

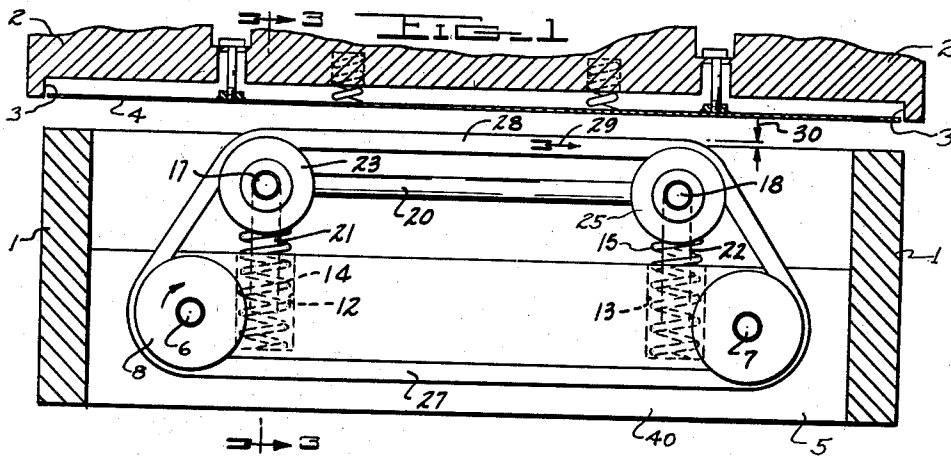
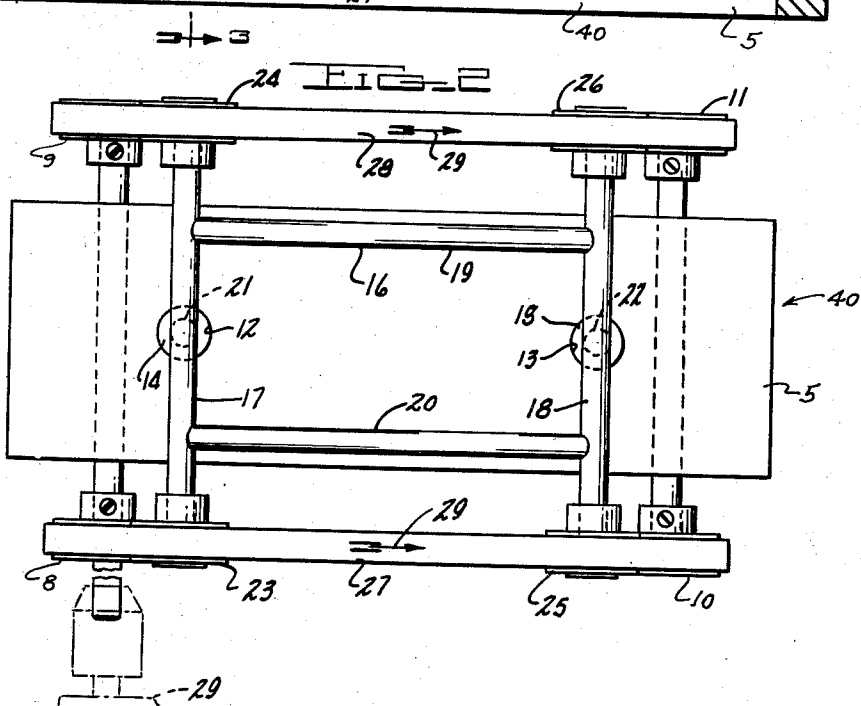
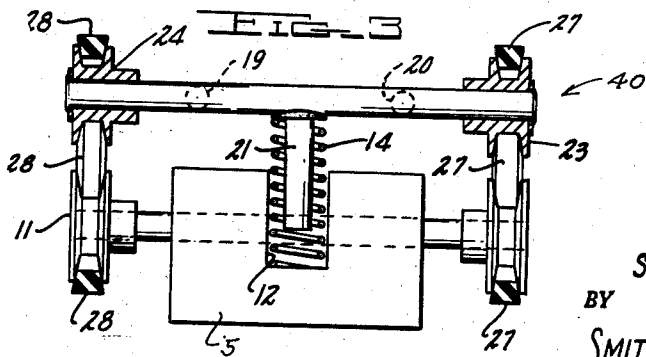
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PANEL EJECTOR

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2,849,064

PANEL EJECTOR

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5 Claims. (Cl. 164—33)

This invention relates to mechanism for ejecting blanks from blanking dies.

The formation of a blank is effected by feeding a sheet of material into the space between two cutting dies, forcing the cutting dies through the sheet to produce the blank, drawing the dies apart, and ejecting the formed blank from the space between the dies. The ejection operation removes the blank and permits a succeeding portion of the sheet material to move into the space between the cutting dies.

Objects of the present invention are:

- (1) To provide a blank ejector which operates in timed sequence with movement of the cutting dies,
- (2) To provide a blank ejector which is automatically rendered inoperative during the blank-cutting period,
- (3) To provide a blank ejector which completely removes the blank from between the cutting dies,
- (4) To provide a blank ejector which is operable independently of cutting and feed-in speeds, thereby making the ejector usable with a wide variety of machines having different cutting and feed-in speeds,
- (5) To provide a blank ejector which can be employed with existing cutting dies with a minimum of parts modification, and
- (6) To provide a blank ejector which can be manufactured as a low cost item.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

Fig. 1 illustrates a die member and blank ejector constructed according to the present invention, with the die member shown in section and the ejector shown in elevation for illustration purposes,

Fig. 2 is a top plan view of the Fig. 1 ejector, and Fig. 3 is a sectional view of the Fig. 1 ejector taken on line 3—3 in Fig. 1.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

In the drawings there is shown a conventional female blanking die 2 cooperable with the registering punch or male die 1. The sheet material to be blanked is fed into the space between dies 1 and 2, and the blanking operation is performed by forcing die 2 downwardly through the sheet material to shear around the periphery of the die 1. The formed blank is retained in opening 3 in die 2, and when die 2 is subsequently moved upwardly the blank is forced out of opening 3 by conventional spring-urged stripper plate 4. The stripping action leaves the

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blank lying on top of die 1, and in order to eject the blank from between the dies it is proposed, under the present invention, to provide the ejector mechanism generally indicated by numeral 40.

- 5 Ejector mechanism 40 includes a base 5 in which are rotatably mounted shafts 6 and 7. Shafts 6 and 7 fixedly carry pulleys or rollers 8, 9, 10 and 11. Base 5 is provided with two cylindrical recesses 12 and 13 which seat compression coil springs 14 and 15. A frame 16 is positioned above base 5. Frame 16 includes shafts 17 and 18 and connecting members 19 and 20. Post members 21 and 22 project downwardly from shafts 17 and 18 into springs 14 and 15. Pulleys 23, 24, 25 and 26 are rotatably mounted on shafts 17 and 18. Endless flexible conveyor means in the form of belts 27 and 28 are trained around the pulleys. The action of springs 14 and 15 is such that belts 27 and 28 are put in tension against the pulleys when punch 2 is in its illustrated position. A continuously rotating electric or air motor 29 is drivingly connected to shaft 6 for effecting movement of belts 27 and 28 in the direction of arrows 29. The upper surfaces of belts 27 and 28 project above the upper face of die 1 a small distance 30 in order to lift a blank clear of die 1 when it is desired to convey the blank from between dies 1 and 2.

Operation of the mechanism is such that initially the sheet metal stock is fed into the space between dies 1 and 2 in the arrow 29 direction. Springs 14 and 15 are strong enough to keep pulleys 23 through 26 in their illustrated position against the gravitational force due to the stock. As a result, belts 27 and 28 are maintained in driving engagement with drive rollers 8, 9. The weight of the stock is however not great enough to cause any undue wear on the belts. Subsequently die 2 is forced through the stock. Pulleys 23 through 26 are thereby forced downwardly against the action of springs 14 and 15 so as to loosen the frictional drive between drive rollers 8, 9 and conveyor belts 27, 28. As a result, the belts have no tendency to rub against the stock when punch 2 is bearing down on the stock. Subsequent upward movement of the die 2 causes the formed blank to be lifted clear of die 1. This movement is accompanied by a restoration of the frictional drive between rollers 8, 9 and belts 27, 28. When the formed blank is forced downwardly out of opening 3, by stripper plate 4, it drops onto belts 28 and 29. Belts 27 and 28 are at this time moving in the arrow 29 direction so as to transport the blank out of the space between dies 1 and 2 in the arrow 29 direction. The clearance distance 30 reduces frictional resistance between the blank and the upper face of die 1, and thereby contributes to movement of the blank in the arrow 29 direction.

I claim:

1. The combination comprising two opposed blanking dies; drive roller means carried by one of said dies; idler roller means adjacent the space between the dies; endless conveyor means trained around said idler roller means and said drive roller means; and yieldable means urging the idler roller means and adjacent portions of the conveyor means toward the space between the opposed dies whereby to (1) put the conveyor surface in the space between the opposed dies, and (2) cause the conveyor means to be drivingly engaged by the drive roller means; the yieldable nature of the urging means permitting the idler roller means to move toward the drive roller means in response to die-closing pressure transmitted to the endless conveyor means, whereby to loosen the conveyor means' grip on the drive roller means.
2. The combination comprising two spaced opposed blanking dies; drive means; guide means adjacent the space between the dies; endless conveyor means trained around said drive means and guide means so as to put

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a portion thereof in the space between the dies when they are in spaced apart position; and yieldable means urging the guide means and the aforementioned portion of the conveyor means toward the space between the opposed dies.

3. The combination comprising first and second opposed dies, said first die being provided with a recess in open communication with said second die; a drive roller in said first die; two idler rollers mounted on parallel axes in the aforementioned recess; endless conveyor means trained around said drive roller and idler rollers; the portion of said conveyor means between the idler rollers being positioned in the path of the second die during blanking movement; and yieldable means urging the idler rollers toward the second die whereby to (1) put the conveyor surface in the space between the opposed dies and (2) cause the endless conveyor means to be drivingly engaged by the drive roller; the yieldable nature of the urging means permitting the second die to apply pressure to the endless conveyor means and thereby drivingly disengage said endless conveyor means from the drive roller.

4. The combination comprising first and second opposed dies; said first die being provided with a recess in open communication with said second die; a base defining the bottom wall of the aforementioned recess; a drive roller journaled on said base; a frame positioned in the recess; two idler rollers mounted on the frame for movement around parallel axes; endless conveyor means trained around the drive roller and idler rollers;

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the portion of said conveyor means between the idler rollers being positioned in the path of the second die during blanking movement; and yieldable means between the frame and base urging said frame toward said second die to tighten the conveyor means on the drive roller; the yieldable nature of the urging means permitting the second die to apply pressure to the endless conveyor means so as to loosen it on the drive roller.

5. The combination comprising first and second opposed blanking dies mounted for movement from spaced apart positions into telescoped positions; endless conveyor means extending along said first die with a portion thereof projecting into the space between the dies when they are in their spaced apart positions; rotary drive means for the endless conveyor means located in the first die; floating guide means for the conveyor means; said endless conveyor means being trained around the floating guide means and rotary drive means; and yieldable means urging the guide means and projecting portion of the conveyor means toward the second die; whereby the drive means is in driving engagement with the endless conveyor means when the dies are separated but is drivingly disengaged from the endless conveyor means by pressure of the second die when the dies are telescoped.

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