

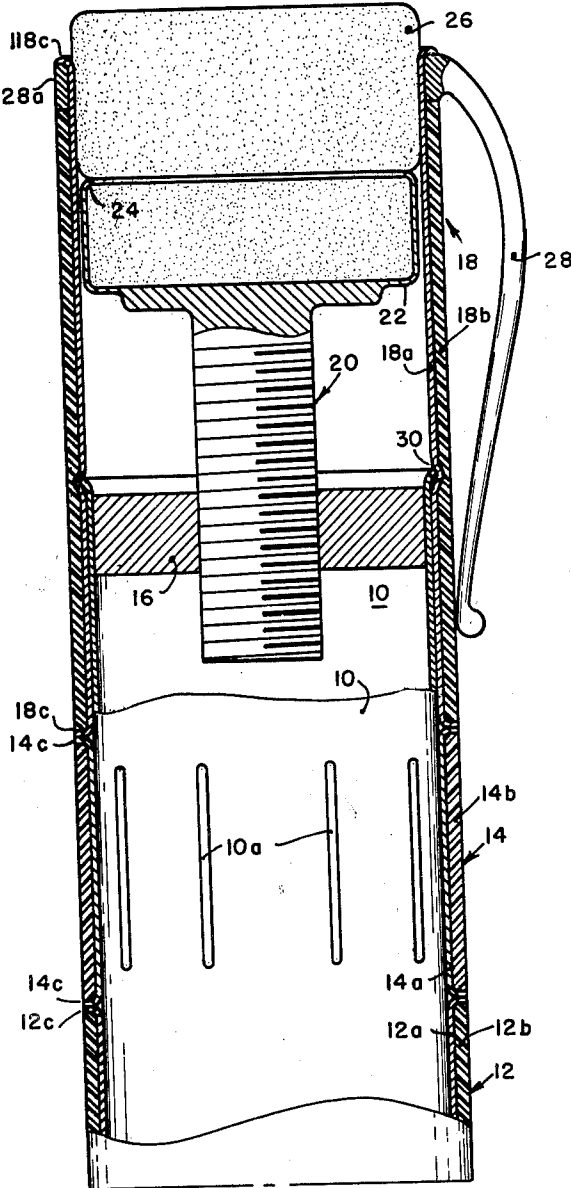
Nov. 10, 1953

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2,658,480

PENCIL ATTACHED ADJUSTABLE ERASER

Filed Feb. 23, 1950



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2,658,480

PENCIL ATTACHED ADJUSTABLE ERASER

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Application February 23, 1950, Serial No. 145,805

11 Claims. (Cl. 120—38)

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This invention relates to mechanical pencils and particularly to an eraser construction therefor by which the eraser is fed into a usable position at the end of the pencil and retracted from such position into a recess in the end of the pencil, which recess provides cover for the eraser to prevent wear thereon, and contamination by dirt and oxidation.

It is the principal object of my invention to provide a low cost and simple construction for a pencil attached adjustable eraser of this character. Other objects and advantages will be understood from the following specification, appended claims, and the accompanying drawing wherein the single figure is a sectional elevation of the eraser end of a mechanical pencil embodying my improved eraser construction.

The usual mechanical pencil construction includes two relatively rotatable parts corresponding to the inner metal barrel 10 and the outer barrel 12. A grip sleeve 14 is frictionally secured to and around, and to give rotation to, barrel 10. Sleeve 14 and barrel 12 are relatively rotated by the fingers and act to extend and retract a pencil lead from one end of the pencil in any of a great number of well known ways by mechanisms which are unnecessary here to be described. By the construction now to be described and by a similar relative rotation of parts, a similar extension and retraction of an eraser is obtained.

Within the upper end of barrel 10 I rigidly mount a centrally threaded nut 16. On the upper end of barrel 10 I journal an eraser tube 18 with a substantial length thereof surrounding barrel 10 to a point immediately adjacent grip sleeve 14. Above barrel 10 the internal cross section of eraser tube 18 is uniform and preferably also right circularly cylindrical. A replaceable eraser assembly comprises a threaded stem or shank 20 adjustably received through nut 16 and an integral cup 22, permanently uniting the cup with the eraser 26 against relative rotation through a beaded rim 24. The eraser 26 is of such large cross section that relative rotation between it and barrel 18 is substantially resisted or prevented when any substantial portion of the free portion of the eraser 26 above bead 24 is within the end of the barrel. Thus, where barrel 18 is internally right circularly cylindrical, the diameter of eraser 26 is slightly greater than the internal diameter of the eraser sleeve 18a. This grip of the eraser and eraser sleeve upon each other permits longitudinal relative movement between them while rotation is imparted

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to shank 20 through the frictional engagement from tube 18. By rotating tube 18, the eraser 26 is moved away from or toward the nut 16, and in the absence of a longitudinal stop to be described below, the tube 18 tends to move axially with the eraser 26 when the threaded stem is rotated to move the eraser away from the nut 16. This tendency is easily overcome by holding the eraser tube against the sleeve grip 14, or the movement may be permitted and later the tube may be pushed against the grip sleeve. It will be evident that in the absence of the longitudinal stop to be described, the eraser assembly, through the frictional grip of the eraser on the inside of tube 18, actually holds the tube 18 onto the main body of the pencil. It is also evident that when the tube 18 is off the pencil, the eraser portion 26 may be inserted into the lower end of the tube with the stem 20 projecting outside of the tube, and the assembly of the stem 20 into nut 16 may then be readily effected using the tube 18 as the driving means.

The resulting telescopic movement of tube 18 over barrel 10 is not, however, essential, and by preventing it the tube 18, with an attached clip 28, may be made into an inseparable though relatively rotatable unit. To prevent the removal of the eraser tube, the inner metal eraser tube liner 18a includes an annular recess 30 and the end of barrel 10 is spun out to engage in said recess as shown, thus preventing endwise movement of tube 18 over barrel 10.

The threading of stem 20 and of nut 16 are preferably of the multiple pitch variety, which give greater displacement for each rotation, and the direction of threading is preferably such as to effect extension of the eraser when the parts are relatively rotated in the same sense as that for extension of the pencil lead.

By grasping the grip sleeve 14 in the fingers of one hand and eraser tube 18 in the other hand and giving them relative rotation, the eraser 26 is extended as far as desired and to a position where it may be removed from the tube and replaced by a new eraser. By opposite rotation the eraser may be retracted fully within the tube end so that it cannot be touched, or seen except by looking into the tube end.

In the specific construction shown, the barrel 12, grip sleeve 14, and eraser tube 18 are of a composite construction including internal metal sleeves 12a, 14a, and 18a; and external plastic tube portions 12b, 14b, and 18b suitably molded thereon between annular spinnings 12c, 14c, and 18c of the metal sleeves.

The inner barrel 10 is provided with three or four longitudinal slits 10a which permit the initial expansion of barrel 10 throughout their lengths to form an outwardly radially acting spring section for frictionally engaging sleeve 14 and allowing the required transmission of force for actuating the lead and eraser feeds. The lower end of sleeve 18a bears for free rotation on the portion of tube 10 above this gripping portion.

It will be appreciated that the manner in which I translate rotary motion of the tube 18 into rotary and/or linear motion of shank 20 will be found useful in other mechanical fields.

I claim:

1. In a mechanical pencil attached adjustable eraser construction having two parts actuatable to extend and to retract the eraser, an eraser assembly having a threaded portion, a nut mounted in one of said two parts, an eraser tube mounted on said one part for rotation thereon, the eraser being fitted directly to the eraser tube to transmit rotational force from the eraser tube to the threaded portion and to slide longitudinally in the tube.

2. In combination, an adjustable eraser construction including a body having a threaded portion and an eraser tube journaled for rotation only with respect to the threaded portion, and an eraser assembly having a threaded portion for reception by the threaded portion of the body, the eraser assembly including an eraser and means rigidly fastening the eraser to its threaded portion, the eraser portion of the eraser assembly and the eraser tube both being cylindrical and frictionally interfitted for rotational drive of the eraser by the tube and for axial movement of the eraser along the tube incident to relative motion of the interengaged threaded parts.

3. Means for translating rotary motion into rotary and linear motion comprising a base member providing coaxially a journal bearing and a threaded portion, a threaded member threaded into the threaded portion of the base member, and a journal member journaled on the bearing having a uniform cross section along the axes of the bearing, and an elastically deformable body rigidly engaging the threaded member and engaging the journal member for transmitting rotation from the latter to produce rotation and reciprocation of the threaded member.

4. A motion transmitting device comprising, in combination: a stationary member, said stationary member being provided with internal screw threading, a movable screw threaded member received in the threading of the stationary member journaled on the stationary member, a tubular driving member, an elastic rubber like cylindrical member of greater unstrained cross section than the internal cross section of the driving member received in the tubular driving member and having a rotational driving relation therewith and a sliding relation axially thereof, and means rigidly joining said elastic member to drive said movable member.

5. A motion transmitting device comprising, in combination: a relatively stationary member provided with an internally threaded passage, a movable member, externally threaded means rigidly secured to the movable member and fitted for threading in the passage threads, an internally right cylindrical driving member, bearing means for confining the cylindrical driving member to substantially only rotational movement on the relatively stationary member about an axis coincident with the axis of threading, and

a solid cylindrical body of elastic rubber like material having an unstrained diameter slightly greater than the internal diameter of the driving member rigidly secured to the movable member with the axis of the elastic body coincident with the axis of the externally threaded means.

6. In a mechanical pencil attached adjustable eraser construction, in combination: three parts relatively actuatable to extend and to retract the eraser comprising an eraser assembly having an externally threaded portion forming one of said parts and having an eraser portion secured thereto for rotation of the assembly portions as a unit about the axis of threading of the threaded portion of the assembly, a nut mounted on another of said parts and said nut being threaded to receive the threaded portion of the eraser assembly, and the third part comprising an eraser tube rotatably mounted on the second part for rotation thereon about the axis of the threaded portion of the nut, the eraser portion of the eraser assembly being interfitted with the eraser tube to receive rotational drive directly from the eraser tube and to slide longitudinally in the tube.

7. In mechanical pencil attached adjustable eraser construction, in combination: three parts relatively actuatable to extend and to retract the eraser comprising an eraser assembly having an externally threaded portion forming one of said parts and having an eraser portion secured thereto for rotation of the assembly portions as a unit about the axis of the threading of the threaded portion of the assembly, a nut mounted on another of said parts and said nut being threaded to receive the threaded portion of the eraser assembly, and the third part comprising an eraser tube rotatably mounted on the second part for rotation thereon about the axis of the threaded portion of the nut, the eraser portion of the eraser assembly being interfitted with the eraser tube to receive rotational drive directly from the eraser tube and to slide longitudinally in the tube, the said other part including means for fixedly supporting said nut and for grasping a human hand thereto and the third part providing surfaces of engagement thereon for engagement by another human hand to produce relative rotation of the parts so engaged.

8. In a mechanical pencil attached adjustable eraser construction, in combination: three relatively movable metallic rigid parts actuatable to extend and to retract the eraser, said construction further comprising an eraser assembly having an externally threaded rigid metallic portion forming one of said parts and a cylindrical eraser portion of solid eraser material across its entire section perpendicular to its cylindric axis with the two portions of the eraser assembly rigidly secured together with their respective axes extending oppositely in alignment from a common point of abutment on said axes, a nut mounted on another of said parts and said nut being threaded to receive the threaded portion of the eraser assembly, and an eraser tube rotatably mounted on said other part for rotation thereon about the axis of the threaded portion of the nut, the eraser portion of the eraser assembly being interfitted with the eraser tube to receive rotational drive directly from the eraser tube and to slide longitudinally in the tube.

9. In a mechanical pencil attached adjustable eraser construction, in combination: three relatively movable metallic or rigid parts actuatable

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to extend and to retract the eraser, said construction further comprising an eraser assembly having an externally partially threaded shank and coaxially therewith an eraser cup both constituting a rigid metallic portion forming one part and a cylindrical eraser portion of solid eraser material entirely over its sections perpendicular to its cylindrical axis with the two portions of the eraser assembly rigidly secured together by the eraser cup crimped into the rubber of the eraser with their respective axes extending oppositely in alignment from a common point of abutment on said axes, a nut mounted on another of said parts and said nut being threaded and receiving the threaded portion of the eraser assembly, an eraser tube rotatably mounted on said other part for rotation thereon about the axis of the threaded portion of the nut, the eraser portion of the eraser assembly being interfitted with the eraser tube to receive rotational drive directly from the eraser tube and to slide longitudinally in the tube.

10. A motion transmitting device for transmitting motion into the chamber of an enclosure through the wall thereof, comprising in combination: a rigid stationary member constituting a part of the enclosure wall providing an internally threaded hole through the wall; a movable screw member of rigid material received in the threading of the stationary member; a driving member having at least a portion of straight uniform internal hollow circularly cylindric cross section, journaled on the stationary member on the axis of the threading thereof; an elastic rubber like cylindrical member of greater unstrained external cross section than the internal cross section of the straight portion of the driving member received in and engaging the internal cylindric surface of said portion of the tubular driving member and hav-

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ing a rotational driving relation therewith and a sliding relation axially thereof; and means rigidly joining said elastic member to said movable member to transmit rotational and compressive and tensile forces to drive said movable member.

11. A motion transmitting device comprising, in combination: a rigid hollow stationary member having a wall providing an opening therethrough, said stationary member being provided with internal screw threading in said opening; a movable screw threaded member of rigid material for reception in the threading of the stationary member; a driving member, having at least a portion of straight uniform internal hollow circularly cylindric cross section, journaled on the stationary member on the axis of the threading thereof; an elastic rubber like cylindrical member of greater unstrained external cross section than the internal cross section of the straight portion of the driving member received in and engaging the internal surface of said portion of the tubular driving member and having a rotational driving relation therewith and a sliding relation axially thereof; and means rigidly joining said elastic member to said movable member at the ends of these members to transmit rotational and compressive and tensile forces to drive said movable member and the elastic member in rotation and axially thereof and of the hole.

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References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,671,393	Zantow	May 29, 1928
2,129,831	Dysart	Sept. 13, 1938
2,286,878	Tefft et al.	June 16, 1942
2,356,474	Savoie	Aug. 22, 1944