

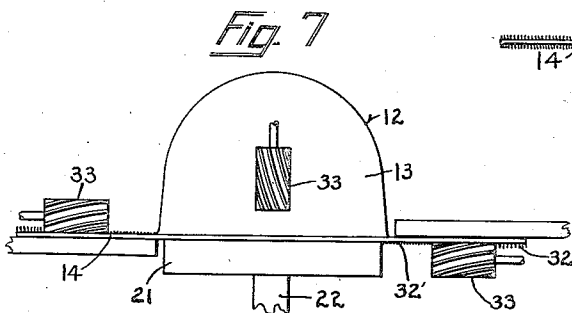
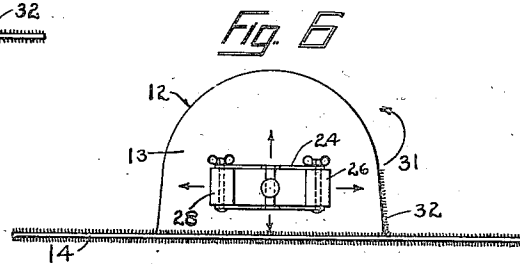
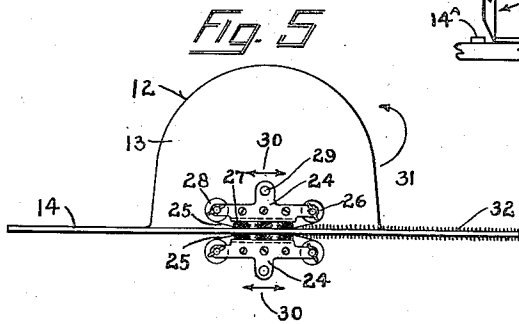
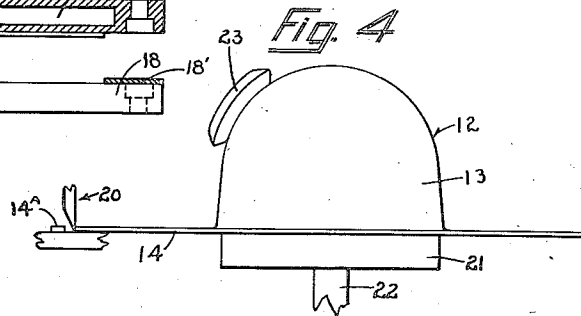
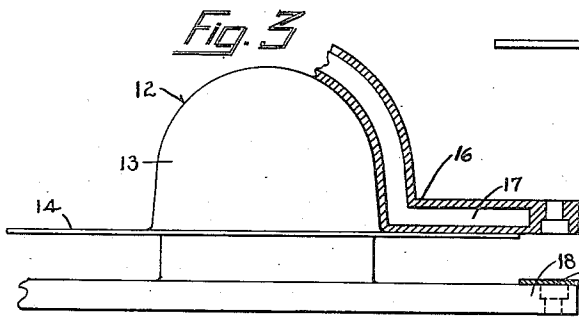
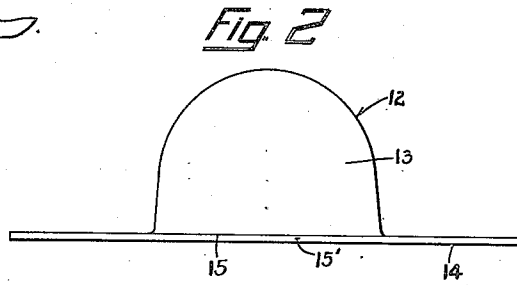
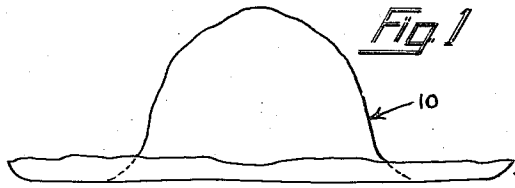
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J. G. CAVANAGH

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HAT AND PROCESS FOR MAKING HATS

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INVENTOR
John G. Cavanagh
BY *William T. Feys*
ATTORNEY

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HAT AND PROCESS FOR MAKING HATS

John Garvan Cavanagh, East Norwalk, Conn., assignor to Hat Corporation of America, East Norwalk, Conn., a corporation of Delaware

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4 Claims. (Cl. 2—192)

This invention relates to hats and to an improved process for making hats.

Hats are now, or have in the past been, made in many different styles, from various materials, and according to divers processes.

In general the materials found most satisfactory are wool and fur felt. However, according to the processes now used many problems and shortcomings are encountered in producing satisfactory hats, the most important of which will now be briefly set forth.

One of the main shortcomings of the past and present processes is that many costly manual operations requiring great care and skill are required so that there is a considerable adverse difference in the weight, quality, and appearance of the individual hats in the same original lot, dependent upon the skill of the individual workers and the degree of care which they use.

Another shortcoming with the well known processes is that considerable difficulty is encountered in developing good color and good finish in hats.

Approximately ninety percent of the hats now manufactured and used are of the so-called "smooth" finish. However, the present processes do not insure a uniform "smooth" finish because the operations of pouncing, (wherein the surface is levelled, cut down, and finished with an abrasive medium) and heat ironing both tend to pull out and lay down the free ends of surface fur fibers.

The fur cut off the hat and thrown off into the atmosphere of the room by the pouncing operation, although a blower system and good ventilation is used, makes the room dirty and adversely settles on hats stored in the room. Also, the fur cut off the hat by the pouncing changes the weight. If much pouncing is done, the original weight of the hat may be changed considerably.

Even though a clipper is passed over the laid down fur of the surface, only some of the free ends are cut to an irregular length, for even some of the longest free ends may still lay down and not be cut. However, after a short time atmospheric moisture and heat tends to raise these free ends obliquely from the body. These obliquely disposed free ends of various lengths impart a hard, raspy feel to the hat, rather than a soft, smooth feel which is much desired, and also tend to wedge and hold dust, dirt, lint, and the like in such a manner that it is hard to be disposed of by brushing.

If atmospheric conditions in the factory cause these free ends to adversely raise, a singeing oper-

ation is very often resorted to, in which the hat must be skillfully manipulated above a suitable flame until the long free ends are burned off. However, there is much danger of spoiling the hat either by discoloring or actually burning the hat inadvertently. Also, the singeing imparts a loose feel to the surface.

A common fault in producing hats, particularly brown and other dark colored hats is what is known to hatters as "mottle" (uneven streaks and sections of color, light and dark, showing up on the surface of the hat). Formerly, and at the present time, this is overcome by smoking, powdering, and/or separate pouncing operations.

Smoking, which consists of depositing soot by passing a hat over the flame and in the smoke of a burning naphtha, crude oil, or the like, is a dirty and unhealthy operation, and is satisfactory only for dark colored hats. Pouncing, in order to overcome mottling, especially on light colored hats, is done both by cutting down the fur surface by abrasives and by the use of pumice and other powders.

In both the smoking and the pouncing method of overcoming mottle, great care and skill is required. Also, the fine fur and powder cut off and thrown off by the pouncing operation settles on the operators, and particularly on the other hats stored in the room, necessitating special brushing operations.

Another real problem is encountered in the treating operation or operations wherein a finishing substance, usually of an oleaginous nature, is applied to the surface of the hat for the purpose of bringing out the color, and to render the hat more impervious to moisture and more mellow to the feel. With present processes difficulty is encountered in obtaining an even distribution of the finishing substance over the surface of the hat body. Further, with these previous processes the finishing substance remains in uneven masses at the surface rather than being thoroughly impregnated down into the felted mass or the subsurface thereof where it is more effective to mellow the hat and to prevent the adverse collection of moisture, and when excessive on the surface tends to seize and hold dust and dirt. Also, because this substance is not thoroughly impregnated with the old processes it is cut off the surface unevenly in the pouncing operations and gives very undesirable irregular surface coloring effects.

Further, slow and skillful manipulations are also required to heat iron the hat with previous processes. The final finishing heat ironing is

usually done by hand, but when done by hand there is no certainty that all parts will be ironed, and there is much difference in the amount of pressure applied. These variables lead to a lack of uniformity in the appearance of the hats.

The present invention represents: a comprehensive effort to provide a product and a process without these shortcomings; and a successful mastery thereof, according to the following description which sets forth only the most apparent improvements in the product and the present preferred process. It is therefore not limiting.

Objects of the present invention aiming to overcome some of the above and other shortcomings include the provision of a product which will be: more uniform in weight, quality, and appearance; of better and more uniform "smooth" finish in appearance, feel, coloring, and other characteristics, like hats made from much rarer and costlier fur; adapted to hold its shape exceedingly well; adapted to be shaped without cracking or creasing adversely; of a surface which may be cleaned of dust, dirt, lint, and the like; of soft appearance and soft feel when handled; and of improved coloring and complete elimination of color mottling.

These objects are advantageously met by the present invention through the provision of: a process wherein the fibres or fur forming the crown and/or the brim are felted together in a superior manner, making a hat which will hold its shape more effectively; a product having an improved surface tightness so that the surface is less liable to crease or crack when given a final or wearer's shape; a product wherein the finishing substance is driven to the interior of the felted mass to more effectively bring out the color, mellow the hat body, and prevent the collection of moisture; a product having an improved surface arrangement of the fur fibres which effectively improves the coloring and lessens the likelihood of adverse surface mottling, and like imperfections which are the cause of many costly rejections in hat manufacture; and a product with very short and substantially equal length upstanding fur ends developed from the felt body itself, imparting a very desirable soft appearance and feel to the product, from which dust, dirt, lint, and the like may be brushed much easier than from obliquely disposed fur ends of different lengths which normally tend to wedge and hold the dirt to the main body portion. Other advantages and improvements in the product of the present invention will be apparent or will be described hereinafter.

Until recent times, considering the origin and life of the hat industry, felting and felt hat manufacturing was done mainly by hand operations and very little machinery was used. Even with the advent of considerable machinery in recent years, hat manufacture is still largely a matter of craftsmanship and skill, especially in the finishing operations, consisting of numerous small but nevertheless very important steps. Singeing, smoking, treating (applying finishing substance) and pouncing operations all require highly trained or skilled, and in many instances almost irreplaceable, workers. Because of this, there may be a lack of uniformity in the product and considerable uncertainty or irregularity from a production standpoint which may result in impaired business standing because of a failure to keep delivery promises. The many hand operations also add considerably to the manufacturing cost.

It is an object of the present invention to provide a process of hat manufacture which will reduce the number of operations and which will make possible a more uniform product even though less skilled workers are used, thus eliminating the uncertainties and disadvantages which occur when much manual skill of various workers is required.

It is a further important object of the present invention to provide an improved process of manufacture whereby it is possible to reduce the cost of manufacturing without impairing quality.

In meeting these objects the present invention provides an improved process of finishing hats wherein the manual operations of singeing, smoking, pouncing, powdering and ironing are entirely dispensed with; wherein the hats are more uniform in weight, quality, and appearance; and wherein the final product has an improved "smooth" finish. Also, it provides a considerable economy in production costs and a very desirable more uniform product.

In the usual process of manufacturing hats there is a rough or primary pouncing operation in the back shop, and in the finishing of hats in the so-called front or finishing shop there are several secondary machine and bench pouncing operations in which an abrasive is usually employed to cut down the surface fur, and in many instances a powdered pumice or talc is used in order to obtain desirable surface characteristics on the hat. Free fur and powder in the atmosphere of the finishing shop from the secondary pouncing operations makes the room dirty and settles adversely on stored hats. The present invention provides a process entirely eliminating the secondary pouncing operations with abrasives and powder in the finishing shop and thus obviates the attendant disadvantages.

The process of the present invention also imparts a uniform dry press and a soft surface finish to the product whereby it is not necessary to heat iron, thus effecting a considerable economy in manufacturing cost and resulting in a more uniform finish on the hat body.

Another feature of the present invention is the elimination of careful bench operations, thus providing an improved process wherein less skilled workers may be used, yet improves rather than impairs the quality of the final product by providing more uniform results.

Other objects, features, and advantages of the improved product and process will be apparent or will be described hereinafter.

Many of the aforementioned product characteristics are accomplished by rather indefinable structural changes because it is impossible to closely observe and understand the changes which occur within or upon the surface of a felt body even with all the aids of modern science such as microscopes, microphotographs, and various testing instruments. Consequently, the description which follows is predicated upon theories of men skilled in the art and is not to be a limitation. The description is intended to impart an understanding of the present improved product and process and to enable others to practice the invention upon expiration of the patent. The process hereinafter described will also provide for a fuller understanding of the product improvements.

In the drawing the various figures diagrammatically illustrate the product and the various steps of the process for producing the improved

product of the present invention, and of these:

Fig. 1 illustrates the rough hat body as it comes from the back shop to the front or finishing shop.

Fig. 2 is a diagrammatic view of the hat after the first steam or machine blocking.

Fig. 3 illustrates the hat in the second or dry pressing operation, when the body is considerably reduced in thickness.

Fig. 4 illustrates the treating operation.

Fig. 5 illustrates the step of jiggering both sides of the brim.

Fig. 6 illustrates the step of jiggering the crown.

Fig. 7 illustrates the step of clipping the brim and the crown.

Before describing the improved process of finishing hats and the improved product resulting therefrom, according to the present invention, a very brief outline of the two most prevalent processes of hat finishing are given. The term "hat finishing process", as used herein relates to that very important intermediate stage when a rough hat body is taken from preliminary building up and wet operations in the so-called back shop to the final shaping and hat body dry finishing operations in the front shop preparatory to having sweat and dress bands added, and in some instances having brim binding added.

The older and now well known method of hat finishing is known as the "hand finish" and comprises the following steps:

1. Hand blocking.
2. Machine ironing.
3. Hand ironing the brim.
4. Hand pounce the crown, with abrasive.
5. Hand pounce the brim with abrasive.
6. Singe.
7. Treat the hat body (apply finishing substance) and powder if necessary to bring out the color.
8. Smoke (when necessary).
9. Work finishing substance and/or smoke soot over the hat surface (usually by manual pouncing operation).
10. Rounding (cut away surplus brim).
11. Flue (viz., light application of water to the surface).
12. Dry.
13. Luer.

The other well known process and the one now in most general use, is known as "the machine finish" and comprises the following steps:

1. Machine block.
2. Machine iron crown.
3. Machine pounce crown.
4. Machine iron brim.
5. Machine pounce brim.
6. Hand pounce crown.
7. Hand pounce brim.
8. Singe (when necessary).
9. Treat (apply finishing substance) (with powder if necessary to bring out color).
10. Smoke (when necessary).
11. Work finishing substance and/or smoke soot over the hat surface.
12. Rounding.
13. Flue.
14. Dry.
15. Luer.

With the machine finish it is possible to effect a saving of approximately 33% over the hand finishing cost. The improved process of the present invention, even though it provides a product of improved characteristics, effects a further sav-

ing of approximately 25% as compared with the usual machine finish and approximately 50% as compared with the hand finish just outlined. Because the improved process of the present invention is also essentially a machine process, it will be referred to herein as the "new" process.

The steps occurring in the improved "new" process of the present invention briefly summarized include the following:

1. Machine block.
2. Press.
3. Rounding.
4. Treat crown and/or brim (with finishing substance) (no powder required).
5. Cloth jigger brim.
6. Cloth jigger crown.
7. Clip crown (if desired).
8. Clip brim (if desired).

These various steps of the "new" process will now be described in detail. Because the improved process of the present invention utilizes well known hat making apparatus, it is thought unnecessary to describe this apparatus in detail. However, it should be noted that this old apparatus is used in an entirely new series of steps, in a special manner, and with some novel modifications in order to form an improved product with less skilled workers and to decrease the manufacturing cost. A detailed description of these steps, of the modified apparatus, and of the advantages and improved product resulting therefrom follows.

The first step of the improved process consists of taking a rough hat body 10, shown in Fig. 1, as it is received from the back shop and machine blocking it in the well known manner. This machine blocking for the "improved smooth finish" is just the same as the machine blocking for the "machine finish" now usually practiced, and consists of placing the rough hat body 10 between suitably shaped male and female die members and subjecting it to steam and pressure in order to press the fur together somewhat and particularly to change its shape from the rough hat body 10, shown in Fig. 1, to the formed hat body 12 disclosed in Fig. 2, in order to form a crown 13 and a brim 14.

The second step of the improved process represents the first departure from the usual "machine process", for the steps 2 through 8 and 10 therein are replaced by a single step or operation of compressing the hat body 12. This second step in the improved process is accomplished in presses carrying a female die member 16 having a chamber 17 to receive steam and a solid cooperating male die member or punch 18. These die members 16 and 18 are formed to impart any desired shape to the hat body 12 and may be provided with holding screws for connection to any press of suitable capacity.

In this step the hat body is subjected to pressures between fifty and two hundred pounds, and to heat of approximately two hundred and twenty degrees. The pressures and heat temperature just stated may be varied considerably and still obtain rather satisfactory product. However, over a long range of experiments it has been found that a pressure of approximately fifty pounds is best for very light weight hats; that pressures of approximately one hundred to one hundred and fifty pounds are satisfactory for medium weight hats; and that a pressure of close to two hundred pounds is desirable for the so-called "English" or heavy weight hat.

The temperature of approximately 220 degrees has been found the best average temperature to use with the various weights of hats passing through this step. Pressures and temperatures much in excess of those just outlined have a tendency to break down the felt structure by making the fibres or fur in the body very brittle, and when very much lower than the pressures and temperature outlined, necessitates leaving the hat in the dies and press for a longer period of time.

These pressures and temperatures just set forth are not limiting, but are merely illustrative of the conditions found best for the general run of hats and type of hats manufactured at the present time. Loose or lightly compacted felt hats and various kinds of fur or other materials in the hat body require pressures and temperatures other than those set forth.

As may be noted by comparing the hat body 12 in Figs. 2 and 3, the brim 14 is compressed considerably by the second step in the improved process. It is thought that the felting is considerably improved by this step for the fur is much compacted and tends to work together in such a way that the fur, or the scales of the fur, take hold of each other better, and that the interstices between the furs are closed. It is also thought that by placing these furs under the considerable pressure and temperature of this step that kinks are formed in the individual hairs where they lie across each other. This step imparts a tautness and compressed state to the hat which cannot be accomplished by machine ironing or hand ironing the hat body as heretofore. Also, by closing the interstices there is less possibility of the felt retaining or holding moisture and the finishing substance may better serve to prevent moisture from entering the hat.

The third step in the improved process consists in rounding the hat body, which is merely the cutting away of the surplus brim 14a as indicated diagrammatically with the cutting tool 20 in Fig. 4. Any of the now well known rounding tools or machines may be used for this purpose. In some forms of hats it is not necessary to trim the brim, for example, when a confining rim 18' is provided in the molding member 13 as shown in Fig. 3 which will limit the spreading of the brim and form a regular predetermined edge.

The fourth step of the improved process is to treat the crown and/or the brim 13 and 14 respectively with a finishing substance having the characteristics of bringing out the color, mellowing the hat body and/or rendering it more impervious to moisture. This is preferably accomplished by placing the hat body 12 on a block 21 having a spindle 22 rotated by a lathe or any suitable spindle head at a slow speed. If preferred, this may be done by hand at a bench. Finishing substance is applied to the top surface of the crown 13 and preferably to both sides of the brim 14 by a luer 23. At this step the finishing substance is in effect merely laid on the surfaces, for only a small portion thereof, if any, really gets down into the inner section 15' of the felt. Consequently, during the regular pouncing operations of the old machine process there is a considerable problem to have an even distribution of substance over the hat for if much of one section of the surface is cut away by the abrasive during the secondary pouncing, an uneven coloring or surface appearance results. This

shortcoming is overcome very effectively by the next two steps of the improved process.

The fifth and very important step of the improved process is to perform what is preferably termed a cloth jiggering operation on the brim 14 of the hat body 12. Jiggering machines of various types are now regularly used for machine pouncing or abrasive cutting both the brim and crown portions of a hat. However, a very important change is effected in this type of machinery according to the present invention for instead of using sandpaper or the like in carriers 24 in order to cut down and smooth the outer surfaces of the hat body 12, the carriers are provided with a comparatively smooth cloth 25 adapted to merely rub the surface rather than to cut it as sandpaper or any abrasive does. Comparatively smooth materials other than cloth, having friction creating but noncutting characteristics, may be used.

The cloth 25 may be a short strip clamped to the carrier 24 in any usual manner. Preferably, and as shown, it is mounted on a pay-off roll 26 and over a pad 27 of cloth or other yielding material and rewound on a take-up roll 28 on the opposite side of the carrier. Thus, when the cloth 25 overlying the pad 27 becomes worn or dirty, it is a very easy matter to replace the same with a clean section from the same strip. Any suitable connection 29 is provided to connect the carriers to the jiggering machine whereby each carrier may be jiggered in the well known manner; for example the carriers may be jiggered in an elliptical or four way path in the duo direction of the arrows 30 and laterally of the brim also. At present the carriers are preferably jiggered mainly in a reciprocatory manner in the direction of the arrows 30 and moved slowly laterally relative to the brim as the hat body 12 is slowly rotated in the machine, for example in the direction of the arrow 31.

Because the carriers 24 and the jiggering machines with which they are used are well known, and because the main change is to replace sandpaper or other abrasive on the rolls 26 and 28 with cloth 25, further detailed description of this apparatus seems unnecessary. However the replacing of the usual abrasive medium in the jiggering machine by a cloth and friction imparting rather than a cutting effect accomplishes new and very important results.

This step in the improved process is a very important one and should be particularly noted. As the cloth 25 is jiggered over the outer surfaces of the brim 14 it has the characteristic of improving the felted body. This is accomplished, it is thought, by the cloth 25 working the loose surface furs down into the mass by pressing, pushing, and turning them without cutting them, so that the individual loose or somewhat loose furs on the surface in effect inch or corkscrew their way down into the mass of felt.

Or, it may be that the cloth rubbing and not cutting the surface fur has the characteristic of opening channels between the surface fibres and pushing loose or long loose ends of surface fur or fibres into the channels. Because the fur and felted mass is so fine and complex, even study with a magnifying glass does not disclose exactly what takes place. In any event, there is provided a surface tightness or tautness which is desirable in order to prevent the hat from creasing or cracking when it is given final shape. It is thought that the interstices between the warp and woof threads of the cloth 25 may have

the characteristic of holding the outer ends of the furs and pushing them down into the mass of felt. Further, it is thought that the slight kinking or curling of the furs in the compressing step as hereinbefore described in conjunction with the cloth jiggering step facilitates the action of the surface furs working into the mass of felt or of developing a tight or taut outer surface.

Furthermore, and of particular importance, this jiggering has the important characteristic of raising a considerable mass of fine nap 32 in a substantially upright direction on the hat body 12 as is illustrated in a slightly exaggerated and diagrammatic manner in Fig. 5. It is only the free ends of the outer surface furs which are thrown up in the form of the nap 32 and the jiggering of these loose free ends of the fur imparts a limber or soft feel to them. It is thought that the coarser furs which might otherwise mar the surface appearance because of their greater strength are driven down into the mass by the cloth 25 and the jiggering thereof in the manner just described. Thus the step of cloth jiggering forms a substantially upright nap and imparts a very soft appearance and feel to the hat body which is very desirable from the merchandising standpoint.

The operation of this cloth jigger produces what I term jiggering. Such jiggering is characterized by a back and forth rubbing, rolling, and pushing under pressure of all the fibres at or near the outer surface, whereby a definite rearrangement thereof is effected and whereby the outer free ends thereof are moved into a substantially upright position, as distinguished from the ordinary and usual pouncing operation wherein an abrasive medium is used to cut down and even the feel and color appearance of the hat, and distinguished from the usual luering operation wherein a luer or pad is used lightly to lay down the free ends of the fibres and to apply colored powder, for the purpose of hiding mottling and other slight surface imperfections.

This jiggering is also characterized by a rubbing under pressure at an extremely high speed whereby sufficient frictional heat is generated to plasticize the finishing substance and thereby facilitate a very even distribution of the finishing substance and driving most of it from the surface 15 down into the sub surface 15' to the end that the surface distribution thereof will be so light that it will not accumulate excessive dust and dirt and so that the sub surface substance gives a mellow feel to the hat and prevents the accumulation of rain and moisture therein.

By driving most of the surface substance down into the sub surface, the loose ends of the surface fibres can remain in the substantially upright position as effected by the jiggering and thereby impart a "peach sheen" to the outer surface, which has the characteristic of hiding unevenness of color and surface mottling, and imparting a desirable soft and yielding surface feel to the hat. In the processes heretofore employed, the finishing substance was unevenly distributed on the outer surface, tended to accumulate dust and dirt, gave a shine rather than a desirable "peach sheen" to the surface, and laid down and held down the loose ends of the surface fibres.

Different effects may be obtained by varying the fibres (fur, wool, or the like) in the hat body, by changing the extent of felting or pressing and by changing from a coarse to a fine cloth or vice versa. Wire and other cloth may be used.

Further, this back and forth jiggering motion

on the surface pushes the nap 32 into an almost vertical position relative to the hat body which facilitates clipping the furs to a very short and substantially equal length in a final step when a "smooth" finish hat is desired. This cannot be accomplished with usual processes where the free ends of the surface fur are pounced, luered and/or ironed down onto the main body. Thus, the present invention makes possible a straight nap and a shorter "smooth" finish than is possible with old processes.

Another important improvement and structural change effected in the product by this step is that enough friction and heat is created by a machine drive of the carrier 24 so that the finishing substance laid on the hat body 12 in the fourth step may be plasticized and spread evenly over the surface and driven down into the subsurface 15' of the hat body where it is most necessary. In some of the hand finishing methods it is usual to run a cloth over the hat body after the treating operation or after the finishing operation, but this is more for the purpose of spreading the finishing substance out on the surface of the hat body in order to get an even surface distribution, rather than to drive it down into the hat body. In fact it is extremely doubtful that sufficient friction and surface heat could ever be obtained by any hand rubbing which would tend to drive the finishing substance down into the hat body satisfactorily. The cloth jiggering operation, machine driven and reciprocating at high speeds (1600 to 3000 times per minute with present day machines) does impart a sufficient friction and heat to the surface and creates a capillary effect adapted to drive the finishing substance down into the body.

When much of the finishing substance remains on or near the surface of the hat body as with the ordinary hat finishing operations, marked differences in the coloring or appearances of the hat occur, especially when certain sections are cut down as by the secondary pouncing. This disadvantage is overcome very effectively by the present invention through a more even flow and a more even distribution of the substance effected by the friction and heat rubbing of the cloth 25 over the surface in the high speed jiggering operation, through the elimination of the need of cutting away or pouncing the outer surface of the hat, and through the driving of the finishing substance down into the hat body.

This latter feature allows only a minimum of substance to remain on the outer surface so that it cannot adversely seize and hold dust and dirt, a common fault in the usual process where uneven and excessive collections of finishing substance remain on the surface. The impregnation of the finishing substance down into the subsurface 15' of the hat body also has the important advantage of reducing the amount of moisture which the hat body can hold and rendering the hat more impervious to the collection of moisture in the body. By embedding the finishing substance down into the hat body fewer creases, softer folds, and a more mellow feel may be imparted to the hat. By reducing the permeability of the hat to moisture and by making possible softer folds and fewer creases, a longer hat life is obtained.

This cloth jiggering surface operation, developing the substantially upright nap, of effecting an even, light distribution of finishing substance on the surface and of driving the bulk of such substance down into the subsurface of the hat body has the advantage of obviating mottling and of

doing away with the usual smoking, pouncing, and powdering operations usually required to bring out color and give a good surface appearance. Thus, too, it obviates the disadvantage of a dirty room and fur dust and powder settling on clean hats, prevalent with the usual process of hat finishing.

The sixth step is very similar to the fifth step and includes the operation of cloth jiggering the crown 13 of the hat rather than the brim 14. Because the operation, equipment, and advantages resulting therefrom in this operation are the same as in the preceding step, detailed description is unnecessary. It is well within the purview of this invention to accomplish the jiggering of both the brim and the crown in one machine and at one step or operation. However, it is easier to load and unload machines when they are made as separate units to jigger the brim and to jigger the crown. Because the inside of the crown is not exposed to view or grasped by the users fingers, it is usually not necessary to jigger the inside thereof. However, it too may be jiggered on the inside in the same manner as both sides of the brim are jiggered. Although in some instances it may be preferred not to jigger both sides of the brim in order to have a different effect and feel to the two sides of the hat, which may appeal to some users.

The seventh step in the improved process consists of clipping the crown 13 when a "smooth" finish is desired. The general appearance of the nap on the exterior of the hat may be improved to meet the desire of some purchasers by clipping the free ends of the furs to a short and substantially equal length. This step of the improved process is for this particular purpose. Various type clippers may be used, at present a circular cutter 33 with helical teeth operating at a high speed has been found to work very satisfactorily. A cutter with handling and mounting apparatus adapted to clip the nap very close to the hat body is at present preferred. Because the nap 32 is in a substantially vertical position from steps five and six, it is comparatively easy to effect the short trimming and to obtain a very even outer surface to the nap. This advantage cannot be obtained in those finishing operations wherein the outer surface of the felt is laid down onto the hat body or the nap is obliquely disposed relative to the body at a sharp angle.

The eighth step in the improved process is directed to clipping the nap 32 of the brim 14 to a very short length as indicated by the nap 32' in Fig. 7. Again, as with the preceding step, the cutter may be of any form adapted to clip the nap 32 very close to the main surface of the hat body. The steps seven and eight, clipping of the crown 13 and the brim 14, may be accomplished in a single machine and in a single operation if preferred. In fact, they may be eliminated entirely whenever a very short finish is not desired. In some hats a longer unclipped nap is preferred. Also, if the fibres in the hat body are felted tight, or if the hat is jiggered but lightly or a small amount, only a short nap is developed by the jiggering operation so that a "smooth" finish may be had without clipping.

The short nap 32' has the advantage of holding less dirt and lint than a long nap. When the nap is substantially upright relative to the hat body, it does not tend to wedge dust and dirt and it may be easily brushed to remove any which

happens to accumulate. Further, the short up-raised nap 32' imparts a very desirable soft appearance and feel to the hat. By driving the finishing substance down into the subsurface 15' of the hat and/or by forming the integral substantially upright nap surface just described, surface discolorations, mottling, and other imperfections which necessitate costly reprocessing of a hat, and which are a frequent occurrence in practically all methods of processes of hat manufacture heretofore proposed, are very nearly eliminated or entirely eliminated by the improved process.

As pointed out hereinbefore: in some instances rounding is not necessary; pressures and temperatures in step 2 may be considerably changed; cloth jiggering the brim and the crown may be done in a single operation; and the crown and brim clipping steps may be entirely eliminated. Also, wool and other fibres may be used in the hat body. Dependent upon the materials used and the effects desired, the treating step may be eliminated.

Other variations and modifications may be made within the scope of this invention and portions of the improvements may be used without others.

Having thus described the invention, what is claimed as new and for which it is desired to obtain Letters Patent is:

1. The herein described process of finishing hats which consists of blocking a rough hat body; die pressing the blocked hat under heat and pressure; applying a finishing substance to the hat; jiggering the hat body to effect a light and even surface distribution of the finishing substance onto the hat and a deep impregnation of the substance into the hat body, and to simultaneously raise a substantially upright nap; and clipping the raised nap.

2. The process of finishing hats which consists in the steps of blocking a rough hat body; compressing the blocked hat body under a pressure of between 50 and 200 pounds dependent upon the weight of the hat, and a heat of approximately 220 degrees Fahrenheit; applying a finishing substance to the pressed hat body; and cloth jiggering the hat body to effect an even surface distribution of the finishing substance and to drive the substance down into the hat body.

3. The process of finishing hats which comprises the steps of blocking a rough hat body; die-pressing the hat under heat and pressure applying a finishing substance to the pressed hat body; and cloth jiggering the hat body to effect an even surface distribution of the finishing substance and to drive the substance down into the hat body, and to simultaneously form an integral and substantially upright nap.

4. The process of finishing hats which consists in the steps of blocking a rough hat body; pressing the hat body; applying a finishing substance to the pressed hat body; and cloth jiggering the hat body by machine at high speeds to create friction, heat and a capillary action adapted to effect an even surface distribution of the finishing substance and to drive the substance down into the hat body, and to simultaneously form an integral and substantially upright nap.