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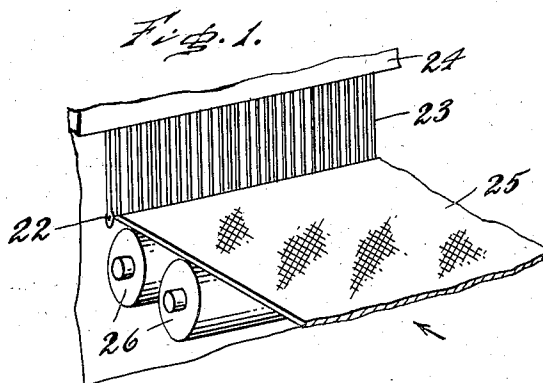
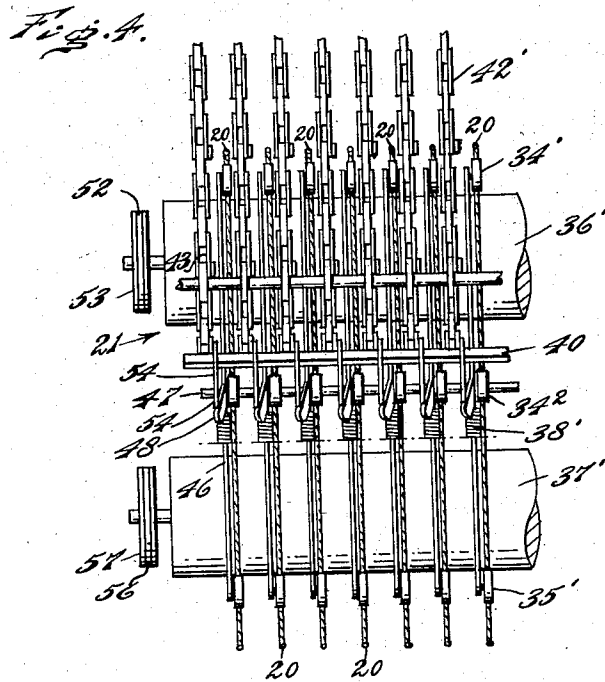
C. H. MASLAND 2ND

2,880,684

FORMATION OF HIGH AND LOW PILE BY NEEDLING

Original Filed March 9, 1955

2 Sheets-Sheet 1



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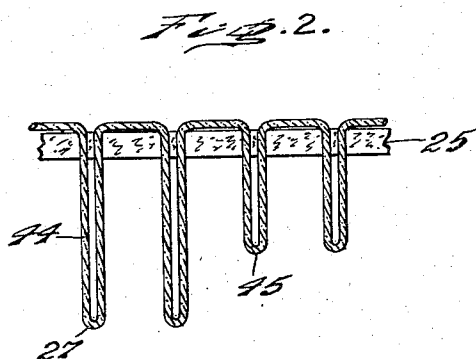
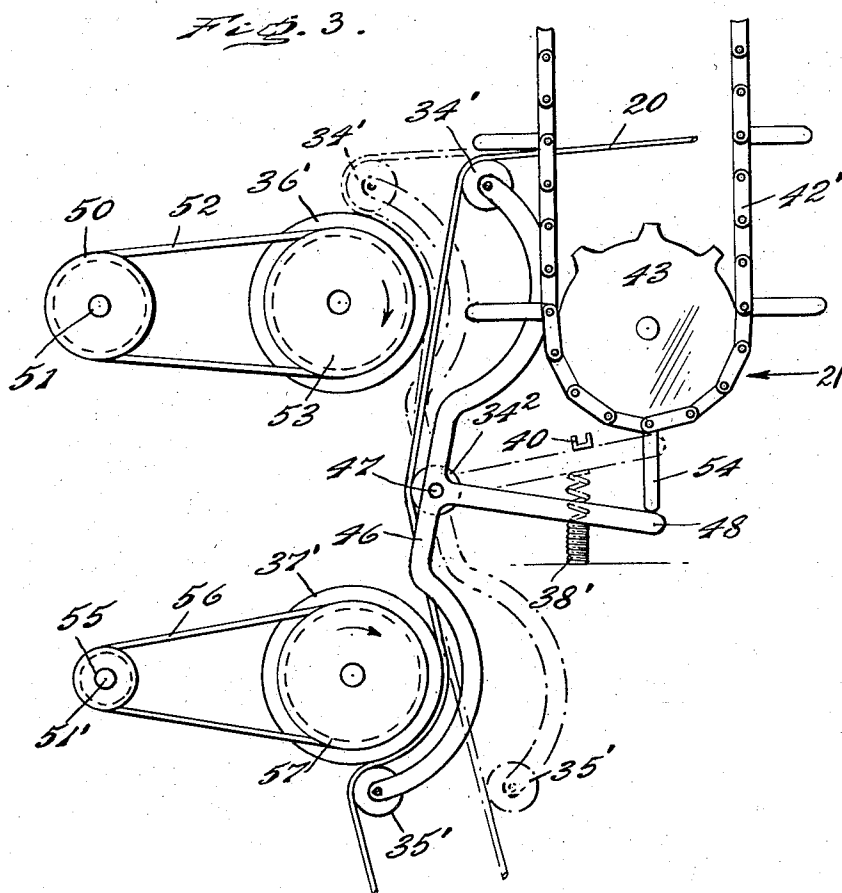
C. H. MASLAND 2ND

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FORMATION OF HIGH AND LOW PILE BY NEEDLING

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2 Sheets-Sheet 2



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1

2,880,684

FORMATION OF HIGH AND LOW PILE BY NEEDLING

Charles H. Masland, 2nd, Carlisle, Pa.; Charles H. Masland, 3rd, and Daniel Lake Masland, executors of said Charles H. Masland, 2nd, deceased, assignors to C. H. Masland & Sons, Carlisle, Pa., a corporation of Pennsylvania

Original application March 9, 1955, Serial No. 493,281. Divided and this application October 3, 1957, Serial No. 694,466

3 Claims. (Cl. 112-79)

The present invention relates to production of high and low pile in pile fabrics by needling.

The present application is a division of my application Serial No. 493,281 of March 9, 1955, now abandoned, for Formation of High and Low Pile by Needling, which is in turn a continuation of application Serial No. 383,009, filed September 29, 1953, now abandoned, for Formation of High and Low Pile by Needling.

A purpose of the present invention is to guide the individual pile yarn ends on yard carriers which are movable relative to driving rolls which are turning at different speeds, and to manipulate the yarn carriers by pattern control mechanism to bring one or the other of the driving rolls into driving relation with the yarn carrier.

Further purposes appear in the specification and in the claims.

In the drawings I have chosen to illustrate one only of the numerous embodiments in which my invention may appear, selecting the forms shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

Figure 1 is a diagrammatic perspective showing the gang of needles and the backing of the needling machine.

Figure 2 is a longitudinal section through the fabric illustrating the difference in heights of the pile projections.

Figure 3 is a fragmentary diagrammatic side elevation of a feed mechanism in accordance with the invention.

Figure 4 is a fragmentary diagrammatic front view of the device of the invention.

Extensive use is made of pile fabrics such as carpets and rugs which are produced by punching, stitching or needling, herein referred to as "needling." In this procedure, a gang of needles are reciprocated back and forth in unison, and individual pile yarn ends carried through eyes of the needles and by the needles are forced through a backing, to form loops which are suitably gripped at the limiting position of entry of the needles by hooks or loopers to hold the loops, as well known, when the needles retract.

Efforts have been made in the art to obtain textured effects in the pile of carpet by producing high and low loops in the same row. These have involved the use of mechanism which is somewhat complex, and which in some cases does not produce sharply defined variations in pile height.

The present invention is designed to give high and low loops which reliably possess the desired height, are suitably uniform with other similar loops, and yet can selectively possess one of at least two heights. The invention furthermore contemplates securing the differences in height by simple, inexpensive and reliable mechanism. The invention permits controlling the height of each individual stitch.

In accordance with the invention, the yarn which is

2

to form the loops is positively fed forward to the needles, but the speed of advance is selectively varied.

Individual pile yarn ends are carried by different yarn carriers and the yarn carriers are manipulated by pattern control mechanism to bring one or the other of a pair of driving rolls turning at different speeds into driving relation with the yarn on the particular yarn carrier.

Considering now the structure shown in Figures 1, 3 and 4, individual pile yarn ends 20 pass from a suitable source, desirably a creel (not shown) through feed mechanism 21 to the eyes 22 near the points of a gang of needles 23 which are reciprocated by a needle bar 24 to penetrate a backing 25 (suitably burlap or osnaburg), which is fed by backing feed rolls 26 through the needling. The needles all advance together through the backing and all withdraw together, leaving pile loops 27 which extend in rows the full width of the machine, the pile loops being held beneath the backing at the limiting position of the needles in any suitable way, as by hooks or loopers well known in the art and not shown herein.

By referring to Figure 2, it will be seen that high loops 44 are formed by controlling the particular pile yarn end to allow relatively liberal feed, and low loops 45 are formed by allowing restricted feed prior to the advance of the gang of needles.

It will be understood that a pattern control device 21 is supplied for each different pile yarn end. I carry the pile yarn ends on yarn carriers individual to the different ends, and shift the yarn carriers to bring one or the other of the driving rolls turning at different speeds into driving relation with the yarn on the yarn carriers.

Thus in Figure 3, the particular pile yarn end 20 of the set of pile yarn ends is guided by feed rollers 34', 34" and 35' which are mounted rotatably on a yarn carrier 46 which is pivoted on a shaft 47, desirably common to all of the yarn carriers and also desirably forming the pivot support of the feed roller 34". The yarn carrier is manipulated back and forth between two limiting positions. The counterclockwise limiting position is reached by the action of spiral compression spring 38' acting on yarn carrier lever extension 48 against stop 40, and in this position the yarn on the yarn carrier is wrapped around a portion of the circumference of driving roll 36' which is driven at a relatively faster speed by pulley 50 driven by shaft 51 engaging belt 52, which connects to pulley 53 on the same shaft as driving roll 36'.

Selectively as the pattern requires, a pattern selecting mechanism, here shown as a dobby chain 42' on sprockets 43 turning intermittently, or continuously as desired, carries a pattern selecting projection 54 on the chain into engagement with arm 48 to deflect the yarn carrier in the clockwise direction so that the yarn is free from engagement with driving roll 36' and instead engages the periphery of driving roll 37' driven at a slower speed by shaft 51' driving smaller pulley 55 which connects to belt 56 which drives pulley 57 on the same shaft as driving roll 37'.

It will be evident, of course, that the driving rolls 36' and 37' may be common to all pile yarn ends, but that there is a separate pattern selection mechanism, and a separate yarn carrier for each pile yarn end. It will also be understood that the feeding rolls 34', 34" and 35" on the yarn carrier are of course placed so they will not interfere with the pattern selecting mechanism, but will alternately reach positions in which feed roll 34' or 35' is turning against the driving roll with the yarn in between the feed roll and the driving roll. It will further be evident that it is immaterial whether the rolls 34' and 35' are actually in pressure engagement against the driving rolls as long as the yarn is wrapped around the periphery of one or the other of the driving rolls so that

it is advanced at a speed controlled by one or the other of the driving rolls.

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 process and machine 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. In a yarn feed for a machine which produces pile of varying heights on a plurality of pile yarn ends, a first driving roll rotatably mounted and extending across the machine, means for turning the first driving roll in a first direction at one peripheral speed, a second driving roll rotatably mounted and extending across the machine beside the first driving roll, means for turning the second driving roll in the same direction as the first at a different peripheral speed from the first, a plurality of carriers for different yarn ends pivoted on an axis extending across the machine beside the driving rolls, each carrier having a yarn guide roll at each end adapted to guide a yarn end, each carrier being rockable between limiting positions, each carrier at one limiting position bringing one yarn guide roll into position adjacent one driving roll to bring the yarn on said one guide roll against said one driving roll to travel at one speed, and each carrier at the other limiting position bringing the other yarn guide roll into position adjacent the other driving roll to bring the yarn on said other guide roll against said other driving roll to travel at a different speed, and pattern means for rocking each carrier selectively between one limiting position and the other limiting position.

2. In a yarn feed for a machine which produces pile of varying heights on a plurality of pile yarn ends, a first driving roll rotatably mounted and extending across the machine, means for turning the first driving roll in a first direction at one peripheral speed, a second driving roll rotatably mounted and extending across the machine beside the first driving roll, means for turning the second driving roll in the same direction at a different peripheral speed from that of the first driving roll, a plurality of carriers for different yarn ends pivoted on an axis extending across the machine beside the driving rolls, each carrier having a yarn guide roll at each end adapted to guide a yarn end, each carrier being rockable between

limiting positions, each carrier at one limiting position bringing one yarn guide roll adjacent one driving roll to deflect the yarn on said one guide roll to conform to the curvature of a portion of the periphery of said one driving roll to travel at the peripheral speed of said one driving roll, and each carrier at the other limiting position bringing the other yarn guide roll into position adjacent the other driving roll to deflect the yarn on said other guide roll to conform to the curvature of a portion of the periphery of said other driving roll, to travel at the peripheral speed of said other driving roll, and pattern means for rocking each carrier selectively between one limiting position and another limiting position.

3. In a yarn feed for a machine which produces pile of varying heights on a plurality of pile yarn ends, a first driving roll rotatably mounted and extending across the machine, means for turning the first driving roll in a first direction at one peripheral speed, a second driving roll rotatably mounted and extending across the machine beside the first driving roll, means for turning the second driving roll in the same direction as the first driving roll at a different peripheral speed from the first driving roll, a plurality of carriers for different yarn ends pivoted on an axis extending across the machine, each carrier having a yarn guide roll at each end adapted to guide a yarn end, each carrier being rockable between limiting positions, each carrier at one limiting position adapted to bring the yarn end into engagement between one yarn guide roll on one side and one driving roll on the other side to cause the yarn end to travel at the peripheral speed of the one driving roll, and each carrier at the other limiting position adapted to bring the yarn end into engagement between the other yarn guide roll and the other driving roll to advance the yarn end at the peripheral speed of the other driving roll, and pattern means for rocking each carrier selectively between one limiting position and another limiting position.

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