

July 16, 1940.

R. AMORY

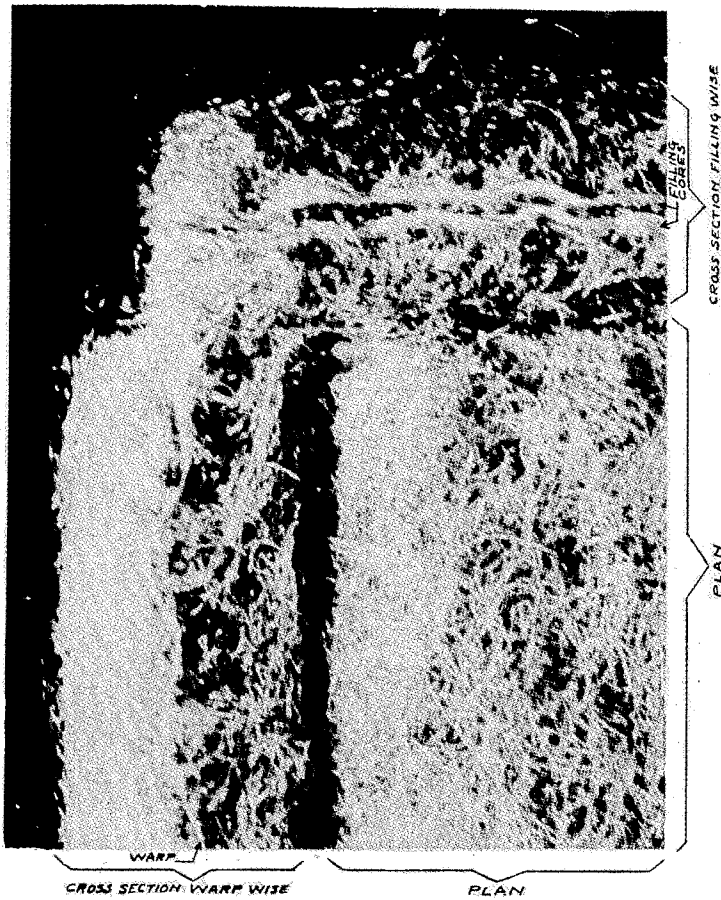
2,208,533

HOUSEHOLD BLANKET

Filed Dec. 20, 1939

5 Sheets-Sheet 1

Fig. 1



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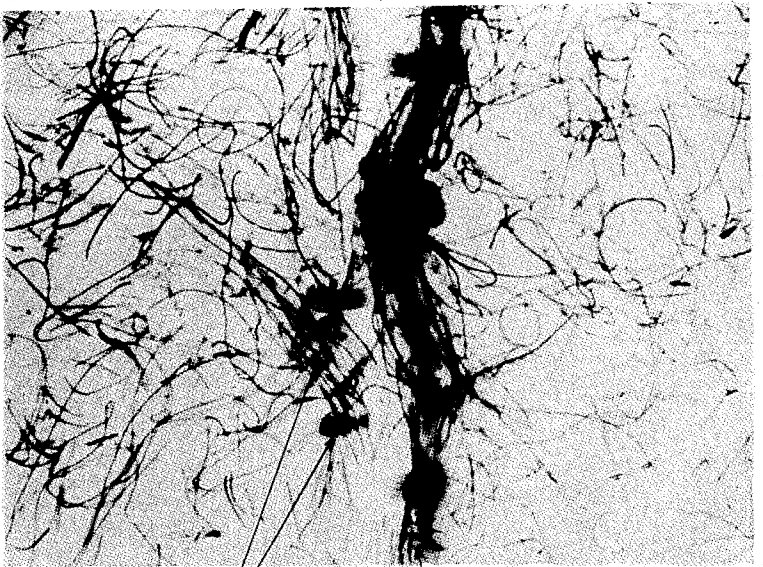
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Fig. 3a



CROSS SECTION FILLING WISE

Fig. 2

CROSS SECTION
FILLING WISE

PLAN



PLAN

CROSS SECTION
WARP WISE

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5 Sheets-Sheet 3

Fig. 3

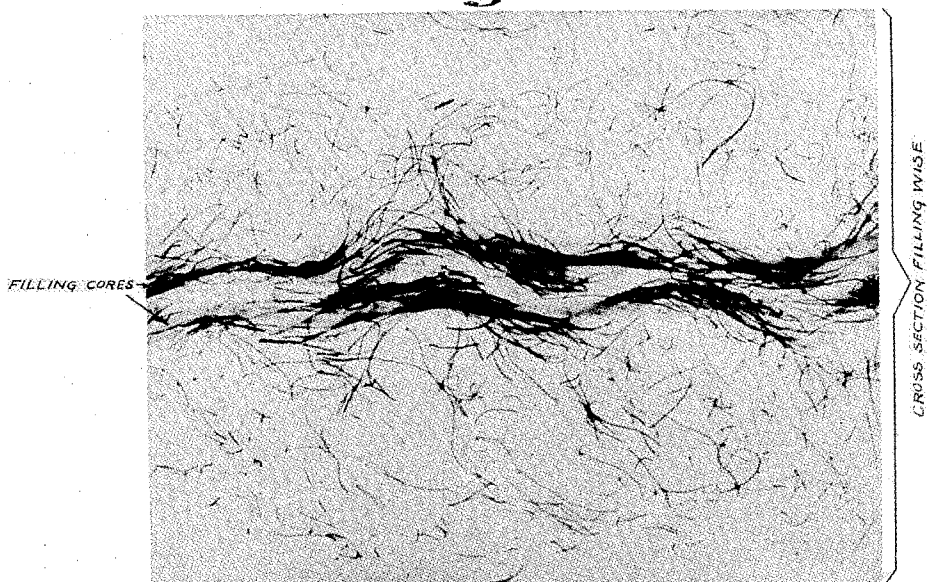
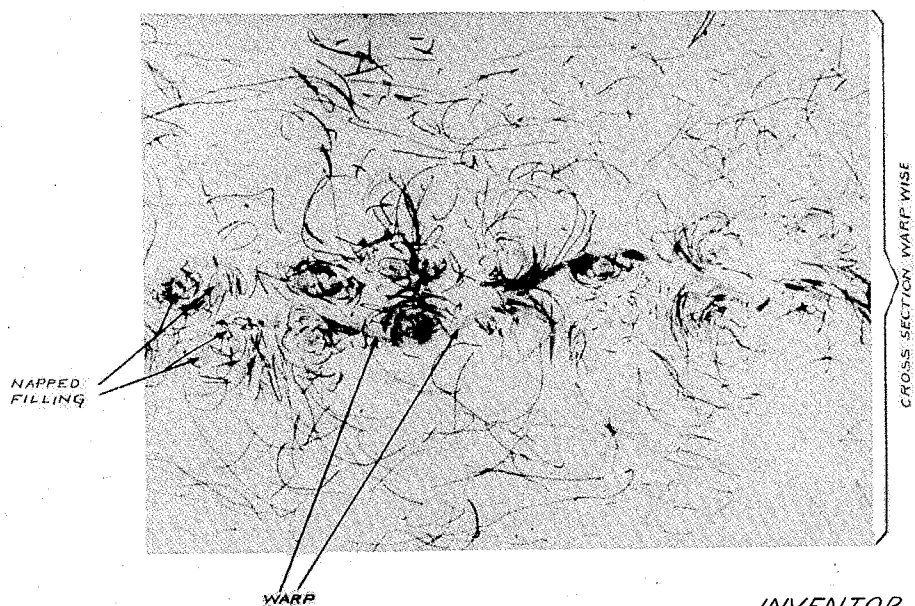


Fig. 4



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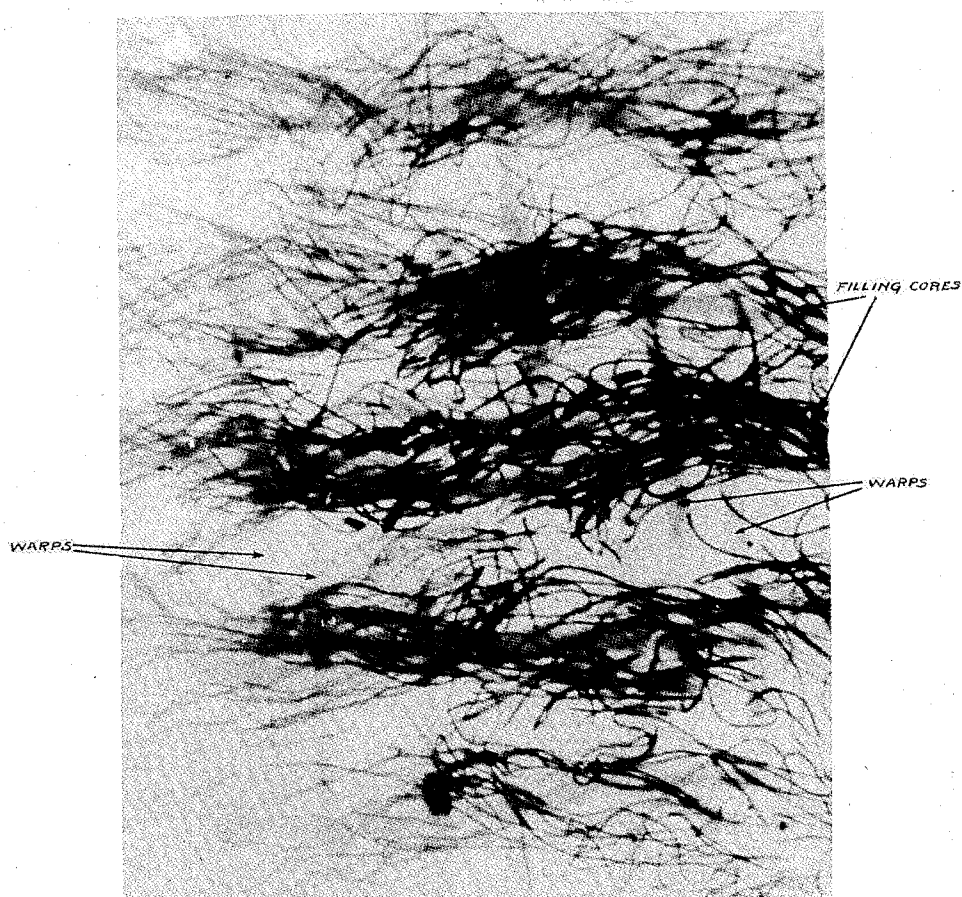
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Fig. 5

CROSS SECTION HORIZONTAL



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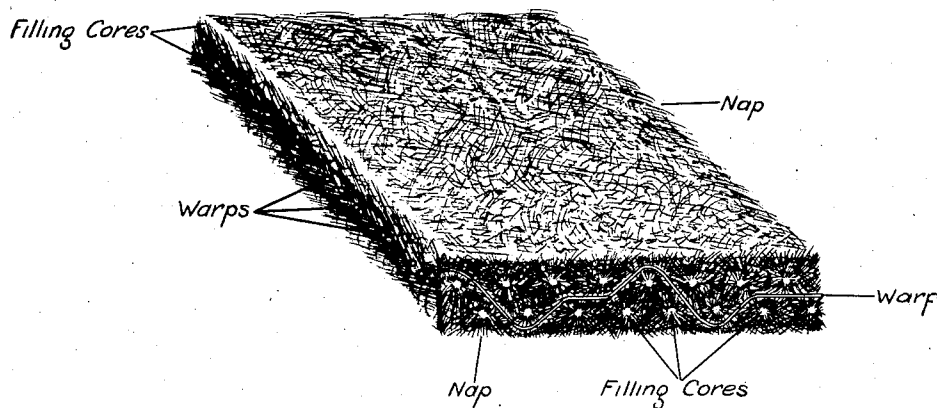
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Fig. 6



INVENTOR

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UNITED STATES PATENT OFFICE

2,208,533

HOUSEHOLD BLANKET

Robert Amory, Milton, Mass., assignor to Nashua Manufacturing Company, Nashua, N. H., a corporation of New Hampshire

Application December 20, 1939, Serial No. 310,191

19 Claims. (Cl. 139—420)

This invention relates to a novel artificial-fibre household blanket of improved construction and characteristics and provides a blanket consisting essentially or principally of rayon fibre but having the advantages of all-wool blankets, and at a far lower cost. Moreover, my blanket in important respects is superior to many if not most woolen blankets of equivalent or even somewhat greater weight and cost. The tendency of the present day demand is toward lighter blankets, but it is difficult to provide, particularly at a popular price, a blanket which is attractive, both light and strong, relatively non-shedding, of high moisture absorption, and at the same time really warm, that is, of high insulating value. The present invention provides all these advantages in a low-density blanket of relatively low cost characterized by a novel lofty and homogeneous, though firmly anchored, stiff and resilient nap, consisting essentially or principally of staple rayon fibre in the blanket construction herein described. These objects are attained by my novel blanket having a composite filling yarn in which short lengths of relatively coarse denier artificial fibre form the wrapping portion of each thread of filling yarn. This wrapping portion, preferably slack twisted and undrafted, though with the fibres randomly intermingled, is lightly laid upon and loosely twisted with or loosely wound around so as to be carried by a small but relatively strong core thread (preferably a spun rayon core) which serves as a reenforcement for the napped rayon exterior of the blanket, in which practically all of what originally was the available or exposed wrapping portion of the filling appears as nap of the finished blanket. These filling threads made up of core yarn, as more fully hereinafter described, are woven upon a light but strong wrap, preferably a warp of spun rayon fibre. Thus, the finished blanket has a relatively large proportion of a lofty, uniform, resilient and thoroughly intermingled nap, which provides the advantages above set forth, and a close, homogeneous nap which in normal household use and cleaning of the blanket does not become materially dislodged, matted, or otherwise adversely affected.

The blanket construction and how it secures these advantages will now be described in connection with the drawings, in which:

Figure 1 is a photomicrograph (7×) showing a plan view of a portion of a typical blanket made in accordance with this invention, combined with two vertical cross-sectional views, namely, a warp-wise cross-sectional view at the left, and a

filling-wise cross-sectional view above the plan view;

Fig. 2 is a photomicrograph (7×) showing in plan, together with a warp-wise vertical cross-sectional view below and a filling-wise vertical cross-sectional view at the left, a partially completed blanket of the invention before the napping operation has been performed, illustrating a typical blanket construction of the invention,—the same construction as in Fig. 1;

Fig. 3 is a photomicrograph (15×) showing a vertical cross-section of a typical blanket, taken filling-wise, and showing the nap as herein described extending above and below the two filling threads there shown which extend across the central horizontal portion of the figure;

Fig. 3a is a photomicrograph (25×) showing another vertical cross-section of the blanket of Fig. 3, still further enlarged, taken filling-wise and prominently showing one napped filling thread (vertically arranged in the photomicrograph);

Fig. 4 is a photomicrograph (15×) showing a vertical cross-section of the blanket of Fig. 3, taken warp-wise;

Fig. 5 is a photomicrograph (25×) showing a horizontal cross-sectional view taken at the base of the nap and just above the level of the interwoven filling and warp yarns of the blanket; and

Fig. 6 is a perspective drawing illustrating in conventional form the blanket of this invention.

In the manufacture of the preferred embodiment of the blanket of this invention, the core of the filling may be made in conventional manner from ordinary spun, hard-twisted rayon, say in a yarn number of 19s (cotton count) and a denier of 1.0 to 2.5, and in which the fibre length is of little consequence so long as the core is sufficiently strong. I have discovered, however, that the filling wrapping to provide the full advantages of this invention must be made up of a yarn of relatively larger denier with an average in excess of 2.75,—4.50 to 5.0 or even larger being the present preferred average, mean, or predominating denier. The fibre length is also of importance and the filling wrapping should include a substantial proportion of fibres of a length of $1\frac{1}{2}'' \pm \frac{1}{2}''$ in order to secure an adequate number of ends to provide the desirable nap of this invention. Also, as in "Snla" rayon, the preferred irregular cross-section of the fibre itself appears to be of advantage in securing a springy nap, and it is found in practice that apparently the more irregular the cross-section the springier the material, for example, fibre cross-section in

general resembling that of structural steel shapes of channels, angles, I's, H's, or the shape of the letter E in cross-section, and somewhat crinkly or bent, most closely approximates the mechanical, stiffly resilient characteristics of relatively high-grade fine wool fibre so as to give the best appearance and feel or hand in the finished product. After the mixing of rayon fibres for the filling wrapping to give the desired color, it is subjected to carding as in a revolving woolen card, preferably one in which the sliver from the card is associated with the core by a rubbing action as in the carding machine of the Whipple & Ekdahl Patent No. 1,439,347, December 19, 1922, following which the filling yarn, after a light twisting, is ready for the loom.

In the preferred practice, the filling wrapper or cover is but slightly and slackly twisted with or around the core and is subjected to little or no drafting effect,—the less drafting the better. As a result, the fibres of the wrapping are not materially or undesirably parallelized as they would be in a system wherein the wrapping is substantially drafted, as is common in the manufacture of yarn in the cotton system, nor is the resultant wrapper like a piled yarn. Alternative to the use of the device of the above mentioned patent, the so-called Pease frame may be used in which the cover is but slightly drafted before being lightly twisted about the core, in this case the draft ordinarily not exceeding 2.

In either practice, the fibres are randomly and heterogeneously intermingled and tangled, as distinguished from substantial parallelizing thereof as occurs with appreciable drafting (as in an ordinary cotton or worsted system for example), with the result that the napping operation may be conducted so as to produce the characteristic nap of the blanket of this invention, the stiffness and resiliency of which approximates that of a fine wool blanket. Moreover, the nap of the blanket of the present invention minimizes heat transfer therethrough because of the close homogeneous character of the nap by reason of the relatively large number of random crossings of the unarrayed fibre, thus providing a large number of small, more or less uniformly spaced "dead air cells" which tend to minimize convection, thus giving a blanket of high insulating value,—for, by far, the major portion of heat transfer through any blanket is by reason of convection.

Though the size of the core should naturally bear some reasonable relationship to the size of the filling wrapping, the core may vary from say 14s to 30s with a filling wrapping of 6s, ranging to as large as 1s, or coarser, though preferably 2s to 4s associated with a core of 20s,—all referring to cotton count.

The filling thus prepared is then woven, referring to the drawings (Figs. 1-5), with warp threads of relatively small cross-section, for example, 20s, as compared with the filling which shows carrying thereon and interwoven therewith the core yarn filling heretofore described, consisting of a core and the surrounding wrapping which, when repeatedly and carefully napped, serves to provide the characteristic up-standing nap of the blanket, as clearly shown in Figs. 1, 3, 3a, and 4, typical photomicrographs illustrating the blanket of the invention, the warp threads and the filling core being relatively small and hard-twisted, are buried in the filling so as not to be appreciably affected by the napping operation, and since each filling thread is strengthened by its core thread, the rayon wrap-

ping as herein described may be much more effectively and more fully napped than an ordinary filling so as to provide the desirable nap characteristic of the blanket of this invention, the character and roughness of which are very much enhanced by reason both of the nature of the fibre itself and the manner and condition of its relationship to the core. Also, there is secured a very high weight and volume ratio of nap to total weight and volume of the blanket, for example, 30% (± 5) by weight and 60% (± 5) by volume, in the preferred blankets.

In accordance with this invention, there is provided a novel low-density blanket having a loftier and closer intermingled nap than is found or can be had in any commercial all-wool blanket of equal weight and finished strength. Because of these features, my blanket has the warmth, appearance and feel of a high-grade all-wool blanket though possessing more weft-wise strength, and low cost advantages, even lower in cost than a medium grade all-wool blanket. For example, in a typical commercial winter-weight blanket of this invention weighing from 11 to 12 oz. per sq. yd., a thickness of approximately $\frac{1}{3}$ of an inch is provided (.300"—.365") and in which the filling strength is from 28-36 lbs. and the warp strength is adequate, approximately 30 lbs., despite the fact that the warp does not exceed 25% by weight of said blanket.

Also important, as above mentioned, my blanket provides a very rapid and substantial moisture regain in excess of 10% by weight, and usually 12.2%-12.5%, as compared with 12.7%-13.5%, as is common in all-wool blankets, whereas cotton blankets ordinarily exhibit a moisture regain of substantially less than 8%. The moisture absorption is tested by obtaining the moisture regain from a bone-dry condition, the blankets being exposed to 65-67% humidity at a temperature of 70° F. Moreover, heat transmission tests demonstrate that the insulating qualities of the blanket of this invention are superior to all-wool blankets of comparative price, and, in fact, at least equal to various all-wool blankets heretofore tested selling at a price in excess of one-and-a-half times the current sales price of the blankets of this invention. As above mentioned, the major portion of heat transfer through the blanket is by reason of convection, and the heat transfer may be conveniently tested in any standard method of measuring heat transfer through such a medium and, preferably in addition, by measuring the resistance to airflow therethrough. The blanket of this invention, in both types of tests, because of its lofty homogeneous nap, is equal or superior to wool blankets such as just referred to.

Though, for convenience, the preferred artificial-fibre employed in this invention has been referred to in the specification as "rayon," meaning viscose or cuprammonium cellulosic fibres commonly termed rayon, it is intended that various other artificial-fibres may be used, including cellulosic or protein base fibres, which will provide the blanket as herein claimed, though if cellulose acetate fibre be used, some sacrifice of moisture absorption or regain is involved. Also, if desired for additional springiness, it is contemplated that a small percentage of wool fibre (for example 10-20%) may be employed by initially mixing it with the artificial fibre filling covering portion.

Having described my invention, what I wish to claim is:

1. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound about and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling.

2. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound about and carried upon a smaller and hard-twisted core thread with substantially all of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling.

3. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling, said blanket having a moisture absorption factor in excess of 10% by weight.

4. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and the napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling, said blanket having a moisture absorption factor in excess of 10% by weight, and an insulating value of the order of that of an all-wool blanket of comparative weight and thickness.

5. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of

an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with substantially all of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling, said blanket having a moisture absorption factor in excess of 10% by weight.

6. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with substantially all of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling, said blanket having a moisture absorption factor in excess of 10% by weight, and an insulating value of the order of that of an all-wool blanket of comparative weight and thickness.

7. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 4.00, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a hard-twisted warp interwoven with said filling.

8. As a new article of manufacture, a relatively thick low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 4.00, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with substantially all of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a hard-twisted warp interwoven with said filling.

9. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 4.00, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the napped thick-

nesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a hard-twisted fine warp interwoven with said filling, said blanket having a moisture absorption factor in excess of 10% by weight.

10. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 4.00, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted fine warp interwoven with said filling, said blanket having a moisture absorption factor in excess of 10% by weight and an insulating value of the order of that of an all-wool blanket of comparative weight and thickness.

11. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple rayon fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound about and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling.

12. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple rayon fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling, said blanket having a moisture absorption factor in excess of 10% by weight.

13. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple rayon fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling, said blanket having

a moisture absorption factor in excess of 10% by weight and an insulating value of the order of that of an all-wool blanket of comparative weight and thickness.

14. As a new article of manufacture, an all-rayon low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple rayon fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound with and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling, said blanket having a moisture absorption factor in excess of 10% by weight and an insulating value of the order of that of an all-wool blanket of comparative weight and thickness.

15. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft, substantially non-drafted yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound about and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling.

16. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn drafted less than 2.00, consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound about and carried upon a smaller and hard-twisted core thread with a major portion of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, and a relatively small hard-twisted warp interwoven with said filling.

17. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound about and carried upon a smaller and hard-twisted core thread with substantially all of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, said nap constituting at least 25% by weight of the total weight of the blanket, and a

relatively small hard-twisted warp interwoven with said filling.

18. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 2.75, said fibres being mainly fibres in excess of 2.75 denier, loosely wound about and carried upon a smaller and hard-twisted core thread with substantially all of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, said nap constituting at least 25% by weight of the total volume of the blanket, and a relatively small hard-twisted warp interwoven with said filling.

19. As a new article of manufacture, a low-density household blanket composed principally of a filling having a napped wrapping of relatively coarse, soft yarn consisting essentially of randomly intermingled staple artificial fibres of an average fibre denier of at least 4.00, said fibres being mainly fibres in excess of 2.75 denier, loosely wound about and carried upon a smaller and hard-twisted core thread with substantially all of the volume of the blanket constituted by said wrapping raised in the form of a lofty uniform homogeneous nap throughout the area and napped thicknesses of the blanket on both sides thereof, though firmly anchored to the core thread, said nap constituting at least 25% by weight of the total weight of the blanket, and a relatively small hard-twisted warp interwoven with said filling.

ROBERT AMORY.

CERTIFICATE OF CORRECTION.

Patent No. 2,208,533.

July 16, 1940.

ROBERT AMORY.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, first column, line 38, for the word "wrap" read --warp--; page 3, first column, line 23, claim 2, for "exeess" read --excess--; and second column, line 28, claim 6, for "misture" read --moisture--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 10th day of September, A. D. 1940.

DISCLAIMER

2,208,533.—*Robert Amory*, Milton, Mass. HOUSEHOLD BLANKET. Patent dated July 16, 1940. Disclaimer filed January 2, 1947, by the assignee, *Nashua Manufacturing Company*.

Hereby enters disclaimer to claims 2, 3, 4, 5, 6, 8, 9, 10, 12, 13, 14, 17, 18, and 19 of said patent.

[*Official Gazette January 28, 1947.*]