

May 17, 1938.

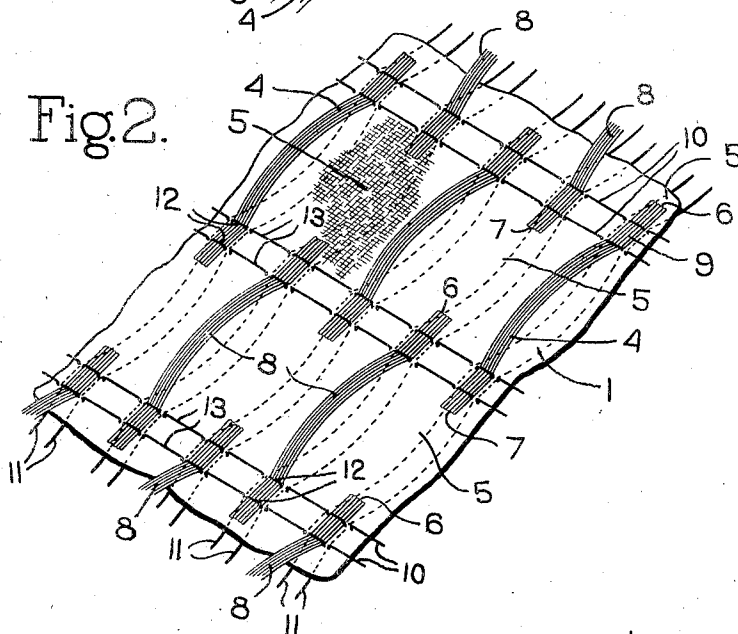
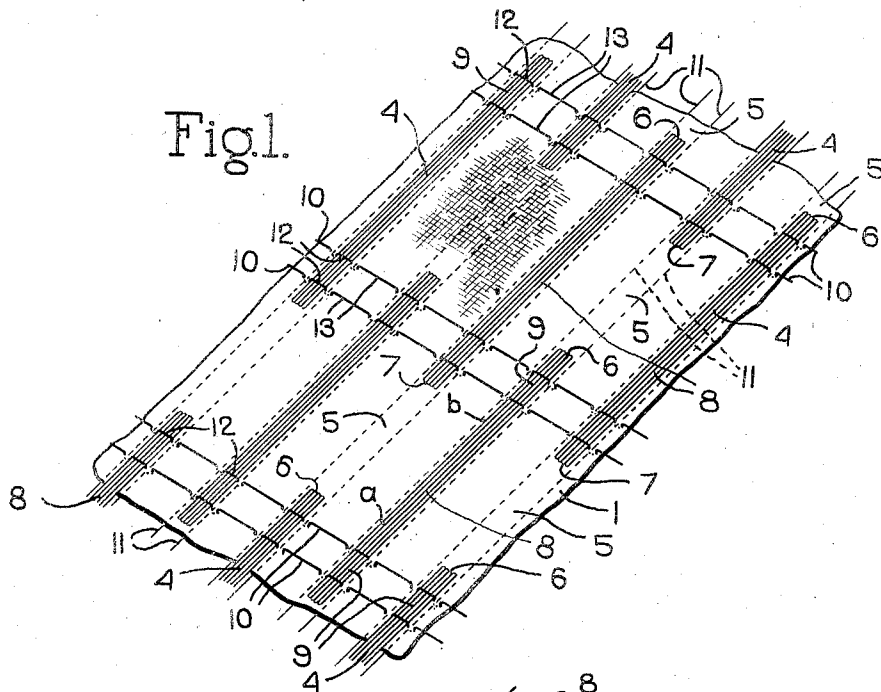
K. T. GREENWOOD

2,117,954

TUFTED FABRIC AND METHOD OF MAKING THE SAME

Filed Dec. 24, 1936

4 Sheets-Sheet 1



Inventor
Kendall T. Greenwood
by *Heard Smith & Tennant.*
Attys.

May 17, 1938.

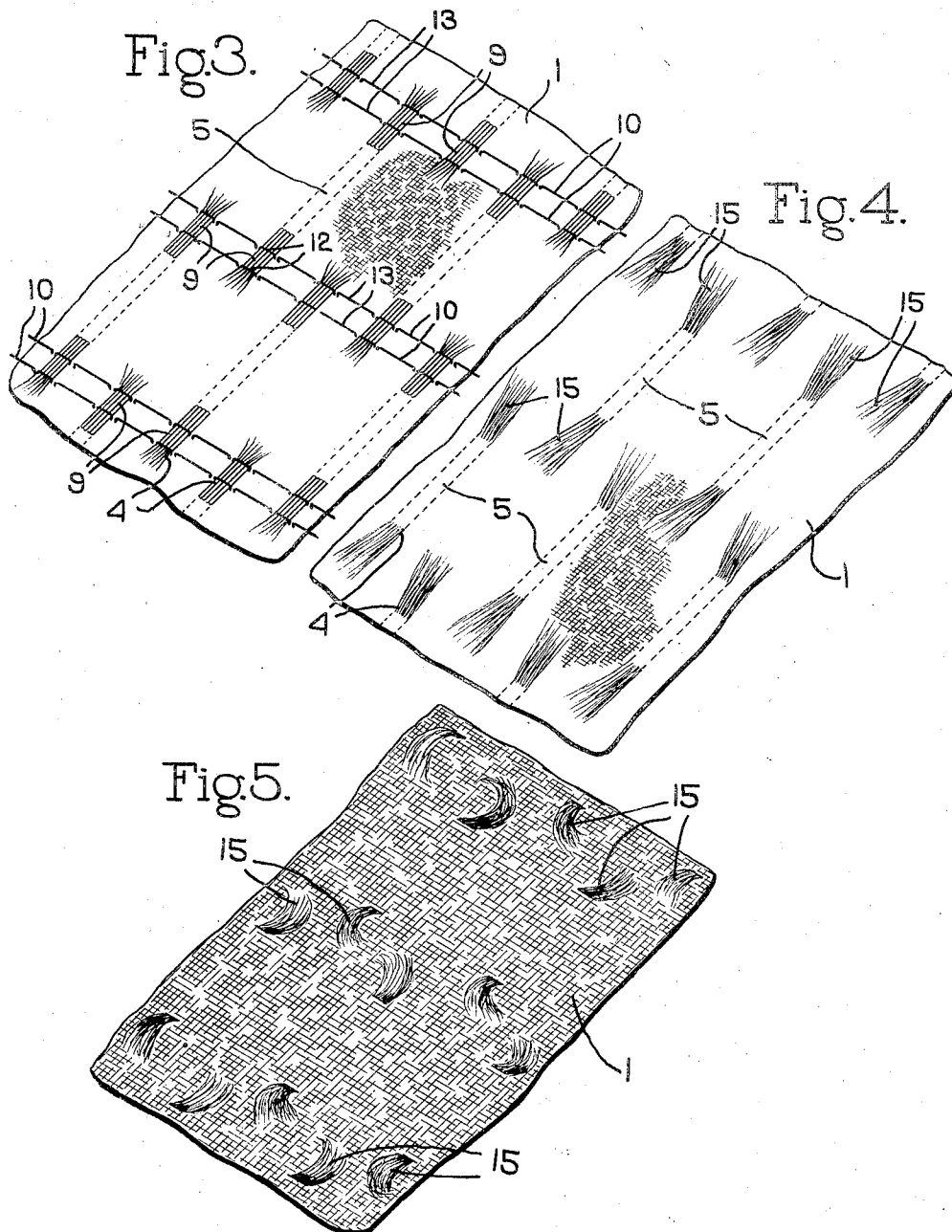
K. T. GREENWOOD

2,117,954

TUFTED FABRIC AND METHOD OF MAKING THE SAME

Filed Dec. 24, 1936

4 Sheets-Sheet 2



Inventor.
Kendall T. Greenwood
by *Heard Smith & Tennant.*
Attys

May 17, 1938.

K. T. GREENWOOD

2,117,954

TUFTED FABRIC AND METHOD OF MAKING THE SAME

Filed Dec. 24, 1936

4 Sheets-Sheet 3

Fig.6.

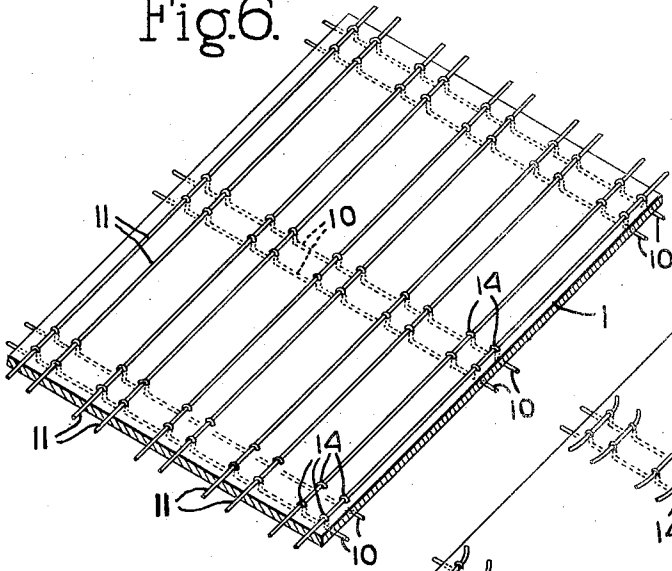


Fig.7.

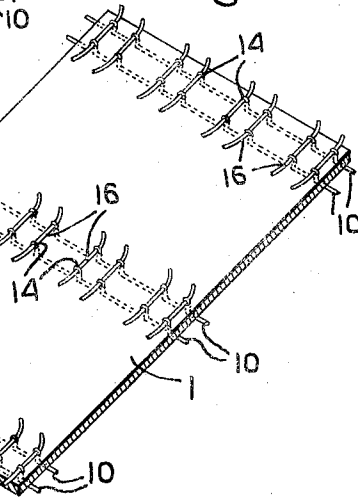


Fig.8.

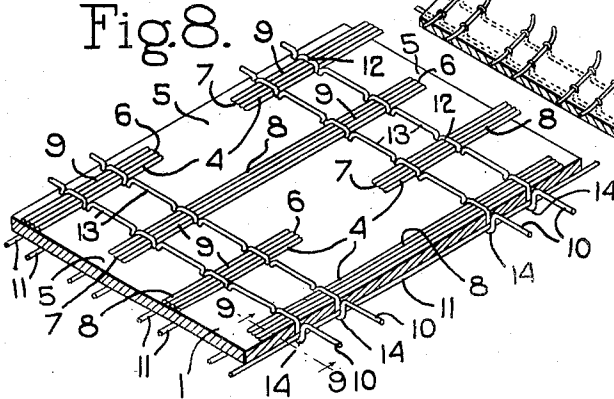


Fig.9.

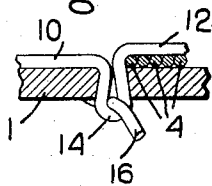
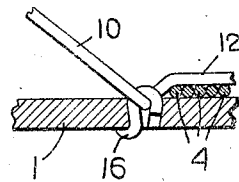


Fig.10.



Inventor.
Kendall T. Greenwood
by *Heard Smith & Tennant.*
Attys.

May 17, 1938.

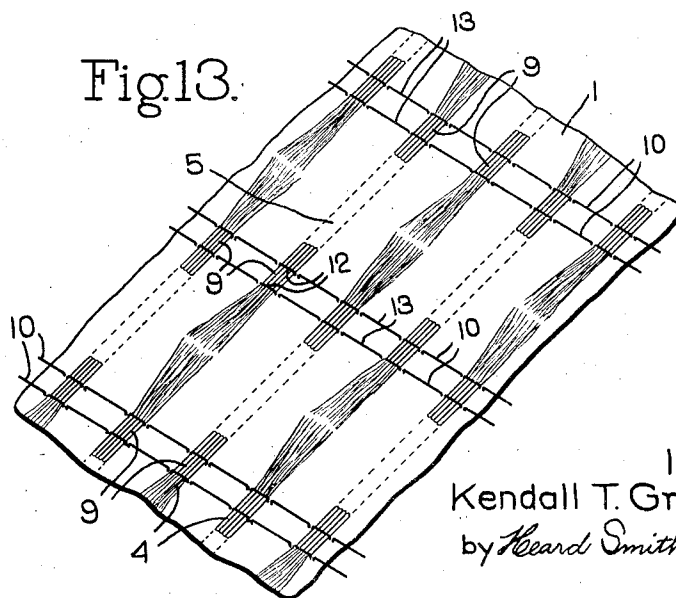
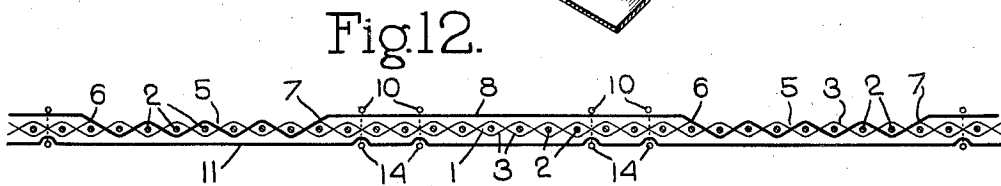
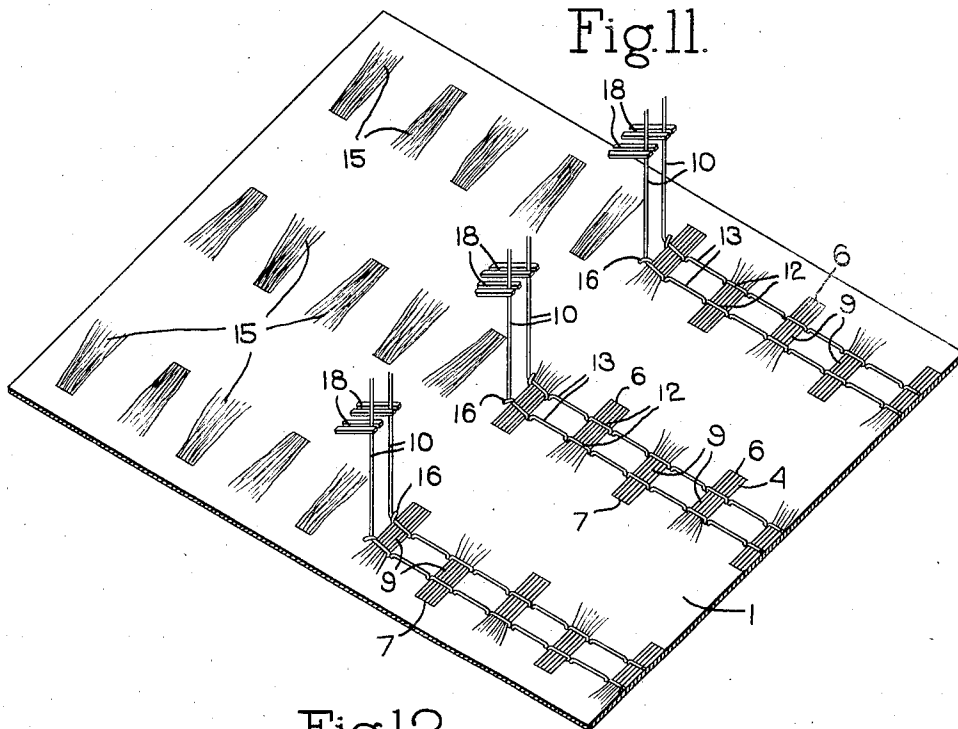
K. T. GREENWOOD

2,117,954

TUFTED FABRIC AND METHOD OF MAKING THE SAME

Filed Dec. 24, 1936

4 Sheets-Sheet 4



Inventor.
Kendall T. Greenwood
by *Heard Smith & Tennant.*
Attys.

UNITED STATES PATENT OFFICE

2,117,954

TUFTED FABRIC AND METHOD OF MAKING
THE SAMEKendall T. Greenwood, Sanford, Maine, assignor
to Goodall Worsted Company, Sanford, Maine,
a corporation of Maine

Application December 24, 1936, Serial No. 117,455

17 Claims. (Cl. 139—391)

This invention relates to a novel fabric having tufts or tassels on its face, and to a method of manufacturing the same.

One of the objects of the invention is to provide a novel fabric of this type in which the tufts or tassels are formed from groups of parallel threads which, when the fabric is initially woven, are woven into the body of the fabric at spaced intervals and are floated over the surface of the fabric between the points where they are woven into the body of the fabric, said floating sections of the parallel groups being subsequently cut to form the tufts or tassels.

In the preferred manner of practising the invention, the fabric is initially woven with the end portions of the floating sections of the groups of parallel threads temporarily held in place or bound to the body of the fabric by binder threads, and after the floating sections of the parallel groups have been cut or severed these binder threads are removed, thereby freeing the end portions of the floating sections and forming the tufts or tassels.

These groups of parallel threads from which the tufts or tassels are formed may be either groups of filling threads or groups of warp threads, but preferably such groups of threads are groups of filling threads, in which case the temporary binders which temporarily hold the end portions of the floating sections of the groups will be warp threads.

The binder threads may be removed from the fabric in any suitable way, such as by mechanical means, or by a chemical operation, or by carbonizing them out. If they are to be removed by chemical treatment of the fabric or by carbonization, it will be understood that the materials or fibres used in the various threads of the fabric must be such that the chemical treatment or the carbonizing action will affect the binder threads only. Where the binder threads are to be mechanically removed from the fabric it is proposed to tie said binder threads into the fabric by anchoring threads which are interlocked with or cross the binder threads on each side of each group of tuft-forming threads, and then to segment these anchoring threads so that by applying a pulling force to the binder threads they may be easily withdrawn from the fabric.

If desired the tufts or tassels which result from the removal of the binder threads can be treated either mechanically or chemically or otherwise to enhance the decorative effect.

The basic weave or body of the fabric may be either a plain weave, twill, sateen or any com-

binations or variations of them as desired, and the threads of the fabric may be made of any suitable material, such as cotton, wool, mohair, alpaca, ramie, silk, rayon, linen or any other fibre or filament, natural or synthetic, or any combinations of such fibres or filaments which can be drawn, thrown or spun into a thread suitable for use in weaving a fabric. The fabric may be so made that the free ends constituting the tufts or tassels may be of various lengths, that is, they may be relatively short, in which case they might more properly be termed "tufts", or they might be relatively long, in which case they might be more properly described as "tassels". For convenience, however, I will refer herein to such free ends as "tufts", said term being used to include the groups of thread ends which project from the face of the fabric regardless of the length thereof.

In the drawings wherein I have illustrated more or less diagrammatically a fabric embodying my invention and one way of weaving the same;

Figs. 1, 2, 3 and 4 are diagrammatic views illustrating various steps in the operation of weaving the improved fabric;

Fig. 5 is a view illustrating the completed fabric;

Figs. 6 and 7 are diagrammatic views showing the floating anchoring threads on the back side of the fabric;

Fig. 8 is a sectional perspective view of the fabric as it is initially woven;

Figs. 9 and 10 are fragmentary sectional views showing one way in which the temporary binder threads may be removed from the fabric;

Fig. 11 is a diagrammatic view also illustrating one manner of removing the binder threads;

Fig. 12 is a diagrammatic section of a fabric made in accordance with the invention and as it comes from the loom;

Fig. 13 is a diagrammatic view illustrating a fabric made in accordance with the invention but having relatively long tufts or tassels.

The body of the woven fabric, or fabric base, is indicated at 1 and this is formed by interweaving warp threads 2 and filling threads 3 in any usual way so as to produce a plain weave, a twill or sateen or any other desirable base fabric.

In initially weaving the fabric various groups of parallel threads from which the tufts are subsequently formed and which, for convenience, will be referred to as "tuft-forming groups", preferably are alternately woven into the body of the fabric 1 and floated on the front face thereof

so that each group of threads will be woven into the body at spaced intervals along the length of the threads and will have floating sections between such spaced intervals from which the tufts or tassels are subsequently formed.

As stated above I will preferably weave the fabric so that these tuft-forming groups are groups of filling threads, although the invention would not be departed from if the fabric were woven in such a way that the tuft-forming groups were groups of warp threads.

Referring to the diagram in Fig. 1, the groups of tuft-forming threads are indicated at 4 and each group of threads is woven into the body of the fabric at spaced intervals, as indicated at 5 between the points 6 and 7, and are floated over the surface of the fabric between the spaced intervals 5, as shown at 8. The length of the spaced intervals 5 in which the tuft-forming threads 4 are woven into the fabric may vary, and the length of the floating section 8 of each group of threads may vary in accordance with the design desired for the completed fabric, and similarly the distance between the groups of parallel tuft-forming threads 4 may vary according to the design desired to be produced.

As stated above I will preferably weave the fabric so that the groups 4 of tuft-forming threads are groups of filling threads.

When the fabric is initially woven one or both end portions 9 of each floating section 8 of any group of tuft-forming threads is temporarily retained in position or tied to the body 1 of the fabric by one or more binder threads 10, and in the drawings I have shown each end portion 9 of each floating section 8 thus bound to the fabric body by two binder threads 10. However, the number of binder threads 10 which are used for temporarily holding any end portion 9 in position may be varied without departing from the invention. These binder threads 10 will preferably be widely spaced from the end or ends of the floating section as shown in the drawings.

Where the tuft-forming groups are filling threads, these binder threads 10 will be in the nature of binder warp threads, and one way of practising the invention is to weave the fabric initially so that each binder warp thread 10 is bound or interlaced with an anchoring or binding pick 11 at each side of each floating section, each binder warp thread floating over the floating tuft-forming groups as shown at 12 and also floating over the face of the fabric between the tuft-forming groups as shown at 13.

Fig. 6 is a diagrammatic view of the back face of the fabric showing the binder picks 11, there being two such binder picks for each tuft-forming group of filling threads 4 and each binder pick floating on the back face of the fabric except where it is interlocked with the binder warp threads 10, as indicated at 14.

The fabric illustrated is thus initially woven with a plurality of separate groups of filling threads, each of which groups is alternately woven into the body of the fabric and floated over the surface thereof, and with the end portion or portions of each floating section retained in position by means of binder warp threads which are interlaced with binder picks or anchoring threads on each side of each tuft-forming group, and which binder warp threads float over the tuft-forming groups and then float over the face of the fabric between the points where they are anchored to the binder picks. A fabric woven

in this way is shown diagrammatically in Fig. 1 and more in detail in Figs. 8 and 12.

After the fabric has been thus woven, the floating sections 8 of the groups 4 of tuft-forming threads are severed between the binding threads 10 and the binding threads are subsequently removed from the fabric to free the tuft-forming portions 9 of the floating sections 8. This severing of the floating sections 8 may be done merely by cutting the threads of each section between the binder threads 10 therefor, as shown in Fig. 13, or it may be done by removing an intermediate portion of each floating section between the binder threads 10 therefor, that is, by cutting away or removing the portions of each floating section between two points, such as the points *a* and *b* in Fig. 1, which would bring the fabric into the condition shown in Fig. 3. Where the floating sections 8 are simply cut as shown in Fig. 13, the end portions 9 will be longer than where an intermediate portion of each floating section is removed or cut away between the points *a* and *b* as shown in Fig. 3.

In order to facilitate this operation of cutting or severing the floating sections, I propose to treat the fabric 1 after it has been initially woven, as shown in Figs. 1 and 8, with the floating sections of tuft-forming threads and the binder picks, so as to set the fabric and raise the floating sections 8 somewhat from the face thereof as shown in Fig. 2. This may be done in any of the ways well known to the textile art by which the fabric may be shrunk somewhat in the direction of the length of the groups 4, thereby introducing some slack into the floating sections 8 which makes them lie loosely on the surface of the fabric between the binder threads and causes them to be separated therefrom as illustrated in Fig. 8. If desired the fabric may also be treated at this point in the operation in order to improve its appearance, and/or to remove dirt, grease or other impurities therefrom, but in any event after the fabric has been brought to the condition shown in Fig. 2 in which the floating sections 8 are slack, then said sections are severed, either as shown in Fig. 13 or by removing the intermediate portions thereof as shown in Fig. 3. This may be done by means of any apparatus suitable for the purpose. The fabric will then be in the condition shown in Figs. 3 or 13 wherein it has on its front face the tuft-forming portions 9 of the floating sections 8 which are held to the face of the fabric by the binder warp threads 10, and these tuft-forming sections 9 may be longer or shorter depending on location of the binder warp threads 10 on the floating sections 8 and the manner in which the floating sections are severed.

After the floating sections 8 have thus been severed to produce the tuft-forming sections 9 the binder warp threads 10 are then removed so as to free the tuft-forming end portions 9, which then become tufts 15 projecting from the face of the fabric, as seen in Fig. 4.

The removal of the binder threads 10 may be accomplished either mechanically or chemically or by carbonizing them out, or in any other desirable way. If the binder threads are to be removed or dissolved by a chemical action, it will, of course, be necessary to weave the fabric that the material constituting the binder threads 10 and anchoring threads 11 will be responsive to the desired chemical action, while the other threads of the fabric will be unaffected thereby, or if the binder threads are to be carbonized

out of the fabric it will also be necessary to use such materials for the various threads of the fabric that the binder threads and anchoring threads will be the only ones which will be affected by the carbonizing operation.

I have, however, illustrated the binder threads as being removed from the fabric mechanically by being pulled therefrom, and where the invention is practised in this way it is necessary first to sever the binder picks or anchoring threads 11. The operations to which the cloth is subjected after it is initially woven, and by which the tuft-forming sections 8 are rendered slack and loose, as shown in Fig. 2, also results in introducing slackness or looseness into the binder picks 11 between the points where they are interlaced with the binder warp threads as illustrated in dotted lines Fig. 2. This makes it possible to treat the back of the fabric so as to segment the binder picks 11, thus leaving only the portions 16 thereof which are interlocked with the binder warp threads, as shown in Fig. 7. After the binder picks or anchoring threads 11 have thus been cut or segmented the binder warp threads 10 can be readily pulled out of the fabric by applying a pulling force thereto, as shown in Figs. 9 and 10. Fig. 9 is a fragmentary view showing a portion of a binder warp thread 10 which is floating over the tuft-forming group of filling threads 4, as shown at 12, and which is looped through the fabric body and interlocked with a portion 16 of the anchoring thread on the back side of the fabric. By applying a pulling force to each binder warp thread, the loop 14 thereof will be pulled through the fabric, in doing which it will either pull the short section 16 of the anchoring thread through the fabric or will be pulled loose from said short section.

Any suitable way of withdrawing these binder warp threads may be employed, and merely for illustrative purposes there is shown diagrammatically in Fig. 11 pulling devices 18 adapted to apply the requisite pulling force to said binder threads.

The removal of the binder threads and anchoring threads leaves the fabric in the condition illustrated in Fig. 4 wherein tufts 15 will be projecting from one face of the fabric. The arrangement of these tufts may be varied almost indefinitely by varying the spacing of the groups of tuft-forming threads lengthwise of the fabric, and by varying the spacing of the places along the length of each group at which each group is woven into the fabric, and by varying the length of the space 5 between successive floating sections 8 in each group and by varying the manner in which the sections are severed.

While the fabric may be used in the condition shown in Fig. 4, yet if it is desired to enhance the attractiveness thereof for certain purposes the tufts 15 may be curled or twisted either mechanically or in any suitable way as shown in Fig. 5, or the tufts may be chemically or otherwise treated for this purpose.

As stated above a fabric may be woven in accordance with this invention with an almost infinite variety in the arrangement of the tufts 15. The fabric may be woven with tufts spaced uniformly over the surface of the fabric or tufts having a random spacing or having a uniform spacing in one direction or a random spacing in the other direction etc., and may also be woven with tufts of various lengths.

Other changes may also be made in the prac-

tise of the invention within the terms of the claims.

I claim:—

1. The method of making a tufted woven fabric which consists in initially weaving the fabric with a group of parallel threads having a part woven into the fabric and a section floating on the surface of the fabric and with an end portion of the floating section held in position by a binder thread, severing the threads of the floating section and then removing the binder thread, thereby to free said end portion which then constitutes a tuft.

2. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of parallel threads, each group being woven into the fabric for part of its length and having a section floating on the surface of the fabric and with a tuft-forming end portion of each floating section held in position by a binder thread widely spaced from the end of the floating section, severing the threads of each floating section and then removing the binder threads from the fabric, thereby to free said end portions which then constitute tufts.

3. The method of making a tufted woven fabric which consists in initially weaving the fabric with a group of parallel threads which are woven into the fabric at spaced points along the length of the threads and are floating on the surface of the fabric between said spaced points and with a tuft-forming end portion of each floating section held in position by a binder thread which is widely spaced from the end of the floating section, severing the threads of the floating sections and then removing the binder threads to free said end portions which then constitute tufts.

4. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of parallel threads having spaced sections of each group floating on the surface of the fabric and the portions of the threads between the floating sections woven into the fabric and with an end portion of each floating section held in position by a binder thread, severing the threads of each floating section and then removing the binder threads from the fabric, thereby freeing said end portions which then constitute tufts.

5. The method of making a tufted woven fabric which consists in initially weaving the fabric with a group of parallel threads which are woven into the fabric at spaced points and which are floating on the surface of the fabric between said points and with each end portion of each floating section held to the fabric by a binder thread widely spaced from the end of the floating section, severing the threads of each floating section between the binder threads therefor and then removing the binder threads, thereby freeing said end sections which then constitute tufts.

6. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of parallel threads, each of which groups is woven into the fabric at spaced points along its length and floats on the surface of the fabric between said spaced points and with each end portion of each floating section retained in position by a binder thread, removing the central portion of each floating section between the binder threads and then removing the binder threads from the fabric, thereby to free the end portions which then constitute tufts.

7. The method of making a tufted woven fab-

ric which consists in initially weaving the fabric with separate groups of filling threads, each of which groups has spaced sections floating on the surface of the fabric with the threads of the group interwoven into the body of the fabric between said floating sections and with each end portion of each floating section held to the fabric by a binder warp thread which is widely spaced from the end of the floating section, removing the central portion of each floating section between the binder warp threads therefor, and then removing the binder warp threads from the fabric, thus freeing said end portions which then constitute tufts.

8. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of filling threads, each of which groups has spaced sections floating on one surface of the fabric with the threads of the group interwoven into the fabric for an appreciable length between said floating sections and with the end portions of each floating section held to the fabric by a binder warp thread which is anchored to the fabric on each side of each group of filling threads by floating anchoring picks located on the opposite face of the fabric, severing each floating section between the binder warp threads therefor, segmenting the floating anchoring picks by cutting each pick to leave a short segment at each point where it is interlocked with a binder thread, and then withdrawing the binder warp threads from the fabric, thereby releasing the end portions of the floating sections which thereby constitute tufts.

9. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of parallel threads having spaced sections of each group floating on the surface of the fabric and the portions of the threads between the floating sections woven into the fabric and with an end portion of each floating section held in position by a binder thread, severing the threads of each floating section, removing the binder threads from the fabric, thereby freeing said end portions which then constitute tufts, and then subjecting the tufts to a finishing treatment.

10. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of filling threads, which groups are spaced from each other and each of which groups has widely spaced sections floating on the surface of the fabric with the threads of the group interwoven into the body of the fabric between said floating sections and with each end portion of each floating section held to the fabric by a binder warp thread which is spaced from the extremity of said section, removing the central portion of each floating section between the binder warp threads therefor, removing the binder warp threads from the fabric, thus freeing said end portions which then constitute tufts, and then curling the tufts.

11. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of filling threads, each of which groups has spaced sections floating on one surface of the fabric with the threads of the group interwoven into the fabric between said floating sections and with the end portions of each floating section held to the fabric by a binder warp thread which is anchored to the fabric by floating anchoring picks located on the opposite face of the fabric, severing each floating section between the binder warp threads

therefor, segmenting the floating anchoring picks, thereby releasing the binder warp threads, withdrawing the binder warp threads from the fabric, thereby releasing the end portions of the floating sections which thereby constitute tufts, and then subjecting the tufts to a finishing treatment.

12. A woven fabric comprising a base fabric of interwoven filling threads and warp threads and separate groups of filling threads having the threads of each group interwoven into the base fabric at spaced intervals and floating on the surface of the base fabric between said spaced intervals, and binder warp threads floating over each end portion of each floating section of filling threads and tied into the base fabric at each side of each floating section by an anchoring pick.

13. A woven fabric comprising a base fabric of interwoven filling threads and warp threads and separate groups of filling threads having the threads of each group interwoven into the base fabric at spaced intervals and floating on one surface of the base fabric between said spaced intervals, and binder warp threads floating over each end portion of each floating section of filling threads and tied into the base fabric at each side of each floating section by an anchoring pick, said anchoring picks floating on the opposite face of the fabric except at the points where they cross the binder warp threads.

14. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of filling threads, each of which groups has spaced sections floating on one surface of the fabric with the threads of the group interwoven into the fabric for an appreciable length between said floating sections, and with the end portions of each floating section held to the fabric by a binder warp thread which is widely spaced from the end of the floating section and is anchored to the fabric on each side of the corresponding group of filling threads by floating anchoring picks located on the opposite face of the fabric, severing each floating section between the binder warp threads therefor, segmenting the floating anchoring picks adjacent the points where they are interlocked with the binder warp threads thereby to leave a short segment of each anchoring pick at each point where it is interlocked with a binder thread, and then mechanically withdrawing the binder warp threads from the fabric by applying a pulling strain to each binder warp thread sufficient to pull it free from the fabric, the removal of the binder warp threads releasing the end portions of the floating sections which then constitute tufts.

15. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of parallel threads, each group being woven into the fabric for part of its length and having a section floating on the surface of the fabric and with a tuft-forming end portion of each floating section held in position by a binder thread, shrinking the fabric in the direction of the length of said parallel threads thereby to raise from the fabric the portion of each floating section not retained by the binder threads, shearing the fabric to remove the raised portion of each floating section, and then removing the binder threads from the fabric thereby to free said end portions of the floating sections which then constitute tufts.

16. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of parallel threads having

5 spaced sections of each group floating on the surface of the fabric and the portions of the threads between the floating sections woven into the fabric and with an end portion of each floating section held in position by a binder thread, shrinking the fabric in the direction of the length of the parallel threads thereby to raise from the fabric the portion of each floating section not held by a binder thread, severing the threads of each floating section at a point where they are raised from the fabric, and then removing the binder threads from the fabric thereby freeing said end portions of the floating sections which then constitute tufts.

10 17. The method of making a tufted woven fabric which consists in initially weaving the fabric with separate groups of filling threads, each of

which groups has spaced sections floating on the surface of the fabric with the threads of the group interwoven into the body of the fabric between said floating sections and with each end portion of each floating section held to the fabric by a binder warp thread, shrinking the fabric in the direction of the length of the filling threads thereby raising from the fabric the portions of each floating section of filling threads not held by a binder thread, removing the portions of the floating sections thus raised from the fabric, and then removing the binder warp threads from the fabric, thus freeing said end portions of the floating sections of filling threads which then constitute tufts.

KENDALL T. GREENWOOD.

15