

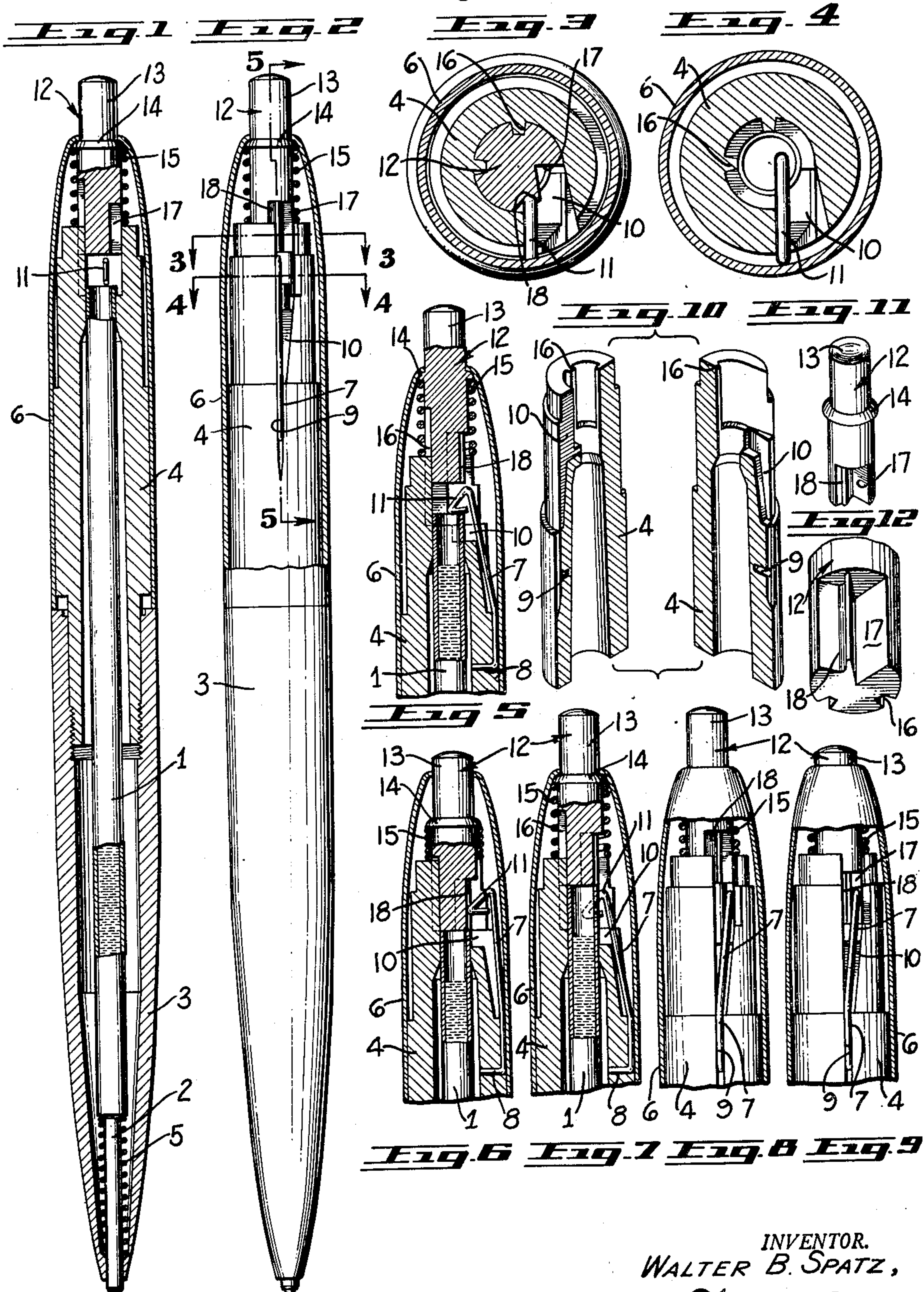
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RETRACTABLE PEN

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RETRACTABLE PEN

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My invention relates to a retractable writing implement, and included in the objects of my invention are:

First, to provide an extending and retracting mechanism for writing implements whereby alternate depression of a button at the remote end of the implement extends and retracts the operating end of the implement.

Second, to provide a mechanism of this class wherein the operating end of the writing implement automatically retracts should it be subjected to shock loads as might occur if the implement were dropped.

Third, to provide a mechanism of this class which incorporates a spring latch and trip mechanism of exceedingly simple and inexpensive construction, yet which is inherently dependable in its operation, capable of withstanding an extremely large number of operations without failure.

Fourth, to provide a mechanism of this class which is inherently simple to assemble, thus enabling a writing implement to be equipped with an extending and retracting means at nominal cost.

With the above and other objects in view as may appear hereinafter, reference is directed to the accompanying drawings in which:

Figure 1 is an enlarged longitudinal sectional view of my retractable writing implement.

Figure 2 is a partially sectional partially elevational view thereof in a plane parallel with Figure 1.

Figure 3 is an enlarged transverse sectional view through 3—3 of Figure 2.

Figure 4 is a sectional view through 4—4 of Figure 2.

Figure 5 is a fragmentary longitudinal sectional view taken through 5—5 of Figure 2 showing the parts in their positions occupied when the writing element is extended, this being the position of the parts shown in the preceding views.

Figure 6 is a sectional view similar to Figure 5 showing the operating button depressed and in the act of unlatching the catch spring.

Figure 7 is a similar sectional view showing the operating button released and the writing element in its retracted position.

Figure 8 is a fragmentary, partially sectional, partially elevational view similar to Figure 2, but showing the latching spring and associated parts in the position assumed when the writing element is retracted.

Figure 9 is a similar view showing the operating button depressed in the process of extending the writing element.

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Figure 10 is a composite view showing the upper case split longitudinally.

Figure 11 is a perspective view of the operating button.

Figure 12 is another enlarged fragmentary perspective view of the operating button showing the lower portion thereof which manipulates the latching spring.

My retractable writing implement includes a writing unit 1 which is shown as a ball point pen unit but may be a pencil unit or other scribing tool. The writing unit is cylindrical with a reduced lower end 2 and is slidably supported in a lower case 3 and upper case 4 which are screw threaded together. The reduced end 2 is surrounded by a retracting spring 5 which bears against the shoulder provided at the lower portion of the case 3. The lower and upper case are formed separately to permit replacement of the writing unit.

The upper case 4 is permanently enclosed in a shell 6. The upper case receives a latch spring 7 comprising a length of wire bent at one end to form an anchor 8 which fits in a radial hole in the case 4. The portion of the latch spring adjacent the anchor 8 lies in a longitudinally extending retainer groove 9 formed in the case 4. The shell 6 maintains the latch spring in place. Above the retainer groove 9, the case 4 is provided with a clearance slot 10 which exposes a portion of the upper extremity of the writing unit 1. The upper end of the latch spring 7 is folded to form a triangular latch loop 11. The latch end of the spring 7 is capable of both radial and circumferential movement relative to the upper portion of the writing unit within the limits of the clearance slot.

Mounted within the shell 6 above the case 4 is an operating pin 12 which protrudes through an opening in the end of the shell 6 to form an operating button 13. Within the shell 6, the operating pin 12 is provided with a shoulder 14 which is engaged by a return spring 15, the other extremity of which bears against the upper end of the case 4. The case 4 and the lower portion of the pin 12 are provided with splines 16 so that the pin is axially slidable but non-rotatable. The lower portion of the pin 12 is provided with a clearance notch 17, one side of which is bordered by a grooved shoulder 18.

Operation of my retractable writing implement is as follows:

The latch spring normally occupies, or tends to occupy, the position shown in Figures 1 through 5. In this position, the latch loop is in its inner and clockwise position as viewed in

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Figures 2, 3 and 4. In this position, the latch loop overlies the upper end of the writing unit and holds it in its extended position. Starting with this position, depression of the button 13 causes the grooved shoulder 18 to engage the latch loop 11 and act as a camming means to move the latch radially outwardly. The surface of the shoulder 18 coincides with the surface of the writing unit so that when the button 13 is released and spring 5 urges the writing unit to its retracted position, the latch loop rides onto the surface of the writing unit. Inasmuch as this surface is round and the force of the latch spring is radially inward this surface functions as a camming surface and the latch loop is biased or deflected laterally or circumferentially in a counterclockwise direction, as viewed in Figures 3 and 4, so as to occupy the position shown in Figures 7 and 8.

With the writing unit retracted and the latch spring in its lateral displaced position shown by Figures 7 and 8, depression of the protruding button as shown in Figure 9 causes the latch spring 11 to press into the notch 17 along the side of the shoulder 18 and catch the top of the writing unit as the button 13 is released. Return movement of the button until the lower end of the pin 12 clears the writing unit allows the latch spring 7 to snap in a direction transverse to the radial movement which occurred prior to the latching and return to the position as shown in Figures 1 through 5.

Thus, if the writing unit is extended, depression and release of the button effects retraction of the writing unit, whereas if the writing unit is retracted, similar depression and release of the button causes the writing unit to be extended.

The shape of the latch loop 11 is such that if excessive upward pressure is exerted on the tip of the writing unit, the spring is forced to release the writing unit. Thus, should the implement be dropped or the tip of the writing unit be caused to strike an object, the spring 7 releases the writing unit before damage is done.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details herein set forth, but my invention is of the full scope of the appended claims.

I claim:

1. In a writing implement; a case, a writing element having an inner end and an outer end, said element being longitudinally slidable in said case between extended and retracted positions, retracting means urging said element to said retracted position, a latch spring fixed in said case and having a latch end adapted to overlie and engage the inner end of said writing element to hold said element in its extended position, said latch end being movable in a substantially radial plane and in a direction transverse to said plane and being biased to seek a position in said plane overlying the inner end of said element, movable releasing means in said case arranged to engage said latch end and move the same outwardly in said plane clear of the inner end of said element to permit said retracting means to retract said element, a cam surface on said element adjacent

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said inner end, said latch end engaging said cam surface when said element is retracted and being guided thereby to a position alongside said element but transversely displaced from said plane, movable projecting means in said case engageable with said element to move the same to its extended position whereupon said latch end is permitted to move transversely toward said plane to again overlie the inner end of said writing element substantially in said plane.

2. A writing implement as defined in claim 1 wherein said latch spring comprises a spring wire mounted at one end on said case and extending longitudinally therein, said latch end comprising a bent portion at the free end of said spring wire.

3. A writing implement as defined in claim 1 wherein said writing element is of cylindrical shape at its inner end, the cylindrical surface thereof comprising said cam surface.

4. A writing implement as defined in claim 1 wherein said releasing means and said projecting means are carried by a plunger reciprocable in said case.

5. A writing implement as defined in claim 1 wherein said releasing means and said projecting means comprise fixed portions of a plunger longitudinally reciprocable in said case, and spring means biasing said plunger in the direction of retraction of said writing element.

6. A writing implement as defined in claim 1 including a plunger slidable in said casing in alignment with said writing element, a longitudinal groove in a side portion of said plunger comprising said releasing means, an end face of said plunger being engageable with said inner end and comprising said projecting means, said plunger being cut away to expose a portion of said inner end of said writing element transversely of said plane to permit said latch end to move toward said plane and over said exposed portion of said inner end while said plunger is still in engagement with said inner end.

7. A writing implement as defined in claim 1 wherein said latch spring comprises an elongated spring element fixed at one end to said case at a substantial distance radially outwardly of said writing element, said spring element extending generally longitudinally within said case away from said outer end and radially inwardly thereof from said one end, said latch end being at the free end of said spring element and overlying said inner end whereby the application of undue force to said writing element in a retracting direction will apply a sufficiently large moment to said spring element to release said latch end and permit retraction of said writing element.

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