United States Patent

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[54] **BASE FABRIC WITH BILATERAL PILES**
10 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **66/194,**
66/85
[51] **Int. Cl.** **D04b 23/08**
[50] **Field of Search** 66/194,
190, 195, 192, 87, 86

[56] **References Cited**

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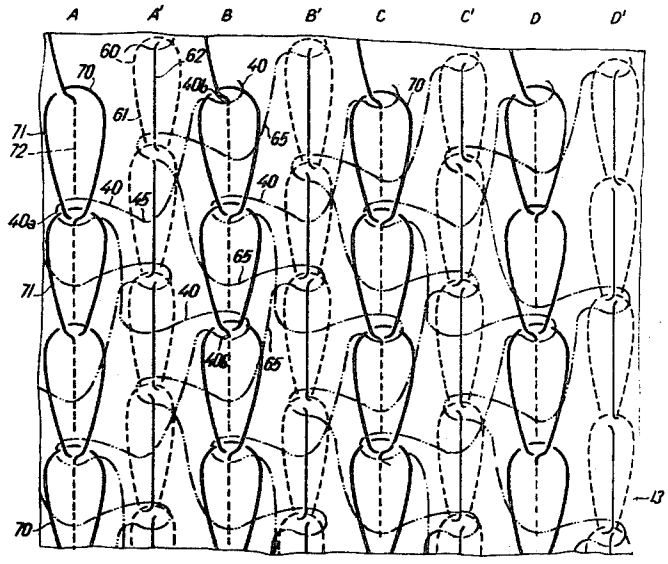
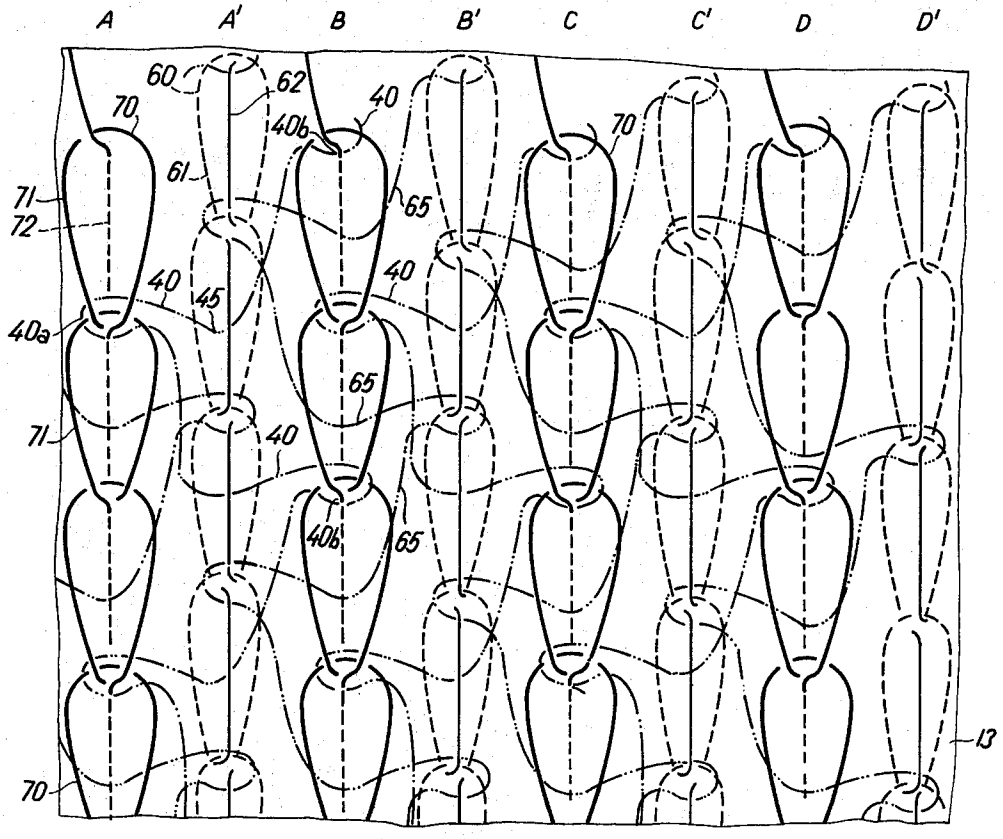
ABSTRACT: Bilateral pile fabrics in which a base fabric, such as a fibrous fleece sheet, has on both sides staggered courses and aligned wales, and including pile threads on both sides extending in successive courses between adjacent wales.

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13
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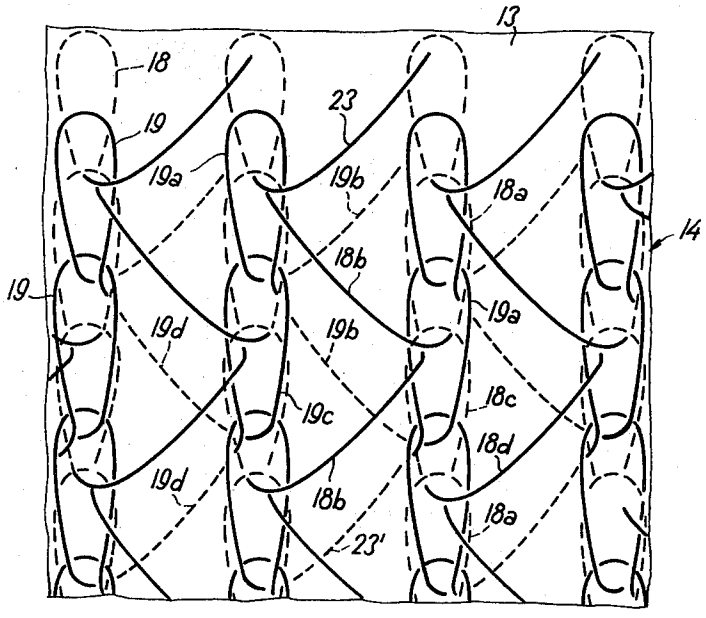
Fig. 2.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19a
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23'

Fig. 1.

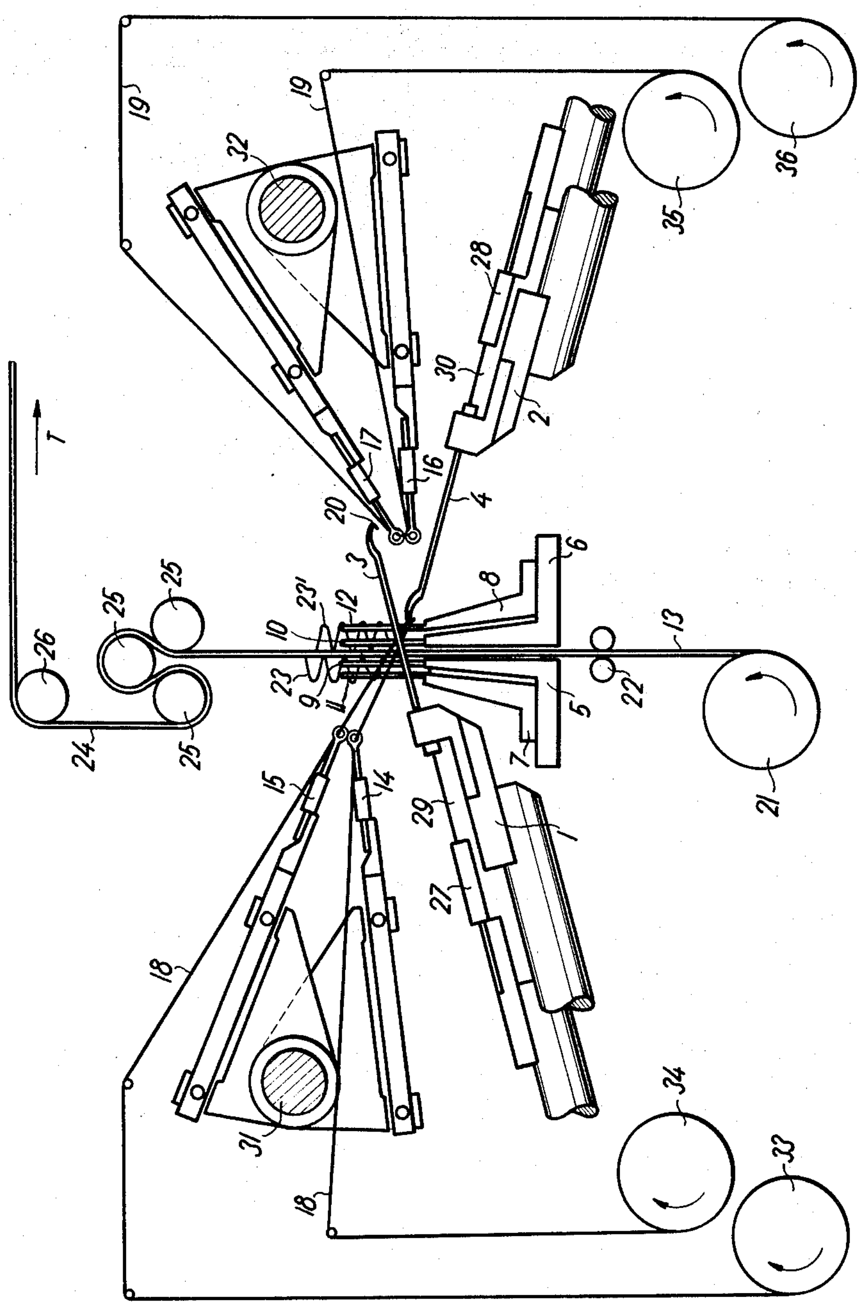
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Fig. 3.

BASE FABRIC WITH BILATERAL PILES

REFERENCE TO A RELATED APPLICATION

The present application is a continuation-in-part application of our copending application Ser. No. 858,935, filed Sept. 18, 1969 entitled "Apparatus and Method for Making Piles on a Base Fabric."

BACKGROUND OF THE INVENTION

Bilateral knitted pile fabrics are known in which knitted loops are held in a base fabric by mutual friction. One bilateral knitted pile fabric is known in which knitted loops are bound by seams made by sewing needles. This fabric has the disadvantage that the pile loops do not have sufficient strength and resistance when finished and used, and furthermore that the pile loops do not have a constant length.

SUMMARY OF THE INVENTION

It is one object of the invention to provide a base fabric with bilateral piles which overcomes the disadvantages of prior art pile fabrics.

It is another object of the invention to provide bilateral pile fabrics in which knitted pile loops are firmly anchored to the base fabric.

Another object of the invention is to provide a base fabric with knitted reinforcing Wales and courses on both sides, and to anchor pile loops in successive courses in different wales.

With these objects in view, the present invention provides on either side of the base fabric, at least one system of pile threads which in each successive course are knitted in different wales.

One bilateral pile fabric according to the invention has registering wales and staggered courses of two threads on opposite sides, and since the back loops of each system of threads extend in successive courses between adjacent wales staggered and firmly anchored pile loops are formed on opposite sides of the base fabric.

Another bilateral pile fabric according to the invention has on opposite sides, registering knitted wales of chain loops, and staggered courses, and a pile thread is knitted on each side of the fabric in successive courses between adjacent wales on the respective side of the fabric.

Generally speaking, a pile fabric according to the invention comprises first and second thread means knitted from opposite sides of a base fabric to form first wales and first courses on one side, and second wales and second courses on the other side of the base fabric, respectively, and the first and second thread means forming, respectively, two groups or systems of pile loop portions of which one group extends between adjacent first wales and successive first courses on one side, and the other group or system extends between adjacent second wales and successive second courses on the other side of the base fabric.

In one embodiment of the invention the first and second thread means include sets of first and second threads, respectively. On each side of the base fabric there are wales and courses consisting of loops having a front loop portion on one side and a back loop portion on the respective other side of the base fabric, and the loops formed of the same thread are located in successive courses in adjacent wales so that the back loop portions extend between successive courses and adjacent wales on the respective other side of the base fabric, and form on both sides of the base fabric groups of pile loops.

In another embodiment of the invention, on either side of the base fabric there is a set of binding threads and a set of pile threads provided. The binding threads form wales consisting of binding chain loops, and the respective pile thread is anchored by the binding chain loops on the same side located in adjacent wales and successive courses, and form a group of pile loops.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a diagrammatic view illustrating a portion of a bilateral pile fabric in accordance with one embodiment of the invention;

FIG. 2 is a diagrammatic view illustrating a portion of a pile fabric according to another embodiment of the invention; and

FIG. 3 is a fragmentary schematic view illustrating apparatus for making pile fabrics according to the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. 3, the apparatus has two opposite supporting means 1 and 2 on which needles 3 and 4 are mounted in a slanted position on opposite sides of a base fabric 13. The angle between the needles 3 and 4 is less than 180°. Between the two supporting means 102, two support combs 5 and 6, and two loop combs 7 and 8 are arranged in a position in which the supporting combs 5 are located directly adjacent opposite sides of the base fabric 13, while loop combs 7 and 8 are mounted on support combs 5 and 6, respectively. Support combs 5 and 6 support sinkers 9 and 10, respectively, and loop combs 7 and 8 support sinkers 11 and 12, respectively.

The loop combs 6 and 8 are mounted on support combs 5 and 6 movable toward and away from the plane of base fabric 13 which may be woven fabric, a knitted fabric, or a fibrous fleece which is withdrawn from a letoff reel 21 through tensioning means 22 by transporting rollers 25 and then guided over a roller 26 in the direction T to a takeup reel, not shown.

Each of the supporting means 1 and 2 carries two thread guide means 14, 15 and 16, 18 which supply threads 18 and 19, respectively, to the hooks 20 of needles 4 and 3. Threads 18 and 19 are supplied, respectively by bobbins 33, 34 and 35, 36, respectively.

Latch beds 27 and 28 support latches 29, 30 which cooperate with the respective needle hoods to close the same during movement of the respective needle through the base fabric, and to open the hook when the needle catches the thread. Each needle 3 cooperates with a pair of sinkers 9 and 11, and each needle 4 cooperates with a pair of sinkers 10 and 12. The thread guide means 14 and 15 cooperate with needle 4, and the thread guide means 16 and 17 cooperate with needle 3, the needles and thread guides being, respectively, located on opposite sides of the supporting combs 5 and loop combs 7. Thread guide means 14 and 15 are mounted on a carrier which is oscillated by shaft 31, and thread guide means 16 and 17 are mounted on a carrier which is oscillated by a shaft 32.

The base fabric is pulled by transporting rollers 25 to an operative position in which it is tensioned by rollers 22 and located between the support combs 5 and 6 and stationary sinkers 9 and 10. The base fabric 13 is stopped, and the needles 3 are operated to penetrate the base fabric 13 and to catch a yarn 19 on the remote side of the base fabric 13 whereupon latch 29 is closed and thread 19 is pulled through the base fabric to form a loop. Needles 3 and 4 knit alternately first and second staggered courses and first and second registering wales on opposite sides of the base fabric. The movement of support beds 1 and 2 is controlled by a mechanism, not shown, by which the motion of the inoperative support bed is slowed down in such a manner that the needles 3 of support bed 1, for example, enter the base fabric 13 after the completion of the working cycle of the needles 4 of the respective other support bed 2.

In order to produce the bilateral pile fabric of FIG. 1, needles 3 and 4 knit threads in a known pattern in which the loops of each thread are located in adjacent wales in each successive course so that the needles do not form wales consisting of chain stitches. The threads 18 form loops having back loop portions 23 laid over sinkers 11 of loop comb 7, while threads 19, passing through the base fabric 13 in the same manner, form back loops 23 on sinkers 12 of loop comb 8. By operation of loop combs 7 and 8, respectively, in synchronism with the needle operations, the back loop portions 23 and 23' are drawn out to be of greater length, as required for pile loops.

After the needles 3 have knitted a course of loops, the base fabric with the knitted course is transported by transporting rollers 25 a distance which is half the spacing between two successive courses, whereupon the needles 4 are operated to knit the next course. Consequently, in the final pile fabric 14, pile loops 23 and 23' are staggered to each other half the distance between two successive courses. The back loop portions 23' formed of yarns 19 on the respective other side of the base fabric, are also drawn out by movement of sinkers 12 of loop comb 8 away from the sinkers 10 of support comb 6, so that pile loops 23 and 23' are formed on both sides of the fabric, consisting of drawn out back loop portions.

A pile fabric according to the first embodiment of the invention is shown in FIG. 1. The back loop portions formed of threads 18 are generally indicated 23, while the back loop portions formed of threads 19 are generally indicated 23'. Each thread 19 has a front loop portion 19*a* which, in successive courses, are located in two adjacent wales and are connected with each other by back loop portions 19*b* located on the respective other side of the base fabric 13. Another thread 19 forms a front loop portion 19 *c* , and back loop portions 19*d* on the respective other side of the base fabric, connecting two front loop portions 19*c*. The slanted back loop portions 19*b* and 19*d* are drawn out by sinkers 12 to form pile loops.

A thread 18 forms front loop portions 18*a* located on the other side of the fabric as compared with the front loop portions 19*a*, and located in two adjacent wales alternating with front loop portions 18*c* formed of another thread 19. The back loop portions 18*b* of front loop portions 18*a*, and the back loop portions 18*d* of front loop portions 18*c* are located on the front of the base fabric, and are drawn out by sinkers 11 of loop comb 7 to form pile loops on the front of the base fabric 13 so that the finished fabric 14 is formed.

The needles 3 and 4 are operated so that the first and second wales formed of threads 18 and 19, respectively, register with each other, while the courses formed of threads 18 are staggered to the courses formed of threads 19 half the distance between two courses formed on the same side of the fabric.

Referring now to the embodiment of FIG. 2, first binding threads 70 form front loop portions 71 and back loop portions 72 in wales A, B, C, D consisting of chain loops. Second binding threads 60 form front loop portions 61 on the back of the fabric, and back loop portions 62 on the front of the fabric 13, each wale A', B', C', D' consisting of chain loops.

FIG. 2 is a perspective view in which the wales A and A', for example, appear to be spaced, but actually the wales A, A', for example, formed on opposite sides of fabric 13, register with each other.

A group of front pile threads 40 is provided on the front of base fabric 13, and a group of back pile threads 20 is provided on the back of the base fabric 13. The front pile thread 40 extends in successive courses of the front binding thread 70 between adjacent wales. For example, a front pile thread 40 is bound at the point 40*b* by a front loop portion 71 in a wale B, and is then bound in the successive course by the front loop portion 71 at a point 40*a* of the wale A in the successive course, and is again bound at a point 40*b* in wale B in the following course.

The back pile threads 20 are bound in the same manner by the chain loops of the back wales A' to D'. For example, a back pile thread 20 extends between adjacent back wales A', B' in a zigzag path and is bound in successive courses and adjacent wales A', B' on the back of the fabric. In this manner, front pile loops 45, and back pile loops 65 are formed on opposite sides of the base fabric 13.

The pile threads 40 and 20 are selectively deposited under the needles, while the binding threads 60 and 70 are knitted of chainstitches whereby the pile threads 20 and 40 are caught between the base fabric 1 and the respective back loop portion 72 of binding thread 70, or 62 of binding thread 60.

Both pile fabrics described with reference to FIGS. 1 and 2 comprise threads which can be of different thickness, quality, and color, and which may be laid on different patterns. For example, the pile threads may be placed on regular or irregular intervals. Different color effects on the two sides of the base fabric, may be achieved by using pile threads 20 and 40 of different color in the embodiment of FIG. 2, and in the embodiment of FIG. 1 by using threads of different color in front and in the back of the base fabric 13. The pile loop portions may be of different length and height so that a relief pattern is formed in the piles.

The bilateral pile fabrics according to the invention may be advantageously used as blankets, garment linings, carpets, terry cloth, and similar fabrics.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of bilateral pile fabrics differing from the types described above.

While the invention has been illustrated and described as embodied in a base fabric with bilateral knitted piles consisting of pile loops extending in successive courses between adjacent wales, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

What we claim as new and desire to be protected by Letters Patent is set forth in the appended claims.

1. Base fabric with bilateral piles, comprising a base fabric; and first and second thread means knitted from opposite sides of said base fabric to form first wales and first courses on one side, and second wales and second courses in the other side of said base fabric, respectively, said first and second thread means forming, respectively, two groups of pile loop portions, one group extending between adjacent first wales and successive first courses on said one side, and the other group extending between adjacent second wales and successive second courses on said other side of said base fabric.

2. Base fabric with bilateral piles as claimed in claim 1 wherein said first and second courses are spaced the same distance, respectively; and wherein said first courses are staggered to said second courses half said distance.

3. Base fabric with bilateral piles, comprising a base fabric; and first and second thread means knitted from opposite sides of said base fabric to form first wales and first courses on one side, and second wales and second courses on the other side of said base fabric, respectively, said first and second thread means forming, respectively, two groups of pile loop portions, one group extending between adjacent first wales and successive first courses on said one side, and the other group extending between adjacent second wales and successive second courses on said other side of said base fabric, said one group of pile loop portions being the back loop portions of loops of said second wales and courses, and said other group of pile loop portions being the back loop portions of loops of said first wales and courses.

4. Base fabric with bilateral piles as claimed in claim 3 wherein said first and second wales register.

5. Base fabric with bilateral piles as claimed in claim 3 wherein said first and second thread means include sets of first and second threads, respectively; wherein said first wales and first courses consist of first loops having a first front loop portion on said one side, and a first back loop portion on said other side of said base fabric; wherein first loops formed on the same first thread are located in successive first courses in

adjacent first wales whereby said first back loop portions extend between successive first courses and adjacent first wales on said other side of said base fabric; wherein said second wales and second courses consist of second loops having a second front loop portion on said other side, and a second back loop portion of said one side of said base fabric; and wherein second loops formed on the same second thread are located in successive second courses in adjacent second wales whereby said second back loop portions extend between successive second wales and adjacent second courses on said one side of said fabric so that said second and first back loop portions form, respectively, said one group and said other group of pile loop portions.

6. Base fabric with bilateral piles as claimed in claim 5 wherein said first and second wales. register; wherein said first and second courses are spaced the same distance, respectively; and wherein said first courses are staggered to said second courses, respectively, half said distance.

7. Base fabric with bilateral piles, comprising a base fabric; and first and second thread means knitted from opposite sides of said base fabric to form first wales and first courses on the other side of said base fabric, respectively said first thread means including a set of first binding threads forming said first wales of first binding chain loops, and a set of first pile threads, each first pile thread being anchored by first binding chain loops of said first binding threads located in adjacent first wales and successive first courses and said second thread means including a set of second binding threads forming said second wales of second binding chain loops, and a set of second pile threads, each second pile thread being anchored by said second binding chain loops of said second binding threads located in adjacent second wales and successive second courses, said first binding chain loops forming one group of pile loop portions and said second binding loops forming an other group of pile loop portions, said one group extending between adjacent first wales and successive first courses of said one side, and said other group extending between adjacent second wales and successive second courses on said other side of said fabric.

8. Base fabric as claimed in claim 7 wherein said first and second wales are formed of chain loops and are located on opposite sides of said base fabric registering with each other, respectively.

9. Base fabric with bilateral piles as claimed in claim 8 wherein said first and second courses are spaced the same distance; and wherein said first courses are staggered to said second courses, respectively, half said distance.

10. Base fabric with bilateral piles, comprising a base fabric; and first and second thread means knitted from opposite sides of said base fabric to form first wales and first courses on one side, and second wales and second courses on the other side of said base fabric, respectively, said first and second thread means forming, respectively, two groups of pile loop portions, one group extending between adjacent first wales and successive first courses on said one side, and the other group extending between adjacent second wales and successive second courses on said other side of said base fabric, at least one of said groups of pile loop portions being made of a plurality of threads having different colors.