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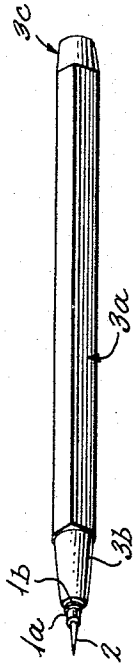
CHAO FU CHIU ET AL

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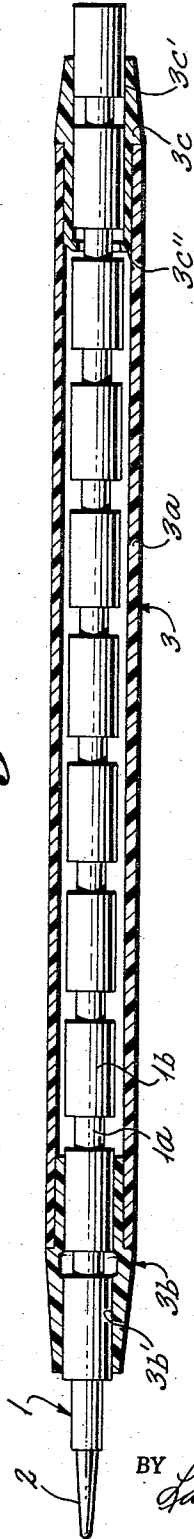
PENCIL WITH SELF-REFILLING CARTRIDGES

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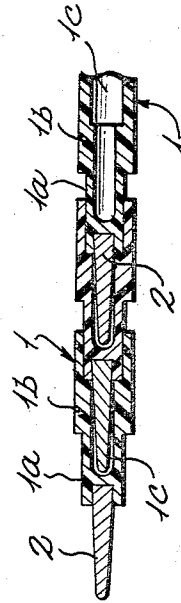
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



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**PENCIL WITH SELF-REFILLING CARTRIDGES**  
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 4 Claims. (Cl. 120-14.8)

The present invention relates to new and useful im-  
 provements in writing implements and, more particularly,  
 to a pencil which is characterized by a suitable number of  
 pre-sharpened leads carried by cartridges contained in a  
 tubular holder and which leads may readily be replaced  
 with fresh pre-sharpened leads contained in said tubular  
 holder.

It is a principal object of this invention to dispense with  
 the usual sharpening of a lead pencil when the lead has  
 become blunt.

It is another object of the present invention to provide  
 a substitute for the ordinary pencil having lead encased  
 in wood in the form of a pencil made of plastic or other  
 low-priced material.

It is still another object of the present invention to pro-  
 vide a pencil having lead tightly fixed at the tip of a  
 holder to prevent the lead from being easily broken, which  
 is common in the case of a screw-type of self-refilling  
 pencil.

It is still another important object of the present inven-  
 tion to provide a writing implement having a plurality of  
 writing units positioned in a tubular casing, there being  
 a sufficient number of said writing units in said casing  
 so that removal of the front-most writing unit from the  
 casing and its insertion in the rear end of said casing will  
 result in the movement of the writing unit immediately  
 behind said front-most writing unit to a position such  
 that its writing point projects out of the front end of said  
 casing.

It is a still further important object of the present inven-  
 tion to provide a lead pencil in the form of a casing having  
 a plurality of pre-sharpened lead-containing writing units  
 positioned in end-to-end position in the casing, each of  
 said writing units being provided with a recess at its rear  
 end so that the lead of each writing unit except the front-  
 most writing unit nests in the recess of the writing unit  
 immediately in front of it.

These and other important objects and advantages of  
 the present invention will become more apparent in con-  
 nection with the ensuing description and claims and draw-  
 ings wherein:

FIG. 1 is a side elevation of a pencil having self-refilling  
 cartridges in accordance with the present invention;

FIG. 2 is a vertical longitudinal sectional view of the  
 pencil illustrated in FIG. 1; and

FIG. 3 is a vertical longitudinal sectional view of car-  
 tridges used in connection with the pencil illustrated in  
 FIGS. 1 and 2.

As shown in FIGS. 1-3, cartridge 1 (alternatively re-  
 ferred to in this specification and claims as a writing unit)  
 is formed with a front end 1a of relatively small diameter  
 and a rear end 1b of relatively larger diameter, a pre-  
 sharpened lead 2 being supported in said front end 1a.  
 Rear end 1b of cartridge 1 is provided with a hollow or  
 recess 1c which is divided into two portions. The front-  
 most portion of the recess is one of small diameter used  
 to receive and protect said pre-sharpened lead 2 of the car-  
 tridge immediately behind it; the rear-most portion of said

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recess is of relatively larger diameter and is provided to  
 receive the front end 1a of the next succeeding cartridge.

The pencil holder or casing 3 is of the tubular type and  
 is provided with two sleeves 3b and 3c. The front-most  
 sleeve 3b has a hollow 3b' fixed at the front end of casing  
 3 and the rear sleeve 3c, having a hollow 3c', is supported  
 at the rear end of casing 3. The front sleeve 3b is formed  
 to receive in frictional relationship the rear end 1b of the  
 front-most cartridge 1. The rear sleeve 3c has an inner di-  
 ameter which is substantially the same dimension as the  
 inner diameter of front-most sleeve 3b and receives in  
 frictional relationship the rear-most portion 1b of the rear-  
 most cartridge 1. As will be seen clearly in FIG. 2, the  
 front end 3c'' of sleeve 3c projects inwardly toward the  
 longitudinal axis of casing 3 to provide an elastic guide  
 for the rear portion 1b of the rear-most cartridge in casing  
 3 so that such cartridge will be properly guided into the  
 hollow of the casing. Such projection 3c'' also prevents  
 retraction of the cartridges from casing 3 upon the applica-  
 tion of pressure to the front-most cartridge during the  
 writing operation.

As will be apparent from the foregoing description and  
 the drawing, the pre-sharpened lead 2 of the front-most  
 cartridge 1 will be normally exposed at the front end of  
 the casing 3. When this lead has become blunt or broken,  
 the front-most cartridge can be readily removed by pulling  
 it out of the front end of casing 3. The front end 1a of this  
 removed cartridge can then be inserted into the recess 1c  
 of the rear-most cartridge of casing 3 and pushed into the  
 rear sleeve 3c until the fresh pre-sharpened lead 2 is ex-  
 posed at the front end of casing 3. By repeating this opera-  
 tion each time the front-most lead 2 is blunted or broken,  
 such pre-sharpened leads may be continuously exposed at  
 the front end of casing 3 and no conventional sharpening  
 operation will be required.

As will be apparent, the particular advantages of the  
 construction previously illustrated and described are best  
 availed of when the writing implement involved is a lead  
 pencil of the type described. Certain advantages of the  
 present invention may also be obtained using other types  
 of writing implements, however, and it is to be therefore  
 understood that the present invention is to be also deemed  
 to be directed broadly to such other writing implements  
 as well as specifically to lead pencils.

This invention may be embodied in other specific forms  
 without departing from the spirit or essential characteris-  
 tics thereof. The present embodiment is therefore to be  
 considered in all respects as illustrative and not restrictive,  
 the scope of the invention being indicated by the ap-  
 pended claims rather than by the foregoing description,  
 and all changes which come within the meaning and  
 range of equivalency of the claims are therefore intended  
 to be embraced therein.

What is claimed is:

1. A writing implement comprising a tubular casing  
 having a front end and a rear end; a plurality of writing  
 units positioned in end-to-end position in said casing, each  
 of said writing units having a writing point in its front end  
 and a recess in its rear-most portion, each of said writing  
 points of said writing units being nested in said recess  
 in the rear-most portion of the writing unit immediately  
 in front of it; the writing point of the front-most writing  
 unit projecting out of the front end of said casing; a suffi-  
 cient number of writing units being present in said casing  
 so that removal of said front-most writing unit from said  
 casing and its insertion in the rear end of said casing will  
 result in the movement of the writing unit behind said

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front-most writing unit to a position such that its writing point projects out of the front end of said casing, said rear end of said casing being provided with locking means containing a longitudinally extending central opening to prevent the front-most writing unit from retracting into said casing upon the application of pressure to said front-most writing unit but to permit the insertion of writing units therethrough without the removal of said locking means from said casing.

2. A writing implement as defined in claim 1 wherein said locking means is comprised of a projection located inside said casing and extending inwardly towards the longitudinal axis of said casing.

3. A writing implement as defined in claim 1 wherein the inner diameter of the front and rear ends of said casing are of approximately the same dimension.

4. A writing implement as defined in claim 1 wherein

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the majority of said writing units are frictionally independent of said casing.

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LAWRENCE CHARLES, *Primary Examiner.*