(No Model.) 2 Sheets—Sheet 1.

W. N. WEEDEN.

MEANS FOR MAKING PINIONS FOR CLOCKS AND WATCHES.

No. 387,470. Patented Aug. 7, 1888.

Fig. 1.

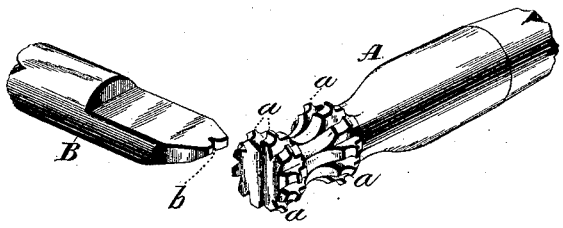


Fig. 2.

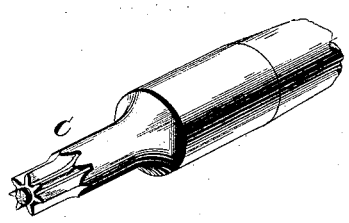


Fig. 3.

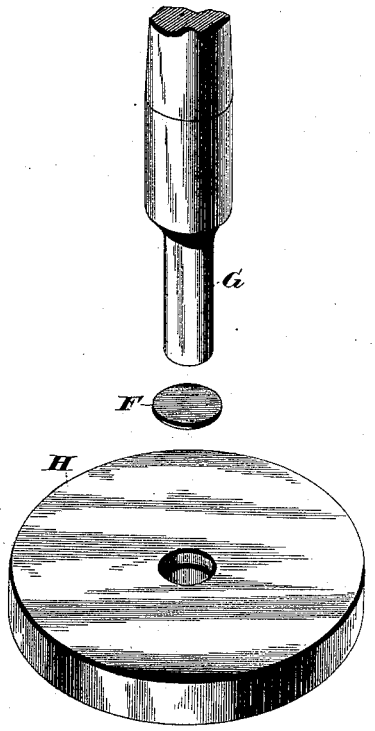
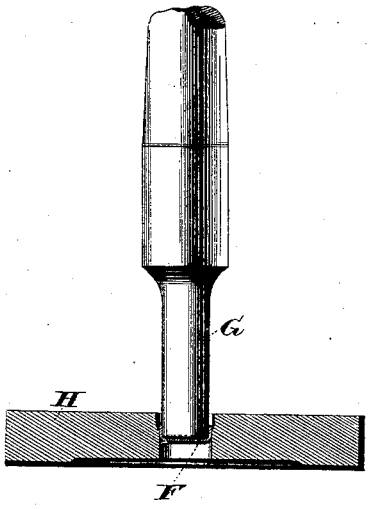


Fig. 4.



Witnesses.
Chas. J. Williamson.
Jas. E. Hutchinson.

Inventor.
Wm. N. Weeden, by
Prindle and Russell, his Attys

(No Model.) 2 Sheets—Sheet 2.

W. N. WEEDEN.

MEANS FOR MAKING PINIONS FOR CLOCKS AND WATCHES.

No. 387,470. Patented Aug. 7, 1888.

Fig. 5.

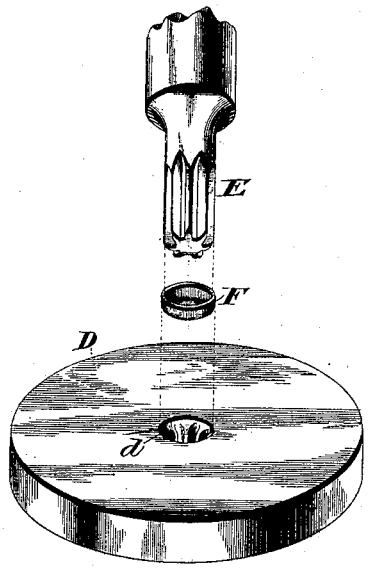


Fig. 6.

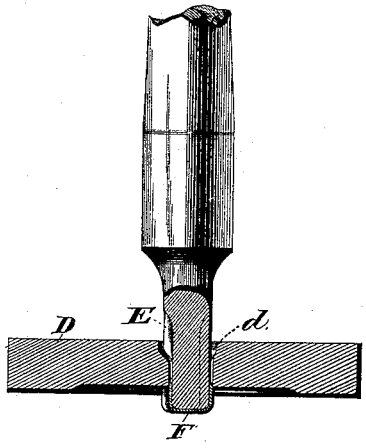


Fig. 7.

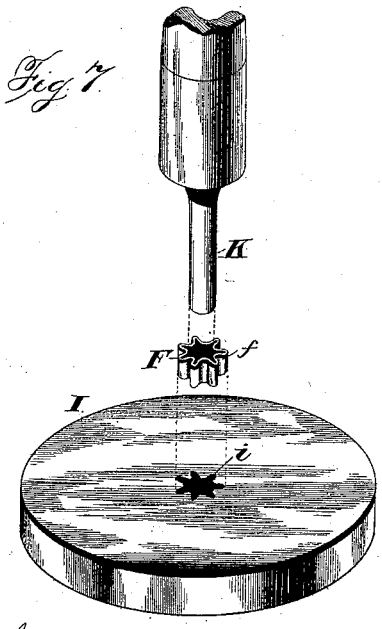


Fig. 9.

Fig. 10.

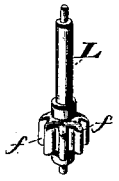
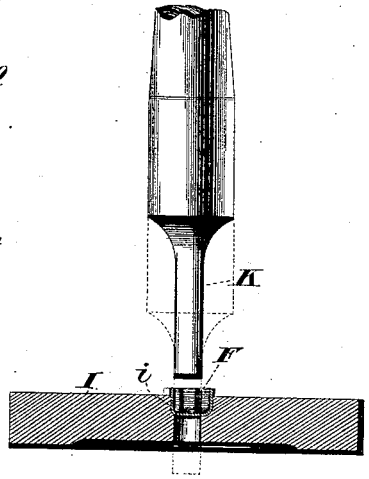


Fig. 8.



Witnesses.
Chas. J. Williamson.
Jas. E. Hutchinson.

Inventor.
Wm. N. Weeden, by
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UNITED STATES PATENT OFFICE.

WILLIAM N. WEEDEN, OF NEW BEDFORD, MASSACHUSETTS, ASSIGNOR TO THE WEEDEN MANUFACTURING COMPANY, OF SAME PLACE.

MEANS FOR MAKING PINIONS FOR CLOCKS AND WATCHES.

SPECIFICATION forming part of Letters Patent No. 387,470, dated August 7, 1888.

Application filed September 2, 1887. Serial No. 248,602. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM N. WEEDEN, of New Bedford, in the county of Bristol, and in the State of Massachusetts, have invented certain new and useful Improvements in Means for Constructing Pinions for Clocks, Watches, &c.; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which—

Figure 1 is a perspective view of a mill and a lathe-tool which is used for giving shape to the cutting portions of the same. Fig. 2 is a like view of a drift as cut by said mill. Fig. 3 is a perspective view of a preliminary drawing-die and punch, and a blank for use with the same. Fig. 4 is a central section of said die and a side elevation of said punch at the instant when they have completed their action upon the blank. Fig. 5 is a perspective view of a finishing drawing-die and punch and a cupped blank. Fig. 6 is a central section of said die and a side elevation of said punch when combined and operating upon said blank. Fig. 7 is a perspective view of the drawn pinion-blank and of the punch and die used for forming an opening in the closed end of the same. Fig. 8 is a central section of said die and a side elevation of said punch immediately before action upon said blank. Fig. 9 is a perspective view of the completed pinion, and Fig. 10 is a like view of the same in position upon an arbor.

Letters of like name and kind refer to like parts in each of the figures.

The object of my invention is to enable pinions for use in watches, clocks, and other similar machinery to be more cheaply constructed than has heretofore been practicable; to which end my said invention consists in the means employed for changing a sheet-metal disk into a pinion, substantially as and for the purpose hereinafter specified.

In the carrying of my invention into practice a milling-tool, A, is first roughly shaped and longitudinally grooved at one end, and then by means of a lathe-tool, B, having within its end a suitably shaped notch, *b*, one or more circumferential series of cutting-teeth, *a*, are formed upon said grooved portion. The milling-tool thus constructed, being hardened, is then employed in the usual manner for cutting a series of drifts, one of which, C, is shown in Fig. 2, that are afterward used in the formation of female dies D, which dies have each a central opening, *d*, that interiorly corresponds to the exterior form of the desired pinion, and such openings decrease in diameter until the smallest corresponds exactly in size as well as shape to the like features of such pinion. Each of said dies is provided with a punch or male die, E, which corresponds exteriorly to but is smaller than the central opening, *d*, and resembles in general appearance the drift C used in the formation of such opening.

In the construction of pinions a disk, F, is cut from sheet metal, and has a certain predetermined diameter and thickness with relation to the diameter, length, and number of leaves of the finished pinion. Said blank is given the cup shape seen in Figs. 4 and 5 by means of a male drawing-die, G, and a corresponding female drawing-die, H, after which it is submitted to the action of the forming-dies D and E and given the form shown in Fig. 7, its exterior having the exact external size and shape of the finished pinion with the desired number of leaves *f*. The blank F is next placed in a recess, *i*, at the center of a die, I, which recess exactly corresponds in size and shape to the like features of the exterior of said blank, after which, by means of a punch, K, there is formed within the lower closed end of the latter a round opening, *f'*, that has substantially the diameter of the space between the inner points of the corrugations which form the spaces or grooves between the leaves *f*. The pinion is now complete and may be placed upon and secured in any usual way to a suitable arbor, L, where it will operate in all respects like the usual solid pinion, and from the fact that its wearing-surface has been condensed and hardened by the method of construction will possess greater durability than would be practicable if said surface had been cut or otherwise dressed to shape.

Having thus described my invention, what I claim is—

1. As a means for forming pinions from sheet metal, a female drawing-die which is provided with a central opening that corresponds in shape to the toothed periphery of a pinion,

in combination with a male die which corresponds to and is adapted to enter said opening, substantially as and for the purpose specified.

2. As a means for forming pinions from sheet metal, a male drawing-die and a female drawing-die which by their joint action are adapted to give to a cupped sheet-metal blank the external form of a toothed pinion, in combination with drawing-dies that are adapted to give a cupped form to a sheet-metal disk, substantially as and for the purpose shown.

3. As a means for forming pinions from blanks, the combination of drawing-dies which are adapted to give a cup form to a sheet-metal disk, drawing-dies that are adapted to give to the cup-shaped blank the external form of a toothed pinion, and punching-dies which are adapted to form within the closed end of said blank an opening for the reception of an arbor, substantially as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 30th day of August, A. D. 1887.

WILLIAM N. WEEDEN.

Witnesses:
E. S. BROWN,
GEO. M. KINGMAN.