

April 30, 1963

F. R. WITTNEBERT ET AL

3,087,464

MODULAR FOUNTAIN PEN

Filed June 29, 1959

3 Sheets-Sheet 1

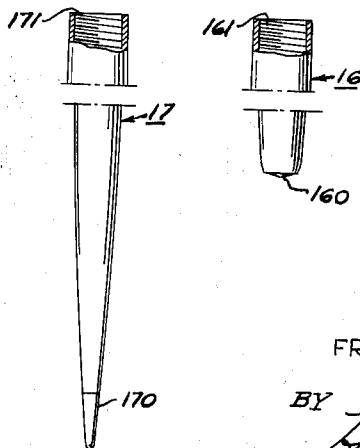
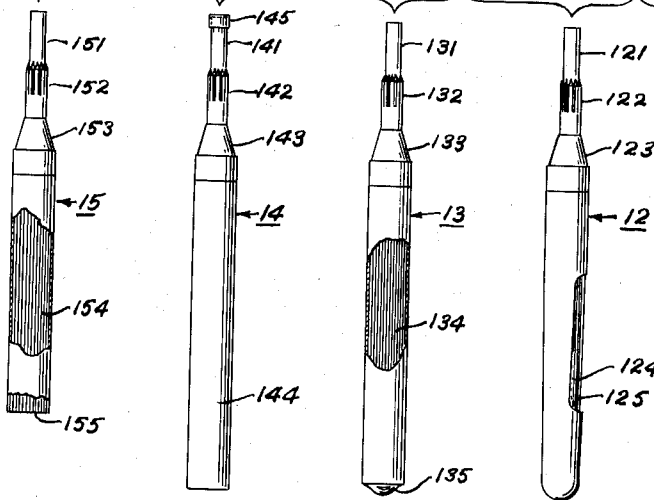
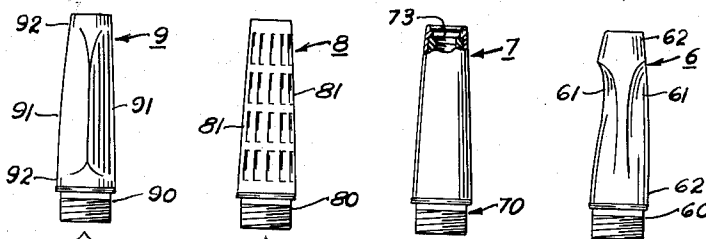
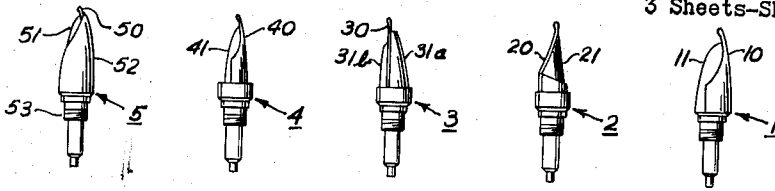


FIG. 1

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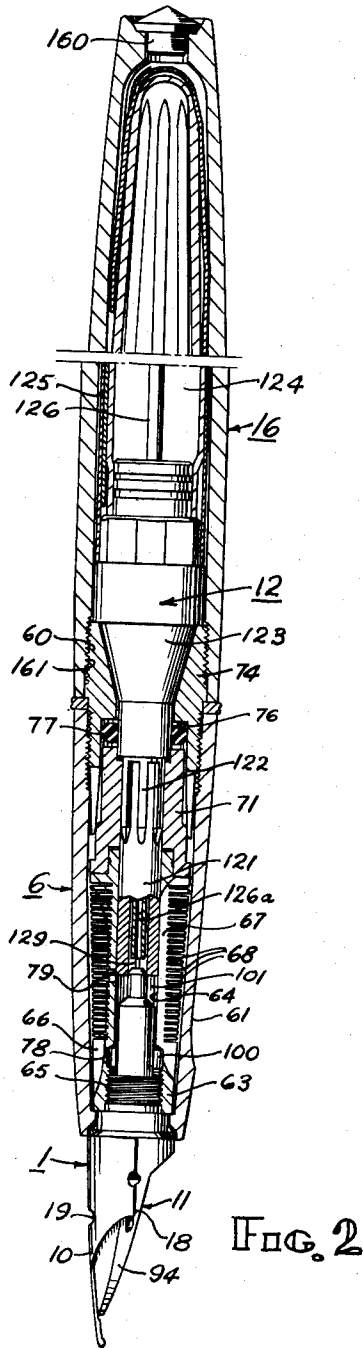


FIG. 2

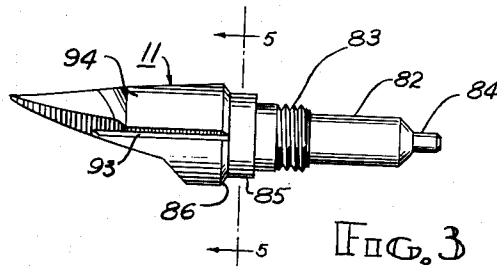


FIG. 3

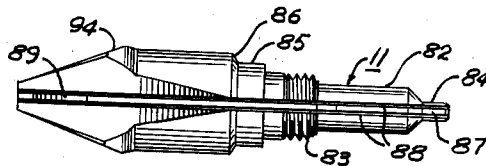


FIG. 4

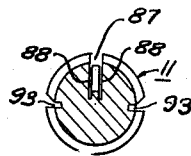


FIG. 5

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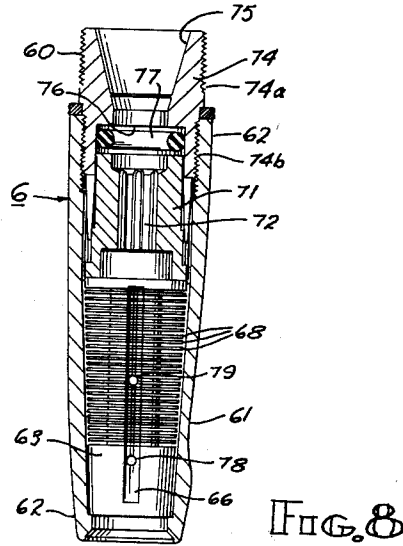
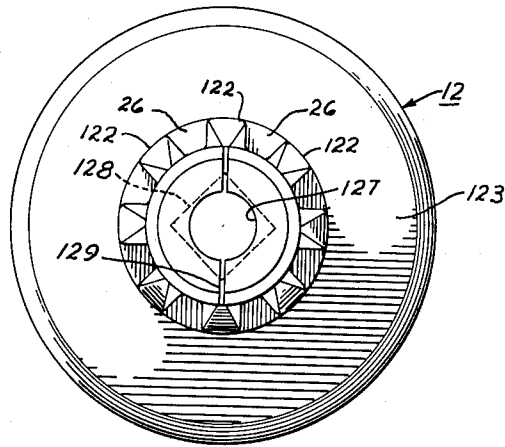
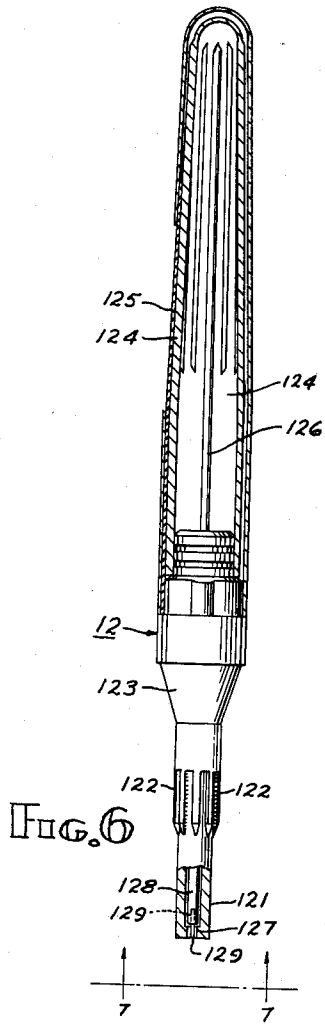
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MODULAR FOUNTAIN PEN

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4 Claims. (Cl. 120-46)

This invention relates in general to fountain pens and in particular to a modular fountain pen combination and a method of making such combination.

With prior art structures and methods, both the users and makers of fountain pens have been limited, when desiring to change the style or function of the reservoir or grip section of the pen, to substituting an entire new pen.

This invention enables manufacturers and consumers to effect styling and functional changes in a fountain pen in an exceedingly simple and effective manner, by providing a plurality of different type reservoirs, grip sections, nib-feed units, and reservoir casings, each being operatively interchangeable with the others as modular components or "modules" of the whole.

The invention further provides a particularly advantageous construction of such modules in a combination wherein they are very easily and reliably interchanged.

Principal components of a fountain pen are the nib-feed unit, the grip-and-collector section, and the reservoir. A primary object of the invention is to provide a plurality of interchangeable types in each of at least two of said three components.

The invention more particularly provides an advantageous fountain pen construction wherein the angular orientation of the gripping portion relative to the nib may be facily changed.

Other objects and advantages will become apparent from the following description and the accompanying drawings, wherein:

FIG. 1 is an elevational view, partly in section, of a plurality of modular components of fountain pens, indicating possible assemblies thereof, and illustrating one embodiment of the invention;

FIG. 2 is an elevational view, partly in section, of a fountain pen formed entirely of certain of the components illustrated in FIG. 1, the components being shown in greater detail and on an enlarged scale;

FIG. 3 is a side elevation of a portion of a feed device shown in FIGS. 1 and 2;

FIG. 4 is a top plan view of said feed device;

FIG. 5 is a sectional view thereof, taken as indicated along line 5-5 in FIG. 3;

FIG. 6 is an elevational view, partly in section, of a reservoir unit shown in FIGS. 1 and 2;

FIG. 7 is a bottom plan view thereof, on an enlarged scale, taken along line 7-7 in FIG. 6; and

FIG. 8 is an elevational view, partly in section, of a grip section unit shown in FIGS. 1 and 2.

The upper portion of FIG. 1 illustrates five different types of nib-feed units, each being different in function and styling. Unit 1 is a type having a nib 10 entirely exposed and lying over a feed bar 11. Unit 2 has an underslung nib 20 underlying a feed bar 21. Unit 3 has

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a sandwiched nib 30 lying between an upper feed bar 31a and a lower feed bar 31b. Unit 4 is a more conventional unit with a partially exposed nib 40 lying over a feed bar 41. Unit 5 is a hooded nib type wherein a nib 50 overlies a feed bar 51 and is nearly completely covered by a hood 52. A threaded portion 53 of unit 5 enables removable mounting of the unit to any of the grip portions 6-9, inclusive, hereinafter described. Each of the other units 1-4, inclusive, has an identically threaded portion, although not numbered in FIG. 1, and has an identical rear configuration for fitting into the grip sections.

The next lower portion of FIG. 1 illustrates four different types of grip sections 6-9, inclusive, each different in function and styling. Section 6 is a contoured grip having a plurality of digit-receiving deformations 61 therein between generally cylindrical portions 62 at the front and rear ends thereof, and having a threaded portion 60 at the extreme rear end thereof for removably mounting either of reservoir casings 16, 17 thereon as hereinafter explained. Section 7 is a more conventional grip section of ordinary frustro-conical shape, and also having a threaded portion 70 at the rear thereof, and having threads 73 internally at the front end thereof. Section 8 is a textured grip section having, forwardly of a threaded portion 80, a pattern of small indentations 81 on the grip surface providing a textured surface. Section 9 is a triangular section having, forwardly of threaded portion 90 and intermediate round ends 92, three sides 91. Each of the grip sections 6-9, inclusive, has identical interior forward threads for receiving the nib-feed units, and has identical rear threaded portions 60, 70, 80, 90 for receiving rear barrel units as hereinafter explained.

The grip section of the pen includes not only the outer grip but also the overflow ink collector device as explained hereinbelow.

The next lower portion of FIG. 1 illustrates four different types of reservoirs 12-15, inclusive, each of differing function.

Reservoir 12 is a conventional vacuum type reservoir having an ink sac 124 and a pressure bar 125 for filling purposes, and having a snout 121 at the front end thereof, and a plurality of splines 122 disposed between the snout and a tapered portion 123.

Reservoir 13 is a closed capillary type of reservoir, i.e. a combination vacuum and capillary reservoir which fills solely by capillary action and writes out by combined vacuum and capillary action, as is fully disclosed in U.S. Patent No. 2,935,044, Wittnebert et al. Reservoir 13 has closable filling openings 135 therein at the rear thereof, and also has a capillary reservoir element 134 therein. Reservoir 13 also has a snout 131, splines 132, and tapered portion 133, identical to those of the other reservoirs.

Reservoir 14 is a throw-away ink cartridge vacuum reservoir. It has a snout 141, splines 142, tapered portion 143, and an ink storage casing portion 144. A cap sealing member 145 is disposed over snout 141 and may be removed just prior to inserting the cartridge 14 into any of the grip sections.

Reservoir 15 is an open capillary type of reservoir having a capillary reservoir element 154 therein vented through the open rear end 155 thereof. This type of reservoir fills solely by capillary action and writes out solely by capillary action, and is fully disclosed in United

States Patents 2,522,553; 2,681,041; and 2,554,654. Reservoir 15 also has a snout 151, splines 152 and a tapered portion 153.

Each of the reservoirs 12-15, inclusive, has identical snouts, splines and tapered portions, as shown, for fitting into any of the grip sections 6-9, inclusive.

The lowermost portion of FIG. 1 illustrates two rear barrel sections, or reservoir covers, 16 and 17. Barrel 16 is the pocket carried type, and barrel 17 is the desk pen type. Barrel 16 has forward interior threads 161 identical to the forward interior threads 171 of barrel 17, these threads being connectable to any of the grip sections 6-9, inclusive, on threaded portions 60, 70, 80 or 90. Barrel 16 has a tassie plug 160 at the rear thereof, whereas barrel 17 has a taper trim plug 170 at its rear end.

FIG. 1 illustrates how any one of the nib-feed units may be used with any one of the grip sections, and in turn used with any one of the reservoirs, and in turn used with any one of the rear barrel sections. By providing a plurality of modular components, i.e. nib-feed units, grip sections, reservoirs, etc., and by further providing a plurality of different types of each of these modular components, a great number of different fountain pens may be assembled from a minimum number of components. For example, in FIG. 1 it is seen that it takes four components to make one complete pen, the components being (1) nib-feed unit, (2) grip section, (3) reservoir, and (4) barrel. By providing one additional reservoir and one additional grip section, four different pens may be selectively made. In other words, by providing two additional modular components, three additional pen models are made available. It is significant to note that the number of additional pen models made available is greater than the number of additional modular components provided. Providing two extra components result in three extra pen models; providing three extra components result in seven extra pen models; providing four extra components result in eleven extra pen models, etc. As shown in FIG. 1 there are fifteen total modular components. It takes four of these components to make up a pen model, and thus there are eleven extra modular components. The total number of pen models possible, from the embodiment shown in FIG. 1, is one hundred and sixty pen models, arrived at by multiplying the number of nib-feed types (five) by the number of grip section types (four) by the number of reservoir types (four) by the number of barrel types (two). It is thus seen that by providing eleven extra modular components, there is provided one hundred and fifty-nine extra pen models. The invention may also be applied to caps for pens and the advantage of more models increases even more.

FIG. 2 shows a preferred embodiment of a fountain pen made up from four of the modular components shown in FIG. 1, comprising a nib-feed unit 1, an ink reservoir unit 12, a grip section 6, and a barrel 16. FIGS. 3-8, inclusive, show in more detail the structure of this pen and its components.

The nib-feed unit 1 comprises a nib 10 and a feed bar 11. The nib has a generally arcuate cross section that tapers to a writing point, and is provided with a pierce hole 19 therein for intake of air. The feed bar 11 includes an exteriorly threaded portion 83 intermediate its ends. Rearwardly of the threaded portion is a shank 82 which at its rearward end reducingly tapers in to a rear rod 84. Forwardly of the threaded portion, is disposed a shank 85 which tapers out enlargingly as at tapered portion 86. The construction just described is identical for each of the nib-feed units 1-5, inclusive, shown in FIG. 1, so that they are interchangeable as hereinafter explained. Forwardly of the tapered portion 86, the feed bar 11 has a generally canted off, pointed front end 94, and has on the sides thereof grooves 93 for receiving inturred wings 18 of the nib 10. The feed bar also has formed therein ink and air passage means in-

cluding ink feed grooves 88, air groove 87, and a dish-out segment 89 located below the pierce of the nib.

Referring to FIGS. 2, 6 and 7, the reservoir unit 12 comprises a flexible ink sac 124 and a pressure bar 125 lying thereagainst to enable filling the sac with ink. The flexible ink sac 124 is held within a hollow tubular guard or housing that is made up of a forward snout portion 121 of reduced diameter and a rearmost rigid casing that has a transverse aperture intermediate its ends through which the pressure bar may be depressed and released for filling the sac. A substantial portion of the rigid casing extends forwardly of the transverse aperture as a finger gripping portion to facilitate the grasping of the reservoir unit for removal thereof from the grip section or for rotation of the reservoir unit and the nib-feed unit relative to the grip section, as hereinafter explained. The casing adjoins the forward snout portion by means of a tapered portion 123. A breather tube 126, open at both ends, is disposed within the sac and extends nearly to the open end of the snout 121. The snout 121 has a round bore 127 at the front end thereof leading into a rectangular bore 128, and has a slot 129 through the wall surrounding both of the bores. The breather tube 126 terminates near the forward end of the rectangular bore 128 just rearwardly of the round bore 127. Intermediate its forward end and the tapered portion 123, the snout is provided with a plurality of angularly-spaced, forwardly extending splines 122 that are adapted to engage complementary splines and grooves in the ink overflow collector of the grip section. The splines 122 have channels 26 therebetween, and the forward ends of the splines are tapered from both sides and from the top to provide camming surfaces for aligning the reservoir with the grip section to facilitate a telescoping engagement of the complementary splines and grooves of the snout and of the ink overflow collector.

Referring to FIGS. 2 and 8, the grip section 6 has at its rear end threaded portion 60 which is formed by a threaded nipple 74 connected in the grip as at threads 74b and being provided with exterior threads as at 74a to accommodate either of the barrel sections 16 or 17. A tapered bore portion 75 in the nipple 74 is provided for receiving the tapered portion 123 on the reservoir. Disposed between forwardly facing shoulder 76 and a receiver plug 71 is an O-ring 77 for sealing against ink leakage. The splined receiver 71, having splines and grooves therein as at 72, receives the splines and channels of the reservoir. The grip further includes a collector 63 that is connected to the splined receiver 71 such that the collector and receiver are rotatable as a unit relative to the grip section 6. Accordingly, the collector is united with or snugly fits into the forward end of the receiver 71 and provides excess ink collection or absorption under overflow conditions.

The main bore 64 of the collector receives therein both the snout 121 of the reservoir and the shank 82 of the nib-feed unit which, respectively are received within the bore 64 to telescope the rear rod 84 of the nib-feed unit into the bore 127 of the snout 121 of the reservoir. Interior threads 65 at the forward end of the collector receive the threaded portion 83 of the nib-feed unit.

An air channel 66 is formed on one side of the collector and an ink feed channel 67 is formed on the opposite side thereof. A plurality of fins 68 intersect these channels and provide between the fins, storage spaces for overflow ink. An air bore 78 connects the air channel 66, near its front end, with an annular space 100 around shank 82 of the nib-feed unit. Another air bore 79 connects the air channel 66 to an annular space 101 around the rear end rod 84 of the nib-feed unit.

Referring to FIG. 2, the feed of ink from reservoir 12 to the nib is as follows. The ink in the reservoir moves down the four capillary spaces between the breather tube 126 and the four walls of the rectangular bore 128, moving down by virtue of the weight or "head" of ink in the reservoir and by virtue of the capillary action of the four

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capillary spaces. The ink enters slot 129 in the snout and from there moves to the nib by either or both of two paths: (1) from slot 129 around the rod 84 and into the feed bar feed channels 88 thence to the nib; and/or (2) from slot 129 into the collector feed channel 67 thence around shank 82 and into the feed bar feed channels 88 thence to the nib. Normally both paths are full of ink. The rod 84 is in contact with the round bore 127 at one or more points around its circumference. Ink in the slot 129 will therefore contact the rod 84 and transfer into the small space between the rod and the bore. Ink fills the annular space between the chamfer on the rod and the bore and transfers from there into the feed channels 88 and thence to the nib.

Referring again to FIG. 2, the intake of air into the reservoir is as follows. Air enters the pierce 19 in the nib, thence into the air channel 88, thence into annular space 100, from there through air hole 78 into air channel 66, and thence through air hole 79 into annular space 101. The above-described spaces are normally clear of ink, or will be clear of ink before any ink is removed from the reservoir. When enough ink has been written out of the reservoir so that the reservoir pressure at the slot 129 is greater negatively than the capillary strength of the ink in slot 129, an air bubble moves through slot 129 and goes either up the inside of breather tube 126 or up the four spaces formed between the breather tube and the corners of rectangular bore 128.

Suitable dimensions for the above-described elements, to obtain satisfactory operation such as above described, are as follows: Slot 129 about 0.008 inch in width; air holes 78 and 79 about 0.040 inch in diameter; air channel 66 about 0.046 inch in width; ink feed channel 67 about 0.005 inch in width; ink feed channels 88 about 0.005 inch in width; air channel 87 about .030 inch in width; round bore 127 about 0.055 inch in diameter; and rectangular bore about 0.055 inch by 0.058 inch.

In mounting the nib-feed unit into the grip section the taper 86 fits into a corresponding receiving taper in the grip, and the threads 83 mate with the corresponding receiving threads in the collector 63 that is rotatably mounted in the grip. The shank 82 of the feed fits snugly into the bore 64 of the collector portion of the grip.

In mounting the reservoir into the grip section, the tapered portion 123 mates with the receiving tapered portion 75, and the splines and channels of the reservoir mate with the splines and grooves in the splined receiver 71 that is connected to the collector 63 for rotation therewith relative to the grip. The cammed off ends of the reservoir splines both center the reservoir and turn the reservoir slightly, if necessary, to align the parts for the spline and groove interengagement. The snout 121 fits snugly into the bore 64 of the collector, and the round bore in the snout fits snugly on the rear end rod 84 of the feed. The O ring grips the rear portion of the snout and establishes an ink leakage seal that prevents ink from passing back out from the collector onto the ink reservoir.

The barrel 16 fits onto the grip via the threaded connection as shown, and covers the reservoir.

The rear end of each of the five nib-feed units 1-5, inclusive, is identically shaped. The front end of each of the reservoirs 12-15, inclusive, is identically shaped. The interior of each of the grip sections is identically shaped. It will be appreciated that any of the grips thus may operatively receive any one of the nib-feed units and any one of the reservoirs, as well as any of the barrels.

The modular components thus fit together in operative arrangement and may be removed from each other easily and interchanged with the other modular components shown in FIG. 1 to form various models as hereinbefore pointed out.

The invention provides a plurality of types of modular components in each of at least two of the following components: nib-feed units, grip sections, and reservoirs.

The invention thus enables a pen manufacturer to add

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to its line of pens by adding certain modular components and utilizing certain of the existing modular components, thereby gaining a greater number of additional pen models than the number of components added.

The invention thus also enables a user (consumer) to change from one pen type to another by adding and changing some modular components and retaining in use the remaining modular components, thereby having readily at his disposal a greater number of additional pen models than the number of modular components added.

The reservoir is preferably filled with ink by simply removing the barrel 16 from the grip section 6, by simply pulling the reservoir 12 off from the grip section to disengage the snout 121 from the bore 64 of the collector, by immersion of the snout in ink, and by depressing and releasing the pressure bar 125 one or more times. Alternately, the pen may be filled when the reservoir is in position on the pen simply by removing the barrel, immersing the nib of the pen in ink to a point above the pierce hole 19, and depressing and releasing the pressure bar. The angular adjustment of the nib relative to the grip section 6, and particularly when the grip section 6 is provided with finger-receiving recesses or is otherwise configured nonsymmetrically, or when the surface of the grip section 6 is provided with an indicia that may be desirably positioned in different selective orientations relative to the nib, is accomplished without the need to grasp the nib of the pen simply by removing the barrel from its connection with the grip section and by grasping the forward rigid portion of the reservoir casing and rotating the reservoir relative to the grip section to thereby effect the desired rotation of the nib relative to the grip section.

We claim:

1. A fountain pen comprising: a nib-feed unit having exterior threads intermediate its ends and a feed shank extending rearwardly therefrom; a grip section having interior threads at the forward end thereof receiving said threads of said nib-feed unit for easy attachment and detachment of said grip section and said nib-feed unit; a reservoir unit having a forwardly extending reduced tubular snout disposed within said grip section and in telescopic ink feeding engagement with the rear of said feed shank of said nib-feed unit for easy attachment and detachment of said reservoir unit from said nib-feed unit and grip section; and a rigid finger-gripping portion on said reservoir for rotating said reservoir and said nib-feed unit relative to said grip section, said grip section having therein means for perimetricaly engaging the outside of said reservoir unit.

2. A fountain pen comprising a nib-feed unit including a nib, a feed bar, and an overflow collector surrounding said feed bar, a hollow collector shell in which said nib-feed unit is rotatably connected, and which forms, in cooperation with said collector, an overflow chamber, a barrel removably connected to the rear of said shell, an ink reservoir non-rotatably connected to said feed unit and at least partly disposed in said barrel when said barrel is connected to said shell, said reservoir being accessible only when said barrel is removed from said shell.

3. A fountain pen comprising a nib-feed unit, a collector secured to said feed unit, a collector shell surrounding said collector and axially rotatable relative thereto, said collector and said shell defining a collector chamber therebetween, said shell having a finger-gripping outer surface which is non-symmetrical about the longitudinal axis of said pen, said shell being sealed to said collector near the front and rear ends of said shell to prevent the leakage of ink from said collector, a barrel removably secured to the rear end of said shell, an ink reservoir positioned within said barrel, and means non-rotatably connecting said reservoir to said collector, said reservoir including a rigid finger-gripping portion for rotating said collector and said nib-feed unit relative to said shell, whereby said reservoir is inaccessible to rotate said nib-

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feed unit relative to said shell when said barrel is in place on said shell.

4. A fountain pen comprising a nib-feed unit, a collector secured to said feed unit, a collector shell surrounding said collector and axially rotatable relative thereto, said shell being non-symmetrical with respect to the longitudinal axis of said pen, said shell being sealed to said collector at the front and rear ends of said shell to prevent the leakage of ink, a barrel removably secured to the rear end of said shell, an ink reservoir positioned within said barrel and a spline non-rotatably connecting said reservoir to said collector, said reservoir including a rigid

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finger-gripping portion on said spline for rotating said collector and said nib-feed unit relative to said shell only when said barrel is removed from said shell.

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