

(No Model.)

A. C. DALZELL.

APPARATUS FOR MAKING PINIONS.

No. 329,286.

Patented Oct. 27, 1885.

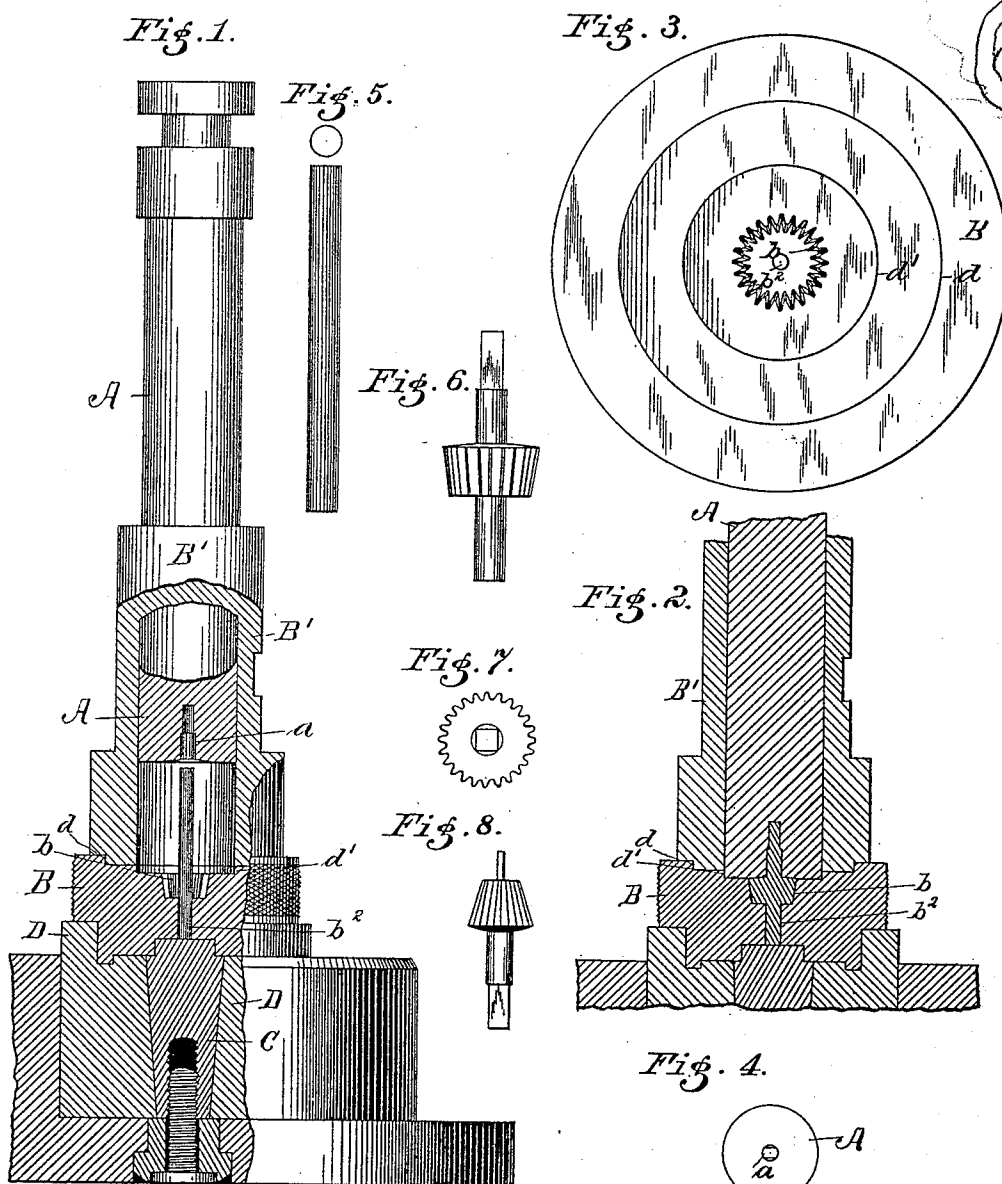


Fig. 1.

Fig. 5.

Fig. 3.

Fig. 6.

Fig. 2.

Fig. 7.

Fig. 8.

Fig. 4.

Witnesses

R. A. Brandon,
G. C. Bowler

Inventor

Allan Cameron Dalzell
By, W. E. Whitney atty.

UNITED STATES PATENT OFFICE.

ALLAN C. DALZELL, OF NEWPORT, KENTUCKY.

APPARATUS FOR MAKING PINIONS.

SPECIFICATION forming part of Letters Patent No. 329,286, dated October 27, 1885.

Application filed April 27, 1885. Serial No. 163,620. (No model.)

To all whom it may concern:

Be it known that I, ALLAN C. DALZELL, of the city of Newport, county of Campbell, and State of Kentucky, have invented certain new and useful Improvements in Apparatus for Making Pinions, of which the following is a specification.

This invention relates to the manufacture of pinions from metallic blanks, the object of the invention being, primarily, to upset a solid metallic blank to form a pinion and staff integral with one another, and form such pinion complete in one operation and without waste of material.

In the manufacture of small pinions for watches, &c., as heretofore practiced, much difficulty has been experienced in securing a uniform pitch and size of teeth, so that the pinions would properly mesh with one another, and much waste of material and time was consequent to the method of forming the said pinion and staff, the pinions being formed from what is known as "pinion-wire," a continuous wire drawn to the desired diameter of the pinion, with teeth or ribs formed upon its periphery for the entire length, the wire being usually drawn in lengths of twenty-four inches. In forming the pinion and staff from pinion-wire the wire was first cut into the desired lengths to form pinions, and such short pieces were subsequently turned off at either end to the diameter desired for the staff, a portion of the wire being left to form the pinion proper, thus requiring three operations to form the pinion—viz., first, drawing the plain wire to the desired length, with longitudinal ribs thereon; second, cutting the wire so formed into short lengths; and, third, turning the metal of such pieces off at either end to proper diameters to form the staff. In forming beveled pinions from pinion-wire the wire must be drawn tapered from end to end, and consequently two pinions cut from the same wire could not be of uniform diameter, and therefore it was difficult to select pinions which would mesh properly.

By my improved method of forming pinions I not only obviate waste of material, but form pinions of exact, practically, proportions, and in less time than by the old method, con-

sequently cheapening the cost of manufacture and increasing the utility of the pinions, as will be hereinafter more clearly pointed out.

My invention consists in certain apparatus to form pinions from metallic blanks, substantially as hereinafter described.

Figure 1 represents in side elevation, partially in longitudinal section, a set of dies for forming watch or other pinions from solid metallic blanks, said figure showing the blank in position to be struck, the guiding-collar down and upper die elevated; Fig. 2, a partial longitudinal section of the dies, showing the blank as operated upon and formed into a pinion; Fig. 3, a plan view of the lower die enlarged; Fig. 4, an under side view of the upper die; Fig. 5, a plan and side elevation of a metallic blank from which the pinion is formed; Figs. 6 and 7, a side and plan view, respectively, of one form of bevel-pinion formed from a metallic blank, and Fig. 8 a side view of another form of beveled pinion.

This invention is virtually a continuation or modification of the invention described in an application for improvements in the method of and apparatus for making watch-crown cores, filed by me in the United States Patent Office April, 1885, to which reference may be had, the general construction of the apparatus therein described being maintained in this invention, with the exception that the matrix of the upper and lower dies are different, as will be described. The dies and auxiliaries for forming a pinion from a solid metallic blank are used with a double-acting press of any ordinary or improved pattern. The dies consist of the upper die or half, A, and the lower die or half, B. The upper die, A, works in and is guided in its movement by a collar, B', the said die and its collar being connected to the die holders or plungers of the press in the usual manner. The upper die, A, is provided with a matrix, *a*, opening into it at its lower end, said matrix being of a shape to correspond to the upper part of the staff of a pinion to be formed, it being herein shown as round at its lower end and square at its upper end. This matrix may, however, be of different shapes to form staffs of different styles. All the dies will be

constructed of hardened or chilled steel, as is customary with dies having to sustain any considerable pressure. The lower die, B, is seated in a steel die-box, D, and is provided at its upper central face with a matrix, *b*, corresponding in shape to the shape of the pinion to be formed, said matrix being herein shown as adapted to form a beveled pinion, it having a beveled toothed face, and having a central downwardly-projecting opening, *b*², communicating with said matrix, which opening is of a length and shape corresponding to the length and shape of the lower part of the pinion-staff to be formed.

By reference to the drawings it will be noticed that the central opening, *b*², extends from the matrix *b* entirely through the die B, a solid-steel base-piece, C, seated in the die-box D, and extending into the die B, terminating the opening *b*², and determining the length of staff to be formed therein. This base-piece C might be done away with, if desired. A projection on the die-box D might be provided to serve the same purpose. The object of extending the opening *b*² entirely through the die B, which die is removable from its die-box, is to provide a means of access thereto to drive the pinion out of the die should it in any manner become wedged or fastened therein. The lower die, B, is provided with an annulus or downwardly-projecting flange which has its bearings in an annular groove formed in the face of the die-box D. The upper face of the lower die is "stepped" or rabbeted, as shown at *d d'*, to form guiding-faces for the collar B' and the upper die, A. The bearings thus afforded by the sides of the rabbets *d d'* not only align the collar B' with relation to the lower die, but insure accuracy of movement of the upper die, A, when operating upon a blank. With the aid of such guides—viz., rabbets *d d'*—the upper die, A, is bound to maintain the same relation with the lower die, B, when upsetting a blank to form a pinion, thereby obviating the possibility of misshaping a blank by striking it out of line.

The operation of forming a pinion from a metallic blank is as follows: The blank, of

suitable material—such as softened or annealed steel—is placed vertically in the central opening, *b*², of the lower die B, which opening corresponds in diameter to the diameter of the blank and supports the same in vertical position. The upper die, A, and sleeve or collar B' are then allowed to descend, the collar contacting with the lower die before the upper die strikes the metallic blank, the collar entering the rabbeted portion *d* of the lower die, which holds said die from lateral movement, after which the die A strikes the upper end of the blank, upsetting the same into the pinion-shaped matrix of the lower die, and filling the staff-forming openings in the upper and lower dies, thus forming the blank to the shape of the upper and lower matrix of the dies and shaping the pinion.

Instead of beveling the matrix of the lower die, as shown in the drawings, its inner face might be straight to form straight pinions.

The staff-forming openings may be of various configuration for various styles of staffs.

Inasmuch as the method of making pinions herein described may constitute a patentable invention, I would reserve the right to make such method the subject-matter of a separate application.

I claim—

1. In an apparatus for forming pinions from solid metallic blanks, a lower die having a pinion-shaped matrix, and an upper die having a staff-forming matrix to press the metal blank and upset the same to form a pinion, substantially as described.

2. The combination, in an apparatus for making pinions from solid metallic blanks, of the die A, having an elongated staff-forming matrix, *a*, and the die B, having the pinion-shaped matrix *b*, and staff-forming central opening, *b*², constructed and operating substantially as described.

In witness whereof I have hereunto set my hand and seal, at Newport, Kentucky, this 22d day of April, A. D. 1885.

ALLAN C. DALZELL, [L. S.]

In presence of—

EDWARD BEESCH,
JOSEPH BECKER, Jr.