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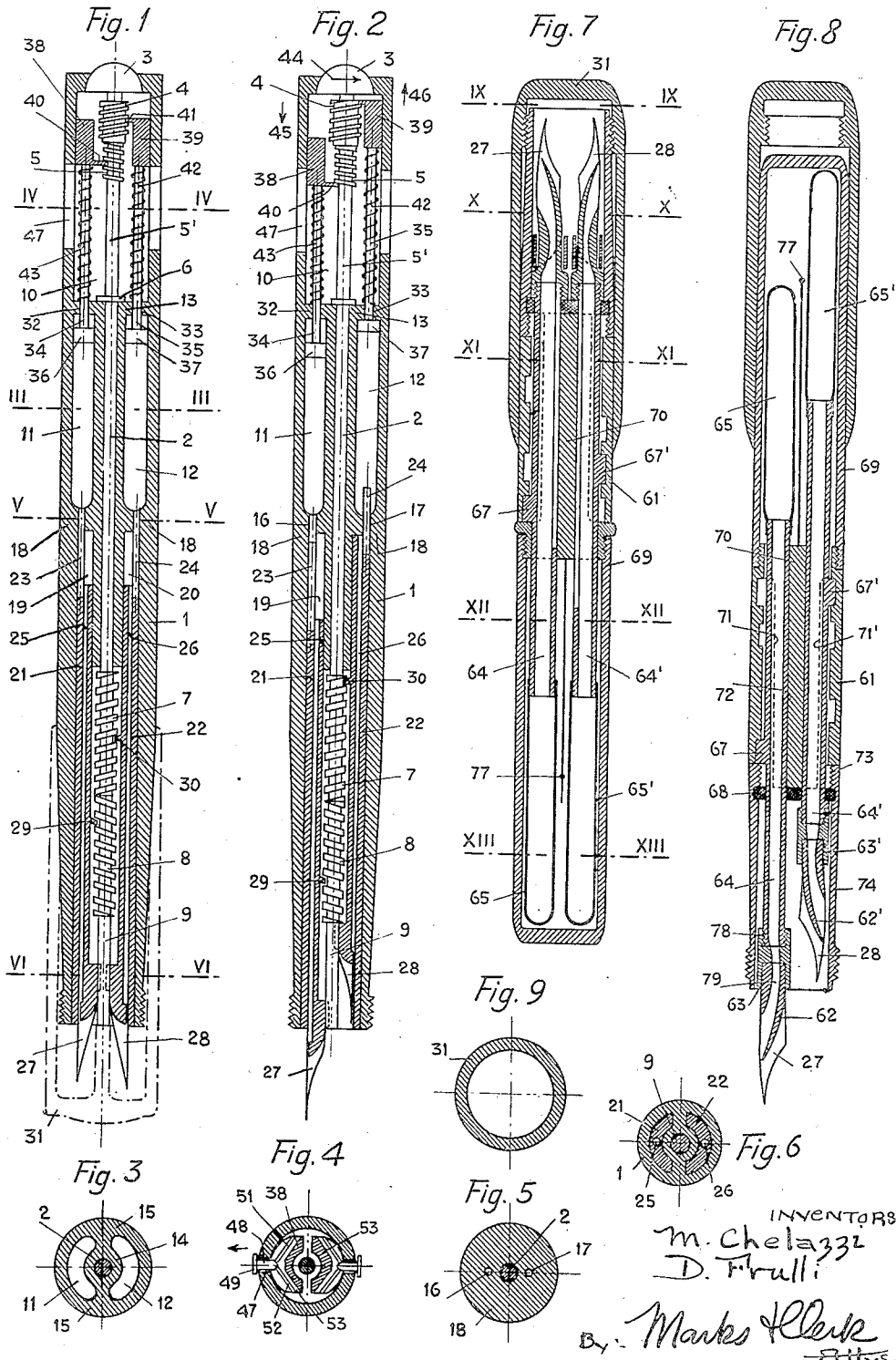
M. CHELAZZI ET AL

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FOUNTAIN PEN

Filed Dec. 9, 1931

3 Sheets-Sheet 1



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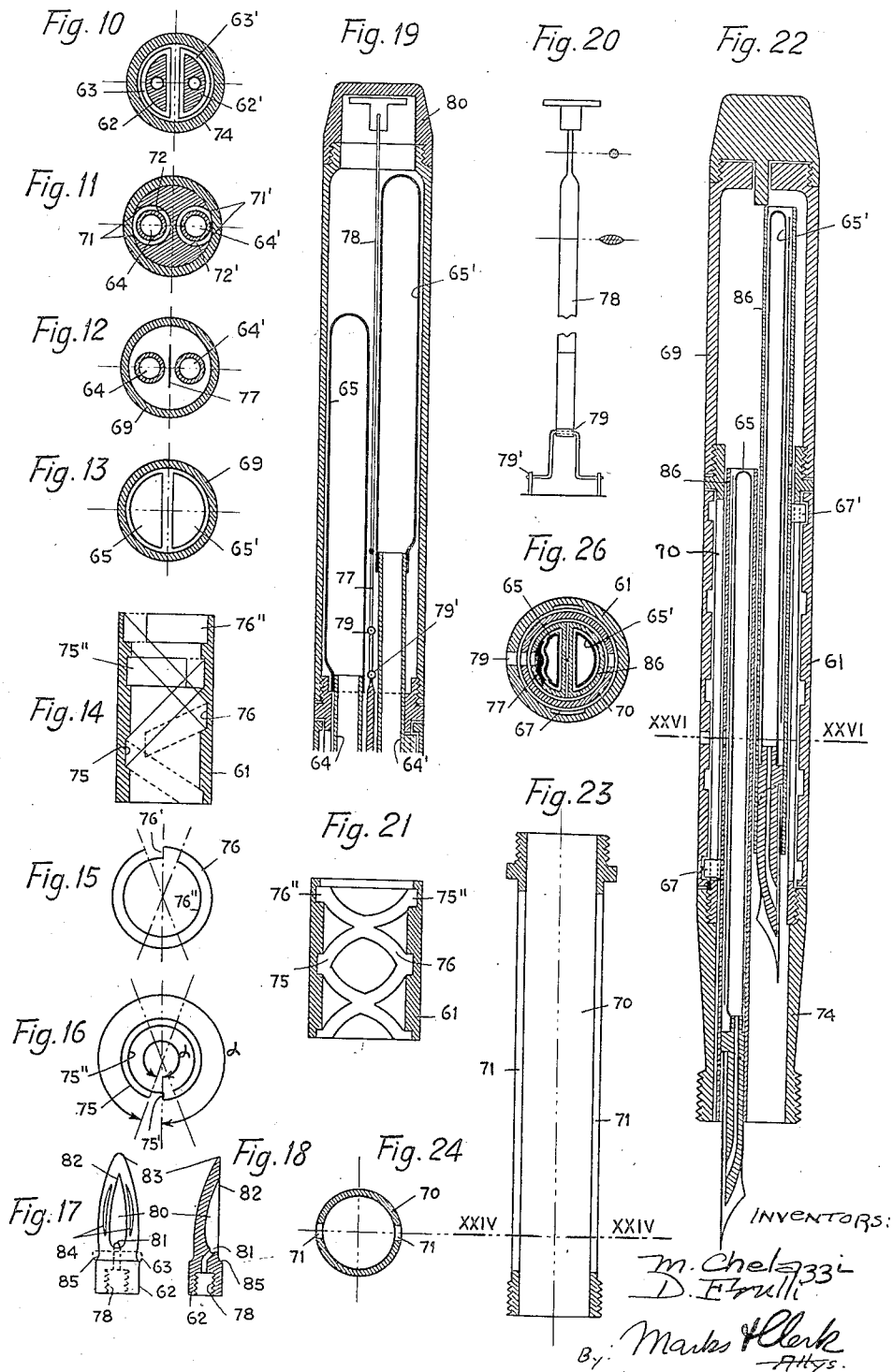
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Fig. 25

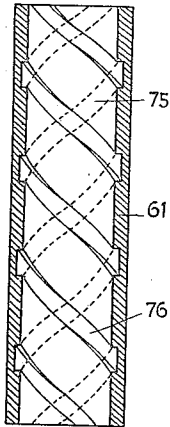


Fig. 27

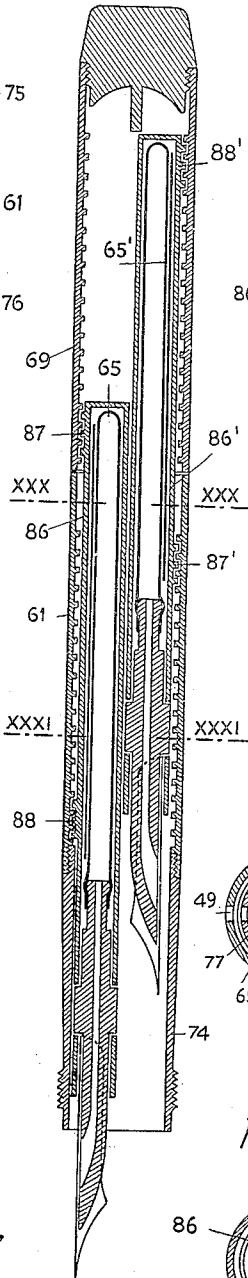


Fig. 29

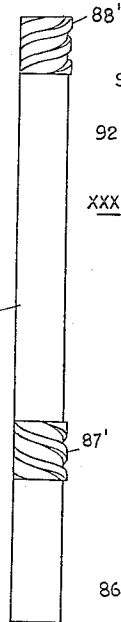


Fig. 32

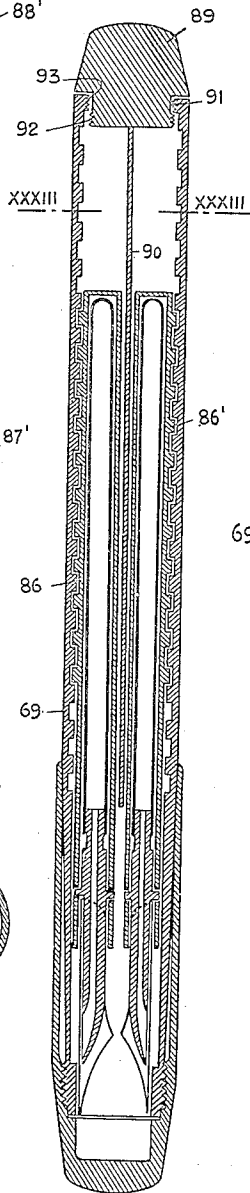


Fig. 34

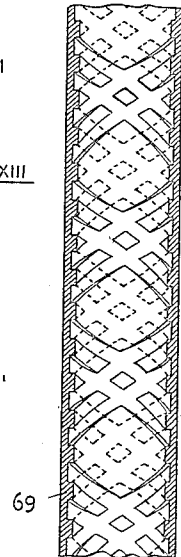


Fig. 28

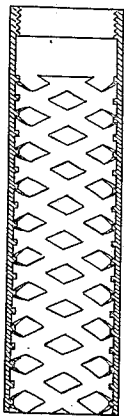


Fig. 31

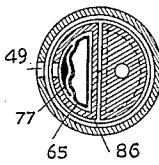


Fig. 35

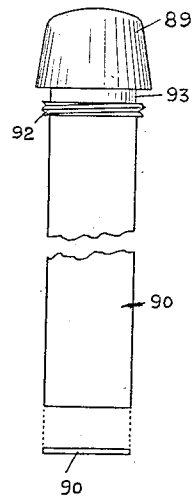


Fig. 30

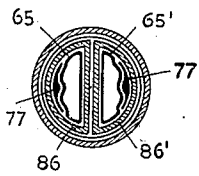
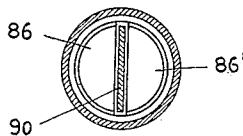


Fig. 33



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# UNITED STATES PATENT OFFICE

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## FOUNTAIN PEN

Application filed December 9, 1931, Serial No. 579,966, and in Italy December 9, 1930.

This invention relates to a fountain pen and particularly to a twin pen comprising two distinct pen units either of which may be employed selectively while the other remains idle.

The object of the invention is to provide a twin fountain pen in which the two units may be filled with different colored inks, and in which the ink of one of the units does not soil the parts of the other unit of the pen.

The invention will be understood from the following description by reference to the accompanying drawings illustrating some embodiments of the invention.

Figure 1 shows an axial section through an embodiment of twin fountain pen with both the pens in idle position;

Figure 2 shows the position of the parts of the twin pen of Figure 1, when one of the pen units is in operative position;

Figures 3 to 6 show respectively cross sections on lines III—III, IV—IV, V—V and VI—VI of Figure 1.

Figures 7 and 8 are views like Figures 1 and 2 relating to a second embodiment;

Figures 9 to 13 are cross sections on lines IX—IX, X—X, XI—XI, XII—XII and XIII—XIII of Figure 7.

Figure 14 is an axial section through a grooved sleeve employed for selectively controlling the shifting of the pens in the second embodiment;

Figures 15 and 16 are diagrams of the angular extension of the grooves of the sleeve shown in Figure 14;

Figures 17 and 18 are detail views of the pen end.

Figures 19 and 20 are detail views of one of the filling systems particularly adapted for use with the pen of Figures 7 and 8.

Figure 21 shows a second embodiment of driving grooved sleeve replacing that shown in Figure 14;

Figure 22 shows an axial section through a third embodiment of twin pen.

Figure 23 is a section through a slotted sleeve.

Figure 24 is a cross section on line XXIV—XXIV of Figure 23;

Figure 25 is a diagrammatical view of the helical grooves of the driving sleeve;

Figure 26 is a cross section on line XXVI—XXVI of Figure 22;

Figure 27 is an axial section through a fourth embodiment of twin pen;

Figure 28 is a diagrammatical view of the helical grooves of the shell;

Figure 29 shows the helical thread provided on to the pen-carrier casings or sheaths for the ink satchels;

Figures 30 and 31 are sections on lines XXX—XXX and XXXI—XXXI of Figure 29;

Figure 32 is an axial section through a fifth embodiment;

Figure 33 is a section on line XXXIII—XXXIII of Figure 32;

Figure 34 is a diagrammatical view of the helical grooves provided internally of the shell of the pen shown in Figure 33, and

Figure 35 is a detail of the selective driving means for the pen units of the embodiment of Figure 32.

The form shown in Figures 1 to 6 relates to a twin pen of the self-filling plunger type. This pen comprises an outer shell 1 having internal partitions and particularly a cross partition 13 separating the part that is liable to come into contact with the ink from the driving part of the pen, a longitudinal partition 15 with an axially bored sleeve 14, and a top wall 18. Between the shell proper 1 and these partitions or walls a pair of separate containers 11 and 12 are formed for the ink of two different colors. The fore wall 18 is situated at about midway of the shell leaving a space free for fitting the pen holders proper and driving means thereof. It is evident that the parts above described, although they are shown in one piece, they may be preferably composed of several parts suitably connected together, as by screwing, pinning or the like.

In the upper part of the shell the pen holders are fitted comprising tubular pen-carriers 21—22 sliding with a tight fit in suitable sheaths 19—20 and having suitably hollowed guide stems 23—24 partially slidable through the delivery ports 16 and 17 of the

ink containers 11, 12, and closing these ports when in their rear position. The bores 25—26 of the pen-carriers open under the pen points 27 and 28.

5 The pen carriers and the pens are fitted in all the embodiments of the invention so as to slide with the convex part adjacent to the outer wall of the shell, i. e. with the hollow part of the pens facing one another.

10 The pen-carriers have projecting members such as lugs 29 and 30 for engagement with the driving means therefor. This driving means is constituted by a stem attached to a turn-button 3 and comprises: (a) A pair of

15 adjacent screw threads 4 and 5 of opposite pitch (right-and-left-hand), the rear screw portion 4 having a diameter at the bottom of its threads that is slightly greater than the diameter taken at the top of the threads of

20 the adjacent screw portion 5. These threads, of a somewhat short pitch, serve for engaging or disengaging and for partially driving the plungers 36, 37 within the ink containers 11, 12, as will be seen hereinafter;

25 (b) a smooth part 5' carrying a stop collar 6; (c) a cylindrical stem 2 rotatable within the bore of sleeve or hub 14; (d) a pair of long-pitch threads 7 and 8, having the same diameter, but different pitch (right-and-left)

30 and adapted to selectively drive in and out either of the pens, by co-action with small lugs 29 and 30 integral with the pen carriers 21, 22; and (e) a guide end 9.

35 Plungers 36 and 37 slidable within containers 11, 12 are attached to rods 34, 35 projecting through apertures 32, 33 of the bottom of the containers into the rear space 10 of the pen. Compression springs 43, 42 coiled around the rods 34, 35 bear at one of their

40 ends against the partition 13 and at the other against blocks 38, 39 attached to the rear ends of rods 34, 35. Block 38 carries a lug 40 for engagement with the screw 5 and block 39 carries a lug 41 for engagement with

45 screw 4. The arrangement is such that when either of the pens (for instance the point 27, Fig. 2) is in its working position the block (38) attached to the corresponding plunger is in its forward position, with its lug 40 dis-

50 engaged from the corresponding threads 5 and free to be pushed forward for re-filling purposes. The re-filling as well as the partial pressing operation for eventually driving out some ink is effected by the usual

55 actuating means, by means of a finger piece 49 projecting through a slot 47.

60 From the foregoing description and from an examination of Figures 1 and 2 the operation of this pen is apparent: The pens assume three distinct positions, i. e. an inner position, (see 28, Fig. 2) an outer or operative position (see 27, Figure 2) and a middle or inactive position (Figure 1) with both

65 the pens projecting equally somewhat out of the shell 1. In this position of the pens the

usual cap 31 may be applied. By turning the button 3 in the direction of the arrow 44 the pens are brought from the position of Figure 1 to that of Figure 2 i. e. the pen 27 and associated parts are shifted in the direction of arrow 45 and the pen 28 and associated parts are shifted in the direction of arrow 46. It should be noted that as the pitch of the threads 5 and 4 is less than that of the threads 7 and 8, the stroke of the pen carriers will be greater than that of the corresponding plungers. The difference of diameter between each plunger and the corresponding rod causes a pressure to build up in the container of the pen that has been driven out and a depression in the other container.

7 The refilling is effected by moving either of the blocks 38 or 39, when the corresponding pen is in operating position and immersed in the ink, forwardly by means of the finger piece 49 and associated parts, and by releasing the finger piece, so as to allow the plungers to be drawn back by the compressed springs 42 or 43.

8 According to the embodiment shown in Figures 7 to 18 the shell comprises a hollow rear portion 69 and a mouthpiece 74 connected together by a middle bridge portion or bored block 70 screwed thereto, and having

9 longitudinal bores 72, 72' with radial slots 71, 71'. In these bores 71, 71' the pen carriers are slidably inserted each comprising a tube 63, 63' carrying attached to its rear end

10 a rubber satchel 65, 65' for containing the ink. The pen carriers have each a tooth or lug 67—67' adapted to slide along the said slots 71—71' and project somewhat above the outer surface of block 70. On this block

10 70 a sleeve 61 is fitted having internally a right-hand and a left-hand helical groove 75, 76, into which the lugs 67, 67' are adapted to project, when the sleeve 61 is mounted in the position as shown, with its outer surface on a level with the parts 69 and 74 and loosely

11 rotatable upon the bridge piece 70, each of the lugs 67, 67' projects into one of the helical grooves 75, 76' extending for an angle  $\alpha$  that is less than a whole circumference. Each of the helical grooves is continued at its rear

11 end 75, 75' by an annular groove 75'', 76'', extending about for the same angle as the corresponding helical grooves and each annular groove ending about on the same axial line as the principal of the other helical

12 groove.

An apertured disc or washer 68 is provided for guiding the axial shift of the pen units.

12 In the inoperative position, the two units of the twin pen will assume the position shown Figure 7 and the lugs 67—67' will be situated at the principal of the helical grooves 75, 76. By rotating the sleeve 61, in one direction, one of the grooves 75 or 76 will drive

13 its corresponding lug forwards, into the heli-

cal part, and therefore the corresponding pen will come out of the shell, while the lug on the other pen carrier will engage itself into the annular part of the other groove and the corresponding pen unit will remain within the shell. By rotating the sleeve 61 in the opposite direction, first the pen that was out will again return to the position of Figure 7 and then, by continuing the rotation, the other pen will come out and the first one will remain within the shell.

Instead of the form of driving sleeve shown in Figure 14, a sleeve with right- and left handed helical grooves crossing themselves, as shown Figure 21 may be employed. The operation is the same, and this form presents the advantage that the lugs 67—67' are fitted at the same height.

The re-filling may take place by any one of the usual means and constituted for instance of a spring blade 77 adapted to press on either of the rubber satchels, when the corresponding pen is in operative position.

A suitable re-filling system is shown in Figures 19 and 20: The spring blade 77 is linked at two points, 79 and 79' and carries a rigid extension blade 78 ending with a push-button. The rear end 80 of the shell is preferably removably fitted to the adjacent shell portion.

When one of the pens is in operative position, the yielding parts 79', 79, 77 of the re-filler are in correspondence of the satchel 65 of the pen in operative position and against the rigid tube 64' of the pen in idle position, and thus when the push-button is pushed in this position, the parts will deflect towards the satchel 65 and depress same. By releasing the push button, the parts will return in the position as shown and the satchel 65 will exert a suction.

The embodiment shown in Figures 22—26 is like that of Figures 7, 8 and 21. Here the rear part 69 and the mouthpiece 74 are connected together by a hollow sleeve 70 diametrically slotted at 71 for its whole length, except at the ends, that are threaded for screwing into said pieces 69 and 74. In this sleeve two sheaths 86, 86' of semi-cylindrical shape, are inserted. These sheaths have projecting lugs 67, 67' passing through the guide slots 71 of the sleeve 70 and projecting above the surface of this sleeve, into right-and-left hand helical grooves 75, 76 cut so as to cross one another in the inner surface of the driving sleeve 61 rotatable on the slotted sleeve 70. The sheaths serve as pen-carriers and in their cavities the rubber satchels 65, 65' are accommodated.

The embodiment of Figures 27 to 29 provides a very simplified form of twin pen in which the shell comprises a rear part 69, and a driving sleeve 61 that is fixed with the mouthpiece 74.

The parts 61 and 69 are made with internal

right-and-left hand threads crossing themselves as shown Figure 28. The sheaths 86—86' carrying the pens are each provided at their ends with different-hand threads 87, 88 and 87', 88' and the thread 87, 87', for instance, are left-hand threads and the threads 88, 88' are right-hand threads, but they are matched in opposite direction, i. e. a right-hand thread 88' at the rear end of one of the sheaths is adjacent to a left-hand thread 87 of the adjacent sheath, when the pens are at the same height (idle position).

The parts of this form of fountain pen are assembled as follows: First one of the pen units is inserted into the sleeve 61 with its sheath 86 in the position shown in Figure 27 and the other pen unit is inserted with its sheath 86' into the sleeve 69 in the position shown in Figure 27. The parts so assembled are put together and by rotating both the sleeve sections in the direction in which the outstanding threads 87 and 87' screw into the opposite sleeve 69 and 61 respectively, each of the sheaths 86 and 86' comes into engagement with the opposite sleeves 61 and 69, respectively. Now as the thread sections 87 and 87' have like pitch and as the parts 61 and 69 are rotated in opposite directions with respect to one another, the sheaths 86 and 86' will be shifted in opposite directions within the tubular shell constituted by the parts 61 and 69, engaged by both the sheaths. In this construction each of the sheaths 86 and 86' during shifting causes the sleeve parts 61 and 69 to be axially pressed against one another and thus these parts are held rigidly together by co-operation of both the pen-carrying sheaths.

The re-filling of this pen takes place easily by providing a lateral spring blade 77 in each of the sheaths containing the rubber satchels 65, and this blade may be depressed from the exterior in one of the usual ways, through slot 49, Figure 31.

A further simplification of the system is obtained by the construction shown in Figures 32 to 35. Here the cylindrical part of the shell is a single tubular piece 69 having internal right-and-left hand helical grooves or threads crossing themselves along the whole internal surface of the shell. In this shell two sheaths 86, 86' are inserted, provided at their cylindrical part with a helical thread of different pitch than that of the mate-sheath. The cross section of each of the sheaths is a little less than half the inner circular section of the shell 69, and thus between the opposite plane surface of the sheaths a play exists, and a blade-like actuating member 90 may be inserted between, for rotating the whole. Owing to the different hand of the threads of the two mate-sheaths, by turning the driving member 90 by means of its button 89 in one direction, one of the pens will come out of the sheath

and the other will go in, and by turning it in reverse direction, opposite movement of the pens will occur.

The turn button 89 has a smooth collar portion 93 and a threaded portion 92 adapted to engage the threads 91 at the rear end of the shell 69. The diameter of the collar portion is equal to the diameter at the bottom of the threads 92 and its height is equal to the height of the threaded portion 91, thus providing a simple and efficient rotating idle engagement between the driving member and the shell. The re-filling is effected in a usual way.

It is evident that the embodiments described and shown are given only by way of example and that many other forms of twin pens may be made within the principles of the invention and the scope of the appended claims.

We claim:

1. A twin fountain pen comprising a pair of pen carriers arranged in opposite relation, with the back of the pens outwardly, and in which the pen is constituted of a shell comprising a rear tubular part, a mouthpiece and a bridge piece connecting the rear part with the mouthpiece and having bores therein for the slidable insertion of the pen carriers, guide slots cut through the bores, lugs on the pen carriers engaging in the said slots and projecting above the surface of the bridge piece, a driving sleeve rotatable on this bridge piece, right-and-left handed helical grooves in the inner surface of the rotatable sleeve, each engaged by the lugs of either of the pen carriers.

2. A fountain pen according to claim 1, in which the right-and-left handed helical grooves of the driving sleeve are single and are arranged in staggered relation and at the end of the helical grooves a circular groove is provided having the same angular extension as the corresponding helical groove, the points in which each helical groove is attached to its annular groove being substantially on the same longitudinal axis of the sleeve.

3. A fountain pen according to claim 1, in which the right-and-left handed helical slots of the driving sleeve are arranged on the same cylindrical path of the sleeve so that they cross themselves on diametrically opposite longitudinal lines of the driving sleeve.

4. A fountain pen according to claim 1, in which the means for re-filling the rubber ink containers consists of a blade with a push button carrying a spring extension that is linked at two points, the linked and the elastic parts being arranged in correspondence of the position of the rigid pen carrier in idle position and in correspondence of the rubber satchel of either of the pens in operative position.

5. A fountain pen according to claim 1, in

which the bridge piece consists of a sleeve having diametrically opposite longitudinal slots and threaded connections at its ends and the pen carriers are provided with semi-cylindrical rigid sheaths attached to the pen holders and sliding with their plane surfaces into direct contact with one another, the lugs engaging the helical grooves of the driving sleeve being integral of these sheaths, the rubber satchels being housed within these sheaths, a separate spring blade being provided in each of the sheaths for depressing the rubber satchel, and means for operating from the exterior said spring blades.

6. A twin pen of the kind as set out in claim 1 consisting of a shell constituted of a rear tubular member and a driving sleeve with mouthpiece, both the rear member and the driving sleeve being provided with a number of internal right-and-left hand helical grooves crossing each other, and a pair of pen carriers having semi-cylindrical sheaths for the ink satchels, each carrying at each end a number of helical threads for engagement with the said helical grooves, the threads of one end of each sheath having a different turning direction as those at the other end and the threads at either end of one of the sheaths being of different turning direction as those at the end of the mate sheath.

7. A twin pen of the kind as set out in claim 1, consisting of a single tubular shell with mouthpiece; right-and-left hand helical threads crossing each other internally of this shell; a pair of pen carriers each having a sheath; for the ink satchels, that are each a little less than semi-cylindrical; a right-hand helical thread on one of the sheaths, a left-hand helical thread on the other sheath; and a driving member constituted of a blade with turn-button, the said blade being inserted between the two sheaths introduced into the shell and with their threads in engagement with the helical grooves of the shell; and coating means provided on the turn button and the rear shell portion for ensuring a rotatable engagement of the turn button with the shell, the turn button closing the rear shell end.

8. A twin fountain pen comprising a pair of shiftable pen carriers arranged in opposite relation, a separate ink container connected to each of the pens, driving means having right-and-left hand helical threads engaging suitable members integral of the pen carriers so as to shift the pen units in opposite direction, the said driving threads being of high pitch and provided on a central spindle having another pair of opposite threads of different diameter and of low pitch; a pair of fixed ink containers having ports in communication with the pen carriers, plungers slidable within these containers, slidable rods attached to these plungers and projecting through apertures rearwardly

of the bottom part of the ink containers,  
guided slidable blocks attached to the rear of  
the plunger rods, a helical spring inserted  
between the bottom of the container and each  
5 of the said blocks, a lug on each of the said  
blocks for engagement with the correspond-  
ing low-pitch thread on the said spindle when  
the corresponding pen is in operative position  
and actuating means for shifting either of the  
10 plungers axially when the corresponding pen  
is in operative position.

In testimony whereof we have signed our  
names to this specification.

MIRKO CHELAZZI.  
DINO FRULLI.

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