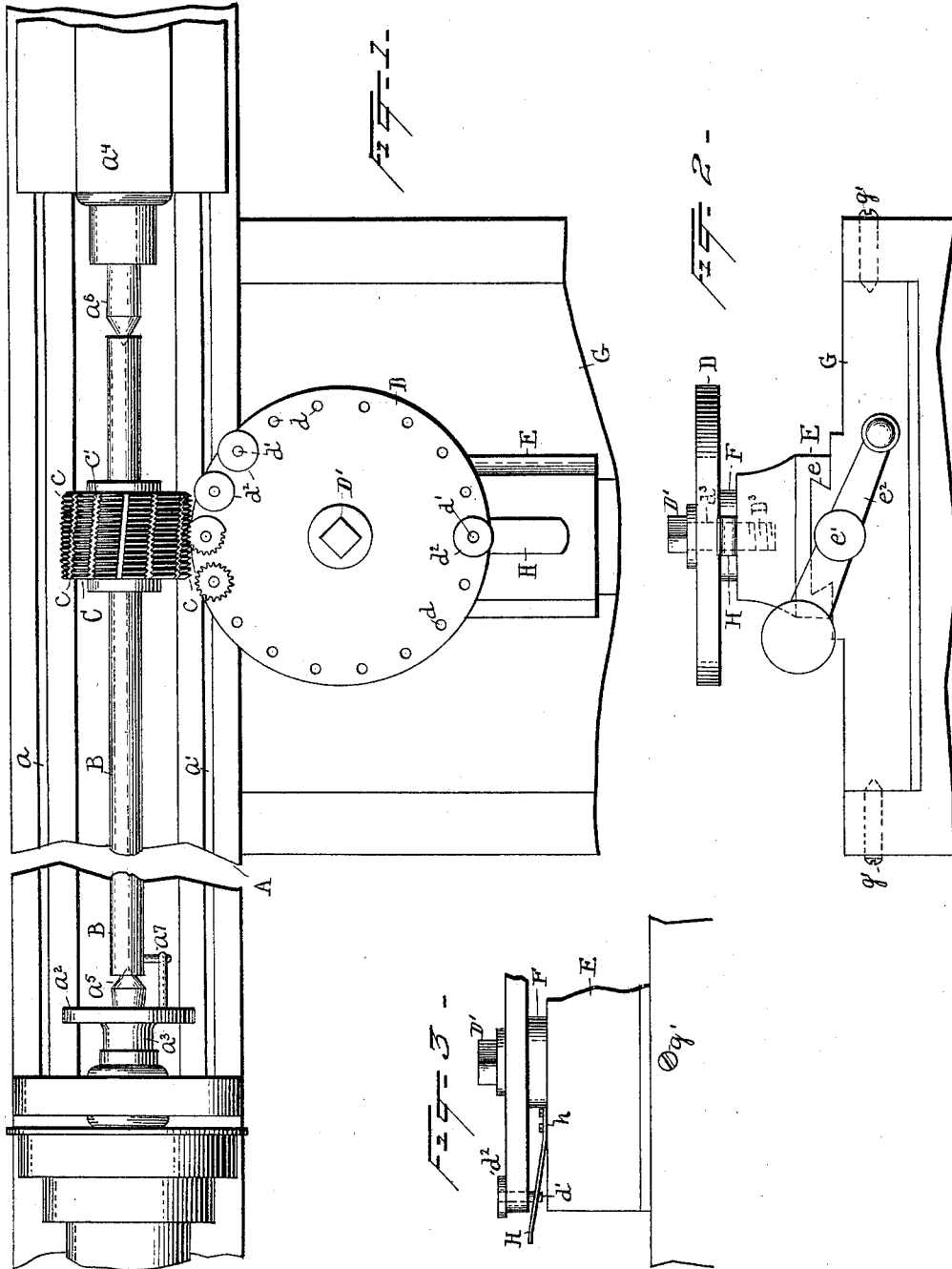


(No Model.)

F. J. MATHEIN.
GEAR CUTTER.

No. 600,544.

Patented Mar. 15, 1898.



Witnesses
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GEAR-CUTTER.

SPECIFICATION forming part of Letters Patent No. 600,544, dated March 15, 1898.

Application filed December 1, 1896. Serial No. 614,073. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. MATHEIN, a citizen of the United States, residing at New Haven, in the county of New Haven and State of Connecticut, have invented a certain new and useful Improvement in Gear-Cutters, of which the following is a specification.

The object of this invention is to provide efficient means for rapidly and economically cutting gears, pinions, and similar articles.

A further object is to so construct and arrange the apparatus as to permit the utilization of lathe mechanism, such as is commonly in use.

A further object is to provide for the cutting of gears or pinions of various kinds, such as spur-gears and beveled gears, on the same machine.

In carrying out the invention I employ a lathe-bed having a head-stock with live center and a back support, tail-stock, or other device adjustable upon said bed and capable of affording a bearing for one end of an arbor, the other end of which is mounted on and driven by said head-stock. Keyed or otherwise secured to the arbor is a revoluble cutter-head, by means of which the teeth in the peripheries of the gear or pinion blanks are formed. In juxtaposition to the cutter-head I employ a revoluble work-carrier upon which are mounted the blanks to be cut. This carrier is not only revoluble, so as to present the blanks successively to the action of the cutter-head, but is vertically adjustable in order that the blanks may be so presented in a plane coincident with the diameter of the revoluble cutter-head (to form spur gears or pinions) or in a plane above or below such diameter, (to form beveled gears or pinions.) Means are also provided whereby the work-carrier may be adjusted toward and from the cutter-head. After one blank has been cut the carrier is given a partial revolution, so as to present the next blank to the action of the cutter.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of a gear-cutting machine embodying my invention. Fig. 2 is an end view of the work-carrier and its supporting and adjusting mechanism, and Fig. 3 is a detail view illustrating means for

locking the carrier in position while a blank is being cut.

Referring to the drawings, in which similar letters of reference denote corresponding parts, A designates a lathe-bed having the grooved arms a , the head-stock a^2 , power-shaft a^3 , and tail-stock a^4 , adjustable toward and from the head-stock upon the grooved arms a .

B designates an arbor. One end of this is mounted upon the live center a^5 of the head-stock a^2 , and the other end is mounted upon the pivot a^6 of the back support a^4 . Motion is imparted to this arbor by means of the head-stock a^2 through the lathe-dog a^7 .

C designates the cutter-head. This is keyed or otherwise secured to the arbor B, so as to turn therewith. The periphery of the cutter is provided with circumferential threads c and with channels c' .

D designates the work-carrier. This is here shown in the form of a disk provided near its periphery with a series of perforations d , through which pass pins d' , supporting the blanks d^2 . The carrier is mounted upon the sliding support E, being secured thereto in the present instance by means of the screw D', the upper portion d^3 of which (not threaded) acts as the pivot of the carrier D. Between the carrier D and the support E is a washer F. In practical use each of these varying in thickness, so as to locate the carrier D above or below a plane coincident with the diameter of the cutter-head C.

The under side of the sliding support E is rabbeted, as shown at e , and with this rabbet engages the projection g upon the upper surface of the slide-rest G. The movement of the support E relatively to the slide-rest G is regulated by the screw e' , having the handle e^2 .

I have shown the slide-rest G mounted upon pivots g' to permit of fine adjustment of the carrier D and the blanks carried thereby relatively to the cutter-head, so that the blanks may be presented to the cutter-head in any plane perpendicular to the plane of revolution of the cutter-head. This adjusting device enables the cutting of any sort of bevel-teeth on the blanks and enables a much finer and more convenient adjustment of the

blanks to the cutter-head than would be permitted by merely raising and lowering the work-carrier D and not tilting it with reference to the cutter-head. I may, if desired, provide such rest with means (not shown) for locking it in any position in which it may be placed.

H designates a flat spring secured at one end *h* to the upper surface of the sliding support E, its other end projecting outwardly and upwardly, as shown in Fig. 3. This spring is provided with a perforation coinciding with one of the series of perforations *d* in the work-carrier D, so that one of the blank-holding pins *d'* may pass through one of said perforations *d* and engage with the perforation in said spring in order to lock the carrier D in position while a blank is being cut.

The operation of the machine above described is as follows: Revoluble movement is transmitted to the cutter-head C by means of the live center of the head and power-shaft of the lathe. Each of the perforations *d* in the work-carrier D is supplied with a pin *d'*, holding a blank *d²*, and one of said pins is permitted to enter the perforation in the spring H to lock the carrier against accidental revoluble movement. If it is desired to form these blanks into spur gears or pinions, the carrier D is adjusted upon the support E at such a height that the blanks are in the same plane as the diameter of the cutter-head. The carrier-support E is then adjusted toward the cutter-head by means of the screw *e'* and handle *e²* until the periphery of one of the blanks comes into contact with the threads on the exterior of the cutter-head C. The blank is pressed against the former until the proper depth of cut is reached. The threads upon the cutter-head then provide the blank with teeth extending continuously around its periphery, after which the locking-pin is removed from engagement with the perforation in the spring H and the carrier given a partial revolution, so as to present another blank to the action of the cutter-head.

If it is desired to cut beveled gears or pinions, the carrier is so adjusted as that the blanks will be presented to the cutter in a plane below the diameter of said cutter, so that the line of thrust of the cutting-threads will be at the proper angle relatively to the horizontal plane of the blanks, or by means of the pivot *g'* the slide-rest G may be tilted so as to present the blanks upon the work-carrier at a proper angle to the cutter-head, and thus form the beveled teeth of the blanks.

What I claim is—

1. In a machine for cutting gears, the combination of a revoluble cutter-head with means for successively feeding a series of blanks

thereto at any angle in a plane perpendicular to the plane of revolution of the cutter-head substantially as set forth.

2. In a machine for cutting gears, the combination of the revoluble cutter-head with a work-carrier adjustably mounted so as to deliver a series of blanks at any angle in a plane, perpendicular to the plane of revolution of said cutter-head, and means for moving said work-carrier and thereby feeding the blanks to said cutter-head, substantially as set forth.

3. In a machine for cutting gears, the combination of a revoluble cutter-head with a revoluble work-carrier, means for mounting said work-carrier so as to present the work carried thereon at any desired angle in a plane perpendicular to the revolution of the cutter-head, and means for revolving said carrier, substantially as set forth.

4. In a machine for cutting spur or beveled gears, the combination with a revoluble cutter-head adapted to cut teeth in the entire periphery of circular blanks, of a moving work-carrier supporting a series of revoluble blanks and presenting them successively to said cutter-head, substantially as set forth.

5. In a machine for cutting gears, the combination with a revoluble cutter adapted to cut teeth in the entire periphery of circular blanks, of a moving work-carrier supporting a series of revoluble blanks, means for feeding the blanks successively to the cutter, and means for locking the said carrier during the revolution of the blanks, substantially as set forth.

6. In an attachment for lathes for cutting gears, the combination of a revoluble cutter carried between the head-stock and tail-stock of the lathe with a movable work-carrier attached to the frame of the lathe and adapted to support a series of blanks, and means for moving said carrier and thereby feeding said blanks successively to said cutter, substantially as set forth.

7. In an attachment for lathes for cutting gears, the combination with a revoluble cutter carried between the head-stock and tail-stock of the lathe of a work-carrier and series of blanks thereon, said work-carrier being adapted to feed the blanks at any desired angle in a plane perpendicular to the revolution of the cutter, and means for moving said carrier to feed the blanks, substantially as set forth.

This specification signed and witnessed this 24th day of November, 1896.

FRANK J. MATHEIN.

Witnesses:

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