

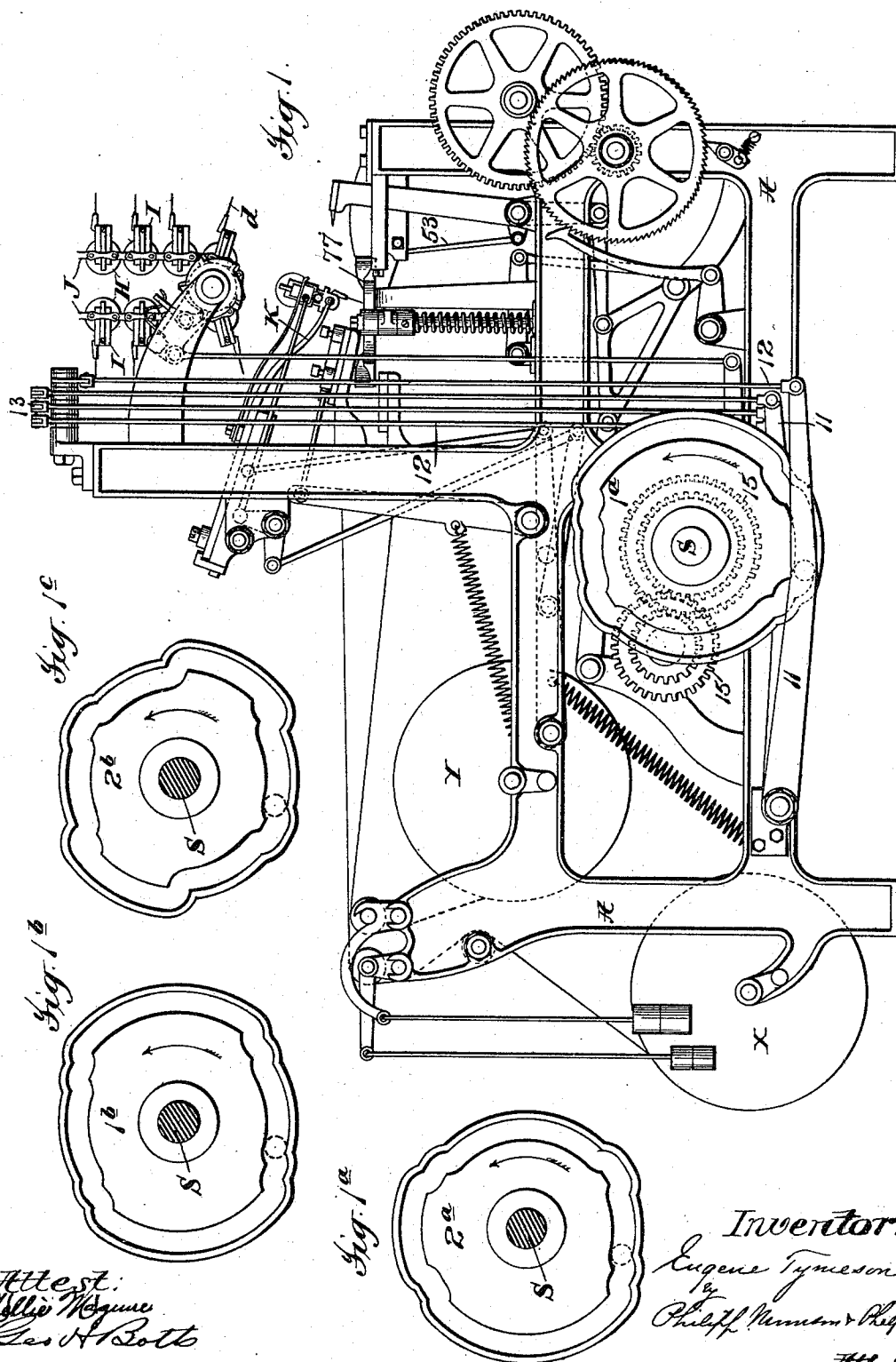
(No Model.)

5 Sheets—Sheet 1.

E. TYMESON.  
MOQUETTE FABRIC AND MOQUETTE LOOM.

No. 571,418.

Patented Nov. 17, 1896.



Attest:  
Willie Mendenhall  
Geo. H. Roth

Inventor:  
Eugene Tymeson  
by  
Philip Mendenhall & Phelps  
Attys

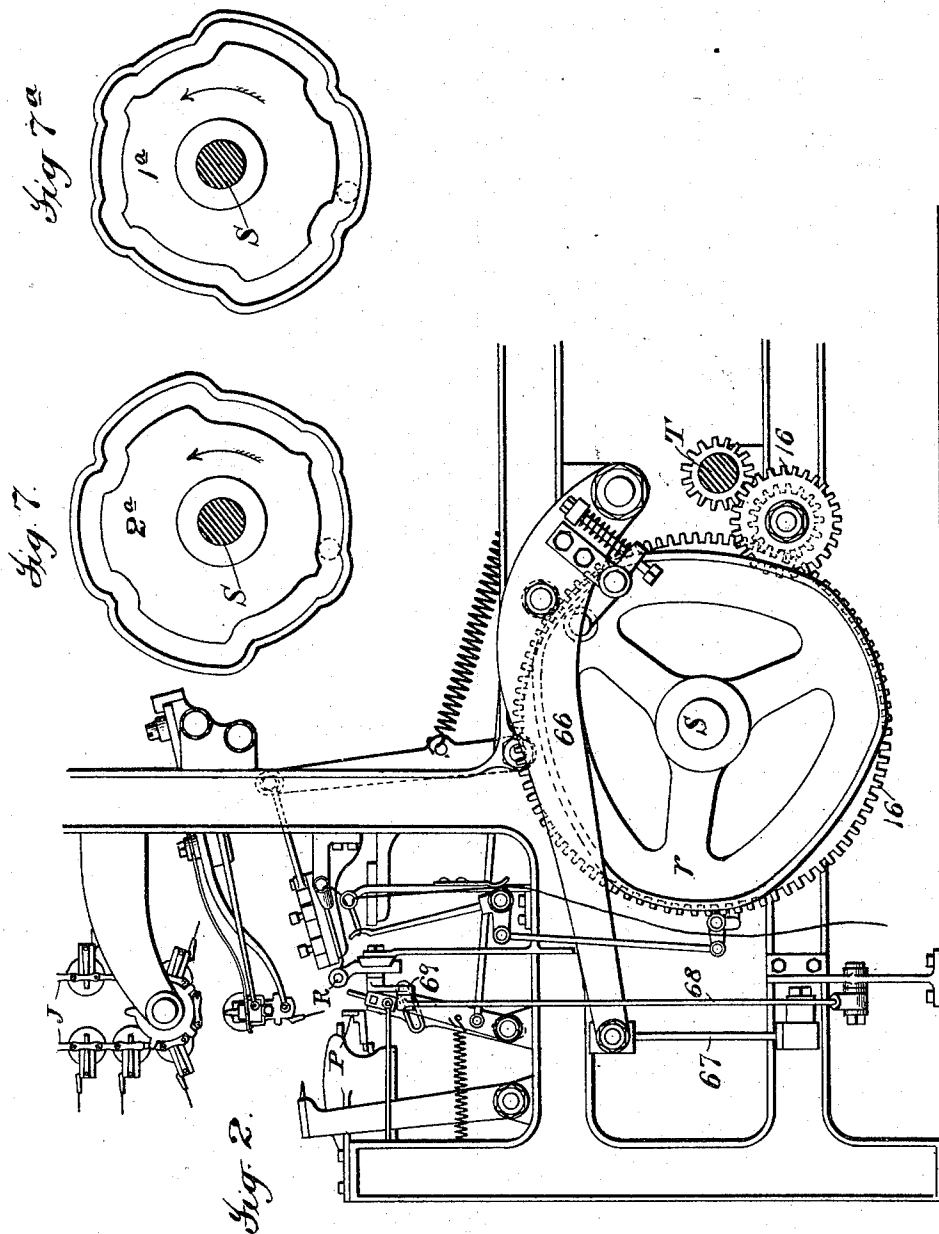
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5 Sheets—Sheet 2.

E. TYMESON.  
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No. 571,418.

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Attest  
Mellie McQuinn  
Geo. H. Bott

Inventor:  
Eugene Tymeson  
By  
Phelps Munson & Phelps  
Attys

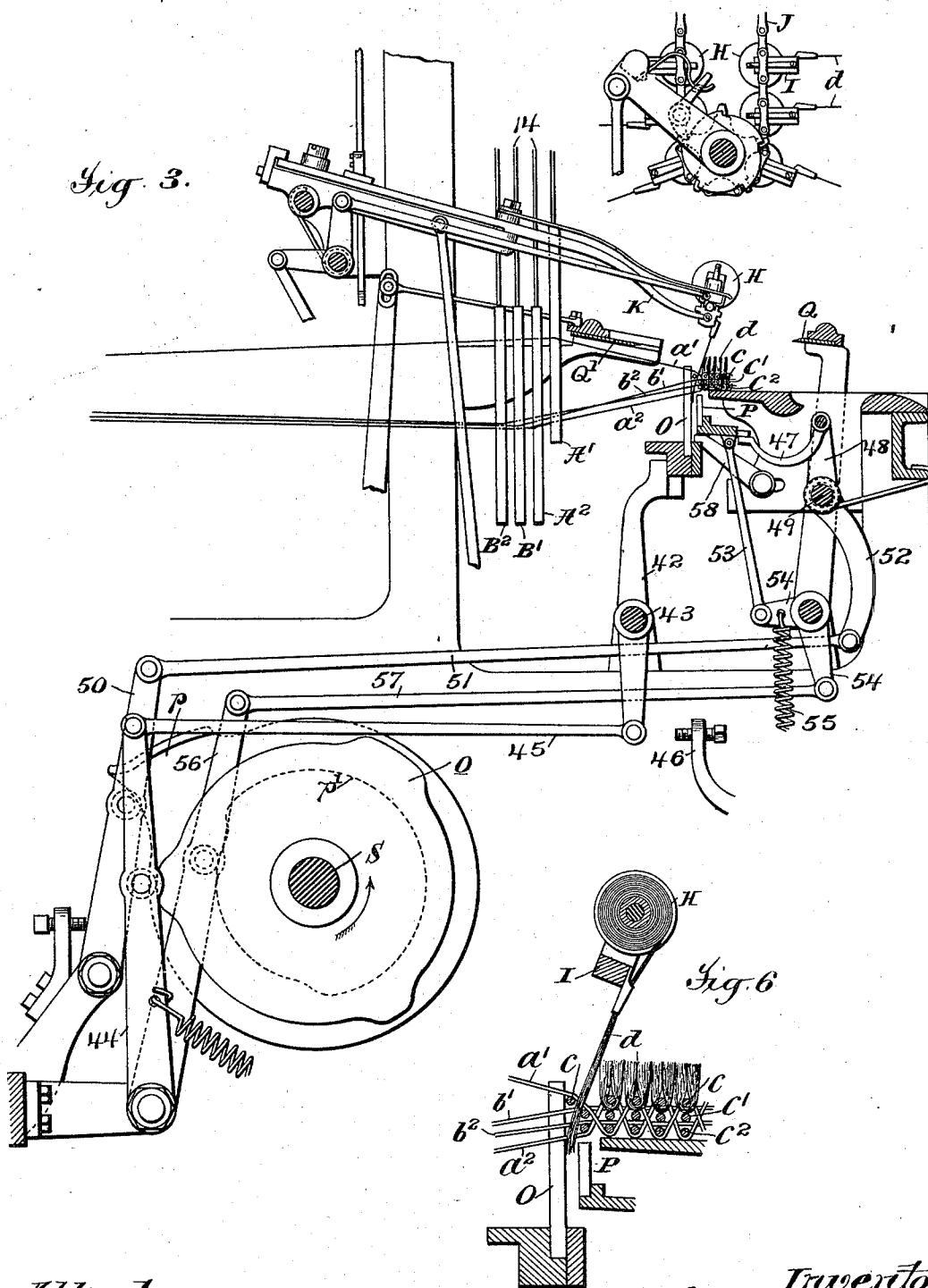
(No Model.)

5 Sheets—Sheet 3.

E. TYMESON.  
MOQUETTE FABRIC AND MOQUETTE LOOM.

No. 571,418.

Patented Nov. 17, 1896.



Attest:  
Wm. M. Quinn  
Geo. A. Botta

Inventor  
Eugene Tymeson  
Philip Munnich & Phelps  
Attys

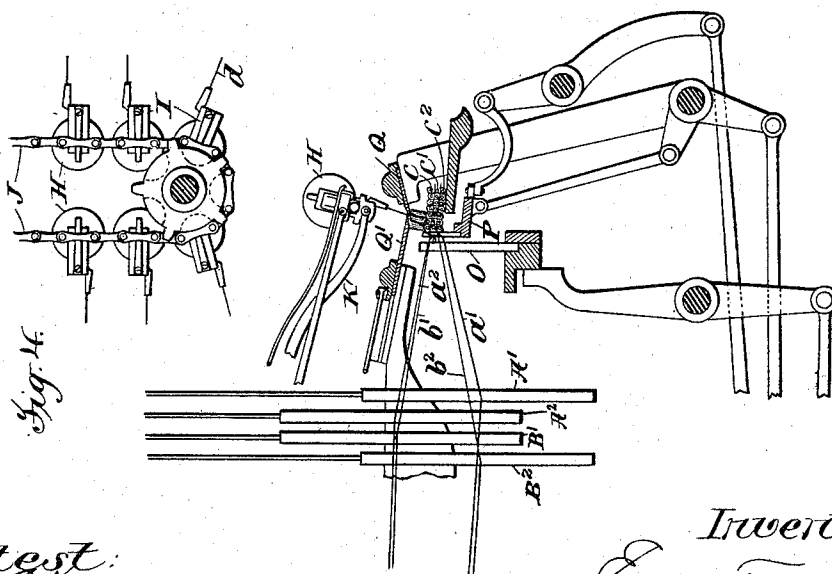
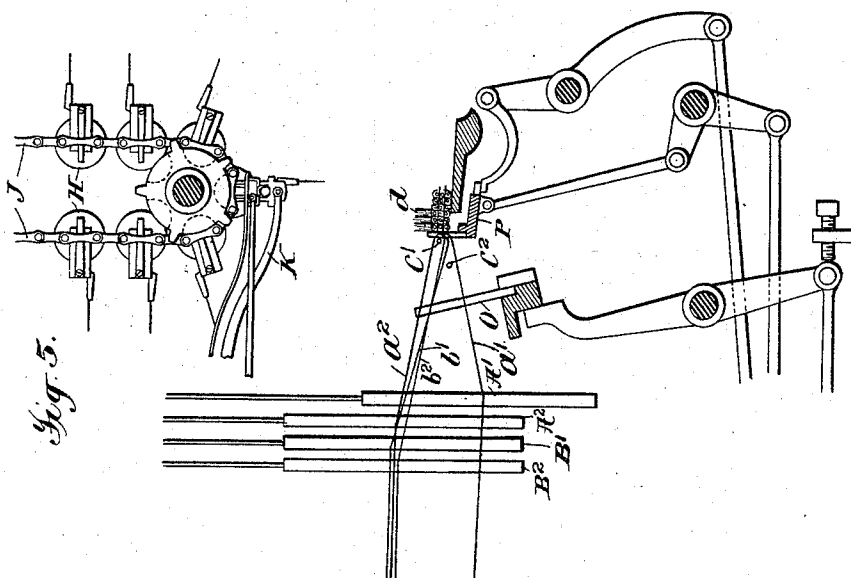
(No Model.)

5 Sheets—Sheet 4.

E. TYMESON.  
MOQUETTE FABRIC AND MOQUETTE LOOM.

No. 571,418.

Patented Nov. 17, 1896.



Attest:  
Nelson McGinnis  
Geo. H. Botts

Inventor:  
Eugene Tymeson  
By  
Philip M. Munn  
Attys.

E. TYMESON.  
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Fig. 8

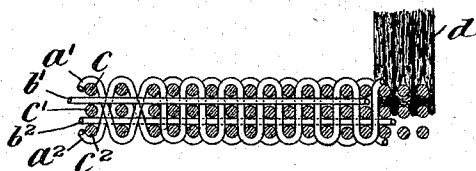


Fig. 9.

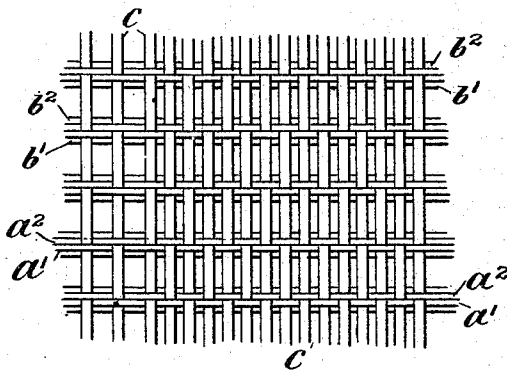
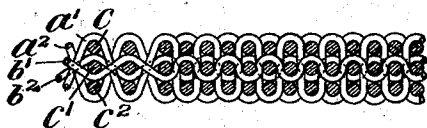


Fig. 10.



Fig. 11.



Attest:  
Hollie Moquin  
Geo. H. Bots

Inventor:  
Eugene Tymeson  
by  
Philip L. Kinsman & Phelps  
Attys

# UNITED STATES PATENT OFFICE.

EUGENE TYMESON, OF YONKERS, NEW YORK, ASSIGNOR TO WARREN  
B. SMITH, OF SAME PLACE.

## MOQUETTE FABRIC AND MOQUETTE-LOOM.

SPECIFICATION forming part of Letters Patent No. 571,418, dated November 17, 1896.

Application filed April 4, 1896. Serial No. 586,166. (No model.)

*To all whom it may concern:*

Be it known that I, EUGENE TYMESON, a citizen of the United States, residing at Yonkers, county of Westchester, and State of New York, have invented certain new and useful Improvements in Moquette Fabrics and Moquette Looms, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to tufted fabrics and looms for manufacturing tufted fabrics of that class of which the fabric now known as "moquette" carpet is an example, this carpet having a body of warp and weft threads of suitable material, usually jute or hemp, and a face consisting of rows of tufts of wool inserted into the body during the formation of the latter and looped about some of the weft-threads and bound in by the other weft-threads and warp-threads. Various modes of manufacturing this carpet have been used, the number of shots of weft to each row of tufts varying from two upward, one or two wefts forming holding-wefts about which the tufts are looped and the other wefts forming binding or body wefts by which, together with the warp-threads, the tufts are secured on the holding-weft and the body or back of the carpet formed. In previous fabrics of this class employing two or more binding or body wefts to each row of tufts one of the binding-wefts lies between the rows of tufts so as to separate them to some extent, so that while a heavier back is provided than in fabrics having but one binding-weft to each row of tufts the tufts cannot be beaten up as close as desired, and the result is a somewhat coarse carpet in which the separation of the rows of tufts causes the backing to show when the fabric is bent.

The especial object of the present invention is to provide a moquette fabric by which a heavy back shall be secured for the support of the tufts and the tufts firmly bound thereon and at the same time avoid the objectionable results of the separation of the rows of tufts by a weft-thread. This result is obtained by a weave employing dividing-warps between the binding or body wefts and between the upper binding or body weft and the tuft-hold-

ing weft in such a manner that the binding or body wefts to each row of tufts are held and lie in substantially a straight line with the tuft-holding weft, so that the successive rows of tufts are not separated by a weft, but may be beaten up close together. The dividing-warps preferably run straight through the fabric, the same warp-thread dividing the corresponding wefts throughout, as in this construction the fabric will beat up more closely, but the dividing-warps may be crossed between two rows of tufts, if desired.

The present invention includes also certain features of construction and combinations in a loom for weaving moquette fabrics, one feature consisting in the general construction and arrangement of the loom by which the binding or body wefts are inserted and woven in so as to lie one upon the other, with one of the binding-wefts lying against the row of tufts on the tuft-holding weft and the other or others forming the back of the fabric, so that no weft lies between the rows of tufts, as above described, and a further feature consists in an improved comb-and-lay movement especially adapted for use in weaving my improved fabric.

In weaving my improved fabric and other moquette fabrics, especially when the tufting forming the pile or face is of very heavy material, the comb which is used for turning the ends of the tufts about the holding-weft is liable to drag part of the tufting material with it as it withdraws from the tufts to permit the binding or body wefts to be beaten up by the lay, as in the movements heretofore used in moquette-loom. I secure an improved action in such looms by retaining the comb in position against the tufts during the action of the lay in beating up one or more of the next binding or body wefts inserted, so that the tufts are held by one or more such wefts before the comb is withdrawn. This feature of the invention is of especial value in a loom for weaving a fabric with two binding or body wefts arranged as above described, and in such a loom the comb is preferably held against the tufts during the insertion of both the binding or body wefts inserted before the next holding-weft. While either of these features of my improved loom may be used

without the other, the general loom movement by which the binding or body wefts are woven in being used without holding the comb against the tufts, as described, and the latter feature being applicable generally in moquette-loom, these two features coact in securing an improved loom, and the invention consists in part of their combination.

For a full understanding of the invention a detailed description of the improved fabric and so much of a loom embodying the apparatus features of the invention as is necessary to enable those skilled in the art to practice the invention will now be given in connection with the accompanying drawings, forming a part of this specification, which show all the features of the invention embodied in the preferred form in a loom of common type and in a portion of the fabric in its preferred form, together with a modification of the fabric.

In the drawings, Figure 1 is a side elevation of the loom. Figs. 1<sup>a</sup>, 1<sup>b</sup>, and 1<sup>c</sup> are detail views showing the inside heddle-cams in correct position, as in Fig. 1. Fig. 2 is a side elevation of the side of the loom opposite that shown in Fig. 1. Fig. 3 is a vertical longitudinal section showing especially my new comb-and-lay movement. Figs. 4 and 5 are similar sections showing the parts in different positions. Fig. 6 is an enlarged detail view showing the fabric in process of construction by the loom shown in Figs. 1 to 5 and corresponding to the position shown in Fig. 3, but with the fabric open to show the construction. Figs. 7 and 7<sup>a</sup> show the binding-warp cams in modified form for varying the order of weaving. Fig. 8 is a longitudinal section of the complete fabric in the preferred form as made by the loom shown in Figs. 1 to 5, part of the fabric being shown with the tufts removed and another part with the threads separated for the purpose of illustration. Fig. 9 is a plan view of the fabric with the tufts removed. Fig. 10 is a cross-section of the fabric with the tufts removed. Fig. 11 is a view similar to Fig. 8 without the tufts, showing a modification.

The fabric will first be described in its preferred form, as shown in Figs. 8 to 10, when the construction and operation of the loom producing it will be more readily understood. In this fabric the warps are arranged in sets of four at short intervals apart across the fabric, as usual in moquette fabrics, and two warps in each set of four are used as dividing-warps and lie, respectively, between the two binding or body wefts and between the upper binding or body weft and the holding-weft of each set of three wefts to a row of tufts, and the other two of each set of four warps are binding-warps and pass alternately above and below the three wefts of successive sets of three wefts, so as to bind them and the dividing-warps together.

$a'$   $a^2$  are the binding-warps,  $b'$   $b^2$  the dividing-warps,  $c$  tuft-holding wefts,  $c'$   $c^2$  the middle and bottom binding or body wefts, and  $d$  the tufts, all these being shown as of some-

what more than actual size of common carpet. The warps are each preferably quite small, as shown, and in the spaces between the sets of four warps the tufts are inserted, as common in this class of fabrics. The three wefts  $c$   $c'$   $c^2$  of each set of three wefts corresponding to a row of tufts, are inclosed within a single shed of the binding-warps  $a'$   $a^2$ , and the upper dividing-warp  $b'$  lies between the tuft-holding weft  $c$  and the upper binding or body weft  $c'$ , and the lower dividing-warp  $b^2$  lies between the upper and lower binding or body wefts  $c'$   $c^2$ , the dividing-warps in this form of the fabric running straight through the fabric.

Referring now to Figs. 1 to 6, the loom for weaving the fabric, embodying my improved features of loom-construction in their preferred form, will be described.

The loom shown is as to its general character similar to those in common use for weaving tufted fabrics of this general class and shown in many prior United States Letters Patent, for instance, Nos. 16,037, 186,374, 233,290, 233,291, and 529,636, and as the construction and general operation of such looms are well understood it has been shown and will be described only so far as is necessary in connection with the explanation of the subject-matter of the present invention.

A is the frame of the loom in which is mounted at the rear end the binding and dividing warp-rolls X Y, from which the warps are led to the heddles in the usual manner, these binding and dividing warps being weighted as required, the dividing warps preferably about twice as heavily as the binding-warps. Four heddles are employed, one for each warp of the four warps in the different sets, these heddles being lettered, respectively, A' A<sup>2</sup> B' B<sup>2</sup>, corresponding to the binding-warps  $a'$   $a^2$  and dividing-warps  $b'$   $b^2$ , carried thereby.

The heddles A' A<sup>2</sup> B' B<sup>2</sup> are actuated by their respective cams 1<sup>a</sup> 2<sup>a</sup> 1<sup>b</sup> 2<sup>b</sup>, so as to secure the opening and closing of the shed, as described hereinafter, through levers 11, connecting-rods 12, levers 13, and links 14, the cams being carried by a sleeve loose on the main shaft S and driven therefrom at a suitable speed by gears 15, the main shaft S being driven from driving-shaft T by gears 16.

Any suitable construction may be used for inserting the tufts and wefts, but the construction shown is substantially that of my prior patent, No. 529,636, so as to require only a general description. The tuft-spools H, having the usual carriages I, and tins for inserting the tufts are carried by a pair of chains J, forming the spool-carrier, and the tuft-spools are transferred in succession from the chains to the warp for the insertion of the successive rows of tufts and returned to the carrier J by transferring-arms K, mounted and actuated to swing in a vertical plane between the chains and warp and horizontally toward and from each other to seize and release the spools. The weft-carrier consists

of the needle R, which is actuated from a cam *r* on shaft S through lever 66, link 67, lever 68, and link 69, so that a very quick movement of the needle is secured, the cam *r* being constructed to actuate lever 66 and needle R three times to each complete movement of the transferring-arms K, so as to insert three shots of weft or filling to each row of tufts in proper time for the operation hereinafter described, the needle coacting with a shuttle in raceway 77 and other parts, as in the Patent No. 529,636, above referred to.

The lay, comb, and cutter construction is substantially the same as shown in my Patent No. 529,636, above referred to, except that their relative movements and timing are changed so as to secure the required action for weaving my new fabric and so as to hold the comb in position against the tufts during the insertion and beating up of the two tuft-binding or body wefts, as above described.

The lay O is carried by arms 42 on a rock-shaft 43, actuated by cam *o* on shaft S through lever 44 and link 45 and controlled by stop 46. The comb P is carried by arms 47, pivoted on crank-arms 48 on rock-shaft 49, the shaft being spring-pressed in one direction and actuated in the opposite direction by cam *p* on shaft S through lever 50, link 51, and crank-arm 52 on shaft 49, and the comb is raised and lowered by link 53, pivoted thereto and connected to one arm of the bell-crank lever 54, returned by spring 55 and actuated against the tension of the spring by a cam *p'* of proper form on shaft S through lever 56 and link 57, connected to the other arm of the bell-crank. The comb P is controlled by an adjustable stop 58.

The operation of the loom will be understood from a brief description without a detailed description of the operation of the various parts, except so far as the latter involve novel features, as the operation of the various devices in detail is substantially the same as in looms of this class heretofore in use and will be clear to those skilled in the art.

Modifications may be made in the order of the insertion of the wefts in weaving the fabric above described, but the loom is shown as inserting the middle weft *c'*, then the bottom weft *c''*, and last the top or holding weft *c* in the same shed of the binding-warps. The position in which the parts are shown in the general views, Figs. 1 to 3, is that in which the ends of the tufting material on a spool H, brought down from the chains J by the transferring-arms K, have been inserted through the warp behind the wefts *c'* *c''*, and holding-weft *c* has been inserted behind the tufts and beaten up by the lay O, so that the comb P is just about to be actuated to turn the ends of the row of tufts through the warp and loop them about the holding-weft *c*. In this position of the parts heddle A', carrying binding-warps *a'*, is raised, and heddles A<sup>2</sup> B' B<sup>2</sup>, carrying, respectively, binding-warp *a''* and dividing-warps *b'* *b''*, are lowered, and the lay O is just about to be returned to normal position and the warps to be shifted into central position for the action of the comb. This row of tufts is the first row and this weft *c* the first weft in the order of weaving, which is hereinafter given in full. The comb P is now actuated to carry up the ends of the tufts around the holding-weft *c*, as usual in such constructions, and the heddles are then shifted into the position shown in Fig. 4, with the heddles A<sup>2</sup> B'', carrying, respectively, binding-warp *a''* and dividing-warp *b'*, raised and heddles A' B<sup>2</sup>, carrying, respectively, binding-warp *a'* and dividing-warp *b''*, lowered, and thus change the shed of the binding-warps, and the needle R is then actuated to insert the middle binding or body weft *c'* for the next shed of the binding-warps, this being the second weft in the order of weaving, while the comb P still rests against the tufts and holds them looped about the holding-weft *c* in the previous shed of the binding-warps, as shown. The lay O then beats up this weft *c'*, while the comb is still held against the tufts, and the cutters Q Q' are actuated to cut off the tufts, all as shown in Fig. 4. The lay O is then withdrawn, the transferring-arms raised for another spool, and the heddles shifted into the position shown in Fig. 5 by shifting heddle B<sup>2</sup> up by a full movement, as shown on cam 2<sup>b</sup> in Fig. 1<sup>a</sup>, the other heddles remaining stationary, so that heddles A<sup>2</sup> B' B<sup>2</sup>, carrying, respectively, binding-warp *a''* and dividing-warps *b'* *b''*, are raised and heddle A', carrying binding-warp *a'*, lowered. The needle R is then actuated to insert the lower binding or body weft *c''*, which is the bottom weft in this shed of the binding-warps and the third weft in the order of weaving, and while the comb P still lies against the tufts this weft also is beaten up against the comb, the lay moving forward from the position, shown in Fig. 5. The lay O is then withdrawn, the heddles shifted into middle position, and the comb withdrawn, the two extra beats of the lay against the tufts while held by the comb beating them up so fully that with the binding or body wefts *c'* *c''* the row of tufts *d*, previously inserted, are held during the withdrawal of the comb, so as to prevent their being dragged down by the comb as it returns to its lower position, (shown in Fig. 3,) even though the tufts be of very heavy material. The transferring-arms are then actuated to bring down the next spool, the chains having been shifted one spool, as usual in such constructions, and the next row of tufts is inserted, which is the second row in the order of weaving, and the holding-weft *c* for this row of tufts, which is the fourth weft in the order of weaving, is inserted by the needle R and beaten up by the lay O while the comb is in its lower position, as shown and previously explained in connection with Fig. 3, thus completing the three wefts in this shed of the binding-warps, and the operation first described is repeated, the shed of the

binding-warps being changed so that the movement of the two binding-warps in shedding is reversed.

The full heddle motion is as follows for each two rows of tufts: First row: weft  $c$ —warp  $a'$  up, warps  $a^2 b' b^2$  down; weft  $c'$ —warps  $a^2 b'$  up, warps  $a' b^2$  down; weft  $c^2$ —warps  $a^2 b' b^2$  up, warp  $a'$  down. Second row: weft  $c$ —warp  $a^2$  up, warps  $a' b' b^2$  down; weft  $c'$ —warps  $a' b'$  up, warps  $a^2 b^2$  down; weft  $c^2$ —warps  $a' b' b^2$  up, warp  $a^2$  down.

As above stated, modifications may be made in the order of the insertion of the wefts in weaving fabric of the form above described, and either one of the two wefts  $c' c^2$  may be put in first, but both are preferably put in before the holding-weft  $c$  in the same shed, the change of the cams for putting in the bottom shot  $c^2$  before the middle shot  $c'$  being readily made by one skilled in the art. It is possible, however, to put in either the middle or the bottom weft  $c' c^2$ , then put in the top or holding-weft  $c$ , and the tufts, and then open the shed again and slip in the third weft, cams  $1^a 2^a$  being changed to secure the required heddle movement, cams  $1^b 2^b$  remaining as shown. In this operation the wefts are not beaten up by the lay against the comb, but the comb is withdrawn before the wefts are beaten up. The form of cams  $1^a 2^a$  and their correct positions corresponding to Fig. 1 are shown in Figs. 7 and  $7^a$ . The heddle motion for thus putting in the middle weft  $c'$  after the wefts  $c$  and  $c^2$  have been put in the shed is as follows for each two rows of tufts: First row: weft  $c$ —warp  $a'$  up, warps  $a^2 b' b^2$  down; weft  $c'$ —warp  $a' b'$  up, warps  $a^2 b^2$  down; weft  $c^2$ —warps  $a^2 b' b^2$  up, warp  $a'$  down. Second row: weft  $c$ —warp  $a^2$  up, warps  $a' b' b^2$  down; weft  $c'$ —warps  $a^2 b'$  up, warps  $a' b^2$  down; weft  $c^2$ —warps  $a' b' b^2$  up, warp  $a^2$  down.

I prefer to run the dividing-warps  $b' b^2$  straight through the fabric, as shown in Figs. 8 to 10, the same dividing-warp thus lying between corresponding wefts of the different sets throughout the fabric, as the fabric will thus beat up more closely. As above stated, however, the dividing-warps  $b' b^2$  may be crossed between the row of tufts, as shown in Fig. 11, the heddle motion being correspondingly varied by changing cams  $1^b 2^b$ , so as to reverse the motion for crossing the dividing-warps in the successive sheds, as readily understood by those skilled in the art, cams  $1^a 2^a$  remaining as shown in Figs. 1 and  $1^a$ , and the heddle motion being as follows for each two rows of tufts: First row: weft  $c$ —warp  $a'$  up, warps  $a^2 b' b^2$  down; weft  $c'$ —warps  $a^2 b'$  up, warps  $a' b^2$  down; weft  $c^2$ —warps  $a^2 b' b^2$  up, warp  $a'$  down. Second row: weft  $c$ —warp  $a^2$  up, warps  $a' b' b^2$  down; weft  $c'$ —warps  $a' b'$  up, warps  $a^2 b'$  down; weft  $c^2$ —warps  $a' b' b^2$  up, warp  $a^2$  down.

Other modifications in the form of the fabric shown may be made without departing from the invention, broadly considered, in-

cluding changes in the arrangement of the warps relatively to each other and to the wefts, as well as the number of warps and wefts employed, and the invention is not to be limited to the exact fabric shown. Thus it is obvious that a similar fabric with three or more binding or body wefts may be made by correspondingly increasing the number of dividing-warps, so as to provide a dividing-warp between each two wefts in the successive sheds of the binding-warps. The weaving of such a fabric, however, would be slow, and more than two binding or body wefts will hardly be required, except possibly for some special object requiring a very heavy back. While the wefts have been shown as each composed of a single thread, so as to make the illustration of the fabric clearer, it will be understood that these wefts may each consist of two or more threads, and in practice double-thread wefts will preferably be used.

It will be understood by those skilled in the art that my improved fabric may be woven in a hand-loom or in a power-loom of any suitable form other than that shown, and that my improved loom movement for weaving such fabric may be embodied in looms varying widely in construction and form of devices used for performing the various operations and in which the tufts are inserted by other means than those shown, either with or without removing the spools from the spool-carrier.

The term "moquette" used herein means and is intended to cover all carpets or other fabrics having rows of tufts inserted in the body and looped about some of the weft-threads.

What is claimed is—

1. A moquette fabric having a tuft-holding weft and a plurality of tuft-binding or body wefts to each row of tufts within a single shed of some of the warps and with the binding or body wefts separated from each other and from the tuft-holding weft by other warps, substantially as described.

2. A moquette fabric having the warps arranged in sets of binding and dividing warps, and having a tuft-holding weft and a plurality of tuft-binding or body wefts to each row of tufts within a single shed of the binding-warps and with the binding or body wefts separated from each other and from the tuft-holding weft by the dividing-warps, substantially as described.

3. A moquette fabric having the warps arranged in sets of binding and dividing warps, and having a tuft-holding weft and a plurality of tuft-binding or body wefts to each row of tufts within a single shed of the binding-warps and with the binding or body wefts separated from each other and from the tuft-holding weft by the dividing-warps, said dividing-warps running straight through the fabric so as to lie between corresponding wefts for the successive rows of tufts, substantially as described.

4. A moquette fabric having binding and dividing warps and having a row of tufts for each three wefts, and having the three wefts for each row of tufts within a single shed of the binding-warps and consisting of a tuft-holding and two tuft-binding or body wefts with the binding or body wefts separated from each other and from the tuft-holding weft by dividing-warps, substantially as described.

5. In a loom for weaving moquette fabrics, the combination with means for inserting the tufts, a weft-carrier, and warp-heddles, of means for actuating the weft-carrier and heddles to insert a tuft-holding weft and a plurality of tuft-binding or body wefts to each row of tufts within a single shed and to shift the warps to form a single shed of some of the warps inclosing all of said wefts and to separate each of said wefts from the other wefts by other warps, substantially as described.

6. In a loom for weaving moquette fabrics, the combination with means for inserting the tufts, a weft-carrier, and binding and dividing warp-heddles, of means for actuating the weft-carrier and heddles to insert a tuft-holding weft and two tuft-binding or body wefts to each row of tufts within a single shed and to shift the binding warps to form a single shed inclosing all of said wefts and to shift the dividing-warps to separate each of said wefts from the other wefts, substantially as described.

7. In a loom for weaving moquette fabrics, the combination with means for inserting the tufts, a weft-carrier, lay, comb, and warp-heddles, of means for actuating the weft-carrier and heddles to insert a tuft-holding weft and a plurality of tuft-binding or body wefts to each row of tufts within a single shed and to shift the warps to form a single shed of some of the warps inclosing all of said wefts and to separate each of said wefts from the other wefts by other warps and means for operating the lay and comb to hold the comb against the successive rows of tufts during the insertion and beating up of one or more binding or body wefts, and to beat up one or more binding or body wefts against the comb substantially as described.

8. In a loom for weaving moquette fabrics, the combination with means for inserting the tufts, a weft-carrier, lay, comb, and binding and dividing warp-heddles, of means for actuating the weft-carrier and heddles to insert a tuft-holding weft and two tuft-binding or body wefts to each row of tufts and to shift the binding-warps to form a single shed inclosing all of said wefts and to shift the dividing-warps to separate each of said wefts from the other wefts, and means for operating the lay and comb to hold the comb against the successive rows of tufts during the insertion and beating up of two binding or body wefts, and to beat up each of said two binding or body wefts against the comb substantially as described.

9. In a loom for weaving moquette fabrics, the combination with the lay, comb, weft-carrier, heddles and means for inserting the tufts, of means for actuating the heddles and weft-carrier, and means for actuating the lay and comb to hold the comb against the successive rows of tufts during the insertion and beating up of one or more tuft-binding or body wefts and to beat up one or more tuft binding or body wefts against the comb, substantially as described.

10. In a loom for weaving moquette fabrics, the combination with the lay, comb, weft-carrier, heddles, and means for inserting the tufts, of means for actuating the heddles and weft-carrier to insert a tuft-holding weft and two tuft-binding or body wefts to each row of tufts, and means for actuating the lay and comb to hold the comb against the successive rows of tufts during the insertion and beating up of one or more tuft-binding or body wefts, and to beat up one or more tuft-binding or body wefts against the comb substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

EUGENE TYMESON.

Witnesses:

ARTHUR LAND,  
JAS. F. VAN VARICK.