April 10, 1956 J. H. WEAR 2,741,196

METHOD AND MEANS FOR FORMING A REVERSIBLE PILE FABRIC

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Fig. 1

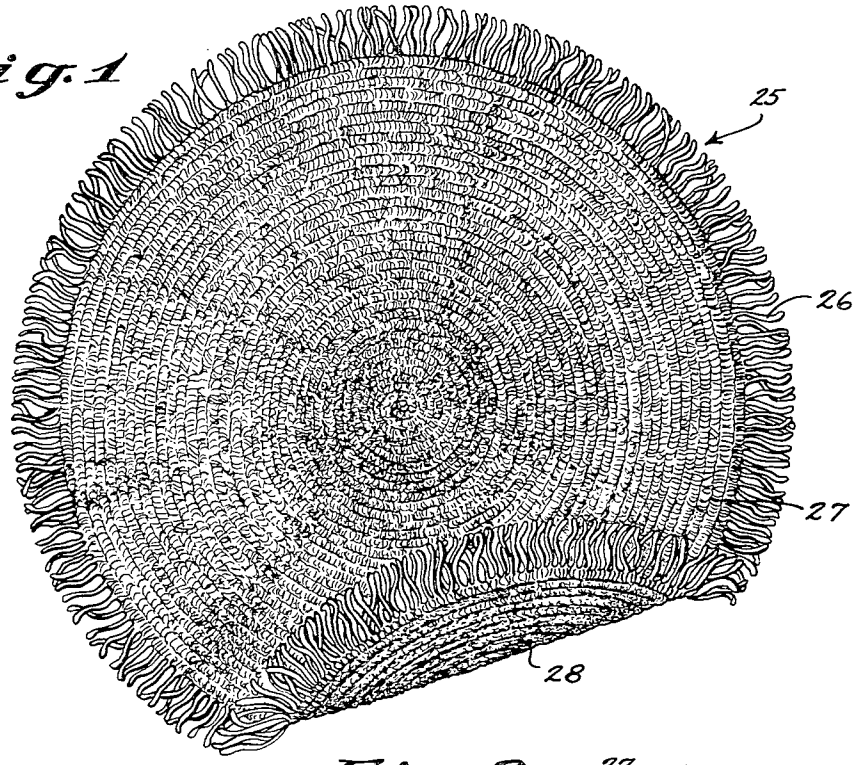


Fig. 2



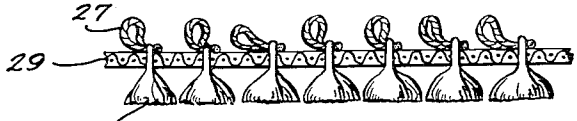
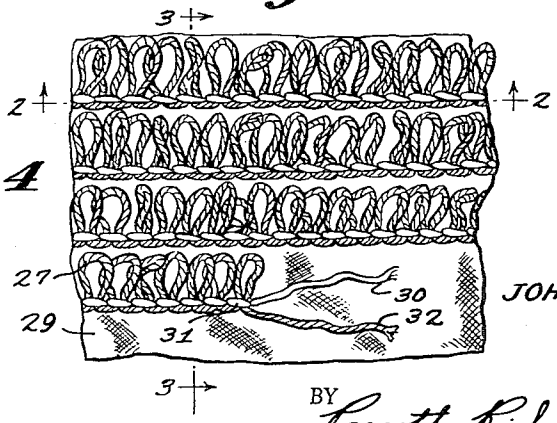


Fig. 3

Fig. 4



INVENTOR
JOHN H. WEAR

BY Parrott, Richards & Sims
ATTORNEYS

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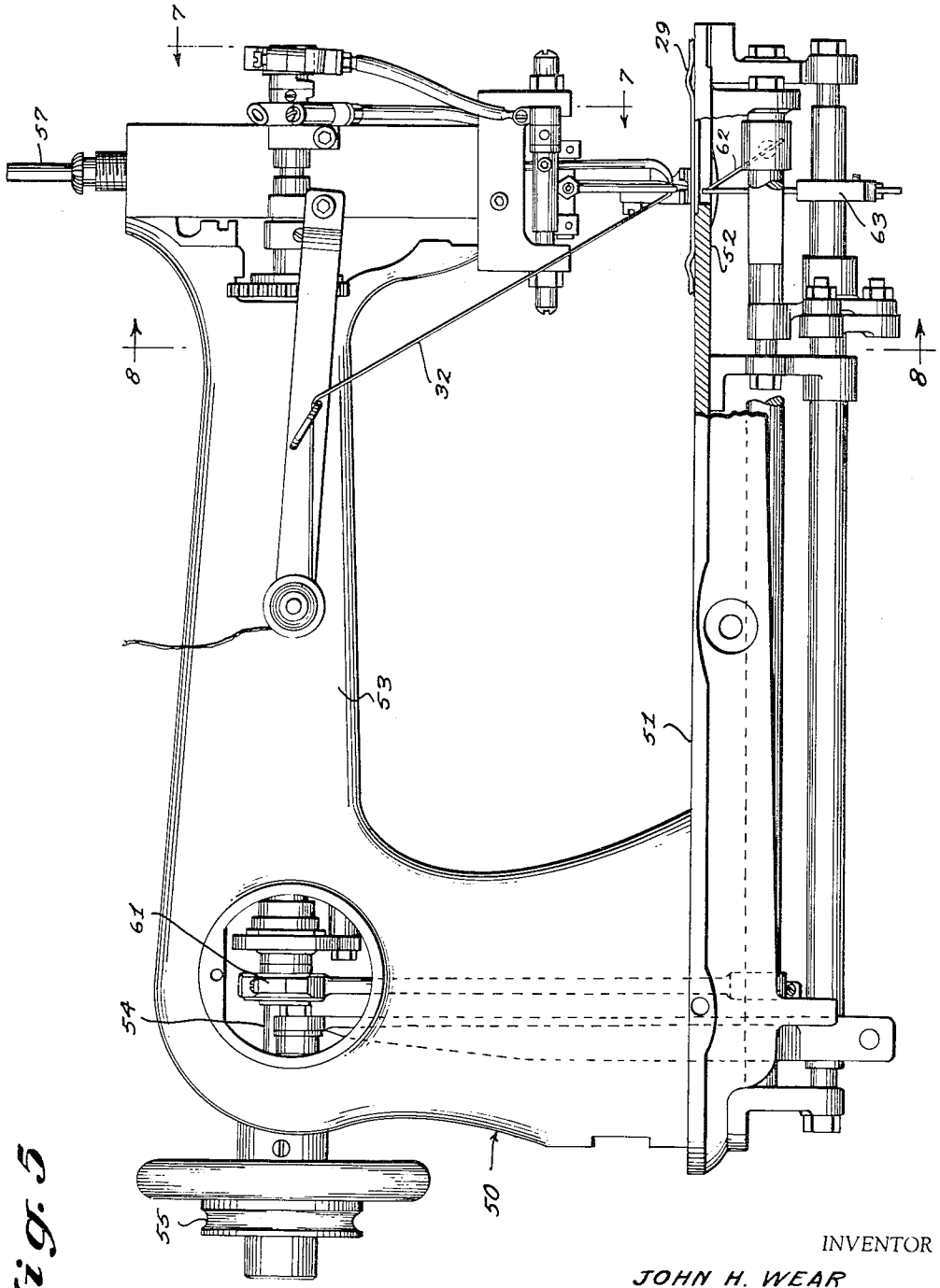


Fig. 5

INVENTOR
JOHN H. WEAR

BY Parrott, Richards & Sims
ATTORNEYS

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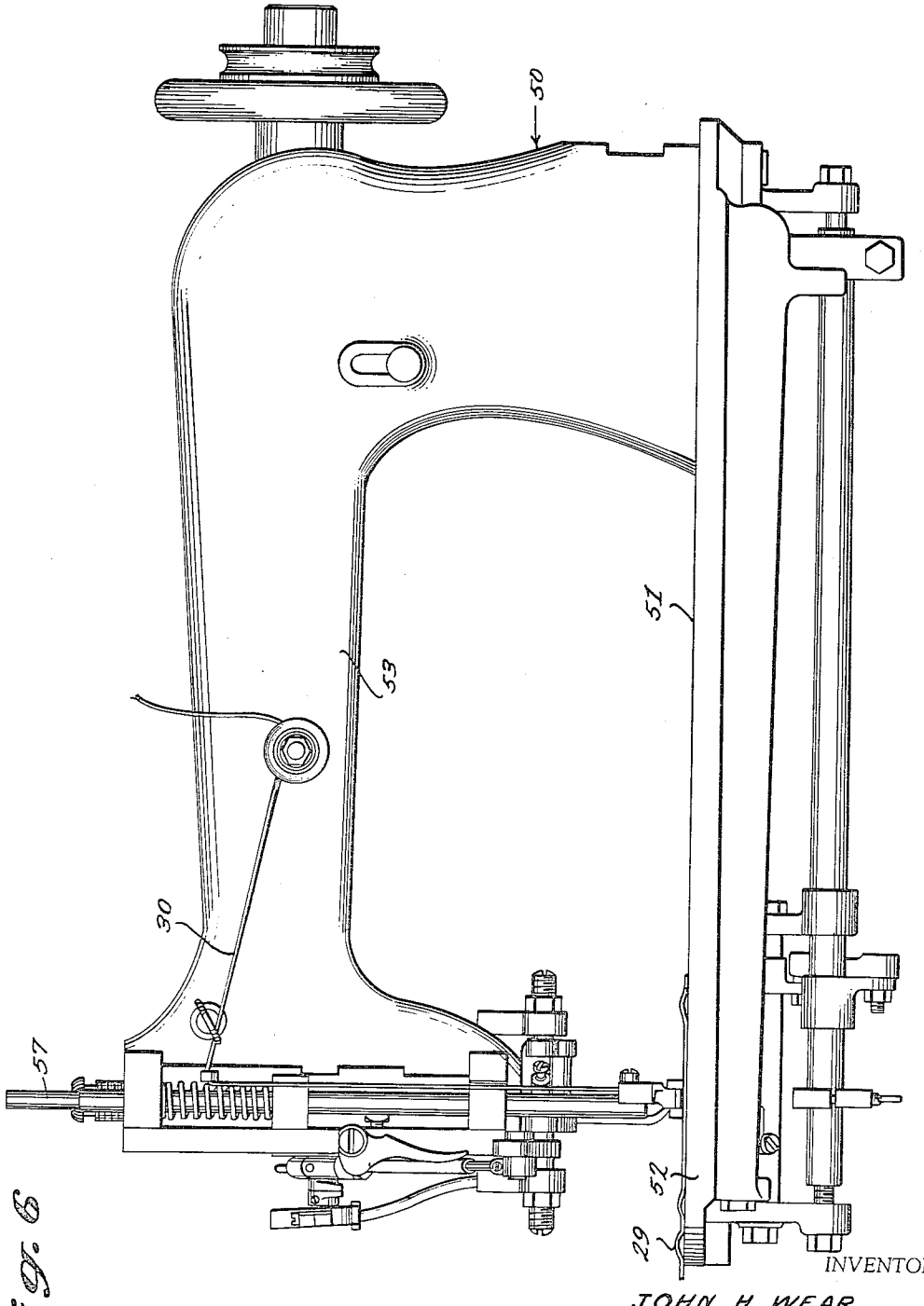


Fig. 6.

INVENTOR
JOHN H. WEAR

BY Parrott, Richards & Sims
ATTORNEYS

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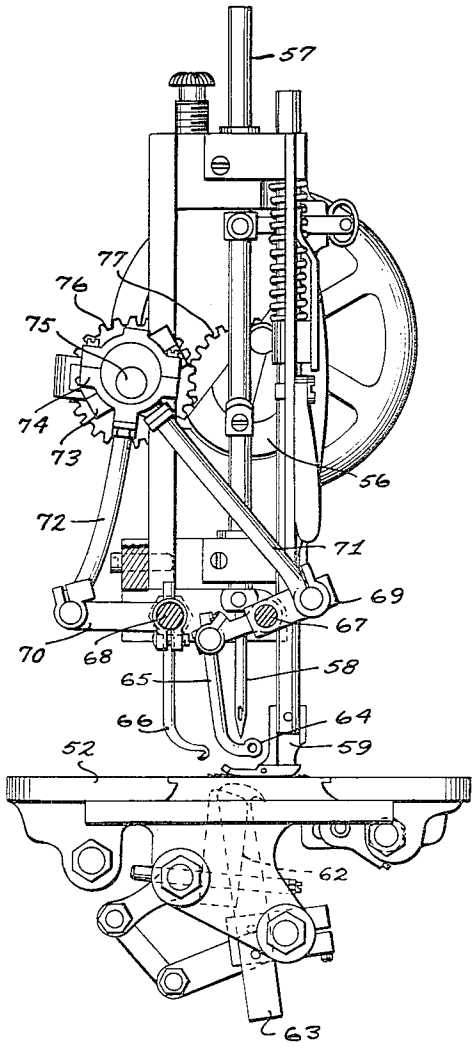


Fig. 7

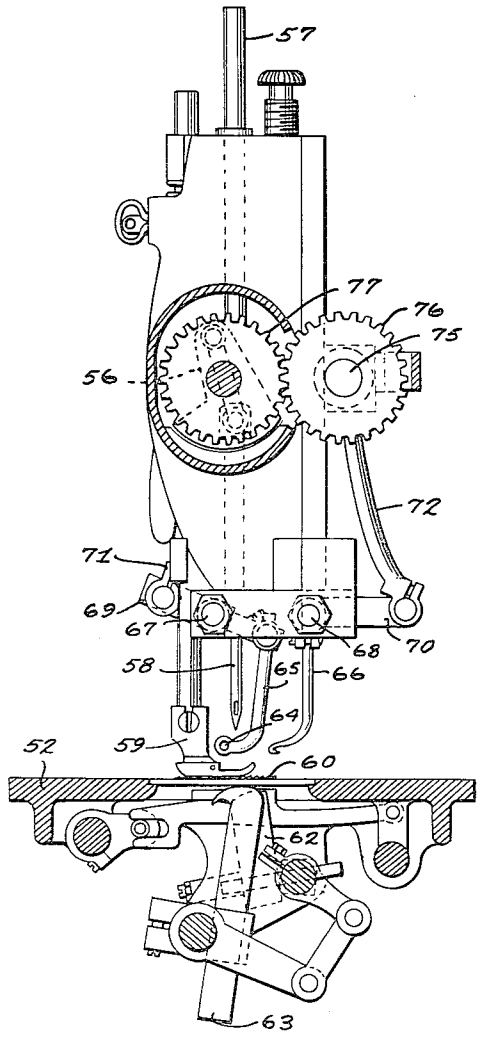


Fig. 8

INVENTOR

JOHN H. WEAR

BY Parrott, Richards & Sims
ATTORNEYS

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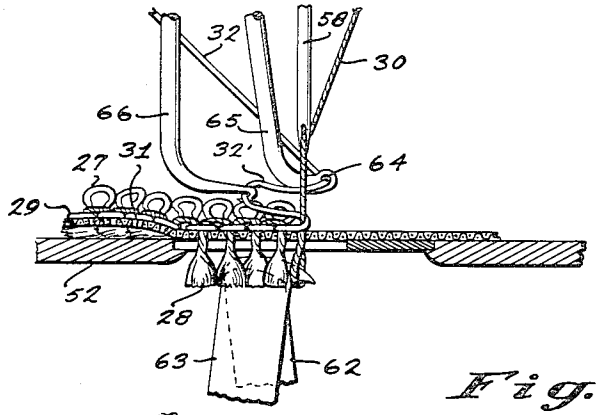


Fig. 9

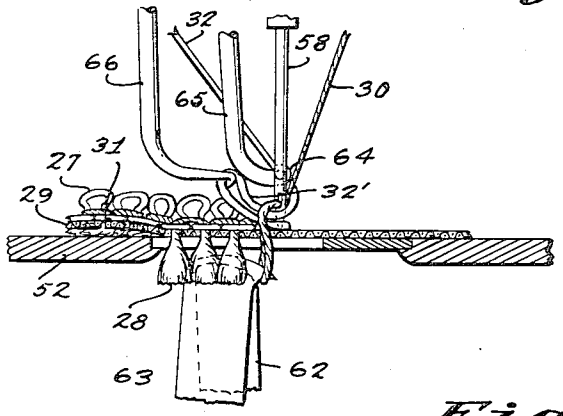


Fig. 10

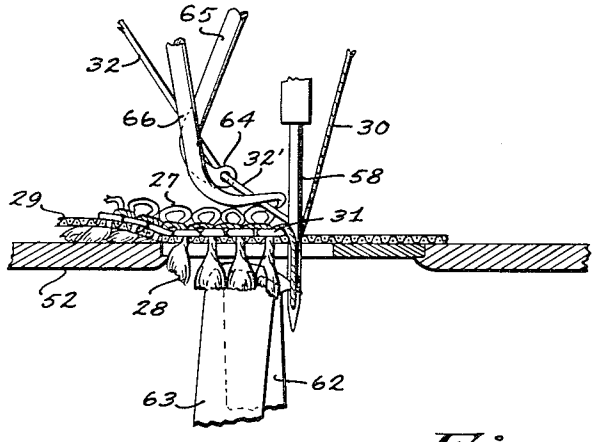


Fig. 11

INVENTOR

JOHN H. WEAR

BY Parrott, Richards & Sims
ATTORNEYS

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2,741,196

METHOD AND MEANS FOR FORMING A REVERSIBLE PILE FABRIC

John H. Wear, Fairmount, Ga., assignor to Russell-Lacey Manufacturing Company, Inc., a corporation of Georgia

Original application May 12, 1952, Serial No. 287,330, now Patent No. 2,696,009, dated December 7, 1954. Divided and this application April 27, 1953, Serial No. 358,678

4 Claims. (Cl. 112—79)

This invention relates to pile fabrics of the type commonly referred to as "chenille," in which a pile yarn is inserted in a fabric base or backing to form a pile or tufting thereon, and more particularly to a uniquely arranged reversible pile fabric of this sort; i. e., a pile fabric in which pile or tufting is provided on both faces of the fabric base. This is a division of copending application Serial No. 287,330, filed May 12, 1952, now Patent No. 2,696,009, dated December 7, 1954, in which the reversible pile fabric is claimed, the method and means for forming this reversible pile fabric being claimed in the present application.

In U. S. Patents No. 2,482,682 and No. 2,482,683, issued September 20, 1949, a reversible pile fabric is disclosed in which the pile or tufting is formed at opposite faces of the fabric base from the same pile yarn. According to the present invention there is now provided a reversible pile fabric in which the pile or tufting at each face of the fabric base is formed from separate pile yarns with the tufting on one face secured in place by the tufting for the opposite face in a manner that makes it possible to form the tufting at both faces in one continuous operation. The use of separate pile yarns in this way for the tufting at opposite faces of the fabric base allows great flexibility in color and pattern design because the color treatment of the separate pile yarn can be handled independently as desired. The present invention is described in further detail below in connection with the accompanying drawings, in which:

Fig. 1 is a plan view of one face of a reversible pile fabric embodying the present invention, with an edge portion turned for comparison of the opposite face;

Fig. 2 is an enlarged sectional detail taken substantially on the line 2—2 in Fig. 4 to show the arrangement of a row of tufting in the pile fabric illustrated in Fig. 1;

Fig. 3 is a similar enlarged sectional detail taken transversely to Fig. 2 as on the line 3—3 in Fig. 4;

Fig. 4 is an enlarged fragmentary plan detail of tufting such as is employed in the pile fabric illustrated in Fig. 1, but with the tufting shown in straight rows;

Fig. 5 is a side elevation of a tufting machine arranged according to the present invention for forming a reversible pile fabric such as is illustrated in Fig. 1;

Fig. 6 is a further side elevation of the machine opposite to that shown in Fig. 5;

Fig. 7 is a front elevation of the machine, partly in section at substantially the line indicated at 7—7 in Fig. 5;

Fig. 8 is a sectional detail taken substantially on the line 8—8 in Fig. 5; and

Figs. 9, 10 and 11, inclusive, are fragmentary details corresponding generally to Fig. 7 and illustrating further the operating relation of the pile forming elements of the machine.

Referring first to Figs. 1 through 4 of the drawings, in which the structural arrangement is illustrated for a pile fabric embodying the present invention, Fig. 1 shows a

pile fabric in a form suitable for use as a circular rug 25 having a conventional decorative fringe 26 attached in the usual manner at the edge thereof and provided with a tufted surface on both the top face 27 and the bottom face 28 thereof.

Fig. 2 represents the structure of the rug 25 more in detail as comprising a fabric base 29 through which doubled portions of a first pile yarn 30 are inserted at spaced intervals to form the bottom face tufting 28 which is shown in the form of chenille ends obtained by cutting the inserted doubled portions of the first pile yarn 30 in the conventional manner, although it will be apparent that the bottom face tufting 28 might be left uncut in the form of loops if desired.

The spaced insertion of the doubled portions of the first pile yarn 30 to form the bottom face tufting 28 as described above results in disposing intermediate portions 31 of the first pile yarn 30 in extending relation between the inserted doubled portions and drawn against the opposite or top face of the fabric base 29 in the manner that is characteristic of conventional chenille fabrics. These intermediate portions 31 of the first pile yarn 30, however, are employed according to the present invention for securing the top face tufting 27 in place. This is also illustrated in Fig. 2 in which the top face tufting is shown as consisting of loops formed by doubled portions of a second pile yarn 32 that are intertwined with the first pile yarn 30 by threading them beneath the intermediate portions 31 of the first pile yarn.

Fig. 2 is arranged to represent a single row of the double faced tufting formed in this manner, while Figs. 3 and 4 illustrate the relation of adjacent rows of such double faced tufting, although it should be noted that these figures of the drawings are exaggerated for purposes of illustration and that the adjacent rows of the double tufting may in fact be spaced so that one face of the rug 25 is covered and characterized solely by the inserted tufting 28, while the other face is characterized solely by the supplemental tufting 27 (which would cover and obscure the intermediate portions 31 of the first pile yarn 30 holding it in place), to provide a reversible pile fabric having the appearance illustrated for the rug 25 in Fig. 1.

The means by which a reversible pile fabric of this sort is formed according to the present invention is illustrated in Figs. 5 through 8 of the drawings as comprising a sewing machine head of any usual construction as indicated generally by the reference numeral 50. As shown, the sewing machine head 50 comprises a base portion 51 which extends forwardly to provide a work support portion at 52 on which the previously mentioned fabric base 29 may be disposed during the tufting or pile forming operation. The sewing machine head 50 also comprises a supporting arm structure 53 in the usual manner for housing a drive shaft 54 arranged to be driven at its rear end through a pulley 55 and extending forwardly to a crank mechanism 56 arranged to reciprocate a needle bar 57 fitted at its lower end with a needle 58 to which the previously mentioned first pile yarn 30 runs as in Fig. 6 to have successive double portions thereof inserted through the fabric base 29 for forming the bottom face tufting 28 as will be explained more in detail presently.

The usual presser foot 59 and work feeding dogs 60 are also provided on the sewing machine head 50 at the work support portion 52 for feeding the fabric base 29 past the needle 58 as the tufting operation is carried out. In addition, an actuating linkage is arranged from an eccentric connection at 61 with the drive shaft 54 for operating the elements 62 and 63 of a cutting means below the work support portion 52 for forming the chenille ends of the bottom face tufting 28, although this cutting means might be replaced by looper hooks for forming the bot-

tom faced tufting 28 in loops instead of chenille ends as mentioned above.

The second pile yarn 32 is shown in Fig. 5 trained through the eyelet 64 of a guide arm 65 and engaged by an associated hook element 66 for forming the supplemental or top face tufting 27 (compare Figs. 9, 10 and 11). Both the guide arm 65 and the associated hook element 66 are mounted for lateral rocking motion about pivot shafts 67 and 68, respectively, with rock arms 69 and 70 fixed on these pivot shafts 67 and 68 for actuation by connecting rods 71 and 72 having eccentric connections at 73 and 74 with a takeoff shaft 75 mounted on the sewing machine head 50 for driving from the drive shaft 54 through a pair of takeoff gears 76 and 77.

The manner in which this mechanism operates to form the reversible pile fabric of the present invention is further shown in Figs. 9 through 11 of the drawings in which the operating relation of the pile forming elements is illustrated. In Fig. 9, the needle 58 is shown at the top of its stroke, having just recovered from inserting a doubled portion of the first pile yarn 30 in the fabric base 29. The guide arm 65 at this time is rocked laterally across the path of the needle 58 so as to dispose a portion 32' of the second pile yarn that has been doubled by the associated hook element 66 in a position so that the needle 58 upon descending to insert a succeeding doubled portion of the first pile yarn 30 will pass between the guide arm 65 and the doubled portion 32' of the second pile yarn 32 as shown in Fig. 10. This results in threading the doubled portion 32' of the second pile yarn 32 beneath the intermediate portion 31 of the first pile yarn 30 as this intermediate portion 31 is drawn against the top face of the fabric base 29 to secure the second pile yarn doubled portion 32' as an element of the face tufting 27 simultaneously with formation of the inserted double portion of the first pile yarn 30 as an element of the bottom face tufting 28. As the operation continues upon further downward movement of the needle 58, the guide arm 65 is rocked laterally away from the needle 58 and the associated hook element 66 is rocked toward the needle 58 so as to release the doubled second pile yarn portion 32' just secured as an element of the top face tufting 27 and thereby free the hook element 66 to move up and engage a succeeding portion of the second pile yarn 32 as illustrated in Fig. 11, after which the cycle of operation is repeated to form the double face tufting continuously in a single operation, as previously noted above.

The present invention has been described in detail above for purposes of illustration only and is not intended to be limited by this description or otherwise except as defined in the appended claims.

I claim:

1. A machine of the character described for forming reversible pile fabrics comprising, in combination with means incorporating a reciprocating needle for inserting successive doubled portions of a first continuous pile yarn in a fabric base at spaced intervals and thereby disposing said doubled portions to form pile elements extending from one face of said fabric base with connected intermediate portions of said first pile yarn drawn against the opposite face of said fabric base, means incorporating a laterally rocking guide arm for directing successive portions of a second continuous pile yarn across the path of said reciprocating needle and a hook arm laterally rocking to and from said needle and associated therewith for forming said successive portions of the second pile yarn into doubled portions and holding said doubled portions of the second pile yarn under said intermediate portions of the first pile yarn to be secured thereby as pile elements extending from the opposite face of said fabric base.

2. In a tufting machine of the type incorporating a reciprocating needle for inserting successive doubled portions of a continuous pile yarn in a fabric base at spaced intervals and thereby disposing said doubled portions to form pile elements extending from one face of said fabric base with connected intermediate portions of said continuous pile yarn drawn against the opposite face of said fabric base, the improvement which comprises a guide arm and a related hook element for disposing successive doubled portions of an additional, separate, continuous pile yarn to form pile elements extending from said opposite face of the fabric base, and means for separately rocking said guide arm and hook element laterally in timed relation with respect to said reciprocating needle and longitudinally with respect to the direction in which the doubled portions of said first mentioned pile yarn are spaced in said fabric base, said separate pile yarn being directed by said guide arm across the path of said needle prior to the insertion of each doubled portion of said first mentioned pile yarn and the successive doubled portions of said separate pile yarn being formed by said hook element beneath the intermediate portions of said first mentioned pile yarn as the latter are drawn against said opposite face of the fabric base.

3. In a tufting machine of the type incorporating a reciprocating needle for inserting successive doubled portions of a continuous pile yarn in a fabric base at spaced intervals and means for cutting said doubled portions after insertion to form chenille ends extending from one face of said fabric base with intermediate portions of said pile yarn reaching between said cut doubled portions and drawn against the opposite face of said fabric base, the improvement which comprises means for threading successive doubled portions of an additional, separate, continuous pile yarn under said intermediate portions of the first mentioned pile yarn to form pile loops extending from said opposite face of the fabric base, said last mentioned means comprising a guide arm and an associated hook element, and means for separately rocking said guide arm and hook element laterally in timed relation with respect to said reciprocating needle and longitudinally with respect to the direction in which the doubled portions of said first mentioned pile yarn are spaced in said fabric base, said guide arm disposing a successive portion of said separate pile yarn across the path of said needle prior to the insertion of each doubled portion of said first mentioned pile yarn and said hook element doubling each such successive portion of the separate pile yarn to form a loop beneath the intermediate portion of said first mentioned pile yarn as the latter is drawn against said opposite face of the fabric base.

4. The method of forming a reversible pile fabric which comprises inserting doubled portions of a first continuous pile yarn at spaced intervals in a fabric base and thereby disposing said doubled portions to form pile elements extending from one face of said fabric base with portions of said first pile yarn between said inserted doubled portions extending and being drawn tight at the opposite face of said fabric base, disposing a doubled portion of a second continuous pile yarn at said opposite fabric base face laterally with respect to each spaced interval before insertion of each doubled portion of said first pile yarn, and holding each laterally disposed doubled portion of said second pile yarn at each spaced interval while inserting the succeeding doubled portion of said first pile yarn in said fabric base and drawing the adjacent portion of said first pile yarn tight at said opposite fabric base face to secure the doubled portion of said second pile yarn and then releasing said secured doubled portion as a pile element at said opposite fabric base face.

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