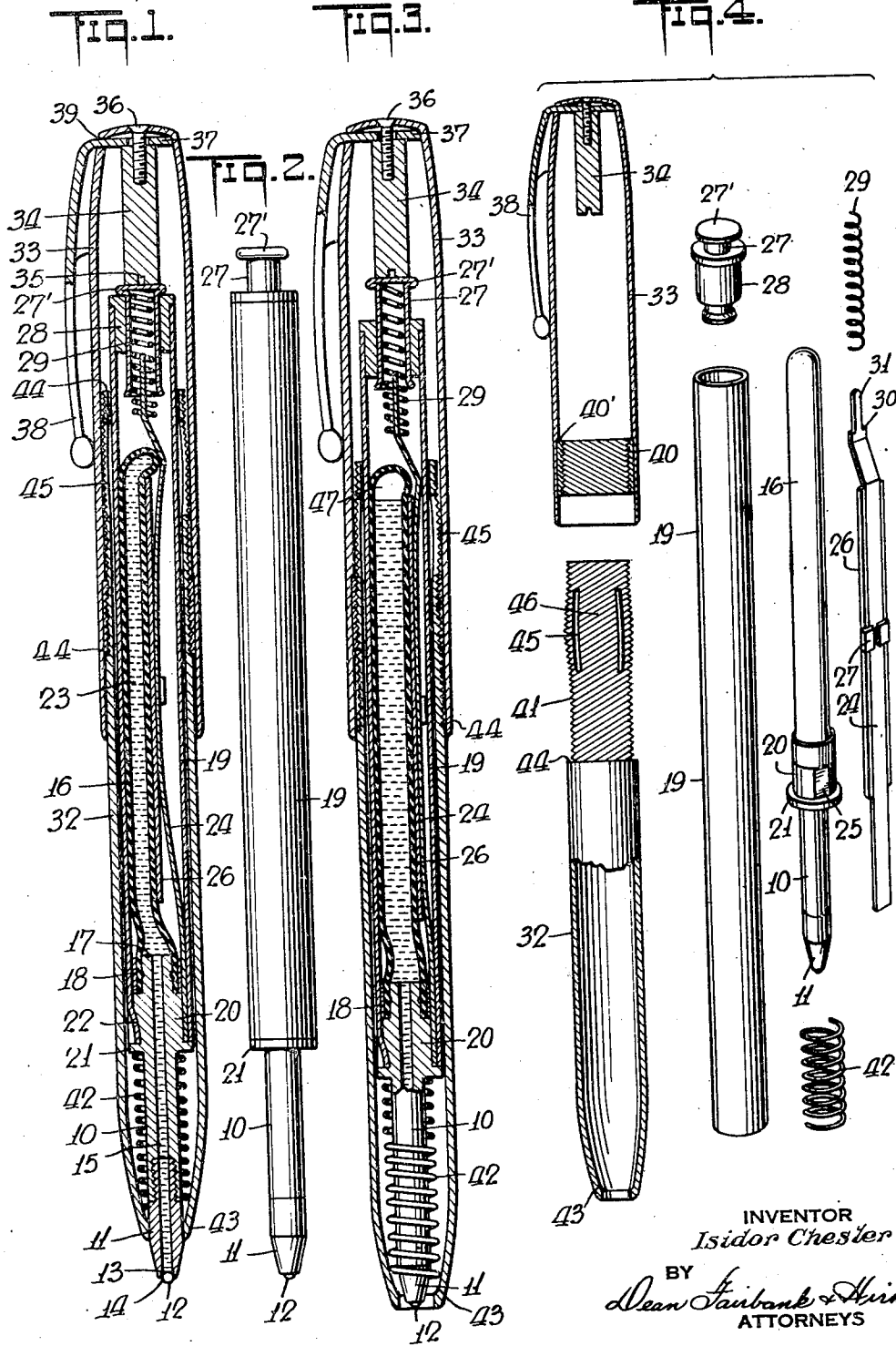


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I. CHESLER
WRITING INSTRUMENT
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WRITING INSTRUMENT

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1 The present invention is concerned with writing instruments especially with ball point writing instruments of that type in which during writing the ink is urged forward under slight pressure toward the writing point.

In an important application of the invention, the ball elements of such instruments, though made at great expense with very small tolerances, nevertheless depart slightly from perfect sphericity so that slow leakage or "weepage" occurs under sustained ink propulsive pressure through the very minute crevice thus existing between the ball and the inturned lip of the tip against which it seats. Accordingly, after a day or more of non-use of the instrument, a droplet or smudge of ink will have become exposed at the ball and this involves the nuisance of wiping before use or the likelihood of a small blot upon the writing sheet.

It is among the objects of the invention to provide a writing instrument of the above type in which, though the ball element be made without great spherical accuracy and at relatively low cost, the objectionable weepage of ink is yet completely obviated without undue complication of the construction and without likelihood of derangement, as for instance by interference with the desired ink feed as long as any ink remains in the reservoir.

Another object is to provide an instrument of the above type in which the use of the arrangement by which weepage is precluded incidentally results in a lengthening of the useful life of the instrument.

It is a feature of the invention to provide a writing instrument with means, preferably a hand operated member by the actuation of which the instrument is conditioned for writing purposes, the idle non-writing condition of the instrument being such that no feed of ink toward the writing point occurs or can occur. In the embodiment shown, pressure is exerted against the ink in the reservoir preparatory to and during writing, and is relaxed and maintained relaxed to relieve the ink in the reservoir of pressure throughout the periods of non-use of the writing instrument. Preferably there is an ink feeding or propulsive agency or member within the instrument, the force of which is applied for ink propulsive purposes by the hand-operated member, the latter being an element of the instrument that is and must be displaced preparatory to, and maintained displaced during writing. For the pen type of instrument, that member may be the end cap or plug which protects and is removed from the point end of the barrel and affixed upon the rear

2 thereof in writing; and for the pencil type it may be a displaceable plug, button or cap on the rear of the barrel and which, when moved to home position, propels the writing point forward from normally retracted or shielded position thereof.

5 In a preferred embodiment, the ink reservoir has a flexible wall and preferably comprises an elongated flexible sac of nylon, synthetic rubber or the like, which is affixed at its rim about the section of the instrument, a normally straight leaf spring being interposed between the sac and the wall of an enclosing cartridge, an actuator for the spring being exposed through the cartridge wall and preferably normally protruding therefrom and coacting with the free end of the leaf spring for causing the latter to be bowed upon operating the actuator in setting the instrument for writing, thereby to exert sustained pressure against the wall of the sac for propulsion of the ink until the actuator is released and returned to stand-by position.

15 In one preferred embodiment the actuator extends through the rear end of the cartridge and is depressed by moving the end cap forward upon the barrel of the instrument, that same movement desirably also effecting the forward movement of the cartridge for advancing the writing point from shielded to writing position against the resistance of a spring which effects retraction of the cartridge and its writing point upon release of the cap and concurrently therewith releases the spring pressure exerted against the flexible sac.

20 In the accompanying drawings, in which is shown one of various possible embodiments of the several features of the invention,

25 Fig. 1 is a view in longitudinal cross section, showing the instrument in operative or writing condition,

30 Fig. 2 is a side elevation of the cartridge unit, Fig. 3 is a view similar to Fig. 1, showing the instrument in idle or non-writing position, and Fig. 4 is an exploded perspective view of the disassembled component parts of the structure.

35 Referring now to the drawing, the instrument comprises a section 10, the forward end of which mounts a tip 11 with ink feeding means in the form of a writing point, preferably in the form of a ball 12 of the usual hard wear resistant substance, such as hardened steel or hardened stainless steel, or a synthetic jewel, maintained in place in its socket 13 by the inturned lip 14. The tip and the section are provided with an axial duct or channel 15, through which the ink is 40 50 55 propelled by suitable ink propulsive means from

an ink supply means, desirably a reservoir 16. That reservoir desirably has a flexible wall portion, preferably an elongated sac of nylon, synthetic rubber or the like, the mouth of which encompasses the reduced cylindrical rear end 17 of the section and is securely mounted thereon as by an appropriate wet plastic band 18 of "Cello-cell" or the like which shrinks in drying and so clamps the sac in place.

A cylindrical cartridge 19 preferably of metal, such as aluminum, encompasses the entire length of the sac, embraces the enlarged hub 20 of the section 10, and rests against ledge 21 at the lower end of said hub and is secured as by indenting the same into grooves 22 in said hub.

The ink propulsive means, preferably a device or element for exerting pressure against the sac and the ink 23 contained therein is desirably a leaf spring 24 normally substantially straight as shown in Fig. 4, the lower end of which is fixedly positioned within the cartridge, desirably by clamping the same between the cartridge wall and a flat 25 on the hub 20 of the section. While the instrument is out of use, this spring is so disposed relative to the sac that the latter is not under compression, and in a preferred embodiment extends longitudinally and without substantial bowing or deflection between the sac and the cartridge wall, as best shown in Fig. 3. Desirably a straight presser bar 26 affixed as by inturned median tongues 27 to the midsection of the spring faces the sac for exerting uniform axially inward pressure along the length of the sac when the spring is deflected to bow it, as shown in Fig. 1.

According to the invention, the free end of the leaf spring 24 is connected to an actuator, operable from the exterior, to cause the leaf spring to be bowed for moving the presser bar 26 thereof toward the axis of the cartridge to exert pressure against the sac for the desired ink propulsion. In a preferred construction the actuator is a button 27 slidably mounted in and exposed through a bushing 28 at the end of the cartridge and in thrust transmitting relation to the free end of the leaf spring 24. Preferably the button is in the form of a small cylindrical cup with an enlarged exposed head 27'.

Preferably a resilient thrust transmitter is interposed between the button or cup 27 and the leaf spring 24 for a purpose which will appear more clearly hereinafter. In a preferred construction, a coil spring 29 is lodged within the cup 27 and is seated at its lower end upon the shoulders 30 defined by the root of the reduced end tongue 31 of the spring 24 which enters the lower convolutions of said coil spring 29.

It will be apparent that no propulsive pressure will be exerted upon the ink in the cartridge unit, as thus far described, when idle, whether in the completed instrument or in stock for replacement, and in the type of construction shown, the sac 16 will be under substantially no compression, so that the ink confined therein will not tend to ooze out past the writing point, as might occur if spring pressure were maintained against the sac, and in the specific embodiment shown in Figs. 2 and 3 the leaf spring 24 is substantially straight and undeflected, with the button 27 protruding.

In one preferred use of the cartridge unit in a commercially completed writing instrument as shown in the drawings, the cartridge and point assembly is enclosed in a barrel 32 from the forward end of which the tip and its point may protrude as shown, with the rear end of the cartridge

and the actuator button 27 thereon protruding beyond the rear end of the barrel. A manually operated member, desirably a cap 33 telescoped over the rear of the barrel and displaceable thereon determines the position of the actuator 27. When the cap is either wholly removed or moved to its outermost position on the barrel as shown in Fig. 3, the actuator is in outermost position, and the spring 34 is therefore flat and exerts no pressure on the sac. When the cap 33 is moved to innermost or home position as shown in Fig. 1, the actuator 27 is depressed to operative or spring bowing relation in which pressure is exerted against the sac. For this purpose the cap has an axial rod 34 which may have a fillister slot 35 in its lower end, which end is engaged by the button 27. The rod 34 is tapped at its upper end to accommodate the screw 36 through the end of the cap, incidentally to serve for affixing the inturned eye 37 of the pocket clip 38, the length of which projects through slot 39 in the cap 33.

While the construction set forth may be incorporated in an instrument, the point of which is permanently in projecting or exposed position, the cap in that case being desirably removable from the barrel and telescoped over the forward end to enclose and shield the point, the drawings show a relationship in which the point is retractable into the barrel to shield it or protect it in non-writing position for convenience in carrying the instrument in the pocket. To this end the cap 33 is preferably provided with an internal nut 40' presenting a short multiple thread 40 near but spaced from the lower rim of the cap, which thread coacts with a corresponding thread 41 on the upper end of the barrel. In practice, the multiple thread may be a 10-3 or 12-3 thread, that is it may have 10 or 12 threads uniformly spaced about the periphery and each may be of one-third inch pitch. Thus a V-thread conformation results, as shown in the drawings, which though sufficiently shallow for use on a thin shell of metal, affords adequate holding surface. A forward turning movement of the cap upon the barrel from the position shown in Fig. 3 results, therefore, firstly in transmitting thrust through the button or cup 27 and the coil spring 29 to bow the leaf spring 24 for exerting writing pressure against sac 16, and secondly, in propelling the entire cartridge and its point 12 from the retracted position of Fig. 3 forward to the advanced or operative position of Fig. 1. While the cartridge could be affixed to the cap so that in the retracting movement of the latter after writing, it is elevated as a unit therewith, it is preferred to introduce the cartridge in the barrel without attaching it to the cap. Retraction of the cartridge and its point is effected by the action of a coil spring 42 encompassing the section, reacting against the lower face of ledge 21 thereof at one end and at the other against the tapering inner surface 43 at the forward end of the barrel. Accordingly, in the forward thrust movement of the cap 33, the cartridge 19 and its point are pressed forward by pressure transmitted through the head 27' of the button to the position shown in Fig. 1 against the resistance of spring 42 and in the retracting movement of the cap the expansion of spring 42 causes the cartridge to move upward in the casing and to retract the point to shielded position, as shown.

Preferably the nut 40' in the cap 33 bottoms against the shoulder 44 of the barrel to limit the

forward thrust stroke of the cap 33 and thereby to determine the operative position of the point 12, as shown in Fig. 1. Desirably means is also provided more or less to define the outer position of the cap when the point is in the retracted position shown in Fig. 3. To this end the upper part of the barrel is preferably longitudinally slitted as at 45 to determine a number of short longitudinal straps 46 which are bowed outward slightly (shown greatly exaggerated in the drawings) for enlargement of the thread 41, thereby to resist further turning of the cap 33 thereon when in that setting in which the point has reached the desired shielded position shown in Fig. 3. The degree of bowing of the straps 46 is not so great as to prevent complete unscrewing of the cap 33 which becomes necessary when the ink in the cartridge unit shown in Fig. 2, is spent and is to be replaced by a corresponding refill unit or when a cartridge with one color of ink is to be replaced by one with another color.

While the operation would appear to be reasonably clear from the foregoing description, it will now be briefly summarized:

The ink filled cartridge unit shown in Fig. 2, whether in a storage bin for eventual incorporation in a writing instrument or whether installed in such instrument, as shown in Fig. 3, is not subject to leakage or weepage, because the leaf spring 24 therein is relaxed or substantially straight and exerts no pressure against the flexible sac 16. Accordingly, there is obviated the tendency to weepage and smudging generally observed with ball point writing instruments of the type in which affirmative pressure is at all times maintained against the flexible reservoir wall.

Upon a slight forward turn of the cap 33 from the position shown in Fig. 3, a forward thrust is exerted to push the button or cup 27 inward through the bushing 28 in the cartridge and to transmit thrust through the coil spring 29 for pressing downward against the shoulders 30 of the leaf spring 24 and therefore bowing the latter to cause the presser bar 26 to compress the sac 16 to whatever extent the quantity of ink remaining therein permits, the ink being confined in the closed chamber determined by the sac 16, the bore 15 in the section and the seated ball 12 in its tip. At the same time the cap in its forward thrust advances the cartridge 19 relative to the barrel and against the resistance of spring 42, so that its point protrudes to the position shown in Fig. 1 when the cap has been moved to the end of its forward stroke into abutment of its nut 40 against shoulder 44 of the barrel. As long as the instrument is in the writing position noted, pressure is thus exerted against the flexible sac adequate to maintain the ball socket 13 charged with ink even in the relatively rapid consumption incurred in speed writing. When the instrument is to be restored to the pocket, the cap 33 is given a short turn in reverse direction until arrested by the tightening of the nut 40' at the bowed strips 46 of the barrel. In this operation the compressed spring 42 expands to retract the cartridge 19 for restoring its point 12 to the shielded position shown in Fig. 3 and at the same time the pressure is relieved against the actuator button 27, the coil spring 29 in which expands to return the same to the outwardly projecting position and to relieve the pressure against the leaf spring 24 which by its inherent resiliency returns to the straight and inactive position shown in Fig. 3.

As soon as the instrument has been put into use for writing, the sac will no longer be completely filled, but any voids will be taken up by the presser bar 26 in the operative position shown in Fig. 1, while in the inoperative position an empty space or void, such as suggested at 47 in Fig. 3, will exist, which void grows, of course, as the ink is consumed. As a consequence, it will be seen that with the instrument in the position of Fig. 3, not only is there no pressure exerted against the sac and the ink therein, but on the contrary, the void 47 effects suction, in direction to draw the ink inwardly from the point. That suction is insufficient to withdraw ink from the socket 13, since the film of pasty ink between the ball and the socket is adhesive in character and substantially precludes the entry of air. However, the suction is adequate to furnish substantial assurance against leak.

When the sac is full or substantially full of ink, much of the stroke of the actuator 27 is accommodated by compression of the coil spring 29, which transmits the thrust to the leaf spring 24 but the latter, while exerting pressure against the incompressible imprisoned column of ink filling the sac, cannot deflect the latter greatly. As the sac empties, the complete depression of the button 27 results in bowing the leaf spring 24 to a greater extent, effectively to follow up the voids in the sac, the coil spring 29 being compressed to a correspondingly lesser degree.

The spring 24 exerts pressure against sac 16 only as long as the instrument is actually being used, and during the much longer periods that the instrument is out of use, no pressure is exerted against the sac, so that the latter is not subjected to the permanent deformation and shortening of its useful life that may be incurred where the sac is constantly maintained under pressure.

As many changes could be made in the above invention and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A writing instrument comprising a barrel having a tip at the forward end thereof equipped with a writing point lodged in a corresponding socket, an ink containing reservoir in said barrel having a flexible wall element, a pressure device in said barrel adapted to react against said flexible wall to exert ink propulsive pressure, control means for said pressure device at the exterior of said reservoir, and a manually actuated member on the exterior of said barrel cooperating with said pressure device to set the same in ink propulsive position.

2. The combination recited in claim 1 in which the pressure device is resiliently urged to inoperative position, so that in the release of the control means the pressure device automatically returns to inoperative position.

3. In a writing instrument of the type comprising a ball point, a barrel having an ink reservoir including a flexible wall and a device in said barrel exerting pressure against said wall to maintain a continuous column of ink clear to the ball; the combination therewith of a man-

ually displaceable member on said barrel and associated with said pressure device to render the latter substantially inoperative in one position of said displaceable member.

4. In a writing instrument of the type having a barrel with a tip comprising a ball writing point in a corresponding socket, an ink reservoir in said barrel including a flexible wall and a pressure device in said barrel adapted to react against said flexible wall to urge the ink forward from the reservoir in a continuous column filling the ball socket; the combination therewith of a manually displaceable member mounted upon said barrel and exposing the ball at will in writing or shielding it in non-writing position, and means under control of said displaceable member to relieve the pressure exerted by said pressure device when said member is in point shielding position.

5. A writing instrument of the ball point type, comprising a barrel having a writing ball point at the forward end thereof, a socket accommodating said ball point, said barrel having an ink reservoir therein in communication with said socket, said reservoir including a flexible wall element, a pressure device in said barrel adapted to react against said flexible wall to propel the ink forward from the reservoir and to maintain the ball socket filled, a member mounted on said barrel maintaining the writing point in shielded position while out of use, and during writing coacting with the rear part of the barrel, said member when in the latter position coacting with the pressure device to activate the same.

6. A writing instrument comprising a barrel, a cartridge removably positioned therein, said cartridge having a section with a tip equipped with a writing point lodged in a corresponding socket, an ink containing reservoir in said cartridge having a flexible wall element, a pressure device in said cartridge adapted to react against said flexible wall to exert ink propulsive pressure, control means for said pressure device exposed through the wall of said cartridge, and a manually actuated member on the exterior of said barrel coacting with said control means to set the same in ink propulsive position.

7. The combination recited in claim 6 in which the pressure device is resiliently stressed in ink propulsive position for automatic return thereof to inoperative position upon release of said control means.

8. A writing instrument comprising a barrel, a cartridge removably mounted therein, said cartridge having a writing point lodged in a corresponding socket at the forward end thereof, an ink reservoir in said cartridge, said reservoir having a flexible wall element, a pressure device interposed between said cartridge and said flexible wall element, an actuator for said pressure device exposed through the wall of said cartridge, and a cap member on said barrel coacting in one position thereof with said actuator to activate said pressure device for exerting ink propulsive pressure against said flexible wall element.

9. In a writing instrument of the type comprising a barrel with a tip having a ball writing point in a corresponding socket, an ink reservoir in said barrel including a flexible wall and a device in said barrel adapted to react against said flexible wall to urge the ink forward from the reservoir in a continuous column filling the ball socket; the combination therewith of an end member on the rear of the barrel and having two settings in one of which the point is in retracted, inoperative, shielded position and in the

other of which the point is in advanced operative and protruding position, said elements being constructed and arranged to activate said pressure device in the writing setting and to render said device ineffective in the non-writing setting of the instrument.

10. A writing instrument of the type comprising a barrel, a cartridge therein having a ball writing point lodged in a corresponding socket at the forward end thereof, an operating member at the rear of the barrel coacting with said cartridge alternatively to dispose the point thereof in advanced or writing position or in retracted or shielded position, said cartridge having an ink reservoir with a flexible wall element, a pressure device within said cartridge adapted to react against said flexible wall to urge the ink content forward, said operating member being correlated with said pressure device for substantially inoperative condition thereof when the cartridge is retracted and to render the same effective when the cartridge is in advanced or writing position.

11. The combination recited in claim 10 in which the pressure device comprises a leaf spring arranged longitudinally of the cartridge, normally in relaxed position, interposed between the cartridge wall and the flexible wall, anchored at its lower end and in which the upper end of said spring is subjected to thrust of said operating member in the advance of the cartridge to writing position, to bow the same for exerting pressure against the flexible wall.

12. A writing instrument comprising a barrel, a cartridge unit removably mounted therein, said unit having a section with a writing ball lodged in a corresponding socket at the tip end thereof, a flexible sac mounted at its rim about the rear of said section and lodged within said cartridge, a leaf spring pressure device interposed between said sac and the cartridge wall and normally in substantially straight inoperative position, an actuator for said spring protruding from the cartridge wall and a displaceable end member on said barrel adapted in one setting thereof to depress said actuator and thereby to bow the spring for exerting ink propulsive pressure against the sac and in another position thereof to relieve the spring.

13. A writing instrument comprising a barrel, a cartridge unit removably mounted therein, said unit having a section with a writing ball lodged in a corresponding socket at the tip end thereof, a flexible sac mounted at its rim about the rear of said section and lodged within said cartridge, a leaf spring pressure device interposed between said sac and the cartridge wall and normally in substantially straight inoperative position, an actuator protruding upward from the extremity of said cartridge and coacting with the upper extremity of said spring, and a cap displaceable on said barrel, said cap in one position thereof depressing said actuator and thereby bowing said spring against said sac for ink propulsive pressure.

14. The combination recited in claim 13 in which a coil spring is interposed between the actuator and the upper end of the leaf spring and serves as the thrust transmission from the former to the latter.

15. The combination recited in claim 13 in which the actuator is a cylindrical cup, the exposed closed end of which is subjected to the thrust of said cap and in which a coil spring is lodged in said cup and is correlated at its lower

9 part in thrust transmitting relation with respect to the upper extremity of the leaf spring.

16. A writing instrument comprising a barrel, a cartridge therein having a section, a tip at the forward end thereof, a writing ball point lodged in a corresponding socket in said tip, a flexible sac affixed at its rim to the rear of said section and extending lengthwise of said cartridge, a leaf spring normally in flat position interposed between said cartridge and said sac and clamped at its lower end between said section and said cartridge wall, a cup slidably protruding axially from the rear end of the cartridge, the upper end of said leaf spring registering with said cup, a coil spring lodged within said cup and coiled about said upper extremity, and a cap displaceable on the end of said barrel and enclosing said cup, said cup in home position exerting thrust against said cap to depress the same in said cartridge and thereby to bow the spring against the sac for ink propulsive pressure thereof.

17. A writing instrument comprising a barrel, a cartridge therein having a section with a tip, the latter having a ball writing point lodged in a corresponding socket, a flexible ink confining sac within said cartridge, a leaf spring device within said cartridge normally in relaxed position, the lower end of said spring being anchored with respect to said cartridge, a cap upon said barrel having a normal position in which the cartridge is retracted with the point end in shielded or inoperative position and an advance position in which the point carrying end of the cartridge protrudes from the barrel for writing position, and a thrust member under control of said cap reacting against the upper part of said spring to bow the same and exert pressure against said sac only while the instrument is in writing position.

18. The combination recited in claim 17 in which a resilient thrust transmitting member is interposed between the cap and the upper end of the leaf spring.

19. The combination recited in claim 17 in which the cap is free from connection with respect to the cartridge and exerts an operative impulse against the latter solely in downward or thrust applying direction and in which a coil spring interposed between the lower end of the barrel and the section is maintained under compression while the cartridge is in advanced position and restores the cartridge to retracted point-shielding position by the expansion thereof upon release of the cap.

20. A writing instrument comprising a barrel, a cartridge therein having a section, a tip on said section with a writing ball point in a corresponding socket in the forward end thereof, a flexible ink containing sac mounted at its rim about the rear of said section, a normally flat leaf spring extending longitudinally at the exterior of said sac, a cartridge encompassing said sac and said leaf spring affixed at its lower end to said section and positioning the lower end of said spring, a spring actuator comprising a cylindrical cup axially of said cartridge and protruding from the upper end thereof, the free upper end of said leaf spring extending toward said cup, a coil spring extending into said cup, said leaf spring presenting a shoulder seating said coil spring, a retracting coil spring seated in the forward end of the barrel, encompassing the forward part of the section and exerting upward thrust thereagainst to urge the cartridge unit upward for maintaining the writing point thereof in shielded position, and a cap displaceably mounted upon the rear end of

the barrel to exert thrust against said cartridge to urge the point thereof to writing position, and maintain the retracting coil spring compressed, the cap in the latter position transmitting the thrust through the actuator cup to bow the leaf spring and thereby exert ink propulsive pressure against the sac.

21. The combination recited in claim 20 in which the cap is threaded upon the barrel, and in which the coacting threads on the barrel are enlarged above the lower ends thereof for imposing increased resistance to unscrewing motion after the cap has been brought to point retracting position.

22. An ink containing cartridge unit for a ball point type writing instrument, said unit having a ball writing point in a corresponding socket at the forward end thereof, an ink containing reservoir within said cartridge and communicating with said ball socket, said reservoir having a flexible wall element, a pressure device interposed between said cartridge and said ink reservoir and normally in relaxed condition, and an actuator exposed for operation thereof through the wall of said cartridge, said actuator having an operative connection to said pressure device.

23. An ink containing cartridge unit for a ball point type writing instrument, said unit comprising a section having a tip with a ball writing point in a corresponding socket at the forward end thereof, a flexible ink-containing sac mounted at its rim upon said section, a cylindrical cartridge affixed over said section and encompassing said sac, a leaf spring normally substantially straight clamped at its lower end between said cartridge and a corresponding flat on said section, and a spring actuator comprising a button protruding from the rear extremity of said cartridge and correlated with the upper free extremity of said leaf spring for bowing the latter by depression of said button.

24. The combination recited in claim 23 in which the button is a cup with an enlarged head and is slidable in a corresponding bushing in the upper end of the cartridge, in which a coil spring is lodged in said cup and the lower end thereof encompasses the free extremity and rests upon a corresponding shoulder of the leaf spring.

25. A writing instrument comprising a barrel, a writing tip, an ink supply means, an ink feeding means for said tip, all contained in said barrel; and means operable to condition said instrument for writing purposes and simultaneously to bring about the exertion of pressure on the ink in said supply means to feed said ink to said ink feeding means.

26. The combination recited in claim 25 in which the ink feeding means is a ball point, the barrel has a normally inactive ink propulsive agency confined therein and the means operable to condition the instrument is interrelated with said ink propulsive agency to set the same into action upon operation of said conditioning means.

27. The combination recited in claim 25 in which the ink feeding means is a ball point, the barrel has a normally inactive ink propulsive member confined therein and the means operable to condition the instrument comprises a member on the barrel manually displaceable preparatory to writing, to set the ink propulsive member into action.

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Disclaimer

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Hereby enters this disclaimer as to claim 1 except in so far as necessary to preserve the combination specified by dependent claim 2 and to claim 6 except in so far as necessary to preserve the combination specified by dependent claim 7; and also enters this disclaimer as to claims 3, 4, 5, 8, 9, 10, 22, 25, 26, and 27.

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