

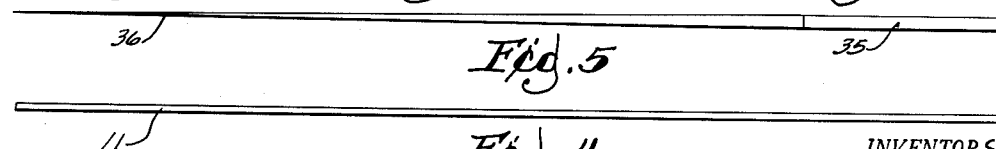
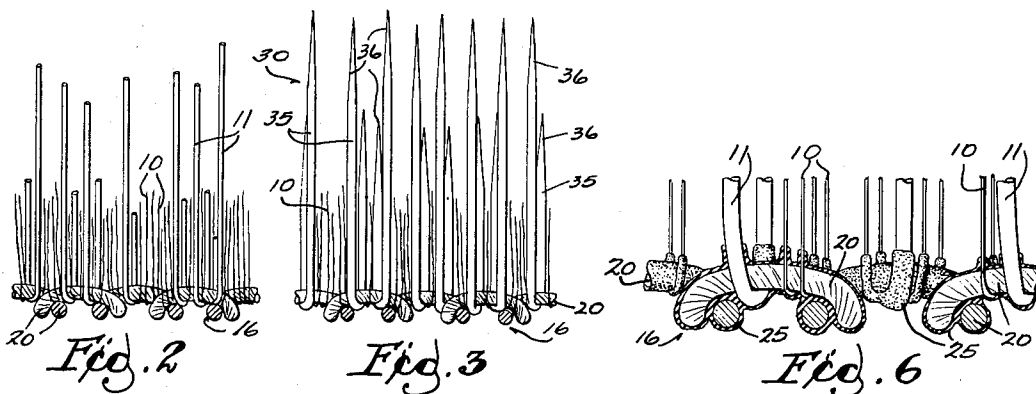
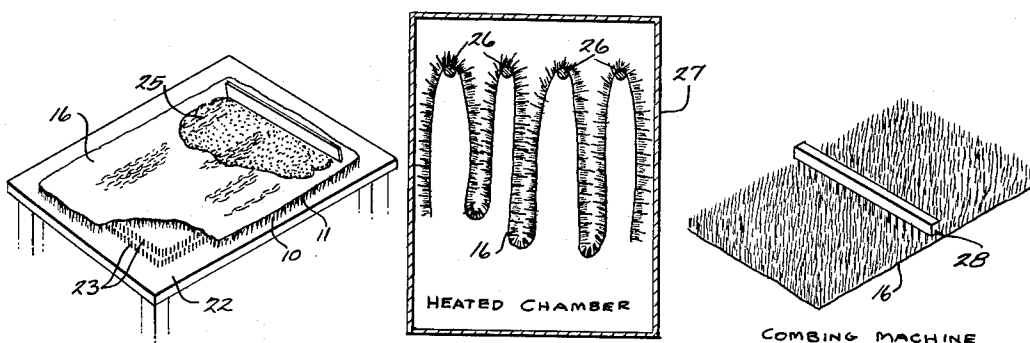
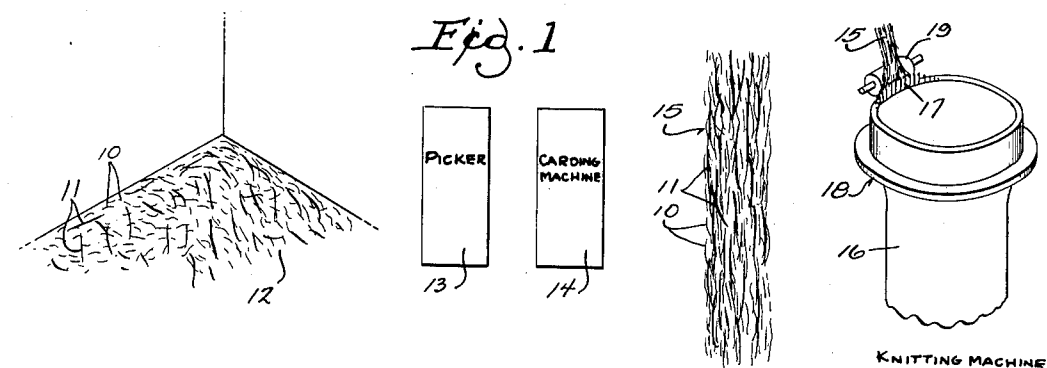
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ARTIFICIAL FUR PRODUCT AND PROCESS OF MANUFACTURE

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ARTIFICIAL FUR PRODUCT AND PROCESS OF MANUFACTURE

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21 Claims. (Cl. 28-74)

The present invention relates in general to artificial or synthetic fur, and more in particular to artificial wolverine fur. This is a continuation in part of our prior application Serial No. 205,030, filed January 8, 1951, now abandoned.

An object of the invention is the production of an artificial fur having special properties which make it equal to natural furs for certain purposes.

A special object of the invention is the production of an artificial wolverine fur that is suitable for use in the manufacture of ruff material for parkas such as are worn in Arctic countries. A parka is an outer garment having a hood the edge of which is provided with a fur ruff to protect the face of the wearer from the wind. The hood covers the head, and the ruff, which is made of a long haired fur, surrounds the opening in the front of the hood and acts as a windbreak.

Parkas having fur ruffs as described above are subject to the objection that the moisture from the breath condenses on the fur in the form of frost and ice. The artificial wolverine fur described in said application is a superior material for the manufacture of ruffs because of its comparative freedom from frosting and icing difficulties, being in this respect comparable to the natural wolverine fur which is generally recognized as being less subject to frosting and damage from icing than any other fur.

Wolverine fur is characterized by a dense underfur about one inch long and by a large number of rather stiff guard hairs which are over two inches long and project noticeably beyond the surface of the underfur, being generally perpendicular to the pelt. An average sample had over 100 guard hairs per square centimeter ranging in length from about 2 inches to over 3 inches. There is some doubt as to which characteristics of the fur are responsible for its peculiar freedom from frosting trouble but this is believed to be at least partly due to the large diameter, smoothness, and high tensile strength of the guard hairs. The hairs are also very firmly anchored to the pelt.

Due to the scarcity of wolverine fur many substitutes have been tried but no other fur has been found to equal it for the special purposes herein described, that is, for fur ruffs on parka hoods. The special object of the invention therefore is the production of an artificial or synthetic wolverine fur which is as well suited to this purpose as the natural wolverine furs.

A further object of the invention is the production of an artificial fur simulating wolverine fur but having certain characteristic properties of this fur emphasized or exaggerated with a view to enhancing the comparative freedom from frosting and icing difficulties and thereby rendering the artificial product superior in this respect to the natural fur.

In the drawings:

Fig. 1 is a schematic showing of the successive steps in the method of making artificial wolverine fur.

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Fig. 2 is a magnified section showing in greater detail the relation of the base fabric, underfur, and guard hairs.

Fig. 3 is a view similar to Fig. 2 but showing our product with larger diameter guard hairs tapered to make their use possible as Arctic wearing apparel.

Fig. 4 is a greatly enlarged guard hair such as those shown in Fig. 2. It is a 4 mil guard hair on the scale of 16 to 1.

Fig. 5 is a greatly enlarged guard hair such as those shown in Fig. 3. It is a 6 mil guard hair on the scale of 16 to 1.

Fig. 6 is a greatly enlarged section through the artificial fur to show the impregnation and support provided by the rubber or synthetic rubber backing compound.

Our artificial wolverine fur may be regarded as a specialized type of knitted pile fabric and the process of manufacture resembles in certain essential features the processes used in manufacturing such pile fabrics. These features or steps include the knitting of a base fabric on a circular knitting machine and the feeding of fibrous material to the needles of the machine during the knitting operation to form a pile. The pile forms the fur of the finished product and consequently preliminary steps involve the selecting and mixing of fibrous materials adapted to give the fur the desired properties. The initial step in the new process is therefore the manufacture of a suitable sliver from the fibrous materials which are to be used to form the pile, and which will eventually become the fur of the finished artificial fur product.

The preferred materials for this purpose are synthetic fibrous materials, such as nylon or dynel, obtained in the form of crimped staples 10 and cut monofilament 11. Nylon is a known material manufactured by Du Pont, while dynel is a copolymer of vinylchloride and acrylonitrile manufactured by Carbide and Carbon Chemicals Corp. As a specific example, the materials may be nylon 1½ to 2 inch crimped staple, 6 denier, and cut nylon monofilament about 4 mils in diameter and 4 inches long. The nylon staple comprises more or less entangled and intertwined crinkly fibers, somewhat resembling wool or cotton staple. The nylon monofilament is preferably composed of straight fibers which are heat set by the manufacturer. The materials are naturally white but may be dyed if some other color is preferred. If it is desired to closely imitate the natural wolverine fur the nylon staple should be dyed the color of the underfur while the monofilament is dyed the color of the guard hairs.

These materials may be rough mixed mechanically on a mixing floor 12, after which the mixture is fed through a picker 13, which is a known machine for blending fibers. The material should be fed through the picker three or four times to insure a good blend, thereby producing a bulk material in which the 6 denier nylon fiber and the nylon monofilament are uniformly distributed. The proportions may be varied somewhat but excellent results have been obtained using equal parts of each material.

The sliver is manufactured from the blended material on a carding machine 14 such as is used for manufacturing sliver from natural wool staple. The machine produces a loose and fluffy sliver 15 about 2 inches in diameter, and having the fibers combed out somewhat, not twisted but overlapping and sufficiently entangled so that the sliver is self-supporting. The monofilament fibers are disposed generally lengthwise of the sliver and are uniformly distributed therein.

The next step is the knitting of a base fabric 16 and simultaneously feeding the sliver to the needles 17 of the knitting machine 18 to form a pile on one side of the base fabric. For this purpose we prefer to use a circular knitting machine such as is made by the Wildman Manufacturing Co., of Norristown, Pa., having a 24 inch cylinder, for example, and 10 needles per inch. This

machine knits a jersey stitch and is equipped with a plurality of carding heads 19 which are preferably of the type disclosed in application Serial No. 150,447, filed March 18, 1950, now Patent No. 2,710,525. Each carding head feeds a sliver such as previously described herein to the needles of the knitting machine.

The operation of a carding head in taking up a sliver of fibrous material and feeding the material to the knitting machine to form a knitted pile fabric is known and is described in said application Serial No. 150,447, previously referred to. Just before reaching knitting position the needles pass through the feeding card at a uniform depth and each needle picks up a bunch of fibers which is folded around the needle with the aid of an air blast and is incorporated in the stitch. Each needle takes up as much fiber as it can hold, a high rate of feed being maintained so that a heavy pile is formed on one side of the knitted base fabric, composed of the 6 denier crimped nylon fibers and the longer monofilament fibers interspersed therebetween.

The yarn or thread 20 used for knitting the base fabric may be of natural or synthetic textile material. Cotton yarn, size 2-24 cotton count, has been used with excellent results but the size may be varied somewhat.

The knitting machine turns out a tubular fabric 16 having the pile inside, which may be of any desired length, twenty-five feet or more, for example. The tube is slit lengthwise and laid out flat forming a piece of material about 72 inches wide, assuming it was made on a 24 inch knitting machine.

The next step in the process of manufacture is the application of a suitable backing to the base fabric. For this purpose the material may be laid out flat pile side down on a table 22 of suitable dimensions having rows of pointed pins 23 projecting from the surface on which the edges of the base fabric may be pressed down and secured temporarily. There are two side rows and two end rows of these pins and the rows are far enough apart so that the base fabric can be stretched slightly, or enough so that the knitted back presents a level surface free from ridges or wrinkles.

The material having been disposed on the table as described, the back of the knitted base fabric is coated with a suitable binder 25 comprising preferably a synthetic rubber compound. For instance, an emulsion of plasticized neoprene latex in water may be used. The emulsion is spread on in any suitable manner, by means of a squeegee or straight edge, for example, so as to apply a uniform coating which fully covers and impregnates the yarn of the base fabric and that portion of the pile material which is incorporated in the stitches.

While the neoprene emulsion is still wet a layer of gauze may be applied, as disclosed in pending application Serial No. 195,486, filed November 13, 1950, now Patent No. 2,630,619. For the particular purpose for which the product is to be used, however, it has been found that the gauze backing is not necessary. It is preferable to apply a somewhat thin emulsion in sufficient quantity to insure a thorough saturation and coating of the base fabric. The emulsion dries fairly well in air at room temperature, but to finish drying and to set the neoprene it is desirable to subject the material to a brief heat treatment.

For this purpose the material is removed from the table, arranged in loose folds on a hanger 26, and placed in a suitable heat treating oven 27 for the desired time interval. A heat treatment at a temperature of about 225 degrees F. for a period of about one-half hour has been found to give excellent results. The neoprene forms a thin elastic coating on the back of the base fabric which is firmly adherent thereto due to penetration of the yarn. Moreover, due to the substantially complete saturation of the yarn the neoprene in effect forms a matrix in which the yarn and the base of the pile are embedded, whereby the stitches and the individual fibers are firmly

secured together. Since the neoprene is elastic it permits some stretching of the knitted base fabric but the resistance to stretching and the resiliency of the material is increased substantially, which promotes dimensional stability.

After the neoprene backing has been applied and heat treated, the material is fed through a combing machine 28 of known construction in order to straighten out the fibers that may have become entangled and to remove the few loose fibers that may be present. These are fibers that were broken when picked out of the feeding card or which were pulled out with bunches of fibers but were not actually wrapped around the needles and therefore did not become incorporated in the stitches. Several passes through the combing machine may be necessary to completely remove loose fibers and give the surface of the pile a natural lay.

The finished product is an artificial fur 30 which closely resembles natural wolverine fur and has the desirable properties of this fur to which attention has been directed. The knitted base fabric 16 impregnated and coated with neoprene corresponds to the pelt or skin of the natural fur and is highly flexible and resilient, even more so than the natural pelt. It can be cut and sewed easily and is free from raveling. The nylon staple material 19 in the pile forms a dense thick underfur about one inch high, while the monofilament fibers constitute the guard hairs. These guard hairs are substantially uniformly distributed throughout the underfur and project therefrom as in the natural wolverine fur. If the fibers are dyed in the natural colors the resemblance to the natural fur is very close.

In case the artificial fur is to be used for trimming the hoods of parkas for use by troops in snow covered terrain it may be desirable to use undyed fibrous materials, resulting in an artificial fur which has the mechanical properties of wolverine fur but which is substantially pure white in color.

Parka hood ruffs made from the artificial fur are equal to or superior to those made from the natural fur. The dense nylon underfur is warm and affords excellent protection from the wind. The substantial immunity of the natural fur to frosting and icing troubles is retained and can even be improved. As mentioned heretofore the superiority of wolverine fur in this respect is attributed in large part to the nature of the guard hairs. In the artificial fur the guard hairs are made of nylon monofilament which has a smooth surface and a high tensile strength. The guard hairs thus formed are very firmly anchored to the base fabric.

As regards improving on the natural fur, it may be pointed out that the number and size of the guard hairs is important and that while the natural wolverine fur is better than other furs in these respects it is not necessarily perfect from a theoretical standpoint. In the artificial fur the optimum number of guard hairs per square inch can be obtained and they can be made of the exact size which produces the best results, thus avoiding the variations which are found in the natural furs. Generally speaking, it is desirable to use monofilament of somewhat larger diameter than the natural guard hairs, thus increasing the ratio of tensile strength to surface area.

In natural wolverine fur, the guard hairs have a diameter of about 3 mils. Using 4 mil monofilament as in the example described, the artificial fur has 4 mil guard hairs 11, which are substantially larger and stronger than the guard hairs in the natural fur. The size can be increased to about 6 mils, if desired, with a further increase in the strength of the guard hairs. This is at the expense of a decrease in the number of guard hairs, however, also the larger guard hairs are rather stiff, which may be objectionable in the absence of treatment as described below. The guard hairs may be reduced in size, if desired, and monofilament having a diameter as small as 2.5 mils has been used, producing an artificial fur which is very soft

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and comfortable to wear, and more attractive in appearance. These desirable properties are due to the smaller diameter, greater resiliency, and increased number of guard hairs, and under certain conditions may more than compensate for some decrease in more utilitarian properties. It will be understood that the size and number of the guard hairs will be regulated to produce the best results as judged by the user of the finished article and that even in the case of so specific an article as a parka hood ruff there will be some difference of opinion.

The guard hairs 11 should of course be long enough so that they project substantially beyond the underfur 10. When 4 inch cut monofilament is used, the guard hairs in the artificial fur range in length from a minimum of about 1¾ inches to a maximum of about 3 inches. The average length is about 2¾ inches. This is a suitable length of guard hair when the underfur has a height of about one inch. The length may be regulated as desired by using longer or shorter cut monofilament.

The 2 inch nylon crimped staple produces an underfur 10 which appears to be of substantially uniform density up to a height of about one inch. Beyond this height the density fades out rapidly to a maximum height of about 1¾ inches. The thickness or height of the underfur can be regulated by selecting a longer or shorter staple. Relatively fine fibers are desirable to simulate the natural underfur which is soft and warm. The 6 denier size recommended herein has been found to give very satisfactory results, but somewhat larger or finer sizes could be used. A considerable contrast between the size of the underfur fibers and the size of the guard hairs appears to be desirable.

We have already referred to the fact that an improved artificial fur may be made with guard hairs of larger diameter to give increased strength. They also have a greater tendency to stand up perpendicular to the underfur 10 rather than lay over parallel thereto, which is important from the standpoint of deicing.

It has been found, however, that when the size of the guard hairs in the artificial fur is increased appreciably the corresponding increase in the stiffness of the guard hairs makes them somewhat scratchy and irritating to the skin. The effect varies with different individuals, some individuals being able to tolerate guard hairs 35 of any practicable size up to about 6 mils, as shown in Fig. 5 where the size of the monofilament may be compared with the 4 mils monofilament shown in Fig. 4, but the average person finds that artificial fur having guard hairs as large as 3½ mils is somewhat uncomfortable in contact with the face. The discomfort increases with the size of the guard hairs and it has been found advisable therefore to limit the size to about 3½ or 4 mils. Even smaller sizes have been used and make a more acceptable article from the standpoint of comfort, although sacrificing something as regards utility.

In view of the foregoing it has not been possible heretofore to realize the theoretical advantage attending upon an increase in the size of the guard hairs. We have discovered, however, that by tapering the ends 36 of the guard hairs substantially to a point the difficulty as regards skin irritation can be overcome and that with this improvement it becomes possible to make fully acceptable artificial fur having guard hairs as large as 5 mils, or slightly larger.

It is not practicable to taper the guard hairs as such, but the same result can be obtained by tapering the cut nylon monofilament from which the guard hairs are made. This monofilament is supplied in packages 4 inches long and about 1½ inches in diameter, each package containing a great many straight 4 inch monofilaments laid parallel to one another. All the monofilaments in a package are tapered simultaneously by a grinding operation. It is understood that the 4 inch length is given by way of example and that the invention is not confined thereto.

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The grinding can be performed by hand with the aid of a rather fine grinding wheel such as is commonly used for sharpening cutlery and a clamp for holding the package during the grinding operation. The clamp is placed about the center of the package and leaves approximately an inch exposed at each end. Utilizing the clamp as a handle, one end of the package is presented to the periphery of the rotating grinding wheel at a slight angle to its radius while at the same time the package is rotated slowly on its own axis. The rotating wheel separates the filaments and bends them somewhat, and this action combined with the rotation of the package causes the filaments to be ground away for some distance at and near the end, whereby they become tapered or pointed. The taper should preferably begin about ¾ inch or more from the end.

We prefer, however, to use a grinding machine such as manufactured by the E. E. Robinson Company of Nutley, N. J., for use in pointing synthetic bristles for the manufacture of paint brushes. In employing this machine for the purpose of the present invention a number of packages of monofilament held in clamps as previously described are ground simultaneously. The clamps are supported on individual rotatable spindles which are mounted on a rotating table or carriage by means of which the packages of monofilament are put through a definite predetermined grinding cycle which gives the individual filaments the desired taper. It is preferable to employ a relatively short cycle which will taper the filaments substantially to a point but will not produce split and frayed ends such as result from longer grinding cycles.

At the end of the grinding cycle the clamps are reversed and the cycle is repeated so as to taper the filaments at the other ends. This is necessary because in the finished artificial fur either or both ends of the monofilaments may project above the under fur as guard hairs.

The tapered monofilament 35 is employed the same as was done heretofore in the case of nontapered material, being mixed and blended with the nylon staple 10 and formed into slivers for feeding to the knitting machines. The rest of the manufacturing process is also the same as already described. The resulting product is an artificial wolverine fur having properties which make it a superior material for the manufacture of fur ruffs. The fur is substantially nonirritating and comfortable to wear and at the same time the number and size of the guard hairs is selected to give the maximum protection against frosting and icing troubles.

The invention having been described that which is believed to be new and for which the protection of Letters Patent is desired will be pointed out in the appended claims.

We claim:

1. The process of making an artificial fur product, which comprises blending a crimped fiber staple with relatively long and large diameter guard hair fibers, tapering both ends of each guard hair fiber to reduce the thickness and increase the flexibility of the fibers at the ends thereof, before the same are blended with said staple, and knitting a base fabric while feeding the blended fibers to the needles of the knitting machine to form a pile on one side of said base fabric, said pile comprising an underfur composed of said fiber staple and tapered guard hairs formed of said long and large diameter fibers.

2. In the method of making an artificial fur product for use in the manufacture of parka ruffs and the like, said method comprising mixing and blending short and fine fiber staple with relatively long and heavy synthetic guard hair fibers, and knitting a base fabric while feeding the blended fiber material to the needles of the knitting machine, to thereby form a pile on one side of said base fabric comprising an under fur composed of said fiber staple and interspersed projecting guard hairs formed of said guard hair fibers, the improvement which consists in tapering the guard hairs at both ends before mixing

the same with the fiber staple, thereby producing guard hairs with flexible ends which are substantially nonirritating to the skin.

3. In the method of making an artificial fur product for use in the manufacture of parka ruffs and the like, said method comprising mixing and blending short and fine fiber staple with relatively long and heavy synthetic guard hair fibers, and knitting a base fabric while feeding the blended fiber material to the needles of the knitting machine, to thereby form a pile on one side of said base fabric comprising an under fur composed of said fiber staple and interspersed projecting guard hair fibers, the improvement which consists in providing guard hairs of a diameter larger than that of natural fur whereby to strengthen the guard hairs and enhance the utility of the fur product from the standpoint of defrosting and deicing, and tapering the ends of the guard hair fibers before mixing with the fiber staple, thereby producing guard hairs which are flexible at the ends and substantially nonirritating to the skin notwithstanding the increased size of the monofilament from which they are formed.

4. An artificial fur product comprising a knitted base fabric, and a pile made of synthetic fibers locked in the stitches of said base fabric and projecting from one side thereof, said pile being formed in part of relatively short and fine fibers constituting an under fur and in part of relatively large diameter straight fibers projecting from the under fur as guard hairs, said guard hairs being tapered substantially to a point at their projecting ends to thereby improve the quality of the fur for use in wearing apparel.

5. An artificial fur product comprising a knitted base fabric, and a pile made of synthetic fibers locked in the stitches of said base fabric and projecting from one side thereof, said pile being formed in part of relatively short and fine nylon staple constituting an under fur and a plurality of relatively large diameter nylon fibers projecting from said under fur as guard hairs, each said guard hair fiber being tapered at both ends and forming two generally parallel guard hairs which are sufficiently flexible at the ends so that the fur is substantially nonirritating to the skin when made into wearing apparel.

6. The process of making an artificial fur product, which comprises mixing crimped synthetic fiber staple with relatively long straight synthetic monofilament fibers, said long straight monofilament fibers having a diameter which is at least 2.5 times the diameter of the crimped staple fibers, forming a sliver of said materials, knitting a base fabric while feeding said sliver to the needles of the knitting machine by means of a carding head to form a fur-like pile on one side of said base fabric, and combining the pile to remove loose fibers and produce a natural lay.

7. The process of making an artificial fur product, which comprises blending short crimped fiber staple with relatively long straight monofilament fibers, said long straight monofilament fibers being all of the same length and at least twice as long as said crimped fiber staple to provide guard hairs, knitting a base fabric while feeding the blended fibers to the needles of the knitting machine to form a pile on one side of said base fabric, said pile comprising an underfur composed of said short fiber staple and guard hairs formed of said long straight monofilament fibers, applying a coating of synthetic rubber compound in liquid form to the back of said base fabric, subjecting the fabric to a heat treatment to dry and cure said coating, and combing the pile to remove loose fibers and produce a finished appearance.

8. The process of making an artificial fur product, which comprises blending crimped fiber staple with relatively long straight monofilament guard hair fibers, knitting a base fabric while feeding the blended fibers to the needles of the knitting machine to form a pile on one side of said base fabric, said pile comprising an under-

fur composed of said fiber staple and guard hairs formed of said guard hair fibers, coating the back of the base fabric with an emulsion of neoprene or similar synthetic rubber compound in water or other suitable carrier, the said emulsion being thin enough and being applied in sufficient quantity to thoroughly saturate the base fabric, at least partially drying the said coating at room temperature, and subjecting the fabric to a heat treatment to complete the drying of said emulsion and convert the same into an elastic backing in which the yarn of the base fabric and the base of the pile are embedded.

9. The process of making an artificial fur product having an underfur and interspersed guard hairs which project therefrom, which consists in selecting fine crimped fiber staple suitable for the underfur, the length of said fibers being approximately twice the desired height of the underfur, selecting cut fibers having a diameter equal to the diameter of the desired guard hairs and a length about one and one-half times the desired length of said guard hairs, mixing said materials in the proper proportion to give the desired ratio of guard hairs to underfur, knitting a base fabric on a knitting machine to form an artificial pelt for the said product, simultaneously feeding said mixed fiber materials to the needles of the knitting machine to form an artificial underfur with interspersed guard hairs on one side of said artificial pelt, coating the back of said pelt with a synthetic rubber compound in liquid form and in sufficient quantity to saturate the yarn of which said artificial pelt is composed, and curing said rubber compound to anchor the said underfur and guard hairs to said pelt.

10. An artificial fur product, comprising a knitted base fabric, a pile made of synthetic fibers locked in the stitches of said base fabric and projecting from one side thereof, said pile being formed in part of relatively short and fine crinkly fibers constituting an underfur and in part of longer and substantially larger straight fibers projecting from the underfur as guard hairs, said guard hairs being substantially uniformly distributed throughout the underfur, and a backing of elastic material which covers the base fabric and penetrates between the stitches thereof.

11. An artificial fur product as claimed in claim 10, wherein the underfur is made of nylon fiber and the guard hairs are made of nylon fiber.

12. An artificial fur product as claimed in claim 10, wherein the backing is composed of neoprene.

13. An artificial fur product as claimed in claim 10, wherein the backing includes a layer of open mesh woven material embedded in said elastic material.

14. An artificial fur product comprising a knitted base fabric, a pile made of synthetic fibers incorporated in the stitches of said base fabric and projecting from one side thereof, said pile being formed in part of crimped staple fibers constituting a dense underfur and in part of relatively long and straight guard hair fibers substantially uniformly distributed throughout said underfur and projecting therefrom as guard hairs, the average length of said guard hairs being at least about double the height of said underfur.

15. An artificial fur product as claimed in claim 14, wherein the denier size of the guard hairs is at least about five times the denier size of the fibers of the underfur.

16. An artificial fur product as claimed in claim 14, wherein the underfur fibers are all of the same denier and the guard hairs are all of the same denier, the denier of the guard hairs being from about five to about thirty times the denier of the underfur fibers.

17. An artificial fur product as claimed in claim 14, wherein the height of the underfur above the base fabric is on the order of about one inch and the length of the guard hairs averages about $2\frac{3}{4}$ inches.

18. An artificial fur product comprising a knitted base fabric, a pile made of synthetic fibers incorporated in the stitches of said base fabric and projecting from one side

thereof, said pile being formed in part of fine crimped staple fibers all of the same diameter and constituting a dense underfur, the remainder of said pile being composed of straight fibers substantially uniformly distributed throughout the underfur and projecting therefrom as guard hairs, said guard hairs all having the same diameter which is at least two and one-half times the diameter of the fibers composing the underfur and having an average length which is at least twice the height of the underfur, and a flexible coating of a synthetic rubber compound covering the other side of said base fabric and penetrating between and around the fibers thereof.

19. An artificial fur product comprising a knitted base fabric, a pile made of synthetic fibers incorporated in the stitches of said base fabric and projecting from one side thereof, said pile being formed in part of fine crimped staple constituting a dense underfur about one inch high, the remainder of said pile being formed of straight fibers substantially uniformly distributed throughout the underfur and projecting therefrom as guard hairs, said guard hairs having a diameter not less than about 2.5 mils nor greater than about 6 mils, and varying in length from a minimum of about $1\frac{3}{4}$ inches to a maximum of about 3 inches, and a flexible coating of a synthetic rubber compound which covers the other side of said base fabric and penetrates between and around the fibers thereof.

20. The process of making a fabric backed fur-like material by a knitting operation using hooked needles, which process comprises feeding fiber staple of differing selected lengths and base yarn into hooks of said needles and knitting the said base yarn with said fiber staple to

form a knitted base fabric and a fur-like pile on one side of the knitted base fabric, whereby the resulting pile includes under fur comprising shorter lengths of fiber staple and outer fur comprising longer lengths of fiber staple.

21. The process of making a fabric backed fur-like material by a knitting operation using hooked needles, which process comprises the selection of a multiplicity of fiber staple pieces comprising at least two differing lengths wherein the longer lengths are of greater diameter, feeding the fiber staple and base yarn into hooks of said needles and knitting the said base yarn with said fiber staple to form a knitted base fabric and a fur-like pile on one side of the knitted base fabric, the differences in length between shorter and longer lengths of fiber staple being sufficiently marked whereby the resulting pile includes a clearly defined zone of under fur comprising shorter lengths of fiber staple and another zone of outer fur comprising longer lengths of fiber staple.

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