Aug. 16, 1932. L. R. LOVELAND 1,872,476

PENCIL SHARPENER

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Fig. 1.

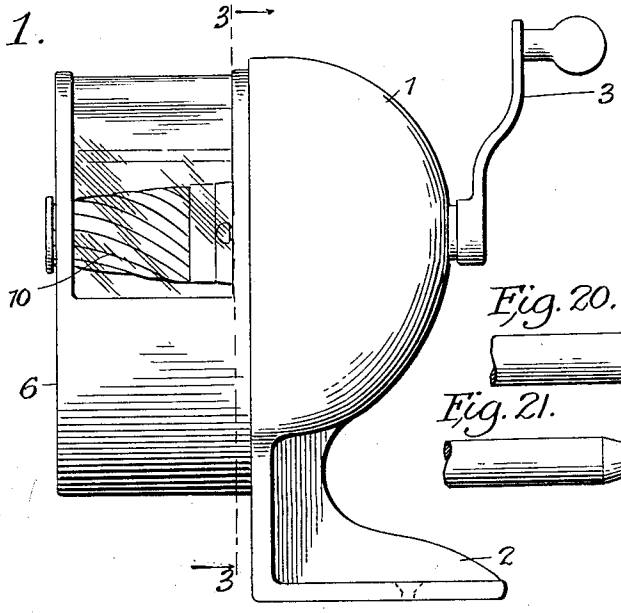



Fig. 20.




Fig. 21.




Fig. 2.

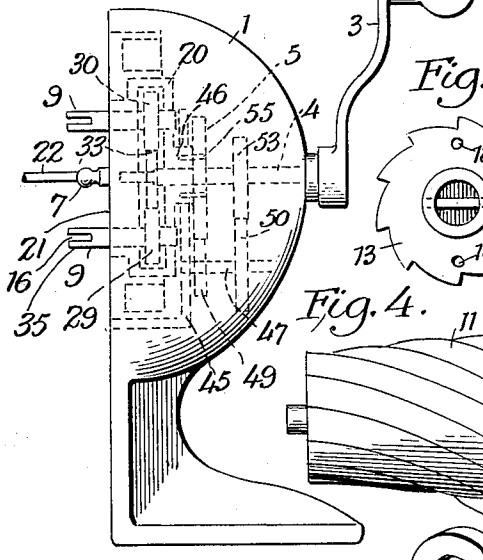



Fig. 5.




Fig. 3.

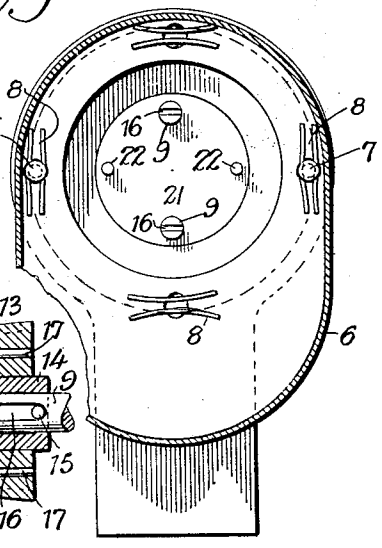
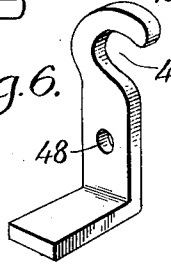



Fig. 4.




Fig. 6.




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Fig. 8.

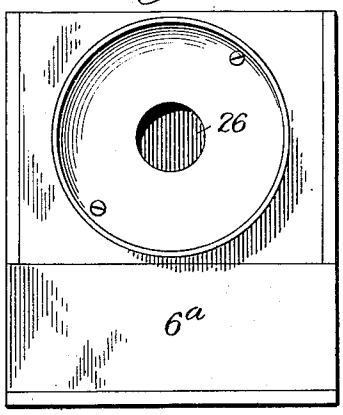



Fig. 7.

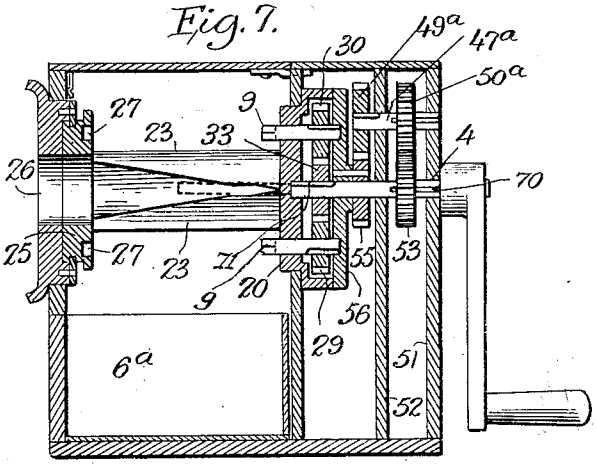



Fig. 9.

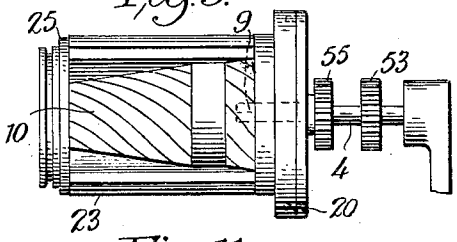



Fig. 10.

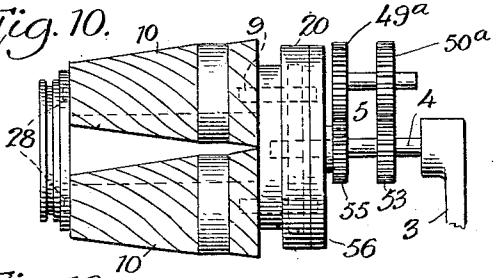



Fig. 11.

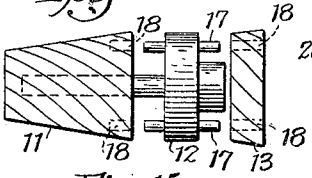



Fig. 12.

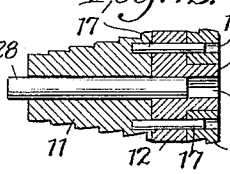



Fig. 13.

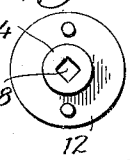



Fig. 14.

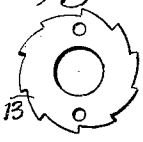



Fig. 15.

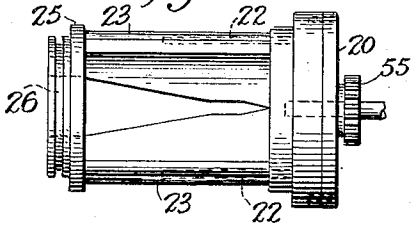



Fig. 16.

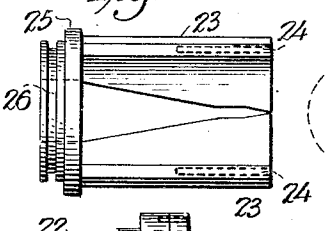



Fig. 17.

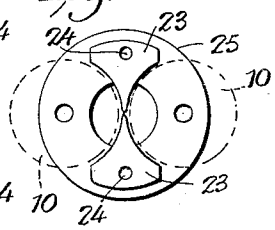



Fig. 18.

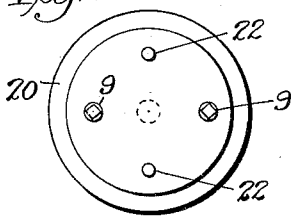
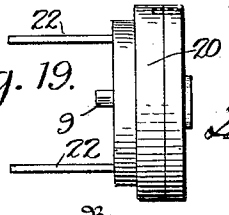



Fig. 19.




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# UNITED STATES PATENT OFFICE

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## PENCIL SHARPENER

Application filed April 20, 1931. Serial No. 531,496.

This invention relates to pencil sharpeners, of the type having a pair of rotary cone cutters, the surfaces of which are provided with the well-known helical cutting edges which latter upon rotation cut away the wood casing of a lead pencil, and also sharpen a point upon the graphite core.

An object of the invention is to provide a pencil sharpener that will remove the wood casing from the end of a pencil and expose a portion of unsharpened graphite core, and also provide a pointed extremity upon the end of said graphite core.

A further object is to provide a cutter wheel with two cutting areas separated by a smooth surface cylindrical section constituting a non-cutting area.

A further object is to provide a sectional cutter, whereby worn cutting sections may be inserted in the sharpener.

In the drawings,

Fig. 1 illustrates a side elevation of a preferred construction of the sharpener;

Fig. 2 is a side view of a portion thereof showing the gear assembly in dotted lines;

Fig. 3 is a broken view on the line 3—3, of Fig. 1, looking from the left;

Fig. 4 is an enlarged view of a cutter wheel;

Fig. 5 is a side view of the cutter wheel looking from the right;

Fig. 6 is a view of a bearing which supports one end of the gear assembly;

Fig. 7 is a sectional view of a modified construction with some of the gears located in the upper part, but involving the same principles of construction and operation;

Fig. 8 is a plan view in elevation looking from the left of Fig. 7;

Fig. 9 is a side view of the pencil guide and cutter together with a shaft supporting two gears and a portion of the handle;

Fig. 10 is a side view of the cutters and the gear assembly;

Fig. 11 is a side view of the separated sections of a cutter;

Fig. 12 is a vertical longitudinal section of a cutter showing the parts assembled;

Figs. 13 and 14 are side elevations of sections of the cutter;

Fig. 15 is a side elevation of the pencil guide mounted upon its support;

Fig. 16 is a side elevation of the pencil guide detached from its support;

Fig. 17 is a view of the right end of the pencil guides shown in Fig. 16;

Figs. 18 and 19 are front and side elevations of the support, Fig. 19 showing pins which support the ends of the pencil guide;

Fig. 20 is a view in elevation of an incompletely sharpened pencil; and

Fig. 21 is a side view in elevation of a completely sharpened pencil.

In Fig. 1, a hollow hemispherical case 1 is provided with a base 2 by which it may be secured to a support; a handle 3 is mounted upon a shaft 4, the latter actuating a train of gears 5, described hereafter, the gears 5 being housed within the case 1. A shavings box 6 is detachably mounted upon the case 1 by means of lugs 7—7 (Figs. 2 and 3) which latter are adapted to engage spring clips 8—8, secured to the inside surfaces of the wall of the box 6. Within the box 6 and supported by shafts 9—9, are a pair of rotatable cone cutters, one of which is shown at 10 in Figs. 1 and 4, the cutters being driven by the train of gears 5 upon the rotation of the handle 3. In Fig. 7, the shaft 4 passes through partitions 51, 52 and upon said shaft 4 is mounted the main gear 53 by the key 70, and also gear 33. The gear 55 and the side 56 of the cutter gear box 20 are journaled upon said shaft 4, and are driven by gear 49*a* fixed upon a shaft with gear 50*a* which is in turn driven by gear 53. The shaving box 6*a* in Fig. 7, as shown as a drawer.

The cone cutter 10 in Fig. 4, is constructed with a wood cutting area 11, a smooth surface non-cutting area 12, and a point sharpening area 13. The smooth surface section 12 is preferably integral with the section 11, and is provided with a hub 14, upon which is mounted the point sharpener section 13. A pin 15, Fig. 4, passes through the end of the hub 14 to engage the slot 16 in the end of the shaft 9. In Figs. 12 and 13 the hub 14 is provided with a square opening 58 which engages a square end of a shaft 9

shown in Figs. 7, 9 and 10. The point sharpener section 13 is held in position by suitable pins 17, which enter the holes 18. The smooth surface section 12 may be made as a separate portion as shown in Figs. 11 and 12 in which case the pins are arranged to engage both of the cutter sections.

The train of gears 5 within the hemispherical case 1 includes a rotatable cutter gear box 20 and secured to its face 21 are pins 22—22, Figs. 2 and 3, which engage and support pencil guides 23, Figs. 15, 16, 17, and 19, the pins entering holes 24 in the ends of said guides. The other ends of the guides 23 are secured to the disc 25, Figs. 15 and 16, the disc 25 having a central opening 26, Figs. 7 and 8, through which a pencil is inserted, and also bearing holes 27 which receive and support the shafts 28 on the small end of the cutters 10, Figs. 7, 10, and 12. The cutter gear box 20 is attached to gear 55 (see Figure 9) and is arranged to be rotated thereby through the gears 49*a*, 50*a*, 53, and contains planetary gears 29—30, mounted on the shafts 9—9, the planetary gear assembly effecting a relatively rapid independent rotation of the cutters 10 on said axes 9 while the cutter gear box 20 is being rotated, the cutting edges of the cutters 10 thereby quickly shaving off the wood casing of the pencil. In the Fig. 2 form the inner side of cutter gear box 20 is provided with a hub 46, supported by the hook shaped bearing 45, Fig. 6, said bearing 45 having a hole 48 in which is supported the end of shaft 47 which latter carries gears 49 and 50, shown in dotted lines in Fig. 2; the corresponding shaft 47*a* and gears 49*a* and 50*a* being shown in Figs. 7 and 10 as located in the upper part of the casing.

In the construction shown in Figure 7 the elements of the gear assembly have substantially the same ratio as their corresponding parts shown in Figure 2. The gear assembly 5 consists of intermeshing gears of different sizes suitably supported. The gear 55 is secured to one wall of cutter gear box 20 and rotates said gear box, the gear box 20 supporting the pencil guide 23 and the cutters 10. The shaft 4 to which the handle 3 is attached, passes through the outer wall of the gear box 20, and a gear 33 is secured thereto by the key 71, Fig. 7, the gears 29—30 intermeshing with said gear 33, said 29—30 being secured to shafts 9, the extremities 35 of which may be slotted at 16 and support the cutters 10, Fig. 2, the slots in this modification engaging the pins 15 in the ends of the cutters as described above. This arrangement of gears within the gear box 20 imparts a relatively high speed planetary rotary movement to the cutters on the rotation of the handle 3, the high speed cutting action reducing the possibility of breaking the graphite core during the sharpening operation, that is to say, the cutters rotate about axis 4 at the same speed as gear box 20 and guide 23, but rotate at a higher speed about their respective shafts 9.

The construction of the cutters provides for removing the wood casing of the pencil by the front section 11 of the cutter, a short length of the graphite core 40 of the pencil being exposed but not cut by the smooth portion 12 of said cutter, as shown in Fig. 20; on continuing the cutting action the wood is further cut away, and an additional portion of the graphite core exposed and the extremity 60 of the graphite core sharpened as at Fig. 21 by the point sharpening section 13 of each cutter.

It will be understood that the invention as here disclosed is not limited to the details of construction shown and described, and that these may be varied widely without departing from the spirit of the invention as defined by the claims.

I claim:

1. A pencil sharpener comprising rotatable cutters, a rotatable pencil guide, a gear assembly, a rotatable gear box, said rotatable cutters and pencil guide mounted upon said gear box, a main shaft, a handle for the main shaft, said main shaft entering said gear box, a gear secured to said main shaft, shafts for said cutters, planetary gears within said gear box mounted upon said cutter shafts, said gear assembly imparting a rotary motion to said gear box and a planetary motion to said cutters.

2. A pencil sharpener comprising a gear assembly, a main shaft to drive said gear assembly, rotatable cutters, a rotatable gear box, said gear box containing cutter shafts, planetary gears on said cutter shafts, said cutter shafts having ends adapted to detachably engage the ends of said cutters, two cutting surfaces on each of said cutters, and a non-cutting surface located between said two cutting surfaces.

3. A pencil sharpener comprising rotatable cutters, a driving gear assembly, a cutter gear box, cutter supporting shafts journaled in said gear box, the ends of said shafts fashioned to detachably engage said cutters, said gear box containing planetary gears, said planetary gears intermeshing with said gear assembly, said planetary gears mounted upon said cutter supporting shafts and arranged to rotate relatively to said gear assembly.

4. A pencil sharpener comprising rotatable cutters, a rotatable pencil guide, a cutter gear box, said cutters and said pencil guide supported by said gear box, a main driving shaft, a gear assembly, said gear assembly arranged to be driven by said main driving shaft, a gear within said gear box attached to said main driving shaft, planetary gears intermeshing with the gear in said gear box at-

tached to said main driving shaft, and said cutters arranged to rotate relatively to said pencil guide.

5. A pencil sharpener comprising rotatable cutters, a gear assembly, a rotatable gear box, a pencil guide, said cutters and said pencil guide detachably supported upon said gear box, cutter-supporting shafts journaled in said gear box, gears upon said cutter supporting shafts and within said gear box, said last named gears arranged to receive a planetary motion from said gear assembly.

6. A pencil sharpener comprising a casing, a main driving shaft, a main driving gear secured to said main shaft, a gear assembly, a cutter driving gear secured to said main shaft, said main driving gear connected to drive said gear assembly, a gear box, cutter supporting shafts journaled in said gear box, planetary gears in said gear box secured to said cutter supporting shafts, and said gear assembly connected to rotate said gear box about its axis, and said cutter driving gear and planetary gears upon their respective supporting shafts.

In testimony whereof I affix my signature.

LAWRENCE R. LOVELAND.