

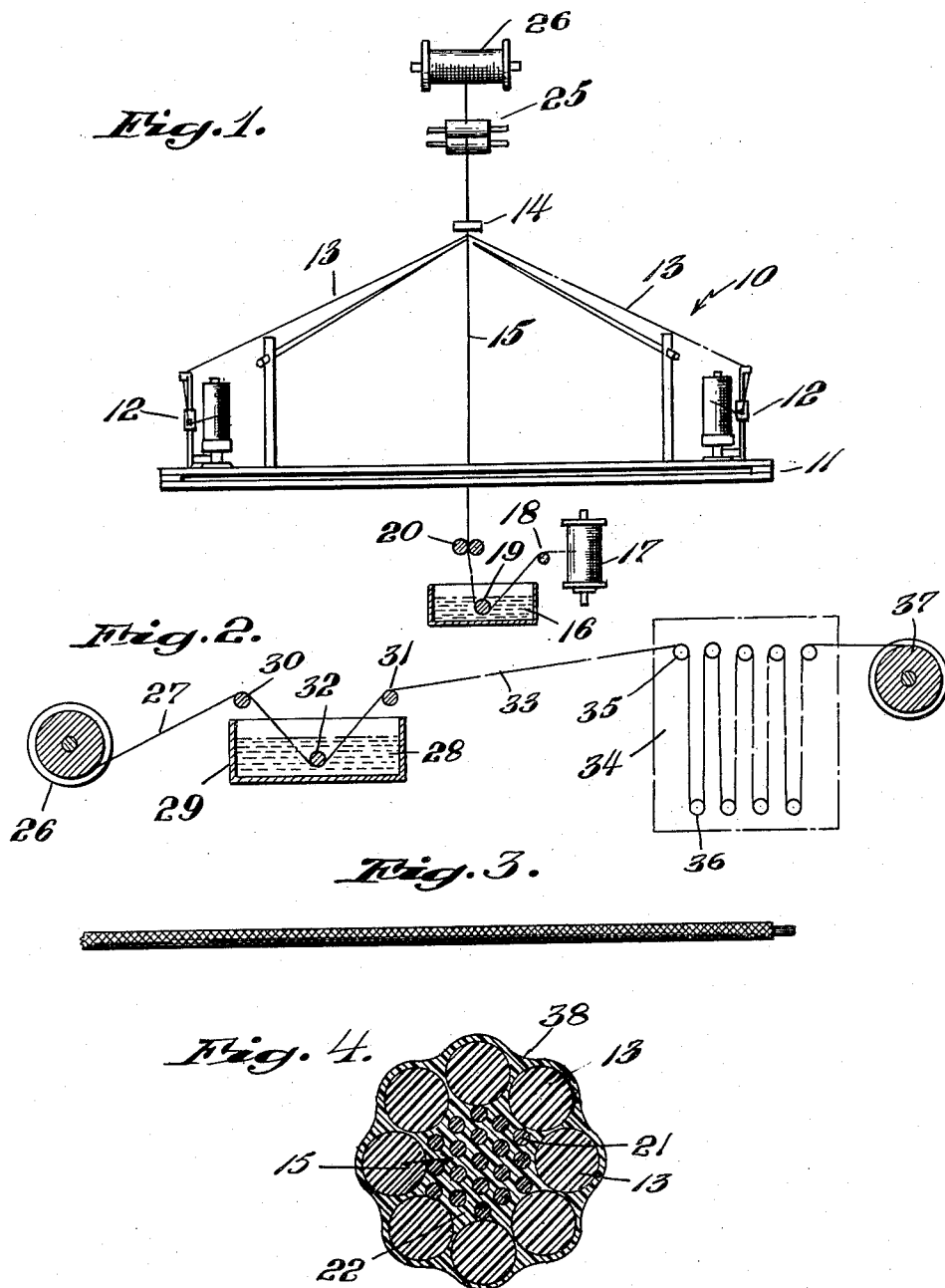
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TENNIS STRING OR LIKE ARTICLE

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TENNIS STRING OR LIKE ARTICLE

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8 Claims. (Cl. 87—1)

This invention relates to a tennis string or like article. Rackets which are used for tennis, badminton, squash, and so forth, are formed by a frame across which there extend strings in generally right angular relationship to provide a mesh surface which will have more or less resiliency depending upon the character of the strings used. Originally such strings were formed of catgut, but because of the effect that moisture may have upon this material, it is desirable to form the string of some synthetic material which will be less affected by moisture.

One of the objects of this invention is to provide a more solid string than has heretofore been formed of synthetic material.

Another object of the invention is to provide a string which may be drawn tighter and therefore provide a faster ball when struck with a racket having such strings.

Another object of the invention is to reduce the sliding of one string upon the other and therefore improve wearing qualities of the strings which are used in a racket of this character.

Another object of the invention is to provide a string which will maintain the form in which it is first furnished throughout the life of the racket.

With these and other objects in view, the invention consists of certain novel features of construction and steps in manufacture as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a diagrammatic view illustrating the braiding of a cover over a core;

Figure 2 is a diagrammatic view illustrating a subsequent operation on the string after formed as shown in Figure 1;

Figure 3 is a plan view of a string on large scale showing the braided covering thereon and the core therein;

Figure 4 is a greatly enlarged sectional view showing the multi-filament core and the mono-filament braided cover about the core with the whole impregnated with some material such as nylon.

A strand of nylon as it appeared on the market some time ago was made up of a large number of filaments of small diameter arranged in generally axially parallel relation. More recently a strand of nylon has been supplied to the market of a solid form in cross section and in a diameter which may be used without plying it with other strands. This latter form is many times the diameter of any one of the single filaments of the earlier form. To distinguish these two forms the trade refers to the earlier form as a multi-filament strand and the latter form as a mono-filament strand, and I here use the terms with such distinction as is used in the trade.

In proceeding with this invention, I pass a multi-filament strand of nylon filaments through a solution of liquid nylon and braid about this core before the liquid nylon becomes set up or hard, a covering of nylon mono-filaments and then reel the same, and after so formed, the entire strand may be again dipped in liquid nylon and then heated to dry prior to use. This provides a

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more or less solid string in which the multi-filament core will remain firmly in place even at the point of sharp bending.

With reference to the drawings, 10 designates generally a braiding machine shown diagrammatically, there being provided a bed 11 in which is provided the serpentine raceway for the braider carriers 12 which carry a single mono-filament nylon strand 13, which, as shown, extends to the former 14, which controls diameter and strips off excess liquid nylon, where it is braided about a multi-filament nylon strand 15 which is passed through a liquid bath 16 of nylon in a volatile solvent having been drawn from the package 17 over a guide roller 18 beneath the immersing roller 19 and through a pair of nip and feeding rollers 20.

The multi-filament core is shown on a somewhat enlarged scale in Figure 4, there being there shown a plurality of these filaments 21 which go to make up the core and interspersed between these filaments is nylon 22 which becomes impregnated in the core 15 as a liquid from the bath 16 and thereafter becomes hardened as its solvent evaporates to fill in the spaces between the multi-filaments and provide a generally solid mass.

The mono-filaments 13 are shown as about the core 15, there being here illustrated eight of such mono-filaments as formed on an eight-carrier braider for the particular form of line which is here illustrated, although any braider where the carriers are in multiples of four may be used. Each of these mono-filaments 13 is many times the diameter of one of the multi-filaments 21. The covered strand is drawn through the machine through feeding rolls 25 and packaged as at 26. Some of the liquid bath 16 oozes through the mono-filament cover to provide a coating on the outer surface of the cover.

This package 26 is then further treated by drawing the covered strand 27 thereof through a second liquid bath 28 of nylon dissolved in a volatile solvent in the trough 29 by passing the line over rolls 30, 31 and beneath the immersing roll 32, after which the string 33 is then dried at some heat usually somewhat above room temperature in order to accelerate the evaporation of the nylon solvent. I have illustrated oven 34 into which the string may pass and be disposed back and forth over guides 35 and 36 to increase its extent in this heating device, after which it is packaged in finished form as at 37. This second treatment through the nylon bath serves to fill in the spaces between the mono-filaments as at 38, although the liquid on the multi-filament core will provide an outer covering as the mono-filaments are braided about it.

The tennis string may be used as it comes from the braider as shown in Figure 1 without the immersion as shown in Figure 2. However, the second bath does provide a smoother string in that the interstices of the braid are better filled by this second bath, although the diameter of the string is scarcely increased by the treatment.

By the above steps I provide an article which has improved wearing qualities and in which the multi-filament core will not pop out through the mono-filament cover upon sharp bending or upon the ball being struck with a racket strung with string of this structure. There is also a sufficient roughness to the string so that when the ball is hit, it may be cut to spin the same as is desirable.

I claim:

1. A tennis string comprising a multi-filament core with a braided cover of mono-filament strands, said core and cover having similar chemical and physical characteristics and said mono-filaments each being many times the diameter of each of the multi-filaments.

2. A tennis string comprising a multi-filament core with a braided cover of mono-filament strands, said string

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being impregnated with material to fill the interstices thereof, said core, cover and material having similar chemical and physical characteristics and said mono-filaments each being many times the diameter of each of the multi-filaments.

3. A tennis string comprising a multi-filament core of nylon with a braided cover of mono-filament strands of nylon, said mono-filament being many times the diameter of each of the multi-filaments.

4. A tennis string comprising a multi-filament core with a braided cover of mono-filament strands, the core of said string being impregnated with material to fill the interstices thereof, said core, cover and material having similar chemical and physical characteristics and said mono-filaments each being many times the diameter of each of the multi-filaments.

5. A tennis string comprising a multi-filament core with a braided cover of mono-filament strands, the core and cover of said string being impregnated with material to fill the interstices thereof, said core, cover and material having similar chemical and physical characteristics and said mono-filaments each being many times the diameter of each of the multi-filaments.

6. The method of forming a tennis string which comprises braiding a mono-filament cover over a multi-filament core which has just been immersed in an adherent bath and is still soft and plastic, said cover, core and bath

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having similar physical and chemical properties, said mono-filament being many times the diameter of each of the multi-filaments.

7. The method of forming a tennis string which comprises braiding a nylon mono-filament cover over a nylon multi-filament core which has just been immersed in an adherent bath of nylon and is still soft and plastic said mono-filament being many times the diameter of each of the multi-filaments.

8. The method of forming a tennis string which comprises braiding a nylon mono-filament cover over a nylon multi-filament core which has just been immersed in an adherent bath of nylon and is still soft and plastic and then passing the whole through a bath of liquid nylon and drying the same said mono-filament being many times the diameter of each of the multi-filaments.

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