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C. W. BOMAN ET AL

PENCIL

Filed May 17, 1922

Fig. 1.

Fig. 2.

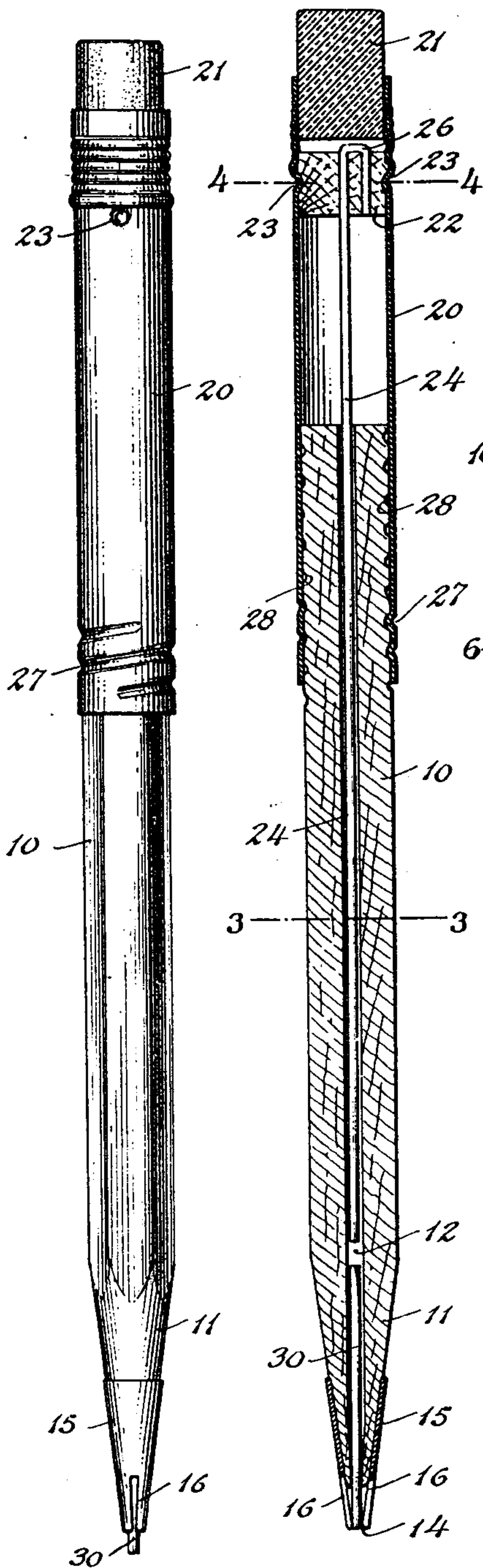


Fig. 5.

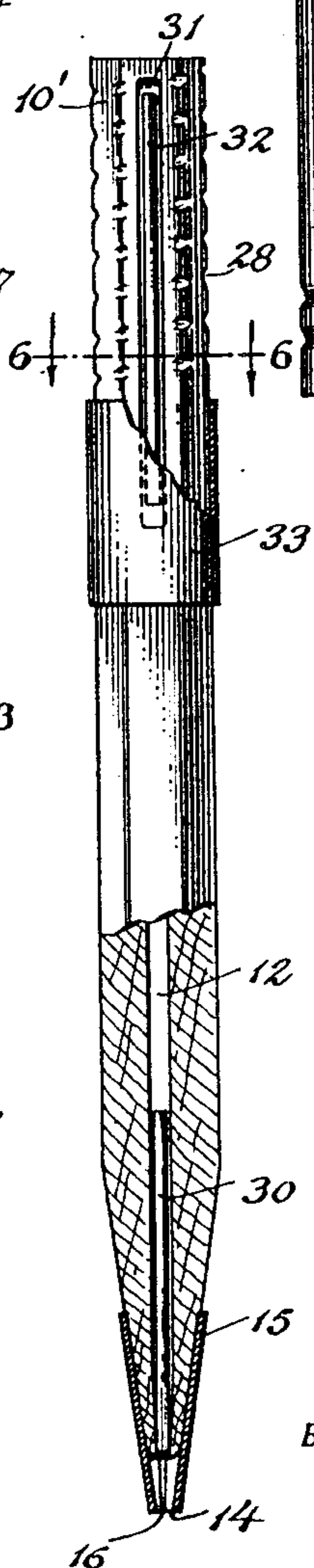


Fig. 3.

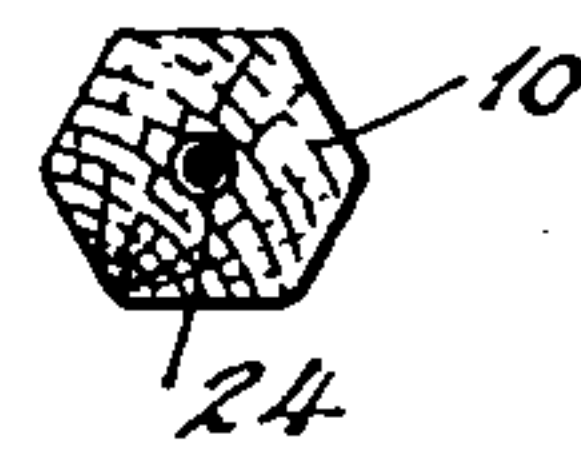


Fig. 4.

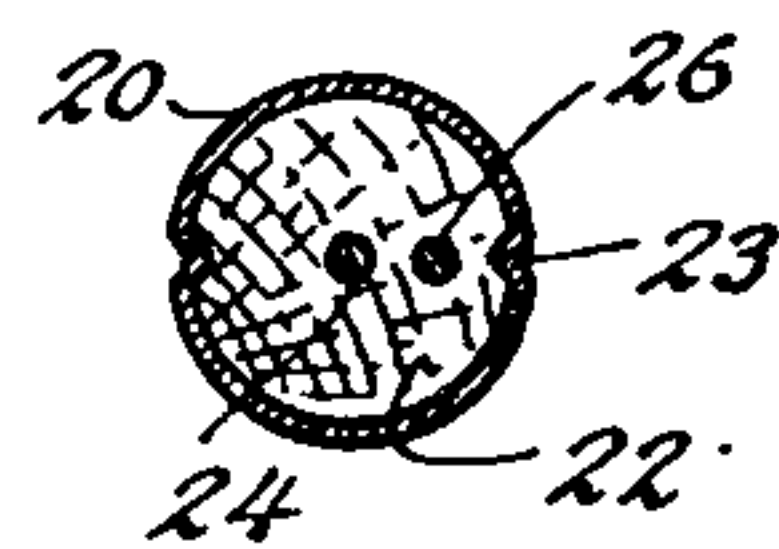
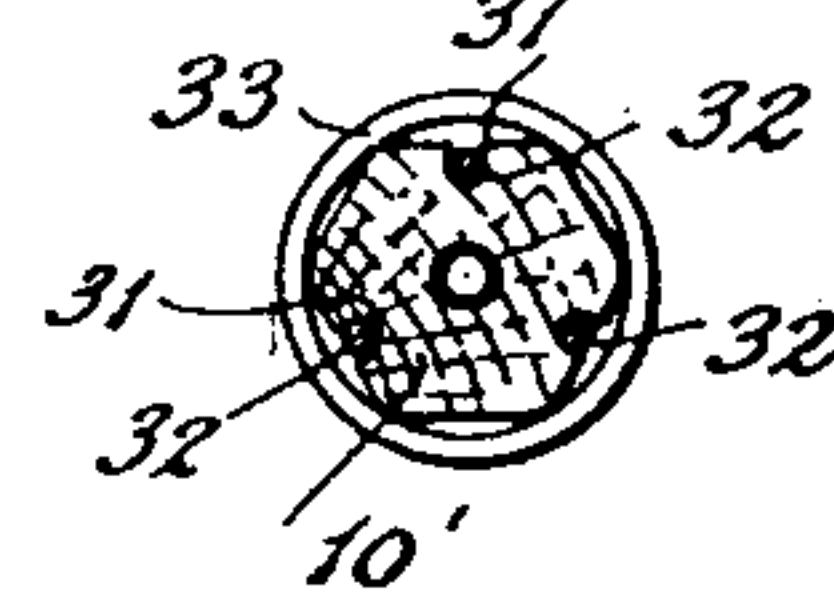


Fig. 6.



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PENCIL.

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This invention relates to pencils, and particularly to pencils of the class known as "propelling pencils" in which means are provided for propelling the lead outwardly from the pencil-body as the lead is worn away by use.

The invention aims to provide a propelling pencil of neat and attractive appearance, and of such simple construction that it may be manufactured at a cost much less than the propelling pencils heretofore made.

Such propelling pencils as have heretofore proved practically useful have had pencil-bodies consisting of a plurality of nested tubular members. Such pencil-bodies have been comparatively expensive to manufacture because they have included a number of parts which had to be accurately made in order to fit together, and because of the labor necessary in assembling the parts.

A propelling pencil constructed in accordance with the present invention has a solid pencil-body of considerable length and of an outside diameter which may be the same as that of an ordinary wooden pencil. The pencil-body may be made of wood, and contains a small axial bore for the lead. The front end of the pencil-body is tapered and provided with a metal ferrule which forces the material of the tapered point of the pencil-body inwardly so that it takes a frictional grip upon the lead. On the rear end of the pencil-body is mounted a thin metal tubular cap. A wire push rod of considerably greater length than the cap has one of its ends secured to the cap near the rear end thereof, while its other end projects into the bore of the pencil-body and engages the rear end of the lead. Near the front end of the cap is stamped an internal helical boss by means of which the cap may be screwed on the pencil-body. When the cap is turned so as to screw it forward on the pencil-body, the push rod propels the lead forward in the bore, causing it to project through from the tapered front end of the body. When the cap is screwed rearwardly on the pencil-body, the lead may be pushed back inside the body.

A further feature of the invention consists in providing in the upper or rear portion of the pencil-body, which is normally covered more or less by the cap or by a separate sleeve, a series of longitudinal grooves in which extra leads may be kept.

In order that the invention may clearly be understood, we will describe in detail the approved embodiments of it which are illustrated on an enlarged scale in the accompanying drawings, in which:—

Fig. 1 is an outside view of the propelling pencil with a short or partly used lead in position for writing;

Fig. 2 is a central longitudinal section of the pencil showing the lead pushed back into the body;

Fig. 3 is a transverse section on the line 3—3 of Fig. 2;

Fig. 4 is a transverse section on the line 4—4 of Fig. 2;

Fig. 5 is a side view, partly in section, of a pencil having grooves for extra leads, the cap being shown removed from the pencil body; and

Fig. 6 is a transverse section on the line 6—6 of Fig. 5.

The pencil-body 10 is most desirably made of wood and may have an outside diameter substantially equal to that of an ordinary wooden pencil. It may be, and most desirably is, made polygonal in cross-section as illustrated. The outer end 11 of the pencil-body is conical in form like the pointed end of a wooden pencil, and a small axial bore 12, slightly greater in diameter than the lead to be used, extends through the body. The surface of the pencil-body may be painted or varnished or otherwise finished to give it an attractive appearance similar to that of a high grade wooden pencil.

A conical ferrule 13 of thin metal having a lead opening or hole 14 at its point covers and protects part of the tapered end portion 11. The ferrule most desirably has a longitudinal slot 16 sawed or otherwise cut across its outer end. It is forced on the tapered portion 11 of the body, and the parts of it upon opposite sides of the slot 16 are slightly pinched together. In this operation the wood at and near the end of the tapered portion 11 of the body is forced or compressed slightly inward, reducing the end of the bore 12 to a size or diameter such that it will lightly grip the lead.

It is desirable to have the ferrule opening 14 in the finished pencil of a size to fit closely about the lead so as to provide a firm support for the lead at the extreme end of the pencil point, and in order to insure such support the

opening 14 is most desirably of a size to exert a very slight pressure on the lead, the slot 16 giving such elasticity to the divided end portions of the tip that such slight grip may be exerted without interfering with the feeding movement of the lead. In order to accurately size the opening 14, we find it desirable to form the opening in the ferrule originally of such size that when the ferrule has been forced on to the end of the pencil body as described the opening 14 will be slightly too small. A steel or other hard wire rod of approximately the size of the lead, and most desirably very slightly smaller than the lead, is then passed through the bore to slightly enlarge the opening 14 to the desired size. The passing of this wire rod through the bore also serves to smooth out any slight unevenness or slight roughness there might be in the reduced end of the bore so that the lead may be fed readily therethrough. Owing, however, to the compressibility and the elasticity of the wood of which the pencil body is made, the end of the bore remains of a size to frictionally grip the lead with a desirable elastic pressure.

By the construction of the pencil point described there is provided means whereby the lead is supported, and most desirably lightly gripped, at the extreme end of the pencil point by the end of the ferrule, and is held with a light grip in the reduced end of the bore 12 at a point spaced slightly back from the point. The lead is thus held very steady. A cap 20 which is placed on the rear end of the pencil-body 10 consists of a thin metal tube having an appearance similar to the protective caps heretofore used on ordinary wooden pencils, and may have an eraser 21 mounted in its rear end in the manner that erasers are customarily mounted in pencil protectors. Near the rear end of the cap, just inside the eraser 21, is a small wooden block 22 secured by internal bosses 23 which are punched in the cap after the block has been placed in position. A wire push rod 24 of materially greater length than the cap has its rear end secured in the block 22. The rod may conveniently be secured to the block in the following manner:—A small axial hole is formed in the block and the rod 24 having its rear end bent over is inserted in this hole from the rear and the bent over rear end 26 of the rod is driven into the block. Near the open front end of the cap 20 a helical groove is formed so as to form an internal helical boss 27 on this part of the cap.

A lead 30, of diameter slightly less than that of the main portion of the bore 12 and slightly greater than the normal diameter of the front end of the bore, is placed in the rear end of the bore and allowed to slide forward until it reaches the reduced front end of the bore. (See Fig. 5.) The push rod 24 is then inserted in the rear end of the bore 12 and

pushed in until the front end of the cap 20 extends on the rear end of the pencil-body 10. The cap is then screwed on the rear end of the pencil-body, the internal helical boss 27 of the cap forming slight helical depressions or screw threads 28 in the outer surface of the body as the cap is screwed forward, if such threads have not been previously formed on the pencil-body. As the cap is screwed forward the front end of the push rod 24 engages the rear end of the lead 30 and pushes the lead forward until the front end of the lead projects through hole 14 of the ferrule 15. (See Fig. 1.) As the front end of the lead is worn away in writing, the cap 20 is screwed slightly forward on the body, causing the push rod 24 to propel the lead 30 outwardly. The friction between the lead and the reduced front end of the bore 12 and the ferrule hole 14 holds the lead firmly in position and prevents it from falling out. When the cap is screwed backward, the lead may be pushed back into the pencil.

When a lead 30 has been used up, the cap is unscrewed from the pencil-body and the push rod withdrawn and a new lead inserted in the rear end of the bore 12, and the push rod and cap then replaced.

When the pencil-body is made polygonal, as shown, the helical depressions 28 are formed by the helical boss 27, of the cap only at the angles of the body, and these tend rather to add to than detract from the appearance of the pencil. If desired, the helical depressions may be stamped or otherwise formed in the rear portion of the outer surface of the body before the cap 20 is applied. This is usually desirable, especially when the body is made circular in cross-section, in which case a single continuous helical depression is formed.

In order to provide for holding extra leads, the pencil body is most desirably formed near its rear end with a plurality of longitudinal grooves 31 in its outer surface, as shown in Figs. 5 and 6. These grooves are made of proper size to receive and lightly hold the leads, so that while the leads may be readily removed they will not ordinarily fall out, and the grooves most desirably do not extend quite to the rear end of the body. To cover the grooves 31 sufficiently for appearance sake and to insure against loss of the extra leads when the pencil is in use, a sleeve is provided which is most desirably a slidable band 33 made separate from the cap 20 and adapted to be pushed forward by the cap as the cap is screwed forward on the body. Making the lead-retaining sleeve as a separate band, rather than as an extension of the cap 20 beyond its helical boss 27, has the advantage that it may remain on the pencil body in position to retain the leads in the grooves when the cap is removed. If no sleeve were provided to extend beyond the helical boss

of the cap over the grooves 31, the desired covering of the grooves could be secured only by screwing the cap further on to the pencil body, thus undesirably prolonging the operation of placing and removing the cap.

The propelling pencils which have been described for the sake of illustration are the embodiments of the invention which we now believe to be most desirable. It should, however, be understood that the invention is not limited to the particular form of these embodiments.

What is claimed is:

1. A propelling pencil, comprising a solid wooden pencil-body having a small axial bore therethrough and having a tapered portion at its front end, a tubular cap mounted on the rear end of the pencil-body and having an internal helical boss near its front end engaging a helical depression in the outer surface of the pencil-body, a push rod having its rear end fixed in the cap near the rear end thereof, projecting beyond the front end of the cap by a distance materially greater than the length of the tapered portion of the body, and extending into the bore of the body to engage the rear end of a lead therein, and a thin walled tapered ferrule permanently secured on the tapered portion of the body to compress the front end thereof and reduce the diameter of the bore, said ferrule extending slightly beyond the end of the body, and being longitudinally slotted at its front end and having a hole at its apex of a size to support and lightly grip the lead, the surface of the body from the tapered end portion to the end of the cap being uncovered, whereby an extended portion of the surface of the wooden body is at all times exposed to facilitate gripping the pencil in the fingers.

2. A propelling pencil, comprising a solid wooden pencil body having a small axial bore therethrough and having a conical portion at its front end, a thin walled conical ferrule permanently seated on the conical portion of the pencil body and serving to slightly compress the front end thereof and slightly reduce the diameter of the end of the bore, said ferrule extending slightly beyond the end of

the body and being longitudinally slotted at its front end and having a hole at its apex of a size to support and lightly grip the lead, and means to engage the rear end of a lead in the bore of the pencil-body and force it forward through the hole in the ferrule.

3. A propelling pencil, comprising a solid wooden pencil-body having a small axial bore therethrough and having a conical portion at its front end, a thin-walled conical ferrule permanently seated on the conical portion of said body to compress the front end thereof and reduce the diameter of the end of the bore, said ferrule extending slightly beyond the end of the body and having in its apex a hole aligned with the bore in the body, and means to engage the rear end of a lead in the bore and force it forward and through the hole in the ferrule, the main portion of the bore being of a size to permit the lead to slide freely therethrough and the reduced end of the bore being of a size to lightly grip the lead, and the hole in the ferrule being of a size to support the lead.

4. A propelling pencil, comprising a solid wooden pencil-body having a small axial bore therethrough and having a conical portion at its front end, a conical ferrule of thin metal permanently seated on the conical end portion of said body to compress the front end thereof and reduce the diameter of the end of the bore, said ferrule extending slightly beyond the end of the body and being longitudinally slotted at its front end and having in its apex a hole aligned with the bore in the body, and means to engage the rear end of a lead in the bore and force it forward and through the hole in the ferrule, the main portion of the bore being of a size to permit the lead to slide freely therethrough and the reduced end of the bore being of a size to lightly grip the lead, and the hole in the ferrule being of a size to support and lightly grip the lead.

In testimony whereof, we have hereunto set our hands.

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