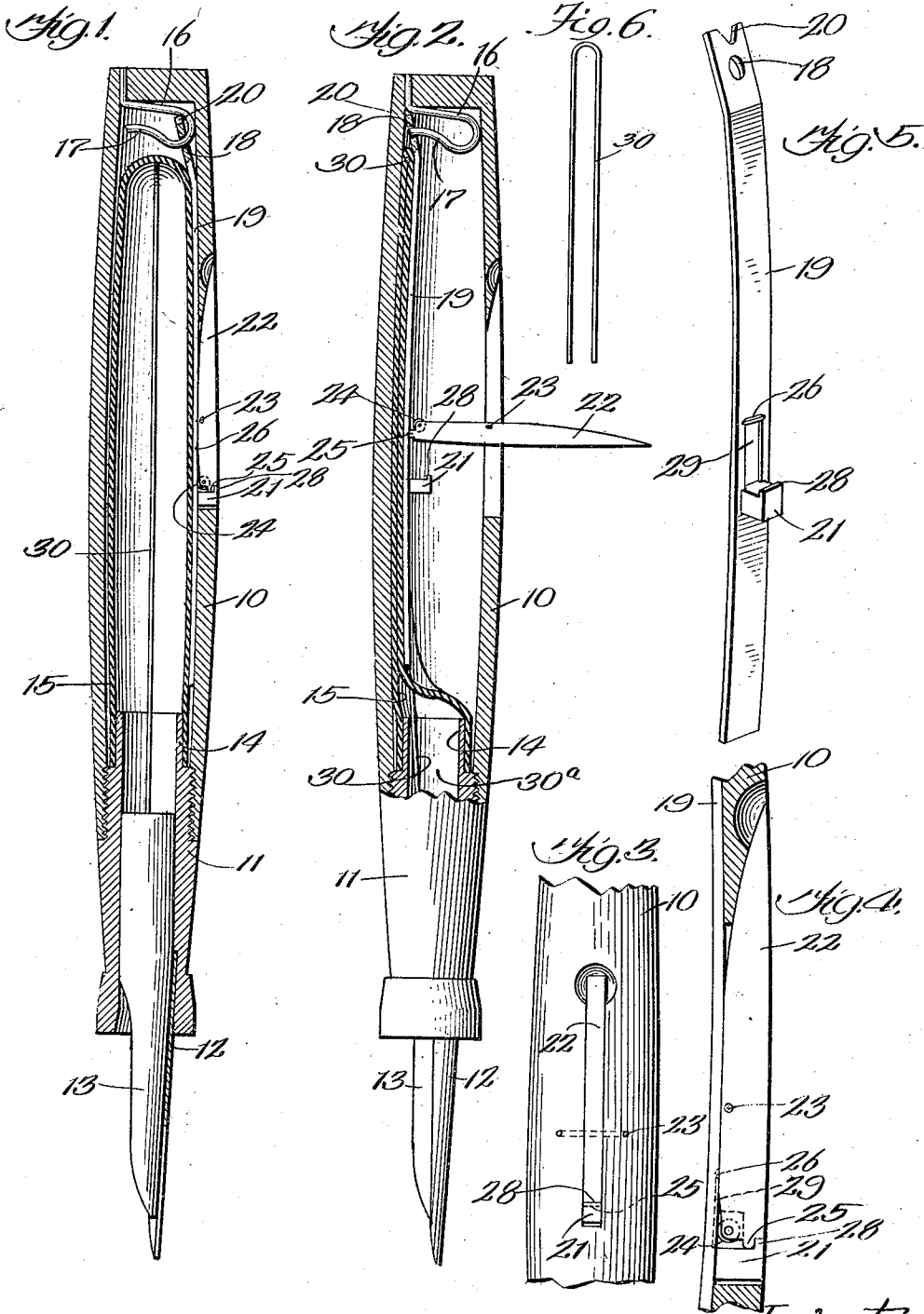


C. R. KEERAN.
FOUNTAIN PEN.

APPLICATION FILED APR. 2, 1917.

1,351,574.

Patented Aug. 31, 1920.



Inventor:
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UNITED STATES PATENT OFFICE.

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FOUNTAIN-PEN.

1,351,574.

Specification of Letters Patent. Patented Aug. 31, 1920.

Application filed April 2, 1917. Serial No. 159,198.

To all whom it may concern:

Be it known that I, CHARLES R. KEERAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Fountain-Pens, of which the following is a specification.

My invention is a fountain pen, and particularly of the class of fountain pens in which there is a rubber sack adapted to hold a supply of ink and feed the same to a pen nib and also provided with means for deflating the sack for the purpose of filling it with a fresh supply of ink.

One of the objects of my invention is to provide a pen of the aforementioned class, which will hold a much larger supply of ink than pens of the prior art, and will have a device by which the ink sack may be completely filled with ink instead of only partially filled, as in other pens of this class.

A further object of my invention is to provide a novel means of retaining the lever which is used to fill the pen in either its open or its closed position. This I accomplish by providing a lever which is in the nature of a toggle joint and arranging the leverage so that said lever will be held securely in its closed position by a force directed along the length of the lever itself.

A further object of my invention is the provision of an intermediate stopping place for the lever used in refilling the pen with the object of enabling one completely to fill the ink sack instead of only to partially fill the same as in the case of the pens of the prior art.

A further object of my invention is the provision of a fountain pen provided with a lever device by which the pen may be refilled without the use of the customary dropper, and by making the pen barrel having a longitudinal elliptical section. I further provide the ink sack with a similar section and provide a presser bar which is normally curved to conform to the outline of the ink sack when the same is in its normal position and is flexible and provided with means for curving the presser bar in the opposite direction to conform to the shape of the ink sack when the same is deflated for the purpose of filling the pen. By this expedient I gain an increased capacity of the ink sack, for, obviously, if this sack is of longitudinal

elliptical section it will afford a greater capacity for ink than if the sack were made with straight inside lines, as was customary heretofore in self filling pens provided with a lever for the purpose of operating the ink sack.

A further object of my invention is to provide a means of stiffening the rubber sack so that a large sack can be inserted easily into the barrel. In the prior art it has been customary to use a rubber sack small enough to be dropped into the barrel easily. However, this resulted in a very material reduction in the sack capacity.

In my hereinafter described combination, I have shown a sack provided with stiffening means to the end that the sack is comparatively rigid in the direction of its length.

A further object of my invention is the provision of an improved structure for the lever which serves to refill the pen, said lever having anti-friction mechanism at the point of operation between the lever and the presser bar, serving to deflate the ink sack.

The above and other objects of my invention will be apparent to those skilled in the art and will be set forth more particularly in the following specification and claims:

My invention will be best understood by reference to the accompanying figures, in which—

Figure 1 is a longitudinal section of my improved pen showing the operating lever in its closed or normal position;

Fig. 2 is a view of the parts shown in Fig. 1, but having the ink sack deflated;

Fig. 3 is a top view of the operating lever;

Fig. 4 is a partial sectional view of the operating lever and its mounting;

Fig. 5 is a perspective view of the presser bar, and

Fig. 6 is a detail view of the wire stiffener for the ink sack, this view being taken at right angles to the view shown in Fig. 1.

Referring to Fig. 1, it will be seen that I have provided a pen body or casing 10, which is preferably of hard rubber and serves as a support for the plug 11, which is screwed on, fitted in the casing and which in its turn serves as a support for the pen nib 12 and the feed bar 13. The body 10, as will be observed by reference to Fig. 1, is of larger diameter in the center than at

either end. The object of this particular shape will hereinafter be described. The feed bar 13 contains the customary channel for the ink feed (not shown), and at its rear end the plug 11 has an attaching portion 14, on which is placed the elastic ink sack 15. This ink sack, like the casing 10, has a larger diameter at its mid-section than at either end and therefore conforms to the outline of the inside of the casing 10. Mounted in the back of the casing 10 is a spring 16, in the shape of a hook, and having a forwardly extending portion 17, which engages a hole 18 in the end of the presser bar 19. The presser bar 19 has in its rear portion a V-shaped slot 20, which is adapted to engage the spring 16 and also has riveted on it an ear 21. The presser bar is operated by means of a lever 22, which is pivoted in a slot in the casing 10 on a pin 23. Mounted on the lever 22 is a roller 24, which is adapted to engage a channel 29 in the presser bar 19 and also the nose 25, which is adapted to engage a slot 26 in the presser bar 19 and thereby hold the lever 22 in its vertical position. The nose 25 is adapted to engage a ledge 28 on the edge of the ear 21, and thus serve to hold the presser bar in its raised position when the lever 22 is in its normal position.

Referring to Fig. 1, it will be seen that when the lever 22 is in its normal position that the spring hook 17 is put under tension by the presser bar 19, and it will be also observed that the pin 23, which forms the pivot of the lever 22, is below a line drawn from the ledge 28 and the hole 18. Therefore, the tension of the spring 16 serves to maintain the lever 22 securely in its closed position.

The presser bar 19 is normally given a shape to conform to the interior of the casing 10; that is, it is convex toward the lever 22. However, when said presser bar is depressed, the center is securely held by the nose 25 and the ends of the presser bar will of course conform to the outline of the other side of the casing 10; that is, when the presser bar is in its lower position it will be concave toward the lever 22. By making the presser bar flexible enough to change from one form to the other, I insure that the ink sack 24 shall be completely deflated.

The notch 20 serves as a guide for the presser bar, as the same is raised and lowered during the expansion of the rubber sack 15. In order to assemble my improved pen, it is necessary to first insert the presser bar so that the notch 20 is in contact with the shank of the spring 16. The presser bar is then raised so that the hook 17 will engage in the hole 18. The lever 22 is then manipulated to bring the presser bar in the position shown in Fig. 1. In this position

the plug 11, on which is mounted the rubber sack 15, may be easily inserted, and when in its position the thickness of the rubber sack together with the stiffener 30 will prevent the disengagement of the presser bar 19 and the hook 17.

The ink sack 15 is provided with a stiffener 30. This is preferably in the form of a light piece of wire shaped somewhat the form of a hair pin and having its points suitably held in the feed plug 13 and having its rear or arched end in contact with the inside of the rear end of the rubber sack 15. The function of this stiffener is to facilitate the placing of the rubber sack in the pen. In the structures of the prior art which are unprovided with any such device as the stiffener 30 it is necessary to choose between two objectionable alternatives. In the first instance, the tube 15 is made considerably smaller than the inside bore of the casing 10 so that it may be easily slid into place. This, of course, attains the ease of assemblage at the expense of ink capacity. On the other hand, the tube of the ink sack 15 may be made a tight fit in the pen casing 10, in which event while additional ink capacity is gained, the pen is extremely difficult to assemble.

I consider the use of the stiffener 30, or the equivalent thereof, a very important part of my invention and wish to claim it broadly.

Having described the structure of my improved pen, I will now describe its operation.

When the ink sack 15 is empty and it is desired to fill the pen, the lever 22, which has been held in its normal position by the tension of the spring 16 as transmitted through the presser bar 19, ear 21 to the nose 25, is raised into the position shown in Fig. 2. The pen nib is then inserted into an ink supply and the lever 22 is thrown back into its normal position shown in Fig. 1. The ink sack 15 will then expand, drawing up the ink and partially filling itself. It is not possible to completely fill the ink sack on this operation, since it will be observed from Fig. 2 that when the ink sack is deflated the forward end of said sack contains a quantity of air, such, for instance, as shown in the space 28. When the sack expands, since the point 12 is in the ink supply the bubble of air contained in the space 30^a will at once go to the highest point of the ink sack, that is, to the rear end of the pen. Thus a single manipulation of the lever 22 cannot possibly completely fill the sack 15. The pen is then withdrawn from the ink and held in the position with the feed bar 13 uppermost. The air that is in the ink sack 15 will, of course, rise to the top end of the sack. The lever 22 is then again manipulated by being brought to a position

where the roller 24 and the nose 25 are both in engagement with the presser bar 19. This action will not expel any ink from the sack, since the top part of the sack contains only the air formerly contained in the space 28. However, it will expel all of the air, and if any ink is forced from the sack, it will be held by capillary attraction on the feed bar 13 and pen 12. It will be observed that when the lever is brought to this intermediate position after the sack has been partially filled with ink that all of the air will be expelled from said sack and it will then contain nothing but ink. The nib 12 is again inserted in the ink supply and the lever 22 is restored to its normal position, shown in Fig. 1. The sack will again expand, sucking up more ink from the ink container, and will then be completely full of ink, since all of the air has been expelled by the operation of bringing the lever 22 to its intermediate position after the first filling of the sack.

I believe I am new in providing a lever for a self-filling pen which will have a definite intermediate position for the purpose of expelling all the air from the ink sack and filling the same entirely with ink, and I wish to claim the same broadly.

I believe I am also new in providing a lever which is kept closed by a toggle joint action caused by exerting a spring pressure approximately in the direction of the lever, and I wish to claim the same broadly. I also believe it is novel to provide an ink barrel, a flexible sack of approximately longitudinal elliptical section and a flexible presser bar adapted to conform to said section to the end of providing a greater ink capacity while keeping the same diameter of the part held by the fingers. It will be observed that the enlarged portion of the barrel of my improved pen comes in the space between the thumb and first finger and that said enlarged portion occupies space which would otherwise be wasted.

Many modifications may be made in the precise structure herein shown without departing from the spirit of my invention.

I claim:

1. In a fountain pen, the combination of an elliptical casing the wall of which curves substantially from end to end of the casing, a pen, a feeding nib, an ink sack attached to said feeding nib, said ink sack being approximately of elliptical section similarly curving from end to end thereof, a flexible presser bar adapted to conform to the opposite curvatures of the casing wall, and a lever for operating said presser bar to deflate said sack.

2. In a fountain pen, the combination of a pen, a feedbar, an elliptical casing serving to provide a mount for said pen and feedbar the wall of the casing curving substan-

tially from end to end thereof, a deflatable ink sack of approximately elliptical section contained within said casing similarly curving from end to end thereof, a lever pivoted in said casing, and a flexible presser bar for deflating said ink sack and adapted to be operated by said lever, said flexible presser bar being adapted to conform to the opposite curvatures of the casing wall.

3. In combination, a fountain pen having a casing of approximately elliptical cross section the wall of which curves substantially from end to end thereof, an ink sack conforming from end to end thereof to the interior section of said casing mounted therein, a presser bar concave toward said ink sack for deflating the same, and means to operate said presser bar and form it convex toward said ink sack for the purposes set forth.

4. In a fountain pen, the combination of a pen casing, a longitudinal slot in said casing, a lever pivoted in said casing, a spring, and means for holding the lever closed by exerting thereon the tension of said spring along a line substantially parallel to the position of said lever when said lever is closed.

5. In a fountain pen, the combination of a pen casing, a longitudinal slot therein, a lever pivoted in said slot and having one end extending on the outside of said casing to form a handle whereby said lever may be manually operated, a presser bar within the casing and adapted to be operated by the portion of said lever extending within said casing, and an anti-friction device at the point of contact between said lever and said presser bar, and means on the lever adjacent to said anti-friction device for holding the lever open.

6. In a fountain pen, the combination of a pen casing, a longitudinal slot therein, a lever pivoted in said slot and having one end extending on the outside of said casing to form a handle whereby said lever may be manually operated, a presser bar within the casing and adapted to be operated by the portion of said lever extending within said casing, a roller on the end of said lever to operate said presser bar, and a nose on the lever adjacent to said roller for holding the lever open.

7. In a fountain pen, the combination of a casing, a longitudinal slot therein, a lever pivoted in said slot, a presser bar adapted to be operated by said lever, and a spring device separate from the lever operative on said lever to hold said lever first in a closed position, second in an open position and third in a definite position between said two positions for the purposes set forth.

8. In a fountain pen, the combination of a casing a longitudinal slot therein, a lever pivotally fixed in said slot, a presser bar operated by said lever, a spring situated in

the end of said casing and adapted to engage a hole in said presser bar and thus give said presser bar a tendency to move longitudinally of said casing, an ear on said presser bar adapted to be engaged by said lever, the arrangement being such that when said lever is in its closed position the engagement of the lever and ear places the spring under tension.

9. In a fountain pen, the combination of a casing, a pivotally fixed lever having a handle portion extending on one side of its pivot, and an operating portion extending on the other side thereof, a presser bar, a spring attached to said presser bar, and a lug on said presser bar adapted to contact with the operating end of said lever to put the spring under tension when the lever is closed, said lug being so positioned that when said lever is in a closed position the pivot will be between said presser bar and the line of action of said spring.

10. The method of filling a fountain pen which contains a deflatable ink reservoir, said method consisting in first deflating said reservoir, inserting the pen in an ink supply and allowing it to fill by atmospheric pressure, then turning the pen end for end, partially deflating said reservoir and again inserting the pen in ink and allowing the reservoir to return to its original position.

11. The method of filling a fountain pen having a deflatable ink sack, said method consisting in first deflating said ink sack, inserting the pen in an ink supply and allowing it to fill by atmospheric pressure, then, turning the pen end for end, partially deflating said ink sack and again inserting the pen in ink and allowing the ink sack to return to its original position.

12. In a fountain pen, the combination of an ink sack, a presser bar for deflecting the sack, and means for operating the same including means to give said presser bar a tension to move in the direction of its length for holding said operating means in inactive position.

13. In a fountain pen, the combination of an ink sack, a presser bar for deflating the sack, means for operating the same and a spring attached to said bar influenced by said operating means and exerting a tension directed along the length of said bar for holding said operating means in inactive position.

14. In a fountain pen, the combination of

a casing, an ink sack, a presser bar for deflating said sack, a spring attached to said bar and exerting a tension directed along the length of said bar, and a lever pivotally fixed to operate said bar, the arrangement of the spring, presser bar and lever being such that when said lever is in its closed position the tension of said spring transmitted through said bar in a direction parallel to the length of said bar holds said lever in contact with the casing.

15. In a fountain pen, the combination of a casing, a deflatable sack contained therein, a presser bar for deflating said sack, a lever pivotally fixed in the casing for operating said presser bar, and a spring operative on said lever and presser bar, the arrangement of lever, presser bar and spring being such that starting with the lever in an open position, actuation of the lever first increases the tension of the spring until the lever has reached a certain point and then further motion of the lever decreases the tension of the spring.

16. In a fountain pen, the combination of a casing, a deflatable ink sack contained therein, a presser bar for deflating said ink sack, means to give said presser bar a tendency to move in the direction of its length, a lug on said presser bar, a lever spaced from said lug when open but adapted to contact with said lug in closing, the arrangement of said presser bar, lug and lever being such that said presser bar and lever form the element of a toggle joint.

17. In a fountain pen, a combination of a casing, a lever pivoted in said casing, said lever having a handle portion on one side of its pivot and an operating portion on the other side of its pivot, a deflatable ink sack in said casing, a presser bar for operating said ink sack, a spring giving said presser bar a tendency to move in the direction of the length of said bar, and means mounted on said presser bar adapted to contact with the operating end of said lever to render said spring effective in holding the handle of said lever firmly against said casing when said lever is in its closed position, but to separate from contact therewith to render said spring ineffective on said lever when said lever is in its open position.

In witness whereof I have hereunto subscribed my name.

CHARLES R. KEERAN.