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LOCKED MULTI-CARTRIDGE PEN

Filed June 28, 1963

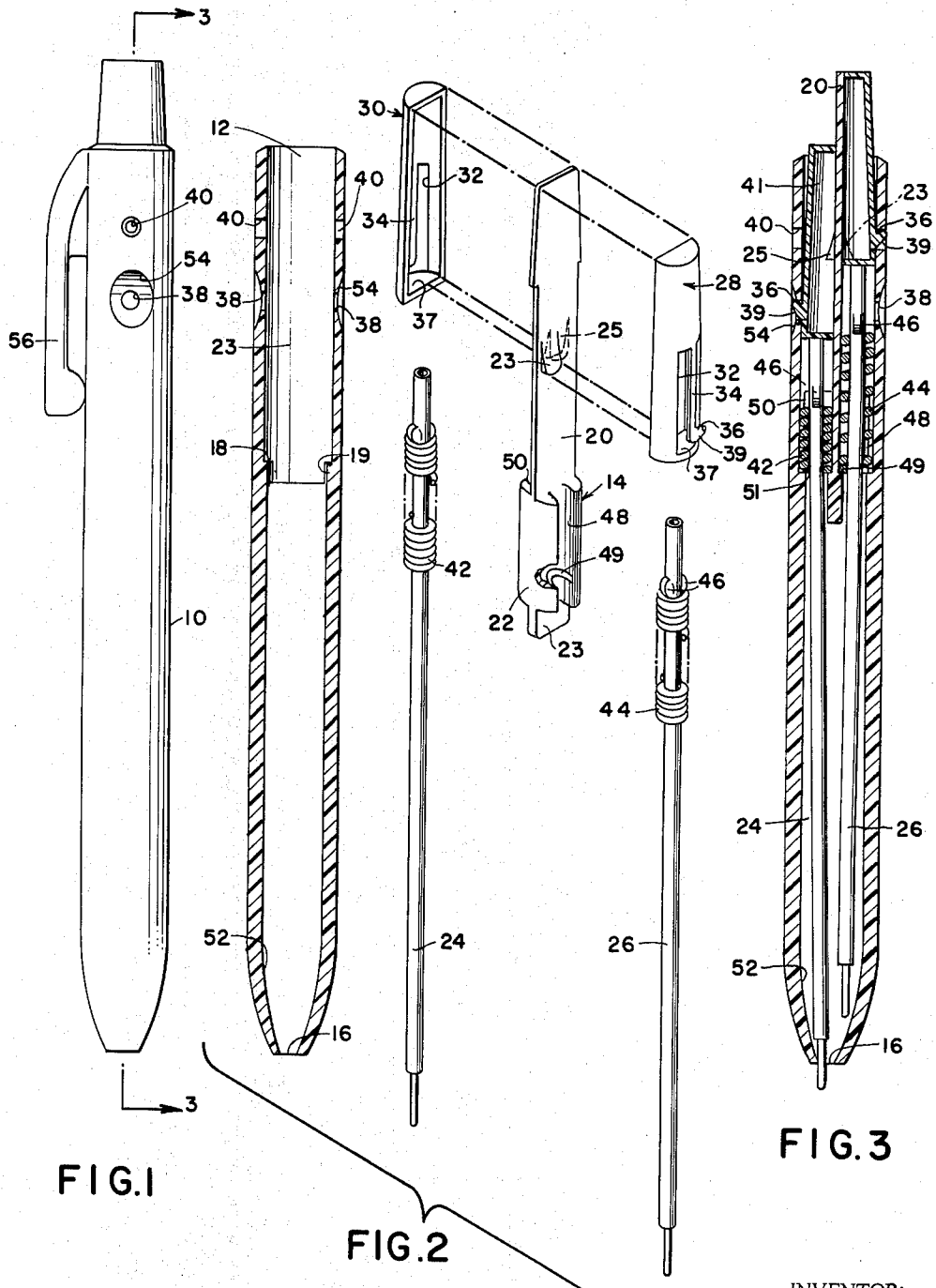


FIG.1

FIG.2

FIG.3

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LOCKED MULTI-CARTRIDGE PEN

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This invention relates to a multi-cartridge pen wherein a selected cartridge may be individually projected or retracted. This application is a continuation-in-part of application Ser. No. 130,851, filed August 11, 1961, now Patent No. 3,143,101 dated August 4, 1964.

In this earlier application, I provide a multi-cartridge pen with an individual cartridge project-retract mechanism that is easy to assemble, employing a minimum number of parts in a minimum amount of space, and having a one-piece combined cap and barrel into the mouth and top of which the project-retract mechanism supporting structure are inserted to complete the assembly.

The project-retract mechanism for each cartridge in the multi-cartridge pen is operated by a spring which urges a plunger provided with a latch, from the project to the retract position, where it is stopped by a catch. If the spring is too strong or the latch too weak, the parts may accidentally be expelled out of the top of the barrel.

Accordingly, it is an object of the present invention to provide an auxiliary lock for the operating mechanism to prevent accidental ejection of the parts by the cartridge spring, when moving from the project to the retract position.

Another object is to provide an additional positive lock in a multi-cartridge pen, without adding any additional parts to the assembly. In my earlier disclosure, I provided a separator extending between the cartridges and associated mechanism to insure independence of operation and freedom from jamming. A further object of the present invention is to provide a stop means on the separator where it will limit the retract position of the plunger and thus prevent accidental loss of the parts. An additional object is to provide a means for permitting the plunger to cam over the stop on the separator when assembling the parts.

I accomplish these and other objects and obtain my new results as well be apparent from the device described in the following specification, particularly pointed out in the claims, and illustrated in the accompanying drawing in which:

FIGURE 1 is a side elevation of the novel multi-cartridge pen;

FIGURE 2 is an exploded view of the pen showing the various constituent parts in perspective; and

FIGURE 3 is a longitudinally sectioned view with one of the cartridges projected into writing position.

Referring more in detail to the drawing, reference numeral **10** designates a one-piece combined cap and barrel having an opening **12** into which a multi-cartridge supporting unit **14** is inserted. The barrel is provided with a ball point opening **16**, and a seat **18** for positioning the unit.

The multi-cartridge unit comprises a longitudinally extending separator **20**, terminating in a transversely extending spacer **22** forming a transverse support for the cartridges. The separator is preferably molded integrally with the spacer. The separator divides the upper barrel compartment **23** into the number of chambers corresponding to the number of cartridges employed. In the embodiment illustrated, a two cartridge unit is utilized by way of example, containing cartridges **24** and **26**.

The separator **20** constitutes a thin diametric wall extending from the spacer to the outside of the opening **12** where it separates the plungers **28** and **30**, used for operating the cartridges. Stops **23** and **25** are formed on the opposite sides of the separator for a purpose hereinafter described.

The plungers are hollow and the outer wall of each is slotted as at **32** to form a springy leg **34** having a latch **36** extending from the end thereof. The base wall **37** is used as an auxiliary catch to engage the stop, insuring that the plunger will not move there beyond.

The barrel of the pen illustrated is formed adjacent each cartridge with two catch openings **38** and **40** representing the project and retract positions respectively of the cartridges. The latch **36** springily engages the wall edge of each opening to snaplock the corresponding plunger therein when in either of the two positions. Springs **42** and **44** encircle the cartridges for biasing the cartridges against the respective plungers. Ears **46** extend laterally from each cartridge to engage the associated spring which rest on the spacer **22**. The pressure is thus exerted on each plunger, causes the latch **36** to engage the corresponding opening to which the plunger has been propelled.

The spacer end **23** fits into slot **19** on the pen body so as to automatically orient the plungers with respect to the catches **38** and **40** when in assembled position.

Openings **48** and **50** are provided in the spacer **22** through which the cartridges extend. The openings are spaced sufficiently apart to permit the separator to extend from the space. The springs rest on the flanges **49** and **51** formed at the bottom of openings **48** and **50**, respectively.

The project-retract mechanism comprises the plungers operating against the action of the cartridge springs. The unit and separator are inserted into the barrel, until the spacer reaches the seat **18**. The cartridges and associated springs are then inserted and thereafter the plungers. The plungers are individually depressed until the respective latches are located in the catch openings **40** constituting the retract position. In this position the springs are under sufficient pressure to hold the entire assembly secured in position in the barrel. The tapered shape of each stop along the upper surface, permits the plungers to be cammed past the stops until the base wall **37** snaps past the stop thus enclosing the stop in the hollow plunger.

Upon selecting the cartridge to be projected, the corresponding plunger is depressed, causing the respective latch to be cammed out of catch opening **40** until it reaches catch opening **38** where the latch will engage the wall thereof, against the action of the spring.

When it is desired to retract the cartridge, the latch is depressed in opening **38** by a finger tip until the latch is free of the wall of the barrel. The cartridge encircling spring will then drive the plunger away from opening **38** until the latch reaches opening **40**. At this point the latch **36** will project itself through the opening **40** engaging the wall thereof.

Should the latch be propelled beyond the opening **40** without catching, due to the excess power of the spring and because the latch does not spring into position fast enough, the stop **23** or **25** will engage the plunger of the base wall **37**, impeding further motion, and preventing loss of the plunger.

The latch **36** is provided with a camming surface **39** to allow the catch to be inwardly sprung to free it from its respective opening when the plunger is depressed.

The inner barrel surface **52** is tapered adjacent the ball point opening **16**, to cam the cartridge slightly off its longitudinal position enabling the ball point to enter the opening. The cartridge may be made flexible, or the openings

48 and 50 in the spacer 22 may be slightly elongated to permit the cartridge to tilt slightly when entering the central opening.

The plunger may be made of springy plastic with the latch outwardly biased in position, to provide the necessary snap action when the latch reaches the catch opening. The hollowed portion 41 formed in the plunger will permit the latch and stop to be accommodated within the plunger without interference when the latch is depressed or when the plunger is moved into operating position.

The barrel opening 38 corresponding to the project position of the cartridge, may be externally grooved, as at 54, to permit the tip of the finger to be guided against the latch, to facilitate depressing and unlatching the plunger. This convenience is not necessary in upper catch opening 40 from which position the latch is normally disengaged by direct axial pressure on the plunger. The type project-retract mechanism shown requires a minimum of space in the barrel. Other mechanisms may also be employed where the overall diameter of the pen barrel is not controlling.

Because of the stop feature, the cartridge, springs, separator, spacer and plunger are all removed as a unit.

The multi-cartridge pen is exceptionally easy to assemble and operate. However, because of the auxiliary stop feature on the separator, when it is necessary to replace a cartridge, the entire multi-cartridge unit 14 must be removed. This may be accomplished by depressing both latches 36 simultaneously, to free the unit from the barrel. Alternatively the multi-cartridge unit 14 may be slightly rotated in the seat 18 when all the latches are positioned in the catch openings 40. This rotation will laterally release the latches from the catches permitting the multi-cartridge unit to slide longitudinally and outwardly in the barrel. The catches 40 may be laterally grooved on the inside of the barrel to permit such camming action, or the latches may be provided with lateral camming surfaces for this purpose.

The clip 56 may be molded to the one-piece combined cap and barrel when forming the same. The separator provided with the auxiliary stops prevents loss of a plunger, associated cartridge and spring, should the latch accidentally by-pass the upper catch opening for any reason.

The stops do not eliminate the need for the upper catch openings, since these serve also to anchor the assembly of spacer, separator cartridges, springs and plunger within the one-piece combined cap and barrel. Should one of the plungers fail during a retract operation this function will be maintained by another latch and catch since only a single cartridge can be operated at one time through the barrel opening 16.

The position of the stops on the separator, is such that they will engage the plungers at the point when the latches engage the upper catch openings.

The hollow plungers are light in weight without loss of strength. Thus there is a saving in material.

The stops are tapered on the upper surface to permit forcing a plunger over the stop when inserting cartridges. The stops are positioned on opposite sides of the separator, and off-set from the center thereof so as not to be directly positioned back to back to permit the separator to flex slightly when the plunger moves over the taper of the stop.

I have thus described my invention, but I desire it understood that it is not confined to the particular forms or uses shown and described, the same being merely illustrative, and that the invention may be carried out in other ways without departing from the spirit of my invention, and therefore I claim the right to employ all equivalent instrumentalities coming within the scope of the appended claim, and by means of which objects of my invention are obtained and new results accomplished.

I claim:

1. A multi-cartridge ball point pen comprising a one piece pen body forming a combined cap and barrel having an opening at one end for allowing a single cartridge to project therethrough, and a mouth at the other end; said pen body having a transverse body seat intermediate said mouth and opening, a transversely extending spacer positioned within the body and on said transverse body seat, and having a separator extending longitudinally from the spacer, said spacer provided with transverse seats, a cartridge and surrounding spring associated with each spacer seat, with the spring reacting against the spacer seat and its associated cartridge to tend to drive the cartridge in a direction out of the mouth of the body, and locking means including a plunger engaging each cartridge, and cooperating means on the body for holding the cartridge in either a project or retract position, said locking means additionally holding the spacer against the transverse body seat, said body mouth wide enough to enable the insertion therethrough of the spacer, cartridges, springs and plunger, said separator extending between said plungers when the plungers are in the project position, and when the plungers are in the retract position, and stop means formed on the separator for limiting the retract movement of the plunger, should the plunger not be engaged by the cooperating means in the retract position; said plungers being hollow, and enclose the stop means, one edge of said plungers engaging the stop means for limiting the movement of the plungers.

2. A multi-cartridge ball point pen comprising a one piece pen body forming a combined cap and barrel having an opening at one end for allowing a single cartridge to project therethrough, and a mouth at the other end; said pen body having a transverse body seat intermediate said mouth and opening, a transversely extending spacer positioned within the body and on said transverse body seat, and having a separator extending longitudinally from the spacer, said spacer provided with transverse seats, a cartridge and surrounding spring associated with spacer seat, with the spring reacting against the spacer seat and its associated cartridge to tend to drive the cartridge in a direction out of the mouth of the body, and locking means including a plunger engaging each cartridge, and cooperating means on the body for holding the cartridge in either a project or retract position, said locking means additionally holding the spacer against the transverse body seat, said body mouth wide enough to enable the insertion therethrough of the spacer, cartridges, springs and plunger, said separator extending between said plungers when the plungers are in the project position, and when the plungers are in the retract position, and stop means formed on the separator for limiting the retract movement of the plunger, should the plunger be not engaged by the cooperating means in the retract position; said stop means being formed on opposite sides of the separator.

3. A multi-cartridge ball point pen comprising a one piece pen body forming a combined cap and barrel having an opening at one end for allowing a single cartridge to project therethrough, and a mouth at the other end; said pen body having a transverse body seat intermediate said mouth and opening, a transversely extending spacer positioned within the body and on said transverse body seat, and having a separator extending longitudinally from the spacer, said spacer provided with transverse seats, a cartridge and surrounding spring associated with spacer seat, with the spring reacting against the spacer seat and its associated cartridge to tend to drive the cartridge in a direction out of the mouth of the body, and locking means including a plunger engaging each cartridge, and cooperating means on the body for holding the cartridge in either a project or retract position, said locking means additionally holding the spacer against the transverse body seat, said body mouth wide enough to enable the insertion therethrough of the spacer, cartridges, springs and plunger, said separator extending between said plungers when the plungers are in the project position, and when the plungers are in the retract position, and stop means formed on the separator for limiting the retract movement of the plunger, should the plunger be not engaged by the cooperating

means in the retract position; said stop means being tapered to permit camming the plungers thereover.

4. The multi-cartridge pen of claim 2, wherein the stop means are off-set from each other.

5. A multi-cartridge ball point pen comprising a one piece body forming a combined cap and barrel having an opening at one end for allowing a single cartridge to project therethrough, and a mouth at the other end; said pen body having a tranverse body seat intermediate said mouth and opening, a transversely extending spacer positioned within the body and on said transverse body seat, and having a separator extending longitudinally from the spacer, said spacer provided with transverse seats, a cartridge and surrounding spring associated with each spacer seat, with the spring reacting against the spacer seat and its associated cartridge to tend to drive the cartridge in a direction out of the mouth of the body, and locking means including a plunger engaging each cartridge, and cooperating means on the body for holding the cartridge in either a project or retract position, said locking means additionally holding the spacer against the transverse body seat, said body mouth wide enough to enable the insertion therethrough of the spacer, cartridges, springs and plunger,

said separator extending between said plungers when the plungers are in the project position, and when the plungers are in the retract position, and stop means formed on the separator for limiting the retract movement of the plunger, should the plunger be not engaged by the cooperating means in the retract position; said pen body being provided with a slot into which the transversely extending spacer fits so as to automatically orient the plungers with respect to the pen body.

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