Patented Mar. 31, 1953

2,633,446

UNITED STATES PATENT OFFICE

2,633,446

METHOD OF TREATING TEXTILE ARTICLES

Joseph C. King, Spartanburg, S. C., assignor to Fairforest Company, Spartanburg, S. C., a corporation of South Carolina

No Drawing. Application June 10, 1950, Serial No. 167,490

5 Claims. (Cl. 167—84)

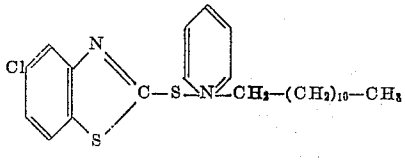
1

This invention relates to a method of impregnating yarns or articles of clothing which are made to shield the wearer against infection from the outside, such as the germ of athlete's foot, commonly known as *Trichophyton interdigitale*. It has been found by various tests that to soak the feet of a patient for about five minutes in a water bath containing about .04 gram per liter of sodium hypochlorite, and then having the wearer wear exclusively socks which were treated according to my method or socks knitted from yarns which were treated according to my method, provides for the elimination of the infection. By the treatment in the sodium hypochlorite solution and the wearing of the socks treated according to the hereinafter described method or the yarns from which they are made, shields the foot of the wearer from reinfection from shoes which the patient has heretofore worn.

This application is a continuation in part of my patent application Serial No. 119,195 filed October 1, 1949, now abandoned.

Broadly this invention consists in thoroughly wetting socks, stockings or other wearing apparel, or the yarn from which such are made, with an aqeous solution containing a small percentage, as of the order of one to ten percent by weight, of lauryl pyridinium salt of 5-chloro-2-mercapto benzo thiazole, then removing a major part of the water, drying and subjecting the thus impregnated textile product to a temperature above 212° F. but below the scorching point of the goods or yarn. By holding the dried or comparatively dry impregnated goods at such elevated temperatures for one to ten minutes, the time varying inversely with the temperature, the lauryl pyridinium salt of 5-chloro-2-mercapto benzo thiazole is set therein. It will not wash out in laundering operations. An exposure to a temperature of 230 F. for five minutes after drying is ample to set this impregnating agent in the textile.

In the treatment of socks or stockings to serve as a shield against reinfection, the socks are immersed for about five minutes in a water bath at approximately 120 degrees F. having a three percent by weight dispersion of twenty-five percent lauryl pyridinium chloro-captax, which is the commonly used expression for lauryl pyridinium salt of 5 chloro-2-mercapto benzo-thiazole or $C_{24}H_{33}N_2S_2Cl$—or structurally:



2

The socks are then removed and placed in an extractor where they are extracted to approximately 76 percent moisture pick-up and then placed in a chamber and cured for about five minutes at 230 degrees F. At this point the socks are ready for use.

Now, in the event the yarn from which the socks are to be knitted is desired to be treated instead of treating the socks after they have been knitted, the yarn is processed while it is in cone or cheese form in a package dyeing machine by forcing through the packages a water solution having about three percent of the solution thereof composed of 25% lauryl pyridinium chloro-captax, which is fully described above, and the water solution being held at approximately 120 degrees F. The water solution is forced from the inside out for about 10 minutes, and then the direction of flow is reversed for about 10 minutes. Of course, the operation could be first carried out by forcing from outside to inside and then inside to outside as this would make no difference. This cycle should be repeated about twice. After this, the cones are removed from the dyeing machine and placed in an extractor and extracted until the yarn cones have about a 76 percent moisture pick-up. Then the cones are placed in a suitable drying machine or oven and dried. After drying, the yarn should be kept at about 230 degrees for at least five minutes in a curing operation, preferably in another retort. The yarn is now ready to be woven into socks, leggings and other articles of wearing apparel where it is desired to protect the portions of the body covered by the articles of clothing knit or woven from this yarn from infection of the germ of athlete's foot.

It is, of course, to be recognized that it is entirely possible to use other methods of treating than above described, as a different type of carrier to treat the fibres before processing into yarn could be employed. The method of pumping, the time element, the temperatures, and method and means of drying and curing could be varied without departing from the spirit of the invention.

It is thus seen that after all fungi on the feet have been destroyed by suitable chemicals, an example of which is above described, the feet of a person can be effectively shielded or insulated in socks or stockings that have been impregnated with the lauryl pyridinum salt of 5-chloro-2-mercapto benzo thiazole; this prevents the normal passage of fresh spores to the skin. Therefore, this invention is not a cure but a means of greatly reducing the possibility of further foot infection. The above outlined treatment of socks and yarn and other articles of wearing apparel is permanent for the normal life of the wearing apparel or for shoe linings, or any other type

of material which is disposed adjacent the skin of the wearer. Articles of wearing apparel treated as above described will withstand numerous washings and boilings without causing the chemical lauryl pyridinium chloro-captax from being removed from the articles.

It is also desirable to treat the interior of the shoes of the wearer with the above described solution of lauryl pyridinium chloro-captax, fully described above.

In the specification there has been set forth a preferred embodiment of the invention; this is however not for purposes of limitation, the scope of the invention being defined in the claims.

I claim:

1. That method of treating yarn and articles of clothing made therefrom to render such impenetrable by *Trichophyton interdigitale* which comprises subjecting the same to an aqueous solution containing a small percentage of lauryl pyridinium salt of 5 chloro-2 mercapto benzo thiazole, removing much of the water, then drying it, and then subjecting the yarn or article made therefrom to a temperature of above 212 degrees F., but below the scorching point to set the said salt therein to prevent its being washed out by laundering.

2. That method treating textile products to render them impenetrable by the fungus *Trichophyton interdigitale* which comprises subjecting the textile products to an aqueous solution containing from one to ten percent of lauryl pyridinium salt of 5 chloro-2 mercapto benzo thiazole, then removing a major part of the moisture, and then subjecting the products so treated to a temperature of above 212 degrees F. to set the lauryl pyridinium salt of 5 chloro-2 mercapto benzo thiazole therein to prevent its being washed out in laundering operations.

3. That method of treating a stocking to prevent the fungus *Trichophyton interdigitale* from penetrating the same, which comprises subjecting the stocking to an aqueous solution containing a percentage of between one and ten percent by weight of lauryl pyridinium salt of 5 chloro-2 mercapto benzo thiazole, then extracting a portion of the moisture from the stocking, and then removing the remaining moisture therefrom by heat and subjecting the stocking to a temperature above 212 degrees F. for a period of from one to ten minutes to set the said salt therein to prevent its being washed out by laundering.

4. That method of treating a yarn to prevent the fungus *Trichophyton interdigitale* from penetrating the same, which comprises subjecting the yarn to a bath containing a percentage of between one and ten percent by weight of lauryl pyridinium salt of 5 chloro-2 mercapto benzo thiazole, then extracting a portion of the moisture from the yarn, and then removing the remaining moisture therefrom and subjecting the yarn to a temperature above 212 degrees F. for a period of from one to ten minutes to set the said salt therein to prevent its being washed out by laundering.

5. That method of treating a textile product embracing yarn to render the same impervious to the fungus *Trichophyton interdigitale* which comprises subjecting the product to an aqueous solution containing about three percent by weight of a 25% solution of lauryl pyridinium salt of 5 chloro-2 mercapto benzo thiazole, for about five minutes at a temperature of about 120 degrees F., then extracting some of the moisture from the product, then drying the product, then subjecting the product to a temperature of about 230 degrees F. for about five minutes to set the said salt therein to prevent its being washed out by laundering.

JOSEPH C. KING.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,962,109	Alvord	June 5, 1934
2,095,092	Barton	Oct. 5, 1937
2,131,244	Williams	Sept. 27, 1938
2,446,796	Van Campen	Aug. 10, 1948
2,449,274	Broll	Sept. 14, 1948

FOREIGN PATENTS

Number	Country	Date
479,925	Great Britain	May 11, 1936

OTHER REFERENCES

Clinical Medicine, December 1940, page 432, "Ringworm of the Feet," Greenbaum.

J. Textile Institute, March 1945, page A113, "Impregnated Cotton Hose: Use in Treatment of Athlete's Foot." Crittenden et al.

Journal American Medical Association, October 29, 1932, page 1531, "Disinfection of Shoes and Stockings in Ringworm of the Feet."

J. Investigative Dermatology, volume 7, 1946, pages 239 to 253, especially page 247, "Fungistatic Agents for Treatment of Dermatophytosis." Hopkins et al.

Am. J. Pharm., January 1947, pages 5 to 14, especially page 9, "Progress in Fungous Disease Therapy." Schwartz.

American Druggist, February 1947, page 201, "New Therapy for 'Ringworm'"—Trimethyl Cetyl Ammonium Pentachlorphenate (Ad.).

Davies, "Chemical Constitution and Fungistatic Action of Organic Sulphur Compounds." Biochem. J., volume 40, 1946, pages 331 to 334.