This invention relates to writing instruments and particularly to an improved fluid ink writing instrument of the fountain pen type.

Every fluid ink writing instrument of the fountain pen type is primarily comprised of four basic elements which include a writing tip assembly incorporating a writing point or nib, a cap to cover and protect the writing tip when the writing instrument is not being used, a self-contained fluid ink reservoir and filling mechanism associated therewith, and a structure or channel network interconnecting the ink reservoir with the writing point to control and direct the flow of writing fluid from the ink reservoir to the nib.

In conventional fluid ink fountain pen constructions the practical maximum capacity of the fluid ink reservoir is objectionably restricted due to the necessary inclusion of comparatively delicate, and hence readily damaged, filling devices that occupy a substantial, if not the greater portion, of the space available for fluid ink storage. This lack of available ink capacity is reflected in the detrimental necessity of frequent refilling operations, at best an unpleasant task, with the attendant hazardous of soiling of one's hands or clothes, and which has not been aided by the recent trend to the "streamlined" designs which effectively shroud the writing nib and always necessitate a cleaning of the instrument following the filling operation to remove the excess ink remaining thereon.

In addition to the objectionable limitations of ink capacity in conventional fluid ink fountain pens, their extreme susceptibility to changes in temperature and pressure with attendant fluid ink leakage are well known. The exposing of the pen to the lowered pressures of high altitudes or to increased temperatures oftentimes resulting from mere body heat usually results in leakage of considerable quantities of fluid ink therefrom, with the attendant damaging soiling of clothing and hands and the consequent necessary cleaning of the pen and cap preparatory to reuse of the writing instrument.

Apart from the difficulties associated with the conventionally constructed fluid ink reservoirs, the conventional fountain pen construction utilizing a removable cap, separate and distinct from the remainder of the pen, but yet an important and necessary part thereof, is subject to serious disadvantages. First and foremost, of course, the loss of the cap renders the writing instrument relatively useless for it thus immediately loses the practical quality of ready portability in the pocket of a garment or in a carrying case such as a handbag. The necessary separability of the cap, which must be readily and easily removable for writing purposes, maintains the inherent deficiency of possible undesired separation while the pen is being carried, with the resultant soiling of clothing.

Another serious deficiency of conventional fluid ink fountain pen construction is the frequent clogging of the writing tip and ink passages associated therewith resulting from the undesired drying of the fluid ink therein intermediate periods of use. This undesirable clogging effectively modifies the ink flow characteristics and if excessive may result in a complete failure of the writing instrument through cessation of fluid ink flow entirely.

This invention may be briefly described as a novel and improved fluid ink writing instrument of the fountain pen type having an improved writing tip construction for the production of calligraphic writing including a novel and inexpensive nib construction, an improved, readily replaceable ink reservoir construction of greatly increased fluid ink capacity obtained through the dispensing of the entire conventional filling mechanism, an improved construction for the structure interconnecting the ink reservoir and the writing tip that provides a novel and carefully regulated control of fluid ink flow in avoidance of detrimental clogging and in prevention of detrimental leakage under any conditions of operation and an improved integral cap construction that serves to shroud and protect the writing tip as well as continually clean said element in avoidance of detrimental clogging effects.

Among the advantages obtained by the herinafter described fluid ink fountain pen construction is an attractive, durable and easily constructed, inexpensive, leak-proof writing instrument of greatly increased ink capacity for the calligraphic presentation of permanent record written material in clear and legible form. Other advantages of my pen construction are the complete avoidance of conventional refilling operations through utilization of readily replaceable ink reservoirs, the avoidance of clogging resulting from the drying of unused fluid ink under diverse conditions of operation and abuse, the regulation of ink flow solely in accordance with the writing demands of the user, the inclusion of an integral cap construction to shroud and protect the writing tip from damage and contamination when not in use and to effectively clean the writing tip immediately preparatory to the commencement of writing operations, and the provision of a writing instrument having the center of gravity thereof disposed adjacent the writing tip for improved balance and ease of writing.

The primary object of this invention is the provision of an improved fluid ink writing instrument of the fountain pen type.

Another object of this invention is the provision of an improved writing tip construction for fluid ink writing instruments of the fountain pen type.

Another object of this invention is the provision of an improved integral cap construction for fluid ink writing instruments of the fountain pen type.

Another object of this invention is the provision of an improved construction for fluid ink writing instruments of the fountain pen type.

Other objects and advantages of the invention will be pointed out in the following description and claims and illustrated in the accompanying drawings which describe by way of example the principles and methods of operation of the invention and the preferred embodiment of the fluid ink writing instrument incorporating those principles.

Referring to the drawings:

Fig. 1 is a side elevational view of the presently preferred embodiment of the writing instrument with the cap in retracted or writing position.

Fig. 2 is a side elevational view of the presently preferred embodiment of the writing instrument with the
cap advanced, as in the carrying position, to protect and shroud the writing nib; Fig. 3 is a side view, partially in section, of a portion of the writing instrument with the cap positioned as illustrated in Fig. 1.

Fig. 4 is a side view, partially in section, of a portion of the writing instrument with the cap positioned as illustrated in Fig. 2;

Fig. 5 is a side sectional view of the ink reservoir component of the writing instrument;

Fig. 6 is a sectional view of the writing tip body portion;

Fig. 6a is a section on the line 6a—6a of Fig. 6;

Fig. 7 is a sectional view of a bushing member adapted to be contained within the writing tip body portion;

Fig. 7a is a section on the line 7a—7a of Fig. 7;

Fig. 7b is a section on the line 7b—7b of Fig. 7;

Fig. 8 is an oblique view of the carrying clip assembly;

Fig. 9 is a sectional view of the cap member;

Fig. 9a is a section on the line 9a—9a of Fig. 9;

Fig. 10 is a sectional view of the capillary ink feed chamber;

Figs. 11 and 12 are side views, partially in section, and rotated 90° from the sections illustrated in Figs. 3 and 4, showing the relative positioning of the components during operation illustrative of fluid ink transfer from the reservoir to the writing tip; and

Fig. 13 is a sectional view of an alternative ink reservoir valve assembly construction.

Referencing the drawings and particularly to Figs. 1 and 2, there is provided, in the presently preferred embodiment of the invention, a writing instrument comprising a writing tip, generally designated 10, incorporating a writing point or nib 12, retractable cap 14 and the writing tip body portion 16, threadedly joined to a barrel portion 18 forming, in the illustrated embodiment, an ink reservoir of greatly increased capacity. As illustrated, the above identified elements are smoothly contoured and when joined together form a writing instrument of smooth unbroken contour and of pleasing streamlined appearance. The retractable cap member 14 is longitudinally displaceable relative to the writing point or nib 12 and writing tip body portion 16 and is illustrated in the retracted or carrying position, exposing the writing point 12, in Fig. 1 and in the advanced or carrying position, shrouding and protecting the writing point 12, in Fig. 2.

Referencing now to Figs. 3 through 10 for the specific constructional details of the illustrated embodiment of the invention, the barrel portion 18 (see Figs. 3, 4 and 5) is preferably formed of any suitable plastic having the requisite mechanical and chemical properties such as those conventionally utilized in present day fountain pen manufacture and is preferably an integral substantially cylindrical elongated unit having a rounded closed end 20 and a cylindrical open end 22 spaced therefrom. The barrel portion 18 is permitted to serve as the fluid ink reservoir for the pen and the absence of any filling mechanism disposed therein or associated therewith results in a fluid ink reservoir of greatly increased capacity as compared with those of conventional fountain pen constructions wherein a substantial, if not the greater portion of the space available for fluid ink storage is occupied by filling devices of varying structural configurations.

Disposed within and closing the open end 22 of the ink reservoir barrel portion 18 is an ink reservoir valve assembly unit generally designated 24. The ink reservoir valve assembly unit 24 is formed of a cylindrically shaped barrel portion 26 sized to fit in liquid-tight relationship within the open end 22 of the barrel portion 18 of the pen and is further provided with an annular spring retaining shoulder 28 internally disposed adjacent the upper extremity thereof. The lower extremity of the valve assembly unit 24 terminates in a dependent cylindrical connecting element 30 externally threaded as at 32. Disposed intermediate the dependent cylindrical connecting element 30 and the upper barrel portion 26 is an externally disposed clip receiving annular recess 34 and an internally disposed valve supporting shoulder 36. Positioned within the valve assembly unit 24 and displaceable intermediate the spring retaining shoulder 28 and the valve supporting shoulder 36 is a valve assembly including a resilient annular sealing gasket 38 secured to a boss 40, dependent from a cup-shaped cylindrical slide 42 suitably apertured as at 43 slidably contained within the barrel portion 26, by a T-shaped fastening element 44 having a dependent substantially conically shaped head 46 disposed within the centrally disposed opening 48 in the annular valve supporting shoulder 36. The sealing gasket 38 is maintained in compressive sealing engagement against the valve supporting shoulder 36 by the action of a spring member 50 compressively disposed intermediate the spring retaining shoulders 28 and the apertured cylindrical slide 42.

The ink reservoir valve assembly unit 24 as described above serves to hermetically seal-off the ink reservoir disposed within the barrel portion 18 of the writing instrument and prevents any leakage of fluid ink therefrom resulting from relative pressure and temperature variations or from shaking, dropping or other conditions that result in ready leakage of fluid ink from conventionally constructed writing instruments. The described construction, through the effective maintenance of a hermetically sealed ink reservoir additionally prevents detrimental drying of the fluid ink within the reservoir and thus permits ready storage of filled ink reservoirs for extended periods of time without deterioration. It will be apparent that the ink reservoir within barrel portion 18 and the valve assembly unit 24 form an entirely self-contained and effectively sealed distinct unit and that removal of fluid ink from the reservoir is permitted solely by a longitudinal displacement of the sealing gasket 38 into the reservoir through the application of a longitudinally directed force upon the T-shaped fastening element 44 of sufficient magnitude to overcome the compressive sealing force exerted by the spring member 50. Although the illustrated embodiment shows the valve assembly unit 24 disposed in the open end of the barrel portion 18, a replaceable cartridge, the open end of which is sealed by a similar valve assembly unit, sized to be contained within the barrel portion 18 could also be utilized and would also result in an ink reservoir construction of greatly increased capacity.

Threadedly secured, as at 52, to the dependent threaded portion 53 of the cylindrical connecting element 30 of the ink reservoir valve assembly unit 24, is the writing tip body portion 16 which serves as an external housing for the hereinafter described components disposed therein. The writing tip body portion 16 (see Figs. 3, 4, 6 and 6a) is a substantially cylindrical slightly tapering bushing element provided with a horizontally disposed shoulder 54 positioned beneath the threaded portion 52 that serves to support a rigid wafer-like supporting disc 56 having an enlarged centrally disposed opening 58 therein and a plurality of smaller openings 60 spaced therefrom disposed adjacent the edge thereof. The shoulder 54 and the supporting disc 56 are sized and positioned so that when the writing tip body portion 16 is threadedly engaged with the cylindrical connecting element 30, the disc 56 is compressively engaged thereby and is rigidly positioned within the body portion 16 to serve as a mount for additional elements disposed within said writing tip body portion.

The shoulder 54 defines a cylindrical bore 62 that terminates in a second shoulder 64 defining another and dependent cylindrical bore 66 of lesser internal diameter. Disposed externally on the surface of the writing tip body portion 16 is an elongated clip receiving channel 68 terminating at each end in the recesses or apertures 70, 72, the aperture 72 being aligned with the clip receiving recess 74 in the cylindrical connecting element 30 when said
writing tip body portion 16 is threadedly engaged therewith.

Slidably disposed within the writing tip body portion 16 beneath the disc 56 and sized to fit within the cylindrical bores 62 and 66 thereof is an annular bushing element 74 (see Figs. 3, 4, 7a, 7b) having a central cylindrical bore 75. The bushing element 74 upwardly terminates in an extending flange portion 76 sized to fit the bore 62 and having a plurality of channels 78 disposed on the periphery thereof. Immediately below the flange portion 76, the bushing element 74 is provided with an elongated body portion 80 sized to fit the bore 66 and having a plurality of clip locking element receiving channels 82 radially therethrough which also serve as air passage channels. The body portion 80 terminates in a dependent connecting element 84 externally threadedly as at 86 and having an axially disposed opening 88 therein formed by the shoulder 90 terminating the bore 75.

Threadedly engaging the dependent thread portion 86 of the bushing element 74 is a substantially conically shaped protective cap member 92 (see Figs. 3, 4, 9a and 9b) having an aperture 94 disposed at the apex thereof and positioned in alignment with the opening 88 in said bushing element 74. Spaced from the opening 94 and positioning itself by a shoulder 96 is a cylindrical deformable elastic material having a small sligt-like opening 100 disposed in alignment with the openings 94 and 88 in said cap member 92 and bushing element 74 respectively. The elastic disc 98 rests upon the shoulder 96 and is peripherally secured in position thereon by an annular washer element 102 concentrically disposed between the surface of said disc 98 and the shoulder 90 of the bushing element 74.

Positioned within the bore 75 of the bushing element 74 and suspended from the disc 56 by the flange 104 is a cylindrical elongated capillary container 106 having a central bore 107 (see Figs. 3, 4 and 10a). The capillary container 106 is independently terminated by a shoulder 108 which defines the dependent cylindrical writing tip shaft 110 extending through the aligned openings 100, 94 and 88 in the disc 98, cap member 92 and bushing element 74 respectively and defining a central bore 111. The writing tip shaft 110 terminates in a split nib writing point 112 of diminutive size, as compared with conventional writing instrument nibs, for the production of calligraphic writing.

Colored within the bore 107 of the capillary container 106 is a capillary ink feed member 114 having disposed on the body portion 116 thereof a plurality of horizontally disposed recesses 118 and a plurality of longitudinally disposed recesses 120. The capillary feed member 114 is supported on the shoulder 96 of the bushing element 74 and is provided with a dependent capillary rod 122 contained within the writing tip shaft 110 and taperedly terminating above the split nib writing point 112.

The upper end of the capillary feed member 114 taperedly terminates in an elongated valve rod 123 of appreciably smaller diameter than that of the body portion 116 and of a length sufficient to engage the conically shaped head 46 of the T-shaped fastening element 44 of the ink reservoir valve assembly unit 24. Dependent from and secured to the underside of the valve supporting shoulder 36 is a resilient deformable goblet-shaped diaphragm member 140 encircling the opening 48 therein and the valve rod 123. The diaphragm member 140 is apertured as at 148 and is preferably of tapered configuration as at 142 so as to bring the sides thereof into proximity with the tapered surface of said valve rod 123 and adjacent the junction thereof with the body portion 116. The lower portion 144 of the diaphragm member 140 is flared and sized to be contained by the annular vertical flange 146 defining the periphery of the flange 104.

There is also provided a clip member 124 (see Figs. 3, 4 and 8) for carrying purposes. The clip member 124 includes an annular mounting ring 126 positioned intermediate the cap member 92, and the dependent shoulder 83 of the bushing element 74. Connected to and extending from the annular mounting ring 126 is the clip arm 128 sized to be contained within the clip channel 68 in the surface of the writing tip body portion 16 and terminating in a retaining bead 130 sized to be contained within the clip receiving recesses 34 and 72 in the cylindrical component 30 and the writing tip body portion 16 respectively.

Attached to the clip arm 128 adjacent the annular mounting ring 126, and slidably disposed within one of the channels 82 in the bushing element 74 internally of the writing tip body portion 16 is an elongated clip assembly spring locking member 132 terminating in a latching tooth 134.

As described above, in the assembled writing instrument, the annular clip mounting ring 126 of the clip assembly 124 is secured intermediate the cap member 92 and the dependent shoulder 83 of the bushing element 74 and thus forms together with the cap member 92 and bushing element 74 a cap assembly that is longitudinally displaceable relative to the writing tip body portion 16 and the remainder of the elements constituting the writing instrument. The length of the longitudinal displacement is limited by the bushing element 74 and the clip assembly 124 are positioned in the retracted or writing position with the split nib writing point 112 extended through the opening 100 in the elastic disc 98. In the retracted position the clip assembly spring locking member 132 is disposed within in the writing tip body portion 16 and in one of the clip locking member receiving channels 82 in the bushing element 74. The clip arm 128 and retaining bead 130 are disposed within the recessed clip channel 68 and recess 72 in the writing tip body portion 16 and thus provide a smooth and continuous external configuration that does not interfere with the conventional grasping of the pen for writing operations. It is preferred to locate the clip arm 128 in alignment with the split nib writing point 112 so as to provide a convenient usual indication of the desired positioning of the pen for writing operations.

In order to abort the split nib writing point 112 subsequent to writing operations, the retaining bead 130 is removed from the recess 72 and the clip assembly altogether with the cap member 92 and bushing element 74 are manually displaced longitudinally of the writing tip body portion 16. The longitudinal displacement is, as explained above, limited by the shoulder 64 interiarily disposed on the lower portion of the writing tip body portion 16. When the limit of longitudinal displacement is reached the locking tooth 134 on the end of the clip assembly spring locking member 132 engages the edge of the recess 70 and prevents the removal of the above described writing point shrouding assembly to its retracted position.

In the advanced or carrying position, as illustrated in Figs. 2 and 4, the split nib writing point 112 has been effectively withdrawn from engagement with the elastic disc 98 and the relative movement therebetween during displacement results in an effective cleaning of the point 112. The elastic qualities of said disc 98 result in a hermetic closure of the opening 100 therein which, together with the engagement of the shoulder 64 by the flange portion 76 and the consequent seating of the peripherally disposed channels 78 therein, effectively seals the interior of the pen and prevents drying and resultant clogging of any fluid ink remaining in the writing tip shaft 110 and capillary container 106. With the parts positioned as illustrated in Fig. 4, the retaining bead 130 is positioned in the channel 68 and clip 128.
is exposed and available for carrying purposes. It should be noted that the instrument is carried point up to prevent the accumulation of dirt or like material within the cap member 92, and it should be further noted that the cap member 124 is only carried in positions when the writing point 112 is completely shrouded. The engagement of the edge of the recess 70 by the latching tooth 134 maintains the cap member 92 in shrouding position and prevents any undesired return thereof in a retracted or writing position.

The cap member 92, bushing element 74 and clip assembly 124 are readily returned to the retracted or writing position exposing the split nib writing point 112 by manually depressing the portion of the clip arm 128 disposed adjacent the locking member 132 so as to disengage the latching tooth 134 from the edge of the recess 70 and then manually displacing the elements to the retracted writing position. The relative displacement of the parts during retraction again results in a cleaning of the writing point 112 in its passage through the opening 100 of the elastic disc 75.

The retention of the above described elements also results in disengagement of the shoulder 64 by the flange portion 76 of the bushing element 74 and the consequent introduction of air by means of the channels 82 which effectively permits air to enter the interior of the pen through the channels 78 peripherally disposed in the flanged end 76 of the bushing element 74, the apertures 60 in the disc 56 and particularly to fill the space 150 defined by the goblet-like diaphragm member 140, air entry being permitted by the apertures 145 therein.

As explained above, the ink reservoir valve assembly unit 24 maintains the ink reservoir within the barrel portion 18 of the writing instrument normally closed and impervious to leakage due to changes in pressure, temperature or any other abuses that normally result in leakage in any conventionally constructed writing instruments.

After retraction of the cap member 92 and the elements associated therewith has exposed the split nib writing point 112 preparatory to writing operations, the parts of the instrument are positioned as illustrated in Fig. 3 and the sealing gasket 36 maintains the ink reservoir hermetically sealed. In order to provide a supply of fluid ink for writing purposes, it is necessary to raise the sealing gasket 38 interiorly of the barrel portion 18 and off the valve supporting shoulders 36.

Referring now to Figs. 11 and 12, a predetermined quantity of the ink contained within the ink reservoir in the barrel portion 18 is readily removed by pressing on the split nib 112 in an axial direction with a force slightly greater than that occasioned by normal writing operations. A sufficient pressure on the writing point 112 results in an overcoming of the compression of the spring member 50 and in a displacement of the writing tip shaft 110 and capillary container 106 relative to the writing tip body portion 16 and bushing element 74 disposed therein. The upward relative displacement of the capillary container 106 also results in an equivalent upward displacement of the capillary feed member 114 disposed therein and an accompanying upward displacement of the sealing gasket 38 due to the action of the valve rod 123 upwardly displacing the T-shaped coupling element 44. The initial upward displacement of the capillary container 106 also results in the closure of the apertures 145 in the goblet-shaped diaphragm member 140. After closure of the apertures 145 further upward displacement of the capillary container 106 results in a deformation of the diaphragm member 149 into engagement with the upper portion 123 of the capillary member 114 as at 152, in Fig. 11. This effectively seals off the lower portions of the capillary member 114 and provides a closed container-like recess 150 for the reception of a predetermined amount of ink from the ink reservoir. The upward displacement of the capillary member 114 also results in an opening of the aperture 48 in the valve supporting shoulder which permits the air disposed within the deformed diaphragm 140 to be forced into the ink reservoir as shown in Fig. 12 and to effect a slight pressure build-up therein. A subsequent lessening of the pressure then results in a downward displacement of the capillary member 106 and a filling of the reformed space 150 with a predetermined quantity of fluid ink. The volume of the space 150 thus determines the amount of ink permitted to be removed from the ink reservoir at any given time.

After the filling of the space 150 by fluid ink, a further decrease in pressure on the writing nib permits the gasket member 38 to be reseated on the valve supporting shoulder 36 under the action of the spring 50 disposed in the ink reservoir valve assembly unit and permits a reopening of the apertures 145 and the disengagement of the flared portion 144 of the diaphragm member 140 from the capillary member 114 as shown at 152 in Fig. 11. As soon as the diaphragm member 140 is disengaged from the surface of the capillary member 114, the ink disposed within the space 150 is permitted to flow under the influence of gravity and forced outwardly and exposed to the dependent surfaces of the valve arm 123 and diaphragm member 140 down over the capillary member 114. The downward flowing ink is then suspended in the horizontal and longitudinal recesses 118 and 120 therein. The capillary action afforded by the capillary member 114 and the capillary connecting element 162 and cylindrical connecting element 162 and the upper barrel portion 160 is an externally disposed clip receiving an angular recess 166 and an internally disposed valve supporting shoulder 165 having a centrally located opening 170 therein. Positioned within the valve assembly unit and closing the opening 170 is a resilient sealing gasket 172 secured to a dependent rod member 174 axially disposed within said dependent cylindrical connecting element 162. The lower extremity of dependent rod 174 terminates in a flange member 176 having a plurality of radial securing holes and a centering hole therein adjacent said rod member 174. Positioned intermediate the valve supporting shoulder 165 and a stop 180 on said rod member 174 is a spring 182 adapted to maintain said gasket member 172 disposed in hermetic sealing relationship with the shoulders 168. Dependent from and secured to the under-
Side of the valve supporting shoulders 168 is a resilient deformable goblet-shaped diaphragm member 184 apertured as at 185, encircling the opening 170 therein and the rod member 174. The diaphragm member 184 is preferably tapered as at 186 so as to bring the sides thereof in proximity with the surface of the rod 174 disposed adjacent thereto. The half of the diaphragm member 184 is flared and sized to be contained by the flange member 176. This embodiment does not require the utilization of an extending valve rod 123 as utilized in the other described embodiment and is adapted to be actuated by the member passing over the capillary feed member as shown in dotted lines on the drawing.

The operation of this embodiment of the ink reservoir valve assembly unit is similar to that described above in conjunction with the embodiment illustrated in Figs. 1 through 5 and 11 and 12 in that an upward displacement of gasket member 172 by action of a capillary feed member against the underside of the rod 174 results in deformation of the diaphragm member 184 and the resultant measured displacement of a predetermined quotient. Ink flow aperture 188 is disposed adjacent to the writing tip and replaceable relative thereto and to said ink reservoir, said elongate tube member terminating at the dependent end thereof in a writing tip shaft of reduced diameter and of a length to extend beyond the end of said writing tip and terminating at the other end thereof in an ink receiving aperture normally biased remote from said ink removal aperture in said ink reservoir, a writing point disposed on the dependent end of said writing tip shaft, a valve acting member disposed within said elongate tube member and having an extending end thereof disposed adjacent to said valve member and being replaceable in conjunction with said elongate tube member in response to displacement of said writing point relative to said writing tip for displacing said valve member out of sealing engagement with said ink removal aperture in said ink reservoir, and means disposed around the extending end of said valve actuating member intermediate said ink removal aperture in said ink reservoir and said ink receiving aperture in said elongate tube member defining an ink flow passage therebetween, last mentioned means being engageable with said valve actuating member upon valve opening displacement thereof and conjoint displacement of said elongate tube member for closing said ink flow passage, and forming a closed chamber beneath said ink removal aperture in said ink reservoir to receive ink and limit the amount of ink removable from said reservoir upon displacement of said valve member from sealing relationship with said ink removal aperture.

In a writing instrument, an elongate fluid ink reservoir having an ink removal aperture disposed in one end thereof, a displaceable valve member biased in sealing relationship with the ink removal aperture in said ink reservoir, a writing point fluidly communicable with said ink reservoir and replaceable relative thereto, displaceable valve actuating means responsive to displacement of said writing point for displacing said valve member out of sealing relationship with said ink removal aperture in said ink reservoir, said writing point being provided with an ink flow aperture of reduced diameter therein closably engageable by said valve actuating means upon valve opening displacement thereof for forming a closed chamber immediately beneath said ink removal aperture in said ink reservoir to receive and limit the amount of ink removable from said reservoir upon displacement of said valve member from sealing relationship with said ink removal aperture.

The combination as set forth in claim 3, wherein said deformable means is a sleeve of deformable material having a restricted diameter at one portion of the ink flow passage therein.

The combination as set forth in claim 3, wherein said deformable means is a goblet shaped diaphragm member.

The combination as set forth in claim 3, wherein said valve actuating member is provided with a plurality of recesses on the surface thereof to regulate, in cooperation with said enclosing elongate tube member, the flow of fluid ink through said tube member to said writing point.

The combination as set forth in claim 3, wherein said valve member is biased by a spring of sufficient strength to prevent displacement of said writing point relative to said writing tip by ordinary writing pressure.
therewith and displaceable relative thereto comprising a valve member normally biased in sealing relationship
with said ink removal aperture in said ink reservoir for controlling the removal of ink from said reservoir, means
displaceable in conjunction with displacement of said writing point relative to said ink reservoir for actuating said
valve member and sleeve means disposed adjacent the under side of said ink reservoir and in encircling relation
around said ink removal aperture therein and around the valve actuating end of said displaceable valve actuating
means for receiving fluid ink removed from said ink reservoir upon displacement of said valve member from
sealing relationship with said ink removal aperture and for directing the same to said writing point, said sleeve
means being provided with an ink flow aperture therein sized to be elasibly engageable by said valve actuating
means upon valve opening displacement thereof to form a closed fluid ink receiving chamber having a volume
determinative of the quantity of ink removable from said reservoir upon each displacement of the valve mem-
ber out of sealing relationship with the ink removal aperture therein.
9. The quantity control metering valve construction as set forth in claim 8 wherein said sleeve means is formed
of resilient deformable material.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,874,679

February 24, 1959

Nathan Zeipelovitch

It is hereby certified that an error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 6, line 44, for "usual" read — visual —; column 11, line 15, for "theren" read — therein —.

Signed and sealed this 30th day of June 1959.

(SEAL)

Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents