April 14, 1925. 1,533,351

H. A. GENEST

PROCESS OF SHRINKING, ETC., FELT ARTICLES

Filed June 9, 1923 3 Sheets-Sheet 1

Fig. 1

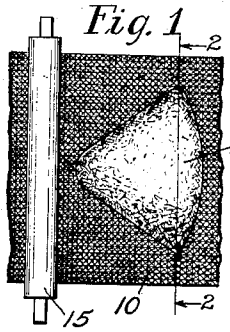


Fig. 2



Fig. 3

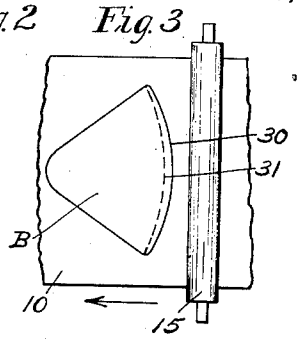


Fig. 4

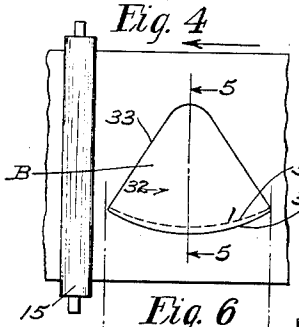


Fig. 5



Fig. 6

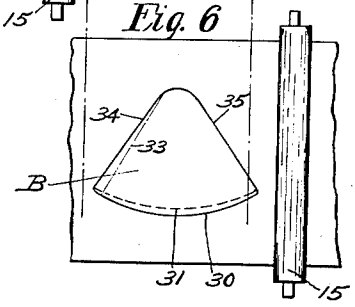


Fig. 7

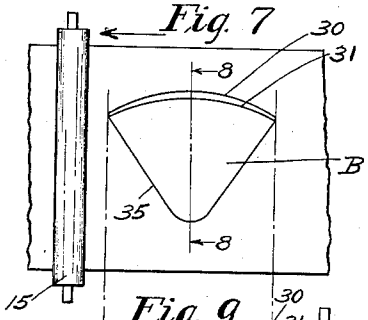


Fig. 8



Fig. 9

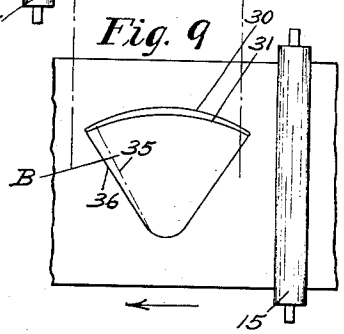


Fig. 10

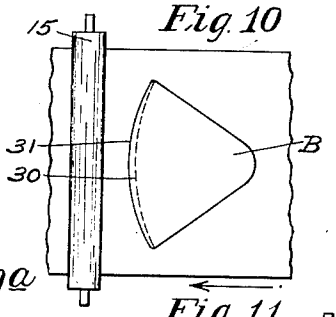


Fig. 10a

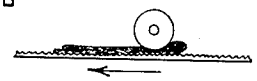


Fig. 11

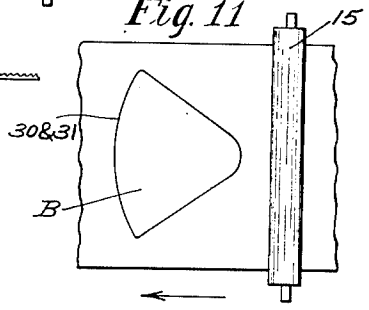


Fig. 12

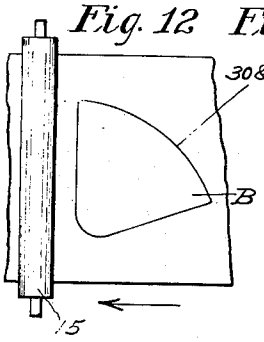
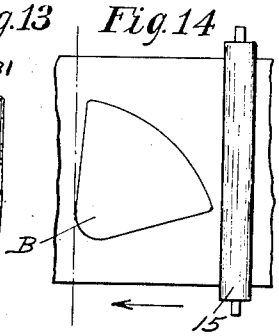


Fig. 13



Fig. 14



Inventor:

Homer A. Genest

by A. Clay Lindsey.

Attorney

April 14, 1925.

1,533,351

H. A. GENEST

PROCESS OF SHRINKING, ETC., FELT ARTICLES

Filed June 9, 1923

3 Sheets-Sheet 2

Fig. 15

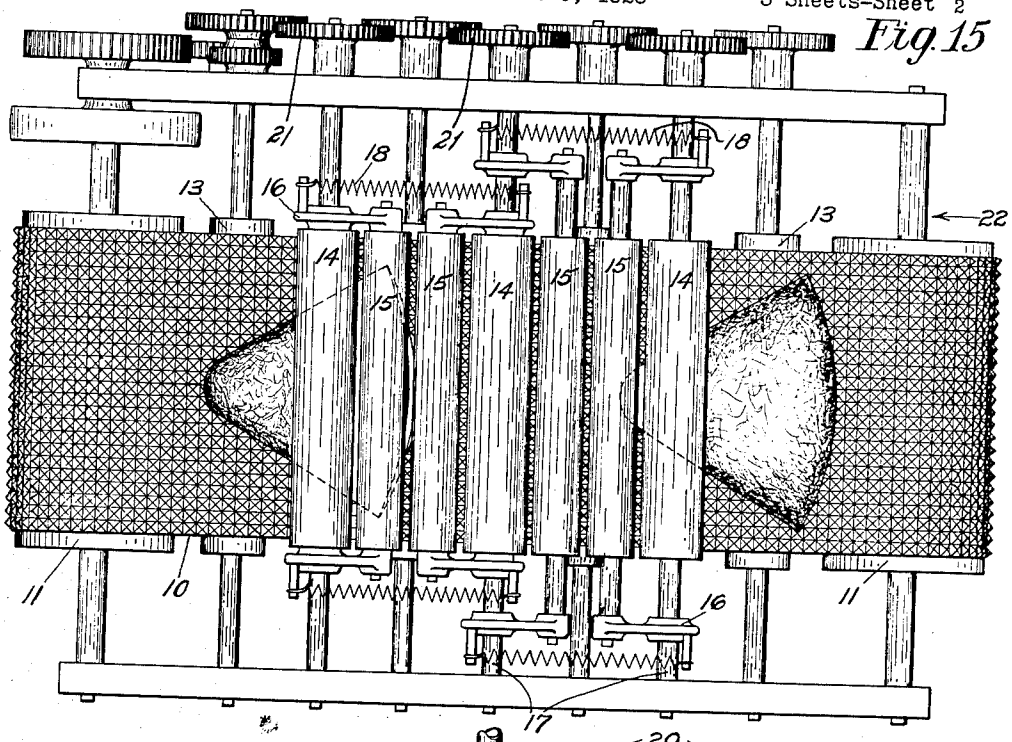
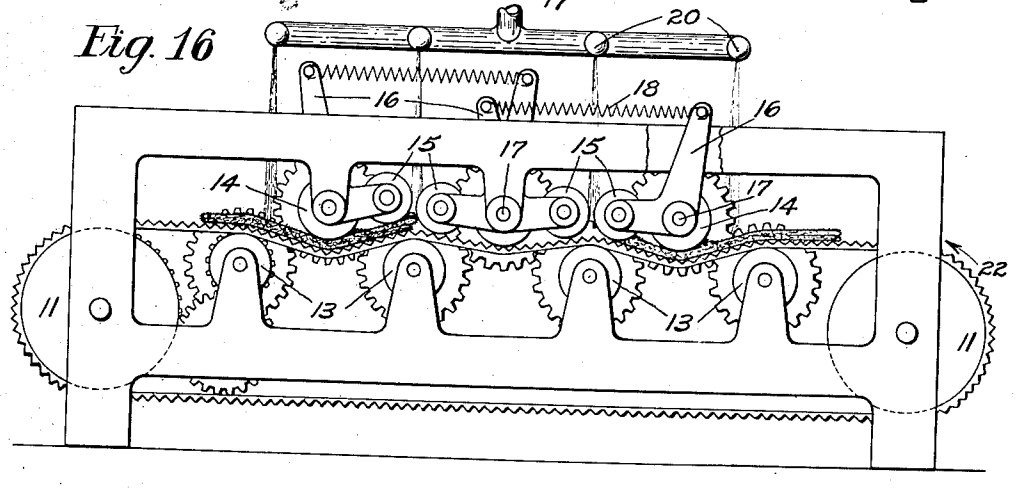


Fig. 16



Inventor:

Homer A. Genest

by Clay Lindsey

Attorney

April 14, 1925.

1,533,351

H. A. GENEST

PROCESS OF SHRINKING, ETC., FELT ARTICLES

Filed June 9, 1923 3 Sheets-Sheet 3

Fig. 17

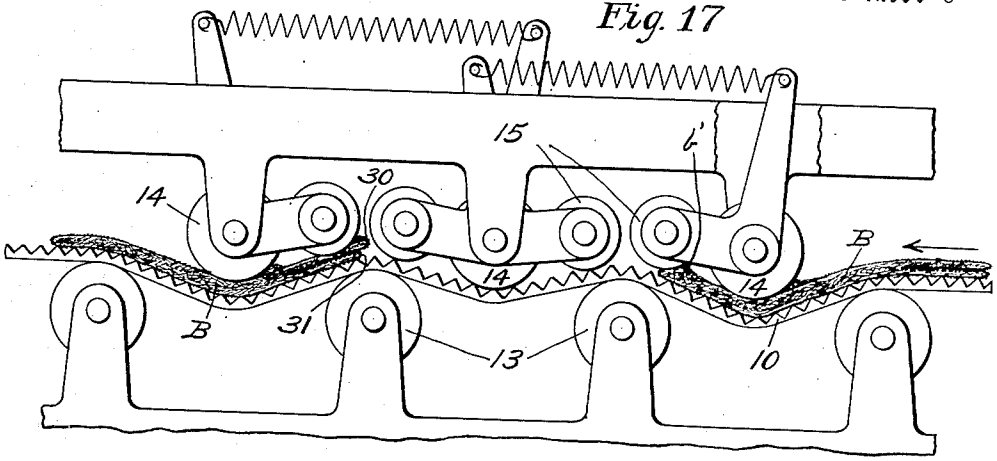


Fig. 18

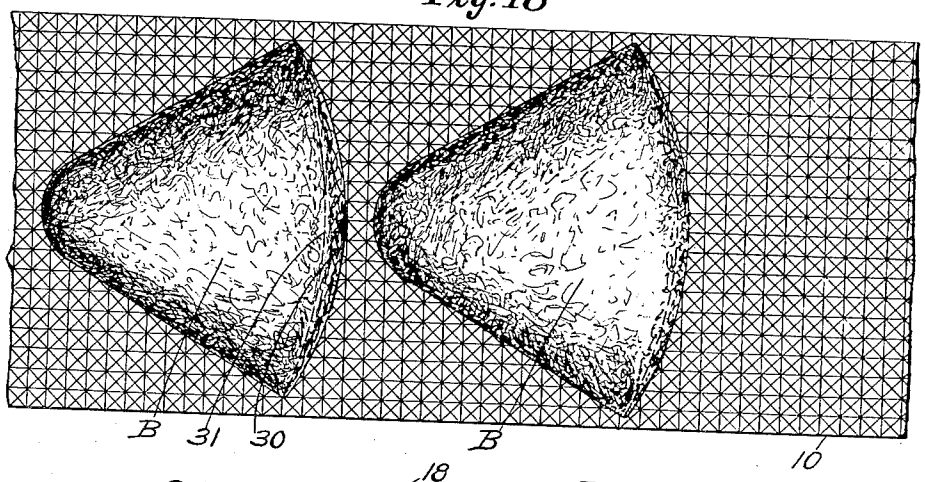
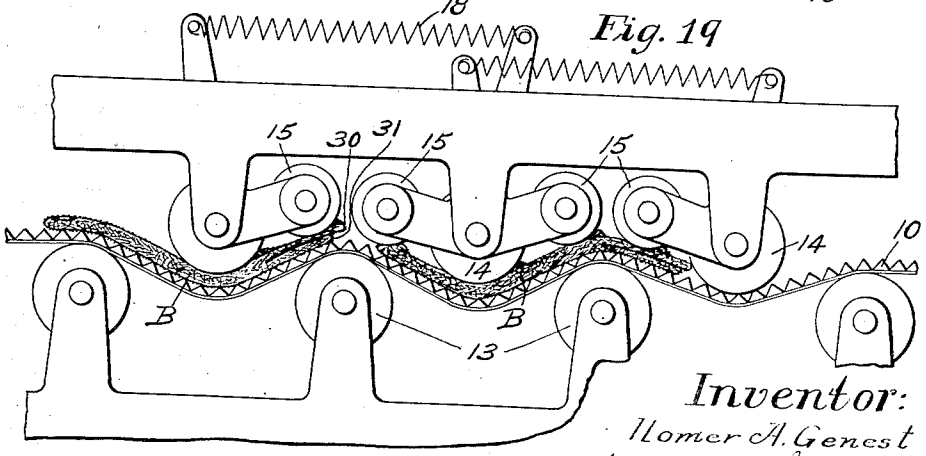


Fig. 19



Inventor:
Homer A. Genest
by T. Clay Lindsey.
Attorney

Patented Apr. 14, 1925.

1,533,351

UNITED STATES PATENT OFFICE.

HOMER A. GENEST, OF HARTFORD, CONNECTICUT, ASSIGNOR TO UNITED STATES HAT MACHINERY CORPORATION, OF NEW YORK, N. Y., A CORPORATION OF VIRGINIA.

PROCESS OF SHRINKING, ETC., FELT ARTICLES.

Application filed June 9, 1923. Serial No. 644,361.

To all whom it may concern:

Be it known that I, HOMER A. GENEST, a citizen of the United States, and a resident of Hartford, county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Processes of Shrinking, Etc., Felt Articles, of which the following is a specification.

This invention relates to the shrinking of felt articles, for example bats from which fur or felt hats are made. According to the usual method heretofore practiced, after a bat has been blown upon the forming cone, it is dipped into scalding water and then given a preliminary manipulation so as to harden it sufficiently to permit it to be handled with safety. Then a number of bats, usually six, are placed one upon the other and rolled up in a blanket, and the rolled blanket and bats are then manipulated so as to shrink and felt the fur, and during this manipulation, the blanket and the bats contained therein are maintained in an extremely wet or saturated condition with hot water. The manipulation is carried out by rolling the blanket and bats back and forth by hand at varying pressures. This manual manipulation of the bats requires the utmost skill by very experienced operators. It is necessary to repeatedly roll up the bats in the blanket, manipulate the assembly, then unroll the blanket, change the relative positions of the bats one upon the other, and turn the bats angularly in order to insure that they are uniformly shrunk in all directions. After each manipulation of the bats, it is necessary for the operator to examine them, and, if the shrinking has been uneven, to slap or stretch the bats so as to bring them back to the proper shape, and this slapping or stretching operation is oftentimes injurious to the bats in that it breaks the barbs of the fibres and makes the bats uneven in thickness. Furthermore, it is necessary for the operator, after each manipulating step, to "croze" the bats, that is to shift one ply relatively to the other one so as to change the lines of fold for, otherwise, the felt, along the lines of fold, would be shrunk and felted to too great an extent, "rods" would occur, and, in the finished hat, shiny streaks, where these folds occurred, would appear. In "crozing" these bats manually, it is necessary for the operator to put his hands on the inside of the bats and pull, slap or jerk one ply relative to the other, and this operation often results in injury to the bats. Furthermore, in this manual manipulation, it is necessary for the operator to keep a careful lookout for any loose felt on the surface of the bats and wipe or flood off this loose felt for otherwise, during the rolling and kneading operation, it will form "dags" which, if later removed, will leave undesirable spots in the bats and the hats produced therefrom. It is also very necessary for the operator to counteract the tendency for the tip of the hat to "point", that is to lose its rounded contour and come to a sharp angle. No matter how careful and skillful the operator may be, the bats which he produces are not going to be uniform, making it necessary to grade the bats and, in many instances, to scrap some of them. From the foregoing remarks, it will be seen that this old practice of felting is a very tedious and relatively slow one and, owing to the relatively slow speed with which the manipulation of the bats must be carried out, the requirement that skilled and experienced operators be employed, and the nonuniformity of the bats and the necessity of scrapping some of them, the felting of the bats by this old pra tice is expensive. Furthermore, this old practice is injurious to the health of the operator.

The aim of the present invention is to provide an improved process or method of treating bats for the purpose of shrinking and felting them wherein the above and other objections incident to the old practice are eliminated. By proceeding in accordance with my improved method, bats may be very speedily and uniformly felted and shrunk without employing highly skilled labor and without adversely affecting the health of the laborer. I have found that by following my method, the bats are automatically "crozed", "dags" and "rods" are

eliminated, and the desired shape of the bat is uniformly obtained; a cheaper fur may be used and as good or better hat produced than when a bat of better fur is manually shrunk; and the number of bats which may be shrunk and felted by an operator is increased many times, all of which means that I provide a method which is very economical and which produces superior and uniform articles.

In my accompanying application, filed under even date herewith and bearing Serial No. 644,360, I have described, illustrated and claimed a bat shrinking apparatus which is peculiarly adapted for use in carrying out the herein described method. While the method herein described and claimed is not limited to that machine, I have, for illustrative purposes, shown that machine in the accompanying drawings.

In these drawings, Figures 1 to 14 are more or less diagrammatic, showing the manner in which the bats are placed in successively different angular positions upon a travelling belt, and the condition of the bats before and after they have been carried, in these respective angular positions, beneath certain pressure rollers which are hereinafter described more in detail.

Figure 1 shows the bat on the belt directed tip first toward the pressure roller;

Fig. 2 is a sectional view of the bat taken on line 2—2 of Fig. 1;

Fig. 3 shows the bat after it has passed beneath the pressure roller;

Fig. 4 shows the bat of Fig. 3 on its next passage through the machine turned at an angle of 90° so that one corner of the bat is directed towards the pressure roller;

Fig. 5 is a sectional view of the bat taken on line 5—5 of Fig. 4;

Fig. 6 shows the bat of Fig. 4 after it has passed beneath the pressure roller;

Figs. 7, 8 and 9 are similar to Figs. 4, 5 and 6, except that the bat has been inverted so that the other corner of the bat is first acted upon by the pressure roller;

Figs. 10 and 11 are similar to Figs. 1 and 3, respectively, except that the brim edge of the bat is directed towards the pressure roller;

Fig. 10[a] shows the manner in which the tip of the bat is "puffed" while passing brim first beneath a pressure roller;

Figs. 12, 13 and 14 are similar to Figs. 1, 2 and 3, except that the bat is so positioned on the belt that the bat is crozed or shifted about a point lying in or near the tip or top of the bat;

Fig. 15 is a top plan view of so much of the machine as is necessary to illustrate the manner in which my improved method is carried out;

Fig. 16 is a side view of what is shown in Fig. 15;

Fig. 17 is an enlarged view showing a portion of the machine in side elevation and the manner in which the bats are crozed as they pass through the machine;

Fig. 18 is a plan view of belt and the bats illustrated in Fig. 19; and

Fig. 19 is somewhat similar to Fig. 17.

The machine, which is shown in the drawings more or less diagrammatically and by way of exemplification, may be briefly described as follows. 10 designates a bat supporting member in the form of an endless travelling belt passing around suitable drums 11, either or both of which are preferably driven in any approved manner. The working face of the belt, by preference, is provided with a multiplicity of kneading knuckles, and, to this end, the belt may be made of rubber having on its surface small pyramids or projections. The working or upper run of the belt is caused to take a wavy or zig-zag course by guide rolls arranged in staggered relation. The guide rolls which support the belt are designated by the numeral 13. The intervening rolls, which cause depressions in the belt and thereby make is take a wavy course, may be referred to as deflecting rolls and are designated by the numeral 14. Preferably, all of the guide rolls are driven. Engaging the working face of the belt are pressure members or rollers 15 which, in the present instance, are spring pressed against the belt, although it is obvious that they may be weighted or otherwise arranged so as to produce the desired pressure on the bats as they are carried beneath these rollers by the belt. In the present illustrative disclosure, two such pressure rollers are located between adjacent deflecting rolls, and cooperate with the supporting roll which is positioned between those adjacent deflecting rolls in that they squeeze or press the belt and the bats carried thereby against that supporting roll. The opposite ends of the pressure rollers may be journalled in the horizontally extending arms of angle levers 16 which may be journalled on the gudgeons 17 of the deflecting rolls. The vertical arms of angle levers may be connected in pairs by springs 18. The bats, as they are carried by the belt through the machine, are maintained in a thoroughly saturated state by a flow of hot water which may be discharged onto the bats and the belt in any suitable manner, as from a pipe or pipes 20. The pressure rollers in the present instance, are not driven except by their frictional engagement with the belt and the bats carried thereby. The drums and the guide rolls may be driven in any suitable manner, as by means of the gearing designated, generally, by the numeral 21 of Fig. 15. The belt travels in the direction of the arrow 22 of Figs. 15 and 16. It will be noted that the supporting rolls and intervening

deflecting rolls are so spaced apart that the belt and the bats carried thereon are not pinched or squeezed between the deflecting rolls and guide rolls, this arrangement being of advantage in that the required depth of wave in the belt may be obtained; the resiliency or stretchability of the portions of the belt between the supporting rolls is taken advantage of to press the bat against the deflecting rolls; and periods of recovery of the bat to each side of the deflecting roll is had. More particularly, what is meant by "periods of recovery" is that the bat is free to recover or assume a normal unpressed condition between the lines on which the bat is pressed.

In carrying out the method of the present invention by the use of the machine just described, a bat is placed in a given angular position upon the receiving end, (right hand end, Figs. 15 and 16) of the belt 10, which carries the same beneath the pressure rollers and, while thus carried, the upper ply or layer of the bat is shifted, by successive increments, relative to the lower ply which is held against movement relative to the knuckled belt by its contact therewith. After the bat is thus passed through the machine, it is again positioned on the receiving end of the belt, but in a different angular position, so that the upper ply will be shifted in a succession of small steps, in another direction relative to the lower ply as the bat is again carried beneath the pressure rollers. This operation is repeated a number of times, the angular position of the bat on the belt being changed each time it is passed through the machine so that the manipulation and crozing of the bat is successively in different directions. By passing the bat through the machine successively, in different directions, the bat is not only properly crozed but its shape is corrected and maintained. The operator, in changing the angular positions of the bats upon the belt, will use such judgment that, when the felting and shrinking operation is completed, the bat will be symmetrical in all respects, that is it will be of the desired shape, the tip being suitably curved, the side edges bearing the proper angular relation to one another, and the edges of the brim being in registry.

My improved method will be more clearly understood by reference to the drawings. Assuming that the bat is placed on the belt, top or tip first, as shown in Fig. 1, the upper ply or layer of the bat will be successively crozed or shifted a slight amount relative to the lower layer each time the bat is brought into engagement with a pressure roller until the bat comes out of the delivery end of the machine with the brim edge of the uper ply slightly overlapping the brim edge of the lower ply, as shown in Fig. 3. The brim edge of one of the plies is designated by the numeral 30 and that of the other ply by the numeral 31. The next time the bat is fed into the machine, it may be placed on the belt in the position shown in Fig. 4. The upper ply of the bat so placed will be shifted as it passes through the machine in the direction of the arrow 32 of Fig. 4 so that the line of fold at the side edge of the bat will be changed from 33 to 34. Then the bat may be placed in the angular position shown in Fig. 7, either with the upper or lower ply of the bat shown in Fig 4 against the belt, depending on the judgment of the operator taking into consideration the shape into which the bat has already been shrunk, (in the present instance the bat is inverted, end on end). When a bat, positioned as shown in Fig. 7 issues from the machine, the line of fold 35 has been shifted backwardly over the lower ply so that there is a new line of fold 36. It has been assumed that, so far, the bat has been passed through the machine in the condition shown in Fig. 3, that is with the brim edge of one ply overhanging that of the other. In order to bring these brim edges 30 and 31 back into alignment, the bat is placed on the belt so that it is brim first, as shown in Fig. 10 and comes out as shown in Fig. 11. If, for any reason, it is desired to roll or shift one ply relative to the other about the top of the bat, it may be positioned on the belt, as shown in Fig. 12, and will issue from the machine in the condition shown in Fig. 14. It is, of course, obvious that the machine may be provided with a plurality of belts and the bats may be carried from one to the other successively.

I have found that, by proceeding in accordance with the present invention, the bat, owing to the fact that it is given a wavy course as it is passed through the machine, and the bats are operated upon or kneaded by the multiplicity of elastic knuckles provided on the working face of the belt, the bats are very effectively and efficiently felted and shrunk. Due to the wavy course given the belt and the bats thereon, the latter are progressively bent to and fro. When the forward edge of the bat is brought into engagement with a pressure roller, the movement of that portion of the bat which first engages the roller is somewhat retarded so that immedately behind this roller a wave or ripple is made in the bat, and this wave is advanced or progressed throughout the upper ply of the bat resulting in the upper layer being shifted or crozed (to a very slight extent in measurement, but a very effective extent in results) relative to the lower layer. In Fig. 17 I have shown the bat B as being fed tip or top first and the tip of the bat just having engaged the first

pressure roller 15. It will be seen that this roller has produced a slight wave or ripple b' in the bat and in so doing, of course, it has changed the line of fold. As the bat is fed further into the machine, the first guide roll 14 will maintain this ripple or wave causing a shifting or crozing of the entire upper layer relative to the lower one. When the tip of the bat comes into engagement with the second pressure roller, the same thing takes effect, that is a second ripple or wave is produced, and a further slight shifting of the upper layer relative to the lower one takes place and this occurs throughout the length of the machine, each pressure roller creating a ripple or wave and causing a slight shifting, and the aggregate of these slight shifting actions of the several rollers will effect the desired extent of "croze" on each pass through the machine. Thus the "crozing" of the bat, each time it is passed through the machine is effected in small increments or in a succession of slight shifting movements, each pressure roller forming a wave at the advancing edge of the upper ply and progressing the wave to the opposite or rear edge. In the present instance, the aggregate extent of shifting is indicated as a distance between the lines 30 and 31, Fig. 3. It is found to be of advantage to drive the deflecting rolls as these, to to speak, maintain the ripples or shifting. It is also found desirable to have the pressure rollers idle or, at least, driven at a slower speed than that of the belt and the guide rolls. When the pressure rollers are idle, these rollers have a tendency, when they are engaged by the forward edge of the bat and raised thereby, to slow up, and thereby retard the movement of the upper layer of the bat and so effect the shifting action described. As previously stated, after the bat is run in one angular position through the machine, it is angularly turned to another position, as for instance to the position shown in Fig. 4, and then the pressure rollers will progressively operate upon the bat to effect a shifting action in the direction of the arrow 32. Then the bat is again angularly changed, depending on conditions, say to the successive positions shown in Figs. 7, 10 and 12, or to any one of these positions, as may be deemed necessary.

When the bat is fed brim first into the machine, as shown in Figs. 10, 10^a and 11, air is trapped, so to speak, in the top of the bat causing this top to be puffed, which is of advantage in that small wrinkles are taken out and the rounded shape is maintained.

It will be seen from the foregoing description that by proceeding in accordance with the present invention the aforestated objects and other are obtained. As previously stated, the method herein described may be carried out in other machines than that illustrated in the drawings, but I have found in actual practice that the machine described is peculiarly well adapted and is extremely advantageous for this use.

I claim:

1. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in kneading the bat under pressure and while wet by a multiplicity of elastic knuckles and relatively shifting the plies of the bat by creating a wave in one of them and advancing the wave.

2. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in supporting the bat on a surface having a multiplicity of elastic knuckles, rolling the bat while applying pressure thereto, and shifting one ply of the bat relative to the other by producing a wave in one ply during the rolling operation.

3. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in placing the bat in an unrolled condition upon a knuckled surface and bringing the bat into engagement with and beneath a pressure roller adapted to rotate at a lesser peripheral speed than that at which the bat is advanced.

4. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in progressively bending the bat to and fro in an unrolled and wet condition and relatively shifting the plies of the bat by creating a wave in one of them and advancing the wave.

5. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in kneading the bat under pressure and while wet by a multiplicity of elastic knuckles, progressively bending the bat to and fro, and relatively shifting the plies of the bat by creating a wave in one of the plies and advancing the wave.

6. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like which consists in placing the bat upon a member having a knuckled surface, passing said member and the bat thereon in a wavy course, applying pressure on said bat by a roller, and causing the pressure roller to shift one ply of the bat relative to the other one.

7. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like which consists in placing the bat in an unrolled condition upon a travelling belt having a knuckled surface, bending the belt and bat to and fro, moving the bat beneath a roll having the same

surface speed as the belt, and creating a wave in one of the plies and advancing the wave throughout the bat by moving the bat into engagement with and beneath a pressure roller adapted to rotate at a lesser peripheral speed than that at which the bat is advanced.

8. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in knuckling the wet bat in an unrolled condition at a multiplicity of local points and under pressure by distorting and laterally bending a multiplicity of elastic knuckles in engagement with the bat and crozing the bat by a succession of slight waves in one of the plies and progressing the waves.

9. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in supporting the bat in unrolled condition on a surface having a multiplicity of elastic knuckles, rolling the bat while applying pressure thereto, and shifting one ply of the bat relative to the other by producing a succession of waves in one ply during the rolling operation.

10. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like which consists in progressively bending the bat to and fro, and relatively shifting the plies by creating a succession of waves in one of them and advancing the waves.

11. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in maintaining the bat in a wet condition, knuckling the wet bat in an unrolled condition at numerous points under pressure by bending and distorting, in engagement therewith, a multiplicity of elastic knuckles, repeatedly bending the bat to and fro, and crozing the plies of the bat relative to one another in a succession of slight shifts and progressing the shifts.

12. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like which consists in placing the bat in an unrolled condition upon a traveling belt having a knuckled surface, bending the belt and bat to and fro, moving the bat beneath rolls having the same surface speed as the belt, and moving the bat into engagement with and beneath a succession of pressure rollers interspersed between said rolls and adapted to rotate at a lesser peripheral speed than that at which the bat is advanced.

13. The herein described method of treating hat bats, which consists in knuckling the bat at numerous points and in flat condition by distorting and laterally bending, in engagement therewith, a multiplicity of elastic kneading knuckles, and continuously progressively shifting one ply of the bat relative to the other one successively in different directions.

14. The herein described method of treating hat bats and the like, which consists in progressively bending the bat in unrolled condition to and fro, and crozing the bat by creating and advancing waves in one of the plies of the bat successively in different directions.

15. The herein described method of treating hat bats and the like, which consists in supporting the bat in an unrolled condition and, successively, in different angular positions on a belt having a surface provided with a multiplicity of knuckles, progressively bending the belt to and fro and progressively applying pressure to the bat on the belt.

16. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in maintaining the bat in a wet condition, knuckling the wet bat in an unrolled condition at numerous points under pressure, repeatedly bending the bat to and fro, and shifting the plies of the bat relative to one another, successively, in different directions.

17. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like which consists in placing the bat successively in different directions in an unrolled condition upon a traveling belt having a knuckled surface, bending the belt and bat to and fro, moving the bat beneath a roll having the same surface speed as the belt, and moving the bat into engagement with and beneath a pressure roller adapted to rotate at a lesser peripheral speed than that at which the bat is advanced.

18. The herein described method of treating hat bats and the like which consists in kneading the bat and shifting the plies, one relative to the other in a succession of small steps in one direction and then kneading the bat and shifting the plies, one relative to the other, in a succession of small steps in another direction.

19. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in repeatedly bending the bat back and forth and shifting the plies of the bat relative to one another in successive increments and successively in different directions.

20. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in, recurrently and successively in different directions, maintaining the bat in a wet condition, knuckling the wet bat in an unrolled condition at numerous points under pressure, repeatedly bending the bat to and fro, and crozing the plies of the bat relative to

one another in a succession of slight shifts and progressing the shifts.

21. The herein described method of simultaneously shrinking, felting and crozing hat bats and the like, which consists in placing the bat in an unrolled condition and successively in different angular positions upon a travelling belt having a knuckled surface, bending the belt and bat to and fro, moving the bat beneath rolls having the same surface speed as the belt, and moving the bat into engagement with and beneath a succession of pressure rollers interspersed between said rolls and adapted to rotate at a lesser peripheral speed than that at which the bat is advanced.

HOMER A. GENEST.