May 6, 1941. H. H. BERGER 2,240,604

FLUID DISPENSING APPARATUS

Filed Oct. 25, 1939

Fig. 1

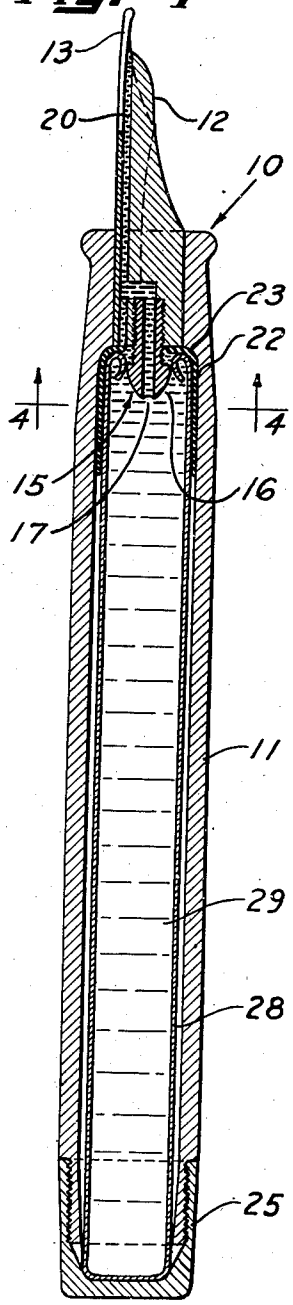


Fig. 2

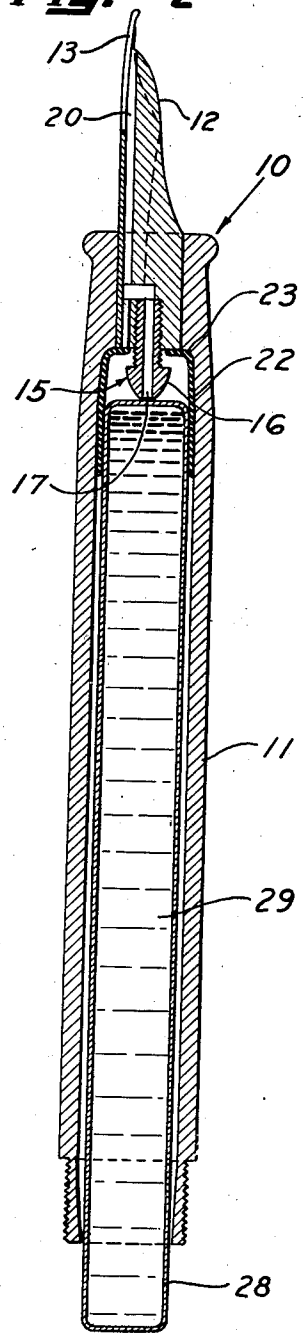


Fig. 3

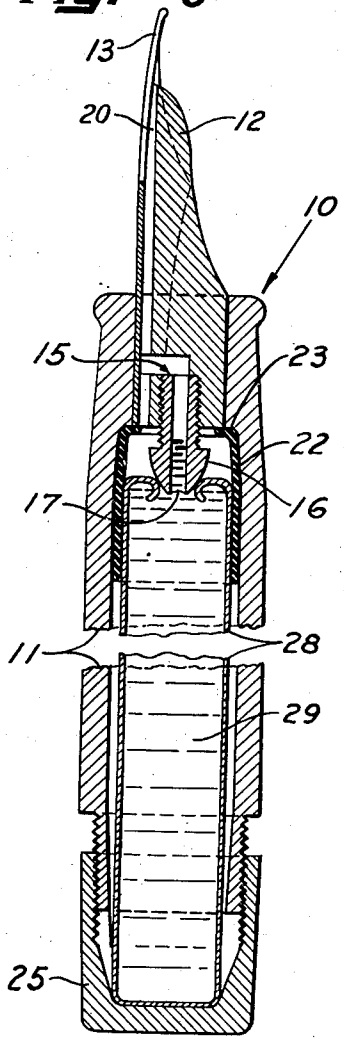


Fig. 4

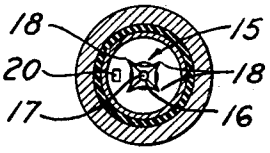
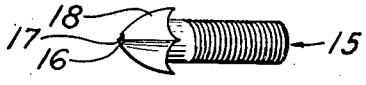


Fig. 5



INVENTOR.

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FLUID DISPENSING APPARATUS

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Application October 25, 1939, Serial No. 301,215

8 Claims. (Cl. 120—42)

My invention relates to fluid dispensing apparatus and particularly to a device in which the fluid dispensed is contained in a sealed cartridge. The present invention is herein illustrated and described in the form of a fountain pen adapted to receive a sealed cartridge containing ink and in which means is provided for automatically establishing communication between the cartridge and the pen point.

Most of the fountain pens in use utilize various forms of mechanisms for supplying ink to the barrel or bulb of the pen body. Such pens are subject to wear, leakage and deterioration and often fail to properly feed ink to the pen point.

An object of my invention is to provide a fountain pen in which the ink supply is obtained from a sealed cartridge disposed within the pen body. A further object of this invention is to provide a novel means for automatically piercing the sealed capsule upon the insertion into the pen body and to simultaneously force ink from the cartridge to the point of the pen. A further object of my invention is the provision of such a pen in which novel means is provided for sealing certain portions of the cartridge with the pen body in order to prevent the flow of ink in any direction but to the point of the pen. Still another object of this invention is to provide a novel means of forcing an ink-filled cartridge against a piercing member within the pen body.

Another object of my invention is to provide a fountain pen employing the use of a sealed cartridge in which an empty cartridge may be readily removed from the pen body.

Other objects and advantages will become apparent in the following description taken in connection with the accompanying drawing in which:

Fig. 1 is an enlarged, longitudinal, sectional view through a preferred form of fountain pen of my invention.

Fig. 2 is a view similar to Fig. 1 showing the initial step in the insertion of a cartridge into the pen body.

Fig. 3 is a view similar to Figs. 1 and 2 showing the final step in the insertion of a cartridge into the pen body.

Fig. 4 is a transverse, sectional view taken on the line 4—4 of Fig. 1 and

Fig. 5 is a detailed perspective view of a cartridge-piercing member employed in the apparatus of my invention.

Referring specifically to the drawing a fountain pen 10, comprising a preferred embodiment of my invention, includes a tubular body 11 having a plug 12 forced into one end thereof, the plug 12 retaining a pen point 13 between the plug 12 and the body 11 as shown. Threaded into the plug 12 and extending into the tubular body 11 is a tubular piercing element 15 having a pointed head 16 and a bore 17 therethrough. The head 16 as shown in Figs. 4 and 5 is non-circular in cross section and formed to provide arcuate depressions 18 thereabout. Formed in the plug 12 is a duct 20 communicating with the bore 17 or capillary system of the member 15 for the purpose of supplying ink to the pen point 13 in a manner to be described hereinafter. Provided within the body 11 adjacent to the plug 12 is an annular resilient gasket 22 formed of rubber or the like. As seen in Fig. 3, a gasket 22 is slightly tapered and formed to provide an annular shoulder 23 at one end thereof. Threaded on to the body 11 is a cap 25.

Slidable into the body 11 is a cylindrical cartridge 28 the latter containing a supply of ink 29 provided within the cartridge 28. In practice the body 11 and the cartridge 28 are preferably made of translucent material so that the supply of ink within the cartridge 28 will be visible.

The cartridge 28 is inserted into the body 11 by removing the cap 25 as seen in Fig. 2, the cartridge 28 is then forced against the member 15 and, as seen in Fig. 2, the gasket 22 comes into sealing relation with the extremity of the cartridge 28 as the latter engages the pointed head 16 of the member 15. At this point the cap 25 is threaded on to the body 11 thus forcing the cartridge further into the body 11 causing the head 16 of the member 15 to be forced through the end of the cartridge thus establishing communication between the interior of the cartridge 28 and the duct 20 as seen in Fig. 3. When the cap 25 is completely threaded on to the body 11, as seen in Fig. 1, the extremity of the cartridge 28 is forced against the shoulder 23 of the gasket 22 and the head 16 of the member 15 is disposed well within the pierced end of the cartridge 28. The amount of ink displaced by the head 16 is sufficient to fill the bore 17 of the member 15 and the duct 20 of the plug 12 thus delivering ink immediately to the tip of the pen point 13. The non-circular shape of the head 16 permits the passage of ink from the cartridge 28 into the duct 20 about the head 16 as well as through the bore 17 of the member 15 thus insuring an ample supply of ink to the pen point.

The cartridge 28 may be readily removed from the body 11 by removing the cap 25 and grasping the portion of the cartridge 28 which extends

beyond the body 11 and then drawing the cartridge 28 from the body 11.

It is thus seen that the fountain pen 10 of my invention is extremely simple in construction and operation and insures a free supply of ink at all times while effectively preventing undesirable leakage of ink.

Although I have shown and described but one preferred embodiment of my invention, it is to be understood that various modifications and changes might be made therein without departing from the spirit of the invention or the scope of the appended claims.

I claim as my invention:

1. In a fluid dispensing apparatus, the combination of: means forming a dispensing outlet; a sealed cartridge containing fluid to be dispensed from said outlet; means connected with the means forming said outlet for piercing said cartridge to enable fluid to pass from said cartridge to said outlet; and a resilient gasket on said outlet forming means said gasket being adapted to seal said cartridge with the means forming said outlet prior to said piercing operation and to maintain said seal after said piercing operation.

2. In a fluid dispensing apparatus, the combination of: means forming a dispensing outlet; a sealed cartridge containing fluid to be dispensed from said outlet; means connected with the means forming said outlet for piercing said cartridge to enable fluid to pass from said cartridge to said outlet; a resilient gasket on said outlet forming means said gasket being adapted to seal said cartridge with the means forming said outlet prior to said piercing operation and to maintain said seal after said piercing operation; and screw means for forcing said cartridge and said piercing means relatively together to accomplish said piercing operation.

3. In a fluid dispensing apparatus, the combination of: a tubular body; means forming a dispensing outlet at one end of said body; a cylindrical, sealed, fluid containing cartridge adapted to be inserted into said body; an annular, resilient gasket in said body adjacent to the outlet end thereof, said gasket sealing the periphery of one end of said cartridge with the wall of said body in response to insertion of said cartridge into said body; and means responsive to said insertion to pierce said cartridge to enable the fluid therein to flow to said outlet, said cartridge moving into sealed relation with said gasket prior to engagement with said piercing means.

4. In a fluid dispensing apparatus, the combination of: a tubular body; means forming a dispensing outlet at one end of said body; a cylindrical, sealed, fluid containing cartridge adapted to be inserted into said body; an annular, resilient gasket in said body adjacent to the outlet end thereof, said gasket sealing the periphery of one end of said cartridge with the wall of said body in response to insertion of said cartridge into said body; means responsive to said insertion to pierce said cartridge to enable the fluid therein to flow to said outlet, said cartridge moving into sealed relation with said gasket prior to engagement with said piercing means; and screw means for forcing said cartridge into said tubular body to accomplish said piercing operation.

5. In a fluid dispensing apparatus, the combination of: a tubular body; a plug at one end of said body forming a fluid dispensing outlet; a sealed cartridge containing fluid to be dispensed, said cartridge being slidable into said tubular body; a cartridge piercing element extending from said plug into said tubular body; an annular, resilient gasket disposed against the inner wall of said body adjacent said plug, said gasket extending along said wall beyond the extremity of said piercing element, the inside diameter of said gasket, on a plane extending transversely in alignment with the extremity of said piercing element, being slightly less than the outside diameter of the end of said cartridge; and means for forcing said cartridge toward said piercing element, said gasket sealing the end of said cartridge prior to the piercing of said cartridge by said piercing element.

6. In a fountain pen, the combination of: a tubular body; a plug in one end of said body; a pen point associated with said plug; a tubular piercing element extending from said plug into said tubular body; means forming a duct leading from said piercing element to said pen point; an annular resilient gasket provided in said tubular body adjacent said plug, said gasket extending along the wall of said body beyond the extremity of said piercing element, a sealed ink cartridge insertable within said body into contact with said piercing element, the inside diameter of said annular gasket on the transverse plane of the extremity of said piercing element being slightly less than the outside diameter of the end of said cartridge disposed adjacent said piercing element; and means for forcing said cartridge against said piercing element to enable said element to pierce said cartridge and permit ink to flow from said cartridge through said duct to said pen point, the outside diameter of the end of said cartridge adjacent said piercing element being in sealed relation with said gasket prior to the piercing of said cartridge by said piercing element.

7. In a fountain pen, the combination of: a tubular body; a plug in one end of said body; a pen point associated with said plug; a tubular piercing element extending from said plug into said tubular body; means forming a duct leading from said piercing element to said pen point; an annular resilient gasket provided in said tubular body adjacent said plug, said gasket extending along the wall of said body beyond the extremity of said piercing element, the bore of said gasket being tapered, the smaller end thereof being disposed adjacent said plug; a sealed ink cartridge insertable within said body into contact with said piercing element, the inside diameter of said annular gasket on the transverse plane of the extremity of said piercing element being slightly less than the outside diameter of the end of said cartridge disposed adjacent said piercing element; and means for forcing said cartridge against said piercing element to enable said element to pierce said cartridge and permit ink to flow from said cartridge through said duct to said pen point, the outside diameter of the end of said cartridge adjacent said piercing element being in sealed relation with said gasket prior to the piercing of said cartridge by said piercing element.

8. In a fountain pen, the combination of: a tubular body; a plug in one end of said body; a pen point associated with said plug; a piercing element extending from said plug into said tubular body, there being a duct extending through said piercing element and through said plug to said pen point; an annular resilient gasket provided in said tubular body adjacent said plug, said gasket extending along the wall of said body

beyond the extremity of said piercing element; a sealed ink cartridge insertable within said body in contact with said piercing element, the inside diameter of said annular gasket on the transverse plane of the extremity of said piercing element being slightly less than the outside diameter of said cartridge disposed against said piercing element, said duct being brought into communication with the interior of said cartridge when said cartridge is forced against said piercing element to cause said element to pierce an end of said cartridge; and means forming a shoulder for engaging said cartridge and arresting the movement thereof following said piercing operation, said piercing element being of a size adapted to displace a quantity of ink from said capsule sufficient to fill said duct.

HANS H. BERGER.