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P. KOLLSMAN

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CARTRIDGE FOR MULTICOLOR BALL POINT PENS

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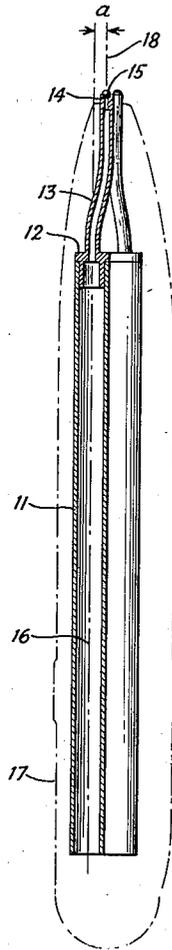


Fig. 1

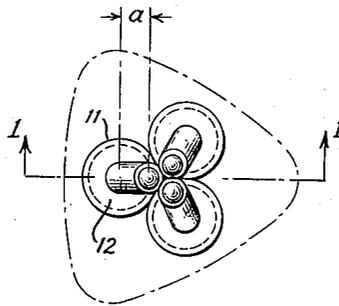


Fig. 2

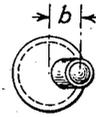


Fig. 4

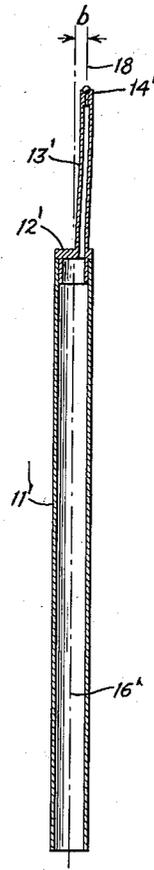


Fig. 3

INVENTOR.

Paul Kollman
BY

Howard S. Russell
his ATTORNEY.

UNITED STATES PATENT OFFICE

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CARTRIDGE FOR MULTICOLOR BALL POINT PENS

Paul Kollsman, New York, N. Y.

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6 Claims. (Cl. 120—42.12)

1

This invention relates to improvements in cartridges for ball point pens.

The invention provides a cartridge which is particularly suited for use in ball point pens having a plurality of writing points at one end of the barrel. The improved cartridge permits of compact construction of the pen leading to an assembly of points at the tip of the pen barrel which does not obscure the writing, thus overcoming a defect found in most multi-color writing implements in which the writing points are fixed rather than individually projectable and retractable. While the improved cartridge is advantageous if used in writing implements of the retractable point type, it has particular application to those implements in which the writing points are fixed, thus doing away with a more or less complicated projecting and retracting mechanism and result in a pen which has a larger ink capacity due to the fact that practically the entire length of the pen barrel may be occupied by a long cartridge whereas retractable construction requires a relatively short cartridge which can be entirely withdrawn in the interior of the pen barrel to make room for another one which is to be used at the time.

The various objects, features and advantages of this invention will appear more fully from the detailed description which follows accompanied by drawings, showing for the purpose of illustration preferred embodiments of the invention. The invention also consists in certain new and original features of construction and combination of elements hereinafter set forth and claimed.

Although the characteristic features of the invention which are believed to be novel will be particularly pointed out in the claims appended hereto, the invention itself, its objects and advantages, and the manner in which it may be carried out may be better understood by referring to the following description taken in connection with the accompanying drawings forming a part of it in which:

Figure 1 is a sectional side view of a cluster of three cartridges embodying the invention; the section being taken on line 1—1 of Figure 2;

Figure 2 is a front view of the cluster of cartridges shown in Figure 1;

Figure 3 is a sectional side view of the modified form of cartridge; and

Figure 4 is a front view of the cartridge shown in Figure 3.

In the following description and in the claims various details will be identified by specific names for convenience. The names, however, are in-

2

tended to be as generic in their application as the art will permit. Corresponding reference characters respond to corresponding parts in the several figures of the drawings.

In the drawings accompanying, and forming part of, this specification, certain specific disclosure of the invention is made for the purpose of explanation of broader aspects of the invention, but it is understood that the details may be modified in various respects without departure from the broad principles of the invention, and that the invention may be applied to other structures than the ones shown.

Each of the cartridges shown in Figures 1 and 2 comprises a hollow substantially cylindrical shell 11 adapted to contain ink. The forward end of the shell 11 is closed by an end wall 12 fluid tightly attached to the shell. A duct 13 preferably integral with the end wall 12 extends from the center of the end wall and terminates in a ball socket 14 within which a ball 15 is mounted with freedom to rotate. The socket 14 is offset with respect to the central axis 16 of the shell. The offset a is preferably made sufficiently large to bring a portion of the circumference of the socket 14 at least, or beyond, the imaginary extension of the cylindrical shell 11. A portion of the ball 15 is exposed, the exposed portion lying substantially at right angles to the axis 16 of the shell.

The cartridge is particularly suited for assembly with several other cartridges in the form of a cluster within a pen barrel 17 indicated in dash dot lines at 17. Such a cluster may comprise three cartridges, containing ink of three different colors, as shown in the drawings. Referring particularly to Figure 2 it is evident that the offset a of the ball sockets with respect to the axis of the respective cylindrical shell permits the sockets to lie in wall-to-wall contact with each other, if a number of cylindrical shells are assembled as a cluster in wall-to-wall contact. Thus a compact assembly is formed within which the wall sockets are about a central axis 18 of the cluster, the axis 18 also being the axis of the pen barrel 17. In the illustrated assembly a change of color may be made simply by rotation of the pen barrel in the hand of the writer.

The compact arrangement of the ball sockets results in a construction in which the cluster of sockets is only slightly larger than the individual socket in a one color pen. This is a feature resulting in great convenience in writing since it permits a plurality of writing points to be fixedly mounted without the accompanying disadvantage

3

of obscuring part or all of the writing as it is the case, for example, in a multi-color fountain pen having fixed nibs. Also the compactness of the assembly makes it necessary to provide for a projecting and retracting mechanism for the cartridges within the pen barrel resulting in greater simplicity, lower production cost and greater convenience in writing since no manipulation of the retracting mechanism is required to obtain a change in color.

In the form of cartridge shown in Figure 1 the duct 13 extends from the center of the end wall 12. It is of course possible to provide for an eccentric arrangement as shown in Figures 3 and 4 in which the end wall 12' is combined with a duct 13' as an eccentric assembly. In the form of cartridge shown in Figure 3 the bend in the duct 13' is naturally less for an offset *b* of the socket 14' with respect to the axis 16 of the shell equal to the offset *a* in Figure 1. In fact, a duct 13' may be made perfectly straight if its lower edge is extended in line with the lower edge of the shell 11'. An additional offset can easily be provided for by forcing the cartridge into an appropriately shaped barrel in which both the cylindrical shell portion as well as the ball socket 14' are constrained in suitable seats.

It is quite apparent that cartridges embodying the invention lend themselves admirably to use in multi-color pens in which the individual ball points are projectable and retractable. Nevertheless, one of the main features in the present invention is the construction of a cartridge such that a compact convenient pen construction is achieved with fixedly mounted cartridges which, by reason of the elimination of the projecting and retracting mechanism, is a particularly advantageous form of writing implement.

What is claimed is:

1. A cartridge for cluster assembly in multiple, particularly in multi-color ball point pens, comprising a substantially cylindrical shell adapted to contain ink, a duct of smaller diameter than said shell extending from one end of said shell; a ball socket and ball at the end of said duct, the ball being of smaller diameter than said duct, the exposed portion of the ball lying substantially at right angles with respect to the axis of the shell, the axis of the socket being substantially parallel with, but spaced from, the axis of the shell, the spacing being sufficiently large to bring a portion of the circumference of the socket beyond the imaginary extension of the wall of the shell.

2. A cartridge for cluster assembly in multiple, particularly in multi-color ball point pens, comprising a substantially cylindrical shell, adapted to contain ink, a duct of smaller diameter than said shell extending from one end of the said shell; a ball socket and ball at the end of said duct, the ball being of smaller diameter than said duct, the exposed portion of the ball lying substantially at right angles with respect to the axis of the shell, the axis of the socket being offset with respect to the axis of the shell, the degree of offset being sufficiently large to result in a socket-to-socket contact of a cluster of three cartridges assembled in wall-to-wall contact of the shells of the cartridges.

3. A cartridge for cluster assembly in multiple, particularly in multi-color ball point pens, comprising a substantially cylindrical shell adapted

4

to contain ink; a separate end wall fluid tightly assembled with said shell; a duct eccentrically extending from said end wall, the end of the duct forming a ball socket; and a ball mounted in said socket with freedom to rotate therein, the exposed portion of the ball lying substantially at right angles to the axis of the shell, the ball socket being offset with regard to the axis of the shell by a distance sufficient to bring a portion of the circumference of the socket beyond the imaginary extension of the wall of the shell.

4. A cartridge for cluster assembly in multiple, particularly in multi-color ball point pens, comprising a substantially cylindrical shell; an end assembly fluid tightly connected to one end of said shell, said end assembly consisting of an end wall for said shell and a duct of smaller diameter than, and integral with, said end wall, the end of the duct forming a ball socket open at right angles with respect to the shell axis, the socket being offset with respect to the shell, the degree of offset being sufficiently large to bring a portion of the circumference of the socket at least to the imaginary extension of the cylindrical shell; and a ball mounted in said socket with freedom to rotate therein.

5. A cartridge for cluster assembly in multiple, particularly in multi-color ball point pens, comprising a substantially cylindrical shell; an end assembly fluid tightly connected to one end of said shell, said end assembly consisting of an end wall for said shell and a duct of smaller diameter than said shell extending from the center of said end wall and being integral therewith, the end of the duct forming a ball socket open at right angles with respect to the shell axis, the duct being bent to bring a peripheral portion of the ball socket end of the duct at least to the imaginary extension of the cylindrical shell; and a ball mounted in said socket with freedom to rotate therein.

6. A cartridge for cluster assembly in multiple, particularly in multi-color ball point pens, comprising a substantially cylindrical shell; an end assembly fluid tightly connected to one end of said shell, said end assembly consisting of an end wall of said shell and a duct of smaller diameter than said shell extending from said end wall off-center and being integral with said end wall, the end of the duct forming a ball socket open at right angles with respect to the shell axis, the axis of the ball socket being substantially parallel with, but spaced from, the axis of said shell, the spacing being sufficiently large to bring the peripheral portion of the ball socket end of the duct at least to the imaginary extension of the cylindrical shell; and ball mounted in said socket with freedom to rotate therein.

PAUL KOLLSMAN.

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