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⑤④ **Apparatus for producing a blank from stock material.**

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Description

The present invention relates to the production of component parts by stamping a smooth edge blank from material and is concerned particularly with an improved method and apparatus for producing such stampings.

The production of stampings from stock material is either by a conventional stamping process or by a fine-blanking process. A stamping produced by conventional methods suffers from the disadvantage known in the art as die break. When a stamping is produced by conventional methods, the cooperating punch and die produce an initial shearing action after which the blank is severed by fracturing. A ridge, known as "shear" extends around the edge of the stamping and divides the portion that has sheared from the portion that has fractured. The fractured portion is the "die break" and is rough and granular in nature. As the thickness of the blank from which the stamping is produced increases so does the problem of die break.

The problem of die break is largely averted by the known process of "fineblanking". Prior to the concept of the present invention, the process of fineblanking (see for example US Patent Specification No 3,635,067) was carried out by positive retention of the blank and stock material in such a manner as to prevent die break when the punch and die perform their blanking operation. By eliminating the die break portion the entire edge of the stamping is shear and there is no fracture.

Fineblanking finds particular application where component parts having close tolerances are required since when a blank is produced by fineblanking many subsequent machining operations, such as grinding, milling, etc., are rendered unnecessary. Although the process of fineblanking has these beneficial and advantageous features, it suffers also from substantial drawbacks. Two of the most serious drawbacks are the need to provide a special press and the slow speed of operation of such a press.

The special press for performing fineblanking operations has hitherto been a triple action punch press which operates to provide three required forces. These forces, which are shear pressure, "yee ring" pressure and counter pressure, necessitate the provision of a special press which is particularly expensive and must be extremely robust to provide sufficient support to absorb reaction, sudden pressures, and all vibration.

As explained in the preceding paragraphs, known fineblanking presses must securely clamp both the blank and the stock material from which the blank is stamped. To this end, it has been necessary to provide a special component to encircle the area to be blanked out. That special component conventionally comprises an up-standing pointed ridge which serves to engage, and in fact "bite into", the stock material around the area to be blanked out. The ridge is termed as "stinger" and may be either in the form of a separate annular disc having an appropriately

profiled upper surface or may, in some embodiments, be embodied in a component known as a "stripper" which is utilized to remove the surplus stock material after the stamping or blank has been removed. In either event, the precise location of the stinger and the need securely to clamp the surplus blank material necessarily results in a press which is intricate, expensive and cumbersome. Quite apart from these inherent disadvantages, it will be appreciated that the utilization of a stinger requires sufficient surplus stock material to permit the desired clamping, thereby leading to waste.

Turning now to the speed of operation, known fineblanking presses operate at speeds of up to five eighths of an inch per second. Consequently, fineblanking can better be explained as extruding metal rather than stamping metal. However, the provision of a stinger to embed in the stock material around the area to be blanked serves to hold that stock material securely during the fineblanking operation and prevent the material from flowing away from the blanking punch.

The present invention does away with the need to provide a stinger and teaches a method of producing fine edge stampings which does not involve clamping of the stock material around the area to be blanked. In other words, only the area which will be blanked is clamped during the blanking operation. The elimination of the stinger not only allows more stampings to be produced per unit length of stock material but, moreover, allows the stock material freely to flow away from the blanking punch which has the beneficial effect of reducing heat and friction around the blanking punch during stock removal thereby increasing the life of the blanking punch.

The present invention also allows the use of a standard press of the type commonly found in practically all metal stamping plants. This standard press, which is simple in construction when used in accordance with the present invention, is capable of operation at speeds hitherto inappropriate for fineblanking.

To this end, according to the invention there is provided a blanking punch and die combination comprising a blanking die defining an opening, a cooperating blanking punch dimensioned closely to mate with said opening, the die edge defining said opening being rounded, a stock engaging shedder displaceable within said die opening to engage and clamp stock, a stripper encircling said blanking punch and displaceable therealong to remove surplus stock after a blanking operation characterized by the die edge defining said opening being rounded and spacer means disposed between the blanking die and the stripper to space the blanking die and the stripper apart by a distance exceeding the thickness of said stock.

Such a combination is intended to be incorporated in a stamping die. Accordingly, the present invention also provides a stamping die comprising a die set in which a blanking punch and die combination is mounted, said blanking punch and die combination comprising a blank-

ing die defining an opening, a cooperating blanking punch dimensioned closely to mate with said opening, a stock engaging shedder displaceable within said die opening to engage and clamp stock, a stripper encircling said blanking punch and displaceable therealong to remove surplus stock after a blanking operation characterized by the die edge defining said opening being rounded and spacer means disposed between the blanking die and the stripper to space the blanking die and the stripper apart by a distance exceeding the thickness of said stock.

Thus, in accordance with the invention, a blanking punch and die combination or a stamping die provides a rounded (or radiused) edge of the die which cooperates with the blanking punch. It has already been explained how the elimination of a stinger enables the surplus stock material to flow away and the provision of this rounded or radiused edge enhances such flowing away of scrap material. In fact, this feature should be considered in conjunction with the increased speed of operation, made possible by the press of the invention. With regard to the increased speed of operation, the advantage obtained by the present invention can best be explained by observing that prior fineblanking presses operate to extrude metal to achieve a smooth edge, whereas the present invention makes it possible to stamp the metal to produce a product having the same quality.

Brief Description of the Drawings

FIGURE 1 is a vertical section through one embodiment of an apparatus of the invention prior to commencement of a piercing and blanking operation;

FIGURE 2 is a section similar to Figure 1 but showing the component parts of the apparatus after commencement of a piercing and blanking operation;

FIGURE 3 is an enlarged view of a detail of the apparatus of Figures 1 and 2 showing some of the component parts in position during a later stage of a piercing and blanking operation; and

FIGURE 4 is a view similar to Figures 1 and 2 but showing the component parts at a still later stage of a piercing and blanking operation.

Description of Preferred Embodiment

Referring now to the drawings, there is illustrated a press incorporating a stamping die for effecting a blanking operation. The illustrated press serves simultaneously both to smooth edge blank and smooth edge pierce an article from a sheet or strip of stock material in a single stamping operation.

To this end, the press incorporates a ram 10 movable towards and away from a bolster 12 by means of, for example, a rotating crankshaft (not shown).

An upper die shoe 14 is carried by the ram 10 and a lower die shoe 16 is mounted to the bolster 12. The lower die shoe is securely attached to the bolster 12 by, for example, screw means

generally designated 18. In the attached drawings, similar screw means are utilized illustratively where various components of the press are to be secured to one another. It will, of course, be appreciated that such screw means represent examples only and any suitable conventional means may be utilized to secure components to one another.

The upper die shoe 14 is secured to the ram 10 through the intermediary of a spring loaded power pack generally designated 20.

The spring loaded power pack is secured in position by a T-plate 22 secured to, and carried by, the ram 10 by means of, for example, screws 24, 26. The T-channel in the T-plate 22 receives and retains a housing 28 having a base 30, depending side walls 32 and a cover 34. The base 30 has a flange or rim 36 projecting peripherally outwardly to seat within the T-channel of the T-plate 22.

The base, side walls and cover of the housing 28 define an internal chamber which accommodates a spring element or elements 38. That spring element bears on a platform 40 to urge the platform downwardly into abutting engagement with the cover 34.

The cover 34 is secured to the side walls 32 and the upper die shoe 14 is, in turn, secured to the cover 34. For convenience, and as illustrated in the drawings, this joint securing may be effected by common screws 42 and 44 extending from the die shoe 14 through the cover 34 and into the side walls 32.

It will be appreciated that with the utilization of the above described floating T arrangement, it is important to ensure that the relatively displaceable component parts of the press are at all times correctly aligned with respect to one another. To this end, guiding pillars 46 upstand from the lower die shoe and pass through registering bores 48 in the upper die shoe. Figure 1 of the drawings clearly shows one such pillar 46 and schematically indicates that at least one other similar pillar is provided. The cooperating guiding pillars and bores constrain the upper die shoe to move directly toward and away from the lower die shoe under the influence of the ram 10.

A blanking punch 50 is secured to the lower die shoe 16 and a cooperating blanking die 52 is secured to and carried by the upper die shoe 14. The drawings show the blanking die 52 secured to the upper die shoe 14 by screw means 54, 56 and the blanking punch 50 secured to the lower die shoe 16 by screw means 58, 60 extending through an outwardly directed peripheral flange 62 provided at the base of the punch 50.

The punch 50 has a concentric bore 64 extending therethrough from top to bottom, which bore 64 constitutes a piercing die. A cooperating piercing punch 66 is carried by the upper die shoe 14. As shown in the drawings, the die 66 has a barrel portion 68 disposed rearwardly of the leading end and terminating in an enlarged head 70. To receive the punch 66 the upper die shoe 14 is provided with concentric bores of different diameter

to define a shoulder 72 against which the heat 70 of the punch seats. The shoulder 72 prevents ejection of the punch 66 downwardly out of the upper die shoe 14 and the cover 34 prevents movement of the punch in the opposite direction.

The leading end of the punch 66, forward of the barrel portion 68, passes through a shedder 74 accommodated within a bore 76 extending through the blanking die 52. The shedder 74 serves to exert a clamping force on the stamping to restrain the latter during piercing and blanking operations. The restraining force is asserted by the spring element 38 and is transmitted from that spring element via the platform 40 and pins 78, 80 extending through aligned appropriately dimensioned bores in the cover 34 and upper die shoe 14. Although only two such pins 78, 80 are shown in the drawings, preferred embodiments of the invention utilize four such pins. As shown in the drawings, the shedder engaging ends of the pins are flared at 82 and 84 to present enlarged surfaces in contact with the shedder 74.

Whilst the piercing punch 66 is surrounded by the shedder 74, the blanking punch 50 is surrounded by a stripper 86. The stripper is in the form of a plate having a central aperture 88 dimensioned to encompass the external periphery of the blanking punch. The stripper 86 is displaceable longitudinally of the blanking punch upwardly towards a supported stamping under the influence of spring means 90, 92. The biasing spring force in this respect is transmitted by the spring means 90, 92 which abut at one end on a platform 94 and at the other end on a movable platform 96 shown most clearly in Figures 2 and 4. The spring biased movement of the platform 96 is transmitted to the stripper 86 by elongated pin members 98 extending through aligned bores 100, 102 extending through the bolster 12 and lower die shoe 16 respectively. In the embodiment shown in the drawings, the pin members 98 are stepped along their length with each portion of different diameter being received in mating bores 100, 102 of corresponding diameter. For convenience, the drawings show only one such pin member 98 in detail but illustrate that at least one further pin member may be provided. In fact, it is preferred to provide four such stripper biasing pin members. Each pin member 98 is attached to the stripper by, for example screw means 104.

The operation of the press to both pierce and blank by a fineblanking operation will be described in detail hereinafter. Before detailing the sequence of operations, attention is drawn to the fact that spacers 106, 108 are carried on the under side of the blanking die 52 to control the closest spacing between that blanking die and the stripper 86. It is important to note that the depth of the spacers 106, 108 is at least twice the thickness the stock material to be stamped.

In the embodiment shown in the drawings the bolster 12 is mounted to the punch press frame (not shown). The platform 110 is fastened to the bolster 12 by screws 112. Platform 94 and sleeves

114 are retained in position relative to platform 110 by screw bolts 116. The spring means 90, 92 are disposed around the sleeves 114 and engage the under side of the platform 96 through the intermediary of washer elements 118, 120.

Having described the overall structure of the invention, the sequence of operation of that press to perform a piercing and blanking operation will now be described.

At the beginning of an operational sequence, the above described components of the invention occupy the position shown in Figure 1. That is to say, the ram 10 is fully withdrawn to its uppermost position to create a maximum gap between the blanking punch 50 and the blanking die 52. A strip of stock 122 from which a stamping is to be made is fed into the position shown in Figure 1 where it overlies the uppermost surface of the blanking punch 50. Feeding of the stock may be either manually or by an automatic feed.

With the strip of stock in this position, the controls, not shown, are operated to cause the ram 10 to descend. Upon such descent of the ram a first contact between the relatively movable upper and lower parts of the stamping die is made by the spacers 106, 108 on the uppermost surface of the stripper 86. This initial contact is ensured by the fact that the depth of the spacers 106, 108 is at least twice the thickness of the stock material 122. Thereafter, continued downward movement of the ram 10 causes the stripper 86 to move downwardly against the influence of the spring means 90, 92.

Secondary contact is established between the under side of the shedder 74 and the uppermost surface of the stock 122. This secondary contact is brought about by so dimensioning the component parts of the stamping die that with the spring elements 38 in a state of minimum compression the under side of the shedder 74 stands proud of the under side of the blanking die 52 in the manner shown most clearly in Figure 1 of the drawings.

Figure 2 of the drawings shows the component parts in their relative positions at the point when said secondary contact is established. Continued downward movement of the ram 10 and components carried thereby will cause the shedder 74 to be forced upwardly thereby compressing the spring element 38. This compressing action is exerted on the spring element 38 through the intermediary of the pins 78, 80 and platform 40.

At this point in the sequence of operation, the respective punches and dies commence the blanking and piercing operations. To this end, the punch 50 cooperates with the edges of the die 52 defining the bore 76. As most clearly shown in Figure 3 of the drawings, those edges 124 of the die 52 are radiused. The provision of a radiused or rounding on the operational edges of the die 52 is crucial to the provision of a smooth edge stamping.

Still referring to Figure 3 of the drawings, it will be observed at this time that the stock is clamped only over the area which will be occupied by the

finished end piece. With the stripper 86 depressed and held clear of the stock by the spacers 106, 108, the scrap material 126 around the edges of the blank is unsupported and, under the influence of the radiused edges 124 is free to flow during advance of the punch 50 into the die bore 76. In other words, the radiused edges 124 of the blanking die 52 draw the stock material around the edge of the blanking punch 50 and the scrap material is free to flow since it is not contained or held under any pressure.

In order to achieve this desired effect, it is not only crucial that the edges 124 of the die 52 are radiused but it is also very important that there be minimal clearance between the external periphery of the punch 50 and the wall portions of the die bore 76. Although "minimal" is a relative term, it will be clearly understood in the context of conventional punches and dies where it is usual to have a clearance between the punch and die equal to approximately ten per cent of the thickness of the material to be stamped. In the case of the present invention, the clearance is preferably not more than one per cent of the thickness of the material to be stamped.

It will be appreciated that piercing of the stock 122 by the punch 66 and die bore 64 is also brought upon downward movement of the ram 10. As shown most clearly in Figure 3 of the drawings, the leading end edges 128 of the punch 66 are radiused.

Although Figure 3 of the drawings shows the respective punch and die parts relatively positioned so that the blanking operation effected by the punch 50 and cooperating die 52 begins before the piercing operation effected by the punch 66 and die bore 64, it is obviously possible relatively to position the punch 66 with respect to the die 52 so that the blanking and piercing operations commence simultaneously. Alternatively, the piercing operation might be arranged to begin before the blanking operation. The time increment, if any, between commencement of the blanking and piercing operations is governed by the position of the forward end of the punch 66 with respect to the underside and radiused edges of the die.

Upon completion of the piercing and blanking operations, the ram 10 is retracted upwardly by the crankshaft. This, in turn, effects a withdrawal of the spacers 106, 108 thereby freeing the stripper 86 which is caused also to move upwardly under the influence of the spring means 90, 92 which transmit their force through the washers 118, 120, the support 110 and the pins 98.

This final stage in the sequence of operations is shown in Figure 4 of the drawings. The stripper 86 is shown supporting the removed scrap 126. Further upward motion of the ram 10 from the position shown in Figure 4 will create a space between the underside of the shedder 74 and the stamping whereupon the stamping may be removed by any convenient means and preferably by a blast of compressed air. At this point in time, it is impossible for the completed stamping to be

forced back in to the stock from which it was removed due to the fact that the spacers 106, 108 are more than twice the thickness of the stamping.

The radius of the die edge forming the opening is from about 0.005 inches to about 0.025 inches depending on the type and thickness of the stock material.

Although one preferred embodiment of the apparatus of the invention has been described in detail with reference to the drawings, it will be appreciated that minor modifications to that embodiment may be made within the scope of the appended claims. For example, the spring loaded power pack 20 preferably is powered by a gaseous spring which may be a nitrogen gas spring. Further, the depth of the spacers 106, 108 need only be at least twice the stock thickness where the stamping is to be blown out of the die. To comply with the inventive concept in its broadest aspect the spacers need only space the die and stripper by a distance exceeding the thickness of the stock material.

Claims

1. A blanking punch and die combination comprising a blanking die (52) defining an opening, a cooperating blanking punch (50) dimensioned closely to mate with said opening, a stock engaging shedder (74) displaceable within said die opening to engage and clamp stock, a stripper (86) encircling said blanking punch (50) and displaceable therealong to remove surplus stock after a blanking operation characterized by the die edge defining said opening being rounded and spacer means (106, 108) disposed between the blanking die (52) and the stripper (86) to space the blanking die (52) and the stripper (86) apart by a distance exceeding the thickness of said stock.

2. A combination according to claim 1, characterized by a piercing punch (66) and piercing die (64), said piercing punch (66) extending through said shedder (74) and said piercing die (64) being defined by a bore (64) extending through said blanking punch (50).

3. A combination according to claim 2, wherein said piercing punch (66) has a rounded leading edge.

4. A stamping die comprising a die set in which a blanking punch and die combination is mounted, said blanking punch and die combination comprising a blanking die (52) defining an opening, a cooperating blanking punch (50) dimensioned closely to mate with said opening, a stock engaging shedder (74) displaceable within said die opening to engage and clamp stock, a stripper (86) encircling said blanking punch (50) and displaceable therealong to remove surplus stock after a blanking operation characterized by the die edge defining said opening being rounded and spacer means (106, 108) disposed between the blanking die (52) and the stripper (86) to space the blanking die (52) and the stripper (86) apart by a distance exceeding the thickness of said stock.

5. A stamping die according to claim 4, characterized in that the blanking punch (50) is secured to a first die shoe (16) and the blanking die (52) is secured to a second die shoe (14), said first and second die shoes being relatively displaceable toward and away from each other and a spring loaded power pack (20) is adapted to be disposed between a ram of a press and said second die shoe (14), said power pack incorporating a housing (30) adapted to be secured to said press ram and containing spring means (38) arranged to exert a downward force on the shedder (74) by means of elongate pin-like elements (78, 80) extending through the second die shoe and into the bore in the blanking die (52) to abut the shedder (74) accommodated therein.

6. A stamping die according to claim 5, characterized in that the housing (28) is in the form of an inverted cup comprising a base (30), wall portions (32) depending from said base, a cover (34) extending across said wall portions to define a chamber and an axially movable platform (40) seated within said chamber, and contacting said pin-like elements (78, 80), and wherein said spring means (38) is disposed within said chamber between said base and said movable platform, said spring means being operable to urge said platform away from said base toward said cover.

7. A stamping die according to claim 5 or 6, characterized in that the stripper (86) is a spring (90, 92) biased platform disposed around the blanking punch, elongate pin-like members (98) extend through the first die shoe (16) one end of said pin-like members contacting the underside of the stripper and the remote ends of said elements receiving said spring biasing force, the remote ends of said pin-like elements rest on one side of a movable platform (96) and wherein spring means (90, 92) under compression abut the opposite side of said platform to exert the spring biasing force on the stripper through the intermediary of said platform and pin-like elements.

8. A combination according to any preceding claim, characterized in that there is a radial clearance between the blanking punch (50) and said opening which does not exceed 1% of the thickness of said stock.

9. A combination according to any preceding claim, characterized in that said distance is at least twice the thickness of the stock.

10. A combination according to any preceding claim, characterized in that the radius of the rounded die edge defining said opening is from about 0.005 inches to about 0.025 inches.

Revendications

1. Ensemble de découpage à poinçon et matrice, comprenant une matrice de découpage (52) définissant une ouverture, un poinçon de découpage (50) coopérant avec cette matrice et dimensionné pour s'engager exactement dans ladite ouverture, un organe de butée (74), mobile dans cette ouverture de manière à retenir et serrer une bande à découper, un dévêtisseur (86) disposé

autour dudit poinçon de découpage et mobile le long de celui-ci pour enlever le surplus de bande après un découpage, caractérisé en ce que l'arête de la matrice définissant ladite ouverture est arrondie et en ce que des moyens d'écartement (106, 108) sont disposés entre la matrice de découpage (52) et le dévêtisseur (86) pour maintenir ceux-ci à un écartement dépassant l'épaisseur de ladite bande.

2. Ensemble de découpage selon la revendication 1, caractérisé en ce qu'il comporte un poinçon de perçage (66) et une matrice de perçage (64), ledit poinçon de perçage (66) s'étendant à travers ledit organe de butée (74) et ladite matrice de perçage (64) étant définie par un trou (64) qui traverse ledit poinçon de découpage (50).

3. Ensemble de découpage selon la revendication 2, dans lequel ledit poinçon de perçage (66) présente en tête une arête arrondie.

4. Estampeuse comportant un dispositif de support de matrices, dans lequel est monté un ensemble de découpage à poinçon et matrice qui comprend une matrice de découpage (52) définissant une ouverture, un poinçon de découpage (50) coopérant avec cette matrice et dimensionné pour s'engager exactement dans ladite ouverture, un organe de butée (74), mobile dans cette ouverture pour retenir et serrer une bande de matière à découper, un dévêtisseur (86) disposé autour dudit poinçon de découpage et mobile le long de celui-ci pour enlever le surplus de bande après un découpage, caractérisé en ce que l'arête de la matrice définissant ladite ouverture est arrondie et en ce que des moyens d'écartement (106, 108) sont disposés entre la matrice de découpage (52) et le dévêtisseur (86) pour maintenir ceux-ci à un écartement dépassant l'épaisseur de ladite bande.

5. Estampeuse selon la revendication 4, caractérisée en ce que le poinçon de découpage (50) est fixé à une première semelle (16) et la matrice de découpage (52) est fixée à une seconde semelle (14), ces deux semelles étant agencées pour effectuer un déplacement relatif l'une vers l'autre et vice-versa, et en ce qu'un bloc de transmission (20) à ressort est agencé pour être disposé entre un pilon presse d'une presse et ladite seconde semelle (14), ce bloc de transmission comprenant un corps (28) agencé pour être fixé audit pilon et renfermant des moyens à ressort (38) agencés pour exercer sur l'organe de butée (74) une force vers le bas au moyen d'éléments allongés en forme de tiges (78, 80) qui s'étendent à travers la seconde semelle et dans l'ouverture de la matrice de découpage (52) pour s'appuyer contre l'organe de butée (74) logé dans cette ouverture.

6. Estampeuse selon la revendication 5, caractérisée en ce que ledit corps (28) présente une forme de cuvette renversée et comporte un fond (30), des éléments de paroi (32) solidaires de ce fond, un couvercle (34) disposé transversalement aux éléments de paroi pour définir une chambre, et un plateau (40) mobile axialement dans cette chambre et en contact avec lesdits éléments en forme de tiges (78, 80), et en ce que lesdits

moyens à ressort (38) sont disposés dans ladite chambre entre le fond et le plateau mobile et sont agencés pour repousser le plateau à distance du fond en direction du couvercle.

7. Estampeuse selon la revendication 5 ou 6, caractérisée en ce que le dévêtisseur (86) est constitué par un plateau sollicité par des moyens à ressort (90, 92) et disposé autour du poinçon de découpage, en ce que des éléments allongés en forme de tiges (98) s'étendent à travers la première semelle (16), leur première extrémité étant en contact avec la face inférieure du dévêtisseur et leur seconde extrémité recevant ladite sollicitation des moyens à ressort, en ce que la seconde extrémité desdits éléments en forme de tiges est en appui contre une face d'un plateau mobile (96), lesdits moyens à ressort (90, 92) étant en compression contre la face opposée dudit plateau pour exercer une force de rappel élastique sur le dévêtisseur par l'intermédiaire de ce plateau et des éléments en forme de tige.

8. Ensemble de découpage selon l'une quelconque des revendications précédentes, caractérisé en ce qu'il comporte, entre le poinçon de découpage (50) et ladite ouverture, un jeu radial qui ne dépasse pas 1% de l'épaisseur de la bande à découper.

9. Ensemble de découpage selon l'une quelconque des revendications précédentes, caractérisé en ce que ledit écartement est égal à au moins deux fois l'épaisseur de la bande à découper.

10. Ensemble de découpage selon l'une quelconque des revendications précédentes, caractérisé en ce que le rayon de l'arête arrondie définissant ladite ouverture de la matrice est compris approximativement entre 0,127 mm (0,005 inches) et 0,635 mm (0,025 inches).

Patentansprüche

1. Stanzstempel — und Prägeplattenkombination mit einem Stanzwerkzeug (52) mit einer Öffnung, mit einem kooperierenden Prägestempel (50), der so dimensioniert ist, daß er eng mit der genannten Öffnung zusammenarbeitet, mit einem Stanzmaterial-Erfassungsdach (74), das zum Erfassen und Einklemmen von Stanzmaterial in der Werkzeugöffnung verschiebbar ist, und mit einem Abstreifer (86), der den Prägestempel (50) umgibt und der an ihm zur Entfernung von Überschußmaterial nach einer Prägeoperation verschiebbar ist, dadurch gekennzeichnet, daß der die Öffnung begrenzende Werkzeugrand abgerundet ist und daß Abstandsteile (106, 108) zwischen dem Stanzwerkzeug (52) und dem Abstreifer (86) angeordnet sind, um das Stanzwerkzeug (52) und den Abstreifer (86) auf Abstand zu halten und zwar auf eine Distanz, die größer ist als die Dicke des Stanzmaterials.

2. Kombination nach Anspruch 1, gekennzeichnet durch einen Lochstempel (66) und ein Lochwerkzeug (64), wobei sich der Lochstempel (66) durch das Werkstück-Erfassungsdach erstreckt und das Lochwerkzeug (64) durch eine Bohrung

(64) definiert ist, die sich durch den Prägestempel (50) erstreckt.

3. Kombination nach Anspruch 2, dadurch gekennzeichnet, daß der Lochstempel (66) einen abgerundeten Führungsrand aufweist.

4. Prägestanze, die ein Werkzeugset enthält, in der ein Stanzstempel und eine Prägeplattenkombination befestigt ist, wobei der Stanzstempel und die Prägeplattenkombination ein Stanzwerkzeug (52) mit einer Öffnung, einen kooperierenden Prägestempel (50), der so dimensioniert ist, daß er mit der Öffnung zusammenarbeitet, ein Stanzmaterial-Erfassungsdach (74), das zum Erfassen und Einklemmen des Stanzmaterials in der Öffnung verschiebbar ist, und einen Abstreifer (86) aufweist, der den Prägestempel (50) umgibt und der an ihm entlang zur Entfernung des Überschußmaterials nach einer Prägeoperation verschiebbar ist, dadurch gekennzeichnet, daß der die Öffnung begrenzende Werkzeugrand abgerundet ist und daß Abstandsteile (106, 108) zwischen dem Stanzwerkzeug (52) und dem Abstreifer (86) angeordnet sind, um das Stanzwerkzeug (52) und den Abstreifer (86) auf Abstand zu halten und zwar auf eine Distanz, die größer ist als die Dicke des Stanzmaterials.

5. Prägestanze nach Anspruch 4, dadurch gekennzeichnet, daß der Prägestempel an einem ersten Gesenkschuh (16) und das Stanzwerkzeug (52) an einem zweiten Gesenkschuh (14) gesichert ist, wobei der erste und der zweite Gesenkschuh relativ zueinander und voneinander weg verschiebbar sind und wobei ein federbelastetes Kraftteil (20) zwischen einem Prägebär und dem zweiten Gesenkschuh (14) angeordnet ist, wobei das Kraftteil ein Gehäuse (30) zur Befestigung an dem Prägebär beinhaltet und eine Federeinrichtung aufweist, die vorgesehen ist, um eine nach unten gerichtete Kraft auf das Dach (74) mittels länglicher zapfenähnlicher Elemente (78, 80) auszuüben, welche sich durch den zweiten Gesenkschuh (14) hindurch und in die Bohrung in dem Stanzwerkzeug (52) erstrecken, um an dem darin aufgenommenen Dach anzuliegen.

6. Prägestanze nach Anspruch 5, dadurch gekennzeichnet, daß das Gehäuse (28) als umgekehrte Tasse ausgebildet ist, mit einer Basis (30), mit von der Basis abzweigenden Wandteilen (32), mit einer sich über die Wandteile zur Bildung einer Kammer erstreckenden Abdeckung und mit einer in der Kammer gelegenen axial verschiebbaren Plattform (40), die mit den zapfenähnlichen Elementen (78, 80) in Verbindung steht, wobei das Federglied (38) im Inneren der Kammer zwischen der Basis und der beweglichen Plattform angeordnet ist, wobei die Federkraft so gerichtet ist, daß sie die Plattform von der Basis weg in Richtung auf die Abdeckung hin zwingt.

7. Prägestanze nach Anspruch 5 oder 6, dadurch gekennzeichnet, daß der Abstreifer (86) eine durch Federglieder (90, 92) belastete Plattform ist, die um den Prägestempel angeordnet ist, wobei längliche zapfenförmige Glieder (98) sich durch den ersten Gesenkschuh (16) erstrecken, welche mit ihren einen Enden mit der Unterseite

des Abstreifers in Verbindung stehen und auf deren anderen Enden die Federkraft wirkt, wobei ferner die anderen Enden der zapfenförmigen Elemente auf einer Seite einer beweglichen Plattform (96) aufliegen und wobei die Federglieder (90, 92) unter Spannung an die gegenüberliegende Seite der Plattform angepreßt sind, um die Federvorspannungskraft auf den Abstreifer über die dazwischenliegende Plattform und die zapfenförmigen Elemente auszuüben.

8. Kombination nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß ein ra-

diales Spiel zwischen dem Prägestempel (50) und der genannten Öffnung vorliegt, welches 1% der Dicke des Stanzmaterials nicht überschreitet.

5 9. Kombination nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß der genannte Abstand wenigstens zweimal so groß ist wie die Dicke des Stanzmaterials.

10 10. Kombination nach einem der vorstehenden Ansprüche, dadurch gekennzeichnet, daß der Radius des abgerundeten Werkzeugrandes, der die genannte Öffnung abgrenzt, zwischen ungefähr 0,005 inch und ungefähr 0,025 inch beträgt.

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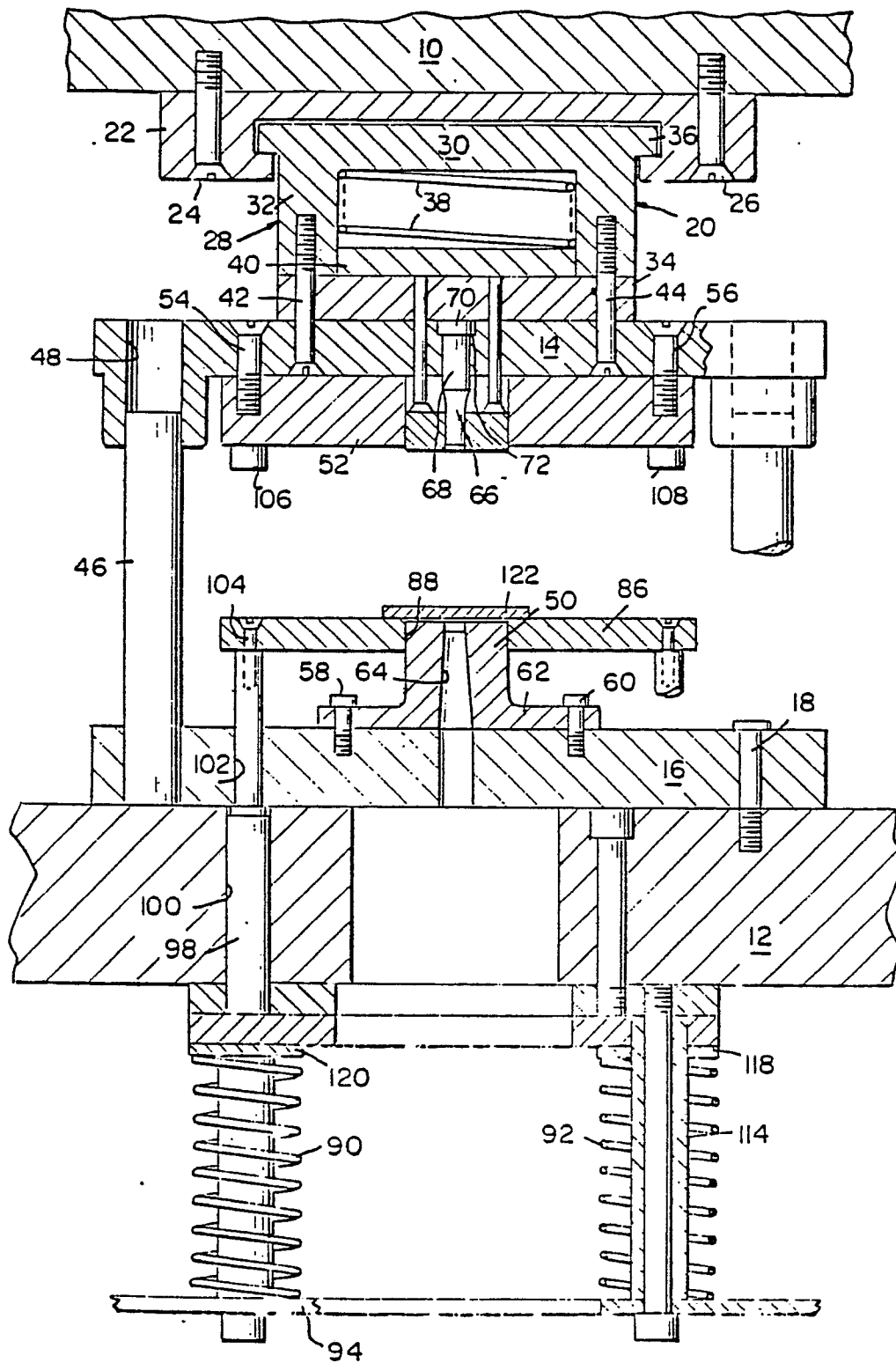


FIG. 1

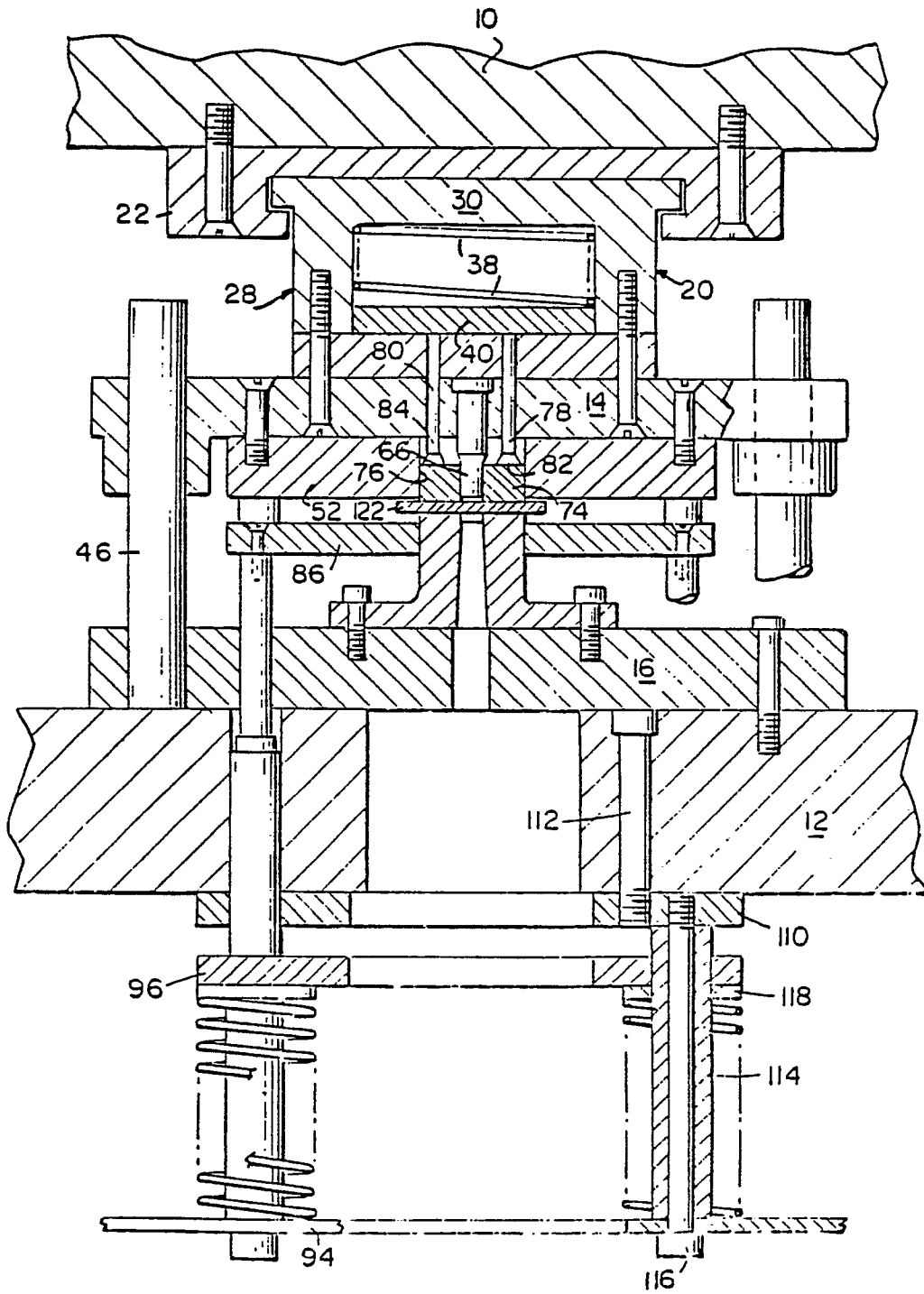


FIG. 2

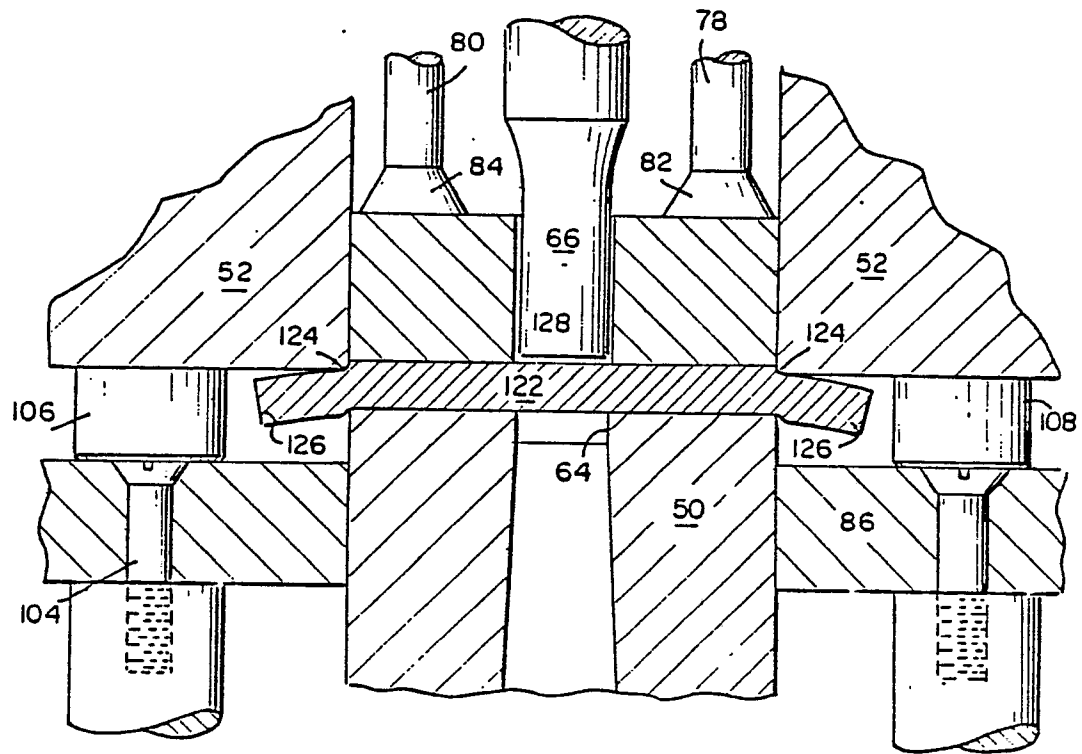


FIG. 3

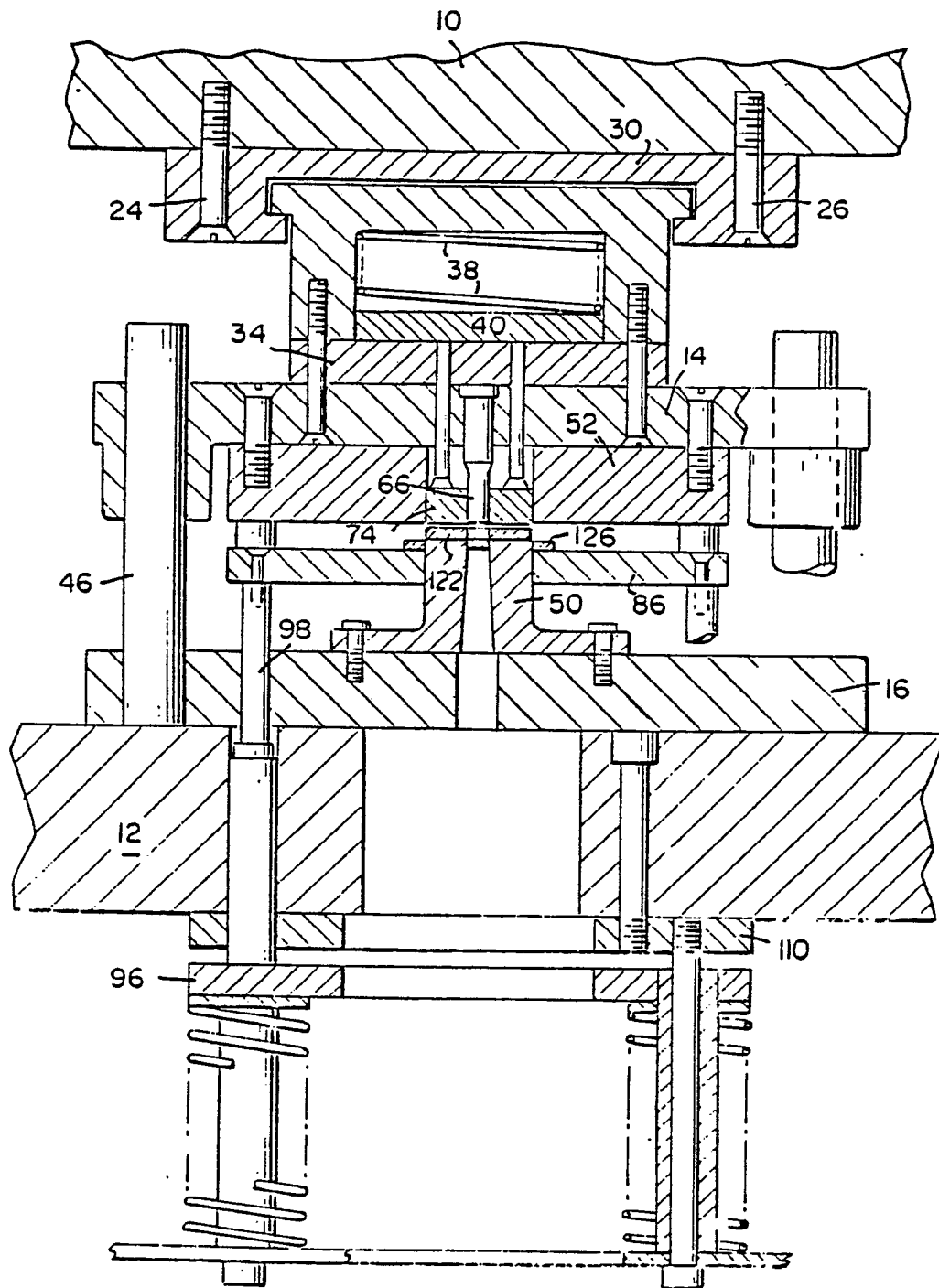


FIG. 4