

SPECIFICATION

Improvements in or relating to compound writing instruments

This invention relates to a compound writing instrument in which a mechanical pencil unit and a ball point pen unit are provided in the body thereof and selectively movable on axial movement out of the body into a writing position.

According to the invention, there is provided a compound writing instrument comprising: a lower tubular casing having a front end opening and a rear end opening; a guide sleeve inserted in the rear end opening of said tubular casing, said guide sleeve having two diametrically opposed guide grooves therein and a head portion on the peripheral face of which is formed a stopper cam engaging with a segment stopper on the top portion of a curved casing; a mechanical pencil unit and a ball point pen unit within said lower tubular casing, each having a writing tip arranged adjacent the front end opening of said lower tubular casing and a slider at its other end, each slider being respectively guided in one of said guide grooves, the mechanical pencil unit having a pencil casing with a tip mouth piece, a rod axially movable within said pencil casing and a sleeve connected thereto, a chuck for gripping a pencil lead attached to the tip of said connecting sleeve, said chuck having a tightening ring cooperating therewith; said curved casing being mounted for rotation through 360° about the axis of said guide sleeve and having a cam surface engaging with the sliders of the mechanical pencil unit and the ball point pen unit, said cam being shaped so that for every rotation of 180° of the curved casing, both writing units are axially moved alternately to a writing position and a fully retracted position; an upper tubular casing covering both said curved casing and the upper end portion of the lower tubular casing and being fixed to the curved casing and with respect to the lower tubular casing but rotatable around it and freely axially movable within a predetermined axial distance; the stopper cam of the guide sleeve and said segment stopper of the curved casing engaging each other whereby when said mechanical pencil unit is brought to its writing position by the rotation of said curved casing, reciprocating axial movement of said upper tubular casing relative to said lower tubular casing is made possible, this movement being transmitted to the slider, rod, connecting sleeve and lead gripping chuck through the curved casing fixed to said upper tubular casing and thereby operating said chuck by the cooperation with its tightening ring to advance the lead, whereas when said ball point pen unit is brought to its writing position on rotation of the curved casing, axial movement of the upper tubular casing relative to the lower tubular casing is checked due to the stopper cam of the guide sleeve being formed in such a manner that when the ball point pen unit is brought to its writing position, the segment stopper is inserted in a gap formed between the stopper cam and the top face of the guide sleeve,

said segment stopper being released from the stopper cam to permit axial movement of the casing relative to the guide sleeve again when the mechanical pencil unit is brought to its writing position.

The preferred embodiments of the invention to be described hereafter provide a compound writing instrument, wherein by rotating the upper barrel in one or two directions around the axis of barrel, the mechanical pencil unit and the pen unit are selectively shifted into a writing position and by means of the cam mechanism mounted within the upper barrel of the writing instrument, the upper barrel is made movable relative to said lower barrel in the axial direction by a distance sufficient to feed the lead out of the mechanical pencil unit when this unit is in its writing position, while the upper barrel is made non-movable relative to the lower barrel when the ball point pen unit is in its writing position. Thus, the structure of the writing instruments is kept simple and selective moving of the writing units into their writing positions is smoothly and positively effected as is the feed out operation of lead.

Several preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:—

Figure 1(A) is a partly broken sectional view of an upper barrel and a lower barrel of a compound writing instrument of a first embodiment of this invention, in which the pen and pencil units are in their retracted positions.

Figure 1(B) is a similar view to Figure 1(A) of a second embodiment of this invention.

Figure 2(A) is a rear view of Figure 1(A).

Figure 2(B) is a rear view of Figure 2(A).

Figure 3(A) shows the embodiment of Figure 1(A) with the pencil unit in its writing position.

Figure 3(B) shows the embodiment of Figure 1(B) with the pencil unit in its writing position.

Figure 4(A) shows the embodiment of Figure 1(A) but with the pencil unit in its writing position.

Figure 4(B) shows the embodiment of Figure 1(B) but with the pencil unit in its writing position.

Figure 5(A) is an end view of Figure 3(A).

Figure 5(B) is an end view of Figure 3(B).

Figures 6(A)(a) and 6(B)(a) are sectional views taken along lines A—A of Figure 1(A) and Figure 1(B) respectively, Figures 6(A)(b) and 6(B)(b) are sectional views taken along lines B—B of Figure 1(A) and Figure 1(B) respectively, and Figures 6(A)(c) and 6(B)(c) are sectional views taken along line C—C of Figure 3(A) and figure 3(B) respectively.

Figure 7(A) is a broken perspective view, showing the cam mechanism of the embodiment of Figure 1(A).

Figure 7(B) is a broken perspective view showing the cam mechanism of the embodiment of Figure 1(B).

Figure 8 is a partly broken sectional view, showing an inner structure of the mechanical pencil unit of the embodiments of Figures 1(A) and 1(B).

Figure 9(A) is an exploded view of each element of the cam mechanism of the embodiment of Figure 1(A).

Figure 9(B) is an exploded view of each element of the cam mechanism of the embodiment of Figure 1(B).

Figure 10(A)(a), (b), (c) and (d) are explanatory developed views of the embodiment of Figure 1(A) explaining the movement of both the mechanical pencil and the pen unit into their writing position, the retaining or withdrawn position and the lead feeding out position with respect to the cam mechanism (the 1st embodiment).

Figure 10(B) (a), (b), (c) and (d) are respectively similar views to Figure 10(A) (a), (b), (c) and (d) but in relation to the embodiment of Figure 1(B).

The first embodiment of this invention is shown in figure 1(A) to Figure 10(A) inclusive and comprises a lower barrel 1, within which a mechanical pencil unit 3 and a ball point pen unit 3' are accommodated. The rear end of each of these units 3, 3' is respectively connected to a rod 5, 5' by means of a connecting sleeve 4, 4' and a slider 7, 7' provided on the upper end of said rods 5, 5'.

In an upper cavity of the lower barrel 1, a coupling sleeve 19 is tightly inserted, within which a lower tube 20 (Figure 2(A), 2(B)) of a guide sleeve 9 is also tightly inserted. An annular projection 21 formed on the guide sleeve 9 abuts on upper end face of the lower barrel 1 to serve as a stop. Thus, the lower barrel 1 and the guide sleeve 9 are solidly connected together.

The guide sleeve 9 is cylindrical and is provided with guide grooves 10, 10' (Figure 10(A)) which are diametrically opposed to each other to guide the sliders 7, 7' in the axial direction. Within these guide grooves 10, 10', the sliders 7, 7' are movably held by the aid of coiled springs 6, 6' which are provided on the rods 5, 5' and are guided in the axial direction by said guide grooves 10, 10'. The lower portions of the guide grooves 10, 10' are reduced in width to form a stepped portion 20' (Figures 5(A), 5(B)) to support the lower ends of said coiled springs 6, 6'.

On upper portion of the guide sleeve 9, a head portion 16 is formed via a stepped portion, and on the periphery of said head portion 16, a cam 18 is formed, whose configuration is shown in Figure 9(A) and the developed view of Figure 10(A). As is apparent from Figure 10(A), the cam 18 comprises a lowermost flat face 18a and cam faces 18b, 18b' on either side thereof, the angles of inclination of these cam faces being the same. It will be noted that the cam 18 is not formed on the whole periphery of the head portion 16, but is formed on a portion thereof, a portion 17a which corresponds to a central inside face of sector stopper 12 of curved casing 8 to be described later.

As shown in Figure 1(A) to Figure 4(A) and Figure 9(A), the guide sleeve 9 is slidably inserted in the curved casing 8, on which sliding cam faces are formed as is apparent particularly from Figure 9(A) and Figure 10(A). As can be seen from these

figures, the sliding cam faces are formed with a flat portion 15 on their top portion, having sliding cam faces 13, 13' formed symmetrically with respect to said flat portion 15 as a top side, a notched engaging portion 14 being formed at a junction of these two cam faces 13, 13'. The notched engaging portion 14 is so formed that it can engage with the tips of arrowheaded engaging portions 11, 11' which project from the sliders 7, 7'. The cam faces of these arrowheaded engaging portions 11, 11' engage with the sliding cam face and slide corresponding to the rotation of the curved casing 8.

On the other hand, as seen from Figure 6, Figure 7 and Figure 9, sector stopper 12 projects from the upper end inner periphery of the curved casing 8. This stopper 12 engages with the cam 18 on the head portion 16.

A fixing ring 17 is fitted on the head portion 16 after the curved casing 8 is put on the outside of the guide sleeve 9 (Figure 3(A), Figure 4(A)). The fixing ring 17 co-operates with the sector stopper 12 and serves to prevent upward shifting of the curved casing 8 due to the action of the springs 6, 6', when the curved casing 8 is brought to the position shown in Figure 3(A).

The upper barrel 2 is secured to the periphery of the curved casing 8, the lower end of the barrel 2 overlapping the upper end of the lower barrel 1 and being slidable relative thereto. As described hereafter, the curved casing 8 is rotatable either to the right and/or the left around the axis of the barrel 2 relative to the guide sleeve 9, and when the mechanical pencil unit 3 is in its writing position, it is shiftable within certain limits in the axial direction, so that the upper barrel 2 is similarly rotatable in any of two directions relative to the lower barrel (which is connectively fixed to the guide sleeve 9), and when the pencil unit 3 is in the writing position, it is shiftable within certain limits in the axial direction (details thereof will be given under).

The mechanical pencil unit 3 has a chuck mechanism shown in Figure 8, comprising a rod 5 which also serves as a magazine for the pencil lead 30. On the lower outside of the rod 5, a connecting sleeve 4 is fixed, and an intermediate sleeve 22 is secured to lower inside of the sleeve 4, a split pawl chuck 25 being secured to said sleeve 22. On the tip portion of pencil body casing 3a, a pencil tip mouth piece 3b is formed. A connecting tube 3c is connected to upper portion of said casing 3a and a spring 23 is interposed between the upper end of the tube 3c and the lower end of the connecting sleeve 4. A casing 24 covers the connecting sleeve 4 and the connecting tube 3c, and constitutes a part of the pencil body casing 3a. In a space between the lower end of the connecting tube 3c and an abutting stepped portion 3e, a clamping sleeve 26, which co-operates with the chuck 25, is slidably inserted, the aperture or cavity within the sleeve 26 being tapered outwardly toward the tip mouth piece 3b. A rubber-like elastic supporting ring 27 is inserted in the tip mouth piece 3b. On the upper portion of

the tip mouth piece 3b, an abutting stop portion 28 is formed to abut against inside of a tip mouth 29, when the pencil body 3 is shifted towards the tip mouth 29 of the lower barrel 1 for the purpose of feeding the lead. The mode of feeding the lead with this chuck mechanism will be described hereafter.

The advancing and retracting of the mechanical pencil unit and the pen unit to their writing or retaining positions will now be explained with reference to the developed view of Figure 10(A).

Figure 10(A), (b) shows both writing units 3, 3' in their retaining position. In this state, cam faces of the arrowheaded engaging portions 11, 11' at the tips of the rods 5, 5' guided within the guide grooves 10, 10' of the guide sleeve 9 are respectively held by springs 6, 6' against the middle portion of sliding cam faces 13, 13' of the curved casing 8. At this moment, the sector stopper 12 at the top of the curved casing 8 is abutting against slant face 18b of the cam 18 of the head portion 16. A chain line shown below the writing units 3, 3' denotes the tip mouth 29 of the lower barrel 1.

First, in order to advance the pen unit 3' to its writing position, the upper barrel 2, namely the curved casing 8 secured thereto is rotated to the position shown in Figure 10(A) (a). Upon this rotation, the cam face of the arrowheaded engaging portion 11 of the pencil unit 3 slides upwardly along the sliding cam face 13, and is stopped when it reaches the flat portion 15. On the other hand, the arrowheaded engaging portion 11' of the pen unit 3' is sliding downwardly along the sliding cam face 13 of the curved casing 8, until it engages with the notched engaging portion 14 at the apex of said sliding cam faces. At this moment, the sector stopper 12 of the curved casing 8 slips into a clearance t (Figure 10(A) (b)) formed between a lowermost flat face 18a and a top face of the guide sleeve 9 so that the curved casing 8 is shifted somewhat lower from the position shown in Figure 10(A) (b). Said clearance t is of such a dimension that the curved casing 8 becomes non-shiftable in the axial direction relative to the guide sleeve 9, when the stopper 12 gets into said clearance.

In the state of Figure 10(A) (a), the pen unit 3 is brought to its writing position, when the curved casing 8 and the upper barrel 2 secured thereto is engaged non-shiftable in the axial direction.

Next, in order to advance the pencil unit 3 to its writing position, the upper barrel 2, namely the curved casing 8 is rotated to the position shown in Figure 10(A) (b) (180° from the position of Figure 10(A) (a) and 90° from the position of Figure 10(A) (b)). Upon this rotation, the cam face of the arrowheaded engaging portion 11 of the pencil unit 3 slides down the sliding cam face 13 of the curved casing 8, until it is stopped by engaging with the notched engaging portion 14 at the apex of the sliding cam faces. Thus, the pencil unit 3 is brought to its writing position. On the other hand, the sector stopper 12 slides upwardly on the cam face of the cam 18 to position 17a in which it is

released from the engagement with the cam 18. It nevertheless still abuts against the lower end face of the fixing ring 17 fitted on the head portion 13 as shown in Figure 3(A) so upward movement of the guide sleeve 9 under the action of the spring 6 is prevented. And, as the result of the sector stopper 12 being brought to said position, the position of the curved casing 8 relative to the guide sleeve 9 is upwardly shifted corresponding to the shift of the sector stopper 12.

As mentioned above, in the state of Figure 10(A) (c), when the sector stopper 12 is at position 17a, it is released from the cam face 18b of the cam 18 and abuts against the fixing ring 17 under the action of the springs 6, 6'. It is therefore in a state where by pushing down the curved casing 8, i.e. the upper barrel 2 in the axial direction, it may be moved at will to a position such as that shown in Figure 10(A) (d) without any obstruction. Due to the movement of this curved casing 8 in the axial direction, the pencil unit 3 is also naturally moved in the axial direction. The distance between the lower face of the sector stopper 12 and the top face of the guide sleeve 9, namely, the movable distance in the axial direction of the sector stopper 12 is so determined, in the state shown in Figure 10(A) (c), that the movable distance of the pencil unit 3 and the axial movement of the curved casing 8 becomes such a distance as to enable the feeding operation of the lead due to the abutment of the abutting stop portion 28 of the pencil unit 3 against the tip mouth 29 of the lower barrel 1. Thus, the curved casing 8, i.e. the upper barrel 2 secured thereto is pushed in the axial direction and released to shift reciprocatingly, whereby the feeding operation of lead of the pencil unit is smoothly and surely effected.

The feeding of the lead 30 of the mechanical pencil unit 3 will now be explained with reference to Figure 8.

When the pencil unit 3 is brought to its writing position shown in Figure 10(A) (c), and the lower barrel is fixed, the upper barrel 2, i.e. the curved casing 8 is moved by pushing it in the direction of the arrow, thus causing the pencil unit 3 to be further moved downwardly, as shown in Figure 10(A) (d), so that the abutting stop portion 28 of the pencil unit 3 abuts against the mouth 29 of the lower barrel 1. When the curved casing 8 is pushed downwardly and moved, the sleeve 4 connected to the rod 5 slides relative to casing 24 against the resilience of spring 23, towards the tip of the pencil unit until the stop 28 abuts against the mouth portion 29. In response to this sliding of the connecting sleeve 4, intermediate shift sleeve 22 and split pawl chuck 25 connected thereto are also moved towards the tip of the pencil unit, where upon the lead 30, which is held by the co-operation between split pawl chuck 25 and clamp sleeve 26, is fed to the tip of the pencil unit. On further movement of the split pawl chuck 25 towards the tip of the pencil unit the clamp sleeve 26, which moves with said chuck, abuts against abutting step 3e and the movement of said sleeve

is stopped, so that said chuck 25 separates from the clamp sleeve 26 and the lead 30 is released from the holding force of the chuck 25. Thus, the lead 30 is fed by a distance equal to the distance moved by the clamp sleeve 26. Next, when the load on the curved casing 8, i.e. the pressure on the upper barrel 2 is released, the lead 30 is held by elastic holding ring 27 and the chuck 25, the intermediate shift sleeve 22, the connecting sleeve 4 and the rod 5 return to their original position. Thus the chuck 25 will tightly hold the lead 30 again. By repeating the reciprocating movement by pushing on the upper barrel 2, a suitable length of lead 30 may be fed from mouth 3d of tip mouth piece 3b for writing. Spare leads may be stored in a cavity 5a in the rod 5. These spare leads may further be continuously fed in succession to the lead 30. Replenishment of the spare leads in the cavity 5a may be achieved by making the connecting sleeve 4 detachable from the rod 5.

The second embodiment of this invention is shown in Figure 1(B) to Figure 10(B) inclusive, in which the same reference numerals denote same parts as in the first embodiment shown in said Figure 1(A) to Figure 10(A) inclusive.

The structure of the second embodiment is similar to that of the first embodiment, except for differences in the configuration of the curved casing 8, the sector stopper cam and the relative motion of arrowheaded engaging portions 11, 11' which will be described hereafter.

As shown in Figure 1(B) to Figure 4(B) and Figure 9(B), the guide sleeve 9 is slidable in the axial direction and rotatably mounted in the curved casing 8. As can be seen particularly from Figure 9(B) and Figure 10(B), a sliding cam face 13 is formed on said curved casing 8 which has a flat portion 15 at its top and a sliding cam face 13a having a notched engaging portion 14 formed at the lowermost apex thereof. This notched engaging portion 14 is so formed that it can be engaged by the tips of an arrowheaded engaging portions, 11, 11' which project from the sliders 7, 7'. Further, the cam face 13 includes a less steeply inclined cam face 13a' on the opposite side of the notched engaging portion 14 to the cam face 13a, and a vertical face 13b rising towards the left end portion of the flat portion 15. The cam face of the arrowheaded engaging portions 11, 11' slides along the cam face 13 in response to rotation of the curved casing 8. However, because of the vertical face 13b rotation of the curved casing 8 and thereby rotation of the upper barrel 2 is only possible in one direction (13a → 13a' → 13b → 15 → 13a).

As has just been explained, the curved casing includes upright face 13b in cam face 13 so as to restrict rotation to one direction only (i.e. in the direction of an arrow in Figure 9(B)) relative to the guide sleeve 9 around its axis, and that it is movable downwardly in the axial direction within certain limits when the pencil unit 3 is in its writing position, so that similarly the upper barrel 2 is rotatable only in one direction relative to the

lower barrel 1 which is securely connected to the guide sleeve 9, and it is movable downwardly in the axial direction within certain limits when the pencil unit 3 is in its writing position.

The means for advancing and retracting the mechanical pencil unit and the ball point pen unit to their writing position or retracted position in the second embodiment will be explained with reference to Figure 10(B).

Figure 10(B) (b) shows both writing units 3, 3' in their retracted positions. In this state, the cam faces of the arrowheaded engaging portions 11, 11' at the tips of the rods 5, 5' guided within the guide grooves 10, 10' of the guide sleeve 9 respectively abut resiliently against the middle portion of cam face 13a of the curved casing 8 under the action of the springs 6, 6'. In this position, the sector stopper 12 at the top of the curved casing 8 abuts against cam face 18b of cam 18 of the head portion 16. A chain line shown below the writing units 3, 3' denotes the position of tip mouth 29 of the lower barrel 1.

In order to advance the pencil unit 3 to its writing position, the upper barrel 2, i.e. the curved casing 8 is rotated to the position shown in Figure 10(B) (c) in the direction of an arrow X. Upon this rotation, the cam face of the arrowheaded engaging portion 11 of the pencil unit 3 slides downwardly along the cam face 13a until the apex thereof is reached and it engages with the notched engaging portion 14 thereon. At this moment, the stopper 12 of the curved casing 8 slides along cam face 18b of cam 18 into portion 17a having no cam face. In consequence, the curved casing 8 rises in the direction of an arrow y from the position shown in Figure 10(B) (b) to the position shown in Figure 10(B) (c). Therefore, the arrowheaded engaging portion 11' of the pen unit 3' is gradually separated from the flat portion 15 of the curved casing 8 until it reaches the position shown in Figure 10(B) (c). Since the sector stopper 12 of the curved casing 8 is positioned in portion 17a, the top face of said stopper abuts against the lower face of the fixing ring 17 under the action of the spring 6, a space d existing between the top face of the guide sleeve 9 and the lower face of the stopper 12 (Figure 10(B) (c)). This space d is so determined that it corresponds to the distance of movement (knocking distance) in the downward axial direction of the upper barrel 2, (i.e. the curved casing 8) needed to feed out the lead. In the state shown in Figure 10(B) (c), the pencil unit 3 is in its writing position.

As mentioned above, the sector stopper 12 of the curved casing 8 is held against the lower face of the fixing ring 17 by the spring 6 to maintain the distance d. By pushing the upper barrel 2, i.e. the curved casing 8 downwardly in the axial direction of arrow z, it is ready to be moved to the position shown in Figure 10(B) (d) as desired without any obstruction. Due to the movement in the direction of arrow z of this curved casing 8, the pencil unit 3 also moves in the direction of arrow z. As mentioned above, the interval d is so determined that the movement distance of the

pencil unit 3 accompanied with the movement of the curved casing 8 in its axial direction (in the direction of arrow z) is such that the lead is fed out due to the abutment of the abutting stop portion 28 of the pencil unit 3 against the tip mouth 29 of the lower barrel 1. Thus, by pushing in the axial direction, and releasing and reciprocatingly moving the curved casing 8, i.e. the upper barrel 2 secured thereto, the feeding operation of the lead of the pencil unit is positively and smoothly effected.

Next, in order to advance the pen unit 3' to its writing position, the curved casing 8 is rotated to the position shown in Figure 10(B) (a) in which the arrowheaded engaging portion 11' of the ball point pen unit 3' is made to engage with the notched engaging portion 14 at the apex of the cam face 13a of the curved casing 8. Description of the movement of the pencil unit 3 and the pen unit 3' as well as the moving of the curved casing 8 in the axial direction to its position in Figure 10(B) (a) will be omitted here because they should be apparent from the explanation already given with reference to Figure 10(B) (d) and Figure 10(B) (c). It should be noted, however, that in the state of Figure 10(B) (a), the sector stopper 12 locates in a clearance t between the top portion of the guide sleeve 9 and the lowermost flat face 18a of the cam 18. The dimension of this clearance t is so determined that the curved casing 8 becomes non-shiftable in its axial direction relative to the guide sleeve 9 when the stopper locates therein.

As mentioned above, the pencil unit and the ball point pen unit can be smoothly and positively brought to a writing position or a withdrawn position selectively by rotating the upper barrel in opposite directions and lead feeding operation of the "knocking" type can be effected by moving the upper barrel in its axial direction. Thus a compound writing instrument of very simple structure and durability can be provided.

CLAIMS

1. A compound writing instrument, comprising:
a lower tubular casing having a front end opening and a rear end opening;
a guide sleeve inserted in the rear end opening of said tubular casing, said guide sleeve having two diametrically opposed guide grooves therein and a head portion on the peripheral face of which is formed a stopper cam engaging with a segment stopper on the top portion of a curved casing;
a mechanical pencil unit and a ball point pen unit within said lower tubular casing, each having a writing tip arranged adjacent the front end opening of said lower tubular casing and a slider at its other end, each slider being respectively guided in one of said guide grooves, the mechanical pencil unit having a pencil casing with a tip mouth piece, a rod axially movable within said pencil casing and a sleeve connected thereto,

a chuck for gripping a pencil lead attached to the tip of said connecting sleeve, said chuck having a tightening ring cooperating therewith;

said curved casing being mounted for rotation through 360° about the axis of said guide sleeve and having a cam surface engaging with the sliders of the mechanical pencil unit and the ball point pen unit, said cam surface being shaped so that for every rotation of 180° of the curved casing, both writing units are axially moved alternately to a writing position and a fully retracted position;

an upper tubular casing covering both said curved casing and the upper end portion of the lower tubular casing and being fixed to the curved casing and with respect to the lower tubular casing but rotatable around it and freely axially movable within a predetermined axial distance;

the stopper cam of the guide sleeve and said segment stopper of the curved casing engaging each other whereby when said mechanical pencil unit is brought to its writing position by the rotation of said curved casing, reciprocating axial movement of said upper tubular casing relative to said lower tubular casing is made possible, this movement being transmitted to the slider, rod, connecting sleeve and lead gripping chuck through the curved casing fixed to said upper tubular casing and thereby operating said chuck by the cooperation with its tightening ring to advance the lead, whereas when said ball point pen unit is brought to its writing position on rotation of the curved casing, axial movement of the upper tubular casing relative to the lower tubular casing is checked due to the stopper cam of the guide sleeve being formed in such a manner that then the ball point pen unit is brought to its writing position, the segment stopper is inserted in a gap formed between the stopper cam and the top face of the guide sleeve, said segment stopper being released from the stopper cam to permit axial movement of the casing relative to the guide sleeve again when the mechanical pencil unit is brought to its writing position.

2. A compound writing instrument according to claim 1, wherein the cam surface on the curved casing has a flat portion adjacent its top end connected by two inclined cam surfaces symmetrically meeting at a lower portion of the casing opposite said flat portion in a notched engaging portion, the arrangement being such that the curved casing can be freely rotated either clockwise or anti-clockwise relative to said guide sleeve.

3. A compound writing instrument according to claim 1, wherein the cam surface on the curved casing has a flat portion adjacent its top end connected by an inclined surface to a notched engaging portion at its lower end diametrically opposite said flat portion, said notched portion



pencil unit 3 accompanied with the movement of the curved casing 8 in its axial direction (in the direction of arrow z) is such that the lead is fed out due to the abutment of the abutting stop portion 28 of the pencil unit 3 against the tip mouth 29 of the lower barrel 1. Thus, by pushing in the axial direction, and releasing and reciprocatingly moving the curved casing 8, i.e. the upper barrel 2 secured thereto, the feeding operation of the lead of the pencil unit is positively and smoothly effected.

Next, in order to advance the pen unit 3' to its writing position, the curved casing 8 is rotated to the position shown in Figure 10(B) (a) in which the arrowheaded engaging portion 11' of the ball point pen unit 3' is made to engage with the notched engaging portion 14 at the apex of the cam face 13a of the curved casing 8. Description of the movement of the pencil unit 3 and the pen unit 3' as well as the moving of the curved casing 8 in the axial direction to its position in Figure 10(B) (a) will be omitted here because they should be apparent from the explanation already given with reference to Figure 10(B) (d) and Figure 10(B) (c). It should be noted, however, that in the state of Figure 10(B) (a), the sector stopper 12 locates in a clearance t between the top portion of the guide sleeve 9 and the lowermost flat face 18a of the cam 18. The dimension of this clearance t is so determined that the curved casing 8 becomes non-shiftable in its axial direction relative to the guide sleeve 9 when the stopper locates therein.

As mentioned above, the pencil unit and the ball point pen unit can be smoothly and positively brought to a writing position or a withdrawn position selectively by rotating the upper barrel in opposite directions and lead feeding operation of the "knocking" type can be effected by moving the upper barrel in its axial direction. Thus a compound writing instrument of very simple structure and durability can be provided.

CLAIMS

1. A compound writing instrument, comprising:
a lower tubular casing having a front end opening and a rear end opening;

a guide sleeve inserted in the rear end opening of said tubular casing, said guide sleeve having two diametrically opposed guide grooves therein and a head portion on the peripheral face of which is formed a stopper cam engaging with a segment stopper on the top portion of a curved casing;

a mechanical pencil unit and a ball point pen unit within said lower tubular casing, each having a writing tip arranged adjacent the front end opening of said lower tubular casing and a slider at its other end, each slider being respectively guided in one of said guide grooves, the mechanical pencil unit having a pencil casing with a tip mouth piece, a rod axially movable within said pencil casing and a sleeve connected thereto,

a chuck for gripping a pencil lead attached to the tip of said connecting sleeve, said chuck having a tightening ring cooperating therewith;

said curved casing being mounted for rotation through 360° about the axis of said guide sleeve and having a cam surface engaging with the sliders of the mechanical pencil unit and the ball point pen unit, said cam surface being shaped so that for every rotation of 180° of the curved casing, both writing units are axially moved alternately to a writing position and a fully retracted position;

an upper tubular casing covering both said curved casing and the upper end portion of the lower tubular casing and being fixed to the curved casing and with respect to the lower tubular casing but rotatable around it and freely axially movable within a predetermined axial distance;

the stopper cam of the guide sleeve and said segment stopper of the curved casing engaging each other whereby when said mechanical pencil unit is brought to its writing position by the rotation of said curved casing, reciprocating axial movement of said upper tubular casing relative to said lower tubular casing is made possible, this movement being transmitted to the slider, rod, connecting sleeve and lead gripping chuck through the curved casing fixed to said upper tubular casing and thereby operating said chuck by the cooperation with its tightening ring to advance the lead; whereas when said ball point pen unit is brought to its writing position on rotation of the curved casing, axial movement of the upper tubular casing relative to the lower tubular casing is checked due to the stopper cam of the guide sleeve being formed in such a manner that then the ball point pen unit is brought to its writing position, the segment stopper is inserted in a gap formed between the stopper cam and the top face of the guide sleeve, said segment stopper being released from the stopper cam to permit axial movement of the casing relative to the guide sleeve again when the mechanical pencil unit is brought to its writing position.

2. A compound writing instrument according to claim 1, wherein the cam surface on the curved casing has a flat portion adjacent its top end connected by two inclined cam surfaces symmetrically meeting at a lower portion of the casing opposite said flat portion in a notched engaging portion, the arrangement being such that the curved casing can be freely rotated either clockwise or anti-clockwise relative to said guide sleeve.

3. A compound writing instrument according to claim 1, wherein the cam surface on the curved casing has a flat portion adjacent its top end connected by an inclined surface to a notched engaging portion at its lower end diametrically opposite said flat portion, said notched portion



being connected to the flat portion again by a vertical face, the arrangement being such that the curved casing can be freely rotated relative to the guide sleeve in one direction only.

5 4. A compound writing instrument substantially as herein described and shown in Figures 1A — 10A or Figures 1(B) — 10B of the accompanying drawings.

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