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C. LIPPER

1,735,467

METHOD OF MAKING HATS AND THE PRODUCT THEREOF

Filed June 6, 1929

2 Sheets-Sheet 1

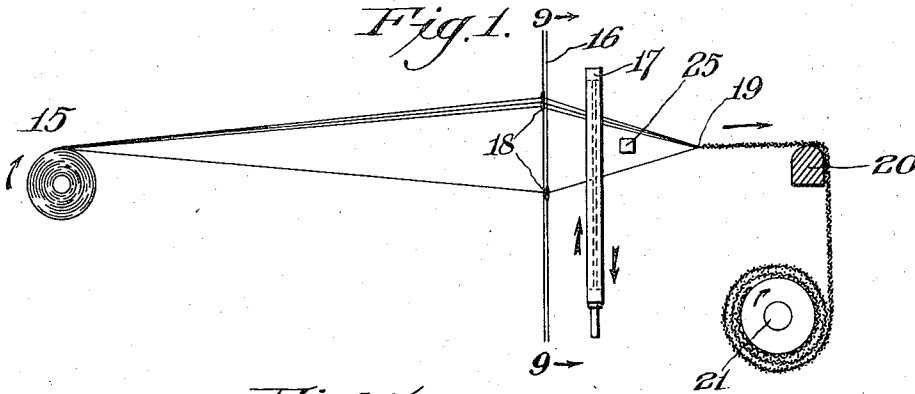
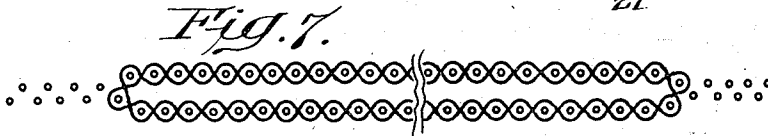
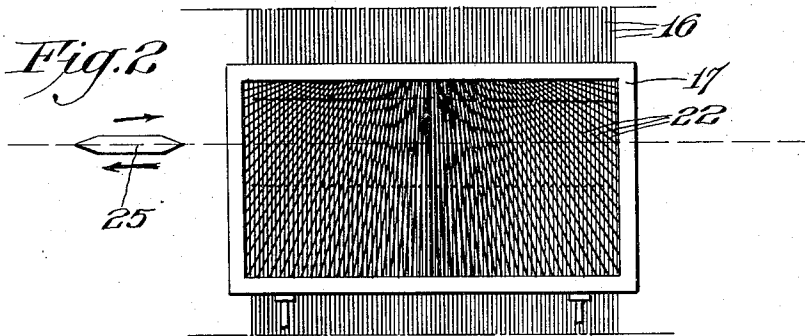
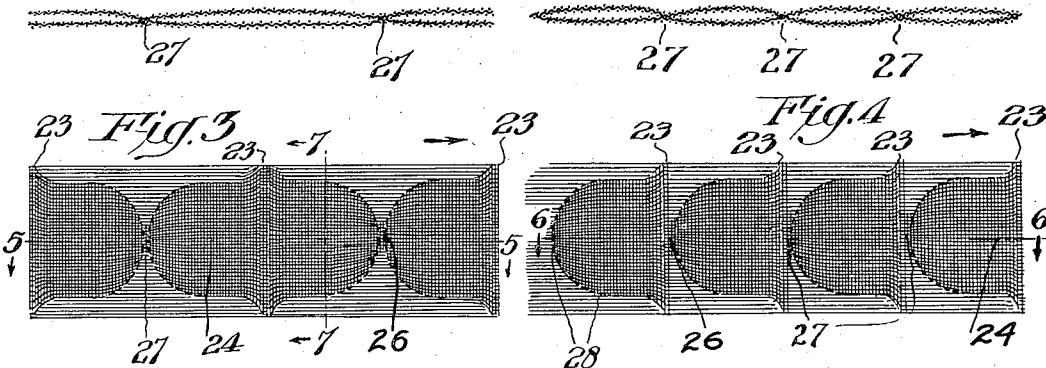
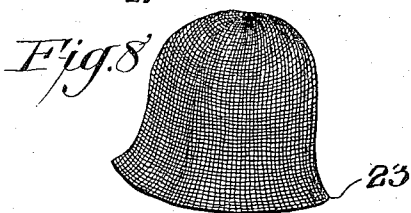


Fig. 5.

Fig. 6.



Inventor
Clarence Lipper,
By Leonard L. Kalish
Attorney.

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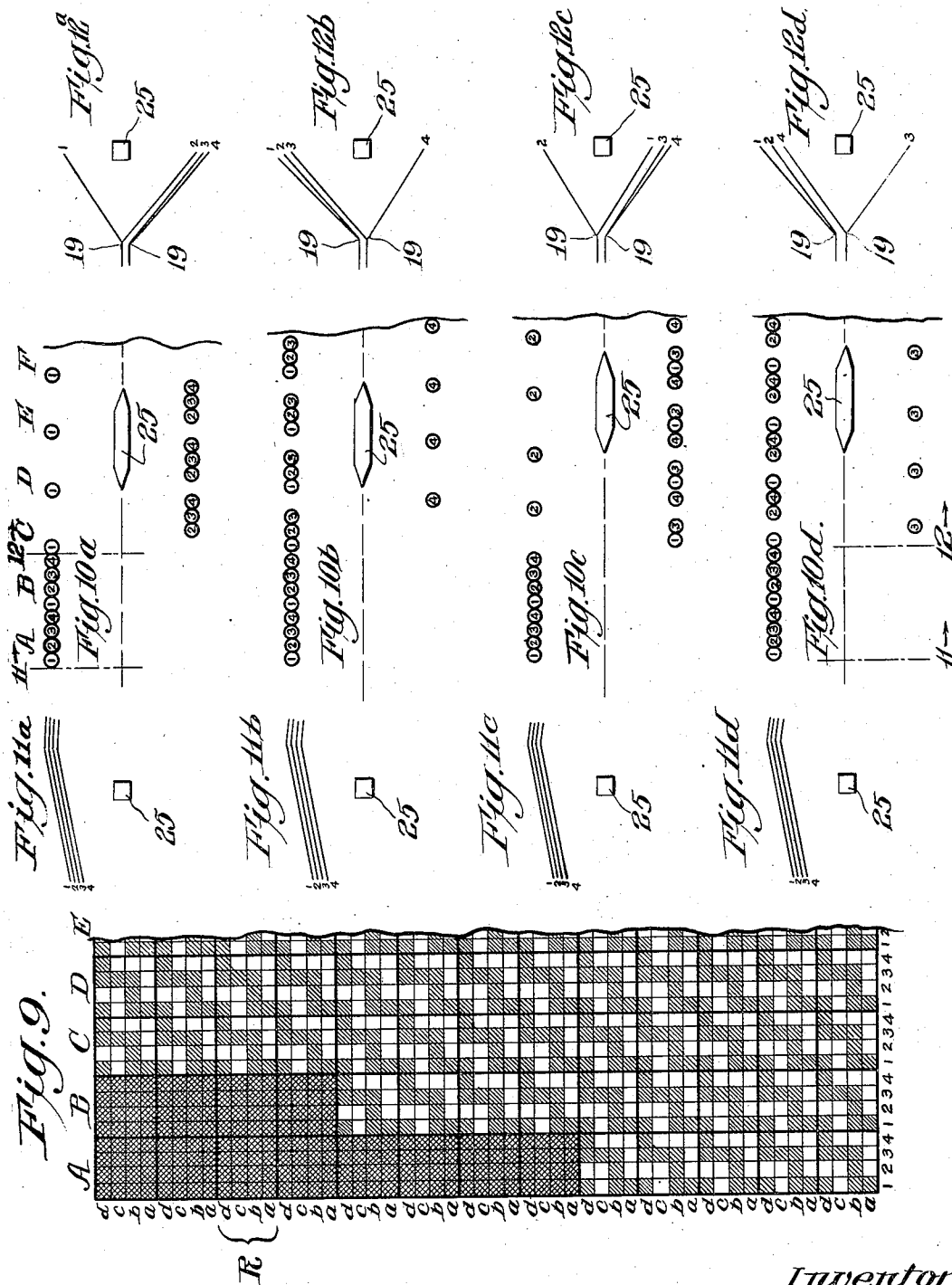
C. LIPPER

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METHOD OF MAKING HATS AND THE PRODUCT THEREOF

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2 Sheets-Sheet 2



Inventor
Clarence Lipper,
By *Leonard L. Kalish*
Attorney.

UNITED STATES PATENT OFFICE

CLARENCE LIPPER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE LIPPER MANUFACTURING CO., INC., A CORPORATION OF PENNSYLVANIA

METHOD OF MAKING HATS AND THE PRODUCT THEREOF

Application filed June 6, 1929. Serial No. 368,753.

My invention relates to a certain new and useful method of weaving hats, whereby a fully shaped hat may be produced on a loom, having the general appearance of a hand made hat, but being made in an automatic manner at a greatly reduced cost.

My invention consists in varying the width of a tubular weave by floating or lifting warp threads clear of the weave or shed over the narrowed portion, so as to produce a suitably shaped and fashioned hat.

My invention further consists in shaping and fashioning a tubular woven hat of the character stated by lifting or floating warp threads clear of the shed over the narrowed portions, and by crowding the warp threads in the shed to produce the desired crown shaped.

My invention further consists in tubularly weaving a hat by shaping and fashioning in a manner above described, and in closing the top of the hat by the union of the two opposed sides of the tubular weave into a single, common ply, or by any other like means which will cause the warp threads of the two opposed plies to cross each other. I may also close the top of the hat forms by subsequent means, not forming part of the loom, as by sewing the tops of the hats closed. In the preferred embodiment of my invention however, I close the tops of the hats with the weave.

My invention further consists in weaving a continuous chain of hats in a tubular manner, by weaving in a continuous fashion, alternate double ply portions in a tubular weave and plain, single ply portions, in a manner herein above described;—said double ply tubular portions forming the successive series of hats, each fashioned and shaped in a manner stated, and said single ply plain woven portions being merely connecting links between successive hats, serving also the purpose of closing the top of each hat.

For the purpose of illustrating my invention I have shown in the accompanying drawings one form thereof which is at present preferred by me, since the same has been found in practice to give satisfactory and

reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of the instrumentalities as herein shown and described.

In the accompanying drawings in which like reference characters indicate like parts, Figure 1 represents a diagrammatic view, in side elevation, of a loom adapted for weaving hats according to my novel method.

Figure 2 represents a diagrammatic view, in front elevation, showing a form of contracting reed, and the series of heddles immediately behind the reed, and the shuttle to the left of the reed frame, adapted to pass back and forth in front of said reed frame.

Figure 3 represents a top plan view (on a greatly reduced scale) of a chain of hats made according to my method.

Figure 4 represents a similar chain of hats (also on a greatly reduced scale) made according to my method, showing a somewhat different arrangement or succession of the individual hats.

Figure 5 represents a section on line 5—5 of Figure 3, illustrating generally the alternate arrangement of double ply tubular woven areas and single ply plain woven areas, in the particular arrangement shown in Figure 3.

Figure 6 represents a similar section on line 6—6 of Figure 4, showing the general arrangement of double ply tubular woven areas and single ply plain woven areas in the particular modification shown in Figure 4.

Figure 7 represents a section on line 7—7 of Figure 3.

Figure 8 represents a perspective view of a hat, forming the product of my novel method.

Figure 9 represents a fragmentary portion of a weave diagram, showing the manner in which the hat is woven and narrowed by the floating of the warp threads. This figure merely illustrates a portion along one edge of a hat (in the flat condition), the opposed edge being merely the reverse, since the hat is woven symmetrically with respect to its longitudinal median line.

Figures 10^a, 10^b, 10^c and 10^d, are successive diagrammatic views in elevation, taken generally on line 9—9 of Figure 1, illustrating the manner in which the warp threads are shed on the successive picks of each repeat;—
 5 the warp threads being illustrated or represented in end section by corresponding circles.

Figures 11^a, 11^b, 11^c and 11^d in turn represent successive side elevational views of the shedding of the warp threads on the successive picks of one repeat, such as the repeat A or B, or other repeats at points where the warps are floated entirely clear of the weave for narrowing purposes. These views are
 10 taken on line 11—11 of Figure 10.

Figures 12^a, 12^b, 12^c and 12^d illustrate a similar series of side elevational views of the shedding of the warp threads on the successive picks of a repeat, such as repeats C, D, E, etc., where the warp threads are interlaced with the weft. These views are taken
 20 on line 12—12 of Figure 10.

For purposes of illustration, Figures 9, 10 and 11 have been referred to the section of
 25 Figure 9, designated by the letter R.

In carrying out my novel method I may utilize any conventional loom equipped with any suitable individual warp control mechanism, such as a jacquard mechanism.
 30

The tubular formation of the weave may be effected in the conventional manner by shedding the warp threads alternately into two different sheds of two separated plies and interlacing the same weft alternately
 35 with said two sheds, on successive throws of the shuttle.

In Figure 1 of the drawings the numeral 15 represents the beam, from which the warp threads 1, 2, 3 and 4 are supplied across the
 40 width of the weave. The warp threads 1, 2, 3 and 4, repeated throughout the width of the weave, pass through suitable series of independent heddles 16, which are suitably
 45 weighted below and controlled from above by any suitable individual warp control mechanism, such as a jacquard mechanism of conventional construction, (not shown in the drawings). The warp threads then pass
 50 through a suitable adjustable reed frame 17, by means of which the warp threads may be spaced more closely or more distantly, between suitable limits, over certain portions of the weave.

From the eyes 18 of the heddles 16, the warp threads converge towards the fell 19 of the weave, from whence the finished woven product passes over a suitable breast beam 20, and then on to a suitable take-up roll 21.
 55

The reed 17 may be of any suitable adjustable type, such as the form illustrated in Figure 2, in which the wires or dents 22 of the reed are angularly disposed toward each other, so that by raising or lowering the reed,
 60 over the desired portion of the weave, the

warp threads may be crowded into the upper and more closely spaced parts of the reed or may be spread out in the lower or more distantly spaced part of the reed, as may be desirable.

Other forms of adjustable reeds or combs may be employed however.

The width of the weave is that of the widest portion, of the part of the finished hat having the greatest diameter, such as the brim 23, indicated in Figures 3, 4 and 8.
 75

The weave of the body of the hat may be of any suitable form and the particular weave illustrated, is a plain square weave.

The shedding of the warp threads into the tubular weave may be effected in a conventional manner, by interlacing the weft alternately with the warp threads of the upper ply and with the warp threads of the lower ply respectively.
 80

The weave, including the narrowing of the weave by the floating of the warp threads, is illustrated by the weave diagram, in Figure 9, while Figures 10, 11 and 12 are diagrammatic front and side elevational views respectively, of the shedding of the warp threads, both for the production of the weave as well as for the narrowing thereof, according to my novel method.
 85

Since the weave is symmetrical about its longitudinal median line 24 (Figures 3 and 4), only one-half the number of jacquard lifts or hooks are necessary, since the pair of corresponding heddles on the two opposed sides of the weave may be attached to one
 90 jacquard hook or lift.

In the weave diagram of Figure 9 the shaded areas indicate warps up, while the unshaded areas indicate warps down. The areas shaded by one-way cross-hatching indicate warps in the weave, while areas shaded by double cross-hatching indicate warps out of the weave, that is, over narrowed portions where said warps are floated.
 95

While in the particular embodiment of my invention shown in the drawings, the weave is a plain weave using four ends and four picks, this may be varied if a different type of weave is desired in the finished hat. Regardless of the particular weave employed in the finished hat however, the salient characteristic of my novel method remains the same, to wit, that warp threads along either edge of the weave are raised out of the weave or floated clear of the shed where it is desired to narrow the weave of the finished product. Thus, regardless of the character of each repeat in the weave, designated generally by the reference characters A, B, C, D, E, etc., the weave diagram would show areas
 100 along the edges of the weave over which the warp threads would be entirely out of action, which in the weave diagram of Figure 9 has been indicated arbitrarily by the double cross-hatched area.
 105
 110
 115
 120
 125
 130

The illustration in Figures 10^a, 10^b, 10^c and 10^d shows a front vertical section of the shed on each of the four picks, illustrating the active as well as the inactive warp threads.

5 The illustrations of Figures 10, 11 and 12 are taken generally at the point of reference R on Figure 9. Thus, at this reference point the sections A and B are narrowed sections, where all the warp threads are floated clear of the shed, while the sections or repeats C, D, E, etc., are woven sections in which the warp threads are active.

10 The reference numerals 1, 2, 3 and 4 designate the four ends of each repeat (A, B, C, D, etc.), while the reference characters *a*, *b*, *c* and *d* represent the four successive picks in each repeat. The circles in Figure 10 represent warp ends viewed endwise).

15 The shuttle is indicated diagrammatically in side elevation and end view in Figure 10, and in Figures 11 and 12, respectively, and is designated by the numeral 25.

20 The hats may be woven according to my novel method in any one of several successive arrangements, such as illustrated in Figures 3 and 4. Thus, in Figure 3 I have illustrated a method by which alternately the brims and the crowns of adjacent hats are in abutting relation, while in Figure 4 another embodiment of my invention is illustrated in which the top and brim of adjacent hats are in juxtaposition. In either embodiment of my invention the narrowest portion of the woven part 26 is formed into a single ply weave, which thereby completely encloses the top of the crown of the hat, or the top of the crown of the hat may be closed by merely reversing the two sheds corresponding to the two plies of the weave, and thus reversing the relative positions of the two plies without weaving them into a single ply but merely causing them to cross each other at the top of the crown so as to close the same.

25 The chain of hats thus produced on the loom is then severed along lines 27, and the loose or floating warp ends may then be trimmed to within a short distance of the body of the hat, and the hat is thereupon turned inside out so as to dispose all the free ends of warps as well as the single ply terminal portion 26 within the hat; thereby leaving a smooth exterior surface.

30 In order to obtain the desired fullness of the crown, the shaping or fashioning action of the jacquard (in floating outside warps) is augmented by the crowding of the warps (within the weave) over suitable portions of the hat, such as that designated by the numeral 28.

35 By this combination of the two narrowing shaping or fashioning actions, a hat may be produced having all the characteristic appearance of a hand-woven hat and capable of being produced to any desired shape or contour.

The vertical movement of the reed frame 17 may be effected by any suitable pattern control mechanism, such as suitable pattern control cams or the like. Likewise in place of the particular form of adjustable or contracting reed 17, other forms of adjustable or contracting reeds or combs may be employed, the gauge of which may be varied by any suitable pattern control mechanism in timed relation to the warp control mechanism by which the outer warp threads are floated clear of the shed or weave.

It is also understood that the warp threads may be floated above or below the shed for the purpose of narrowing the weave.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiments to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

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

1. The method of making hats or the like, which consists in weaving a generally tubular body with varying number of warp threads interlaced with the weft, and crowding the interlaced warp threads over suitable area.

2. The method of weaving hats or the like, which consists in alternately interlacing a weft thread with warp threads in two separate plies to produce a tubular body, and a single ply to close one end of said tubular body varying the number of warp threads interlaced, and crowding the warp threads over desired areas of the tubular body.

3. The method of making hats or the like, which consists in weaving alternate tubular and non-tubular portions in succession, varying the number of warp threads interlaced by the weft over suitable areas of the tubular portions, and crowding the interlaced warp threads of said tubular portions over suitable areas.

4. A flat tubular woven hat body having a weft extending around the same in successive courses, interlaced with a varying number of warp threads from bottom to top, and having the warp threads thereof crowded over portions of said hat body.

5. A hat comprising a flat tubular woven body, including a weft thread extending around the body, and warp threads interlaced therewith; varying in number from bottom to top, and being crowded over portions of the hat body to give fullness to the shape of the hat, and a single ply woven portion at the top of the hat, forming a closure therefor.

6. The method of making hat bodies which consists in weaving a generally tubular body

of varying diameter by varying the number of warp threads interlaced with the weft and crowding the weft threads over a portion of the weave and closing the top of the hat by crossing the warp threads.

7. The method of weaving hat bodies which consists in alternately interlacing wefts with warp threads in two separate plies to produce a tubular body, varying the diameter of said tubular body by varying the number of warp threads interlaced, imparting fullness to the shape of the hat by more closely spacing the warp threads over some portion of the body of the hat, and closing the top of the hat by crossing the warp threads of the two plies.

8. The method of weaving hat bodies which consists in tubular-weaving a series of warps and floating varying number of warp threads clear of the shed over some portion of the weave to vary the diameter thereof and spacing the warp threads in the weave relatively differently over various portions of the hat body to impart the desired fullness thereto.

9. The method of weaving hat bodies which consists in tubular-weaving a series of warps and floating varying number of warp threads clear of the shed over some portion of the weave to vary the diameter thereof and spacing the warp threads in the weave relatively differently over various portions of the hat body to impart the desired fullness thereto, and closing the weave at the top of the hat body.

10. A one-piece hat crown having a tubular woven body including a weft extending around the same in successive courses and interlaced with a varying number of warp threads and having the warp threads thereof crowded over portions of the body; the top of the hat crown being closed by the crossing of juxtaposed warp threads on opposed sides of the body.

11. The method of making hats or the like, which consists in weaving a generally tubular body with a varying number of warp threads interlaced with the weft, thereby to vary the diameter of the finished product, and crowding the interlaced warp threads over suitable area to impart the desired fullness to the product.

12. The method of making hats or the like, which consists in weaving a generally tubular body with a varying number of warp threads interlaced with the weft, thereby to vary the diameter of the finished product, and crowding the interlaced warp threads over suitable area to impart the desired fullness to the product, and closing the top of the hat by the weave.

13. The method of weaving a chain of hat bodies, which consists in tubular-weaving the warp, by interlacing a common weft thread alternately with two different groups of alternately-shed warp threads, gradually varying the number of warp threads interlaced

with the weft in predetermined repeats corresponding to successive hats, by floating varying number of warp threads clear of the sheds, thereby successively varying the diameter of the tubular weave to produce the successive hat crowns, causing the warp threads of the two different sheds to cross each other at intervals corresponding to the lengths of the hats, thereby to close the tops of the hat crowns, and crowding the interlaced warp threads over suitable areas of each hat-repeat thereby to impart the desired fullness to the hats.

14. The method of weaving a chain of hat bodies, which consists in tubular-weaving the warp, by interlacing a common weft thread alternately with two different groups of alternately-shed warp threads, gradually varying the number of warp threads interlaced with the weft in predetermined repeats corresponding to successive hats, by floating varying number of warp threads clear of the sheds, thereby successively varying the diameter of the tubular weave to produce the successive hat crowns, and crowding the interlaced warp threads over suitable areas of each hat-repeat thereby to impart the desired fullness to the hats.

In witness whereof I have hereunto set my hand this 24th day of May, 1929.

CLARENCE LIPPER.