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H. MAUCHER
MECHANICAL PENCIL

2,170,761

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Fig. 1.

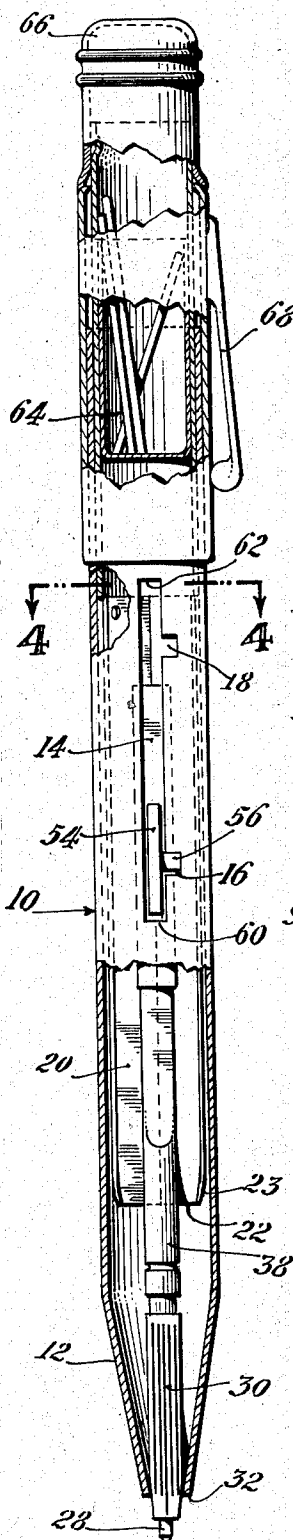


Fig. 4.

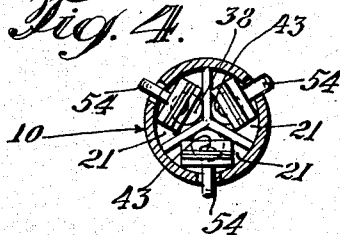


Fig. 5.

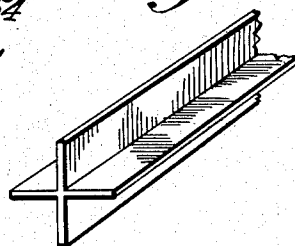


Fig. 7.

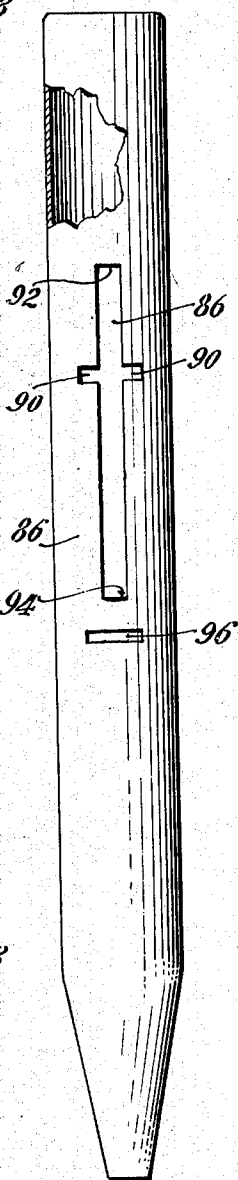


Fig. 2.

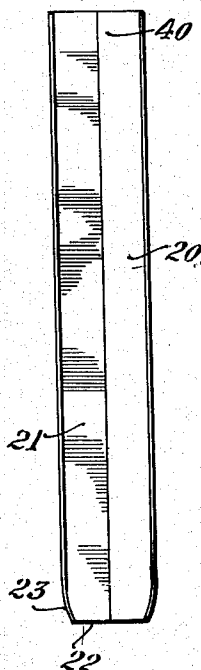
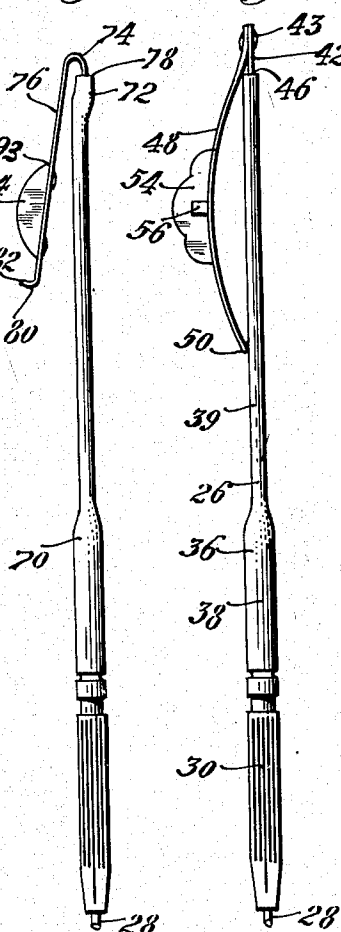


Fig. 6. Fig. 3.



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MECHANICAL PENCIL

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6 Claims. (Cl. 120—14)

The present invention relates to mechanical pencils and more particularly to such pencils having a plurality of leads, which leads may have different characteristics and which may be selectively projected into operative position.

A typical embodiment of the type of mechanical pencils to which the present invention relates is a multi-color lead pencil having a plurality of lead carrying and lead propelling members which are arranged to be selectively projected into operative position. Heretofore such pencils have been quite complicated, having a multiplicity of springs, housings and other constructional features which have added to the cost of such pencils. The present invention contemplates the provision of a pencil having the minimum of parts necessary for such a pencil, and which is comparatively simple in construction. Such a pencil costs less to manufacture because of the fewer parts, and is less likely to get out of repair.

It has been a common fault of such pencils in the past that the lead carriers which are not separated from each other rub against each other and occasionally are bent or jammed together when a specific carrier is advanced or retracted from its operative position. In the more severe instances of such jamming or bending of the carrier, the pencil has been ruined and in less severe instances the pencil parts have worn out quite rapidly. Because of this and because as heretofore stated, there are a great many parts to such pencils, these pencils have not been durable, resulting in frequent repair.

The present invention, therefore, contemplates the provision of means whereby the lead carriers are maintained separate from each other so that they will not jam and so that the pencil will have smooth, frictionless operation with longer durability and less need for repair. The present invention further contemplates the provision of means whereby each lead carrier is guided during the course of its movement so that it will operate smoothly and not catch on other portions of the pencil.

Heretofore, the assembly of such type of pencil has been comparatively complex, demanding a degree of skill comparable to that required of a watchmaker. The problem of maintaining a number of elements, comprising a spring or springs, a plurality of lead holders and associated parts, in their relative assembled positions prior to locking such members in assembly, is one that requires a considerable degree of skill, time and comparatively costly effort.

The present invention, therefore, contemplates the provision of a pencil which is easy to assemble and results in a substantial saving in the cost of labor used in assembling such pencil.

Conversely, a pencil such as is contemplated by the present invention would be easy to disassemble and consequently readily repaired.

It has been characteristic in the past of pencils of the general character described that they have not been positive in operation. For example, such lead carriers have not been locked positively in inoperative position. They have usually been held in inoperative position by springs or by a slight frictional engagement. Thus, it has often occurred that the lead carrier which is supposed to be in inoperative position moves out of that position to an extent sufficient to cause the pencil to jam or an adjacent lead carrier to be bent or for friction to develop between such lead carrier and other working parts of the pencil with consequent damage to the pencil. The present invention contemplates overcoming such disadvantages by making the selective operation of the lead carriers positive in operation.

Other features and advantages of the present invention will be apparent from the following description in conjunction with the drawing, in which:

Fig. 1 is an elevational view of an embodiment of the present invention, partly in section.

Fig. 2 is an elevation of the longitudinal partition member of said pencil.

Fig. 3 is a side elevation of the lead carrier.

Fig. 4 is a cross section of the pencil along line 4—4 of Fig. 1.

Fig. 5 is a fragmentary perspective view of a modification of the partition member.

Fig. 6 is a side elevation of a modification of the lead carrier illustrated in Fig. 3.

Fig. 7 is a front elevation of a modification of the casing, adapted to accommodate the lead carrier illustrated in Fig. 6.

Referring to the embodiment illustrated in Figures 1 to 5, the pencil of the present invention has an outer casing 10 which may be made of sheet metal and which has a conical point 12 formed at one end thereof.

As the present pencil is designed to have several lead carriers, longitudinal slots 14 equal in number to the number of lead carriers, in the present instance, three, are provided in the casing. A short distance from each end of the longitudinal slot 14 are formed lateral recesses, a lower lateral recess 16 nearer the point of the pencil and an upper lateral recess 18 toward the upper end of

the pencil. The distance between the two recesses is equal to the distance the lead carrier is advanced from its inoperative to its operative position. The purposes of these recesses will be explained hereinafter.

In order to separate the lead carriers from each other within the casing and to provide beds upon which each carrier can move and by which it is guided, a longitudinal partition member 20 forming as many compartments 21 as there are lead carriers and an equal number of beds is provided. The present embodiment has three compartments and three beds as illustrated in Fig. 4. A modification of said partition member is shown in Figure 5 having four compartments therein. The partition member 20 is longer than the longitudinal slot 14 and substantially shorter than the length of the outer casing 10. Near the bottom 22 of the longitudinal partition member 20, a tapered portion 23 is formed so that the longitudinal partition member may be inserted a short distance into the conical point 12. The walls of the longitudinal partition member are equal to each other in width, height and general contour, and equal angles are formed thereinbetween. In the longitudinal member shown in Figure 4, angles of 120° are formed between each of the walls which form three beds and in the longitudinal partition member shown in Figure 5 the angles between the walls of this member are 90° each which form four beds.

In assembling the pencil, the longitudinal partition member 20 is first inserted deeply into the pencil so that the tapered portion 23 of the partition member projects a short distance into the conical point 12 of the casing. The longitudinal partition member 20 in this position does not interfere with the insertion of the lead carriers which is the next operation. The lead carriers are inserted one at a time. While they may differ, it is preferred that all the lead carriers in one pencil be similar in construction. Therefore, only one will be described.

This lead carrier, referred to as a unit by the numeral 26, has inserted therein through the bottom thereof an ordinary lead 28. These leads may differ in color or degree of hardness or other characteristics in each separate carrier. The lead 28 may be propelled forward in the lead carrier to writing position by turning a knurled grip 30 which projects beyond the end 32 of the conical point 12 of the casing. The mechanism for propelling the lead within the lead carrier is no part of the present invention and, therefore, will not be described. Various types of propelling mechanism which might be used with the present invention are well known to those versed in the pencil art and will, therefore, not be described.

Reference also is made to Patent No. 2,067,455 issued to the present inventor, which shows a propelling mechanism which might be used to propel the leads in the herein-described lead carrier.

A long, narrow tube 36 is disposed above the lead propelling mechanism and secured to it. The lower portion 38 of said tube is affixed to the lead advancing mechanism and is secured thereto by any desired means, such as by frictional engagement, soldering, etc.

The lead carrier 26 is designed to slide along and be guided in its movement by the bed 40 formed by the walls of the longitudinal partition member 20. To maintain the lead carrier against the bed, it is preferred to provide thereon a tension member, a portion of which presses against

the inside of the casing 10, so that it holds the lead carrier against the bed at all times.

The tension member may be secured to the lead carrier in any desired manner. As illustrated in Fig. 3, a short flat metal tab 42 may be inserted into the open end 46 of the tubular member 36. The tab 42 may be secured in place by flattening the upper portion 39 of the tubular member 36 so that the flattened walls thereof frictionally engage the tab. A rivet 43 may be used to secure the tab to the tension member. It is to be understood that there are numerous other ways of securing the tension member to the lead carrier member which will readily occur to any skilled mechanic. It is also apparent that it is not necessary that the tension member be affixed to the lead carrier to maintain said carrier against the bed 40 of the longitudinal member. For example, it may be affixed to the casing, or it may lie loosely between the carrier and the casing.

The tension member may be formed of an arcuate leaf spring 48, one end of which is attached by rivet 43 to the tab 42. The opposite end 50 rests against the flattened portion 39 of the tubular member 36 and slides downward thereon when the arcuate spring 48 is flattened.

In the center of the arcuate spring 48, a longitudinal knob 54 is provided which is sufficiently narrow to be readily reciprocated within the slot 14 of the casing 10. Adjacent the center of the knob 54 is an offset portion 56 which is sufficiently small to enter the lateral recesses 16 and 18 formed in the longitudinal slot 14. The knob 54 and its offset portion 56 are secured to the spring in any manner desired and as there are a great many well known ways of securing same, it will not be described here. The arcuate spring 48 is wider than the longitudinal slots so that it will not enter the same, but instead will press against the inside of the casing adjacent the longitudinal slot.

While the upper portion 39 of the tubular member 36 has been described as a flattened tube, it is to be understood that this portion may be so distorted as to conform in cross-section to the cross-section of the bed 40 in order that it may fit snugly against the bed and be restrained thereby from lateral movement. In order to conform to the triangular contour of the bed 40 as shown in this embodiment, the tubular member 50 may be formed so as to be triangular in cross-section. It is also to be understood that the contour of the beds may be varied also. The cross-sectional contour of the entire lead carrier may be made to conform to that of the bed which serves as a guide on which the lead carrier slides.

As stated hereinbefore, the longitudinal partition member 20 is inserted all the way into the casing 10 so that it will not interfere with the insertion of the lead carriers into said pencil. Next a lead carrier is inserted into one of the compartments formed by the longitudinal partition member. This is done by flattening the arcuate spring 48 so that the knob 54 and the offset portion 56 will pass underneath the wall of the outer casing 10 while the remainder of the lead carrier urged by the action of the arcuate spring 48 operating against the interior of the casing 10 adjacent the longitudinal slots rides along the bed 40 formed by the junction of two sides of the longitudinal compartment member. As the knob 54 of the lead carrier reaches the longitudinal slot 14, it is pushed upward into said slot by the action of the arcuate spring 48 which tries to reassume its normal curvature and the offset portion 56 en-

ters the upper lateral recess 18, thus locking the lead carrier positively in its inoperative position.

In similar fashion, the other lead carriers are then inserted. A hook is then inserted into the pencil which catches the end 22 of the longitudinal partition member 20 and said member is drawn upward until it reaches the desired level. It is then secured to the casing by any desired means so that it will not thereafter slide out of position. It is preferred that the longitudinal compartment member be drawn upward to such position that it extends an equal distance longitudinally on both sides of the longitudinal slot 14. In this position, it forms a balanced bed on which the portion of the lead carrier opposite the arcuate spring 48 rests. Thus, the pressure of the arcuate spring 48 forcing the knob 54 upward is constant throughout the normal range of movement of the knob in the slot. The arcuate spring 48 maintains the lead carrying member in its bed by its pressure against the inside of the casing.

To operate this pencil after the pencil has been assembled, the knob 54 of the lead carrier which holds the type of lead desired to be used is depressed so that the offset portion 56 of the knob 54 extends below the edge of the lateral recess 18. The knob 54 is then urged downward toward the point of the pencil until it is stopped by the edge 60 at the lower end of the longitudinal slot 14. Thus, the end of the lead carrier is pushed out past the edge 32 of the conical point 12 of the pencil. The knob 54 is released as it reaches the lower end 60 of the slot whereupon the offset portion 56 of the knob 54 enters the lower recess 16 urged by the spring 48, thus locking the lead carrier selected in operative position. When the selected lead carrier is no longer desired, the knob 54 is again depressed, thus removing the offset portion 56 out of the lateral recess 16 and the lead carrier is then pushed upward until the movement of the knob is stopped by the upper end 62 of the longitudinal slot 14. Upon release of the knob, the offset portion 56 is urged outwardly by spring 48 and is locked in lateral recess 18.

A magazine 64 for extra leads may be provided in the upper portion of the casing. The ordinary frictionally retained closure cap 66 may be provided at the top thereof. The usual clip 68 may be attached also.

Having already described in detail a specific embodiment of the present invention, reference is now made to Figures 6 and 7 illustrating a modification thereof. The modified structure is similar to the above-described structure in all particulars except those hereinafter described.

The long tube 70 of the lead carrier illustrated in Figure 6 is flattened except at its upper end 72 where it is distorted so that it is triangular in cross-section. This portion 72, therefore, fits snugly into the bed 40 and serves as a guide for the lead carrier in its movement. One end 74 of a flat leaf spring 76 is bent back upon the spring to form a U as shown in Figure 6 and is inserted into the top 78 of the tube 70 and may be held there by frictional engagement, soldering, etc. The spring 76 is spaced from the tube 70 and when not under tension extends away therefrom forming an angle therewith. The end of the spring 76 opposite the end 72 is bent at substantially right angles to the spring in a direction away from the tube 70, thereby forming a flange 80. The flange 80 may be curved at its outer edge 82 so that the longitudinal shape of the outer edge of the flange conforms to the curved shape of the casing of the pencil. If the casing were flat or

diagonal, this edge 82 would similarly be shaped.

A knob 84 is mounted on the spring 76 a short distance from the flange 80. The knob 84 is narrower than the longitudinal slot 86 in the casing 88 illustrated in Figure 7 so that the knob can be readily reciprocated therein.

Unlike the slot 14 in the casing 10 shown in the embodiment of Figure 1, the slot 86 in the casing 88 of the embodiment of Fig. 7 does not have two spaced lateral recesses. Instead, a pair of lateral recesses 90 facing each other across the longitudinal slot 86 may be provided a short distance from the top 92 of the longitudinal slot. The pair of recesses 90 may be made sufficiently wide so that the flange 80 of the spring member 76 may enter therein. The flange 80 enters this pair of recesses and holds the lead carrier in this, its inoperative position. To release the lead carrier, the knob 84 is depressed, thereby depressing the spring 76 and moving flange 80 out of the recesses 90. Knob 84 is then urged downward by the fingers until it is stopped by the lower end 94 of the longitudinal slot 86.

A short distance below the end 94 of the slot 86 is a narrow transverse slot 96 sufficiently large to accommodate the flange 80. After the knob 84 reaches the end 94 of the slot 86 and is released, the spring 76 urges the flange 80 into the transverse slot 96, thereby locking the lead carrier in place in its operative position.

From the foregoing description, it will be seen that I have provided a pencil of the character described which is extremely simple in construction, has few parts, is smooth and frictionless in operation, that is easily assembled and easily repaired and that is positive in operation, as well as being economical to manufacture.

Furthermore, it is obvious that it is easy to repair this pencil for each lead carrier member may be removed without disturbing any of the other carrier members.

While I have described in detail specific embodiments, I wish to claim this invention as broadly as the scope of the appended claims and the state of the prior art allow, for obvious modifications of the specific structure will occur to a person skilled in the art.

I claim:

1. In a multi-lead pencil, a casing having a plurality of slots arranged therein, a longitudinal partition member arranged in the casing and having walls forming a plurality of compartments, a lead carrying member arranged in each compartment, a spring on each lead carrying member and a knob on the spring extending through one of the longitudinal slots, each spring urging the lead carrier against the walls of the compartment in which it is arranged.

2. In a multi-lead pencil, a casing, a longitudinal partition member arranged in the casing and having walls forming a plurality of beds, a plurality of lead carrying members movably arranged on said beds and separated from each other by the longitudinal partition member and a spring on each lead carrying member urging said lead carrier against the bed on which it is arranged.

3. In a mechanical pencil having a casing with a plurality of longitudinal slots therein, each of said longitudinal slots having extending therefrom a plurality of lateral recesses, the combination of a longitudinal partition member having a plurality of beds therein, with a plurality of lead carrying members arranged to move on said beds, each of said lead carrying members having

arranged thereon a tension member, a knob and a locking member, both arranged on said tension member, the knob being urged into the longitudinal slot and the locking member being urged into a lateral recess by the tension member to lock the lead carrying member in either operative or inoperative position.

4. In a multi-lead pencil, a casing, a longitudinal partition member arranged in the casing, and having walls forming a plurality of guide beds, a plurality of lead carrying members movably arranged on said beds and separated from each other by the longitudinal partition member, said lead carrying members provided with a slide element similar in cross section to the guide bed and snugly fitting therein and a spring on each lead carrying member urging said lead carrier against the bed on which it is arranged.

5. In a mechanical pencil, the combination of a casing having a plurality of longitudinal slots therein, each of said longitudinal slots having extending therefrom a plurality of spaced lateral recesses, with a plurality of lead carrying mem-

bers, each of said lead carrying members having arranged thereon a tension member, a knob and an offset portion adjacent the knob, both arranged on said tension member, the knob being urged into the longitudinal slot and the offset portion being urged into a lateral recess by the tension member to lock the lead carrying member in either operative or inoperative position.

6. In a mechanical pencil, the combination of a casing having a plurality of longitudinal slots therein, each of said longitudinal slots having extending therefrom a pair of recesses and a transverse slot adjacent one end of each of said longitudinal slots, with a plurality of lead carrying members, each of said lead carrying members having arranged thereon a tension member having a portion thereof formed into a locking member, a knob arranged on said tension member, the locking member being urged into the recesses or into the transverse slot to lock said lead carrier in operative or inoperative position.

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