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QUICK CHANGE CHISEL

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2 Sheets-Sheet 1

Fig. 1.

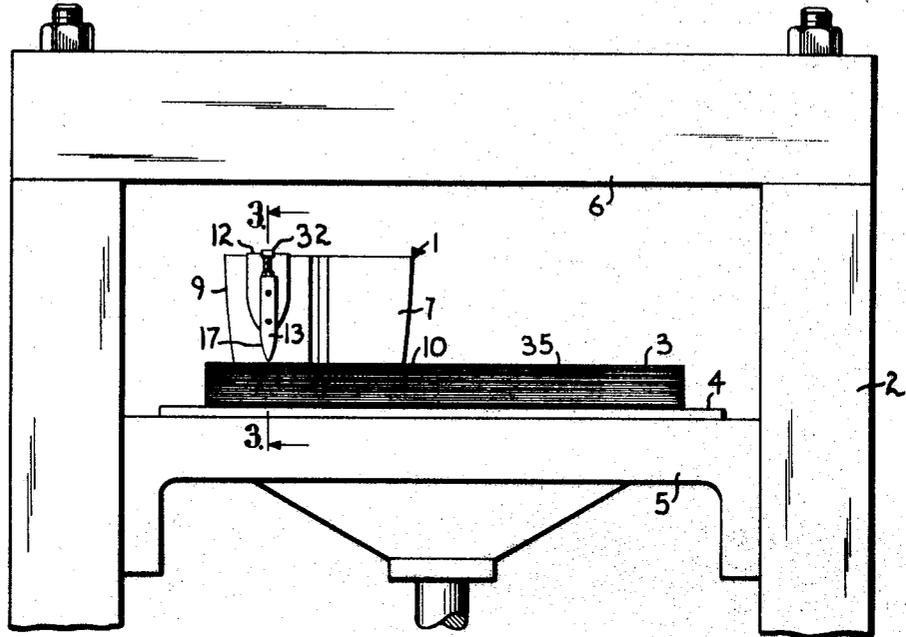
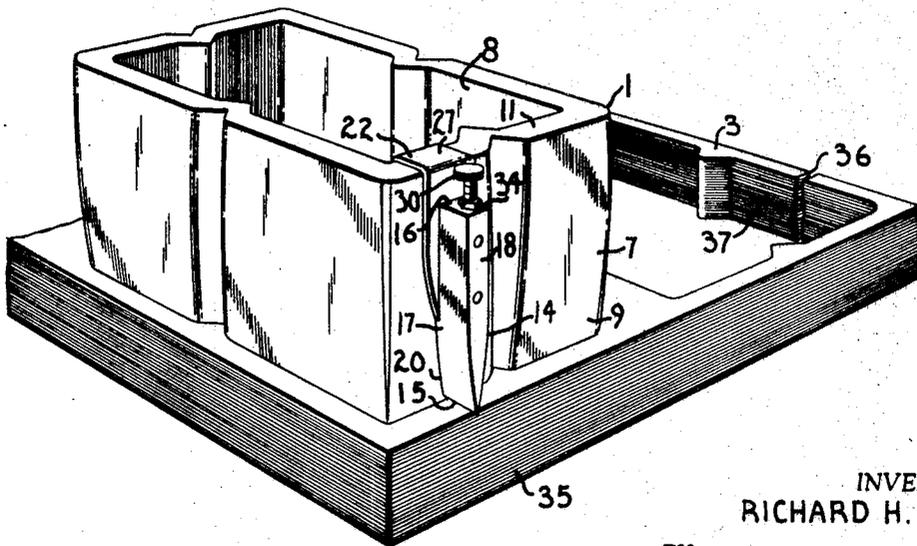


Fig. 2.



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QUICK CHANGE CHISEL

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5 Claims

ABSTRACT OF THE DISCLOSURE

A chisel, for use with envelope blank cutting dies to permit easy paper break-away, is secured to a resilient clip which removably retains the chisel adjacent the die wall, the chisel having an adjustable abutment member projecting thereabove and cooperating with the clip for resisting separation between the chisel and die during blank cutting.

This invention relates to the cutting of paper blanks from a stack of sheets with hollow dies, and more particularly to improvements in paper relief chisels used with the die.

In cutting paper blanks from a stack of sheets with a hollow die, the paper outside the die in the cut-through layers must deform or split to make room for increasing die wall thickness during descent into the stack. If controlled relief is not provided, the paper may tear randomly, interfering with subsequent cutting operations and/or there may be damage to the die caused by excessive forces needed to overcome the resistance of the paper. It has heretofore been known to provide controlled relief for the paper with a chisel having a sharp edge positioned adjacent the die cutting edge and communicating with a paper edge, whereby the cut-through sheets break away easily and uniformly as the die progresses through the stack.

Dies vary considerably in size and shape and careful nesting of the cuts is often required to obtain the maximum number of blanks from a stack of sheets. This commonly necessitates that the chisel be removed and replaced in various positions on the die. Heretofore, chisels usually have been rigidly secured to the die wall by screws or the like extending into the body of the die. However, this arrangement not only greatly limits the various positions of the chisel on the die, but also requires considerable time and labor to remove and replace the chisel. Further, the drilling and tapping of many sets of screw receiving bores in the die requires time, labor, undesirable handling of the die, and reduces die strength.

This invention overcomes the above difficulties by providing a chisel mounted on a spring clip whereby the chisel may be removed and replaced at any number of desired die positions with great ease, and yet, during a cutting operation, the chisel is maintained firmly in contact with the die wall and in proper relation to the die cutting edge.

The principal objects of the present invention are: to provide a die break-away chisel and retaining structure adapted to permit the chisel to be easily removed and replaced in various positions on the wall of a die; to provide such a chisel arrangement whereby the chisel is firmly urged against the die wall during blank cutting; and to provide such a chisel structure which is inexpensive to produce, long lived, and well suited for its intended purpose.

Other objects and advantages of this invention will become apparent from the following description taken in connection with the accompanying drawings wherein are set forth by way of illustration and example certain embodiments of this invention.

FIG. 1 is a partially schematic, fragmentary, front elevation showing a paper stack within a die press and having an envelope blank cutting die thereon supporting a paper break-away chisel arrangement embodying this invention.

FIG. 2 is a fragmentary perspective view on an enlarged scale showing the die and chisel arrangement in more detail.

FIG. 3 is a fragmentary cross-sectional view taken on the line 3—3, FIG. 1, on a further enlarged scale showing additional details of the chisel arrangement and its relation to the die.

Referring to the drawings in more detail:

The reference numeral 1 generally indicates an envelope blank cutting die of the type which is pressed by means of suitable apparatus 2 through a stack 3 of paper sheets. The stack 3, in this example, rests upon a layer of relatively soft backing material such as a wood platform 4 which is supported on a reciprocating table 5. In this illustration, the operation of the apparatus 2 causes the table 5 to rise, urging the die 1 against an upper plate or abutment 6 and forcing the die through the paper stack 3, thus cutting, in a single stroke, a large number of paper blanks.

The die 1 has an upstanding wall 7 with a substantially vertical inside surface 8 and an outwardly and upwardly curving or tapering outside surface 9, producing an increase in wall thickness upwardly from a lower cutting edge 10. The die wall 7 terminates in a relatively thick upper edge 11 which normally contacts the upper plate or abutment 6 while the die is urged through the paper stack 3.

Referring more particularly to this invention, a paper break-away chisel 12 comprises a knife member 13 having an elongated upstanding body 14, with a downwardly directed horizontal sharp edge 15 extending generally normally to the adjacent section of the wall outside surface 9, and a top surface 16. The knife member 13 has a height whereby the top surface 16 is spaced from the sharp edge 15 a distance less than the distance between the lower cutting edge 10 of the die and the die wall upper edge 11.

The knife member body 14 has opposed side surfaces 17, an outer face 18 and an inner face 19, the latter being directed toward the wall outside surface 9. The body inner face 19 contacts the wall outside surface 9 over an appreciable area at 20 which is just above and adjacent the sharp edge 15. The inner face 19 tapers upwardly away from the outer surface 9 above the area 20 at a curvature somewhat greater than the wall outside surface 9, whereby space 21 is produced between the knife member 13 and die wall except for the contacting area at 20 and a portion of the clip member 22 now described.

The clip member 22 has a depending leg portion 23 of relatively thin spring-like material and extending substantially parallel to the wall outside surface 9. The leg portion 23 is secured to the knife member 13 along the inner face 19 by means of suitable screws 24 projecting therethrough and into tapped bores 25 extending generally horizontally into the body 14 between the outer face 18 and inner face 19. The inner face 19 is relieved or offset at 26 to receive the leg portion 23 thereagainst without producing an undesirable ridge facing the die wall outer surface 9. The lowest part of the leg portion 23 terminates above the area of contact at 20 and, therefore, above the sharp edge 15.

The leg portion 23 projects just above the knife member top surface 16 and integrally joins a resilient hook portion 27 which extends inwardly and horizontally over the wall 7 a distance greater than the thickness of the die upper edge 11. The hook portion 27 then projects downwardly at 28 from a position spaced inwardly from

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the wall inside surface 8 and turns toward the wall inside surface 8, providing a wall contacting heel 29. The heel 29 cooperates with the leg portion 23 to removably grasp the wall 7 therebetween, thereby removably mounting the knife member 13 adjacent and against the wall outside surface 9, FIG. 3.

An adjusting screw 30 is threadedly engaged in the knife member 13, extending downwardly through the top surface 16 into a tapped bore 31. The screw 30 has a head 32 which projects upwardly beyond the top surface 16 to a position slightly above the hook portion 27 and thus above the wall upper edge 11. The screw 30 also is spaced outwardly from the wall outside surface 9 essentially forming a lever system with a pivot point located at the intersection 33 between the leg portion 23 and hook portion 27 of the clip member 22. A lock nut 34 cooperates between the screw 30 and the top surface 16 of the knife member for locking the head 32 at the desired elevation with respect to the hook portion 27 and wall upper edge 11.

In operation, the upper plate abutment 6 strikes the head 32 just prior to contacting the wall upper edge 11 on the opposite side of the die, thus causing the knife body 14 to be securely urged against the wall outside surface 9 at the area 20. Thus, there will not be a tendency for the sharp edge 15 to separate from the wall outside surface 9 as the edge 15 and die cutting edge 10 progress through the stack 3. The edge 15 is positioned adjacent an end or open edge 35 of the paper stack adjacent the area from which the blanks are being cut, so that the chisel 12 produces the desired break-away relief at 36 while the die is making its cut 37 through the paper sheets.

When a die cut 37 is completed and the die discharged of contents in the usual manner, the die is reset on the stack 3 in the most advantageous position to minimize waste. This often necessitates repositioning the chisel 12. In the practice of this invention, it is only necessary to lift the chisel 12 from the die wall and replace it in the desired position by insertion of the hook portion 27 over the die wall upper edge 11.

It is to be understood that while one form of this invention has been illustrated and described, it is not to be limited thereto except insofar as such limitations are included in the following claims.

What I claim and desire to secure by Letters Patent is:

1. A paper break-away chisel for a blank cutting die of the type pressed through a stack of paper sheets, said die having an upstanding wall with an inside surface and an outside surface and increasing in wall thickness upwardly from a lower cutting edge, said die wall terminating in a relatively thick, press-plate contacting upper edge; said chisel comprising:

- (a) a knife member having a body with a downwardly directed sharp edge and a top surface, and
- (b) a clip member secured to said body above said

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sharp edge, said clip member including a resilient hook portion extendable over said wall upper edge and projecting downwardly, said hook portion providing a heel for resiliently contacting said inside surface with said body adjacent said outside surface to removably grasp said wall therebetween,

(c) whereby said chisel is easily removable and replaceable on said die.

2. The chisel as set forth in claim 1, wherein:

(a) said body has an inner face directable toward said wall outside surface, said body inner face being adapted to contact said wall outside surface at said sharp edge, and

(b) means on said body and contactable with a press-plate for urging said body toward said wall outside surface during the pressing of said die through a stack of paper sheets.

3. The chisel as set forth in claim 2 wherein:

(a) said body top surface is spaced from said sharp edge a distance less than the distance between said die cutting edge and wall upper edge, said body urging means including

(b) an adjusting screw threadedly engaged in said body through said top surface and having a head projecting thereabove, and locking means cooperating between said screw and said knife member for locking said head in a position slightly above said hook portion,

(c) whereby a press-plate contacts said screw head with said die upper edge.

4. The chisel as set forth in claim 1, wherein:

(a) said body has an inner face directable toward said wall outside surface, and

(b) said clip member has a relatively thin leg portion substantially parallel to said wall outside surface and secured to said knife member at said inner face above said sharp edge,

(c) said leg portion projecting above said knife member body top surface and integrally joining said hook portion.

5. In combination:

(a) an envelope blank cutting die having a wall and a paper break-away chisel,

(b) said chisel including a resilient clip member grasping said wall.

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FRANK T. YOST, Primary Examiner

U.S. Cl. X.R.

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