

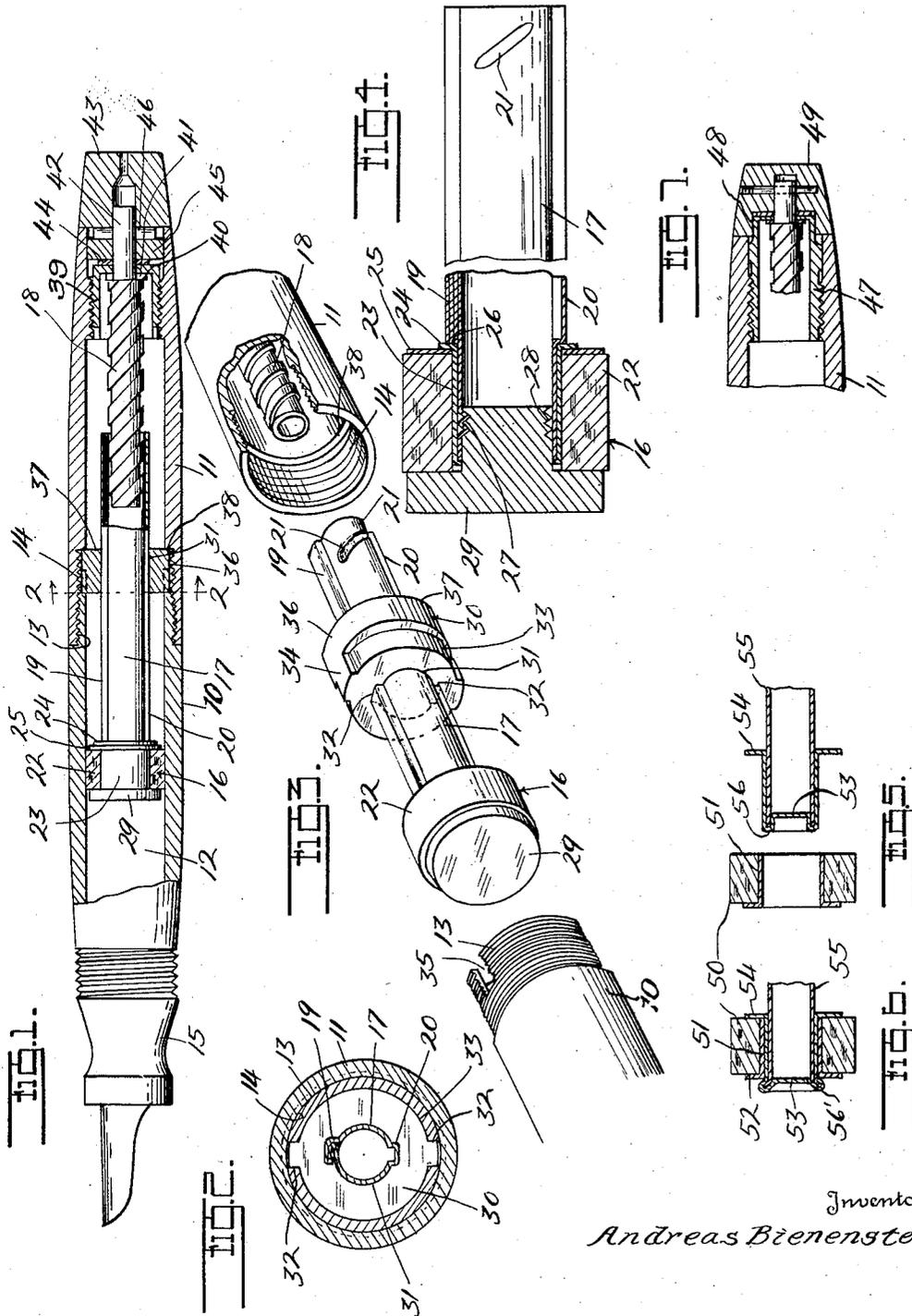
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PLUNGER TYPE PEN

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# UNITED STATES PATENT OFFICE

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## PLUNGER TYPE PEN

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This invention relates to fountain pens and more particularly to improvements in bulbless or plunger type fountain pens.

The invention has as one of its objects to simplify, render more efficient, and improve generally structures of this type.

Another object of the invention is to provide a fountain pen of this type so constructed that it is capable of facile assembly. To this end, I propose forming the barrel portion of the pen in two sections and to locate, at the parting line of the sections, means for engaging the stem of the reciprocable piston to permit relative longitudinal movement of the piston without relative rotative movement thereof.

In the interests of economical manufacture, my invention contemplates producing the piston rod from a flat strip rolled or curled to form a hollow tubular stem, the folded seam of which constitutes a feather or key engageable in a key-way to permit longitudinal sliding by non-rotative movement of the piston.

The object of economy is further obtained by an improved construction of connection between the piston and its piston rod, the present invention moreover contemplating an improved form of operating knob and its connection with the pen barrel.

The several objects, advantages and novel details of construction of several forms of the invention will be made more apparent as this description proceeds, especially when considered in connection with the accompanying drawing, wherein

Fig. 1 is a sectional elevational view of a fountain pen constructed in accordance with my invention;

Fig. 2 is an enlarged transverse sectional elevational view taken substantially on the plane indicated by line 2—2 in Fig. 1;

Fig. 3 is a fragmentary separated sectional perspective view of the pen barrel sections with their associated parts at the parting line thereof;

Fig. 4 is an enlarged sectional elevational view of the piston and piston rod;

Fig. 5 is a sectional view of a modified

form of piston and stem prior to the completion of the assembly operation;

Fig. 6 is a view similar to Fig. 5 after the parts have been completely assembled, and

Fig. 7 is a fragmentary sectional elevational view through the knob and of the pen showing a slightly modified form of construction.

Referring now more particularly to Fig. 1, it will be noted that the pen comprises a barrel consisting of two sections 10 and 11 which together present a tubular reservoir 12. The parting line of the barrel sections 10 and 11 is shown as substantially midway between the ends of the pen so that when the sections are disconnected the interior of the pen barrel and the mechanism therein contained is accessible. For joining the two barrel sections, one section thereof is provided with a reduced exteriorly threaded portion 13 with which an interiorly threaded portion 14 on the other barrel section engages, the construction being such that the outer surfaces of the two barrel sections are flush when the barrel sections are completely assembled.

The pen is provided with the usual nib-end section 15 which may be of any standard or conventional design.

Reciprocably mounted in the reservoir 12 is a piston indicated generally by the reference character 16, this piston being provided with a piston rod or stem 17 operatively connected to a preferably steep pitch threaded operating rod or member 18 swivelly mounted in the end of the pen barrel in a manner yet to be referred to in detail.

As shown probably best in Figures 2, 3 and 4, the piston stem or rod 17 is formed from a flat strip which is curled or rolled to form the tubular stem, the edges of the strip being united by a seam 19. This seam projects beyond the cylindrical surface of the stem to form a feather or key, cooperating with a key-way formed in a supporting member, yet to be referred to, which supports the piston and stem for longitudinal sliding movement but prevents relative rotative movement thereof. If desired, the piston stem may be provided diagrammatically opposite the

seam 19 with a longitudinal extending rib or embossed portion 20 also constituting a feather or key.

The piston stem 17 at one end thereof is provided with a pair of opposed short thread sections 21 in the form of radially inwardly extending projections which may be conveniently pressed in the sheet metal stem.

The piston comprises essentially a piston ring 22 which is mounted on a sleeve member 23, the latter being provided with a laterally extending annular flange 24, a piston ring liner 25 being preferably interposed between the ring 22 and the flange 24, as illustrated in Fig. 4. It is to be noted that the seam 19 and the embossed portion 20 terminate short of the end of the stem and thus provide shoulders 26 against which the sleeve 23 may engage. The end of the stem is provided with radially inwardly extending projections 27 at the proper helix angle to be engaged between threads 28 of a piston head 29. With this arrangement, the piston may be economically produced and assembled with facility.

Arranged at the parting line of the barrel sections 10 and 11 is a piston stem guiding sleeve or member 30. This member is provided with a passage or opening 31 there-through into which the piston stem 17 extends, and with key-ways 32 opening into this passage with which the feathers or keys 19 and 20 engage so as to mount the piston rod to permit relative sliding movement but to prevent rotary movement thereof. It is quite obvious, however, that only one key and key-way need be employed, in which event one of the key-ways 32 would be eliminated and the seam 19 would constitute the key.

The member 30 is provided with a reduced portion 33 having an outside diameter such as will fit snugly within the end of the barrel section 10, this reduced portion being provided with one or more radially outwardly extending projections 34 which engage in correspondingly shaped recesses 35 in the ends of the barrel section 10, to non-rotatively associate the sleeve member 30 with this barrel section 10. The remainder of the member 30 is provided with a portion 36 of greater diameter but of a diameter to fit snugly within the end of the barrel section 11, the end face 37 of this member 30 being engaged by a radially inwardly extending shoulder 38 on the barrel section 11 when the sections are screwed together.

In assembling the parts, the sleeve member 30 will be inserted in the end of the barrel section 10 with the projections 34 thereof engaged in the slots or recesses 35. Thereafter when the barrel section 11 is assembled, the projecting portion 36 acts as a pilot to guide and aline the section 11 with respect to the section 10 and when the barrel section 11 has been fully screwed into place the annular shoulders 38 formed on the inner sur-

face thereof will engage the face 37 of the sleeve member and hold the same firmly against the end face of the barrel section 10, as will be clearly apparent.

The sleeve member 30 not only provides means for guiding and supporting the piston stem, but acts to reinforce and strengthen the barrel sections at the parting line thereof. By locating this member 30 in the parting line of the barrel sections, it may obviously be quickly and easily assembled and by reason of this construction the remaining portions of the pen may also be quickly and easily assembled.

The operating or screw member 18 is preferably in the form of a hollow rod member having a steep pitch thread rolled therein. The screw member 18 is swivelly mounted in the end of the barrel section 11 by means of a ferrule 39 threaded into the ends of the barrel. The operating screw 18 is provided with a shoulder 40, a washer 41 being preferably interposed between the shoulder 40 and the adjacent face of the ferrule. The reduced end portion 42 on the operating member extends into a recess in a knob member 43, a washer 44 being interposed between the ferrule 39 and an extension 45 on the knob member. The knob is secured to the operating member by means of a pin 46. Thus the operating member is swivelly mounted in the end of the barrel and by rotating the knob member 43 the screw or operating member 18 may be rotated, whereupon the threads thereof engaging the threads 21 on the piston rod produce a longitudinal movement of the piston rod as will be apparent, these parts telescoping during the movement of the piston to the right, as viewed in Figure 1.

While in the construction of the knob end just described the knob is provided with the extension 45 which projects into the barrel the modified form of construction shown in Figure 7 may be employed in which the operating parts are carried up into the knob. In this form of construction the ferrule 47 is more elongated and projects beyond the end of the barrel section 11 and engages in a recess 48 in the knob 49. Thus the knob rotates on the projecting end of the ferrule instead of having a portion rotating within the barrel. In other respects this construction is similar to that just previously described but it will be obvious that the length of the pen may be reduced or the movement of the parts increased.

In Figures 5 and 6 I have shown a modified means of piston construction and of the connection between the stem and the piston.

In this construction the piston ring is indicated by the reference character 50, this ring being mounted on a sleeve 51 provided with a laterally extending annular flange 52 which engages the sleeve-like piston ring 50 at one end thereof. In assembling this form

of construction a cup-shaped member 53 provided with a laterally outwardly extending flange 54 is assembled with the sleeve 51 and piston ring 50 as suggested in Figure 5, and this assembly is engaged with the end of the tubular piston stem 55, the end of the piston stem engaging in an annular recess or groove 56 formed in the cup-shaped member 53. With the parts assembled as shown in Figure 5, the groove portion 56 of the cup member together with the end of the stem 55 engaged therein is flared or bent radially outwardly, as shown at 56', into engagement with the annular flange 52 of the sleeve 51, as clearly indicated in Figure 6. This rigidly unites the piston stem 55 with the cup-shaped member 53 and the engagement between the flared portion 56' and the flange 52 holds the assembly consisting of the sleeve 51 and piston ring 50 in engagement with the flange 54 so that the piston and piston stem assembly is complete. This provides an extremely economical and efficient piston construction which eliminates the need for threaded parts.

Obvious modifications may suggest themselves to those skilled in this art, and to this end reservation is made to make such changes as may come within the purview of the accompanying claims.

What I claim as my invention is:

1. In a fountain pen, a barrel portion presenting a tubular reservoir, a piston reciprocable in said reservoir, said barrel being formed in two sections, and means non-rotatively associated with the interior of the ends of the barrel sections at the parting line of the sections and concealed thereby for slidably and non-rotatably mounting said piston.

2. In a fountain pen, the combination with a barrel portion formed in two sections and presenting a reservoir, of a piston and stem reciprocable therein, and means having a telescoping non-rotatable connection with said barrel sections at the parting line thereof and engaging said piston rod to permit relative sliding movement of said piston without relative rotation thereof.

3. In a fountain pen, a barrel portion presenting a tubular reservoir, a piston reciprocable in said reservoir, and a piston stem therefor formed of a strip rolled into tubular form with the edges folded to form a seam constituting a longitudinal key, and a sleeve member fixed in said barrel adapted to slidably receive said stem, said sleeve being provided with a key-way to receive said key.

4. In a fountain pen, the combination with a barrel portion formed in two sections and presenting a reservoir, of a piston and stem reciprocable therein, a sleeve member having a reduced end portion fitted within the end of one of said barrel sections together with a radial projection engaging a slot in the end of the barrel section to non-rotatively connect

said sleeve member and barrel section, the other end of said sleeve constituting a pilot to guide the end of the other barrel section when the sections are assembled, said pilot portion fitting within the second barrel section, for the purpose set forth.

5. In a fountain pen, the combination with a barrel portion formed in two sections and presenting a reservoir, of a piston and stem reciprocable therein, and a member engageable in the open end of one of said barrel sections and secured in place by engagement with the other barrel section when said sections are assembled, said member engaging the piston stem to slidably and non-rotatably support the piston.

6. In a fountain pen, the combination with a barrel portion formed in two sections and presenting a reservoir, of a piston and stem reciprocable therein, a sleeve member having a reduced end portion fitted within the end of one of said barrel sections, said reduced portion forming a shoulder engaging the end face of said barrel section, and a shoulder on the inner surface of the other barrel section engaging the opposite end of said sleeve member when the barrel sections are assembled, for the purpose set forth.

7. In a fountain pen, a barrel formed in two sections united substantially midway of the ends of the barrel, a sleeve member detachably and non-rotatively associated with said barrel sections at the parting line thereof, a piston and a piston stem, a longitudinal key formed on said stem, said sleeve member being formed with a passage and keyway to receive said piston stem and key to slidably and non-rotatively mount said piston.

8. In a fountain pen, a barrel formed in two sections provided with telescoping threaded parts at the parting line thereof, a threaded operating member swivelly mounted in the free end of one of said barrel sections, a piston reciprocable in the other barrel section, a piston stem therefor, a telescoping threaded connection between said stem and operating member, a sleeve member detachably and non-rotatively associated with said barrel sections at the parting line thereof, a key on said stem, and a passage provided with a key-way extending through said sleeve member to slidably and non-rotatively receive said piston stem.

9. In a fountain pen, a piston, a tubular stem therefor, said piston comprising a sleeve provided with a radial abutment at one end, a piston ring on said sleeve with an end thereof engaging said abutment, a cup-shaped member provided with a radial abutment at one end insertable through said sleeve with said abutment engaging the other end of said piston ring, an annular groove in said cup-shaped member in which the end of said tubular stem engages, said groove portion being

bent radially outwardly into engagement with said sleeve abutment to secure said stem thereto and rigidly unite the parts.

5 10. In a fountain pen, a barrel open at one end, a ferrule member threadedly engaging within the open end of said barrel and having a portion projecting beyond the end of the barrel, a threaded operating member having a reduced end portion forming a shoulder, 10 said reduced portion extending through the projecting portion of said ferrule with the shoulder engaging said ferrule, an operating knob having a recess into which said projecting ferrule portion extends, said knob being 15 secured to the end of said operating member and engaging the side of said ferrule opposite said shoulder, as and for the purpose set forth.

20 In testimony whereof I affix my signature.  
ANDREAS BIENENSTEIN.

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