Aug. 21, 1956 C. H. MASLAND 2ND 2,759,495

PILE CARPET WEAVING

Filed Jan. 27, 1953 3 Sheets-Sheet 1

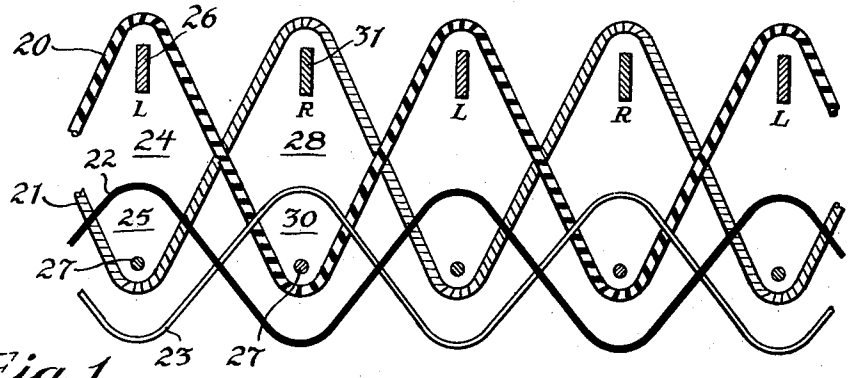


Fig. 1.

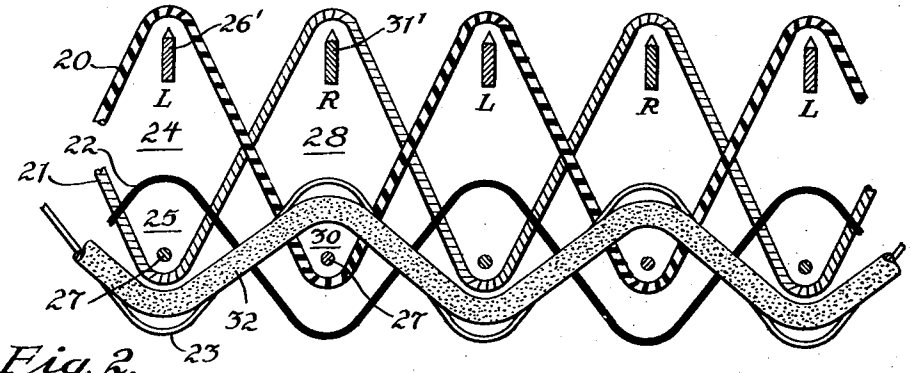


Fig. 2.

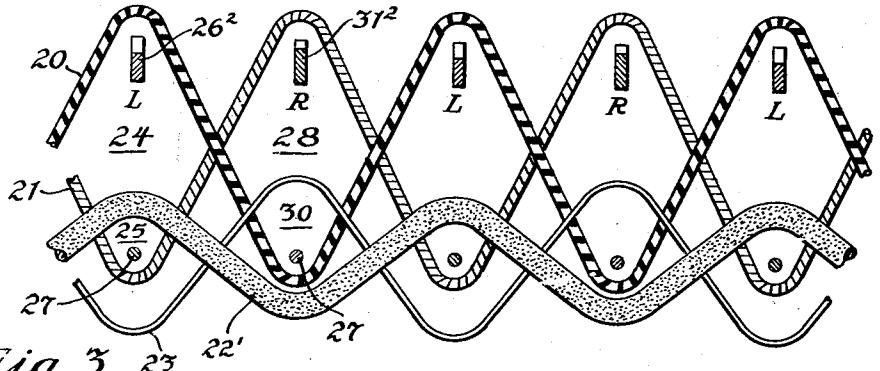


Fig. 3.

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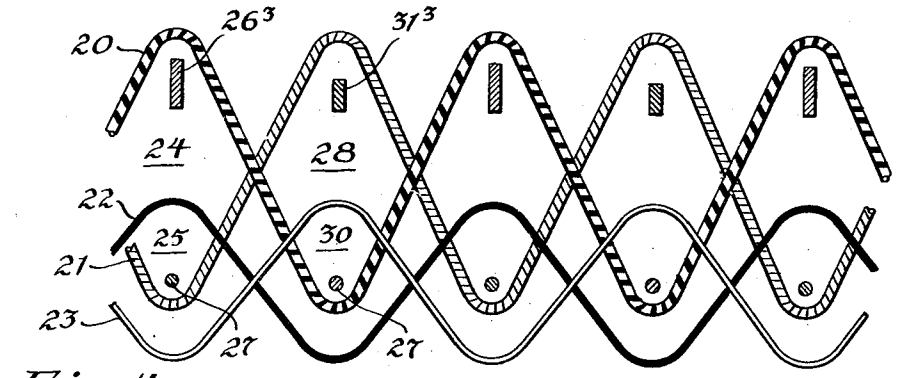


Fig. 4.

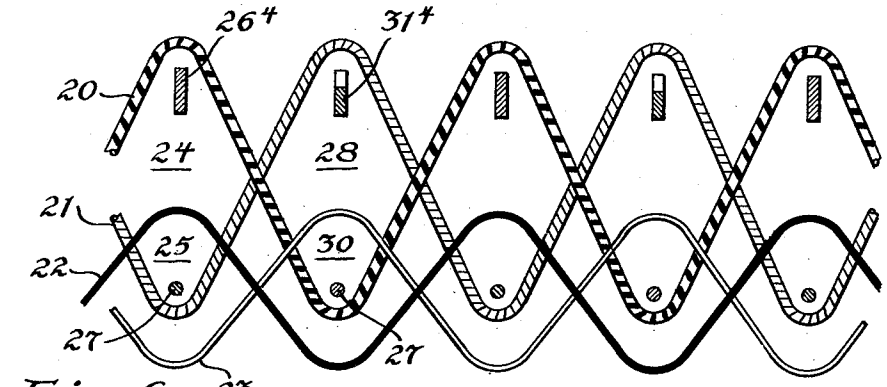


Fig. 6.

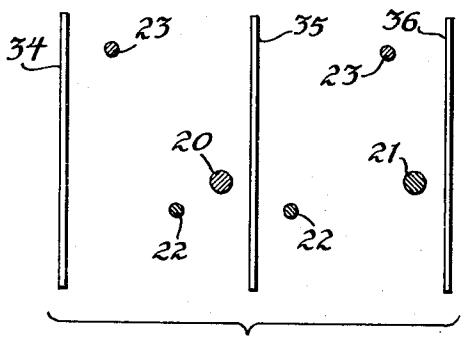


Fig. 5.

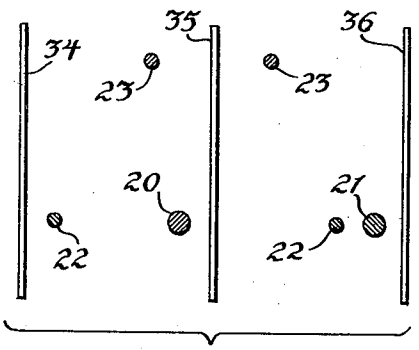


Fig. 7.

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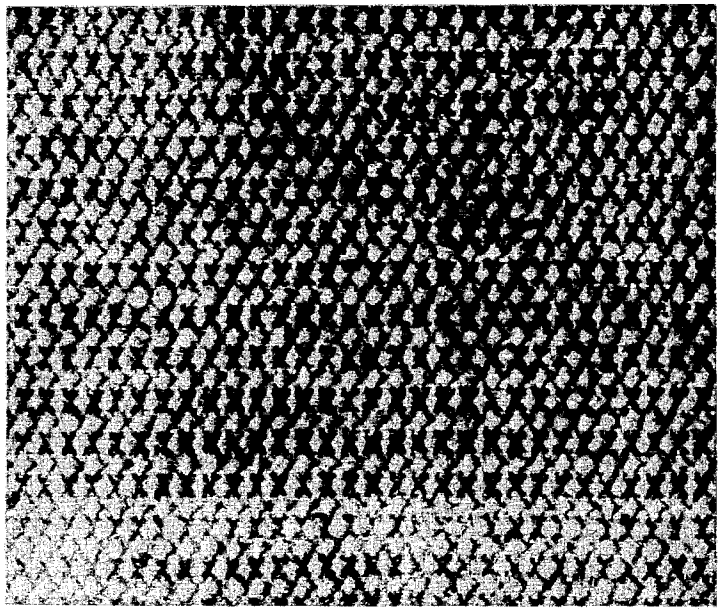


Fig. 8.

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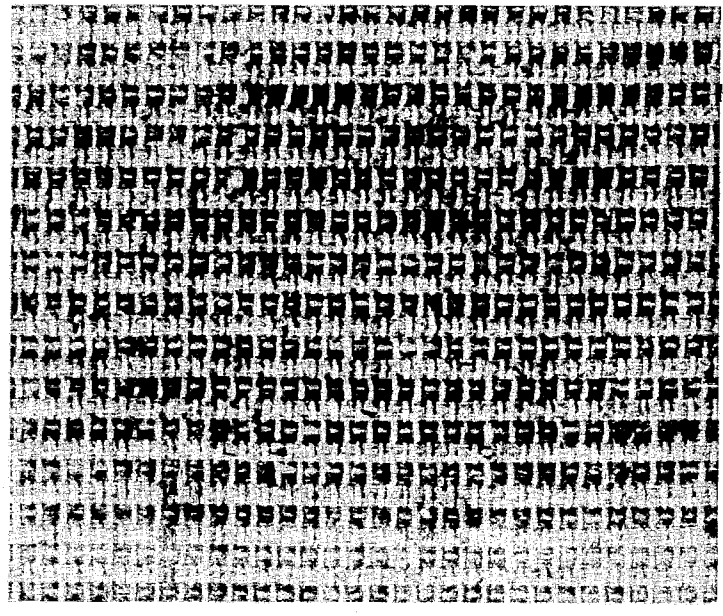


Fig. 9.

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United States Patent Office 2,759,495 Patented Aug. 21, 1956

2,759,495

PILE CARPET WEAVING

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Application January 27, 1953, Serial No. 333,515

5 Claims. (Cl. 139—39)

The present invention relates to pile carpets and rugs.

A purpose of the invention is to increase the production of pile floor covering looms.

A further purpose is to reduce the quantities of material necessary in making carpets and rugs.

A further purpose is to insert and also withdraw wires oppositely and introduce a wire over each weft.

A further purpose is to employ two sets of pile warp ends and two sets of binder warp ends, to raise the pile warp ends in the pile over alternate wefts and to cross the binder warp ends between each pair of wefts.

A further purpose is to thread-in pile of the two sets in alternate dents and to modify the backing by placing the pile warp end either adjoining to or in spaced relation from that binder warp end which is half raised when the pile warp end is fully raised, thus selectively accenting the pile warps at the back or hiding the pile warps at the back as desired in the particular fabric.

A further purpose is to weave a one shot carpet or rug.

Further purposes appear in the specification and in the claims.

In the drawings I have chosen to illustrate a few only of the numerous embodiments in which my invention may appear, selecting the forms shown from the standpoints of convenience in illustration, satisfactory operation and clear demonstration of the principles involved.

Figure 1 is a warpwise weave diagram showing the weave of the invention before removal of the wires.

Figure 2 is a view similar to Figure 1 showing a weave employing a stuffer warp in addition to the two sets of pile warp ends and also showing cutting wires.

Figure 3 is a view similar to Figure 1 using a single binder warp and weaving the stuffer warp opposed to the binder warp and showing wavy wires (varying in heights along their lengths within the shed).

Figure 4 is a view generally similar to Figure 1 showing a special draw-up or thread-in in which the binder warp end which is half raised at the weft position at which a particular pile warp end is fully raised adjoins that pile warp end in each dent, the pile warp ends of the two sets appearing only in alternate dents.

Figure 5 is a weftwise thread-in diagram corresponding to Figure 4.

Figure 6 is a view corresponding to Figure 1 showing a draw-up or thread-in in which the binder warp end which is half raised when a particular pile warp end is fully raised at a given weft position is separated from that pile warp end in each dent by an opposed binder warp end.

Figure 7 is a weftwise thread-in diagram corresponding to Figure 6.

Figures 8 and 9 are enlarged bottom plan views showing variations in the fabric.

Describing in illustration but not in limitation and referring to the drawings:

In conventional weaving of carpets and rugs, two wefts are inserted for each wire, and one of these wefts

appears at the face beneath the pile, while the other appears at the back of the fabric. Wires are inserted and withdrawn from the same side over every second weft and pile warps are raised over the respective wires. This necessitates that the loom go through a comparatively nonproductive sequence of heddle adjustments and shuttle motions after inserting each wire and before the next wire can be introduced to form additional pile. It is furthermore the widespread practice in the prior art to stiffen the back of floor covering pile fabrics by inserting relatively stiff stuffer warps which occupy space in the back of the fabric and give it rigidity.

In accordance with the present invention the process of weaving pile floor coverings such as carpets and rugs has been simplified and improved, greatly increasing the production, and at the same time producing a fabric with smaller consumption of materials and having many advantages from a structural standpoint.

In accordance with the invention, pile is raised over each weft. At least two sets of pile warp ends are employed, and pile warp ends of one of these sets appear in the pile above each weft. There is preferably a staggered relation between the pile warp ends, those of one set being raised in the pile opposite a weft behind which the ends of the other pile warp set are bound, so that each pile warp end is raised in the pile over every second weft and bound behind every second weft. The binder warps cross between successive wefts.

In accordance with the invention it is unnecessary to employ a stuffer warp, although a stuffer warp may be used in addition to the two sets of binder warp ends or to perform the function of one of the sets of binder warp ends.

The invention is also applicable to the creation of varying types of tie-ins by the back of the fabric acting on the pile. Thus if desired the pile can be accentuated at the back of the fabric by making it show wrapped around the filling while on the other hand if desired the pile can be suppressed at the back.

Considering first the form of Figure 1, I illustrate a first set of pile warp ends **20**, a second set of pile warp ends **21**, a first set of binder warp ends **22**, and a second set of binder warp ends **23**.

The two sets of pile warp ends may if desired be manipulated by heddles on the velvet or tapestry carpet weaving system, or they may be selected by a jacquard or other pattern control on the Wilton or Brussels carpet weaving system. In the first step of weaving, pile warp ends **20** are fully raised, pile warp ends **21** are lowered, binder warp ends **23** are lowered, and binder warp ends **22** are raised half way, forming an upper shed **24** and a lower shed **25**. A wire **26** is inserted in the upper shed and a weft **27** is inserted in the lower shed. Because it is preferable to insert alternate wires from opposite sides in order to get full advantage from the increased speed possible in weaving, the letter L is placed adjoining the wire **26** to show that it has been inserted from the left.

In the next weaving step, pile warp ends **21** are fully raised, binder warp ends **23** are raised half way, binder warp ends **22** are lowered and pile warp ends **20** are lowered, forming an upper shed **28** and a lower shed **30**. Wire **31** is inserted in the upper shed and weft **27** is inserted in the lower shed. An R is placed adjoining wire **31** to show that it will preferably come from the opposite side, in this case from the right.

The further steps of weaving then constitute a repetition of what has gone before, subject of course where a jacquard mechanism is used to the introduction of special design features by the jacquard.

The weave of Figure 1 produces a very tight back due to the fact that the sets of binder warp ends **22** and **23** cross

between each pair of wefts and it is not necessary to insert a stuffer warp, although a stuffer warp **32** can be woven with one of the sets of binder warp ends as shown in Figure 2.

The wires will of course vary as desired, and to illustrate this I have shown in Figure 1 straight non-cutting wires **26** and **31**, while in Figure 2 I illustrate straight cutting wires **26'** and **31'** used alternately, and in Figure 3 I show non-cutting wavy wires 26^2 and 31^2 alternating, and producing high and low portions at different points on the same transverse row within the shed. In Figure 4 I show high straight non-cutting wires 26^3 and lower straight non-cutting wires 31^3 alternating, and in Figure 6 I show straight non-cutting wires 26^4 alternating with wavy non-cutting wires 31^4.

In some cases it is desirable to make a stuffer warp perform the function of one of the binder warps or to employ a binder warp which is stiffer than a normal binder warp to perform part of the function of a stuffer warp, and I illustrate a stuffer warp **22'** woven in opposition to a single binder warp **23** in Figure 3.

Very interesting effects can be obtained on the back of the fabric by varying the draw-up or thread-in which is employed. In the weaves of Figures 5 to 9 pile warp ends **20** are placed only in alternate dents, for example the odd numbered dents, and pile warp ends **21** are placed in the other alternate dents, for example the even numbered dents of the reed. One binder warp end **22** and one binder warp end **23** appear in each dent, but by changing the thread-in the character of the tie-up of the pile in the backing of the fabric is changed and the appearance of the backing is radically modified.

In the form shown in Figures 4, 5 and 8, in each dent the binder warp end which is woven over a particular weft is placed adjoining the pile warp end which rises in the pile over that weft, and a crowding effect occurs which tends to make the pile show at the back of the fabric wrapped around the wefts. This appears at **33** in Figure 8. As illustrated, the sequence of thread-in in Figure 5 is to place binder warp end **23** adjoining one dent separator **34**, next to place binder warp end **22** and next pile warp end **20**, which adjoins the next separator **35**. In the next dent pile warp end **21** adjoins the next dent separator **36**, binder warp end **22** is placed adjoining the separator **35** and binder warp end **23** is placed adjoining pile warp end **21**. Thus in each case the binder warp end which is half raised when the pile warp end is fully raised is placed adjoining it.

In some cases, however, it is desired to reverse the process and avoid having the pile show at the back, saving yarn, and this is accomplished by the thread-in used in Figures 6, 7 and 9. In this case binder warp end **23** which is woven opposite to pile warp end **20** is placed between pile warp end **20** in each dent where it appears and binder warp end **22**, and likewise where pile warp end **21** appears binder end **22** is placed between it and the binder warp end **23** which rises half way when pile warp end **21** is fully raised. This creates the back formation **34** of Figure 9, hiding the pile at the back.

It will thus be evident that the invention finds its fullest application in a form in which the pile warp ends appear in alternate dents, although it is applicable where multiple frames are used in the ordinary manner.

It will be evident that the wires are withdrawn from the same sides at which they were inserted, usually after all wires of the set, say twenty or thirty in a particular case have been inserted in the fabric. Thus if the wires are inserted alternately from opposite sides they are likewise withdrawn from opposite sides, but to save time in weaving, a wire is inserted on one side while it is withdrawn from the opposite side.

In view of my invention and disclosure variations and modifications to meet individual whim or particular need will doubtless become evident to others skilled in the art, to obtain all or part of the benefits of my invention without copying the process and apparatus shown, and I therefore, claim all such insofar as they fall within the reasonable spirit and scope of my claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The method of weaving a pile floor covering, which comprises threading in a first set of pile warp ends in alternate dents, threading in a second set of pile warp ends in dents alternating with those of the first set, threading in two sets of binder warp ends in each dent, fully raising the pile warp ends of the first set, fully lowering the pile warp ends of the second set, half raising the binder warp ends of the first set, lowering the binder warp ends of the second set, thus forming an upper shed and a lower shed, inserting a wire from one side in the upper shed, simultaneously withdrawing another wire, inserting a shot of weft in the lower shed, fully raising the pile warp ends of the second set, lowering the pile warp ends of the first set, half raising the binder warp ends of the second set, lowering the binder warp ends of the first set, thus forming an upper shed and a lower shed, inserting a wire from the opposite side in the upper shed, simultaneously withdrawing another wire, and inserting a shot of weft in the lower shed.

2. The method of weaving, which comprises threading-in pile warp ends of a first set in alternate dents, threading-in pile warp ends of a second set in alternate dents, threading-in a binder warp end of a first set in each dent, threading-in a binder warp end of a second set in each dent, in the dents having a pile warp end of the first set the binder warp end of the first set being placed between the binder warp end of the second set and the pile warp end of the first set and in the dents having a pile warp end of the second set the binder warp end of the second set being placed between the binder warp end of the first set and the pile warp end of the second set, fully raising the pile warp ends of the first set, lowering the pile warp ends of the second set, half raising the binder warp ends of the second set, thus forming an upper shed and a lower shed, inserting a wire in the upper shed, inserting a shot of weft in the lower shed, fully raising the pile warp ends of the second set, lowering the pile warp ends of the first set, half raising the binder warp ends of the second set, lowering the binder warp ends of the first set, thus forming an upper shed and a lower shed, inserting a wire in the upper shed, and inserting a shot of weft in the lower shed.

3. The method of weaving, which comprises threading-in pile warp ends of a first set in alternate dents, threading-in pile warp ends of a second set in alternate dents, threading-in a binder warp end of a first set in each dent, threading-in a binder warp end of a second set in each dent, in the dents having a pile warp end of the first set the binder warp end of the second set being placed between the binder warp end of the first set and the pile warp end of the first set and in the dents having a pile warp end of the second set the binder warp end of the first set being placed between the binder warp end of the second set and the pile warp end of the second set, fully raising the pile warp ends of the first set, lowering the pile warp ends of the second set, half raising the binder warp ends of the first set, lowering the binder warp ends of the second set, thus forming an upper shed and a lower shed, inserting a wire in the upper shed, inserting a shot of weft in the lower shed, fully raising the pile warp ends of the second set, lowering the pile warp ends of the first set, half raising the binder warp ends of the second set, lowering the binder warp ends of the first set, thus forming an upper shed and a lower shed, and inserting a wire in the upper shed.

4. A single pile floor covering fabric comprising a first set of pile warp ends, a second set of pile warp ends, a first set of binder warp ends, a second set of binder warp ends, and wefts interwoven together, there being two opposed binder warp ends between every pile warp end of one set and the next pile warp end of the other set of pile warp ends, the binder warp ends of the two sets

crossing between each pair of wefts, the two sets of pile warp ends being staggered and each rising in the pile in pile projections, at least some of which are uncut loops over every second weft and being bound behind every second weft, the binder warp end which is woven over a weft over which a pile warp end is raised in the pile being placed adjoining that pile warp end.

5. A single pile floor covering fabric comprising a first set of pile warp ends, a second set of pile warp ends, a first set of binder warp ends, a second set of binder warp ends, and wefts interwoven together, there being two opposed binder warp ends between every pile warp end of one set and the next pile warp end of the other set of pile warp ends, the binder warp ends of the two sets crossing between each pair of wefts, the two sets of pile warp ends being staggered and each rising in the pile in pile projections, at least some of which are uncut loops over every second weft and being bound behind every second weft, the binder warp end which is raised over a weft at a position at which a particular pile warp end is raised in the pile being spaced from that pile warp end by an opposed binder warp end.

References Cited in the file of this patent

FOREIGN PATENTS

18,756	Great Britain	of 1896
245,973	Great Britain	Jan. 21, 1926
787,922	France	July 16, 1935
814,846	France	Mar. 30, 1937