

Pen

Pens come in a variety of types, shapes and sizes and range in cost from as little as a few cents to several hundred dollars. The present invention relates to an inexpensive pen.

- 5 Relatively low cost ball-point pens can be found in both the retractable type, in which the writing tip extends from and retracts into a barrel, for example, by pressing in a push button at the head end of the barrel or by rotating one portion of the barrel relative to another portion, and the fixed type, some of which have removable caps, in which the writing tip is permanently affixed to the barrel. Generally, the retractable types are somewhat more costly to produce and, therefore, more expensive than the fixed types.
- 10 The retractable types are generally preferable from the point of view of being transportable in a pocket or purse, inasmuch as the writing tip can be retracted and will not, therefore, deface the pocket, purse or objects in them. The detachable caps of fixed type
- 15 ball-point pens tend to get lost. Moreover, the barrel of a pen with a detachable cap can easily become detached from the cap when the pen is carried in a pocket or purse, in which case a shirt can be ruined or items in a purse or pocket defaced.
- 20 Ball-point pens, and for that matter all writing instruments, are not particularly convenient to carry, but most people like to carry a pen anyway. When clipped to a shirt pocket or coat pocket, a pen can poke or press against the wearer from time to time.
- 25 Some pockets are not deep enough to fully accept the pen. There is often not enough room in small compartments of purses or in small change purses to receive the conventional ball-point pen.
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There is provided, in accordance with the present invention, a pen that is, in a sense, of the retractable type, in that the writing tip is exposed in one configuration and covered and protected in another configuration. In another sense, it is not a retractable type, inasmuch as there is no retraction mechanism for moving the writing tip into and out of the barrel, the writing tip being affixed to the barrel. The invention further provides a pen that is flexible when in the configuration in which the writing tip is covered and protected but is rigid when the tip is uncovered for use. The flexibility of the pen in the configuration when the tip is covered and protected allows the pen to bend when placed in a pocket or a purse so that it can fit conveniently into small pockets and purses and so that it can yield and thereby be more comfortable when carried on the person.

In particular the invention is a pen comprising an elongated one-piece barrel having substantially rigid tip end and head end portions joined to each other by an intermediate integral flexible portion, whereby the barrel can be bent at the flexible portion, and a writing tip at the distal end of the tip end portion. A substantially rigid tubular cap member is telescopically received over the tip end portion of the barrel in a manner such that it can be moved along the barrel between (1) a retracted position in which it overlies part of the tip end portion and substantially all of the flexible portion, thus rendering the pen substantially rigid, and (2) an extended position in which it covers the writing tip and leaves the flexible portion exposed, thus protecting the writing tip and rendering the pen flexible. The cap and barrel have interengaging coupling elements that releasably retain the cap member in each of the retracted and extended positions.

The invention may include the following additional characteristics, separately or in combination:

- 1) The cap member has a length such that it covers a major part of the barrel when in the retracted position, the pen being thereby adapted to be held for use by gripping the cap member;
- 2) An external circumferential surface of the tip end portion of the barrel closely adjacent the writing tip engages a matching internal surface of the cap member in the retracted position of the cap member, whereby the tip end portion is firmly supported within the cap member when the pen is in use;
- 3) The cap member is retained in the respective extended and retracted positions by longitudinally spaced-apart grooves in either the tip end portion of the barrel or in the cap member that receive a rib or boss on the other of the barrel or the cap member;
- 4) The end of the cap member nearer to the head end portion of the barrel telescopically receives a part of the head end portion in the retracted position;
- 5) The head end portion of the barrel includes a pocket clip. In one form the pocket clip is integral with the barrel and is joined to the head end portion by an integral flexible hinge strip spaced apart from both ends of the clip, whereby the hinge strip constitutes a fulcrum. The distal end of the head end portion of the barrel receives a resilient insert having a portion engaging the pocket clip and resiliently urging the clip to pivot about the fulcrum, the insert being yieldable to enable the clip to pivot about the fulcrum to an open position; and
- 6) The flexible portion of the barrel comprises at least one bendable strip extending longitudinally between and joined to the tip end and head end portions and a multiplicity of longitudinally spaced-apart ribs extending transversely from the

strip at least in each direction of bending of the strip, the adjacent pairs of ribs being engageable upon bending of the strip and limiting the amount of bending of each segment of the strip between adjacent ribs.

The main advantages of a pen embodying the present invention are the ability to be bent, which facilitates carrying the pen on the person or in small purses, and the capability of covering the tip when the pen is transported by a cap that is non-detachable and cannot, therefore, get lost. In a preferred embodiment having an integral pocket clip, the pocket clip can be opened up manually like a clothespin, which limits the wear of a shirt or coat pocket that occurs with conventional pocket clips.

For a better understanding of the invention, reference may be made to the following description of exemplary embodiments, taken in conjunction with the figures of the accompanying drawings.

Fig. 1 is a front elevational view of the barrel component of a first embodiment;

Fig. 2 is a side elevational view of the barrel component of Fig. 1, a portion being broken away in cross section;

Fig. 3 is an axial cross-sectional view of the cap member of the first embodiment, a portion being shown in elevation;

Figs. 4A and 4B are a side elevational view and a top plan view, respectively, of an insert that closes the head end of the barrel of the first embodiment;

Fig. 5 is a side cross-sectional view of the first embodiment as assembled and shows the cap member in the retracted position and the pocket clip opened up;

Fig. 6 is a side elevational view of the first embodiment as assembled, the cap member being shown

in cross section and in the extended position, and illustrates how the barrel bends;

Fig. 7 is a front elevational view of the barrel component of a second embodiment;

5 Fig. 8 is a side elevational view of the barrel component of Fig. 7, a portion being broken away in cross section;

Fig. 9 is an axial cross-sectional view of the cap member of the second embodiment, portions being
10 shown in elevation;

Fig. 10 is a top plan view of the second embodiment;

Fig. 11 is a cross-sectional view of the second embodiment taken along the lines 11-11 of Fig. 8;

15 Fig. 12 is a front elevational view of the second embodiment as assembled and shows the cap member in the retracted position; and

Fig. 13 is a front elevational view of the second embodiment as assembled, the cap member being shown in
20 cross section and in the extended position, and illustrates how the barrel bends.

The barrel 10 of the first embodiment (see Figs. 1 and 2) is an elongated one-piece member made of a suitable plastic, such as a substantially rigid nylon,
25 by injection molding. It comprises three main sections, a rigid tip end portion 12, a rigid head end portion 14, and an intermediate integral flexible portion 16 joining the tip end and head end portions. The tip end portion 12 is rotationally symmetrical
30 about its longitudinal axis and includes at its distal end a tapered external surface 18 that generally matches the taper of a writing tip 19 of a ball-point pen cartridge affixed in the barrel. An internal hole 20 extends (see Fig. 5) co-axially with the axis of
35 the barrel the entire length of the tip end portion 12, the hole having an enlarged portion at the distal

end defining a shoulder 22 against which the shank of the writing tip 19 bears. The hole 20 accepts the tubular ink reservoir 19a of the ball-point cartridge, which may be of any suitable construction but preferably has a flexible plastic casing that extends nearly the entire length of the barrel. A short, rigid ink reservoir that does not extend into the flexible portion 14 of the barrel is also suitable.

The tip end portion 12 has a pair of longitudinally spaced-apart, circumferentially extending grooves 24 and 26. A shoulder 24a defining the wall of the groove 24 nearer the distal end of the tip end portion 12 is of a slightly greater height than the other wall, for a reason that is described below. Over a major part of the space between the grooves 24 and 26, the outer surface of the tip end portion 12 has a diameter that is slightly less than the diameters at the respective junctures with the grooves.

The flexible portion 16 comprises a multiplicity of circular ribs 28, each of which has a central hole 30 of the same diameter as the hole 20 and, therefore, is able to receive the flexible ink reservoir of the writing tip cartridge. The adjacent ribs are joined to each other, and the endmost ribs are joined to the respective portions 12 and 14, by diametrically-opposite connecting portions 32, the connecting portions being aligned in two rows in the longitudinal direction and being located adjacent the perimeter. The connecting portions 32 define relatively thin lengthwise strips or bands joining the tip end and head end portions. These thin bands can bend back and forth in a direction that is transverse to the two rows, i.e., in the plane of the paper with respect to Fig. 2 and perpendicular to the plane of the paper with respect to Fig. 1. The ribs 28, in addition to serving an aesthetic purpose in that they provide visual mass to what would otherwise be a thin ribbon or ribbons joining two end portions, restrict and

control the flexure of the flexible portion by engaging under extreme flexure; each pair of ribs limits the amount of bending that can occur in the connecting portion between them. The rings also join
5 the two strips to each other transversely and stiffen them so they do not bend in the direction of the joiner.

The head end portion 14 is tubular (to minimize the use of material), and has a circular cylindrical
10 external surface. A pocket clip 34 is formed integrally with the body and is joined to the body by a hinge strip 36 that defines a fulcrum about which the clip 34 can pivot. The hollow distal end 38 of the
15 head end portion 14 receives a resiliently deformable insert 40 (see Figs. 4A and 4B), that is accepted by and occupies a region 42 inwardly of the head end of the pocket clip. A series of shallow grooves 44 in
20 the head end of the pocket clip 34 facilitate gripping the head end so that the user can squeeze the clip to an open position (see Fig. 5) to open up the tip end so the pen can be stuck into and clipped to a pocket. The resilient insert 40 urges the pocket clip to the closed position (see Fig. 6).

The cap member 46 (see Fig. 3) is rotationally
25 symmetrical about a lengthwise central axis. It is tubular and telescopically receives the tip end portion 12 and the flexible portion 16 of the barrel in either of two positions, each of the positions being established and maintained against a selected level of
30 axial force by reception of an internal rib 48 in one or the other of the grooves 24 and 26 on the tip end portion of the barrel. When the rib 48 is seated in the groove 24, the cap 46 is extended and covers and protects the writing tip of the pen (see Fig. 6).
35 When the rib 48 is received in the groove 26, the cap member overlies the major part of the tip end portion 12 and all of the resilient portion 16 of the barrel. In this retracted position (see Fig. 5), the writing

tip of the pen is uncovered, an internal surface 50 on the tip end of the cap member engages part of the tapered surface 18 of the tip end portion of the barrel, thereby firmly to support the cap member on the barrel, and the head end portion of the cap member telescopically receives a portion 52 on the head end portion 14 of the barrel. In the retracted position the cap, therefore, engages the portion 52, a part of the barrel adjacent the groove 26 and a portion of the tapered distal end 18 of the barrel, thereby rendering the pen substantially rigid (see Fig. 5).

In being moved between the extended and retracted positions, the cap member moves freely over most of the extent of movement by reason of a sliding or clearance fit between the rib 48 on the cap member and the reduced diameter part of the tip end portion of the barrel. In the extended position of the cap member (see Fig. 6), the rib 48 bears against the shoulder 24a which, because of its larger outer diameter (see Figs. 1 and 2) keeps the cap member from being removed entirely from the barrel. In the extended position, moreover, the cap member no longer covers the flexible portion 16, so the pen can bend along the flexible portion in the manner described above and shown in Fig. 6. The pen can be bent considerably more than the amount shown in Fig. 6; it can, indeed, be bent double such that the cap member touches the head end portion 14 of the barrel.

The second embodiment, shown in Figs. 7 to 13, is identical in most respects to the first embodiment (Figs. 1 to 6), and the above description is largely applicable to the second embodiment. The corresponding components of the second embodiment are assigned reference numerals exactly 100 higher than those of the first embodiment. (For example, the tip end portion of the barrel of the second embodiment is 112, 100 higher than the tip end portion 12 of the first embodiment.) The components of the second

embodiment corresponding to those of the first embodiment need not, therefore, be described. The differences between the embodiments are as follows:

5 The elements that lock the cap member in the respective extended and retracted positions comprise a pair of narrow, shallow grooves 160 in the tip end portion 112 of the barrel, the two grooves being of identical shape and being positioned on diametrically-opposite sides of the barrel. A major portion
10 160a of each groove extends longitudinally (e.g., parallel to the axis) of the barrel. At each end of such longitudinal portion 160a is an oblique portion 160b, and at the end of each groove 160 is a locking portion 160c, 160d.

15 The cap member 146 has a pair of internal bosses 170 that are received in the respective grooves 160 on the tip end portion of the barrel. When the bosses 170 are positioned in the locking portions 160c, the cap 146 is in the extended position and covers and
20 protects the writing tip of the pen (see Fig. 13). When the bosses 170 are received in the locking portions 160d of the grooves, the cap member overlies the major part of the tip end portion 112 and all of the flexible portion 116 of the barrel. In this retracted
25 position (see Fig. 12), the writing tip of the pen is uncovered, an internal surface 146a on the tip end of the cap member is in close clearance with the proximal part 118a of the tapered surface 118 of the tip end portion of the barrel, and an internal surface 146b of
30 the cap is likewise in close clearance with a surface 112a on the barrel. The head end portion 146c of the cap member telescopically receives a reduced diameter portion 152 on the head end portion 114 of the barrel. In the retracted position, therefore, the cap surfaces
35 146a, 146b and 146c support the tip end portion 112 and flexible portion 116 of the barrel 110, relative to the head end portion 114 and make the pen substantially rigid. The user grips the pen in the usual

manner with the thumb and fingers engaging the cap member. The locked position of the cap member sustains the writing pressure applied by the user.

To move the cap member between the extended and retracted positions, the user merely rotates the cap member in a direction to dislodge the bosses 170 on the cap member 146 from the locking portions 160c or 160d. The locking portions of the grooves are in interference fit with the bosses 170 so that a small amount of rotational force is required to move the bosses out of the locking portions. The remaining parts of the grooves are in clearance fit with the bosses, so that the cap member can easily first rotate and simultaneously move a short distance longitudinally as the bosses move through the oblique portions 160b of each groove and then slide longitudinally as the bosses move along the portions 160a. When the bosses 170 reach the oblique portions at the other end of the grooves, further longitudinal movement of the cap member also induces rotation of the cap member relative to the barrel, which signals to the user the direction of rotation required to lock the cap member in the new position. A user can quickly learn how to manipulate the cap and will thereafter use the pen properly as a matter of habit. The change from one locked position to the other can easily be made with one hand.

Relatively little force is required to maintain the locked position against rotation, but the bosses and grooves can be designed to provide a comparatively high force resisting longitudinal movement from the respective locked positions of the cap member.

A pocket clip 162 bent out of a thin metal band is retained in the head end portion by a cup-like end member 164 received and suitably secured, such as by a bonding agent, in the end of the head portion 114 and by reception of an L-shaped retaining flange 166 in a slot 168 in the top of the barrel. Instead of the

metal pocket clip 162, the pocket clip 34 of the first embodiment can be used in the second embodiment.

The above-described embodiments of the invention are intended to be merely exemplary, and numerous
5 variations and modifications will be apparent to those of ordinary skill in the art. For example, the means by which the cap member is retained in the extended and retracted positions can be modified, such as by having bosses or ribs on the barrel and grooves on the
10 inner surface of the cap. The length of the cap member can be such that it is only sufficiently longer than the flexible portion of the barrel to provide a substantially rigid coupling with the tip end portion and the head end portion so that the pen is substan-
15 tially rigid when the cap member is in the retracted position for use. The writing tip is not necessarily limited to ball-point cartridges, although the type of writing tip used in the pen should be chosen with due attention to the shelf life for a particular type of
20 packaging (hermetically sealed packages can make shelf life largely immaterial) and the useful life of the writing tip, inasmuch as the cap member of the pen does not fully enclose the writing tip. In the circumstances ball-point cartridges are preferred over
25 the so-called felt-tip cartridges, which dry out when uncovered.

Thus, there is provided in accordance with the invention a pen that is inexpensive to manufacture and convenient to carry and use. The cap is securely
30 retained on the barrel and is not removed when the pen is used, so it cannot be lost. The cap covers the tip when the pen is stored or transported, and the pen is flexible and, therefore, can be bent to fit more readily into pockets and small purses.



Claims

1. A pen having an elongated one-piece barrel having substantially rigid tip end and head end portions, a writing tip affixed at the distal end of the tip end portion, and a substantially rigid tubular cap member telescopically received over the tip end portion of the barrel characterized in that the barrel includes an integral flexible portion intermediate the tip end and head end portions, whereby the barrel can be bent at the flexible portion, in that the cap is movable along the barrel between (1) a retracted position in which it overlies part of the tip end portion and substantially all of the flexible portion, thus leaving the writing tip exposed and rendering the pen substantially rigid, and (2) an extended position in which it covers the writing tip and leaves the flexible portion exposed, thus protecting the writing tip and rendering the pen flexible, and in that the cap and the tip end portion of the barrel include means for releasably retaining the cap member in each of the retracted and extended positions.
2. A pen according to claim 1 and further characterized in that the cap member has a length such that it covers a major part of the barrel when in the retracted position, the pen being thereby adapted to be held for use by gripping the cap member.
3. A pen according to claim 2 and further characterized in that an external circumferential surface of the tip end portion of the barrel closely adjacent the writing tip engages a matching internal surface of the cap member in the retracted position of the cap member, whereby the



tip end portion is firmly supported within the cap member when the pen is in use.

4. A pen according to claim 1 and further characterized in that the retaining means includes at least one groove in either the outer surface of the tip end portion of the barrel or the inside surface of the cap member and a boss on the other of the cap member and barrel received in the groove, the groove being coextensive with the distance between the extended and retracted positions of the cap member and including locking portions at each end offset circumferentially from adjacent end portions of the groove, whereby the cap member is locked in said respective portions in the absence of rotation relative to the barrel.
5. A pen according to claim 4 and further characterized in that a major portion of the groove intermediate the locking portions extends substantially longitudinally of the pen, whereby the cap member is movable substantially longitudinally of the barrel over a major part of the distance between the extended and retracted positions.
6. A pen according to claim 4 and further characterized in that the end portions of the groove adjacent the locking portions are oriented obliquely to the longitudinal portion, whereby the direction of rotation of the cap member relative to the barrel into the corresponding locking portion is established before the respective extended and retracted positions are reached upon movement of the cap member from one such position to the other.
7. A pen according to claim 1 and further characterized in that the retaining means includes



longitudinally spaced-apart external circumferential grooves in the tip end portion of the barrel and an internal circumferential rib on the cap member receivable in the respective grooves.

- 5 8. A pen according to claim 7 and further characterized in that the groove in the barrel that is nearer the writing tip is bounded on its side nearer the writing tip by a retaining shoulder that engages the rib on the cap member, whereby
10 detachment of the cap member from the barrel is impeded.
9. A pen according to claim 7 and further characterized in that a substantial part of the external
15 surface of the tip end portion of the barrel between the grooves makes a sliding or clearance fit with the rib on the cap member, whereby the cap member slides easily between the extended and retracted positions.
- 20 10. A pen according to claim 1 and further characterized in that the end of the cap member that is nearer to the head end portion of the barrel telescopically receives a part of the head end portion in the retracted position, thereby to restrict bending of the head end portion relative
25 to the flexible portion.
11. A pen according to claim 1 and further characterized in that the head end portion of the barrel includes an integral pocket clip.
- 30 12. A pen according to claim 11 and further characterized in that the pocket clip is joined to the head end portion by an integral flexible hinge strip spaced apart from both ends of the clip, whereby the hinge strip constitutes a fulcrum, and



in that the distal end of the head end portion of the barrel receives a resilient insert having a portion engaging the pocket clip and resiliently urging the clip to pivot about the fulcrum to a closed position, the insert being yieldable to enable the clip to pivot about the fulcrum to an open position.

13. A pen according to claim 1 and further characterized in that the flexible portion of the barrel comprises at least one bendable strip extending longitudinally between and joined to the tip end and head end portions and a multiplicity of longitudinally spaced-apart ribs extending transversely from the strip at least in each direction of bending of the strip, the adjacent pairs of ribs being engageable upon bending of the strip and limiting the amount of bending of each segment of the strip between adjacent ribs.
 14. A pen according to claim 13 and further characterized in that there are two bendable strips located opposite each other adjacent the outer transverse extremity of the barrel and wherein the ribs are segments of rings that join the two strips transversely.
 15. A pen constructed substantially as herein described with reference to and as illustrated in Figs. 1 to 6 or Figs. 7 to 13 of the accompanying drawings.
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