Jan. 5, 1943. A. J. DUANY 2,307,119

PENCIL SHARPENER

Filed Jan. 3, 1942

Fig. 1.

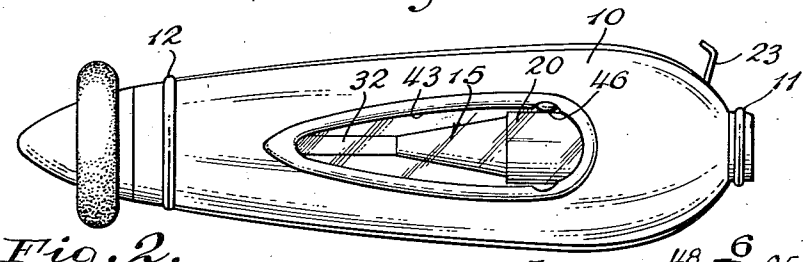


Fig. 2.

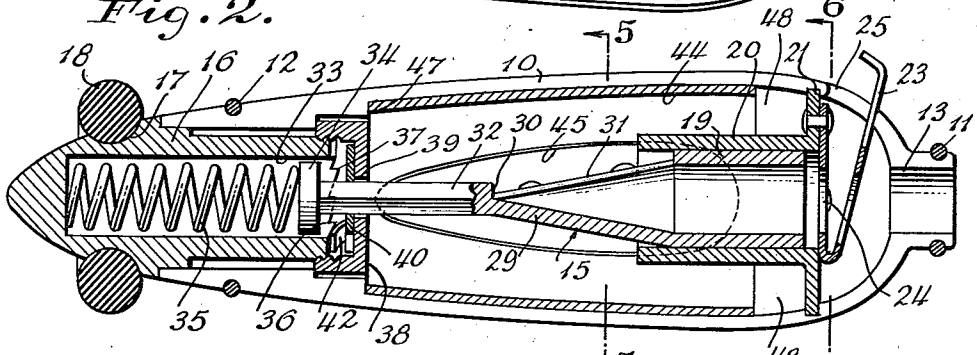


Fig. 3.

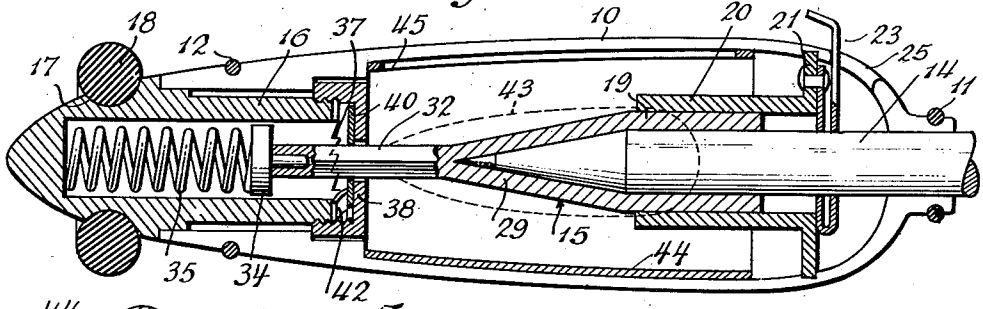


Fig. 5.

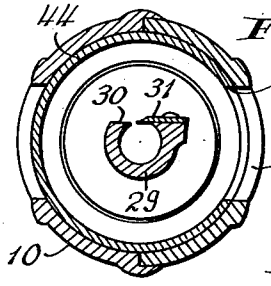


Fig. 7.

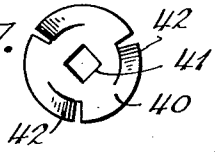


Fig. 6.

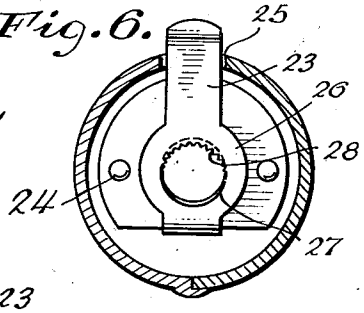
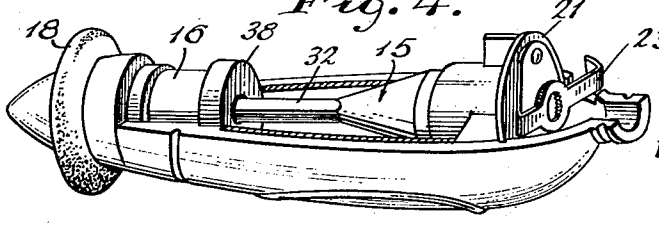


Fig. 4.



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PENCIL SHARPENER

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Application January 3, 1942, Serial No. 425,487

15 Claims. (Cl. 120—96)

This invention relates to improvements in sharpening devices and has particular reference to a pencil sharpener.

An object of the invention is to provide an improved sharpener of simple and practical construction wherein a sharpening element is movably mounted within a casing and driven to effect a sharpening operation by means of a rotatable member carried by said casing and adapted to be propelled by a movement of the casing over a surface engaged by a portion of said rotatable member.

Another object is to mount a sharpening device for rotatable and longitudinal movements within a casing, and to actuate said device by means of a rotatable member supported within the casing and coupled to said device by a clutch in such manner that a reciprocating movement of the casing over a surface and engagement of a portion of said member with said surface will impart an intermittent rotary movement to said sharpening device during which it will also be continuously moved longitudinally in the casing as the sharpening operation progresses.

The above and other objects will appear more clearly from the following detailed description when taken in connection with the accompanying drawing which illustrates a preferred embodiment of the inventive idea.

In the drawing:

Fig. 1 is a plan view of the pencil sharpener constructed in accordance with the invention.

Fig. 2 is an enlarged longitudinal section therethrough, with the parts in normal or inoperative position.

Fig. 3 is a similar view illustrating the manner of inserting the pencil into the sharpener.

Fig. 4 is a perspective view, with one section of the casing removed.

Fig. 5 is a transverse section on the line 5—5 of Fig. 2.

Fig. 6 is a similar section on the line 6—6 of Fig. 2, and

Fig. 7 is a plan view of one element of the clutch which is utilized to transmit rotary movement to the sharpening device within the casing.

Referring more particularly to the drawing, the numeral 10 indicates generally the casing of the sharpener, which casing preferably comprises two complemental sections that are made of a suitable plastic material, and when said sections are combined and held together by the binding rings 11, 12 adjacent the ends of the casing, the latter presents a torpedo-like or streamlined configuration. At the larger end of the casing the same is provided with an opening 13 of sufficient size to permit the insertion into the casing of the end of the pencil 14 to be sharpened. A sharpening device generally indicated by the numeral 15, preferably made of metal, is rotatably and slidably supported for longitudinal movement within said casing and is adapted to be propelled in this rotary movement by the rotation of a sleeve-like member 16 also made of plastic and supported in the end of the sectional casing opposite the opening 13, said member 16 being coupled to the sharpening device 15 in a manner which will appear in the course of the description. The outer end of the member 16 which extends beyond the adjacent end of the casing 10 is tapered to complete the streamline effect of said casing and is provided with a circumferential groove 17 in which is seated a propelling means preferably in the form of a solid rubber ring 18 the outer periphery of which is adapted to bear upon a surface, such as a desk top, so as to impart rotation to the member 16 as the casing 10 is moved back and forth over such surface.

The sharpening device 15 includes a sleeve 19 rotatably and slidably supported in a stationary cylindrical bearing 20, also of plastic, one end of which is provided with a plate 21 the periphery of which is seated in an annular groove 22 formed in a wall of the casing 10 so as to prevent longitudinal shifting of the bearing 20 within the casing. This plate 21 is disposed near the opening 13 of the casing and carries on the face thereof a pencil retaining element in the form of a spring arm 23 one end of which is attached at 24 to said plate 21 while the other end projects through an elongated slot 25 formed in the casing 10. Said arm 23 is enlarged intermediate its ends as indicated at 26 and the enlarged portion is provided therein with an opening 27 at least a portion of the edge of which is provided with teeth 28 adapted to bite into the surface of the pencil 14 after the latter has been inserted through the opening 27 so as to hold such pencil in fixed relation to the sharpening device 15. The width of the arm 23 at the point where it passes through the slot 25 is substantially the same as that of said slot and the edges of said arm will therefore engage the sides of the slot to prevent turning movement of the plate 21 and the bearing 20 when the device 15 is being rotated. The normal or inoperative position of the arm 23 is shown in Fig. 2 and preparatory to inserting the pencil 14 into the opening 13 and through said arm, the latter is moved to the position of Fig. 3 to align the opening 27 with the opening 13 so that the pencil may be inserted through said openings without engaging the teeth 28. After the pencil has been properly engaged in the device 15 and the latter has been forced toward the smaller end of the casing, for a purpose which will presently appear, the arm 23 is released and due to its resiliency the same will move toward the position of Fig. 2 with the result that its teeth 28 will engage and bite into

the surface of the pencil and thus hold the same against both rotary and longitudinal movements relative to the casing until the arm 23 is again moved to the position of Fig. 3 to release the pencil after a sharpening operation.

The sharpening device, in addition to the sleeve 19, includes a tapered portion 29 which is cut away as indicated at 30 to form a support for the cutting blade 31 removably attached to the portion 29 and positioned with respect thereto so that when the pencil 14 is properly located within the sharpening device and the latter is rotated in one direction the blade 31 will act to sharpen the pencil. Extending from the small end of the tapered portion 29 is a squared shaft 32 the free end of which projects into a bore 33 formed in the rotatable member 16, and said free end is provided with an enlarged head 34 that is disposed within said bore. An expansible coil spring 35, also located within the bore 33, has one of its ends engaged with the head 34 so as to urge the sharpening device 15 in the direction of the larger end of the casing. When the pencil 14 is first inserted into the sharpening device sufficient pressure is applied to the pencil to move the sharpening device longitudinally in the direction of the smaller end of the casing so that the spring 35 will be compressed and placed under tension, as shown in Fig. 3, and during the sharpening operation when the device 15 is being rotated, the spring 35 will continuously force the device 15 toward the larger end of the casing as the sharpening of the pencil progresses.

In order to transmit the intermittent rotary movement to the device as the casing 10 is moved back and forth over a surface when the ring 18 is brought in contact with the latter, there is provided on the inner end of the rotatable member 16 a metal or like ring 36 provided with a series of ratchet teeth 37 thereon. A coupling nut 38 is threaded upon the inner end of the member 16 and has an opening 39 therein through which the squared shaft 32 extends. A clutch plate 40 is recessed within the nut 38 and is provided with a square opening 41 through which the shaft 32 projects, and the face of said plate opposed to the teeth 37 is provided with spring teeth 42 adapted to engage with said teeth 37. When the member 16 is rotated in one direction the teeth 37, 42 so engage with each other that the plate 40 will be rotated to impart rotation to the sharpening device 15, and when said member 16 is rotated in the opposite direction the teeth 37 will ride freely over the teeth 42 with the result that the sharpening device will remain stationary during the last mentioned rotation of said member 16.

The casing 10 is provided with a discharge opening 43 through which accumulated shavings within the casing resulting from sharpening operations may be emptied from said casing. Said opening 43 is normally kept closed by a transparent shutter 44 of frusto-conical formation and made of Celluloid or the like. Said shutter is disposed within the casing and provided with an opening 45 adapted to be registered with the opening 43 by a turning movement of the shutter 44 when it is desired to empty the casing. This turning movement may be facilitated by having a projection 46 extending outwardly from the shutter 44 and into the opening 43 where it may be engaged by a finger of the operator to rotatably shift the shutter back and forth within the casing. The shutter 44 is held against longitudinal movement within the casing by one end of the shutter butting against a shoulder 47 formed in the casing and its other end engaging with spaced flanges 48 projecting laterally from the plate 21.

What is claimed is:

1. In combination, a casing, a sharpening element movably mounted in said casing, a drive for said sharpening element operable to move the same when performing a sharpening operation, said drive comprising a rotatable member having a bearing within said casing, and a resilient ring embracing said rotatable member for rotating the same when said ring is engaged with a surface and the casing is moved thereover.

2. In combination, a casing, a sharpening element rotatable in said casing, operating means for said sharpening element comprising a member also rotatable in said casing, coupling means between said rotatable member and sharpening element including a clutch operable to rotate said sharpening element when said rotatable member is rotated in one direction, and a resilient ring embracing said rotatable member to propel the same when said ring is engaged with a surface and the casing is moved thereover.

3. In a pencil sharpener, a casing, a stationary bearing within said casing, a sharpening device rotatably and slidably mounted in said bearing and adapted to receive the end of a pencil therein and having a cutter carried thereby, said device further having a shaft, means to hold a pencil stationary relative to said sharpening device as the latter is rotated, means to exert pressure upon said sharpening device in a linear direction to slide the same in said bearing during a sharpening operation, and propelling means for said sharpening device coupled to said shaft.

4. In a pencil sharpener, a casing, a stationary bearing within said casing, a sharpening device rotatably and slidably mounted in said bearing and adapted to receive the end of a pencil therein and having a cutter carried thereby, said device further having a shaft, means to hold a pencil stationary relative to said sharpening device as the latter is rotated, means to exert pressure upon said sharpening device in a linear direction to slide the same in said bearing during a sharpening operation, a rotatable member having a bearing in said casing, and a clutch between said rotatable member and said shaft for driving the latter when said member is rotated.

5. In a pencil sharpener, a casing, a stationary bearing within said casing, a sharpening device rotatably and slidably mounted in said bearing and adapted to receive the end of a pencil therein and having a cutter carried thereby, said device further having a shaft, means to hold a pencil stationary relative to said sharpening device as the latter is rotated, means to exert pressure upon said sharpening device in a linear direction to slide the same in said bearing during a sharpening operation, a rotatable member having a bearing in said casing, a clutch between said rotatable member and said shaft for driving the latter when said member is rotated, and a resilient ring embracing said rotatable member for rotating the same when said ring is engaged with a surface and the casing is moved thereover.

6. In a pencil sharpener, a casing having a discharge opening therein, a movable shutter for opening and closing said opening, a stationary bearing within said casing, a sharpening device rotatably and slidably mounted in said bearing and adapted to receive the end of a pencil therein and having a cutter carried thereby, said device

further having a shaft, means to hold a pencil stationary relative to said sharpening device as the latter is rotated, means to exert pressure upon said sharpening device in a linear direction to slide the same in said bearing during a sharpening operation, a rotatable member having a bearing in said casing, a clutch between said rotatable member and said shaft for driving the latter when said member is rotated, and a resilient ring embracing said rotatable member for rotating the same when said ring is engaged with a surface and the casing is moved thereover.

7. In a pencil sharpener, a casing of torpedo-like formation having an opening at one end for receiving an end of a pencil to be sharpened, a bearing member fixed within said casing adjacent said opening, a gripping spring for said pencil attached to said bearing and projecting through said casing for manipulation from the exterior thereof, said spring having a serrated opening through which said pencil projects with the serrations in said opening engaging the pencil to prevent rotation thereof while being sharpened, a sharpening device into which the pencil projects, said device being rotatable in and movable longitudinally of said bearing, means to exert pressure upon said device in a longitudinal direction during a sharpening operation, and means at the other end of said casing for rotating said device relative to said pencil.

8. In a pencil sharpener, a casing of torpedo-like formation having an opening at one end for receiving an end of a pencil to be sharpened, a bearing member fixed within said casing adjacent said opening, a gripping spring for said pencil attached to said bearing and projecting through said casing for manipulation from the exterior thereof, said spring having a serrated opening through which said pencil projects with the serrations in said opening engaging the pencil to prevent rotation thereof while being sharpened, a sharpening device into which the pencil projects, said device being rotatable in and movable longitudinally of said bearing and provided with a shaft, a drive for said shaft including a rotatable member having a bearing in the end of said casing opposite the opening therein and provided with a bore into which said shaft projects, a spring within said bore bearing upon said shaft to move said sharpening device longitudinally in its bearing as the sharpening of the pencil progresses, and means to rotate said rotatable member.

9. In a pencil sharpener, a casing having an opening at one end for receiving the end of a pencil to be sharpened and further having a slot therein adjacent said end, a bearing member within said casing adjacent said opening, a resilient pencil gripping arm carried by said bearing member and projecting through said slot and engageable with the edges thereof to maintain said bearing member against rotation within said casing, said arm having an opening therein through which the pencil projects when being sharpened and the edge of said opening being serrated to grip said pencil to prevent movement thereof while being sharpened, a sharpening device rotatable in said casing, and means to operate said sharpening device.

10. In a pencil sharpener, a casing of torpedo-like formation having an opening at one end for receiving an end of a pencil to be sharpened, a bearing member fixed within said casing adjacent said opening, a gripping spring for said pencil attached to said bearing and projecting through said casing for manipulation from the exterior thereof, said spring having a serrated opening through which said pencil projects with the serrations in said opening engaging the pencil to prevent rotation thereof while being sharpened, a sharpening device into which the pencil projects, said device being rotatable in and movable longitudinally of said bearing and provided with a shaft, a drive for said shaft including a rotatable member having a bearing in the end of said casing opposite the opening therein and provided with a bore into which said shaft projects, a spring within said bore bearing upon said shaft to move said sharpening device longitudinally in its bearing as the sharpening of the pencil progresses, and a resilient ring encircling said rotatable member and adapted, while the casing is held in the hand and moved over a surface, to engage the latter and thus rotate said rotatable member to drive said sharpening device.

11. In combination, a casing, a sharpening element therein, a rotatable member for operating said sharpening element, and an annulus carried by said rotatable member and having a frictional bearing surface adapted for contact with another surface for propelling said rotatable member when said casing is moved over the latter surface.

12. In combination, a casing, a sharpening element therein, a rotatable member for operating said sharpening element, means to couple said sharpening element and rotatable member when the latter is rotated in one direction, and an annulus carried by said rotatable member and having a frictional bearing surface adapted for engagement with and movement over another surface to propel said rotatable member in said direction.

13. In combination, a casing, a sharpening element movable in said casing, operating means for said sharpening element, coupling means between said operating means and sharpening element including a clutch operable to actuate said sharpening element when said operating means is actuated, and propelling means for said operating means having a frictional bearing surface adapted for contact with another surface for actuating said operating means when the casing is moved over the latter surface.

14. In a pencil sharpener, a casing of torpedo-like formation having an opening at one end for the insertion of a pencil to be sharpened, sharpening means within said casing, a rotatable member mounted in the other end of said casing and operable to drive said sharpening means, and propelling means for said rotatable member having a frictional bearing surface adapted for contact with another surface to operate said rotatable member when said propelling means is moved over said surface.

15. In a pencil sharpener, a casing, a sharpening device rotatably and slidably mounted in said casing and including a pencil receiving sleeve and a shaft, both having a common axis about which they rotate, a cutter in said sleeve, means to hold a pencil stationary in said sleeve as said sharpening device is rotated to operate said cutter, a rotatable member supported by said casing and coupled to said shaft, and an annulus carried by said rotatable member and having a frictional bearing surface for contact with another surface to rotate said rotatable member when the casing is moved over said other surface.

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