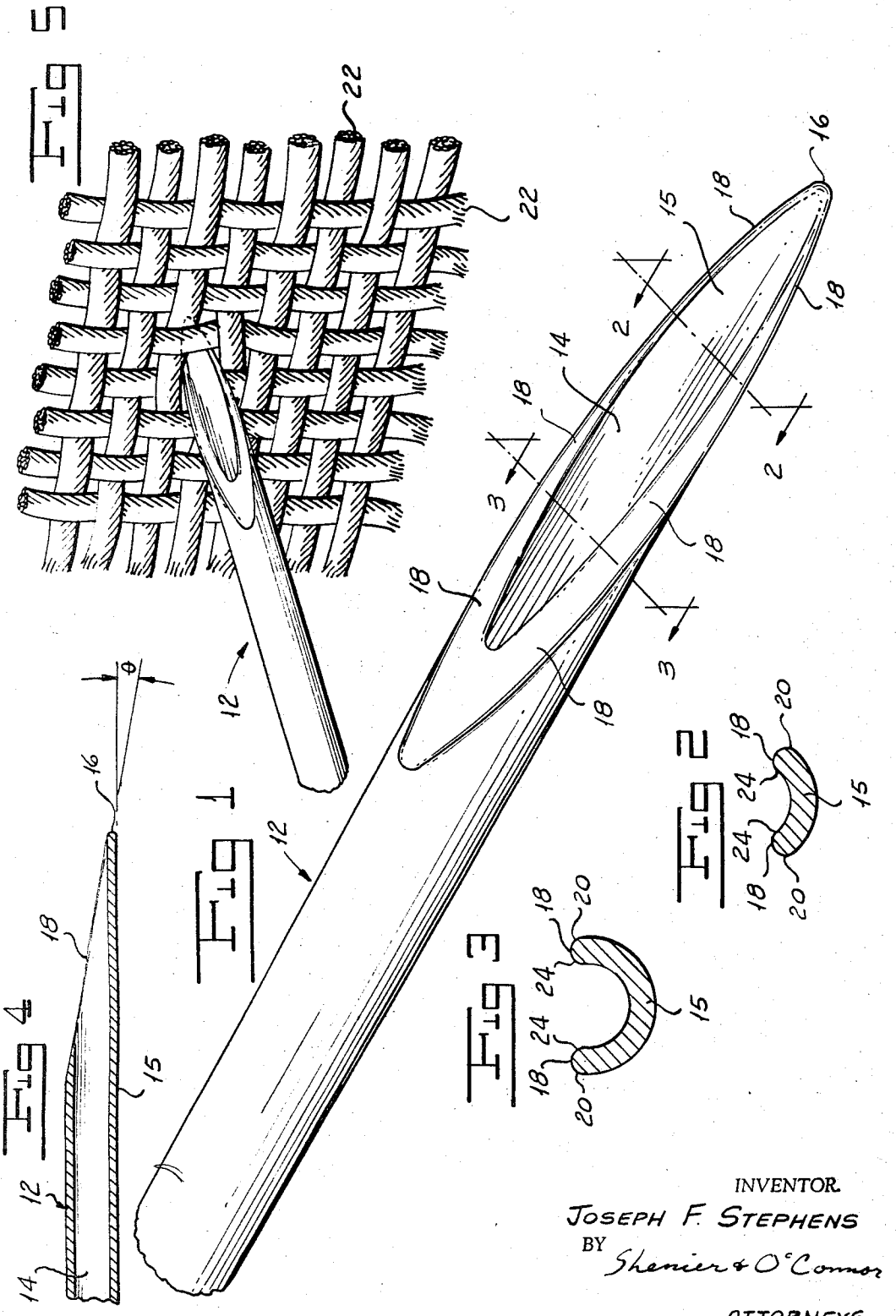
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FILAMENT INSERTING TOOL

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FILAMENT INSERTING TOOL

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My invention relates to a filament inserting tool for applying tags to fabrics by concomitantly feeding a length of solid filamentary material through the tag and fabric, and more particularly to an improved filament inserting tool which is long wearing and which will not cut or damage the fabric.

A new merchandise tagging machine and method are disclosed in copending United States patent application Ser. No. 422,643, filed Dec. 31, 1964, by Frederick N. Stephens, Robert R. Vetter and Stuart J. Burhans. Briefly, this new merchandise tagging machine operates by first placing a tag on the fabric and then bowing the fabric and tag slightly. While in bowed position, a hollow tool which surrounds a length of solid, heat reactive plastic filamentary material is driven through the tag and the fabric. The tool is withdrawn, leaving the plastic filament extending through the tag and the cloth and thus attaching them to each other. A heater melts each end of the plastic filaments, forming heads thereon, which prevent the tag from being removed from the cloth without breaking either the plastic filament or one of the heads.

Usually the tags are made of a tough cardboard or plastic or the like. The soft goods to be tagged are often delicate fabrics. Hypodermic needles have been used as filament inserting tools in the prior art. The point of a hypodermic needle is formed and sharpened as a lance, and is easily able to cut through the tough cardboard tags. However, I have found that these hypodermic type needles are unsatisfactory for several reasons. Their sharp edges often cut the fabric or sever fabric threads. Their sharp points frequently penetrate the fabric yarns, splitting them.

Another problem encountered occurs as the hypodermic needle repeatedly strikes the tough cardboard tags (and in some cases the harder fibers such as nylon) in that its point or leading edge bends or distorts in the region where the wall of the needle has been reduced in thickness to sharpen it. Typically, the point deflects only about 1/64 of an inch, and its deflection is difficult to detect without magnification. But such points fray the fabric even though the extent of the deflection is slight. The fraying is usually not noticeable while a plastic filament is holding a tag in place. It is apparent only after the goods have been sold and the filament and tag removed. Thus sometimes many pieces of merchandise have been tagged with a tag applicator which has a needle having a bent point which frayed each piece. This problem is especially serious when the filament inserting tool is used in a high speed tag applicator such as that disclosed in the aforementioned application, Ser. No. 422,643, because of the high impact force between the needle point and the tag.

I have discovered that I can advantageously punch rather than cut through the tags, and I have invented a filament inserting tool which does not damage even delicate fabrics.

One object of my invention is to provide a filament inserting tool for soft goods tag applicators which does not cut fabric or damage its threads.

Another object of my invention is to provide a filament inserting tool for soft goods tag applicators which does not penetrate or split the fabric yarns but rather wedges them apart and passes through the interstices formed by the weave.

A further object of my invention is to provide a filament inserting tool for soft goods tag applicators which is long wearing and which has a leading edge that resists bending.

In general my invention contemplates the provision of a filament inserting tool comprising a hollow steel shank one end of which is adapted to be carried by the tag applicator machine as in the prior art and the other end of which is tapered and ground to form a generally spherical point with rounded edges in the tapering region. Thus I form a strong point and provide a wedging or camming surface which can pierce the tags while having the ability to force the fabric yarns apart without cutting them.

In the accompanying drawings which form part of the instant specification and which are to be read in conjunction therewith and in which like reference numerals are used to indicate like parts in the various views:

FIGURE 1 is a fragmentary perspective view of an embodiment of my new filament inserting tool showing the tapering end;

FIGURES 2 and 3 are views of sections taken respectively along the lines **2—2** and **3—3** of FIGURE 1;

FIGURE 4 is a cross-sectional view of the tool shown in FIGURE 1; and

FIGURE 5 is a perspective view of an embodiment of my new filament inserting tool passing through a piece of fabric.

More particularly, referring now to the drawings a steel tube or shank generally indicated by the reference number **12** has a longitudinally extending passageway **14** through which the plastic filamentary material is fed. In a typical embodiment the outside diameter of the steel tube **12** is about 0.048 inch; the diameter of the passageway **14** is about 0.042 inch; and the wall **15** of tube **12** is thus about 0.006 inch thick.

The other end of my new filament inserting tool (not shown) is adapted to be positioned in a tag applicator machine and has suitable fitting for the particular machine, such as a socket for example. A typical fitting construction is disclosed more fully in the aforementioned patent application Ser. No. 422,643.

Tube **12** tapers to a generally spherical point **16**. The taper should be gradual. A taper angle θ, as shown in FIGURE 4, of approximately 10 degrees is satisfactory. As will be appreciated by persons skilled in the art, tube **12** can conveniently be tapered and the point **16** rounded by grinding the end of the tube with a grinding wheel or other suitable apparatus known in the art.

I also grind the edges of the tube wall **15** forming a rounded surface **18** in the region that is tapered. Preferably, the radius of curvature of the surface **18** and radius of curvature of the point **16** are both substantially equal to one-half the thickness of the wall **15** so that the point **16** is approximately spherical, or more precisely approximately hemispherical.

It will be noted that the surface **18** is substantially tangential to the point **16**, forming a strong leading edge which resists bending. It will also be noted that there are no sharp edges at **20** or **24** with my new construction, preventing side cutting of the yarns as the tool passes between them, as can be seen in FIGURE 5.

In operation, the filament inserting tool **12** is driven through a bowed cardboard tag and an underlying piece of fabric, usually at high speed. The hemispherical point **16** punches through the tag, wedges apart the yarns or strands **22**, and passes through the interstices of the fabric. I have found that yarns met head on by the point **16** slide to one side and are not pierced or split.

Thus it can be seen that I have accomplished the objects of my invention. My filament inserting tool will not cut fabric, and will not split or penetrate yarns or fibers or strands. Additionaly, my tool is long wearing and its point resists turning or bending.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations. This is contemplated by and is within the scope of my claims. It is further obvious that various changes may be made in details within the scope of my claims without departing from the spirit of my invention. It is therefore to be understood that my invention is not to be limited to the specific details shown and described.

Having thus described my invention, what I claim is:

1. A filament inserting tool for advancing a filament axially through a ticket and through soft goods comprising a thin walled filament receiving tube, said tube tapering at one end to a substantially spherical point the radius of which is substantially equal to one-half the thickness of said tube wall, and the edges of said wall in the region of said taper being rounded and forming a surface which is substantially tangential to said point.

2. A filament inserting tool for advancing a filament axially through a ticket and through soft goods comprising a thin walled filament receiving tube, said tube tapering at one end to a substantially hemispherical point which has a radius substantially equal to one-half the thickness of said tube wall.

3. A filament inserting tool for advancing a filament axially through a ticket and through soft goods comprising a thin walled filament receiving tube, said tube tapering at one end to a curved point which has a radius of curvature substantially equal to one-half the thickness of said tube wall.

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