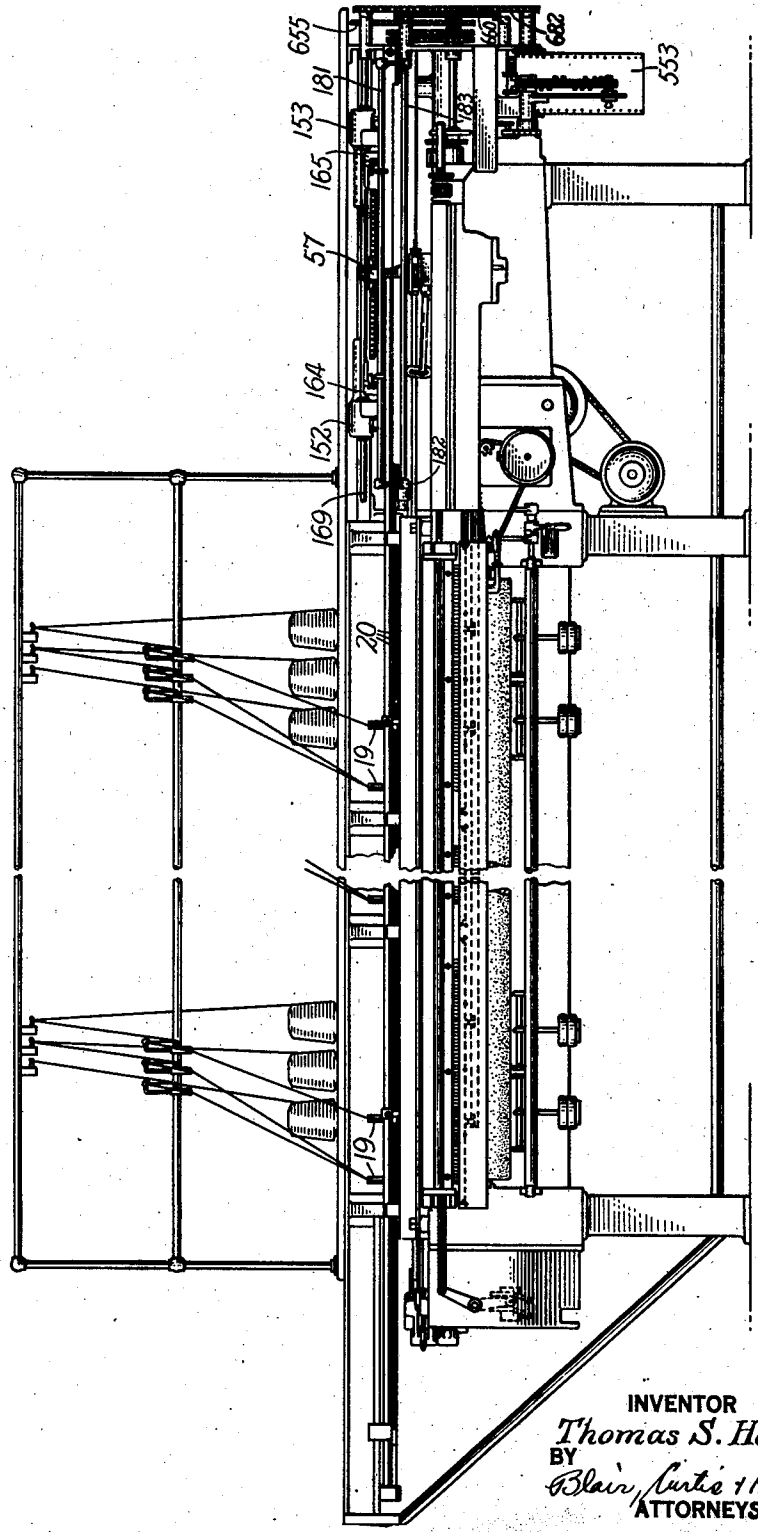
March 5, 1946. T. S. HAYHURST 2,395,816

KNITTING MACHINE

Filed April 13, 1944 10 Sheets-Sheet 1

Fig. 1.



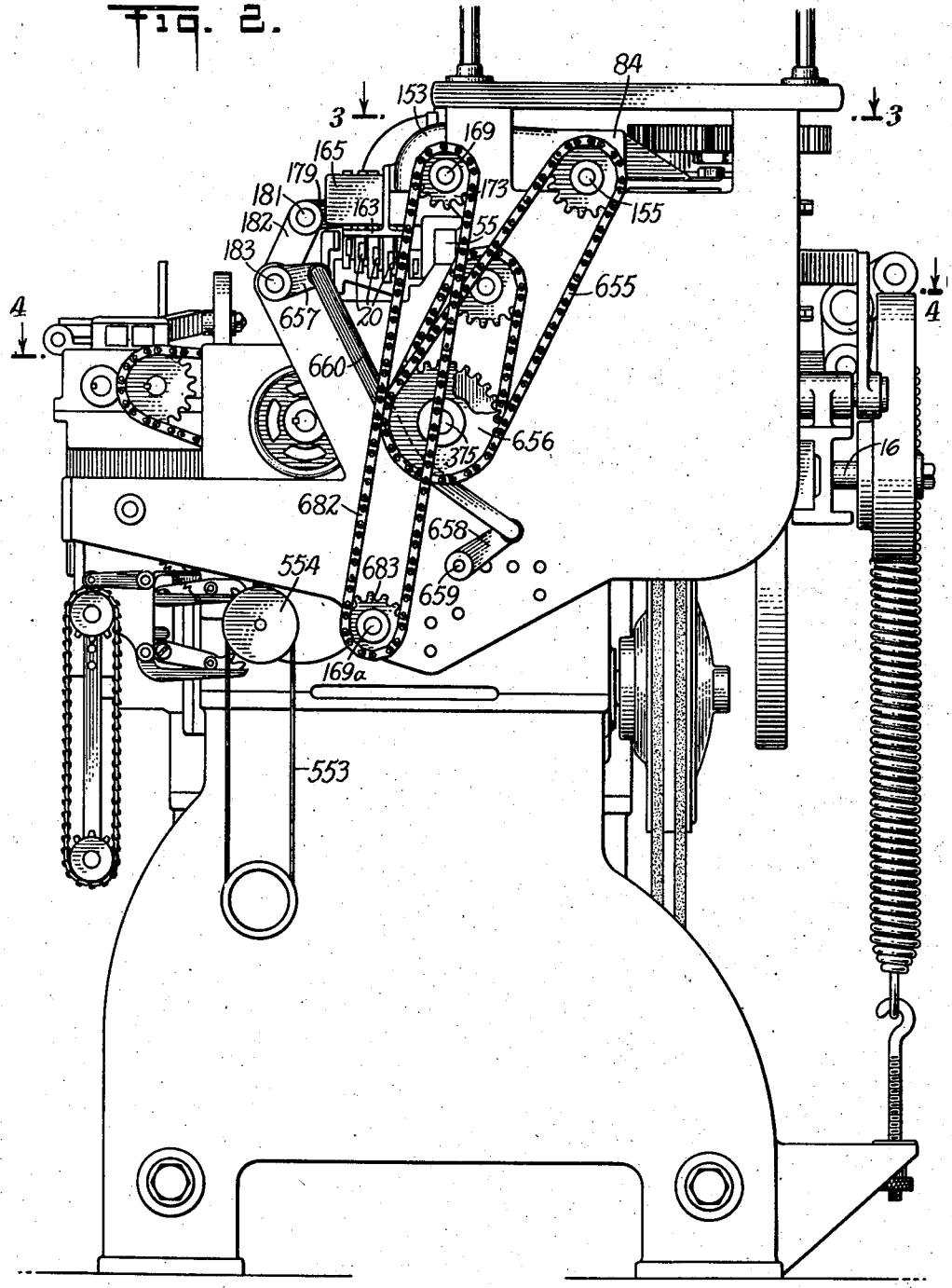
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Fig. 2.



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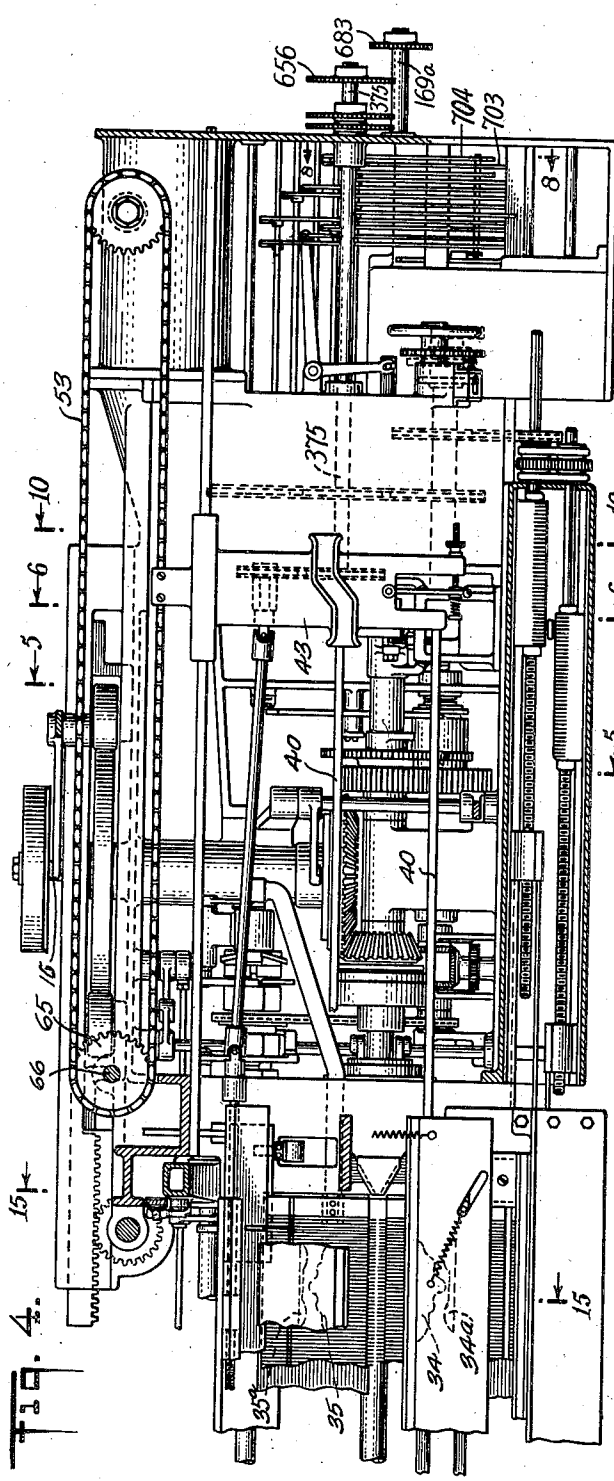


Fig. 4.

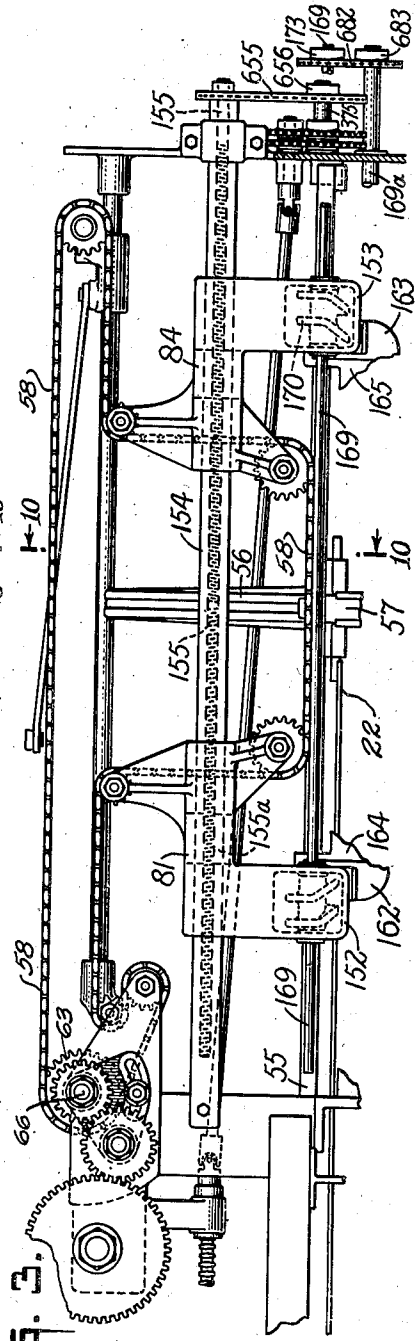


Fig. 3.

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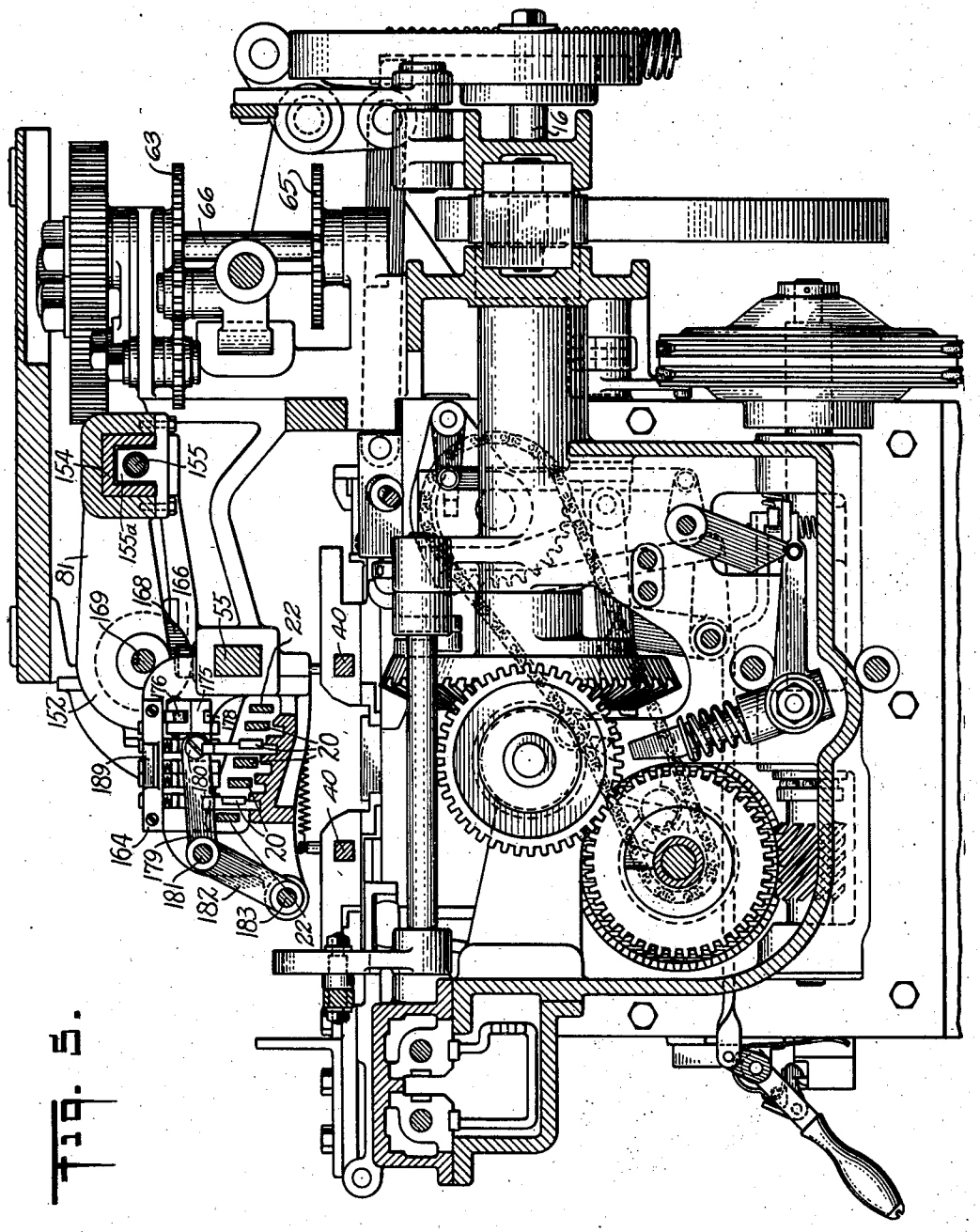


Fig. 5.

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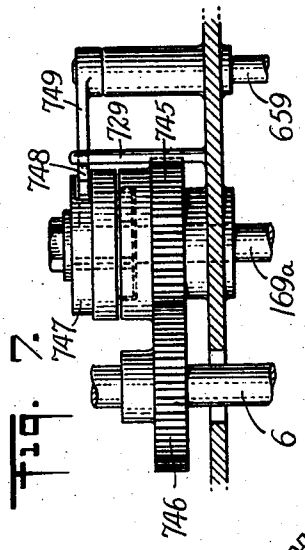


Fig. 7.

Fig. 6.

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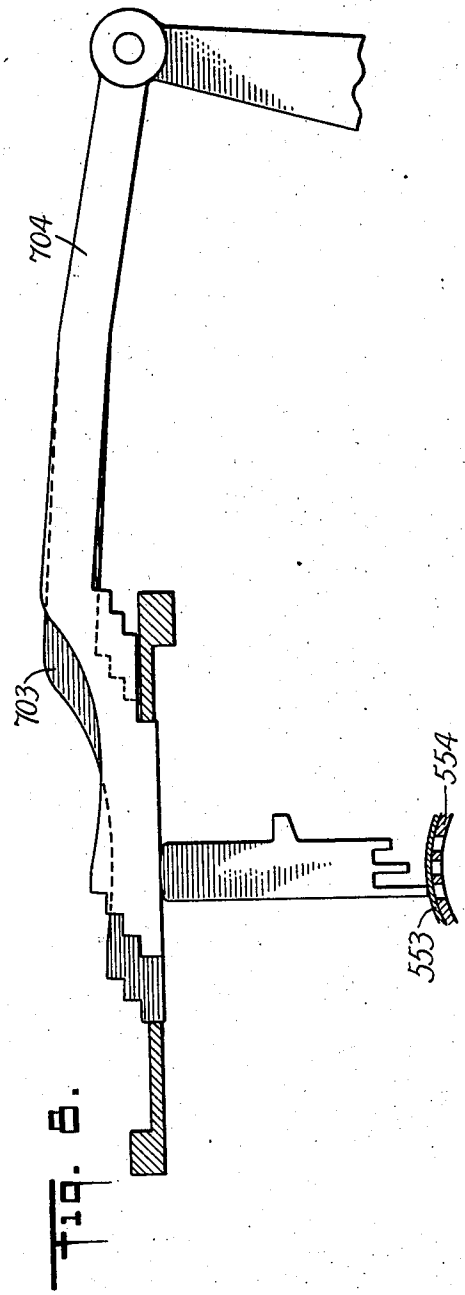


Fig. 8.

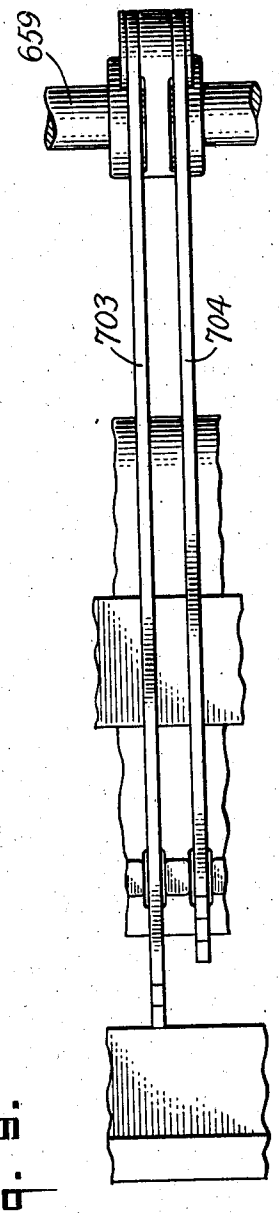


Fig. 9.

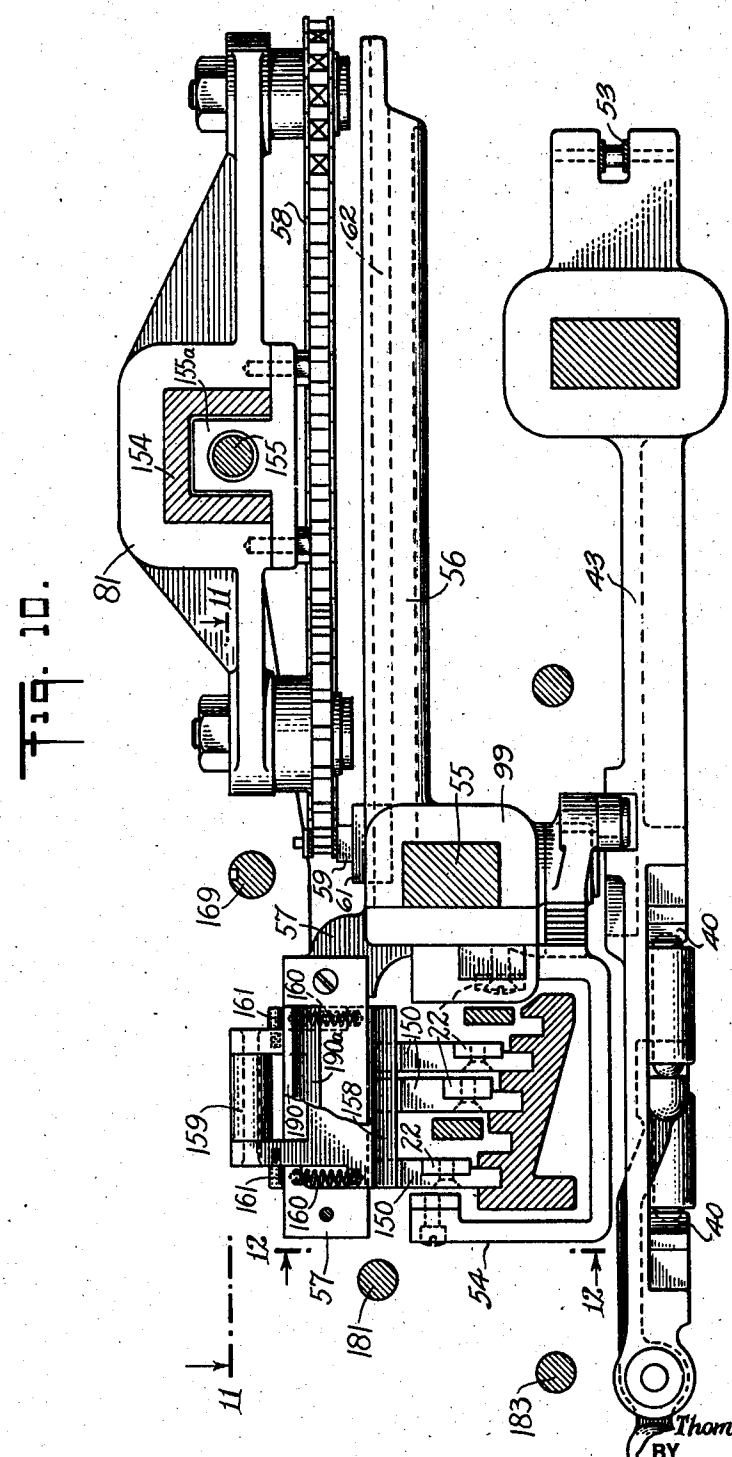
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Fig. 10.



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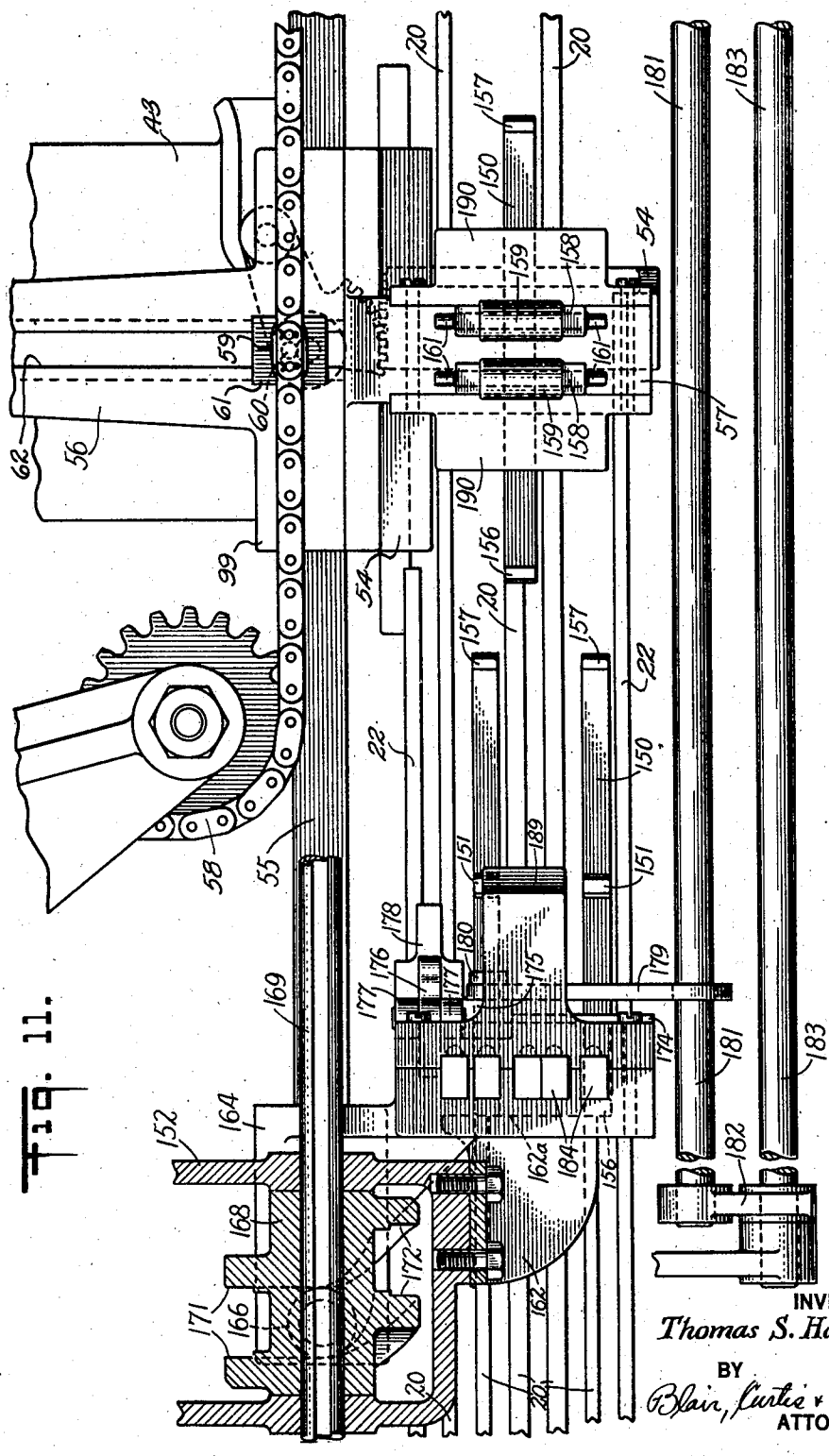


Fig. 11.

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Fig. 12.

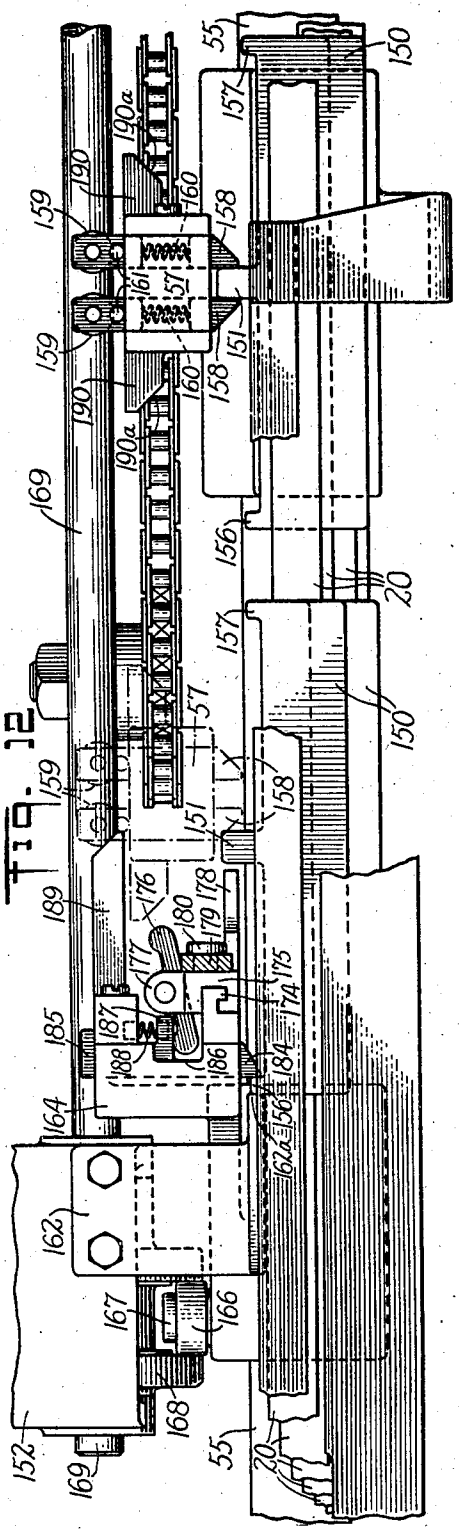


Fig. 14.

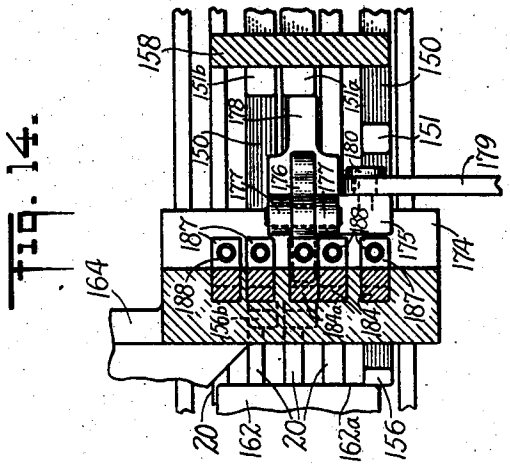
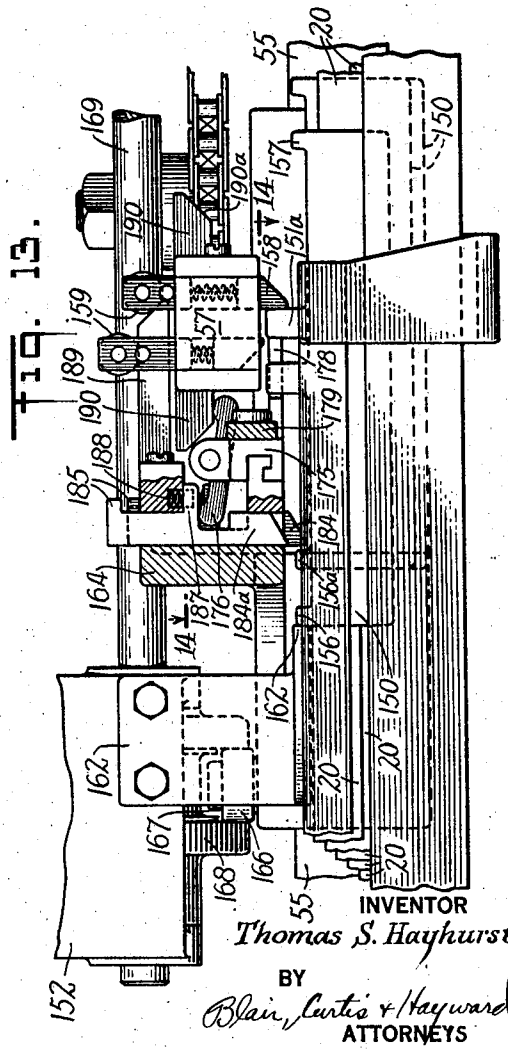


Fig. 13.



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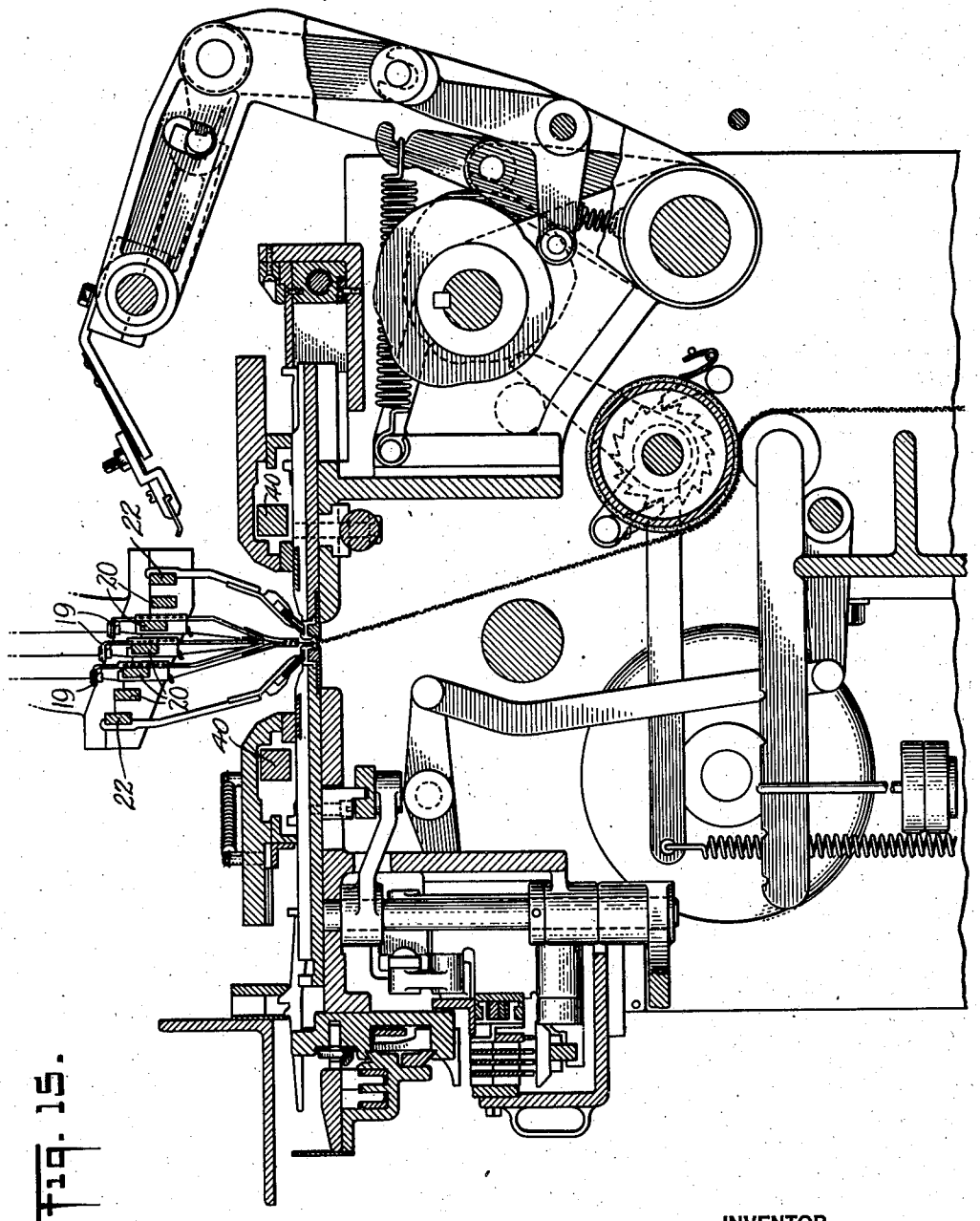


Fig. 15.

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Patented Mar. 5, 1946 2,395,816

UNITED STATES PATENT OFFICE

2,395,816

KNITTING MACHINE

Thomas S. Hayhurst, Belle Harbor, N. Y., assignor to Max Nydegger, Summit, N. J.

Application April 13, 1944, Serial No. 530,763

13 Claims. (Cl. 66—63)

The present invention relates to an improvement in knitting machines.

Objects of said invention have been to provide improved thread change mechanism for knitting machines, more particularly of the links-links or knit-purl type; to provide means for feeding the thread which involve a minimum amount of travel, thereby reducing friction and permitting the free use of relatively more tender threads or yarns than is otherwise feasible; and to provide thread feeding devices which in operation produce a more continuous and uniform tension on the thread with resulting increased evenness of texture in the knitted product.

One embodiment of my invention in a form adapted for use with an automatic multiple links knitting machine is described in the following specification and illustrated in the drawings appended thereto and in which:

Figure 1 is a front elevation of a knitting machine embodying the improved thread change mechanism;

Figure 2, an end elevation of the right end of the machine as shown in Figure 1;

Figure 3, a plan view on the line 3—3 of Figure 2, showing portions of the thread feeder and brush carrier actuating mechanisms positioned rearwardly and at the right end of the machine as shown in Figure 1;

Figure 4, a horizontal section on the line 4—4 of Figure 2;

Figure 5, an enlarged transverse vertical section on the line 5—5 of Figure 4;

Figure 6, an enlarged transverse vertical section on the line 6—6 of Figure 4;

Figure 7, a fragmentary view on the line 7—7 of Figure 6;

Figure 8, a fragmentary view partly in section on the line 8—8 of Figure 4 showing a portion of the thread change control mechanism including the control links in neutral position;

Figure 9, a top plan view of the devices shown in Figure 8;

Figure 10, a transverse vertical section on the line 10—10 of Figures 3 and 4 showing more particularly parts employed in thread changing, thread and brush carrier actuating and stitch cam actuating;

Figure 11, a fragmentary plan view with parts in longitudinal section on the line 11—11 of Figure 10 showing portions of the thread change and lead change devices in relation to the stitch cam drive and the thread carrier and brush actuating devices in a course from left to right;

Figure 12, a fragmentary view in elevation from the line 12—12 of Figure 10 of portions of the thread carrier drive, thread carrier selector, and associated devices in position with a thread carrier rod operatively engaged and moving toward change (dotted line) position at the left;

Figure 13, a fragmentary view in elevation from the line 12—12 of Figure 10 showing the relative positions of certain parts at the thread changing phase;

Figure 14, a detail view in horizontal section on the line 14—14 of Figure 13; and

Figure 15, a transverse vertical section, enlarged, on the line 15—15 of Figure 4.

In the construction shown in the drawings, for example Figure 15, five thread feeder carrying bars 20 are employed to actuate a corresponding number (three shown) of different thread feeders 19 in each knitting section of the needle beds. And means are provided for automatically selecting, actuating, and idling said bars in any desired sequence to effect predetermined thread changes through operation of suitable pattern control devices.

The thread feeder supporting or carrying bars 20 and brush bars 22 are reciprocated in synchronized relation to stitch cam rods 40 and stitch cam assemblies as 34, 34a and 35, 35a, Fig. 4, connected thereto by operation of shaft 16 through suitable connecting devices.

As seen more clearly in Figures 3, 10 and 11, outer end portions of the brush carrier bars 22 are secured to the spaced arms of a U-shaped bracket 54 slidably supported on a fitting 99 mounted to slide on a longitudinally extending fixed bar 55. Fitting 99 also carries an actuating arm 56 having a longitudinal slot 62 open at its rear end and a bracket 57 on which latch devices or keepers are mounted for engaging and disengaging portions of the thread carrier bars 20. Thus, the brush bar actuating bracket 54 and the thread feeder carrying bar actuating bracket 57 are both operatively connected to and slidable with said actuating arm 56 which reciprocates by operation of a chain 58 in unison with the stitch cam operating arm 43 over intermediate portions of the latter's path. Said stitch cam operating arm 43 is actuated by a chain 53 driven by sprocket 65 on spindle 66, Figure 4.

Reciprocating movement is imparted to said brush carrier and thread feeder actuating arm 56 by chain 58 through a driving block 59 having a pintle 60 which pivotally engages a head 61, Figures 10 and 11, mounted to slide in said undercut longitudinal open ended slot 62 extending lengthwise of arm 56. As shown in Fig-

ures 3 and 4 chain 58 is mounted to be driven alternately in opposite directions, and in synchronized relation with chain 53, portions of chain 58 being engaged for this purpose by a driving sprocket 63 fixed on said spindle 66.

As seen in Figures 12, 13 and 14, each thread carrier bar 20 has a fitting 150 at its outer end provided with end detent lugs 156 and 157 and a middle driving lug 151 projecting upwardly and adapted and positioned to be engaged and disengaged by suitable latch devices or keepers mounted respectively on idling or detent latch carrying brackets 164 and 165, Figure 3, movable with control heads or bracket supports 152 and 153, and on the driving bracket 57 which is reciprocated with actuating arm 56, Figure 3, between said brackets 164 and 165.

Head 152 is mounted on a portion of bracket 81 and head 153 on a portion of bracket 84, which brackets are simultaneously movable toward each other in narrowing and from each other in widening.

To effect said simultaneous movements in narrowing and widening, a portion of a nut 155a secured to said bracket 81 is slidably mounted between the flanges of the inverted U-shaped rail 154 and threaded on the screw shaft 155, Figure 10. Thus, when said screw shaft is turned, bracket 81 is moved longitudinally thereon with said nut between one end (left, Figure 3) and an approximately middle point thereof, in a direction depending on the direction of rotation of said screw shaft. The thread on the right end portion of screw shaft 155 is pitched oppositely to that on the left end portion and engages a similar nut secured to bracket 84, so that, when said shaft is rotated in fashioning, bracket 84 moves simultaneously with bracket 81—but in the opposite direction.

Suitable means for controlling the time and direction of rotation of said screw shaft 155 incident to widening and narrowing include the chain 655 and sprocket 656 on shaft 375, Figures 2, 3 and 4, actuated by fashioning control means of which portions are there shown.

Thread changes for all needle sections are made simultaneously by dropping one or more thread carriers from operation and picking up one or more other thread carriers in each section. This is accomplished at the end of any course and at all positions of the parts in widening and narrowing by effecting appropriate connections and disconnections between said middle or drive lugs 151 of the several thread carrier bars 20 and keepers carried on the reciprocating driving bracket 57 mounted to move with arm 56 which drives said thread carrier bars along with the brush carrier bars 22.

The adjustably mounted control heads 152 and 153 cooperate with devices for controlling the operative change position of the detent and drive lugs on carrier bars 20 and for actuating said idling brackets 164 and 165 respectively to bring the latches thereon into and out of operative detent lug engaging position. Said idling brackets 164 and 165 which are slidably mounted on a longitudinally extending bar 55 carry latches arranged to selectively engage and disengage said detent lugs 156 and 157 respectively. Said lugs 156 are engaged by latches on bracket 164, at the left, Figure 3; and lugs 157 by like latches on the bracket 165, at the right, whereby corresponding thread carrier bars are releasably held in inoperative position, i. e. not connected to move with driving bracket 57 at the end of any course in either direction.

As shown in Figures 10, 12 and 13, when a thread carrier bar 20 is placed in operation, the drive lug 151 thereon is releasably engaged to move (i. e. reciprocate) with driving bracket 57 by means of a pair of spring pressed lug engaging keepers 158 mounted to slide vertically in recesses extending through said driving bracket 57. Upper end portions of keepers 158 provide bearings for rollers 159; and springs 160 are interposed between bracket 57 and keepers 158 to bias the latter downwardly in locking position and to an extent limited by stop pins 161 thereon.

As seen in Figures 3, 11, 12 and 13, brackets 162 and 163 which are secured to the control heads 152 and 153 respectively, present transversely disposed edge portions, as 162a on bracket 162, just above the thread carrier bars 20 and in position to engage the detent lugs 156 and 157 respectively. These edges effect adjustment and maintain alignment (Figures 12, 13) of the detent lugs 156 on the thread carriers bars 20 with widening and narrowing movements of heads 152 and 153 and with reciprocating movements of brackets 164 and 165 in relation thereto. Proper operative relation is thereby maintained between the several detent and drive lugs of the carrier bars and the latch or keeper devices cooperating therewith.

The latch carrier bracket 164, left, in Figure 3, slidably mounted on bar 55, Figures 5 and 11, moves with control head 152 and also has limited reciprocating movement relatively thereto. It is provided with a cam roller 166 mounted on a stud 167, Figure 12. A closed cam 168 having cam flanges is mounted to rotate in head 152. Said cam is splined on a shaft 169 having one portion journaled in said head 152 and another portion journaled in head 153.

A closed cam 170 having cam flanges similar to those of cam 168, but oppositely disposed, and operated by shaft 169 simultaneously with cam 168, is mounted to rotate in head 153 (at the right, Figure 3).

Cam roller 166 rides between the flanges of closed cam 168, each flange having an annular portion 171 extending about 180° and an oblique thrust portion 172, Figure 11, of the same extent. A similar cam roller engaging cam 170 operates in like manner.

Thus, when shaft 169 is rotated 360°, it simultaneously turns closed cams 168 and 170, at all positions of heads 152 and 153. The oblique flanges of said cams 168 and 170, during 180° of their rotation, bear simultaneously in opposite directions against their respective cam rollers. The effect is to initially thrust said brackets 164 and 165 from normal retracted position, Figure 12, to the extended or operative thread change position shown in Figure 13, and then back to said normal position in relation to heads 152 and 153 respectively. When said brackets are brought into extended position, the latch devices thereon cooperate with the detents and lugs on the bars 20 and with other instrumentalities in effecting a thread change as hereinafter described.

Shaft 169 is controllably rotated one turn at predetermined times to effect the above described reciprocating movement of brackets 164 and 165. For this purpose, in the illustrated embodiment a sprocket 173 fixed on said shaft 169, Figure 2, is driven by a chain 682 from a sprocket 683 fixed on shaft 169a.

As shown in Figures 2, 6 and 7, shaft 169a has

a gear 745 loosely mounted thereon and meshing with a gear 746 on main shaft 6. Gear 745 has a clutch carrier portion, Figure 7, cooperating in a well known manner with a clutch plate 747 through a spring pressed rolling key 748. An arm 749 secured on a thread change control shaft 659 normally engages a stop 729 and an exposed outer end portion of rolling key 748, thereby holding clutch plate 747, and shaft 169*a* to which it is secured, disconnected from gear 745 which is loose on said shaft. However, when the incidence of perforations in the pattern control sheet 553, Figure 2, in proper relation to holes in pattern drum 554, effective through a link 703 or 704, Figures 4, 8 and 9, causes the thread change shaft 659 to rotate counter-clockwise a predetermined extent, Figure 6, the end of key 748 is released from the arm 749, and shaft 169*a* is rotated one turn with a corresponding turn of main shaft 6.

The aforesaid thrust or reciprocation of idling brackets 164 and 165 effected by rotation of shaft 169 is synchronized with thread carrier bar driving devices to effect any required thread change in accordance with the operation of suitable control mechanism, such for example, as that shown in part in Figures 8, 9.

As seen more clearly in Figures 12, 13, 14, an undercut edge portion of bracket 164 presenting an inverted flange 174 engages and supports a slide box 175. A latch lifting lever 176 having rounded ends is pivotally mounted on said box 175 between posts 177.

Slide box 175 also carries a horizontally extending pusher 178 positioned below and in vertical alignment with lever 176 and having its free end projecting beyond the adjacent end of said lever (Figures 12, 14) at a level to pass above the detent lugs 156, 157, but to engage a drive lug 151.

A link 179 has one end pivotally connected at 180 to said slide box 175 and the other end connected to slide freely along rod 181 which extends through a hole in link 179 (Figure 11). Rod 181 is supported between the ends of spaced levers, as 182, secured to and rocked by a shaft 183 having at its outer end, Figure 2, a lever 657 connected to a lever 658 on thread change control shaft 659, Figures 6 and 7, by a link 660.

Said shaft 659 is rotated from neutral to any one of a number of angular positions in response to suitable control devices, Figures 4, 8, 9, to move said box 175, and consequently said latch lifter 176 and said pusher 178 carried thereby, transversely to any desired one of various operative positions along said flange 174 of bracket 164 to determine which thread carrier bar or bars are to be actuated and which to be idled.

In each of said several operative positions of box 175 the pusher 178 is aligned to engage the drive lug 151 of the one or more thread carrier bars 20 selected for operation in the next knitting course; and the latch lifting lever 176 is in position to engage one or more latch plungers 184 mounted to slide vertically on bracket 164 above the same thread carrier bar or bars 20 as that which has the drive lug or lugs 151 in line to be engaged by pusher 178, Figure 14.

Each latch plunger 184 has a horizontally extending top flange 185 to limit downward movement. The bottom end of each such plunger is tapered to facilitate passage of said plunger if and as it is moved inwardly across a detent lug 156 or 157 with inward movement of the carrier brackets 164 and 165. One side of each latch plunger 184, Figures 12 and 13, is recessed between its ends at 186 to receive one end of said lifting lever 176; and a shoulder 187 extends from said side of latch plunger 184 just above said recess 186. A compression spring 188 mounted between said shoulder 187 and an overlying portion of the carrier bracket 164 normally biases the latch plunger 184 downwardly.

As shown in Figures 11 and 13, the latch carrier bracket 164 is also provided with a keeper lifting arm 189 extending toward driving bracket 57 and having a tapered end arranged and adapted (Figure 13) to engage rollers 159 on keeper 158 to lift the latter out of drive lug retaining position. Thus, when the parts are in the relative positions shown in Figures 13 and 14, i. e. with keeper 158 lifted, the drive lug 151*b*, Figure 14, last engaged thereby, is cleared by said keeper which, in raised position, Figure 13, is also ready to be lowered behind the drive lug 151*a*, Figure 14, of the newly selected bar 20. It will be understood that positioning, latching, releasing and controlling devices such as those above described in connection with head 152 are also associated with head 153 (right, Figure 3) for a similar purpose and so that thread changes may be made at the end of any knitting stroke in either direction.

It is assumed for the purpose of explaining the mode of operation of the improved thread change apparatus herein described that the control devices have caused slide box 175 to move from neutral, Figure 11, to an operative position on guide flange 174, in preparation for dropping a thread carrier bar 20 and picking up another selected bar 20. (Figure 14.) This brings the pusher 178 into line operatively with the drive lug 151*a* (so marked in Figure 14 for the purposes of this description) mounted on the selected bar which is the middle one of the five thread carrier actuating bars 20, and brings latch lifter 176 in line with the middle one, as 184*a* of the latch plungers 184.

Driving bracket 57 completes its movement toward the still retracted bracket 164 and into the end or change position, shown in broken lines, Figure 12, where it dwells during the overrun phase of the stitch cams.

During this period and after the above described positioning movement of slide box 175, shaft 169 is rotated one turn to cause the previously described oscillation of carrier bracket 164 from the position shown in Figure 12 to that shown in Figure 13 and back. During the initial portion thereof, the pusher 178 advances to the right and, in so doing, moves the drive lug 151*a* aligned therewith into position, Figure 14, to be presently engaged by the raised keeper 158 on driving bracket 57.

The driving bracket 57 has oppositely extending arms 190 which present downwardly directed cam surfaces 190*a* positioned and adapted to engage and depress the exposed rounded end of lifting lever 176, when said carrier bracket 164 is advanced to the right from its position, as shown in Figure 12, toward driving bracket 57 while the latter is in its left end or change position, shown dotted Figure 12. This rocks lever 176, as shown in Figure 13, thereby raising its other rounded end to engage the under side of a shoulder 187 to lift the middle one, 184*a*, of latch plungers 184, Figures 13 and 14, against compression spring 188 so that the lower end of said plunger 184*a* may pass freely above the upper end of said detent lug 156 when carrier bracket 164 is returned from said extended or change position (Figure 13) to

normal retracted position (Figure 12). This return movement takes place just before the next stroke of driving bracket 57 to the right.

During said forward and return movements of bracket 164, the other four latch plungers 184 thereon remain biased in operative "down" position. They are therefore set, on forward movement, to engage the detent lug, 156b, Figure 14, for example, on the bar 20 lately free to move toward the left by the lifting of keeper 158 on driving bracket 57. On the return movement of bracket 164, therefore, detent lug 156b of said bar 20 passes under said lifted keeper and said bar is carried to retracted or idling position (Figure 12).

When said bracket 164 reaches its normal retracted position, the tapered end of lifting arm 189 is disengaged from roller 159, whereupon keeper 158 returns to a "down" or latching position in relation to the newly engaged drive lug 151a. On the next movement of driving bracket 57 to the right (Figure 11), the thread carrier bar 20 corresponding to and carrying said engaged drive lug 151a is brought into operation.

It will be noted that the middle latch plunger 184a and the one below it, as shown in Figure 14, are contiguously arranged. By moving slide box 175 to a slightly less advanced or lower intermediate operative position than that as shown in said figure, the inner end of latch lifter 176 may simultaneously engage both said latch plungers; and the outer end of pusher 178 engages corresponding adjacent drive lugs 151, so that when bracket 164 is advanced and retracted as above described, two thread carrier bars 20 are brought into operation together, as for plating or reinforcing.

The mode of operation above described applies as well to the parts having similar functions located at the right (Figure 3); and thread changes may be made as desired at either end of the travel path of driving bracket 57 in accordance with predetermined settings of suitable control devices.

My improved thread change apparatus as above described provides a sturdy and reliable mechanism which is also flexible and adaptable to knitting machines whether single or multiple employing various types of driving and widening and narrowing devices and involving full or partial automatic control.

The above described mechanisms are also shown and described but not independently claimed in my co-pending application Serial No. 530,761 filed herewith and of which the present application is in effect a division.

I claim:

1. In a knitting machine having a stitch cam actuated by a reciprocatable stitch cam carrier, means including a reciprocatable arm for driving said stitch cam carrier, and a plurality of thread feeders arranged and adapted to dispose different threads in advance of said stitch cam, the combination of a plurality of slidably mounted bars for supporting said several thread feeders, a reciprocatable thread feeder driving arm actuated independently of said stitch cam carrier driving arm and operatively connected for synchronized movement with a portion of the course of said stitch cam carrier driving means, and means for releasably connecting said slidably mounted bars in operative relation to said thread feeder driving arm.

2. In a knitting machine having a stitch cam actuated by a reciprocatable stitch cam carrier, means including a reciprocatable arm for driving said stitch cam carrier, and a plurality of thread feeders arranged and adapted to dispose different threads in advance of said stitch cam, the combination of a plurality of slidably mounted bars for supporting said several thread feeders, means for releasably retaining said bars in inoperative position, a reciprocatable thread feeder driving arm actuated independently of said stitch cam carrier driving arm and operatively connected for synchronized movement with a portion of the course of said stitch cam carrier driving means and movable toward and from said bar retaining means, means for releasing said bars from said retaining means, and means for releasably connecting said released bars in operative relation to said thread feeder driving arm.

3. In a knitting machine having a stitch cam actuated by a reciprocatable stitch cam carrier, means for driving said stitch cam carrier, and a plurality of thread feeders arranged and adapted to dispose different threads in advance of said stitch cam, the combination of a plurality of slidably mounted supports for said several thread feeders, means for releasably retaining said supports in inoperative position including a separate spring pressed latch for each support, a reciprocatable thread feeder driving member operatively connected to said stitch cam driving means and movable toward and from said support retaining means, a spring pressed keeper for releasably connecting said supports to said driving member, latch actuating means movable into and out of operative relation to said spring pressed latches, means for moving said latch actuating means to displace one of said latches and thereby free a thread feeder support from said retaining means, and means cooperating with said driving member to lift said keeper and thereby to release another thread feeder support therefrom and movable away from said driving member to permit said keeper to engage and retain said first mentioned support in operative connection with said driving member.

4. In a knitting machine having a plurality of slidably mounted supports for thread feeders, detent means for releasably retaining some of said carrier supports in idle position including a set of independently operative latches, one for each support, and driving means for actuating said feeder supports, the combination of means for periodically moving said driving means to and from a change over position in relation to said detent means, means for moving said set of latches to and from change over position in relation to said driving means, and means for selectively conditioning one or more of said latches to release a corresponding support or supports from said detent means.

5. In a knitting machine having a plurality of thread feeder supporting bars, detent means for retaining said bars in idle position, means for driving said bars and means for moving said bar driving means to and from change over position in relation to said detent means, the combination of means for moving said detent means to and from change over position, and means operatively interposed between said detent means and said driving means to releasably connect and disconnect said bars in relation to said detent means and said driving means while the latter is at said change over position.

6. In a knitting machine having a plurality of thread feeder supporting bars, detent means for retaining said bars in idle position including a

set of detent latches, means for driving said bars including a keeper, and means for moving said bar driving means to and from a change over position in relation to said detent means, the combination of means for moving said detent means to and from change over position, and means operatively interposed between said detent means and said driving means to releasably connect and disconnect said bars in relation to said detent latches and said keeper while the driving means is at said change over position.

7. In thread change mechanism for knitting machines having widening and narrowing devices and wherein different threads are supplied to the needles in knitting by different thread feeders which are supported on bars mounted for endwise sliding reciprocation and a selected one, or more of said bars is actuated to feed thread while others of said bars are releasably held in idle position, the combination of means operatively connected with said widening and narrowing devices for driving said thread feeder carrying bar, detent means operatively connected with said widening and narrowing devices for releasably holding said other bars in idle position, said driving means including a keeper arranged and adapted to releasably engage a portion of said bar, and said detent means including a latch arranged and adapted to releasably engage another portion of said bar, and means for actuating said keeper and said latch.

8. In thread change mechanism for knitting machines having widening and narrowing devices and wherein different threads are supplied to the needles in knitting by different thread feeders which are supported on bars mounted for endwise sliding reciprocation and a selected one, or more of said bars is actuated to feed thread while others of said bars are releasably held in idle position, the combination of means operatively connected with said widening and narrowing devices for driving said thread feeding bar, detent means operatively connected with said widening and narrowing devices for releasably holding said other bars in idle position, said driving means including a keeper arranged and adapted to releasably engage a portion of said bar, and said detent means including a set of latches arranged in a row, a slidably mounted latch lifter, means for moving said lifter into and out of position along said row to lift any selected one of said set of latches, means for actuating said keeper, and means for actuating said lifter in any one of its several latch lifting positions.

9. In thread change mechanism for knitting machines having widening and narrowing devices and wherein different threads are supplied to the needles in the needle bed by different thread feeders which are supported on bars mounted for sliding endwise reciprocation toward and from thread change position, and a selected one, or more, of said bars is actuated to feed thread while others of said bars are releasably retained in idle position, the combination of a movable head, means operatively connected with said widening and narrowing devices for varying the position of said head, a carrier bar driving arm, means operatively connected with said widening and narrowing devices for actuating said arm toward and from said head, a slidably mounted detent bracket arranged between said head and said driving arm, means for moving said bracket away from said head into thread change position and toward said head into bar retaining position, latches mounted on said detent bracket, and means for actuating one or more of said latches to release one or more of said bars when said bracket is moved into thread change position.

10. In thread change mechanism for knitting machines having widening and narrowing devices and wherein different threads are supplied to the needles in the needle bed by different thread feeders which are supported on bars mounted for sliding endwise reciprocation toward and from thread change position, and a selected one, or more, of said bars is actuated to feed thread while others of said bars are releasably retained in idle position, the combination of a carrier bar actuating arm, a driving lug on each bar, a keeper mounted on said arm to releasably engage said lug, and means for actuating said keeper to disengage said lug when said bar and said arm are in thread change position.

11. In thread change mechanism for knitting machines having widening and narrowing devices and wherein different threads are supplied to the needles in the needle bed by different thread feeders which are supported on bars mounted to slide toward and from thread change position; and a selected one, or more, of said bars is actuated to feed thread while others of said bars are releasably retained in idle position, the combination of a carrier bar actuating arm, a driving lug on each bar, a keeper mounted on said arm to releasably engage said lug, means for actuating said keeper to disengage said lug when said bar and said arm are in thread change position, and means for moving another bar into position for its lug to be releasably engaged by said keeper when the latter is actuated to disengage said other lug.

12. In thread change mechanism for knitting machines having widening and narrowing devices and wherein different threads are supplied to the needles in the needle bed by different thread feeders which are supported on bars mounted to slide toward and from thread change position; and a selected one, or more, of said bars is actuated to feed thread during said sliding movement while others of said bars are releasably retained in idle position, the combination of a movable head, a slidably mounted detent bracket operatively connected to be moved with said head, a cam actuating shaft, a cam slidably mounted thereon and rotatable therewith and movable with said movable head, means operatively interposed between said cam and said detent bracket and actuated by rotation of said cam to effect reciprocating movement of said bracket from its idle position to its thread change position and return, and latches mounted on said bracket and arranged and adapted to releasably engage portions of said thread feeder carrying bars to retain the same when said bracket is in idle position and to release the same in its thread change position.

13. In thread change mechanism for knitting machines having widening and narrowing devices and wherein different threads are supplied to the needles in the needle bed by different thread feeders which are supported on bars mounted to slide toward and from thread change position; and a selected one, or more of said bars is actuated to feed thread during said sliding movement while others of said bars are releasably retained in idle position, the combination of a movable head, a slidably mounted detent bracket operatively connected to be moved with said head, a cam actuating shaft, a cam slidably mounted thereon and rotatable therewith and

movable with said movable head, means operatively interposed between said cam and said detent bracket and actuated by rotation of said cam to effect reciprocating movement of said bracket from its idle position to its thread change position and return, latches mounted on said bracket and arranged and adapted to releasably engage portions of said thread feeder carrying bars to retain the same when said bracket is in idle position and to release the same in its thread change position, a latch actuating member, means for adjusting the position of said member in relation to said latches, and means for actuating said adjusting means in advance of each movement of detent bracket from its idle position to its thread change position.

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