April 21, 1959 N. PORITZ 2,882,859

BALLPOINT PEN WITH INK TUBE ADAPTER

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Fig. 1.

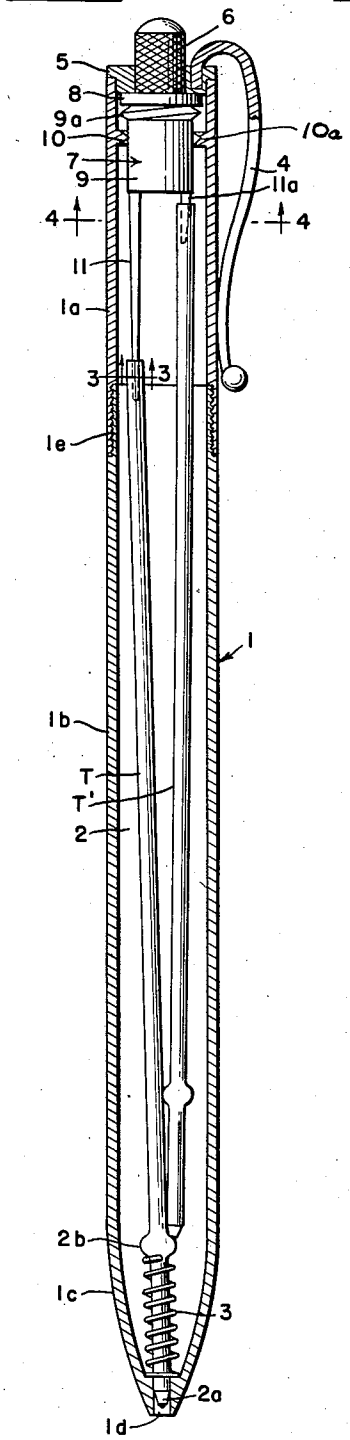


Fig. 5.

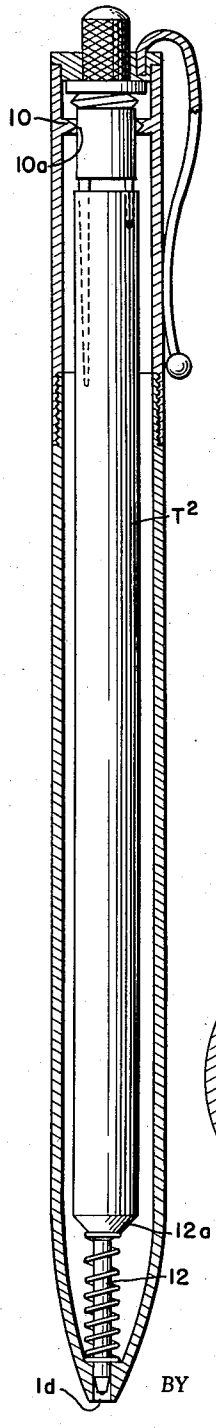


Fig. 2.

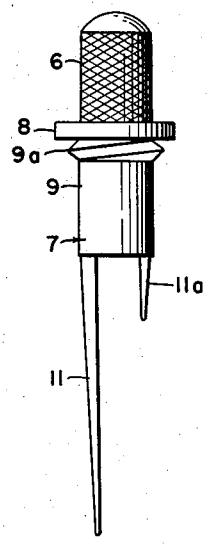


Fig. 3.

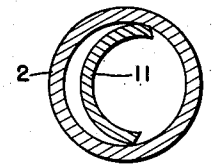
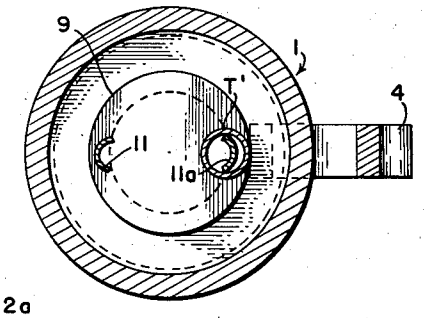


Fig. 4.



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Fig. 6.

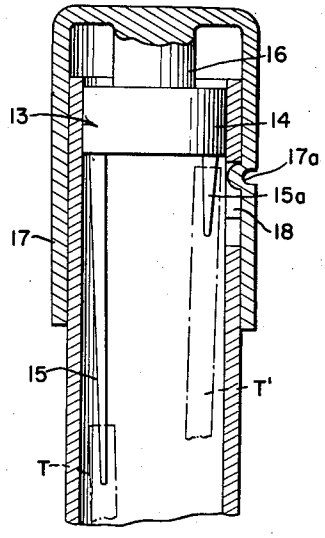


Fig. 11.

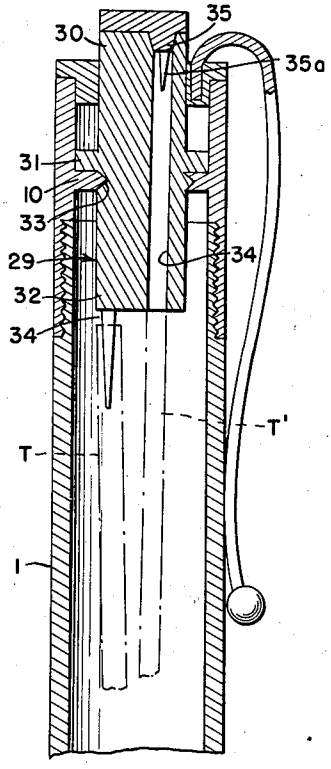


Fig. 9.

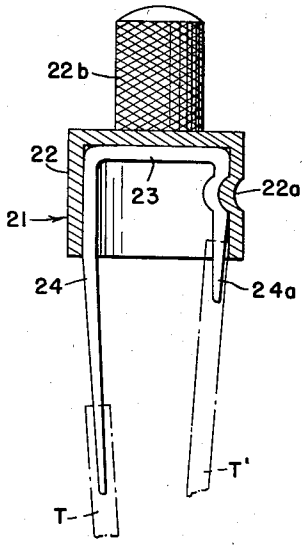


Fig. 10.

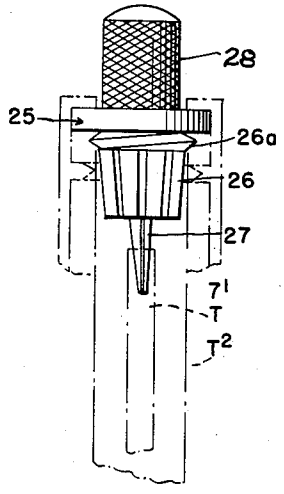


Fig. 8.

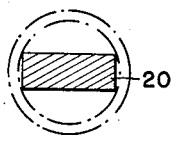
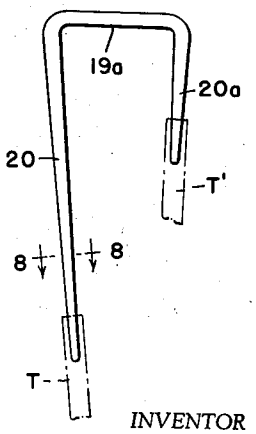


Fig. 7.



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BALLPOINT PEN WITH INK TUBE ADAPTER

Nathan Poritz, Brooklyn, N.Y.

Application April 16, 1958, Serial No. 728,841

9 Claims. (Cl. 120—42.03)

This invention relates to ballpoint pens of the general type in which an ink tube is housed within the barrel of the pen with means for projecting and retracting the writing ballpoint of the tube out of and into the barrel.

An important object of the invention is to provide a ballpoint pen of the above character in which a plurality of ink tubes of conventional size may be retained within the pen barrel in such a manner that when the ink of one of the tubes becomes exhausted, the exhausted tube may be discarded and quickly replaced with a spare tube, thus avoiding the inconvenience and annoyance occasioned by the pen running dry and being rendered useless due to the unavailability of a new ink tube.

Another object of the invention is to provide in a ballpoint pen of the above character an adapter for retaining the plurality of ink tubes within the barrel and which is also capable of alternative use with a single oversize ink tube of enlarged ink capacity, in accordance with the needs or preference of the writer.

Still another object of the invention is to provide a ballpoint pen of the above character having improved means for locking the ballpoint in projected writing position and for positively maintaining the point against accidental release during the use of the pen in writing.

Other objects and advantages will be apparent from the following detailed description of several preferred embodiments of the invention, reference being made to the accompanying drawing in which:

Figure 1 is a longitudinal cross-sectional view of a ballpoint pen;

Figure 2 is a detail view of an adapter for use with the pen of Fig. 1 for mounting a pair of conventional size ink tubes thereon;

Figure 3 is an enlarged transverse cross-sectional view through an arm of the adapter and ink tube taken on the line 3—3 of Fig. 1;

Figure 4 is an enlarged transverse cross-sectional view through the pen taken on the line 4—4 of Fig. 1;

Figure 5 is a longitudinal cross-sectional view of the pen of Fig. 1 showing the manner in which an oversize ink tube may be mounted upon the adapter for use with the pen;

Figure 6 is a longitudinal cross-sectional view through a modified form of adapter;

Figure 7 is a longitudinal cross-sectional view through another modification of the adapter;

Figure 8 is a transverse cross-sectional view through one arm of the adapter on the line 8—8 of Fig. 7;

Figure 9 is a longitudinal cross-sectional view of a further modification of the adapter;

Figure 10 is a longitudinal cross-sectional view of another modification of the adapter having its ink tube supporting arms arranged in a different manner; and

Figure 11 is a longitudinal cross-sectional view of the upper end of a ballpoint pen illustrating still another modification of the adapter.

The ballpoint pen illustrated in Fig. 1 comprises a barrel 1 having an upper longitudinal section 1*a* and a lower longitudinal section 1*b*, the lower end of the lower section being tapered as indicated at 1*c* and provided at its tip with a passageway 1*d*. The two barrel sections 1*a* and 1*b* are threadedly connected at their adjacent ends as indicated at 1*e* so that the sections may be taken apart by unscrewing one section from another. The barrel 1 may be made of metal, plastic or other suitable material. Inside the barrel is an ink tube T comprising a cylinder 2 of long, slender, conventional size containing a supply of plastic ink and provided with a ballpoint 2*a* normally retracted within the passageway 1*d* but projectable beyond the lower end of the tube into writing position. The tube is formed with an abutment 2*b* a short distance above its ballpoint end and a coil spring 3 is interposed between this abutment and the lower end of the tapered barrel section 1*c*. Upon the barrel 1 is mounted a clip 4 by which the pen may be carried in the pocket.

Ballpoint pens constructed as thus far described are broadly old and no invention is claimed therefor. The coil spring 3 pressing against the abutment 2*b* normally holds the ink tube T retracted within the tapered lower end of the barrel but permits the ballpoint 2*a* to be projected, against spring pressure, through the passageway 1*d* outwardly into writing position.

In accordance with the present invention, provision is made for storing a spare ink tube within the pen barrel or, alternatively, substituting an ink tube of "giant" size for two conventional-size ink tubes, without requiring any appreciable increase in the dimensions of the pen barrel beyond those which have now come to be regarded as more or less standard for "pencil" type ballpoint pens. The means (which I term an "adapter") for accomplishing this purpose are self-contained within the pen barrel and, thus, are always conveniently accessible when needed.

Closing the upper end of the barrel 1 is a centrally apertured plug 5 of the barrel section 1*a*; and projecting upwardly through the aperture of the plug is a press button 6. This button forms part of a cylindrical adapter 7 slidable within the barrel. This adapter comprises an enlarged circumferential section 8 normally abutting the lower face of the plug 5 when the pen is in non-writing condition and snugly fitting within the interior of the pen barrel and serving to guide the adapter axially within the barrel. The clearance between the circumferential section 8 and the wall of the barrel is shown somewhat exaggerated in Figs. 1 and 2 in the interest of clearness, this section desirably having a sliding fit with the barrel in actual practice. Located below the circumferential section 8 is a cylindrical section 9 of somewhat smaller diameter than the section 8, and the section 9 is formed for a very short extent of its length with one or two turns of screw thread 9*a*, these threads projecting radially outward beyond the circumference of the subjacent cylindrical portion of the section 9. The interior of the barrel 1 a short distance below the plug 5 is formed with a constriction defining a ring 10 which is internally screw-threaded as indicated at 10*a*, to mate with the screw-threads 9*a* of the adapter, this ring also functioning as a stop to abut the section 8 and limit the inward movement of the adapter after the threads 9*a* and 10*a* have become engaged.

Depending from the lower face of the cylindrical section 9 and forming an important feature of the adapter is a pair of arms 11 and 11*a*. One arm 11 is substantially longer than the other arm 11*a*, the arms being slightly tapered downwardly and inwardly, as best shown in Fig. 2. Each arm is adapted to be introduced into the open upper end of an ink tube T of conventional size, desirably in a manner such as to grip the ink tube with a frictional fit. The arm 11 is mounted upon the ink tube T, where-

as the other arm **11***a* supports an identical ink tube T', the latter serving as a spare ink tube held in inoperative stand-by position within the pen barrel. The axes of the arms **11** and **11***a* are slightly inclined downwardly and inwardly toward the longitudinal medial axis of the barrel **1**, as shown in Fig. 1. The length of the arm **11***a* is such as to support the ink tube T with its ball-point end at an elevation approximately at or slightly above the tapered end **1***c* of the pen barrel so that this ink tube will not jam or otherwise interfere with the action of the coil spring **3**. As best illustrated in Fig. 3, each arm is of angular and arcuately-curved cross-sectional shape, so that an arm does not completely close the open end of an ink tube but admits atmospheric pressure to the column of ink filling the tube for feeding ink to the ballpoints, while at the same time the corners of the arm bite into the inner circumference of the ink tube when the arm is wedged into the ink tube.

A second important function of the adapter **7** is to render the pen serviceable for use with an oversize, or "giant" size, ink tube. For this purpose the two separable sections **1***a* and **1***b* of the pen barrel **1** are unscrewed, the two conventional size ink tubes T and T' are discarded, and both arms **11** and **11***a* of the adapter are then introduced into the open upper end of a giant ink tube T^2. For this purpose the two arms **11** and **11***a* are slightly resilient so that they may flex laterally to be wedge-fitted into the end of the giant tube. The giant tube is shaped to provide at its lower end an axially disposed pilot portion **12** capable of freely passing through the passageway **1***d* of the tapered section **1***c* of the pen barrel. The coil spring **3** encircling the pilot portion is arranged to exert a thrust between the lower end of the pen barrel and a shoulder **12***a* on the ink tube as illustrated in Fig. 5. In inserting the adapter into the open end of the giant ink tube, the two arms are slightly compressed laterally, making a tight binding fit with the interior of the tube. The pen is reassembled by screwing together the two barrel sections **1***a* and **1***b*.

When the pen is not in use, the adapter **7** will normally be held in raised position by the coil spring **3** pressing against the lower end of a small size ink tube T or a giant size ink tube T^2, whichever one of the tubes may have been assembled upon the adapter. When the pen is to be used the ballpoint is projected outwardly of the barrel into writing position by finger pressure upon the button **6** to first move the threaded section **9***a* vertically downward to about the ring **10**, and then the stem is given a partial turn to threadedly interlock the threads **9***a* with the threads **10***a* to maintain the ballpoint in projected writing position. To retract the ballpoint, the button is turned in the opposite direction to release the threads, whereupon the spring **3** snaps the ink tube endwise into raised position until the enlarged circumferential section **8** of the adapter abuts the plug **5** closing the end of the barrel. The adapter being vertically slidable for the major portion of its travel and depending upon only one or two turns of threads for locking the ballpoint in projected position makes for quicker projection and retraction of the ballpoint as compared with mechanism employing threads entirely for the projecting and retracting operation.

The ink tubes T, T' and T^2 may contain ink all of the same color, or the ink of the several tubes may be of different colors, thus making the pen suitable for writing in different colors by a simple change-over operation. For simplicity of manufacture the clip **4** may have its upper end molded into or formed integral with the plug **5**, although this is not essential.

The adapter may take other forms than the one just described. For example, the adapter **13** illustrated in Fig. 6 comprises a cylindrical section **14** slidable within the upper end of the pen barrel and having a pair of downwardly-extending arms **15** and **15***a*, which arms may correspond in all material respects to the arms **11** and **11***a*, respectively, of the adapter of Fig. 1. The cylindrical section **14** upon its upper face is formed with a press button **16** which projects outwardly through the open end of the barrel and is here shown as integral with, but it may be made as a separate part of, a cap **17** telescopically associated with the upper end of the barrel. The cap upon its circumference is dimpled, as indicated at **17***a*, and this dimple extends into a bayonet slot **18** recessed upon the circumference of the barrel. Finger pressure applied to the cap depresses the cap, and with it the adapter **13**, against the action of a coil spring, not shown but corresponding to the spring **3** of Fig. 1. A slight twist locks the cap in the bayonet slot so that the ink tube is held in projected writing position. In the same manner as has already been described in connection with the adapter of Fig. 1, the arms **15** and **15***a* may be used selectively with either conventional or oversize ink tubes; and for purpose of illustration the arms **15** and **15***a* are shown in Fig. 6 as mounting two conventional size ink tubes T and T', indicated in broken lines, the latter representing a spare ink tube supported in stand-by position. Alternatively, for mounting a giant ink tube, the two arms will both be wedge-fitted into the upper end of the oversize tube.

In the modification of Fig. 7, the adapter **19** in its most simple form comprises a metal bar bent to define a connector section **19***a* at its top and a pair of downwardly extending arms **20** and **20***a*. The arms are of different lengths and are disposed in slightly convergent relation with the longer arm **20** adapted to mount thereon a conventional size ink tube T in operative position and the shorter arm **20***a* is adapted to mount a similar size ink tube T' in stand-by position; or both arms may be frictionally fitted into the upper end of a gaint size ink tube as already explained in connection with the preceding forms of the adapter. As illustrated in Fig. 8, each arm may be of square or rectangular transverse cross-section so that the corners of the arm bite into and tightly grip the ink tube when the arm is wedged into the tube.

While an adapter constructed according to that of Fig. 7 is best suited for use with a ballpoint pen having a depressible cap as illustrated in Fig. 6, wherein the connector **19***a* corresponding to the button **16** of Fig. 6, is either united with or held in contact with the cap by spring pressure, nevertheless this general form of adapter may be readily modified so as to be capable of use with the type of pen illustrated in Fig. 1 wherein a button projects beyond the upper end of the barrel and is directly engageable bv the fingers for depressing the adapter.

To this end the adapter may take the form illustrated in Fig. 9. The adapter **21** of this latter figure comprises a cup **22** of sheet metal or plastic within which is crimped, as indicated at **22***a*, a metal bar corresponding in all essential respects to the adapter of Fig. 7 and comprising a connector member **23** and a pair of downwardly extending and slightly converging arms **24** and **24***a* of different lengths. The connector member **23** lies flat against the lower face of the cup and the top of the cup is fashioned to provide a press button **22***b*. The ends of the arms, as before described, are tapered to wedge into the upper ends of a pair of ink tubes T and T' (indicated in broken lines) or, alternatively, the two arms may be inserted into the end of a giant size ink tube, not shown. In inserting the shorter arm **24***a* into the spare ink tube T', the upper end of the tube is forced between the arm and the adjacent circumferential flange of the cup where it is firmly clamped by the resilient pressure of the arm, as indicated in Fig. 9.

Still another form of adapter is illustrated in Fig. 10 which is capable of use with the form of pen illustrated in Fig. 1. In this form of adapter the arms are arranged in superposed relation. The adapter **25** comprises an upper arm **26** of slightly conical shape surmounted by a threaded section **26***a* corresponding to the threads **9***a* of

Fig. 1, the lower end of arm 26 is of such diameter as to frictionally fit into the upper end of a giant size ink tube T^2, indicated in broken lines. The arm 26, in turn, carries a downwardly and inwardly tapered depending arm 27 adapted to wedge into the upper end of a conventional size ink tube T, also indicated in broken lines, to frictionally retain the latter in assembly with the adapter. A button 28, similar to the button 6 of the form of adapter of Fig. 1, is provided upon the upper end of the adapter for finger engagement to depress the adapter. The arms 26 and 27 may be fluted to admit atmospheric pressure to the ink tubes. In this form of the invention the adapter may be used either with a single conventional size ink tube T or, alternatively, with a giant size tube T^2, in substantially the same manner as the previously described modifications except that the arm for supporting a conventional size spare ink tube is omitted.

The over-all length of the ballpoint pen may be somewhat shortened by employing an adapter corresponding to that illustrated in Fig. 11. The adapter 29 of this figure is constructed similarly to the adapter shown in Fig. 2, and comprises a press button 30 projecting upwardly from an enlarged circumferential section 31 slidable within the barrel of the pen and a somewhat smaller cylindrical section 32 located below the section 31. The cylindrical section 32 carries adjacent its upper end one or two turns of screw threads 33 extending radially outward beyond the circumference of the section 32 and mating with the internal threads of the restricted ring portion 10 upon the inside of the pen barrel.

From the lower face of the circumferential section 32 an arm 34 projects downwardly for wedging into the upper end of a conventional size ink tube T, indicated in broken lines. The cylindrical section 32 is longitudinally recessed, as indicated at 34, and the upper end of the recess is closed by a removable plug 35. Depending from the plug is an arm 35*a* adapted to be wedged into the open end of a stand-by ink tube T' of standard size. Thus, the ink tube T' may be supported at a higher elevation than in the case of the embodiment of the adapter of Fig. 2. Desirably the cylindrical section 32 may be made of a diameter such as to frictionally fit within the open upper end of a giant size ink tube so as to hold the ink tube in association with the adapter when such an oversize ink tube is to be used with the pen instead of smaller ink tubes T and T' of standard size.

It will be apparent from the foregoing examples that I have enlarged the utility of the usual ballpoint pen by providing as an element thereof an adapter by which either a spare ink tube of conventional size may be stored within the barrel of the pen in stand-by position, or an oversize ink tube may be assembled with the adapter for use with the pen. Obviously the number of arms of the adapter may be increased if desired so as to support more than a single spare ink tube, and the arms may be placed in various relations with respect to each other. While I prefer to employ standard size ink tubes that are commonly on sale at the stationary counters of retail stores, the ink tubes may be made of such sizes and shapes as are found most desirable to fit particular styles of pens.

Other means may be adopted for locking the ink tube in projected writing position besides a screw-threaded or a bayonet slot connection as described in the foregoing examples. However, I believe the threaded connection described in connection with the embodiment of Fig. 1 has particular utility when used with ballpoint pens in order that the locking mechanism may be concealed and protected entirely within the pen barrel where it is not liable to damage by accidentally dropping the pen on the floor. Pressure of the spring upon the ink tube retains the threads in tight frictional contact and reduces the liability of accidental unturning when the ink tube is locked in projected writing position.

Aside from the several embodiments of the invention herein shown and described, it will be understood that numerous details of construction may be altered or omitted without departing from the spirit and scope of the invention as disclosed and claimed, and that I do not desire to limit the invention to the exact constructions herein set forth.

I claim:

1. The combination with a ballpoint pen comprising a barrel, a passageway through the lower end of the barrel, an ink tube extending longitudinally within the barrel and having its lower ballpoint end located in registry with the passageway, and a spring disposed intermediate an abutment upon the ink tube and an abutment on the barrel for yieldingly urging the ink tube upwardly to retracted position with the passageway, of an adapter longitudinally movable within the upper end of the barrel, said adapter comprising a member having a plurality of generally parallel downwardly-extending arms of different lengths, the longer of said arms being so constructed and arranged as to be insertable into the upper end of the ink tube and the shorter of said arms being so constructed and arranged as to be insertable into the upper end of a spare ink tube for maintaining the ink tubes in vertically displaced side-by-side relation, stop means to limit the upward movement of the adapter, means located exteriorly of the upper end of the barrel for applying finger pressure to the adapter for depressing the adapter against the action of the spring to project the ballpoint of the lowermost ink tube through the passageway, and releasable means for locking said adapter against retraction.

2. The combination set forth in claim 1 wherein the arms extend in downwardly slightly convergent relation.

3. The combination set forth in claim 1 wherein the arms are tapered downwardly to form a wedge fit with the interior of the ink tubes.

4. The combination set forth in claim 1 wherein the plurality of arms are laterally compressible to together fit within and frictionally retain an oversize ink tube.

5. The combination set forth in claim 1 wherein the locking means comprise a threaded section upon the adapter and a threaded section upon the interior of the barrel located a spaced distance below the upper end of the barrel, whereby the adapter may be moved first freely and non-rotatably vertically within the barrel and thence rotationally to engage the threads in locking relation.

6. The combination set forth in claim 1 wherein the locking means comprise a cap telescoping over the upper end of the barrel and overlying the outer end of the button, and a bayonet slot connection between the cap and the barrel.

7. The combination set forth in claim 1 wherein the arms in cross-section are of non-circular shape to provide space for admitting atmospheric pressure to the ink tubes.

8. The combination as set forth in claim 1 wherein the adapter comprises a one-piece rod of spring metal bent to form a pair of downwardly-extending arms and a connector portion joining the upper ends of the arms.

9. The combination as set forth in claim 1 wherein the adapter comprises an inverted cup-shaped member, and a one-piece rod bent to form a pair of downwardly-extending arms and a connector portion joining the upper ends of the arms, said rod being crimped within the open end of the cup and one of said arms insertible within an ink tube and forming with the wall of the cup a spring clip for gripping the edge of the ink tube.

References Cited in the file of this patent

UNITED STATES PATENTS

2,839,030 Zang ---------- June 17, 1958