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A. F. O'CONNOR

WRITING INSTRUMENT

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2,499,771

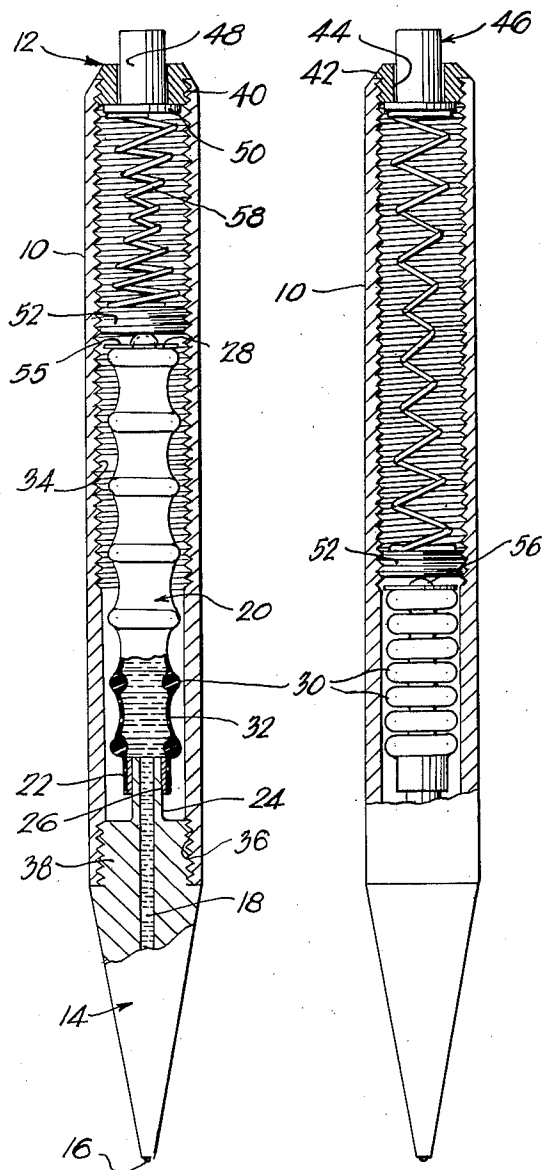


Fig. 1

Fig. 2



Fig. 3

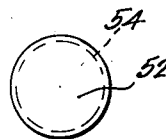


Fig. 4

Arthur F. Connor
INVENTOR

UNITED STATES PATENT OFFICE

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WRITING INSTRUMENT

Arthur F. O'Connor, Chicago, Ill.

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2 Claims. (Cl. 120-46)

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The present invention relates to improvements in fountain pens and is particularly adaptable for use with pens of the ball-point type wherein a dense ink is employed.

One object is to provide improved means whereby the ink may be selectively urged into cooperative relation with the writing element of the pen.

Another important object is to provide selective means for moving the ink toward the writing element wherein the feed mechanism requires very little room in the pen barrel when the latter is fully charged with ink, thereby providing room in the barrel for a larger amount of ink than in the pens of the prior art and requiring less frequent renewal of the ink supply.

A further object is to provide an improved ink feeding mechanism extremely simple and inexpensive to manufacture and requiring but few parts of readily available inexpensive material.

The invention is particularly well adapted for use with the axially compressible ink cartridge shown in the drawings; this type of cartridge being also part of the subject matter of my co-pending application Serial No. 777,935, filed October 4, 1947, now Patent 2,492,058, dated December 20, 1949.

Other objects, advantages and capabilities of the present invention will be apparent from the following description when read in conjunction with the accompanying drawings, in which—

Fig. 1 is an axial sectional view through a pen embodying a preferred form of my invention; the feed mechanism being shown in full elevation and portions of the cartridge and tip member being shown broken away for clarity; the feed mechanism being shown in retracted position and a full cartridge of ink being shown in Fig. 1.

Fig. 2 is a view of the structure of Fig. 1, with the feed mechanism shown in its extended position and the cartridge substantially empty.

Fig. 3 is an elevational view of the follower used to compress the cartridge.

Fig. 4 is a plan view of the follower.

While the feed mechanism of the present invention is particularly well adapted for use with the axially compressible cartridge shown in the drawings, it is specifically understood that it may be used also with pens wherein the ink is disposed directly in the bore of the barrel and no cartridge used.

Throughout the specification the words "forward end" and "rear end" and their equivalents are intended to mean the writing end and the opposite end of the pen, respectively.

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In the drawings, the barrel is indicated by the reference numeral 10. A bushing 12 is shown removably secured in the rear end of the barrel bore and a tip member 14 is shown secured to the forward end of the barrel; a writing ball 16 being rotatably mounted in the forward end of the tip member with a duct 18 formed in the tip member to provide communication between the ink in the barrel and the writing ball; the detailed description thus far being well known pen construction.

The cartridge 20 comprises an axially compressible elongate hollow member which I prefer to make of rubber or other suitable flexible material and, as shown in Fig. 1, extends lengthwise of the barrel bore, with its forward end 22 removably secured to the sleeve member 24 of the tip member 14. The sleeve-like end 22 of the cartridge may be provided with a ferrule 26 which latter may be integrated with the cartridge as by stretching the flexible material of the end 22 over the telescoped ferrule. The ferrule 26 may be made of vulcanized fibre, plastic or any similar material suitable for a sliding telescoped fit with the sleeve member 24 and, if desired, the ferrule may be interiorly threaded and the sleeve member 24 exteriorly threaded, if a threaded connection is desired.

The cartridge 20 is tubular, having an integral closed end wall 28 and side walls comprising spaced shape-retaining rings 30 and intermediate integral relatively thin walls 32 of concavo-convex cross-sectional configuration; the concave surface being on the exterior of the wall 32; the walls 32 being adapted to fold inwardly as the rings 30 move toward each other. The barrel 10 is shown formed with internal threads 34, extending from the rear end of the barrel to a point coincident the extreme forward position of the follower hereinafter described. The forward end of the barrel is shown formed with internal threads 36 adapted to register with the externally threaded end 38 of the tip member. The bushing 12 is shown as a cylindrical member having its forward portion externally threaded, as at 40; a shoulder portion 42 at its rear end and an axial aperture 44 extending through the bushing; the bushing being adapted to be screwed into the rear end of the barrel until the shoulder portion 42 abuts the end of the barrel. An actuating member 46 comprises a rod-like portion 48 extending through the aperture 44 and normally extending rearwardly of the bushing. A disc-like member 50 of larger diameter than the diameter of the portion 48 may be integrally formed with

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the forward end of the member 48 adapted to normally abut the forward end of the bushing, whereby to limit the rearward movement of the actuating member 46. A follower 52 is disposed within the barrel adapted for movement longitudinally thereof and comprises a cylindrical member formed with peripheral threads 54 adapted to register with the threads 34 of the barrel; the follower normally being in closely adjacent relation with the end wall 28 of the cartridge. As best shown in Fig. 1, I prefer to use a friction-reducing member 55 intermediate the follower 52 and the end wall 28 of the cartridge and which is shown as a circular disc of relatively thin material in flatwise abutting relation with the end wall 28 and formed with a centrally disposed rearwardly extending boss 56 adapted to engage the forward surface of the follower 52. The use of the member 55 will be understood to be optional.

A conical extension spring 58 is disposed intermediate and is affixed adjacent its opposed ends to the member 53 and the rear face of the follower 52, respectively, whereby upon rotation of the actuating member 46 in a given direction the spring will rotate and will in turn rotate the follower 52 in the same direction, causing the latter to move lengthwise of the barrel into or out of compressive relation with the cartridge. The cross-sectional configuration of the wire used in the spring 58 may be round, flat, square or any other suitable shape and it is to be understood that the spring is not used as a compression member but as a medium to rotate the follower capable of being retracted into a compact shape and extendable to a desired length to accommodate the extreme forward position of the follower. I contemplate the use of a spring 58 having a free length slightly greater than that indicated in Fig. 2 of the drawings whereby the spring will at all times urge the actuating member 46 in a rearwardly direction. The opposed ends of the spring may be non-rotatably affixed to the actuating member and the follower by welding or by any other of the numerous methods of non-rotatably fastening a spring to a member.

After the several parts of my invention have assumed the general positions shown in Fig. 2, it will be understood that a new cartridge will replace the empty one. To apply a new cartridge the actuating member 46 may be rotated in a direction adapted to return the follower to the general position shown in Fig. 1, after which the tip member 14 may be removed from the barrel and the cartridge removed and replaced by a filled cartridge.

Whereas I have shown internal threads 34 formed in the wall of the barrel bore, I contemplate the use of a sleeve-like member which may be internally threaded if desired and telescoped into the barrel bore without departing from the scope of my invention. Whereas I have shown a bushing 12 in the rear end of the barrel I contemplate an equivalent structure wherein the rear end of the barrel 10 is formed with an integral apertured end wall.

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While a preferred embodiment of my invention has been shown and described in detail, it will be understood that this is illustrative only and is not intended to be a definition of the limits of the invention, reference being had for this purpose to the appended claims.

I claim:

1. In a writing instrument comprising an elongate barrel formed with internal threads, a tip member at the forward end of the barrel provided with a writing element, and an ink supply in the forward portion of the barrel in communication with said writing element; means for selectively urging said ink supply toward said writing element comprising a follower rearwardly adjacent said ink supply formed with a peripheral portion adapted to register with said threads, an actuating member rotatably mounted in the rear end of said barrel, and an extension spring intermediate and having its opposed end portions affixed in non-rotating relation with said follower and said actuating member, respectively; said follower being adapted to rotate and move forwardly in the barrel in response to the rotation in one direction of said actuating member whereby to urge said ink supply toward said writing element.

2. In a writing instrument comprising an elongate barrel formed with internal threads, a tip member at the forward end of the barrel provided with a writing element, an axially compressible elongate cartridge in the forward portion of the barrel adapted to be charged with ink and cooperatively connected with said writing element; means for selectively urging said ink toward said writing element comprising a follower rearwardly adjacent said cartridge formed with a peripheral portion adapted to register with said threads, an actuating member rotatably mounted in the rear end of said barrel, and an extension spring intermediate and having its opposed end portions affixed in non-rotating relation with said follower and said actuating member, respectively; said follower being adapted to move forwardly into axially compressive relation with said cartridge in response to the rotation in one direction of said actuating member whereby to urge the ink toward said writing element.

ARTHUR F. O'CONNOR.

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