W. L. WARD.

CONSTRUCTION OF METAL SWAGING DIES.

APPLICATION FILED DEC. 8, 1909.

998,216. Patented July 18, 1911.

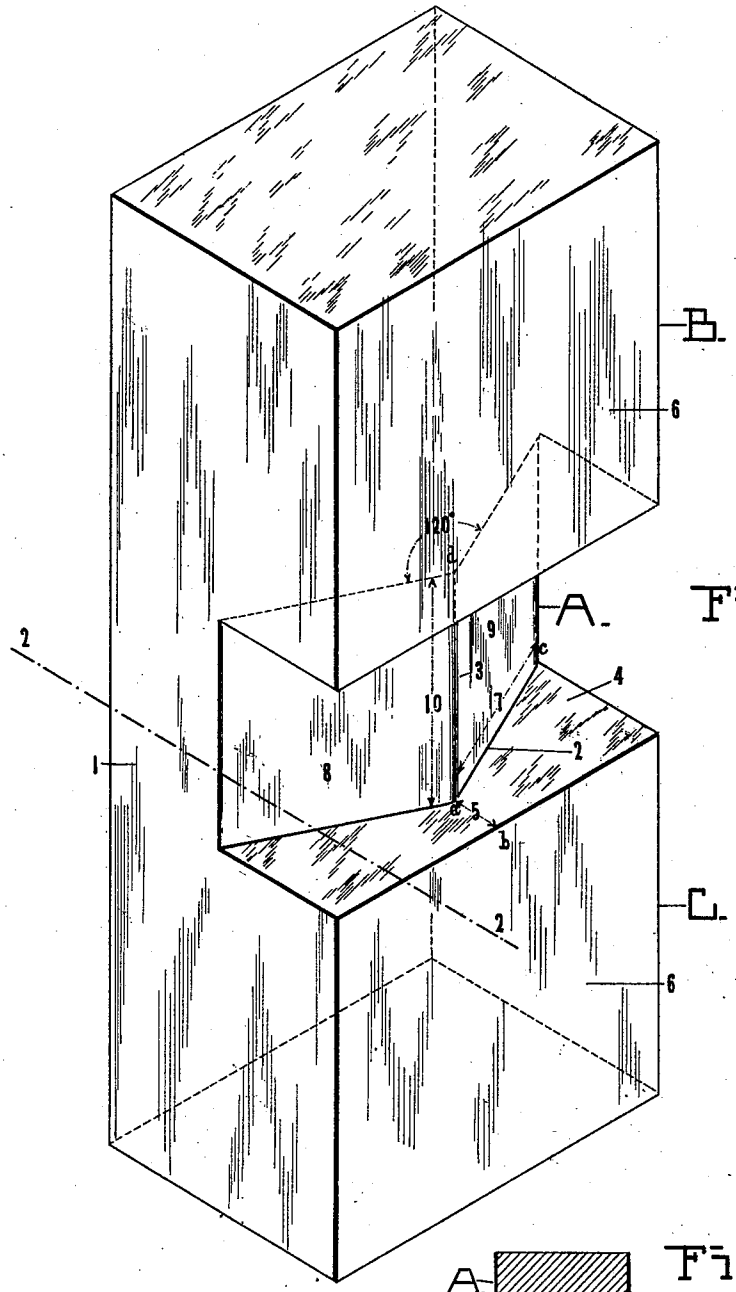

Fig. 1.

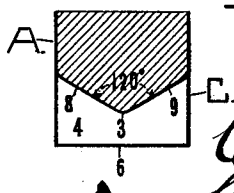

Fig. 2.

WITNESSES:

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CONSTRUCTION OF METAL-SWAGING DIES.

998,216. Specification of Letters Patent. Patented July 18, 1911.

Application filed December 8, 1909. Serial No. 532,072.

To all whom it may concern:

Be it known that I, WILLIAM L. WARD, a citizen of the United States, residing at Port Chester, in the county of Westchester and State of New York, have invented certain new and useful Improvements in the Construction of Metal-Swaging Dies, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in the construction of metal swaging dies and has for its primary object the production of a metal swaging die especially adapted for use in swaging elongated rectangular bars without loss of material or undue distortion of metal in such manner as to convert the original bar into one having its two longitudinal narrow edges so serrated as to enable nut blanks of approximately the predetermined ultimate shape to be easily obtained therefrom by successively shearing said serrated bar into a multiplicity of similar sections.

A further and more specific object of this invention is to provide an inexpensive swaging die characterized by simplicity, durability and efficiency, and which furthermore possesses the capacity of so supporting certain portions of the metal undergoing the swaging operation as to prevent a flow of metal in a direction transverse to the path of the swaging die and at the same time perpendicular to the length of the bar being swaged, thereby avoiding a local swelling of the bar adjacent the notches.

Another object accruing to the more intense aspect of this invention is to provide a die of the nature described, so designed and constructed as to be capable of swaging notches subtending an angle of not less than approximately 120° in a cold elongated stock bar in a commercially successful and satisfactory manner.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

The other objects and advantages of this invention will be in part pointed out in the following description and in part readily apparent from the accompanying drawings in which:—

Figure 1 is a front perspective view of one of the various feasible embodiments of this invention. Fig. 2 is a horizontal section taken through line 2—2 of Fig. 1, showing somewhat more exactly the form of the swaging point and its relation to the side support in the preferred form of this invention.

Continuing now by way of a more detailed description of the illustrated die, which is typical of this invention but which, of course, may assume various forms within the purview of this invention, A depicts the intermediate or swaging portion of the die, which is preferably, though not necessarily, formed integral with the upper and lower or restricting parts B and C of the die.

The swaging part A of the die consists of a base portion 1, terminating at its forward end in a V-shaped projection 2. This V-shaped projection will be so designed as to subtend between its two adjacent converging sides 8 and 9 an angle approximately equal to that produced when two of the finished nuts are placed together with corresponding faces contacting and in registry. Thus, when the die is so fashioned as to adapt it for producing hexagonal nuts, the angle subtended by the two converging sides of V-shaped point or projection 2 will be approximately 120°. In such case, the extreme tip or apex 3 of the swaging point will preferably be slightly blunted as illustrated so that during the operation of swaging, there will be no tendency to cleave or split the stock bar.

The upper and lower restricting parts of the die (which is preferably formed from a single solid piece of die-steel) present flat faces 4, which extend forwardly from the converging vertical side faces of the swaging projection to such an extent as to provide the distance 5, from point "*a*" to "*b*",

so as to position the extreme forward apex of the swaging projection a short distance back from the front edges of the restricting parts, *i. e.*, countersunk with respect to the front vertical faces 6 of the restricting parts B and C. Preferably this distance 5 approximates or slightly falls short of about one-half the distance 7 from point "*a*" to point "*c*", that is, the length of the converging face 9 of the swaging projection, or in other words, approximate one-half the width of a face of a polygonal nut such as is intended to be ultimately produced. The front faces 6 of the upper and lower restricting parts of the die are preferably arranged perpendicular to the path of movement of the die, and the height 10 of the swaging projection, *i. e.*, the distance between the points "*a*" and "*d*" is only slightly greater than the thickness of the stock-bar, so that the upper and lower faces 4 of the restricting parts may act as supports for the material of the stock-bar at points adjacent the swage lines, and thus be effective to prevent distortion where the tendency to distort is greatest. The width of the front faces 6, while subject to considerable variation, is preferably proportioned to come flush with the distance between the portions of the converging faces 8 and 9 last contacting with the stock-bar during the act of swaging.

It is to be understood that the term "inclined sides" used herein as descriptive of certain features of the V-shaped swaging projection, has reference only to the effective portions or areas of such faces as may be used, and does not, of course, apply to such surfaces of the inclined swaging faces or sides as constitute non-swaging areas or merely form continuations or extensions of the effective faces, and, accordingly, dimensional references to such elements are to be taken as applicable to effective parts thereof. So, also, the term "rectangular cross-section" as applied to the stock-bar, is to be regarded in a generic or practical sense as comprehending such diversely modified cross-sections of the stock bar as may be required in the various refinements of this invention, and is not to be taken in the rigidly precise manner required of geometrical definitions. Furthermore, in speaking of the top, bottom, etc., such terms have been adopted as a matter of brevity and clearness and do not carry an implication tending to limit the position of the element having such feature.

Without further elaboration, and in the light of current knowledge, the foregoing disclosure will be sufficiently suggestive and otherwise enable those skilled in this art to readily produce various structures which, although perhaps calculated to appear widely different under a superficial inspection, would nevertheless embody certain herein-described features which, from the aspect of the prior art, constitute essential characteristics of this invention, and therefore such structures should and are intended to be comprehended in the scope of the following claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A swaging die of the nature disclosed, comprising upper and lower restricting portions having inner faces, and a single forwardly extending V-shaped swaging projection intervening between the inner faces of said restricting portions, the converging faces of said V-shaped projection subtending an angle of not less than approximately 120° and arranged perpendicular to said inner faces of said restricting portions.

2. A swaging die of the nature disclosed in the form of an integral block of metal, consisting of upper and lower restraining portions presenting inner opposing parallel faces, and a single V-shaped swaging portion intervening between said faces and having its converging sides subtending an angle of not less than approximately 120° and disposed perpendicular to said faces, the apex of said projection being spaced back of the forward extremities of said restraining portions.

3. A swaging die of the nature disclosed, comprising a V-shaped swaging projection, an upper restricting portion having an underlying plane face overhanging said V-shaped projection and arranged perpendicular to the converging faces thereof, said portion extending forwardly of the apex of said V-shaped projection, and a lower counterpart restraining member, said portions terminating at their forward extremities in flat vertical faces.

4. A swaging die of the nature disclosed, comprising a V-shaped swaging projection, the converging sides of which subtend an angle of not less than approximately 120° and converge in a blunted apex, and upper and lower restraining portions having inner faces arranged perpendicular to said converging sides.

5. A swaging die of the nature disclosed, comprising a V-shaped projection, the sides of which subtend an angle of not less than approximately 120° and converge in a blunted apex, and upper and lower restraining portions having inner smooth faces which extend forwardly beyond said apex a distance less than the length of said sides.

6. A swaging die of the nature disclosed, comprising a V-shaped projection having

converging sides subtending an angle of not less than approximately 120°, and upper and lower restricting portions providing spaced smooth inner faces, the forward edges of said portions being straight and positioned in advance of the said apex a distance not exceeding approximately one-half of the width of the effective swaging portions of the converging sides of said V-shaped projection.

In testimony whereof I affix my signature, in the presence of two witnesses.

WILLIAM L. WARD.

Witnesses:

WALTER S. CONDY,

R. J. MYOER.