(No Model.)

G. GRAY.

PROCESS OF FORMING METAL WIRE.

No. 276,391. Patented Apr. 24, 1883.

Fig. 1.

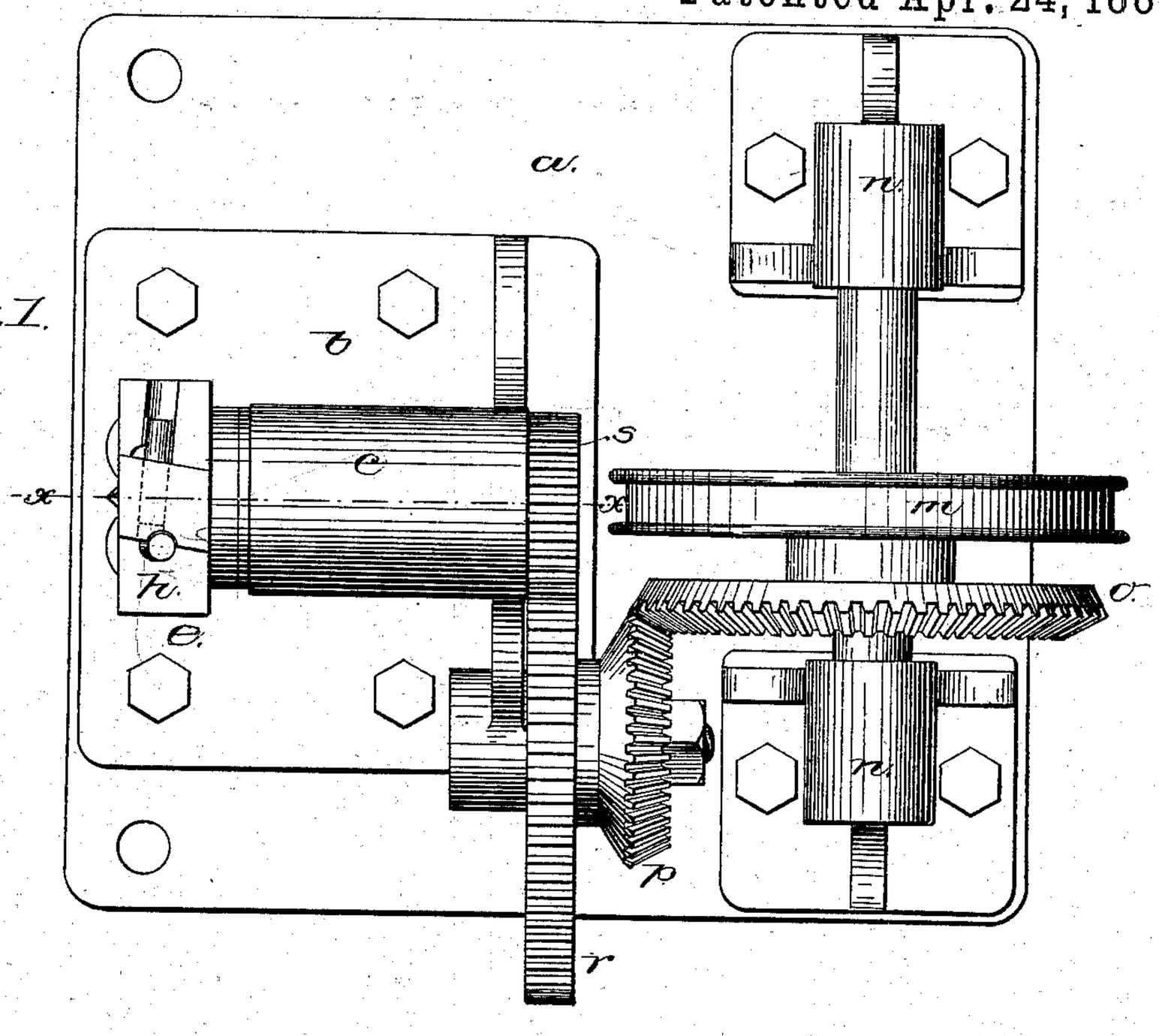


Fig. 2.

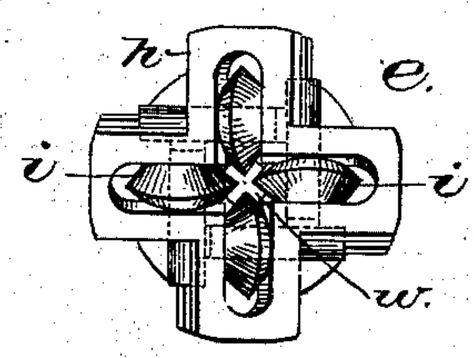
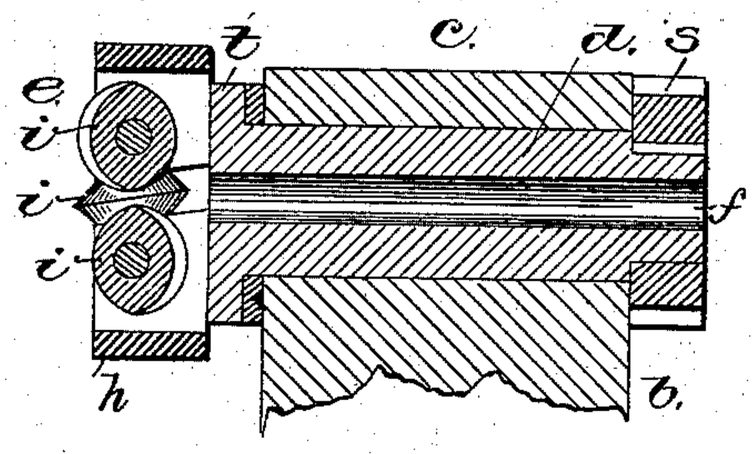


Fig. 3.



Witnesses.
John F. B. Freudenberg
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UNITED STATES PATENT OFFICE.

GORHAM GRAY, OF BOSTON, MASSACHUSETTS.

PROCESS OF FORMING METAL WIRE.

SPECIFICATION forming part of Letters Patent No. 276,391, dated April 24, 1883.

Application filed November 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, GORHAM GRAY, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Process of Forming Metal Wire, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to a process of giving to round wire a different shape in cross-section—such, for example, as cross shape, or fluted, or star-shaped, the longitudinal projections and recesses in the sides of the wire being spirally arranged. Wire of this shape has heretofore been made by drawing through a die of the shape desired for its cross-section and afterward twisting the wire to give the required spiral form; or in some instances the recessed portions are made by cutting away or removing the metal, in which case the metal is usually removed in spiral grooves or recesses.

The present invention has for its object to give the wire the proper sectional shape by impressing or indenting its surface by suitable dies, the said dies at the same time revolving around the wire as it progresses through them, and thus giving the desired spiral form without necessitating any twisting in the fiber of the wire or cutting or removing any portion of the metal thereof.

Figure 1 is a plan view of an apparatus for shaping wire in accordance with this invention; Fig. 2, a front elevation of the revolving die; and Fig. 3, a longitudinal section of the said die and its shaft on line *x x*, Fig. 1.

The main frame-work *a* is provided with a pedestal, *b*, supporting the bearing *c* for the shaft or arbor *d* of the revolving die *e*, the said shaft *d* being made tubular or provided with a passage, *f*, as shown in Fig. 3, to permit the wire that is being operated upon to pass through. The die *e* in this instance consists of a frame-work, *h*, provided with a series of hardened rollers, *i*, the peripheries of which are in this instance shaped to impress upon the wire passing through them a series of longitudinal indentations, giving the wire a cross or X shape, as shown at *w*, Fig. 2. The plane of rotation of the said disks is inclined to the axis of the wire passing through them, so as to give the angular recesses and the projecting portions or edges of the wire produced by them the required spiral arrangement along and around the wire, and the entire die, being free to rotate with its shaft *d* in the bearing *c*, would travel around the wire drawn through it, being actuated only by the rollers themselves, just as a tap or die is guided by the threads cut by it. In order to, however, relieve the wire of all twisting strain, the said die is positively rotated at the proper speed by actuating mechanism operated by the longitudinal movement of the wire being acted upon. The said wire, after passing through the passage *f* of the arbor *d* of the die, is turned once or twice around a drum, *m*, mounted in bearings *n* on the frame *a*, and provided with a bevel-gear, *o*, meshing with a pinion, *p*, in turn carrying a gear, *r*, meshing with a pinion, *s*, fixed upon the arbor *d* of the die *e*. The wire, after passing around the said drum *m*, is connected with the drawing mechanism, by which it is pulled through the die, and by its friction rotates the drum *m*, and, through the connected gearing, also turns the die *e*, as before described. The arbor *d* of the die *e* is provided with an enlargement or shoulder, *t*, bearing against the end of the bearing *c* of the said arbor, and thus receiving the longitudinal pressure upon the said arbor *d*, caused by the resistance of the rollers *i* to the wire passing through them.

In practice the wire will usually be passed through a series of machines similar to the one shown, the die of each succeeding one being constructed to enter more deeply into the wire until the desired shape is produced.

It will be seen that dies can be constructed to give any desired cross-sectional shape to the wire, and the spiral form is produced without any twisting in the fiber of the wire itself, spiral channels or deep impressions being made round the wire.

The shaft of the drum *m* may be driven by power, and the said drum thus made to draw the wire through the die.

I am aware that it is old to twist together a number of wires to form a lightning-rod and simultaneously cover such twisted wires with sheet metal, which sheet metal is depressed by rollers in the cavities of the twist as the twisted wires are drawn through the machine. I am also aware that it is old to rotate a num-

ber of embossing-dies about a tube to make spiral ornamentation upon said tube, said tube being by such dies fed through the machine; and I am further aware that rotary dies in a non-rotating head have been made to spirally ornament tubes. My invention differs from these in its purpose, and by it I effect the manufacture of spiral, angle, or like wire in a very cheap and expeditious manner and of much better quality and greater tensile strength than has been possible with the methods heretofore practiced.

I claim—

The method of making spiral, angle, or flanged wire herein set forth, the same consisting in imparting the desired configuration and spirality to the wire by drawing round wire through a revolving set of rotating dies, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

GORHAM GRAY.

Witnesses:

JOS. P. LIVERMORE,

BERNICE J. NOYES.