

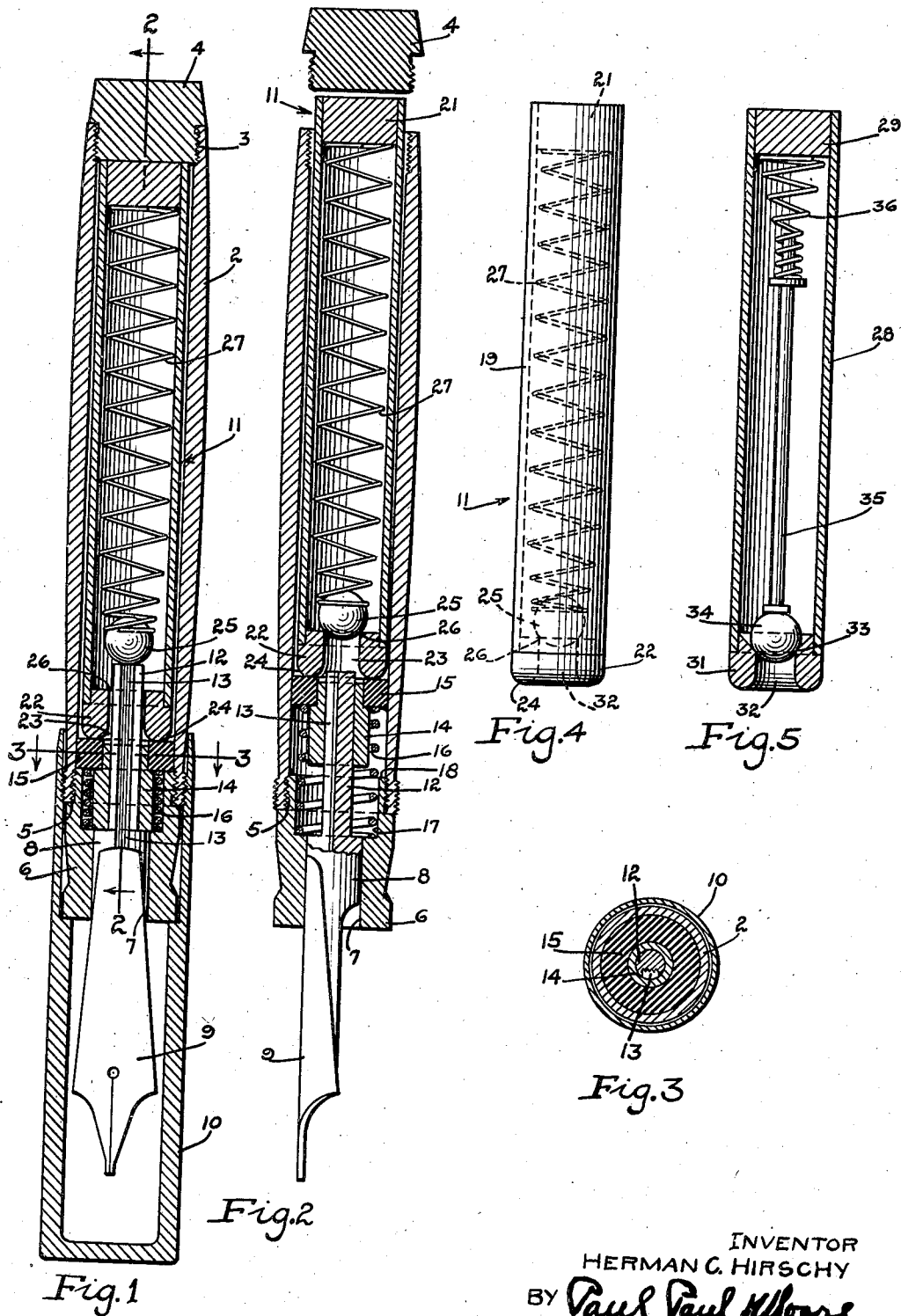
June 30, 1936.

H. C. HIRSCHY

2,045,774

FOUNTAIN PEN

Filed Nov. 19, 1934



INVENTOR
HERMAN C. HIRSCHY
BY *Paul, Paul & Moore*
ATTORNEYS

UNITED STATES PATENT OFFICE

2,045,774

FOUNTAIN PEN

Herman C. Hirschy, Long Beach, Calif.

Application November 19, 1934, Serial No. 753,572

18 Claims. (Cl. 120—42)

This invention relates to new and useful improvements in fountain pens and more particularly to fountain pens of the cartridge type.

Attempts have heretofore been made to develop a fountain pen of the cartridge type which would be simple and convenient to reload, easy to manufacture, and positively leak-proof when in operation, and also when an empty, or a partially emptied cartridge is removed from the barrel and air is admitted into the pen body, as when substituting a filled or loaded cartridge for one that has been used, but to the best of my knowledge, all of these attempts have proven more or less unsuccessful, primarily because of the difficulties encountered in providing a cartridge type fountain pen, in which the cartridge may be readily inserted into or removed from the barrel of the pen, without danger of leakage, or spilling a portion of the ink. If a fountain pen is not leak-proof, it cannot be made commercially practical.

In the novel pen herein disclosed, all of the difficulties heretofore experienced in pens of this general type, have been eliminated, and a pen is provided which is simple, and inexpensive in construction, is positively leak-proof in operation, and so constructed that the cartridges may be quickly interchanged without danger of leakage and consequently soiling the fingers.

Objects of the invention reside in the unique construction of the sealing means provided in the lower portion of the pen barrel for sealing the connection between the lower end of the cartridge and the walls of the pen barrel, to positively prevent ink from leaking from the cartridge into the barrel, regardless of whether the pen is in use, or carried in the pocket, or when interchanging cartridges therein; in the means provided for partially ejecting the cartridge from the barrel, when the cap at the upper end of the barrel is removed, and whereby the cartridge may readily be grasped by the fingers and withdrawn from the barrel; in the unique construction of the cartridge, which has a discharge opening at its lower end normally closed by a spring-actuated valve provided within the cartridge, and which constitutes a part thereof; in the unique construction of the pen stock, which has a portion extending upwardly into the barrel adapted to engage and unseat the valve, when the cartridge is inserted into position within the barrel; and, in the construction of the pen stock and the cartridge, whereby the latter cannot be incorrectly inserted into an operative position within the barrel, thereby as-

uring the user that the cartridge is properly positioned in the barrel of the pen, when the cap is secured to the upper end of the barrel to retain the cartridge therein.

Other objects of the invention will appear from the following description and accompanying drawing and will be pointed out in the annexed claims.

In the accompanying drawing, there has been disclosed a structure designed to carry out the various objects of the invention, but it is to be understood that the invention is not confined to the exact features shown as various changes may be made within the scope of the claims which follow.

In the drawing:

Figure 1 is a longitudinal sectional view of my improved pen showing the cartridge positioned therein and the valve thereof opened to permit the flow of ink to the pen point;

Figure 2 is a longitudinal sectional view on the line 2—2 of Figure 1, showing the cap at the upper end of the barrel removed and the cartridge partially ejected from the barrel;

Figure 3 is a cross-sectional view on the line 3—3 of Figure 1;

Figure 4 is a view showing the cartridge removed from the barrel of the pen; and

Figure 5 is a sectional view of a cartridge of modified construction.

The novel pen herein disclosed is shown provided with a barrel 2 having its upper end threaded, as indicated at 3, to receive a suitable cap 4, which provides a closure for the upper end of the barrel.

The lower end of the barrel is similarly threaded, as indicated at 5, to detachably receive an end piece 6 having a suitable bore 7 therein, adapted to receive a pen stock 8, the lower end of which is of ordinary well-known construction and supports the usual pen point 9.

An important feature of the invention resides in the construction of the upper end of the pen stock and the means associated therewith for preventing leakage within the lower portion of the barrel, when a cartridge 11, shown in Figure 4, is inserted into position within the barrel, or removed therefrom. As best shown in Figures 1 and 2, the pen stock 8 is provided with a reduced portion 12, which extends upwardly into the barrel and is axially aligned therewith. This reduced portion 12 has an ink feed duct 13 in its periphery, extending the full length thereof and having its lower end communicating with the usual feed duct provided in the lower end of

the pen stock and through which the ink is conducted from the cartridge to the pen point in the usual well-known manner, when the cartridge is supported in operative position within the barrel 2, as shown in Figure 1.

A sleeve 14 is mounted for sliding movement upon the reduced portion 12 of the pen stock 8, and has a resilient sealing member 15 such, for example, as rubber, suitably supported upon the upper end thereof and movable therewith, as a unit. A suitable compression spring 16 is shown mounted in a counterbore 17 in the end piece 6, and has its upper end engaging the lower face of the sealing member 15 and its lower end seated in the bottom of the counterbore 17. The uppermost end 18 of the end piece 6 provides an annular shoulder or seat 18 adapted to be engaged by the sealing member 15, when the cartridge 11 is inserted into the barrel to the position shown in Figure 1. The diameter of the sleeve 14 is shown slightly larger than the diameter of the bore 7 of the end piece 6, and its length is such that when the sleeve is forced downwardly, by the insertion of a cartridge into the pen, the lower end of the sleeve 14 will engage the bottom of the bore 17, and thereby cooperate with the sealing member 15 to prevent the ink from escaping from the ink duct 13 in the pen stock, into the counterbore 18 in the end piece 6. It is to be noted that by this arrangement, air cannot enter the ink duct 13, whereby the ink will feed freely through said duct by gravity and capillary attraction, whenever the pen is used, and without danger of dripping or feeding too freely.

In the drawing I have shown the lower end of the sleeve 14 arranged to directly engage the bottom of the counterbore 17, when the cartridge is inserted into the pen. It is to be understood, however, that in some instances, the bore 7 in the end piece 6 may be of the same diameter as the counterbore 17, in which case the spring 16 and sleeve 14 would seat directly against the annular shoulder provided on the pen stock. Even if so constructed, the function and operations of the sleeve and spring would be the same as now shown in the drawing, and such a change in the structure would therefore come within the scope of the invention.

Another feature of the invention resides in the novel construction of the cartridge, which, as clearly illustrated in Figures 1, 2, and 3, comprises a tubular body portion 19, shown having its upper end suitably closed by a plug 21. A suitable end piece 22 is shown secured to the lower end of the body 19 of the cartridge, and has a discharge opening 23 therein, which is of a diameter suitable to receive the upper reduced portion 12 of the pen stock, as clearly illustrated in Figure 1. The lower end 24 of the end piece 22 is shown rounded or convexed, and is adapted to sealingly engage the resilient sealing member 15, when the cartridge is inserted into the pen barrel. In the drawing I have shown the end piece 22 engaging the upper face of the sealing member 15, but it is to be understood that it may engage it in any suitable manner to provide a leak-proof joint therebetween, when the cartridge is inserted in the pen. If desired, the end piece 22 may be integrally formed with the body of the cartridge.

A suitable valve 25, preferably in the form of a ball, such as shown in the drawings, is provided within the cartridge and engages a seat 26, shown defined by the upper edge of the wall of the discharge opening 23 in the end piece 22. The valve 25 is normally retained in leak-tight

engagement with the seat 26 by a suitable compression spring 27, having one end engaging the valve 25 and its upper end the plug 21.

Figure 5 illustrates a cartridge of slightly modified construction, which comprises a tubular body portion 28, closed at its upper end by a plug 29, and having an end piece 31 secured to its lower end, which has a discharge opening 32. The end piece 31 has a valve seat 33 adapted to be engaged by a valve 34 provided within the cartridge, and shown having one end of a stem 35 secured thereto, the opposite end of which is operatively engaged with one end of a suitable spring 36, whose opposite end is seated against the plug 29. The valve in Figure 5 operates in substantially the same manner as the valve 25, shown in Figure 4.

To load the novel pen herein disclosed, the cap 4 at the upper end of the barrel is removed, and a loaded cartridge 11, such as shown in Figure 4, 20 is inserted into the barrel, until its lower end engages the resilient sealing member 15, as shown in Figure 2. The cap is then placed against the upper end of the cartridge and the latter shoved downwardly into the barrel against the tension of the spring 16, whereupon the upper end of the reduced portion 12 of the pen stock passes through the discharge opening 23 of the cartridge and engages the valve 25 and unseats it, as clearly shown in Figure 1. When the cap 4 has been secured to the pen barrel, as shown in Figure 1, the lower end of the sleeve 14 will be in leak-proof engagement with the bottom of the bore 17, and the sealing member 15 will be seated upon the seat 18, whereby the ink may feed freely downwardly through the air-free passage provided by the duct 13, to the pen point, when the pen is in use. It is to be understood that the length of the cartridge is such that when the latter is secured in operative position in the pen, the lower annular face 24 of the cartridge will engage the sealing member 15 with sufficient pressure to retain the latter in sealing engagement with the seat 18.

The construction of the lower end of the cartridge and the sealing means provided in the lower end of the pen is such that substantially all of the ink in the cartridge may feed therefrom to the pen point, as none of the ink can escape into the barrel of the pen because of the novel sealing means hereinbefore described. It is to be noted that when a cartridge is inserted into the barrel, the member 15 seals the lower end of the cartridge before the valve 25 is opened, and in like manner, when the cartridge is withdrawn from the barrel, the valve will close the discharge opening 23 thereof before the lower end of the cartridge moves out of sealing engagement with the member 15. This is an important feature of the invention, as it prevents ink in the cartridge from leaking therefrom into the barrel, when a cartridge is inserted therein or removed therefrom.

When a cartridge has been drained of its contents and a new one is to be substituted therefor, the cap 4 is removed from the upper end of the barrel, whereupon the action of the spring 16 will force the cartridge upwardly and partially eject it from the barrel, as clearly illustrated in Figure 2. When thus partially ejected from the barrel, the cartridge may readily be grasped by the fingers and removed therefrom to permit another cartridge to be inserted therein.

The pen is very simple in construction and comprises few working parts, as will readily be noted by reference to Figures 1 and 2. The valve means

for closing the discharge opening in the lower end of the cartridge is a part of the cartridge and is removed from the barrel of the pen when the cartridge is withdrawn therefrom. It will thus be seen that the only movable parts within the pen, when the cartridge is removed therefrom, resides in the sleeve 14, sealing member 15, and spring 16, all of which parts may readily be fitted into or removed from the upper open end of the barrel, when the cap 4 is detached therefrom.

In ordinary use, the parts 14, 15, and 16 are not removed from the pen. The pen has been found very satisfactory in actual operation, as it may be quickly loaded with a new or loaded cartridge, without spilling any of the ink, and without soiling or staining the fingers with ink. Because of the discharge opening 32 of the cartridge being tightly sealed by the valve 25, additional cartridges may be carried on hand, so that when the supply of ink in the pen becomes exhausted, a new or loaded cartridge may be quickly substituted for the empty one without exposing the fingers to the ink, and without loss of time.

The construction of the pen, as a whole, is such that it may readily be manufactured in quantity production at a very low cost, it being noted that all of the various parts thereof present the utmost in simplicity from a manufacturing point of view, and, as the cartridges are equally simple in construction, the pen may be dispensed to the public, with one or more extra cartridges, at a price well in line with prices on similar devices now on the market.

Because of its simplicity, the pen will require very little servicing in use. The parts 14, 15, and 16, constituting the sealing means at the bottom of the cartridge, may readily be inserted into or removed from the pen barrel by an inexperienced person, whereby said parts may be carried in stock by dealers. Thus, should one of said parts be found defective, or in some manner become damaged, said part may readily be replaced by the dealer in a few moments, whereby the pen need not be returned to the factory for repairs, as is now customary with most ordinary pens, and which usually require several days.

The pen may also be readily cleaned by simply removing the cartridge from the barrel and allowing water to flow through from an ordinary faucet, whereby the pen may conveniently be retained in a usable condition indefinitely.

I claim as my invention:

1. A fountain pen comprising a barrel, a pen stock mounted in one end thereof and having a portion extending upwardly into the barrel, a cartridge removably received in the barrel and having a discharge opening, said pen stock having a duct therein for conducting the ink from the cartridge to the pen point, a valve normally closing said discharge opening and adapted to be opened by the pen stock, when the cartridge is inserted into the barrel, and slidable means for preventing leakage of the ink from said duct.

2. A fountain pen comprising a barrel, a pen stock mounted in one end thereof and having a portion extending upwardly into the barrel, a cartridge removably received in said barrel and having a discharge opening, said pen stock having a longitudinally extending duct in its periphery for conducting the ink from the cartridge to the pen point, a valve normally closing said discharge opening and adapted to be opened by engagement with the upper end of the pen stock, when the cartridge is inserted into the barrel, and means

slidably mounted on the pen stock for preventing leakage of the ink from said duct.

3. A fountain pen comprising a barrel, a pen stock mounted in one end thereof and having a reduced portion extending upwardly into the barrel, a cartridge removably received in said barrel and having a discharge opening, said pen stock having a duct therein for conducting the ink from the cartridge to the pen point, a valve normally closing said discharge opening and positioned to be engaged by the upper end of the pen stock, when the cartridge is inserted into the barrel, and means for preventing leakage of the ink from said duct, comprising a sleeve mounted for sliding movement within the barrel and carrying a packing element adapted to be engaged by the adjacent end of the cartridge.

4. A fountain pen comprising a barrel, a pen stock supported in one end of the barrel, and having a portion extending upwardly into the barrel with its periphery spaced from the walls thereof, a cartridge removably received in said barrel and having a discharge opening at its lower end adapted to receive the upper end of the pen stock, a valve normally closing the discharge opening in the cartridge and adapted to be unseated by engagement with the pen stock, when the cartridge is inserted into the barrel, whereby ink may flow from the cartridge through the pen stock to the pen point, and means for sealing the connection between the lower end of the cartridge and the pen stock to prevent leakage of the ink into the barrel.

5. A fountain pen comprising a barrel, a pen stock removably supported in one end of the barrel and having a portion extending upwardly into the barrel with its periphery spaced from the walls thereof and provided with an ink duct, a cartridge removably received in said barrel and having a discharge opening at its lower end adapted to receive the upper end of the pen stock, a valve normally closing the discharge opening in the cartridge and adapted to be unseated by engagement with the pen stock, when the cartridge is inserted into the barrel, whereby ink may flow from the cartridge through said duct to the pen point, and sealing means adapted to be actuated by insertion of the cartridge into the barrel, to thereby prevent leakage of the ink from said duct.

6. A fountain pen comprising a barrel, a pen stock removably supported in one end of the barrel and having a reduced portion extending upwardly into the barrel and provided with an ink duct, a cartridge removably received in said barrel and having a discharge opening at its lower end adapted to receive the upper end of the pen stock, a spring-actuated valve in the cartridge normally closing the discharge opening thereof and adapted to be unseated by engagement with the pen stock, when the cartridge is inserted into the barrel, whereby ink may flow from the cartridge through said duct to the pen point, and means slidably mounted on the reduced portion of the pen stock adapted to be actuated by the cartridge to thereby prevent leakage of the ink from said duct.

7. A fountain pen comprising a barrel having an annular seat at one end thereof, a pen stock supported in the barrel adjacent to said seat and having a duct therein, a cartridge removably received in the barrel and having a discharge opening at one end, a valve in the cartridge normally closing the discharge opening thereof, when the cartridge is removed from the barrel, said valve

being adapted to be opened by engagement with the pen stock, when the cartridge is inserted into the barrel, whereby ink may flow from the cartridge through said duct to the pen point, and means for sealing the connection between the lower end of the cartridge and the pen stock to thereby prevent ink from leaking into the barrel, said means comprising a spring-actuated resilient sealing element mounted for relative axial movement within the barrel and adapted to be engaged by the lower end of the cartridge, when the latter is inserted into the barrel, whereby said element is pressed into sealing engagement with said annular seat.

8. A fountain pen comprising a barrel having a plurality of annular seats adjacent one end thereof and spaced apart in a direction lengthwise of the barrel, a pen stock secured in the barrel adjacent to said annular seats and having a reduced portion extending upwardly into the barrel and provided with a suitable duct, a cartridge removably received in the barrel and having a discharge opening at its lower end, a valve normally closing said discharge opening and adapted to be opened by engagement with the pen stock, when the cartridge is inserted into the barrel, whereby ink may flow from the cartridge through said duct to the pen point, a sleeve mounted for longitudinal movement lengthwise of the barrel and having one end adapted to engage one of said annular seats, a resilient sealing element mounted on said sleeve and adapted to engage another of said annular seats, and a spring normally holding said sleeve and element out of engagement with their respective seats, said resilient element being arranged to be engaged by the cartridge, when the latter is inserted into the barrel, whereby said sleeve and element are pressed into sealing engagement with their respective seats, to thereby prevent leakage of the ink into the barrel.

9. A fountain pen comprising a barrel having a plurality of annular seats adjacent one end thereof and spaced apart in a direction lengthwise of the barrel, a pen stock secured in the barrel adjacent to said annular seats and having a reduced portion extending upwardly into the barrel, which reduced portion has an ink duct in its periphery, a cartridge removably received in the barrel and having a discharge opening at its lower end, means normally closing said discharge opening and adapted to be actuated, when the cartridge is inserted into the barrel, whereby ink may flow from the cartridge through said duct to the pen point, a sleeve mounted for sliding movement on the reduced portion of the pen stock and having one end adapted to engage one of said annular seats, a sealing element secured to said sleeve and adapted to engage another of said annular seats, and a spring normally holding said sleeve and element out of engagement with their respective seats, said sealing element being arranged to be engaged by the cartridge, when the latter is inserted into the barrel, whereby said sleeve and element are pressed into sealing engagement with their respective seats, to thereby prevent leakage of the ink into the barrel.

10. A fountain pen comprising a barrel having a cap removably secured to the upper end thereof and a pen stock secured in its other end, said pen stock having a reduced portion extending upwardly into the barrel, and an ink supply cartridge adapted to be inserted into said barrel and having valve means for normally closing said discharge opening, means in the barrel for opening

tioned in the barrel and said cap is secured to the upper end thereof, and means for partially ejecting the cartridge from the barrel, when the cap is detached therefrom.

11. A fountain pen comprising a barrel adapted to receive a cartridge for supplying ink to the pen point, a normally closed valve in said cartridge for preventing leakage of the ink therefrom, when the cartridge is removed from the barrel, a pen stock secured to the lower end of the barrel and having a portion adapted to engage the valve in said cartridge and unseat it, when the cartridge is inserted into the barrel, a cap at the upper end of the barrel for securing the cartridge in position therein, and means for partially ejecting the cartridge from the barrel, when said cap is detached from the barrel, and whereby the valve is seated before the cartridge can be removed from the barrel.

12. A cartridge type fountain pen comprising a barrel open at both ends and having an end piece removably secured to its lower end, a pen stock fitted in a bore in said end piece and having a reduced portion extending upwardly into the barrel, a cartridge removably received in said barrel and having a discharge opening at its lower end, a spring-actuated valve in the cartridge normally closing the discharge opening thereof, means on the pen stock for unseating said valve, when the cartridge is inserted into the barrel, a cap secured to the upper end of the barrel for retaining the cartridge in position therein, and means for partially ejecting the cartridge from the barrel, when said cap is removed from the upper end of the barrel.

13. A cartridge type fountain pen comprising a barrel having a pen stock removably fitted in the lower end thereof and provided with a reduced portion extending upwardly into the barrel, a cartridge removably received in said barrel and having a discharge opening at its lower end, a spring-actuated valve in the cartridge normally closing said discharge opening, said valve being adapted to be unseated by engagement with the upper end of the pen stock, when the cartridge is inserted into the barrel and secured in position therein, a sleeve slidably mounted on the upper reduced end portion of the pen stock and having a resilient sealing element secured to the upper end thereof and adapted to be engaged by the lower end of the cartridge, an annular shoulder in the lower end of the barrel adapted to be engaged by said sealing element, when the cartridge is secured in position within the barrel, whereby the connection between the lower end of the cartridge and the barrel is sealed against leakage, and a spring in the lower end of the barrel engaging said resilient sealing member and constantly urging the same in an upward direction, whereby when the cartridge is released, said spring will partially eject the cartridge from the barrel to a position to permit the valve therein to close before the lower end of the cartridge disengages said resilient sealing element, whereby the cartridge may be conveniently grasped by the fingers and removed from the barrel without any of the ink therein leaking into the barrel.

14. An ink cartridge for fountain pens comprising a tubular body closed at one end and having a cap secured in its opposite end and provided with a discharge opening, and a spring-actuated valve within said cartridge normally closing the discharge opening thereof, said cap having an annular rounded face adapted to engage a sealing element.

15. An ink cartridge for fountain pens comprising a tubular body having one end closed to the atmosphere and having a discharge opening at its opposite end, a valve seat surrounding said opening and valve means within the cartridge for normally closing said discharge opening, said valve means comprising a valve element adapted to engage said seat and having one end of a stem secured thereto, and a spring engaging the opposite end of said stem and constantly urging the valve into engagement with said seat.

16. A cartridge type fountain pen comprising a hollow body, a pen stock at one end having a portion extending into said hollow body and provided with an ink duct, a cartridge removably received in the body and having a discharge opening and adapted to be unseated by the pen stock, when the cartridge is inserted into the pen body, whereby ink may feed from the cartridge through said duct to the pen point, and sealing means movable by the cartridge for preventing leakage of the ink into the pen body, when the valve in the cartridge is open.

17. A cartridge type fountain pen comprising a hollow body, a pen stock having a reduced portion extending into said hollow body and provided with an ink duct, a cartridge removably fitted in said body and having a discharge opening at one end adapted to receive the reduced portion of the pen stock, a spring-actuated valve within the cartridge for closing said discharge opening, when the cartridge is removed from the

pen, and the reduced portion of the pen stock being of such length that when the cartridge is inserted into the pen body, said reduced portion will pass through the discharge opening of the cartridge and unseat the valve, and whereby said ink duct will be in direct communication with the interior of the cartridge so that the ink may feed by capillary attraction from the cartridge to the pen point without leakage.

18. A cartridge type fountain pen comprising a hollow body, a pen stock having a reduced portion extending into said hollow body and provided with an ink duct, a cartridge removably fitted in said body and having a discharge opening at one end adapted to receive the reduced portion of the pen stock, a spring-actuated valve within the cartridge for closing said discharge opening, when the cartridge is removed from the pen, and the reduced portion of the pen stock being of such length, that when the cartridge is inserted into the pen body, said reduced portion will pass through the discharge opening of the cartridge and unseat the valve, and whereby said ink duct will be in direct communication with the interior of the cartridge so that the ink may feed by capillary attraction from the cartridge to the pen point without leakage, and means engageable with the end of the cartridge for sealing the joint between the discharge end of the cartridge and the interior of the pen body, thereby to prevent leakage of the ink into the pen body.

HERMAN C. HIRSCHY.