(No Model.) 2 Sheets—Sheet 1.

W. N. WEEDEN.

PINION FOR CLOCKS, WATCHES, &c.

No. 387,471. Patented Aug. 7, 1888.

Fig. 1.

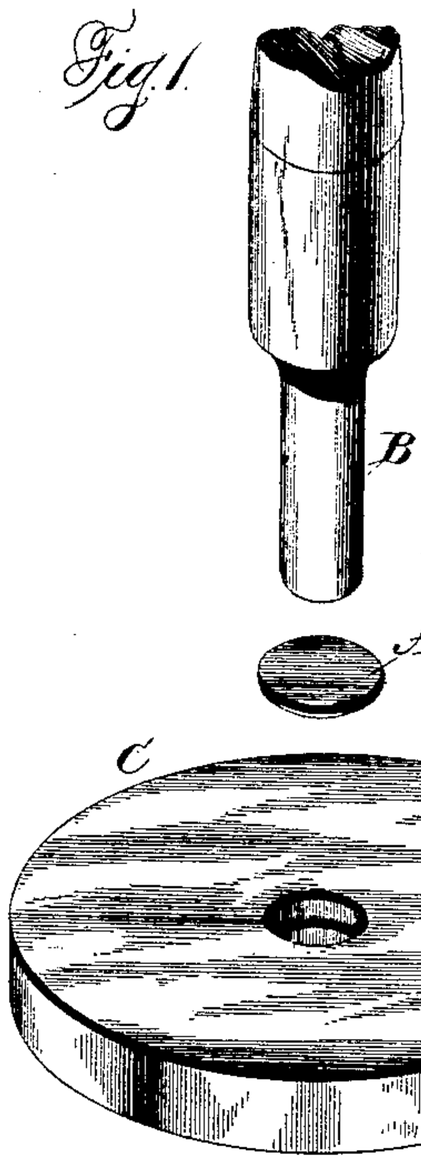


Fig. 3.

Fig. 2.

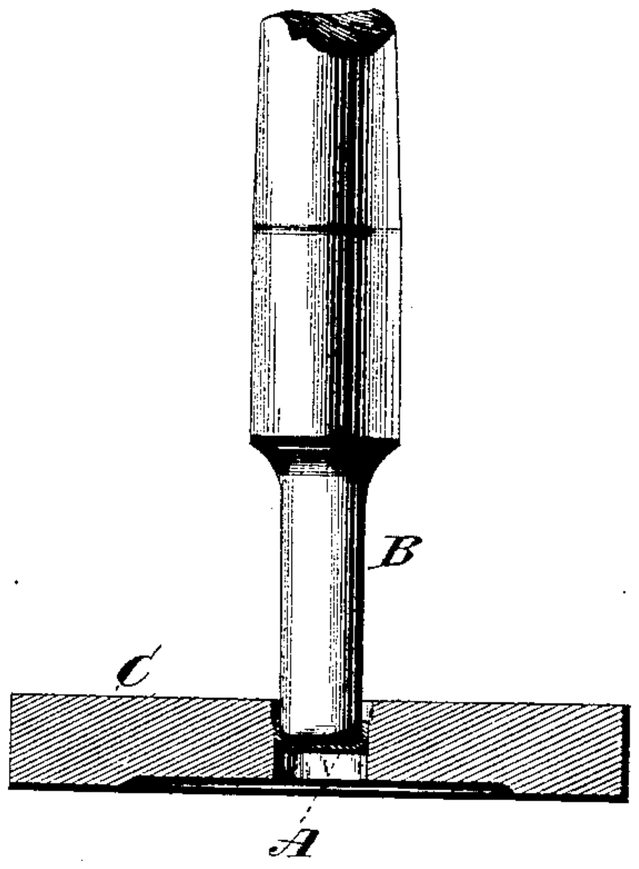
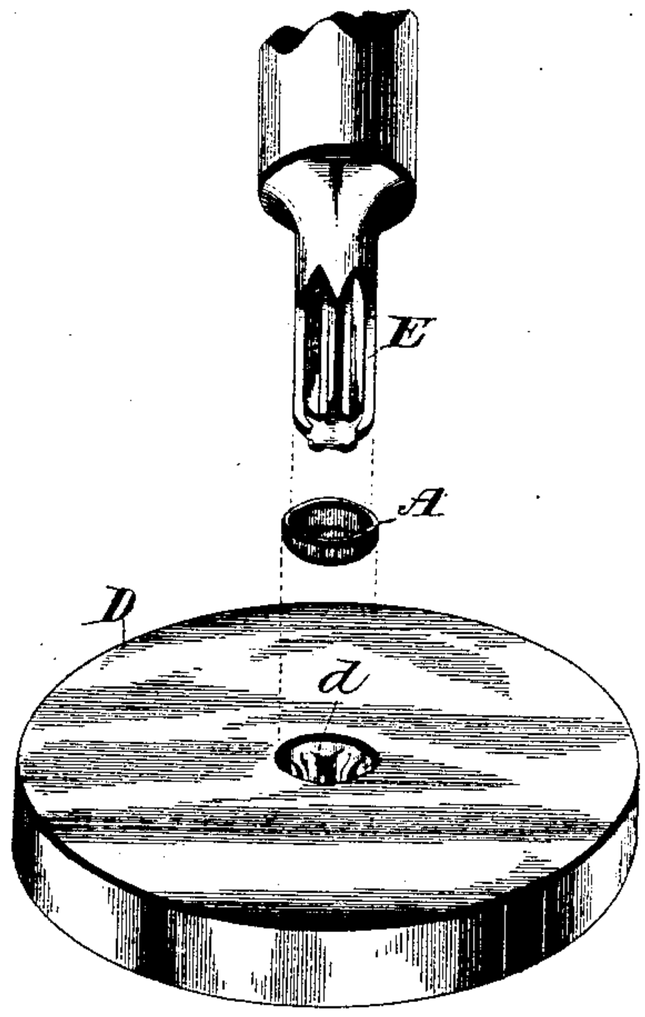
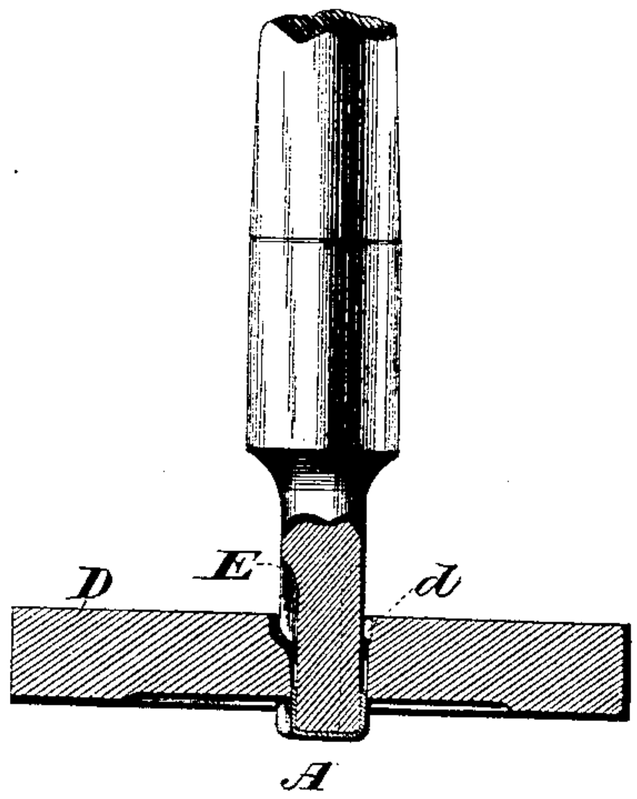


Fig. 4.





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.

PINION FOR CLOCKS, WATCHES, &c.

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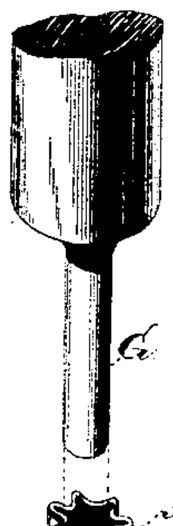
Fig 5



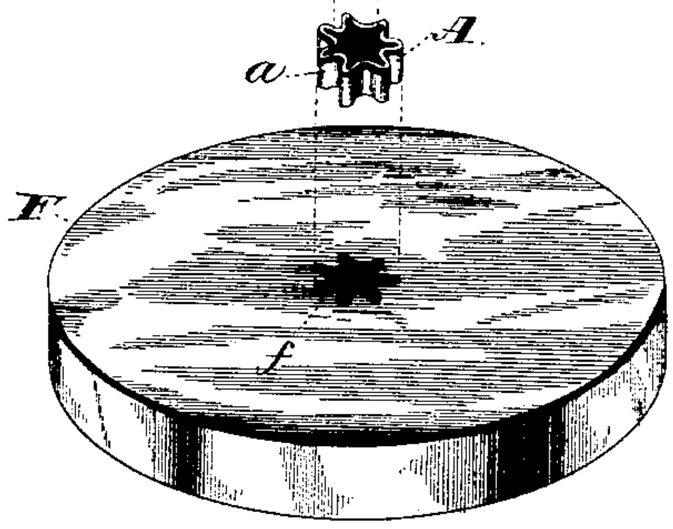
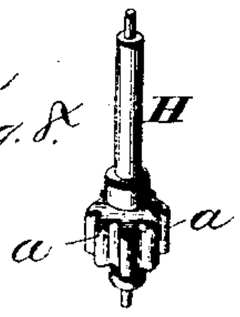


Fig. 6.

Fig. 7. 

Fig. 8. 

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

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

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

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

PINION FOR CLOCKS, WATCHES, &c.

SPECIFICATION forming part of Letters Patent No. 387,471, dated August 7, 1888.

Application filed September 2, 1887. Serial No. 248,631. (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 Pinions for Watches, Clocks, &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 the preliminary drawing-die, punch, and blank used in the formation of my pinion. Fig. 2 is a central section of said die and a side elevation of said punch when in action upon said blank. Fig. 3 is a perspective view of the blank as left by the preliminary dies, together with the drawing-die and punch used for finishing the shaping of the same. Fig. 4 is a central section of said tools when in action upon said blank. Fig. 5 is a perspective view of the drawn pinion and of the punch and die used for opening the closed end of said pinion. Fig. 6 is a side elevation of the punch and a central section of said die in position for action upon the pinion. Fig. 7 is a perspective view of the completed pinion, and Fig. 8 is a like view of the same when attached to an arbor.

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

The design of my invention is to produce pinions which shall have a maximum of durability and strength combined with a minimum of weight, and shall be capable of construction at a relatively small expense; to which end my said invention consists, principally, as a new article of manufacture, in a spur-pinion which is composed of a shell of corrugated metal that interiorly corresponds in shape to its exterior, substantially as and for the purpose hereinafter specified.

It consists, further, in the combination of a shell-pinion with an arbor which passes axially through and is secured within the same, substantially as and for the purpose hereinafter shown.

It consists, further, in the combination of a shell-pinion with an arbor which passes axially through the same and fills the space between the points of the internal teeth, substantially as and for the purpose hereinafter set forth.

It consists, finally, in the special construction of the pinion, substantially as and for the purpose hereinafter shown and described.

In the carrying of my invention into practice the pinion may be constructed in various ways; but it will sufficiently illustrate such invention to show the way preferably employed, in which I take a disk of sheet metal, A, that in diameter and thickness bears a certain predetermined relation to the diameter, length, and number of leaves of the finished pinion, and by means of a male die, B, and a female die, C, give to said blank the cup shape shown in Figs. 2 and 3. I next employ a female die, D, which is provided with a central opening, *d*, that has a grooved periphery, and through such opening force the blank A by means of a male die, E, which corresponds to but is somewhat smaller than said opening, the result being the elongation of said blank and the formation upon its sides of corrugations *a*, that correspond in number to the number of teeth desired. Said blank is then operated upon by other similar dies until its exterior has the exact dimensions required, after which it is placed within a properly-shaped recess, *f*, of a die, F, and by means of a punch, G, there is cut in the bottom or closed end of said blank a round opening, *a'*, which has substantially the same diameter as the space between the inner points of the corrugations *a* and is concentric with the periphery of said blank. The pinion is now ready for attachment to an arbor, H, which operation is effected by placing said pinion within a holding-die that is similar to the punching-die F, forcing the arbor into its interior, and then securing said parts in relative positions by staking, soldering, or any desired means.

The pinion described may be made from gold, silver, platinum, aluminium, brass, steel, or any metal or composition desired, as the quantity of metal required is so small as to render its cost of but slight consequence, and when made from steel it may be hardened, as in case of ordinary solid pinions.

In addition to the advantages named, a pinion of the form shown has but a fraction of the weight of any other kind of pinion, and is especially useful wherever lightness is an object, as in time mechanism, where the action of the

train consists of a continued succession of movements and pauses, and the inertia of parts in starting and their momentum in stopping constitute an important element in the operation of such train.

Having thus described my invention, what I claim is—

1. As a new article of manufacture, a spur-pinion which is composed of a shell of corrugated metal that interiorly corresponds in shape to its exterior, substantially as and for the purpose specified.

2. The combination of a shell-pinion with an arbor which passes axially through and is secured within the same, substantially as and for the purpose shown.

3. The combination of a shell-pinion with an arbor which passes axially through the same and fills the space between the points of the internal teeth, substantially as and for the purpose shown.

4. The described pinion, constructed from sheet metal and having one end open and its other end partly closed and provided with a central opening which is concentric with the periphery of said pinion, substantially as and for the purpose shown and described.

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.