June 23, 1964 M. D. LEVY 3,138,142

WRITING INSTRUMENT UNIT

Filed Oct. 13, 1961

FIG. 1

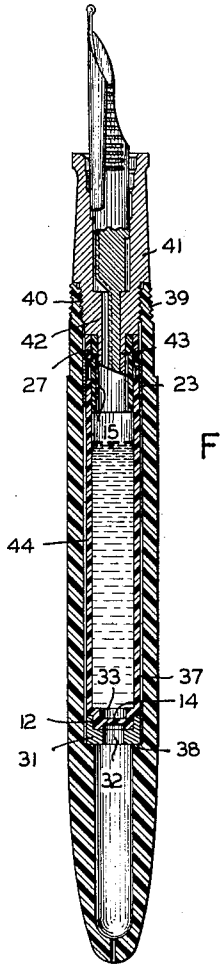


FIG. 2

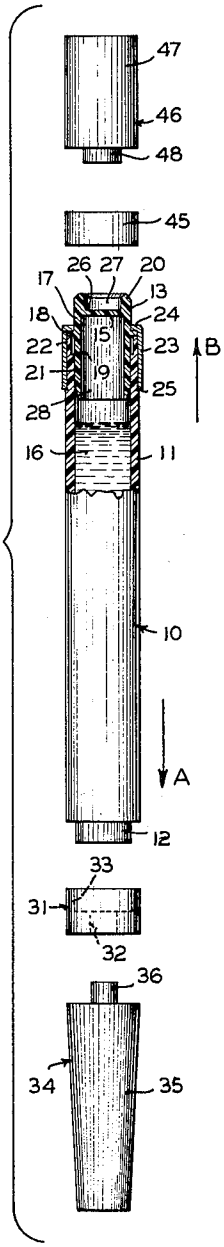
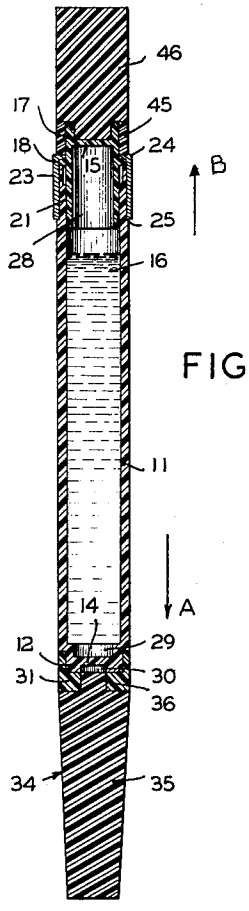


FIG. 3



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WRITING INSTRUMENT UNIT

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This invention relates to a writing instrument unit, particularly replacement cartridges for fountain pens and more particularly replacement cartridges which are universal in character, that is, cartridges which fit many different models and brands of fountain pens.

There are on the market today a variety of fountain pens wherein the ink is supplied by cartridges inserted into the pen. The pens are of different designs and are produced by different manufacturers. The cartridges which fit these pens are also of different shapes or designs. In general, each manufacturer's pens are designed to accommodate an ink-filled cartridge which is specifically constructed for that pen. Usually, only the cartridge made by a particular manufacturer fits that manufacturer's pen. Because of the variation in cartridges, the storekeepers are required to stock many different brands and shapes of cartridges in order to meet the public demand.

The problems created by such a situation causes an inconvenience to the public and the storekeepers.

According to the present invention, these problems are reduced because the present invention provides a cartridge which will fit many, if not all, of the various types of cartridge fountain pens now on the market.

According to one aspect of the present invention, there is provided a universal fountain pen cartridge comprising an elongated, tubular ink-containing reservoir, each end of said reservoir being sealed, at least one end being sealed by a transverse openable partition, and an extension plug removably mounted on the end of said reservoir remote from said openable partition, said plug enlarging at least one dimension of said reservoir.

Preferably, the reservoir has each end thereof sealed by a transverse openable partition so that, depending upon the structure of the fountain pen in which the cartridge is to be inserted, either end of the cartridge may be pierced by the piercing member of the pen. Preferably, the cartridge includes a plurality of plugs which can be removably secured to each other and/or the reservoir so that a variety of shapes of cartridges can be obtained by the judicious selection of the plugs.

These and other aspects of the invention will be readily apparent from the following description in connection with the accompanying drawings wherein:

FIG. 1 shows a longitudinal transverse section of a cartridge-type fountain pen having a cartridge therein.

FIG. 2 shows an exploded view, partly in section, of a cartridge having a reservoir and a plurality of plugs.

FIG. 3 shows a longitudinal section of the cartridge of FIG. 2 with all the plugs inserted in position on the reservoir.

Referring to FIGS. 2 and 3, there is provided a universal fountain pen cartridge including an elongated, tubular ink-containing reservoir **10** having a main body portion **11** of substantially uniform external diameter. On at least one end of the body portion and preferably on both ends thereof there is provided an axial extension. In the illustrated embodiment, there is provided an axial extension **12** at one end of the body portion and another axial extension **13** on the other end of the body portion, each axial extension having an external diameter less than the diameter of the body portion.

Axial extension **12** is provided with a transverse openable partition **14** and axial extension **13** is provided with a transverse openable partition **15**, said partitions comprising the closure for the reservoir **10**.

The reservoir can be made, filled with ink and sealed in any desirable manner. The illustrated reservoir **10** is made by molding in one piece the body portion **11** and the axial extension **12**. The end of the reservoir opposite extension **12** is open. The reservoir **10** is filled with ink **16** and then the open end of the reservoir is sealed by sealing plug **17**.

Sealing plug **17** is a tubular member having near one end thereof transverse partition **15** and on the exterior thereof an outwardly extending annular shoulder or flange **18** which divides the plug into an inner portion **19** and an outer portion **20**. The inner portion **19** has an external circumference dimensioned so that it is received snugly within the opening **21** at the forward end of the body portion **11**.

After the body portion **11** is filled with ink, the portion **19** of the plug **17** is inserted into the opening **21** until the shoulder **18** abuts the forward edge **22** of the body portion. A tubular metal grommet **23**, having an inwardly directed flange **24**, is then slipped over the assembly of the body portion **11** and the plug **17** so that the flange **24** is seated on the shoulder **18**. The lower edge **25** of the grommet is then inwardly deformed so that the grommet becomes fixed to the body portion holding the plug **17** in sealing engagement in the body portion.

The plug **17** has a longitudinal bore **26** therethrough, said bore being divided into two coaxial bores **27** and **28** by the partition **15**. In the preferred construction, bore **27**, the outer bore, is of lesser internal diameter than the inner bore **28**, "inner" and "outer" being used with reference to the inside of the reservoir **10**. At the other end of the reservoir, the partition **14** divides the reservoir bore into an inner bore **29** and an outer bore **30**, the inner bore **29** again being of greater diameter than the outer bore **30**. The significance of the difference in diameters of the bores at each end of the reservoir will be discussed hereinafter.

Extension plug **31** has an outer diameter substantially the same as the outer diameter of the body portion **11**. Extension plug **31** has an axial bore **32** and a counter-bore **33** coaxial with and of greater diameter than axial bore **32**. The counter-bore **33** is so dimensioned that the extension **12** will be received therein.

A second extension plug **34** is constituted by a main portion **35** frusto-conical in shape and an inwardly directed cylindrical extension **36** coaxial with and of lesser diameter than main portion **35**. Extension **36** and bore **32** are dimensioned so that extension **36** is received within bore **32**.

According to one form of the invention, a cartridge is formed by assembling reservoir **10**, plug **31** and plug **34** with extension **12** being positioned in bore **33** and extension **36** being positioned in bore **32**, the bores and extensions being so dimensioned that the plugs are secured to each other and to the reservoir by frictional engagement, said engagement being merely sufficient to maintain the parts together during normal handling thereof but being sufficiently weak so that the user of the assembly can easily remove a plug or plugs therefrom.

Before describing the manner in which the cartridge assembly is used, a typical cartridge fountain pen will be described. Such a pen is shown in FIG. 1 and is a pen having the structure described in detail in U.S. Patent No. 2,964,012 to Kahn et al. The pen comprises a barrel **37** having a shoulder **38** in the interior thereof to limit rearward movement of the cartridge in the barrel. The exterior of the forward portion of the barrel is provided with external threads **39** to which a conventional cap (not shown) can be secured. The interior of the forward portion of the barrel is provided with threads **40** to which a

pen section **41** can be secured by means of externally threaded portion **42**.

Extending rearwardly from externally threaded portion **42** is a beveled piercing extension **43** of lesser diameter than the threaded section. To load a pen of the character just described, a cartridge **44** is inserted in the barrel through the open forward end, the openable partition of the cartridge facing forwardly.

The pen section is then inserted into the open forward end of the barrel until the threads on the pen section engage the threads on the forward end of the barrel. The pen section is then screwed into place. As the pen section is being screwed into place, the rear extremity of the piercing extension **43** is first received in bore **27** (see FIG. 1) of the cartridge, said bore being outward of the openable partition and defining an annular guide for the piercing member of the pen section.

As the pen section is further screwed into the barrel, the piercing extension cuts through the openable partition until the partition is almost completely severed from the cartridge. Further rearward movement of the pen section forces the partition against the inner wall of the cartridge and places the pen section in free communication with the interior of the cartridge. The pen is now ready to be used.

The various cartridge fountain pens now on the market all have in common three features. First, a cartridge receiving bore in the barrel. Secondly, means to limit the rearward movement of the cartridge; and thirdly, piercing means for piercing the forward end of the cartridge. However, the chamber into which the cartridge is inserted varies in length or shape from manufacturer to manufacturer.

The means to limit the rearward movement of the cartridge may vary from manufacturer to manufacturer so that the cartridges for the various pens may require that their rear extremities be of different diameters. Similarly, the piercing means may have a different structure from manufacturer to manufacturer.

A cartridge which consists only of reservoir **10**, plug **31** and plug **34** can be used with pens of five different manufacturers as set forth below:

Make of pen	Remove plug	End facing piercing means of pen section
Wearever	34	B.
Sheaffer	31 and 34	A.
Venus	31 and 34	A.
Eversharp	none	B.
Parker	none	B.

Referring again to FIG. 1, this figure shows the Wearever pen. It will be appreciated, therefore, as shown at **44** in FIG. 1, that the cartridge assembly used with this pen is constituted by reservoir **10** and plug **31** with end B being pierced by piercing extension **43**.

Attention is directed to the fact that the annular guide **27** is of greater diameter than the annular guide defined by bore **30**. This is necessary because the piercing extension of the Wearever, Eversharp and Parker pens have a greater external diameter than the piercing means of Venus and Sheaffer pens.

In addition to the manufacturers enumerated above, there are additional manufacturers who make cartridge fountain pens. The pens of these additional manufacturers cannot be accommodated by a cartridge constituted by reservoir **10**, and plugs **31** and **34**. To accommodate these other pens, the cartridge assembly requires additional plugs **45** and **46**.

Plug **45** has a central bore therethrough which will frictionally engage extension **13** of the reservoir. Plug **45** does not increase the length of the reservoir but merely enlarges the external diameter of the extremity of the reservoir to which plug **45** is affixed.

Plug **46** is constituted by a main elongated cylindrical section **47** and a cylindrical extension **48** coaxial with section **47**, extension **48** being received within annular guide **27** of the reservoir.

The pen sold under the name of "Venus" has an abutment to limit the rearward movement of the cartridge slightly larger in size and so dimensioned that end B of the reservoir will not properly be seated thereon. It is necessary that end B of the reservoir be slightly enlarged in diameter and this is accomplished by plug **45**.

When the universal cartridge is constituted by reservoir **10** and plugs **31**, **34**, **45** and **46**, the parts used with the various pens are as follows:

Make of pen	Remove plug	End facing piercing means of pen section
Wearever	34 and 46	B.
Esterbrook	46	B.
Eversharp	45 and 46	B.
Parker	45 and 46	B.
Sheaffer	34, 31 and 46	A.
Venus	34, 31 and 46	A.
Waterman	31 and 34	A.
Scripto	31 and 34	A.

From the above disclosure it is apparent that an assembly of reservoir **10** and plugs **31** and **34** forms a universal cartridge which will fit five makes of pens while an assembly of reservoir **10** and plugs **31**, **34**, **45** and **46** provides a universal cartridge which will fit eight makes of pens.

If a universal cartridge is being marketed which comprises only reservoir **10** and plugs **31** and **34**, the external diameter of reservoir **10** can be slightly greater than the external diameter of the reservoir when the universal cartridge is constituted by reservoir **10** and plugs **31**, **34**, **45** and **46**. This is so because the Sheaffer and Venus pens have cartridge receiving chambers of slightly lesser diameter than the other pens.

In FIG. 3 there is shown the assembly of reservoir **10** and the four extension plugs **31**, **34**, **45** and **46**. It will be apparent that a complete assembly of these five elements cannot be inserted as such in any pen because in the complete assembly both openable partitions are blocked by plugs and, therefore, before the complete assembly of FIG. 3 can be utilized in any pen, one or more plugs must be removed.

It is apparent that the universal cartridge can be marketed in various stages of assembly. For example, a cartridge can be sold as an assembled unit, as shown in FIG. 3, with the user thereof removing the appropriate plug or plugs. On the other hand, the universal cartridge can be packaged with all the parts detached from each other with the user thereof assembling the parts as necessary.

It is also apparent that a universal cartridge can be sold in a packaged form containing a plurality of reservoirs with only one set of extension plugs, the extension plugs being re-used when the reservoir is replaced.

The reservoir is preferably made by injection molding utilizing an organic synthetic resin or plastic such as polyethylene, polypropylene, nylon or any other appropriate plastic. Most desirably, the reservoir is made of one of the enumerated plastics and is sufficiently transparent or translucent to render visible the ink supply therein.

The extension plugs can be made of any suitable plastic and can be made of one of the above enumerated plastics. The enumerated plastics are particularly desirable because they are somewhat resilient and, therefore, the various parts can be easily shaped for frictional engagement to hold the assembly together.

It is apparent, therefore, that the present invention provides a universal cartridge wherein the reservoir can be dimensionally enlarged or extended to form an assembly which will take the various types of pens on the market. The reservoir can be dimensionally enlarged by changing

any pertinent dimensions, that is, by changing either the length, diameter or shape, whichever is appropriate.

I claim:

1. A universal fountain pen cartridge comprising an elongated, tubular ink-containing reservoir, each end of said reservoir being sealed by an openable partition, said reservoir comprising a main body portion of substantially uniform external diameter, an axial extension on each end of said body portion, each extension having an external diameter less than the diameter of said body portion, a first extension plug having an axial bore at one end thereof, one of said axial extensions of said body portion being removably receivable within said bore of said plug, said plug, when said axial extension is seated in said bore, longitudinally enlarging said reservoir, and a second extension plug removably mounted on the other of said axial extensions.

2. A universal fountain pen cartridge according to claim 1, wherein said first extension plug has an axial bore at the other end thereof, and there is provided a third extension plug frusto-conical in shape, said third extension plug having an end portion reduced in diameter, said end portion being removably receivable within said axial bore at the other end of said first extension plug, said third extension plug further longitudinally extending said reservoir.

3. A universal fountain pen cartridge according to claim 2 including a fourth extension plug adapted to be removably mounted on the end of said reservoir adjacent said other of said axial extensions to longitudinally enlarge said reservoir when mounted thereon.

4. A universal fountain pen cartridge according to claim 1 wherein each openable partition is spaced inwardly from the extremities of said reservoir, the portion of said reservoir, at each end thereof, between the partitions and the corresponding extremity defining an axial bore constituting an annular guide for receiving the piercing extension of a fountain-pen pen section.

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