

G. D. EDMANDS.
Tool for Making Spinning-Rings.

No. 216,730.

Patented June 24, 1879.

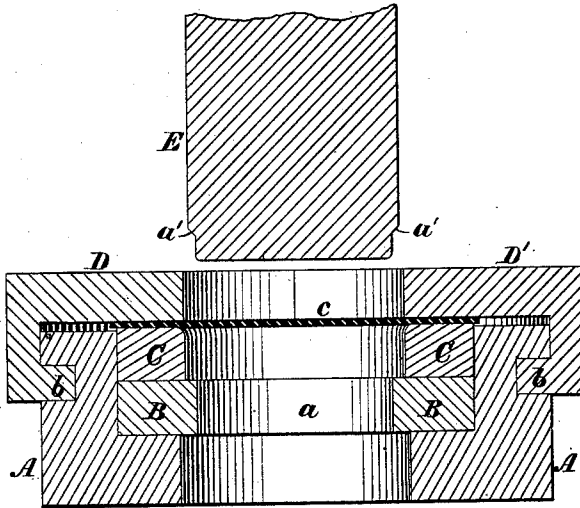


Fig. 2.

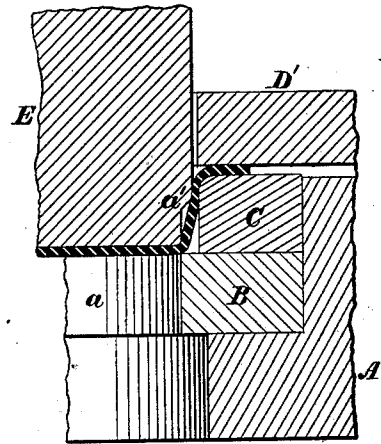


Fig. 3.

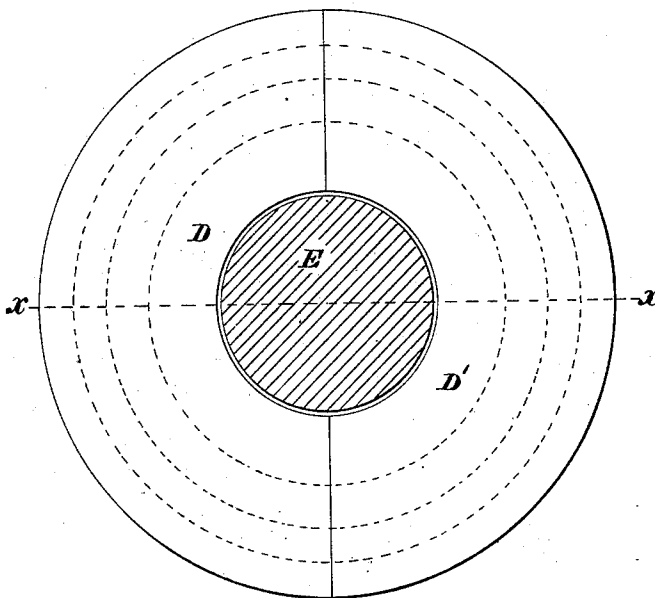


Fig. 1.

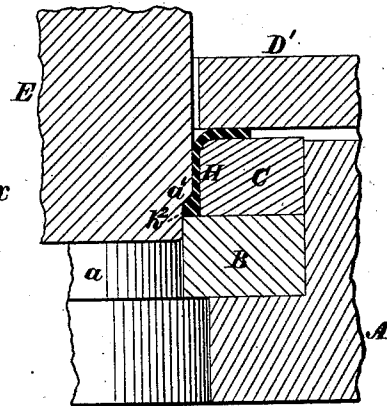


Fig. 4.

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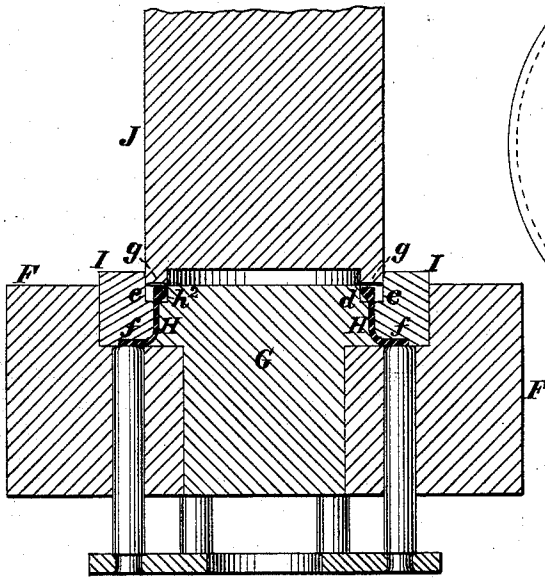


Fig. 5.

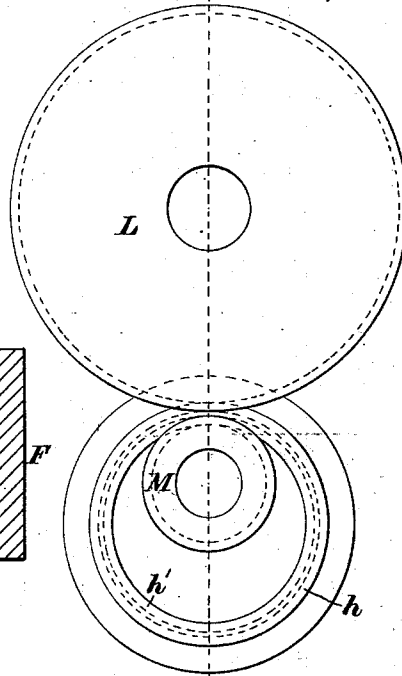


Fig. 9.

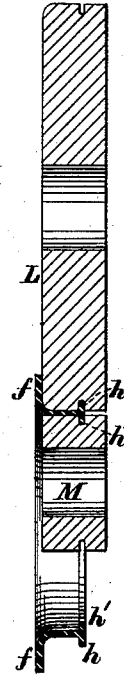


Fig. 10.

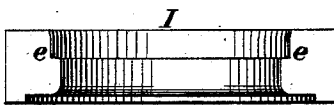


Fig. 8.

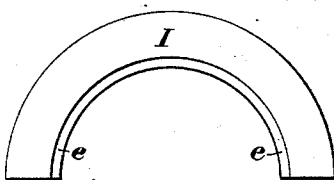


Fig. 7.

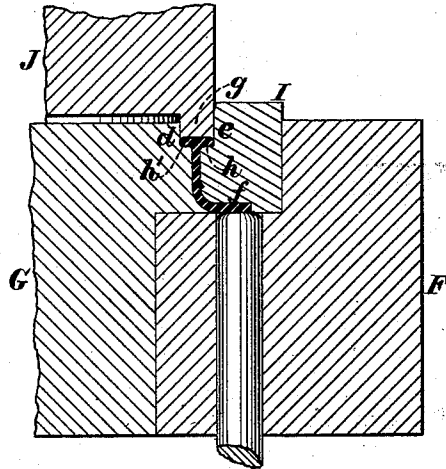


Fig. 6.

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UNITED STATES PATENT OFFICE.

GEORGE D. EDMANDS, OF MILFORD, MASSACHUSETTS.

IMPROVEMENT IN TOOLS FOR MAKING SPINNING-RINGS.

Specification forming part of Letters Patent No. **216,730**, dated June 24, 1879; application filed February 10, 1879.

To all whom it may concern:

Be it known that I, GEORGE D. EDMANDS, of Milford, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Tools for the Manufacture of Spinning-Rings, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to tools employed in constructing spinning-rings from sheet metal; and it consists in the use, in combination, for the purpose of forming a ring-blank of special form, as the first operation in forming spinning-rings from sheet-metal, of a female cutting-die, a female forming-die resting upon the female cutting-die, and concentric therewith, having an interior diameter greater than the interior diameter of the cutting-die, and a male die or punch having its extreme end made of a diameter to exactly fit the interior of the female cutting-die, and the portion above made of a diameter intermediate between the interior diameter of the cutting-die and the interior diameter of the female forming-die, as will be hereinafter described.

It further consists in the use, in combination, as a means of upsetting the end of a tube for the purpose of forming thereon an outwardly-projecting and an inwardly-projecting flange opposite each other, of a die-holder provided with a circular recess in its upper side, a male supporting-die having a portion of its periphery shaped to fit the interior of the lower portion of the blank ring or tube to be acted upon, and having formed in its upper corner an annular rabbet; a female supporting-die, made in two or more segments, and having the lower portion of its inner periphery formed to fit the lower portion of the exterior of said blank ring or tube, and having formed in its upper inner corner an annular rabbet, and a male heading or upsetting die having formed upon its operating end an annular downwardly-projecting lip of a width and diameter adapted to fit and accurately fill the space between the perpendicular walls of the rabbets formed in the male and female supporting-dies, as will be described.

Figure 1 of the drawings is a plan of an improved die for performing the first operations in the construction of spinning-rings from

sheet metal. Fig. 2 is a central vertical section of the same on line *xx* on Fig. 1. Figs. 3 and 4 are partial sections of the same drawn to an enlarged scale, and illustrating two different positions of the male die and the consequent results thereof upon the sheet metal being operated upon. Fig. 5 is a central vertical section of my improved dies for completing the operation of shaping a spinning-ring from sheet metal by upsetting the end of a blank ring or tube. Fig. 6 is a partial section of the same drawn to an enlarged scale, showing the male die in the position it occupies when it has completed its work of forming the double-race flange. Figs. 7 and 8 are, respectively, a plan and an inside elevation of one of the segments of the blank or tube-supporting die I; and Figs. 9 and 10 are, respectively, an end elevation and a central section of a pair of rolls, and illustrate their application to the rolling of the spinning-ring after it has been shaped in the dies.

A is a die-holder, provided with a circular recess in its upper side, in the bottom of which is placed the female cutting-die B, having a circular opening, *a*, the walls of which are at right angles to its upper surface.

C is a female forming-die, also placed in the recess of the die-holder above the cutting-die, and resting thereon, and having an inner periphery somewhat larger than the opening through the cutting-die, and having its upper inner corner rounded, as shown.

D and D' are two segmental holding-down plates, each provided with an inwardly-projecting semi-annular lip, *b*, which fits into a corresponding groove in the outer periphery of the die-holder A, to hold said plates in position with their under surfaces a distance above the upper surface of the forming-die C about equal to the thickness of the disk of sheet metal *c*, all these parts being substantially the same in form and arrangement as described in another application of even date herewith.

E is the male die, made cylindrical in cross-section, and having its extremelower end made of a diameter to accurately fit the opening through the female cutting-die B, and the portion immediately above of a diameter intermediate between the inner diameter of the fe-

male cutting-die B and the inner diameter of the female forming-die C, as shown, said male die being provided in practice with a shank or other suitable means of securing it to the reciprocating plunger or cross-head of a suitable press. (Not shown in the drawings.)

The office of the dies just described is to partly form a spinning-ring from sheet metal, and their operation will be hereinafter explained.

The next operation is performed by the dies illustrated in Figs. 5, 6, 7, and 8, in which F is a die-holder, having a circular recess formed in its upper side and a central opening extending through to its under side, into which central opening is fitted the male supporting-die G, resting by its shoulder upon the bottom of the recess in the upper side of the die-holder F, the lower portion of that part thereof which projects above the bottom of said recess being made of a shape and diameter to accurately fit the lower portion of the interior of the blank or partially-formed ring H, (shown in Fig. 5,) and has formed around its extreme upper end the angular rabbet *d*.

A female supporting-die composed of two or more segments, I I, having the lower portions of their inner surfaces shaped to fit the exterior of the blank H, and an angular rabbet, *e*, formed in their inner upper corners, is fitted to and rests in the recess of the die-holder F, as shown, the under surface of said segments I I being varied according as to whether the blank H is made with or without an outwardly-projecting flange, *f*.

J is the male heading or upsetting die, made cylindrical in form, and provided with a shank (not shown) or other suitable means for securing it to the plunger or cross-head of a suitable press. (Also not shown.)

The lower or operating end of the die J has formed therein a circular recess concentric with the outer periphery of the die, so as to form around the outer edge of its end face a downwardly-projecting annular lip, *g*, the under face of which may be made the counterpart or reverse of the shape that it is desired to give to the upper face of the traveler-race of the spinning-ring—that is, if it is desired to make the upper surface of the race convex in cross-section, the under surface of the lip *g* should be made concave, said lip being made of a thickness just equal to the distance between the vertical walls of the rabbets *d* and *e*, as shown in Fig. 5.

In Figs. 9 and 10 are shown a pair of rolls, L and M, the peripheries of which are made to fit, respectively, the outer and the inner surfaces of the cylindrical body and the race-flanges *h* *h'* of the spinning-ring, as shown, said rolls being mounted upon suitable shafts (not shown) and forced toward each other by screws or other well-known means, (not shown,) to give the desired pressure to properly smooth the surface and condense the metal of the ring.

The operation of my improved tools and the process of making spinning-rings of sheet

metal by my improved method are as follows: The disk of sheet metal *c* being placed in position upon the female forming-die C and beneath the male die E, as shown in Fig. 2, the die E descends to the position shown in Fig. 3, when the flat disk is transformed into a shallow cup by its central portion being carried downward into the forming-die C, drawing the metal over the rounded corner of said die, and reducing it in thickness from the upper corner of said die to the shoulder *a'* on the male die E, as shown in Fig. 3.

A continuation of the downward movement of the die E, acting in conjunction with the cutting-die B, cuts out the bottom of the cup, and upsets and molds the metal contained in the chamber between the shoulder *a'* of the male die E and the upper surface of the cutting-die B into the form shown in Fig. 4, when the die E has completed its downward movement and a ring-blank, H, of the form shown in Fig. 4 is completed. This blank is next placed upon the male supporting and forming die G, and the segments I I are placed around the blank and the whole is placed in the die-holder F beneath the male upsetting or heading die J, as shown in Fig. 5.

The lower portion of the blank H is firmly supported between said male supporting-die G and segments I I up to a point on said blank where it is desired to form the under side of the race-flanges, the upper edge of said blank provided with the inwardly-projecting lip *h*², of a thickness in the direction of the length of the blank greater than the thickness of the disk from which said blank was formed, occupying the annular space between the perpendicular walls of the rabbets *d* and *e*, as shown.

A downward movement of the male die J causes the annular lip *g* formed thereon to enter and close the upper part of the annular groove or space formed by the rabbets *d* and *e* before it comes in contact with the upper edge of the blank H, as shown in Fig. 5.

A further downward movement of the die J from the position shown in Fig. 5 to the position shown in Fig. 6 causes the upper edge of the blank H to be upset and flattened out to the full width of the annular space between the perpendicular walls of the rabbets *d* and *e*, thus forming the race-flanges *h* and *h'*, projecting respectively outward and inward from the cylindrical body of the ring, as shown in Fig. 6.

The ring thus formed is then subjected to the action of the pressure-rolls L and M to smooth its surface and condense the metal in the manner illustrated in Figs. 9 and 10, after which the ring is hardened and polished in a well-known manner, and it is then ready for use.

I am aware that a female cutting-die with a female forming-die having an interior diameter greater than the cutting-die, placed above, concentric with, and resting upon said cutting-die, and a male die having a diameter

to just fit the cutting-die have been before used, and therefore I do not claim such devices broadly; but

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. As a means of forming a ring-blank from sheet metal, from which to make a spinning-ring by an after operation, the combination of the female cutting-die B, the female forming-die C, made separate and distinct from, and having an interior diameter greater than, the cutting-die B, placed above, concentric with, and resting upon said cutting-die, and the male die E, having its extreme lower end made of a diameter to just fit the female cutting-die B, and its upper portion made of a diameter intermediate between the diameters of the in-

teriors of the female cutting and forming dies, substantially as and for the purposes described.

2. The combination of the die-holder F, male supporting-die G, provided with the rabbet *d*, the annular supporting-die, composed of two or more segments, I, and provided with the rabbet *e*, and the male die J, provided with the annular lip *g*, all constructed, arranged, and adapted to operate substantially as and for the purposes described.

Executed at Boston, Massachusetts, this 30th day of January, A. D. 1879.

GEO. D. EDMANDS.

Witnesses:

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