Aug. 27, 1935. A. GEYER 2,012,504

RACKING MECHANISM FOR KNITTING MACHINES

Filed April 20, 1933 4 Sheets-Sheet 1

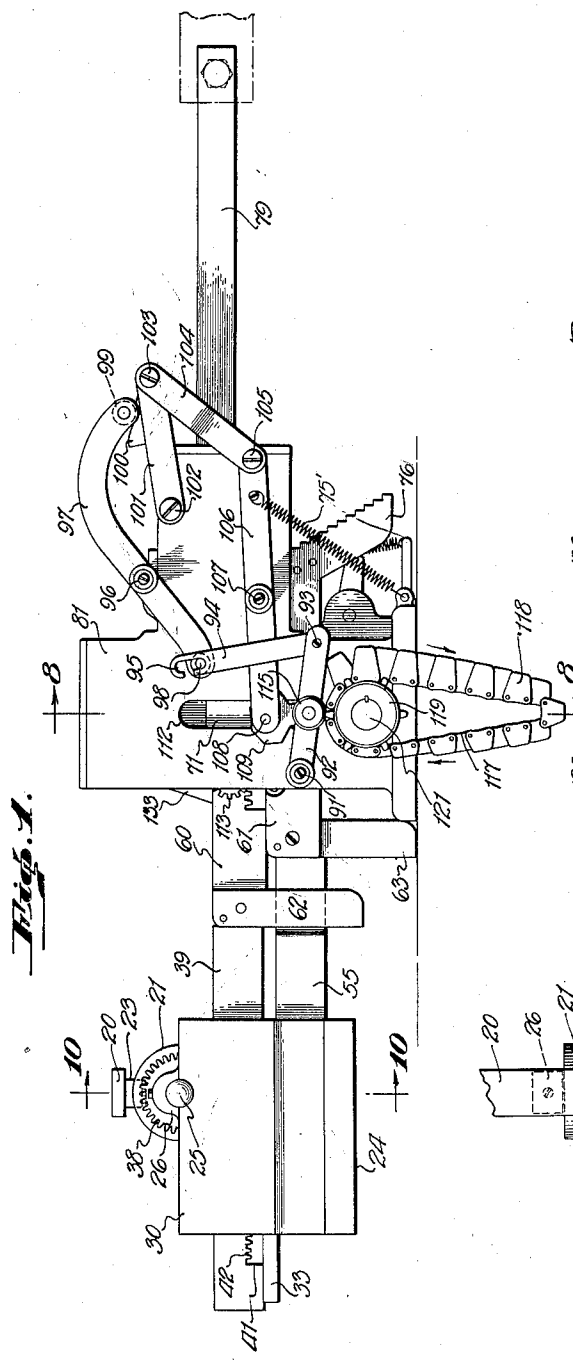

Fig. 1.

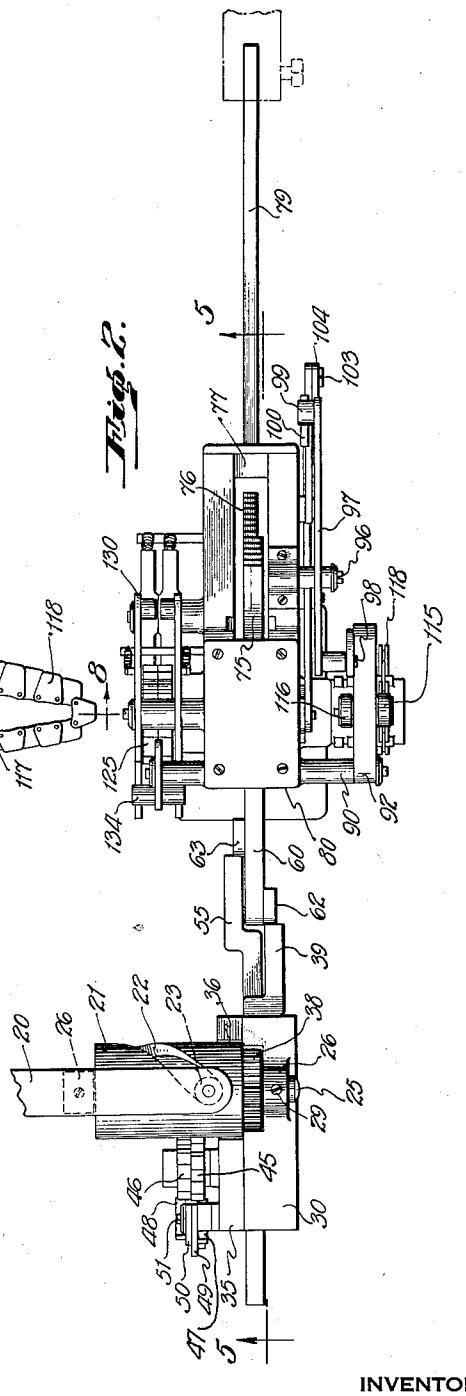

Fig. 2.

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Fig. 3.

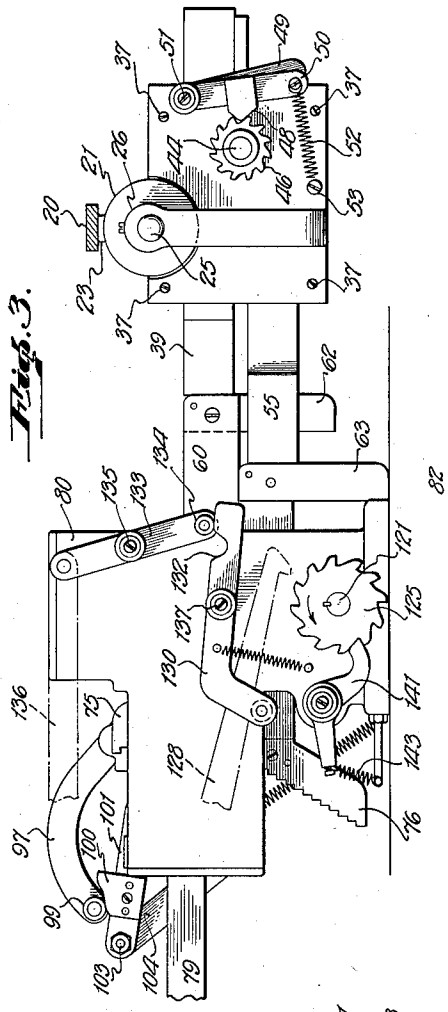


Fig. 4.

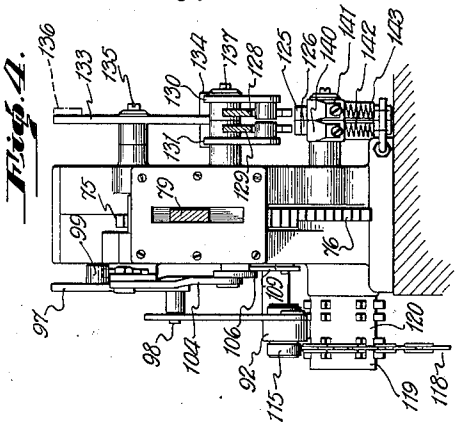
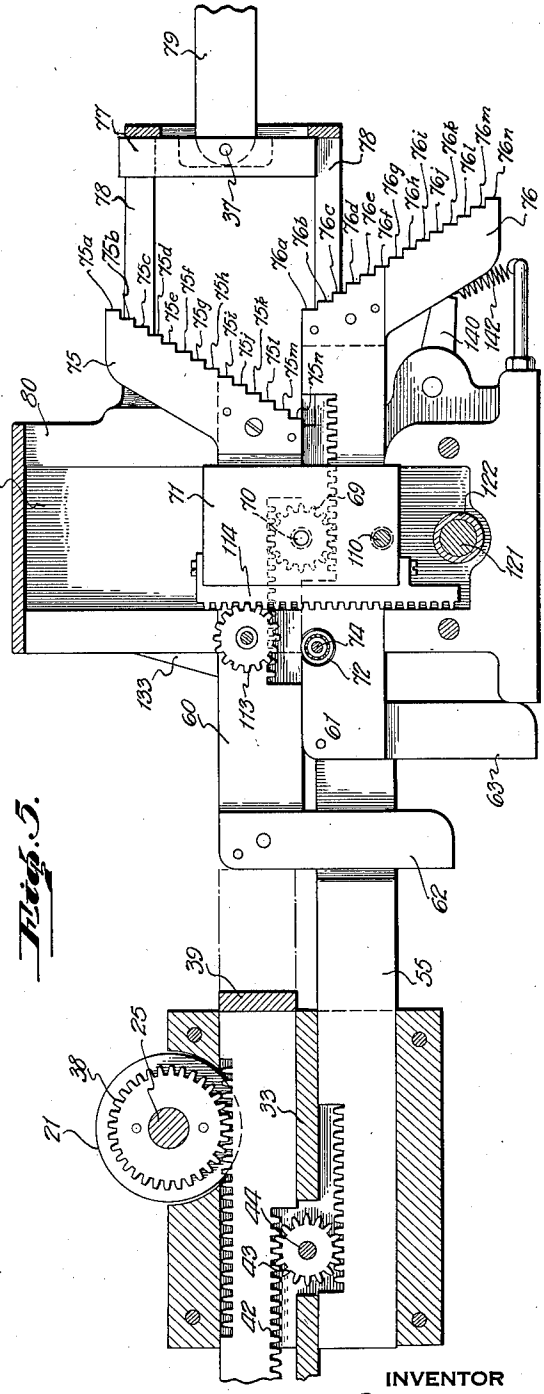


Fig. 5.



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RACKING MECHANISM FOR KNITTING MACHINES

Filed April 20, 1933 4 Sheets-Sheet 3

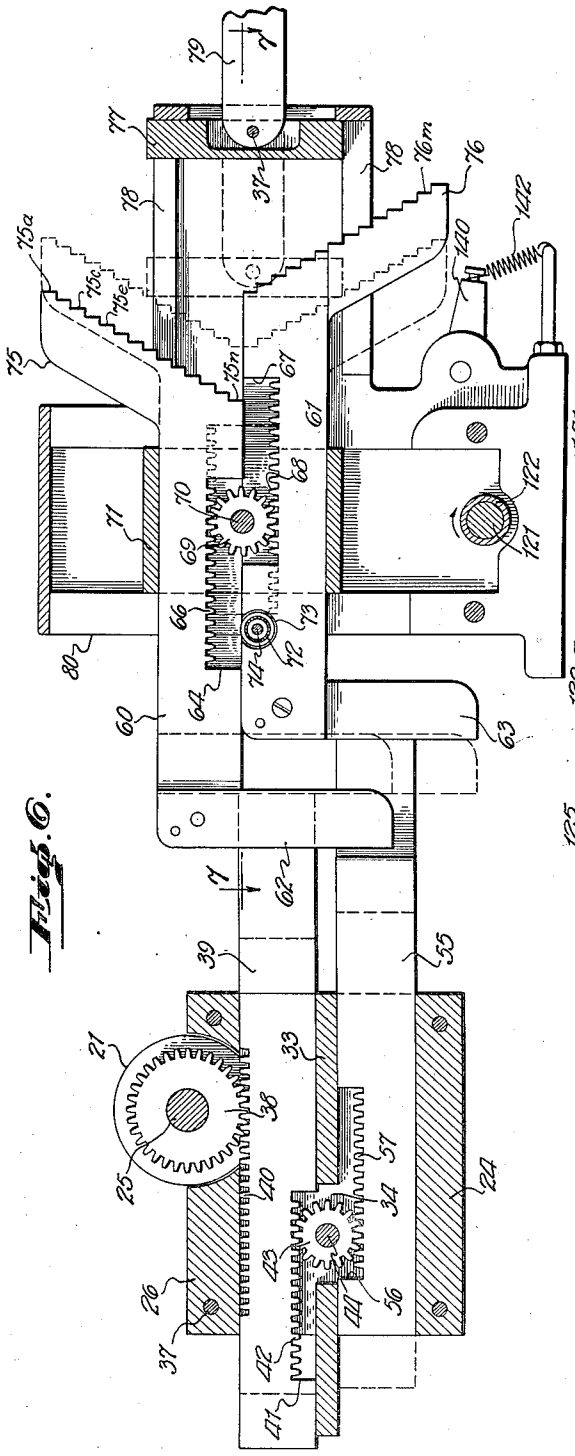

Fig. 6.

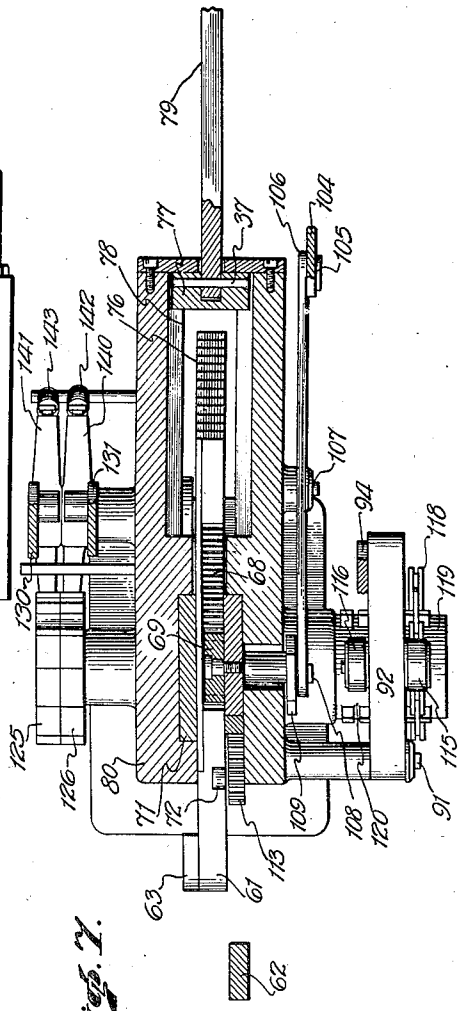

Fig. 7.

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RACKING MECHANISM FOR KNITTING MACHINES

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Fig. 8.

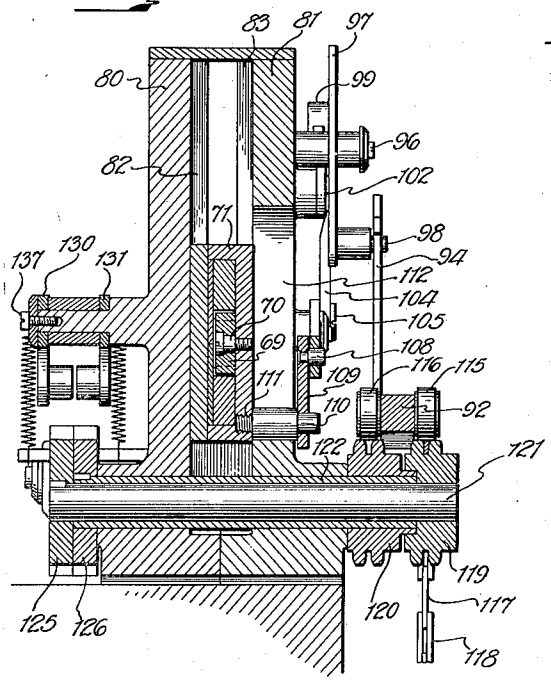


Fig. 9.

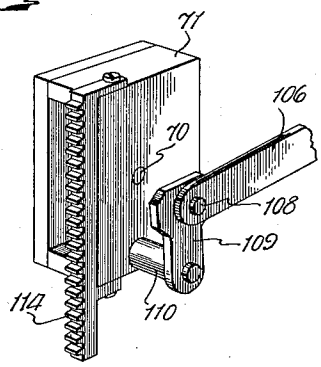


Fig. 10.

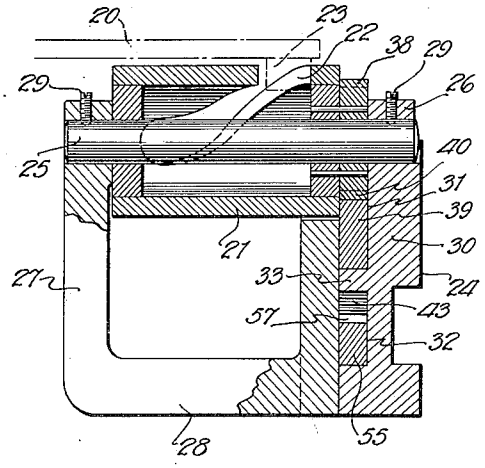
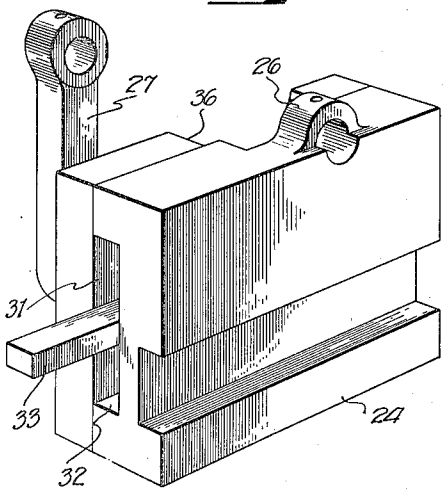


Fig. 11.



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Patented Aug. 27, 1935 2,012,504

UNITED STATES PATENT OFFICE

2,012,504

RACKING MECHANISM FOR KNITTING MACHINES

Adam Geyer, Brooklyn, N. Y., assignor to Queens Machine Corporation, Brooklyn, N. Y., a corporation of New York

Application April 20, 1933, Serial No. 666,952

18 Claims. (Cl. 66—69)

This invention relates to new and useful improvements in knitting machines, and more particularly it pertains to a new and improved racking mechanism therefor.

Certain types of knitting machines employ two needle beds or plates which are arranged in relative close, although not in contacting relation. Under control of certain mechanisms of the machine, needles are moved from one needle bed to the other during the knitting operation. At intervals during the knitting operation, one of the needle beds is moved longitudinally with relation to the other needle bed. This movement of one needle bed relatively to the other needle bed is known in the art as racking and it is to a novel mechanism for producing this operation, to which the present invention relates.

In most machines with which I am familiar, the racking movement imparted to the racking needle bed is limited to a distance equal to two, or at the most four needles. This has limited such machines in their operation and has prevented the use of the rack stitch in the production of designs in the body of the fabric.

One object of the invention is to improve the construction and mode of operation of knitting machine of the afore-mentioned type and to provide such machines with mechanism which will effect better and more varied knitting operations than prior machines.

A feature of the invention resides in a novel racking mechanism whereby a racking movement of any desired magnitude may be imparted to one of the needle beds.

A further feature of the invention resides in a novel mechanism whereby a needle bed may be racked different distances in either direction as distinguished from prior machines in which although a needle bed may be moved a distance equal to either two or four needles during a racking movement in one direction, when racked or moved in the opposite direction, it is always returned to its initial or starting position. For example, in prior machines, if a needle bed is racked a distance equal to two needles, the next movement in the opposite direction has always been a distance equal to two needles, the same being true when the needle bed is racked a distance equal to four needles.

A still further feature of the invention resides in the provision of novel mechanism whereby the various racking operations may be automatically effected, the automatic operations being controlled by pattern chains in a manner common to selective operation of other mechanisms of such machines.

Other features of the invention relate to certain novel and improved constructions, arrangements and combinations of parts hereinafter described and particularly pointed out in the claims, the advantages of which will be readily understood and appreciated by those skilled in the art.

The invention will be clearly understood from the accompanying drawings illustrating the invention in its preferred form and the following detailed description of the constructions therein shown.

In the drawings,

Figure 1 is a view in front elevation illustrating a racking mechanism constructed in accordance with the present invention,

Figure 2 is a top plan view thereof,

Figure 3 is a view in rear elevation of the racking mechanism,

Figure 4 is a view in end elevation,

Figure 5 is a vertical sectional view on an enlarged scale taken substantially on the line 5—5 of Figure 2,

Figure 6 is a view similar to Figure 5 showing the parts in a different position,

Figure 7 is a horizontal sectional view taken substantially on the line 7—7 of Figure 6,

Figure 8 is a vertical sectional view on an enlarged scale taken substantially on the line 8—8 of Figure 1,

Figure 9 is a detail perspective view of a portion of the mechanism,

Figure 10 is a vertical sectional view on an enlarged scale taken substantially on the line 10—10 of Figure 1; and,

Figure 11 is a detail perspective view.

In the present illustration of the invention I have not shown the needle bed since this may be of any conventional construction. In machines of this general type the needle bed has an arm which extends therefrom and by which the racking movement is imparted to the needle bed. In the accompanying drawings this arm is designated 20 and is shown broken away.

Various forms of mechanisms for imparting reciprocating motion to this arm have heretofore been used. I prefer, however, to employ a rotating cam slotted member 21 having a cam slot 22 therein. An anti-friction roller is carried by the arm 20 of the racking needle bed and this anti-friction roller is positioned in the cam slot 22 of the cam member 21 in such a manner that when the cam member 21 is rotated, a re-

ciprocating movement will be imparted to the bar 20.

As best illustrated in Figure 10, the cam member 21 may be freely mounted upon a shaft 25. This shaft is supported at one end in a bearing 26 upon the upper face of a housing 24, the other end of the shaft being supported in the upper end of an upright arm 27 of a bracket 28, extending from the rear of the housing 24. The shaft 25 may be held in position in its bearings by set screws 29.

The housing 24 consists of a casting 30 formed on its rear face with two parallelly extending passageways 31 and 32, separated by a rib or web 33 cut out as at 34 for a purpose to be hereinafter described. A plate 35 which is cut out as at 36 to accommodate the cam slotted member 21, is removably secured to the rear of the housing by bolts or screws 37.

Carried by that end of the cam slotted member 21 which is adjacent the bearing 26, there is a gear 38 which serves the means for rotating the cam slotted member by a reciprocating rack member 39 mounted for reciprocating movement in the passageway 31. The rack member 39 has teeth 40 upon its upper edge which mesh with the teeth of the gear 38 as best illustrated in Figure 6. Upon its lower edge, this rack member is cut out as at 41 and in said cut out portion 41 there are rack teeth 42 which mesh with a gear 43 mounted in the cut out portion 34 of the web 33 and keyed or otherwise secured to a shaft 44 mounted in the housing 24. The rear end of this shaft 44 projects beyond the housing 24 and secured thereto there are two toothed wheels 45 and 46 which are engaged respectively by holding dogs 47 and 48 carried respectively by levers 49 and 50 pivotally mounted upon the rear wall of the housing as at 51. A spring such as 52 is attached at one end to each of said levers 49 and 50, the other end of said springs being connected as at 53 to the housing 24. By this construction the shaft 44 and the gear 43 are held against movement except when operated by the operating mechanism of the machine. The teeth of the two wheels 45, and 46, are disposed in opposite directions in order that the cam slotted member may be held against movement in either direction.

The reference numeral 55 designates a rack bar which is slidably mounted in the passageway 32. The upper edge of this rack bar is cut out as at 56 and the rack teeth 57 are formed in said cut out portion. These teeth 57 mesh with the teeth of the gear 43 at a point diametrically opposite to that point of engagement of the teeth of said gear with the teeth 42 of the rack bar 39.

By the above construction, it will be obvious that as the rack bar 39 is moved to the left in Figure 6, the gear 38 and the cam slotted member 21 will be rotated in a clockwise direction while the rack member 55 will be moved to the right in Figure 6, this being accomplished through the gear 43 which meshes with the teeth of the rack members 39 and 55. On the other hand, when the rack member 55 is moved to the left in Figure 6, the rack member 39 will be moved to the right in said figure and the cam slotted member 21 will be rotated in a counter-clockwise direction. These movements of the cam slotted member 21 in either the clockwise or counter-clockwise direction will impart racking movement in opposite directions to the arm 20 of the racking needle bed.

The rack member 39 is moved to the left in Figure 6 by a reciprocable power transmitting member 60, and the rack member 55 is moved to the left in said figure by a reciprocable power transmitting member 61. These power transmitting members 60 and 61 have right angular extensions 62 and 63 respectively which engage respectively, the rack bars 39 and 55 to push them to the left in Figure 6 in the manner heretofore described. The power transmitting member 60 is cut out as at 64 and in said cut out portion 64, a series of rack teeth 65 are formed. The power transmitting member 61 is likewise cut out at 67 and formed with rack teeth 68 and interposed between the power transmitting members and having engagement with the rack teeth 66 and 68, there is a gear 69 carried upon a bolt or the like 70.

The power transmitting members 60 and 61 are slidably mounted in a housing 71 and the bolt 70 upon which the gear 69 is carried is mounted in one of the side walls of this housing 71. Interposed between the power transmitting members 60 and 61, there is an anti-friction bearing 72 mounted in a recess 73, preferably in the power transmitting member 61, this anti-friction bearing being mounted upon a shaft 74.

Referring to Figure 5, it will be noted that each power transmitting member is provided upon its right-hand end with an angular extension, these extensions being designated 75 and 76 respectively. The angular extension 75 of the power transmitting member 60 is stepped along one edge to provide a plurality of faces 75^a, 75^b, 75^c, 75^d, 75^e, 75^f, 75^g, 75^h, 75^i, 75^j, 75^k, 75^l, 75^m, and 75^n. The angular extension of the power transmitting member 61 is likewise stepped to provide a plurality of faces 76^a, 76^b, 76^c, 76^d, 76^e, 76^f, 76^g, 76^h, 76^i, 76^j, 76^k, 76^l, 76^m, and 76^n.

The reference numeral 77 designates a reciprocating power driving member reciprocably mounted in guides 78. This power member may be connected by a link 79 with the power of the machine in any desired manner. It may, if desired, be continuously operating, or it may be intermittently operated only at such times as a racking operation is desired, but in either instance the reciprocating power member 77 preferably moves, or operates through a stroke of fixed length.

I will now proceed to describe the operation of the construction as thus far described.

In Figure 5, the several parts are shown in a neutral position in which position the cam slotted member 21 will be positioned as illustrated in Figure 2 of the drawings, that is, with the anti-friction roller 23 at the left-hand end of the cam slot 22 as shown in Figure 2. With the parts in this neutral position the reciprocating power driving member is free to move throughout its entire stroke without effecting any operation of the mechanism.

To effect a racking mechanism with the parts in the position shown in Figure 5 it will be necessary to elevate the power transmitting member 61 so that one of the faces formed on the angular member 76 will be raised into the path of travel of the power driving member 77. For example, let's assume that the power transmitting device 61 has been elevated to the position in which it is shown in full lines in Figure 6. In this position, the reciprocating power driving member will engage the face 76^f as it nears the completion of its inward stroke in said figure. When the power driving member 77 engages the face 76^f of the angular member 76 the power

transmitting member 61 will be moved to the left in said Figure 6 and will through the medium of its right angular extension 63, move the reciprocating rack member 55 to the left. Movement of this member to the left will drive the gear 43 in a clockwise direction moving the rack member 39 to the right and rotating the cam slotted member 21 in a counter-clockwise direction and reciprocating the bar 20. Movement of the rack member 39 to the right causes movement of the power transmitting member 60 to the right and at the end of the stroke of the power driving member 77 the face 75f of the angular extension 75 will engage the power driving member 77 which in turn acts as a stop to prevent further movement of the power transmitting member 60 to the right.

The needle bed having been racked in the above described manner, to return the same to the neutral position the power transmitting members are lowered so that the face 75a of the angular extension 75 will be engaged by the power driving member and moved to the left. This movement of the power transmitting member 60 to the left will move the cam slotted member 21 in a clockwise direction thus imparting a reciprocating movement to the bar 20 in a direction opposite to that above described. Movement of the rack member 39 to the left causes a movement of the rack member 55 to the right through the medium of the gear 43 and the rack member 55 in moving to the right will move the power transmitting member 61 to the right so that the power transmitting members 60 and 61 will assume the position in which they are shown in Figure 5 at the end of the stroke of the power driving member 77. As the power transmitting member 61 is moved to the right, the face 76a of the angular extension 76 will engage the power driving member 77, which acts as a stop to prevent further movement of the power transmitting member 61 to the right.

The faces on the angular extensions of the power transmitting members are so arranged that the offset therebetween will be equal to the distance between single needles in the needle beds and by adjustment of the power transmitting members, a movement which will rack the racking needle bed, one needle or more may be had. The right angular extensions 62 and 63 of the power transmitting members 60 and 61 respectively are provided so that the rack members 39 and 55 may be operated by the power transmitting members regardless of the elevated position of the latter.

Means is provided for adjusting the power transmitting members 60 and 61 relative to the power driving member 77. In the present embodiment of the invention this adjustment is effected by vertical movement of the power transmitting members 60 and 61 and to this end the housing 71 in which the power transmitting members are carried is mounted for vertical sliding movement between two guides 80 and 81 the guides being hollowed out or provided with channels 82 and 83 respectively, in which the housing 71 is mounted for sliding movement.

Projecting from the guide member 81 there is a stud 90 and pivotally mounted as at 91 upon said stud there is a lever 92. This lever 92 is adapted to rock about its pivot point 91 and pivotally connected as at 93 to its free end there is a link 94 provided with an open eye 95. Pivotally mounted as at 96 there is a lever 97. One end of this lever 97 carries a pin 98 which operates in the open eye 95 of the link 94. The opposite end of the lever 97 carries a roller 99. This roller is adapted to ride upon and actuate a cam member 100 which is mounted upon a lever 101 pivotally mounted to the guide 81 as at 102. Pivotally connected to the lever 101 as at 103 there is a link 104 and this link 104 is pivotally connected as at 105 to a lever 106. This lever 106 is pivotally mounted as at 107 and pivotally connected as at 108 to the free end of said lever 106 there is a link 109. As best illustrated in Figure 8, this link 109 is pivotally attached to a stud 110 which in turn is connected as at 111 to the housing 71 in which the power transmitting members 60 and 61 are carried. The stud 110 travels in a slot 112 in the front guide 81 and in travelling through said slot 112 the stud 110 serves to raise the housing 71. When the housing 71 is in an elevated position it will move by gravity to a lower position if permitted, its movement from elevated positions to lowered positions being checked by a spring 75', see Figure 1. The vertical movement of the housing 71 is guided by a gear 113 which meshes with a rack 114 carried by the housing 71.

With the parts in the position in which they are shown in Figure 1, it is obvious that if the free end of the lever 92 be elevated, the link 94 will rock the lever 97 about its pivotal point 96. This will cause the roller 99 to depress the lever 101 and this lever through the link 104 will rock the lever 106 about its pivotal point 107, raising the link 109. Raising the link 109 will elevate the stud 110 consequently raising the housing 71.

The lever 92 may be rocked about its pivotal point in any desired manner. I prefer, however, to use a plurality of pattern chains having links of various heights which pattern chains are so arranged that they pass beneath rollers 115 and 116, which are carried by the lever 92. The chain is designated 117 and is formed with a plurality of links 118 in the same manner as pattern chains commonly known in this art. The pattern chains of which there are two pass around sprockets 119 and 120. The sprocket 119 is carried upon a shaft 121 which extends through the base portion of the guides 80 and 81. The sprocket 120 is carried by a hollow shaft or sleeve 122 which surrounds the shaft 121 and which also extends through the base portion of the guides 80 and 81. On its opposite end, the shaft 121 has keyed thereto a toothed ratchet 125 and adjacent the toothed ratchet 125 there is a toothed ratchet 126 which is keyed to the sleeve 122. Suitable driving means for the toothed ratchets 125 and 126 is provided and this driving means consists of a plurality of reciprocating dogs which engage the teeth of the ratchets 125 and 126 and cause rotation of the shaft or sleeve in a step by step movement. Rotation of the shaft 121 or sleeve 122 causes a rotation of their respective sprocket wheels and this will move the chains 117 to bring the links 118 thereof beneath the rollers 115 or 116 as the case may be to effect an operation of the lever 92 to raise or permit of lowering of the housing 71. The two dogs 128 and 129 which operate respectively the ratchets 125 and 126 are supported upon pivoted levers 130 and 131 respectively. These pivoted levers are notched at different locations as at 132 and a pivoted lever 133 has rollers 134 which engage the levers 130 and 131 to hold them elevated and the dogs 128 and 129 out of contact with the ratchets 125

and 126. This lever 133 is pivotally mounted as at 135 upon the outer face of the rear guide 80 as best illustrated in Figure 3. The lever 133 may be rocked about its pivotal point by a suitable link 136, which in turn is operated by a pattern chain not shown and when the lever is rocked to one position the roller 134 will engage the notch 132 of the lever 130 and permit the same to rock about the pivotal point 137 and lower its operating dog 128 into engagement with the driving ratchet 126. When moved to position where the roller 134 will engage the notch of the lever 131 this lever 131 will be rocked about the pivotal point 137 and will lower its dog 129 into engagement with the driving ratchet 126. It is intended that the dogs 128 and 129 will be continuously operated in such a manner that immediately they are lowered into engagement with their driving ratchet an operation thereof will be had. The driving ratchets 125 and 126 are held against accidental operation by means of holding pawls or dogs 140 and 141 which are held in engagement with their respective ratchets by coil springs 142 and 143 respectively.

A complete operation of the device will now be given.

With the parts in the neutral position in which they are shown in Figure 1 the anti-friction roller 23 of the arm 20 will be positioned at the left hand end of the cam slot 22 in Figure 2. The housing 71 will be at the bottom of the guides and the chains 117 and 118 will be so positioned that the low link of each will be beneath the rollers 115 and 116.

In this position the power driving member 77 in its reciprocating movement will move to the left in Figure 5 and will engage the face 75^a of the angular extension 75 and the face 76^a of the angular extension 76. These faces 75^a and 76^a in the neutral position are located exactly at the end of the stroke of the power driving member 77 and consequently no movement of the power transmitting members 60 and 61 is had.

The several pattern chains are so arranged that they will be driven to produce a racking movement of the desired extent at the desired time. For the sake of illustration let us assume that the pattern chain 117 has been driven by its sprocket 119 to a position where its second lowest link has passed beneath the roller 115. The second lowest link in passing beneath the roller 115 will rock the lever 92 and elevate the housing 71 as heretofore described. This elevation of the housing 71 will elevate the power transmitting members 60 and 61 to a position where the face 76^b of the angular extension 76 will be engaged by the power driving member upon its next stroke to the left in Figure 5, just before the end of the stroke. As the power driving member engages the face 76^b the power transmitting member 61 is moved to the left in Figure 5 and through the medium of the rack members 55 and 39 the cam slotted member 21 will be moved in a counter-clockwise direction and produce a racking movement equal to a single space between two needles. The rack member 39 in its movement to the right in Figure 5 will move the power transmitting member 60 to the right in said figure and the face 75^b of the angular extension 75 will engage the power driving member which forms a stop and prevents movement of the power transmitting member 60 further to the right in Figure 5. In this position the power driving member is free to reciprocate without further operation of the mechanism since the faces 75^b and 76^b will be at the end of the stroke of the power driving member 77.

If, now, it be desired to produce a further racking operation of the needle bed, the pattern chain will be so made up that immediately following the second lowest link there would be a higher link in order that the housing 71 may be still further elevated to move one of the faces of the angular extension 76 of the power transmitting member 61 into the path of the power driving member 77 which would produce a further racking operation in the manner above described when the face of the angular extension 76 is engaged by the reciprocating power member. If, on the other hand, it be desired to return the racked needle bed to the neutral position the next link in the chain would be any of the lowest links. This link when it passed beneath the roller 115 would permit the housing 71 to move downwardly under the action of gravity and position the face 75^a of the angular extension 75 in the path of the reciprocating power member 77. When the reciprocating power member 77 moves to the left in Figure 5 it will engage the face 75^a, move the power transmitting member 60 to the left, operating the rack member 39 to rotate the cam slotted member 21 in a clockwise direction and return the anti-friction roller 23 to the left hand end of the cam slot 22 in Figure 2 returning the racked needle bed to the neutral position.

From the foregoing it will be apparent that the mechanism may be so controlled by pattern chains to produce a rack stick at any desired time and that the racking needle bed may be moved any desired distance merely by varying the height of the links of the pattern chains and thereby raising and lowering the housing and power transmitting members to properly position their angular extensions with respect to the power driving member.

While the invention has been herein presented in a preferred form, it is to be understood that it is not limited to the construction herein shown and that it may be embodied in other forms without departing from the scope thereof.

Having thus described the invention, what is claimed as new and what it is desired to secure by Letters Patent of the United States, is:

1. A mechanism of the class described including a reciprocating needle bed, a rotary member for imparting reciprocating movement to said reciprocating needle bed, reciprocating means including driving and operating members for imparting rotary motion to said rotary member, an adjustable stop for limiting the reciprocal movement of said operating member, thereby to determine the extent of racking movement imparted to the reciprocating needle bed, and means controlled by said reciprocating means for operating said adjustable stop.

2. A mechanism of the class described including a reciprocating needle bed, a rotary member for imparting reciprocating movement to said reciprocating needle bed, reciprocating means including driving and operating members for imparting rotary motion to said rotary member, a selectively adjustable stop for limiting the reciprocal movement of said operating member, thereby to determine the extent of racking movement imparted to the reciprocating needle bed, and means controlled by said reciprocating means for operating said adjustable stop.

3. In a knitting machine, a racking mechanism including a reciprocating driving member and a racking mechanism operated thereby, said racking mechanism including a reciprocating member and a stop, the reciprocating member being operated by the reciprocating driving member, and the stop being movable into engagement with the reciprocating driving member by said reciprocating member, thereby to limit the racking movement of the racking mechanism.

4. In a knitting machine, a racking mechanism including a reciprocating driving member having a stroke of fixed magnitude, a reciprocating operating member for effecting a racking operation, a reciprocating stop for limiting the extent of racking movement, and means for moving said reciprocating operating member and said stop into the path of the reciprocating driving member at different positions in the stroke thereof.

5. In a knitting machine, a racking mechanism including a reciprocating driving member, a reciprocating member movable into the path of travel of said reciprocating driving member to effect a reciprocating movement of the reciprocating member by the reciprocating driving member, a racking needle bed, means for imparting racking movement to said needle bed from said reciprocating member when it is operated by the reciprocating driving member, and means for limiting the extent of racking movement imparted to the racking needle bed.

6. In a knitting machine, a racking mechanism including a reciprocating driving member, a reciprocating member movable into the path of travel of said reciprocating driving member to effect a reciprocating movement of the reciprocating member by the reciprocating driving member a racking needle bed, means for imparting racking movement to said needle bed from said reciprocating member when it is operated by the reciprocating driving member, and means for limiting the extent of racking movement imparted to the racking needle bed, said last mentioned means including a member movable into engagement with said reciprocating driving member.

7. In a knitting machine, a racking mechanism including a reciprocating driving member having a stroke of predetermined length, a racking needle bed, and means for imparting a racking movement to said racking needle bed, the last mentioned means including a reciprocative member movable into the path of travel of the reciprocating driving member at different points in the stroke thereof.

8. A racking mechanism for knitting machines comprising in combination, a racking needle bed, and means for imparting a racking movement thereto, the last mentioned means including a reciprocating driving member, a rotary cam member, a rack and gear for imparting rotary motion to said cam member, and means operated by said reciprocating driving member for imparting different degrees of racking movement to said rotating cam member.

9. A racking mechanism for knitting machines comprising in combination, a racking needle bed and means for imparting a racking movement thereto, said last mentioned means including a reciprocating driving member, a rotary cam member, means interposed between the reciprocating driving member and the rotary cam member for transmitting power from said reciprocating driving member to said rotary cam member, and means for introducing said last mentioned means into the path of travel of said reciprocating driving means at different points in the stroke thereof, whereby to impart different degrees of racking movement to the rotary cam member.

10. A racking mechanism for knitting machines comprising in combination, a racking needle bed and means for imparting a racking movement thereto, the last mentioned means including a reciprocating driving member, a rotary cam member, means interposed between the reciprocating driving member and the rotary cam member for transmitting power from said reciprocating driving member to said rotary cam member, and means for introducing said last mentioned means into the path of travel of said reciprocating driving means at different points in the stroke thereof, whereby to impart different degrees of racking movement to the rotary cam member, and means for automatically determining the position of the power transmitting means relative to the reciprocating driving member.

11. A racking mechanism for knitting machines comprising in combination, a racking needle bed, a rotary cam slotted member for imparting a racking movement to said racking needle bed, and means for driving said rotary cam slotted member in opposite directions to effect operation of the racking needle bed in opposite directions, the last mentioned means including a plurality of intergeared rack members, means for gearing one of said rack members to said rotating cam slotted member, a plurality of intergeared power transmitting members for imparting motion to said rack members, and driving means for selectively and singly engaging said power transmitting members to selectively operate said rack members.

12. A racking mechanism for knitting machines comprising in combination, a racking needle bed, a rotary cam for imparting a racking movement to said racking needle bed, and means for driving said rotary cam member in opposite directions to effect operation of the racking needle bed in opposite directions, the last mentioned means including a plurality of intergeared rack members, means for gearing one of said rack members to said rotating cam slotted member, a pair of intergeared power transmitting members for imparting motion to said rack members, a reciprocating driving means, and means for moving said power transmitting members singly into operative engagement with said driving means.

13. A racking mechanism for knitting machines comprising in combination, a racking needle bed, a rotary cam for imparting a racking movement to said racking needle bed, and means for driving said rotary cam member in opposite directions to effect operation of the racking needle bed in opposite directions, the last mentioned means including a plurality of intergeared rack members, means for gearing one of said rack members to said rotating cam slotted member, a pair of intergeared power transmitting members for imparting motion to said rack members, a reciprocating driving means, and means for moving said power transmitting members singly into operative engagement with said driving means at different points in the stroke thereof thereby to determine the extent of racking movement imparted to said racking needle bed.

14. In a racking mechanism for knitting machines, a movable needle bed, means for imparting different degrees of racking movement to said

needle bed, and an adjustable stop actuated by one element of said means to engage another element thereof to thereby limit the racking movement of said needle bed.

15. In a knitting machine, a needle bed having a normal and racking positions, a racking mechanism for said bed including a driving member having an operating movement of fixed magnitude, an operating member responsive to said driving member to rack said bed from one racking position to which the bed has been previously racked to any one of a plurality of other racking positions, without being first racked to said normal position, and a stop member actuated by said operating member to engage said driving member to limit the racking movement of said bed.

16. In a knitting machine, a needle bed, a racking mechanism therefor including a reciprocatory driving member having a stroke of constant length, a reciprocatory operating member for said needle bed having movements of different length and actuated by said driving member, a reciprocatory stop member for limiting the extent of movement of said operating member, and means to effect relative adjustments between said driving and operating members to vary the length of movements of the latter to thereby change the degree of racking of said needle bed.

17. In a knitting machine, a needle bed, a racking mechanism therefor including a reciprocatory driving member having a stroke of constant length, a reciprocatory operating member for said needle bed having movements of different length and actuated by said driving member, a reciprocatory stop member for limiting the extent of movement of said operating member, a rotary member responsive to the varied reciprocating movements of said operating member for racking said needle bed, and means to effect relative adjustments between said driving and operating members to vary the amount of reciprocation of the latter to thereby alter the degree of rotation of said rotary member.

18. In a knitting machine, a needle bed, a racking mechanism therefor including a driving member, an operating member responsive to said driving member to rack said bed and having a stepped formation providing a series of faces operatively associated with said driving member, a stop member actuated by said operating member and also having a stepped formation providing a series of contacting faces each of which forms a stop which cooperates with said driving member to limit the racking movement of said needle bed.

ADAM GEYER.