Feb. 6, 1962 F. H. SEYER ET AL 3,019,768

CONNECTOR MEANS FOR A TANDEM WRITING UNIT

Filed Jan. 18, 1957 2 Sheets-Sheet 1

FIG. 1.

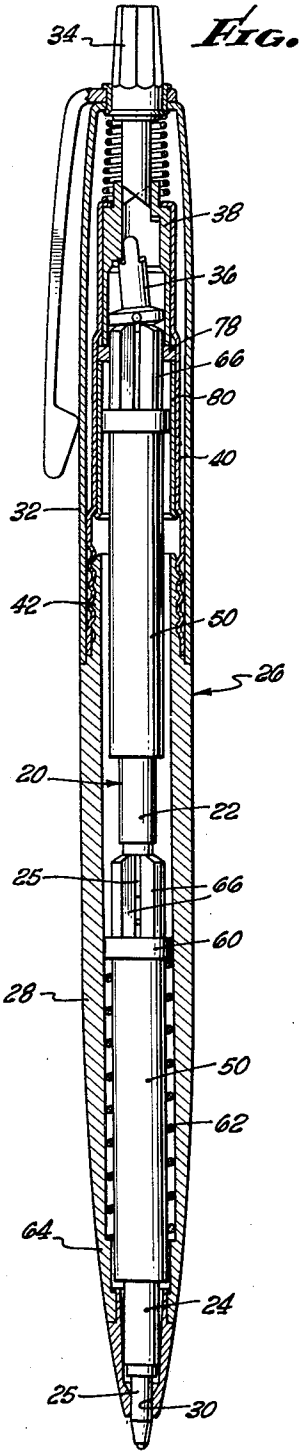


FIG. 2.

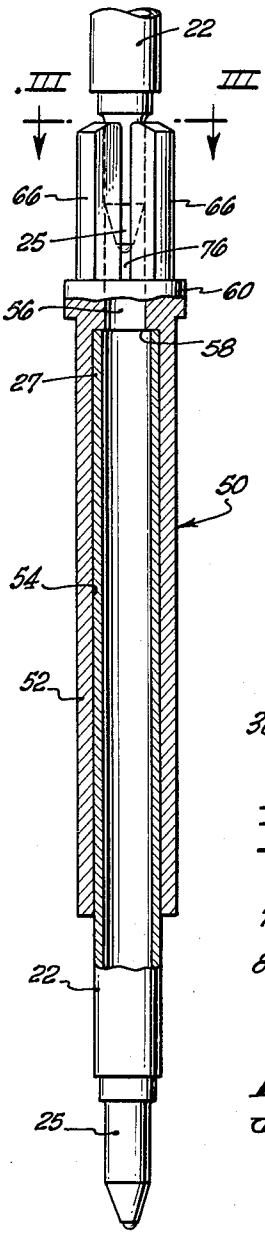


FIG. 3.

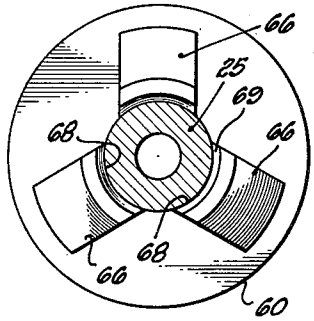
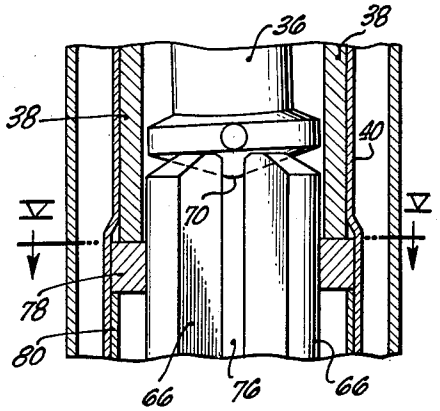


FIG. 4.



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Feb. 6, 1962 F. H. SEYER ET AL 3,019,768

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Filed Jan. 18, 1957 2 Sheets-Sheet 2

FIG. 5.

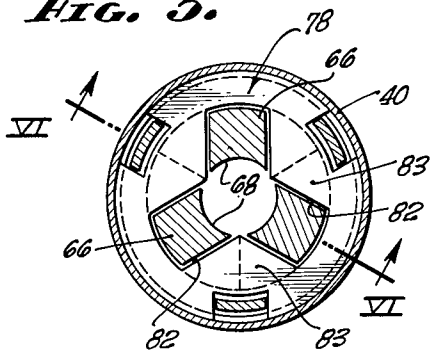


FIG. 6.

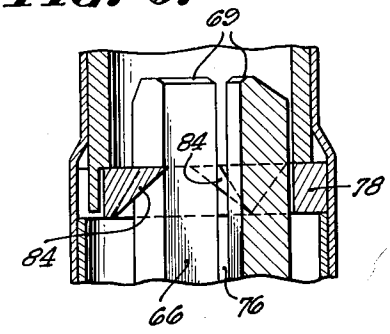


FIG. 8.

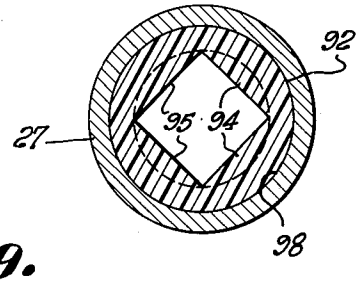


FIG. 9.

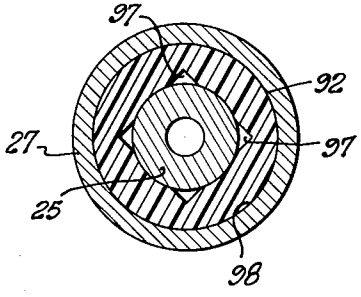
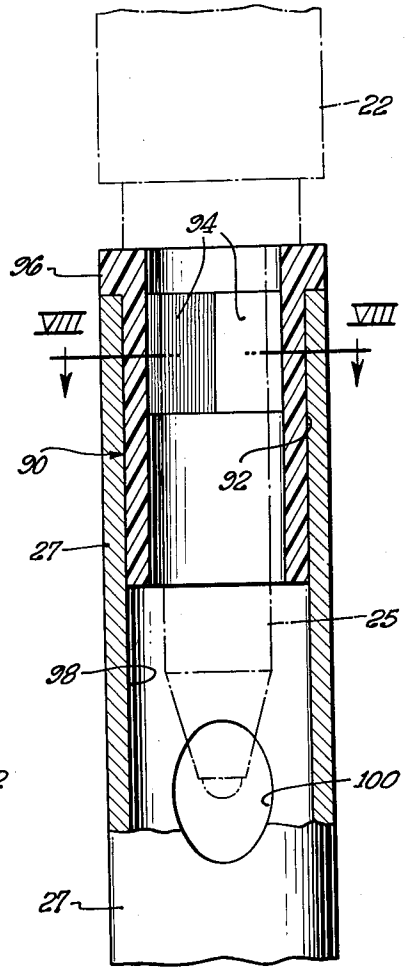


FIG. 7.



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3,019,768

CONNECTOR MEANS FOR A TANDEM WRITING UNIT

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5 Claims. (Cl. 120—42.1)

The present invention relates generally to writing implements. In particular, the present invention relates to writing implements employing tubular ink cartridges provided with a writing tip at one end and an open end at the other, with the cartridge so mounted in the implement that the writing tip is automatically retractable. Even more particularly, the present invention relates to a writing implement employing a plurality of ink cartridges connected in coaxial alignment within the implement in such way that free communication of air to the open ends of the cartridges is provided at all times. The present invention is an improvement over the invention described and claimed in co-pending application Serial No. 538,135, filed October 3, 1955 by Frank H. Seyer, now Patent No. 2,971,494, issued February 14, 1961.

Conventionally, ball point writing instruments comprise a cylindrical barrel open at one end and containing an elongated tubular ink cartridge retractably mounted in the barrel so that the writing tip may be projected into a writing position. In writing with the instrument, the ball is caused to pick up ink from a supply carried in the cartridge and then deposit or lay it down upon the surface over which the ball is rolled. Although ball-pointed writing instruments of this type have been successfully used for many years, their use is not entirely free from difficulty. For example, if the free universal rotation of the ball in the writing tip is prevented for any reason, the pen will not write. This may occur if the ball is struck a sharp blow or dropped or otherwise caused to be jammed into a non-rotative position in its seat in the writing tip. Thereafter, the pen is useless until the writing cartridge is replaced much to the annoyance and inconvenience of the user.

Another difficulty arises because of the prevalent trend to prolong the useful life of such pens, primarily by the development of better inks and improvements in writing tip design. However, the inexpensive materials advantageously employed in the construction of the tips frequently are unable to endure longer periods of wear. Accordingly, the pen may cease to function altogether even though the ink supply in the cartridge is far from exhausted, the expected advantages being unrealized. Moreover, manufacturers of such pens are constantly faced with recurrent demands for instruments of varying length, or which will supply ink of different colors, or which provide writing tips with ball points of varying diameter. In the main, such demands have heretofore been ignored due to the difficulty or impracticability of providing all such advantages in a single writing instrument.

Generally stated, the present invention relates to a tandem writing cartridge for use in a ball point pen comprising a pair of tubular ink cartridges, each provided with a writing tip at one end (of a diameter smaller than the ink cartridge) and connector means by which an opposite open end of the cartridge may be adapted to receive and hold a writing tip in coaxial alignment. The connector means of this invention is constructed as a tubular member of resilient material including a cylindrical surface adapted to frictionally engage a correspondingly surfaced open-end portion of one cartridge and a plurality of spaced-apart resilient gripping elements

adapted to grasp the writing tip of the other. More specifically, the gripping elements are provided with portions extending radially inward of a surface of a revolution defined by said cylindrical surface a distance sufficient to provide a plurality of circumferentially spaced, virtually opposing, longitudinally extending contact surface areas, spaced from one another a diametrical distance slightly less than the diameter of a writing tip. Connection and coaxial alignment of the separate cartridges is accomplished by a writing tip being resiliently grasped and held by the gripping elements of the connector device along said opposed areas of contact.

In one form of the invention, the gripping elements are formed as fingers projecting outwardly from the tubular element and parallel to its axis. However, as will appear, the gripping element may also be formed as cylindrical segments or other similarly shaped projections having portions tangent to a cylinder of smaller diameter than the diameter of a writing tip, such projections being positioned interiorly of said tubular element. In either event, however, the areas of gripping contact are spaced from one another a distance which (although less than the diameter of a writing tip) is sufficiently great to provide air passages between the gripping elements and about the writing tip held therein.

The improved construction of the connector means of the present invention, makes possible a unified tandem writing unit having substantially the same general configuration and dimension as standard writing cartridges, permitting such units to be received for projection and retraction in existing ball-point pen constructions. Moreover, each cartridge is provided with a pair of writing tips which may advantageously be constructed of less expensive materials, as each of the tips will be required to deliver but a portion of the total ink supply. The construction of the writing unit also makes possible the use of inks of varying concentrations, or color, in each of the cartridges, or the use of various size balls in the writing tips.

It is an object of the present invention therefore, to provide means by which a pair of tubular cartridges may be secured or connected in coaxial alignment within a writing implement, such means including a cylindrical surface adapted to frictionally engage an open end of an ink cartridge and a plurality of spaced-apart resilient gripping elements, each having portions disposed inwardly of said cylindrical surface to provide circumferentially spaced contact areas falling on a cylinder of smaller diameter than the diameter of a writing tip.

Another object of this invention is to provide a unitary device for use in a writing implement by which more than one writing tip is always available for use within the implement so that a damaged or imoperative tip does not render the entire device inoperative.

Another object of the invention is to provide a unified tandem writing device by which the wear of a ball-point tip is reduced so that the likelihood that the device will function throughout the life of the ink supply is substantially increased.

Other advantages of the invention will be apparent from the following description and from the drawings in which:

FIG. 1 is a view in section and in elevation of a writing implement employing a tandem writing cartridge in accordance with the invention;

FIG. 2 is an enlarged fragmentary view in section and in elevation of the tandem writing cartridge of FIG. 1, showing details of the connecting means employed therein;

FIG. 3 is a horizontal section along the lines III—III of FIG. 2;

FIG. 4 is an enlarged detail view, illustrating the co-

operative engagement of the writing cartridge with retracting means provided in the writing implement;

FIG. 5 is a horizontal section along the lines V—V of FIG. 4;

FIG. 6 is a vertical section along the lines VI—VI of FIG. 5;

FIG. 7 is a view in section of a modified connector means in accordance with the invention, shown positioned within the upper end of an ink cartridge;

FIG. 8 is a horizontal section along the lines VIII—VIII of FIG. 7; and

FIG. 9 is a like view showing a writing tip resiliently grasped within the connector means.

Referring to a preferred embodiment of the invention illustrated in FIGS. 1 to 6, 20 indicates an improved writing unit of the invention (comprising two cartridges 22 and 24 held together in a coaxially telescoped relation) positioned for retraction and projection in an exemplary writing implement 26. The writing implement 26 consists of a barrel or housing having a lower portion 28 provided with a downwardly directed port 30 adapted to receive the writing tip of the writing instrument 20 and an upper barrel portion 32. Retained in the upper barrel portion is a suitable retracting mechanism which in the illustrated apparatus comprises a plunger 34, a cooperating cam follower 36, a cammed body element 38 adapted to house the cam follower and to guidingly support the plunger, and a sleeve assembly 40 positioning the entire retracting mechanism within the upper barrel portion. As shown, the sleeve assembly may terminate at its lower end in threads 42 adapted to cooperate with the lower barrel portion 28.

The particular retracting mechanism, just described, is of the general type disclosed in copending application Serial No. 555,451, filed December 27, 1955 by James L. Marcotte, now Patent No. 2,941,510, issued June 21, 1960. However other suitable mechanisms might also be used with equal success; for example, the mechanism described in U.S. Patent No. 2,624,314, issued to Walter B. Spatz. Accordingly, the details of the retracting mechanism are not further described.

In accordance with the invention, the two ink cartridges 22 and 24 are held together in a coaxially telescoped relation (with the writing tip 25 of one cartridge positioned adjacent the open end 27 of the other) by means of a unique tubular connecting device 50 provided adjacent the upper end of each of the writing cartridges. As shown (FIG. 2), each connector device 50 is of substantially tubular configuration and includes an elongated cylindrical portion 52 provided with an internal cylindrical surface 54 adapted to frictionally engage an open end of an ink cartridge. An internal shoulder 58 adjacent the surface 54 serves to limit axial movement of an ink cartridge into the connector 50. Preferably an external radially extending flange 60 is also provided on the connecting device so that a spring or resilient means 62 may be trapped between the assembled writing unit 20 and the lower or front end 64 of the barrel body, such spring normally urging the axially connected writing unit into a non-writing position.

Extending away from the flange 60 and parallel to the axis of the connector device are a plurality of spaced-apart gripping elements or fingers 66 each provided with longitudinally extending contact surface areas 68, the shortest distance between points on any two of such contact areas being somewhat less than the diameter of a writing tip 25. As a result, the gripping elements or fingers 66 of one cartridge are adapted to resiliently grasp and hold the writing tip of the other along areas of contact to thereby provide the coaxially assembled writing unit 20. Desirably the upper ends of the fingers 66 are chamfered as at 69 to provide surfaces not only adapted to guiding a writing tip between the finger elements, but also to cooperating with the lower convex surface 70 of the cam follower 36, forming part of the retracting mechanism.

It will be understood that the construction of the connector device 50 just described permits the device to be firmly wedged upon the open end of a tubular ink cartridge with the cylindrical surface 54 firmly and frictionally engaging the upper cylindrical wall 27 of the cartridge. The extending fingers 66 are then in position to receive the writing tip of a second cartridge coaxially above the first. A particularly advantageous construction of the fingers 66, typified in FIG. 5, utilizes a contacting surface 68 that is a portion of a cylindrical surface generally defined by the longitudinally extending contact areas 68 of all of the fingers, such cylindrical surface having a diameter somewhat less than the diameter of a writing tip 25. Consequently, when a writing tip is inserted into the space between the fingers, the fingers are expanded outwardly so as to resiliently and firmly grasp the writing tip and hold it in proper aligned position.

It is a feature of the invention that the connector devices 50 provide uninterrupted air passages in communication with the upper surface of the supply of ink or writing fluid normally contained in the ink cartridges 22 or 24. In the preferred embodiment of FIGS. 1 to 6, these air passages are provided by the spaces 76 lying between each pair of adjacent fingers or gripping elements 66, air passing through such space 76 and through the interior passage 56 of the connector to the ink supply.

Desirably, means are also provided to guide the fingers 66 into proper alignment and contact with the cam follower device 36 of the retracting mechanism. In the illustrated apparatus, this function is provided by the guide disc 78 positioned and retained between the body 38 and inner sleeve portion 80 of the sleeve assembly 40 (FIGS. 1 and 4). Preferably, as shown in FIGS. 5 and 6, the guide disc 78 is provided with a plurality of notched openings 82 aligned with and adapted to permit free passage of the fingers 66. Lower portions of dividers 83 between the notches may be bevelled, as at 84, to ensure proper positioning of the fingers within the notches. The guide disc 78 provides an additional function of strengthening and protecting the fingers 66 throughout the repeated operations of the retracting mechanism. Moreover, the guide disc tends to counteract any spreading of the fingers which may occur while a connecting device is in lowermost position within the writing implement (and holding the writing tip 25), the guide disc tending to return the fingers to an original aligned configuration.

FIGS. 7 to 9 illustrate a modified form of tubular connector 90 in which an outer cylindrical surface 92 is provided, such surface being adapted to frictionally engage interiorly of an open end of a writing cartridge as contrasted to the external engagement characterizing the device 50. In addition, instead of axially extending fingers, the gripping elements of the modified device are formed as a plurality of cylindrical segments 94 extending radially inward of the device, each having longitudinally extending contact areas 95 tangent to a cylinder of smaller diameter than the diameter of a writing tip 25, as is particularly shown in FIG. 8. These inwardly directed cylindrical segments may be of varying axial dimension, but preferably as shown in FIG. 7 have an axial dimension that is somewhat less than that of the connecting means or device 90. Desirably, a radially extending flange 96 is provided on the connector device 90 to limit axial movement of the connector into the open end of an ink cartridge.

In use, the device 90 functions similarly to that of the connector element 50 previously described. When inserted in the upper end 27 of a writing cartridge its cylindrical surface 92 will frictionally and retentively engage a corresponding wall surface 98 of the cartridge; similarly, its gripping elements 94 can resiliently grasp a writing tip 25 along the internal contact areas 95 to hold the separate cartridges in coaxial alignment and to provide air passages 97 about the writing tip and between the gripping elements 94 to a supply of ink contained

within the lowermost cartridge. When in this assembled relation, as shown in FIG. 9, the resilient gripping elements 94 are expanded slightly outwardly by the large diameter of the tip 25 in similar fashion to the fingers 66 of the device 50. If desired, the radial flange 96 may be extended radially so as to provide a means for trapping the retraction spring 62 between the connector 90 and the forward end 64 of the writing implement, although with this form of device, it is preferred to use a crimped enlargement (not shown) in the manner of conventional writing cartridges. Also it may be desirable with this form of a device to provide additional (or alternative) air passage means such as the openings 100 punched, milled or otherwise provided in the upper wall 27 of the writing cartridge, as is shown in FIG. 7.

As will appear from the description, the present invention provides a tubular connecting device of resilient material including a cylindrical surface adapted to frictionally engage an open end of an ink cartridge and a plurality of spaced apart resilient gripping elements each having portions disposed inwardly of the cylindrical surface to provide longitudinally extending, circumferentially spaced, virtually opposing, contact surface areas falling on the cylinder of less diameter than the writing tip of a writing cartridge. By this construction, a means of connection is provided whereby two short tipped cartridge assemblies may be joined into an integral unit of substantially the same length as an ordinary refill cartridge, and adapted to use with existing retracting mechanisms. A further advantage of such an arrangement is the provision of two separate ball points to last the life of the ink supply, so that excessive wear of a single point is avoided; also different colored inks may be used or points of different ball sizes. The feature of decreased wear is of particular advantage since it allows less expensive materials to be used in fabricating the writing tips.

To those skilled in the art to which this invention relates, many changes in construction and widely differing embodiments and applications of the invention will suggest themselves without departing from the spirit and scope of the invention. The disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

We claim:

1. In combination with a writing unit comprising at least two ink-containing cartridges, each including a cartridge body having an open end and an opposite writing tip end, the provision of: an elongated generally cylindrical connector body member of resilient material having a radially extending flange, said flange presenting a surface having engagement with at least one cartridge body at its open end to longitudinally position said cartridge body, said connector member having engagement surfaces extending longitudinally away from said flange to frictionally engage said one cartridge body, said connector member including spaced gripping elements extending longitudinally from said flange in a direction opposite to said surfaces engaging said one cartridge body, said gripping elements providing spaced friction faces in circumaxial spaced relation to grasp and hold the writing tip end of the other cartridge body, said friction faces commencing at and also extending longitudinally away from said flange.

2. The combination as stated in claim 1 wherein said spaced gripping elements have end portions and wherein a shoulder on said writing tip end of said other cartridge body is in abutment with said end portions to longitudinally position the said other cartridge body with respect to the said one cartridge body.

3. In combination with a writing unit comprising at least two ink-containing cartridges, each including a cartridge body having an open end and an opposite writing tip end, the provision of: an elongated connector body member of resilient material having a radially extending flange, said flange presenting a surface having engagement with at least one cartridge body at its open end to longitudinally position said cartridge body, said connector member having engagement surfaces at one side of said flange to frictionally engage said one cartridge body, said connector member including spaced gripping elements at the other side of said flange, said gripping elements having friction faces in circumaxial spaced relation to grasp and hold the writing tip end of the other cartridge body.

4. In combination with a writing unit comprising at least two tubular ink cartridges, each including a cartridge body having a writing tip at one end and having an opposite open end, the provision of: an elongated connector body member having laterally extending means presenting a surface having engagement with at least one cartridge body at its open end to longitudinally position said one cartridge body, said connector member having longitudinal surfaces in holding frictional engagement with said one cartridge body, said connector member including spaced gripping portions extending longitudinally in a direction opposite to said longitudinal surfaces and from the opposite side of said laterally extending means, said gripping portions having circumaxially spaced friction faces to grasp and hold the writing tip end of the other cartridge body.

5. The combination as stated in claim 4 wherein said connector member includes air passage means between said spaced gripping portions and communicating with the open end of said one cartridge body.

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