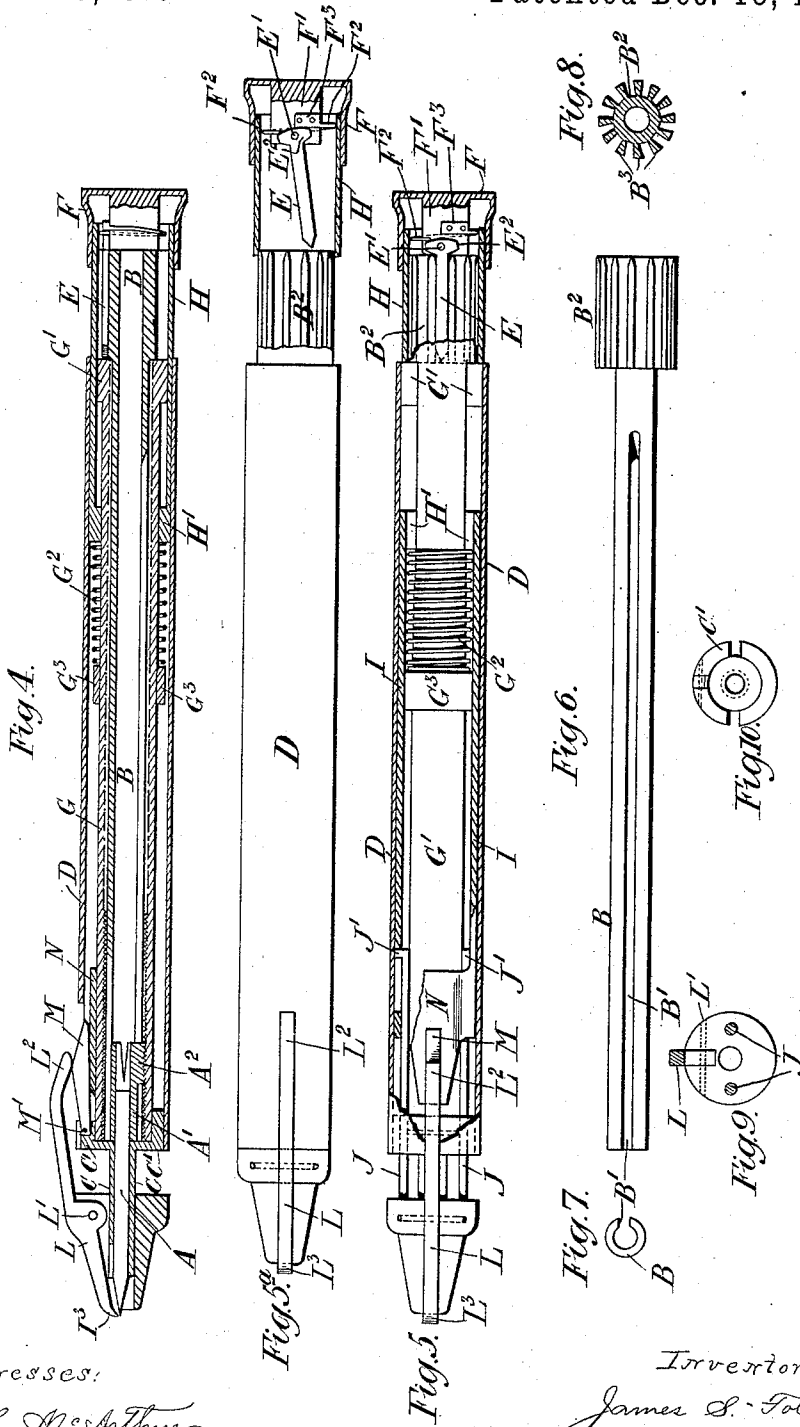


J. S. FOLEY.
EVER POINTED PENCIL.

No. 465,057.

Patented Dec. 15, 1891.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES SAMUEL FOLEY, OF LONDON, ENGLAND.

EVER-POINTED PENCIL.

SPECIFICATION forming part of Letters Patent No. 465,057, dated December 15, 1891.

Application filed August 17, 1891. Serial No. 402,899. (No model.)

To all whom it may concern:

Be it known that I, JAMES SAMUEL FOLEY, a citizen of the United States of America, residing at London, in England, have invented certain new and useful Improvements in or Appertaining to Ever-Pointed Pencils, of which the following is a specification.

This invention relates to the common class of screw-pencils in which a stick of lead is projected to the point-section as it is used up by a screw device inside the case; and the particular feature of the present invention relates to the fact that the lead is pointed as it is projected forward.

Various modifications in structural details may be made; but the invention will be understood from the following description and drawings, in which—

Figure 1 is an outside view of the complete pencil-case. Fig. 2 is a longitudinal sectional view of the same, showing the parts in their normal position with the lead not sharpened. The second tube in this view is shown in full. Fig. 3 is a similar view to Fig. 2, but shows the position of the parts while the sharpening operation is in progress. Fig. 4 is a longitudinal section right through into the first or inner tube in the same position as Fig. 3. Fig. 5 is a view similar to Fig. 3 and with the parts in the same position, but is taken upon a plane in cross-section at right angles to that of Fig. 3. Fig. 5^a is an outside view with parts shown broken away and in section. Fig. 6 is a view of the first or innermost tube, Figs. 7 and 8 being views of the two ends thereof. Fig. 9 is a back view of the point-section, and Fig. 10 is a back face view of the plug end of the lead-tube.

Like letters indicate like parts throughout the drawings.

A is the lead carried in the lead-propeller A', which latter is provided with the projection A², screwed upon its edge and adapted to traverse longitudinally the slot B' of the first or innermost tube B.

C is the lead-tube, which supports the outer end of the lead and from which the latter projects for purposes of writing. The tube C is securely fixed in the outer end of the external tube or casing D, which may be ornamented in any desired manner.

The tube B is shown detached in Fig. 6 and

is provided with a longitudinal slot B' and carries at its back end the head or pinion B², (shown in end elevation in Fig. 8,) with the teeth or leaves B³ of which engages the cam or pawl E, pivoted at E' to an internal projection F' of the cap F. Around the projection F' is the spring F², riveted at F³ to F', the part F³ operating as a stop to the T-head E² of the cam E and the end F² acting as a spring to keep the cam E in its normal position. (Shown in Fig. 5^a.) The ends of the leaves B³ are beveled or pointed, so as to facilitate the entry of the cam or pawl E between them.

Fitting upon the tube B is an internally-screwed tube G, the screw-thread on which engages with the projection A² of the lead-propeller A', so that when the tube B is revolved within the tube G longitudinal movement in either direction, according to the direction in which the tube is turned, is imparted to the lead-propeller A', as will be well understood.

Rotary movement may be imparted to the tube B by the operator placing his fingers upon the pinion B², which, as shown in Figs. 1 and 2, can be got at through an opening in the sliding tube H, upon which the cap F is fixed, either by soldering, riveting, or the like, or it can be merely forced on. This sliding tube H has its inner end partly plugged by an internal collar H', Fig. 4, which, engaging with the external collar G', prevents the sliding tube H from being drawn entirely off the tube G, while the spring G², which surrounds a portion of the tube G and bears at one end upon the collar G³, secured upon the tube G, tends to force the sliding tube H off the tube G.

Upon the inner end of the sliding tube H are secured two longitudinal plates I, slightly curved to agree with the general circular form of the apparatus and having slots I' at their free ends. With these slots engage the turned-up ends J', Fig. 5, of the wires J, whose other ends are secured in the point-section K. The point-section K is slotted longitudinally to accommodate the knife L, which is pivoted at L' in the said point-section and whose back end L² is curved, as shown, and adapted to work upon the inclined face of the cam M, which is pivoted at M' to the casing D or

to the plug C', which forms the inner end of the lead-tube C and closes the case D. The free end of the cam M when the pencil is in its normal condition, as in Fig. 2, rests upon the outside of the tube G, in which position the point-section is retracted, as in Fig. 2. When the cutting has to be effected, however, the block N, which is secured to and connects the side plates I, is pushed forward under the end L² of the knife, which, being curved or beveled, freely rises, and also under the cam M, the free end of which is also beveled to facilitate the passage of the block N, whose leading end is likewise beveled, as shown in Fig. 4.

The operation of this apparatus is as follows: The lead is placed through the lead-tube into the lead-carrier, and by revolving the tube B by means of the operator's fingers, placed upon the pinion B², in the right direction the lead-carrier, taking the lead with it, is drawn up the tube as far as necessary. In the drawings the tube G is only shown threaded part of the way; but it will be understood that it may be threaded the whole or any portion of its length. The pencil having been thus charged with lead and it being desired to point the lead, the cap F and sliding tube H are pushed forward by the operator. This has the effect of forcing the plates I forward, so that they engage with the ends J' of the wires J, and consequently carry forward the point-section K and knife L, while the block N is pushed under the cam M, as above explained. It will thus be seen that the knife, which cuts the lead with its pointed end L³, is carried forward, while the lead remains stationary, with a portion projecting from the lead-tube C. As the knife is carried forward its back end L² rises up the inclined face of the cam M, so that as the knife goes forward the back is raised up and the point L³ depressed, thus producing the tapered point required, as indicated in Fig. 4 of the drawings. Releasing the pressure upon the cap F allows the spring G² to return the sliding tube H to the position indicated in Figs. 1 and 2 of the drawings, while pressing in the cap F places the parts in the positions indicated in Figs. 3, 4, and 5 of the drawings.

An important feature of the mechanism is to be observed in connection with the cutting operation just described. As the block N moves forward its beveled leading edge engages with the beveled end of the cam M, so that the block N easily pushes underneath M, and thus raises the cam. Then as the knife is carried forward by the point-section its tail runs up the inclined face of M, as above described. The object of the slots I' in the side plates I is to allow of the block N being withdrawn from underneath the cam M before the point-section (and consequently the knife) begins its return movement. The length of the slots is therefore such that when the ends J' of the wires J engage with the ends of the slots in the return movement the

end of the block N has been so far withdrawn from M as to allow it and the tail L² of the knife to drop so that the point L³ is clear of the lead. This in practice is found to be essential, as otherwise the spring G² has not power to withdraw the sliding tube H, the knife taking such a hold upon the lead that unless its point be clear of the lead the point-section will not go back without a more powerful pull than the spring G² can exert.

The operation above described will have made a single line upon the point of the lead parallel with the axis. It is therefore necessary that before the next cutting stroke is made the lead should be partially rotated. This is accomplished in the following manner: The normal position of the cam E is that shown in Fig. 5^a; but as the cap is, except when in use, forced out by the spring G² the pawl goes with it, and is consequently not in engagement with the pinion B², as shown in Fig. 2. Upon pressing forward the cap F the point of the cam E enters between two of the leaves B³, which space the body of the pawl just comfortably fills. Therefore as the cam E (the sides of which are parallel) is forced farther in between the leaves it will be manifest that the axial line of the cam and the axial lines of the leaves must become parallel, and since the pawl is pivoted on an axial line corresponding with that of the pencil and its point at the commencement of the movement is out of that line (see Fig. 5^a) and the cap cannot turn, (being held by the operator,) the pinion must turn to obtain the necessary parallelism, and this imparts the necessary amount of rotation to it. The relative positions between the turning mechanism and the cutting mechanism are such that the rotation of the pinion B², and consequently of the tube B and the lead itself, will have just ceased before the knife commences its cut, the slots I' in the plates I allowing of sufficient movement to the cap F, and consequently the cam E, before the forward movement is imparted to the knife. Upon the return of the cap F the cam E is withdrawn from between the leaves B³, the spring F² returning it to its normal position of Fig. 5^a. This cutting operation is repeated till the lead has been turned completely round, when the required pointing will have been effected. As the point would be spoiled and lead wasted if the lead A were carried forward to any great extent while it was being revolved and cut, it is found desirable to make the threads upon the inside of tube G and upon the lead-carrier A² of a fine pitch, so that the longitudinal movement of the lead during one revolution may be so slight as to be of no practical importance. The important thing is to observe a proper proportion between the screw-thread and the pitch of the teeth of the pinion, a coarse thread requiring a fine pitch to the teeth of the pinion, and vice versa. A convenient proportion is one that will move the lead forward about one-fortieth of an inch at one revolution. It will be noticed that by

the above arrangement the lead is projected forward and pointed by the same movement, so that, should the point have got blunt, not only is a fresh sharp point provided, but some lead is pushed forward by the one operation to supply the place of that used up. Notwithstanding this, however, it will be further noted that the lead can be pushed forward or drawn in without the sharpening operation by simply turning the pinion B² by the operator's fingers without pushing in the cap.

The form of the knife may be varied, and it may have more than one cutting-edge or be made like a file; but the form above described is found to give the best results in actual work.

I claim—

1. The combination, in a self-sharpening pencil, of a pencil-case, means for feeding the lead from the case, a section having a longitudinal movement upon the case, and a knife-blade mounted upon said section and arranged to cut the lead when the section is reciprocated, substantially as described.

2. The combination, in a self-sharpening pencil, of a pencil-case, a knife-carrying section having a longitudinal movement on said case, a knife on said section, and means connected with said section for automatically rotating the lead as the knife is reciprocated, substantially as described.

3. In a self-sharpening pencil, the combination, with a point-section movable in the axial line of the pencil, of a knife pivoted therein, substantially as set forth.

4. In a self-sharpening pencil, the combination, with the point-section movable in the axial line of the pencil and having a knife pivoted therein, of a cam carried by the pencil-case, along the inclined face of which cam the tail of the knife travels as the point-section is projected forward, substantially as set forth.

5. In a self-sharpening pencil, the combination, with a longitudinally-movable point-section and cam-operated knife pivoted thereto, of a lead-propeller and slotted tube-pinion, cam-pawl, and sliding tube, substantially as set forth.

6. In a self-sharpening pencil, the combination, with a point section and cam-operated knife pivoted therein, lead tube and propeller, and rotatable slotted tube, of a fixed internally-threaded tube, with the thread of which the lead-propeller engages, substantially as set forth.

7. In a self-sharpening pencil, the combination, with a longitudinally-movable knife-carrying point-section, of wires, slotted plates, and sliding tube, substantially as set forth.

8. In a self-sharpening pencil, the combination, with a longitudinally-movable knife-carrying point-section and knife-operating cam and wires, of a cam-raising block, slotted side plates, sliding tube, and spring, substantially as set forth.

9. In a self-sharpening pencil, the combination,

with a slotted tube and pinion, of a spring cam or pawl adapted to engage the leaves of the pinion and partially rotate the same at each cutting operation, substantially as set forth.

10. In a self-sharpening-pencil, the combination, with a sliding tube, a rotatable slotted tube, and pinion, of a spring pawl or cam pivoted in said tube, substantially as set forth.

11. In a self-sharpening pencil, the combination, with a sliding tube, of a cap having an internal projection, and a spring pawl or cam pivoted thereon, substantially as set forth.

12. In a self-sharpening pencil, a pivotal knife L, having a cutting edge or point L³ and a curved tail L², substantially as set forth.

13. In a self-sharpening pencil, the combination, with a fixed lead-tube, of a knife-carrying point-section having a sliding longitudinal movement thereon, substantially as set forth.

14. In a self-sharpening pencil, the combination, with a fixed lead-tube, of a screw-threaded lead-propeller adapted to rotate in engagement with a fixed screw, substantially as set forth.

15. In a self-sharpening pencil, the combination, with a fixed lead-tube and a knife carrying a point-section sliding thereon, of a screw-threaded lead-propeller adapted to rotate in engagement with a fixed screw, substantially as set forth.

16. In a self-sharpening pencil, the combination, with a sliding tube, of a cap, an internal projection to which is pivoted a spring cam or pawl, and a spring fixed to the projection and surrounding the same, substantially as set forth.

17. In a self-sharpening pencil, the combination, with the movable point-section K, knife L, pivoted cam M, and wires J, of slotted plates I I', lead-propeller A' A², rotatable tube B, fixed threaded tube G, pinion B², and cam or pawl E, substantially as and for the purpose described, and illustrated in the accompanying drawings.

18. In a self-sharpening pencil, the combination, with pinion B² and pivoted cam E, of slotted plates I I', substantially as and for the purpose described, and illustrated in the accompanying drawings.

19. In a self-sharpening pencil, the combination, with the movable point-section K, of wires J, slotted plates I I', block N, cam M, and pivoted knife L, substantially as and for the purpose described, and illustrated in the accompanying drawings.

In testimony whereof I have hereto set my hand in the presence of the two subscribing witnesses.

JAMES SAMUEL FOLEY.

Witnesses:

ALFRED J. BOULT,
HARRY B. BRIDGE.