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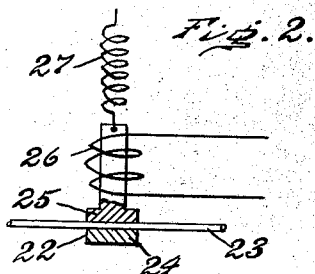
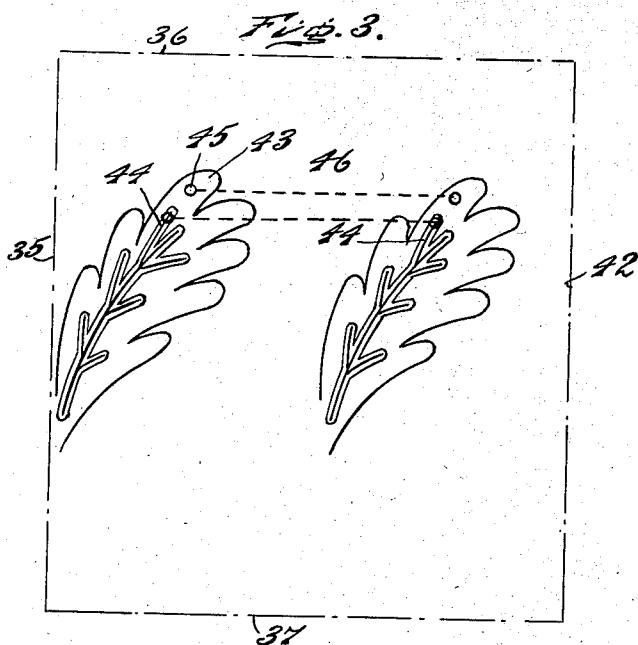
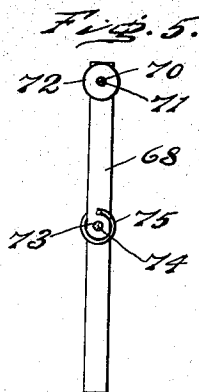
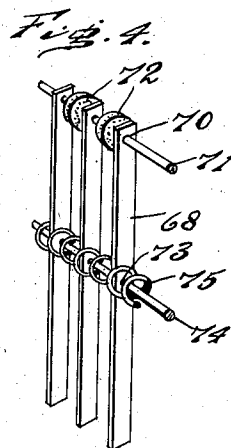
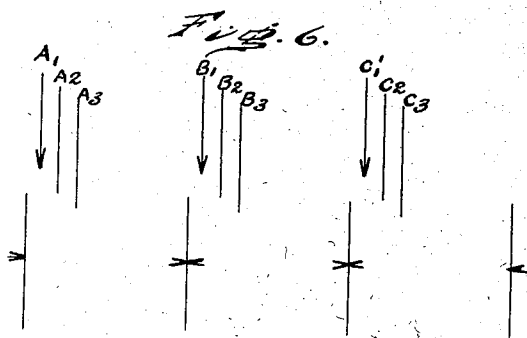
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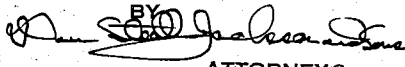
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YARN FEED FOR NEEDLING OR KNITTING OR THE LIKE

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2 Sheets-Sheet 2



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YARN FEED FOR NEEDLING OR KNITTING OR THE LIKE

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The present invention relates to feeding yarn for needling, knitting or the like.

In needling of pile fabrics where a gang of needles are advanced together through a backing fabric, or where the different yarn ends are carried to a knitting machine for knitting a pile fabric, it is sometimes necessary to provide mechanism for variation in yarn feed.

The purpose in which this is very advantageous in needling is to permit variation in height of loops by causing pull back of a loop previously formed or varying the tightness of the yarn which forms the loop so that in repose, the loop has a predetermined height.

A further purpose is to decrease the time limit for selecting the yarn feed.

With this objective in view, the present invention provides a simple, inexpensive and convenient pattern control for yarn feed.

The invention has the great advantage that pattern can readily be changed, for example, by merely changing a sheet or series of sheets which are employed to produce the pattern.

In the drawings, I illustrate one only of the preferred embodiments of the invention, selecting the form shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

Figure 1 is an electrical diagram illustrating the structure of the invention.

Figure 2 is a detailed diagrammatic axial section.

Figure 3 is a diagrammatic elevation of the pattern blanket.

Figure 4 is a fragmentary perspective of some of the contact wires.

Figure 5 is a fragmentary section through the group of contact wires.

Figure 6 is a repeat diagram.

Describing in illustration, but not in limitation, and referring to the drawings:

In the prior art, control of feed of yarn has been used for needling by varying the tension on an individual yarn end of a group of yarn ends which are being punched through a backing fabric by a gang of needles in line. Similar requirements exist where fabrics such as pile fabrics are produced by knitting, since the size of the loop can be controlled by the feed.

In accordance with the prior art practice, the change in pattern control for yarn feed in needling or the like, has been very difficult, often necessitating the replacement of an entire drum, or making a very large number of adjustments. Furthermore, under present practice, the speed of operation of the pattern control is often not adequate.

The invention provides a simplified method of controlling yarn feed by pattern, and in particular makes it possible to preserve and keep a simple pattern master for reuse, and also permits high speed operation.

In accordance with the invention, an arm 20 pivoted at 21 is manipulated by any suitable mechanism, desir-

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ably a cam (not shown) to move it from position A to position B. A yarn clamp 22 (Figures 1 and 2) mounted on the arm receives a yarn end 23 moving in the direction of the arrow to the needle of the needling machine, or to a knitting machine or otherwise. The clamp consists of a stationary jaw 24 and a movable jaw 25 which is moved to clamping position by the energization of a solenoid 26. The movable jaw and its associated armature are retracted by a suitable spiral tension spring 27 acting from an anchorage. As the arm 20 moves, it engages a series of contacts 28, 30 and 31 suitably supported on an insulating arc 32. The contact 28 is the longest and extends over substantially the entire range of motion of the arm. The contact 30 is shorter and extends over a shorter range of motion, and the contact 31 is still shorter.

The arm 20 carries a movable contact 32' which is wide enough to engage all of the contacts 28, 30 and 31, and will receive current from whichever one is energized. The movable contact 32' connects to one end of solenoid 26, the opposite end of the solenoid being grounded at 33.

In the preferred embodiment of the invention, a hollow cylinder 34, which may be of wood, mounts on its surface pattern sheet or blanket 35 (Figures 1 and 3), the blanket suitably being wrapped around the cylinder, having end portions 36 and 37 carried into a slot 38 between clamping jaws 40 and 41 on the circumference of the cylinder.

The blanket is suitably made of an insulating plastic 42, and has mounted on its outside, areas 43, suitably of copper foil or other conductor which are connected in one circuit and conform to one pattern character, and areas 44 which are connected in another circuit and correspond to another pattern character. All of the elements making up the pattern areas 43 are insulated from those making up the pattern areas 44, but are connected to one another, and all of the areas making up the pattern areas 44 are insulated from the pattern areas 43, but connected to one another. In order to connect together each pattern area, each pattern area has a metallic eyelet 45 or the like extending through the insulation from the front to the back, and on the back the eyelets of one pattern area are electrically connected by metallic wire or tape to the similar eyelets.

Thus as shown in Figure 1 all of the areas 43 are connected by wires 46, and all of the areas 44 are connected by wires 46' and the wires 46 are connected to slip ring 47 engaged by brush 48 and the wires 46' are connected to slip ring 50 engaged by brush 51.

Any suitable electric relay or the like may be used to energize a selected one of the contacts 28, 30 or 31 at each of the yarn ends. It will be understood that at a given position of the selector cylinder, all of the yarn ends which are to make pile, for example for the background area, will have their contacts 28 energized, all of those intended to form the pattern area 43 will have their contacts 30 energized, and all of those intended to form the pattern area 44 will have their contacts 31 energized.

The brush 48 is connected to one electromagnet 52 and the brush 51 is connected to an opposed electromagnet 53 of a three position relay which has an intermediate position to which the contact maker 56 is restored by opposed helical tension springs 54 and 55. When neither one of the electromagnets 52 and 53 is energized, the contact maker 56 engages contact 57 at an intermediate position, connecting ground 58 and battery source 60 to lead 61 which energizes a series of contacts 28, one for each corresponding yarn end feeder in the pattern repeat. If electromagnet 52 is energized the contact maker 56 engages contact 62 which connects the power source to contact 30 and a series of similar contacts at corresponding feeders in each pattern repeat. If electromagnet 53 is energized it connects the source through the contact maker 56 to contact 63 of the relay, which applies current to

contact 31 of each feeder in the same position in the pattern repeat.

In operation of the device, the arm 20 slides through the full arc from A to B on each feeding step, for example each needle stroke cycle of the needling machine. If, at the particular feeder, contact 28 is energized, the clamp engages the yarn end at the beginning of the stroke and holds engagement throughout the stroke, feeding a relatively large amount of yarn. If at the particular feeders contact 30 is energized, the clamps engage the yarn ends at an intermediate position in the stroke and less yarn is fed. If at the particular positions contact 31 is energized, the clamp engages the yarn ends relatively late in the stroke, and still less yarn is fed.

As the arm reaches the end of the stroke, abutment 64 trips limit switch 65 to one limiting position to interrupt the solenoid circuit and release the clamp. The limit switch remains in that position until the arm returns to the opposite end of the stroke and encounters abutment 66, which again closes the limit switch.

It will be evident that any suitable contact making device engages the contact areas on the blanket to provide electric current from the source 67. In the preferred embodiment metallic wires 68, suitably of copper, have holes 70 through which an insulating rod 71 passes to support the wires. The wires are separated by insulating washers 72 strung on the rod 71. The wires, at their lower ends, have openings 73 through which an insulating rod 74 is passed, and around the rod and between the wires is an insulated helical spacer spring 75, which may be a spring of a non-metallic resilient material such as nylon or a metallic spring coated with an insulating coating. The wires themselves are sufficiently resilient to engage the blanket. The form of mounting shown in the drawings makes it possible to add or remove wires for the purpose of changing the gauge of the carpet without threading in different spacers since the spring tends to space the wires equally across the pattern areas.

One great advantage of the device of the invention is that the pattern blanket enables the designer to see the design in the actual form in which it is going to be used, and any required corrections or modifications can be made with a minimum of study and experiment.

Figure 6 illustrates diagrammatically that there will be a series of relays and circuits which may be designated No. 1, which will control the yarn feeder A1 in pattern repeat A, the yarn feeder B1 in pattern repeat B, the yarn feeder C1 in pattern repeat C, etc. Similarly there will be relays and circuits No. 2 which will control the yarn feeder A2 in pattern repeat A, the yarn feeder B2 in pattern repeat B, the yarn feeder C2 in pattern repeat C, etc. Thus there will be as many of the circuits of Figure 1 as there are yarn ends in the pattern repeat, but the same cylinder 34 will control all yarn ends.

In a preferred embodiment of the invention, there are two devices of Figure 1 with yarn clamps at different positions along the yarn ends, 180° out of phase, so that one arm 20 is moving from A to B while the other is moving from B to A.

In view of my invention and disclosure, variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the method and structure shown, and I, therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The method of feeding yarn in accordance with a pattern, which comprises advancing a clamp along a yarn over a predetermined path of invariable length, engaging the clamp with the yarn at a variable position in respect to the end of the path, which accords with the pattern, and carrying the yarn forward from the position of clamping to the end of the path by the motion of the clamp.

2. The method of claim 1, which comprises energizing a solenoid to engage the clamp at a predetermined position with respect to the path.

3. The method of feeding yarn in accordance with a pattern, which comprises moving a clamp back and forward over an invariable arcuate path while carrying the yarn through the clamp, engaging the clamp on the yarn at a selected position in the forward stroke with respect to the end of the stroke, and carrying the yarn forward by the clamp, from the position of engagement of the clamp, to the end of the stroke.

4. The method of claim 3, which comprises carrying the yarn through a plurality of clamps and moving the clamps out of phase so that one clamp retracts when the other clamp advances.

5. In a yarn feed, a clamp adapted to surround the yarn, means for moving the clamp through an invariable predetermined path, electrical means for engaging the clamp on the yarn at a selected position along the forward motion of the clamp and for releasing the clamp at the end of the path, and pattern control means for energizing the electrical means.

6. A yarn feed of claim 5, in which the electrical means includes solenoid means moving with the clamp for energizing the clamp and designator means for energizing the solenoid means at one of a plurality of positions along the length of the solenoid means travel.

7. A yarn feed of claim 5, in which the pattern control means includes a drum having a plurality of first pattern areas interconnected together and having electrical connecting means in the areas, a plurality of second pattern areas interconnected and having electrical connecting means in the second areas, the first areas being insulated from the second areas, and brush means engaging the pattern areas, and in which the electrical means comprises switch means interconnecting the first contact areas with the electrical means for engaging the clamp at one position along the length of the travel of the clamp, and switch means interconnecting the second contact areas with the electrical means for engaging the clamp at a different position along the length of travel of the clamp, the brush means being connected with the electrical means.

8. A yarn feed of claim 5, in which the pattern control means comprises a contact cylinder having first electrical conducting areas distributed according to the pattern and second electrical conducting areas insulated from the first and distributed according to the pattern, and brush means riding the cylinder and making contact at a particular time with one of the pattern areas, and in which the electrical means for engaging the clamp includes solenoid means, electrical means interconnecting the brush means to one side of the solenoid means, switch means having a first switch position interconnected with the other side of the solenoid means at one position along the clamp travel and interconnected to the first conducting areas and a second switch position interconnected with said other side of the solenoid means at a second position of clamp travel and interconnected to the second conducting areas, and connections to a source of electric power in the circuit.

9. A yarn feed of claim 5, in which the pattern control means includes a pattern selecting cylinder having pattern areas defined on its circumference and first and second contacts insulated from one another and occupying different pattern areas, and brush means engaging the circumference of the selecting cylinder, and in which the electrical means for engaging the clamp comprises solenoid means operatively connected to the clamp, a designator relay having opposed relay coils, each interconnected at one end to the brush means, separate connections from the contacts in the first pattern areas as a group to the opposite end of one of the relay coils and from the contacts in the second pattern areas as a group to the opposite end of the other relay coil, connections to an

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electrical source in the relay circuit, and switch means making contacts at different positions in the clamp travel and connected at different switch contacts to different relay contacts, and also connected to the solenoid means for energizing the clamp at selectively different positions. 5

10. A yarn feed of claim 9, in which the selecting cylinder has a movable insulating blanket carrying the electrically contacting pattern areas and cross connections from one similar area to another.

11. A yarn feed of claim 9, in which the pattern 10 control means includes a series of brushes, each connected to a metallic wire, common insulator means extending through the wires transversely, an insulating separator

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between the wires on the insulator means, and an insulating spiral spring extending transversely of the brushes and further separating the wires.

References Cited in the file of this patent

UNITED STATES PATENTS

495,472	Buxtorf -----	Apr. 18, 1893
1,072,803	Ambler -----	Sept. 9, 1913
1,863,049	Hermann -----	June 14, 1932
2,088,428	McClure -----	July 27, 1937
2,658,367	Shortland -----	Nov. 10, 1953
2,734,954	Kidd -----	Feb. 14, 1956