W. P. HOPKINS.

Gear-Cutting Attachments for Lathes.

No. 156,705. Patented Nov. 10, 1874.

Fig 1.

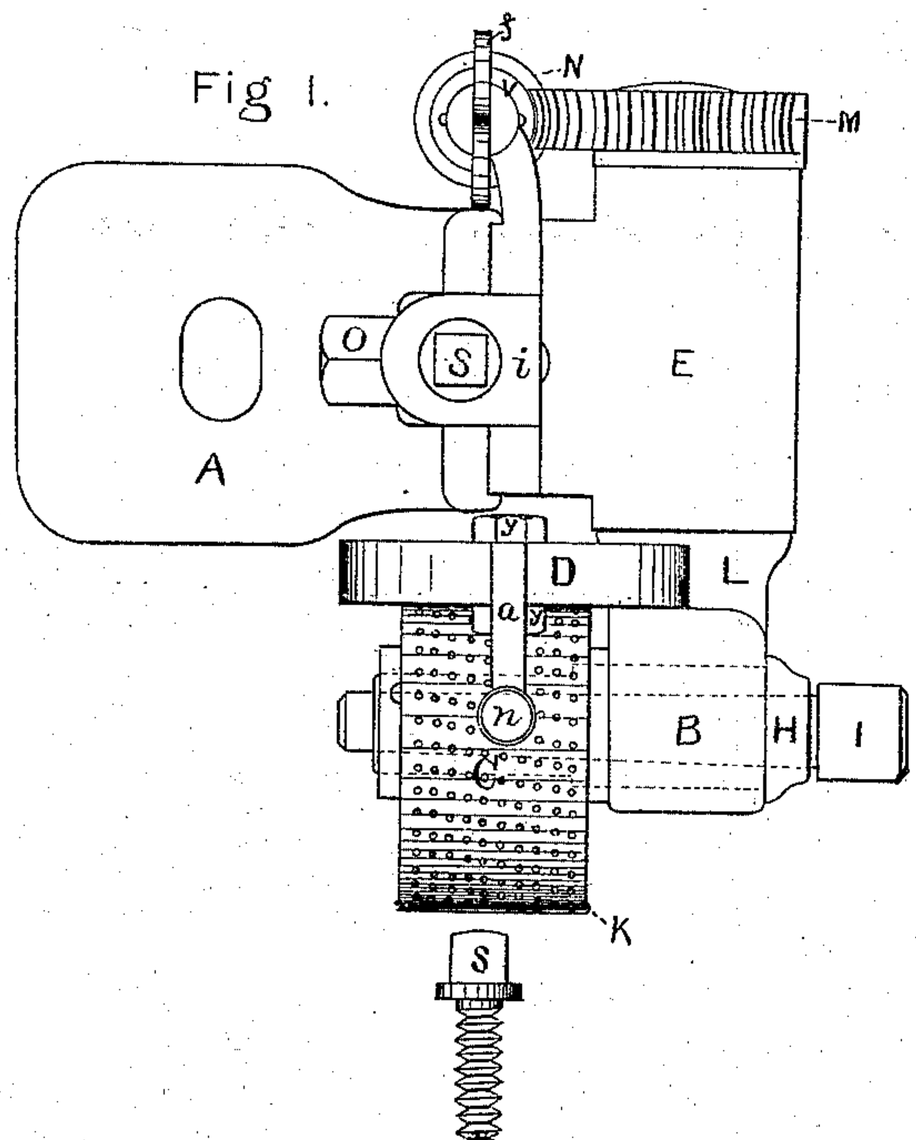


Fig 2.

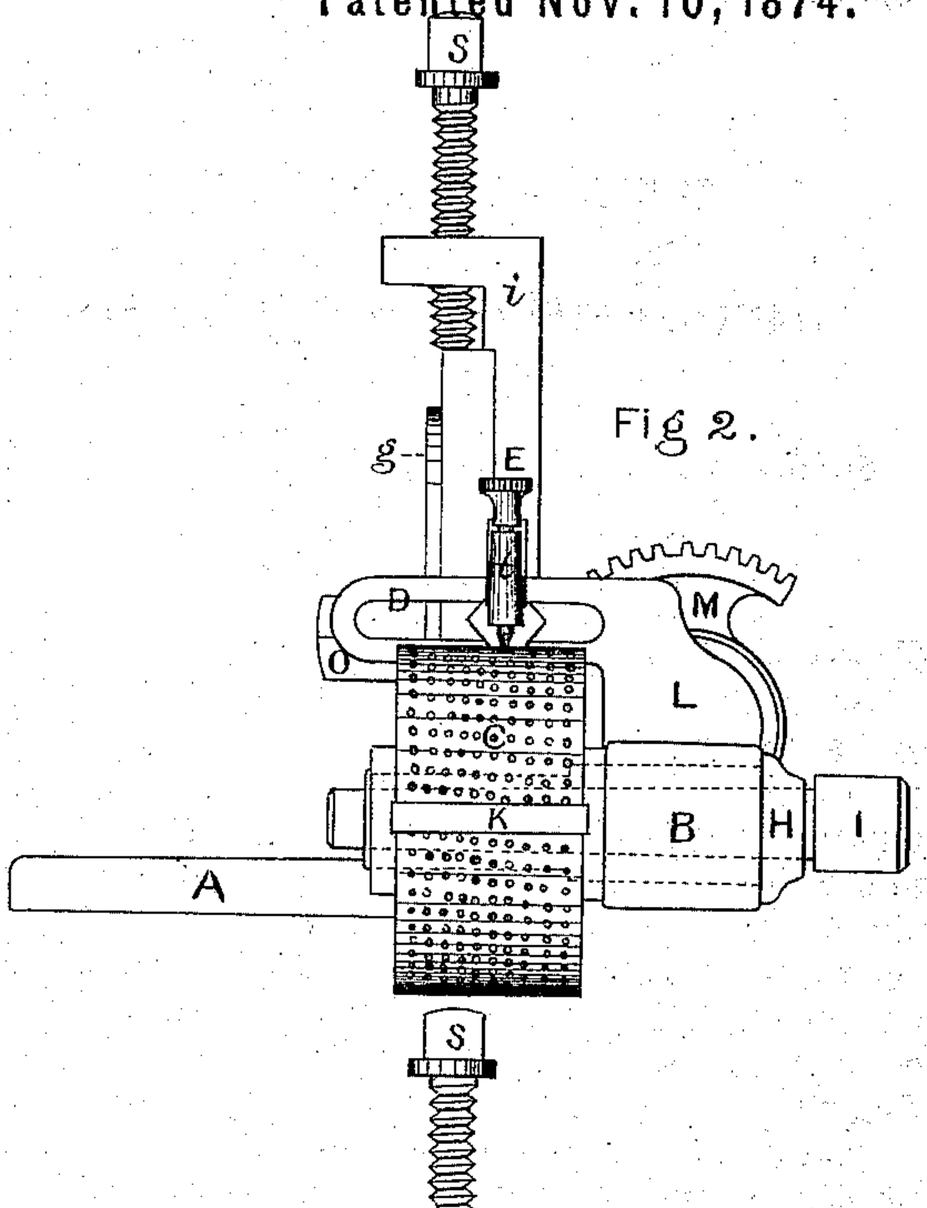


Fig 3.

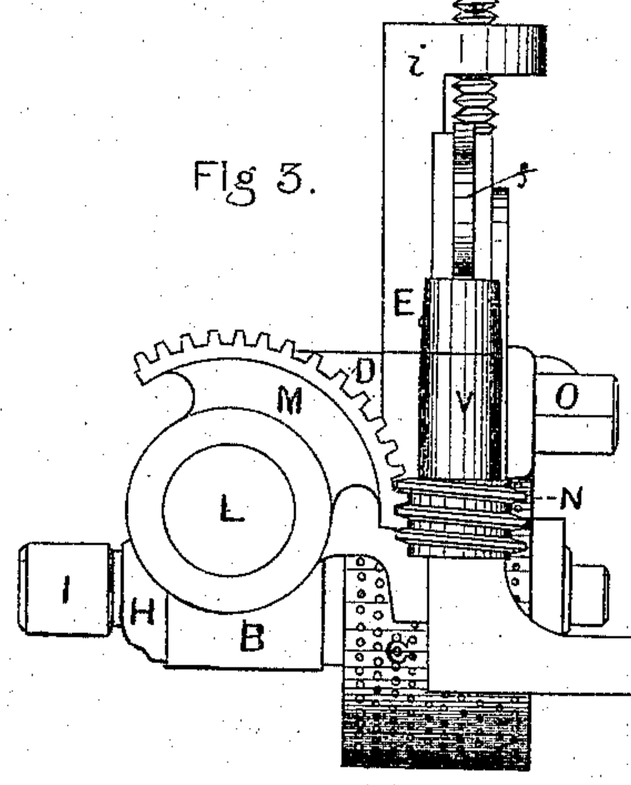


Fig 5.

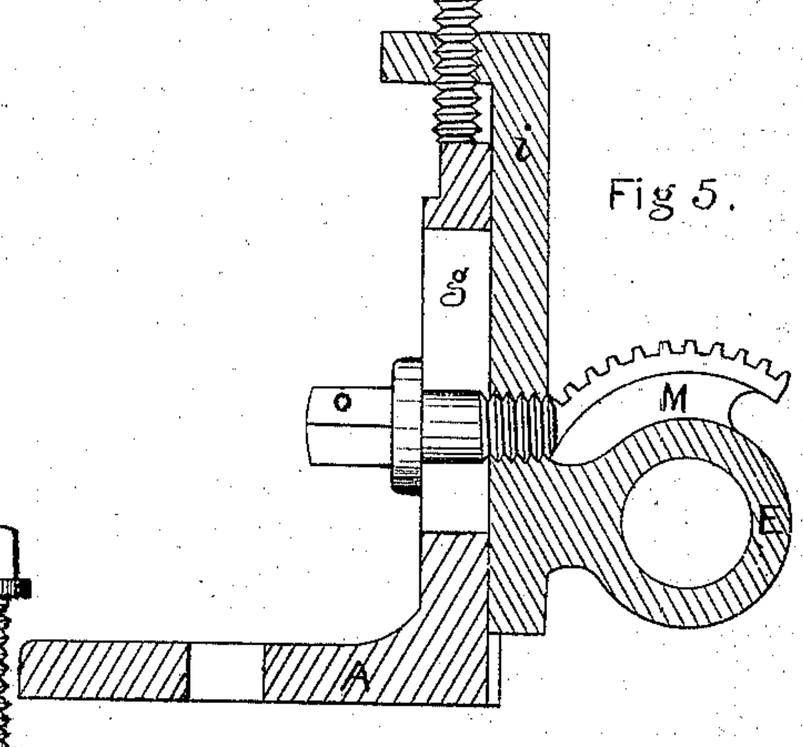
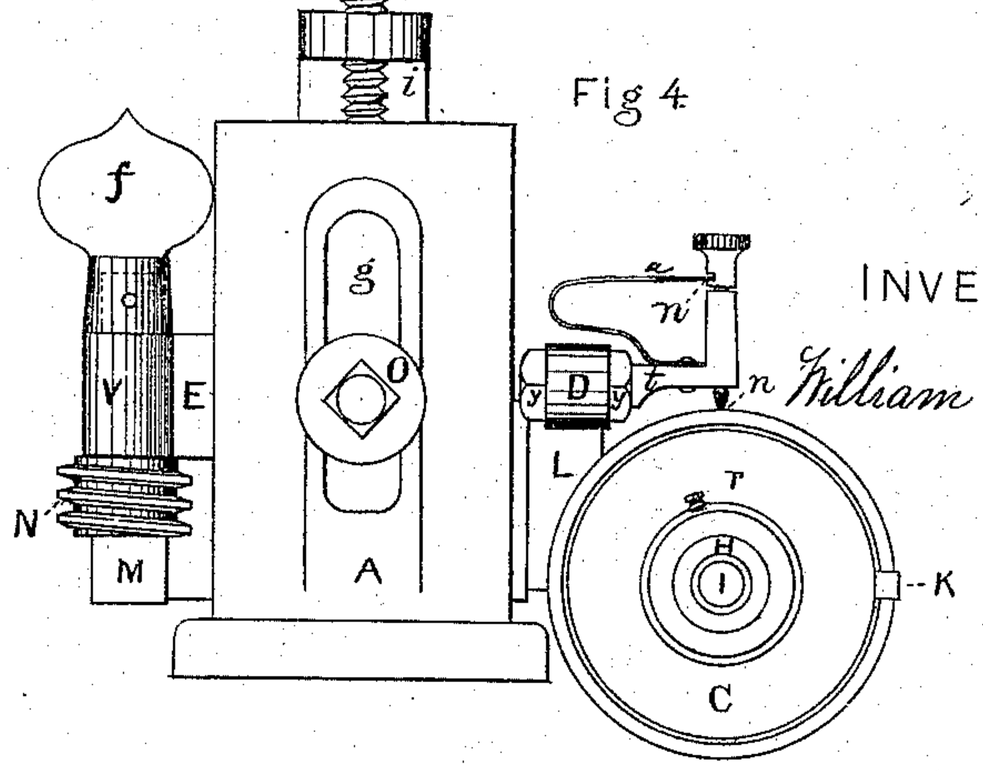


Fig 4



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WILLIAM P. HOPKINS, OF LAWRENCE, MASSACHUSETTS.

IMPROVEMENT IN GEAR-CUTTING ATTACHMENTS FOR LATHES.

Specification forming part of Letters Patent No. **156,705**, dated November 10, 1874; application filed May 21, 1874.

To all whom it may concern:

Be it known that I, WILLIAM P. HOPKINS, of Lawrence, in the county of Essex and State of Massachusetts, have invented a new and useful Improvement in Gear-Cutting Attachments for Lathes; and I do hereby declare the following to be a full, clear, and exact description of my invention, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification.

The object of this invention is to provide an improved and cheap gear-cutting attachment to be used in a lathe. It is attached to the lathe tool-carriage, as the tool-post block is, and is moved backward and forward with the tool-carriage of the lathe by the same screw which is used to feed the cutting-tool, and the work to be operated upon is fed under a revolving cutter turning upon the centers of the lathe.

The peculiar construction of my gear-cutter provides for various adjustments for properly presenting for the action of the cutter external surfaces of any usual form of which gears are made—viz., spur, bevel, skew, and worm gears. All the adjustments are very rapidly and easily accomplished to all the positions which are common to large gear-cutters.

Figure 1 is a top view of my gear-cutting attachment. Fig. 2 is a side elevation, (right.) Fig. 3 is a side elevation, (left.) Fig. 4 is a rear elevation; and Fig. 5 is a longitudinal section.

Similar letters of reference indicate corresponding parts.

All the parts are made of metal.

A marks the angle-iron of my gear-cutting device; B, the arbor-box; C, the index-pulley; D, the slotted guide; E, the pivot-shaft box; H, the hollow arbor-spindle; I, the arbor; K, the side clasp; L, the pivot-shaft; M, the toothed quadrant; N, the screw-worm.

The foot part of the angle-iron A is bolted to the tool-carriage of the lathe. The outside of the upright portion is slightly grooved, to receive one side of the pivot-shaft box E, fitted to slide therein. A slot, *g*, through the center of the upright part of the angle-iron A, permits the bolt *o* to pass through it loosely, and screw into the pivot-shaft box E, and the two slide up and down together, and also hold the pivot-shaft box E and the angle-iron A firmly together. A small arm, *i*, extends upward from the pivot-shaft box E and over the top of the angle-iron A. The part *i* receives the screw *s*, which regulates the adjustment of the pivot-shaft box E upon the side of the angle-iron A. The pivot-shaft L is nicely fitted to the box E, and carries on one end the arbor-box B and the slotted guide D, both cast thereon. The arbor-box B is made to hang down lower than the shaft part, and the slotted guide D is raised up about as high, or little higher, than the top of the index-pulley C. The hole in the arbor-box B and the slotted guide D are parallel with each other when the pivot-shaft L is turned in any position. On the other end of the pivot-shaft L, which projects through the box E, is rigidly fastened a toothed quadrant, M, so that both must turn together. The worm-screw N turns in the bearing *v*, which is a part of the pivot-shaft box E, and the threads of the worm N mesh in between the teeth of the quadrant M, and by turning the worm N by the handle *f* motion is imparted to the pivot-shaft L.

The work to be operated upon is fixed on the large end of the tapering arbor I, which fits in the hollow spindle H, turning free in box B, and passes through and has secured to it the index-pulley C, fastened by the set-screw *r*, so that both must turn together.

When the work on the arbor I needs to be rotated to cut the next groove or space, the index-point *n*, fitted to slide up and down in the hole in the end of the sliding a djustable arm *t*, carrying the spring *a*, is raised out of the hole in the index-pulley C, which can then be turned as desired, carrying with it the arbor-spindle and its attachments. When it has been turned as desired, the spring *a*, which is riveted to the arm *t*, and bent over down upon the shoulder of the upper part of the index-point *n*, pushes the lower end of the point *n* into the next hole in the index-pulley C, and secures the pulley in that position until taken out for another change. A series of rows composed of different numbers of holes extending around the pulley C provides various graduations, and, to enable the point *n* to be used in

either row, the end of the sliding adjustable arm *t*, which passes loosely through the slotted guide D, is threaded to receive two screw-nuts, *y y*, one on each side of the slotted guide D. These nuts *y y* can be tightened after the arm *t* and point *n* are placed at the desired row of holes, to hold them there. These nuts *y y* also provide a fractional adjustment of any of the graduations on the pulley C. The number of holes in each row around the pulley C is marked upon the face of the slide-clasp K, directly over the row of holes the number represents. This slide-clasp K slides entirely around the circumference of the index-pulley C, and can be used to mark the number of holes passed under the index-point *n*, in this case serving the purpose of the spacing-fork on common gear-cutting machines.

Skew and worm gears can be cut by turning the base of the angle-iron A obliquely upon the tool-carriage, thereby causing the groove to be cut obliquely across the face or periphery of the blank or disk.

The pivot-shaft L is useful in obtaining the proper inclination of the arbor-box B, for cutting bevel-gears. The worm N and the toothed quadrant M control the movement of the pivot-shaft L.

One advantage gained by placing the arbor-box B low down on the end of the pivot-shaft L is, that a larger disk can be placed on the arbor I, and fed under the revolving cutter. Another advantage is, that the pivot-shaft L is brought nearer opposite the place where the work is being operated upon; consequently the tendency of the cutter, in acting upon the work, to turn or swing it out of its way, is less than if the arbor-box B were in line with the pivot-shaft L.

Having described my invention, I desire to secure by Letters Patent these parts, which I claim as new and my invention—

1. The combination and arrangement, as herein shown and described, of the pivot-shaft L, provided with arbor-box B and slotted guide D, the hollow arbor-spindle H, index C, adjustable arm *t*, spring *a*, and index-point *n*, all designed to operate in the manner and for the purpose specified.

2. In combination with the frames A E and the bolts O S, constructed substantially as described, the worm N, quadrant M, pivot-shaft L, having arm D and arbor-box B, hollow arbor-spindle H, index C, adjustable arm *t*, spring *a*, and pointer *n*, arranged to operate as and for the purpose set forth.

WILLIAM P. HOPKINS.

Witnesses:

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AMOS P. LITTLE.