This invention relates to the manufacture of a hat having a brim that can be flexed upwardly at the front for packing and downwardly at the front to be worn.

It is common for hats, particularly men's hats, to be provided with brims which are turned up all around the hat for packing but which are turned down at the front when worn. Fur felt hats for men are commonly of this character. In the manufacture of fur felt hats one of the last operations is normally the flanging or final shaping of the brim, and the conventional way of flanging the brim is to press it between heated dies which leave the brim in a turned up condition all around the hat. The hat is packed in this condition, the front portion of the brim normally being turned down at the time of sale of the hat by the retailer. Some care is required to ensure that the front portion of the brim is turned down symmetrically with respect to the crown of the hat, and after the hat has been used for some time, in particular if it has become wet, the symmetry of the turned down portion of the brim is often difficult to maintain.

It is an object of this invention to provide means for ensuring that a hat brim will, when its front portion is turned down and up, always flex about the desired points.

FIGURE 1 is a perspective view showing two flanging dies in separated position, and showing between the dies a hat of which the brim is to be finally shaped or flanged when the dies are pressed together;

FIGURE 2 is a perspective view showing the two dies pressed together with the hat brim between them;

FIGURE 3 is a perspective view of the finished hat after the flanging operation has been performed by the dies;

FIGURE 4 is a perspective view of a hat before the flanging operation;

FIGURE 5 is a perspective view of a finished hat after the flanging operation with the front portion of the brim flexed away from the crown of the hat (i.e., with the front portion of the brim turned down when the hat is viewed right side up);

FIGURE 6 is a perspective view of a finished hat after the flanging operation with the front portion of the brim flexed toward the crown of the hat (i.e., with the front portion of the brim turned up when the hat is viewed right side up); and

FIGURES 7, 8, and 9 are sectional views taken along the lines 7--7, 8--8, and 9--9 respectively of FIGURES 4, 5, and 6.

In FIGURE 1 a hat 10 of the fur felt type is shown inverted between a lower die 11 and an upper die 12. The hat 10 is a finished hat except for the flanging operation. Thus the hat has the usual hat band 13, sweat band 15 and lining 17. The brim 19 is of uniform thickness and is integral with the crown 21, i.e., the brim 19 and the crown 21 are formed (as is usual) of a single piece of felted material. The junction of the brim and crown is along an edge 22 which provides a stiff inner margin for the brim. At its outer edge 23 the brim has a welt 24 (not seen in FIGURE 1 but shown in FIGURE 3). Though the hat 10 is shown with a welt 24, the method of the invention is equally applicable to a hat with a bonded edge, a bound edge or a raw edge.

The brim of the hat 10, in the inverted condition shown in FIGURE 1, curves outwardly and downwardly from the inner edge 22 to the welt 24, so that the brim 19 exhibits a convex surface when viewed from the bottom of the hat, and a concave surface when viewed from the crown 21 of the hat. In the inverted position of FIGURE 1, the welt 24 is lower than the inner edge 22 of the brim 19.

In its unflanged state the brim in reality has an unpressed appearance which the drawing does not convey.

The lower die 11 has a central opening 25 for the crown 21 of the hat. Around the opening 25 is a smooth annular upper surface 27 which is upwardly convex in transverse cross-section at the rear portion 29 of the die 11, and upwardly concave in transverse cross-section at the front portion 31 of the die 11. And immediately above and below the opening 25 and 11 there is a smooth transition 33 in the annular surface 27 from the upwardly convex to the upwardly concave cross-section. The curvature of the annular surface 27 is the same as the curvature intended to be given to the hat brim by the flanging operation.

The upper die 12 has a smooth annular lower surface 35 that is complementary to the annular upper surface 27 of the lower die 11, and thus is downwardly convex in transverse cross-section at the rear portion 36 of the die 12, and downwardly convex in transverse cross-section at the front portion 37 of the die 12. At each side of the die 12 there is a smooth transition 39 from the downwardly concave to the downwardly convex cross-section. At the rear portion 36 of the annular surface 35 of the die 12 the inner edge 35c of the surface 35 is higher than the outer edge 35b of the surface (just as in the brim of the unflanged hat the edge 22 is higher than the edge 23), whereas at the front portion 37 of the annular surface 35 the inner edge 35c is lower than the outer edge 35b.

At the transitions 39 of the lower surface of the upper die 12 are two smooth, identical dimples 41, and at the transitions 33 of the upper surface of the lower die 11 are two smooth protuberances 43 complementary to the dimples 41. The heights of the protuberances 43 are approximately one quarter their base diameters, and their base diameters are approximately half the width of the annular surface 27 in the region of the protuberances 43.

The upper die 12 is electrically heated by an element 45, and is supported by rods 47. The lower die 11 is supported on a base (not shown) from which it is heated. Aligning pins 49 on ears 51 of the lower die 11 register with apertures 53 in ears 55 of the upper die 12 to hold the dies 11 and 12 in alignment during the flanging operation, which is illustrated in FIG. 2. In the flanging operation the hat 10, with its brim damp, is placed upside-down upon the lower die 11, and the electrically heated upper die 12 descends and closes and presses the brim 19 of the hat 10 between the dies. The two complementary surfaces 27 and 35 of the dies 11 and 12 are determinative of the shape of the finished hat brim 19. The dies press the brim 19 so that when it is removed from the dies, as shown in FIGURE 5, it is flexed downwardly at the front, with the annular surfaces 27 and 41 and protuberances 43 in the annular surfaces of the dies form permanent flexion locating means such as downward dimples 59 in the hat brim 19; said dimples being downwardly disposed when the hat 10 is viewed in an upright position.

The front portion 57 of the hat brim 19 can be flexed upwardly (towards the crown 21) for packing in a standard container, and it can be flexed downwardly again.
The points of flexure are fixed by the permanent dimples 59 in the brim at the sides of the hat. The dimples 59 are sufficiently shallow to merge unobtrusively with the brim 19 when the front portion of the brim 19 is in the concave downwardly condition of FIGURE 3. The inner and outer edges of the brim are relatively stiff, and consequently the edges of the brim are not affected by the dimples 59 and the latter are therefore, unobtrusive to the eye. However, when the front portion of the brim 19 is turned up (towards the crown) the dimples 59 cause a slight distortion in the brim 19, as will presently be explained with reference to FIGURES 6 and 9. The dimples 59 are arranged symmetrically of the hat so that when the front portion of the brim is flexed up and down it must do so symmetrically, the dimples 59 constituting the rearward limits of the portion which flexes. The dimples 59 thus fix the boundaries between the front portion 57 and the rear portion 61 of the brim.

FIGURES 4, 5 and 6 may help to illustrate the characteristics of a hat made according to the invention. FIGURE 4 shows the hat before the flanging operation, and FIGURE 7 indicates the approximate shape of the brim in the unflanged state.

FIGURE 5 shows the hat after the flanging operation, with the front portion 57 of the brim 19 flexed away from the crown 21. FIGURE 8 shows, in section, one of the dimples 59. Although the dimple 59 is very apparent in FIGURE 8, a person looking at the hat does not of course see it in cross-section. The dimple merges with the brim at the periphery of the dimple and thus does not create any apparent distortion of the brim when in the condition of FIGURE 5.

FIGURE 6 shows the hat of FIGURE 5 with the front portion 57 of the brim flexed toward the crown 21. This is the condition of the hat for packing. As can be seen in FIGURE 9, the dimples 59 are not as pronounced when the front portion 57 of the brim is flexed in this manner, but ahead of the dimples the brim is somewhat distorted by the dimples, and the total effect of the dimples plus this distortion is a brim that appears to be distorted.

By comparison, a hat flanged in the conventional way has, after flanging, an appearance similar to FIGURE 4 since conventional flanging does press the brim in its turned up (towards the crown) condition all around the hat. When the front portion of a conventionally flanged hat is turned down, the brim normally becomes dimpled at the sides of the hat but the dimples are only temporary and the positions are determined by the points about which the user chooses to flex the brim, whereas according to the present invention dimples are permanently formed and determine the points about which the brim flexes. Also, with a conventional hat, when the front portion of the brim is turned up the temporary dimple disappears.

While the invention has been described with reference to a fur felt hat, it is also applicable to hats of straw, paper and other flexible materials. What I claim as my invention is:

1. A hat having an annular, flexible brim, comprising a front half, a rear half and sides, that can be flexed upwardly at the front for packing and downwardly at the front for wearing, in which a pair of flexion locating means, each comprising at least one dimple molded into the said brim, are located at both sides of the front half of the brim in substantially symmetrical positions.

2. A hat as claimed in claim 1, wherein the dimples merge with the brim around the peripheries of the dimples.

3. The hat as defined in claim 1 in which each of the said flexion locating means comprises only one dimple.

4. The hat as defined in claim 3 in which the said dimple of each flexion locating means is positioned laterally between the inner and outer edges formed by the annular brim.

5. A fur felt hat having an integral crown and annular, flexible brim comprising a front half, a rear half and sides, of substantially uniform thickness, the rear portion of the brim being concave upwardly and the front portion of the brim being capable of flexing between a concave downwardly condition and a concave upwardly condition in which a pair of flexion locating means, each comprising at least one downwardly extending dimple molded into the said brim, are located at both sides of the front half of the brim in substantially symmetrical positions, the dimples being sufficiently shallow to merge unobtrusively with the brim when the front portion is in its concave downwardly condition but distorting the brim with the front portion in its concave upwardly condition.

6. The hat as defined in claim 5 in which each of the said flexion locating means comprises only one dimple.

7. The hat as defined in claim 6 in which the said dimple of each flexion locating means is positioned laterally between the inner and outer edges formed by the annular brim.

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