

SPECIFICATION

Draw punch

5 This invention relates to a punch to be used with a draw punch for metal removal. Prior art, such as disclosed in U.S. Patent 2,237,069, shows a draw punch having a die with a bolt axially aligned and threadedly engaged with a cutting head and a nut, such that as the nut is turned, the cutting head is urged to cut a slug of metal that is the same size as the inner diameter of the recessed portion of the die.

According to this invention there is provided a male punch member adapted to be used with a cooperating female member to remove a slug in two pieces from a workpiece, comprising a body having an axial bore extending longitudinally therethrough for receiving means for moving the body inwardly and outwardly with respect to the female member, the body having cutting means at one end thereof, the cutting means including a pair of inclined surfaces disposed around the bore and sloping upwardly in opposite directions from one another, the inclined surfaces each having a cutting edge on the entire edge of the outermost portions thereof, each inclined surface terminating at an uppermost end in a rib member extending laterally across the surface from the cutting edge to the bore and upwardly from the surface at the said uppermost end, the rib members together forming lateral cutting means extending across the said one end of the body except for the bore, whereby the cutting edges of the said outermost portions cut the outer slug periphery and the rib members cut across the slug to split it into two pieces when the male member is forced inwardly of the female member with the workpiece therebetween.

The invention will now be described by way of example with reference to the drawing, in which:-

Figure 1 is a top view of the punch or cutter head; Figure 2 is a general side elevational view of the punch;

Figure 3 is a general side oblique view of the punch, seen in the direction of the arrow 3 in Figure 2; and

Figure 4 is another general side view of the punch, seen in the direction of the arrow 4 in Figure 2.

In the draw punch or cutter head illustrated in the drawing and described in detail herein, the die that is mated with the cutter head is not unique, in that it is a typical female die comprising a cylinder with one end closed and a recess comprising an inner diameter extending throughout almost the length of the die. The closed end of the cylindrical die includes a bore which is aligned with the threaded bore of the cutter head or punch. In particular, the invention relates to a cutter head 10, typically called a male punch, having a threaded bore 15 axially aligned throughout its longitudinal length. The outer diameter 20 of the cutter head 10 is adapted to fit the inner diameter of a female die, not shown. The cutter head 10 comprises a plurality of helical or inclined surfaces 25, 25' inclined with respect to the top surface of ribs 30, 30' as shown in Figure 2 and Figure 4. Each inclined surface 25, 25' covers the

semi-circular portion of the cutter head 10, and is symmetrical as viewed from the top of the tool, Figure 1. Each uppermost portion of the inclined surfaces 25, 25' ends at the ribs 30, 30' respectively.

The diameter of ribs 30 and 30' is the same diametral size as the cutting head, but is interrupted at the centre as shown by the diameter of the bore 15. In other words, the ribs 30 and 30' extend diametrically from one edge of the cutting head 10 to the other edge, except for the bore 15. Each rib 30, 30' has two uppermost lateral faces 35, 40' and 35', 40', respectively. Lateral faces 35, 35' meet the uppermost radius junctures 47 of the inclined surfaces 25, 25', whereas lateral faces 40, 40' meet the lowermost radius junctures 47' of inclined surface 25, 25'. The preferred embodiment has a pair of inclined surfaces 25, 25' and ribs 30, 30' and radius junctures 47, 47'.

In operation, the male punch is placed opposite the female die member (not shown) with a metallic member to be cut between these members. A bolt (not shown) is inserted through the bore of the female die (not shown) and through the hole of the metallic member previously drilled therethrough to allow such bolt to be inserted therein and threaded onto the threaded portion 15 of the punch die 10. A nut or other device is then used to squeeze together the male punch or cutter head and the female die. As the male punch is progressively moved against the metal, edge 45, 45' cuts the diametral hole, and the diametral ribs 30, 30' separating each inclined surface 25, 25' cut the metallic slug into two pieces. It is therefore apparent that the metallic slug cut out of the metal is split into two pieces by the ribs 30, 30', and the diameter of the metallic slug being cut by the edge 45, 45'. The radius junctures 47, 47' formed between the inclined surfaces 25, 25' and the lateral faces 40, 40' provide strength and rigidity to the punch.

105 CLAIMS

1. A male punch member adapted to be used with a cooperating female member to remove a slug in two pieces from a workpiece, comprising a body having an axial bore extending longitudinally therethrough for receiving means for moving the body inwardly and outwardly with respect to the female member, the body having cutting means at one end thereof, the cutting means including a pair of inclined surfaces disposed around the bore and sloping upwardly in opposite directions from one another, the inclined surfaces each having a cutting edge on the entire edge of the outermost portions thereof, each inclined surface terminating at an uppermost end in a rib member extending laterally across the surface from the cutting edge to the bore and upwardly from the surface at the said uppermost end, the rib members together forming lateral cutting means extending across the said one end of the body except for the bore, whereby the cutting edges of the said outermost portions cut the outer slug periphery and the rib members cut across the slug to split it into two pieces when the male member is forced inwardly of the female member with the workpiece therebetween.



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2. A male punch member constructed and arranged substantially as herein described and shown in the drawing.

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