Aug. 25, 1931. H. L. FISCHER 1,820,130

LEAD PUSHER FOR MECHANICAL PENCILS

Filed June 6, 1925

Fig. 1

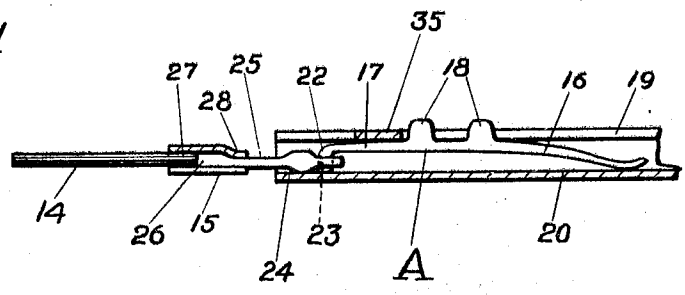


Fig. 2

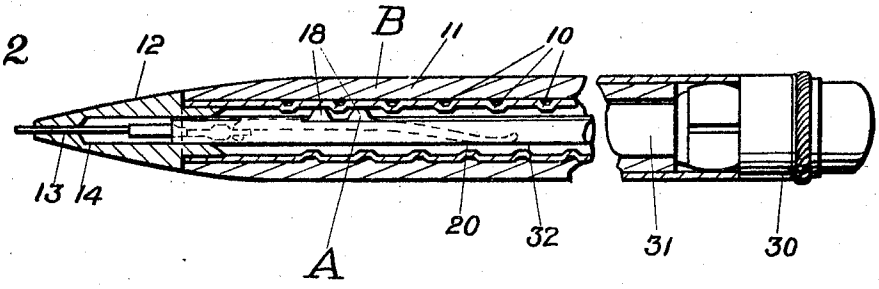


Fig. 6

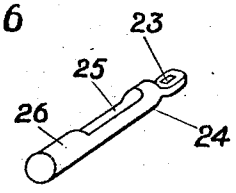


Fig. 4

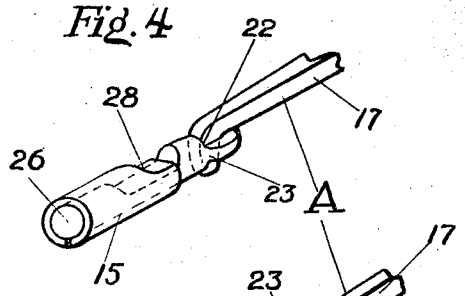


Fig. 5

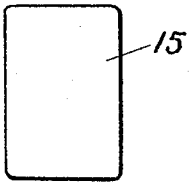
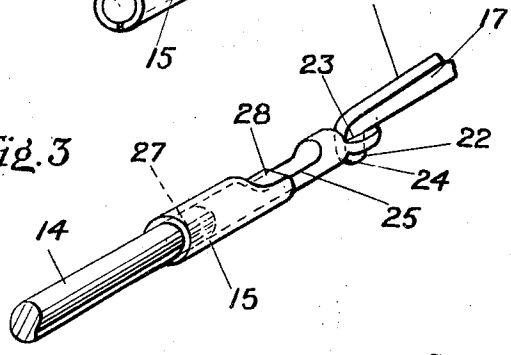


Fig. 3



Inventor

Howard Fischer

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UNITED STATES PATENT OFFICE

HOWARD L. FISCHER, OF ST. PAUL, MINNESOTA, ASSIGNOR TO BROWN & BIGELOW, OF ST. PAUL, MINNESOTA, A CORPORATION OF MINNESOTA

LEAD PUSHER FOR MECHANICAL PENCILS

Application filed June 6, 1925. Serial No. 35,426.

My invention relates to pencils wherein it is desired to provide means for holding the marking lead in writing position by a lead carrier which forms the nut engagement with the thread to the propelling mechanism of the pencil, the lead carrier or nut being free to move transversely without material influence on the lead so as to provide a compensating movement between the carrier and the lead, which holds the lead in such a manner that it will not be broken when the nut slips over the threads of the operating mechanism.

In my particular design of the member adapted to engage the threads of the pencil I term the same the lead pusher. This pusher is carried on spring ends which are adapted to hold the teeth of the pusher in engagement with the threads, in the propelling mechanism. By means of this construction the teeth can be held against the threads under spring tension to provide an even smooth feeding of the lead pusher throughout the operation of the pencil.

This design of my lead pusher shows the same adapted to travel over the threads in the pencil and when an excess amount of pressure is exerted against the marking lead the teeth of the pusher are adapted to be released from the high part of the thread engagement and permit the teeth to ride over the threads due to the spring action of the arm. With this construction it is desirable to provide a socket for holding the butt end of the marking lead carried by the pusher. There is a flexible joint between the pusher and the socket. This prevents any deflecting of the socket when the pusher rides over the threads and permits the socket with the marking lead held therein to adjust itself to the opening in the writing end of the pencil to permit the same to be guided freely through the opening at the writing end.

My invention includes the flexible connection between the pusher and the lead socket together with the sleeve socket which is movable to eject the stub of the marking lead held therein when the lead is broken off in the socket, or the writing end is worn off so that a new lead is required.

These features, together with other details of construction will be more fully set forth in the following specification and claims.

In the drawings forming part of this specification:

Figure 1 is a side sectional elevation of my pusher and center tube showing the lead carrying socket.

Figure 2 is a central cross section of my pencil illustrating my lead pusher and socket in operation in the same.

Figure 3 is a perspective view of my lead socket with a portion of the pusher broken away showing the lead held in the socket.

Figure 4 is a perspective view of my lead socket drawn back illustrating the lead ejected from the same with the socket in ejecting position, only a portion of the pusher being illustrated.

Figure 5 illustrates the flat died out formation of the lead socket sleeve.

Figure 6 is a perspective of the rod connecting link which carries the sleeve and lead socket.

In the drawings the pusher A forms part of the threaded mechanism of the pencil means. This part is adapted to run in the threads 10 of the threaded member in the pencil casing 11 and in this particular construction illustrated the threaded member is held stationary in the casing 11, being secured to the writing tip 12 which is formed with an axial opening 13 at the apex through which the marking lead 14 held in the socket 15 is carried.

The lead pusher A is formed with spring end arms 16 and 17. The arm 16 forming the rear spring arm while the arm 17 is positioned at the front, adapted to support the teeth 18 of the pusher A extending through the slot 19 of the center tube 20 in which the pusher A is slideably carried. The spring arms 16 and 17 hold the teeth 18 under spring tension and in engagement with the threads 10, as illustrated in Figure 2 of the drawings.

The forward arm 17 is bent downward to form a hooked end 22 which is adapted to engage in the opening 23 formed in the connecting link rod 24 at the rear of the same. The connecting link rod 24 is cut away at 25 and

is formed with a round cylindrical forward end 26 which forms the abutment for the rear end 27 of the marking lead 14 when it is held in the sleeve 15.

The sleeve 15 is formed of thin sheet material to form a spring gripping jaw or socket when it is rolled into a cylindrical formation. In the flat formation the sleeve appears when died out, in enlarged formation, as illustrated in Figure 5. The connecting rod link 24 appears as illustrated in Figure 6.

After the spring sleeve 15 has been formed cylindrical it is slipped onto the connecting link rod 24 and the rear end is flattened at 28 against the recessed portion 25. When the sleeve is flattened out in this manner it is adapted to be held slideably attached to the link rod 24 so that the sleeve is held against disengagement from the rod, but free to slide back and forth on the same.

In use the marking lead 14 is inserted with the butt end 27 in the sleeve 15 which forms a socket to hold the same with the end 26 abutting against the end 27 of the lead. When the lead has been used in the pencil to the extent where it is necessary to insert a new lead, the butt end 27 is ejected from the socket 15 by drawing the socket backward on the connecting link rod 24, causing the end 26 to push the end 27 of the lead out of the link socket sleeve 15, as illustrated in Figure 4 of the drawings. The sleeve is then pushed forward into the position illustrated in Figure 3 and in Figure 1 and it is ready to receive the end of a new marking lead.

The lead pusher A operates freely in the longitudinal slot 19 of the center tube 20 when the operating head 30 is rotated. The center tube 20 is enlarged at 31 at th rear portion and connected integrally with the forward reduced portion 32 which is slotted longitudinally at 19 and which carries the lead pusher A with the teeth 18 projected through the slot 19 so as to engage with the threads 10 of the threaded tube. These features are illustrated in Figure 2 where a portion of the barrel and center tube are broken away so as to show the pencil in enlarged formation.

The lead carrier A constitutes the main feature of my invention wherein it is designed to provide flexible connection between the lead carrying socket and the teeth 18 of the lead carrier. This flexible connection permits the lead to be held freely moveable in a manner so as to adjust itself with the opening 13 in the writing tip 12 without bending and breaking the lead and to prevent breaking the lead when more than writing pressure is brought to bear against the projecting end of the lead 14 at the writing tip 12 which causes the teeth 18 to jump over the threads 10. This release of the lead is a feature in my pencil, as covered by other issued patents. Without this link connection provided by the rod 24 when the teeth 18 jump over the threads 10 the forward end of the pusher would be deflected so as to break the lead. With my construction the springing of the teeth over the threads has no material effect on the lead 14 held in the socket 15. This construction permits the pivoting action of the hook end 22 in the opening 23 which allows the arms 16 and 17 to spring downward freely without affecting the lead socket 15 and provides a link connection between these members.

The lead socket 15 is slidably connected to the connecting rod 24 so that by pulling the socket backward on the rod the cylindrical portion 26 of the same which forms the abutment for the butt end 27 of the marking lead is pushed outwardly, as illustrated in Figure 4, to entirely eject the worn-out lead in the socket. The depressed portion 28 of the lead socket 15 frictionally engages the recessed portion 28 of the rod 24 so that the lead socket forms a spring gripping means for the butt end of the lead, which is held against free movement on the connecting link rod 24.

In assembly the sleeve 15 is attached to the connecting link rod 24 and permanently connected thereto by depressing the portion 28 against the recess 25 and then the end 22 is positioned in the opening or socket 23, after which the pusher A, which constitutes in its entirety the member with the teeth 18, the spring arms 16 and 17, and the connecting link 24 with the socket 15, are inserted in the center tube 20 with the teeth 18 projecting through the slot 19. A shoulder 35 is then bent down across the forward end of the slot 19 to form a stop to prevent the lead pusher A from being disengaged from the slot 19. The spring arms 16 and 17 hold the teeth 18 projecting out of the slot and cause the hook end 22 to engage in the socket 23 under spring tension sufficiently to hold the connecting link 24 against disengagement from the forward end 17 of the pusher. It is also apparent that the arm 17 could not raise up sufficiently high to permit the hook end 22 to disengage itself from the opening 23 when the pusher arm 17 is held within the tubular center tube 20 as illustrated clearly in Figure 1. Thus the parts of the pusher A are held together without solder and in a simple manner so as to provide an inexpensive, yet very effective construction for my pusher A.

In accordance with the patent statutes I have described the principles of operation of my lead pusher and connecting parts, and while I have illustrated a particular formation in the drawings I desire to have it understood that this is only suggestive and that the invention can be carried out by other means and applied to uses other than those above set forth within the scope of the following claims:

I claim:

1. A lead pusher for mechanical pencils including a member having teeth, a threaded

member in said pencil, means for propelling and repelling said pusher, spring arms extending from said lead pusher, a hook formed on one of said arms, a connecting link rod having a recess into which said hook is adapted to engage and a tubular spring sleeve slideably connected to the forward end of said link rod.

2. A lead carrier for a mechanical pencil comprising a member formed with thread engaging teeth, spring arms projecting from said member, a connecting link rod, an opening formed in said rod to permit pivotal engagement of one of said spring arms therein and a slideable spring lead gripping sleeve secured to the forward end of said link.

3. A lead carrier for a pencil consisting of a spring member with projecting teeth supported in a tubular center operating member, a longitudinal slot formed in said operating member, a link sleeve lead supporting member and an opening formed in said link to provide pivotal connection between the spring member and the link and sleeve lead supporting member, said operating member holding the spring member against disengagement from the link sleeve lead supporting member in operation.

4. A lead carrier for a pencil comprising an operating member having a longitudinal slot formed therein, a spring member with projecting teeth, the teeth of which are adapted to extend through said slot under spring tension, a link, a lead sleeve slideably secured to the link, an opening adapted to provide pivotal connection between the link and said spring member to permit free transverse movement of said sleeve, said center tube being adapted to form means to hold said spring member against disengagement from said link when contained in said center tube.

HOWARD L. FISCHER.