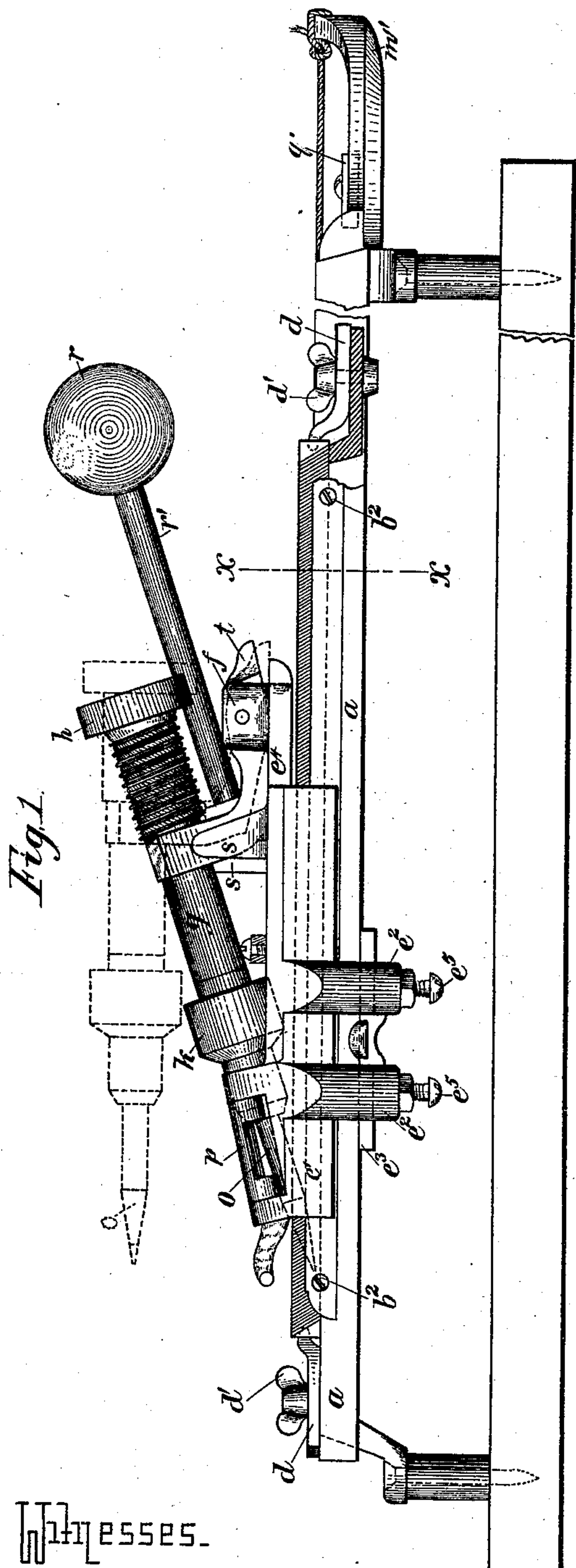


(No Model.)

S. FORRESTER.
PENCIL SHARPENER.

No. 372,258.

Patented Oct. 25, 1887.



WITNESSES.

W. A. Corwin
J. A. Burns.

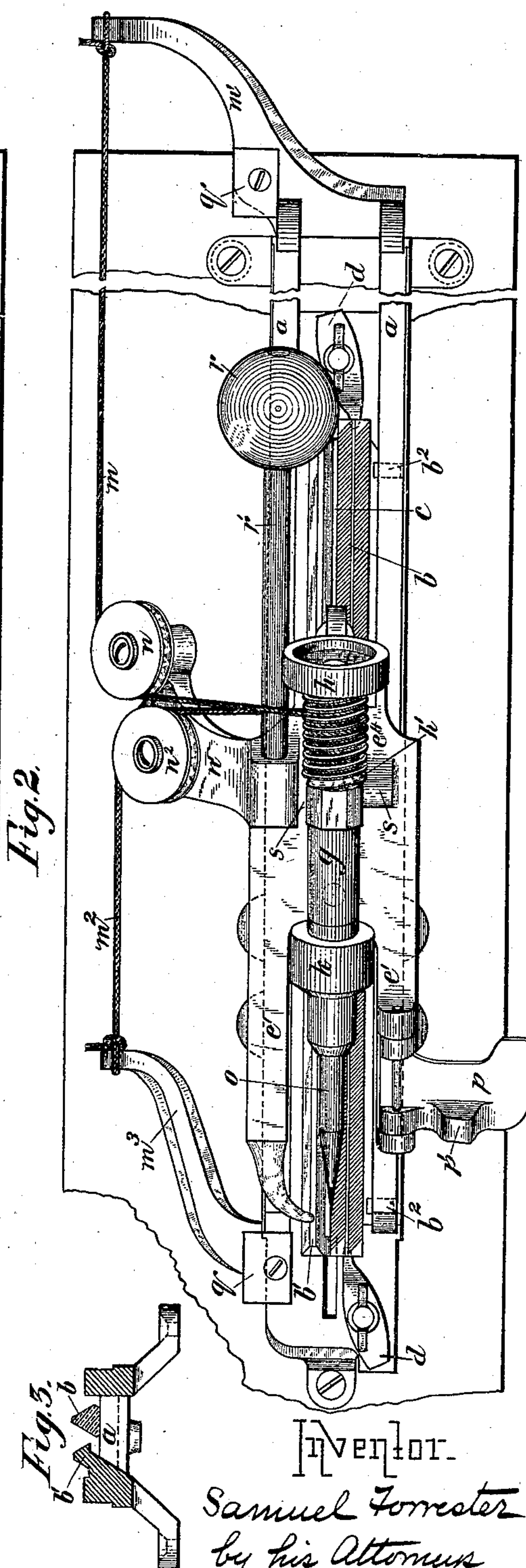
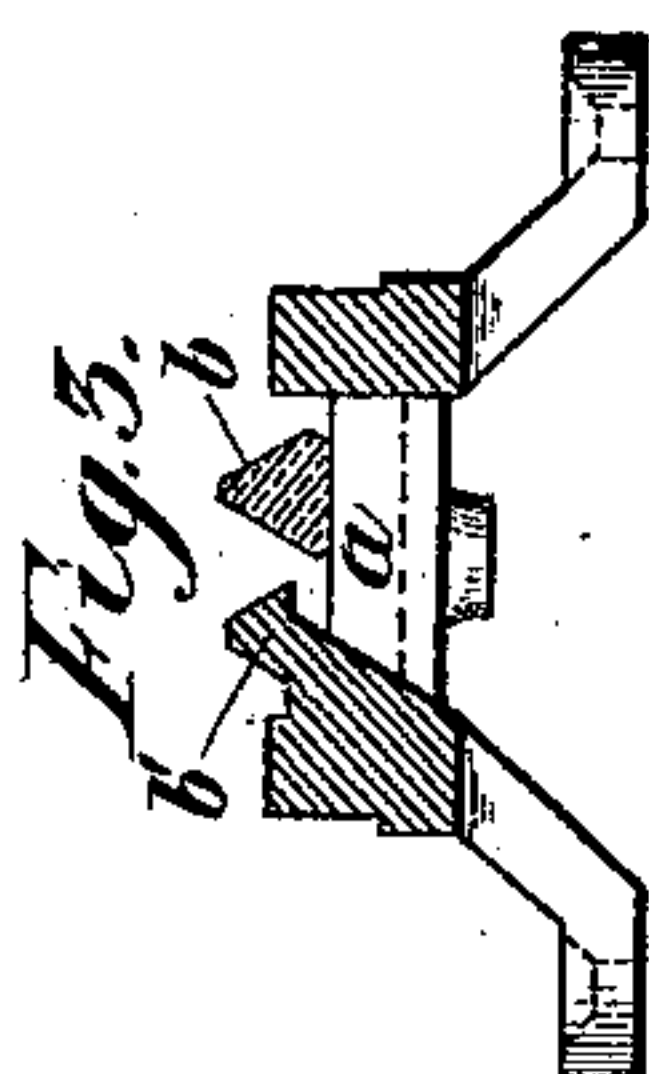


Fig. 3



INVENTOR.

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UNITED STATES PATENT OFFICE.

SAMUEL FORRESTER, OF ALLEGHENY CITY, PENNSYLVANIA.

PENCIL-SHARPENER.

SPECIFICATION forming part of Letters Patent No. 372,258, dated October 25, 1887.

Application filed August 27, 1885. Serial No. 175,441. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL FORRESTER, of Allegheny City, 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, forming part of this specification, in which—

Figure 1 is a side elevation of my improved machine. Fig. 2 is a plan view thereof. Fig. 3 is a vertical cross-section on the line $x x$ of Fig. 1.

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 No. 310,041 were granted to me on the 30th day of December, 1884; and it consists, principally, in providing the movable carriage of such a sharpener with improved mechanism for automatically rotating the pencil as the carriage is moved backward and forward over the grinding-surface, and in several other new and useful features of invention, herein-after specified.

Referring to the drawings, a represents the frame of the sharpener. It consists, preferably, of two parallel bars or rods connected at one or both ends, and placed at a proper distance apart to accommodate between them a grinding-surface, which in the present case consists of a single file, b , triangular in cross-section, with its bases set upon the supports on the frame a , parallel with the frame-bars. Parallel with the file upon the frame is a pencil-guiding bar, b' , whose inner face is smooth and is inclined toward the file, and together with the latter it constitutes a concave or V-shaped space, within which the end of the pencil reciprocates during the grinding operation. This guide-bar takes the place of one of the files shown and claimed in the above-mentioned patent, and one of the important distinctions between the present device and the patented machine is that in the latter there is a concave grinding-surface, both of whose faces are roughened, while in the present device only a single roughened face is used. The file and the guide-bar are preferably so set upon the frame that there is a small longitudinal space,

c , between them, and they are made relatively movable toward and away from each other by means of plates or bars $d d$, one of which is pivoted on the frame at each end of the file, and has a tongue fitting within a notch or hole on the end thereof. By turning these bars in the proper direction on their axes their engaged tongues move the file toward the guide-bar, and by turning them in the other way the file and guide-bar are separated. The file is held in its proper position by means of thumb-screws or clamps d' , which bear upon the adjusting-plates d .

Mounted upon slides on the side bars of the frame a is a carriage which is capable of being moved reciprocally backward and forward thereon. This carriage, when made of metal, may be cast of one piece, and consists of two parallel grooved side bars, $e' e'$, which fit and bear upon the slides of the frame a . Guide-lugs e'' are made on each bar, to extend downwardly therefrom, and at their bases these guide-lugs are bent inwardly, so as to pass underneath the slides of the frame a , and to hold the carriage securely thereon. A bushing or slide-bearing, e''' , is interposed between each of the guide-lugs and its slide, and is tightened by a set-screw, e'''' , the purpose of which is to prevent rattling of the carriage. The side bars of the carriage are joined by a cross head or bar, e^4 . Mounted on this cross-head is a pencil-holder, h , which is capable of holding a pencil in a position longitudinal with the grinding-surface, and of being rotated on its axis. 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 , and pivotally journaled 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.

The pencil-holder proper is mounted within the bore of the sheath g , so as to be rotatory therein. It consists of a tubular casing, h , of the proper diameter to contain an ordinary lead-pencil, and projects from the sheath in both directions. The forward end of the holder is slit, and is screw-threaded externally for accommodating a clutch or chuck, k , by which the pencil is secured during the sharpening pro-

cess. When the pencil is placed within the tube h and the chuck k screwed thereon, it will press the split ends of the holder against the pencil and will 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 in a direction parallel 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 as follows: The tubular pencil-holder h is provided with a groove, h' , which extends helically a number of times around its surface just back of the rocking sheath g . A cord or strap, m , is fastened to an arm, m' , which projects from the rear end of the frame a , and after passing around the grooved periphery of a friction-pulley, n , which is journaled on a laterally-projecting arm, n' , of the carriage, is wrapped around the helical groove h' from an intermediate point to its rear end, where it is suitably fastened. In like manner a similar cord or strap, m^2 , is fastened to a projecting arm, m^3 , at the front of the frame, and after passing around a pulley, n^2 , on the projecting arm n' , is wrapped around the helical groove from the starting-point of the cord m , and in the opposite direction therefrom, to the front end of the groove, where it is fastened. The cords having been drawn taut, if the carriage be moved forward on its ways, the friction of the cord m will rotate the holder h to the right within its sheath, thereby unwinding the cord m from the groove and wrapping the other cord farther therein. A backward movement of the carriage will turn the holder to the left, unwrapping the cord m^2 and rewrapping the cord m .

In order to hold the end of the pencil to be sharpened against the grinding-surface, a plate, p , is hinged to one of the side bars, c' , of the carriage, forward of the pencil-holder, so that when the pencil is in position a pressure on the plate will force it against the pencil and the latter against the file. (See Fig. 1.) 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 may be cast integrally with the plate, and extends downward far enough to reach the pencil. This is a convenient arrangement, because the bearing-face of the shoe is small and will oppose but little friction to the turning of the pencil. When the pencil is being placed in the holder h , the presser-plate may be raised and thrown over the side of the carriage, as shown in Fig. 2. Rubber buffers q are affixed to the frame a , at the front and rear ends of the slide, to properly limit the motions of the carriage and to prevent noise and jar as the carriage reaches the ends of its stroke.

The checks in which the holder-sheath g is pivoted are preferably situate somewhat back of the center of gravity of the sheath and its

inclosed pencil-holder, so that the latter will have a downward tendency toward the grinding-surface. By these means I am enabled to dispense with the use of springs for this purpose. The sheath is steadied in position and guided in its oscillations by being set between two vertical guide-posts, s . Its limits of oscillation are determined by a tongue, t , which projects back of the cheeks f and engages the carriage cross-head e' when the sheath has been raised to the highest desirable point, as shown by dotted lines in Fig. 1.

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 shall extend for the proper distance beyond the chuck k , and the latter is tightened to grasp the pencil. The end of the holder is then lowered sufficiently to depress the end of the pencil against the file, and the hinged plate is turned over to rest upon the pencil. The operator then with one hand seizes a knob or handle, r , whose bar r' is affixed to the carriage, and places the forefinger of the other hand upon the plate p , applying a sufficient pressure thereto to keep the end of the pencil in contact with the file. If, now, the carriage be moved backward and forward on the slides of the frame a , the sides of the projecting end of the pencil will be rubbed upon the surface of the file and ground to a point. During this operation the tension of the cords m^2 and m upon the pencil-holder will give to the pencil a reciprocating rotation, thereby presenting the whole circumference of the pencil end to the file and producing a regularly uniform point. The action of the pencil-guide b' is to steady the end of the pencil and to keep its end in contact with the file on the opposite side. I have found that the use of a single lateral grinding-surface, when used with a smooth guide, is better than a double grinding-surface, because in the latter there is too much rasping, and consequently an unevenness in the point produced. With a single file the action is rather a proper cutting action than a grinding, and a practically perfect point is made. In sharpening lead-pencils the double files are apt to score the projecting lead and to make a weakened and irregular point; but the single file produces a symmetrical and regularly-tapering point on the lead. The use of the single grinding-surface enables the machine to be efficient in sharpening pencils for drafting and other fine work.

Another respect in which the combination of the file with a smooth surface, as distinguished from the combination of two files, is useful, is this: When a pencil is sharpened in a machine having two files, the wooden part of the pencil has two surfaces against which it bears and by which it is cut, and the lead point, which projects through the slot at the base of the grinding-surface, bears only on one file. Owing to the greater pressure of the lead on the file, the teeth of the latter are apt to wear smooth much more rapidly at the

line where it grinds the lead than on the lines where the wooden part of the pencil is cut. When this happens, the use of the machine cuts or grinds away the wooden part of the pencil too fast relatively to the grinding of the lead, and consequently the point is made long and ragged and is apt to break off during the sharpening process. The same thing happens to a less degree when new files are used, because of the fact that there are two surfaces cutting the wood and only one acting on the lead. The arrangement of my file prevents this, because it provides means for equalizing the grinding on the point and wood, thereby preventing unequal wear of the files and also enabling the machine to produce a more regular and an otherwise better point. This is an important feature of my invention, because the machine is chiefly used by school-children; and by extended practical experience I have found that while they have difficulty in sharpening the pencil on the two-file machine without often breaking the point, there is no such difficulty when my present construction is employed.

If it should happen that the file *b* should wear away by long-continued friction, it may, when it is a three-sided file, be turned over and a new grinding-face presented. In order to provide an adjustable stop for limiting the lateral motions of the file *b* toward and away from the unroughened pencil-guide to produce a correspondingly sharper or blunter point on the pencil, I use a set-screw, *b*², which traverses the side of the sharpener-frame, one screw being placed at each end thereof and having their ends directed toward the outer side of the file. By screwing these set-screws inward the file is rendered susceptible of a less adjustment, and by withdrawing them the limit of adjustment is increased.

The peculiar advantage which is derived from the use of the cords *m m*² in rotating the pencil-holder is that they are certain and noiseless in their action, are very cheap, and easily renewed. The pivotal adjusting-plates *d* are important because of their simplicity and efficiency.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a pencil-sharpener, of a suitable grinding-surface, a pencil-holder mounted thereover on a carriage and capable of a reciprocating motion, said pencil-holder being rotatory on its longitudinal axis, and a cord or band enwrapping the holder and secured to a point independent of the carriage, whereby a motion of the latter will exert a tension on the cord and rotate the pencil-holder, substantially as and for the purposes described.

2. The combination, in a pencil-sharpener, of a suitable grinding-surface, a pencil-holder mounted thereover on a carriage and capable of a reciprocating motion, said pencil-holder being rotatory on its longitudinal axis and provided with a helical groove, *h*¹, and cords or bands enwrapping the pencil-holder in the groove and secured to a point independent of the carriage, whereby a motion of the latter will exert a tension on the cord and will rotate the pencil-holder, substantially as and for the purposes described.

3. The combination, in a pencil-sharpener, of a suitable grinding-surface, a pencil-holder mounted thereover on a carriage and capable of a reciprocating motion, said pencil-holder being rotatory on its longitudinal axis, cords or bands enwrapping the pencil-holder and secured to a point independent of the carriage, and guide-pulleys around whose peripheries or portions thereof the cords or bands pass, substantially as and for the purposes described.

4. As the grinding-surface of a pencil-sharpener, the combination of two parallel surfaces laterally inclined toward one another, one of said surfaces being roughened and the other smooth, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 13th day of August, A. D. 1885.

SAMUEL FORRESTER.

Witnesses:

THOMAS W. BAKEWELL,
JOHN S. KENNEDY.