T. O. MILLS.

Gear Cutting-Attachments to Lathes.

No. 144,214. Patented Nov. 4, 1873.

Fig. 1.

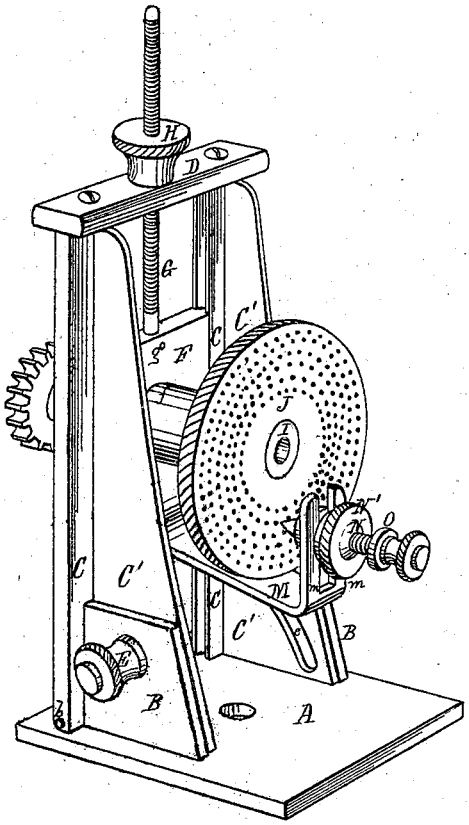
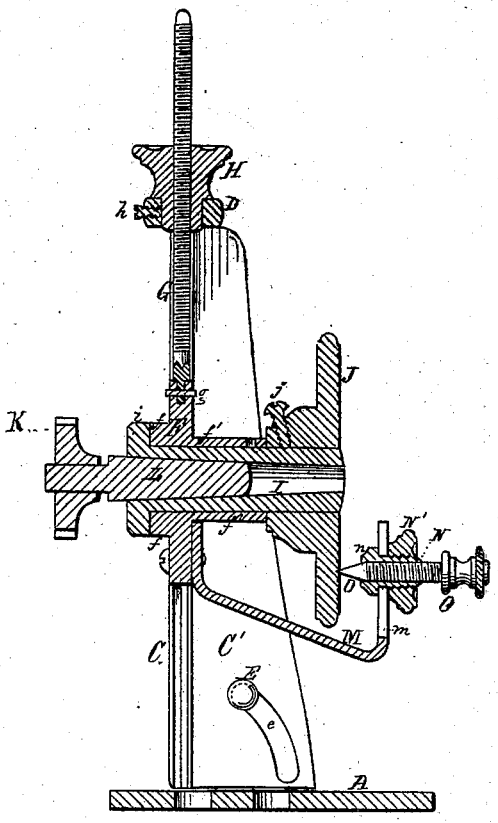


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

THOMAS O. MILLS, OF ROCKFORD, ASSIGNOR OF ONE-HALF HIS RIGHT TO WILLIAM H. MILLS, OF FREEPORT, ILLINOIS.

IMPROVEMENT IN GEAR-CUTTING ATTACHMENTS TO LATHES.

Specification forming part of Letters Patent No. **144,214**, dated November 4, 1873; application filed June 20, 1873.

To all whom it may concern:

Be it known that I, THOMAS O. MILLS, of Rockford, in the county of Winnebago and State of Illinois, have invented a new and useful Improvement in Gear-Cutters; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings and to the letters of reference marked thereon.

Figure 1 is a perspective view of my improved machine, and Fig. 2 represents a vertical longitudinal section through the same.

Similar letters of reference denote corresponding parts in both figures.

My invention relates to a novel construction of machine for holding and properly presenting to the action of the cutter any usual form of external gear, such as spur, bevel or miter, and worm gear, and is adapted to be used upon the tool-rest of an ordinary lathe, as hereinafter described.

In the accompanying drawing, A represents a base-plate, which is designed to be attached to the sliding tool-rest of a lathe by means of a slide-bolt passing up the slot in said rest, used for the tool-post, and through one of the holes *a* in plate A, and secured by a nut. B B are short uprights or flanges formed upon or secured to plate A, one on each side, the forward lower ends of which are each provided with a perforated lug or ear, in which the lower ends of uprights or frame-bars C are pivoted, as at *b*, Fig. 1. The frame-bars or uprights C are united at their upper ends by a cross-bar, D, and are provided on their rear faces with longitudinal ribs or flanges C′, which are expanded in width toward their lower ends, which are located inside of and in close proximity to the fixed uprights or flanges B, as shown. The lower ends of the flanges C′ are each provided with a slot, *e*, curved in the arc of a circle, of which the pivot *b* is the center, and a thumb or set screw, E, passing through the flanges or uprights B, and through the slot *e*, one upon each side, serves to permit the adjustment of the pivoted frame-standards C C, and also to hold them at any desired adjustment. The inner or adjacent faces are provided with vertical ways or grooves, within which a cross-head, F, works, operated by a screw-rod, G, secured at its lower end, at *g*, to the upper edge of said cross-head, and passing up through an adjusting-wheel or thumb-nut, H, which is mounted in a bearing or perforation in the transverse bar D, and by means of which the cross-head F may be adjusted up or down, as desired. A set-screw, *h*, passing through one side of the cross-bar D, and entering a groove in the shank or hub of the wheel or nut H, or a collar secured on the lower extended end of said shank underneath the cross-bar D, will serve to hold the hand-wheel H in its place, and insure a positive movement of the rod G and cross-head F in either direction, according to the direction of rotation given to said hand-wheel or nut H. The cross-head or sliding box F is provided with a central longitudinal hub or sleeve *f f*, in which is mounted a hollow mandrel, I, provided at one end with an enlarged hub or collar, *i*, and adapted, at its opposite end, to receive the index plate or disk, J, secured thereto by a set-screw, *j*, in such manner that the hub *i* abuts against the sleeve *f* of cross-head F upon one side, and the hub of disk J against the sleeve *f′* upon the opposite face of said cross-head F, thereby preventing end movement of the mandrel I. The perforation through the index-mandrel is made tapering in form from front to rear, and a gear-mandrel, L, is made with a corresponding taper, and fits snugly within the index-mandrel I, as shown, and is held in place therein by friction. K represents a spur-gear in place on the outer end or shank of the mandrel L. M is a bent arm or bracket formed upon or secured to the rear face of cross-head F, and extending underneath the index-disk J, where its outer or rear end is bent upward, and forked at *m* to receive a nut, N, which is grooved upon its opposite sides to fit between the arms of the fork *m*, and to prevent the nut N from turning, and is provided, at its forward end, with a hub or collar, *n*, and at its rear or shank end with an external screw-thread and a thumb or jam nut, N′, between which and collar *n* the arms of fork *m* are clamped, thereby preventing end movement of nut N. A pointed thumb-screw, O, passes through the nut N, and the point enters one of a series of indentations or depressions in the index-plate J, as

shown, for holding said plate. The index plate or disk J is provided with several concentric circles of these indentations or marks, graduated to suit the different size, number, or pitch of gears to be cut, and any one of these may be used by adjusting the point O and nut N up or down in fork *m*.

The operation is as follows, viz: The machine is secured to the tool-rest or carriage, as above explained. The blank to be cut is driven on the shank of the tapering mandrel L, which, in turn, is placed in the hollow index-mandrel I, and the frame C C adjusted and set, by means of the set-screws E, in the required position, either upright or at any desired angle, according to the character of gear to be cut. The cutter or cutter-disk, which may be of any usual form and construction, is secured to a second mandrel made to rotate between the centers of the lathe, and the gear-blank is brought or fed to this rapidly-rotating cutter by means of the feed-screw which operates the tool-carriage of the lathe. A groove or nick is cut in the blank, after which the carriage is withdrawn, the index-mandrel released from point O, turned the required distance, the point O again screwed up, and the operation above described repeated until the gear is completed, when the gear-mandrel is released from the hollow index-mandrel by means of a punch, the gear removed, and a new blank substituted in its place.

Worm-gears may be cut by turning the base-plate quartering to the right or left upon the vertical pivot-bolt which connects it with the tool-rest, thereby causing the grooves to be cut obliquely across the face or periphery of the blank. The other adjustments will be understood without further description.

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

1. The hollow index-mandrel I and tapering gear-mandrel L, in combination with the sliding cross-head F, substantially as and for the purposes described.

2. The bent arm M, secured to and moving with the cross-head F, in combination with the index-plate J and point O, substantially as described.

3. The index point or screw O, in combination with the screw or nut N, jamb-nut N′, and fork *m*, substantially as described.

This specification signed and witnessed this 28th day of May, 1873.

THOMAS O. MILLS.

Witnesses:
G. W. FORD,
W. H. BECKER.