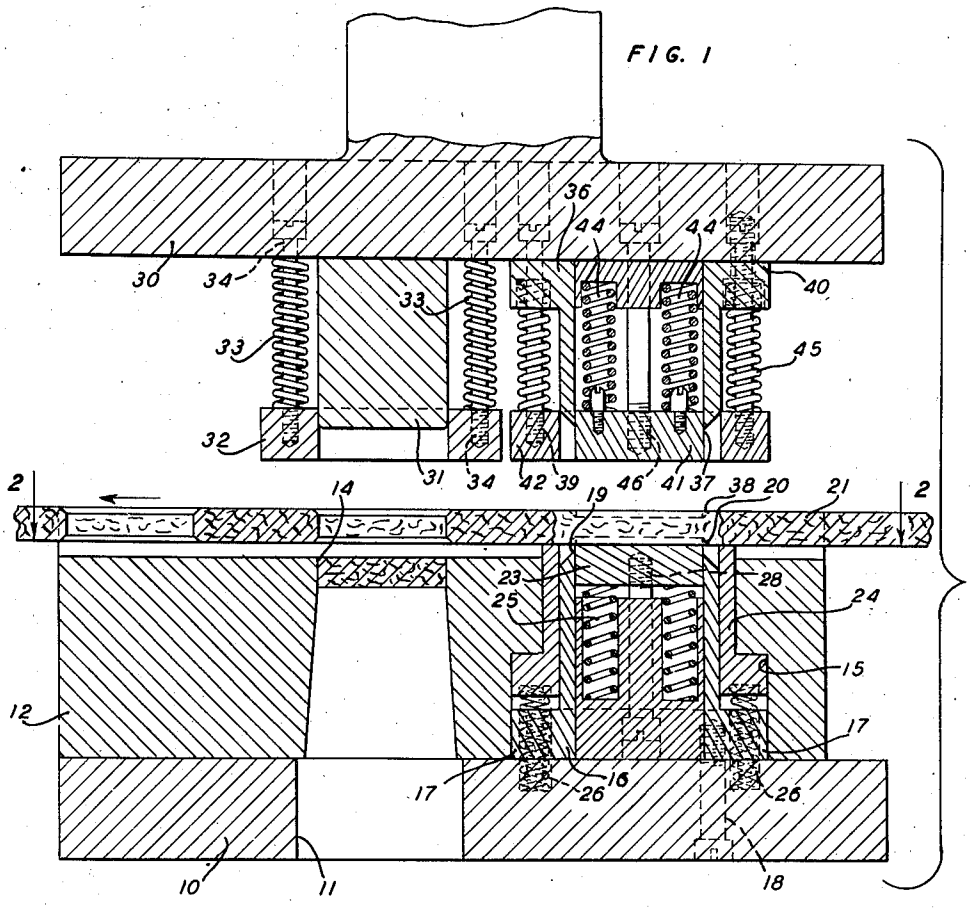
June 27, 1944. N. M. OLNEY 2,352,339

APPARATUS FOR BLANKING MATERIALS

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FIG. 1



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FIG. 2

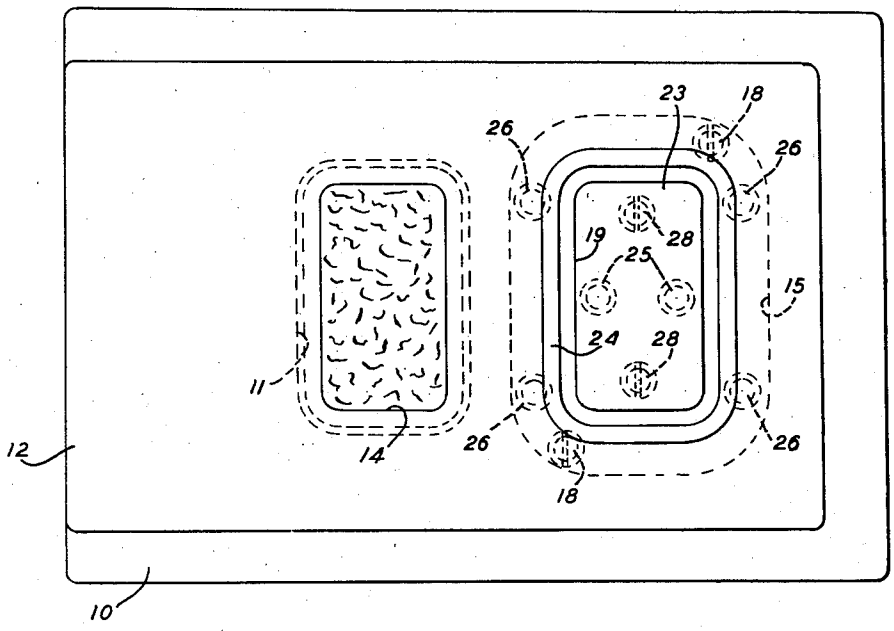


FIG. 3

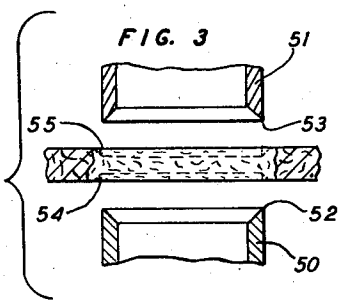
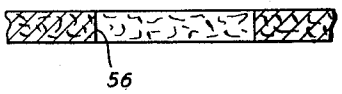


FIG. 4



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APPARATUS FOR BLANKING MATERIALS

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Application September 4, 1942, Serial No. 457,369

9 Claims. (Cl. 164—18)

This invention relates to apparatus for blanking materials, particularly those of the brittle type.

Extreme care must be taken in blanking materials of the brittle type, such as fibres, plastics and the like, to eliminate fractures and breakage during such operations. To minimize damage to such materials they are ofttimes heated prior to the blanking operations, yet even then it is difficult to blank materials of considerable thickness and have the product free of fractures. To eliminate such difficulties it has been found highly advantageous to score such materials prior to the blanking or punching operation.

An object of the invention is to provide a simple yet highly efficient apparatus for scoring a material prior to the punching of the part therefrom.

With this and other objects in view, the invention comprises an apparatus for scoring a material at positions where the material is to be punched, and subsequently punching the scored portion of the material.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings, wherein

Fig. 1 is a vertical sectional view of the apparatus;

Fig. 2 is a top plan view of the lower portion of the apparatus, this view being taken along the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary detailed view illustrating another species of the invention, and

Fig. 4 is a sectional view of material resulting from the structure illustrated in Fig. 3.

Referring now to the drawings, attention is first directed to Figs. 1 and 2, wherein a die shoe 10 is formed for mounting upon a table of a conventional press (not shown) and provided with an opening 11 for the passage of the punched or blanked parts. A die 12 is mounted upon the die shoe 10 in a suitable manner and includes a die opening 14 and a cavity 15, the latter being provided for the lower scoring mechanism.

The lower scoring mechanism includes a scoring element 16 of the contour illustrated in Fig. 2 and provided with a flanged base 17 for securing, with the aid of screws 18, to the die shoe 10. The upper edge 19 of the element 16 may be called a scoring edge, and is of the bevelled contour shown, to perform a score of the contour illustrated at 20, in the under surface of material 21. Pressure or stripping members 23 and 24 are respectively disposed within and without the scoring element 16, the former filling the area within the element while the latter surrounds and conforms to the element, as will be observed by viewing Figs. 1 and 2. The members 23 and 24 are supported by springs 25 and 26 respectively, and are normally urged outwardly thereby. The outward movement of the member 23 is limited by the screws 28 while the outward movement of the member 24 is limited by a shoulder in the cavity 15. The screws 28 and the said shoulder in the cavity 15 are adapted to position their respective members 23 and 24 so that their outer surfaces will lie in a common plane beyond the scoring edge 19 of the element 16 when the apparatus is in opened position.

Attention is now directed to the upper half of the apparatus, which illustrates an upper die shoe 30 supported by the reciprocal portion of the press (not shown) and supporting a punch member 31 adapted to cooperate with the die opening 14 in the final operation, which will hereinafter be described.

A pressure or stripping member 32, surrounding the punch member 31, is supported by springs 33 and conventional limit screws 34, to cause functioning of the member 32 to hold the material 21 during the operation of the apparatus and to strip the material from the punch member during the opening half of the operating cycle.

Attention is now directed to the upper scoring structure, which includes a scoring element 36 similar in contour to the scoring element 16 and having a scoring edge 37 identical in contour to the scoring edge 19, and of the similar bevelled type to form a score 38 of the same contour and in direct alignment with the score 20. The element 36 is secured to the die shoe 30 by means of screws 39, these screws extending through a flange portion 40 of the element. In a similar manner, pressure or stripping members 41 and 42 are respectively disposed within and without the element 36 and conform to the contour thereof. These members are normally urged downwardly by springs 44 and 45 respectively, which are in the present instance stronger or provided with greater force than the springs 25 and 26. The movement of the members 41 and 42 may be controlled by suitable screws 46.

Considering now the operation of the apparatus, let it be understood that suitable means may be provided to advance the material 21 intermittently in the direction of the arrow sufficient distances during each movement to position the portion scored at the first station in direct alignment with the punch member 31 and

die opening 14 at the second station. Other means may also be provided to guide the material during its movement.

When the material is at rest, attention is first directed to the first station, that is the portion of the apparatus including the scoring elements 16 and 36. During one operating cycle of the apparatus the die shoe 30, with its attached structure, is moved downwardly and during this movement the members 41 and 42, with their lower surfaces lying in a common plane, will engage the material 21, and, due to the fact that the springs 44 and 45 have greater force than the springs 25 and 26, the latter will be compressed through downward movement of their members 23 and 24. This movement is continued until the material rests upon the upper surface of the die 12, and during this movement the material has been forced onto the scoring edge 19 of the element 16, causing the scoring edge to cut into the lower surface of the material to form the score 20.

The half cycle has not been completed, as there is continued movement downwardly of the upper die structure to cause compression of the springs 44 and 45 sufficient for the continued downward movement of the scoring element 36 until the score 38 is formed thereby, in the upper surface of the material. When this has been accomplished, one half of the operating cycle of the apparatus has been completed, and upon the return stroke the various parts move in their reverse action, that is the element 36 is moved free of the material until the springs 44 and 45 have been extended their full limit controlled by the screws 46, after which the members 23 and 24 will be rendered effective to move the material 21 free of the element 16. At this time the material may be advanced to position the scored portion thereof in registration with the punch member 31 and die opening 14, so that during the next cycle of operation of the apparatus the scored portion will be pushed by the punch member through the die opening and allowed to drop into a receptacle (not shown) beneath the aperture 11.

With the scoring elements shown in Figs. 1 and 2, the inner walls of the scored portions 20 and 38 are in vertical alignment with each other to produce the portion with vertical outer edges. If it is desired to provide the aperture in the material or work with the vertical edges and leave the depressed or disturbed edges in the portion removed, scoring elements 50 and 51, identical in every detail to the elements 16 and 36 respectively with the exception of scoring edges 52 and 53 thereof, may be provided to accomplish this result. It will be observed that the bevelled contours of the edges 52 and 53 are the reverse of those of the former elements 16 and 36, so that the outer surfaces of scores 54 and 55 are in vertical alignment with each other. The result of the truly vertical surface 56 of the aperture after the scored part has been removed is illustrated in Fig. 4. The results illustrated in Figs. 3 and 4 may be produced by the apparatus shown in Figs. 1 and 2, with the substitution of the scoring elements 50 and 51 for the scoring elements 16 and 36.

With the aid of the apparatus a material may be scored where a portion is to be removed therefrom. In this manner a cut or score is made in one surface of the material short of the full thickness thereof. Subsequently, another score is made in the opposite surface of the material in direct alignment with that of the first score yet short of the full thickness thereof and short of the first score. As a result thereof, the portion to be blanked is cut from the material excepting the central area which serves to support the portion for the final operation. Therefore, as the greatest abuse to material during blanking operations occurs to the surfaces of the material in starting the cut, such has been eliminated by the scores and breakage or fracture of the material is thus avoided. Subsequently, the material adjacent the scored portion is supported while pressure is applied to the portion to push it free of the material. During this time the area receiving the final punching operation is spaced from the surfaces of the material and is supported against damage by the outer or scored areas of the material.

It has been defined that the surfaces of the material are scored at different intervals at the same station during the operating cycle of the apparatus. It should be understood, that if so desired, the opposite surfaces may be scored at different stations at different operating cycles or they may be scored simultaneously during each operating cycle.

Although specific improvements of the invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claims.

What is claimed is:

1. An apparatus for blanking material comprising opposing scoring elements, means to support a material between the elements, means to cause relative movement of the elements to cause their forming of scores in opposite surfaces of the material surrounding a portion thereof and a pressure pad cooperating with the said moving means to control forming of the scores at different intervals, and means to push the portion from the material.

2. An apparatus for blanking material comprising opposing scoring elements, pressure pads therefor having compressible means of varied forces, means to support a material between the elements, means to cause relative movement of the elements and their pressure pads to cause forming of aligned scores at different intervals in opposite surfaces of the material surrounding a portion thereof, and means to push the portion from the material.

3. An apparatus for blanking material comprising companion die units having a scoring station and a punching station, the scoring station comprising a scoring element and a companion pressure member adapted to cause forming of a score surrounding a portion of a material disposed between the units when relative movement is imparted to the units, the punching station comprising means to punch a portion scored at the first station from the material during relative movement of the units.

4. An apparatus for blanking material comprising companion die units having a scoring station and a punching station, the scoring station comprising opposing scoring elements adapted to cause forming of aligned scores in opposite surfaces of a material disposed between the units and surrounding a portion thereof when relative movement is imparted to the units, the punching station comprising means to punch a portion scored at the first station from the material during relative movement of the units.

5. An apparatus for blanking material comprising a fixed scoring element, an opposing movable scoring element, means to support a material between the elements, means to move the movable element relative to the fixed element to cause forming of aligned scores in opposite surfaces of the material surrounding a portion thereof, and a pressure pad for one of the elements having a compressible means to hold the material free of its element until the score formed by the other element has been completed.

6. An apparatus for blanking material comprising a fixed scoring element, an opposing movable scoring element, means to support a material between the elements, means to move the movable element relative to the fixed element to cause forming of aligned scores in opposite surfaces of the material surrounding a portion thereof, a pressure pad for one of the elements having a compressible means to hold the material free of its element until the score formed by the other element has been completed, a die spaced from the fixed scoring element, and a punch carried by the said moving means and cooperating with the die to subsequently punch the scored portion from the material.

7. An apparatus for blanking material comprising a fixed scoring element, an opposing movable scoring element, means to support a material between the elements, means to move the movable element relative to the fixed element to cause forming of aligned scores in opposite surfaces of the material surrounding a portion thereof, a pressure pad for one of the elements having a compressible means to hold the material free of its element until the score formed by the other element has been completed, a die spaced from the fixed scoring element, and a flat surfaced punch carried by the said moving means and cooperating with the die to subsequently punch the scored portion from the material.

8. An apparatus for blanking material comprising a fixed scoring element, an opposing movable scoring element, means to support a material between the elements, means to move the movable element relative to the fixed element to cause forming of aligned scores in opposite surfaces of the material surrounding a portion thereof, a pressure pad for one of the elements having a compressible means to hold the material free of its element until the score formed by the other element has been completed, and a pressure pad for the other element actuable to free the material therefrom after the forming of the scores.

9. An apparatus for blanking material comprising a fixed scoring element, an opposing movable scoring element, means to support a material between the elements, a member to support the movable element movable relative to the fixed element to cause forming of aligned scores in opposite surfaces of the material surrounding a portion thereof, and a pressure pad carried by the member and movable in advance of the movable element to cause forming of the score by the fixed element prior to the forming of the score by the movable element.

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