E. W. FROST.

PENCIL-SHARPENER.

No. 192,752. Patented July 3, 1877.

Fig: 1.

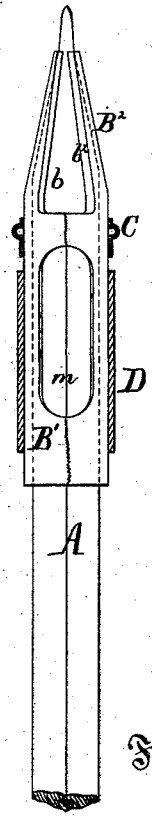


Fig: 2.

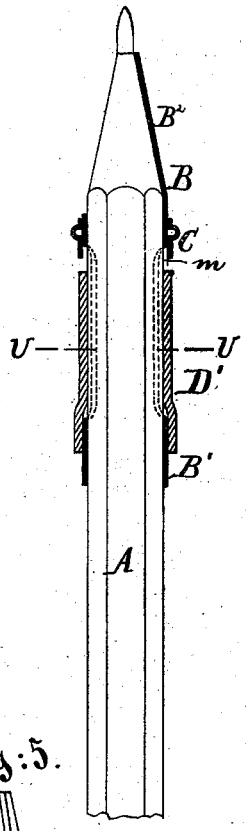


Fig: 5.

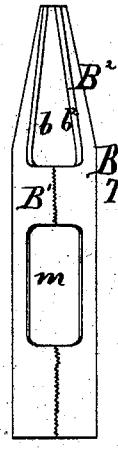
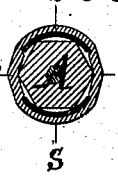


Fig: 4.

Fig: 3.



Witnesses:

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UNITED STATES PATENT OFFICE.

EZRA W. FROST, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN PENCIL-SHARPENERS.

Specification forming part of Letters Patent No. **192,752**, dated July 3, 1877; application filed March 22, 1877.

To all whom it may concern:

Be it known that I, EZRA W. FROST, of Brooklyn, in the State of New York, have invented certain new and useful Improvements relating to Pencil-Sharpeners and Point-Protectors; and I do hereby declare that the following is a full and exact description thereof.

Sheet-metal devices have been proposed which were capable of receiving the body of a pencil and allowing it to be turned therein and guided or held in position while its tapering end is sharpened by rotation against a cutting-edge.

My invention is of that class. I have contrived to overcome, by simple means, some of the difficulties heretofore serious with this class.

One difficulty has been the tendency of the metal parts to spring out of position when the pencil is turned. The strain thrown upon the sharpener twists and deflects the metal. Economy of construction seems to render it imperative that the metal shall be formed from a single piece of sheet-steel struck-up by dies, or otherwise formed, into the proper shape, partly cylindrical and partly conical. The joint where the edges abut together is sure to twist more or less when the pencil is turned around in the process of sharpening. The entire device is twisted and warped by the force, so as to cause the cutting-edge to sometimes enter too deeply into the pencil and break the lead, and at other times to refuse to take hold. I overcome this difficulty by the use of a thin but strong hoop of metal pushed forcibly upon the device, and holding the abutting edges together, so that they remain about as firmly supported as if made from a solid piece of steel.

Another difficulty lies in the looseness of the hold when the device is partly drawn off to shield the point of the lead, so as to serve as a point-protector. I overcome this by forming large apertures in the sides and incasing it in a contractile hoop or band of india-rubber. The rubber acts on the body of the pencil through the interstices in the sheet metal.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is an elevation, partly in section. The section is on the line S S in Fig. 3. Fig. 2 represents all the parts in section except the pencil. The section is on the line T T in Fig. 3. Fig. 3 is a cross-section on the line U U in Figs. 1 and 2. Fig. 4 is a cross-section through the contractile band of india-rubber, or analogous material, represented as detached. Fig. 5 is a side view of the steel portion detached.

Similar letters of reference indicate corresponding parts in all the drawings.

A is the body of a lead-pencil made of common cedar wood, with a lead running along its center, which is exposed by whittling or otherwise removing the wood in the act of pointing. B is the sheet metal or main portion of my sharpener and protector. The several parts are indicated by B^1 B^2, &c. B^1 is the cylindrical body of the sharpener, which guides the pencil. B^2 is the tapering point, having a sharpened edge, b^2, along one side of the long aperture b. The cutting-edge b^2 is just sufficiently within the cone-like figure to enable it to take hold properly and remove a thin shaving as the pencil is revolved against it. The edges of the sheet metal in the body of the sharpener are formed, by a suitable tool, into minute notches analogous to saw-teeth.

The band C is forced on tightly, and compresses the metal firmly together, so that its abutting edges are stiffly braced against each other, and the minute notches in the edges are locked firmly together. Considerable openings m are formed in the cylindrical portion or body B^1. Through these the incasing rubber may press against the wood A.

D is a ring or band or envelope of nearly pure india-rubber vulcanized. It is drawn upon the device with force, and tends to contract itself into the aperture m thereby pressing forcibly upon the wood A, and exerting a sufficient friction to hold the device in any position in which it may be placed. To increase the effect of this holding, the interior of the rubber band D is formed with consid-

erable projections or internal spurs. A little care to so place the band that these projections shall reach in through the openings *m*, causes the rubber to press with force on the wood A, and to hold the whole firmly together.

I believe that the rubber may serve with some effect without the internal projections, and that the holding of the edges of the sheet metal tightly together by the rigid band C may be effective without the previous notching of the edges; but the provisions shown increase the effect.

The device is not in the way for ordinary use as a pencil. The rubber D may, and preferably does, abut against the edge of the ring C, but should not cover it. As the pencil-lead wears up it is easy to cut away the wood and expose more of the lead by simply turning the pencil in the sharpener. When the pencil is to be placed in the pocket, the sharpener should be partially drawn off, and will then retain its place by the contractile force of the rubber to act through the apertures *m*, and will serve as a point-protector.

The proportions of the several parts may be varied within wide limits. I have represented them as varied somewhat in relation to the size of the holes through which the rubber presses against the wood, which is much less in Fig. 5 than in Fig. 1. I esteem the proportion in Fig. 5 preferable for general purposes.

I claim as my invention—

The pencil-sharpener and point-protector described, composed of the sheet-metal portion B^1 B^2, having liberal apertures *m*, in combination with the contractile rubber band D and rigid hoop C, as herein specified.

In testimony whereof I have hereunto set my hand this 19th day of March, 1877, in the presence of two subscribing witnesses.

E. W. FROST.

Witnesses:
THOMAS D. STETSON,
A. HENRY GENTNER.