Aug. 25, 1953 J. K. McCUTCHEN 2,649,748

METHOD OF SEWING AND TUFTING FABRIC SECTIONS

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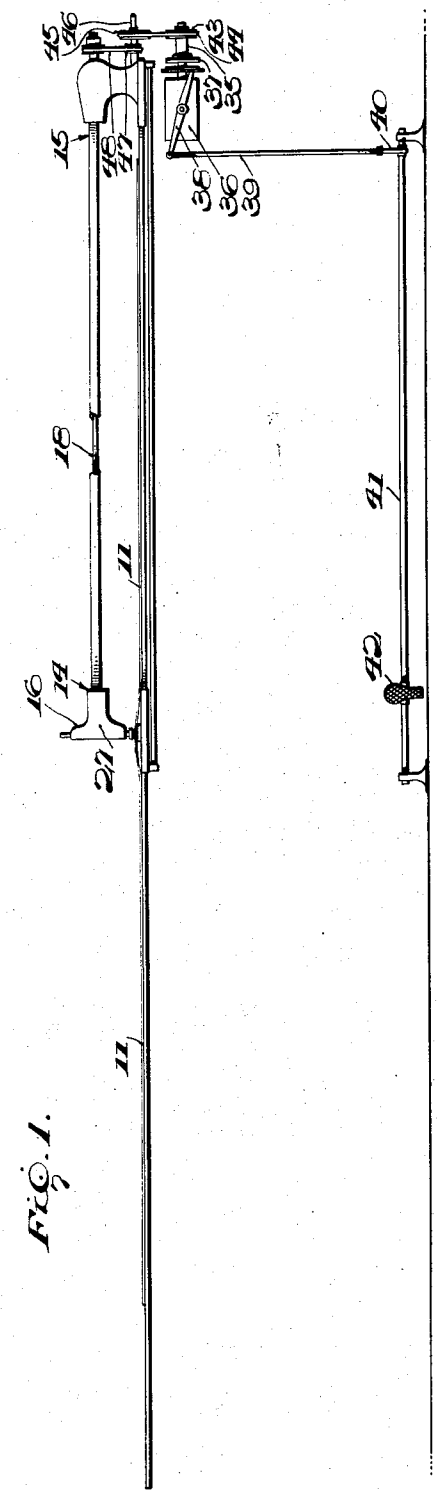


Fig. 1.

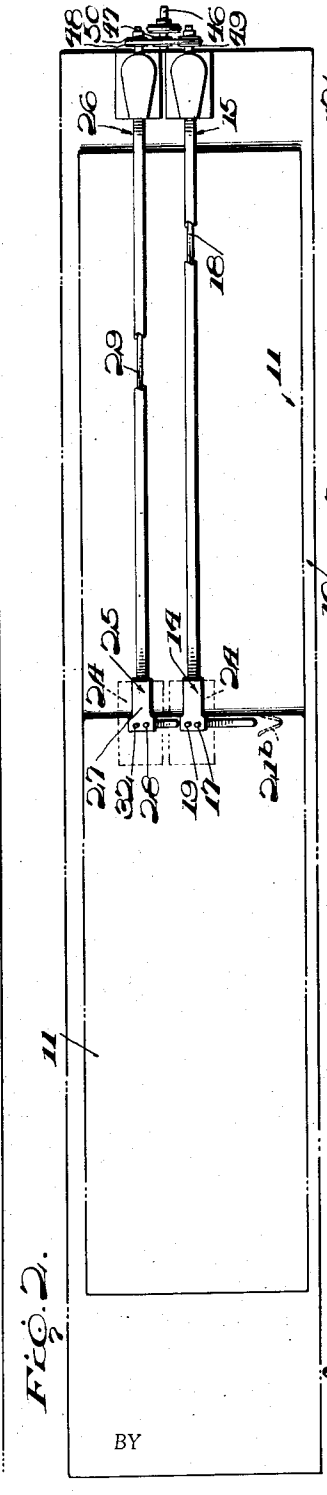


Fig. 2.

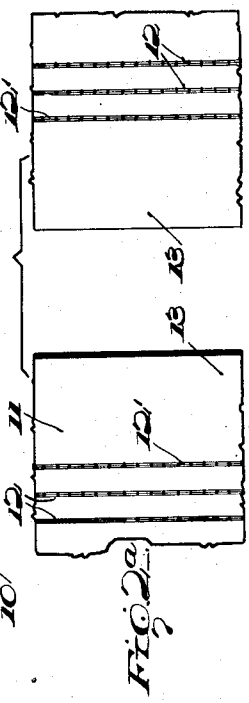


Fig. 2a.

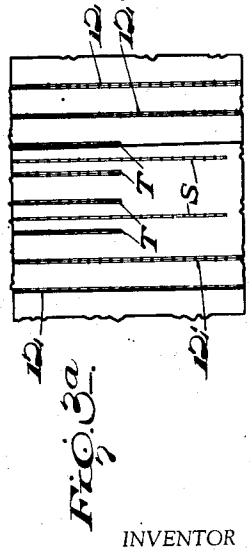


Fig. 3a.

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METHOD OF SEWING AND TUFTING FABRIC SECTIONS

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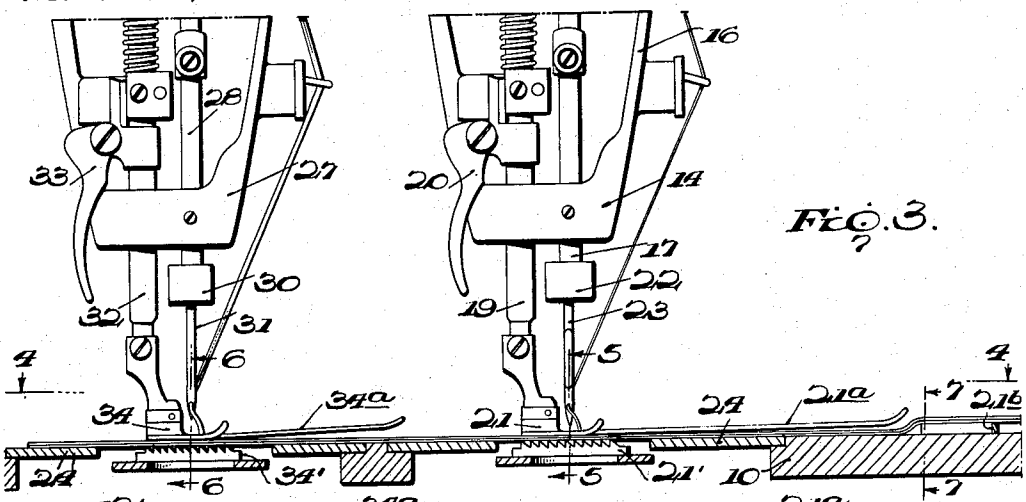


Fig. 3.

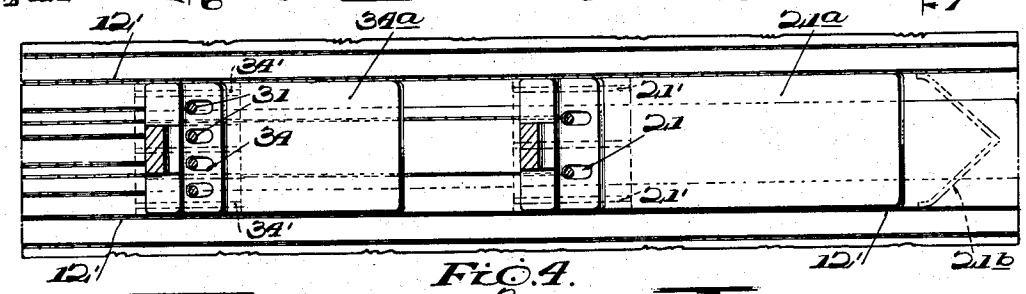


Fig. 4.

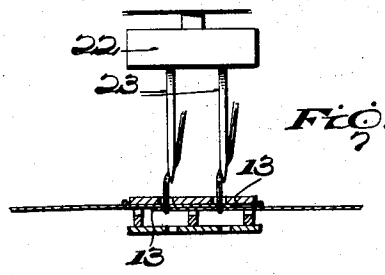


Fig. 5.

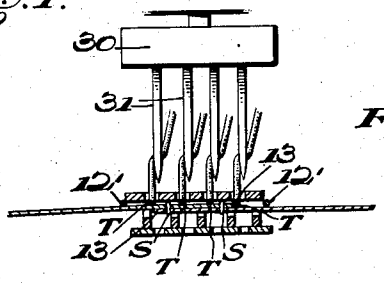


Fig. 6.

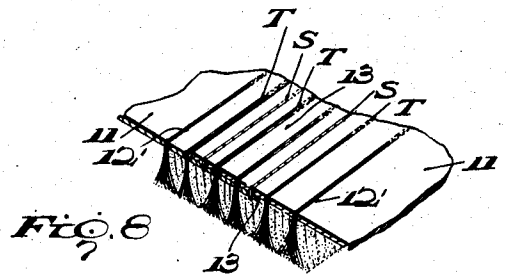


Fig. 8

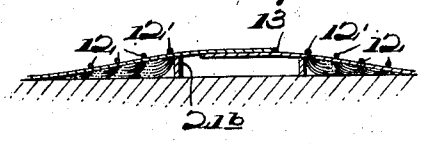


Fig. 7.

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METHOD OF SEWING AND TUFTING FABRIC SECTIONS

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Application January 17, 1952, Serial No. 266,860

9 Claims. (Cl. 112—79)

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My invention relates to a method of and apparatus for sewing together the marginal or zone portions of fabric sections having severed or unsevered tufting formed thereon, and completing the tufting operation upon the attached portions, providing a tufted product having a unitary appearance.

An important object of the invention is to provide a method of and apparatus for performing work of the above-mentioned character, so that the fabric sections being operated upon may be arranged upon opposite sides of the operator, who may conveniently manipulate and guide the same during the sewing and tufting operations, which are started in close succession and continued simultaneously.

A further object of the invention is to provide means whereby the operator may conveniently guide the fabric sections for maintaining the marginal portions or zones in proper superposed relation, and the lines of stitching and the added lines of tufting in proper relation.

Other objects and advantages of the invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this application in which like numerals are employed to designate like parts throughout same,

Figure 1 is a side elevation of a combined sewing and tufting machine embodying my invention,

Figure 2 is a plan view of the same,

Figure 2*a* is a plan view of fabric sections to be sewed together and tufted,

Figure 3*a* is a plan view of the assembled fabric sections illustrating the sewing and tufting steps,

Figure 3 is an end elevation, parts broken away, of the heads of the sewing and tufting machines,

Figure 4 is a horizontal section taken on line 4—4 of Figure 3,

Figure 5 is a transverse section taken on line 5—5 of Figure 3,

Figure 6 is a transverse section taken on line 6—6 of Figure 3,

Figure 7 is a transverse section taken on line 7—7 of Figure 3,

Figure 8 is a perspective view of the sewed and tufted fabric sections.

In the drawings, the numeral 10 designates a table top, having sections of fabric 11 supported thereon. These sections of fabric have longitudinal rows of severed or unsevered tufting 12 and 12', previously formed thereon, with the tufts extending upon the bottom faces of the fabric

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sections. The fabric sections 11 have bare or untufted longitudinal marginal edge or zone portions 13, Figures 2*a* and 3*a*, defined by the longitudinal edges of the fabric sections and the adjacent outer lines of tufting 12'. In sewing together and tufting the marginal edge or zone portions 13, such zone portions are arranged in superposed or overlapping relation, as will be more fully explained.

The numeral 14 designates a multiple or two-needle sewing machine, of a conventional type, such as shown in Patents 1,917,756, 402,432 and 785,168. The sewing machine 14 is conventional with the exception that the overhanging arm 15 is elongated, to accommodate fabric of considerable width such as about four feet. The sewing machine comprises a head 16, Figure 3, and 17 is the reciprocatory needle bar driven by the drive shaft 18. The numeral 19 designates the spring pressed presser foot bar which is raised by a cam lever 20. This presser foot bar carries at its lower end a presser foot 21, for coaction with the conventional feed dog, 21'. The needle bar 17 is provided at its lower end with a transverse bar 22 having two sewing needles 23 secured thereto. The usual mechanism is arranged beneath the base plate 24 for coaction with the needles 23 for forming the lines of stitching.

The numeral 25 designates a four-needle tufting machine, for forming four lines of tufting. Any conventional form of multiple needle tufting machine may be employed such as is shown in Patent 2,269,837. By tufting machine is meant a machine which will produce severed or unsevered lines of tufting. The tufting machine 25 is conventional except that its arm 26 is elongated. The tufting machine comprises a head 27, Figure 3, within which is mounted a vertical reciprocatory needle bar 28, operated by a drive shaft 29. The needle bar 28 is provided at its lower end with a horizontal bar 30, having four tufting needles 31 rigidly mounted thereon. The tufting machine includes the conventional loopers arranged beneath the bed 24 and the blades to sever the loops. If desired, the loops may not be severed, in which event the blades are omitted and the loopers are arranged to face in the direction of the feed of the work, as is well known. Mounted within the head 27 is a vertical spring pressed presser foot bar 32, raised by a pivoted cam lever 33, as shown. Secured to the lower end of the presser foot bar 32 is a presser foot 34, Figures 3 and 4, having four openings for the passage of the tufting needles. The presser foot 34 coacts with the conventional

feed dog 34' to feed the fabric sections during the operation of the machine.

Arranged beneath the table 10 is a tubular drive shaft 35, driven by a motor 36 through the medium of a friction clutch 37, which is biased inactive and rendered active by a pivoted lever 38, connected with a link 39, turned by a crank 40, swung by a rock shaft 41, carrying a pedal 42. The shaft 35 has a pulley 43 rigidly mounted thereon, engaged by a belt 44, engaging a pulley 45, rigidly mounted upon a shaft 46. The shaft 46 has a pulley 47 rigidly mounted thereon and this pulley is engaged by a belt 48, passed about pulleys 49 and 50, rigidly mounted upon the shafts 18 and 29 respectively. It is thus seen that the shafts 18 and 29 are driven in the same direction and at the same speed. The sewing machine and tufting machine are therefore synchronized in operation. Any other suitable means may be employed to drive the sewing machine and tufting machine at the same speed.

Arranged upon the trailing side of the presser foot 21 and rigidly secured to the trailing end of the presser foot is a substantially horizontal elongated guide plate 21*a*, rigidly secured to the presser foot, as stated. This guide plate has its lower face at an elevation above the lower face of the presser foot 21 and is raised and lowered with the presser foot 21. The guide plate 21*a* is longitudinally inclined, as shown. When the presser foot 21 has clamping engagement with the superposed marginal edge or zone portions 13 of the fabric sections, to cause the feed dogs to feed the fabric sections 11, the guide plate 21*a* freely slidably contacts with the superposed marginal edge or zone portions 13, as will be more fully explained. The presser foot 21 and the guide plate 21*a* have the same width and have a width equal to the distance between the outer lines of tufting 12' of the overlapping marginal edge or zone portions 13. A guide plate 34*a* is rigidly secured to the trailing end of the presser foot 34 and is vertically movable with the presser foot. The guide plate 34*a* is of the same width as the presser foot 34 and the guide plate 21*a*, and is of such a width that its longitudinal edges are disposed in close relation to the outer lines of tufting 12'. The guide plate 34*a* is substantially horizontal and has its lower face arranged at an elevation above the lower face of the presser foot 34, and the guide plate 34*a* is slightly inclined longitudinally, as shown. The guide plate 34*a* freely slidably engages the overlapping marginal or zone portions 13 and does not have clamping engagement with these portions, like the presser foot.

Arranged near and upon the trailing side of the guide plate 21*a* is a tuft spreading device 21*b*, which is V-shaped and is mounted upon the bed plate 24 and has its ends arranged adjacent to the longitudinal edges of the guide plate 21*a*. The purpose of this spreading device 21*b* is to laterally sweep the tufts 12' outwardly so that they will not pass beneath the overlapping marginal or zone portions 13.

In the practice of the method and the operation of the machine, the operator sits at the trailing side of the sewing machine 14, with respect to the direction of feed of the fabric sections. These fabric sections are long and may be relatively wide, such as four feet, and are disposed upon opposite sides of the operator who sits between the marginal edge or zone portions 13. It is difficult to manipulate large fabric sections. The leading end portions of the fabric sections, with the operator sitting between them, are arranged by the operator upon the table top and the leading ends are manipulated by the hands of the operator so that the marginal or zone portions 13 are passed beneath the elongated guide plate 21*a* and these zone portions 13 are arranged in superposed or overlapping relation. Since the guide plate 21*a* is at an elevation above the lower face of the presser foot 21, as explained, the overlapping marginal or zone portions 13 may be readily shifted laterally by the operator, while arranged beneath the guide plate 21*a*, and the operator moves these zone portions forwardly in a longitudinal direction and guides them so that the outer lines of tufting 12' are held at the longitudinal edges of the guide plate 21*a*. This guiding retains the edge portions or zones 13 in proper overlapping relation, and as the assembled overlapping zone portions continue to move forwardly, they pass beneath the presser foot 21, and the sewing needles 23 form two lines of stitching S, which secure together the superposed zones 13. The work feed means of the sewing machine 14 causes the sewed portions 13 of the fabric sections to travel forwardly and these sewed superposed zone portions 13 pass beneath the guide plate 34*a* and the fabric sections 11 are so guided by the operator that the lines of tufting 12' are held close to the longitudinal edges of the guide plate 34*a*, and the sewed zones 13 pass forwardly beneath the presser foot 34, and the work feed means of the tufting machine advances the sewed zones 13. These superposed marginal edge or zone portions 13 are plain or untufted, and the tufting needles 31 form lines of tufting T, which are spaced for the same distance as the spacing of the lines of tufting 12 and 12'. The outer lines of tufting T are arranged between the lines of tufting 12' and the lines of stitching S, while the inner lines of tufting T are arranged between the lines of stitching S. In this manner, there are two lines of stitching S and four lines of added tufting T, formed in the superposed zone portions 13. As shown in Figure 3*a*, the lines of stitching S extend in a trailing direction beyond the ends of the lines of added tufting T, for a distance corresponding to the distance between the sewing machine 14 and the tufting machine 25. The tufting is therefore completed over the superposed attached zone portions 13, and will completely cover these portions, whereby the product will have a unitary appearance. It is thus apparent that the lines of stitching are started first, and the lines of added tufting are formed in the stitched zone portions when they reach the tufting machine, and then the lines of stitching and the lines of tufting continue to be formed simultaneously, and their starting points while longitudinally spaced, are close together. This is necessary in order that the operator may have the advantage of sitting between the zone portions 13 of the separate fabric sections before they are stitched together. This places the guiding of the fabric sections at the sewing machine and at the tufting machine in reach of the operator. If the fabric sections were first sewed together throughout their entire length, it would be much more difficult to guide the same for producing the added lines of tufting. Instead of employing separate sewing machines and tufting machines in close relation, I contemplate mounting the tufting needles and the sewing needles upon a common

needle bar, with the associated mechanism for completing the work. The tufting needles should be spaced longitudinally of the work feed for a slight distance beyond the sewing needles, so that the lines of stitching S which are produced before the added lines of tufting are started, will have a substantial length, since this properly secures together the superposed zone portions 13, so that they will feed forwardly in a straight line. The feed dogs of the sewing machine and the tufting machine are in alignment, and are transversely centered with respect to the line of work feed at the transverse center of the guide plates. The needles of the sewing machine are transversely spaced with relation to the needles of the tufting machine, so that two lines of tufting will be arranged between the lines of stitching and the remaining lines of tufting will be disposed outwardly of the lines of stitching. While I have shown and described a plurality of lines of stitching, and a plurality of lines of tufting, I contemplate using a single line of stitching and a single line of tufting.

It is to be understood that changes may be resorted to in the order of the steps of the method, and that various changes may be made in the shape, size and arrangement of parts of the machine, without departing from the spirit of my invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. The method of sewing and tufting the untufted marginal zone portions of tufted fabric sections, comprising supporting the tufted fabric sections upon opposite sides of the operator and arranging the untufted marginal zone portions next to the operator, effecting a single longitudinal feeding of the marginal zone portions and their fabric sections forwardly to a sewing and tufting station, starting arranging the forward end portions of the marginal zone portions in overlapping relation and continuing such overlapping arranging during the single longitudinal feeding, first starting the sewing of a longitudinal line of stitching in the same overlapped marginal zone portions at the said station and during the said single longitudinal feeding, then starting the sewing of a longitudinal line of tufting in said same overlapped marginal zone portions at a leading point with respect to the starting of the sewing of the line of stitching and at said station and during the said single longitudinal feeding, and continuing the sewing of the line of stitching and the sewing of the line of tufting simultaneously whereby the line of stitching and the line of tufting in the said same overlapped marginal zone portions are completed during the said single longitudinal feeding.

2. The method of sewing and tufting the untufted marginal zone portions of tufted fabric sections, comprising supporting the tufted fabric sections and arranging the untufted marginal zone portions inwardly, effecting a single longitudinal feeding of the marginal zone portions and their fabric sections forwardly to a station, starting arranging the forward end portions of the marginal zone portions in overlapping relation and continuing such overlapping arranging during the single longitudinal feeding, starting the sewing of a longitudinal line of stitching in the same overlapped marginal zone portions at the station and during the single longitudinal feeding, starting the sewing of a longitudinal line of tufting in the same overlapped marginal zone portions at the said station and during the said single longitudinal feeding, and continuing the sewing of the line of stitching and the sewing of the line of tufting simultaneously whereby the line of stitching and the line of tufting in the said same marginal zone portions are completed during the single longitudinal feeding.

3. The method of sewing and tufting the untufted marginal zone portions of tufted fabric sections, comprising effecting the single longitudinal feeding of the marginal zone portions and their fabric sections forwardly to a station in reach of the operator at the trailing side of the station, assembling the marginal zone portions when they reach the station, starting the sewing of a longitudinal line of stitching in the assembled marginal zone portions at the station and during the said single longitudinal feeding, starting the sewing of a longitudinal line of tufting in the same marginal zone portions at said station and during the said single longitudinal feeding, continuing the sewing of the line of stitching and the sewing of the line of tufting simultaneously whereby the line of stitching and the line of tufting in the said same marginal zone portions are completed during the said single longitudinal feeding.

4. The method of sewing and tufting the untufted marginal zone portions of tufted fabric sections, comprising effecting a single longitudinal feeding of the marginal zone portions and their tufted fabric sections to a station, arranging the marginal zone portions in overlapping relation when they reach the station, starting the sewing of a longitudinal line of stitching in the overlapped marginal zone portion at the station and during the said single longitudinal feeding, starting the sewing of a longitudinal line of tufting in the same overlapped marginal zone portion at said station and during the said single longitudinal feeding, and continuing the sewing of the line of stitching and the sewing of the line of tufting simultaneously whereby the line of stitching and the line of tufting in the said same marginal zone portions are completed during said single longitudinal feeding.

5. The method of sewing and tufting the untufted marginal zone portions of tufted fabric sections comprising, effecting a single longitudinal feeding of the marginal zone portions and their tufted fabric sections to a station, arranging the marginal zone portions in overlapping relation when they reach the station, starting the sewing of longitudinal lines of stitching in the overlapped marginal zone portions at the station and during the said single longitudinal feeding, starting the sewing of longitudinal lines of tufting in the same overlapped marginal zone portions at points near the starting of the sewing of the lines of stitching and at the same station and during said single longitudinal feeding, and continuing the sewing of the lines of stitching and the sewing of the lines of tufting simultaneously whereby the lines of stitching and the lines of tufting in said same marginal zone portions are completed during said single longitudinal feeding.

6. The method of sewing and tufting the untufted marginal zone portions of tufted fabric sections comprising, effecting a single longitudinal feeding of the marginal zone portions and their tufted fabric sections to a station, arranging the marginal zone portions in overlapping relation when they reach the station, starting the

sewing of a plurality of transversely spaced longitudinal lines of stitching in the overlapped marginal zone portions at the station and during the said single longitudinal feeding, starting the sewing of a plurality of longitudinal lines of tufting in the same overlapped marginal zone portions at points near the starting of the sewing of the lines of stitching and at the same station and during said single longitudinal feeding, arranging certain of the longitudinal lines of tufting between the longitudinal lines of stitching and certain of the longitudinal lines of tufting outwardly of the sides of said lines of stitching, and continuing the sewing of the lines of stitching and the sewing of the lines of tufting simultaneously whereby the lines of stitching and the lines of tufting in said same marginal zone portions are completed during said single longitudinal feeding.

7. The method of sewing and tufting the untufted marginal zone portions of tufted fabric sections comprising, effecting a single longitudinal feeding of the marginal zone portions and their tufted fabric sections, arranging the marginal zone portions in overlapping relation, sewing longitudinal stitching means in the overlapped marginal zone portions during the said single longitudinal feeding, and sewing longitudinal tufting means in the same overlapped marginal zone portions and during the said single longitudinal feeding whereby the longitudinal stitching means and the longitudinal tufting means are completed during the said single longitudinal feeding in the said same marginal zone portions.

8. The method of sewing and tufting the untufted marginal zone portions of tufted fabric sections comprising, effecting a single longitudinal feeding of the marginal zone portions and their tufted fabric sections, arranging the marginal zone portions in overlapping relation, starting the sewing of longitudinal lines of stitching in the overlapped marginal zone portions during

the said single longitudinal feeding, starting the sewing of longitudinal lines of tufting in the same overlapped marginal zone portions at a leading point with respect to the starting of the sewing of the lines of stitching, and completing the sewing of lines of stitching and lines of tufting in the same overlapped marginal zone portions and during the said single longitudinal feeding.

9. The method of sewing and tufting the untufted marginal zone portions of tufted fabric sections comprising, effecting a single longitudinal feeding of the marginal zone portions and their tufted fabric sections, starting arranging the marginal zone portions in overlapping relation adjacent to the leading ends of the marginal zone portions and progressively continuing such overlapping relation during the said single longitudinal feeding, starting the sewing of longitudinal lines of stitching in the overlapped marginal zone portions adjacent to their leading ends and progressively continuing the sewing of the longitudinal lines of stitching during said single longitudinal feeding, starting the sewing of longitudinal lines of tufting in the same overlapping marginal zone portions adjacent to their leading ends and progressively continuing the sewing of the longitudinal lines of tufting during the said longitudinal feeding whereby the trailing portions of the marginal zone portions are disconnected prior to the sewing of the lines of stitching and the sewing of the lines of tufting in said trailing portions.

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