Sept. 20, 1949. W. N. MOORE 2,482,682

PILE FABRIC

Filed Feb. 24, 1948

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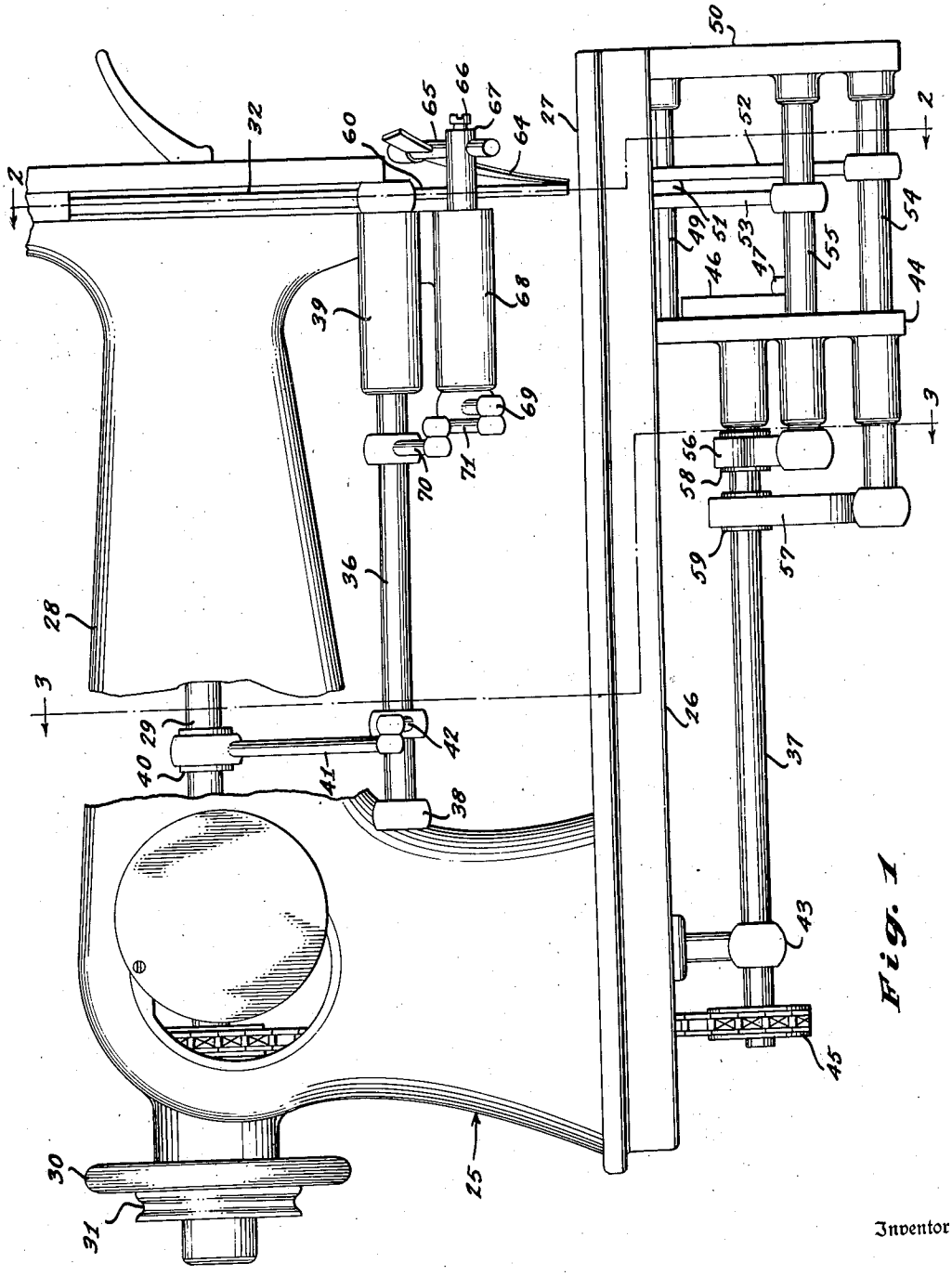


Fig. 1

Inventor

By WILLIAM N. MOORE

Parrott and Richards

Attorneys

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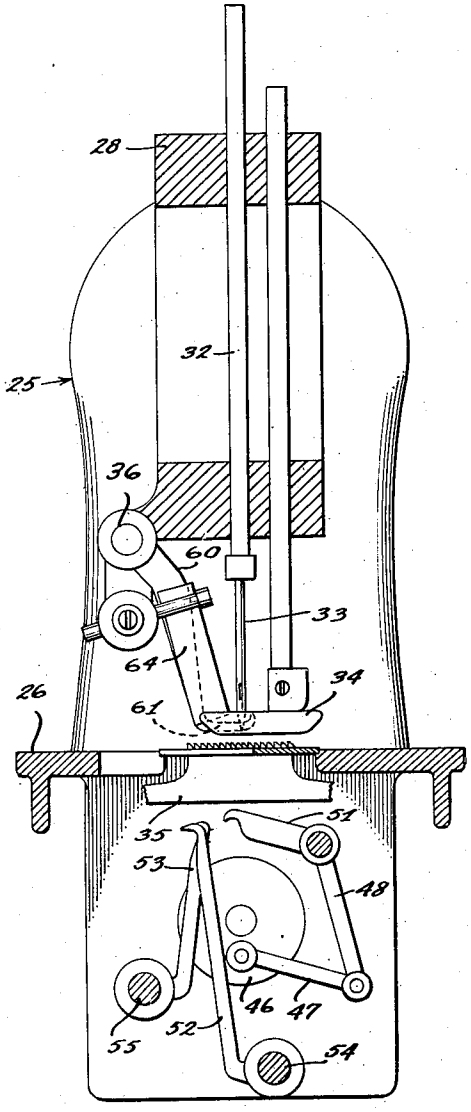


Fig. 2

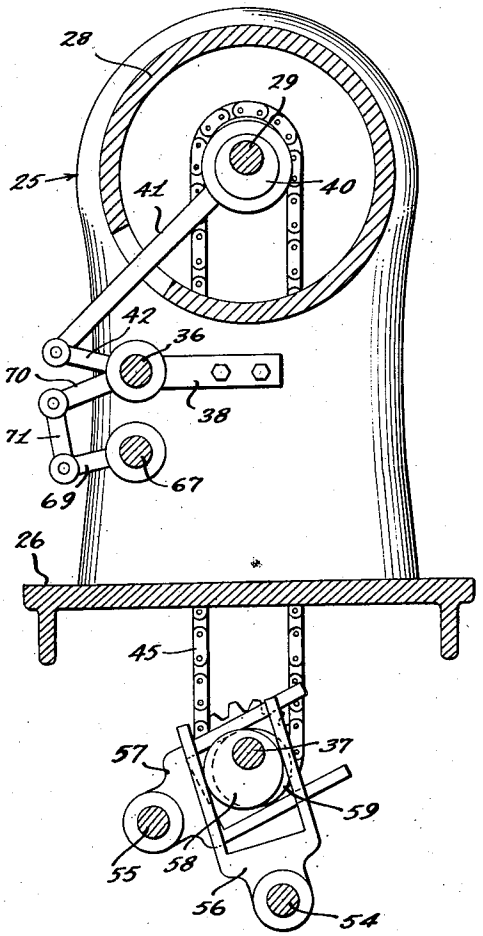


Fig. 3

Inventor

By WILLIAM N. MOORE

Parrott and Richards

Attorneys

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Fig. 4

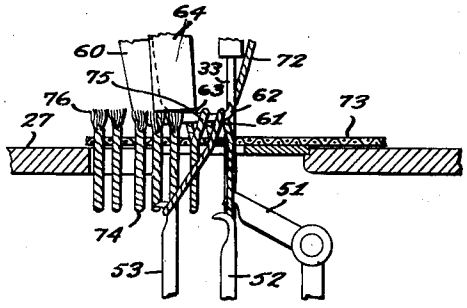


Fig. 5

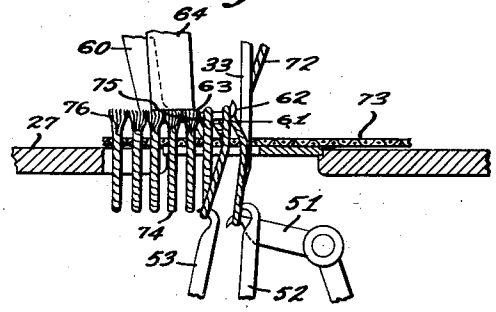
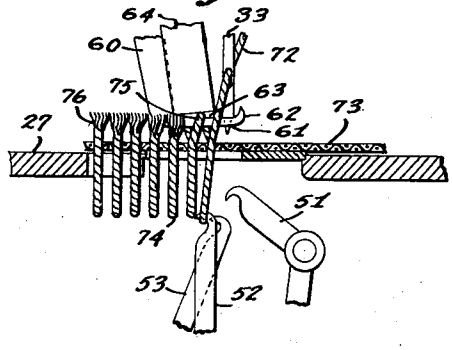


Fig. 6



Inventors

By WILLIAM N. MOORE

Parrott and Richards

Attorneys

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Fig. 7

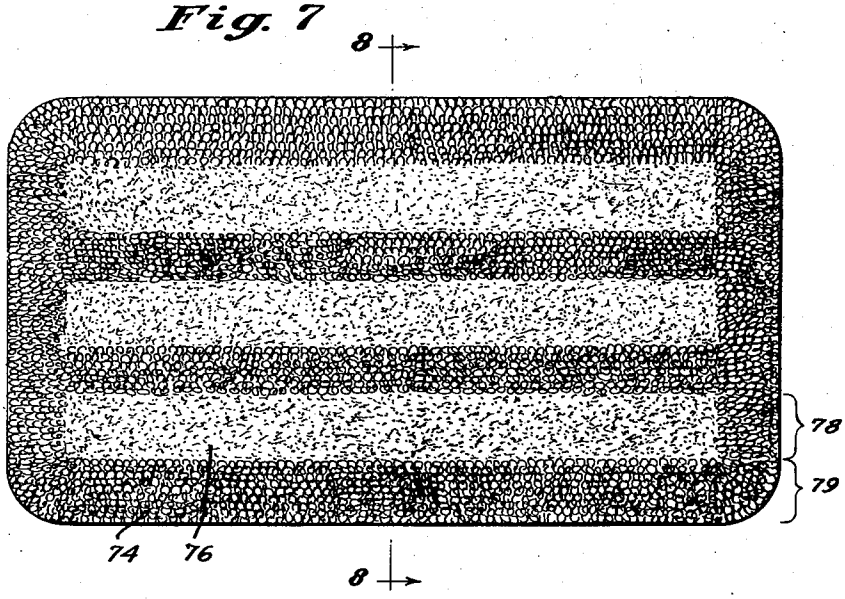


Fig. 8

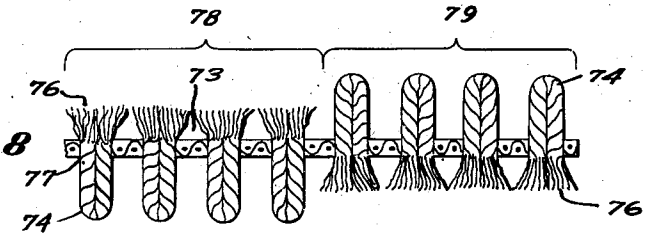


Fig. 9

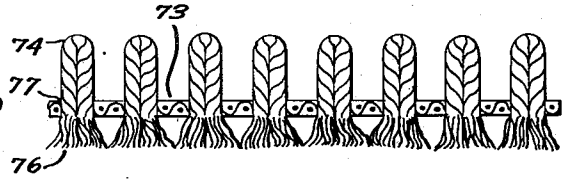
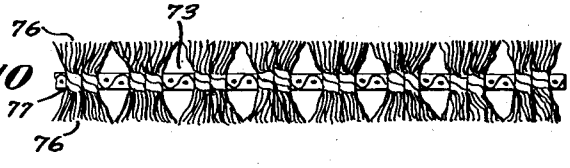


Fig. 10



Inventor

By WILLIAM N. MOORE

Parrott and Richards

Attorneys

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PILE FABRIC

William N. Moore, Tilton, Ga., assignor, by mesne assignments, to Russell-Lacey Manufacturing Company, Incorporated, Fairmount, Ga., a corporation of Georgia

Application February 24, 1948, Serial No. 10,208

11 Claims. (Cl. 112—79)

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This invention relates to pile fabrics, and in particular to that class of pile fabrics commonly known as "chenille," in which a pile yarn is inserted in a fabric base or backing to form a pile or tufting on the fabric base.

Pile fabrics of this sort have heretofore generally been formed by carrying the pile yarn through the fabric base at successively spaced points to form a series of loops on one face of the fabric, which loops may be allowed to remain as such, or be cut to provide chenille ends. In a pile fabric formed in this manner, a pile is provided on only one face of the fabric base, the pile yarn extending on the reverse face of the fabric base in the nature of stitches between the successive points of insertion of the pile yarn so that this reverse face is bare and is accordingly not suitable for exposure to view during use of the fabric.

According to the present invention, a pile fabric of the chenille type is provided in which a pile is formed on both faces of the fabric base or backing so that it is reversible, and may be used with either face exposed. The pile fabric of the present invention comprises a fabric base or backing such as has heretofore been used in forming similar fabrics, but differs over these prior fabrics in that pile tufts are inserted in the fabric base to extend from both of its faces, these pile tufts being formed by doubled strands of pile yarn cut to form chenille ends on at least one face of the fabric base.

The reversible pile fabric formed according to the present invention is novel not only in the provision of a pile on both of its faces, but also in the fact that the manner in which it is formed provides a luxuriant body or hand, and corresponding appearance characteristics, which are unique in fabrics of this sort. Moreover, this reversible pile fabric may be formed in accordance with the present invention with only a slight increase over the amount of material required by previous methods for forming the usual single face chenille fabrics.

Briefly stated, the method employed according to the present invention for forming this reversible pile fabric comprises inserting a doubled portion of a continuous pile yarn in the fabric base, thereby disposing a loop of the pile yarn extending from one face of the fabric base, training the pile yarn to form a loop extending from the other face of the fabric base while inserting a succeeding doubled portion of the pile yarn in the fabric base, and then cutting at least one of these loops to form chenille ends. If it is desired to cut the loops on only one face, the above mentioned trained loops are cut, which provides a pile of chenille ends on one face of the fabric, and a pile of loops on the other face. It is possible, however, to cut the loops on both faces of the fabric to form a pile of chenille ends on each face, or the fabric base may be reversed during the process of manufacture to provide an alternating pile pattern of chenille ends and loops, as described more in detail below.

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My reversible pile fabric and the means and method by which it is formed according to the present invention are illustrated in the accompanying drawing in which:

Fig. 1 is a side elevation of a machine arranged according to the present invention for forming the reversible pile fabric;

Fig. 2 is a transverse section taken substantially at the line **2—2** in Fig. 1;

Fig. 3 is a transverse section taken substantially at the line **3—3** in Fig. 1;

Figs. 4, 5, and 6, inclusive, are fragmentary details corresponding generally to Fig. 3, and illustrating further the operating relation of the pile forming elements of the machine;

Fig. 7 is a plan view of one face of a reversible pile fabric formed according to the present invention;

Fig. 8 is an enlarged diagrammatic section of the reversible pile fabric shown in Fig. 7; and,

Figs. 9 and 10 are similar enlarged diagrammatic sections illustrating modified forms of the reversible pile fabric.

Referring first to Figs. 1, 2, and 3 of the drawing, the means employed according to the present invention for forming the reversible pile fabric comprises a sewing machine head indicated generally at **25**, which may be of any usual construction. As shown in the drawing, the sewing machine head **25** comprises a base portion **26** which extends forwardly to form a work support at **27**, and a supporting arm structure **28** in which a drive shaft **29** is journaled. The drive shaft **29** carries the usual hand wheel **30** and drive pulley **31** at its rear end, and is arranged at its forward end to reciprocate the usual needle bar **32** through a crank mechanism (not shown), the needle bar **32** being fitted at its lower end with a needle **33**. The sewing machine head **25** is further fitted with a presser foot **34** and fabric feeding mechanism **35** in the usual manner. All of the foregoing elements are common in sewing machine mechanisms generally, and further detailed description is not believed necessary here.

The additional operating elements provided for

forming the reversible pile fabric of the present invention are actuated through countershafts 36 and 37 mounted on the sewing machine head 25. The countershaft 36 is disposed above the base portion 26 in bearing brackets 38 and 39 carried on the supporting arm structure 28. This countershaft 36 is actuated from the drive shaft 29 through an eccentric 40 by a link member 41 extending from the eccentric 40 to a rocker arm 42 carried on the countershaft 36, so that an oscillating motion is imparted to the countershaft 36 from the drive shaft 29 during operation of the machine.

The countershaft 37 is arranged below the base portion 26 and is mounted in bearing brackets 43 and 44 carried by the base portion 26. A chain and sprocket drive 45 provides a driving connection for the countershaft 37 from the drive shaft 29, so that this countershaft 37 is rotated upon rotation of the drive shaft 29 during operation of the machine.

The countershaft 37 extends forwardly through the bearing bracket 44 to carry a crank plate 46 from which a crank arm 47 extends to a rocker arm 48 carried on a shaft 49 extending between bearing bracket 44 and a front bearing bracket 50. This shaft 49 also carries a hook member 51 which is disposed for oscillation across the path of movement of the needle 33 by the above described connections from the crank plate 46, so that the hook member 51 is adapted for receiving loops from the needle 33, as described more in detail below. A second hook member 52, and a third hook member 53, are similarly arranged to receive these loops in turn from the first hook member 51 for a purpose which is also described further below. The hook members 52 and 53 are mounted on shafts 54 and 55, both of which are carried in the bearing brackets 44 and 50, and extend rearwardly to carry rocker arms 56 and 57 which extend to follow eccentrics 58 and 59 arranged on the countershaft 37 to impart the necessary oscillating motion to the shafts 54 and 55 and in turn to the hook members 52 and 53.

The countershaft 36 extends forwardly through the bearing bracket 39 to carry an arm 60 which is formed at its extending end with a finger portion 61 disposed transversely of the path of movement of the needle 33. This finger portion 61 terminates in a hook 62 and its top edge is sharpened at 63 to provide a cutting edge. A cutting blade 64 is associated with this finger portion 61 of the arm 60. The cutting blade 64 is carried in a transverse arm 65 mounted for adjustment by means of a set screw 66 in a shaft 67, so that it may be positioned with suitable sidewise pressure against the finger portion 61. The shaft 67 is disposed parallel with the countershaft 36 in a bearing bracket 68 carried on the supporting arm structure 28, and is connected to the countershaft 36 through rocker arms 69 and 70, and compensating link 71, to receive the oscillating motion of countershaft 36 for operation of the cutting blade 64 in relation to the cutting edge 63 formed on the finger portion 61 of arm member 60.

The operation of the above described mechanism for forming the reversible pile fabric of the present invention is illustrated in Figs. 4, 5, and 6 of the drawing. During operation of the machine, the needle 33 threaded with a suitable pile yarn 72 is reciprocated to carry successive doubled portions of the pile yarn 72 through a fabric base 73 positioned on the work support 27, thereby forming a series of loops 74 of the pile yarn 72 extending from the under face of the fabric base 73. As each loop 74 is formed in this manner, the hook member 51 oscillates across the path of movement of the needle 33 and receives the loop 74 from the needle 33. Upon withdrawal of the needle 33 for a succeeding loop-forming stroke, the second hook member 52 oscillates to receive the loop 74 from the first hook member 51, and thus free this hook member 51 so that it is available to receive the next loop 74 formed by the needle 33. The third hook member 53 in turn receives the loop 74 from the second hook member 52 in a similar manner, so that each loop 74 is continuously engaged by the hook members 51, 52, and 53 and is thus held against withdrawal until a succeeding doubled portion of the pile yarn 72 is carried through the fabric base 73 to form a succeeding loop 74.

During the withdrawal or recovery of the needle 33 for each succeeding loop-forming stroke, the arm 60 carrying the finger portion 61 oscillates so that this finger portion 61 traverses the path of movement of the needle 33, and passes between the pile yarn 72 and the needle 33, so that the yarn 72 is trained over this finger portion 61 to form a loop 75 extending from the upper face of the fabric base 73 as each succeeding doubled portion of the yarn 72 is carried through the fabric base 73 by the needle 33. As previously mentioned, the upper edge 63 of the finger portion 61 is sharpened to form a cutting edge, and as the loops 75 are successively trained over the finger portion 61, they work backwardly to a point within the reach of the associated cutting blade 64 which oscillates to provide a scissors action with the cutting edge on the finger portion 61 to cut the trained loops 75 and thereby form chenille ends 75 extending from the upper face of the fabric base 73. It will be understood that with the presser foot 34 lowered the fabric feeding mechanism 35 will feed the fabric base 73 through the machine so that a series of the loops 74 and chenille ends 76 may be formed in a row entirely across the fabric base 73, and that by repeating this operation, the entire surface of both faces of the fabric base 73 can be covered with a pile of loops 74 or chenille ends 76 as desired.

A reversible fabric formed in this manner is shown in Fig. 7 of the drawing. In Fig. 7 the pile fabric is shown in a form suitable for use as a rug, and the construction illustrated is characterized by a pattern of loops 74 and a supplementary pattern of chenille ends 76 on each face of the rug. This feature of the construction shown in Fig. 7 is further illustrated in Fig. 8, in which the doubled portions of the yarn 72 forming the pile tufts 77 are shown inserted in one portion 78 of the fabric base 73 with the loops 74 disposed downwardly to form a pattern of loops on the under face of the fabric base 73 as seen in Figs. 7 and 8. The other pile tufts 77 are inserted in the remaining portion 79 of the fabric base 73 with the loops 74 extending upwardly to form a complementary pattern of loops 74 on the upper face of the fabric base 73, and the chenille ends 76 at the other end of the pile tufts 77 are correspondingly disposed to form supplementary patterns on each face of the fabric base 73. The pile pattern formed in this manner may be varied further by adjusting the spacing of the pile forming elements of the machine of the present invention so that the chenille ends 76 are formed with a different elevation or extent from the fabric base 73 than the loops 74, as illustrated best in Fig. 8. Variations of this sort may be used to advantage to accentuate the contrast in the alternating pile pattern described above.

A reversible pile fabric incorporating a pattern of the type illustrated in Figs. 7 and 8 may be formed on the machine described above without modification simply by alternately turning the fabric base **73** over before feeding it to the machine so that the pile tufts **77** are inserted in the proper direction to obtain the pattern desired. Also, in forming reversible pile fabrics with a pattern of this sort, it is advantageous in commercial production to arrange the pile-forming elements in multiples so that a sufficient number of rows of the pile tufts **77** to cover the portions **78** or **79** of the fabric base **73** may be inserted at one time. As is apparent from the foregoing disclosure, this may be done by merely mounting in place of the single needle **33** a plurality of needles (not shown) on the needle bar **32** so that they are disposed in spaced relation longitudinally with respect to the work support **27**, and duplicating the above described arrangement of the transverse finger **61** and cutting blade **64**, and the oscillating hook members **51**, **52**, and **53**, in correspondence. It will also be apparent that a multiple arrangement of the pile-forming elements may generally be used to advantage with any other pattern adoped for pile fabrics formed according to the present invention.

In Fig. 9, a modified arrangement of a reversible pile fabric formed according to the present invention is illustrated in which the pile tufts **77** are all inserted in one direction, so that the fabric base **73** is provided with a pile of loops **74** on one face and a pile of chenille ends **76** on the other face. In Fig. 10 a further modification is shown in which the pile tufts **77** are cut at both ends to form chenille ends, so that in this case both faces of the fabric base **73** are provided with a pile of chenille ends. In forming a reversible pile fabric as shown in Fig. 10, the pile forming elements of the machine described above are modified only by replacing the oscillating hook members **51**, **52**, and **53** with a transverse finger and cutting blade operating exactly like the previously described finger **61** and cutting blade **64** to receive the loops **74** and cut them to form chenille ends.

The present invention accordingly allows selection among a variety of patterns in forming the reversible pile fabrics as described above, and the manner in which a pile is provided on both faces of the fabric base results in exceptional body and substance in the fabric no matter which pattern is used. Moreover, all of the advantages and novel features of the present invention may be obtained with the same fabric-forming material heretofore commonly employed in forming chenille fabrics, and, as previously noted, the method of the present invention for forming the reversible pile fabric requires only a slight increase over the amount of material used by previous methods for forming single face chenille fabrics.

I claim:

1. A pile fabric comprising a fabric base and doubled strands of pile yarn having a uniform length inserted in said fabric base at spaced intervals and extending from both faces thereof, said doubled strands of pile yarn being cut to form chenille ends on at least one face of said fabric base.

2. A reversible pile fabric comprising a fabric base having pile tufts inserted therein at spaced intervals and extending from both faces thereof, said pile tufts being formed by doubled strands of pile yarn provided in predetermined uniform lengths and cut to form chenille ends on at least one face of said fabric base.

3. A reversible pile fabric comprising a fabric base having doubled strands of pile yarn of predetermined uniform length inserted therein at spaced intervals thereby forming loops extending from one face thereof, and said doubled strands of pile yarn being cut in spaced relation to the other face of said fabric base thereby forming chenille ends extending from the said other face.

4. A reversible chenille fabric comprising a fabric base having doubled strands of pile yarn of predetermined uniform length inserted therein at spaced intervals in looped form and extending from both faces of said fabric base, and said doubled strands of pile yarn being cut in spaced relation to both faces of said fabric base, thereby forming chenille ends on both faces of said fabric base.

5. A reversible pile rug comprising a fabric base having doubled strands of pile yarn of predetermined uniform length inserted therein at spaced intervals and thereby forming a pile of loops extending from one face thereof, and said doubled strands of pile yarn being cut in spaced relation to the other face of said fabric base thereby forming a pile of chenille ends extending from said other face.

6. A reversible pile rug comprising a fabric base having doubled strands of pile yarn of predetermined uniform length inserted therein at spaced intervals and thereby forming loops extending from the faces thereof, certain of said doubled strands of pile yarn being inserted in a portion of said fabric base in one direction to form a pattern of loops on one face of said fabric base, the other doubled strands of pile yarn being inserted in the remaining portion of said fabric base in the opposite direction to form a complementary pattern of loops on the other face of said fabric base, and each of said doubled strands of pile yarn being cut in spaced relation to said fabric base to form supplementary patterns of chenille ends.

7. A pile fabric comprising a fabric base having doubled strands of pile yarn inserted therein at spaced intervals and extending from both faces thereof, said doubled pile yarn strands being inserted in said fabric base to extend uniformly from one face thereof as a pile of loops, and being cut in uniform spaced relation to the other face of said fabric base to form a pile of chenille ends extending from said other face.

8. A pile fabric comprising a fabric base having doubled portions of a continuous pile yarn inserted therein at spaced intervals, said doubled pile yarn portions being inserted through said fabric base and extending in a uniform predetermined length from one face thereof, said continuous pile yarn being trained between said inserted doubled portions in uinform spaced relation to the other face of said fabric base, and said continuous pile yarn being cut to form chenille ends on at least one face of said fabric base.

9. A pile fabric comprising a fabric base, and doubled portions of a continuous pile yarn inserted through said fabric base at spaced intervals and extending in a uniform predetermined length from said fabric base, certain of said doubled pile yarn portions being inserted through said fabric base in one direction and the remaining doubled pile yarn portions being inserted in the other direction, said continuous pile yarn being trained between said inserted doubled portions to extend in uniform spaced relation from

the respective opposite faces of said fabric base, and said continuous pile yarn being cut in uniform spaced relation to one face of said fabric base alternately in accordance with the direction of insertion of said doubled pile yarn portions, whereby an alternating pile pattern of loops and chenille ends is formed on each face of said pile fabric and the pile pattern on each face is complementary to the pattern on the other face.

10. In a pile fabric of the type formed by inserting doubled portions of a continuous pile yarn at spaced intervals in a fabric base, the improvement which comprises an arrangement of pile tufts extending from both faces of said fabric base and thereby rendering said pile fabric reversible, said pile tufts being formed by doubled portions of said continuous pile yarn inserted through said fabric base and extending in a uniform predetermined length from one face thereof, and by intermediate portions of said continuous pile yarn trained between said inserted doubled portions in uniform spaced relation to the other face of said fabric base, with said continuous pile yarn cut to form chenille ends on at least one face of said fabric base.

11. In a pile fabric of the type formed by inserting doubled portions of a continuous pile yarn at spaced intervals in a fabric base, the improvement which comprises an arrangement of pile tufts extending from both faces of said fabric base and thereby rendering said pile fabric reversible, said pile tufts being formed by doubled portions of said continuous pile yarn inserted through said fabric base to extend in a uniform predetermined length as loops from said fabric base on one face thereof, and by intermediate

portions of said continuous pile yarn trained as loops between said inserted doubled portions in uniform spaced relation from the opposite face of said fabric base, with all of one set of said loops cut to form chenille ends, and with certain of said doubled pile yarn portions inserted in said fabric base in one direction and the remaining doubled pile yarn portions inserted in the other direction, whereby an alternating pile tuft pattern of loops and chenille ends is formed on each face of said pile fabric and the pile tuft pattern on each face is complementary to the pattern on the other face.

WILLIAM N. MOORE.

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