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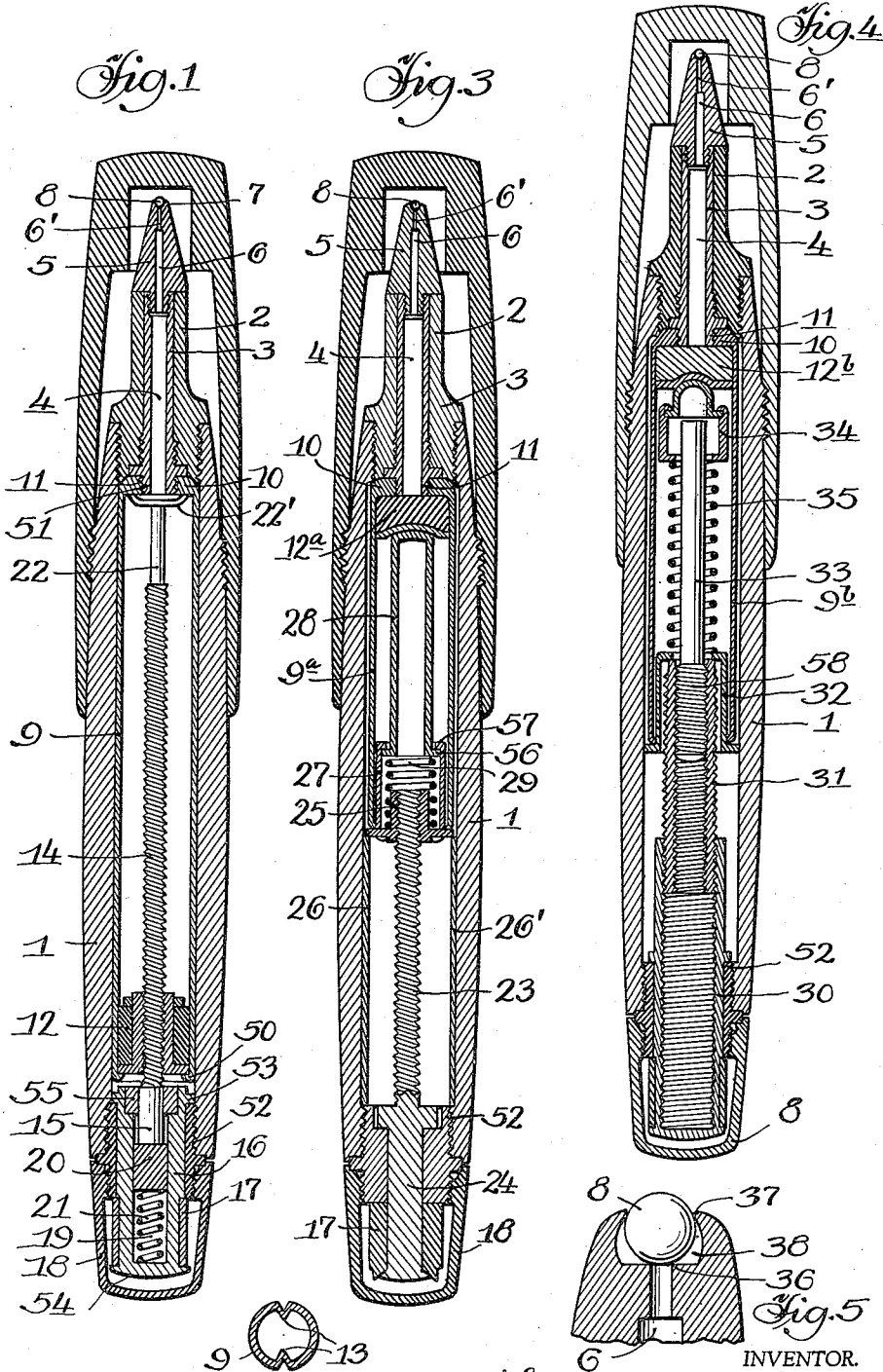
L. J. BIRO

2,258,841

FOUNTAIN PEN

Filed April 23, 1941

2 Sheets-Sheet 1



Witness:
Chas. L. Kousch

Fig. 2

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2 Sheets-Sheet 2

Fig. 6.

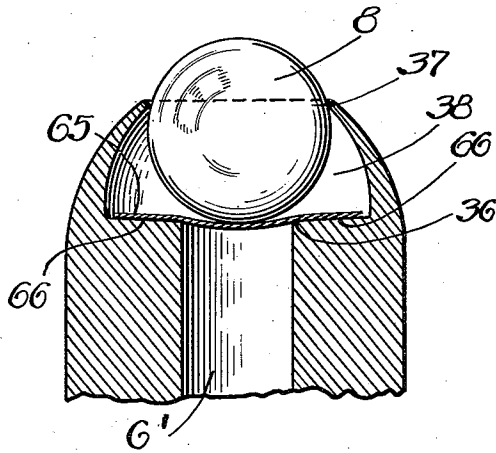
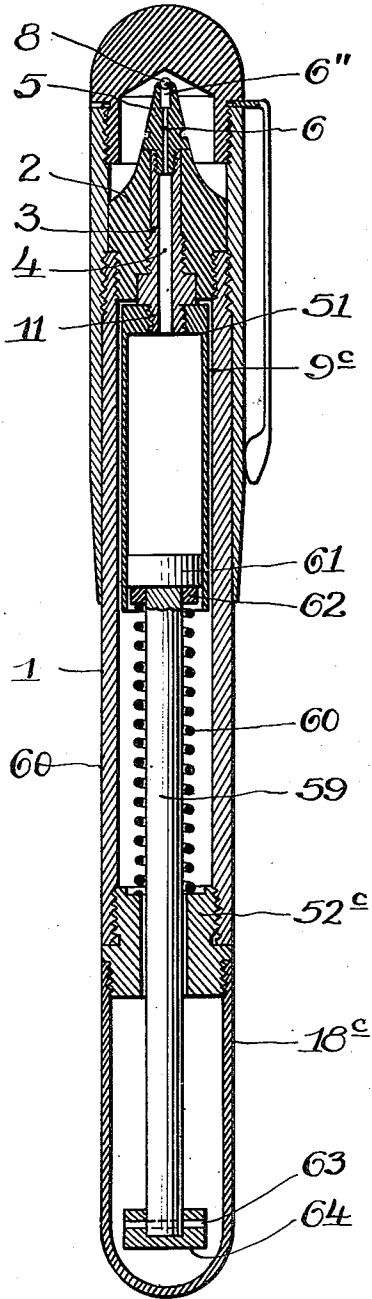


Fig. 7.

Witness:
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UNITED STATES PATENT OFFICE

2,258,841

FOUNTAIN PEN

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Application April 23, 1941, Serial No. 389,830

19 Claims. (Cl. 120—43)

This invention relates to fountain pens, and more particularly to fountain pens of the type for use with a writing material of a pasty consistency and having a replaceable cartridge or container for the ink paste, which may be removed when the ink is exhausted and a full cartridge or container be inserted into the fountain pen hollow barrel.

Preferably my new fountain pen has a ball point, which ball is rotatably mounted in the forward end of the tip, means being provided for feeding the ink to the ball and from the ball to the paper in such manner as to result in great efficiency, and enable continuous and satisfactory use of the pen. I have provided a ball point fountain pen such as to prevent too rapid drying of the ink and at the same time obviate too much looseness of the ball in its inclosure.

Fountain pens using pasty writing material and having a ball point, as known prior to my invention, have necessitated the use of means for bringing a relatively large area of the ball into constant contact with the writing material and a relatively large clearance for the ball, since the heretofore available writing pastes dried too rapidly and caused clogging of the writing point.

In order to ensure prompt absorption of the contained moisture of the writing paste, when writing therewith, it is highly desirable that the paste be applied to the paper in a very thin coat. I have provided a new writing paste as described and claimed in my copending application Serial No. 389,829, filed April 23, 1941, which is especially adaptable in my present novel fountain pen. The new features of my present fountain pen, together with my new writing paste just referred to, provide a new combination of results never attainable prior to my invention.

Among the objects of my invention is to obviate the disadvantages and to accomplish the advantages referred to above.

A further object is to provide a ball-pointed fountain pen of the general type indicated above and described hereinafter, which shall be particularly adapted to be used in conjunction with pasty writing material having a relatively high humidity content.

A still further object of my invention is to provide a fountain pen of the type described, which shall expend only a very thin coat of pasty material to the paper or other writing surface when used with writing pastes of high humidity content and high viscosity.

Another object is to provide a fountain pen in

which the writing ball shall be supported only along two contact circles whereby the gap between the ball and its supporting contact circles is reduced to a minimum and results in the production of only a thin coating of writing paste during the writing operation.

A further object is to provide a fountain pen in which means are provided for the insertion and removal of a paste reservoir or cartridge separately obtainable and designed to be readily inserted into the fountain pen hollow barrel when the previous one has become exhausted and has been removed from the barrel.

A still further object is to provide novel means for expelling under proper pressure the writing paste from the cartridge or container to the ball point in order to give maximum efficiency and the best results in the writing operation.

Another object is to provide a leaf spring in the ball enclosure for urging the ball with proper pressure into contact with the curled forward edge of the ball enclosing walls or cup.

A still further object is to provide means for the quick and easy removal and replacement of the ink cartridge or container.

Other objects, advantages and capabilities inherently possessed by my invention will later more fully appear.

My invention further resides in the combination, construction and arrangement of parts illustrated in the accompanying drawings, and while I have shown therein preferred embodiments I wish it understood that the same are susceptible of modification and change without departing from the spirit of my invention.

This application is a continuation-in-part of my application Serial No. 247,969, filed December 27, 1938.

In the drawings:

Fig. 1 is a longitudinal section taken on a median plane of one form of my invention.

Fig. 2 is a transverse section of the cartridge or container for the writing paste.

Fig. 3 is a view similar to Fig. 1 but showing a modification of my invention.

Fig. 4 is a view similar to Fig. 1 but showing a still further modification of my invention.

Fig. 5 is a fragmentary longitudinal section taken on a median plane through the writing ball and its seating or support.

Fig. 6 is a view similar to Fig. 1 but showing another form of my invention, and

Fig. 7 is a view similar to Fig. 5 but showing a different form of support for the writing ball.

Referring first to the form of my invention shown in Fig. 1, my novel fountain pen comprises a hollow barrel 1, one end of which has screwed into it a feeder in the form of a hollow body portion 2 containing a tube 3 tightly fitting therein and having a longitudinal central bore 4. The end of the feeder remote from the barrel 1 has screwed into it a writing head 5, the free end of which carries the rotatable writing ball 8 supported to rotate about any axis in an enlarged cavity 38 (Fig. 5), which in the assembled pen is in communication, except for such interruption as occurs from the presence of the ball, with the bore 4 of tube 3 by a relatively narrow passage 6 extending longitudinally centrally of the writing head and terminating just below the cavity 38 in a still narrower longitudinal bore 6'. The free edges of the wall or walls defining the enlarged cavity 38 are spun or crimped over to provide an annular retaining and contact edge 37, between which and the circular opening 36 of the outlet 6' the ball 8 is rotatably held so that said ball is in contact with its support only along the two circles defined by said spun-over wall and said opening 36 as seen in Fig. 5.

In the embodiment shown in Fig. 7, I have provided more or less narrow leaf spring 65 of less width than the diameter of the opening 36, so that said leaf spring extends across said opening and extends at both ends over the two shoulders 66, which shoulders in effect form the inner end of the cavity 38. By this construction the ball is constantly spring-urged into contact with the upper circular seating edge 37. This spring 65 provides an intimate contact between the ball and the seating edge 37 while the pen is at rest, but permits the ball to move slightly away from the said seating edge during the act of writing to allow passage of the proper amount of paste on the ball surface as the ball rotates during the writing operation. This construction of the ball support may be adopted in any of the other embodiments shown and described in this specification if desired.

Referring again to Fig. 1, the main portion of the interior of the barrel has removably positioned therein a tubular casing or cartridge 9 which forms a container for the writing paste, said casing being preferably made of metal so that it will readily withstand handling and transportation and also prevent evaporation of the moisture content of the ink paste. The rear end of the casing 9 is spun or crimped over to form a shoulder or stop 50 against which a piston 12 contacts when in its lowermost position in the container 9. Piston 12 is located within the casing 9 and has a longitudinally threaded opening adapted to be threaded onto corresponding threads on screw 14 disposed longitudinally within said casing. To prevent rotation of the piston 12 with relation to the container 9 upon rotation of the screw 14, grooves (not shown) are provided at diametrically opposite points therein adapted to engage ribs 13, 13' (Fig. 2) formed longitudinally on the inside of said container 9.

The forward end of the casing 9 is partially closed by an end wall 10 having an internally threaded opening 51 formed therein adapted to have screwed thereinto an externally threaded connecting member 11 former upon the rear end of tube 3. When the ink container is not in use in the fountain pen, the opening 51 is adapted to receive a threaded stopper (not shown), cork

or other closure means for closing the container or cartridge while being stored.

The forward end 22 of the screw 14 is supported by a resilient bridge member 22' which, as shown, throughout the greater part of its length is spaced away from the inner end of bore 4 in order to keep the rear end of opening 51 (when the container is not in use in the pen), and the rear end of bore 4 of tube 3 (when assembled to the casing) clear so as to ensure free passage through bore 4 for the writing paste. As stated, the bridge member 22 is made of resilient material to permit it to move forwardly under pressure of rod 14, 22, and to return to its original shape when the pressure of said rod thereagainst is relieved.

Screw 14 at its rear end projects beyond the cartridge or container 9 and is formed of square or other non-circular cross-section at 15, or splined to enable it to be coupled in driven engagement with a driving member 16 rotatably mounted in a bearing 52 threaded into the rear end of the barrel 1 and projecting therebeyond to receive a screw cap or end closure 18. This construction enables the end portion 15 of screw 14 to have longitudinal movement when desired but at the same time rotate with the driving member 16. Near the forward end of the driving member 16 is provided an annular flange 53 which abuts against the corresponding end of the bearing 52 to prevent withdrawal of the driving member rearwardly of the pen. Said driving member 16 projects rearwardly beyond the bearing 52, and has secured to it in a circumferential groove a knurled or roughened sleeve 17 adapted to serve as a gripping and driving surface. The sleeve 17 abuts against the rear end of the bearing 52 and prevents forward movement of the driving member 16 while permitting rotation thereof. The rear extremity 54 of driving member 16 is spun over to retain the sleeve 17 in position.

The driving member 16 is formed with an interior bore 19 to receive a plunger 20 which is urged toward the forward end of the member 16 by having coil spring 21 located in bore 19, the forward end of said bore being partially closed by an annular ring 55 which acts as a stop to limit the forward movement of the plunger 20 inside the bore, and also to act as a coupling member to receive the squared or non-circular cross-section end 15 of the screw 14.

The function of the spring 21 is to exert pressure on the writing paste, said pressure being transmitted thereto through the screw 14 and piston 12 against the yielding reaction of the bridge member 22'. The positioning rearwardly of the screw 14 of the spring pressing means 21 enables the use of a short spring with a consequent saving of space, which is utilized to increase the capacity of the paste cartridge or container 9.

The thread on the screw 14 terminates some distance rearwardly of its forward end to provide for disengagement of the piston 12 from said screw 14 when the piston reaches the unthreaded portion of screw 14, as it does approximately at the time when the supply of paste in the container 9 is exhausted. By this arrangement the user of the pen is enabled to tell when the paste in the container 9 is empty and the piston 12 consequently at its forward end of travel, as it will then be disengaged from screw threads 14, and continued rotation of the driving member 16 will give no sensation of pressure as

it would when the piston is forcing paste out of the container.

With the parts in the position shown in Fig. 1, with the container 9 full of paste, the spring 21 exerts pressure on the paste as explained above to force the paste along the bore 4 of the feeder member into the passage 6 and along the constricted bore 6' into the enlarged hollow or ball cavity 38.

Very little paste penetrates into the ball chamber or cavity 38 until the ball has been rotated in the act of writing, and the double circular contact of the ball with its two supports is sufficient combined with the selected strength of spring 21 to prevent the paste from being forced too rapidly past the ball. It is to be understood that in the illustrated position of parts in Fig. 1, the spring 21 is at least partially compressed causing yielding of the resilient bridge member 22'. As the paste is used spring 21 distends maintaining pressure until a quantity of paste has been used such as to relieve the compressive action of spring 21 on the bridge member 22' owing to completion of the distention of the spring 21. Under these conditions the supply of paste to the ball 8 will diminish, thus indicating that the parts must be adjusted. Adjustment is effected by rotation of the driving member 16 to cause forward movement of the piston 12, thereby restoring the pressure conditions referred to. When the contents of container or cartridge 9 have been exhausted and the piston 12 has been disengaged from screw 14 at the forward end of said screw, the empty container 9 may be removed from the barrel 1 and a fresh full container inserted by unscrewing feed member 2 from the barrel and withdrawing it together with the container 9 to which it is removably secured. Upon removal of the empty container 9 and the feeder member 2 the latter may be then unscrewed from the container, or vice versa, and a full fresh container screwed onto the externally threaded connecting member 11, it being understood that the sealing plug will have first been removed from the opening 51 of the container. The new container is then inserted into the barrel and the feeder member screwed thereinto to lock the container in position. Should it happen that during the unscrewing of the feeder member from the barrel it becomes unscrewed from the empty container, the latter may readily be shaken or otherwise pulled out of the hollow barrel.

The embodiment shown in Fig. 1 involves discarding the screw 14 and piston 12 together with the empty casing 9, as the operator of the fountain pen would not be readily able to insert the screw 14 into a new full container. This is, of course, undesirable as it tends to increase the cost of the refills. This difficulty, however, can be readily overcome while still keeping within the scope of the present invention by adopting the modified construction shown in Fig. 3 in which the feeding screw 23 is integral with a solid driving member 24 and has threaded onto it a nut 25 adapted to be guided for longitudinal but non-rotative movement with relation to the barrel by means of the ribs 26 and 26' fixed at suitably spaced intervals and adapted to be longitudinally slidably received in corresponding notches in the nut 25. Said screw 23 is connected by means of a coupling member 27 to a hollow stem 28, the rearward end of which lies within said coupling member 27 and has a flange 56 whereby it is loosely secured thereto, said flange 56 being urged

into contact with an inturred rib 57 of the coupling member 27 by a coil spring 29 located within the coupling member and positioned around the nut 25 against one end of which one end of the spring 29 compressively contacts.

The piston 12^a of the form shown in Fig. 3 is part of the casing assembly and is adapted to be propelled forwardly of the pen by said hollow stem 28, which is itself caused to advance by rotation of the driving member 24 which causes the nut 25 and its associated parts, including the stem 28, to travel along the screw 23. In the drawings, the parts of the embodiment of Fig. 3 are shown when the piston has reached the forward end of its travel, that is to say, when the charge of ink paste in the container 9 has become exhausted and it is necessary to insert a refill. It will be noticed that all that is discarded with the container 9^a is the piston 12^a, which can be made of comparatively cheap material.

The form shown in Fig. 4 is a modification of that shown in Fig. 3 and is intended to permit of the use of a longer container than Fig. 3, it being observed that to save the feeding screw of Fig. 1 the casing in Fig. 3 had to be reduced considerably in length, thus reducing the useful life of a charge.

In the form shown in Fig. 4, instead of the solid driving member 24 of Fig. 3, a hollow internally threaded elongated driving sleeve 30 is provided which is in threaded engagement with an internally and externally threaded sleeve 31 rigidly connected to a cup-like member 32 guided to move longitudinally of the barrel 1. The sleeve 31 has screwed into it a threaded portion 58 of a stem 33, the forward end of which has mounted on it for free rotational movement a pusher head 34 adapted to engage the rear end of the piston 12^b, which piston forms part of the container assembly as in Fig. 3. Between the pusher head 34 and the cup-like member 32 is interposed a coil spring 35 to provide for compression of the writing paste to force the same through bore 4 as in the preceding embodiments.

When the casing 9^b is full and has been assembled in the barrel of the pen, the whole of sleeve 31 must lie within the threaded bore of the driving sleeve 30. When in this position with the stem 33 fully screwed into the sleeve 31, the cup-like member 32 will enclose the forward end of the driving member 30 and thus permit of a longer casing or container 9^b within the barrel 1 than the casing 9^a of Fig. 3.

Fig. 6 shows a simplified form of construction of my invention in which the feeding screw has been omitted, and which simplified form of Fig. 6 has the advantage that the writing paste is continuously under feeding pressure so that no screwing forward of the piston advancing parts by hand is required. In this example, the piston 61 of the casing or container 9^c is a relatively thick disc of paraffin-wax-impregnated leather, the cost of which is negligible, so that the discarding of the piston together with the empty container is a matter of no practical consequence. The piston 61 is continuously under the pressure of the feeding spring 60, one end of which is in contact with the forward end of a bearing and coupling member 52^c which connects the rear end cap 18^c to the barrel 1.

The other end of spring 60 contacts the rear face of an annular ring 62 fixed on the end of a plunger rod 59, which slidably and rotatably passes through an opening in the bearing and

coupling member 52^o, and the rearward end of which has secured to it, as by a cotter or pin 63, a knob 64 to facilitate retraction of the rod 59 and ring 62 when inserting a refill in the barrel. Access to the knob or handle 64 is gained by unscrewing the end cap 18^o. In this modification it has been found advisable to substitute an outlet 6'' of somewhat larger diameter than the passage 6 for the constricted opening 6' of the other embodiments, owing to the fact that as the piston 61 approaches the forward end of the casing or container 9^o by reason of the using up of the paste the thrust of the spring 60 weakens and the presence of the larger outlet 6'' assists in maintaining the flow.

It will be noted that in all of the embodiments of my invention and particularly those of Figs. 3, 4 and 6, the piston is left inside the casing when the latter is discarded upon becoming empty. As previously stated, the cost of the piston is negligible but apart from this it is distinctly advantageous to have the piston associated with the casing or refill rather than separable therefrom, as otherwise a user in fitting the piston to a new casing might cause air to be entrapped between the piston and the paste, which entrapped air under the pressure of the feeding devices and because of the pasty nature of the writing material would permeate the paste and form small bubbles therein, giving rise to interruptions in the flow. Furthermore, the supplying to the user of a refill in the form of a clean metal casing, with the piston properly positioned and assembled by the manufacturer, not only ensures the user against the above mentioned trouble but enables him to recharge the pen without any messy handling of a used piston and without risk of accidentally ejecting paste on the piston end of the casing.

It will be obvious to those skilled in the art that there are various modifications in the construction of my novel pen, and although I have hereinabove described certain preferred embodiments, I wish it understood that the same are susceptible of modification and change without departing from the spirit of my invention.

Having now described my invention, I claim:

1. In a fountain pen of the type adapted to be charged with writing material of a pasty consistency, a hollow barrel, a closure removably supported on said barrel at the forward end thereof, said closure having a bore extending longitudinally therethrough and communicating with the interior of the barrel, the forward portion of said closure having a transversely extending supporting face on all sides of the forward end of said bore, said closure having a hollow nose portion extending forwardly from said supporting face, a ball on said supporting face in line with said bore, the forward edge of the hollow nose portion being curled over to provide a circular edge of smaller diameter than the ball, the said parts being so constructed and arranged that the ball is rotatably held between said curled edge and supporting face to permit a thin film of ink to be carried by the ball from within to outside the curled edge for writing purposes, said nose portion being formed with an ink receiving cavity laterally around the ball from the supporting face to the curled edge, a removable container for pasty ink in said barrel, a piston in the container, and a piston rod for said piston and removable from the container while the container is being removed from the barrel.

2. A fountain pen according to claim 1, in

which is provided a spring continuously pressing against the piston for continuously supplying writing paste to the ball.

3. In a fountain pen of the type adapted to be charged with writing paste, a hollow barrel, a closure removably supported on said barrel at the forward end thereof, said closure having a bore extending longitudinally therethrough, the forward portion of said closure having an enlarged cavity, the side walls forming the cavity having an open forward end and inwardly bent forward edges, said bore extending from the interior of the barrel to the cavity, a spring strip extending across the floor of the cavity and across the end of the bore, the length of the strip being greater than the diameter of the bore and the width of the strip being substantially less than said bore diameter, and a ball rotatably mounted between said strip and said inwardly bent edges of the cavity.

4. A fountain pen according to claim 3 in which the diameter of the ball is such that the ball will be normally urged by the strip against said bent edges.

5. In a fountain pen of the type adapted to be charged with writing paste, a hollow barrel, a feeder element detachably secured to the forward end of the barrel, said feeder element having a longitudinal bore therethrough, a ball rotatably mounted in the tip of the feeder element and seated in a cavity, said bore being in communication with the interior of the barrel and the cavity, a container adapted to contain writing paste and removably mounted in the barrel, a piston in the container in contact with the rear end of the writing paste, a piston rod in loose and removable contact with the rear face of the piston, a shoulder in the rear end of the barrel, a coil spring surrounding the piston rod and held in compression between said shoulder and the piston, the piston remaining in the container when the container is removed from the barrel, and the piston rod and coil spring remaining in the barrel upon removal of the container.

6. A fountain pen according to claim 5, in which the container is removably attached to the feeder element and removable therewith from the barrel.

7. A fountain pen of the type adapted to be charged with a writing material of a pasty consistency, comprising a hollow barrel having a forward end and a rear end, an internal screw thread in each of said ends, a feeder adapted to be screwed into said forward end and having a duct coaxial with said barrel and an externally threaded connecting member projecting rearwardly of said feeder, a writing ball support secured to the forward end of the feeder the end of said support remote from the feeder being free and having formed therein an enlarged hollow having a bottom and a surrounding side wall, a circular opening in said bottom, a passage in said support coaxial with said duct and said barrel, and establishing communication between said duct and said enlarged hollow through said circular opening, a ball adapted to convey writing paste to the surface to be written on, said ball being located in said enlarged hollow and said side wall being returned to provide a circular contact edge contacting the forward side of said ball, a separable paste containing casing located within said barrel and having a forward end with a threaded perforation adapted to have screwed thereinto said connecting member, said casing having a rear end with an inwardly ex-

tending lip, a resilient bridging member located within the forward end of the casing, a rod extending from said bridging member lengthwise through said casing and having a rear end projecting beyond the rear end of the casing, said rear end of said rod being non-circular in cross-section, a screw thread cut on said rod and extending from said non-circular rear end to a point short of the bridging member, a piston mounted in screwed engagement on the threaded portion of the rod and located at the rear end of said casing in abutment against said lip, guiding means provided lengthwise internally of said casing for guiding said piston and preventing rotation thereof, a bearing secured in the rear end of the barrel, a driving member rotatably mounted in said bearing, said driving member having a non-circular opening therein adapted to receive the non-circular end of said rod to establish driving connection therewith, a blind bore extending lengthwise of said driving member and of greater diameter than said non-circular opening, a plunger within said blind bore and displaceable lengthwise thereof and a spring located in said blind bore between the blind end thereof and the plunger, whereby in the assembled condition of the parts the paste contained in the casing is subjected to pressure to urge it towards said ball and said plunger may be manually moved forward by rotation of said driving means to take up room left by the using up of said paste and upon exhaustion of the charge in said casing said piston becomes disengaged from the thread on the rod to indicate the necessity for renewal of the charge.

8. A fountain pen according to claim 7 in which said ball is seated on said circular opening whereby it is held between only two contact edges.

9. A fountain pen according to claim 7 in which a leaf spring is provided in said enlarged hollow, said leaf spring extending across said circular opening and being of width less than the diameter thereof and arranged to urge said ball against said circular contact edge.

10. A fountain pen of the type adapted to be charged with writing material of a pasty consistency, comprising a hollow barrel having a forward end and a rearward end, an internal screw thread in each of said ends, a feeder adapted to be screwed into said forward end and having a duct coaxial with said barrel and an externally threaded connection member projecting rearwardly of said feeder, a support secured to the forward end of the feeder, the end of the support remote from the feeder being free and having formed therein an enlarged hollow having a bottom and a surrounding side wall, a circular opening in said bottom, a passage in said support coaxial with said opening, said duct and the barrel and establishing communication between said duct and said enlarged hollow, a ball adapted to convey writing paste to the surface to be written on, said ball being located in said enlarged hollow and said side wall being inturned to provide a circular contacting edge in contact with the part of the ball remote from the barrel, a separable paste containing casing located within said barrel and having a forward end with a threaded perforation adapted to have screwed therewithin said connecting member, said casing having a rear end with an inturned lip, a piston located within said casing against said lip and displaceable lengthwise of said casing, and driving means for said piston including a bearing mounted within the rear end of the barrel, a

screwed stem having an integral non-threaded rear end rotatably journaled in said bearing, a nut threaded on the screwed portion of said stem, a hollow cup-like member secured to said nut and having a perforation adapted to allow the stem to pass therethrough as the nut is caused to travel therealong, a hollow push member extending through said perforation and adapted to permit said stem to extend therethrough, said hollow push member having an outwardly flanged rear end whereby it is loosely connected to said cup-like member and a spring within said cup-like member seated between said nut and said outward flange, said hollow push member being adapted to engage the rear face of the piston in the assembled condition of the parts and to transmit thereto the pressure of the spring and the forward movement of said nut on rotation of the non-threaded portion of the stem, thereby to force the paste charge of the casing towards the ball, and whereby on exhaustion of the charge said casing may be removed from said barrel independently of the stem and driving means and a fresh casing and piston inserted to recharge the pen.

11. A fountain pen according to claim 10, in which said ball is seated on said circular opening while in contact with said circular edge, whereby it is held between only two circular contact edges.

12. A fountain pen according to claim 10, in which a leaf spring is located in said enlarged hollow across said circular opening, said spring being of width less than the diameter of the circular opening and having said ball in contact therewith whereby said ball is spring urged towards said circular contact edge.

13. A fountain pen of the type adapted to be charged with a pastry writing material, comprising a hollow barrel having an internally threaded forward end and a rearward end, feeder means adapted to be screwed into said forward end and having a duct coaxial with the barrel and an externally threaded connection member projecting rearwardly of said feeder, a support secured to the forward end of the feeder, the end of the support remote from the feeder being free and having formed therein an enlarged hollow having a bottom and a side wall, a circular opening in said bottom, a passage in said support coaxial with said duct and said opening and establishing communication between said duct and said enlarged hollow, a ball adapted to convey pasty writing material to the surface to be written on, said ball being located in said enlarged hollow, and said side wall being inturned to provide a circular contacting edge in contact with the ball on the side thereof remote from the barrel, a separable paste containing casing located within said barrel and having a forward end with a threaded perforation adapted to have screwed therewithin said connection member, said casing having a rear end with an inturned lip, a piston in said casing in abutment against said lip when the casing is full of paste and adapted to be displaced lengthwise of the casing, to force out paste through said perforation, said duct, said passage and said opening into said enlarged hollow and into expending contact with said ball, driving means mounted in said barrel and independent of said casing for driving said piston forward, said driving means comprising a bearing in the rear end of the barrel, a hollow internally threaded tubular member rotatably

mounted in said bearing and projecting forwardly and rearwardly therebeyond, an internally and externally threaded hollow sleeve in screwed engagement with said tubular member, a push member having a threaded rear portion 5 screwed into said sleeve and a forward portion having secured thereto a head adapted to engage said piston in the assembled condition of the pen, a cup-like member rigidly mounted on the forward end of the sleeve, said cup-like member having its opening directed rearwardly 10 to embrace the forward projection of the tubular member on retraction of said threaded sleeve, and a spring extending between said cup-like member and said head whereby pressure is transmitted to the paste and upon exhaustion of the charge in the casing the casing may be removed for replacement independently of the driving means.

14. A fountain pen according to claim 13, in 20 which said ball is seated on said circular opening while in contact with said circular contacting edge, whereby it is held between only two circular edges.

15. A fountain pen according to claim 13, in 25 which a leaf spring is provided in said circular hollow, said leaf spring extending across said circular opening and being of width less than the diameter thereof, and said ball being in contact with said spring whereby it is resiliently urged into intimate contact with said circular 30 contacting edge.

16. A fountain pen of the type adapted to be charged with a pasty writing material, comprising a hollow barrel having an internally 35 threaded forward end and a rear end, feeder means adapted to be screwed into said forward end and having a duct coaxial with the barrel, and an externally threaded connection member projecting rearwardly from said feeder, a support 40 secured to the forward end of the feeder the end of the support remote from the feeder being free and having formed therein an enlarged hollow having a bottom and a surrounding side wall, a circular opening in said bottom, a passage in said support coaxial with said barrel and said opening, and establishing communication between said duct and said enlarged hollow, a ball adapted to convey pasty 45 writing material to the surface to be written on, said ball being located in said enlarged hollow, said side wall being intumed to provide a circular contact edge contacting said ball on the side thereof remote from said opening, a separable

paste containing casing located in said barrel and having a forward end with a threaded perforation therein adapted to have screwed thereinto said connection member, and a rear end 5 with an intumed lip, a piston located in said casing in abutment against said lip when said casing is full of paste and adapted to be displaced lengthwise of said casing to force paste through said perforation, said duct, said passage and said opening into expending contact with 10 said ball, driving means mounted in said barrel for driving the piston forward, said driving means comprising a bearing mounted in the rear end of the barrel, a rod extending through said bearing in slidable and rotatable relation therewith, said rod having a head on its forward 15 end adapted to engage said piston and a knob on its rearward end adapted to facilitate retraction of said rod, and a spring extending between the forward end of said bearing and said head and adapted to urge said head forward whereby to apply a continuous expending pressure to the paste within the casing while 20 permitting ready removal of the casing and the piston upon exhaustion of the charge independently of said driving means.

17. A fountain pen according to claim 16, in 25 which said ball is seated on said circular opening while in contact with said circular contacting edge, whereby it is held between only two circular edges.

18. A fountain pen according to claim 16, in 30 which a leaf spring is provided in said enlarged hollow, said leaf spring extending across said circular opening and being of width less than the diameter of said opening, and said ball being in contact with said spring whereby it is normally urged into intimate contact with said circular 35 contacting edge.

19. In a fountain pen of the type adapted for use with writing paste, a hollow barrel, a closure 40 removably supported on said barrel at the forward end thereof, said closure having rotatably mounted in its forward end a ball, a container 45 mounted in said hollow barrel and adapted to contain writing paste, means for feeding writing paste from the container to the ball, and means for removably mounting the container in the barrel so that when the writing ink in the container is exhausted the container may be removed 50 from the barrel and a fresh container inserted thereinto.

LASZLO JOZSEF BIRO.