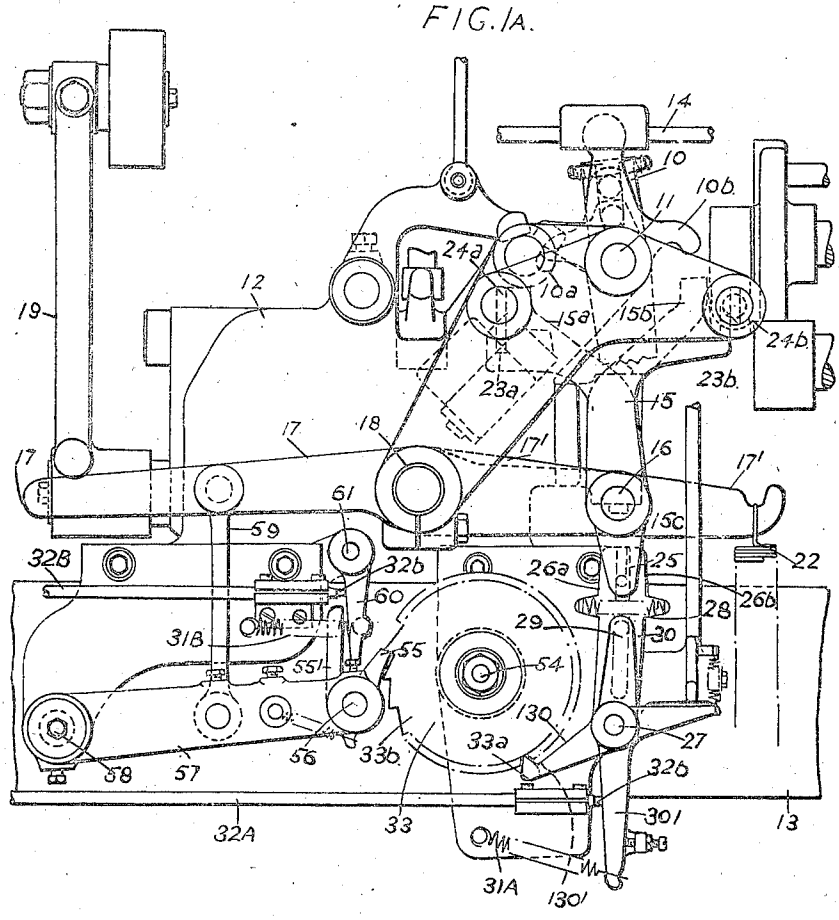
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PATTERNING MECHANISM OF KNITTING MACHINES

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FIG. 1A.



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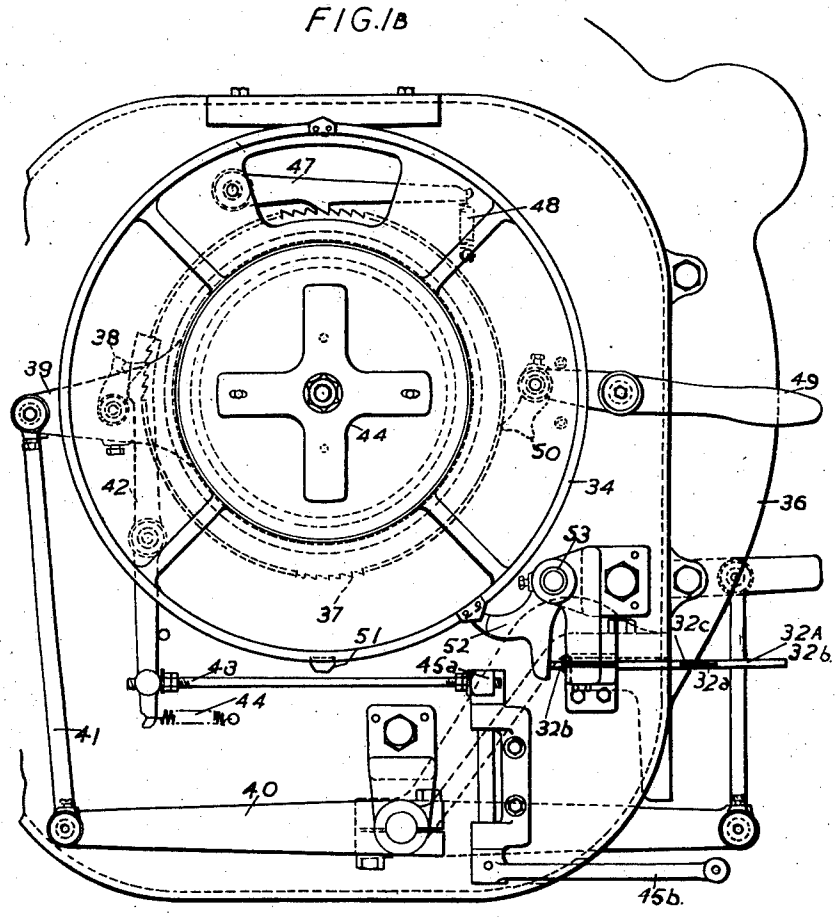
Their Attorney

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PATTERNING MECHANISM OF KNITTING MACHINES

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FIG. 1B



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PATTERNING MECHANISM OF KNITTING MACHINES

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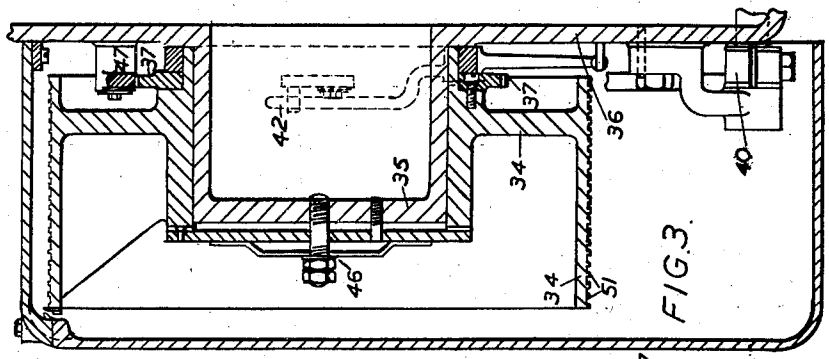


FIG. 3.

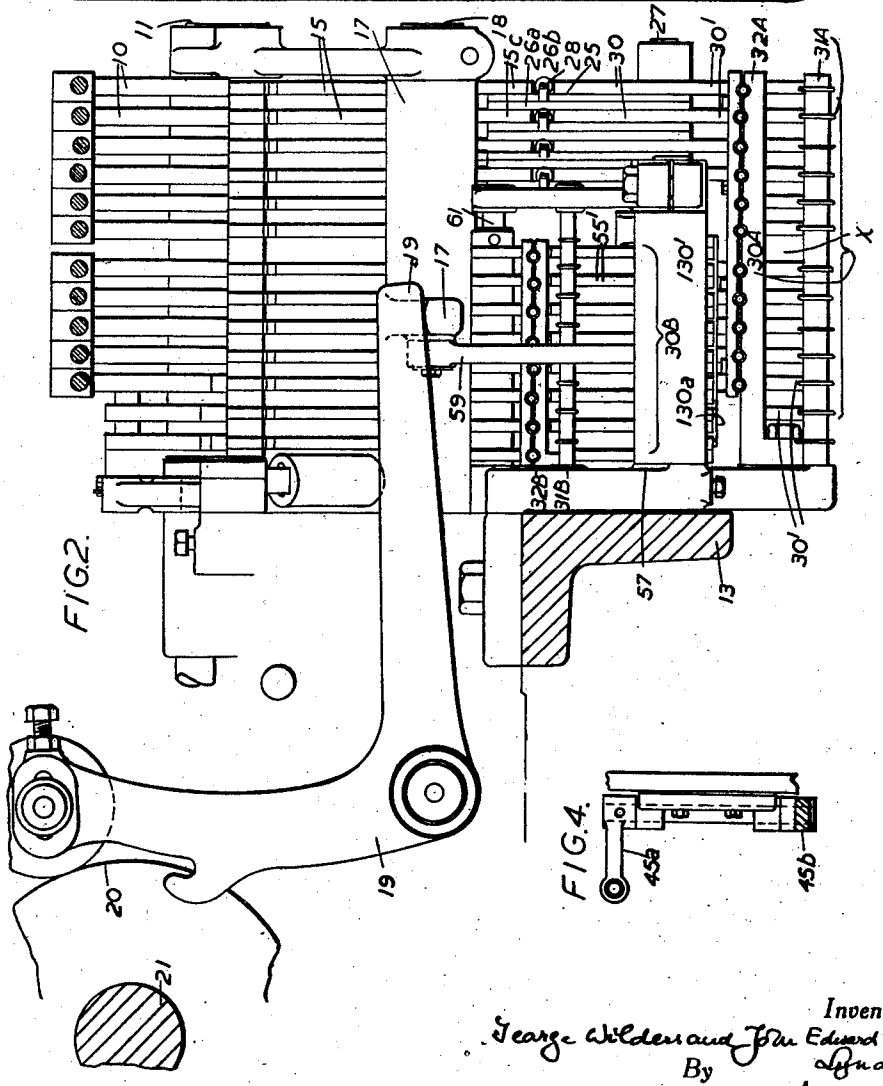


FIG. 2.

FIG. 4.

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2,431,218

UNITED STATES PATENT OFFICE

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PATTERNING MECHANISM OF KNITTING MACHINES

George Wilders, Kegworth, and John E. Lynam, Mapperley, England, assignors to William Cotton Limited, Loughborough, England

Application July 5, 1945, Serial No. 603,374
In Great Britain April 7, 1944

7 Claims. (Cl. 66—155)

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This invention concerns the patterning mechanism of knitting machines, primarily Cotton's Patent and other straight bar knitting machines, and one object is a construction of patterning mechanism whereby elements of the machine may be selectively moved by power means.

The mechanism provided by this invention comprises a set of individually-movable patterning members, a set of actuating members associated therewith and selectively movable each between alternative positions at least one of which is an operative position in which it is positioned ready to move an associated patterning member, at least one patterning device (such for example as a drum, chain, a series of discs, or the like) for selectively moving said actuating members, and power means for effecting relative bodily displacement between said sets and for thereby causing any operatively positioned actuating member to move its associated patterning member. It will be appreciated that, the patterning members being connected to those elements of the machine that it is required to move selectively, the patterning device is relieved of the duty of producing this movement and its functions are confined to the selection of the actuating members. Preferably there are two alternative operative positions of the actuating members, whereby the patterning members may be moved between two alternative positions. It is further preferred that the actuating members shall be bodily displaceable as aforesaid, although it is within the scope of the invention to displace the patterning members.

The foregoing, and other features of the invention set out in the appended claims, are incorporated in the construction that will now be described, as an example of a patterning mechanism that is suitable for a Cotton's Patent or other straight bar knitting machine, with reference to the accompanying drawings in which—

Figure 1A is a side elevation of a patterning mechanism according to this invention;

Figure 1B is a continuation, to the left, of Fig. 1A and is a side elevation of pattern drum and associated parts for controlling the patterning mechanism;

Figure 2 is an elevation, looking from the left, of the mechanism shown in Fig. 1A;

Figure 3 is a cross-section through the drum of Fig. 1B;

Figure 4 shows a detail.

Referring primarily to Figs. 1A and 2, the set of patterning members consists of a plurality of arms 10 pivoted side by side on a spindle 11 suitably mounted by bracket 12 in the machine frame whereof the front rail is shown at 13; these arms 10 are connected to the various elements that it is required to move. For example some of them may be connected to control rods 14 that extend, slidably, lengthwise of the machine to shog trucks or to operate various other devices. Each arm 10 is further provided with two noses 10a, 10b disposed on opposite sides of the axis, so that if one nose is pushed the arm is rocked in one direction and if the other nose is pushed the arm is rocked in the other direction.

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The set of actuating members consists of a plurality of levers or actuators 15 pivoted side by side on a spindle 16 carried between the fork arms 17' of a lever 17 which is pivoted in the machine frame on a spindle 18 and is rocked, to carry the actuating members 15 towards and away from the noses 10a, 10b of the patterning members 10, by power derived from a truck lever 19 operated by a cam 20 on the main cam shaft 21. Each actuating lever 15 has its end bifurcated to provide two fingers 15a, 15b and is movable between two alternative positions in one of which one finger is registered with one nose of the associated patterning arm 10 and in the other of which the other finger is registered with the other nose. Therefore according to the attitude of the lever 15, as a given set thereof is advanced by lever 17 one or other of the fingers 15a, 15b pushes against the associated nose 10a, 10b and the appropriate arm 10 is rocked in one direction or the other. The set of actuating members 15 is retracted by a spring 22 attached to an extension of one of the fork arms 17'.

The fingers 15a, 15b of the actuators 15 are provided with slots 23a, 23b which co-operate with fixed blades 24a, 24b, the arrangement being that when one of the fingers, such as the finger 15b in Fig. 1A, has been rocked into the operative position in which it registers with the associated nose of a patterning arm, one of the slots is brought into register with one of the blades (slot 23a being in register with blade 24a in Fig. 1A) and engages it after a small initial advance of the set of actuating members so that thereafter that particular actuating member is locked in angular position. This, in conjunction with the scissors mechanism now to be described, permits a fresh selection of the actuating members to be prepared while the previous selection is in operation, the actual change to the fresh selection only being made when the actuating members have been withdrawn clear of the blades 24a, 24b.

Each actuating member 15 has a downward

extension 15c carrying a pin 25 received between a pair of scissor jaws 26a, 26b pivoted on a shaft 27 and drawn together by spring 28. The jaws further receive a pin 29 on a lever 30 also pivoted on shaft 27 and biassed by a return spring attached to its arm 30', there being a lever 30 for each pair of jaws 26a, 26b and for each actuating member 15. Thus when a selected lever 30 is rocked in one direction or the other, one of the scissor arms 26a, 26b is moved and the spring 28 is tensioned so that immediately the actuating member is freed from a blade 24a or 24b said spring moves the other scissor arm and therefore moves the associated actuating member.

These levers 30 are selectively moved by at least one cyclic patterning device; there may be a plurality of such devices each controlling at least one lever and there may be at least one of the levers which is controlled by a plurality of the devices. In the present example the levers 30 that are embraced by the bracket 30A in Fig. 2 are controlled by the patterning device shown in Fig. 1B through connections 32A and those that are embraced by the bracket 30B are controlled by a patterning device which is indicated generally by the numeral 33 in Fig. 1A; furthermore (as shown by the overlap between the brackets) some of the levers are controlled by both devices.

Turning now to Figs. 1B and 3, the cyclic patterning device is therein illustrated by way of example as consisting of a drum 34 mounted on a boss 35 which if desired can be an extension on the side of the existing end gear guard 36. It is provided with a rack wheel 37 engaged by a pawl 38 on a lever 39 oscillatable about the drum axis by an arm 40 and link 41; the pawl 38 is controlled by a bluff lever 42, link 43, spring 44, and arms 45a and 45b from any suitable control (not shown) such for example as a chain with a single row of studs. Over-racking is prevented by a friction device 46 of known construction, and back-racking by ratchet 47 and spring 48; hand-racking is accomplished by hand lever 49 and pawl 50. The periphery of the drum is equipped with rows of studs 51 in the required pattern lay-out which operate a set of stud levers 52 pivoted at 53 and these in turn operate the connections 32A, 32B. Each such connection consists of a tubular sheath 32a with a plunger 32b at each end connected by a close-coiled spring 32c, and it follows that pressure on a plunger 32b at the drum end projects the plunger at the other end of the sheath, the plungers being returned by springs 31A, 31B.

The drum 35 controls the group of levers 30A directly through connections 32A and controls the group of levers 30B indirectly through the patterning device 33 and connections 32B. This device 33 consists of a plurality of cyclic patterning units, one for each lever of group 30B. The said units are illustrated, by way of example, as each consisting of a pattern disc 33a.

These discs 33a have notched peripheries engaged by arms 130 of the levers of group 30B, are each provided with a rack wheel 33b, and are individually rotatable on a common stationary shaft 54. For each rack wheel 33b there is a pawl or clawker 55 for racking it. These pawls or clawkers 55 are pivoted side by side on a fixed axis 56 on a lever 57 which is rocked about its pivot 58 by a connection 59 from the lever 17 which carries the actuating members 15 so that, providing they are not bluffed or otherwise rendered inoperative, each time the set of actuating members moves in one direction the operative pawls or clawkers 55 rack their associated pattern discs 33a. The said pawls or clawkers 55 are selectively released, or rocked to a position in which they engage their rack wheels 33b, by the drum 34 and connections 32B, each of the latter being arranged to push against one of a set of levers 60 pivoted at 61, the said levers being returned by springs 31B against tails 55' on the clawkers.

There may be at least one lever 30 that is movable by each of a plurality of the discs 33a, the said lever having a lateral extension or feeler 130' that spans said plurality. This particular lever 30 may be void of an arm 30', as is indicated in Fig. 2 by the blank space marked X, in which case only this one of the group of levers 30B is controlled indirectly through the device 33. Alternatively or in addition there may be a lever 30 having a projection 30' for direct control by drum 34 in addition to a feeler (such as that indicated at 130a in Fig. 2) which spans a plurality of discs 33a and thereby provides for indirect control from the drum 34 through the device 33.

The device 33 will, in general, be employed for fashioning and the discs 33a will be cut out to provide various spacings for the fashionings. Thus when an appropriate stud 51 on drum 34 allows one of the pawls 55 to come into operation the co-operating disc 33a will commence to rack and will cause the machine to fashion at predetermined intervals according to the cutting of that disc. This will continue without further movement of drum 34 until the latter is racked to bluff the pawl 55.

Alternatively or in addition there may be at least one lever movable by a single disc or each of a plurality of levers may be provided with its own disc.

Preferably, but not necessarily, the pattern discs 33a are racked, to change the selection of the actuating lever or levers controlled thereby, during displacement of the aforesaid set of actuating levers 15 in one direction and the actuating levers are moved into contact with the noses 10a, 10b of the patterning arms 10 and rock the latter during displacement of said set in the opposite direction.

We claim:

1. In a knitting machine, patterning mechanism comprising a set of patterning members individually movable to and fro, a set of actuating members associated therewith and selectively movable each between two alternative positions each of which is an operative position in which it is positioned ready to move an associated patterning member, power means for effecting relative bodily displacement between said sets and for thereby causing the actuating members to move the associated patterning members in one direction or the other according to the positions occupied by said actuating members, means for locking the actuating members in the selected positions during the bodily displacement, a patterning device for selecting the actuating members, while locked, for movement between their alternative positions, and spring connections between said device and the actuators for moving the latter, when unlocked, in accordance with the prior selection by said device.

2. Mechanism according to claim 1, wherein said connections consist of pair of scissors jaws, and a spring urging each pair of jaws together.

3. In a knitting machine, patterning mechanism comprising a set of patterning members in-

dividually-movable to and fro about a pivot and each having two noses whereby it may be rocked in one direction or the other by pressure on the appropriate nose, a set of actuating members associated therewith and selectively movable each between two alternative positions for engagement with either of the two noses of an associated patterning member, at least one patterning device for selectively moving the actuating members between their alternative positions, and power means for effecting relative bodily displacement between the two sets and for thereby causing the actuating members to press on and move those noses, of the patterning members, for engagement with which they have been prepared by the selection.

4. Mechanism according to claim 3, wherein the actuating members are pivotally movable between their alternative positions and each of them has a pair of fingers operable respectively in the two positions.

5. In a knitting machine, a patterning mechanism comprising a set of patterning members, individually movable to and fro; a set of actuating members associated therewith and selectively movable each between two alternative positions each of which is an operative position in which it is positioned ready to move an associated patterning member; at least one patterning device for selectively moving said actuating members, between their alternative positions; power means for effecting relative bodily displacement between said sets and for thereby causing the actuating members to move the associated patterning members in one direction or the other according to the positions accupied by said actuating members; and means for locking said actuating members in the selected position during the bodily displacement and for making a fresh selection thereof while they are locked.

6. In a knitting machine, a patterning mechanism comprising a set of patterning members individually movable to and fro; a set of actuating members associated therewith and selectively movable each between two alternative positions each of which is an operative position in which it is positioned ready to move an associated patterning member; a plurality of patterning devices one

of which is moving at least one of said actuating members between its alternative positions and another of which is moving at least one other of said actuating members between its alternative positions; and power means for effecting relative bodily displacement between said sets and for thereby causing the actuating members to move the associated patterning members in one direction or the other according to the positions occupied by said actuating members.

7. In a knitting machine, a patterning mechanism comprising a set of patterning members individually movable to and fro; a set of actuating members associated therewith and selectively movable each between two alternative positions each of which is an operative position in which it is positioned ready to move an associated patterning member; a plurality of patterning devices one of which is controlling movement of at least one of said actuating members between its alternative positions, another of which is controlling movement of at least one other of said actuating members between its alternative positions and two of which are controlling movement of at least one other of said actuating members between its alternative positions; and power means for effecting relative bodily displacement between said sets and for thereby causing the actuating members to move the associated patterning members in one direction or the other according to the positions occupied by said actuating members.

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J. E. LYNAM.

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