

July 27, 1965

K. WEISSER

3,196,838

WRITING INSTRUMENT

Filed April 3, 1958

2 Sheets-Sheet 1

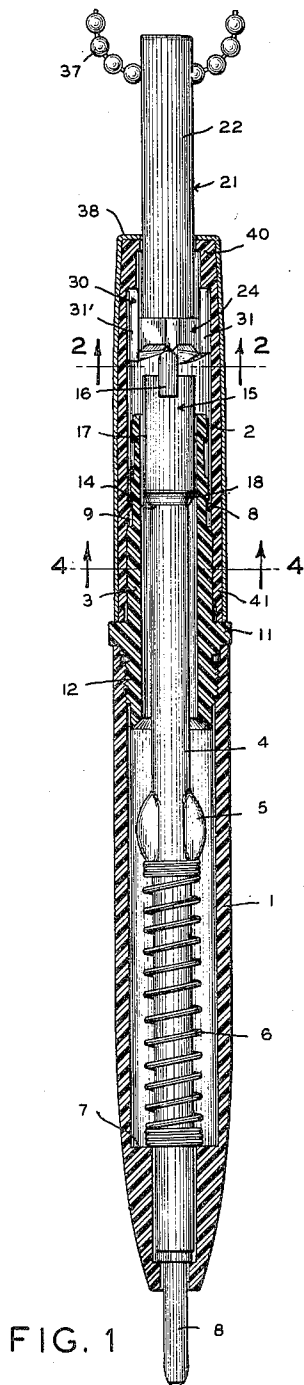


FIG. 1

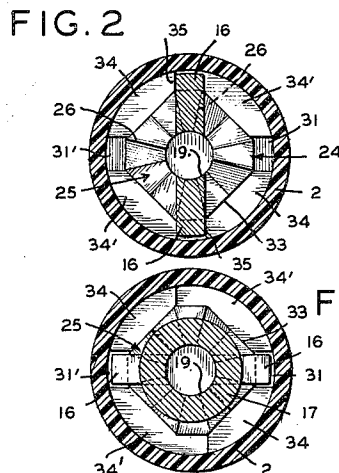


FIG. 2

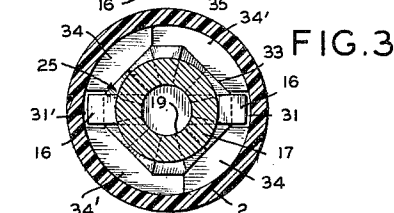


FIG. 3

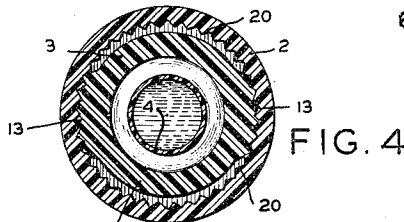


FIG. 4

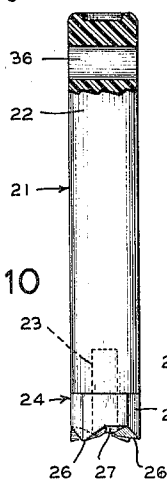


FIG. 5

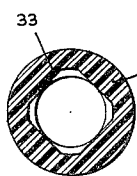


FIG. 6

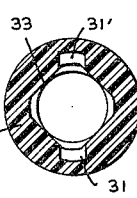


FIG. 7

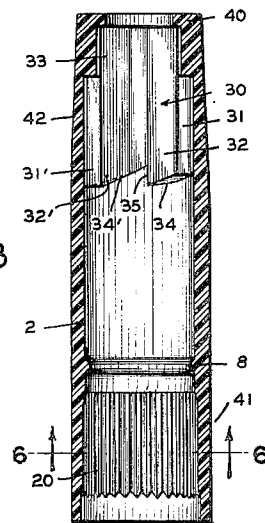


FIG. 8

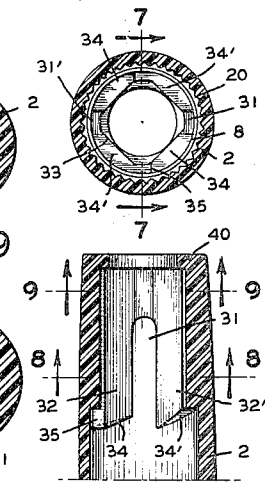


FIG. 9

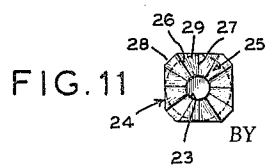


FIG. 10

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2 Sheets-Sheet 2

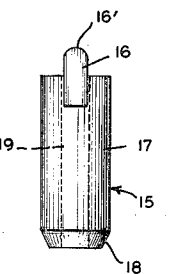
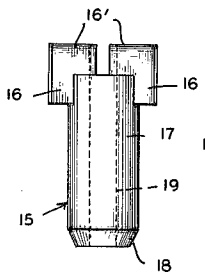
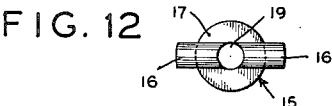


FIG. 15

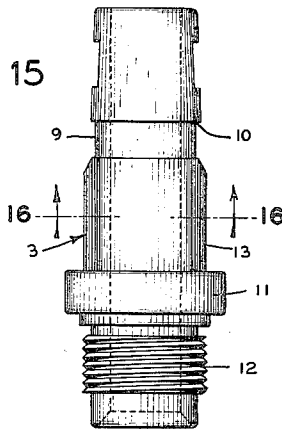


FIG. 13

FIG. 14

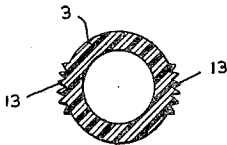


FIG. 16

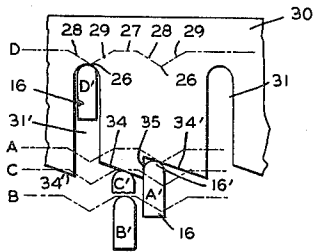


FIG. 17

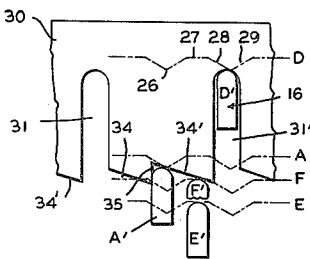


FIG. 18

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1

3,196,838

WRITING INSTRUMENT

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Filed Apr. 3, 1958, Ser. No. 726,285
8 Claims. (Cl. 120—42.03)

The present invention relates to improvements in writing instruments and more particularly to a new and improved push button operating mechanism for projecting the writing tip of a writing instrument into an exposed writing position and retracting the writing tip into a retracted position within a protecting barrel.

In accordance with the present invention, a cartridge unit carrying a writing tip is resiliently biased toward the rear of a protecting barrel and a push button is employed so that a first depression of the push button will project the cartridge unit forwardly and release of the push button will leave the writing tip locked in a projected position, and a second depression and release of the push button will retract the writing tip into a protected position in the barrel. The sequence of projection and retraction can be repeated.

More particularly, the present invention relates to an improvement of the writing instrument disclosed and claimed in copending application Ser. No. 531,460, filed August 30, 1955, now Patent No. 3,137,276 by Karl Weisser, of which this application is a continuation-in-part. The aforesaid application discloses a writing instrument comprising a barrel open at its opposite ends, a pen unit slidably mounted in said barrel and having a writing point at its forward end adapted to be projected and retracted through the forward end of the barrel upon successive depressions and release of a push means, spring means constantly urging the pen unit toward a retracted position wherein the writing point is concealed within the barrel, push means slidably mounted in the barrel, said push means having an upper portion projecting through the rear end of the barrel and a lower portion non-rotatably mounted in the barrel, said push means being provided with downwardly directed teeth, an internal gear having longitudinally extending channels separated by two teeth, said teeth defining therebetween a stop surface at a position offset from but intermediate the length of said channels, a rotatable member having at least one outwardly projecting lug extending into and slidable in said channels of said internal gear and engageable with the teeth thereof, said rotatable member being interposed between the spring means and the teeth of said push means whereby said spring means forces the rotatable member against the teeth of said push means, at least one of the engaging surfaces of the teeth of the push means and rotatable member being inclined so that the force of the engagement between the teeth of said push means and the engaging surface of the rotatable member caused by said spring means rotatably biases said rotatable member, means to elevate the push means after said push means has been depressed, said rotatable member being reciprocable with said push means and rotatable by the downwardly directed teeth thereof when depression of the push means removes said lug from within said channels whereby said lug is positioned between the two teeth of said internal gear so that said spring means can urge said lug against said stop surface when said push means is released.

In the aforesaid application, the means to elevate the push means after said push means has been depressed includes the relative inclination between the engaging surfaces of the teeth of the push means and the rotatable member.

According to the present invention, there is provided

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a new structure for accomplishing essentially the same result as set forth in the aforesaid application but which is so designed that it will take up less space than the prior art mechanisms and greatly simplify the molding operation since many lands and grooves are eliminated.

The parts of the mechanism are preferably made of molded plastic and it is apparent that a significant reduction in the lands and grooves in a molded product greatly simplifies the problems involved in preparing the dies as well as the problems involved in the various molding stages.

According to one aspect of the present invention, the means for maintaining the push means non-rotatable resides in the cross-sectional shape of the internal gear and the push means. In the structure shown in the aforesaid application, the internal gear has a generally circular opening therethrough for reception of the push means. This necessitates providing the gear with at least one relatively deep recess to receive a projection on the push means to maintain the push means non-rotatable.

However, according to the present invention, the opening through the internal gear is non-circular and the push means has a cross-sectional shape cooperating with the opening to maintain the push means non-rotatable. Preferably, the opening is generally polygonal with the open face of the channels in the gear defining at least a portion of a side of the polygon.

More specifically, the opening and the cross-section of the push means are both generally octagonal with alternate sides of the octagon being smaller than the remaining sides of the octagon. In this manner an internal gear can be constructed having a minimum number of channels and the push means can be made without any projections.

The advantages of such a structure will be more readily apparent from the following description taken in conjunction with the accompanying drawings in which:

FIG. 1 is an elevation of a ball point pen assembly constructed in accordance with the invention with the barrel broken away and in section and showing the writing tip in the projected position.

FIG. 2 is a section taken on the line 2—2 of FIG. 1.

FIG. 3 is similar to FIG. 2 with the pen assembly in retracted position.

FIG. 4 is a cross-section taken on the line 4—4 of FIG. 1.

FIG. 5 is an elevation in section of the upper casing portion of the barrel corresponding to FIG. 1 and showing the internal gear.

FIG. 6 is a section taken taken on the line 6—6 of FIG. 5.

FIG. 7 is an elevation in section of the upper casing portion of the barrel taken along the line 7—7 of FIG. 6, said elevation being inverted.

FIG. 8 is a section of the upper casing along the line 8—8 of FIG. 7.

FIG. 9 is a section of the upper casing along the line 9—9 of FIG. 7.

FIG. 10 is an elevation of the push means with a portion thereof broken away and in section.

FIG. 11 is a bottom view of the push means shown in FIG. 10.

FIG. 12 is a top view of the rotating lug member.

FIG. 13 is an elevation of the rotating lug member shown in FIG. 12.

FIG. 14 is a side elevation of the rotating lug member shown in FIGS. 12 and 13.

FIG. 15 is an elevation of the intermediate holder to which the upper and lower casings are secured to form the barrel of the pen assembly.

FIG. 16 is a cross-section of the intermediate holder taken on the line 16—16 of FIG. 15.

FIG. 17 is a diagrammatic developed elevation depict-

ing the retract operation showing the position of the teeth of the push means and the position of the lugs of the rotatable member in the various stages of the retracting operation.

FIG. 18 is similar to FIG. 17 and depicts the projecting operation.

Referring to FIG. 1 which illustrates a ball point pen assembly constructed in accordance with the invention, there is provided a barrel comprising a lower casing 1, an upper casing 2, and an intermediate holder 3. Within the barrel is a cartridge 4 of a conventional type and includes a writing tip 8 and an outwardly extending abutment 5 which provides a seat for the upper end of helical spring 6 surrounding the lower end of cartridge 4. The other end of spring 6 rests against shoulder 7 of the lower casing 1 and the spring constantly urges the cartridge 4 toward the rear or upper end of the barrel into the retracted position.

The upper casing 2 of the barrel contains the projecting and retracting mechanism of the invention. This mechanism includes push means 21, a rotating lug member 15, and an internal gear 30 which is preferably formed integral with the upper casing 2 so that the upper casing and the internal gear can be constituted by a single injection molded piece of plastic. Further, in accordance with the present invention, the push means 21 and the rotating lug member 15 can also be constituted by injection molded pieces so that every element of the projecting and retracting mechanism may be simply and economically manufactured to achieve a superior mechanism at greatly reduced cost.

The upper casing 2 (see FIG. 5) is tubular and is preferably formed with upper end portion 40 of reduced internal diameter, a forward portion 41 of enlarged internal diameter and an intermediate portion 42 in which the internal gear 30 is formed.

As can be seen in FIG. 1, the lower end 18 of rotating lug member 15 fits upon the upper end 14 of cartridge 4. The upper portion 22 of the push means 21 extends through the upper open end 40 of the upper casing 2 and is positioned above the rotating lug member 15.

Referring more particularly to FIGS. 10 and 11, the push means 21 comprises an upper portion 22 which may be cylindrical and a lower portion 24 which includes at the bottom thereof a plurality of circumferentially disposed teeth 25.

In the preferred construction, the cross-sectional shape of the lower portion of the push means is generally polygonal and preferably is octagonal as shown in FIG. 11. The alternate sides of the octagon are smaller than the remaining sides of the octagon. The shape of the lower portion of the push means might also be described as being generally square with the corners of the square cut off.

The teeth 25 on the lower portion of the push means are, in the preferred embodiment, defined by downwardly and inwardly inclined faces 28 and 29 which meet to form the lines 26 which lines define the points of the teeth. The points of the teeth are generally centrally disposed with respect to said teeth. The points of the teeth preferably lie at the angles of the octagon rather than the sides thereof, that is, the point of each tooth lies on a radius of the octagon terminating at an angle of said octagon (a radius extending from the center to a vertex of the octagon).

Between the teeth 25 are recesses, the bottom 27 of which define a stop surface which serves to always maintain the coacting or engaging surfaces of the teeth of the push means above the reacting or engaging surfaces of the rotatable lug member for a purpose which will be hereinafter described. The bottom of the push means has a recess 23 which extends to the bottom face of the push means. It will be apparent because of the recess 23 that each tooth terminates short of the axis of said pushbutton, that is, the tooth does not extend to the very center of the pushbutton.

It is evident from the drawings that the lower portion of the push means requires no radial projections thereon defining teeth or any other structure. It is also evident that if any such radial projections were provided thereon, as the size of the push means is decreased, the projections thereon would also be decreased with a consequential loss of strength in the projections thereby rendering them more liable to breakage. Also, it is very difficult to properly injection mold small projections having substantial strength.

As will be hereinafter described, the bottom portion of the push means is received or nested within the internal gear which has a longitudinal opening therethrough which is also of non-circular cross-section and the shape of the bottom portion of the push means cooperates with the shape of the opening of the internal gear to maintain the lower portion of the push means non-rotatable.

Referring to FIGS. 12, 13 and 14, the rotating lug member 15 has a cylindrical lower portion 17 on which is mounted, preferably integral therewith, outwardly extending lugs 16. As is shown in FIGS. 2 and 3, the lugs 16 extend radially beyond the periphery of the non-circular opening 33 of internal gear 30. The rearward extremity 18 abuts the upper extremity 14 of the cartridge 4 (see FIG. 1). A means is provided to admit air into the interior of the cartridge as the ink therein is consumed and this means is preferably a longitudinal opening 19 through rotating lug member 15. The upper end 16' of lug 16 is tapered and preferably generally semi-circular for reasons hereinafter set forth.

The lower cylindrical portion 17 of rotating lug member 15 may be of any desired length, it only being necessary that the cartridge abut the lower extremity thereof. If desired, the lower cylindrical portion 17 may be kept to a minimum length, it only being necessary that there be provided a support to hold lugs 16 in position. However, the utilization of portion 17 in the approximately relative length shown in the drawing is desirable in that it makes it easier to assemble the mechanism.

The internal gear 30, see particularly FIGS. 5, 6, 7, 8 and 9, is preferably integral with the interior of the upper casing 2 and is constituted by a plurality of downwardly extending teeth 32 and 32', and channels 31 and 31'. The teeth 32 and 32' have lower inclined faces 34 and 34' respectively. Inclined face 34' terminates above the lowermost point of tooth 32 and the exposed side 35 of tooth 32 defines a stop surface as hereinafter described. The teeth of the internal gear together with the channels 31 and 31' function in the same manner as the internal gear disclosed in the aforesaid application Ser. No. 531,460.

There is a longitudinal opening 33 through the internal gear and this opening, as can be seen more clearly from FIGS. 8 and 9, is non-circular, and more particularly octagonal, in cross-section. As can be seen from FIG. 8, the open face of longitudinal channels 31 and 31' each define at least a portion of a side of the octagon. In other words, the curve defined by the innermost points or surfaces of the internal gear is non-circular and preferably octagonal. This curve is continuous except where interrupted by the longitudinal channels 31 and 31' which receive the lugs 16 of the rotatable lug member 15.

The lugs 16 of rotatable lug member 15 extend outwardly a distance greater than any diameter of the octagonal opening 33 and are of such a length that they will be received in channels 31 and 31' when in alignment therewith as shown in FIGS. 2 and 3.

The lower portion 24 of push means 21 is received in the opening 33 and is thereby maintained non-rotatable within said opening. In other words, the cross-sectional shape of the bottom portion 24 of the push means has the same cross-sectional shape as the opening 33 and is dimensioned for relatively snug fitting but permitting axial reciprocation therein.

The ball point pen assembly shown in FIG. 1 may be

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assembled by inserting the push means 21 into the upper casing 2 and afterward inserting the rotatable member 15. Then the intermediate holder 3 is inserted into the bottom end 41 of the upper casing 2. The intermediate holder 3 functions to retain the retract mechanism in the operative position and also serves as means for uniting the upper casing to the lower casing.

The intermediate holder 3 comprises an intermediate band 11, a lower threaded portion 12 which threadably engages threads in the upper end of lower casing 1. Above the band 11 there are provided a plurality of ribs 13 which interengage flutes 20 in the lower portion 41 of upper casing 2. The intermediate holder 3 has a circumferential recess 9 terminating in a sharp shoulder 10. When the intermediate holder is inserted in the upper casing with the ribs 13 and the flutes 20 in interengagement, the internal bead 8 of upper casing 2 is received within the recess 9 and abuts against the shoulder 10 to render it difficult to remove intermediate holder 3 from upper casing 2. This preferred construction of the intermediate holder is further described and claimed in copending application Ser. No. 596,935 filed July 10, 1956 by Karl Weisser.

Instead of intermediate holder 3 as shown and described above, there may be used the intermediate holder described in copending application Ser. No. 531,460 which has external threads in place of ribs 13. The particular form of intermediate holder is immaterial, it only being necessary to provide means to retain the rotatable lug member 15 and push means 21 in operative position. If so desired, the intermediate holder may be entirely eliminated but this would render it possible to remove lug member 15 and push means 21 from the writing instrument every time a cartridge is being replaced.

After the intermediate holder has been inserted in the upper casing as above described, the helical spring 6 and the cartridge 4 are inserted in the lower casing 1 and the intermediate holder by means of threads 12 is then inserted in the lower casing 1.

The project-retract mechanism is ready for operation. Replacement of cartridge 4 is accomplished simply by unscrewing intermediate holder 3 with the upper casing 2 attached thereto, removing the exhausted cartridge, inserting a new cartridge and again screwing the intermediate holder into the lower casing 1. It is evident that such replacement does not necessitate re-aligning of the operating parts of the project-retract mechanism.

The operation of the device is illustratively depicted in FIGS. 17 and 18. Referring to FIG. 17, this figure diagrammatically illustrates the retracting sequence. In this figure the lines A, B, C, D represent successive positions of the toothed lower face of the bottom portion 24 of push means 21 and A', B', C', D' represent the corresponding positions of the lugs 16 of the rotatable member 15. The solid lines in this figure represent a developed view of the internal gear 30 and show the channels 31 and 31', inclined faces 34 and 34' and stop surface 35.

At the beginning of the sequence shown by A and A', the lug 16 is seated against face 34' and stop 35 and the writing instrument is in the projected position. Upon depression of the push means 21, points 26 of teeth 25 are moved downwardly against the upper end 16' of lug 16. Because of the relative inclination between face 28 and upper end 16' (that is, between face 28 and arcuate or semi-circular end of 16'), the lug 16 is urged to the left which would cause rotation of the lug 16. However, this motion of the lug 16 is prevented by the stop surface 35 until the downward motion of the teeth move lug 16 downwardly sufficiently to clear the lowest point of stop 35.

As soon as this point is reached, the lug 16 is released for rotational movement and the lug 16 slides upward along face 28 until it comes to rest at stop surface 27 as shown by B, B'. The push means is then released and,

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because of the upward urging of spring 6, lug 16 at B' is urged upwardly and lug 16, abutting stop surface 27, moves upwardly together with stop surface 27 to the position shown at C and C'. As soon as the upper end 16' of the lug in position C' abuts the inclined surface 34, the lug 16 is biased to the left as shown in the drawing, and the lug tends to ride upward against inclined surface 34.

Simultaneously therewith, because of the relative inclination of inclined face 29 and the upper end 16' of lug 16, the urging of the spring against lug 16 also urges the push means upwardly rendering it possible for the lug at C' to ride all the way up the inclined face 34 until it enters the channel 31' to take the position D' with the push means at D. At this point, the writing unit is in the retract position.

The stop surface 27 between the teeth of the push means serves to always maintain the surfaces of the teeth 25 above the coating surfaces of the upper end 16' of lug member 16. FIG. 3 shows a cross-sectional view of the mechanism in the retract position.

Referring to FIG. 18, the projection sequence is diagrammatically illustrated starting with the push means and the lug 16 in the position D and D' and going through successive steps E, E', F, F' and finally to project position A, A'. The operation shown in FIG. 18 is similar to that shown in FIG. 17.

When the push means is in position D and it is depressed, because the lug 16 is in longitudinal channel 31', the lug will not rotate until the push means is in the position E whereupon the lug 16 is urged by the inclined face to position E'. Upon release of the push means, the lug and the push means are urged successively to positions F', F and A', A, the latter being the projected position. In other words, the lug when sliding along the inclined face 34' abuts against stop 35 to prevent any further movement of the lug.

As can be seen from FIGS. 2 and 3, because of the elimination of the teeth of the push means in the central portion thereof by the formation of bore 23 and also because of the bore or central opening 19 in the rotatable lug member 15, the teeth are shaped so that they do not engage the upper end 16' of the rotatable lug 16 at dead center. This prevention of dead centering is also assisted by the upward incline of the line which defines point 26 of the teeth 25 as is readily seen from FIG. 10. The points 26 of the teeth 25 of the push means, in order to properly engage the rotatable lug member, lie on a radii of the octagon extending to the angles of the octagon. In other words, the points of the teeth intercept the periphery of the octagon at the angles thereof.

Thus, it is evident that in the preferred construction, at least one of the engaging surfaces of the teeth of the push means and the rotatable member is so inclined that the force of engagement between the teeth of the push means and the engaging surface of the rotatable member caused by the spring, rotatably biases the rotatable member when the push means is depressed. In addition, another of the engaging surfaces of the teeth of the push means and the rotatable member is so inclined that the force of engagement between the teeth of the push means and the engaging surface of the rotatable member caused by the spring, upwardly biases the push means when the push means is released.

It is evident that when one sequence of project and retraction has been completed, the sequence can be repeated endlessly because of the continuous nature of the internal gear 30. Although the shape of the longitudinal opening 33 through internal gear 30 has been illustrated octagonally to minimize the number of surfaces in the molding operation, the mechanism would function equally as well using any polygon having a number of sides divisible by four.

While the present invention has been disclosed in connection with the projection and retraction of ball point

writing instruments, it is applicable to other kinds of instruments including those provided with a writing nib, a pencil or any other writing medium.

The operating parts herein set forth may be injection molded from plastic material and any suitable plastic such as the acrylic resins, polyethylenes or polystyrenes, as disclosed in copending application Ser. No. 531,460, may be used.

As has been pointed out, this invention is particularly directed to a mechanism of reduced size so that it can be used with small pens. If desired, the push means 21 may have a transverse opening 36 at the upper end thereof and a chain 37 may be positioned in the opening to secure the pen to a key chain or the like. The upper casing 2 may comprise the exposed upper portion of the pen or if so desired, there may be provided thereupon a cap member 38 which may be made of metal or other suitable material. If desired, in lieu of the chain fastening means 37, a clip, not shown, may be secured to the upper casing 2 or the cap member 38.

The present invention is thus directed to a writing instrument as disclosed in copending application Ser. No. 531,460 wherein the improvement resides in the provision of an internal gear having a non-circular longitudinal opening therethrough to receive at least the lower portion of the push means therein for axial reciprocation, said lower portion having a cross-sectional shape cooperating with the opening to maintain said lower portion non-rotatable. The opening is preferably polygonal and more specifically octagonal with the open face of each channel in the internal gear defining at least a portion, and preferably all, of a side of the octagon. The cross-sectional shape of the lower portion of the push means is preferably the same as the longitudinal opening in the internal gear and with said lower portion having downwardly directed teeth having no projections extending radially beyond the periphery of the polygon.

As is evident, in the preferred construction described above, only one spring is necessary to provide proper operation of the project-retract mechanism. However, if so desired, for esthetic purposes, a second spring (not shown) may be inserted between the push means and the upper end of the rotatable member. This spring may be seated in the recess 23. It is evident that such a second spring would merely serve to elevate the push means from the position shown at A in FIG. 18 to the position shown at D but the mechanism is completely operative without such spring. The one spring operation results from the relative incline of faces 28 and 29 of teeth 25 with respect to the upper end 16' of the lug 16 and from the provision of stop surface 27.

If the face 28 and the upper end 16' are not properly inclined with respect to each other, a single spring 6 would not alone serve to return the push means 21 to the operative position and in such a case the second spring as above described would be necessary. Thus, the means for returning the push means to the operative position is either a second spring or the proper inclination of the contacting surfaces of the rotatable member and the teeth of the push means.

The present invention is broadly directed to a writing instrument comprising a tubular barrel open at its opposite ends, the internal cross-section of said barrel being non-circular, a writing unit slidably mounted in said barrel and having a writing point at its forward end adapted to be projected and retracted through the forward end of the barrel upon successive depressions and release of the push means, spring means constantly urging said unit toward a retracted position wherein said writing point is concealed within the barrel, and push means slidably mounted in said barrel, said push means having an upper portion projecting through the rear end of said barrel and a lower portion having a cross-sectional shape cooperating with said non-circular internal cross-section of said barrel to maintain said lower portion non-rotatable.

By forming the lower portion of the push means and the interior of the barrel with a plurality of axes of symmetry, such as are provided by the octagonal shape shown in the drawings, the assembly of the mechanism is facilitated. When inserting the push button into the barrel, it is not necessary under such circumstances to carefully orient the push button with respect to the interior of the barrel. It is only necessary to drop the push button into the upper end of the barrel and the push button will properly seat itself within the internal gear, a slight shaking being occasionally necessary.

It is apparent from FIGS. 10 and 11 that because the upper portion 22 of the push means is cylindrical and the lower portion 24 is octagonal, the teeth 25 extend radially beyond the circumference of the upper portion of the push means in longitudinal alignment with the teeth, thereby providing radially extending circumferential spaced shoulders at the rear of the lower portion 24. When the push member is inserted into the upper end of the barrel, the cylindrical upper portion 22 will, of course, readily pass through the internal gear. If the octagonally shaped lower portion 24 is in proper rotational relationship with the internal gear, the push button can properly seat itself. If, however, when the push button is dropped into the barrel, if it is not in proper rotationally aligned relationship to the internal gear, the shoulders of the rear of the lower end of the push button are aligned with the inclined surface of the teeth of the internal gear of the push button. Because of the octagonal shape of the push button and the internal gear, the former would not properly be received within the internal gear. Nevertheless, because of the inclination of the teeth of the internal gear when the shoulders contact these teeth, the push button will be caused to rotate, and in this manner the push button will be properly rotatively adjusted so that it is received within the internal gear.

What is claimed is:

1. In a writing instrument comprising a barrel, a writing unit slidably mounted in said barrel and having a writing point at its forward end adapted to be projected and retracted through the forward end of the barrel upon successive depressions and releases of a push means, push means slidably and non-rotatably mounted in said barrel, an axially movable and rotatable member, the axial position of the writing point being determined by the axial position of the rotatable member, spring means urging said rotatable member toward the push means, an internal gear having longitudinally extending channels, at least two circumferentially spaced teeth offset from said channels and at least one stop surface, said rotatable member having at least one outwardly projecting lug movable into and slidable along said channels of said internal gear and engageable with the teeth and stop surfaces thereof, said rotatable member being in one axial position when a lug is in a channel and another axial position when a lug engages a stop surface, said push means being provided with teeth directed toward said rotatable member, said rotatable member being reciprocable with said push means and the teeth of the push means engaging the rotatable member when the push means is being depressed with said spring means forcing the rotatable member against the teeth of the push means, at least one of the engaging surfaces of the teeth of the push means and the rotatable member being inclined so that the force of engagement between the teeth of said push means and the engaging surfaces of the rotatable member caused by said spring means rotatably biases said rotatable member when said push means is depressed, depression of said push means removing said lugs from within said channels and rotating said rotatable member to position one of said lugs between two teeth of said internal gear so that said spring means can urge said lug against said stop surface when said push means is released, said push means, when released, moving to an operative position so that the teeth of the push means will be in a position to engage

the rotatable member upon a subsequent depression of the push means to remove said lug from said stop surface to cause the lug to slide in one of said channels, said internal gear having a longitudinal opening therethrough for receiving at least a portion of said push means therein for axial reciprocation, said opening being radially enlarged at spaced circumferential locations, said radial enlargements defining said longitudinally extending channels, the improvement wherein the periphery of the longitudinal opening, exclusive of said radial enlargements but including the open faces of said channels, defines a polygon having substantially straight sides, the open face of each of said channels defining at least a portion of a side of said polygon, said portion of said push means having a cross-sectional shape cooperating with said polygonal periphery to maintain said portion non-rotatable.

2. A writing instrument as recited in claim 1 wherein said polygon is an octagon and wherein said portion of the push means has a generally octagonal cross-sectional shape.

3. A writing instrument as recited in claim 2 wherein alternate sides of said octagon are smaller than the remaining sides and two opposed smaller sides are defined by the open faces of said channels.

4. A writing instrument as recited in claim 3 wherein the rotatable member and the teeth of the push means have surfaces which are in engagement when the push means is released, at least one of the latter engaging surfaces being inclined so that the force of engagement between said surfaces caused by said spring means upwardly moves said push means, when said push means is released, to the operative position for a successive depression of said push means.

5. A writing instrument as recited in claim 4 wherein the lower ends of the teeth of the push means taper to points, said points being generally centrally positioned with respect to said teeth.

6. A writing instrument as recited in claim 5 wherein said teeth of said push means engage with and act upon the lug of said rotatable member to rotatably bias the same.

7. A writing instrument as recited in claim 5, wherein each push means tooth terminates short of the axis of said push means and the point of each tooth lies on a radius of said octagon terminating at an angle of said octagon.

8. A writing instrument comprising a tubular barrel open at its opposite ends, said barrel having a longitudinal opening therethrough, a writing unit slidably mounted in said barrel and having a writing point at its forward end adapted to be projected and retracted through the forward end of the barrel on successive depression and release of a push means, spring means constantly urging said unit toward a retracted position wherein said writing point is concealed within the barrel, and push means slidably mounted in said barrel, said push means having a first portion projecting through an end of said barrel, and a second portion mounted in a non-rotatable fashion with respect to said barrel, a plurality of circumferentially spaced inclined teeth in said barrel, said longitudinal opening receiving the lower end of said push means, said opening being radially enlarged at spaced circumferential locations to define longitudinally extending channels, the cross-sectional shape of said longitudinal opening, exclusive of said channels, being generally a polygon having substantially straight sides, said second portion of said push means having a cross-sectional polygonal shape to cooperate with the polygonal shape of the longitudinal opening to maintain said second portion non-rotatable, the second portion of said push means, at circumferentially spaced locations, being radially larger than the first portion of the push means in longitudinal alignment with said locations to provide radially extending circumferentially spaced shoulders between said first portion and second portion so that during assembly of the push means into said opening, in the event said shoulders are longitudinally aligned with the inclined surface of said teeth, the inclination of said teeth will cause rotation of the push means until the second portion of said push means is rotationally aligned with the opening to be received therein.

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