

Sept. 27, 1949.

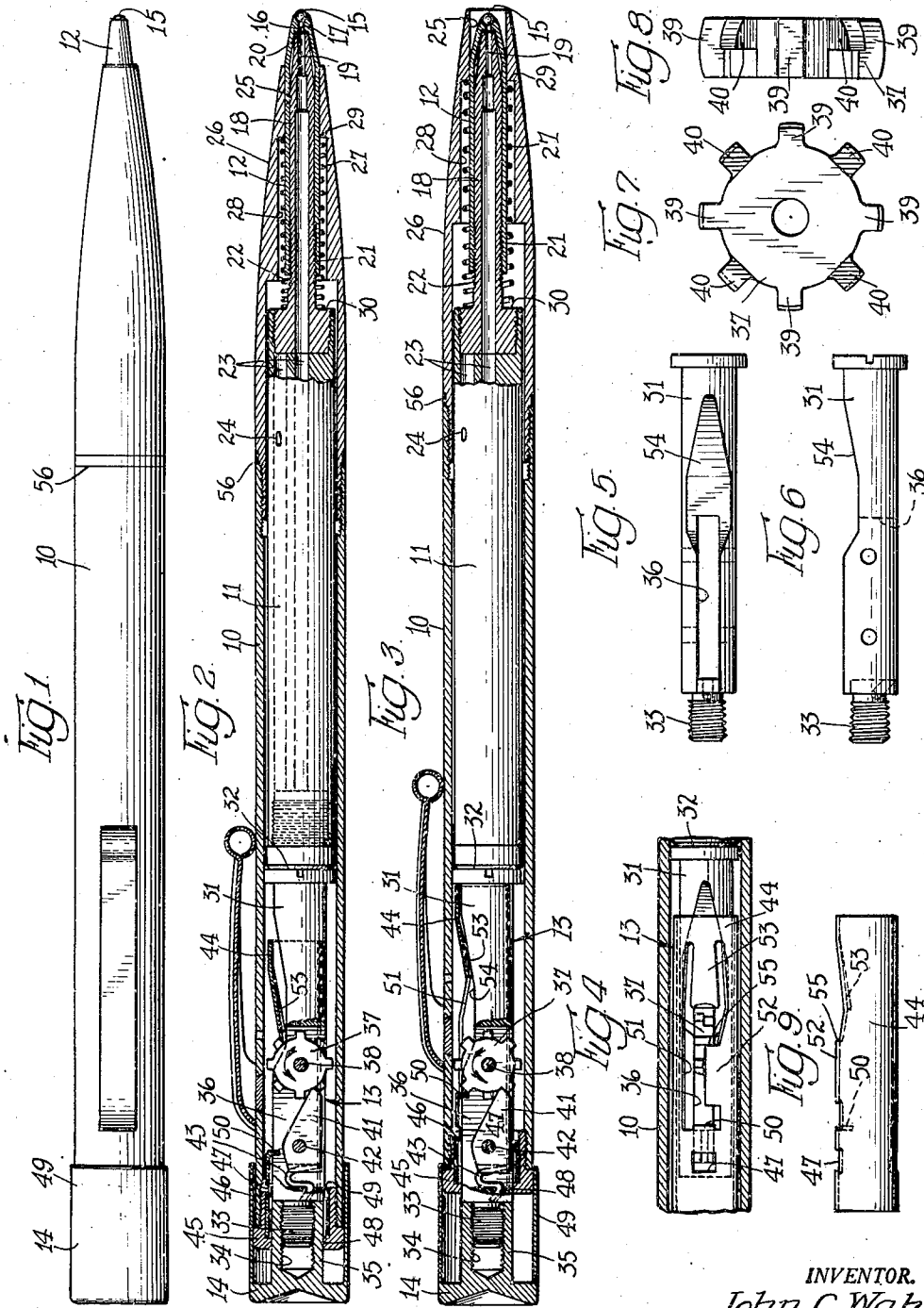
J. C. WAHL

2,483,329

WRITING INSTRUMENT

Filed Aug. 6, 1945

2 Sheets-Sheet 1



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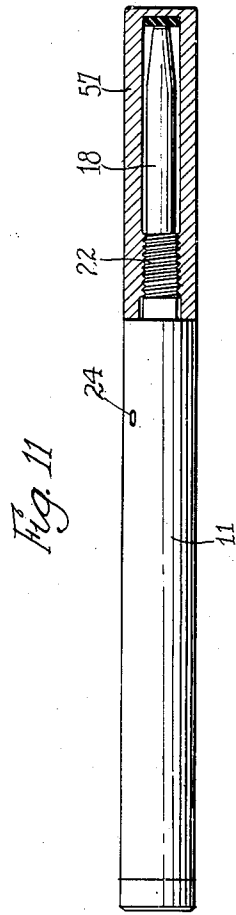
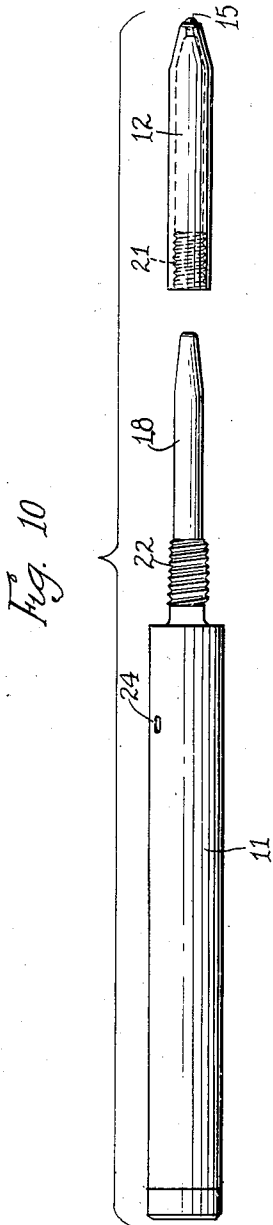
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UNITED STATES PATENT OFFICE

2,483,329

WRITING INSTRUMENT

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1 Claim. (Cl. 120—42.03)

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This invention has to do with writing instruments of the type in which the tip is retractable, and is particularly concerned with an improved ball point pen of this type.

One of the principal objects of the invention is to provide a pen of the character described in which the tip containing the writing ball will be either projected if in a retracted position or retracted if in a projected position by merely pressing in on a novel push button mechanism located in the rear end of the pen.

Another important object of the invention is to provide an improved refill ink cartridge for use in a retractable tip pen.

Another object is to provide an improved pen structure for the reception of both a refill ink cartridge and a tip projecting and retracting mechanism.

Other more specific objects and advantages of the invention will be apparent to those skilled in the art upon a full understanding of the construction, arrangement and operation of the new writing instrument.

One embodiment of the invention is presented herein for the purpose of exemplification, but it will of course be appreciated that the invention is susceptible of incorporation in other structurally modified forms coming equally within the scope of the appended claim.

In the accompanying drawings:

Fig. 1 is an enlarged side view of a ball point pen constructed in accordance with the invention;

Fig. 2 is a longitudinal section through the pen, showing the writing tip of the pen in its projected position;

Fig. 3 is a similar section, showing the tip in its retracted position;

Fig. 4 is a fragmentary longitudinal section through the casing of the pen at the location of the projecting and retracting mechanism, taken at right angles to Fig. 2, showing the mechanism in elevation in the projected position of the tip;

Fig. 5 is a side view of the housing for the mechanism, with the several associated parts removed, viewed from the same direction as Fig. 4;

Fig. 6 is a different side view of the housing for the mechanism;

Fig. 7 is a greatly enlarged side view of the ratchet wheel;

Fig. 8 is an edge view of the same;

Fig. 9 is a side view of the stationary wheel engaging tube which surrounds the housing for the mechanism;

Fig. 10 is a side view of the refill ink cartridge

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and the ball point writing tip to which the cartridge is secured; and

Fig. 11 is a side view of the cartridge alone, with the ink feeding nipple of the cartridge encased within a protective closure.

As will be observed in the drawings, the pen includes primarily a casing 10, a refill ink cartridge 11, a writing tip 12, a mechanism 13 for projecting and retracting the tip, and a push button 14 for operating the mechanism.

The ink used in the pen is a thick semi-fluid ink having somewhat the viscosity of ordinary printer's ink. This ink is transferred to the paper or other material to be written on by the rolling action of a very small ball 15 which is journaled in a socket located in the extreme front end the tip 12.

The tip 12 is of elongated tubular form and tapers at its front end toward the ball 15. Immediately behind the ball the tip contains a bore 16 of even smaller diameter than the ball, which bore terminates but a short distance rearwardly of the ball in an annular rearwardly facing seat 17—all within the end of the tapered portion of the tip. The tip 12 is removably telescoped over a slender nipple 18 which projects forwardly from the body of the cartridge 11. The nipple 18 contains a bore 19 in register with the bore 16 and tapers toward its front end, at which end it is provided with a small annular face 20 for fluid-tight abutment with the annular seat 17. The face 20 is clamped against the seat 17 by screw threads 21 on the inside of the rear end of the tip 12 which engage with corresponding threads 22 on the outside of the nipple 18 near the base of the latter.

The cartridge 11, to which the tip 12 is thus fixedly secured in the operative position of the pen, contains a long tortuously arranged passage 23 in which the supply of ink for the pen is held. One end of the passage 23 communicates with the rear end of the bore 19 in the nipple 18—which bore is quite small at its front end but substantially enlarged toward its rear end—while the other end of the passage 23 is vented to the atmosphere at 24.

The tip 12 is reciprocally mounted in a bore 25 in the front forwardly tapering end portion 26 of the casing 10, and the cartridge 11 is similarly mounted in the casing 10 rearwardly of the portion 26. A coil spring 27 encircles the tip 12 within an enlarged portion 28 of the bore 25 and is compressed axially between an annular shoulder 29 in the bore 25 and an annular shoulder 30 on the nipple 18 at the point where the latter

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connects with the body of the cartridge 11. The spring 27 serves to press the cartridge 11 and tip 12 rearwardly within the casing 10 from the projected position of the tip shown in Fig. 2 to the retracted position of the same shown in Fig. 3.

The mechanism for effecting the projection and retraction of the tip 12 relative to the casing 10 includes an elongated housing 31 which bears at 32 against the rear end of the cartridge 11, and, like the cartridge, is slidably mounted in the casing 10. The housing 31, which is located near the rear end of the casing 10, is provided at its rear end with a screw threaded stud 33 which engages with a correspondingly threaded recess 34 formed on the inside of a stud 35 on the push button 14, thus connecting the housing 31 fixedly with the button 14. The housing 31 is provided with a longitudinally extending slot 36, and a ratchet wheel 37 is rotatably mounted on a cross pin 38 in the slot. Every other tooth 39 on the wheel 37 extends the full width of the latter, while each intervening tooth 40 extends but half such width, for a purpose which will be explained later. The wheel 37 is intended to turn only in the direction indicated by the arrows in Figs. 2 and 3, and is prevented from turning in the opposite direction by a pawl 41. The pawl 41 is positioned in the slot 36 and is pivoted on a cross pin 42. A reversely bent leaf spring 43 is compressed between the pawl 41 and the rear end of the slot 36 in the housing and presses the pawl 41 into one-way clutched engagement with the teeth on the wheel.

The housing 31, which carries both the wheel 37 and the pawl 41, and which reciprocates as a unit with the push button 14, is surrounded by and slides within an open ended tube 44 formed of spring material. The tube 44 is fixedly secured at its rear end within a recess formed in a stationary cap 45, and the cap 45 is screwed tightly into the rear open end of the casing 10. The tube 44 is held against turning in the cap 45 by burring the edge of the cap at 46 into a small opening 47 cut in the tube. The cap 45 contains a bore 48 in which the stud 35 on the push button 14 reciprocates. The button 14 is provided with a forwardly extending rim 49 which slidably telescopes over the stationary cap 45 and over the rear end of the casing 10. The tube 44 is provided opposite the slot 36 in the housing 31 with an intumed tongue 50 which slidably engages within the slot and prevents the housing from turning relative to the casing 10. The tube 44 is also provided forwardly of the tongue 50 with an elongated opening 51, with a locking projection 52 at one side only of the opening, and with a rearwardly extending spring finger 53 at the front end of the opening. The finger 53 is depressed at its rear end into an inclined recess 54 formed on the underlying portion of the housing 31. The front edge 55 of the projection 52 is adapted to abut with the wide teeth 39 of the wheel 37 but such edge does not extend laterally across the path of the wheel far enough to engage with the narrow teeth 40 and in consequence clears the latter.

The mechanism 13 for projecting and retracting the writing tip 12 operates as follows:

Starting with the tip 12 in its retracted position, as shown in Fig. 3, depression of the button 14 acts directly through the housing 31 of the mechanism to project the tip from the position shown in that view to a position a little beyond that shown in Fig. 2. As the housing 31 moves forwardly during the projection of the tip the

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spring finger 53 on the stationary tube 44 engages with and rotates the ratchet wheel 37 through an angle corresponding to the distance between adjoining teeth, from a position in which one of the narrow teeth 40 is disposed in the plane of the projection 52 on the tube 44 in a position in which one of the wide teeth 39 is disposed in that plane. Release of the button 14 then permits the tip 12 to recede slightly until the then laterally exposed wide tooth of the wheel engages with the front edge 55 of the projection 52, whereupon further rearward movement of the housing 13 is solidly blocked and the tip 12 is brought to rest in the projected position shown in Fig. 2, in readiness for use.

To retract the tip 12 it is merely necessary to press the button 14 a second time. This initially results in the tip being again projected a little beyond the position shown in Fig. 2. During this projection one of the teeth of the forwardly moving wheel 37 is brought into engagement with the finger 53, and the latter causes the wheel to turn the distance of another tooth, thereby bringing one of the narrow teeth 40 into the plane of the locking projection 52. In this position of the wheel 37 the narrow tooth will clear the projection 52 and can move rearwardly past the edge 55 of the same. Release of the button 14 then allows the tip 12 to move rearwardly under the action of the coil spring 27 into its fully retracted position, in readiness for the next projecting operation.

The casing 10 is preferably made in two sections, which sections are screwed together at 56 and can be easily taken apart when a full ink cartridge is to be substituted for an empty one. To replace the cartridge 11 it is merely necessary to unscrew the two sections of the casing 10, slide the empty cartridge out of the front section of the casing, unscrew the writing tip 12 from the nipple 18 of the cartridge, screw the same tip onto the nipple of the new cartridge, slide the same into the front section of the casing, and replace the rear section.

Before applying the tip 12 to the nipple of a new cartridge a temporary closure 57 on the nipple is first removed from the same. The closure 57, which is illustrated in Fig. 11, can then be discarded. The screw threads 22 which are used on the nipple 18 for securing the tip 12 in position are also used for retaining the closure 57.

I claim:

In a writing instrument, a hollow casing provided at its front end with a forwardly opening bore and at its rear end with a rearwardly opening bore, a writing tip reciprocably mounted in the front bore for movement between a retracted position and a projected position, a push button reciprocably mounted in the rear bore, and means within the casing operated by the button and acting upon the tip to alternately project and retract the tip upon successive forward movements of the button; said projecting and retracting means including a rotatable ratchet wheel which reciprocates with the button and is rotatable in but one direction, a stationary element in the casing which turns the wheel every time the wheel moves forwardly, and a second stationary element in the casing which holds the wheel against rearward movement by engagement with predetermined teeth thereof every other time the wheel starts to move rearwardly.

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