United States Patent

[11] 3,583,820

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Continuation-in-part of application Ser. No. 698,903, Sept. 18, 1968, now Patent No. 3,480,370, dated Nov. 25, 1969.

[54] **WRITING INSTRUMENTS**
8 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **401/107**
[51] **Int. Cl.** **B43k 24/16**
[50] **Field of Search** 401/107-108, 59, 60

[56] **References Cited**

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ABSTRACT: A writing instrument having a barrel and an ink cartridge shiftably mounted in the barrel and provided at one end with a writing tip. At its end, the barrel has longitudinally extending fingers which close upon themselves and completely shield the writing tip when the cartridge is in its retracted position. A camming surface on he cartridge engages inwardly projecting shoulders on the fingers and spreads the fingers as the cartridge moves to its extended position. An elastomeric band assists in urging the fingers together. A hood is mounted on the barrel and surrounds the fingers. The hood includes an opening to permit the extension of the writing tip.

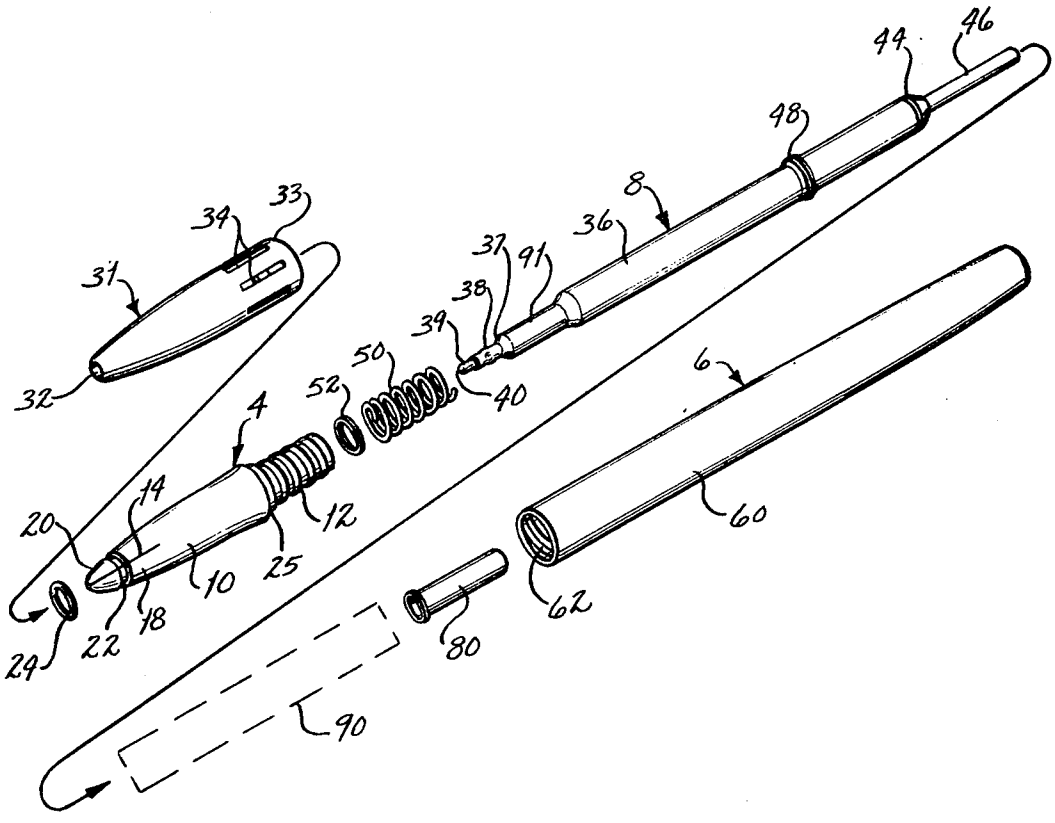


FIG. 1

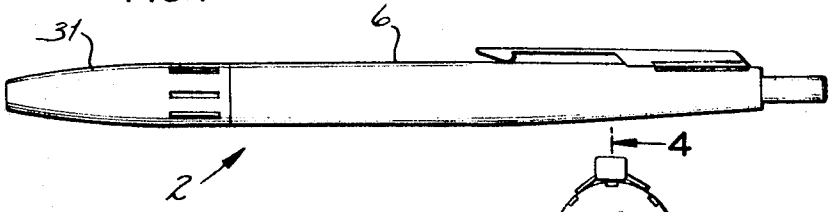


FIG. 2

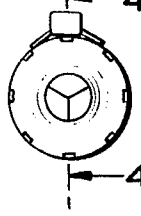


FIG. 3

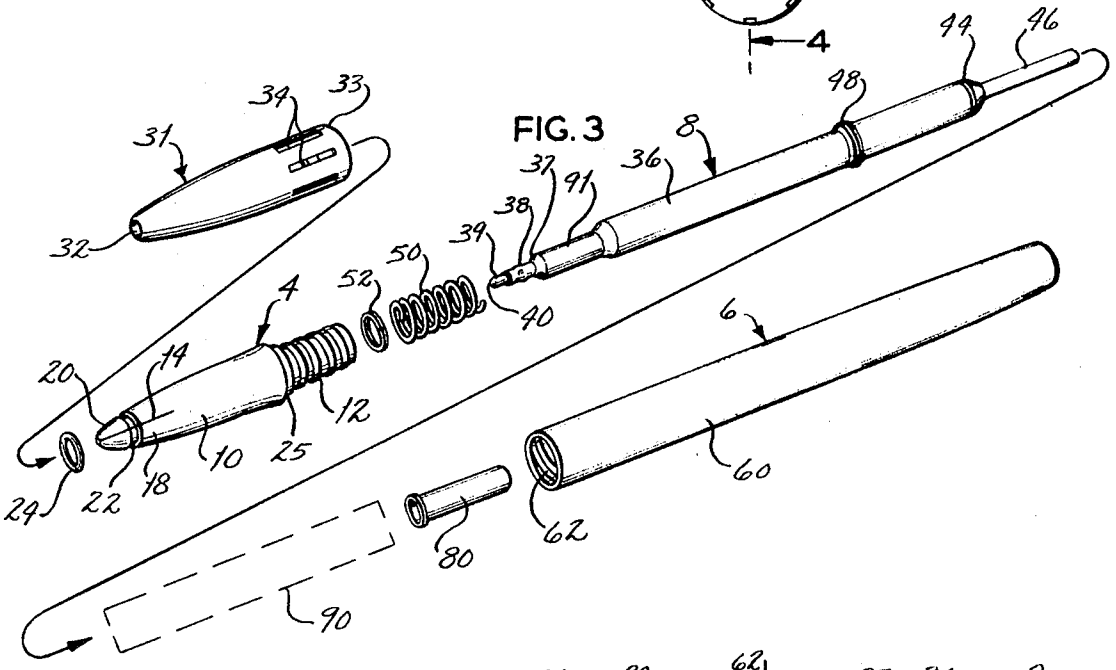


FIG. 4

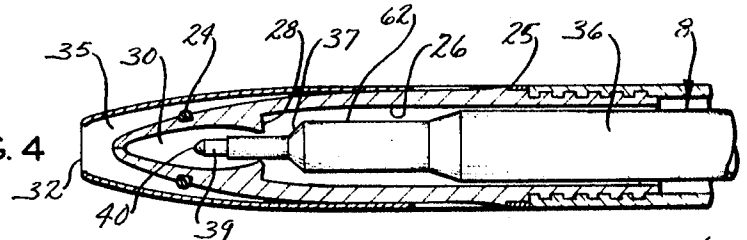
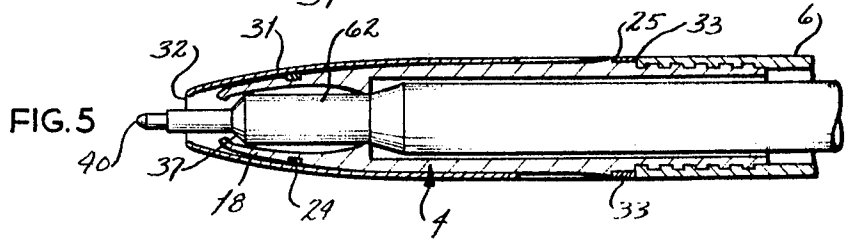


FIG. 5



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WRITING INSTRUMENTS

This application is a continuation-in-part of my copending application Ser. No. 698,903, filed Jan. 18, 1968 now U.S. Pat. No. 3,480,370 issued Nov. 25, 1969.

This invention relates in general to writing instruments and, more particularly, to writing instruments having retractable marking tips.

Ballpoint pens having retractable writing points are commonplace and have been in use almost since the inception of the ballpoint pen itself. Since the rotatable ball in the point of a ballpoint pen is generally very small, the point itself requires little breadth to support it and consequently the hole or aperture in the end of the pen barrel through which the point projects need not be much larger than the point. Therefore, when the point is retracted into the pen barrel, the chance of the point contacting and staining nearby objects is remote. Nevertheless, after repeated use, ink and stray paper fibers tend to accumulate on the point and this accumulation is transferred to the surrounding margins of the barrel aperture as the writing tip is withdrawn. In time a relatively large deposit of ink and paper fiber accumulates on the pen barrel, thereby subjecting shirt and coat pockets, the interior of purses and other places where such pens are normally kept to permanent ink stains.

Recently fiber tip pens or felt writers have become popular for household and business use. The writing tips of these pens, while relatively small in comparison to the felt markers previously marketed, are nevertheless considerably larger than ballpoint tips, and as a result such cartridges are not customarily made to retractably mount them in a manner similar to ballpoint cartridges. In particular, a barrel capable of retractably receiving such a cartridge in the same manner in which ballpoint cartridges are normally mounted would not have the slim gentle taper which makes conventional ballpoint pens aesthetically pleasing and easy to manipulate, and moreover the end of the barrel would necessarily have an enlarged aperture for receiving the felt tip. This barrel construction would not adequately shield the writing tip from nearby objects. Furthermore, fiber tips, being relatively flexible, would have an even greater tendency to deposit ink on the margins of the barrel apertures than is the case with conventional ballpoint pens. Also, the fiber tips of these pens function like a wick and, unless covered, the ink evaporates at an accelerated rate. Consequently, fiber tip markers of current manufacture do not employ retractable tips, but are, on the contrary, supplied with removable protective covers similar to those used on fountain pens.

The present invention is a writing instrument having a barrel provided with an ink cartridge and writing point mounted on the end of the cartridge. The barrel has at its end longitudinally extending fingers which close upon one another and substantially completely cover and protect the writing point when that point is retracted. A hood is mounted on the barrel and surrounds the fingers so that the pen may be held without touching the fingers. The hood has an opening positioned axially in front of the writing tip. When the point is extended, a portion of the cartridge engages the fingers and urges them apart, thereby allowing the point to project beyond the end of the barrel and through the opening in the hood for marking purposes.

Among the several objects of the present invention may be noted the provision of a writing instrument in which the writing point retracts into and is completely shielded by the barrel; the provision of the writing instrument in which the writing point is relatively broad, yet retracts into a slim tapered barrel; the provision of a writing instrument which does not leave a deposit of ink and paper fibers on the pen barrel after the point has been retracted numerous times; the provision of a writing instrument having spreadable fingers for protecting the writing tip, but also having a hood covering the fingers so that the instrument may be held without touching the fingers;

and the provision of a writing instrument which is simple and rugged in construction and economical to manufacture. Other objects and features will be in part apparent and in part pointed out hereinafter.

The invention accordingly comprises the constructions hereinafter described, the scope of the invention being indicated in the following claims.

In the accompanying drawings, in which one of various possible embodiments of the invention is illustrated,

FIG. 1 is an elevational view of the writing instrument of the present invention;

FIG. 2 is an end elevational view with the writing tip retracted;

FIG. 3 is an exploded perspective view of the writing instrument;

FIG. 4 is a fragmentary sectional view taken along line 4–4 of FIG. 2; and

FIG. 5 is a fragmentary sectional view similar to FIG. 4 but showing the writing tip extended beyond the end of the barrel.

Corresponding reference characters indicate corresponding parts throughout the several views of the drawings.

Referring now to the drawings, 2 designates a writing instrument including a barrel 4, an end cap 6, and an ink cartridge 8 mounted for shiftable movement in barrel 4.

Barrel 4 is preferably molded from a somewhat flexible plastic and has a gently tapered tubular body portion 10 having a diametrally reduced threaded end portion 12 projecting axially from its upper end, reference being made to the position in which instrument 2 is normally held when writing on a horizontal surface. At its opposite or lower end, body portion 10 is provided with three upwardly extending longitudinal slits 14 defining three longitudinally extending fingers 18 which taper inwardly to form a rounded nose portion 20 on barrel 4. Immediately inwardly from nose portion 20, body portion 10 is undercut in the formation of a shallow circumferential recess 22. Fitted into recess 22 is an elastomeric band 24 which biases fingers 18 toward one another so that the edges forming slits 14 abut unless otherwise restricted. Spaced slightly downwardly from threaded portion 12 is an upwardly presented annular shoulder 25. The portion of barrel 4 running from shoulder 25 down to nose portion 20 is tapered radially inwardly.

Barrel 4 is provided with an internal axially extending bore 26 which extends through threaded end portion 12 and body portion 10. At its lower end, bore 26 tapers inwardly with the taper of body portion 10 and terminates at shoulder 28 located on the inwardly presented surfaces of fingers 18 substantially midway between their ends. Beyond shoulders 28, fingers 18 are relieved in the formation of an axially extending well 30 in body portion which opens upwardly into bore 26.

A tubelike hood 31 is constructed of metal and includes an aperture 32 at its lower end and an annular rim 33 at its upper end. Adjacent rim 33 are a plurality of longitudinally extending slots 34 which are positioned in a circular array around the circumference of hood 31. Hood 31 tapers smoothly radially inwardly from rim 33 to aperture 32. The diameter of the inner surface of rim 33 is approximately the same as the diameter of the outer surface of barrel 4 immediately above shoulder 25.

Hood 31 is secured to barrel 4 by sliding rim 33 upwardly over shoulder 25. The diameter of shoulder 25 is slightly greater than the diameter of the inner surface of rim 33 so that rim 33 must be forced over shoulder 25. Shoulder 25 is compressed slightly when rim 33 is forced over it. After rim 33 moves above shoulder 25, shoulder 25 presses radially outwardly against the portion of hood 31 containing slots 34. This pressure causes shoulder 25 to distort in shape so that portions of it protrude within slots 34 and abut against the upper ends of slots 34, thereby rigidly attaching hood 31 to barrel 4 and holding hood 31 against both longitudinal and rotational movement with respect to barrel 4.

In order for shoulder 25 to distort in this manner it is necessary that barrel 4 be constructed of a somewhat elastic materi-

al. Soft plastic materials such as polyethylene, polypropylene, and butyrate have been found to have the requisite elasticity. An example of such a material is the high density polyethylene, Ser. No. 3060, sold by Eastman Chemical Co.

When hood 31 is attached to barrel 4 it surrounds and encloses fingers 18 with aperture 32 positioned axially in front of nose portion 20. The tapering of hood 31 is less pronounced than the tapering of fingers 18 and nose portion 20 so that a space 35 is provided between the outer surfaces of fingers 18 and the inner surface of hood 31. Space 35 is sufficiently large to permit radial spreading of fingers 18 within hood 31.

Mounted in bore 26 for limited axial shifting movement between extended and retracted positions is ink cartridge 8, including a tubular reservoir 36 having a tapered camming surface 37 at its lower end which merges into an axially extending diametrally reduced end portion 38 having a fiber marker 39 retained therein by mains of crimps. Fiber marker 39 projects axially beyond end portion 38 in the provision of a writing tip 40 which is disposed within well 30 of barrel 4 when cartridge 8 is in its retracted position. Camming surface 37 is located adjacent shoulders 28 when cartridge 8 is in its retracted position (FIG. 4). The location of camming surface 37 with respect to writing tip 40 of marker 39 is such that when cartridge 8 is moved axially forward in barrel 4, camming surface 37 will engage shoulders 28 before tip 40 reaches the base or closed end of well 30. Moreover, the taper of camming surface 37 is such that continued advancement of cartridge 8 will cause camming surface 37 to spread fingers 18 sufficiently to allow writing tip 40 to project beyond the spread nose portion 20 on barrel 4 without being in contact or having ever contracted the internal surfaces of fingers 18 (FIG. 5). When cartridge 8 is in its fully extended position, tip 40 extends outwardly through aperture 32 in hood 31. Hood 31 protects fingers 18 to prevent dust or other foreign particles from preventing the full closure of fingers 18 when cartridge 8 moves to its retracted position. Hood 31 also provides a smooth outer surface for the writing instruments so that it can be held comfortably during use. Hood 31 protects fingers 18 from being caught on objects or being pried open during use.

Operatively secured to the opposite end of tubular reservoir 36 is a plastic end plug 44 having a diametrally reduced operating stem 46 projecting axially therefrom. Embracing reservoir 36 immediately downwardly from plug 44 is a restraining collar 48 and bearing against collar 48 is a coil spring 50 which also encircles reservoir 36. At its opposite end coil spring 50 bears against a ring 52 which rests on the upper rim of end portion 12 on barrel 4. Accordingly, spring 50 continually biases cartridge 8 to its retracted position. Reservoir 36 is filled with a suitable ink composition which saturates fiber marker 39.

The upper end of cartridge 8 projects out of bore 26 beyond which it is contained within end cap 6 which forms an uninterrupted external continuation of hood 31. End cap 6 (FIG. 3) includes a body portion 60 having a downwardly opening lower bore 62 which receives the upper end of cartridge 8. The walls defining the lower end of bore 62 are threaded for reception of threaded end portion 12 of barrel 4. Shiftably mounted in the opposite end of end cap 6 is an actuating button 80, and interposed between stem 46 and button 80 is an actuating mechanism 90. Since actuating mechanism 90 is conventional, it is designated by dotted lines in FIG. 3. When button 80 is depressed, mechanism 90 will act upon stem 46 and shift cartridge 8 axially within bore 26 to its extended position. When cartridge 8 reaches its fully extended position, wherein writing tip 40 projects beyond nose portion 20 and hood 31, mechanism 90 will engage cap 6 and maintain cartridge 8 in that position until button 80 is again depressed or mechanism 90 is otherwise disturbed. When this occurs, mechanism 90 will disengage itself from cap 6, and allow spring 50 to shift cartridge 8 back to its retracted position.

As cartridge 8 moves from its fully retracted position to its extended position, camming surface 37 will engage shoulders 28 and spread fingers 18 before writing tip 40 reaches the base of well 30 (FIG. 4). Immediately above camming surface 37 is a cylindrical surface 91. Continued advancement of cartridge 8 will cause shoulders 28 to ride up onto cylindrical surface 91, thereby maintaining fingers 18 in a spread condition (FIG. 5). Since fingers 18 are spread, tip 40 of marker 39 is free to shift outwardly between spread fingers 18 and projects beyond the extreme end or nose portion 20 on barrel 4 and through aperture 32 of hood 31. When button 80 is again pushed so that spring 50 will retract cartridge 8, the reverse sequence of operation occurs with elastomeric band 24 assisting the natural resiliency of the plastic in brining fingers 18 into snug closure. This closure is sufficiently tight to prevent any appreciable evaporation of the ink from writing tip 40, thereby preventing fiber marker 39 from drying out through exposure. Furthermore, marker 39 is completely shielded so that objects coming in contact with the end of barrel 4 will not be stained with ink. Also, when cartridge 8 is moved into and retracted from its extended position, fingers 18 are maintained in spaced relation from writing tip 40 so that ink and paper fibers do not accumulate on them.

In view of the above, it will be seen that the several objects of the invention are achieved and other advantageous results attained.

What I claim is:

1. A writing instrument comprising a barrel having a bore extending longitudinally therethrough; a plurality of slits extending longitudinally inwardly from one end of said barrel, said slits defining a plurality of fingers which taper inwardly to form a nose portion at said one end of said barrel; said fingers having shoulders which protrude radially into said bore at a point between said one end of said barrel and the inner ends of said slits; said barrel, said fingers and said shoulders being of unitary construction; a cartridge shiftably mounted within said bore and including a writing tip and a camming surface; and a hood rigidly mounted on said barrel and surrounding said fingers, said hood having an opening in front of said nose portion; said cartridge being movable from a retracted position wherein its writing tip is within said barrel to an extended position wherein said writing tip protrudes axially beyond said fingers; said camming surface being positioned on said cartridge so that it engages said shoulders during movement of said cartridge to its extended position and spreads said fingers prior to the exit of said writing tip from said barrel; and bias means encircling and engaging the outer surfaces of said fingers to yieldably urge them radially inwardly into snug closure-forming relationship.

2. The writing instrument of claim 1 wherein space is provided between said hood and said fingers to permit said fingers to spread during the movement of said cartridge to its extended position.

3. The writing instrument of claim 1 wherein a bias means is mounted on the outside of said barrel and engages the outer surfaces of said fingers to yieldably urge them radially inwardly.

4. The writing instrument of claim 1 wherein said fingers are integral with said barrel.

5. The writing instrument of claim 1 wherein said hood is secured to said barrel at a point axially inwardly from said fingers and forms a smooth continuation of the outer surface of said barrel, said nose portion of said barrel being of reduced diameter with respect to the remainder of said barrel so that a space is formed between said nose portion and the inner surface of said hood.

6. The writing instrument of claim 1 wherein said hood includes an upper end which engages and is attached to said barrel.

7. The writing instrument of claim 6 wherein said barrel includes an upwardly presented annular shoulder and said upper end of said hood includes an annular rim having a diameter less than that of said shoulder, said rim being positioned above said shoulder to attach said hood to said barrel.

8. The writing instrument of claim 7 wherein said hood includes a plurality of slots therein positioned below said rim, portions of said shoulder protruding within said slots and engaging their upper ends to prevent said hood from coming off the end of said barrel.

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,583,820 Dated June 8, 1971

Inventor(s) Harold E. Koeln

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

In the Abstract, line 6, "he" should read - - the - -. Column 1, line 68, "the", second occurrence, should read - - a - -. Column 2, line 47, "shoulder" should read - - shoulders - -; line 51, "body portion which" should read - - body portion 10 which - -. Column 3, line 17, "mains" should read - - means - -; line 31, "contracted" should read - - contacted - -; line 37, "instruments" should read - - instrument - -. Column 4, line 12, "brining" should read - - bringing - -.

Signed and sealed this 26th day of October 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

ROBERT GOTTSCHALK
Acting Commissioner of Patents

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