(No Model.)

S. FORRESTER.

PENCIL SHARPENER.

No. 332,146. Patented Dec. 8, 1885.

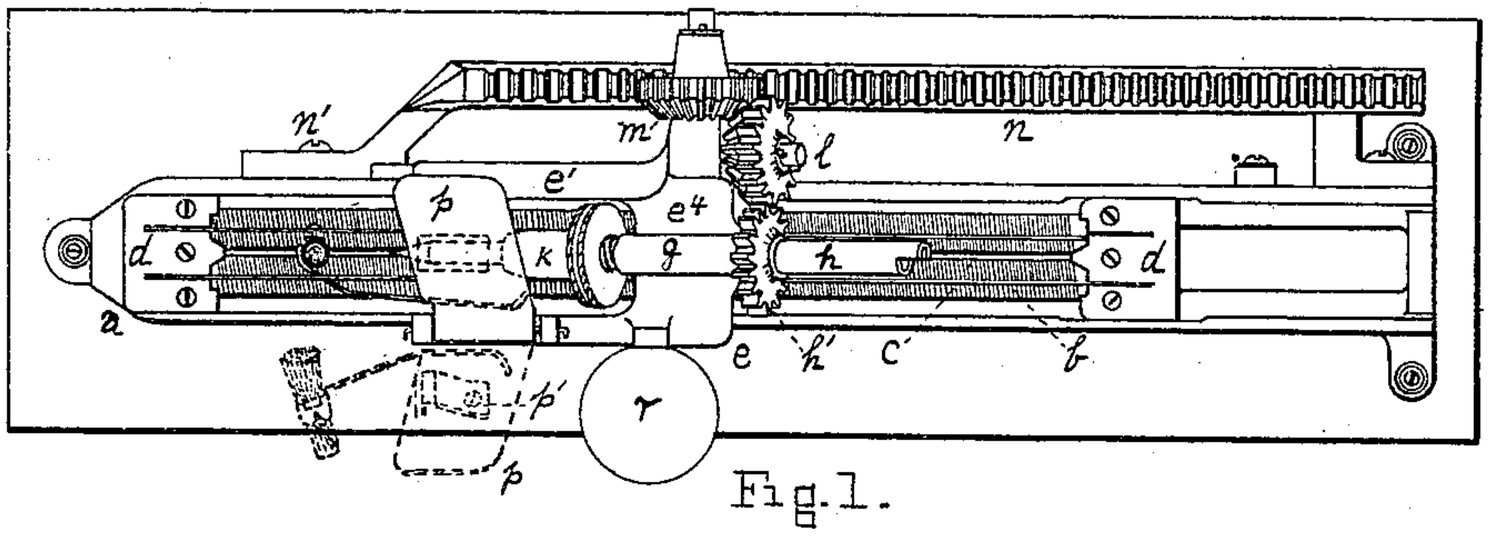

Fig. 1.

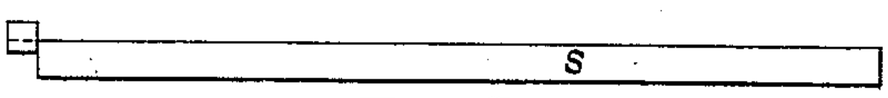

Fig. 2.

Fig. 3.

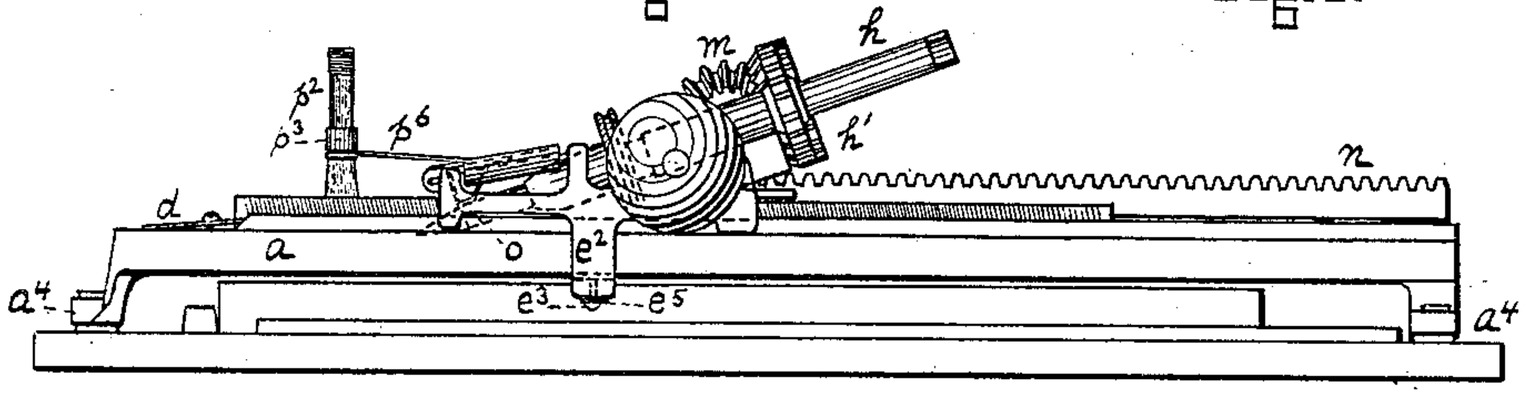

Fig. 4.

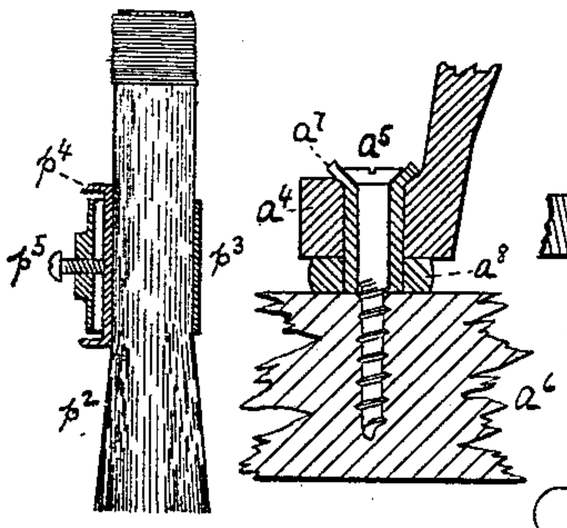

Fig. 5.

Fig. 6.

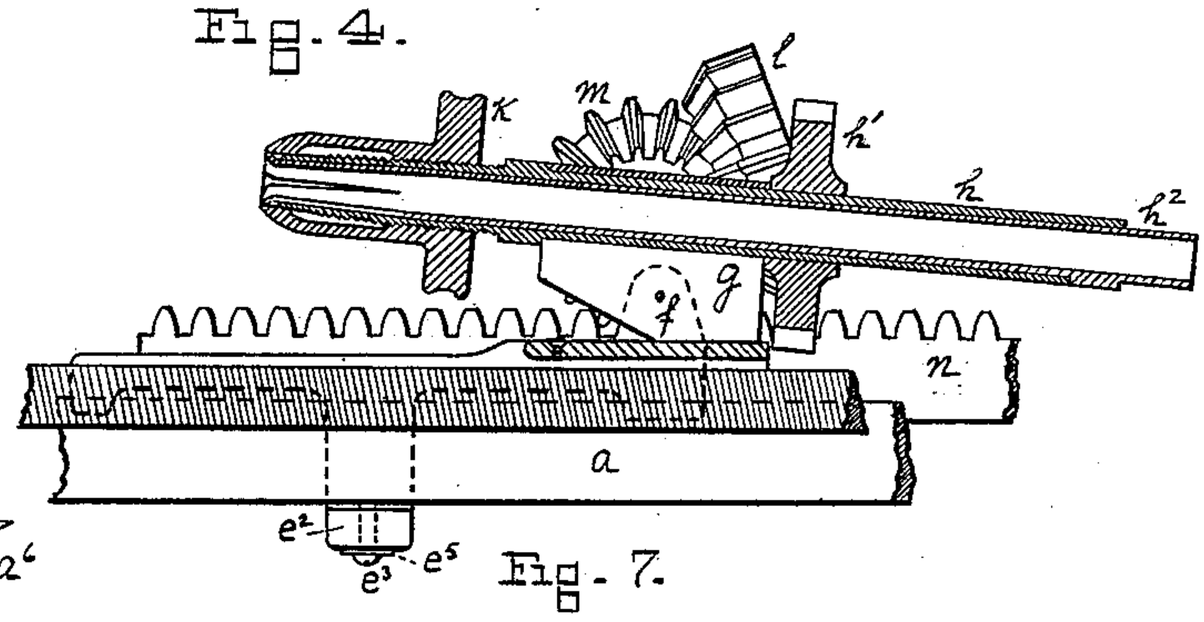

Fig. 7.

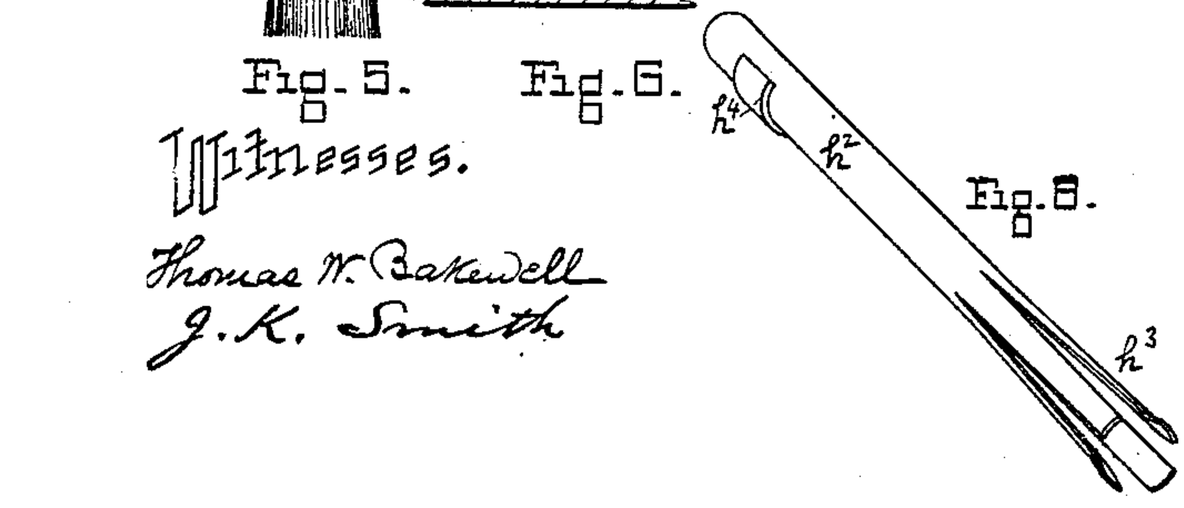

Fig. 8.

Witnesses.

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SAMUEL FORRESTER, OF ALLEGHENY, PENNSYLVANIA.

PENCIL-SHARPENER.

SPECIFICATION forming part of Letters Patent No. 332,146, dated December 8, 1885.

Application filed December 12, 1884. Serial No. 150,140. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL FORRESTER, of the city of Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Pencil-Sharpeners; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a plan view of my improved sharpener. Fig. 2 is a side view of an auxiliary guiding-surface. Fig. 3 is a sectional view showing its mode of application. Fig. 4 is a side elevation of the sharpener. Fig. 5 is a vertical sectional view of a brush used in the apparatus. Fig. 6 is a vertical sectional view of one of the feet of the frame. Fig. 7 is an enlarged view of a part. Fig. 8 is a perspective view of a part of the pencil-holder. Like letters of reference indicate like parts in each.

My invention relates to an improvement in a pencil-sharpener of the kind for which Letters Patent of the United States No. 310,041 were granted to me on the 30th day of December, 1884; and it consists in providing the movable carriage of such a sharpener with mechanism for automatically rotating the pencil as the carriage is moved back and forth over the grinding-surface, and in several other new and improved features, hereinafter set forth.

Referring now to the drawings, *a* represents the frame of my improved pencil-sharpener. It consists, preferably, of two parallel bars or rods connected at one or both of their extremities, and placed at a proper distance apart to accommodate between them two files, *b b*, which are adapted to grind or sharpen the pencil which is rubbed over their surfaces. The grinding-faces of these files are preferably beveled or inclined downwardly toward each other, so as to form a concave or V-shaped grinding-surface, and for the purpose of giving a proper point to the pencil the bases of the inclines are somewhat separated, so as to leave a small longitudinal space, *c*, between them.

In the drawings the files are shown as being triangular in cross-section, mounted upon the frame *a* with their bases in the same plane, and secured thereto by means of plates *d d*, notched so as to fit over the apices of the files at their extremities. When screwed to cross-bars on the frame, these plates press against the files and hold them securely in place. I do not desire to limit myself to the use of such files, nor even to the use of a concave grinding-surface, since, as will appear, a flat surface may be advantageously employed for some purposes.

Mounted upon slides on the side bars of the frame *a* is a reciprocating carriage, *e*, which is capable of being moved backward and forward thereon. This carriage, when made of metal, may be well cast in one piece, and consists of two parallel grooved side bars, *e' e'*, which fit and bear upon the slides of the frame *a*. A guide-piece, e^2, is made on each side bar, to extend downwardly therefrom, and at their bases they are bent inwardly, so as to pass underneath the side pieces of the frame *a* and to hold the carriage firmly thereon. The side bars of the carriage are united by a cross head or bar, e^4. Mounted on the cross-head e^4 of the carriage is a pencil-holder, *h*, which is capable of holding a pencil longitudinally with the grinding-surface, and of being rotated upon its axis. In practice, I have found the preferable pencil-holder of this kind to be the one shown in the drawings. It consists of a hollow cylindrical sheath, *g*, having its bore arranged in the same vertical plane with the longitudinal space *c* between the files *b b*, and pivotally mounted at right angles to its length, between cheeks or standards *f* on the cross-head e^4, which will allow the sheath a vertical oscillating motion on its axis. Mounted within the bore of the sheath *g* so as to be rotatory therein is the pencil-holder proper, which consists of a tubular casing, *h*, of about the proper diameter to contain an ordinary lead-pencil. The tube *h* projects from the sheath in both directions, and at its inner end is slit and provided with a screw-thread for accommodating a clutch or chuck, *k*, for securing the pencil during the sharpening process. When the pencil is placed within the tube *h* and the chuck *k* screwed up, it will press the split ends of the holder against the pencil and hold it firmly. Thus constructed, it is clear that the pencil-holder *h* is capable of three simultaneous motions—a longitudinal motion with the reciprocating carriage *e* par-

allel with the files, a vertical oscillating motion with the sheath *g* upon the axis of the latter, and a rotary motion within the sheath and axially with its bore.

The last-named rotary motion is imparted in the following manner: The tubular holder *h* is provided with a cog wheel or pinion, *h'*, preferably situate just back of the rocking sheath *g*, and this cog is geared by intermediate gearing, *l*, to a toothed pinion, *m*, the teeth of which mesh into those of a rack, *n*, which is mounted beside and longitudinally with the frame *a*. The pinion *m* and the intermediate cog-wheel, *l*, are mounted on bearings affixed to the cross-head of the carriage *e*, the teeth of both being beveled and their axes situate at right angles, so that longitudinal rotation of the pinion as it traverses the rack *n* will impart a transverse rotation to the miter-wheel and to the pinion *h'*. The teeth of the miter-wheel *l* and cog *h'* are separated sufficiently to permit the tubular holder *h* to be oscillated somewhat on the axis of the sheath *g* without throwing these gearings out of gear. The rack *n* is conveniently cast separate from the frame *a*, and is attached to it by bolts or screws *n'*.

In order to hold the end of the pencil to be sharpened against the files, a bar or plate, *p*, is hinged to one of the side bars of the carriage *e*, forward of the pencil-holder *h*, so that when the pencil is in position a pressure on the plate will press it against the pencil and force the latter downward against the files.

In case the plate cannot be conveniently placed low enough to encounter the pencil directly, I provide its under surface with a knob or shoe, *p'*, which is removably screwed to the plate, and extends downward far enough to reach the pencil. This is a convenient arrangement, because the bearing face of the knob is small and will afford but little friction to the turning of the pencil. The reason for screwing the shoe *p'* to the plate *p* is, that it may be removed and replaced when worn out.

When the pencil is being placed in the holder *h*, the hinged plate may be raised and thrown over to the side of the carriage, as shown in dotted lines in Fig. 1. Attached to the under side of the hinged plate *p* is an arm, p^6, carrying a brush, p^2, which is so arranged that when the plate is thrown over onto the pencil the end of the brush may be in contact with the grinding-surface *b b*. As the carriage *e* is moved backward and forward on the slides the brush p^2 will sweep all the dust and filings of the pencil off the files and through the space *c* into a suitable receptacle placed thereunder. The broom is simply made by placing a number of bristles within an annular socket, p^3. Within the socket is a loose clamp or plate, p^4, against which bears a set-screw, p^5, arranged in the side of the socket. By tightening the screw the plate is clamped against the bristles and holds them firmly.

The operation of the apparatus when thus constructed is as follows: A pencil, *o*, is inserted into the tubular pencil-holder, so that the end to be sharpened extends the proper distance beyond the chuck *k*, and the chuck is tightened to grasp the pencil. The end of the holder is then lowered sufficiently to depress the end of the pencil against the files, and the hinged plate is turned over to rest upon the pencil. The operator then seizes the carriage *e* by a knob or handle, *r*, and places his hand upon the plate *p*, applying a sufficient pressure thereto to keep the end of the pencil against the files. If, now, the carriage *e* be moved backward and forward on the slides on the frame *a*, the pencil *o* will be rubbed upon the surface of the files and ground to a point. During this operation the action of the rack *n* upon its reciprocating pinion *m* will give the pencil a continuous rotation, thereby presenting each portion of the pencil end to the file and producing a regularly uniform point. The end of the rack-frame, where it joins the side bar of the frame *a*, may be covered with rubber, and so situate as to form a stop or buffer for the guide-piece e^2 of the carriage, which will limit its movement and prevent the pencil-point from being struck against the end of the frame and blunted or broken.

In practical use of the pencil-sharpener described in the application before referred to a disadvantage became manifest, in that it was difficult to prevent rattling of the apparatus and a disagreeable rasping noise. I have, however, overcome these difficulties by means of the devices shown in Figs. 2 and 6 of the drawings.

On that part of the guide-piece e^2 which extends under the sides of the frame *a*, I arrange screws e^3, which extend through the guide-piece and bear against the bottom of the slides. By tightening these screws against the slides the carriage *e* may be held as firmly as desirable, and prevented from rattling as it moves over the files. A number of thin washers, e^5, are arranged on the screws between their heads and the outer face of the guide-piece, there being enough washers that when the ends of the screws bear against the slides of the frame their heads may fit tightly on the washers. This will prevent the screws from jarring loose. As the ends of the screws wear off, the wear may be compensated by removing one or more of the washers and retightening the screws. In this way an adjustable bearing is provided for the carriage, so that the apparatus may be used for a long time without wearing loose.

The other device for preventing rattling is shown in Fig. 6. The feet a^4 of the frame are provided with holes, through which they may be attached to a table, a^6, or other support by screws a^5, which pass through these holes. Each hole is lined with an annular rubber socket, a^7, which projects from both sides of the foot. The screw is inserted within this socket, and as it is screwed down the head will bear against the upper part of the socket,

while both it and the shank of the screw will be prevented from touching the foot by contact with the rubber. A second rubber annulus, a^3, of larger diameter may be used to inclose the socket a^7 beneath the foot, so as to form a support for the latter to rest upon, or the two rubber pieces may be made integral.

I am aware that rubber washers and rubber feet have been used for preventing rattling, and I do not desire to claim the same broadly herein.

I have mentioned the fact that the tubular pencil-holder *h* has a split end, around which fits the clutch or chuck *k*, by tightening which an inclosed pencil will be grasped by the holder and held during the sharpening process. The tightening of this clutch will be sufficient to make the holder adjustable for most sizes of lead-pencils; but when slate-pencils or lead-pencils of small diameter are sharpened it is usually necessary to provide additional means for reducing the bore of the pencil-holder. To do this I employ a tube, h^2, of smaller external diameter than the bore of the pencil-holder *h*, and having a split end, h^3, to correspond to the split end of the larger holder. When the tube h^2 is inserted within the tubular holder *h*, it will diminish the bore of the latter, and when the split end h^3 is under the corresponding part of the tube *h*, tightening of the clutch will enable a very small pencil to be clamped and sharpened.

In order to prevent the inner tube from revolving with its inclosed pencil, its surface is provided with a stud or lug, h^4, which fits within a slot in the side of the holder *h*. The apparatus may thus be made adjustable to any size of pencil by regulating the internal diameter of the inner tube.

The pencil-point produced by grinding over the surfaces of two adjacent files separated sufficiently to provide an intermediate longitudinal space between their bases is elongated, and of substantially the same diameter throughout its length. I have invented an auxiliary device to my improved sharpener for producing a tapering point to the pencil, which is illustrated in Figs. 2 and 3, and consists of a rod, *s*, triangular in cross-section, so that it may be laid between the files *b b* and present a plane surface to the pencil-point. This surface is coated with emery or otherwise roughened to a grinding-surface. When the pencil has been sharpened by the files *b b*, the angular rod *s* is adjusted as shown in Fig. 3, and the carriage *e* is moved backward and forward a few times, the pencil-point being at the same time pressed gently upon the emery-coated surface. The rack *n* and pinion *m* will rotate the pencil during this operation, and will cause a sharp and regularly-tapered point to be produced. The rod *s* may be readily adjusted in position by raising the pencil-holder on the axis of the sheath *g* and turning back the hinged plate *p*, and when this operation is complete it may be removed in the same manner.

I do not desire to claim, broadly, in grinding or sharpening apparatus, devices for imparting a rotary from or by a reciprocating motion.

Having thus described my improvement, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a pencil-sharpener having a grinding-surface, the combination of a rotary holder mounted longitudinally on a reciprocating carriage over the grinding-surface, a rack situate parallel to the grinding-surface, and a pinion and gearing, substantially as described, for imparting a rotary movement to the holder from the reciprocating movement of the carriage, substantially as and for the purposes specified.

2. The combination, with the reciprocating carriage of a pencil-sharpener, of a rotatory pencil-holder mounted thereon, a stationary rack, and a pinion mounted on said carriage and geared to said holder for imparting a rotary motion thereto, substantially as and for the purposes described.

3. The combination, with the reciprocating carriage of a pencil-sharpener, of a pencil-holder mounted on said carriage and capable of a vertical oscillatory motion thereon, and the movable plate *p*, arranged on said carriage, for the purpose of depressing the pencil, substantially as described.

4. The combination, with the carriage of a pencil-sharpener, capable of a reciprocating movement over a suitable grinding-surface, of a brush attached to said carriage and capable of bearing on said grinding-surface during the motion of the carriage, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 4th day of December, A. D. 1884.

SAMUEL FORRESTER.

Witnesses:
W. B. CORWIN,
THOMAS W. BAKEWELL.