

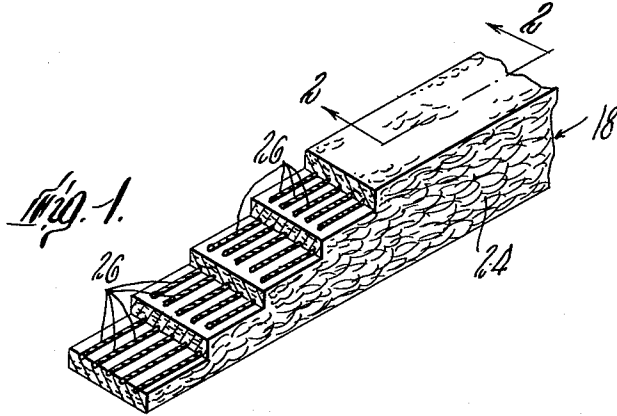
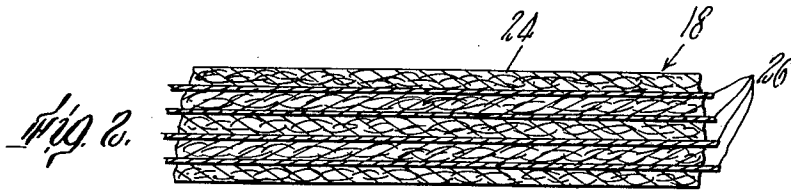
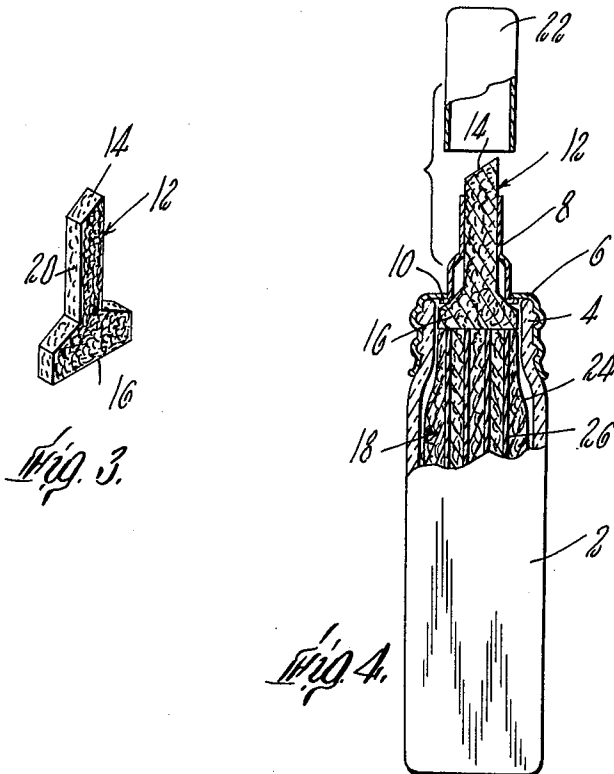
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FELT-TIPPED MARKING PEN WITH COMPOSITE INK RESERVOIR

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FELT-TIPPED MARKING PEN WITH COMPOSITE INK RESERVOIR

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The present invention relates to marking pens and more particularly to an improved marking pen employing a felt reservoir and to an improved reservoir for use in such pens.

Marking pens wherein the ink is held in a felt reservoir from which it is fed to a felt writing point or nib are very useful for a number of purposes. Such pens, of the type shown for example in Patents Nos. 2,416,596 and 2,713,178, find substantial use where it is desired to make broad lines as in printing or writing on labels and the like. Such pens comprise a closed container within which is located a block of felt which serves as the reservoir for the ink. The nib, composed of a hard felt, is disposed within an opening at one end of the container with its inner end in contact with the felt reservoir and its outer end extending outwardly of the container. It has been found that it is not practicable to charge the container with a greater amount of ink than can be taken up and held by the felt, as excess ink, free within the container, would cause leakage. One drawback to such pens as heretofore known has been the fact that the amount of ink which can be provided within the felt reservoir is limited, limiting the useful life of the pen. It has been found that by decreasing the density of the felt, the felt reservoir can be caused to take up a greater amount of ink, but such less dense felt is less effective in conveying or wicking the ink to the nib from the portions of the reservoir remote from the nib so that any advantage in increased ink storage capacity to be obtained by decreasing the density of the felt is offset by such decrease in the feeding or discharging properties of the felt, so that all of the ink may not be utilized. Such discharging property, or ability to feed the ink from remote portions of the reservoir to the nib, can be increased by increasing the density of the felt, but the advantage of such increase in density is offset by the decrease in the amount of ink which can be retained within the felt.

The invention provides an improved marking pen wherein the reservoir may be less dense and thus have a large ink storage capacity but yet wherein the ink conducting and discharging properties of the reservoir are excellent. With the reservoir of the invention an ink storage capacity corresponding to that of a less dense felt is obtained with ink discharge properties corresponding to those of a more dense felt, so that the total amount of ink available for utilization is greater than can be obtained with either a dense felt or a markedly undense felt, with corresponding longer useful life of the pen, and with a felt that is not so lacking in density as to permit the ink to settle out of the felt and cause leakage. These advantages, further, are obtained with a decreased total amount of fibre, and thus lower cost.

An object of the invention is to provide an improved marking pen characterized by excellent ink storage capacity and excellent ink discharge properties, and consequently a long useful life.

A further object is to provide an improved felt reservoir for use in marking pens characterized by large ink storage capacity and excellent ink discharging properties.

A further object of the invention is to provide an improved felt suitable for use in marking pens to provide an ink reservoir characterized by large total available ink and by long life.

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Other and further objects, features and advantages of the invention will become apparent from the following description of presently preferred particular embodiments of the invention, in which description reference is made to the accompanying drawing wherein

FIG. 1 is a perspective view of the ink reservoir, partly broken away to show the construction;

FIG. 2 is a sectional view on line 2—2 of FIG. 1, looking in the direction of the arrows;

FIG. 3 is a perspective view of a writing point or nib employed in the marking pen of the invention, and

FIG. 4 is an elevation, partly broken away, of the marking pen.

In accordance with the invention I provide a marking pen comprising an elongated liquid type container, suitable in shape for use as a writing instrument, the container having an opening in one end thereof in which is located a felt nib having its writing tip extending outwardly of the container and its inner end disposed within the container and in contact with a felt ink reservoir within the container. The ink reservoir comprises an elongated body, adapted to be received within the container, which body may be cylindrical or rectangular in cross section and is formed of randomly disposed textile fibers, said body further containing a plurality of textile fiber strands arranged in two or more layers within the body and extending endwise of the reservoir from the end adjacent the nib to the end most remote therefrom, approximately parallel to each other and along approximately straight lines. With this construction, a less dense felt may be employed, thus providing a larger ink storage capacity, and yet due to the presence of the longitudinally disposed strands, the ink is effectively conducted to the nib from all points throughout the body of the reservoir.

Referring to the drawing, and first to FIG. 4, the marking pen comprises a container 2 which may be of metal, glass, plastic or other suitable material, and is preferably such as to constitute a body which is elongated and of a size such that it conveniently can be held in the hand during writing or marking with the pen. The container 2 is open at its upper end, as shown, and is provided adjacent its open upper end with screw threads 4 for the reception of the similarly threaded closure member 6. The member 6 has a central opening therein within which is received a nib holding tubular member 8 having at its lower or inner end an outturned flange 10 which is seated against the inner surface of the closure member 6 adjacent and surrounding the central opening. Within the nib-holding member 8 is located the nib 12 composed of a hard felt of animal fibers, typically wool. The tip 14 of the nib 12, which constitutes the writing portion of the nib, protrudes from the open end of the tubular member 8 and the inner or lower end 16 of the nib is disposed below the flange 10 and in engagement with the reservoir 18 within the main body of the container 2.

While the nib may be of any conventional form and construction, I prefer to use a nib of the form shown in FIG. 3, wherein the inner end 16 of the nib is of greater dimension in at least one direction than the portion of the nib which lies entirely within the tubular nib supporting member 8. Thus, in FIG. 3, the lower end 16 is of greater width than the body 20 of the nib. It will be understood that the ink contained within the reservoir 18 is transferred to the nib by the contact between these two elements so that, in the use of the pen, ink is conducted from the reservoir to the writing tip 14 as it is needed. The preferred form of nib, as shown in FIG. 3, provides a lower portion which makes contact with the reservoir 18 across the entire width of the reservoir and thus contributes to effective and complete discharge of ink from the reservoir.

A cap 22, adapted to be tightly seated on the tubular nib-holding member 8, is provided to protect the nib when not in use and to seal the container 2 against loss of ink by evaporation.

Referring now to FIGS. 1 and 2, wherein the reservoir 18 is shown in more detail, the reservoir comprises the body 24 of felted animal fibers, typically wool, the fibers, as is conventional, being disposed in random directions within the body and by their interlocking with each other serving to provide the necessary coherence and integrity and hold the body of felted fibers together. The body 24 of the reservoir may include a reasonable amount of non-felting fibers such as will provide the optimum density, if desired, as is well known in the art.

In accordance with the invention, the body of the reservoir 18 is provided with layers of fibrous strands 26 disposed endwise of the body. As shown, the strands 26 are disposed in flat layers within the body 24. The strands need not be composed of feltable fibers as they are held in place within the felted body by the felting or intermingling of the fibers of the main portion 24 of the body. Due to the nature and the disposition of the strands 26, the fibers thereof lie predominantly in the direction extending from one end of the reservoir to the other. There are at least two layers of such strands 26 and preferably four or five or more layers. Each layer may be composed of any desired number of strands. Preferably the strands are of such number and are so spaced within the layer as to provide about 15 to 20 strands per inch of width of the layer, transversely of the length of the strands. The total number of strands and layers is such that the strands 26 constitute between about 5% and 20% of the total weight of the reservoir 8. It is an important feature of the invention that the strands 26 be disposed substantially parallel and along lines extending from the end of the reservoir 18 which is in contact with the nib 12 to the opposite or remote end of the reservoir.

The material of which the strands 26 are formed is not a critical feature of the invention. The fibers of the strands may be formed from acrylic fibers, polyamide fibers, such as nylon fibers, glass fibers, viscose, Dacron or acetate fibers, or fibers of a polyester resin or other synthetic material, or any textile fiber. The strands 26 may be formed of vegetable fibers, such as cotton, and I have found that cotton fibers are very effective for the purpose. A two ply No. 20 scoured cotton yarn of 3 turns per inch twist makes an excellent strand 26.

The strands 26 may be of any desired construction. I prefer that the strands not be so tightly twisted or of such fine diameter as sewing threads. Desirably the construction of the strands 26 is such that they are no harder than the felt structure 24 in which they are embedded. On the other hand, the strands 26 preferably are not of a very soft and spongy construction.

While I have described the body 24 of the reservoir as formed of felted fibers, I do not intend to exclude bodies of fibers formed into a felt-like form by the conventional needling operation, as such bodies are useful in the invention.

Conveniently the strands 26 may be assembled with layers of the fibers which are to constitute the body 24 before hardening and felting of the body 24, whereby the fiber layers are secured to each other and about the strands 26 by the felting or needling operation.

I have found that reservoirs constructed in accordance with the invention are capable of raising to the nib of the pen over twice the amount of ink that could be provided by a similar reservoir from which the strands 26 were absent. A further advantage of the reservoir construction of the invention is that the strands 26, due to their longitudinal disposition within the body of the felt, provide a certain amount of longitudinal stability or stiffness, causing the body to better resist endwise deformation and thus to hold the upper end of the body in good

contact with the lower end of the nib. The strands 26 of the reservoir of the invention provide a height of rise of the ink greater than can be provided by a simple felt. Thus the reservoir 18 can be made longer, thereby providing a greater volume of reservoir with the consequent greater volume of useable ink and corresponding longer life of the pen.

With reservoirs constructed in accordance with the invention containing five layers of strands of cotton fibers I have found that the overall useful life of the pen is increased one-third or more as compared with a pen of conventional construction wherein the reservoir is a felt of wool fibers. Accordingly the invention provides a marking pen and a felt reservoir for such pens, characterized by longer useful life than has heretofore been available, yet at lower cost, as the total weight of the fiber may be less, and provides more positive feeding of ink to the nib due to the longitudinal strands and provides more lengthwise rigidity in the reservoir thus affording a more positive contact between the reservoir and the nib.

With the construction of the invention, the reservoir may be formed of a less dense felt than would ordinarily be employed for such reservoirs, thus providing a larger ink storage capacity. Due to the longitudinal disposition of the strands 26, the reservoir of the invention exhibits excellent ink exhausting properties, markedly better than would be the case with a felt of corresponding density from which the strands 26 were absent. Thus the invention provides at the same time both excellent ink storage capacity and excellent ink exhausting properties, while employing a lesser total weight of fiber and yet without making the felt body of the reservoir so soft and lacking in density as to permit unwanted loss of ink therefrom and leakage of the pen.

I claim:

1. A marking pen comprising an elongated liquid-tight container having an opening in one end thereof, a nib of felted fibers disposed in said opening and extending outwardly of said container, a cap enclosing the outwardly extending portion of said nib and closing said opening, and an ink reservoir within said container comprising an elongated body of randomly disposed felted fibers, said body containing a plurality of textile fiber strands arranged in two or more layers within said body and extending parallel to each other along approximately straight lines from one end of said body to the other lengthwise of said body, the inner end of said nib engaging said body and said strands.

2. A marking pen comprising an elongated liquid-tight container having an opening in one end thereof, a nib of felted fibers disposed in said opening and extending outwardly of said container, a cap enclosing the outwardly extending portion of said nib and closing said opening, the portion of the nib within the container being substantially wider than the portion of the nib extending outwardly of the container, and an ink reservoir within said container comprising an elongated body of randomly disposed felted fibers, said body containing a plurality of textile fiber strands arranged in two or more layers within said body and extending parallel to each other along approximately straight lines from one end of said body to the other lengthwise of said body, the inner end of said nib engaging said body and said strands.

3. A marking pen comprising an elongated liquid-tight container having an opening in one end thereof, a nib of hard felted animal fibers disposed in said opening and extending outwardly of said container, a cap enclosing the outwardly extending portion of said nib and closing said opening, and an ink reservoir within said container comprising an elongated body of randomly disposed felted fibers, said body containing a plurality of twisted cotton fiber strands arranged in two or more layers within said body and extending parallel to each other along approximately straight lines from one end of said body

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to the other lengthwise of said body, the inner end of said nib engaging said body and said strands.

4. A marking pen comprising an elongated liquid-tight container having an opening in one end thereof, a nib of hard felted animal fibers disposed in said opening and extending outwardly of said container, a cap enclosing the outwardly extending portion of said nib and closing said opening, and an ink reservoir within said container comprising an elongated body of randomly disposed felted fibers, said body containing a plurality of twisted cotton fiber strands arranged in two or more layers within said body and extending parallel to each other along approximately straight lines from one end of said body to the other lengthwise of said body, said cotton fiber strands constituting between 5% and 20% of the weight of said body, the inner end of said nib engaging said body and said strands.

5. A marking pen comprising an elongated liquid-tight container having an opening in one end thereof, a nib of hard felted animal fibers disposed in said opening and extending outwardly of said container, a cap enclosing the outwardly extending portion of said nib and closing said opening, and an ink reservoir within said container comprising an elongated body of randomly disposed felted fibers, said body containing a plurality of twisted textile fiber strands arranged within said body in two or more layers of 15 to 20 strands per inch of width and extending parallel to each other along approximately straight lines

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from one end of said body to the other lengthwise of said body, the inner end of said nib engaging said body and said strands.

6. A marking pen comprising an elongated liquid-tight container having an opening in one end thereof, a nib of hard felted animal fibers disposed in said opening and extending outwardly of said container, a cap enclosing the outwardly extending portion of said nib and closing said opening, the portion of the side within the container being substantially wider than the portion of the nib extending outwardly of the container, and an ink reservoir within said container comprising an elongated body of randomly disposed felted fibers, said body containing a plurality of cotton fiber strands twisted at least 3 turns per inch and arranged within said body in two or more layers of 15 to 20 strands per inch of width and extending parallel to each other along approximately straight lines from one end of said body to the other lengthwise of said body, said cotton fiber strands constituting between 5% and 20% of the weight of said body, the inner end of said nib engaging said body and said strands.

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