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STAYING MACHINE DIE

5 Sheets-Sheet 1



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2,987,728

STAYING MACHINE DIE

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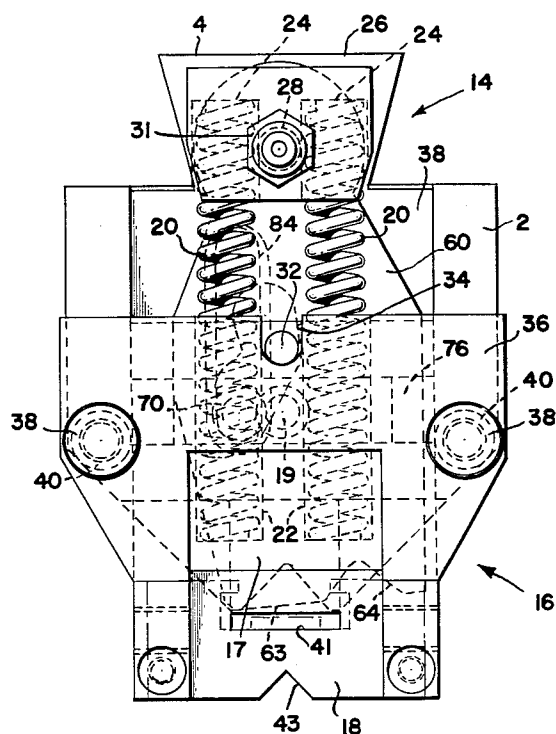


FIG. 3.

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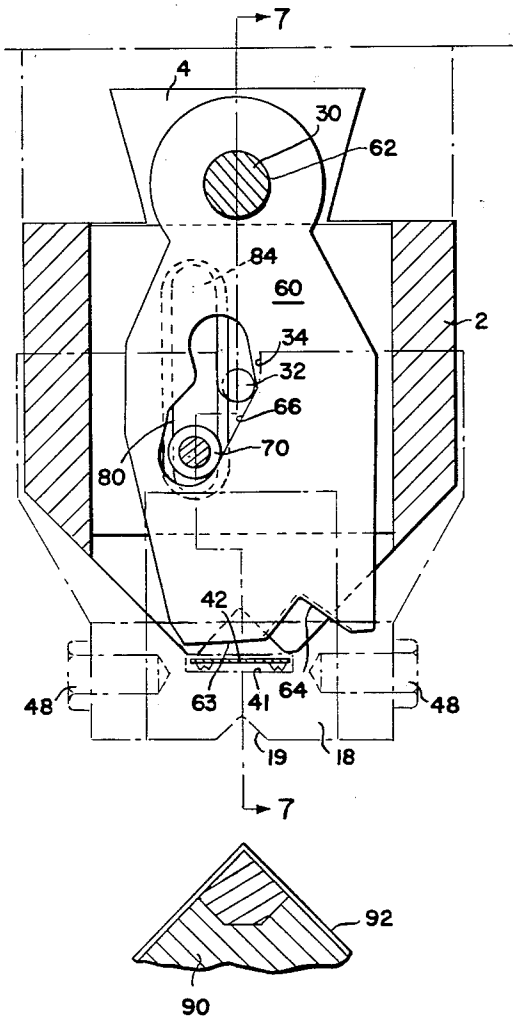


FIG. 4.

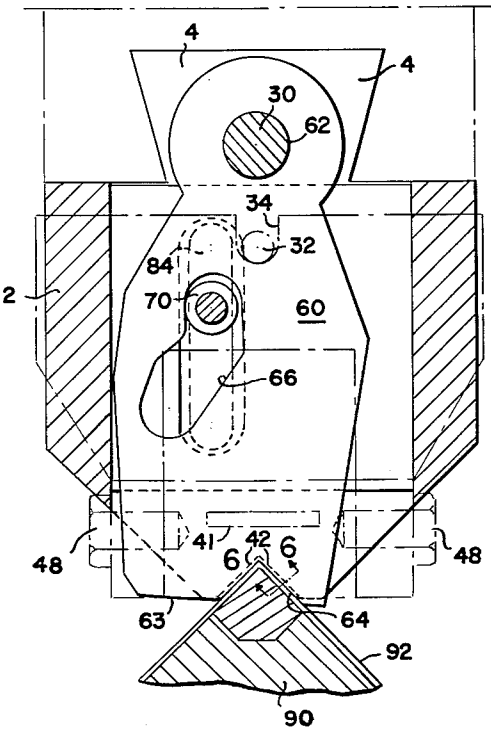


FIG. 5.

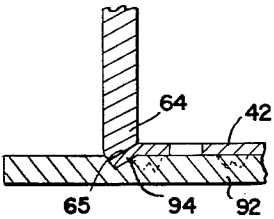


FIG. 6.

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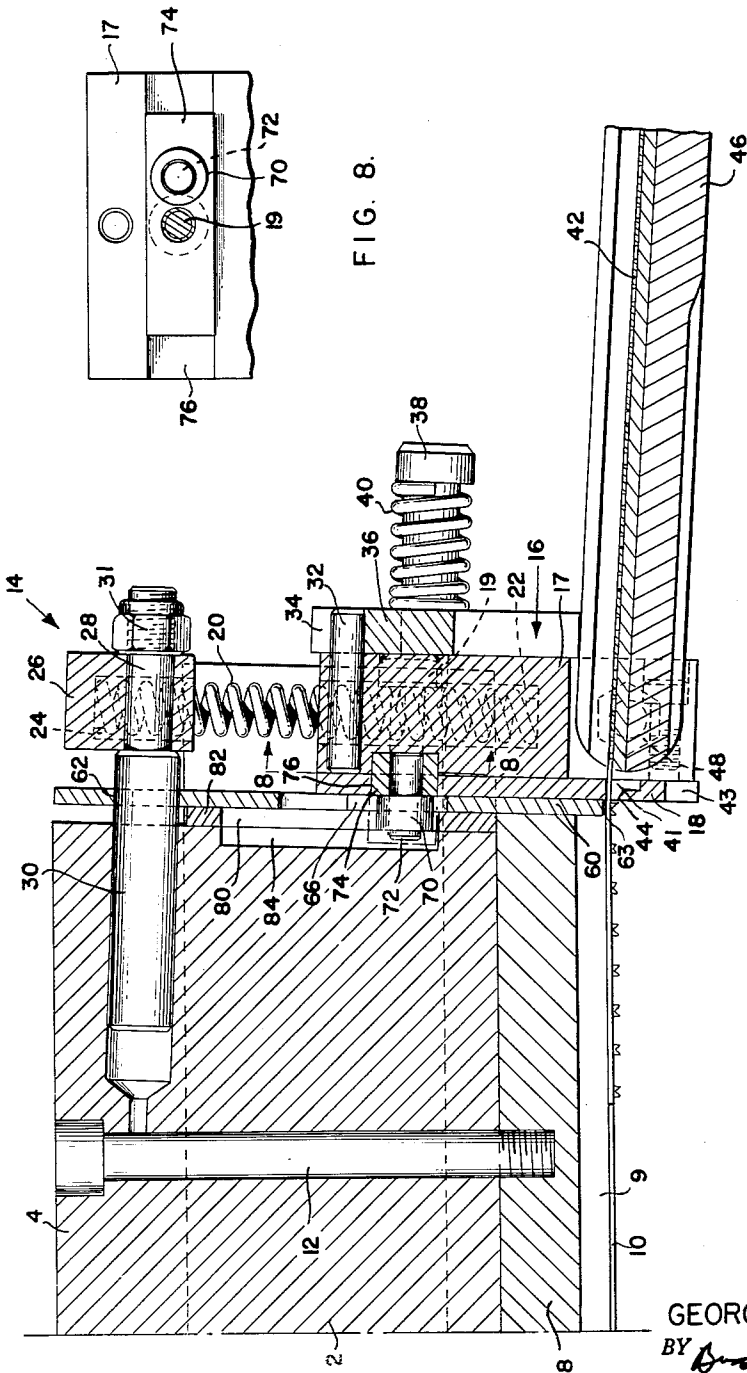


FIG. 7.

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2,987,728

STAYING MACHINE DIE

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4 Claims. (Cl. 1-117)

This invention relates to an improvement in a staying machine die and more particularly relates to an improvement in the mechanism of the die for cutting off the stay. The die of this invention is useful for example in connection with the application of metal stay strips to box corners.

It is known to the prior art to provide the die of a staying machine with an integrated mechanism for cutting off the stay at the desired point. More specifically, it is known to construct such a cut-off mechanism with a sliding knife which presents a straight knife edge for cutting the stay and a V-shaped edge when the stay is being secured. Such a device is disclosed in United States Patent No. 2,070,767, issued February 16, 1937. The structure of this invention is superior to that of the patent in that it provides a smooth action as against the snap action of the patented structure and is far easier to adjust. Due to its design, hardened metal plates can be used giving longer life and better operation. Further the backing up of the knife in this invention is superior, eliminating binding of the knife. All deficiencies have been fully overcome in the structure of this invention.

The invention will be further clarified by reading the following description in conjunction with the drawings in which:

FIGURE 1 is a side elevation of a die member in accordance with this invention;

FIGURE 2 is a plan view of the die member of FIGURE 1;

FIGURE 3 is a front elevation of the die of FIGURE 1;

FIGURE 4 is a vertical section taken on the plane indicated by the line 4-4 in FIGURE 2;

FIGURE 5 is a view of the parts of FIGURE 4 with the V portion of the knife cammed into its operative position;

FIGURE 6 is a section taken on the plane indicated by the line 6-6 in FIGURE 5;

FIGURE 7 is a section taken on the planes indicated by the line 7-7 in FIGURE 4; and

FIGURE 8 is a section taken on the planes indicated by the line 8-8 in FIGURE 7.

As shown in the drawings, a die 2 in accordance with this invention is provided with an upper key portion 4 which is adapted to be engaged by the key-way of the cross-head of a staying machine (not shown) as is conventional in the art and shown, for example, in the aforesaid Patent 2,070,767. Die 2 has a lower portion 8 provided with a V-shaped groove 9 having in its walls a pair of opposed slots 10 for the reception of a stay. The several portions of the die 2 are bolted together by means of bolts indicated at 12. As thus described, die 2 is conventional and well known to the art.

A stay cut-off mechanism indicated generally at 14, has a cutter slide 16 comprised of adjacent members 17 and 18. Cutter slide 16 is biased downwardly by means of compression coil springs 20, 20 which are engaged in openings 22, 22 in member 17 and openings 24, 24 in member 26. Member 26 is mounted on reduced portion 28 of a pin 30 which is secured to die 2 by a pressed fit. Member 26 is retained by a nut 31. The downward travel of the slide 16 is limited by a pin 32 secured to member 17 by a pressed fit and which engages a U-shaped slot 34 in retaining plate 36. Retaining plate 36

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engages the outer face of slide 16 and is secured to die member 2 by means of bolts 38, 38 and a pair of compression springs 40, 40 being interposed between retaining plate 36 and the heads of bolts 38. Member 18 of cutter slide 16 is provided with a slot 41 through which a metal stay 42 is adapted to pass and a V slot 43 for engagement of an anvil. Slot 41 has an edge 44 which is adapted to cooperate with a knife to be described in order to sever stay 42. Member 18 being separable from member 17 can readily be replaced at low cost or reground.

Stay 42 is supplied by a throat indicated at 46 in a conventional manner, throat 46 being secured to cutter slide 16 by bolts indicated at 48.

A knife 60 is pivotally secured to pin 30 at 62. Knife 60 is provided with a straight cutting edge indicated at 63 and an adjacent V-shaped portion 64 which is adapted to become aligned with V-shaped slot 9 of die 2. Knife 60 has a cam opening 66 which is engaged by a cam follower 70. Cam follower 70 is mounted on a pin 72 which is secured by a pressed fit to a block 74. Block 74 is mounted by a pressed fit in a groove 76 in cutter slide 16 and acts to secure adjacent members 17 and 18 of the cutter slide together. Block 74 is held by a pin 19 secured to block 74 and member 17 by a pressed fit. Cam follower 70 is adapted to move vertically in a slot 80 in plate 82 which is interposed between die 2 and knife 60. Die 2 is provided with a recessed portion 84 to provide for the unhindered movement of shaft 72 and cam follower 70.

The knife 60 is flat on both sides and the oppositely presenting faces thereof engage respectively with the adjacent flat faces of members 18 and 82.

In the above structure the design is such that moving parts and those adjacent thereto can be and preferably are of a hardened metal such as hardened steel.

As is best seen in FIGURE 7, the stay cut-off mechanism indicated at 14 lies at an angle to the vertical with the faces of the relatively moving parts lying in planes sloping from top to bottom in the direction in which the stay is fed to the die to inhibit the movement of the knife and the cutter slide away from the die against the bias of springs 40.

Operation

In operation stay 42 in the desired length is fed into the die 2. The die 2 and its associated mechanism is then forced downwardly against an anvil 90 which is indicated schematically in FIGURES 4 and 5 and which supports the box 92 which is to be stayed. The V slot 43 of cutter slide 16 engages box 92 on anvil 90 and prevents its further downward travel. Die 2 continues to move downwardly which results in knife edge 63 shearing stay 42 where it emerges from slot 41 in cutter slide 16. It will be appreciated that the shearing operation is accomplished quickly after slot 43 engages box 92 and before the position of knife 60 is shifted.

As die 2 continues in its downward movement, carrying with it knife 60, cam opening 66 is moved so that its left hand wall, as viewed in FIGURE 4, engages cam follower or roller 70, causing knife 60 to be swung to the left as shown in FIGURE 5, placing the V-shaped portion 64 in line with the V-shaped groove 9 of die 2. Thus, when die 2 forces stay 42 on to box 92, knife 60, rather than presenting the cutting edge 63, presents the V-shaped portion 64 which will act to secure the end of stay 42 to box 92.

As shown in FIGURE 6, chamfered face 65 of V-shaped portion 64 will secure the edges 94 of the stay 42 without leaving any exposed fray edges. As the die is carried back upwardly, springs 20 force cutter slide 16 downwardly until pin 32 engages slot 34. As cam

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follower 70 moves downwardly with respect to die 2, it engages the right-hand wall of opening 66 in knife 60, forcing the knife to move to the right, as shown in FIGURE 4, thus restoring the cutting edge 63 to its operative position. It is impossible for cutting edge 63 to touch anvil 90 causing damage to edge 63 and anvil 90. With conventional dies now in use if the box is not in place the cutting edge strikes the anvil damaging both the anvil and the cutting edge.

It is not desired to be limited to the subject matter except as set forth in the following claims.

What is claimed is:

1. In combination with a die for a staying machine, a cutter slide mounted for up and down movement with respect to the die and comprising a pair of adjacent members removably secured together, a spring biased retaining plate urging the cutter slide towards the die, a stop pin secured to the cutter slide and adapted to engage the retaining plate to limit the downward travel of the cutter slide, a pin extending from the upper portion of the die, a spring retaining member mounted on said pin, a pair of compression springs interposed between said spring retaining member and said cutter slide to bias the cutter slide downwardly, one of the said members of the cutter slide having a portion extending below the die to engage an anvil-supported box and having a slot for the passage of a stay to the die, a knife having its upper end pivotally secured to said pin extending from the die and having at its lower end a straight cutting edge and a V-shaped

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portion, said knife having a cam opening, a cam follower secured to the cutter slide and engaging said cam opening whereby the knife is pivoted after cutting off a stay passing through said slot to position the V-shaped portion for securing the cut-off end of the stay and the cutting edge is returned to its operative position when the die is moved away from the box, said die member having a cavity to accommodate a portion of the cam follower extending therein and said knife and said one member of the cutter slide having parallel abutting faces and said knife having a second face parallel to and abutting against a face on the adjacent end of the die.

2. Apparatus in accordance with claim 1 characterized in that the planes of all the said faces slope from top to bottom in the direction in which the stay passes to the die.

3. Apparatus in accordance with claim 1 characterized in that the cam follower comprises a shaft secured to the cutter slide and a roller for engagement in the cam opening.

4. Apparatus in accordance with claim 3 characterized in that the shaft is fixedly secured to a block carried in a groove in the cutter slide.

References Cited in the file of this patent

UNITED STATES PATENTS

1,044,257	Saur	Nov. 12, 1912
2,070,767	Wisner	Feb. 16, 1937