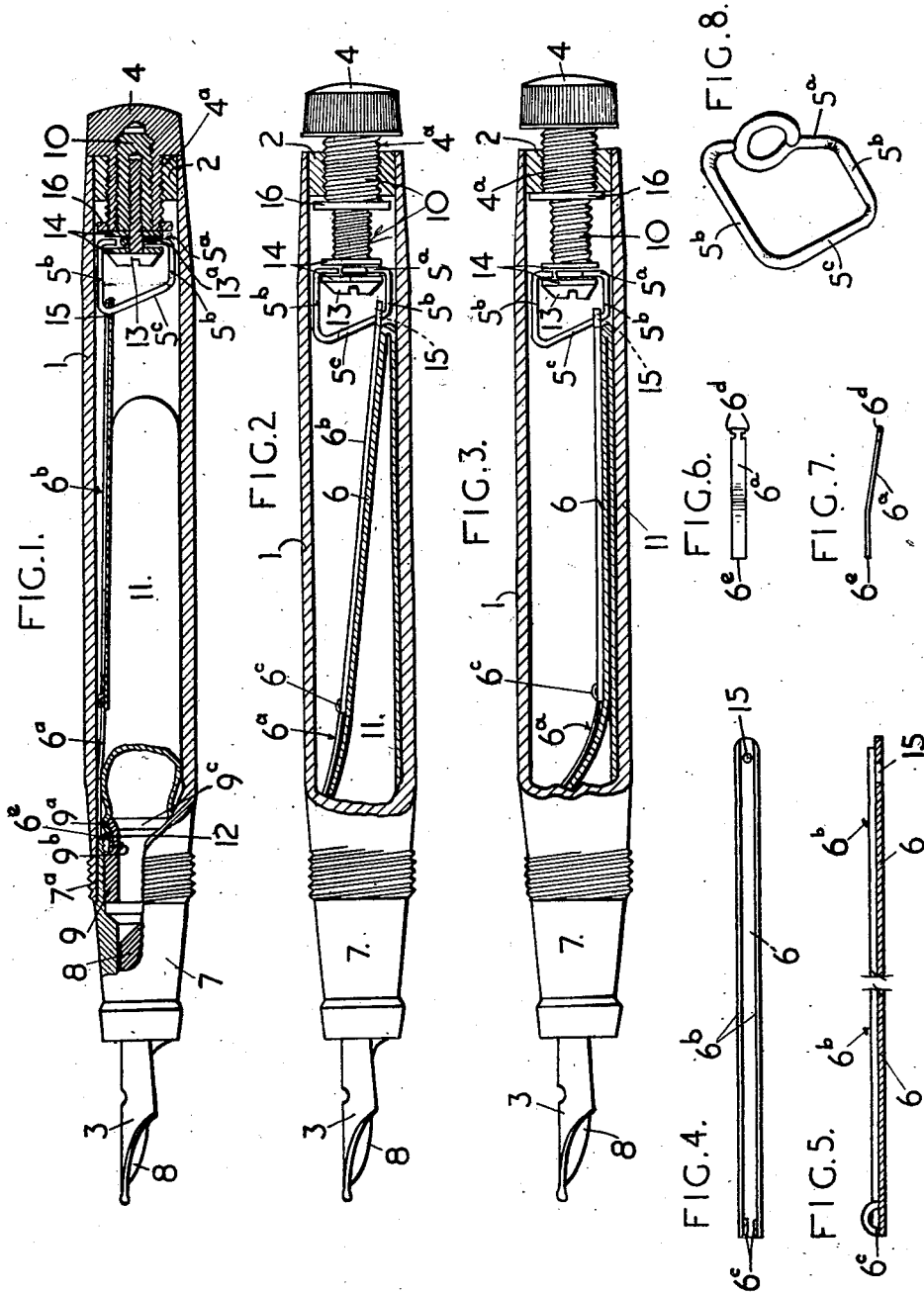


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E. S. SEARS
FOUNTAIN PEN

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Inventor
EDWARD STEPHEN SEARS

By
Linton and Linton
Attorneys

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FOUNTAIN PEN

Edward Stephen Sears, Bushey Heath, England,
assignor to Mabie Todd & Company Limited,
London, England, a British company

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This invention relates to sac self-filling fountain pens of the type in which actuation of the sac is effected from the rear of the barrel (i. e. the end of the barrel remote from the nib section) by the aid of a rotary knob or button. The present application is a continuation in part of my Patent No. 2,554,641 dated May 29, 1951.

Such back-actuated sac pens of arcuate spring type possess a common disadvantage—shared also by the conventional sac-collapsing lever located at a side of the barrel—in that, as the sac deflating pressure is imposed on or about the middle of the pressure bar, complete evacuation of air from the sac is not feasible, as there is always a certain space within the sac in the vicinity of its closed end not occupied by ink.

The present invention aims to improve sac self-filling fountain pens of the aforesaid character in which the sac compression means is projected within the pen barrel whereupon the sac is progressively compressed and deflated from its closed end substantially throughout its entire length and yet enables economy in manufacture with an appreciable reduction in stresses and tension of the sac actuating parts and sac, thereby prolonging the efficient working life of the pen.

I will further describe my invention with the aid of the accompanying sheet of explanatory drawings which illustrate, by way of example and not of limitation, one mode of carrying same into effect.

In said drawings—

Fig. 1 is a longitudinal view, partly in elevation and partly in section, of the pen prior to deflation of the sac.

Figs. 2 and 3 are similar views, Fig. 2 showing the sac partially deflated, and Fig. 3 showing the sac fully deflated.

Fig. 4 is a plan view of the presser plate, and

Fig. 5 is a sectional elevation of the presser plate drawn to an enlarged scale. Figs. 6 and 7 are plan and elevation respectively of the sac-actuating tail bar forming a part of the present pen. Fig. 8 is an enlarged perspective view of the presser plate carrier.

A pen body or barrel 1 is bored to suitable size for its full length: a plug 2 is secured in the bore of body 1 remote from nib 3 and functions as a stop to limit outward movement on unscrewing knob 4. 5^a, 5^b, 5^c, denotes a member located in the knob-end of body 1, and carrying a presser plate 6 where to is hingedly attached a tail bar 6^a normally resting against the end face of a nib holder 7. Said plug 2 is screw-threaded, as shown, to freely receive the threaded

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part 4^a of knob 4, and body 1 is threaded externally in known manner to receive a conventional cap closure.

The nib holder 7 may be of common design outwardly, with stepped portion or shank 7^a corresponding with the size of, and fitting frictionally in, the main bore of body 1.

A bore is formed in said nib holder 7 for the accommodation of the feed 8 and nib 3 in known manner. This bore is enlarged at the opposite or shank end to a suitable depth and size, and is screw-threaded to freely receive a threaded plug 9. Said holder-bore shank 7^a is countersunk, as shown, at the end remote from the nib 3 at a suitable angle.

The sac-actuating knob 4, which may be roughened or knurled, is made to conform with the outer shape of body 1 at the end remote from the nib, the stepped portion or shank 4^a of the knob being threaded to correspond with the screw threaded passage of plug 2, in which it should move freely. Said externally threaded portion 4^a of knob 4 is bored and internally threaded to receive a non-rotating screw 10 of faster pitch than that of the knob screw.

Feed 8 may be of common form and of suitable size and length, but an angle or slope—as shown—may be cut at the end which abuts against said threaded-plug 9 to allow free flow of the ink to nib 3. Said plug 9 is suitably through-bored, and a portion thereof is threaded externally for free attachment in the nib holder 7. An outwardly sloping portion 9^a of plug 9 forms a continuation of a recess 9^b provided for the reception of the open end of sac 11 and at an angle corresponding to that in the nib holder; and a countersink 9^c at a corresponding angle may be made in the upper side of this enlarged part of the plug to facilitate ink flow from sac 11.

Said presser-plate carrier, in one convenient construction, and as most clearly shown in Fig. 8, may be formed from a single length of wire of suitable diameter and sufficiently malleable for shaping, and preferably protected by plating, or the like. Its configuration approximates to a trapezoid with top portion 5^a at right angles with the two sides 5^b one of which is shorter than the other: the bottom member 5^c forms a slope or angle towards the nib. The top 5^a or part of the carrier adjacent the threaded end of knob 4 is looped at its centre, or, in other words, one end of the length of wire is looped to freely receive a headed carrier-screw 13 secured in said secondary screw 10. The carrier is then shaped to

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the form shown, the free end of the wire of which it is composed finishing on the opposite side of the loop; and in a preferred formation, this latter end is left unattached as it may be found that attachment is not essential with the incorporation of washers 14. This free end of the carrier makes for ease of assembly with regard to presser-plate 6, and also allows for a certain amount of adaptation, as the carrier should, preferably, be a sliding fit in the bore of the body to obviate fouling or undue gripping on the wall of the bore, whilst being to a certain extent adaptable to the size of the bore.

The presser-plate 6 may be of known form, in so far as the usual narrow ribs 6^b (Figs. 4 and 5) longitudinally and at right angles with its face are concerned. One end of said plate is drilled through at 15 (Fig. 4) and is adapted for free movement when attached to the sloping or angled part 5^c of the trapezoidal plate carrier.

Said carrier-screw 13 is, preferably, of metal of suitable size and common form: its thread should be the opposite to the external thread, and corresponding to the internal thread of the secondary screw 10. The thread of screw 13 is cut to leave a plain shank 13^a adjacent its head, and the length of the shank should correspond with the combined thickness of the presser-plate carrier wire and washers 14, plus a slight tolerance. Upon tightening the screw 13 the loop 5^a is held against rotation by means of the washers 14. As the flat surface of the plate 6 rests upon the sac 11 the latter prevents its rotation and as this plate is attached to the carrier the screw 10 is also retained against rotation, but the latter may move back and forth within the barrel upon the rotation of the knob 4.

There is also formed or provided on the inner end of said knob screw 4^a a collar 16 which, by abutment against the plug 2 secured within the bore of barrel 1, limits the outward travel of knob screw 4^a and so of knob 4.

In a sac-charging operation, when the rear knob 4, 4^a is unscrewed outward to deflate sac 11, the secondary fast pitch screw 10 is projected forwardly toward the nib end of the pen, and the adjacent end of presser-plate 6 slides along the inclined portion 5^c of the carrier from the long to the short side to deflate the closed end of the sac by reason of the abutment of the tail bar's extremity against nib holder 7; furtherance of the sac's collapse being effected by the consequential angular movement and bending of the tail bar (on the continued unscrewing of knob 4) which carries the front end of presser plate 6 across the body bore to complete the deflation of the sac. Screwing of knob 4 back to its normal position causes the movement of parts to be reversed and a charge of ink is thus induced into sac 11. The tail bar 6^a shown most clearly in Figs. 6 and 7 is in the form of a light leaf spring having one end 6^c in stop abutment with the inner face of the shank 7^a of the nib holder as best shown in Fig. 1, and its opposite end extends within the barrel over a portion of the sac 11. This end of the tail bar may be attached to one end of the pressure plate 6 in any convenient manner, but, preferably this end of the tail bar has formed therewith a pair of end lugs 6^d insertable through corresponding loop portions 6^e formed in the pressure plate 6. The leaf spring or bar 6^a is of a width whereby it will fit snugly within the channel-way formed by the ribs 6^b of the plate 6 so as to limit the slide play of one within the other. Said end

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lugs 6^d of tail bar 6^a when inserted through loop portions 6^e of the pressure plate 6 connect the two together and yet effect a hinged connection therebetween so that during the collapsing of the sac these components 6 and 6^a will at first assume the position as shown in Fig. 2 and on final collapsing of the sac, assume the position as shown in Fig. 3 whereat, due to the pressure upon the fixed bar 6^a, it will bend due to its spring construction and the hinged connection with the pressure plate 6 will cause the latter to lie flat with the collapsed sac.

Assuming that the end of the presser-plate 6 attached to its angled carrier 5^a, 5^b, 5^c, is "X" and the opposite end is "Y," the complete movement of the presser plate will be "X—Y" on the outward travel of knob 4, and Y—X on the return movement of the knob, thus achieving a natural movement of sac deflation and inflation.

In said X—Y, Y—X movements, the Y travel across the body bore is approximately two and a half times faster than that of X along the angle 5^c of the plate carrier. This is an advantage in ink filling, as the sac is almost completely filled by the time the knob 4 is screwed home, thus rendering unnecessary the customary pause essential with sac self-filling pens of conventional construction before removing the pen from the ink.

It will be obvious to those skilled in the art that various constructions within the scope of this invention, as set out in the claims, may be made to achieve the end in view.

What I claim as my invention and desire to secure by Letters Patent is:

1. A sac self-filling fountain pen comprising in combination a barrel, a nib holder closing one end of said barrel, a compressible sac within said barrel and connected to said nib holder, a threaded plug closing the opposite end of said barrel, a knob rotatably connected to said threaded plug, a carrier connected to said knob whereby upon the rotation of the latter said carrier will be caused to move longitudinally in opposite directions within said barrel, an inclined bar formed with said carrier, a pressure plate resting upon and extending longitudinally of said sac, means for slidably connecting one end of said pressure plate to said inclined bar, and a flexible tail bar connected to the opposite end of said pressure plate whereby when said carrier is projected with said barrel said flexible tail bar will be moved in stop abutment with said nib holder and caused to buckle to force said pressure plate to the lower end of said inclined bar and upon said sac to deflate the latter.

2. A sac self-filling fountain pen comprising in combination a hollow barrel, a nib holder closing one end of said barrel, a compressible sac within said barrel and connected to said nib holder, a knob rotatably connected to the opposite end of said barrel, a carrier connected to said knob whereby upon the rotation of the latter said carrier will be caused to move longitudinally in opposite directions within said barrel, an inclined bar formed with said carrier, a pressure plate resting upon and extending longitudinally of said sac, a flexible tail bar connected to one end of said pressure plate and in stop abutment with said nib holder, means for slidably connecting the opposite end of said pressure plate to said carrier whereby when said carrier is projected within said barrel by the rotation of said knob, said pressure plate is caused to slide upon the inclined bar of said carrier and said tail bar

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to buckle for progressively compressing and deflating said sac from its closed end.

3. A sac self-filling fountain pen comprising in combination a barrel, a nib holder closing one end of said barrel, a compressible sac within said barrel and connected to said nib holder, a threaded plug closing the opposite end of said barrel, a knob rotatably connected to said threaded plug, a carrier associated with said knob whereby upon the rotation of the latter said carrier will be caused to move longitudinally in opposite directions within said barrel, an inclined bar formed with said carrier, a pressure plate resting upon and extending longitudinally of said sac and slidably connected at one end to said inclined bar, and a flexible tail bar connected to the opposite end of said pressure plate and in stop abutment with said nib holder whereby when said carrier is projected within said barrel said flexible tail bar is caused to buckle to force said pressure plate to the lower end of said inclined bar and upon said sac to deflate the latter.

4. A sac self-filling fountain pen comprising in combination a hollow barrel, a nib holder closing one end of said barrel, a compressible sac within said barrel and connected to said nib holder, a screw threaded plug closing the opposite end of said barrel, a knob having a screw threaded shank for rotation in said plug, a secondary screw of faster pitch than that of the knob screw entered within a screw threaded bore of said knob shank, a pressure plate resting upon

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and extending longitudinally of said sac with one end extending beyond the closed end of the latter, a flexible tail bar, means for hingedly connecting said tail bar to one end of said pressure plate, a carrier of trapezoidal form secured to said secondary screw and having an inclined side slidable within an aperture of the other end of said pressure plate whereby upon the rotation of said knob in one direction said pressure plate and tail bar will progressively compress said sac for deflating the same, and when said knob is rotated in an opposite direction said pressure plate and tail bar will be released from compression engagement with said sac.

EDWARD STEPHEN SEARS.

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