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G. S. COX.

HAIRCLOTH FABRIC.

APPLICATION FILED OCT. 4, 1905.

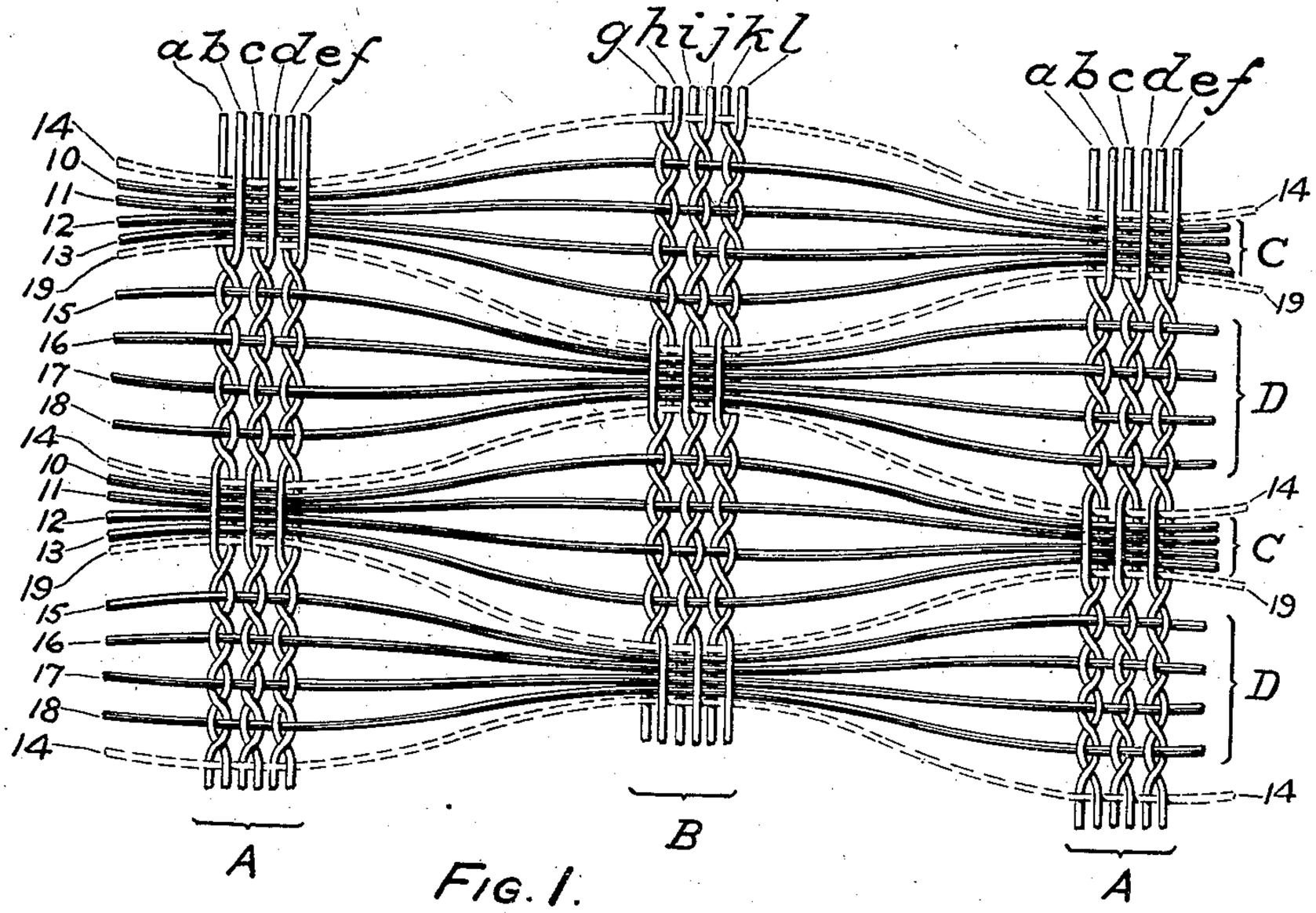

FIG. 1.

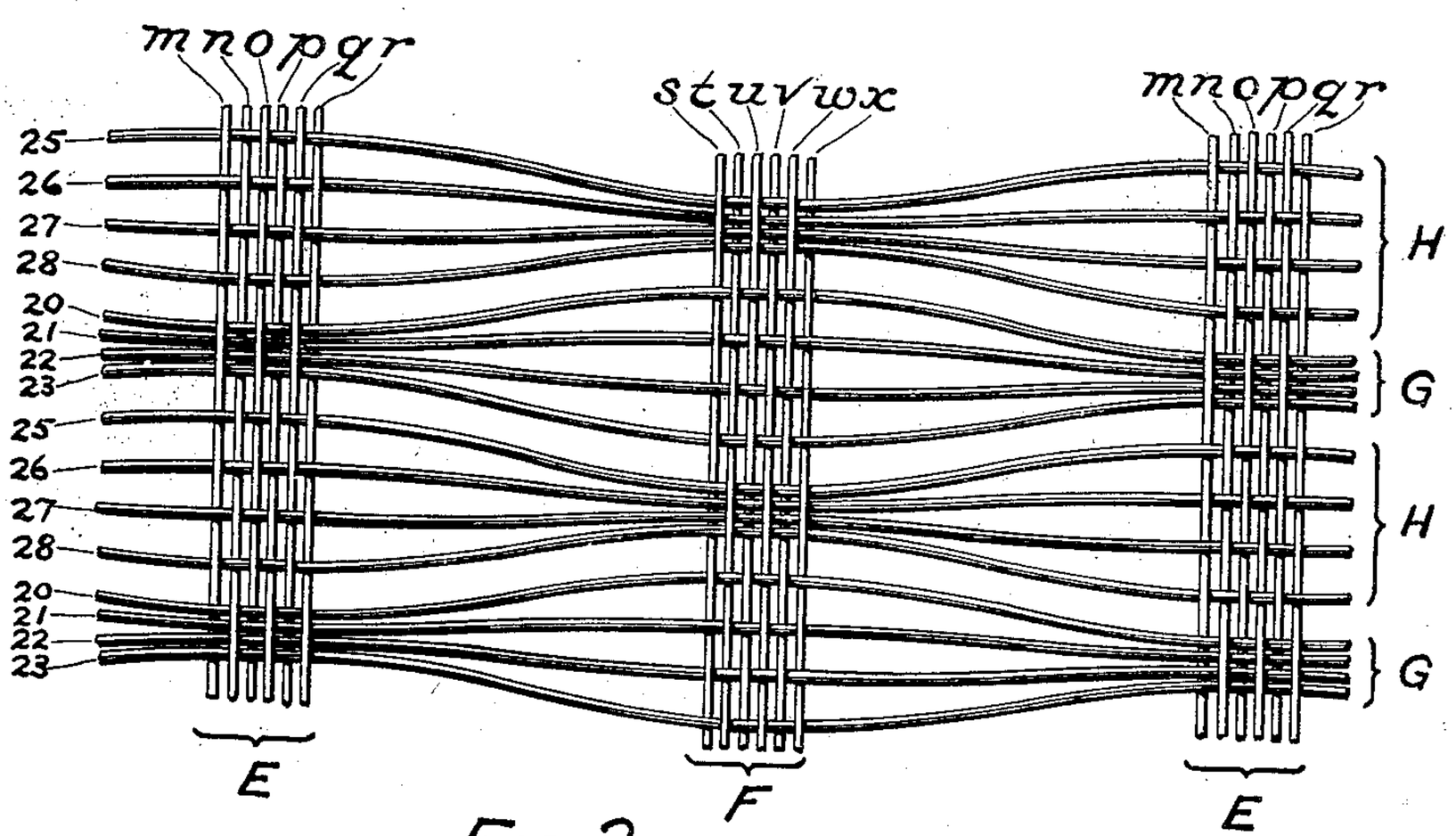

FIG. 2.

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GEORGE S. COX, OF FITZWATERTOWN, PENNSYLVANIA, ASSIGNOR TO HIMSELF, AND WALTER S. COX, OF PHILADELPHIA, PENNSYLVANIA, TRADING AS GEORGE S. COX AND BROTHER.

HAIRCLOTH FABRIC.

No. 890,611. Specification of Letters Patent. Patented June 16, 1908.

Application filed October 4, 1905. Serial No. 281,238.

To all whom it may concern:

Be it known that I, GEORGE S. COX, a citizen of the United States, residing at Fitzwatertown, in the county of Montgomery and State of Pennsylvania, have invented a new and useful Improvement in Haircloth Fabrics, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to hair cloth fabrics. These fabrics are used as interlinings for dresses, coats, etc. The standard fabric consists of a warp of cotton and a weft of horse-hair. The weave is a plain up and down weave, there being a single pick of hair in each shed of warp.

The ordinary hair-cloth is open to the serious objection that the strands of horse-hair, having a smooth surface, cannot be tightly bound by the warp, and the hair frequently pulls out, leaving an open space extending entirely across the warp; or the hair is displaced lengthwise and presenting thus a protruding end, is pulled out. Moreover, after one hair has thus escaped, the binding capacity of the warp is still further diminished, resulting in a constantly increasing tendency to fray. This occurs particularly after the interlining is placed in position, and is not only annoying to the wearer, but the stiffening function of the hair is seriously affected. It is obvious that this objection will be somewhat mitigated by increasing the number of picks, and consequently manufacturers have found it necessary to weave the fabric with a considerable number of picks to the inch. This, however does not obviate the fraying evil, but it does add substantially to the cost of the goods, horse-hair being very expensive and constantly increasing in value owing to the demand outrunning the source of supply.

The main object of the present invention is to eliminate the tendency to fray. This object is effected by means of the weave embodying my invention and at the same time the number of picks per inch that is practically necessary is about half the number that it is customary to use in the ordinary weave. Moreover, the stiffness of the fabric embodying my invention is much greater than that of the ordinary weave containing an equal number of picks.

In the drawings: Figure 1 is a plan view of the preferred weave; Fig. 2 is a plan view of a modification.

The warp may be regarded as being composed of two series of sets of threads, the sets of one series alternating with the sets of the other series, adjacent sets being separated from each other by a space substantially exceeding in width the space occupied by a single set. Each set of warp threads is composed of (say) three pairs of threads, and the sheds of warp are formed by these pairs.

In Fig. 1, *a* and *b*, *c* and *d*, and *e* and *f*, form the three pairs constituting each of the sets A, of warp, and *g* and *h*, *i* and *j*, and *k* and *l* form the three pairs constituting each of the sets B, of warp. The sets A, are arranged alternately with the sets B, and are repeated across the width of the fabric and constitute respectively the two series of warp. One warp thread of each pair is caused to pass over its companion thread after one or more picks of hair have been inserted, as hereinafter described, thus binding the pick or picks of hair between them. This may be effected by means of the ordinary heddles used in making the well known leno weave. The corresponding threads of all the pairs of corresponding sets are operated from the same shaft. The horse-hair weft may also be considered as composed of two series of sets of hair strands, the sets of one series alternating with the sets of the other series. Each set of hair weft is composed of (say) four picks of hair.

In Fig. 1, 10, 11, 12 and 13 represent the four picks of hair constituting the sets C, of weft, and 15, 16, 17 and 18 represent the four picks of hair constituting the sets D, of weft. The sets C, are arranged alternately with the sets D, and are repeated along the length of the fabric and constitute respectively the two series of weft. It will be observed that the hair picks 10, 11, 12 and 13 of each of the weft sets C, lie together in single warp sheds formed by the warp threads *a* and *b*, *c* and *d*, *e* and *f* of the warp sets A, while these same picks are bound in separate warp sheds formed by the warp threads *g* and *h*, *i* and *j*, *k* and *l*, of the warp sets B; also that the hair picks 15, 16, 17 and 18 of each of the weft sets D, lie together in single warp sheds formed by the warp threads *g* and *h*, *i* and *j*, *k* and *l* of the warp sets B, while these same picks

are bound in separate warp sheds formed by the warp threads *a* and *b*, *c* and *d*, *e* and *f* of the warp sets A. In a fabric thus constructed, each of the strands of hair extends from selvage to selvage in a waved line, and the hair, at the outside of each wave, is firmly bound in position. This arrangement not only prevents an accidental lengthwise displacement of the hair, but it is impossible to withdraw a hair, the tension required for withdrawal exceeding the tensile strength of the hair, which breaks off at about the line of the selvage if a slight partial withdrawal is effected.

It is not essential to have any particular number of threads in each warp set, although more than a single pair should be employed if the hair is to be held in place with the desired security. Nor is it essential to have any particular number of picks of hair in each weft set, although it should consist of an even number of picks, as otherwise the central hair will lie perfectly straight. If desired, additional picks of hair 14 and 19 may be introduced which may be inserted in both the warp sheds of sets A containing picks 10, 11, 12 and 13, and the warp sheds of sets B containing picks 15, 16, 17 and 18.

Fig. 2 illustrates a modification in which a plain weave is substituted for the leno weave. *m* and *n*, *o* and *p*, *q* and *r*, represent the pairs of warp threads of each of the sets E of warp, and *s* and *t*, *u* and *v*, *w* and *x* represent the pairs of warp threads of each of the sets F of warp. The sets E are arranged alternately with the sets F, and are repeated across the width of the fabric and constitute respectively the two series of warp. The warps *m*, *o* and *q* are operated from one shaft, the warps *n*, *p* and *r* from a second shaft, the warps *s*, *u* and *w* from a third shaft, and the warps *t*, *v* and *x* from a fourth shaft. 20, 21, 22 and 23 represent the four picks of hair constituting the sets of weft G, and 25, 26, 27 and 28 represent the four picks of hair constituting the sets of weft H. The hair picks 20, 21, 22 and 23 of each of the sets G lie together in single warp sheds formed by the warp threads *m*, *n*, *o*, *p*, *q* and *r* of the warp sets E, while these same picks are bound in separate warp sheds formed by the warp threads *s*, *t*, *u*, *v*, *w* and *x* of the warp sets F. The hair picks 25, 26, 27 and 28 of each of the sets H lie together in single warp sheds formed by the warp threads *s*, *t*, *u*, *v*, *w* and *x* of the warp sets F, and these same picks are bound in separate warp sheds formed by the warp threads *m*, *n*, *o* *p*, *q* and *r* of the warp sets E. The modification shown in Fig. 2 is less desirable than the form shown in Fig. 1, in that the adjacent picks of hair when in different sheds tend to lie comparatively close (although less close than when in the same shed), and consequently more picks of hair are required to fill out the fabric, and the average deviation from a straight line is not so pronounced.

My improved fabric also possesses the advantage that a great saving in warp is effected owing to the preferably wide spaces between adjacent sets of warp. It is impracticable to leave such spaces in horse-hair fabric woven in accordance with the standard weave. The omission of warp threads does not affect the stiffness of the fabric, as this function is dependent on the horse-hair alone.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

1. A horse hair fabric composed of warp of suitable material and weft composed of picks of horse hair, each pick of horse-hair extending across the warp in a wave line.

2. A horse hair fabric composed of warp of suitable material arranged in sets and a weft composed of picks of horse hair arranged in sets, each set of hair picks being interlaced with adjacent sets of warp so as to lie close together in one set and be substantially separated in the adjacent set.

3. A horse-hair fabric consisting of two series of sets of warp in which the sets of the two series are arranged alternately, each set consisting of a plurality of pairs of warp threads forming sheds, and horse hair weft threads arranged in sets, the wefts of each set lying within a single shed of one series of warp sets and a plurality of sheds of the other series of warp sets.

4. A horse hair fabric consisting of two series of sets of warp in which the sets of the two series are arranged alternately, each set consisting of a plurality of pairs of warp threads in which the warp threads of each pair are crossed laterally to form sheds, and horse hair weft threads arranged in sets, the wefts of each set lying within a single shed of one series of warp sets and a plurality of sheds of the other series of warp sets.

5. A horse-hair fabric consisting of two series of sets of warp in which the sets of the two series are arranged alternately, and two series of sets of horse-hair weft in which the sets of the two series are arranged alternately, the horse-hair in each set of the first series of weft being arranged in a single shed of the first series of warp, and in different sheds of the second series of warp, and the horse-hair in each set of the second series of weft being arranged in a single shed of the second series of warp and in different sheds of the first series of warp.

6. A horse-hair fabric consisting of two series of sets of warp in which the sets of the two series are arranged alternately, each set consisting of a plurality of pairs of warp threads, and two series of sets of horse hair weft in which the sets of the two series are arranged alternately, the horse-hair in each set

of the first series of weft being arranged in a single shed formed by the pairs of the first series of warp and in different sheds formed by the pairs of the second series of warp, and the horse hair in each set of the second series of weft being arranged in a single shed formed by the pairs of the second series of warp and in different sheds formed by the pairs of the first series of warp.

7. A horse-hair fabric consisting of two series of sets of warp in which the sets of the two series are arranged alternately, each set consisting of one or more pairs of warp threads, and two series of sets of horse-hair weft in which the sets of the two series are arranged alternately, the horse-hair in each set of the first series of weft being arranged in a single shed formed by the pairs of the first series of warp and in different sheds formed by the pairs of the second series of warp, and the horse hair in each set of the second series of weft being arranged in a single shed formed by the pairs of the second series of warp and in different sheds formed by the pairs of the first series of warp.

8. A horse hair fabric consisting of two series of sets of warp in which the sets of the two series are arranged alternately, each set consisting of one or more pairs of warp threads, and two series of sets of horse-hair weft in which the sets of the two series are arranged alternately, the horse-hair in each set of the first series of weft being arranged in a single shed formed by the pairs of the first series of warp and in different sheds formed by the pairs of the second series of warp, and the horse hair in each set of the second series of weft being arranged in a single shed formed by the pairs of the second series of warp and in different sheds formed by the pairs of the first series of warp, and additional horse hair weft threads arranged both within the said single sheds formed by the pairs of the first series of warp and the said single sheds formed by the pairs of the second series of warp.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 30th day of September, 1905.

GEORGE S. COX.

Witnesses:
FRANK S. BUSSER,
M. M. HAMILTON.