Sept. 29, 1936. J. SALADINO 2,055,776

METHOD OF MAKING RACKET STRINGS AND THE LIKE

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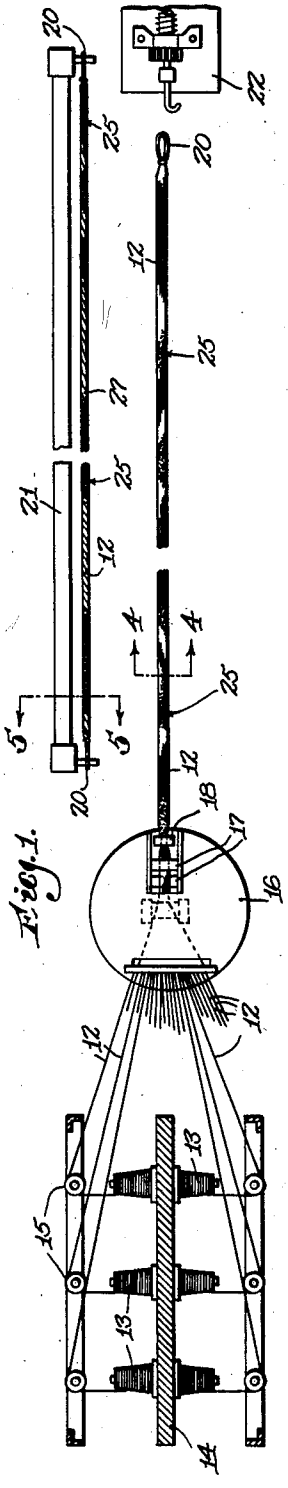


Fig. 1.



Fig. 2.

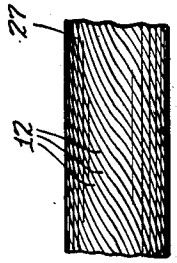


Fig. 3.



Fig. 4.

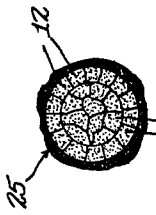


Fig. 5.

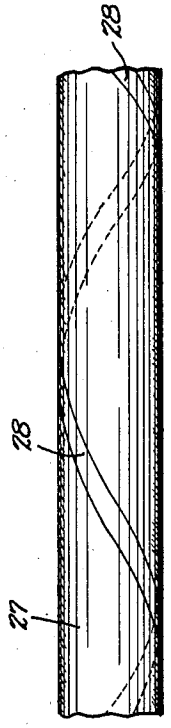


Fig. 6.

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METHOD OF MAKING RACKET STRINGS AND THE LIKE

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5 Claims. (Cl. 117—2)

This invention relates to a method of manufacturing racket strings and the like.

On account of the high price and dissatisfaction with the use of gut strings in rackets used to play tennis, squash, badminton and the like it has been the endeavor to make a silk or other fiber string which could supplant gut to a great extent. One object of my invention is to improve the method of making silk or fiber strings so that the finished string resulting therefrom will have greater resiliency than those previously made, as well as greater strength. Another object is to reduce the cost of production of silk or fiber strings. Still another object is to improve the appearance of said strings and make their color or colors clearer. My method may also be applied to the manufacture of gut strings.

In the manufacture of silk strings it has been necessary to give them a breaking operation after they have been twisted to limber them up sufficiently so they can be strung in a racket and played with. Otherwise they would be too stiff for practical use, which stiffness is apparently due to an excess of colloidal binder being contained in the string. The breaking operation breaks the colloidal binder which has saturated the strands of the string and then hardened. While this breaking operation is necessary, it weakens the string and lessens its resiliency considerably.

A particular object of my invention is to so improve the method of making a string that there will not be the need of this breaking operation, and this I accomplish by my method which keeps excess colloidal binder out of the string. By this new method I am also able to manufacture strings in colors which are much clearer than those previously made and more translucent.

The foregoing and other objects which will appear as the nature of the invention is better understood, may be accomplished by a method, and arrangement of parts such as is disclosed by the drawing and specification. The nature of the invention is such as to render it susceptible to various changes and modifications, and, therefore, I am not to be limited to the disclosure herein, but am entitled to all such changes therefrom as fall within the scope of my claims.

In the drawing:

Figure 1 is a diagrammatic plan view showing the threads forming a string coming off the bobbins and passing through a compound tank and then brought together ready to be attached to the twisting device shown. There is also shown a drying frame with a string hanging thereon.

Figure 2 is an enlarged fragmentary view of one of the threads forming a string, one end of which is shown frayed to indicate the strands forming said thread.

Figure 3 is an enlarged fragmentary view of a finished string.

Figure 4 is a section taken on the line 4—4 of Figure 1 showing the threads of a string after being treated with the compound and ready to be twisted together.

Figure 5 is a section taken on the line 5—5 of Figure 1 showing a finished string, the threads having been twisted together.

Figure 6 is an enlarged fragmentary view of a finished string having an identifying or marker thread forming part of the outer surface.

I start the manufacture of a racket string or the like with a plurality of strands 11 of silk or fiber or other material which are twisted together to form a thread 12, as illustrated in Figure 2 of the drawing. In making a silk string I have used twenty-four threads 12, each thread being made up of a plurality of silk strands twisted together, although, of course, the number of threads used will vary with the thickness of the string to be made, as well as with the kind of material used. These threads 12 are usually wound on spools or bobbins 13 which are mounted on a supporting frame 14, and the strands 11 forming said threads 12 are twisted together. These threads 12 preferably pass under the usual tensioning devices or weights 13 which tension them, thence to the usual tank 16 containing a colloidal binder or compound commonly used. This compound makes the threads adhere to each other when brought into contacting relation and may be made to impart moisture proof qualities to the finished string as well. After being treated with said compound said threads 12 pass under and over rollers 17 on said tank 16 and thence between guides 18 which provide a constricted passage, thereby bringing said threads together, and the adhesive compound serves to keep them together. Loops 20 are fastened to the threads 12 at both ends, and after pausing for a minute or a few minutes, depending upon the temperature of the room as well as the humidity, one of the loops 20 is placed over a twisting device 22 and the other loop 20 placed on a projecting peg on said frame 21 and the initial twist given to said threads 12, the said compound still being moist. The direction of this twist is opposite to the twist previously given the strands 11 forming each thread 12 so that as the threads 12 are twisted together the strands 11 in said threads are given an untwisting movement. This twisting movement continues so that after said strands have untwisted as much as they can they will be given the same twisting movement as the said threads 12. In other words, at this point the twisting operation twists the strands 11 forming the

threads 12 in the same direction as said threads themselves. By treating the threads 12 with said compound 25 while said strands 11 forming them are in a twisted condition, the said compound will not saturate said strands to the extent it does when they are in normal or untwisted condition. The untwisting movement given to said strands 11 loosens them and exposes them to a spray from the moist compound adhering to the threads which spray results from this initial twisting operation so that any portions of said strands which were not coated with said compound when passing through the said tank 16 will be coated in all probability during this initial twisting operation. The result is that the strands 11 are coated with said compound 25; but are not so saturated with it that they have an excess of it, which, upon drying, will make the finished string so stiff that it will have to be made pliable by a breaking machine.

The twisted string 27 is taken off the twister 22 and placed on the pegs of said drying frame 21, one of which pegs is usually just above the twisting device, and then after a wait of a quarter or half an hour, depending upon conditions, the said string 27 is given another twist in the same direction, thereby twisting said threads 12 more tightly together. The string 27 is then hung up on said drying frame 21 and after a wait of approximately half or three-quarters of an hour, depending upon conditions, another twist in the same direction is given it, and this process is again repeated for a fourth twisting if necessary. The twisting is sure to squeeze some of the compound 25 to the outside surface as shown in Figure 5 of the drawing, so the whole of the outside surface will be covered with it.

By my new method it is possible to twist the threads more closely together than under the old method, which is due to the fact that there is less of the compound in the string 27 than in a string made by the old method. This results in a string which is more translucent than a string made the old way, and the coloring of the string is clearer than was the case before.

This method is adapted for use in the manufacture of what are commonly called spiral strings illustrated in Figure 6 of the drawing, which have a marker thread 28 of a different color than the threads forming the body of the string. The strands forming said marker thread 28 are twisted together in the same direction as the strands 11 of the other threads 12, and while the marker thread 28 is kept separate from the other threads until after it is treated with said compound 25, thereafter the method of manufacturing this spiral string is the same, and all the threads 12 and the marker thread 28 are fastened with said loops 20 in the usual manner, and the twisting operations are the same as previously described. Usually the marker thread 28 is larger in diameter than the other threads 12, and shows clearly as part of the outside surface in the finished string.

What I claim is:

1. The method of making a string from a plurality of threads, comprising forming each thread by twisting a plurality of strands together, treating said threads with a compound, then twisting said threads together in a direction opposite to said first-mentioned twisting of said strands while said compound is moist until said first-mentioned twisting is untwisted, and continuing said twisting in said opposite direction until said threads are twisted together to form a unitary string, then waiting an interval and again twisting said unitary string in said opposite direction.

2. The method of making a string from a plurality of threads, comprising forming each thread by twisting a plurality of strands together, treating said threads with a compound, then twisting said threads in a direction opposite to said first-mentioned twisting of said strands until said first-mentioned twisting is untwisted, and continuing said twisting in said opposite direction until said cords are twisted together to form a unitary string, then waiting an interval and again twisting said unitary string in said opposite direction, and then repeating said waiting interval and said twisting in said opposite direction until the said unitary string has been twisted to the required degree of tightness.

3. The method of making a string from a plurality of threads, comprising forming each said thread by twisting a plurality of strands together, treating said threads with a moist compound, then joining said threads together at their ends and twisting said threads while said compound is still moist in a direction opposite to said first-mentioned twisting of said strands until said first-mentioned twisting is untwisted and continuing said twisting in said opposite direction until said threads are twisted together to form a unitary string, then waiting an interval and again twisting said string in said opposite direction, and then repeating said waiting interval and said twisting in said opposite direction until the said string has been twisted to the required degree of tightness.

4. The method of making a racket string from a plurality of threads, comprising forming each said thread by twisting a plurality of strands together, treating said threads while in said twisted condition with a moist compound, then bringing said threads together and connecting one end thereof to a twisting device and twisting them while said compound is still moist in a direction opposite to the first-mentioned twisting of said strands until said first-mentioned twisting is untwisted, and continuing said twisting until all said strands and threads are twisted together in said opposite direction to form a unitary string, then waiting an interval and again twisting said unitary string in said opposite direction, and then repeating said waiting interval and said twisting in said opposite direction until the said unitary string has been twisted to the required degree of tightness and part of said compound has been squeezed to the outside surface of said string.

5. The method of making a racket string from a plurality of threads formed by twisting a plurality of strands together, treating said threads with a moist compound while in twisted condition, then holding said threads together and twisting them in a direction opposite to the first-mentioned twisting of said strands while said compound is moist and continuing said twisting in said opposite direction until said threads are untwisted from the first-mentioned twisting and are twisted in the second-mentioned direction to thereby form a unitary string.

JOSEPH SALADINO.