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WRITING INSTRUMENT

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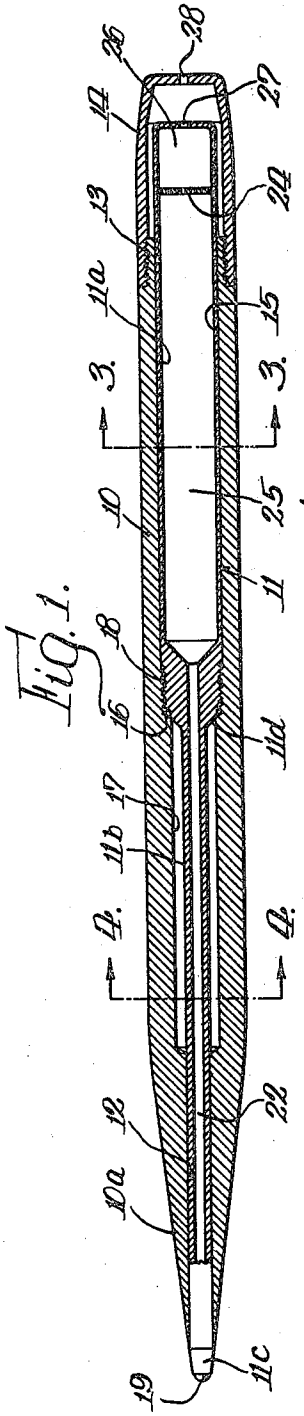

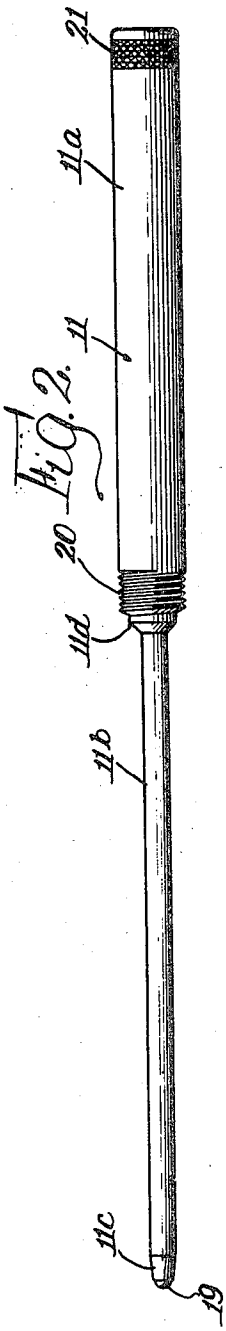

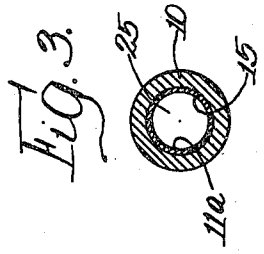

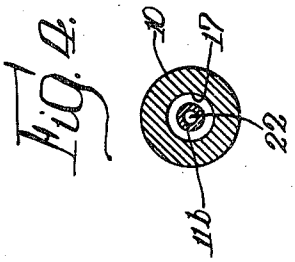

INVENTOR.
Ivan D. Tefft,
BY Fidler & Crouse
ATTORNEYS.

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WRITING INSTRUMENT

Ivan D. Tefft, Janesville, Wis., assignor to The Parker Pen Company, Janesville, Wis., a corporation of Wisconsin

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11 Claims. (Cl. 120—42.4)

1

My invention relates to writing instruments and it has to do particularly with devices of that character having a writing point in the form of a ball fed with a pasty or viscous ink from a cartridge-type reservoir.

One of the objects of my invention is to provide an improved device of the foregoing character which is simple in construction, easy and inexpensive to manufacture, durable and efficient in operation.

Another object is to provide an improved point-and-cartridge unit for a ball-point type of pen which may be easily and quickly applied to and removed from a supporting barrel or casing by the user.

Still another object is to provide an improved ball point writing instrument of the foregoing character wherein the ball point is replaced each time a refill cartridge is inserted so that an efficient writing point will always be available notwithstanding wear existant in the use of devices of the foregoing character.

A more specific object is to provide a point-and-cartridge unit formed of a single piece of rigid material and including a reservoir portion terminating at its forward end in a reduced tubular extension constituting a feed portion having a socket at its forward end for supporting a ball writing point, the arrangement being such that the unit is adapted to be inserted in a supporting barrel or casing with the rear end of the reservoir portion projecting from the rear end of the barrel and the ball point projecting from the forward end thereof where it may engage the writing surface.

An additional object is to provide a point-and-cartridge unit of the foregoing character which may be easily and quickly applied to a barrel or casing by merely screwing the reservoir portion thereof into the casing to a predetermined extent at a point remote from the ball point, the threaded connection between the reservoir portion and the barrel constituting the sole means for removably securing the cartridge to the casing.

Other objects and advantages will become apparent from the following description taken in conjunction with the accompanying drawing in which—

Figure 1 is an enlarged longitudinal sectional

2

view showing one form of device embodying my invention;

Fig. 2 is a side elevational view of the point-and-cartridge unit shown in Fig. 1;

Fig. 3 is a section taken on line 3—3 of Fig. 1; and

Fig. 4 is a section taken on line 4—4 of Fig. 1.

The structure shown in the drawing takes the form of a barrel 10 containing a point-and-cartridge unit 11. The barrel 10 is formed preferably of plastic material but may, if desired, be of any desired and suitable material. Its exterior is so shaped as to provide a tapered forward end 10*a* in which there is provided an elongated axial bore 12 for guidingly and supportingly receiving the forward part of the ball point supporting section of the unit 11. The rear end of the barrel is privided with a reduced threaded extension 13 for reception of a closure cap 14. The rear portion of the barrel is provided with an enlarged cartridge chamber portion 15, the forward end of which terminates in a shoulder 16 formed by a reduced forward chamber portion 17. The forward end of the enlarged chamber portion 15 is threaded at 18 for detachable connection with the unit 11.

According to my invention the cartridge unit 11 is preferably formed of a single piece to provide a reservoir section 11*a*, feed section 11*b* and ball-supporting or socket section 11*c* carrying a ball writing point 19. The unit sections 11*a*, 11*b* and 11*c* are preferably formed of metal so as to provide a rigid and durable unit which may be threaded for securement in the barrel and formed for receiving and retaining the ball point 19. The entire unit is preferably of cylindrical form with the reservoir section 11*a* of sufficient diameter to fit snugly within the cartridge chamber portion of the barrel 10. This section is provided with threads 20 which are adapted to engage the barrel threads 18 for securing and holding the unit 11 in place. Also, this reservoir section is of such length as to project slightly beyond the rear end of the barrel where it is knurled, as at 21, to facilitate screwing it in and out of the barrel.

The forward end of the reservoir section is formed to the shape of a tapering seat 11*d* adapted to engage the barrel shoulder 16, the tapering seat portion terminating in the reduced

tubular feed extension 11b, the opening through which is comparatively small, providing a feed passage 22 adapted for the feed of a pasty or viscous ink. The unit feed section 11b is preferably of uniform diameter throughout, it being of such size that its forward end snugly fits within the bore 12 at the forward end of the barrel. Furthermore, the unit section 11b is of such length that when the reservoir section 11a is screwed home from within the barrel, its forward end projects slightly from the end of the barrel so that the ball point 19 carried thereby will be exposed for engagement with the writing surface at a writing angle permitted by the tapered forward end of the barrel 10.

The manner of mounting the ball point 19 does not form part of this invention. Briefly, however, the ball point 19 takes the form of a substantially true sphere retained in the socket portion 11c in the projecting end of the unit section 11b in such a way that its surface is exposed for contact with the writing surface. The ball point 19 is retained in a freely rotatable condition, its relation to its supporting bearing surfaces being such that the ink passing through the feed passage 22 is constantly in contact with it and, while rotation of the ball feeds ink to the writing surface, leakage of the ink is prevented during periods of non-use.

In operation, as the ball point rotates along the writing surface, ink is fed from the reservoir section 11a through the feed passage 22 to the ball point. Unless otherwise provided for, the feed of ink from the reservoir section 11a would result in the formation of a partial vacuum within such section which would prevent further feed of ink from the reservoir. To provide against this and to insure a constant and uniform feed, the reservoir section 11a is provided at its rear end with a perforated partition member 24 dividing such section into an ink chamber 25 and an air chamber 26, the latter being vented through a small opening 27 of capillary size. The perforations of the partition member 24 are very small and are of such size that they will readily permit the flow of air therethrough but will normally prevent the passage of a pasty or viscous ink. The closure cap 14 is also provided in its rear end wall with a small opening 28 preferably of capillary size so that the ink reservoir 25 is vented to atmosphere by way of the air chamber 26 and vent openings 27 and 28.

I believe that the construction and operation of my invention will be well understood from the foregoing description. The ink reservoir 25 is of a size sufficient to contain ink enough to meet one's writing needs over a period of several months. When the reservoir is exhausted of ink, all the user need do is remove the end cap 14, unscrew the cartridge unit 11 from the barrel and replace it with a new and filled unit which is again enclosed and concealed by the end closure cap 14.

It is well known that the writing point 19, through its contact with the writing surface and its bearing surfaces, tends to wear quite rapidly, destroying the necessary sphericity thereof and in turn impairing the writing action. Usually, by the time the ink supply is exhausted from the cartridge portion 11a, the ball point 19 requires replacement and, according to my invention, a new ball point is supplied each time a new cartridge is inserted so that the ball point will at all times be maintained in an efficient writing condition, insuring substantially constant and uniform writing action.

Another advantage of the unitary structure as a whole is that no manipulations of any kind respecting the disposition and feed of ink are required by the user when a new cartridge is substituted. The manufacturer of the unit may completely fill it with the desired pasty or viscous ink in such a way that the unit is entirely free from voids, air pockets or other conditions which would tend to prevent uniform ink feed. With this arrangement the device is ready for instant writing when a new cartridge is applied.

It will be appreciated from the foregoing that all of the above advantages are attained by the use of a very simple and durable unit which may be easily and quickly applied by the user and which will afford maximum writing efficiency.

I claim:

1. A ball-point type of fountain pen comprising a barrel having a cartridge-receiving chamber in its rear end and a reduced axial bore in its forward end, and a point-and-cartridge unit comprising a reservoir section adapted to fit snugly in said cartridge chamber, an elongated feed section of reduced form having a feed passage therein and snugly fitted and frictionally guided in said bore, said feed section having its forward end formed to provide a ball-receiving socket, a ball-point member mounted in said socket, and means between said reservoir section and said barrel for detachably securing said unit within said barrel.

2. A ball-point type of fountain pen comprising a barrel having a cartridge-receiving chamber in its rear end and a reduced axial bore in its forward end, and a point-and-cartridge unit of greater length than said barrel and adapted to be applied to and removed from said barrel as a unit, said point-and-cartridge unit comprising a reservoir section adapted to fit snugly in said cartridge chamber with its rear end projecting from the rear end of said barrel where it may readily be grasped, a feed section of reduced form having a feed passage therein and snugly fitted and guided in said bore with its forward end projecting slightly beyond the forward end of said barrel, said feed section having its projecting end formed to provide a ball-receiving socket, a ball-point member mounted in said socket with part of its surface exposed, and means between said reservoir section and said barrel for detachably securing said unit at a predetermined position within said barrel with said sections projecting therefrom as above set forth.

3. A ball-point pen comprising a barrel having a cartridge-receiving chamber in its rear end portion terminating forwardly in a shoulder, another chamber forwardly of and open to said cartridge chamber and connecting at its forward end with a reduced bore in the forward end of said barrel, and a point-and-cartridge unit comprising a reservoir section in said cartridge chamber with its forward end abutted against said shoulder to position the unit therein, a reduced feed section extending from said reservoir section and extending through said other chamber with a feed passage therethrough, said feed section having its forward end frictionally mounted in said bore and projecting therethrough beyond the forward end of said barrel, a ball-point member mounted in the projecting end of said feed section, and means for detachably securing said unit within said barrel.

4. A ball-point pen comprising a barrel having

a cartridge-receiving chamber in its rear end portion terminating forwardly in a shoulder, another chamber forwardly of and open to said cartride chamber and connecting at its forward end with a reduced bore in the forward end of said barrel, and a point-and-cartridge unit adapted to be applied to and removed from said barrel as a unit, said point-and-cartridge unit comprising a reservoir section threadedly engaged in said cartridge-receiving chamber with its forward end abutted with said shoulder to position the unit therein and with its rearward end projecting rearwardly a slight distance beyond the rear end of the barrel, a reduced feed section extending integrally from said reservoir section through said other chamber with a feed passage therethrough and its forward end snugly mounted in said bore and projecting therethrough beyond the forward end of said barrel to a predetermined extent as determined by said shoulder, and a ball point member mounted in the projecting end of said feed section.

5. A ball-point pen comprising a barrel having a cartridge-receiving chamber in its rear end portion terminating forwardly in a shoulder, another chamber forwardly of and open to said cartridge chamber and connecting at its forward end with a reduced bore in the forward end of said barrel, and a point-and-cartridge unit comprising a reservoir section in said cartridge-receiving chamber with its forward end abutted with said shoulder to position the unit therein and with its rearward end projecting from the rear end of the barrel a slight distance, a reduced feed section extending from said reservoir section with a feed passage therethrough and having its forward end snugly mounted in said bore and projecting therethrough beyond the forward end of said barrel, a ball point member mounted in the projecting end of said feed section, means between said reservoir section and barrel for detachably securing said unit in the latter, and a cap detachably mounted on the rear end of said barrel concealing said unit.

6. A ball-point pen comprising a barrel open at its opposite ends, a cartridge unit mounted in said barrel and including a straight tubular reservoir section snugly fitting in the rear end of said barrel, and an integral feed section extending forwardly in alignment with said reservoir section and with its forward end projecting slightly through the front end of said barrel, said feed section having a feed passage extending therethrough and connecting with said reservoir section and terminating in a ball-point socket, a ball point mounted in said socket with part of its surface exposed for writing, means between said reservoir section and barrel for detachably securing the former immovably within the latter with said ball point socket projecting a predetermined extent, and a cap detachably carried by the rear end of said barrel for enclosing and concealing said reservoir unit.

7. A ball-point pen comprising a barrel and a cartridge unit adapted to be inserted and removed through an end of said barrel and including a one-piece casing having a straight tubular reservoir section at one end, a ball-point socket at the other end and a feed section in alignment with said reservoir section and having a small longitudinal feed passage intermediate and connecting said reservoir section and socket, means between said reservoir section and barrel for detachably securing said unit immoveably in the latter, and a ball point mounted in said socket.

8. A ball-point pen comprising a barrel, a cartridge unit adapted to be inserted and removed through the rear end of said barrel and including a one-piece casing having a straight tubular reservoir section at one end, a ball-point socket at the other end and projecting from the forward end of said barrel, and a feed section in alignment with said reservoir section and having a small longitudinal feed passage intermediate and connecting said reservoir section and socket, means between said reservoir section and barrel for detachably securing said unit immovably in the latter with the rear end of said reservoir section projecting from the rear end of said barrel and a ball point mounted in said socket, and a removable cap member mounted on the rear end of said barrel and enclosing and concealing the projecting end of said unit.

9. A ball-point pen comprising a barrel having a longitudinally extending chamber therein, a unitary cartridge removably disposed in said barrel and including a substantially straight tubular section defining an ink reservoir vented at its rear end, a feed section projecting from and in alignment with said reservoir section and through the forward end of said barrel and defining an ink feed channel of substantially smaller diameter than said reservoir leading therefrom, a ball-writing element connected at the free end of said feed section in ink feeding relation with said feed channel, cooperating means on said barrel and on said cartridge intermediate the ends thereof for detachably connecting said cartridge in said barrel, and means for closing the rear end of said barrel to enclose said cartridge.

10. A ball-point pen comprising a barrel having a longitudinally extending chamber therein formed with a forward portion of reduced diameter, a substantially straight tubular unitary cartridge removably disposed in said barrel and including a section defining an ink reservoir vented at its rear end, a feed section of smaller diameter than and in alignment with said reservoir section projecting therefrom and through the forward end of said barrel and defining an ink feed channel of substantially smaller diameter than said reservoir leading therefrom, and a ball-writing element mounted at the free end of said feed section in ink feeding relation with said feed channel, said feed section being extended through said reduced forward chamber portion and snugly fitted in at least a portion thereof, means on said barrel and on said cartridge adjacent the juncture of said reservoir section and said feed section for seating and detachably connecting said cartridge in said barrel, and means for closing the rear end of said barrel to enclose said cartridge.

11. A ball-point pen comprising a barrel having a longitudinally extending chamber therein, a unitary cartridge removably disposed in said barrel and including a substantially straight tubular section defining an ink reservoir therein vented at its rear end, a feed section of smaller diameter than and in alignment with said reservoir section projecting therefrom and through the forward end of said barrel and defining an ink channel of substantially smaller diameter than said reservoir, and a ball-writing element at the free end of said feed section in ink feeding relation with said feed channel, cooperating shoulders on said barrel and said cartridge adjacent the junction of said reservoir section for seating said cartridge in said barrel and said feed section, means in said barrel and on said cartridge adjacent said cooperating shoulders for de-

tachably connecting said cartridge in said barrel and means for closing the rear end of said barrel.

IVAN D. TEFFT.

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