June 12, 1956 J. W. BAYMILLER 2,750,348

METHOD OF MAKING LOOM PICKER FROM POLYVINYL ALCOHOL AND PRODUCT

Filed Sept. 9, 1950

FIG. 1

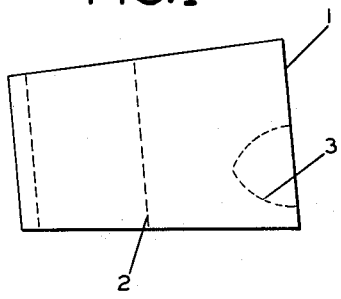


FIG. 3

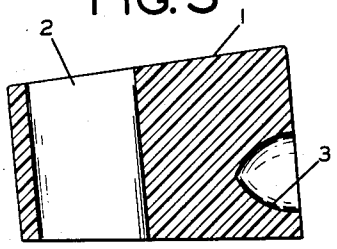


FIG. 2

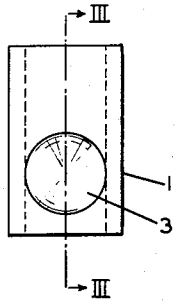
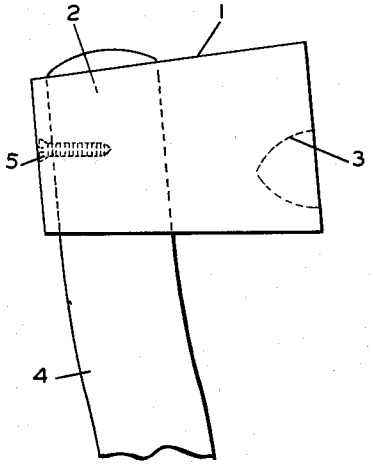


FIG. 4



Inventor
JOHN W. BAYMILLER
by
Walter + Kaufman
Attorney

United States Patent Office 2,750,348
Patented June 12, 1956

2,750,348

METHOD OF MAKING LOOM PICKER FROM POLYVINYL ALCOHOL AND PRODUCT

John W. Baymiller, Manheim Township, Lancaster County, Pa., assignor to Armstrong Cork Company, Lancaster, Pa., a corporation of Pennsylvania

Application September 9, 1950, Serial No. 184,023

3 Claims. (Cl. 260—23)

This application is a continuation-in-part of my co-pending application Serial No. 717,513, filed December 20, 1946, now abandoned.

This invention relates to loom pickers and a method of making the same. More particularly, the invention relates to an all-plastic loom picker molded from a composition comprising a polyvinyl alcohol material which has been subjected to elevated temperatures prior to molding.

Power-operated looms are provided with an automatic mechanism for tossing the shuttle from one side to the other during the weaving of the cloth. The mechanism employed comprises a picker stick that is periodically thrust in a direction opposite to the direction of travel of the shuttle so that it engages the shuttle at substantially the end of the path of movement thereof with such force as to move it to the other end of the warp shed.

The shuttle reciprocates very rapidly such as 170 to 220 times per minute and, in so doing, engages the picker at the shuttle point with considerable force. In addition, comparatively large amounts of heat are generated through contact of the shuttle point with the picker which often causes development of high temperatures in the body of the picker.

Heretofore, loom pickers have been manufactured from such materials as leather and rubberized fabric. In the case of leather, the service life is extremely short; and in some instances, failure of the picker has resulted after a period of about two days' use. Rubberized fabric, generally speaking, is more serviceable than leather, but failure generally results after continued use for a period such as one or two months. Proper shuttle action depends largely upon the resiliency of the picker. For instance, if the picker is hard or nonresilient, the shuttle may break during operation of the loom. Also, nonresilient pickers tend to project the shuttle too abruptly, causing the shuttle to jerk which causes filler yarn breakage.

Attempts have been made to provide an all-plastic loom picker which is characterized by long service life and by resistance to deterioration under the conditions of operation of the loom. However, plastics which have been heretofore employed are of such a nature as to fail in comparatively short periods of time because of disintegration of the picker at elevated temperatures which are developed in high speed loom operation. This failure is believed to be due to the comparatively low softening points of the plastic material utilized in fabrication of the loom picker.

In order to overcome this difficulty, it has been proposed to shield the plastic by means of resilient metal casings to prevent or delay the destructive spreading and distortion of the picker resulting from frequent contact with the shuttle point. Pickers containing such resilient metal shields, in addition to being expensive, may fail in service as a result of a separation of the shield from the picker brought about by the extreme conditions of operation caused by continual pounding of the article by the shuttle point.

It is, accordingly, an object of this invention to provide a loom picker that can be manufactured at low cost and which will have an unusually long service life.

It is a further object of this invention to provide an all-plastic resilient loom picker characterized by a long service life under the conditions of operation of a high speed loom.

Still another object of my invention is the provision of a method for making an all-plastic resilient loom picker characterized by long service life which includes the step of heat treating the molding composition prior to the molding operation.

Another object of this invention is the provision of an all-plastic loom picker molded from a particular heat-treated polyvinyl alcohol composition containing alkaline earth metal stearates.

These and other objects will become apparent to those skilled in the art upon becoming familiar with the following description.

As disclosed in my above-identified copending application, I have found that loom pickers may be molded from compositions containing polyvinyl alcohol material advantageously plasticized with a suitable plasticizer therefor. The term "polyvinyl alcohol material" or its equivalent as used herein is intended to include polyvinyl alcohol and modified polyvinyl alcohols of the type described below.

The polyvinyl alcohol employed may be prepared by any method known to the art. For instance, one widely utilized method of preparation comprises polymerizing vinyl acetate and hyrolyzing the resulting polymer in methyl alcohol. The resulting polyvinyl alcohol is insoluble in methyl alcohol, is precipitated, and separated from the remaining liquid by any suitable means such as filtration.

Representative of the modified polyvinyl alcohols which are particularly advantageous for use are the ethylene modified polyvinyl alcohols which are polyvinyl alcohols containing ethylene groups obtained by copolymerizing ethylene and vinyl acetate and removing the acetate groups from the resulting copolymer by hydrolysis.

In accordance with my present invention I employ a plasticized polyvinyl alcohol material composition containing selected amounts of alkaline earth metal stearates. Suitable plasticizers which are found to be particularly advantageous in the preparation of the composition to be molded are the polyhydric alcohols such as glycerine, ethylene glycol, and the like. In addition to the polyhydric alcohols, other plasticizers such as aromatic aldehydes, for example benzaldehyde may be employed. Water itself has been found to be an excellent plasticizer for polyvinyl alcohol material. However, this particular plasticizer is known as a "fugitive" plasticizer in that it is lost by the composition after or during molding with the result that a brittle product may be obtained. However, if desired, a plasticizing composition comprising water and glycerine may be employed; and during the forming operation the water is lost by the material, resulting in a product comprising polyvinyl alcohol plasticized with glycerine. Mixtures of the various plasticizers may be used. For instance, advantageous results may be obtained from use of a plasticizer comprising benzaldehyde and glycerine.

Examples of alkaline earth metal stearates are calcium stearate, magnesium stearate, zinc stearate, or their equivalents. Particularly advantageous results have been obtained with magnesium stearate. The alkaline earth metal stearates act to improve toughness and heat resistance in the finished molded picker.

Generally speaking, I have obtained advantageous results by preparing a picker from a composition com-

prising about 20 to 65 parts by weight of plasticizer for each 100 parts by weight of polyvinyl alcohol and .5 to 5 parts by weight of alkaline earth metal stearate for each 100 parts of polyvinyl alcohol. Particularly advantageous results have been obtained utilizing 40 to 50 parts by weight of plasticizer for each 100 parts by weight of polyvinyl alcohol. When less than about 20 parts plasticizer are employed, the resulting molded picker tends to be somewhat brittle and the service life thereof is decreased in that it is less resistant to the shock imparted to it by the rapid motion of the shuttle during the loom operation. Also, when the quantity of plasticizer is less than 20 parts by weight per 100 parts by weight of polyvinyl alcohol material, a picker of such hardness may result as to cause shuttle breakage as well as improper shuttle action during loom operation. When the quantity of plasticizer exceeds about 65 parts by weight per 100 parts by weight of polyvinyl alcohol, the molded product is somewhat susceptible to moisture in that the plasticizer absorbs the water present in the surrounding atmosphere; and in those cases wherein the picker is to be employed in comparatively humid atmosphere, difficulties are experienced from the presence of moisture in the picker. In addition, when the amount of plasticizer exceeds about 65 parts by weight per 100 parts by weight of polyvinyl alcohol, the resulting product may be less suitable for use in connection with high-speed looms wherein comparatively high temperatures are developed in the operation. When too much plasticizer is present in the composition, it tends to soften at elevated temperatures such as those which are encountered in high-speed loom operation. Furthermore, the use of more than 65 parts by weight of plasticizer per 100 parts by weight of polyvinyl alcohol material may result in the production of a loom picker which would be too soft to enable proper shuttle action. As to the stearates, less than .5 part gives no significant improvement whereas more than 5 parts cause handling difficulties in the manufacture of the material.

When a mixture of plasticizers, such as a glycerine-benzaldehyde mixture is employed, generally speaking, 10 to 30 parts by weight of each component of the plasticizer mixture are used per 100 parts by weight of polyvinyl alcohol material. Thus the composition may contain polyvinyl alcohol, a plasticizer which is a mixture of benzaldehyde and glycerine, and magnesium stearate.

In accordance with this invention I have also found that the service life of pickers molded from polyvinyl alcohol material is greatly increased by the heat treating of the molding composition prior to the molding step. The desired molding composition, as described hereinabove, is first mixed in a suitable mixing device which is advantageously a mill; and following mixing, the material is then heated with agitation in air at temperatures of 280° F. to 340° F. The most advantageous means of accomplishing this heating is that involving milling the mixture on a mill while maintaining the temperature within the desired range. Temperatures below 280° F. do not result in the desired improvement in service life, and temperatures above 340° F. result in decomposition of the molding compound. The time of milling may vary depending upon the particular temperature conditions employed; generally speaking, the milling is continued until the compound is readily separated from the mill in the form of a sheet. Ordinarily, this occurs after milling at 320° F. to 340° F. for a period of about ten minutes.

Following the heat treating as described above, the molding compound is broken up in a plastic grinding device or micro-pulverizer to obtain a powder which is molded into the shape of a loom picker by any suitable means such as compression or injection molding.

My invention may be more readily understood by reference to the accompanying drawing in which:

Figure 1 is a side elevation of the finished picker;

Figure 2 is an end elevation of the picker;

Figure 3 is a vertical sectional view on the line III—III; and

Figure 4 is a view illustrating the picker in position on a picker stick.

An advantageous configuration is that illustrated in the drawing. As shown, the picker **1** is provided with a channel **2** for receiving the picker stick and an indentation **3** for engaging the shuttle point during operation of the loom.

As illustrated in Figure 4, the picker **1** is attached to the picker stick **4** by suitable means such as the screw **5**. Generally speaking, it is advantageous to mold the picker with the channel **2** having a cross-sectional area substantially equal to but less than the cross-sectional area of the picker stick. With such a configuration the picker is forced onto the picker stick and is partially held in position during loom operation by friction.

The loom pickers prepared in accordance with this invention have been subjected to conditions of high-speed loom operation and have operated for periods as high as ten months without failure. A loom picker prepared in accordance with this invention is not affected by the high humidity which is generally prevalent in weaving rooms, and this is unusual as polyvinyl alcohol materials are generally accepted as being subject to moisture. While I do not intended to be limited by any theory expressed herein, it is believed that the heat treatment results in increased resistance to heat and shock to which the picker is subjected during the operation of a loom. Heat treating with mastication in the presence of air is necessary to increase the heat and shock resistance as heating in a press or heating by other means does not give the results desired.

The preparation of a typical composition for the manufacture of pickers is illustrated in the following specific example:

Example

	Parts by weight
Polyvinyl alcohol	100
Glycerine	60
Magnesium stearate	2
Water	50
Titanium dioxide	5

The titanium dioxide and magnesium stearate were added to the polyvinyl alcohol and mixed for one half hour in a Baker-Perkins mixer. The water was added to the resulting mixture and mixing was continued for one half hour. The resulting mass was allowed to stand overnight, after which the glycerine was slowly added and the materials mixed for one half hour. The mixture was allowed to stand overnight, after which it was heat treated on a mill at 330° F. to 340° F. for eight to ten minutes.

I claim:

1. A loom picker made of material comprising polyvinyl alcohol molded from a composition containing polyvinyl alcohol and a metal stearate of the group consisting of alkaline earth metal stearates and zinc stearate which composition has been heated with mastication in air at a temperature between 280° F. and 340° F. prior to molding.

2. An all-plastic loom picker obtained by forming a molding compound including 100 parts by weight of polyvinyl alcohol, 20 to 65 parts by weight of a plasticizer, and .5 to 5 parts of a metal stearate of the group consisting of alkaline earth metal stearates and zinc stearate, heating said molding compound with mastication in air at a temperature between 280° F. and 340° F., and molding said heated compound into the shape of a loom picker.

3. A method of making a heat and shock resistant loom picker comprising forming a molding compound including plasticized polyvinyl alcohol and a metal stearate of the group consisting of alkaline earth metal stearates and zinc stearate, milling said compound in air at a temperature approximately 320° F. to 340° F. for

about ten minutes to obtain a heat-treated sheet, subdividing said sheet, and molding the resulting subdivided material into a desired configuration.

References Cited in the file of this patent

UNITED STATES PATENTS

1,932,889	Groff	Oct. 31, 1933
2,375,388	Ryan	May 8, 1945
2,389,157	Kottemann	Nov. 20, 1945
2,399,401	Sonnichsen et al.	Apr. 30, 1946
2,468,102	Nelson	Apr. 26, 1949
2,469,319	Swan	May 3, 1949
2,515,800	Sadowski	July 18, 1950
2,573,273	Porth	Oct. 30, 1951
2,599,570	Metz	June 10, 1952

FOREIGN PATENTS

410,506	Great Britain	May 14, 1934
588,058	Great Britain	May 13, 1947
465,751	Canada	June 6, 1950