(No Model.) 2 Sheets—Sheet 1.

G. F. BALLOU.

PENCIL SHARPENING MACHINE.

No. 556,709. Patented Mar. 17, 1896.

Fig. 1.

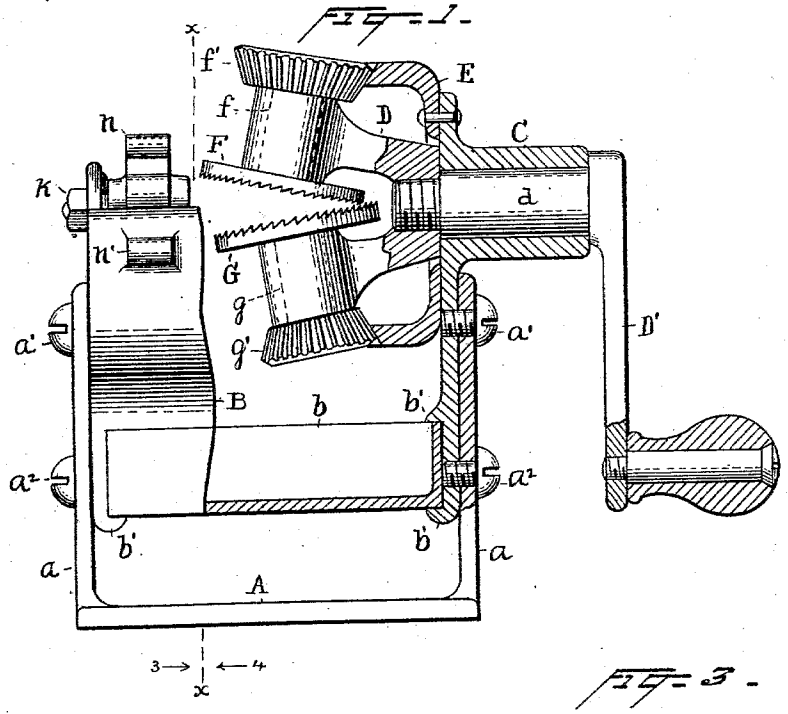


Fig. 2.

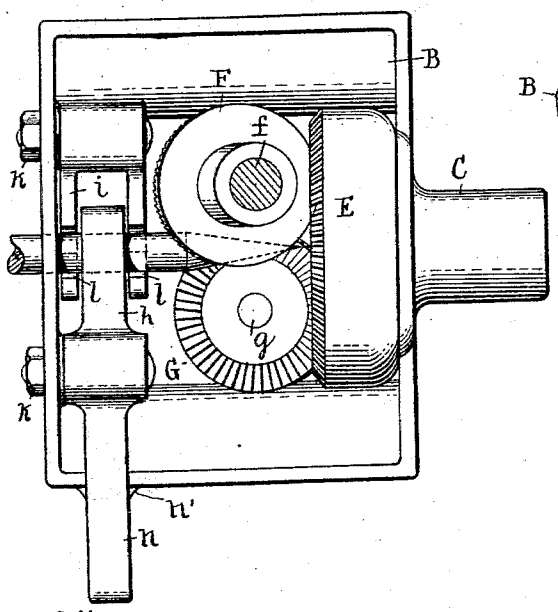
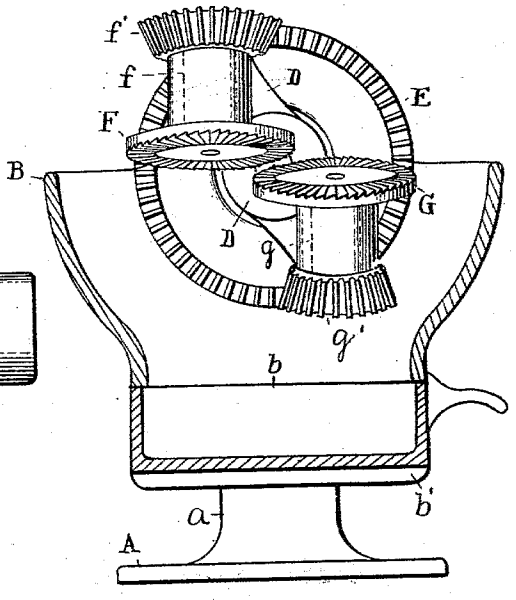


Fig. 3.



Witnesses
Norris A. Clark.
W. Bakewell

Inventor
Geo. F. Ballou
By his Attorneys Dyer & Driscoll

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

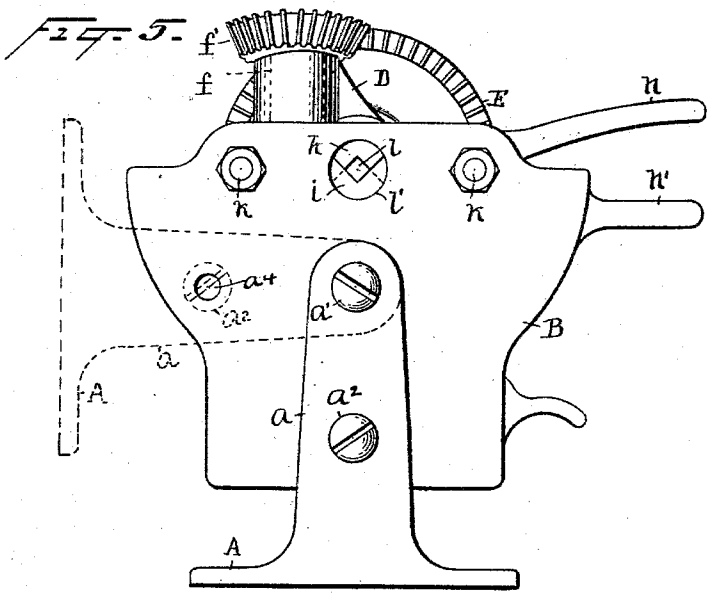
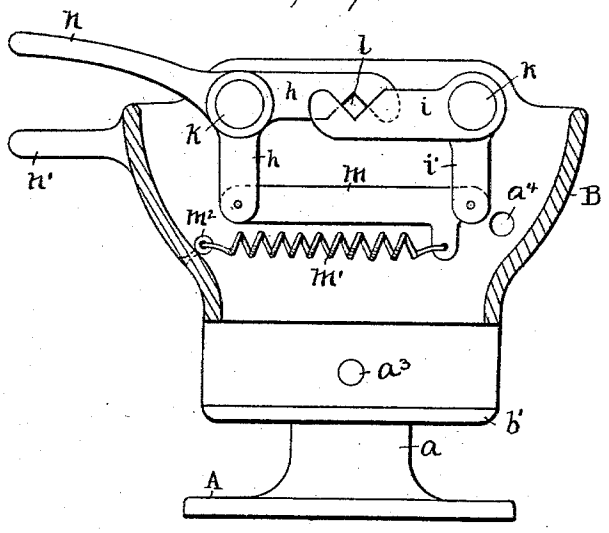


Fig. 4.



Witnesses
Norris R. Clark.
W. Pfyer

Inventor
Geo. F. Ballou
By his Attorneys
Dyer & Driscoll

UNITED STATES PATENT OFFICE.

GEORGE F. BALLOU, OF NEW YORK, N. Y., ASSIGNOR TO THE A. B. DICK COMPANY, OF CHICAGO, ILLINOIS.

PENCIL-SHARPENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 556,709, dated March 17, 1896.

Application filed December 2, 1895. Serial No. 570,751. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. BALLOU, a citizen of the United States, residing at New York city, in the county and State of New York, have invented a certain new and useful Improvement in Pencil-Sharpening Machines, of which the following is a specification.

My invention relates to that class of pencil-sharpening machines in which rotary cutters or grinders are employed, and which are also caused to revolve around the pencil, the movement of the cutters being what is commonly called a "planetary motion." The machines heretofore constructed on this principle were objectionable for several reasons, the principal reasons being the frequent breakage of the lead, the necessity for frequently replacing the cutters or grinders, since they become dull very quickly, and the difficulty in properly feeding the pencil forward or in adjusting the cutter or grinder to the pencil as the end of the pencil is reduced in producing the point. I avoid these objectionable features in my machine by employing two like cutters or grinders working on opposite sides of the pencil, and between which the pencil is firmly held by pushing it forward by hand. To facilitate the sharpening of the pencil, I provide a guide or support, which, in conjunction with the cutters or grinders working on opposite sides of the pencil, prevents all lateral movement of the pencil, and thus the breaking of the point is avoided. When cutters are employed, I provide them with a large number of cutting-edges, and since the two cutters operate at the same time the sharpening of a pencil is accomplished with about half the number of revolutions of the cutter than were heretofore necessary. Thus each individual cutting-edge has less work to perform, and hence the cutters will remain sharp a very much longer time than the cutters heretofore employed. The two cutters are so arranged that the axial center of one is slightly in advance of the other, and the diameter of the gear-wheel carried by one is somewhat less than the diameter of the gear-wheel carried by the other, so that the cutters revolve at different speeds and so that the relative positions of the cutting-edges are constantly changing, whereby a smooth and evenly-cut surface is produced; and a further object of rotating two cutters at different speeds is to prevent the pinching of the pencil, which would sometimes happen if the cutting-edges of the cutters were exactly opposite each other when engaging the pencil.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is a partial side elevation and longitudinal section; Fig. 2, a plan view with the operating-handle omitted and a pointed pencil in position to show the relative positions of the pencil and cutters; Fig. 3, a cross-section on the line $x\ x$ of Fig. 1, looking in the direction of arrow 3; Fig. 4, a cross-section on the line $x\ x$ of Fig. 1, looking in the direction of arrow 4; and Fig. 5 an end elevation showing two positions of the supporting base or bracket.

Referring to the drawings, A is a base or bracket having two arms a. Pivoted between the arms a by means of screws a' is a case B. The case B contains a drawer or slide b for receiving the dust formed by the cutting of the pencil, and this drawer slides between two ledges b' on each side of the case B. At the upper right-hand end of the case B is formed a bearing C for a spindle d, which at its inner end carries a yoke D, upon which the cutters are mounted. The outer end of the spindle d is provided with a crank D' for rotating the same. On the same side of the case B is rigidly secured a stationary gear E, which is concentric with the spindle d. The yoke D carries two revolving cutters or grinders F and G, the cutter F having a spindle f having a bearing in one arm of the yoke D, and at the other end the spindle is provided with a beveled gear f', meshing with the stationary gear E. The cutter G has a spindle g, having a bearing in the other arm of the yoke D, and at the outer end is provided with a beveled gear g', also meshing with the stationary gear E. The gear g' is somewhat smaller in diameter than the gear-wheel f', in order that the cutters F and G will revolve at different speeds. The arrangement of gear-wheels f' and g' and stationary gear E

produces a planetary motion of the cutters when the spindle *d* is rotated, as will be readily understood.

The two cutters overlap slightly, as shown in Fig. 2, and the cutting-edges are so formed that the pencil will be cut from the point backward. This is an important advantage. Where the cutters act in the opposite direction—that is, from the body of the pencil toward the point—the cutting-edges are liable to grasp the lead, breaking it off and pulling it from the wood. It has also been proposed to sharpen the pencil by cutting it circumferentially as distinguished from a lengthwise cut. This also is an objectionable method, since both the wood and lead are liable to be split and broken. This cannot happen when the cutters act from the point of the pencil backward. The cutting-edges of the cutters are of short length, since only a very small surface of the pencil is acted on by the cutters as they revolve around the pencil. The axial center of the cutter F is slightly in advance of the axial center of the cutter G, as before stated, in order to bring them sufficiently close together to produce a sharp point on the pencil. If this were not done, the cutters would have to be sufficiently far apart to prevent their cutting-edges striking, and hence a sharp point could not be produced; but, on the contrary, the point of the pencil as the pencil is fed forward would pass beyond the periphery of the cutters, which would result in the production of a long cylindrical-like point to the pencil, which in most cases would break off. From an examination of Fig. 2 it will be seen that as the pencil is fed forward the point passes beyond the periphery of the cutter F, but it will still be in contact with the cutting-edges of the cutter G, thus producing a conical point and preventing the point from being broken off by reason of its having no support; and it will also be seen that the pencil-point could in no way extend beyond the cutter G, since that cutter constantly reduces the surface and maintains a conical point.

Mounted within the case B, opposite the cutters, is a guide for the pencil. This guide comprises two pivoted L-shaped levers having laterally-projecting arms *h* and *i* and downwardly-projecting arms *h'* and *i'* respectively. These two levers are pivoted to the case B by bolts *k*. The arms *h* and *i* are provided with V-shaped recesses *l* for grasping the pencil, which is inserted through the hole *l'* in the case B. The two arms *h'* and *i'* are connected by a link *m*, to one end of which is connected a spiral spring *m'*, the other end of the spring being secured to the case B at m^2. The object of the link *m* is to move the arms *h* and *i* uniformly, and the spring *m'* is provided for the purpose of causing the arms to grasp the pencil and at the same time to hold the arms in a central position relative to the cutters, or, in other words, in such position that the axial center of the pencil will pass through the axial center of the spindle *d*, so that when the pencil is operated upon by the cutters the end of the pencil is reduced to a perfect cone. The arms *h* and *i* are separated to release the pencil by depressing the finger-piece *n* and to facilitate this action a rigid finger-piece *n'* is provided on the casing B, so that by grasping the two and pressing finger-piece *n* arm *h* will be tilted upward, at the same time tilting arm *h'* to the right, which, through link *m*, tilts arm *i'* in the same direction, causing the arm *i* to be moved downward. From this it will be seen that the arms *h* and *i* always move toward and away from each other uniformly. In opening the arms to release the pencil spring *m'* is placed under increased tension, and upon the finger-piece *n* being released the spring will pull the arms backward toward their normal positions. The arm *i* is preferably a double or bifurcated one, as shown in Fig. 2, so that the arm *h* will extend between the two parts of the arm *i*, thus forming a longer and more rigid bearing for the pencil and guarding against any wabbling thereof.

The case B is held rigidly between the two arms *a* by screws a^2, which enter holes a^3 in the sides of the case. The base or bracket A is shown in position for securing the apparatus upon a table; but if it is desired to secure the apparatus to a wall or other vertical support the screws a^2 are removed and the bracket is swung around to the position shown in dotted lines in Fig. 5, and the bracket is locked in this position by inserting the screws a^2 in holes a^4. (See Figs. 4 and 5.)

What I claim is—

1. In a pencil-sharpening machine, the combination with two rotary cutters or grinders adapted to work on opposite sides of a pencil, of means for giving a planetary motion to said cutters, and a guide for holding a pencil, substantially as set forth.

2. In a pencil-sharpening machine, the combination with two rotary cutters or grinders adapted to work on opposite sides of a pencil, the axial center of one being in advance of the axial center of the other, of means for giving a planetary motion to said cutters or grinders, and a guide for holding a pencil, substantially as set forth.

3. In a pencil-sharpening machine, the combination, with two overlapping rotary cutters or grinders adapted to work on opposite sides of a pencil and the axial center of one being in advance of the axial center of the other, of means for giving a planetary motion to said cutters, and a guide for holding a pencil, substantially as set forth.

4. In a pencil-sharpening machine, the combination, with two rotary cutters or grinders adapted to work on opposite sides of a pencil, of a yoke having bearings for the spindles of said cutters or grinders, gear-wheels on said spindles engaging with a stationary gear, a spindle upon which the yoke is mounted, and a crank for rotating said spindle,

whereby a planetary motion of the cutters or grinders is produced, and a guide for the pencil, substantially as set forth.

5. In a pencil-sharpening machine, the combination with a rotary cutter or grinder, of a guide for the pencil consisting of two pivoted L-shaped levers, a link connecting said levers, and a spring acting upon said levers, whereby a pencil inserted between said levers will be so held that its axial center will pass through the axial center of the spindle carrying the cutter or grinder, and means for adjusting said levers to permit the insertion and withdrawal of a pencil, substantially as set forth.

6. The combination with a tool carried by a rotating spindle, of a work-holding device consisting of two pivoted levers, a link connecting said levers, and a spring acting upon said levers, whereby the work inserted between said levers will be so held that its axial center will pass through the axial center of the tool or its spindle, and means for adjusting said levers to permit the insertion and withdrawal of the work, substantially as set forth.

7. In a pencil-sharpening machine, the combination with the case B, of a stationary gear carried thereby, a bearing for a rotating spindle provided with a yoke carrying two revolving cutters or grinders, said cutters or grinders being provided with gear-wheels meshing with the stationary gear, whereby a planetary motion of the cutters is produced, a pencil-guide mounted on the opposite side of the case, and an adjustable supporting-bracket for said case, substantially as set forth.

This specification signed and witnessed this 30th day of November, 1895.

GEO. F. BALLOU.

Witnesses:

EUGENE CONRAN,

JOHN R. TAYLOR.