

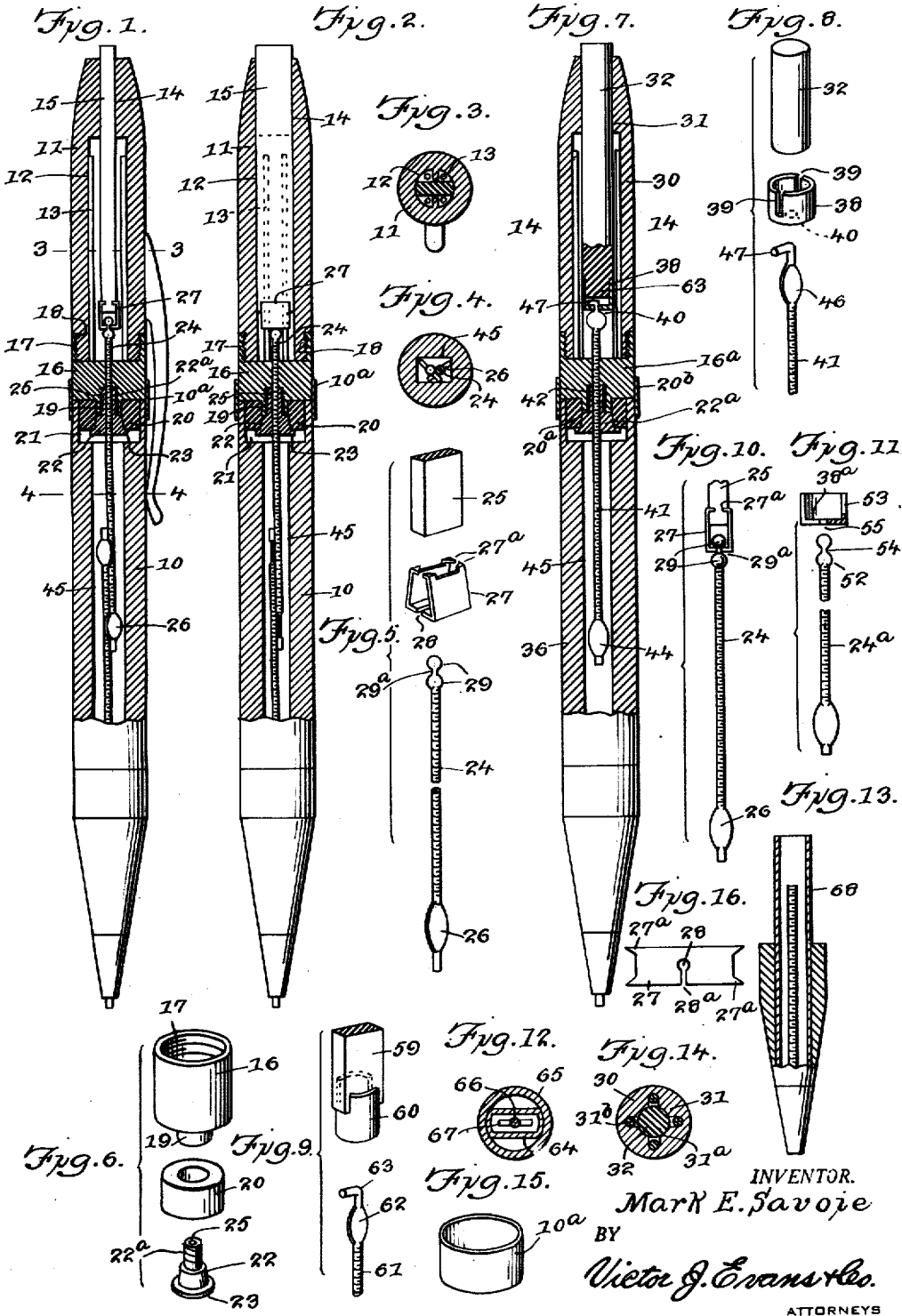
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ERASER FOR MECHANICAL PENCILS

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ERASER FOR MECHANICAL PENCILS

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2 Claims. (Cl. 120—38)

This invention relates to an eraser for mechanical pencil and has for an object to provide an eraser holder combined with the pencil and having propel and retract mechanism similar to the lead propel and retract mechanism for feeding the eraser progressively as it becomes worn, so that a usable eraser will be obtainable for approximately the life of the pencil.

A further object is to provide a device of this character in which the eraser holding member forms a magazine for leads when using a flat eraser and the pencil barrel forms a magazine for leads when using a round eraser.

A further object is to provide a device of the character stated in which the eraser holding member, when adapted to hold a cylindrical eraser, has its wall grooved to provide pockets adapted to receive leads.

With the above and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawing forming a part of this specification:

Figure 1 is a longitudinal sectional view, with parts in elevation, of a mechanical pencil equipped with an eraser and propel and retract mechanism constructed in accordance with the invention.

Figure 2 is a longitudinal sectional view of the mechanical pencil taken in a plane at a right angle to the plane of Figure 1.

Figure 3 is a cross sectional view taken on the line 3—3 of Figure 1.

Figure 4 is a cross sectional view taken on the line 4—4 of Figure 1.

Figure 5 is a perspective view showing the screw of the propel and retract mechanism separated and the means of attaching the eraser to the screw.

Figure 6 is a perspective view showing the cup member of the eraser holding housing, the rubber bushing, and the member for locking the bushing to the cup member.

Figure 7 is a longitudinal sectional view of a modified form of the invention.

Figure 8 is a perspective view of the parts of the propel and retract mechanism, separated and the means for attaching the eraser to the screw mechanism.

Figure 9 is a perspective view showing propel

and retract mechanism, similar to Figure 8, used in connection with a flat eraser.

Figure 10 is a sectional view, with parts in elevation of a further modified form of propel and retract mechanism with eraser clamp in position.

Figure 11 is a sectional view of a still further modified form of propel and retract mechanism with modified form of eraser holder.

Figure 12 is a cross sectional view of a modified form of the invention.

Figure 13 is a sectional view of the pencil tip showing the magazine for holding leads.

Figure 14 is a cross sectional view taken on the line 14—14 of Figure 7.

Figure 15 is a view of metal band which fits over the housing member concealing the junction of pencil barrel and housing member, and

Figure 16 is a development of the clamp shown in Figures 1, 2, 5 and 10.

Referring now to the drawing, 10 designates the barrel of a mechanical pencil. In carrying out one form of the invention a tubular housing 11 is provided with a molded axial opening 12 which is of substantially cylindrical formation and which forms a magazine for leads 13, see Figure 3, the opening being provided with a reduced extension 14, of oblong form in cross section, to slidably receive an eraser 15 also of substantially oblong cross section. As shown in Figure 7, the extension of the axial opening and the eraser may be round in cross section. The eraser projects into the opening 12, and at the inner end is provided with means to propel and retract the eraser as will now be described.

A cup shaped member 16 is provided internally with screw threads 17 to receive external screw threads 18 on the uniformly reduced inner end of the housing. The member 16 is substantially cylindrical and is flush with the outer surface of the housing and with the outer surface of the barrel 10. A projection 19, one half the diameter of a sleeve 20 and threaded inside, extends from the member 16 into the barrel and is surrounded by the annular sleeve 20 of rubber or other material to secure the member 16 to the barrel 10. The outer wall of the bushing frictionally contacts with the wall of an enlarged axial opening in the barrel 21.

A cone shaped member 22, having an axial dimension one-half that of the bushing 20, and fitting in the opening of the bushing, is provided at its small end with an externally screw threaded shank 22a which is threaded into member 16. The cone-shaped member 22 rotatably connects

the bushing 20 to the member 10, and the bushing connects the housing 11 to the barrel 10. A flange 23 on the lower end of the cone-shaped member 22 holds the bushing 20 against accidental displacement from the member 10 and it is held against accidental displacement from the barrel 10 by its frictional engagement with the barrel. A metal band 10a which surrounds the barrel 10 and member 10, conceals the juncture between said parts.

An elongated screw 24 is threadedly engaged with the wall of an axial opening 25 in the member 10 and the cone 22 and its shank 22a. The screw 24 is provided with a flattened portion 26 which is located within the bore 45 of the barrel 10, and which contacts with the walls of the bore to prevent the screw and barrel from turning one with relation to the other. The screw 24 is connected to the eraser 15 by a clamp 27 which is attached to the eraser by four prongs 27a. The lower side of the clamp 27 is, as best shown in Figure 16, provided with an opening 28 through which the upper end of the screw 24 passes. This end of the screw is provided with spherical elements 29 connected by a neck 29a, the neck passing through the opening 28, and the spherical elements contacting with the upper and lower surfaces of the lower side of the clamp 27, to swivelly connect the clamp and screw. The clamp 27 is provided with a slot 28a to permit the clamp and the screw 24 to be readily assembled. The spherical elements 29 of the screw 24 prevent the screw and the clamp 27 from having any relative axial movement, so as to insure the movement of the eraser 15 when the screw and housing 11 are turned one with relation to the other.

By holding the housing 11 stationary and turning the barrel 10 on its axis the screw 24 will also be turned and will feed endwise through the members 12 and 22 since the screw is held against rotation by the flattened portion 26. During rotation of the barrel in one direction the eraser 15 will be propelled to project from the housing and during rotation of the barrel in the opposite direction the eraser will be retracted into the housing.

Another form of the invention is shown in Figures 7 and 8 in which the housing 30 is provided with a cylindrical bore 31 to receive a cylindrical eraser 32. The bore 31 is, as best shown in Figure 14, provided with four grooves 31a which provide pockets for leads 31b. In this form of the invention the cup shaped member 16a, bushing 20a, cone-shaped member 22a, and 20b are the same as previously described and are assembled with the housing 30 and barrel 36 of the pencil as previously described.

The cylindrical eraser 32 is wedged into a cup shaped holder 38 having oppositely disposed slots 39 in the sides to make the walls of the holder resilient to clamp the eraser firmly in the holder. The holder is provided in the bottom with a central opening 40. A screw 41 is threadedly engaged in an axial opening extending through the members 16a and 22a and is held against rotation with relation to the barrel 36 by a flattened portion 44 which extends into a bore 45 of the barrel. A flattened portion 46 near the outer end of the screw is disposed adjacent to the holder 38 and the end portion is provided with a hook 47 which is engaged in the opening 40 in the bottom of the cup to swivelly attach the screw to the cup. The flattened portion 46 forms a shoulder to push

against the cup when the screw is fed endwise as previously described to propel the eraser out of the housing. Endwise feeding of the screw in the opposite direction causes the hook 47 to retract the eraser into the cap.

As best shown in Figure 11 the operating screw, here designated 24a, may be provided with ball heads 52 and an intermediate neck 54, the neck passing through the opening in the bottom of the holder 38a, and the heads contacting with the upper and lower sides of the bottom of the holder. The holder 38a is provided with a slot to permit the application or removal of the screw 24a.

The eraser of rectangular cross section shown at 59 in Figure 9, and which is identical to 15 previously described, may be confined in a cup shaped holder 60 similar to the holder 38 and the operating screw 61 may be provided with a shoulder 62 and hook 63 similar to the shoulder 46 and hook 47 previously described.

The rectangular shape of the bore in the barrel may, as shown in Figure 12, be produced by an elongated casing 64 which is confined in the barrel 65 to receive the operating screw 66 and flattened portion 67 thereof in order to non-rotatably mount the operating screw in the barrel.

The lead magazine may be disposed in the lower end of the mechanical pencil as shown at 68 in Figure 13 and a portion of the magazine projects beyond the upper end of the pencil tip to attach said lower end to the barrel of the pencil.

In all forms of the invention the operating screw is fed endwise, and is operatively connected to the eraser through the various forms of connections heretofore described.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

1. In combination with a pencil barrel, a sleeve frictionally fitted in the inner end of the barrel, an interiorly threaded tubular member extended through the bore of the sleeve, said member having an exteriorly threaded portion projecting outwardly of the barrel and sleeve and an enlarged inner end portion holding the member against outward displacement, a cylindrical member mounted in end to end relation with the sleeve having an interiorly threaded bore therethrough co-axial with the bore of said tubular member, said cylindrical member being provided with an enlarged interiorly threaded counter bore engaging the projecting portion of the tubular member, that end of the cylindrical member remote from the sleeve having an interiorly threaded socket, a tubular eraser housing having its inner end exteriorly threaded and engaging said socket, a screw extended through and threadedly engaging the co-axial bores of said tubular and cylindrical members, said screw having a broad longitudinally flattened end slidably received in the barrel, means in the barrel to prevent rotation of said flat end, an eraser disposed for axial sliding movement in said housing, and a clamp attached to the inner end of the eraser and having swivel connection with the screw.

2. The structure defined in claim 1 wherein the enlarged inner end of the tubular member comprises a conical portion having a flange at its end inwardly of the barrel bearing against the inner end of the sleeve.

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