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FOUNTAIN PEN

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3 Claims. (Cl. 120-42)

This invention relates to fountain pens and more particularly to what are referred to as the ink-sacks or wells of instruments of this type and kind. The novel features of the invention will be best understood from the following description, when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a sectional view through the barrel of a pen illustrating one adaptation of the invention.

Fig. 2 is a side and sectional view of the ink-sack detached.

Fig. 3 is a detail sectional view on the line 3-3 of Fig. 2.

Fig. 4 is an end view of the sack as shown in Figs. 1-3.

Fig. 5 is a view similar to Fig. 4 showing another adaptation of the invention.

Fig. 6 is a view similar to Figs. 4 and 5 showing another modification; and

Fig. 7 is a detail view showing a method of forming an ink-sack, substantially similar to those shown in Figs. 1-4 inclusive.

In fountain pens, it has been the practice for many years to employ molded rubber sacks in the form of elongated, thimble shaped bodies, or rounded closed end tubes, for the storage of ink in the barrel of a fountain pen. The construction of such devices has necessitated a molding operation, thus production has been relatively slow.

It is the purpose of my invention to materially simplify the construction of ink-sacks of the character described by providing tubular sections, cut to a predetermined length and then compressing one end portion of these sections and uniting the compressed portions of the sections to form closed end tubes which will form very practical ink-sacks. In the compressing operation, the compressed parts may be cemented together, particularly in using certain types and kinds of flexible materials, including various kinds of plastic materials, whereas with other plastic materials, the operation is performed by simply heating one end portion of a tube section and then placing said end portion of the section between die parts or forming tools to compress the heating end portion of the section firmly, which operation, and by virtue of the heating of the materials of the section, results in a sub-

stantial welding of the opposed firmly compressed walls.

Various types and kinds of flexible plastic materials may be used in forming the tube sections and one of the materials, which could be used, is known in the trade as vinyl resin, one of which materials is identified in the trade as "Vinylite."

For practical purposes it is desirable to use a plastic material having such resiliency and formed into a tube of such construction, as to establish a comeback property, so that upon compression of the sack by the usual filling mechanism of the pen, the sack will expand to normal position in drawing ink thereinto. It is, of course, desirable to employ plastic materials which will not be affected by the writing fluids used in the pen nor affect characteristics of the fluid.

To illustrate certain adaptations of the invention, I have shown in Fig. 1 of the drawing the barrel 10 of a fountain pen, the end 11 of which is closed and the externally threaded end 12 of which is open to receive the detachable section 13. The section 13 has a reduced portion 14 fitting snugly within the bore of the barrel 10 and a further reduced extension 15 upon which the open end of the ink-sack 16 is mounted and to which the same may be cemented, or otherwise secured to prevent accidental displacement. It will thus be seen that as a customary practice, the sack 16 is insertable and removable with respect to the barrel as a unit part of the section 13.

As is the usual practice, the barrel of the pen is provided with some type and kind of sack compressing elements, the specific structure of which forms no direct part of the present invention, but one type of such device is shown simply to illustrate the general combination. An elongated spring 17 is arranged along the wall of the barrel 10 having the elongated aperture 18 therein with the curved end 19 of the spring seating in the closed end 11 of the barrel. To the free end 20 of the spring is secured the compressor bar 21 which is arranged parallel to the spring and upon the sack 16. At 22 is shown the operating lever pivotly supported upon a ring 23 seated in the barrel 10, the end 24 of the lever operating upon the spring 17 and bar 21 in compressing the sack 16 in lifting the finger piece end 25 of the lever in the well known manner. The end 25 seats in a recessed portion 26 formed beyond one end of the aperture 18 as will be apparent.

The sack 16 is in the form of an elongated seamless or seamed tubular body, the end portion 27 of which is closed by a compressed and united section 28, opposed walls 29 and 30 of

which are cemented or welded in abutting relation to each other as indicated at 31, note Fig. 3, to form a substantially unitary structure of the section 28.

The section 28 presents at the end of the sack what might be defined as a rib which is disposed axially of the tube and the width of this rib is slightly less than the outer diameter of the tubular body portion of the sack, and upper and lower ends of the rib join the wall structure of the sack in which might be termed pleated or folded sections 32 which, in the construction shown in Figs. 1-4 inclusive, extends slightly beyond the outside diameter of the sack 16 but not sufficient to interfere with free passage of the sack into the bore of the barrel 10.

In forming the sack 16, as shown in Figs. 1-4 inclusive, a tube of plastic material, cut to the desired length, is compressed at one end between dies or forming tools which first slightly compress opposed sides of the tube, which defines the ultimate width of the section 28, and then the other opposed walls are compressed upon each other in the cementing or welding of the latter walls together, confined within the limits named. The result of this operation produces the slightly folded portions, as at 32, and extends these portions slightly beyond the diameter of the tube. In other words, the end of the tube adjacent the section 28 becomes somewhat flattened, the walls 29 and 30 curving gradually into the normal diameter of the tube, as indicated by the wall portions 33, clearly illustrated in Fig. 3 of the drawing.

There is a distinctive advantage in a tube constructed in the manner described and by the use of flexible plastic materials, and that is, this tube possesses a greater longitudinal rigidity and firmness than the old conventional rubber sack, thus the feeding of the sack 16 into the barrel of the pen is facilitated while, at the same time, it is possible to use sacks of greater outside diameter, thus providing for a greater storage of ink. It is also noted, upon a consideration of Fig. 1, that the flattened surface of the sealed end section 28 has the flat surface arranged parallel to the surface of the bar 21, thus if the bar were to extend to the full length of the sack, the section 28 would not interfere with free compressing operation of the bar. This flat section 28 will also guide the operator in proper insertion of the sack in the barrel 10, the flat portion being turned sufficiently so that either of the shoulders at 32 will not strike the said spring.

Instead of compressing the tube simply in two directions, in the manner illustrated in Figs. 1-4 inclusive, the walls of the tube may be compressed in three directions by the use of three dies, the result of which would be the formation of a Y sealed end section 34, instead of what might be termed the I-section of Figs. 1-4. With this construction, the extension of the tube adjacent the sealed section will be substantially eliminated in that the ribs do not extend nearly so far from the center.

In Fig. 6 of the drawing is shown another adaptation of the invention, wherein an X or cross shaped section 35 is produced preferably by the use of four dies or forming tools. This construction will draw the adjacent end portion of the tube inwardly and completely dispense with any widening of the tube. With the structure shown in Figs. 5 and 6, it will be desirable to position the bar 21 in the valley formed between two of the radially extending ribs which form the Y and

X sections. In the illustration in Figs. 5 and 6 of the drawing, the united sections 34 and 35 have been drawn in outline form only, to indicate that these resulting sections actually become a unitary body, particularly when the heating process is employed. Of course, when these parts are cemented together a line of abutment of opposed walls would appear.

In Fig. 7 of the drawing, I have diagrammatically illustrated another method of producing ink-sacks of the type and kind disclosed in Figs. 1-4 inclusive, in which the tubular sections are cut at double length and these longer tube sections, partly illustrated at 36, are compressed centrally, as seen at 37, to unite opposed walls in forming closed rib ends 38, 39 on the resulting sacks 40, 41 respectively, the compressed sections 39 being severed centrally, as seen at 42, in sub-dividing the sacks 40, 41. With this method of procedure the central portion of the tube is headed prior to the compressing operation which unites the opposed walls in the same manner as set forth in connection with the structure shown in Figs. 1-4 inclusive.

With a method of production, according to the teachings in Fig. 7, the sealing and end closing of the sacks is more accurately performed and at the same time, in a single operation, two complete sacks are produced, the only additional operation required being, severing the workpiece to form two independent sacks, but this can be cared for in direct relationship to the forming operation.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. An ink sack for fountain pens composed of a material other than rubber, said sack comprising an elongated body of a plastic material such as "Vinylite," the wall structure of said tubular body having the characteristics of presenting longitudinal rigidity, free compressibility and being automatically returnable to extended form when means compressing said body is released, the thickness of the wall of said tubular body contributing longitudinal rigidity thereto, means at one end of said tubular body constituting a sealed end, said last named means comprising united opposed wall portions of the tube forming a rib like sealed section at said end of the tube, said rib section in combination with the longitudinal rigidity of said tubular body facilitating assemblage of the tubular body in the pen barrel, said rib section being arranged within longitudinal boundaries of said body and assisting in returning the tubular body when compressed to expanded form.

2. An ink sack for fountain pens composed of a material other than rubber, said sack comprising an elongated body of a plastic material such as "Vinylite," the wall structure of said tubular body having the characteristics of presenting longitudinal rigidity, free compressibility and being automatically returnable to extend form when means compressing said body is released, the thickness of the wall of said tubular body contributing longitudinal rigidity thereto, means at one end of said tubular body constituting a sealed end, said last named means comprising united opposed wall portions of the tube forming a rib like sealed section at said end of the tube, said rib section in combination with the longitudinal rigidity of said tubular body facilitating assemblage of the tubular body in the

pen barrel, said rib section being arranged within longitudinal boundaries of said body, and said rib section being cross shaped in cross sectional form and assisting in returning the tubular body, when compressed, to expanded form.

3. An ink sack for fountain pens composed of a material other than rubber, said sack comprising an elongated body of a plastic material such as "Vinylite," the wall structure of said tubular body having the characteristics of presenting longitudinal rigidity, free compressibility and being automatically returnable to extended form when means compressing said body is released, the thickness of the wall of said tubular body

5 contributing longitudinal rigidity thereto, means at one end of said tubular body constituting a sealed end, said last named means comprising united opposed wall portions of the tube forming a rib like sealed section at said end of the tube, said rib section in combination with the longitudinal rigidity of said tubular body facilitating assemblage of the tubular body in the pen barrel, said rib section being arranged within longitudinal boundaries of said body, and said rib section being Y-shaped in cross sectional form and assisting in returning the tubular body, when compressed, to expanded form.

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