

April 1, 1941.

A. E. USHAKOFF

2,236,552

COVERING ARTICLE

Filed March 30, 1939

2 Sheets-Sheet 1

Fig 2

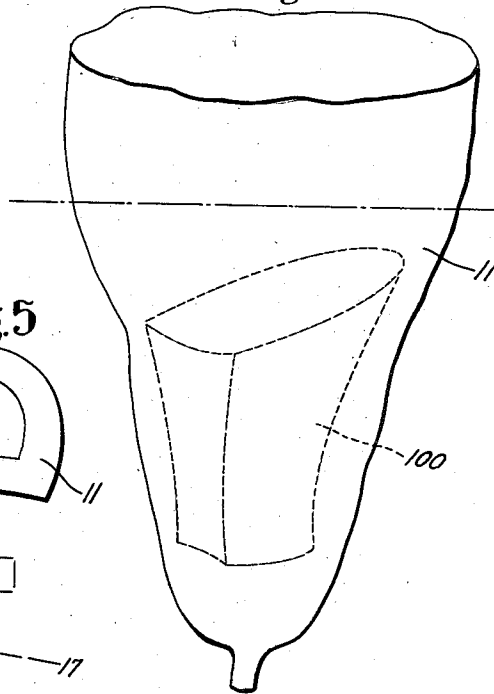


Fig 1

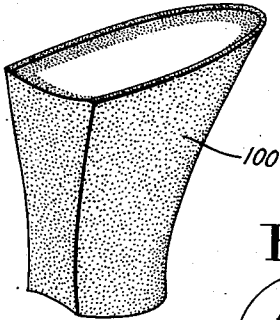


Fig 5

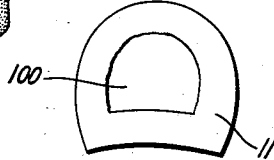


Fig 3

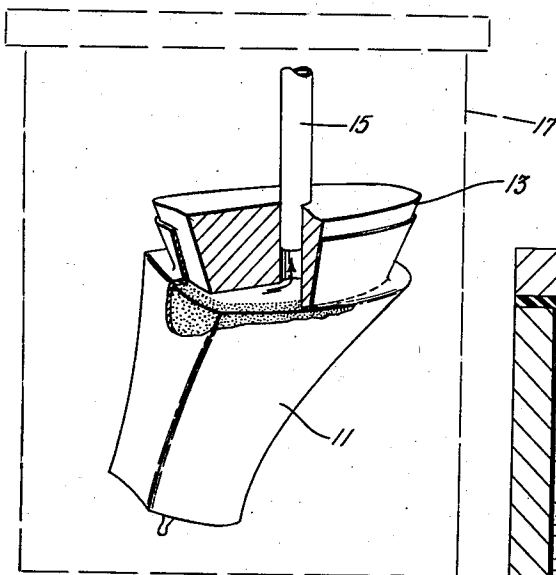


Fig 6

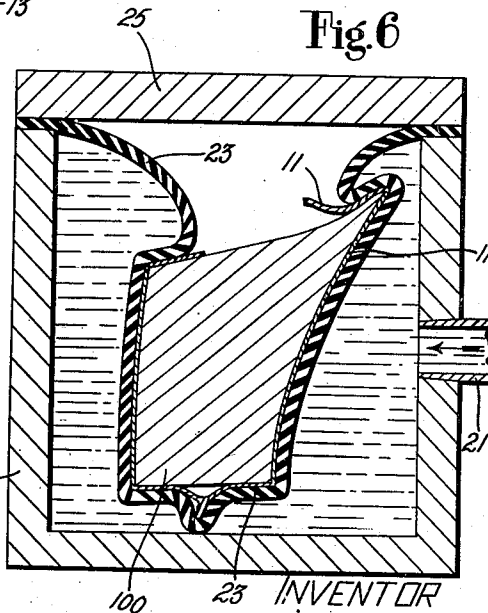
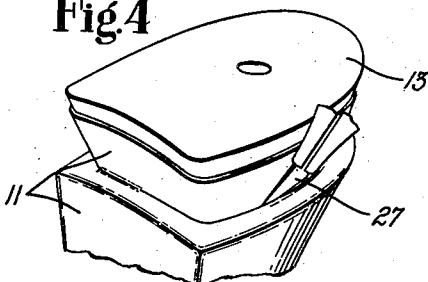


Fig 4



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2 Sheets-Sheet 2

Fig.7

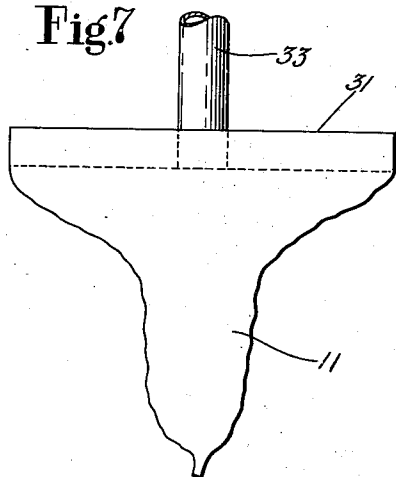
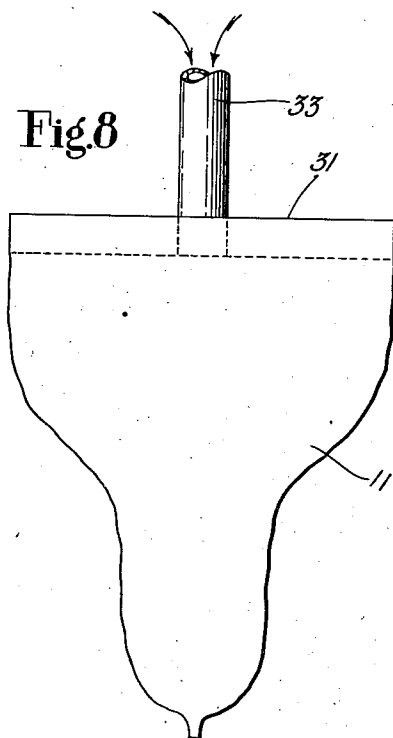


Fig.8



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UNITED STATES PATENT OFFICE

2,236,552

COVERING ARTICLE

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Application March 30, 1939, Serial No. 264,996

28 Claims. (Cl. 12—147)

This invention relates to the manufacture of a thin-walled hollow object, to an article having shrunk thereon a thin-walled cover, to a shrinkable cover blank and to a method of applying the blank to the article, and is herein set forth as embodied in a cover blank, a covered heel and a method of applying the cover blank to a heel.

Hitherto a common practice in covering wood heels has been to cut from a sheet of Celluloid a cover of the proper shape, to apply cement to certain localities on the heel, to soften the cover somewhat by treatment with a suitable liquid and then to wrap the cover about the heel. The operator who applies the cover must handle the sticky heels which hampers his speed and may cause transfer of cement from the heels to the display surface of the covers. In any event the operation of covering heels, as hitherto practiced, has been a slow one.

As herein illustrated, the cover blanks are in the form of a swollen gel, said blanks, when placed upon articles such for example as heels, being adapted to shrink to covers in the form of strong films which grip the articles. Such cover blanks require no handling by the operator other than to place them upon the articles; and the articles need not be sticky since cement may be applied to them in advance and allowed to dry, the cement chosen being one which will be activated either by the liquid in the gel or by heat, or both by the liquid and by heat.

The cover blanks, since they will shrink greatly, can be made large so as to be capable of shrinking about articles which differ considerably in size. They will so shrink by normal evaporation of the liquid but in such case will bridge concavities in the surfaces of the articles to be covered. In order to cause them to conform to concave surfaces, suction may be employed; and in order to hasten the evaporation, heat may be applied at the same time.

A cement which is thermoplastic, or one which is both thermoplastic and capable of being activated by the liquid of the gel, may be used if desired. In either case the application of heat to activate the cement will also render the shrunk cover more flexible so that it may be pressed against any concave or broken surface which may be present on the article. In any event, whether suction is employed or not, there results an article having a shrunk cover attached by cement, said cover being in the form of a hard, thin, strong, smooth-surfaced film.

The above is the so-called "wet method" of

practicing the invention. Alternatively the swollen blanks may be allowed to dry, heated to render them elastic, expanded while heated, and then set or frozen in their expanded condition, and finally heated once more to cause them to shrink.

Referring to the accompanying drawings—

Fig. 1 is a perspective of a Cuban heel with a coating of dry cement covering its breast, sides and back, and with a narrow coating along the margin of its heel-attaching face;

Fig. 2 is a perspective of a swollen cover blank in which the heel of Fig. 1 has been placed;

Fig. 3 is a perspective of a device for applying suction to create a partial vacuum in the interior of the cover blank and thereby cause the blank as it shrinks to conform to the shape of the heel, said device also serving to aid in the trimming off of surplus material of the cover;

Fig. 4 is a perspective, showing how the device of Fig. 3 is used in the trimming operation;

Fig. 5 is a plan view of the bottom of a heel after the cover has been trimmed;

Fig. 6 is a section of a device for warming the heel and cover to activate a thermoplastic cement and/or to render a hard cover pliable and for pressing the cover against the heel;

Fig. 7 is an elevation of a shrunk cover blank, the mouth of which has been held open;

Fig. 8 is an elevation of the same blank after it has been heated and expanded.

The cover blanks may be made in any suitable manner, for example, by molding various colloidal substances as disclosed and claimed in application Serial No. 250,188, filed January 10, 1939, in my name. One of the procedures set forth in said application is as follows. From 10 to 20 parts by weight of a linear macromolecular copolymer consisting of cellulose acetate propionate having a composition by weight of 30.8% acetyl and 12.9% propyl, and from 90 to 80 parts by weight of a mixture of liquids consisting of equal parts by volume of benzol and methanol, are placed in a closed mixing apparatus and maintained for an interval at 200° F. A sol results at this elevated temperature which upon being cooled sets to a swollen gel. This gel is placed in the hopper of an injection molding machine, heated to convert it again into a sol and forced into a cool mold. In the application identified above the particular compound, the method of making and using the compound, and the article made of the compound are claimed. However, the manner in which the shrinkable cover blank is made and the particu-

lar substance or substances used in its manufacture form no part of the present invention.

A cover blank for a heel, said cover blank being in swollen gel form, preferably has the shape shown in Fig. 2, being closed at the bottom and having a large mouth at the top, the portion of the blank below the dot-and-dash line containing substantially all of the blank which is finally shrunk about the heel and which, after certain upper and lower portions have been trimmed off, forms the finished cover. The portion of the blank below the dot-and-dash line has dimensions which are roughly proportional to the corresponding dimensions of the heels to be covered, having in mind that the cover blank will shrink greatly and that a single size of blank may be used for a large number of sizes of heels.

In using such a cover blank, cement is applied to the desired locality on the heel, and the heel is placed in the cover. Preferably the cement is applied to a large number of heels in advance and allowed to dry since this procedure obviates the handling of sticky heels by the operator who puts the heels in the cover blanks. The cement used is preferably one which will be activated by the liquid in the gel of the cover blank. If the benzol-methanol mixture mentioned above is present in the gel, the dry coat of cement may be, for example, vinyl acetate. A heel 100, such as that shown in Fig. 1 having upon its breast, sides, back and heel attaching face a coat of vinyl acetate as shown, is placed in a swollen gelled cover blank 11, as illustrated in Fig. 2. The upper portion of the cover blank 11 may now be gathered about a suction nozzle 13 as shown in Fig. 4, said nozzle being of the particular shape shown, so as to facilitate the subsequent trimming of the cover. A partial vacuum is created in the cover blank by suction applied through a pipe 15 to cause the blank, while it is shrinking and is still pliable, to conform to the shape of the heel; and, while the suction is being applied, the blank is preferably exposed for a short interval to an elevated temperature. If the blank is composed of the mixed esters and the liquid mentioned, it may be exposed for about fifteen minutes to a temperature of 300° F. Conveniently, this heating may be accomplished by maintaining the heel during the application of the suction in a heated chamber 17, which should be open to the atmosphere, or to a solvent-recovery apparatus, to permit escape of the vapors of the solvent from the chamber.

Instead of applying suction or suction and heat, the cover blank with the article in it may simply be allowed to stand at room temperature. In such case, however, the time required for the shrinking of the blank will be much longer, ordinarily about one and one-half hours, as compared with fifteen minutes for the procedure wherein heat is employed. Moreover, if no suction is employed, the cover will bridge any recesses in the article, and further procedure will be necessary to cause the cover to conform to the surfaces of such recesses. In the case of the Cuban heel which is illustrated, the breast of the cover will bridge the concave recess in the breast of the heel. In order to cause the breast of the cover to conform to this recess without the application of suction and to be firmly attached to the breast, the dry coat of cement on the surface of the heel may be one which is not only activated by the liquid contained in the gel but is also thermoplastic. Vinyl acetate, for example, will satisfy this requirement. When the

shrinking of the cover is complete, the cover will be firmly and smoothly attached to the back and sides of the heel by reason of the shrinking of the cover and the fact that the coat of cement on those portions of the heel has been activated by the liquid in the gelled cover and then dried. The cover will be smoothly drawn about the sides and back of the heel even though the dry coat of cement on the heel was not itself smooth since the liquid of the gelled cover will have softened the cement, and the shrinking of the cover will have smoothed out all irregularities. The breast portion of the cover will be stretched tightly from one breast corner to the other breast corner of the concavely curved breast of the heel. The heel with its shrunken cover may now be heated to activate the cement and to make the cover more pliable, after which the breast portion of the cover may be pressed against the breast of the heel.

The heating and pressing may be carried out conveniently by the use of the apparatus shown in Fig. 6, which consists of a receptacle 19, provided with an inlet pipe 21 for a fluid, such as hot water, and having attached to its rim the continuous edge of a flexible rubber container 23 for a heel, the container being open at its top. A heel 100, having a cover tightly shrunk about its back and sides and over its tread face and attaching face but bridging the concavity in its breast, is placed in the rubber container; a cover 25 is fastened in place, and hot water under pressure is forced into the receptacle 19 through the pipe 21 to distort the rubber container 23, as shown in the figure, and cause it to press the cover against the heel, the heat serving to soften the thermoplastic cement as well as to increase temporarily the flexibility of the cover.

The apparatus shown in Fig. 6 may also be used in conjunction with the suction apparatus of Fig. 3. In case, for example, an embossed heel is to be covered, it may be that the pressure produced by the creation of a partial vacuum in the cover is not sufficient to force the cover into intimate contact with the broken surfaces of the heel. In such case, the heel with its cover may be treated thereafter in the apparatus of Fig. 6.

After the cover has been caused to fit about the heel, whether the fitting was facilitated by suction or not, a certain amount of surplus material is trimmed from the upper and lower portion of the cover. If suction is used, as in Fig. 3, the nozzle 13 is preferably of the upwardly flaring shape shown, its lower edge serving, as illustrated in Fig. 4, as a guide for a trimming knife 27. If neither suction nor a member such as 13 is used, the surplus material at the top of the cover may be trimmed off without the use of a knife-guide. The surplus material at the bottom of the shrunken cover is then trimmed off to have the appearance illustrated in Fig. 5.

As described above, the article is placed in the cover blank while said blank is in its swollen gel form in which it contains a large amount of liquid. It may be desired to avoid the use of wet cover blanks during the application of the blanks to the articles. Inasmuch as the resinous substances from which the blanks are prepared are long molecular chain substances, which are tough and hard at ordinary or normal temperatures and exhibit elastic properties at elevated temperatures, the swollen blanks may first be permitted to shrink by evaporation of the liquid in their gels, then they may be heated to render them elastic and, while so heated, expanded, then

set or frozen in their expanded condition by cooling them, for example, to room temperature, and finally, after articles to be covered have been placed in them, they may be heated again whereupon, being elastic at elevated temperatures, they will once more shrink. When this dry method is to be employed, I prefer to use, instead of the copolymer of cellulose acetate propionate referred to above, one of the other copolymers described in my prior application, for example, the copolymer of vinyl chloride and vinyl acetate which exhibits greater elasticity at elevated temperatures.

In carrying out this dry method (Figs. 7 and 8) a disc 31 at the end of a pipe 33 may be placed in the large open end or mouth of a heel cover 11, while the cover blank is in swollen gel form, and the liquid in the gel allowed to evaporate. The result will be a dry shrunken cover blank of some such shape as is shown in Fig. 7, the mouth of the cover blank being held open by the disc. The cover blank is then heated and expanded, for example by forcing a heated fluid into it, whereupon it may be caused to assume a shape much like its original shape, as indicated in Fig. 8. The blank is then quickly set or frozen in its expanded condition, for example by forcing a cool fluid into it. The disc is then removed. The heel to be covered is placed in the blank, and the blank may be subjected to heat or to heat and suction as indicated in Fig. 3, followed by heat and the pressure of a fluid as indicated in Fig. 6, or to any of the treatments described above which involve heat. The heat causes the cover blank to shrink; and the pressure, whether due to the creation of a partial vacuum in the blank, as in Fig. 3, or by the forcing of a fluid into a receptacle as in Fig. 6, forces the blank into firm contact with any concavities or broken surfaces which may be present on the heel. The trimming off of the surplus material of the cover then follows in any of the manners which have been described above. It will be understood that when a substantially dry cover blank in shrinkable form is prepared, the heel, or the inside of the cover blank, may be coated with cement which will firmly attach the shrunken cover to the heel.

For convenience, the invention has been described in connection with the covering of a heel by means of a cover blank which is closed at one end and open at the other, certain surplus material of the cover being finally trimmed off to expose certain surfaces of the heel. It should be understood, however, that the invention is not limited in the scope of its application to any particular shape or size of cover or to the covering of any particular article.

It should also be understood that, although the invention has been described in connection with providing an object such as a heel with a permanent cover in the form of a thin-walled shell or hollow article, the invention provides a method of making such a shell or hollow article of a particular shape by causing the shrinkable blank to take the shape of a form and removing the shrunken blank from the form, in which case, of course, no cement would be used. It is thus possible to make such thin-walled hollow articles as may be removed from the forms on which they are made.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

ing exactly to its sides and back a shrunken seamless cover formed in situ from a swollen gel.

2. A heel formed with a concave breast, said heel having extending over and lying smoothly upon its sides, back and concave breast a shrunken endless cover formed in situ from a swollen gel and attached by cement.

3. A cover blank in swollen gel form having a closed bottom and an open top, the lower portion of the blank being designed when shrunken to form the finished cover and the upper part of the blank being adapted to be attached to a suction nozzle.

4. A cover blank in swollen gel form having a closed bottom and an open top, the lower portion of the blank being designed when shrunken to form the finished cover and having dimensions which are greater than but proportional to the corresponding dimensions of the article which is to be covered.

5. The method of covering an article which comprises preparing a cover blank in swollen gel form, applying to the article a cement, placing the cover blank on the article, allowing the blank to shrink, and activating the cement during the shrinking of the blank.

6. The method of covering an article which comprises preparing a cover blank in swollen gel form, applying to the article a cement, allowing the cement to dry, placing the blank on the article, allowing the blank to shrink, and activating the cement.

7. The method of covering an article which comprises preparing a cover blank in swollen gel form, applying to the article a cement which is capable of being activated by the liquid of the gel, placing the blank on the article, and allowing the blank to shrink by evaporation of the liquid.

8. The method of covering an article which comprises preparing a cover blank in swollen gel form, applying to the article a cement which is capable of being activated by the liquid of the gel, permitting the cement to dry, placing the blank on the article, and allowing the blank to shrink by evaporation of the liquid.

9. The method of covering an article which comprises preparing a cover blank in swollen gel form, applying to the article a thermoplastic cement, placing the blank on the article, permitting the blank to shrink, and warming the cement to activate it.

10. The method of covering an article which comprises preparing a cover blank in swollen gel form, applying to the article a cement which is capable of being activated by the liquid of the gel and by heat, placing the blank on the article, and thereafter activating the cement.

11. The method of covering an article which comprises preparing a cover blank in swollen gel form, placing the blank on the article, permitting the blank to shrink by evaporation of the liquid of the gel, and, during such shrinking, applying suction to cause the blank to conform to the shape of the article.

12. The method of covering an article which comprises preparing a cover blank in swollen gel form, placing the blank on the article, permitting the blank to shrink by evaporation of the liquid in the gel, and applying suction and heat.

13. The method of covering an article which comprises preparing a cover blank in swollen gel form, placing the blank on the article, permitting the blank to shrink by evaporation of the liquid of the gel, and, during such shrinking, applying suction and heat to cause the blank to conform

1. A heel having extending over and conform-

to the shape of the article and to hasten the evaporation of the liquid to the gel.

14. The method of covering an article which comprises preparing a cover blank in swollen gel form, applying to the article a cement capable of being activated by the liquid of the gel, allowing the blank to shrink, and, during such shrinking, applying suction to cause the blank to conform to the shape of the article.

15. The method of covering an article which comprises preparing a cover blank in swollen gel form, applying to the article a cement capable of being activated by the liquid of the gel, allowing the blank to shrink, and, during such shrinking, applying suction and heat to cause the blank to conform to the shape of the article and to hasten the evaporation of the liquid.

16. The method of covering an article which comprises placing on the article a cover blank consisting essentially of a swollen gel and having a closed bottom and an open top, creating a partial vacuum in the blank while allowing it to shrink to a hard firm cover, and trimming off the top and bottom of the cover.

17. The method of covering an article which comprises providing a shrinkable cover blank having a closed bottom, an open top and a height which is greater than that of the article, putting the article in the blank, placing upon the top of the article a combined nozzle and trimming guide, applying suction to cause the blank to conform to the shape of the sides of the article and the sides of the guide, and subsequently trimming off the surplus material by a cut made around the base of the guide.

18. The method of covering an article which comprises preparing in swollen gel form a cover blank having a closed bottom, an open top and a height which is greater than that of the article to be covered, putting the article in the blank, creating a partial vacuum in the blank during the shrinking of the blank, and thereafter subjecting the blank to heat and pressure to ensure conformation of the blank to an article, such for example as an embossed heel, having a broken surface.

19. The method of covering an article which comprises preparing in swollen gel form a cover blank, the solid substance of which when dry is hard and tough at ordinary temperatures and at elevated temperatures is elastic, permitting the blank to shrink by evaporation of the liquid in the gel, heating and stretching the blank to expand it, lowering the temperature of the blank to freeze it in its expanded condition, placing the expanded blank on the article, and heating it to cause it to shrink.

20. The method of covering an article which comprises preparing in swollen gel form a cover blank, the solid substance of which when dry is hard and tough at ordinary temperatures and at elevated temperatures is elastic, permitting the blank to shrink by evaporation of the liquid in the gel, heating and stretching the blank to expand it, lowering the temperature of the blank to freeze

it in its expanded condition, placing the expanded blank on the article, heating it to cause it to shrink, and, during the heating, causing the blank to be pressed against the article.

21. The method of covering an article which comprises preparing in swollen gel form a cover blank, the solid substance of which when dry is hard and tough at ordinary temperatures and at elevated temperatures is elastic, permitting the blank to shrink by evaporation of the liquid in the gel, heating and stretching the blank to expand it, lowering the temperature of the blank to freeze it in its expanded condition, placing the expanded blank on the article, heating it to cause it to shrink, and, during the heating, creating a partial vacuum in the blank to cause the blank to be pressed against the article.

22. The method of making a thin-walled hollow article which comprises preparing in swollen gel form a hollow blank, placing a form in the blank, permitting the blank to shrink by evaporation of the liquid of the gel, and during such shrinking applying pressure to the blank.

23. The method of making a thin-walled hollow article which comprises preparing in swollen gel form a hollow blank the solid substance of which when dry is hard and tough at ordinary temperature and at elevated temperature is elastic, permitting the blank to shrink by evaporation of the liquid in the gel, heating and stretching the blank to expand it, lowering the temperature of the blank to freeze it in its expanded condition, placing the expanded blank upon a form, heating it to cause it to shrink and, during the heating, causing the blank to be pressed against the form.

24. A hollow blank in swollen gel form having a closed bottom and an open top, the lower portion of the blank being designed when shrunk about a form to result in a thin-walled article having the shape of the form and the upper portion of the blank being adapted to be attached to a suction nozzle.

25. The method of covering an article which comprises placing a cover blank in shrinkable form upon the article with a film of cement between them, causing the blank to shrink and at the same time exerting pressure upon the blank.

26. The method of covering an article which comprises placing the article in a cover blank which will shrink when heated, with a film of cement between the blank and the article, heating the blank and applying pressure to it.

27. The method of covering an article which comprises providing a shrinkable cover blank, placing the article in the blank with a film of cement between them, causing the blank to shrink and at the same time activating the cement.

28. The method of covering an article which comprises providing a shrinkable cover blank, placing the article in the blank with a film of thermoplastic cement between them, causing the blank to shrink and at the same time activating the cement.

ALEXIS E. USHAKOFF.