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D. G. FALCONER

2,629,932

RULING PENCIL

Filed Jan. 14, 1952

FIG. 1

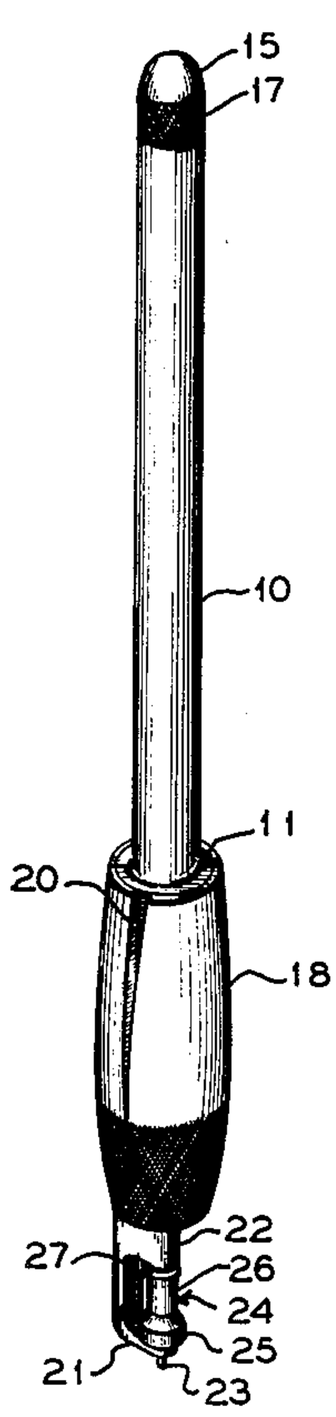


FIG. 2

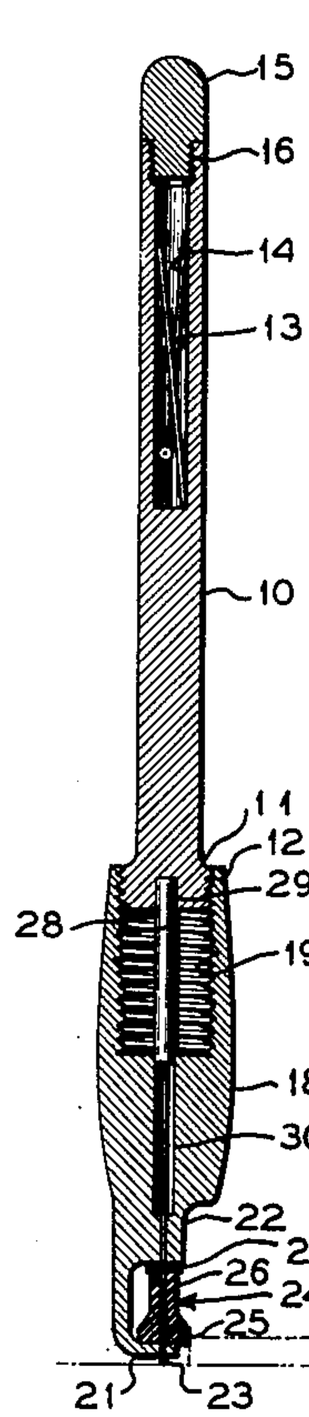


FIG. 3

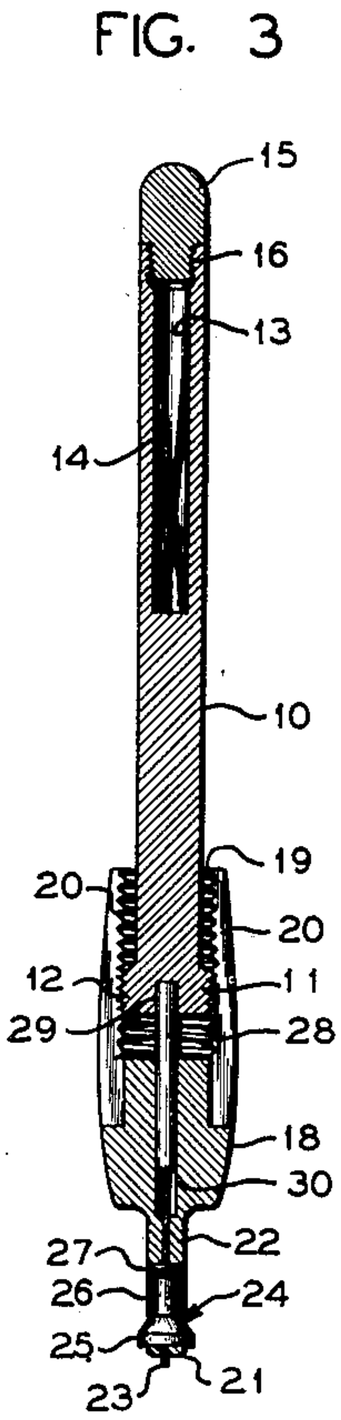


FIG. 4

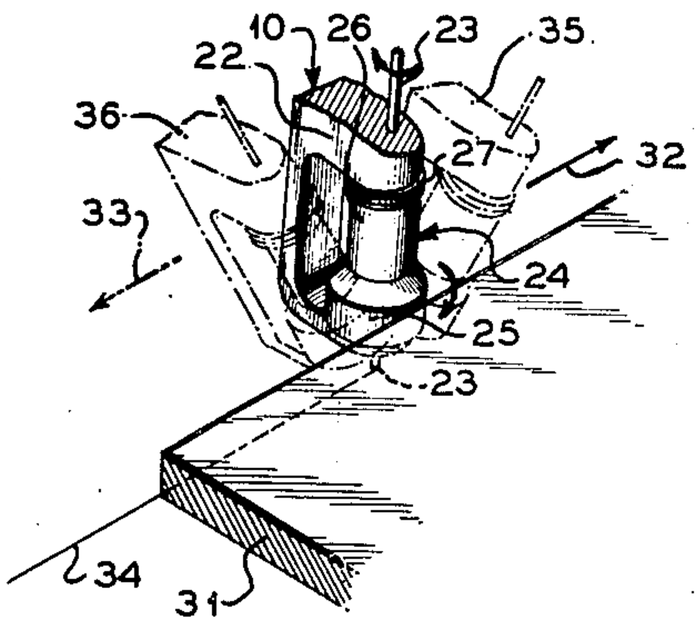


FIG. 5

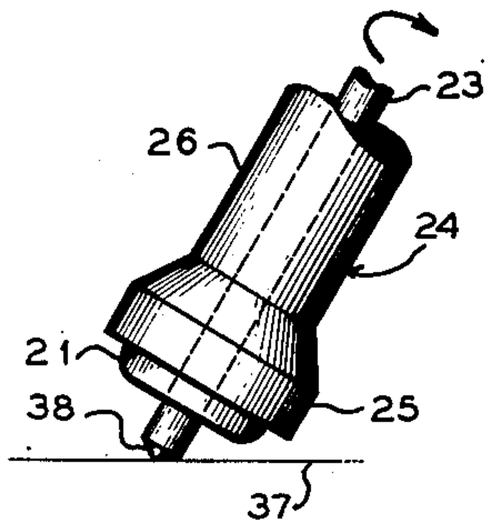
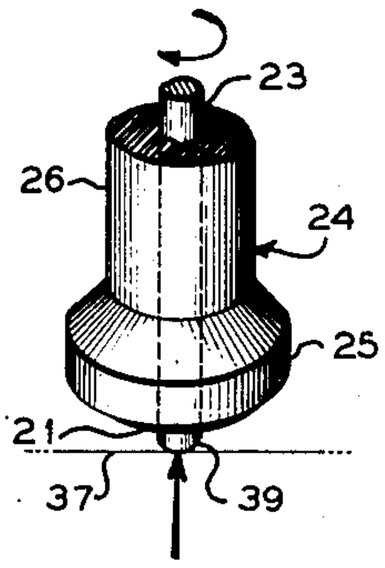


FIG. 6



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RULING PENCIL

David Gray Falconer, Berkeley, Calif.

Application January 14, 1952, Serial No. 266,424

14 Claims. (Cl. 33—41)

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This invention relates to geometrical devices, more particularly drafting equipment and specifically to a ruling pencil of the character employed in making precise and accurate drawings where it is necessary to have lines of substantially uniform widths and appreciably smaller than the diameter of the lead.

The invention relates to a ruling pencil having the features above mentioned and in addition a pencil capable of utilizing lead which can be adjusted easily and readily removed and replaced.

In the making of drawings it has been an annoying as well as a time consuming problem for the draftsman to maintain his pencil in a sufficiently sharpened condition to produce a thin uniform line. This has been particularly true where a relatively soft pencil has been used since rapid wear of the lead has resulted in a line gradually increasing in width until the same became unduly wide and detracted both from the accuracy and from the appearance of the drawing.

When wood pencils are utilized by a draftsman it is necessary to sharpen the same by removing a portion of the wood with a knife and thereafter to sharpen the lead by use of a file or sandpaper pad. These are time consuming operations which must be continued as long as the pencil is in use. Also the pencil cannot be used for its full length because when it becomes short it cannot be conveniently grasped in the hand.

Mechanical pencils have been produced for use by draftsmen, which pencils have a shank or handle which is hollow to receive lead and a chuck to hold such lead, but the majority of these have required a lead of substantially the same diameter as that found in conventional wood pencils and it is necessary to sharpen these pencils by means of a file or sandpaper pad. In such cases a considerable portion of the lead must project from the chuck in order to provide proper contact between the lead and a straight edge or other instrument utilized in making the drawing and in view of this fact the lead must be of appreciable diameter in order to provide sufficient strength to prevent frequent breaking of the same in the event considerable pressure is applied thereto. These mechanical pencils also present the same difficulty of providing a line of increasing width as the lead wears and consequently any device which provides a pencil line of uniform width regardless of the wear of the lead represents a contribution to the art.

An object of the invention is the provision of

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a pencil for use by draftsmen of simple and inexpensive construction, susceptible of high quantity production and which can be produced of readily available materials by relatively unskilled labor.

Another object of the invention is to provide a pencil of the character described employing a lead without the same having to be sharpened and which provides a penciled line of uniform width regardless of the wear of the lead as well as a pencil of a construction such that the lead is both adjustable and replaceable.

A further object of the invention is to provide a pencil for use by draftsmen in which pencil the structure is such that inadvertant displacement of the lead inwardly or outwardly of the pencil is prevented and there is an elongated shank and a finger gripping portion with means to move or project the lead outwardly of the gripping portion as the lead is consumed.

Further objects and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a perspective of a draftsman's pencil in accordance with this invention;

Fig. 2, a vertical section of the internal construction of the pencil of Fig. 1;

Fig. 3, a view similar but at right angles to that of Fig. 2;

Fig. 4, a fragmentary perspective of the pencil in full lines in vertical operating position and in phantom lines in two angular positions;

Fig. 5, a fragmentary elevation illustrating the relationship of the pencil lead and paper and the manner in which the lead wears during use; and

Fig. 6, an elevation at right angles to that of Fig. 5 and illustrating the contour of the lead in contact with the paper.

With continued reference to the drawing a pencil in accordance with the present invention has an elongated shank 10 terminating at one end in an enlarged shoulder portion 11, the external surface of which is provided with screw threads 12. The purpose of these screw threads will presently appear. The opposite end of the shank 10 may be provided with a bore 13 for the reception of spare leads 14 and the bore 13 may be conveniently closed by a cap 15 provided with screw threads 16 for retaining the same in shank 10. The external surface of the cap 15 may have a knurled portion 17 to provide a firm finger grip or if desired the cap 15 may be retained in the bore 13 by a sliding friction fit.

A finger engaging piece 18 is provided with a

bore having screw threads 19 designed to mate with the screw threads 12 on enlarged portion 11 of shank 10 and rotation of finger piece 18 with relation to shank 10 will move the same inwardly or outwardly thereof. In order to provide a firm engagement between threads 12 and 19 the finger engaging piece 18 may be provided with vertical slots 20 which results in a firm frictional engagement between the threads and prevents inadvertant relative rotation.

Finger engaging piece 18 is provided adjacent the lower end thereof with a transversely disposed yoke having spaced arms 21 and 22 provided with aligned bores for slidably and rotatably receiving a relatively thin lead 23. Disposed between the arms 21 and 22 and frictionally engaging and receiving the lead 23 is a friction drive member 24 having an enlarged collar 25 adjacent the lower end thereof, and an elongated portion 26 extending upwardly therefrom. Disposed between the upper end of the portion 26 and the lower surface of arm 22 of the yoke are spacing washers 27 which take up excessive play or clearance and serve to prevent inadvertant axial movement of the friction drive member 24 and the lead 23. Drive member 24 may be formed of rubber, neoprene or other suitable resilient material and this member serves to firmly grip the lead 23 and upon rotation of the member 24 lead 23 will rotate therewith and in view of the frictional engagement between the member 24 and lead 23 the latter may be moved axially through the member 24 as the lead 23 wears away.

Means is provided for projecting the lead 23 through the friction driving member 24 to compensate for wear and this means may conveniently take the form of a plunger 28 secured in an aperture 29 in the lower end of shank 10 in any desired manner such as by soldering or welding or if desired plunger 28 may constitute a drive fit in the aperture 29. A bore 30 may be provided in the finger engaging piece 18 which bore is concentric with the aligned bores in the yoke arms 21 and 22 and the diameter of board 30 is such as to snugly but slidably receive the plunger 28.

It will be seen therefore that upon the rotation of the shank 10 with relation to the finger piece 18 to move the shank 10 downwardly into the finger piece 18 that the plunger 28 will engage the upper end of lead 23 and project the same through the friction driving member 24 to compensate for wear of the lead 23. Upon the plunger 28 reaching the extreme downward position at which time the lead 23 has been fully extended the remaining portion of the lead within the friction driving member 24 may be removed and a new lead inserted at which time the plunger 28 will be retracted by relative rotation between the shank 10 and the finger engaging piece 18 to accommodate the new lead.

The pencil of this invention is designed to be used in either the right or left hand and if it is desired to draw a line having a width equal to the diameter of the lead 23 the pencil will be held in a vertical position as shown in full lines in Fig. 4 with the collar 25 of the friction driving member 24 in engagement with one edge of a straight edge 31. Movement of the pencil in the direction of the solid line arrow 32 or the dotted line arrow 33 will result in drawing a line having a width equal to the diameter of the lead 23 and the lead 23 will be rotated by reason of the frictional engagement between the collar 25 and the straight edge 31 resulting in a line 34 of uniform density. When a pencil is being used in the right hand and it is desired to draw a line 34 of relatively narrow width the pencil is inclined as shown in phantom at 35 in Fig. 4 and moved in the direction of the solid line arrow 32. Conversely when the pencil is used in the left hand it is inclined to the position shown in phantom lines 36 in Fig. 4 and moved in the direction of the dotted line arrow 33.

As shown in Figs. 5 and 6 with the pencil in either inclined position and with the collar 25 engaging the straight edge 31 the lead 23 will engage the paper 37 and as the pencil is moved in either direction or as shown in Fig. 5 toward the right, the lead will be rotated by engagement of the collar 25 with the straight edge 31 and the lead will wear in the form of a cone 38. The arcuate surface 39 of the cone 38 is in engagement with the paper 37 as shown in Fig. 6 and consequently it will be seen that the width of the line formed by the pencil will be determined by the radius of the arcuate surface 39. This will be substantially a line contact and consequently the line 34 will be relatively narrow and in view of the fact that the pencil lead 23 is continuously rotated during the ruling process the arcuate surface 39 will be maintained and a flat will not form on the lead 23 which would result in a gradual increase in width of the line 34. Consequently a line of uniform width will be obtained and this will be a relatively fine line of considerably less width than the diameter of the lead 23. Identically the same action will occur if the pencil is inclined in the opposite direction and moved toward the left as viewed in Fig. 5.

It will be seen that by the above described invention there has been provided a relatively simple pencil for use by draftsmen in which means is provided for maintaining a line of uniform width and which line is of considerably less width than the diameter of the lead utilized in the pencil. Furthermore means is provided for conveniently adjusting the lead to compensate the wear and such lead may be easily renewed when necessary. The pencil may be formed of metal, plastics or any other suitable material.

It will be obvious to those skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is shown in the drawings and described in the specification but only as indicated in the appended claims.

What is claimed is:

1. A ruling pencil comprising an elongated shank having a threaded enlargement on one end thereof, a bore in its opposite end for receiving spare leads, and a cap for closing said bore, a plunger extending axially and concentrically from said enlargement, a finger engaging piece having a threaded bore in one end thereof and threadedly engaging said enlargement, said piece being partially split longitudinally to provide a relatively tight frictional engagement between said threads to prevent inadvertant relative rotation between said shank and said piece, a reduced bore in said piece for receiving said plunger, a yoke on the opposite end of said piece having transversely disposed spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bores and extending into

said reduced bore, a resilient rotating member received on said lead and frictionally gripping the same between said arms, an enlarged collar on said rotating member for engaging a straight edge and spacing washers between one end of said rotating member and one of said arms to prevent excessive end play whereby upon movement of said pencil along a straight edge with said collar engaging the same said lead will be rotated to provide a line of uniform width and upon relative rotation between said shank and said piece said plunger will engage said lead to project the same through said rotating member to compensate for wear of said lead.

2. A pencil comprising an elongated shank having a threaded enlargement on one end thereof, a plunger extending axially from said enlargement and concentric therewith, a finger engaging piece having a threaded bore in one end thereof and threadedly engaging said enlargement, said piece being partially split longitudinally to provide a relatively tight frictional engagement between said threads to prevent inadvertant relative rotation between said shank and said piece, a reduced bore in said piece for receiving said plunger, a yoke on the opposite end of said piece having transversely disposed spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bores and extending into said reduced bore, a resilient rotating member received on said lead and frictionally gripping the same between said arms, an enlarged collar on said rotating member for engaging a straight edge and spacing washers between one end of said rotating member and one of said arms to prevent excessive end play whereby upon movement of said pencil along a straight edge with said collar engaging the same said lead will be rotated to provide a line of uniform width and upon relative rotation between said shank and said piece said plunger will engage said lead to project the same through said rotating member to compensate for wear of said lead.

3. A pencil comprising an elongated shank having a threaded enlargement on one end thereof, a plunger extending axially from said enlargement and concentric therewith, a finger engaging piece having a threaded bore in one end thereof and threadedly engaging said enlargement, said piece being partially split longitudinally to provide a relatively tight frictional engagement with said threads to prevent inadvertant relative rotation between said shank and said piece, a reduced bore in said piece for receiving said plunger, a yoke on the opposite end of said piece having transversely disposed spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bores and extending into said reduced bore, a resilient rotating member received on said lead and frictionally gripping the same between said arms and an enlarged collar on said rotating member for engaging a straight edge whereby upon movement of said pencil along a straight edge with said collar engaging the same, said lead will be rotated to provide a line of uniform width and upon relative rotation between said shank and said piece said plunger will engage said lead to project the same through said rotating member to compensate for wear of said lead.

4. A pencil comprising an elongated shank having a threaded enlargement on one end thereof, a plunger extending axially from said

enlargement and concentric therewith, a finger engaging piece having a threaded bore in one end thereof and threadedly engaging said enlargement, a reduced bore in said piece for receiving said plunger, a yoke on the opposite end of said piece having tranversely disposed spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bores and extending into said reduced bore, a resilient rotating member received on said lead and frictionally gripping the same between said arms, and an enlarged collar on said rotating member for engaging a straight edge whereby upon movement of said pencil along a straight edge with said collar engaging the same, said lead will be rotated to provide a line of uniform width and upon relative rotation between said shank and said piece said plunger will engage said lead to project the same through said rotating member to compensate for wear of said lead.

5. A pencil comprising an elongated shank having a threaded enlargement on one end thereof, a plunger extending axially from said enlargement and concentric therewith, a finger engaging piece having a threaded bore in one end thereof and threadedly engaging said enlargement, a reduced bore in said piece for receiving said plunger, a yoke on the opposite end of said piece having transversely disposed spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bore and extending into said reduced bore and a resilient rotating member received on said lead and frictionally gripping the same between said arms whereby upon movement of said pencil along a straight edge with said rotating member engaging the same said lead will be rotated to provide a line of uniform width and upon relative rotation between said shank and said piece said plunger will engage said lead to project the same through said rotating member to compensate for wear of said lead.

6. A pencil comprising an elongated shank having a threaded enlargement on one end thereof, a plunger extending axially from said enlargement and concentric therewith, a finger engaging piece having a threaded bore in one end thereof and threadedly engaging said enlargement. a reduced bore in said piece for receiving said plunger, a recess in the opposite end of said piece providing spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bores and extending into said reduced bore and a resilient rotating member received on said lead and frictionally gripping the same between said arms whereby upon movement of said pencil along a straight edge with said rotating member engaging the same said lead will be rotated to provide a line of uniform width and upon relative rotation between said shank and said piece said plunger will engage said lead to project the same through said rotating member to compensate for wear of said lead.

7. A pencil comprising an elongated shank having screw threads on one end thereof, a plunger extending axially from said shank and concentric therewith, a finger engaging piece having a threaded bore in one end thereof and threadedly engaging said shank, a reduced bore in said piece for receiving said plunger, a re-

cess in the opposite end of said piece providing spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bores and extending into said reduced bore and a resilient rotating member received on said lead and frictionally gripping the same between said arms whereby upon movement of said pencil along a straight edge with said rotating member engaging the same said lead will be rotated to provide a line of uniform width and upon relative rotation between said shank and said piece said plunger will engage said lead to project the same through said rotating member to compensate for wear of said lead.

8. A pencil comprising an elongated shank having screw threads on one end thereof, a finger engaging piece having a threaded bore in one end thereof and threadedly engaging said shank, a recess in the opposite end of said piece providing spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bores and extending into said threaded bore and a resilient rotating member received on said lead and frictionally gripping the same between said arms whereby upon movement of said pencil along a straight edge with said rotating member engaging the same said lead will be rotated to provide a line of uniform width and upon relative rotation between said shank and said piece said shank will engage said lead to project the same through said rotating member to compensate for wear of said lead.

9. A pencil comprising an elongated shank having a finger engaging portion at one end thereof and a bore in the opposite end for receiving spare leads, a cap for closing said bore, a reduced axial bore in said finger engaging portion, a yoke on the end of said finger engaging portion having transversely disposed spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bores and extending into said reduced bore, a resilient rotating member received on said lead and frictionally gripping the same between said arms, an enlarged collar on said rotating member for engaging a straight edge and spacing washers between one end of said rotating member and one of said arms to prevent excessive end play whereby upon movement of said pencil along a straight edge with said collar engaging the same said lead will be rotated to provide a line of uniform width.

10. A pencil comprising an elongated shank having a finger engaging portion at one end thereof, a reduced axial bore in said finger engaging portion, a yoke on the end of said finger engaging portion having transverse disposed spaced arms, aligned bores in said arms communicating with said reduced bore, a lead slidably and rotatably received in said aligned bores and extending into said reduced bore, a resilient rotating member received on said lead and frictionally gripping the same between said arms, an enlarged collar on said rotating member for engaging a straight edge and spacing washers between one end of said rotating member and one of said arms to prevent excessive end play whereby upon movement of said pencil along a straight edge with said collar engaging the same said lead will be rotated to provide a line of uniform width.

11. A pencil comprising an elongated shank having a finger engaging portion at one end thereof, an axial bore in said finger engaging portion, a yoke on the end of said finger engaging portion having transversely disposed spaced arms, aligned bores in said arms communicating with said axial bore, a lead slidably and rotatably received in said aligned bores and extending into said axial bore, a resilient rotating member received on said lead and frictionally gripping the same between said arms and an enlarged collar on said rotating member for engaging a straight edge whereby upon movement of said pencil along a straight edge with said collar engaging the same said lead will be rotated to provide a line of uniform width.

12. A pencil comprising an elongated shank having a finger engaging portion at one end thereof, an axial bore in said finger engaging portion, a yoke on the end of said finger engaging portion having transversely disposed spaced arms, aligned bores in said arms communicating with said axial bore, a lead slidably and rotatably received in said aligned bores and extending into said axial bore and a resilient rotating member received on said lead and frictionally gripping the same between said arms whereby upon movement of said pencil along a straight edge with said member engaging the same said lead will be rotated to provide a line of uniform width.

13. A pencil comprising an elongated shank having a finger engaging portion at one end thereof, a yoke on the end of said finger engaging portion having transversely disposed space arms, aligned bores in said arms, a lead slidably and rotatably received in said aligned bores and a resilient rotating member received on said lead and frictionally gripping the same between said arms whereby upon movement of said pencil along a straight edge with said member engaging the same said lead will be rotated to provide a line of uniform width.

14. A pencil comprising an elongated shank having a finger engaging portion at one end thereof, a transverse recess in the end of said finger engaging portion providing transversely disposed spaced arms, aligned bores in said arms, a lead slidably and rotatably received in said aligned bores and a resilient rotating member received on said lead and frictionally gripping the same between said arms whereby upon movement of a pencil along a straight edge with said member engaging the same said lead will be rotated to provide a line of uniform width.

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No references cited.