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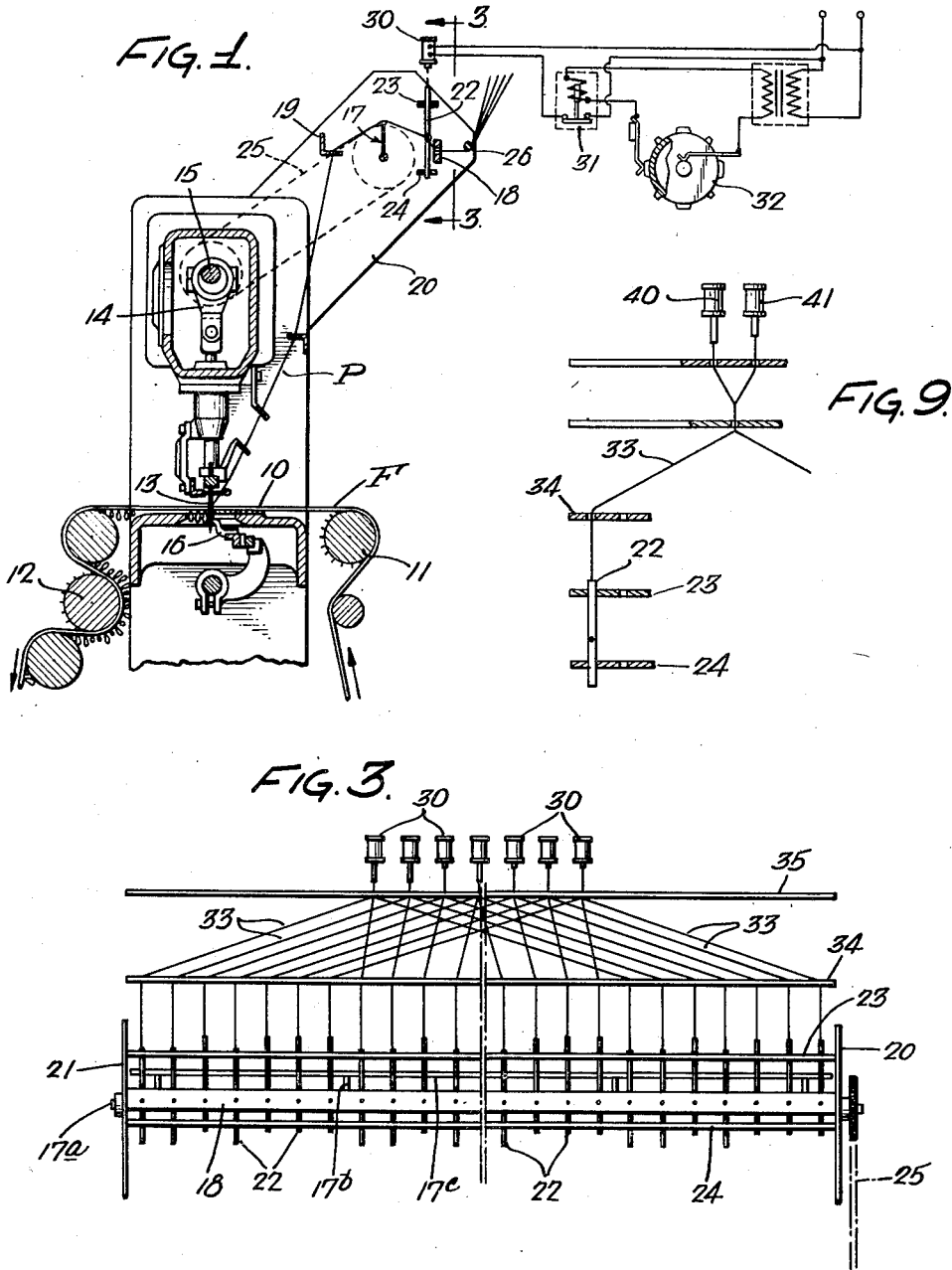
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INDIVIDUAL PILE YARN CONTROL APPARATUS FOR PILE FABRICS

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2 Sheets-Sheet 1



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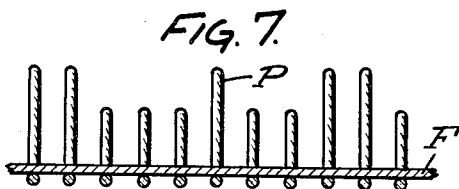
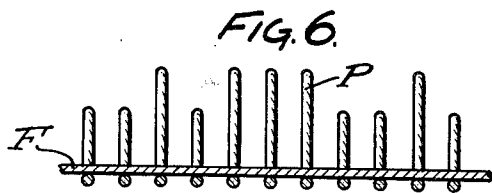
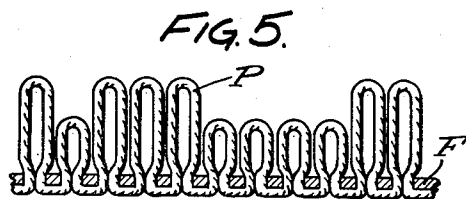
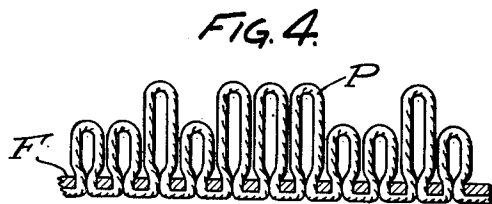
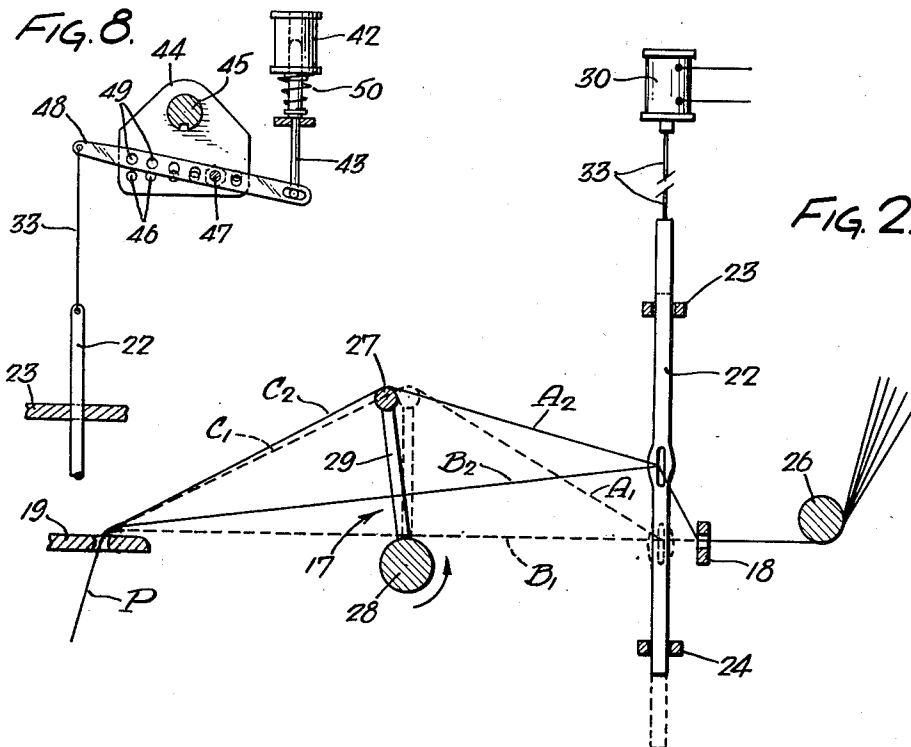
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INDIVIDUAL PILE YARN CONTROL APPARATUS FOR PILE FABRICS

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2 Sheets-Sheet 2



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INDIVIDUAL PILE YARN CONTROL APPARATUS FOR PILE FABRICS

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14 Claims. (Cl. 112-79)

The present invention relates to apparatus for producing a variable height pile in pile fabrics and more particularly to control mechanism for varying the rate at which individual ends of pile yarn are supplied to the pile-forming means of tufting machines and similar apparatus.

In the manufacture of conventional tufted fabrics, the pile surface is formed with uniform pile heights by means of a bank of tufting needles which are adapted to insert a row of pile loops into a base fabric. A let off roll extends the full width of the tufting machine to feed pile yarn to the tufting needles which penetrate the base fabric to a uniform depth when inserting the loops therein. Because of this, it has not been possible to produce a variable pile height in conventional tufted fabrics.

With the ever-increasing use of tufted fabrics for floor covering and the like, it is desirable to provide means for producing variations in the pile height of the finished fabric in order to produce an embossed or carved pile surface effect. An embossed pile surface produces a fabric having striking characteristics which are unobtainable with printed or plain pile patterns.

The prior methods for producing embossed surface effects on tufted pile fabrics involve the use of complicated mechanisms which are disposed along the feed roll to control the feed of the individual pile yarns. These mechanisms are space-consuming and it is, therefore, difficult to obtain the desired regulation of the height of the individual pile loops across the full width of the fabric.

In addition to the difficulty in obtaining the desired regulation of the individual pile loops, the prior mechanisms are difficult to regulate to obtain the desired pattern effect on the pile surface. To obtain the desired pattern, the designer must have an intimate knowledge of the function of the control apparatus in order to properly adjust the regulating devices of the mechanisms to produce the desired effect.

With the foregoing in mind, it is a primary object of the present invention to produce a novel apparatus for feeding the pile yarn to the loop-forming mechanism of a tufting machine in variable lengths to produce a pile surface of varying height in the finished fabric.

Another object is to provide control apparatus which is easily regulated and set up to provide the desired pattern without the necessity for intimate knowledge of the operating characteristics of the apparatus by the designer.

A further object is to provide control apparatus which can be readily changed to produce a different pattern effect.

Still another object is to provide improved pile yarn control apparatus of simple construction which is entirely effective and efficient in operation and use.

A still further object is to provide an apparatus capable of controlling individual ends of yarn across a given row length to effect the production of floral or non-geometric patterns or the like.

The above and other objects of the invention and the

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various features and details of the construction and operation thereof are more fully set forth hereinafter with reference to the accompanying drawings in which:

Fig. 1 illustrates a tufting machine embodying control apparatus made in accordance with the present invention;

Fig. 2 is an enlarged view showing the operation of the control apparatus comprising the present invention;

Fig. 3 is a fragmentary sectional view taken along the line 3-3 of Fig. 1;

Figs. 4 and 5 illustrate two laterally adjacent warp-wise sectional views of the fabric produced by the machine and method shown and described herein showing pile effects which may be obtained by the present invention;

Figs. 6 and 7 illustrate two consecutively adjacent weft-wise sectional views of a fabric produced by the machine and method shown and described herein showing pile effects which may be obtained by the present invention;

Fig. 8 illustrates a modified construction affording adjustment of the height of loops formed by the present invention; and,

Fig. 9 is a fragmentary view patterned after Fig. 3 showing an arrangement for obtaining different height loops during the tufting operation.

The invention may be applied to the formation of any pile fabric in which the pile yarn is fed to the base fabric substantially independently of the formation of the base fabric; but, for the purposes of illustration, the present embodiment of the invention is shown and described in conjunction with a conventional tufting machine.

Referring more particularly to the drawings, in the tufting machine shown in Fig. 1, the ground fabric F is fed across the bed 10 of the machine by pin rollers 11 and 12. The pile surface is formed by loops which are inserted into the ground fabric F by a bank of needles 13 mounted for vertical oscillation relative to the bed 10. The needles are oscillated by a crank mechanism indicated generally at 14 and driven by an eccentric shaft 15. The base fabric F is driven intermittently and the bank of needles 13 inserts full rows of loops at successive equally spaced intervals along the length of the fabric. The needles 13 move in unison and penetrate the fabric F to a given distance below the bed 10 of the tufting machine, so that upon each reciprocation of the needles, a row of loops of uniform height is formed in the base fabric F. The latching mechanism for retaining the pile loops in the fabric F upon withdrawal of the needles 13 is conventional, for example, as shown at 16.

In accordance with the invention the pile yarn P is fed to the needles by a rotatable yarn puller 17 disposed between spaced yarn guides 18 and 19 and journaled within suitable bearings upon a pair of spaced supporting plates 20 and 21. The present invention affords a variation in the height of pile loops by varying the rate at which the yarn P is fed to the needles by the yarn puller 17. The rate of feed, in turn, is controlled by means of heddles or movable guide members 22 interposed between the yarn puller 17 and the yarn guide 18. The heddles 22 are mounted for vertical movement between a pair of spaced heddle guides 23 and 24. The positioning of the heddles 22 with respect to the yarn guides 18 and 19 and the yarn puller 17 regulates the rate of feed to the needles 13 as will be more fully described later.

A fast rate of feed to the needles 13 of the tufting machine causes loops to be formed of maximum height as determined by the depth of penetration of the needles 13 below the bed 10 of the machine. When the pile yarn P is advanced to the needles 13 at a slow rate of feed, insufficient yarn is fed to the needles to permit the formation of a loop of maximum height. However, since the needles 13 always penetrate to the same depth, the yarn

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necessary to form a loop of maximum height is robbed or drawn back from the immediately preceding row of loops, thereby forming loops of lesser height in the latter row. By varying the rate of feed between the yarn guides 18 and 19, it is possible to vary the height of the loops formed in the row formed immediately preceding the row being formed by the needles 13.

In the illustrated embodiment of the invention, the drive for the yarn puller 17 is taken from the tufting machine through a chain drive, for example as indicated at 25. It is important to note that the drive for the yarn puller 17 is arranged that the yarn puller beings to feed yarn through the guide 18 at the start of the upstroke of the needles 13 while the latching mechanism 16 is retaining the loops formed on the previous downstroke in order to insure the proper amount of yarn for the succeeding downstroke thereof, and to prevent the yarn from being robbed or drawn back. The tension exerted on the yarn as it is withdrawn from the creels is in excess of the tension retaining the yarn in the base fabric F. Thus the latching mechanism insures that the yarn is retained in the base fabric during the feed of yarn from the creel. During the insertion of the needles, the latching mechanism is withdrawn, whereby when the yarn puller 17 feeds insufficient yarn to form a loop of maximum height, the necessary extra yarn is robbed or drawn back from the previously inserted row because of the differences in tension set forth above.

As shown in Fig. 1, the yarn P is fed from a supply (not shown) over a guide roller 26, through the guide 18, the heddle 22 and guide 19, the yarn being periodically engaged by the yarn puller 17 between the heddle 22 and guide 19, and thence to the needles 13 of the tufting machine through the conventional guide means shown.

As stated above, the rate at which the yarn P is fed to the needles 13 is controlled during its passage between the guides 18 and 19 to subsequently control the height of pile loops formed in the fabric F. To this end the heddles 22 are movable vertically (see Fig. 2) to vary the position of the yarn P as it passes between the guides 18 and 19 in engagement with the puller and thereby to vary the amount of yarn fed to the needles 13, as described more fully hereinafter.

In the present instance, the yarn puller 17 comprises a beater rod 27 extending the full width of the tufting machine and engaging all of the pile yarns P passing to the needles. In the present instance, the beater rod is mounted for movement in a cylindrical path intersecting the path of travel of the yarn between the guide 19 and the heddle 22, as indicated in broken lines in Fig. 1, said lines coinciding with the outline of the sprocket of the drive 25. To this end, the beater rod is mounted on a rotary shaft 28 positioned below the path of the yarn by means of a plurality of struts or spacer members 29 extending radially from the shaft 28. The puller 17 is driven in synchronism with the tufting needles, so that it passes through its upper limit position when the previously inserted loops are retained in their maximum position by the latching mechanism 16, and is in the lower position or portion of the cycle when the needles are inserting the next row of tufts into the base fabric F. Thus, as the beater rod 27 is displaced from its lower to its upper limit position, it engages the yarn intermediate the guide 19 and the heddle 22 and withdraws a selected quantity of yarn from the creel. During the travel of the beater rod through the lower portion of the cycle, it is disengaged from the yarn and the slack caused by the disengagement is taken up by the needle as it inserts the yarn into the base fabric.

In accordance with the invention, the amount of each pile yarn P withdrawn from the creel is determined by the position of the heddle 22 associated with the yarn. With the heddle 22 in its lowermost position, as indicated by the dotted lines, and the yarn puller 17 rotated to a position out of contact with the yarn P in the lower por-

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tion of the cycle, the base length of yarn in its normal path extending between the guide 19 and the heddle 22 is equal to that portion designated as B_1 . As the yarn puller 17 is displaced to its upper limit position, it engages the yarn and extends the path and withdraws from the creel a selected length of yarn equal to the sum of A_1 plus C_1 minus B_1 . When the beater rod 27 passes back to the lower portion of its cycle, the selected length is fed to the needles 13. The selected length of yarn is sufficient to form a loop of maximum height in the fabric F.

With the heddle 22 moved to the position indicated in solid lines, the base length of yarn in its normal path extending between the guide 19 and the heddle 22 is equal to that portion designated as B_2 . As the yarn puller 17 is subsequently rotated throughout one complete revolution it displaces the yarn into an extended path and feeds a second selected length of yarn to the needles 13 equal to the sum A_2 plus C_2 minus B_2 . This position results in a slow rate of feed and, therefore, provides insufficient yarn to produce a loop of maximum height in the fabric F, and accordingly produces a low loop in the immediately preceding row.

Thus, the present invention determines the length of yarn fed to the needle by varying the point of intersection of the normal straight-line path of yarn between the guide 19 and the heddle 22 and the path of the beater rod 27. When the point of intersection is adjacent the upper limit position of the rod 27, a minimum amount of yarn is fed to the needles 13. On the other hand, when the point of intersection is removed from the upper limit position of the rod, a maximum length of yarn is fed to the needles 13.

It should be noted that the heddle 22 is maintained in a given position for as long a time as the yarn passing through that heddle is forming loops of a given height. The position of the heddle changes only when it is desired to change the height of loops being formed in the pile yarn.

In order to control the positioning of the heddles 22 so as to cause loops of selected heights to be formed in the fabric F in accordance with a predetermined pattern, a series of solenoids 30 is provided, each of which, when energized, raises selected heddles 22 to the upper position, and when subsequently deenergized allows the heddles to return to its lower position. As shown schematically in Fig. 1, energization and deenergization of the solenoid 30 is controlled by means of a low-energy relay 31 which, in turn, is controlled by a conventional rotary contact selector 32 set up according to a predetermined pattern.

Figure 3 diagrammatically illustrates one type of arrangement of the control mechanism for carrying out the present invention. In practice, one solenoid 30 will be provided to control the positioning of each individual heddle 22 within each repeat of a selected pattern weftwise of the fabric. The illustration, by way of example, shows seven heddles 22 in each repeat of the pattern beginning at the left side thereof. Assuming these seven heddles 22 to comprise one complete pattern, it may be seen that every eighth heddle will be controlled by the same solenoid 30 through harness wires 33 directed through guides 34 and 35 so as to provide identical repeats of the pattern weftwise of the fabric. It is contemplated that for coarser patterns each solenoid 30 could control two or more heddles 22 in each repeat of the pattern weftwise of the fabric.

Figures 4 and 5 illustrate two consecutively adjacent warpwise sections through a pile fabric which could be produced by means of the present invention and illustrates the flexibility of control of each individual warpwise pile loop that can be accomplished thereby.

Figures 6 and 7 illustrate two consecutively adjacent weftwise sections through a pile fabric which could be produced by means of the present invention and further illustrates the flexibility of control over each weftwise pile loop that can be accomplished thereby.

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The configuration of each transverse or weftwise row of pile loops need not be limited to two selected heights of loops, but there may be additional heights. To provide the additional heights of the pile in each weftwise row, solenoids of varying stroke may be provided to vary the positioning of the heddles 22 and thus vary the amount of yarn P fed to the needles 13 by the yarn puller 17. For example, Fig. 9 illustrates a modification of the invention wherein two solenoids 40 and 41 selectively control the harness wires 33. The solenoid 40 has a relatively long stroke, whereas the solenoid 41 has a smaller stroke. The two solenoids are controlled by a pattern selector, for example similar to the selector 32, so that when the solenoid 40 is energized, a relatively low pile loop is formed in the preceding row; when the solenoid 41 is energized, a medium height pile loop is formed in the preceding row; and when both solenoids are de-energized, a high loop is formed in the preceding row. Of course, it is to be understood that additional solenoids may be connected to the heddle wires 33. If a greater variety of pile height is desired, control devices other than solenoids may be employed, for example mechanical-ly-controlled linkages and the like.

It is frequently desirable to provide a tufting feed which is adjustable to produce at different times, loops of different heights. This may be accomplished in the previously described embodiments by providing solenoids having different strokes, but a preferable expedient is disclosed in Fig. 8. In this modification of the invention, a solenoid 42 is provided which has a given stroke. To provide variation in the solenoid's effect on the heddle 22, the heddle wire 33 is connected to the arm 43 of the solenoid through a linkage which is adjustable. The linkage comprises a plate 44 which is fixedly mounted on a shaft 45 extending across the width of a feed device. The plate is provided with a series of apertures 46 operable to receive a pin 47 mounting an arm 48 which is connected at its respective ends to the heddle wire 33 and the solenoid arm 43. The arm 48 is provided with a corresponding series of apertures 49, each registrable with an aperture 46 when the solenoid is energized. In the present instance, when the solenoid is energized, the heddle 22 is allowed to drop to form a loop of maximum height. When the solenoid is deenergized, a spring-bias provided at 50 raises the heddle 22 to its upper position to form a loop of minimum height in the preceding row. By selecting which of the apertures 46 and 49 to employ as a pivot point, the elevation of the heddle 22 may be regulated. It will be readily understood jacquard devices may be employed instead of the solenoid devices shown herein.

Thus, it is seen that the present invention affords pile height control apparatus wherein the operation of a yarn beater or feeding element is combined with variably positioned heddles to control the rate of feed of the pile yarn to the tufting machine, such control being effected for individual ends of yarn within each repeat of a given pattern.

While particular embodiments of the present invention have been herein illustrated and described, it is not intended to limit the invention to such disclosure; but, changes and modifications may be made therein and thereto, as defined in the appended claims, without departing from the invention.

I claim:

1. For pile fabrics, a pile yarn control apparatus comprising a fixed guide member for said yarn, a movable guide member spaced apart from said fixed guide member operable to guide said yarn in a normal path between said guide members, a beater element intermediate said guide members operable to cycle in a path intersecting said normal path and between positions at respectively opposite sides of the normal path, and operable to engage the yarn in said path and displace the same out of said normal path to one of said positions and into an extended path, means operable in timed relation to said

beater element to immobilize the yarn at one of said guide members during the travel of said beater element in each cycle from its point of engagement with the yarn to said one position to cause the beater element to advance a preselected length of yarn past said other guide member, and operable to advance a length of yarn equal to said preselected length past said one guide member during travel of the beater element in the remainder of each cycle to return the yarn to said normal path, and means selectively operable during the travel of said beater element to adjust said movable guide member to displace the position of said normal path relative to said one position of the beater element to thereby change the preselected length of yarn advanced past said other guide member during travel of the beater element in the cycle to said one position and likewise the length of yarn advanced past said one guide member during the travel of the beater element in the remainder of each cycle.

2. For pile fabrics, a pile yarn control apparatus comprising a fixed guide member for said yarn, a movable heddle guide member spaced apart from said fixed guide member operable to guide said yarn in a normal path between said guide members, a beater element intermediate said guide members operable to cycle in a path intersecting said normal path and between positions at respectively opposite sides of the normal path, and operable to engage the yarn in said path of displace the same out of said normal path to one of said positions and into an extended path, means operable in timed relation to said beater element to immobilize the yarn at one of said guide members during the travel of said beater element to said one position to cause the beater element to advance a yarn increment past said other guide member and operable to advance said yarn increment past said one guide member during travel of the beater element in the remainder of its path to return the yarn to said normal path, and means selectively operable during the travel of said beater element to adjust said heddle guide member to displace said normal path relative to said one position comprising a solenoid, a core member in said solenoid operable upon actuation of the latter to be displaced, means interconnecting said core member and said heddle guide member to actuate the latter upon actuation of the solenoid, and means to selectively actuate said solenoid.

3. For pile fabrics, a pile yarn control apparatus comprising a fixed guide member for said yarn, a movable heddle guide member spaced apart from said fixed guide member operable to guide said yarn in a normal path between said guide members, a beater element intermediate said guide members operable to cycle in a path intersecting said normal path and between positions at respectively opposite sides of the normal path, and operable to engage the yarn in said path and displace the same out of said normal path to one of said positions and into an extended path, means operable in timed relation to said beater element to immobilize the yarn at one of said guide members during the travel of said beater element to said one position to cause the beater element to advance a yarn increment past said other guide member and operable to advance said yarn increment past said one guide member during travel of the beater element in the remainder of its path to return the yarn to said normal path, and means selectively operable during the travel of said beater element to adjust said heddle guide member to displace said normal path relative to said one position comprising a plurality of solenoids, each having a core member operable upon actuation of the solenoid to be displaced a different distance, flexible ligament means connecting said heddle guide member to each of said solenoids to displace the former upon selective actuation of the latter, and means to selectively actuate said solenoids.

4. For pile fabrics, a pile yarn control apparatus comprising a fixed guide member for said yarn, a movable

heddle guide member spaced apart from said fixed guide member operable to guide said yarn in a normal path between said guide members, a beater element intermediate said guide members operable to cycle in a path intersecting said normal path and between positions at respectively opposite sides of the normal path, and operable to engage the yarn in said path and displace the same out of said normal path to one of said positions and into an extended path, means operable in timed relation to said beater element to immobilize the yarn at one of said guide members during the travel of said beater element to said one position to cause the beater element to advance a yarn increment past said other guide member and operable to advance said yarn increment past said one guide member during travel of the beater element in the remainder of its path to return the yarn to said normal path, and means operable selectively during the travel of said beater element to adjust said heddle guide member to displace said normal path relative to said one position comprising a solenoid, means to selectively actuate said solenoid, a core member in said solenoid operable upon actuation thereof to be displaced a given distance, and means interconnecting said heddle guide member and said core member comprising a lever connected at the respective opposite ends thereof to said core and said heddle guide member, a pivotal mounting for said lever at a point intermediate the ends of said lever, and means to adjust the point longitudinally of said lever.

5. In a tufting machine having a yarn supply, a needle, and a latching mechanism cooperating with said needle to form a looped pile, a feed control device intermediate said needle and said yarn supply comprising a pair of spaced-apart guide members operable to guide the yarn from the supply to the needle in a normal path between said guide members, a beater element positioned intermediate said guide members and cyclically movable in a path intersecting said normal path of the yarn and between positions at opposite sides of said yarn path, one of said positions being spaced a selected distance from said normal path, means to operate said beater element in timed relation with said tufting machine to displace the beater element from a point of intersection of said path to said one position upon engagement of said latching mechanism of the tufting machine with the loop of pile yarn inserted by the needle to thereby displace said yarn into an extended path through said one position and withdraw a selected length of yarn from the supply, and to operate said beater element from said one position to the other of said positions and back to said point of intersection upon actuation of the needle of the tufting machine to form the succeeding loop of pile to thereby free a length of yarn equal to said selected length for the formation of loops by the needles, and means operable during travel of said beater element to selectively adjust at least one of said guide members relative to said one position of the beater element to vary said selected distance, and thereby the amount of yarn available to said needle from said supply for the formation of the said succeeding loop.

6. In a tufting machine having a yarn supply, a bank of needles, and latching mechanisms cooperating with said needles to form successive rows of looped pile, a feed control device intermediate said needles and said yarn supply comprising a pair of spaced-apart guide members operable to guide a strand of yarn from the supply to each needle in a normal path between said guide members, a beater element positioned intermediate said guide members and cyclically movable in a path intersecting said normal paths of the yarn and between positions at opposite sides of said normal yarn paths, one of said positions being spaced from said normal paths, means to operate said beater element in timed relation with said tufting machine to displace the beater element from points of intersection of said paths to said one posi-

tion upon engagement of said latching mechanisms of the tufting machine with the row of loops of pile yarn inserted by the needles to thereby displace said yarns into extended paths through said one position and withdraw selected lengths of yarn from the supply, and to operate said beater element from said one position to the other of said positions and back to said points of intersection upon actuation of the needles of the tufting machine to form the succeeding row of loops of pile to free lengths of yarn equal to said selected length for the formation of loops by the needles, and means selectively operable during travel of said beater element to adjust selected guide members relative to said one position of the beater element to vary the amount of yarn available to said needles from said yarn supply for the formation of the said succeeding row of loops.

7. In a tufting machine having a yarn supply, a bank of needles disposed transversely of said machine, and latching mechanisms cooperating with said needles to form successive rows of looped pile, a feed control device intermediate said needles and said yarn supply comprising a pair of spaced-apart guide members operable to guide a strand of yarn from the supply to each needle in a normal path between said guide members, an elongated transverse beater element mounted intermediate said guide members for cyclic movement in a cylindrical path intersecting said normal paths of the yarn and between positions at opposite sides of said normal yarn paths, one of said positions being spaced from said normal paths, means to cycle said beater element in timed relation with said tufting machine to displace the beater element in one portion of its cycle from points of intersection of said paths to said one position upon engagement of said latching mechanisms of the tufting machine with the row of loops of pile yarn inserted by the needles to thereby displace said yarns into extended paths through said one position and withdraw selected lengths of the yarn from the supply, and to operate said beater element in the remaining portion of its cycle from said one position to the other of said positions and back to said points of intersection upon actuation of the needles of the tufting machine to form the succeeding row of loops of pile to free lengths of yarn equal to said selected lengths for the formation of loops by the needles, and means selectively operable during travel of said beater element to adjust selected guide members relative to said one position of the beater element to vary the amount of yarn available to said needles from said yarn supply for the formation of the said succeeding row of loops.

8. A control device according to claim 7 wherein said beater element in said one portion of its cycle rotates towards said needles to assist the withdrawal of the yarns from the supply.

9. In the manufacture of pile fabrics, the methods of selectively changing the length of pile yarn fed to pile forming apparatus comprising the steps of guiding the yarn in a normal path, intermittently immobilizing the yarn at one end of said path, and simultaneously engaging and displacing the yarn a given distance out of said normal path into an extended path to thereby draw a pre-selected length of yarn into said extended path from the other end thereof, and during the lulls in said intermittent immobilizing step withdrawing from said one end of the normal path a length of the yarn equal to the pre-selected length drawn from the other end of said path to thereby return the yarn to said normal path, and during the performance of the above steps selectively changing the given distance through which said yarn is displaced from its normal path to thereby change the preselected length of yarn drawn from the said other end of the path and likewise the length of yarn withdrawn from said one end of the path.

10. In the manufacture of pile fabrics having a plurality of pile yarns, the method of changing the lengths of

yarn fed to pile forming apparatus comprising the steps of guiding each yarn in a normal path, intermittently immobilizing the yarns at one end of said path, and simultaneously engaging and displacing the yarns selected distances out of said normal paths into extended paths to thereby draw draw pre-selected lengths of the yarns into said extended paths from the other end thereof, and during the lulls in said intermittent immobilizing step withdrawing from said one end of the normal paths lengths of the yarns equal to the respective pre-selected lengths drawn from the other end of said paths to thereby return the yarns to their said normal paths, and during the performance of the above steps selectively varying the selected distances through which selected yarns are displaced from their normal paths to thereby change the pre-selected lengths of yarns drawn from the said other end of the paths and likewise the lengths of yarns withdrawn from said one end of the paths.

11. In apparatus for selectively controlling a plurality of pile yarns, a pair of spaced-apart guide members guiding each of said yarns in a normal path therebetween, the paths of said yarns being substantially parallel and coextensive in length, a single beater element disposed transversely to said path, means mounting said beater element for cyclic travel from one position at one side of said path, into engagement with the yarns in said path, to a second position spaced beyond said paths to displace the yarns into extended paths longer than said normal paths, and back to said one position to afford return of said yarns to said normal paths, means to immobilize the yarns at one of said guide members during travel of said beater element in a first portion of the cycle from its point of intersection with said normal paths to said second position to thereby draw preselected lengths of yarns through said other guide member, means operable during travel of said beater element in the remainder of each cycle thereof to withdraw lengths of yarn through said one guide member, and means operable during the travel of the beater to selectively change the position of said normal path relative to said one position of the beater to thereby change the length of the yarns withdrawn through said other guide member during travel of the beater element in said first portion of the cycle.

12. Apparatus according to claim 11 wherein said

means mounting said beater element for cyclic travel moves said beater element in a cylindrical path having an axis at said one side of said normal yarn path, and intersecting said yarn paths at points intermediate said guide members.

13. Apparatus according to claim 12 including drive means for said beater element operable in timed relation to said yarn immobilizing means to rotate said beater toward said one guide member during the first named portion of its cycle to assist the drawing of yarn through said other guide member.

14. In apparatus for selectively controlling a pile yarn, a pair of spaced-apart guide members guiding said yarn in a normal path therebetween, a beater element disposed transversely to said path, means mounting said beater element for cyclic travel from one position at one side of said path, into engagement with the yarn in said normal path, to a second position spaced beyond said normal paths to displace the yarn into an extended path longer than said normal path, and back to said one position to afford return of said yarn to said normal path, means to immobilize the yarn at one of said guide members during travel of said beater element in a first portion of the cycle from its point of intersection with said normal path to said second position to thereby draw a preselected length of yarn through said other guide member, means operable during travel of said beater element in the remainder of each cycle thereof to withdraw a length of yarn through said one guide member, and means operable during the travel of said beater element to selectively change the position of said normal path relative to said one position of the beater to thereby change the length of the yarns withdrawn through said other guide member during travel of the beater element in said first portion of the cycle.

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