowden wire 170 then extends upwardly between the quality drum 31 and the clutch drum 30, and is fastened, as by a clamp member 176, to the intermediate bed plate 21. The clamp member 176 is secured to the intermediate bed plate 21, as by a screw 177.

The Bowden wire 170 extends upwardly beyond the intermediate bed plate 21 and its upper end slidably penetrates a cuff member 180 (Figure 3) and there is a collar 181 secured to the upper end of the Bowden wire 170, as by a set screw 182. The cuff member 180 is threadably imbedded adjacent one end of a lever arm 182 (Figures 1 and 3) which is oscillatably mounted intermediate its ends, on a screw 184 threadably imbedded in the upper bed plate 24. The left-hand end of the lever arm 182 in Figures 1 and 3 has an inwardly bent portion 186 which is adapted to engage an upwardly projecting pin 187 (Figure 2) the lower end of which is restricted and slidably penetrates the outer end of the conventional pawl-carrying lever 75, and is secured thereon by a nut 188 (Figure 2).

It may be observed in Figure 1 that the right-hand end of the lever arm 182, as observed in

Figure 1, has the lower end of a tension spring 190 connected thereto which extends upwardly and is connected to the upper end of the conventional take-up lever pivot post 26 to thus urge the right-hand end of the lever 182 in Figure 1 upwardly and to move its other end downwardly into the path of the upwardly projecting pin 187 on the pawl-carrying lever 75.

Now, when the conventional needle cylinder 50 completes one revolution, this causes the needles associated therewith to knit two courses and then certain of the selector fingers 60 being in the path of the butts 51 projecting from the needle cylinder 50, will then engage certain of the butts 51 to move them downwardly. The selector drum 55 would then be caused to rotate another step by means of the cam member 77 moving to engage the pawl-carrying lever 75 in the manner heretofore described.

This operation will continue as long as the cam follower 147 (Figure 6) is not in engagement with the outer periphery of the semi-circular cam member 123 in Figure 5. When the cam follower 147 is not in engagement with the outer periphery of the cam member 123, the tension spring 150 urges the upper end of the lever arm 142 inwardly and thereby moves the lower end of the lever arm 142 outwardly and it is obvious that this outward movement of the lever arm 142, at its lower end, would move the connecting link 155 from right to left in Figure 5 and would cause the bell crank 162 to partially rotate in a clockwise direction in Figure 5. This would cause the right-hand end of the same to move downwardly and would pull the Bowden wire 170 downwardly and would thus pull the right-hand end of the lever arm 182 downwardly in Figure 1 against the resistance of the spring 190 and would hold the left-hand end 186 of the same upwardly and out of engagement with the pin 187 to thus allow normal operation of the knitting machine.

Now, it is obvious that when the cam follower 147 is engaged by the cam member 123 in such a manner as to move the upper end of the same outwardly, or to the left in Figure 5, this would cause the Bowden wire 170 to be moved upwardly by the tension spring 190 at the outer end of the lever arm 182 in Figure 1. The left-hand end of the lever arm 182 would then move downwardly into the position shown in Figure 1 and the inwardly bent portion 186 would then be in the path of the pin 187 projecting upwardly from the outer end of the pawl-carrying lever 75. It is obvious that the pawl-carrying lever 75 and the selector drum racking pawl 74 would not be able to move from left to right at their front ends in Figures 3 and 11, and consequently, although the cam member 77 in Figure 11 will continue to rotate with the needle cylinder 50, the cam member 77 will not be able to transmit motion to the pawl-carrying lever 75, inasmuch as it will be held out of engagement with the same by the bent portion 186 of the arm 182 and thus the selector drum 55 will remain stationary during succesive revolutions of the needle cylinder 50 until the lever arm 182 is again moved downwardly at its right-hand end in Figure 1, and upwardly at its left-hand end, out of the path of the pin 187 mounted on the front end of the pawl-carrying lever 75. The normal operation of the selector drum 55 and the selector fingers 60 associated therewith would then be resumed.

The idler pinion 112 and the gear wheel 133 are of such proportions that the semi-circular cam member 123 would cause the lever arm 182 to move downwardly into the path of the pin 187, at the front end of the pawl-carrying lever 75, once in every four revolutions of the needle cylinder 50, thus increasing the courses per step of the selector drum, for instance, from a normal two to eight. This causes the selector drum 55 to remain stationary through four revolutions of the needle cylinder instead of a normal single revolution.

Obviously, by changing the cam member 123 from semi-circular to quarter-circular, the drum 55 would remain stationary for two revolutions of the needle cylinder and by changing the cam member 123 from semi-circular to three-quarter-circular, the selector drum 55 would remain stationary for six revolutions.

It is thus seen that the pattern range formed by the selector pins 56 in the selector drum 55 would then be increased in much the same manner as would be the case if a selector drum of much greater diameter were installed on the machine, due to the suspending of movement of the selector drum 55 in the manner described.

In the drawings and specification there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only, and not for purposes of limitation, the scope of the invention being defined in the claims.

We claim:

1. In a circular knitting machine having a selector pattern drum and a needle cylinder and devices associated with the needle cylinder controlled by the selector drum, driving means for rotating said drum in step by step relation comprising a cam member adapted to rotate with the needle cylinder, a pawl carrying lever mounted to swing about the axis of the selector drum and one end of which is adapted to be engaged by the cam member, a ratchet pawl pivotally mounted adjacent the other end of the pawl-carrying lever to thus transmit one step in the step by step rotation of the selector drum with each revolution of the needle cylinder, an upwardly extending pin secured to said pawl-carrying lever, a lever arm oscillatably mounted adjacent the upwardly extending pin, means for automatically moving one end of the lever arm into the path of the upwardly extending pin for a predetermined length of time to thus prevent the pawl-carrying lever and its associated pawl from moving reversely after it has completed a stroke to generate a step in the step by step rotation of the selector drum and to where the opposite end of the pawl-carrying lever will be held out of engagement with the cam member associated with the needle cylinder to thus suspend the step by step rotation of the selector drum for a predetermined length of time until the lever arm is again automatically moved out of the path of and out of engagement with the upwardly extending pin.

2. In a structure according to claim 1, said means for automatically moving one end of the lever arm into the path of the upwardly extending pin of the pawl-carrying lever comprising a fixed shaft, a gear wheel rotatably mounted on said fixed shaft and being driven by the machine, said gear wheel having a cam member mounted on one side thereof, a bar secured to one end of said shaft, a lever arm pivotally mounted on said bar, a cam follower mounted on one end of said last-named lever arm and which is adapted to engage the cam member, spring means for urging

said cam follower into engagement with the cam member, a connection between the last-named lever arm and the lever arm disposed adjacent the pawl-carrying lever and whereby upon rotation of the gear wheel and its associated cam member the cam member will move into engagement with the cam follower of the lever arm to thus cause the last-named lever arm to move the first-named lever arm in one direction or the other and whereby when the cam member moves out of engagement with the cam follower, the spring means will move the last-named lever arm in a direction opposite from that in which the cam member has forced it to move to thus move the first-named lever arm in the opposite direction from that in which it has been previously moved.

3. In a structure according to claim 2, a bell crank pivotally mounted below the first-named lever arm and being on a horizontal plane with the second-named lever arm, a connecting link between the second-named lever arm and the bell crank, a Bowden wire extending from the first-named lever arm to the bell crank to where oscillation of the second-named lever arm in the manner described will transmit oscillation to the bell crank and the bell crank in turn will transmit oscillation to the first-named lever arm to thus cause one end of the first-named lever arm to move into the path of the upwardly projecting portion of the pawl-carrying lever.

4. In a circular knitting machine having a selector pattern drum and a needle cylinder and devices associated with the needle cylinder controlled by the selector drum, driving means for rotating said drum in step by step relation comprising a cam member adapted to rotate with the needle cylinder, a pawl-carrying lever mounted to swing about the axis of the selector drum and one end of which is adapted to be engaged by the cam member, a ratchet pawl pivotally mounted adjacent the other end of the pawl-carrying lever to thus transmit one step in the step by step rotation of the selector drum with each revolution of the needle cylinder, an upwardly extending pin secured to said pawl-carrying lever, a lever arm oscillatably mounted adjacent the upwardly extending pin, means for automatically moving one end of the lever arm into the path of the upwardly extending pin for a predetermined length of time to thus prevent the pawl-carrying lever and its associated pawl from moving reversely after it has completed a stroke to generate a step in the step by step rotation of the selector drum and to where the opposite end of the pawl-carrying lever will be held out of engagement with the cam member associated with the needle cylinder to thus suspend the step by step rotation of the selector drum for a predetermined length of time until the lever arm is again automatically moved out of the path of and out of engagement with the upwardly extending pin, said means for automatically moving one end of the lever arm into the path of the upwardly extending pin of the pawl-carrying lever comprising a fixed shaft, a gear wheel rotatably mounted on said fixed shaft and being driven by the machine, said gear wheel having a cam member mounted on one side thereof, a bar secured to one end of said shaft, a lever arm pivotally mounted on said bar, a cam follower mounted on one end of said last-named lever arm and which is adapted to engage the cam member, spring means for urging said cam follower into engagement with the cam member, a connection between the last-named lever arm and the lever arm disposed adjacent the pawl-carrying lever whereby, upon rotation of the gear wheel and its associated cam member, the cam member will move into engagement with the cam follower of the lever arm to thus cause the last-named lever arm to move the first-named lever arm in one direction or the other and whereby when the cam member moves out of engagement with the cam follower, the spring means will move the last-named lever arm in a direction opposite from that in which the cam member has forced it to move to thus move the first-named lever arm in the opposite direction from that in which it has been previously moved, a bell crank pivotally mounted below the first-named lever arm and being on a horizontal plane with the second-named lever arm, a connecting link between the second-named lever arm and the bell crank, a Bowden wire extending from the first-named lever arm to the bell crank to where oscillation of the second-named lever arm in the manner described will transmit oscillation to the bell crank and the bell crank, in turn, will transmit oscillation to the first-named lever arm to thus cause one end of the first-named lever arm to move into the path of one end of the pawl-carrying lever.

5. In a circular knitting machine having a selector drum and a needle cylinder and devices associated with the needle cylinder being controlled by the selector drum and driving means for rotating said drum in step by step relation comprising a pawl and ratchet wheel and a cam member adapted to rotate with the needle cylinder to thus transmit one step in the step by step rotation of the selector drum with each revolution of the needle cylinder and a pawl-carrying lever mounted to swing about the axis of the selector drum and one end of said pawl-carrying lever being adapted to be engaged by the cam member and the pawl being pivotally mounted adjacent the other end of the pawl-carrying lever and spring means for urging one end of said pawl-carrying lever in a direction opposite to that in which the cam member moves the same, a lever arm oscillatably mounted adjacent that end of the pawl-carrying lever on which the pawl is mounted, means for automatically moving one end of the lever arm into the path of the end of the pawl-carrying lever remote from the end which is adapted to be engaged by the cam member for a predetermined length of time to thus prevent the pawl-carrying lever and its associated pawl from moving reversely after it has completed a stroke to generate a step in the step by step rotation of the selector drum and to where the opposite end of the pawl-carrying lever is held out of engagement with the cam member associated with the needle cylinder to thus suspend the step by step rotation of the selector drum and to thus allow the needle cylinder to rotate a predetermined number of additional revolutions before again transmitting one step in the step by step rotation of the selector drum, that is, until the lever is again automatically moved out of the path of and out of engagement with the end of the pawl-carrying lever remote from the end which is adapted to be engaged by the cam member.

6. In a circular knitting machine having a driven needle cylinder in which a plurality of selectors having butts integral therewith have vertical sliding movement, said machine also having a plurality of selector fingers oscillatably mounted adjacent the circular machine needle

cylinder, and a selector drum associated with the fingers and having means for patterning associated therewith for moving certain of said selector fingers into the paths of certain of the said butts, said needle cylinder having a cam member, said selector drum having a ratchet wheel integral therewith and a pawl-carrying lever oscillatably mounted to swing about the axis of the selector drum and having a resiliently mounted ratchet pawl connected thereto the other end of which is adapted to engage the ratchet wheel and the ratchet carrying lever being adapted to be intermittently engaged by the cam member on the needle cylinder to thus move the pawl-carrying lever about the axis of the same and to in turn move the pawl and the ratchet wheel associated therewith in such a manner as to transmit step by step rotation to the selector drum, the drum thereby being caused to move one step with each revolution of the needle cylinder, cam means for automatically suspending movement of the pawl-carrying lever at the completion of one of its strokes for a predetermined number of complete revolutions of the needle cylinder and said cam member being adapted to allow normal operation of the needle cylinder and associated parts to resume after having rotated the predetermined number of revolutions.

JOHN C. SIMMONS.
DAVID H. SETZER.
DWIGHT E. MULL.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,005,632	Page	June 18, 1935
2,047,279	McAdams	July 14, 1936
2,255,693	Jones	Sept. 9, 1941
2,316,823	Thurston	Apr. 20, 1943
2,382,757	Wawzonek	Aug. 14, 1945
2,411,795	Lawson	Nov. 26, 1946