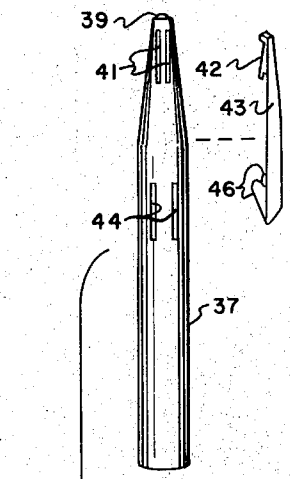
Jan. 26, 1971 N. A. ZEPELL 3,558,233

ROTARY ACTUATING MECHANISM FOR WRITING INSTRUMENT

Filed April 21. 1969 3 Sheets-Sheet 1



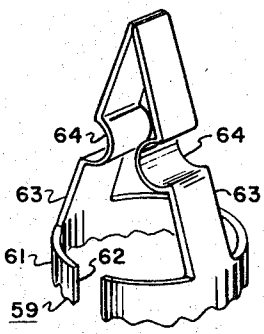


FIG. 4

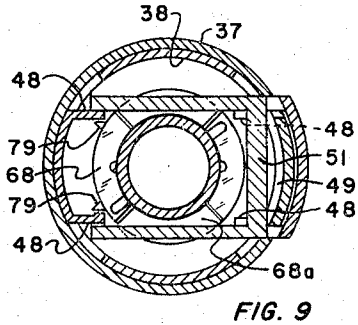
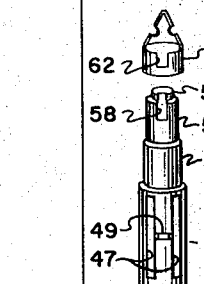


FIG. 9



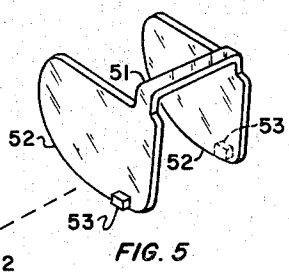


FIG. 5

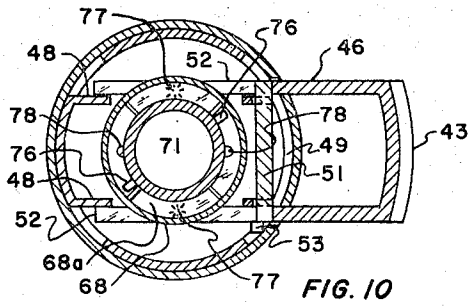


FIG. 10

FIG. 13

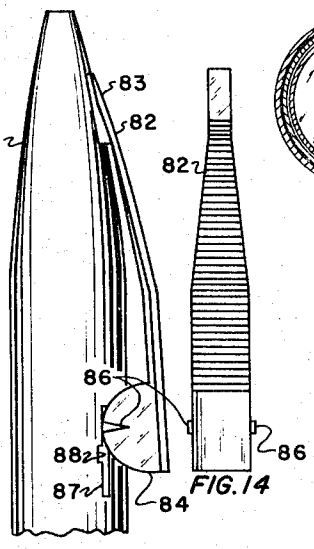


FIG. 14

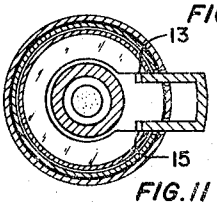
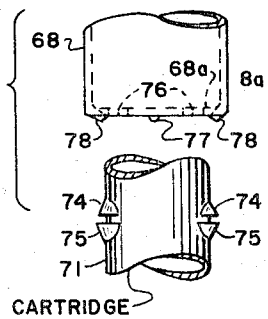


FIG. 11

FIG. 12



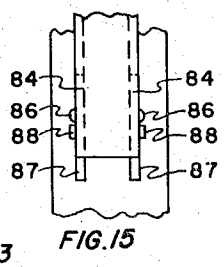


FIG. 3

FIG. 15

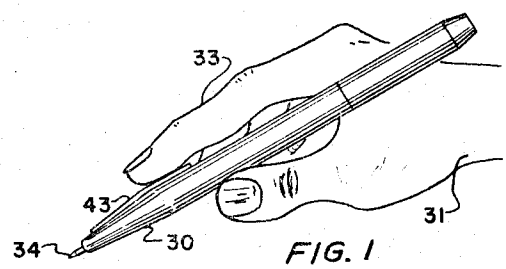


FIG. 1

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ROTARY ACTUATING MECHANISM FOR WRITING INSTRUMENT

Filed April 21. 1969 3 Sheets-Sheet 2

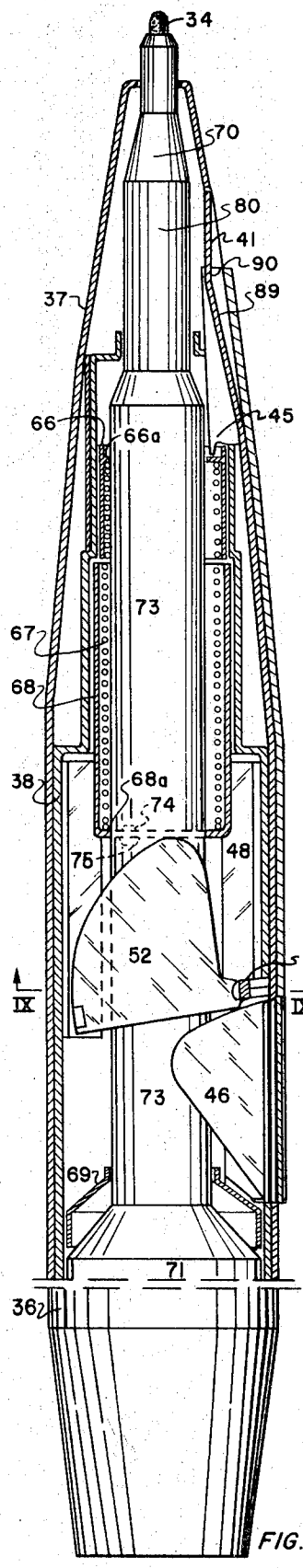


FIG. 6

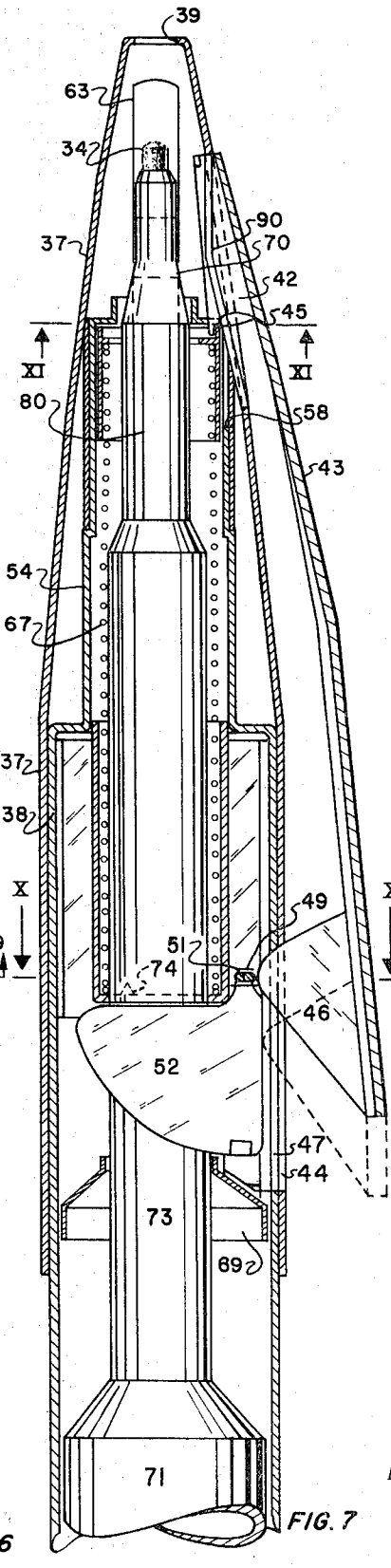


FIG. 7

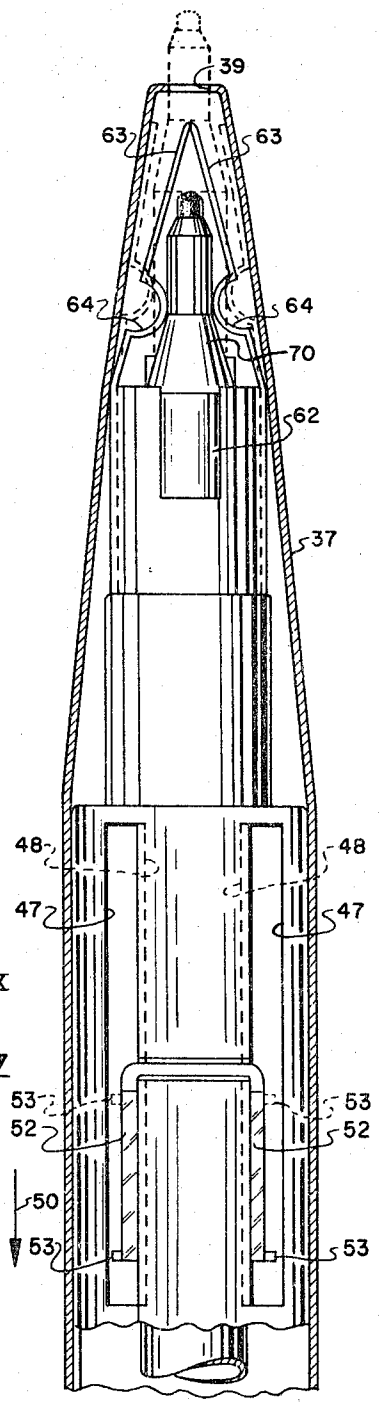


FIG. 8

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ROTARY ACTUATING MECHANISM FOR WRITING INSTRUMENT

Filed April 21. 1969 3 Sheets-Sheet 3

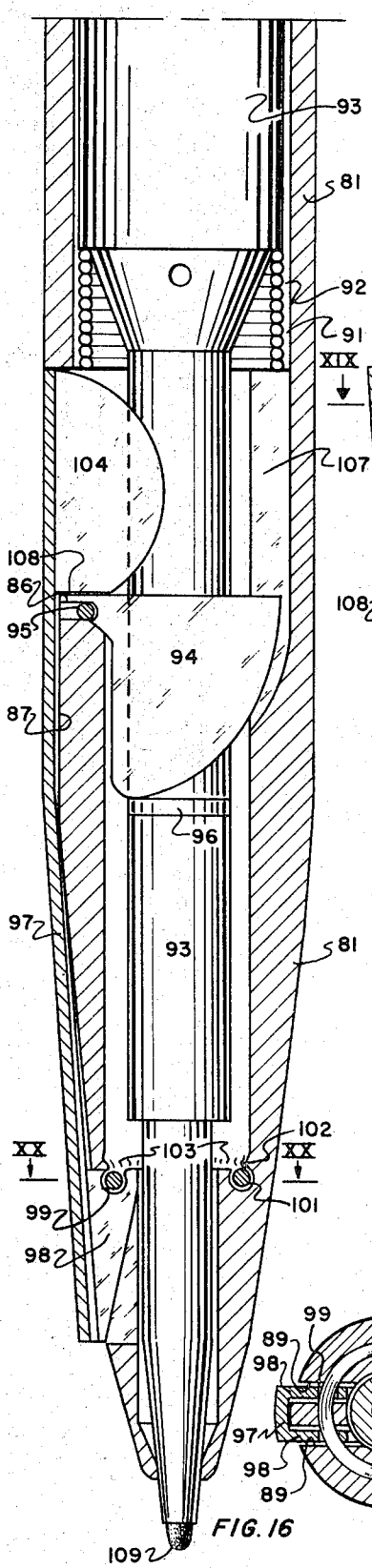


FIG. 16

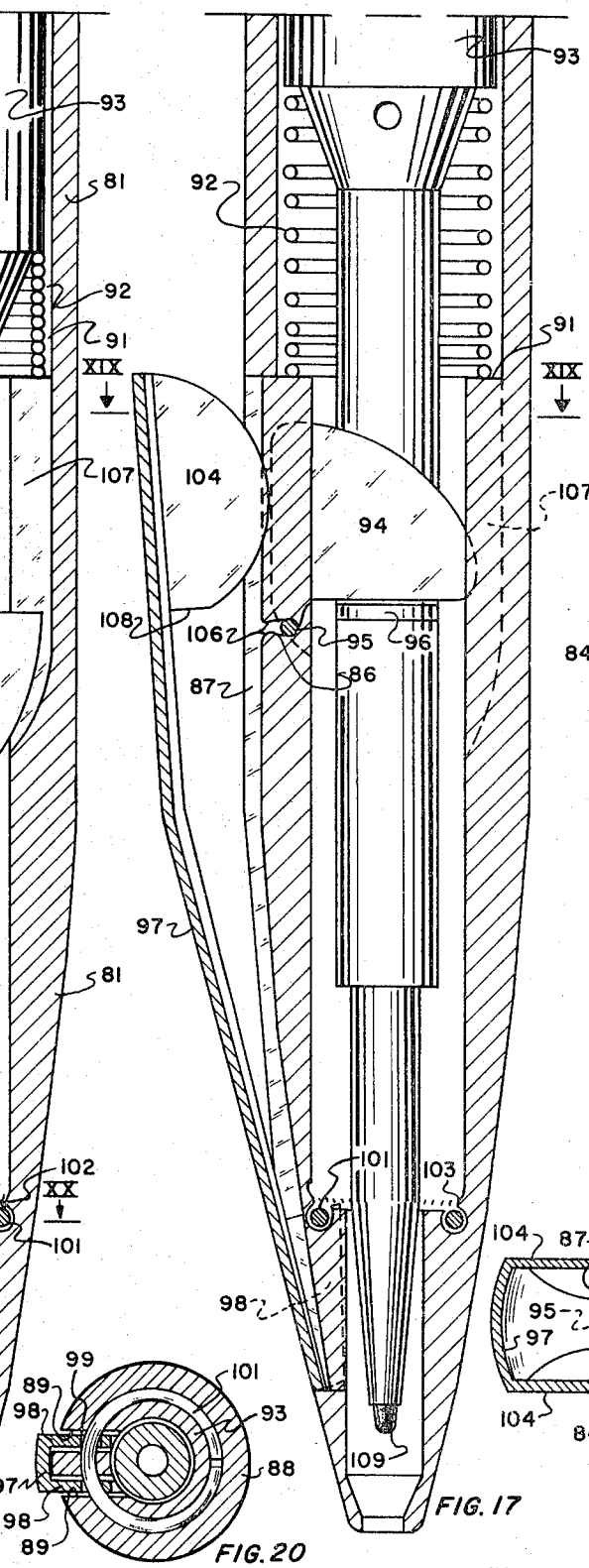


FIG. 17

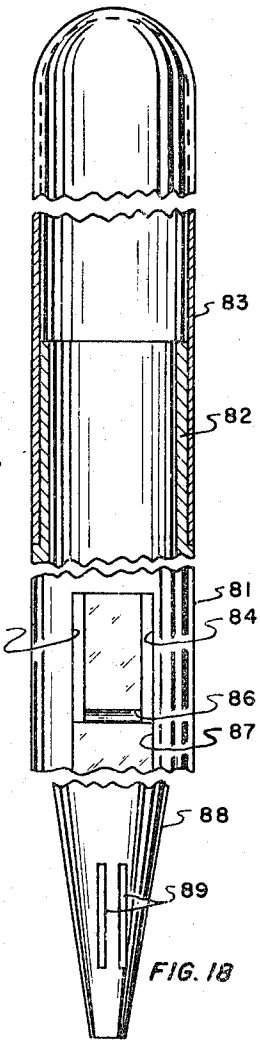


FIG. 18

FIG. 20

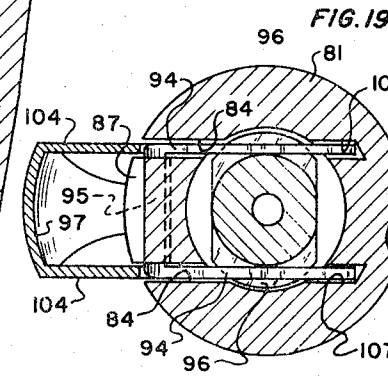


FIG. 19

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United States Patent Office 3,558,233
Patented Jan. 26, 1971

3,558,233

ROTARY ACTUATING MECHANISM FOR WRITING INSTRUMENT

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Filed Apr. 21, 1969, Ser. No. 817,782
Int. Cl. B43k 24/04
U.S. Cl. 401—106 10 Claims

ABSTRACT OF THE DISCLOSURE

The clip ball is manually pressed inwardly to contact a pair of crank arms that straddle a cartridge and rotate to press against a shoulder of the cartridge to extend the writing tip. A compression spring normally retracts the writing tip within the barrel. The clip is not only hinged to the barrel but also slides so that the clip ball can be moved out of alignment with the crank arms when the pen is not in use. This provides a safety against accidental extension of the writing tip.

This invention relates to writing instruments wherein the ball of the clip is used to extend a retractable writing tip, and has particular reference to a rotary crank arm structure actuated by the clip ball. It is particularly useful for felt point or soft point cartridges.

The soft tip pen is making greater and greater inroads in the writing instrument business. This is because it writes with very little pressure, much less than a ball point pen or a mechanical pencil; it writes continuously and never skips; it makes very legible heavy lines; and it writes at an any angle on the paper and in any rotational position. Many improvements have been made from its first appearance as a "felt marker" where the line was very broad, the ink had an unpleasant odor and penetrated the paper, and the ink dried quickly at the tip. Presently the tip is made of a fibrous, porous material, only one millimeter in diameter, and wears very little. The ink has no odor, it doesn't penetrate the paper, has greater opacity, flows on the paper very easily, will write on different surfaces and will not dry at the tip even when the cap has been left off for several months.

There is one serious shortcoming the soft tip pen has which the industry is trying to overcome, but as yet has not succeeded, namely: it must have a cap just as the fountain pen we used many years ago. The sales of the soft tip pen could have multiplied many times if it would retract as the ball point pen does, a feature which made the retractable ball point the leading writing instrument for the last twenty years the world over. Many manufacturers here and abroad have tried to solve this problem by replacing the ball point cartridge with a soft tip cartridge in a retractable ball point pen housing. The pen industry learned quickly this was very unsatisfactory. The reason is that unlike the ball pen where its point must roll along or be rotated on the paper to produce a line, or unlike the mechanical pencil where its point must be rubbed against the paper to produce a line, the soft tip point has an extremely easy flow characteristic so that the slightest touch at its point with anything porous or fibrous will allow the ink from the tip to flow out from the tip quickly on the material it touches. Because of this it can be very damaging to leave the pen with its point extended on a desk since anything porous such as paper, a handkerchief, etc., which will touch that wet point will suck the ink out of it and discolor the porous material. The accident is even much faster and more extensive when the user forgets to retract the point before putting it in the pocket or purse and the wet tip touches the cloth of the pocket. But even when one does retract the point,

the fact that it is kept in the pocket with its point downwards makes it easy for a thin thread, lint, or cloth of the pocket to reach the point, which is merely recessed in the front of the housing of the instrument. This contact will allow the ink to run from the point by capillary action over the thread or other material to the cloth of the purse or pocket and will cause a leakage almost as bad as if the point were not retracted at all.

It should be noted that the soft tip pen cannot be used like the so-called stick pen which is a ball point pen with no cap and which is used to a great extent in many offices, nor can it be used like a pencil, because of the danger of the wet tip touching any papers or cloth as outlined before. This means retractability and good cover for the point of the soft tip is of prime importance.

A satisfactory soft tip pocket pen should therefore have several characteristics. The point must retract automatically when the user lays it down, and retraction should not be left to the memory of the user. In addition to retraction, the point must be protected in its retracted position from accidental contact with threads, lint, tissue paper, etc., to prevent accidental leakage. Furthermore, the point must not project accidentally. I have devised a pen structure to meet these requirements and employ the clip of the pen as part of the mechanism to project the writing tip during use.

It is, therefore, a general object of the invention to provide an improved soft point pocket pen that is safe and reliable in operation.

Other objects, advantages and features of the invention will be apparent in the following description and claims together with the drawing forming an integral part of this specification in which

FIG. 1 is a three dimensional view of the hand of a user holding a pen embodying the invention wherein a finger depresses the clip to extend the writing point;

FIG. 2 is an exploded view of the pen of FIG. 1 showing all the parts except the writing cartridge;

FIG. 3 is a three dimensional view of a cartridge which is inserted in the assembly of FIG. 2;

FIG. 4 is an enlarged three dimensional view of the writing point protector also shown in FIG. 2;

FIG. 5 is a three dimensional view on an enlarged scale of the double crtnk arm provided particularly in accordance with the invention and also shown in smaller scale in FIG. 2;

FIG. 6 is an elevation view in full section through a fully assembled pen shown in FIG. 1 with the point extended;

FIG. 7 is an elevation view in full section of the fully assembled pen and similar to FIG. 6 but with the writing point in retracted position, and bottom cap removed;

FIG. 8 is a view similar to FIG. 7 but rotated 90° to show a different view of the writing point protector when the cartridge is retracted, and showing in broken out line the point when it is extended;

FIG. 9 is a cross sectional view along the section line IX—IX of FIG. 6;

FIG. 10 is a view in full section along the line X—X of FIG. 7;

FIG. 11 is a sectional view along the line XI—XI of FIG. 7;

FIG. 12 is a fragmentary elevation view of part of the cartridge that fits in part of the actuating sleeve in order to mechanically interconnect the cartridge with the mechanism or advancing and retracting the writing point;

FIGS. 13, 14 and 15 are views of a modified form of the invention, FIG. 13 being an elevation view of the upper part of a barrel having a clip secured thereto;

FIG. 14 is a front view of the clip of FIG. 13; and

FIG. 15 is a fragmentary view of the ball portion of

the clip contacting the pen barrel to show the locking of the clip in the point retracted position;

FIGS. 16 through 20 show a presently preferred embodiment of the invention as manufactured in plastic;

FIG. 16 is an elevation view in full section of the clip end of a plastic pen embodying the invention and showing the cartridge in extended position;

FIG. 17 is a view in full section similar to FIG. 16 but showing the writing point in retracted position;

FIG. 18 is an elevation view of the pen FIGS. 16 and 17 but rotated 90° to show the slots in the barrel;

FIG. 19 is a sectional view along the line XIX—XIX of FIG. 17;

FIG. 20 is a sectional view along the line XX—XX of FIG. 16.

Referring to FIG. 1 there is illustrated a pen **30** embodying the invention which is held in the hand of a user **31** who has depressed a clip **43** on the pen with a finger **33**. This causes a cartridge to be projected out of the clip end of the pen so that a writing tip **34** will be available for writing. Release of the clip **43** by the finger **33** will result in the writing point **34** being withdrawn inside the body of the pen **30**.

Referring to FIGS. 2 and 3 there is illustrated an exploded view of the pen of FIG. 1. The pen has a two piece barrel formed of a lower section **36** and an upper section **37**, both having a frictional grip on a tubular body member **38**. The upper barrel **37** has an opening **39** through which the writing tip **34** of FIG. 1 projects. This upper barrel also has a pair of slots **41** which receive a pair of ears **42** on the upper end of the clip **43**. The slots **41** and the ears **42** form part of a hinge joint for the clip **43**. Also formed in the upper barrel member **37** are a pair of larger slots **44** provided particularly in accordance with the invention, and these receive a pair of striker plates **46** formed on the lower end of the clip **43**. An enlargement on the open end of a clip is usually referred to as a "ball" because the characteristic structure is spherical or hemispherical. In this case, however, the ball is the pair of striker plates **46** which are parallel.

Referring now to the tubular body member **38** in the center of FIG. 2, it will be noted that it has a pair of parallel slots **47** similar in extent but wider than the two slots **44** in upper barrel member **37**. When the upper barrel member **37** is slid over the body member **38**, the manufacturer carefully aligns these slots. These slots **47** in the body member are formed by first slitting the tubular body **38** at the outside edge of the two slots **47** and bending the material inwardly to form a pair of parallel plates **48** best visualized in FIG. 9. The body member **38** is slotted with a cross slot **49**, and this slot acts as a bearing for an axle **51** on a pair of crank arm plates **52** which fit within the slots **47**. The crank arm pair is shown in more detail in FIG. 5. There it will be noted that at the bottom edge of each crank arm plate **52** there is provided a projection **53** which limits rotation in one direction to keep the crank arm pair from coming out of the barrel member **37**.

Referring now to the upper part of the body member **38** of FIG. 2, it will be noted that there is a reduced section **54** and above that another reduced section **56**, and above that a tubular bushing section **57**. The section **56** is slotted at **58** to provide clearance for the clip ears **42** when the pen is assembled as will be described in more detail later.

Referring now to the part of FIG. 2 between the body member **38** and the upper barrel **37**, there is illustrated a tip protector assembly **59** shown in more detail in FIG. 4. In these two figures it will be noted that the diameter of a tubular base **61** is such that a friction fit will take place when it is slipped over the upper reduced section **56** on the body member **38**. Likewise the tubular base **61** is slotted at **62** to coincide with the slot **58** on the section **56** to give the same clearance to the clip ears **42**. Formed on the tubular base **61** are a pair of spring fingers **63** each

having a semi cylindrical portion **64** to be engaged by part of the cartridge to spread the fingers **63** apart. In the closed position illustrated in FIG. 4, these spring fingers **63** keep lint, threads and other fibres from touching the retracted writing point **34** of the cartridge, and thus make the writing instrument fool proof when it is carried in a purse or pocket or other place where threads, lint and other fibrous materials are encountered.

Referring now to the part of FIG. 2 between the body member **38** and the lower barrel **36**, there is illustrated an upper tubular hinge member **66** having an internal flange not shown in that figure, but against which abuts a compression spring **67**, the lower end of which fits inside of a tubular cartridge engager **68** which also has an internal flange not shown. Below that is a frusto-conical bushing **69** for guiding the cartridge.

Shown in FIG. 3 is a cartridge **71** having the writing tip **34** and having the usual air vent **72**. An upper reduced section **73** fits within the cartridge engager tube **68** and lugs **74** and **75** on the cartridge engage the internal flange of member **68**, as shown in more detail in FIG. 12. The crank arm plates **52** strike the bottom of the cartridge engager **68** to move the cartridge **71** inwardly or outwardly of the pen barrel **37–36**.

Referring to FIGS. 6, 7 and 8, there is illustrated the various parts already identified in FIGS. 2 and 3. The upper barrel portion **37** and the lower barrel portion **36** have a frictional engagement with the tubular body member **38**. The cartridge **71** has its reduced portion **73** inserted inside the cartridge engager **68**, the spring **67**, and the hinge tube **66**. Referring especially to the hinge tube **66**, the internal flange mentioned but not shown in connection with FIG. 2 is there illustrated and identified as **66*a***. This flange **66*a*** acts as a stop for the upper end of the compression spring **67**. The upper edge of the tubular member **66** engages a prong **45** in each of the hinge ears **42** of the clip **43**, and these notches and tubular structure act as the hinge for the clip **43**. The slots **41** in the upper barrel **37** in which the clip ears **42** project, are longer than the clip ears, and the entire clip **43** can be manually moved downwardly as shown in FIGS. 6, 7 and 8, against the compression of spring **67**. As shown best in FIG. 7, when the spring **68** urges the clip in its upward position the striker plates **46** of the clip ball strike the axle **51** of the rotatable crank arms **52**, and thus are unable to cause any rotation of the crank arms **52**. When the clip **43** is manually pulled downwardly then the striker plates **46** are in the position shown in broken outline in FIG. 7, and can then move inwardly under manual pressure through the slots **44** in the barrel **37** and through the slots **47** in the body member **38**. The striker plates **46** thereupon engage the crank arm plates **52** and drive them to the rotational position shown in FIG. 6. The crank arm plates **52** strikes a bottom flange **68*a*** of the cartridge engager **68** and move the entire cartridge **71** upwardly because of the inter-engagement of the lugs **74** and **75** with this flange. This, accordingly, projects the writing tip **34** as shown in FIG. 6 and FIG. 1.

The mechanism for inter-connecting the cartridge **71** and the cartridge engager tube **68** is shown best in FIGS. 6 9, 10 and 12. There it will be noted that the inwardly projecting flange **68*a*** on the cartridge engager **68** has a pair of oppositely disposed notches **76**, a pair of downwardly projecting dimples **77**, and a pair of slitted downwardly projecting stops **78**. Referring particularly to FIG. 12 it will be noted that the smaller upper projections **74** on the cartridge **71** can pass through the notches **76** but that the lower projections **75** are too large to pass through these notches **76**, and accordingly, the cartridge stops with these projections **75** abutting the bottom edge of flange **68*a***. The cartridge **71** is then rotated with respect to the cartridge engager **68** and the projections **74** and **75** are forced past the dimples **77**, and projections **75** abutt against the downwardly projecting stops **78**. The cartridge is thus locked by this rotary motion against

again aligning itself with the notches **76** and is thereby effectively locked to the cartridge engager **68**.

Also illustrated in FIG. 10 are the rearward pair of flanges **48** that are similar to the front pair **48** and both pairs act to guide the rotatable crank plates **52** shown best in FIG. 5. Also shown in FIG. 10 is the transverse slot **49** first identified in FIG. 2, which serves as a hinge place or bearing for the axle **51** on the crank plate pair **52**. The outer barrel **37** is not transversely slotted in this area, and hence it acts to close the outer extremity of this transverse slot **49**, thus keeping the axle positioned on the transverse slot of **49**. It will also be noted in FIG. 10 that the outwardly projecting lugs **53** on the crank arm plates **52** strike the inner wall of barrel **37**, to limit counter clockwise rotation of the crank arms **52**, as viewed in FIGS. 5, 6 and 7.

Illustrated additionally in FIG. 9 is a structure for keeping the cartridge engager **68** from rotating when a user desires to take out one cartridge and substitute a new cartridge. This is the form of projections **79** formed on the outer surface of the cartridge engager **68**, and these fit within the left hand pair of guide plates **48**, as viewed in FIG. 9.

Illustrated in FIGS. 6 and 7 at the region of the clip hinge is s structure for giving hinge action to the clip with minimum size of clip. The metal between the hinge slots **41** is bent inwardly at **90** to allow a space between it and the body of clip **43**. Thus when the clip of FIG. 6 is manually pressed at the top, the top can move inwardly at this region to permit outward rotation of the ball.

The lint protector mechanism **59** in FIG. 4 is shown also in FIGS. 7 and 8. In the retracted position of the cartridge **71** and its writing tip **34**, the spring fingers **63** are closed over the top of the tip **34** in the form of a wedge. Even though this structure is open at the sides, it has proved to be adequate to prevent accidental contact of lint, threads, tissue, etc. that accidentally intrude in the end opening **39**.

Referring particularly to FIG. 8, it will be noted that a frustoconical portion **70** of the cartridge **71** engages the semi cylindrical bulges **64** on the fingers **63**, and as the cartridge moves upwardly, forces these fingers **63** away from each other until they lie flat against the inside of the barrel **37**, as shown in broken outline. An enlarged cylindrical portion **80** of the cartridge keeps these fingers spread as the tip **34** is projected fully, also as shown in broken outline. The spring action of the fingers **63** causes them to return to the touching V-shaped position of FIG. 8 when the cartridge is retracted.

OPERATION: FIGS. 1 THROUGH 12

The user **31** grasps the pen **30**, as shown in FIG. 1, and attempts to press the clip **43** inwardly, but is unable to do so because, as shown in FIG. 7, the striker plates **46** on the lower end of the clip **43** strike against the ayle **51** and no operation results to extend the writing tip **34**.

The user must manually slide the clip **43** downwardly in the direction of arrow **50** in FIG. 7, against compression spring **67** (and sleeve **66**), and this disposes the striker plates **46** in an area opposite the slots **44** (FIG. 2) in the upper barrel **37** and on the outer end of the striker plates **52**. The user then pushes the clip downwardly or inwardly into the pen, as shown in FIG. 1, and this causes clockwise rotation of the crank arm plates **52** as viewed in FIG. 6. The plates **52** in turn engage the inwardly projecting flange **68***a* on the cartridge engager **68**, forcing the cartridge engager upwardly against the compression of spring **67**. Lugs **74** formed on the cartridge portion of **73** are in engagement with this flange **68***a*, and the entire cartridge is thus lifted upwardly, as viewed in FIG. 6 to project the writing point **34** upwardly, and through the hole **39** in the end of barrel **37**. The projected tip **34**, which may be a porous or soft tip, is then ready for writing use as shown in FIG. 1.

When it is desired to retract the writing tip **34** the user merely lifts off his finger pressure on the clip **43** and compression spring **67** then rotates the crank arm plates **52** counter clockwise, as viewed in FIG. 6, and this in turn forces the clip striker plates **46** outwardly of the barrel **37**, and the clip assumes its extended position. Simultaneously the compression spring **67** acts against the upper hinge tube **66**, the upper end of which presses against the clip notch **45**, moving the entire clip **43** upwardly to the position illustrated in FIG. 7. Simultaneously with the retraction of the writing tip **34** the spring fingers **63** close over the retracted tip, as shown in FIG. 8, and the tip **34** is thus protected from lint, threads, or other materials that might accidentally enter through the opening **39** in the end of the barrel **37**. The pen is now in a condition to be placed in a purse or any other place where it can be subjected to pressure against the clip **43**. The clip **43**, as viewed in FIG. 7, will not extend the tip because pressure on the clip is transmitted through the striker plates **46** to the hinge axle **51** and no rotation of the crank arm plates **52** results.

MODIFICATION: FIGS. 13 THROUGH 15

Referring to FIGS. 13 through 15 there is illustrated a pen and barrel and clip wherein the locking action is obtained by misalignment of a clip projection and a notch in the slots which receive the clip ball.

Referring to those figures, a pen barrel **81** has a clip **82** suitably pivoted to it at the upper end **83** of the clip. The ball of the clip may consist of a pair of parallel plates **84** each formed with an outwardly projecting dimple **86**. Formed in the barrel **81** are parallel slots **87** which receive the parallel plates **84** of the clip, but in a central area they are notched at **88** to receive the dimples **86**. The slots **87** are too narrow to receive the dimples unless they are aligned with the notches **88**. The clip **82**, accordingly, is locked when it is slid upwardly on the barrel **81**, inasmuch as the dimples strike the side of the slots and the parallel plates **84** cannot enter. When the clip **82** is manually slid downwardly to the point where the dimples **86** are aligned with the notches **88**, then the plates **84** can enter the slots **87** and actuate a suitable mechanism for extending the tip (not shown) of a cartridge in the fashion shown in the preceding figures.

MODIFICATION MADE OF PLASTIC

Referring to FIGS. 16 through 20 there is illustrated a presently preferred embodiment of the invention which is formed of molded plastic material. In these figures the writing tip is shown at the bottom of the figures, but it will be noted that this is the clip end also of the writing instrument, and if the clip is used to hold the pen in a pocket, the writing tip will be at the top of the pen.

Referring first to FIG. 18, it will be noted that a thick walled barrel member **81** has a reduced section **82** over which is frictionally fitted a thin cap member **83**. This cap **83** is removed for insertion of the writing cartridge which is not shown in FIG. 18. An intermediate portion of the thick walled barrel **81** has a pair of slots **84** formed through the wall and at the bottom of the slots **84** is a transverse slot **86** which does not penetrate the wall. The outer surface of this portion of the body member **81** has a shallow recess **87** to receive a clip so that the clip can be flush with the outer surface when it is pressed against the barrel **81**. The body member **81** has a lower tapered point **88** in which are formed a pair of slots **89** which pass through the wall and which act as part of the hinge and as guides to allow sliding motion for a clip.

Referring now to all of the figures, the thick walled barrel **81** has an internal step **91** against which rests a compression spring **92** which urges a cartridge **93** upwardly. Fitted within the transverse notch **86** is an axle **95** of a double crank arm **94** constructed similarly to that of FIG. 5. The double cranks **94** engage transverse flanges **96** extending from opposite sides of the cartridge **93**, and it will be noted, especially in FIG. 19, that this cartridge

may be rotated 90° in order to have the flanges **96** pass between the crank arm plates **94**. No particular mechanism is needed to hold the cartridge **93** in this particular rotational position inasmuch as it seems to hold its rotational position during use, but the provision of an outer lip on the top of the flanges **96** helps keep the position.

The clip of FIGS. 16 through 20 is designated by the number **97** and has a pair of parallel projecting ears **98** at its hinge end which project into the slot **89**. Notches **99** are formed on these ears **98**, and these notches are engaged by a ring **101**, which is held in a circular recess **102** which preferably has an overhanging rib **103**. Modern plastic molding materials accommodate to such overhangs, and the mold can be withdrawn from the recess **102** without shearing off the rib **103**. The effect, therefore, is a snap action on the ring **101** to hold it in the recess **102**. The clip is held in this hinge joint on the ring **101** by virtue of the fact that its bottom end abutts against the bottom end of the point slots **89**.

Referring now to the upper end of the clip ball in FIGS. 16 through 20, it will be noted that the ball part of the clip is formed with a pair of plates **104** which strike the plates of the crank arm **94** to cause that crank arm to rotate. These plates **104** are aligned with the slots **84** previously described with respect to FIG. 18. The crank arm plates **94** are joined by an axle **95** which is journaled in the cross slot **86**. The cross slot **86** may also be provided with an interference overhang **106** shown best in FIG. 17 to hold the axle **95** in its slot **86**. Aligned with the through slots **84** in the front of the barrel body **81** are a pair of grooves **107** in the back of the barrel body which receive the crank arm plates **94** especially as they rotate clockwise from the position in FIG. 17 to the position in FIG. 16.

A lock is provided to hold the clip in its inward position, as shown in FIG. 16, without appreciable manual effort on the part of the user. This lock includes a flat **108** on the bottom of the striker plates **104**, and this flat, as shown in FIG. 16, engages the flat upper surface of the crank arms **94**. The action of spring **92** urging an upward pressure on the crank arms **94** causes this pressure to be transferred to this flat at the point of engagement, and this acts as a low pressure lock. When the user releases the clip **97** from his manual grasp, the clip stays locked, and the user then presses upon the part of the clip closest to the end of the pen, and this being on the far side of the hinge, rotates the clip to an outward position. The spring **92** now moves the cartridge **93** upwardly to retract it. As shown in FIG. 16 especially the clip **97** fits within the recess **87** of the thick walled barrel **81** so that it forms a smooth contour at the portion of the pen grasped by the user.

OPERATION: FIGS. 16 THROUGH 20

The plastic molded pen of FIGS. 16 through 20 is grasped similarly to the pen of FIG. 1, and the user presses inwardly on the clip **97**. This causes the striker plates **104** to engage the crank arm plates **94**, as shown in FIG. 17, causing them to rotate clockwise to the position shown in FIG. 16. These crank arm plates **94** engage the outwardly projecting flange **96** on the ctraridge **93** farcing it downwardly so that a writing tip **109** projects for writing, as shown in FIG. 16. In the position shown in FIG. 16, the flat **108** on the bottom edge of the striker plates **104** engage the flattened upper surface of the crank arms **94**, as shown in FIG. 16, and this causes a locking of the plates **94** in the position illustrated with practically no manual pressure. This reduces the muscular effort required to hold the point **109** extended during use. Release of the manual pressure on the clip **97** does not release the lock, and the user pushes on the bottom end of the clip to release it. The ring **101** acts as a hinge for the clip **97** because of the notches **99** in the clip plates **98** engaging the ring **101**.

The invention has been described with reference to several embodiments but is not limited to these or any other modification. The appended claims encompass all variations and modifications that fall within the true spirit and scope of the invention.

DISCUSSION

It will be apparent that the sliding clip not only causes projection of the writing tip, but also upon release of the clip ball from the side wall opening, two things result; one, the cartridge spring retracts the cartridge and two, spring action causes the clip to slide to its rest position where the ball is out of contact with the side wall opening. In this rest position, the clip ball bears against the pen barrel and accidental forces acting on the clip transverse to the barrel will not extend the tip. Thus this movement of the clip to its rest position acts as a safety against accidental projection of the writing tip.

It will be noted with respect to the embodiment of FIGS. 1 through 12 that the spring **67** serves the double function of retracting the cartridge **71** so that the tip **34** is within the barriel **37**, and also at the same time urges the clip **43** toward the tip opening **39** so that the ball plates **46** are misaligned (not opposite) the sidewall slots **44** and hence cannot actuate the cartride. The spring **67** is thus a common factor in this double safety action of the pen.

The rotatable crank arm plates **52** and **94** are located at the side of the cartridge. They rotate in a plane that can be described as parallel to a radius from the cartridge. But actuation of these plates is based upon a new type of clip ball, namely, one that can reach inside the pen barrel to strike and thereby rotate the crank plates. This is accomplished by making the clip "ball" in the form of plates, also preferably parallel to a radius from the barrel. These plates reach inside at the side of the cartridge. A conventional solid ball of a clip could not achieve sufficient rotation of crank arms to be useful.

The invention makes double use of the clip; not only does it serve its normal clip function of holding the pen in a pocket, but it actuates the extending of the writing tip. A separate mechanism for extension is thus avoided. The user merely holds the pen in his fingers and slides the clip longitudinally with his thumb to extend the tip, and then grasps it in the writing position shown in FIG. 1. Alternatively, the user grasps the pen in his fingers for writing as shown in FIG. 1, and then slides the clip with his fingers.

The invention has been described with reference to several embodiments but is not limited to these or any other modification. The appended claims encompass all variations and modifications that fall within the true spirit and scope of the invention.

I claim:

1. A writing instrument having a clip adapted to be grasped at the clip for use comprising:

(a) a barrel having an opening in one end and a sidewall opening adjacent that end;

(b) a cartridge disposed within the barrel and having a writing tip and reciprocable within the barrel to selectively project the writing tip through the end opening of the barrel and to retract the writing tip within the barrel and extending past the sidewall opening;

(c) a clip having a ball and mounted on the barrel for movement of the clip ball toward and away from the barrel and located to dispose the clip ball opposite the sidewall opening and movable into the barrel at one side of the cartridge;

(d) a crank located entirely within the barrel adjacent the sidewall opening mounted on a pivot within and at one side of the barrel for rotation in a plane alongside the cartridge, one arm of the crank being engageable by and rotataable by the clip ball upon movement of the clip ball into the barrel through the sidewall opening, and the lengths of the arms of the crank being less than the inside diameter of the barrel so that the crank may rotate through a large angle; and

(e) means interengaging the other crank arm and the cartridge to extend the writing tip through the end opening when the clip ball is pressed into the sidewall opening and contacts said one crank arm to rotate the crank, so that a user can press the clip while holding the instrument to extend the writing tip.

2. A writing instrument as defined in claim **1** wherein the mounting of the clip to the barrel permits a second type of manual movement of the clip to misalign the clip ball and side wall opening to act as a lock to prevent accidental projection of the writing tip through the barrel end opening.

3. A writing instrument as defined in claim **1** wherein:

(f) the clip is mounted on the barrel with a limited longitudinal movement so that at one limit the clip ball is opposite the side wall opening and at the other limit it is not opposite the sidewall opening; and

(g) a spring interconnects the clip and the cartridge to normally urge the cartridge to a tip retracted position and to normally urge the clip to a ball misaligned position.

4. A writing instrument as defined in claim **1** wherein: the crank arm is double and joined by a common axle, and the arms are disposed on opposite sides of the cartridge; and the clip ball comprises a pair of striker plates so that one engage each crank arm.

5. A writing instrument as defined in claim **1** wherein the clip is hinged to the barrel by a pair of clip ears passing through slots in the barrel and a ring inside the barrel engages notches in the ears to form the hinge joint.

6. A writing instrument as defined in claim **5** wherein the ring is held in place by resilient barrel portions that give a snap action upon inserting the ring.

7. A writing instrument as defined in claim **1** wherein the means interconnecting the cartridge and the crank arm comprises lugs on the cartridge, and a tubular cartridge engager having an internal flange engages the lugs, and the crank arm engages the tubular cartridge engager.

8. A writing instrument as defined in claim **7** wherein a spring is provided to urge the cartridge to retracted position, and the cartridge engager tube retains one end of the spring and transmits the spring force to the cartridge.

9. A writing instrument as defined in claim **1** wherein the sidewall opening is a slot with a notch at one portion, the clip slides longitudinally of the barrel and has a projection that fits in the notch, said clip being movable to misalign the ball plate projection and the notch to act as a safety against accidental projection of the writing tip.

10. A writing instrument as defined in claim **6** wherein a spring interconnects the cartridge and barrel to hold the cartridge normally in a retracted position, and the crank arm and clip ball overcome this spring to project the writing tip.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,558,233 Dated January 26, 1971

Inventor(s) Nathan A. ZEPELL

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Inventor's address: "Terisita" should be --Teresita--

Column 1: Line 34, after "at" delete "an"

Column 2: Line 44, "crtnk" should be --crank--

Column 4: Line 53, after 52 "strikes" should be --strike--

Column 5: Line 56, "ayle" should be --axle--

Column 7: Line 9, "slot" should be --slots--
Line 60, "ctraridge" should be --cartridge--
Line 60, "farcing" should be --forcing--

Column 8: Line 22, "cartride" should be --cartridge--
Line 53, after "clip" insert --end--
Line 68, after "opening" insert --and--
Line 71, "rotataable" should be --rotatable--

Column 9: Line 25, after "one" insert --can--

Column 10: Line 1, after "wherein" insert --:--

Signed and sealed this 3rd day of August 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER,
Commissioner of Pate