Oct. 30, 1956 H. F. HEYNAU 2,768,609

MECHANICAL DRAWING PENCIL

Filed Aug. 19, 1953

Fig. 1.

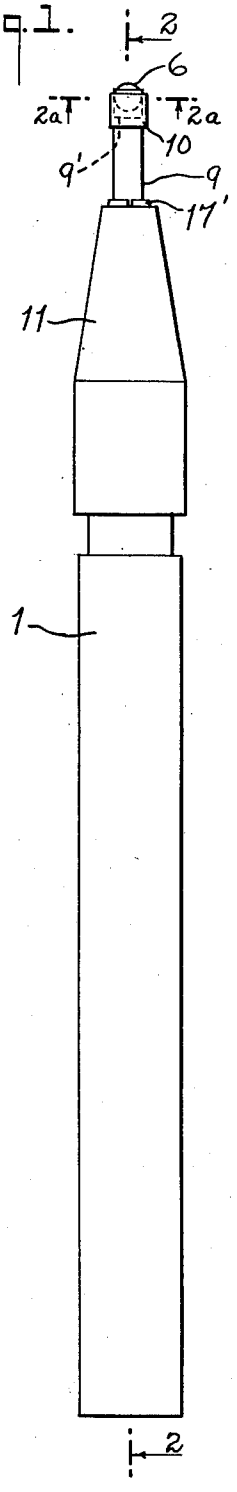


Fig. 2.

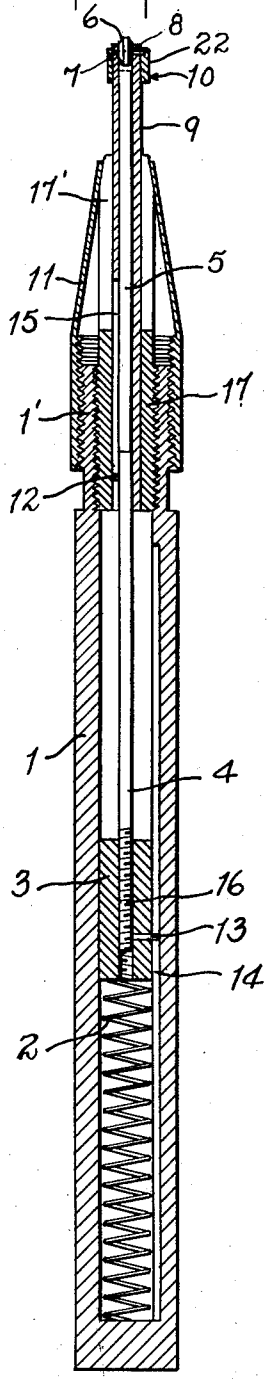


Fig. 2a.

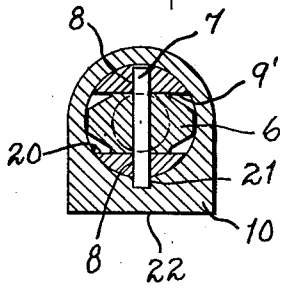


Fig. 3.

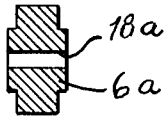


Fig. 4.

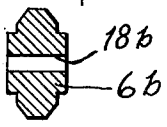
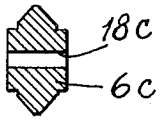


Fig. 5.



INVENTOR.
HANS FELIX HEYNAU
BY Walter S. Allerton
ATTORNEY

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MECHANICAL DRAWING PENCIL

Hans Felix Heynau, West Los Angeles, Calif.

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2 Claims. (Cl. 120—9)

The invention relates to a mechanical drawing pencil and its principal object is to provide a mechanical pencil which renders it possible to draw lines of selectively different thickness. Conventional pencils lose their sharpness very soon during use especially if the lead is soft, and it is necessary to sharpen such pencils frequently in order to maintain a desired thickness of the lines drawn. This causes a very considerable loss of the pencil material and also of the draftsman's useful time. Therefore it is another object of the invention to avoid the mentioned drawbacks and to provide a mechanical pencil which does not require a repeated sharpening, but which will draw lines of a constant thickness as long as the pencil has not been adjusted for another thickness.

The invention also contemplates the provision of a mechanical pencil with a roller which during the use of the pencil transfers lead material from the pencil to the paper in a line of a predetermined uniform thickness, and wherein the roller can be readily exchanged for another one of a set of rollers which so differ from one another as to produce lines of different thickness.

According to the invention, the pencil comprises a roller against which the lead guided in a barrel is pressed by means of a spring, and wherein the roller is directly inserted into and easily removable from the tip of a tube receiving the lead of the pencil so that the roller can be readily exchanged for another one of a set of rollers having differently shaped, set-off circumferential faces, and each roller of the set being so formed that, in drawing, it produces lines of one predetermined thickness. Owing to the possibility of selectively inserting into the pencil different rollers, it is attained that lines can be drawn of different but in each instance constant thickness. Hence with the device according to the invention similar advantages are obtained for pencil drawings to those hitherto obtainable with drawing pens when drawings are made in ink. By using the pencil according to the invention it is also possible to make carbon copies simultaneously with the original of a drawing. A further advantage of the device consists in the fact that with any selected roller the thickness of the line drawn is independent of the force with which the drawing pencil is more or less strongly pressed on the paper.

Further objects and details of the invention will be apparent from the description given hereinafter and the accompanying drawing illustrating an embodiment thereof by way of example.

In the drawing,

Fig. 1 is a side elevation of a pencil according to the invention,

Fig. 2 is a longitudinal cross-section along line 2—2 of Fig. 1, Fig. 2*a* is a section along line 2*a*—2*a* of Fig. 1, and

Figs. 3, 4 and 5 are cross-sections of three different interchangeable rollers as used in the pencil of Figs. 1 and 2.

Referring now to the drawing, in a barrel-like holder 1 a piston 3 is lengthwise movable. The piston is loaded by a compression spring bearing against the closed end of the barrel. A rod 4 is secured to the piston 3 e. g. by a screw thread 16 and projects from the latter opposite the spring 2. The rod is of the same diameter as a pencil lead 5 against which the free end of the rod 4 is pressed by the spring 2. The lead is housed in the lead-receiving tube 9, and means are provided to secure tube 9 adjustably in the head end 1′ of the holder 1. For this purpose, a chuck or collet-like member 17 may be secured by any suitable means, e. g. a fine thread in the head end 1′ so as to project therefrom with its slotted and externally conical end portion 17′. The chuck or collet 17, 17′ encompasses the lead-receiving tube 9 and a hollow, internally conical nut 11 is secured on the head end 1′ so as to engage the conical end portion 17′ and to clamp it firmly about the tube 9. In this manner, the lead-receiving tube 9 can be turned and longitudinally shifted in relation to the holder 1 and secured in any adjusted position. In the free end of the tube 9, bores 8 form the bearings for a little axle or pin 7 on which a roller 6 it rotatable so that a portion of its periphery projects from the free end of the tube. The diameter of the roller is larger than the width of the latter, and the end of the tube is longitudinally slotted at 9′ in order to render rotation of the roller possible and to guide it laterally.

Means are provided in order to ensure that the drawing pencil when used is always held at right angles to the axis of the roller 6, that means in the correct position with respect to the paper. For this purpose a guiding piece 10 with an inner bore is applied to the tube 9 close to the roller 6. This piece is provided with a groove 21 in its bore 20 so that one end of the axle 7 can engage therein. It also has an outer face 22 at right angles to the axle 7 and, thereby, facilitates the keeping of the direction during the drawing of the lines when the face slides along a ruler. The same piece 10 also prevents an undesired lateral shifting of the axle 7 especially if the structure is simplified e. g. by avoiding additional securing means in order to facilitate the exchanging of rollers some of which are shown in Figs. 3, 4 and 5. It has been stated that a set of various interchangeable rollers is provided in order to render the device useful for drawing lines of different thicknesses. All the rollers of the set are of the same thickness in their center portions and of the same maximum diameter. They differ merely in the width or thickness of their circumference. Thus Fig. 3 shows a roller 6*a* of a relatively very wide circumference destined to produce a very thick line. The roller 6*b* of Fig. 4 is intended for a line of medium thickness, and roller 6*c* of Fig. 5 is for a thin line. Each roller has a bore 18*a* (Fig. 3), or 18*b* (Fig. 4), or 18*c* (Fig. 5) to receive therein the axle 7 when the roller is to be used in the device.

Means are also provided to adjust the tension of the spring 2 which feeds the lead to the roller via piston 3 and rod 4. For this purpose the lead-receiving tube has a longitudinal slot 15 and rod 4 has a laterally projecting nose or pin head 12 engaging in the slot 15. Similarly, holder 1 is provided with an internal longitudinal groove 14 engaged by a lateral projection 13 of the piston 3. Now it will be clear that the total length of piston and rod can be adjusted by screwing the rod more or less into or out of the piston and that the so adjusted relative position is secured by the projections 12 and 13 engaging the slot 15 and groove 14, respectively.

In order to use the pencil, the mentioned adjustment can be made after the nut 11 and the tube 9 have been

removed whereupon the free end of the rod 4 can be projected forward of the chuck end 17' and turned in the piston 3 as desired. Thereupon tube 9 can be inserted with projection 12 engaging slot 15 and shifted inwards as far as desired. The tube can then be clamped in position by means of nut 11 which will be screwed tight on the head end 1'. In order to apply the desired roller, piece 10 will be shifted backward to free the axle 7 which then can be removed and returned when the desired roller has been placed with its bore 18*a* (Fig. 3), or 18*b* (Fig. 4), or 18*c* (Fig. 5) in registry with the bearings 8. Piece 10 finally will secure the axle 7 in its bearings.

When, then, the pencil is pressed down with the roller on a drawing paper or board while being moved in a direction at right angles to the axle 7, the roller will turn about the latter and take up lead material owing to the friction caused by the spring 2 urging the lead via piston 3 and rod 4 against the roller circumference. This lead material will be deposited on the paper or board in a line of a thickness according to the width of the periphery of the roller used in each instance.

It will be apparent to those skilled in the art that many alterations and modifications of the structure illustrated and described can be made without departure from the spirit and essence of my invention which for that reason shall not be limited but by the scope of the appended claims.

I claim.

1. In a mechanical drawing pencil comprising a barrel-like holder having one open and one closed end, a lead-receiving tube inserted with its rear end in said open holder end and projecting therefrom with its front end, a lead-feeding rod interiorly of said holder and

projecting into said tube from the rear end thereof, spring means interiorly of said holder between said closed end and said rod so as to urge said rod towards the front end of said tube, said tube being provided with bores in its wall close to its front end and at right angles to its axis, an axle inserted in said bores, a marking roller having a periphery of invariable width and a central bore fitting said axle, said roller being mounted on said axle so that a lead in said tube will be urged by said rod against the periphery of said roller on said axle, and a guiding sleeve slidably mounted on said tube adjacent the front end thereof and adapted to overlie said axle in its forward position to lock said axle in place and being slidable to a rearward position to expose said axle to permit removal of the marking roller, said sleeve having a plane surface laterally of the tube and at right angles to said axle, said surface adapted to be projected along a straight edge to thereby conduct said roller in a line parallel to said edge.

2. A mechanical drawing pencil according to claim 1 in which one end of said axle projects beyond the periphery of the tube, said sleeve being provided with a groove in its inner face to receive said projecting end of said axle.

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