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A. C. HOUGH.

WEAVE FOR SHADES, &c.

APPLICATION FILED DEC. 16, 1902.

NO MODEL.

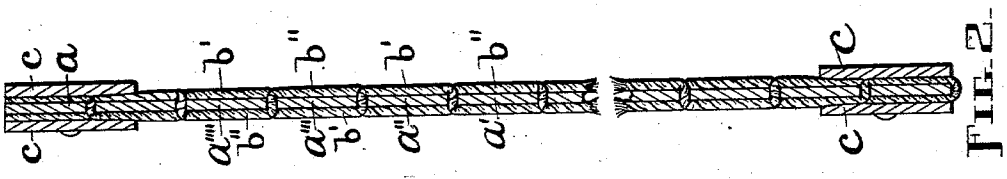


FIG. 2.

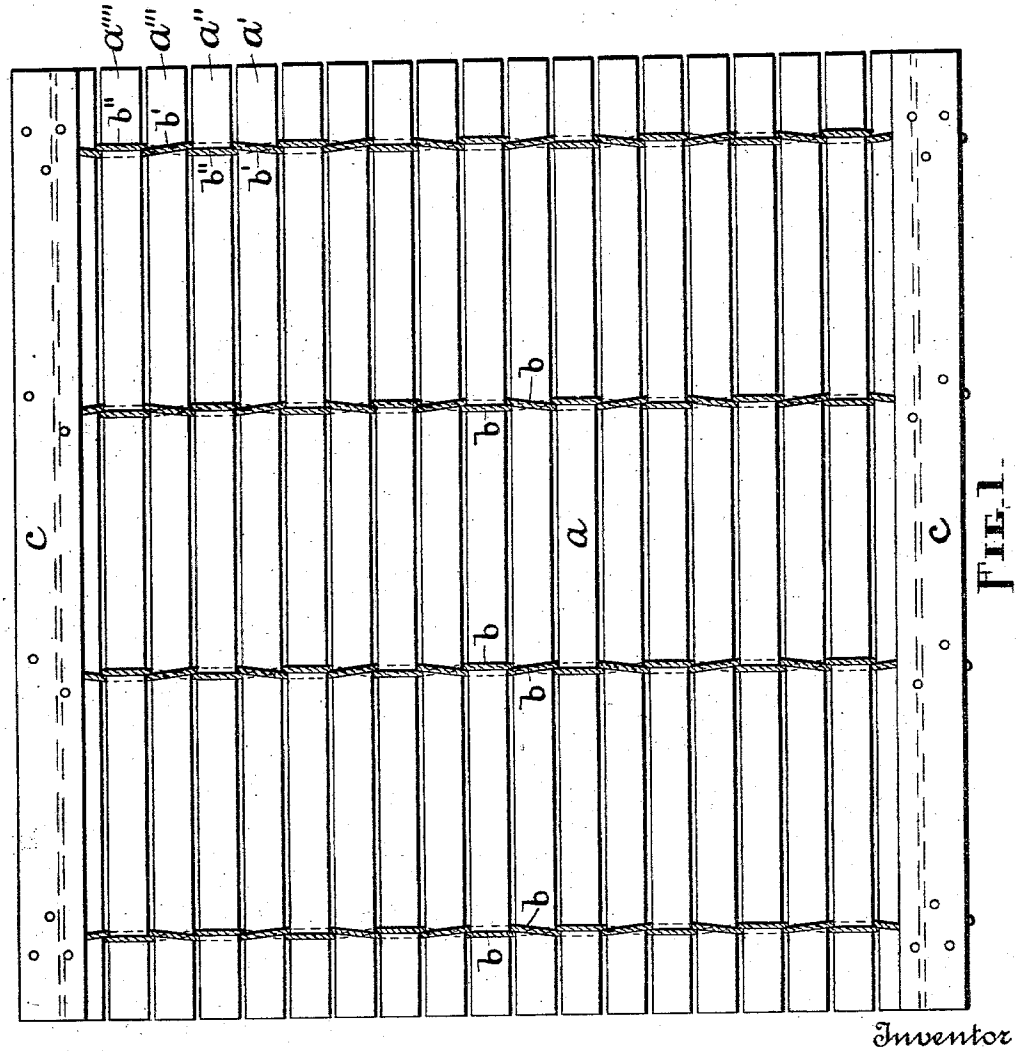


FIG. 1.

Witnesses

H. A. Leuttee.

Stephen D. Taft, Jr.

Inventor

Azel C. Hough

By Webster Taft & Tilly

Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

No. 748,734. Patented January 5, 1904.

UNITED STATES PATENT OFFICE.

AZEL C. HOUGH, OF JANESVILLE, WISCONSIN, ASSIGNOR TO HOUGH SHADE CORPORATION, OF JANESVILLE, WISCONSIN, A CORPORATION OF CONNECTICUT.

WEAVE FOR SHADES, &c.

SPECIFICATION forming part of Letters Patent No. 748,734, dated January 5, 1904.

Application filed December 16, 1902. Serial No. 135,386. (No model.)

To all whom it may concern:

Be it known that I, AZEL C. HOUGH, a citizen of the United States, residing at Janesville, in the county of Rock and State of Wisconsin, have invented a new and useful Weave for Shades and the Like, of which the following is a specification.

My invention relates to improvements in both the method of fabricating shades, curtains, screens, &c., and the weave itself in which weft splints, strips, or slats of wood or other material having some degree of stability are united by warp threads or strands, which are wrapped or twisted about the weft units to hold them together; and my invention resides in the peculiar manner in which the warp and weft are united, more particularly to the twisting of the warp-strands and the interlacing of the same with the weft units. The weft units may be of any suitable shape, but are generally flat when made of wood.

The object of my invention is to provide a method of weaving fabric of the kind noted in an efficient and practicable manner to bring about results not heretofore obtained.

A further object is to provide a strong and lasting shade, curtain, or screen in which displacement of or "end chase," as it is known, in the splints when the fabric is swayed violently by the wind is prevented and the durability and life of said fabric prolonged indefinitely; and to this end the warp is locked around or infolds in cross-laps in alternate directions every other weft unit, thereby closely uniting the warp-strands, so that they are practically inseparable, and not only holding the weft units in proper position, but so retaining them that endwise displacement common in other forms of weave is in this absolutely prevented. As a further safeguard against displacement I prefer to arrange adjacent cross-laps on the same weft unit in opposite directions—that is to say, if one extends obliquely upward to the right the next unit on the same side will extend obliquely upward to the left. The method and these features of fabrication, with means for fastening the fabric at the top and bottom, will be hereinafter more fully described, and particularly pointed out in the claims.

Heretofore woven fabric having a more or less stable weft has comprised no adequate means for providing the necessary strength and affording the requisite capacity for resisting torsional strain, so that when a shade made of such fabric is exposed to the wind it is liable to either become twisted out of shape or have some of its weft units forced out of place—in short, the warp separates and the whole shade becomes so loose that in time it is likely to fall to pieces. Difficulties of this kind have been overcome and are obviated by my improved method and weave.

I attain these objects in part by the means illustrated in the accompanying drawings, in which—

Figure 1 is a side view of an improved form of shade embodying my invention; and Fig. 2, an enlarged vertical section through the upper and lower portions of the shade, a part being broken out and omitted.

Similar letters refer to similar parts throughout the several views.

Proceeding first with a description of the method, it should be said that ordinarily a specially-constructed loom for carrying out the same in a practical manner may be desirable, not to say necessary, and such a loom is disclosed in my application for United States Letters Patent filed October 16, 1901, Serial No. 78,791, and divisional applications covering portions of the loom construction set forth in the first-mentioned application, filed April 25, 1902, Serial Nos. 104,671 and 104,672; but any other suitable loom mechanism may be employed. Said application, Serial No. 104,671, has since merged into Patent No. 740,362, dated September 29, 1903. In practice a splint is inserted in the shed of the loom and the weaving-heads revolved half-way around. Then another splint is inserted and the revolution of the weaving-heads continued in the same direction another half-turn, thus making a complete revolution in one direction. Next a third splint is inserted and the weaving-heads revolved half-way around in the opposite direction, and finally a fourth splint is inserted and the reverse or last-mentioned movement of the weaving-heads continued to complete the second full revolution, which is, however, in a reverse direction to that of

the first complete revolution. The weaving-heads have now described a full circle in both directions, with a cessation of motion intermediate of each, and are next reversed to begin again, as with the first splint, the several operations being repeated and continued indefinitely in the way described. It is to be understood that each weaving-head operates two weft-strands.

By twisting the warp-strands in the manner described in the preceding paragraph and rotating adjacent weaving-heads in the opposite directions at the same time—that is, while one is turning to the left the next is turning to the right, and vice versa—the results hereinafter described in detail are produced. This is a desirable feature of the method, though perhaps not an indispensable one.

The weave itself is described in detail as follows: The shade shown in the drawings consists generally of a plurality of light wooden splints or weft units *a*, connected by warp-strands *b* and having top and bottom retaining-strips *c*. To assist in describing the peculiarities of the weave in a clear and comprehensive manner, four of the splints *a* have been selected and designated as *a'*, *a''*, *a'''*, and *a''''*, and the warp-strands near the right-hand edge of the shade are designated as *b'* and *b''* in the drawings. The strand *b'* passes obliquely upward to the right over the splint *a'*, and the strand *b''* passes obliquely upward to the left over the back of said splint. Next the strand *b''* passes vertically upward over the front of the splint *a''* or at right angles to said splint, and the strand *b* passes in the same way over the back of this splint. Then the strand *b'* passes upward over the front of the splint *a'''* obliquely to the left, and the strand *b''* passes upward over the back of said splint obliquely to the right, and finally the strands *b''* and *b'* pass vertically upward on opposite sides of the splint *a''''* or at right angles thereto, the strand *b''* being on the front and the strand *b'* on the back. The same general arrangement of the stands is maintained throughout the fabric with the following exception: The parallel strands, which embrace the splints *a''* and *a''''* adjacent to or at the left of the strands just described change position, so as to bring the lap of the strand which passes over the front of the splint *a''* to the right instead of the left of the lap which passes over the back of said splint, and in the case of the splint *a''''* the front lap of the strand is at the left instead of the right of the back lap. Attention is also called to another change or exception, consisting in changing the oblique directions of the cross strands or laps which embrace the splint *a'* in the adjacent line of warp, the front lap here passing upward to the left and the rear lap to the right, just the reverse of corresponding laps of the strands *b'* and *b''*, and the same thing is true of the oblique strands or laps which embrace the splint *a'''*. The above applies, of course, to any given corresponding section of the fabric. The different positions and directions of the laps in adjacent lines of warp just noted are the result of simultaneously rotating adjacent weaving-heads in opposite direction.

From the foregoing it will be readily understood that each second splint *a* is locked by the strands *b* against endwise movement, and the intermediate splints are held no less securely. By interlacing and crossing the warp-strands and the weft-splints in the particular manner herein pointed out a close and even weave is obtained and a fabric produced which comprises all of the advantages that should be expected without any of the disadvantages so often found. The warp-strands cannot spread or separate, and different sections of the fabric are so held together by said strands as to react upon each other, as it were, when endwise pressure or torsional strain is brought to bear on one or more splints.

The shade is completed by taking a piece of fabric of the required size and fastening the retaining-strips *c* thereto at the top and bottom. Two of the strips *c* are placed each side of the fabric at the bottom and nailed together, and two more are employed in a similar manner at the top. It is to be understood, however, that any suitable means may be substituted for finishing the shade and fastening the ends of the warp-strands, the cut ends of said strands in the present instance being securely held between the upper splints *a* and the retaining-strips *c*.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The method of weaving shades and the like, consisting in turning the warp-strands about two weft units with a stop between each half of the revolution, and then in turning said warp-strands about two other weft units in the opposite direction, with a stop between each half of the revolution, and the insertion of one weft unit between the warp-strands at each stop.

2. The method of weaving, consisting in giving the warp-strands a half-turn about a weft unit, in giving said strands a second half-turn in the same direction about another adjacent weft unit, in giving the warp-strands a half-turn in the opposite direction about another adjacent weft unit, and in giving the warp-strands a second half-turn in the last direction about another adjacent weft unit.

3. The method of weaving, consisting in turning the warp-strands about two weft units with a stop between each half of the revolution and the insertion of a weft unit at each stop, in turning said warp-strands about two other weft units in the opposite direction with a stop between each half of the revolution and the insertion of a weft unit at each stop, and simultaneously turning other warp-strands about the same weft units in like manner but in opposite directions.

4. The improvement in the method of weaving awning-shades and the like, consisting in inserting a weft unit between two contiguous warp units, then giving the warp units a half-twist together causing them to cross to opposite sides of the weft unit, then inserting another weft unit, then giving to the warp units another half-twist together in the same direction as the first half-twist causing the warp units to again cross to opposite sides of the weft, then inserting another weft unit and giving the warp units another half-twist together but in a direction opposite to the direction of the first two half-twists, then inserting another weft unit and giving the warp units another half-twist together in the same direction as the last or third half-twist, and so continuing, two half-twists of the warp units together in one direction and then two half-twists in reverse direction, with a weft unit inserted between the warp units at each half-twist of the warp units.

5. The improvement in the method of weaving shades and the like, consisting of inserting a weft unit between pairs of warp-strands, twisting each pair of warp-strands together, then inserting another weft unit between the warp-strands and again twisting each pair of warp-strands together, the twist being in the same direction as the first twist, then inserting another weft unit and again twisting each pair of strands together but in reverse direction to the two first twists, then inserting another weft unit and again twisting each pair of strands together in the same direction as the last twist, and so continuing so that the adjacent weft units will be held beween warp-strands twisted in one direction and the next two adjacent weft units will be held between warp-strands twisted in a direction opposite to the twist of the strands holding the first two weft units.

6. A weave for shades and the like, comprising a plurality of weft units, and warp-strands, the latter passing at right angles over the front and back of alternate weft units and obliquely over the front and back of the intermediate weft units.

7. A weave comprising weft units and cross-laps of warp alternating with parallel laps of warp upon both sides of the woven structure.

8. A weave comprising weft units and cross-laps of warp alternating with parallel laps of warp, the oblique directions of said cross-laps on the same side of the same weft unit in adjacent lines of warp, being different—*i. e.*, one inclined to the right and the other to the left when seen from a given point with the weft held horizontally.

9. A weave for shades and the like, comprising a plurality of weft units held between pairs of warp units, the latter arranged to cross one weft unit in a line substantially at right angles to the said weft unit, then to cross the next adjacent weft unit obliquely, then to cross the next adjacent weft unit substantially at right angles, then to cross the next adjacent weft unit obliquely, said oblique direction alternately reversing—*i. e.*, first inclining toward the right then inclining toward the left.

10. A weave comprising a plurality of weft units and warp-strands passing in and out over the front and back of said weft units, alternate front and back laps of the strands being in substantially the same straight line, and the other laps extending obliquely in opposite directions over the front and back of each alternate weft unit.

11. A weave comprising weft units, a warp-strand extending at right angles over the front of one of said weft units, crossing obliquely the back of a second weft unit, extending at right angles over the front of a third weft unit, and crossing obliquely the back of a fourth weft unit in a different direction to the first oblique course, and a second warp-strand extending at right angles over the back of said first weft unit, crossing obliquely the front of said second weft unit in an opposite direction to that of the lap at the back, extending at right angles over the back of said third weft unit, and crossing obliquely the front of said fourth weft unit in an opposite direction to that of the lap at the back.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AZEL C. HOUGH.

Witnesses:
G. G. CHETTENDEN,
M. F. PANNOCK.