(No Model.)

H. HOWARD.

MACHINIST'S MEASURING TOOL.

No. 386,469. Patented July 24, 1888.

Fig. 1.

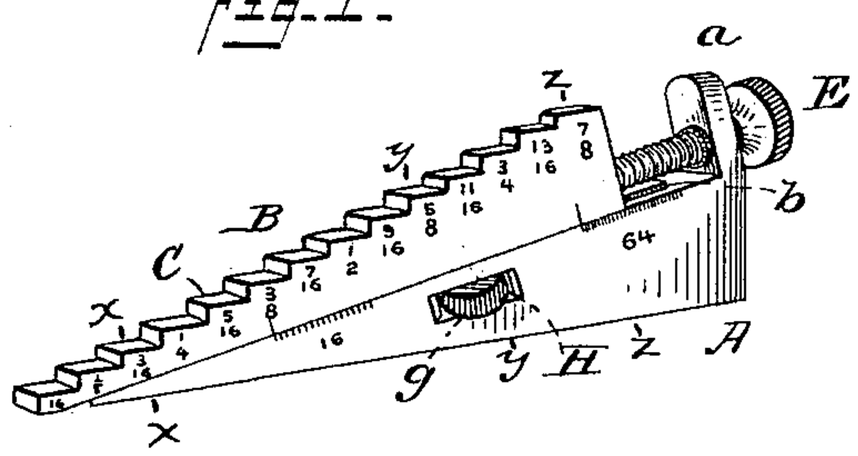

Fig. 2.

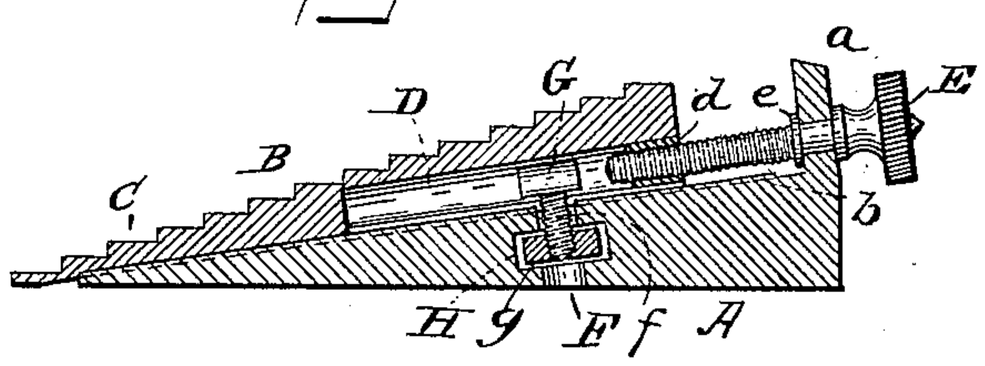

Fig. 3.

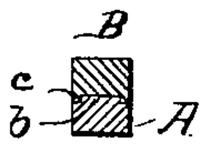

Fig. 4.

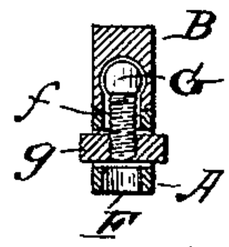

Fig. 5.

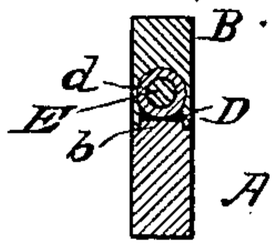

Fig. 6.

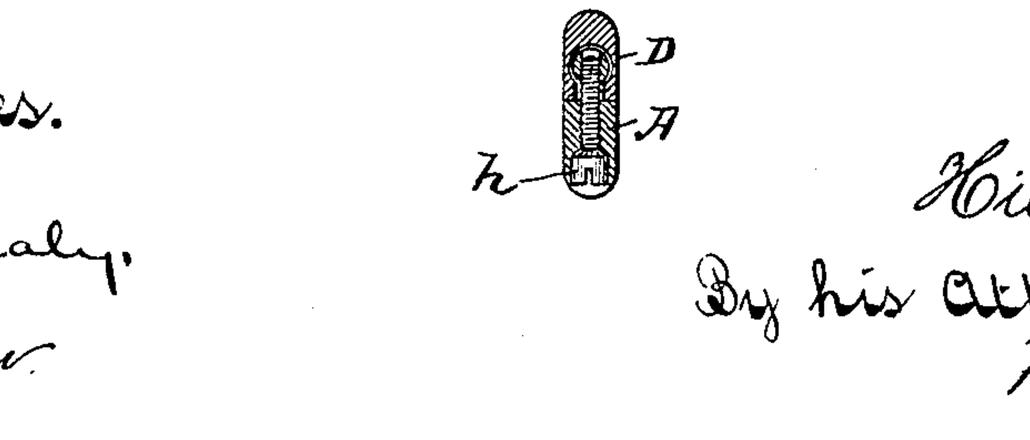

Fig. 7.

Witnesses.

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MACHINIST'S MEASURING-TOOL.

SPECIFICATION forming part of Letters Patent No. 386,469, dated July 24, 1888.

Application filed April 6, 1888. Serial No. 269,789. (No model.)

To all whom it may concern:

Be it known that I, HILTON HOWARD, a citizen of the United States, residing at Fitchburg, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Machinists' Measuring-Tools; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to an improvement in a machinist's tool, and has for its object a device for accurately measuring heights on planers, lathes, and other machinery, and also for obtaining correct inside diameters of pipes, holes, and other places where it is difficult to obtain correct measurement with an ordinary scale-rule; and it consists in the construction hereinafter described, and more partiularly pointed out in the claims.

Referring to the drawings, Figure 1 is a perspective view of my improved device. Fig. 2 is a longitudinal section. Fig. 3 is a vertical cross-section on the line *x x* of Fig. 1. Fig. 4 is a vertical cross-section on the line *y y* of Fig. 1. Fig. 5 is a vertical cross-section on the line *z z* of Fig. 1. Fig. 6 is a perspective view of a modified form of my device, showing the steps and under edge of the base-piece rounded. Fig. 7 is a vertical cross section on the line *v v* of Fig. 6.

A represents a triangular or wedge shaped base piece or section having its inclined upper surface at one end extending to a point on the plane of its base or under surface, while its opposite portion is gradually increased in a vertical depth and terminates in a wide end provided with an ear, *a*, projecting above the end and at a right angle to the upper inclined surface of the base-piece to serve as a bearing for an adjusting-screw. This ear *a* is preferably formed integral with the base-piece, though, if desired, it may constitute a separate piece and be secured to the end of the base-piece by means of screws. On the upper or inclined side of the base-piece there is a tongue, *b*, which extends from its thin or smallest end to near the ear *a* at its vertically-thickened or largest end.

B represents a triangular step section of the same depth as the base-section and somewhat shorter, adapted to fit thereon with its thin or tapering end to the thin or tapering end of the base-section.

The step-section B is provided on its under side with a groove, *c*, which fits over and slides upon the tongue *b* of the base-piece. On the upper side of the triangular piece B there are a series of graduated steps, C, each of which is parallel to the bottom of the base-piece and of a certain specific height from the bottom of the tool, as indicated on its side when the step-piece is in position, to register with the scale on the lower or base piece. On the under side and extending from the vertically-thickened end of the step-piece B there is an enlarged inverted-U-shaped groove, D, for the adjusting-screws, having its lower margin or flanges contracted, which extends about one-half the length of the step-piece. Within the outer end of this groove D there is rigidly secured an annular ring, *d*, which is screw-threaded on its inner side, and receives a thumb-screw, E, which is swiveled in the projecting ear *a* on a parallel line with the upper face of the base-piece. This screw is provided with rigid collars *e* on each side of the ear-piece, which holds the screw in position while it is turned in the hole of the ear by the milled thumb-piece. By this construction the triangular step-piece B is adjusted upon the incline of the base-piece to or from the ear, as desired, to vary the heights of the steps from the plane of the base by a minute fraction.

Through the base-piece A, slightly toward its vertically-thickened or largest end from its longitudinal center, there is a hole, F, from its straight under to its upper surface at right angles to its inclined upper side. This hole registers with the enlarged groove D in the step-piece B above, and is provided with a screw, *f*, somewhat smaller in diameter than the hole. The upper end of the screw *f* is provided with a circular lug, G, elongated in the direction of and fitting within the groove D, while the lower part of the screw has a milled nut, *g*, resting in and extending through a lateral slot, H, in the base-piece A.

In operation the screw F is turned up or down to clamp the two triangular pieces together, or to loosen them to permit the step-

piece to be adjusted upon the inclined base-piece over the lug G, as desired.

Upon the upper edge of the side of the base-piece A there are marked various fractional scales, which, together with the heights of each step, (indicated on the side of the upper or triangular adjustable piece B,) enables the operator to measure the minutest difference in height or diameter of any space or opening in which the tool is adapted to be used.

To better adapt my measuring-tool for determining the diameter of key-holes, pipes, and other circular openings, I may slightly modify its construction, as shown in Figs. 6 and 7, by making the steps C and bottom of the base-piece A semicircular in form, so that they will fit within the top and bottom of circular openings. In this construction I find it desirable also to change the position of the means for operating the holding-screw *f*. This is accomplished by extending the screw having an ordinary grooved head, *h*, thereon to near the bottom of the base-piece, which has a countersink therein to receive the head, leaving the outer surface of the base unobstructed. This screw is conveniently operated by a small screw-driver, and by this means the triangular step and base pieces are readily loosened, so as to be adjusted one upon the other, or rigidly secured together in the same way as by the means heretofore described.

In operation, to ascertain the height of a space or opening, the tool, with its upper and lower sections adjusted to register with each other, according to the indicating-marks on its side, is thrust into the opening until the highest step possible has passed under or within the opening, when the thumb-screw is turned, adjusting the step-piece upon the inclined base toward the ear holding the screw, until the space or opening is filled by the tool, when the diameter of the space or opening will be indicated upon the side of the tool, and the clamp-screw tightened to hold the two sections rigidly together, when it can be withdrawn.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. A machinist's measuring-tool consisting of two wedge-shaped sections with their small or thin ends in the same direction, one of the sections being adjustable upon the other, as and for the purpose set forth.

2. A measuring-tool consisting of two wedge-shaped sections, one of the sections having a tongue, and the other a groove fitting over the tongue and adjustable thereon, the two sections being adjustably secured together, with their thin ends in the same direction, as set forth.

3. A measuring-tool consisting of two wedge-shaped sections, one adjustably secured upon the other, with their thin ends in the same direction, the lower or base section having a bearing-ear for an adjusting-screw at the wide end extending above the section, as and for the purpose set forth.

4. The combination, with a measuring-tool consisting of two wedge-shaped sections adjustably secured upon each other, with their thin ends in the same direction, of a slot in the upper section, containing a lug having a screw in the lower section at right angles with its upper inclined surface, and an adjusting-screw ear on the lower section at right angles with and extending above its upper inclined face, as set forth.

5. A measuring-tool consisting of two wedge-shaped sections, one secured upon the other, with their thin ends in the same direction, one of said sections having a series of graduated steps parallel to the plane of the base of the other section and being adjustable thereon, as set forth.

6. The combination, with a tool consisting of two wedge-shaped sections adjustably secured together, with their thin ends in the same direction, of a series of steps on the upper section, with an enlarged contracted groove on its under side containing a screw-threaded ring, and the lower or base section having at its wide end a bearing-ear at right angles to its upper face extending above the section for an adjusting-screw, as set forth.

7. The combination, with a measuring-tool consisting of two wedge-shaped sections, one section having a tongue and the other a groove, the two being adjustably secured together, with their thin ends in the same direction, of a series of graduated steps on one section parallel to the plane of the base of the other section, with an enlarged contracted groove on its under side, the other section having a clamping-screw and bearing ear at right angles to its inclined surface, said ear having an adjusting-screw, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

HILTON HOWARD.

Witnesses:

JAMES CUTHBERT,

HENRY THRASHER.