Dec. 6, 1932. H. SPIRO 1,890,100

FOUNTAIN PEN

Filed Sept. 9, 1931

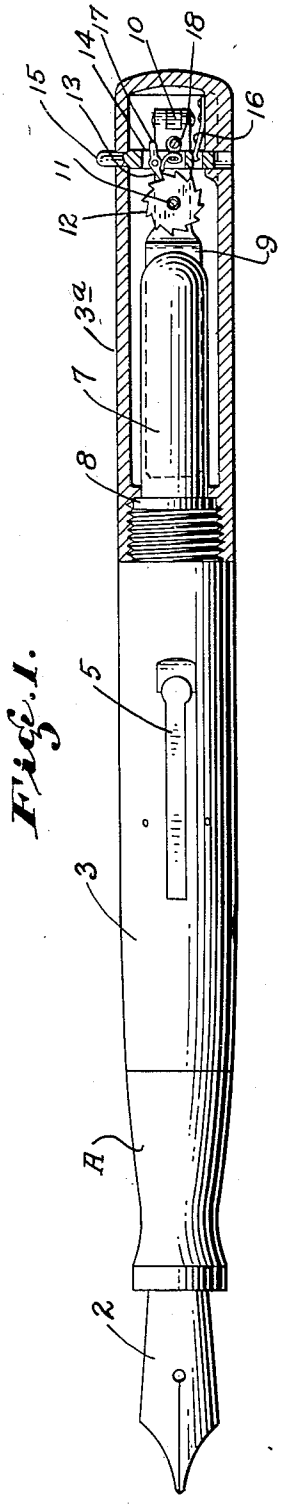

Fig. 1.

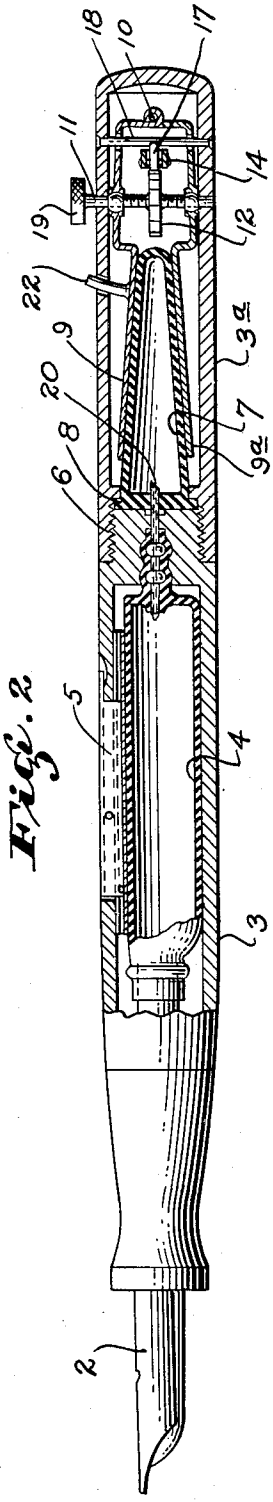

Fig. 2.

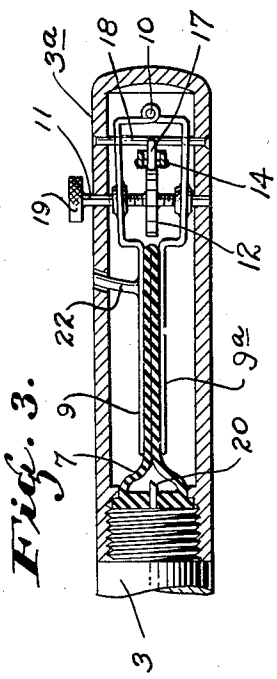

Fig. 3.

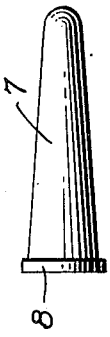

Fig. 4.

INVENTOR.
Harry Spiro.
BY
Townsend & Loftus
ATTORNEYS.

Patented Dec. 6, 1932 1,890,100

UNITED STATES PATENT OFFICE

HARRY SPIRO, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR TO ADA JOEL SPIRO

FOUNTAIN PEN

Application filed September 9, 1931. Serial No. 561,861.

This invention relates to fountain pens and particularly the type which is provided with a water bag and a container for concentrated ink, together with means for delivering measured quantities of concentrated ink to the water bag, where it is mixed to form a writing fluid.

The object of the present invention is to generally improve and simplify the construction and operation of fountain pens; to provide a fountain pen having a chamber in which is mounted a rubber bag for the reception of water and a second chamber for the reception of a cartridge containing concentrated ink; to provide a simple easily operated mechanism whereby a predetermined quantity of concentrated ink may be discharged from the cartridge and delivered to the water bag and mixed therewith to form a writing fluid; to provide means for visibly indicating the amount of concentrated ink remaining in the cartridge; and further, to provide a renewable cartridge to permit replacement of the cartridges as they become empty.

The invention is shown by way of illustration in the accompanying drawing, in which—

Fig. 1 is a plan view of the fountain pen, said view being partially in section.

Fig. 2 is a side elevaton of the fountain pen partially in section.

Fig. 3 is a detail sectional view of the cartridge containing chamber, showing the shape of the cartridge when empty.

Fig. 4 is a side elevation of a cartridge completely filled with concentrated ink.

Referring to the drawing in detail, particularly Figs. 1 and 2, A indicates the head of a fountain pen, 2 the pen proper, and 3 the barrel connected with the head. The barrel is, in this instance, divided into two sections, the section indicated at 3 and a second section indicated at 3*a*. The section 3 is provided with the usual flexible rubber bag 4 which is adapted to be filled with a writing fluid and it is also provided with a lever mechanism 5 whereby the flexible bag may be deflated prior to filling. A threaded connection 6 is formed between the sections 3 and 3*a* so that the section 3*a* may be removed, as will hereinafter be described.

The section 3*a* is adapted to contain a cartridge 7 filled with concentrated ink and it also contains a mechanism hereinafter described whereby predetermined quantities of ink are discharged from the cartridge into the rubber bag 4 to be mixed with the content thereof to form a writing fluid.

The cartridge 7 is preferably made of rubber or a like resilient material. It consists of a base section 8 and an elongated bag-like extension 7. It is filled with concentrated ink during manufacture and may be sold in lots of a dozen or the like.

The mechanism for actuating the cartridge, that is, for gradually squeezing or collapsing the same is best shown in Figs. 1, 2 and 3. It consists of a pair of arms 9 and 9*a* which are pivotally connected as at 10 on a pin extending crosswise of the barrel section 3*a*. Extending through the arms 9 at a point adjacent the pivot 10 is a rod or pin 11 which is right and left-handed threaded. Secured centrally on said pin is a ratchet gear 12 and engageable therewith is a pawl 13. The pawl is pivotally mounted in a crosshead 14 which is provided with a pin-like extension 15. The crosshead and pin 15 are normally maintained in the position shown in Fig. 1 by a spring 16 but the crosshead is adapted to be depressed by means of the pin 15 and as the pawl 13 is pivotally mounted in the crosshead it will engage the teeth of the ratchet gear 12 and thereby impart rotary movement to the right and left-hand threaded pin 11. The pawl is automatically disengaged with relation to the teeth on the ratchet gear 12 when the crosshead is depressed a predetermined distance. This is accomplished by means of a rearwardly extending arm 17 carried by the pawl. This arm engages a pin 18 when the crosshead has been depressed to its lowermost limit. The arm 17 engages the pin 18 in this position and thereby swings the pawl 13 out of engagement with the teeth of the ratchet gear, hence permitting the crosshead and pawl to be raised by means of the spring 16 when the plunger or pin 15 is released.

In actual operation, if the cartridge 7 is

empty and it is desired to replace the same, a turning knob 19 secured in one end of the right and left-hand threaded pin 11 is first grasped and rotated in a direction to spread the arms 9 and 9*a*. The barrel section 3*a* is then unscrewed from the section 3 and the cartridge 7 is removed from the section 3*a* by merely grasping the head 8 and pulling it upwardly. A full cartridge, such as shown in Fig. 4, is then inserted between the arms 9 and 9*a* and the barrel section 3*a* is replaced and screwed into position on the threaded connection 6. During replacement of the barrel section 3*a* a perforating pin 20 carried by the barrel section 3 enters the base 8 of the cartridge and perforates the same. This pin is hollow in the manner of a hypodermic needle, or the like, and as such forms communication between the cartridge containing concentrated ink, and the rubber bag 4 as the opposite end of the perforated pin is connected with the bag 4. When the barrel section 3*a* has been replaced and the base of the cartridge perforated, the rubber bag 4 is filled with water, for instance by dipping the pen 2 in a glass of water or the like, the lever 5 is actuated in the usual manner to deflate or compress the bag and when the lever is returned to normal position the bag expands and as such produces sufficient suction to fill the bag 4 with water. The user of the pen then depresses the pin or plunger 15. In so doing, pawl 13 engages the teeth of the ratchet gear 12 and as such imparts a rotary movement to the right and left-hand threaded pin 11. This has a threaded engagement with the respective arms 9 and 9*a* and as such causes them to apply a squeezing pressure to the bag extension 7 of the cartridge. The amount of rotation of the pin 11 is predetermined as the pawl rides out of engagement with the ratchet gear when the pin 18 is engaged and as the degree of rotation and the amount of inward movement imparted to the arms 9 and 9*a* is predetermined, it is sufficient to discharge the desired quantity of concentrated ink. One depression of the plunger 15 is sufficient, as during the depressing operation the bag 7 is squeezed sufficiently to discharge the desired amount. The concentrated ink entering the bag 4 mixes with the water and a writing fluid is thus formed. When the pen or the bag 4 becomes empty, the operator need only actuate the lever 5 and again refill the bag with water. He or she will then depress the plunger 15 once and, as this imparts further inward or squeezing movement to the arms 9 and 9*a*, a second predetermined quantity of concentrated ink is delivered to the bag 4 and mixed therewith and the bag or pen is again filled with writing fluid.

The capacity of the concentrated bags or cartridges 7 may be sufficient to refill or deliver sufficient concentrated ink to the bag a desired number of times, for instance six times, twelve times, or whatever the case may be. The concentrated cartridge or bag 7 will at the end of this period become empty as it will have become completely flattened by the arms 9 and 9*a* as shown in Fig. 3. It is then necessary to remove the barrel section shown at 3*a* and insert a full cartridge such as shown in Fig. 4, as previously described. A person using a pen of this character should be warned or should at least have some means of indicating the fact that the concentrated cartridge or bag 7 is becoming empty. In this instance, an indicating pin 22 is employed. This is secured to the arm 9 and projects through a top opening in the barrel 3*a*. When the cartridge or bag 7 is full the pin 22 projects as shown in Fig. 2, but as it begins to reach an empty condition the pin disappears into the opening, thus visibly indicating the amount of concentrated ink remaining in the bag.

The important feature of the present invention is the provision of means whereby a predetermined quantity of concentrated ink may be delivered to the bag 4. Such delivery of concentrate is positively insured as the operator or owner of the pen is instructed to merely depress the plunger 15 once when recharging or refilling the pen, hence a writing fluid of a predetermined strength is obtained and the pen may be refilled as many times as desired depending upon the contents of the cartridge 7.

While certain features of the present invention are more or less specifically described, I wish it understood that various changes may be resorted to within the scope of the appended claims. Similarly, that the materials and finish of the several parts employed may be such as the manufacturer may decide, or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In a fountain pen of the character described, a barrel section, a container in the barrel, a pen connected with one end of said container, an opaque cartridge containing concentrated ink connected with the opposite end of the container, means for filling the container with water, means for successively discharging predetermined quantities of concentrated ink from the cartridge into the container to form a writing fluid, and other means actuated by said discharging means for visibly indicating the quantity of concentrated ink remaining in the cartridge.

2. In a fountain pen of the character described, a barrel section, a container in the barrel, a pen connected with one end of said container, a compressible cartridge containing concentrated ink connected with the opposite end of the container, means for filling the container with water, a pair of arms

engaging opposite sides of the cartridge, said arms being movable towards each other to compress the cartridge, and actuating means for the arms whereby they are moved a predetermined distance so as to discharge a predetermined quantity of concentrated ink from the cartridge into the container to form a writing fluid.

3. In a fountain pen of the character described, a barrel section, a container in the barrel, a pen connected with one end of said container, a compressible cartridge containing concentrated ink connected with the opposite end of the container, means for filling the container with water, a pair of arms engaging opposite sides of the cartridge, said arms being pivotally connected at one end, a right and left-hand threaded screw having a threaded connection with the respective arms, and means for rotating said screw a predetermined portion of one revolution whereby the arms are moved towards each other a predetermined distance causing a predetermined quantity of concentrated ink to discharge from the cartridge into the container to mix with the water and form a writing fluid.

4. In a fountain pen of the character described, a barrel section, a container in the barrel, a pen connected with one end of said container, a compressible cartridge containing concentrated ink connected with the opposite end of the container, means for filling the container with water, a pair of arms engaging opposite sides of the cartridge, said arms being pivotally connected at one end, a right and left-hand threaded screw having a threaded connection with the respective arms, a ratchet gear secured on the screw, a depressible plunger, and a pawl on said plunger engageable with the ratchet gear whereby the screw is rotated a predetermined portion of one revolution.

5. In a fountain pen of the character described, a barrel section, a container in the barrel, a pen connected with one end of said container, a compressible cartridge containing concentrated ink connected with the opposite end of the container, means for filling the container with water, a pair of arms engaging opposite sides of the cartridge, said arms being movable towards each other to compress the cartridge, actuating means for the arms whereby they are moved a predetermined distance so as to discharge a predetermined quantity of concentrated ink from the cartridge into the container to form a writing fluid, and other means for quickly spreading the arms.

6. In a fountain pen of the character described, a barrel section, a container in the barrel, a pen connected with one end of said container, a compressible cartridge containing concentrated ink connected with the opposite end of the container, means for filling the container with water, a pair of arms engaging opposite sides of the cartridge, said arms being pivotally connected at one end, a right and left-hand threaded screw having a threaded connection with the respective arms, means for rotating said screw a predetermined portion of one revolution whereby the arms are moved towards each other a predetermined distance causing a predetermined quantity of concentrated ink to discharge from the cartridge into the container to mix with the water and form a writing fluid, and means connected with the right and left-hand screw for rotating it to rapidly spread the arms.

7. In combination with a fountain pen having a barrel and a compressible ink cartridge therein, means operable from the exterior of the barrel for compressing said cartridge, and a member movable with said compressing means and extending through the barrel to indicate the amount that the cartridge has been compressed.

8. In combination with a fountain pen having a barrel and a compressible ink cartridge therein, means for compressing said cartridge a little at a time and maintaining it in a compressed position, and a member movable with said compressing means and extending through the barrel to indicate the amount that the cartridge has been compressed.

HARRY SPIRO.