Feb. 21, 1939. F. J. KRATCHMAN 2,147,655

PUNCH AND DIE ASSEMBLY

Filed Jan. 27, 1938

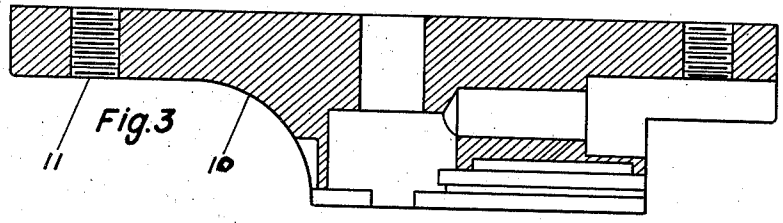


Fig.3

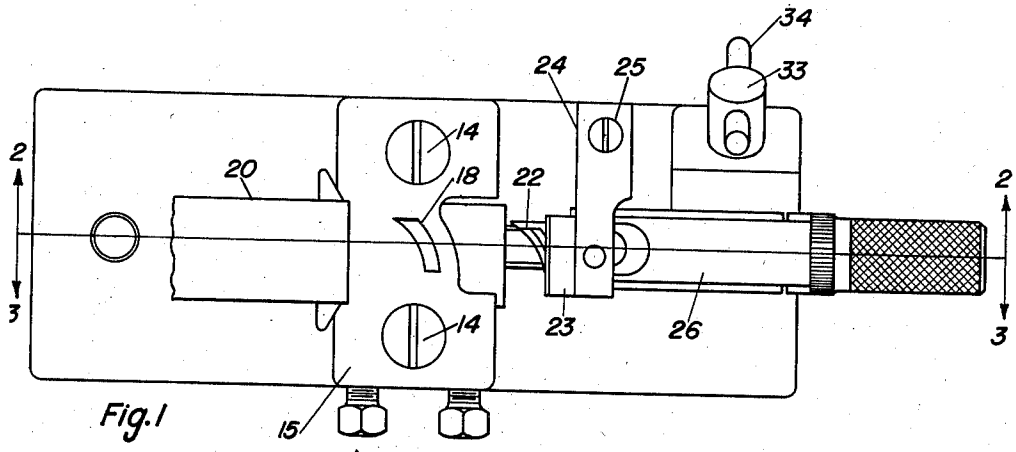


Fig.1

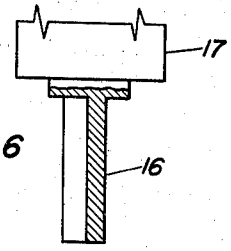


Fig.6

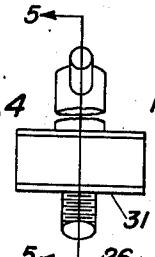


Fig.4

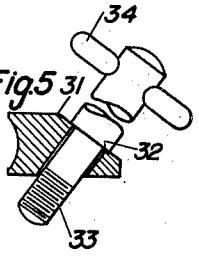


Fig.5

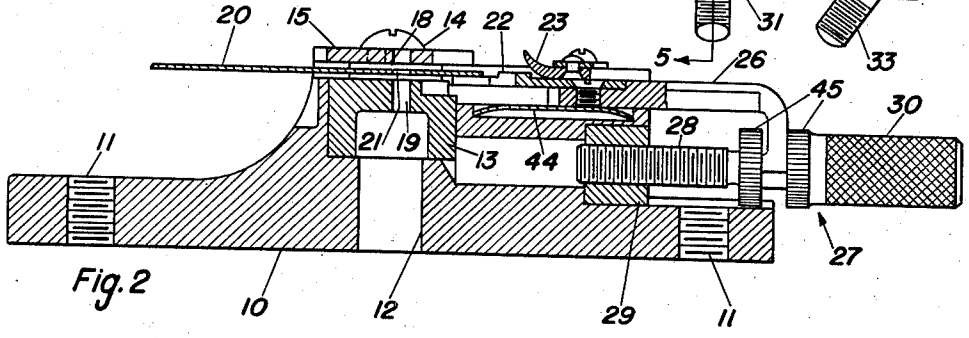


Fig.2

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PUNCH AND DIE ASSEMBLY

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Application January 27, 1938, Serial No. 187,217

2 Claims. (Cl. 164—118)

(Granted under the act of March 3, 1883, as amended April 30, 1938, 370 O. G. 757)

This invention relates to a punch and die assembly, and more particularly to an adjustable micrometer feed punch and die assembly, especially intended for use in piercing blade shrouding.

With the former types of punch and die assembly available in fabrication of blade shrouding, which include a sliding rack, punch and die, and having a fixed serration feeding device for the spacing of the slots in the shrouding, the following disadvantages are present: A series of racks are required for each width of shrouding for spacing the slots, due to various widths of packing sections, heights of the blades, radii of the shrouding and the expansion due to brazing. Further, there is a non-positive feed stop requiring a close visual check on each piercing operation, resulting in a low production rate. Each time it is found necessary to make a new rack with a different feed spacing, all the die operators and welders employed on the job, approximately fifteen men, are held up about one and one-half hours, causing a great loss of efficiency. This condition cannot be eliminated using the rack method, for it is only when assembling the blades, packing sections and shrouding to their respective radii that it is possible to determine the exact spacing of the slots in the shrouding.

With this invention, these disadvantages are overcome. Only one die is required for each width of shrouding, regardless of the spacing of the slots in the shrouding, thereby reducing the tooling cost by twenty percent. A positive feed stop eliminates the need for a close visual check on each piercing operation and results in a speeding up of at least twenty percent in the rate of production. Further, the die operators and the welders are not held up on the job, for the micrometer feed adjustment permits instantaneous change of the spacing of the slots as found necessary, eliminating a tremendous loss of working time.

With the foregoing and other objects in view, the invention consists in the construction, combination and arrangement of parts hereinafter described and illustrated in the drawing, in which—

Figure 1 is a top plan view of the die and micrometer adjustment feed;

Fig. 2 is a sectional view on line 2—2 of Fig. 1;

Fig. 3 is a sectional view on the die block base on line 3—3 of Fig. 1;

Fig. 4 is an elevational view of the micrometer locking means;

Fig. 5 is a partly sectional view on line 5—5 of Fig. 4, and

Fig. 6 is a partly sectional view of the punch.

There is shown at 10 the die block base of this invention, which is provided with threaded bolt apertures for securing it to a suitable foundation on a small hand or foot-operated press. Mounted on the base 10 and in line with a suitable waste disposing aperture 12 is the die block 13 held in position there by the stud bolts 14, which also hold the stripper 15 spaced slightly thereabove. Aligned above the stripper 15 is the punch 16 extending down from a punch operating mechanism, partly shown as at 17, and shaped to cooperate with the opening 18 in the stripper 15 and the aligned die opening 19. The space between the bottom of the stripper 15 and the top of the die block 13 is at least twice and preferably not more than three times the thickness of the work or shrouding 20 which is fed therebetween for the punching operation.

After the hole 21 has been punched in the work or shrouding 20, the shrouding is pulled off the punch 16 as it is withdrawn through the stripping aperture 18, permitting the shrouding to be lifted up and advanced until the shrouding hole 21 may drop over the finger 22, being pressed down thereover by the guide 23 against the finger supporting spring 44. The guide 23 is extended on the spring arm 24 secured to the die base 10 at 25, while the finger 22 is secured on a toe 26 extending from a micrometer adjustment feeding mechanism 27.

The micrometer adjustment feeding mechanism 27 consists of a micrometer screw 28 operating in a nut 29 on the base 10, while a micrometer control handle 30 serves to feed the screw 28 backward or forward in the nut 29, and simultaneously advance or retract the toe 26 and finger 22 to the exact desired position, thus accurately controlling the spacing between the successive shrouding holes 21. When no change in the spacing is desired, the micrometer may be locked against rotation by the bar 31 pressed against the graduated micrometer control wheels 45 by the shoulder 32 of the threaded shaft 33, operable by the cross-arm 34, a suitable threaded aperture being provided in the base 10 to receive the end of the shaft 33.

In operation, the shrouding 20 is fed between the die 13 and the stripper 15, the punch is operated to make the hole 21 and withdrawn, then the shrouding is raised by the operator, withdrawing the previously punched hole 21 from the finger 22 and advancing the shrouding until

the guide **23** places the last punched hole over the finger **22**, whereupon the punching operation is repeated. When a change in spacing is desired, the locking bar **31** is released by operating cross arm **34**, allowing the micrometer feed handle **30** to be operated to move the finger to the new desired position, and then it is relocked to hold it in such new position as long as desired.

Other modifications and changes in the proportions and arrangements of the parts may be made by those skilled in the art without departing from the nature of the invention, within the scope of what is hereinafter claimed.

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. A shrouding strip punch and die assembly comprising a punch, a die, a stripper spaced above the die, a shrouding punch hole receiving finger, said receiving finger being shaped to correspond with and fill the shrouding punch hole, adjustable mounting means on which said finger is secured, a yieldable bed beneath said finger mounting, a yieldable guide above said finger whereby the shrouding may pass between said finger mounting and said guide and have the shrouding punch hole yieldably forced about said finger to immovably secure the shrouding in proper position to receive the next punching operation.

2. A shrouding strip punch and die assembly comprising a punch, a die, a stripper spaced above the die, a shrouding punch hole receiving finger, said receiving finger being shaped to correspond with and fill the shrouding punch hole, adjustable mounting means on which said finger is secured, a yieldable bed beneath said finger mounting, a yieldable guide above said finger whereby the shrouding may pass betwen said finger mounting and said guide and have the shrouding punch hole yieldably forced about said finger to immovably secure the shrouding in proper position to receive the next punching operation, a micrometer to which said finger mounting is secured for adjustment, a bar lock securable against said micrometer and a threaded shaft extending through said bar lock for fastening said bar lock against said micrometer and thereby holding said finger against displacement.

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