C. C. ELSENER.

COMBINATION BLANKING AND FORMING DIE.

APPLICATION FILED MAR. 20, 1917.

1,270,933. Patented July 2, 1918.

3 SHEETS—SHEET 1.

Fig. 1.

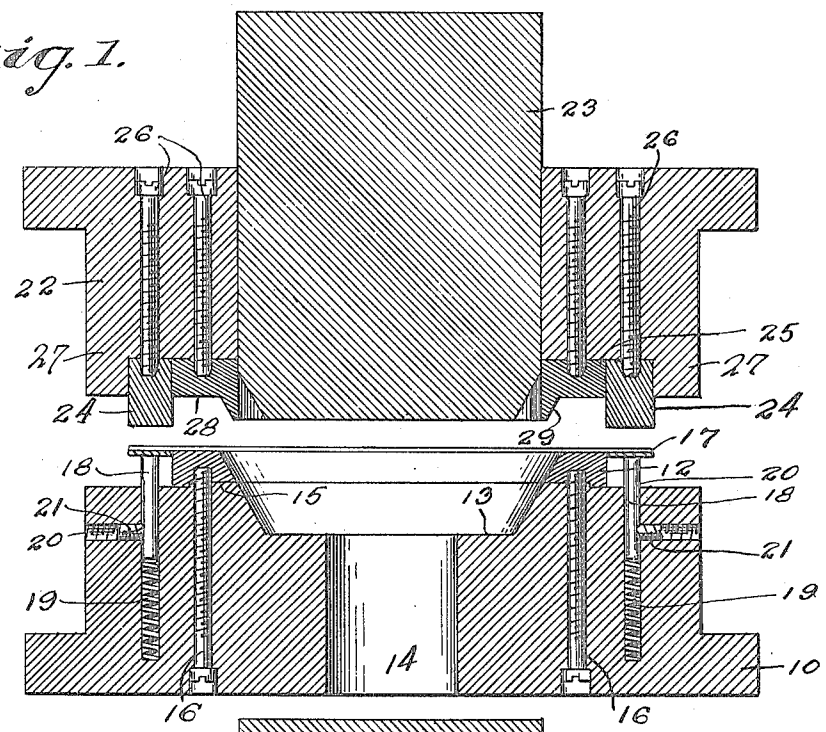
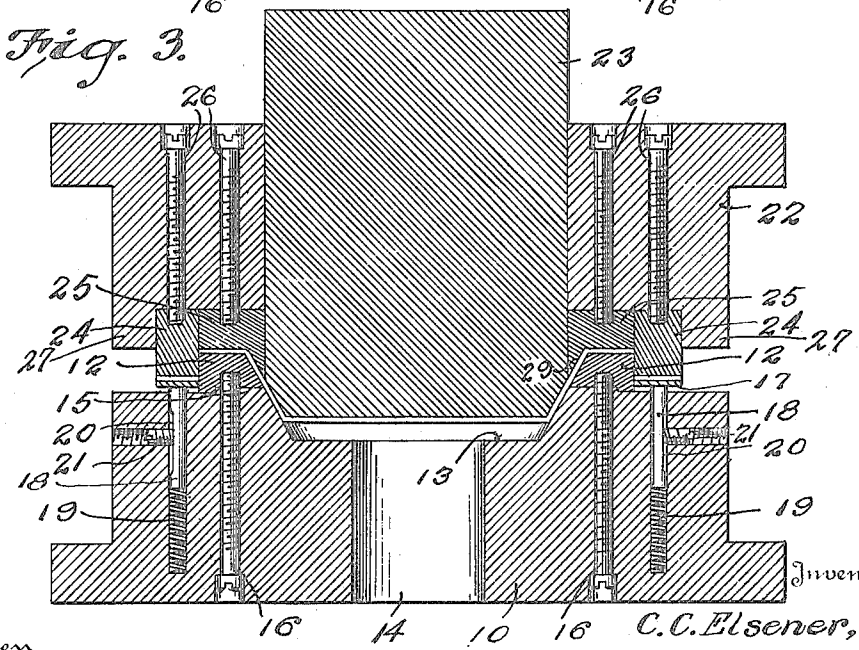


Fig. 3.



Inventor

C. C. Elsener,

Witness

Chr. Nielsen Jr.

By H. S. Woodward

Attorney

C. C. ELSENER.

COMBINATION BLANKING AND FORMING DIE.

APPLICATION FILED MAR. 20, 1917.

1,270,933. Patented July 2, 1918.

3 SHEETS—SHEET 2.

Fig. 2.

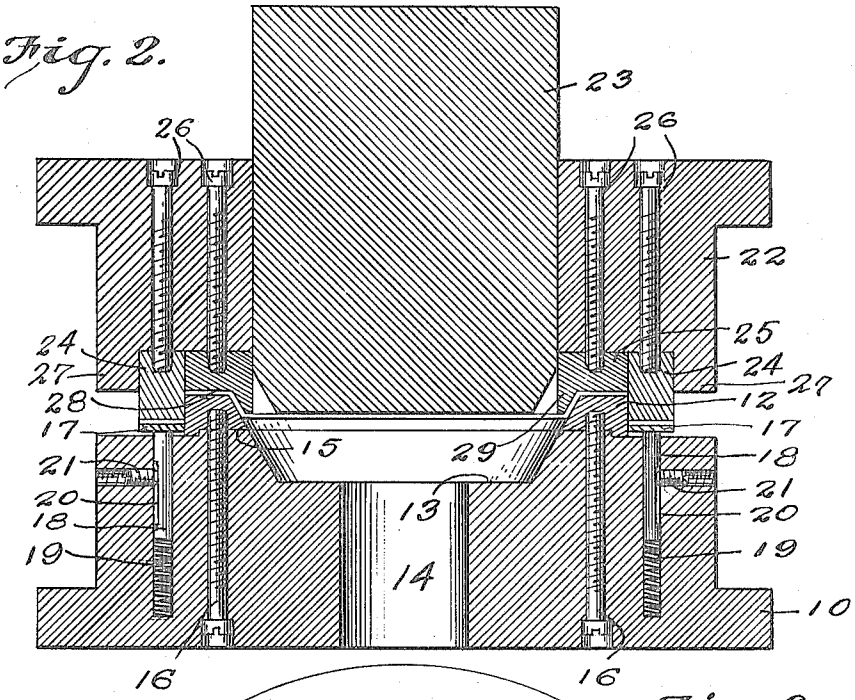
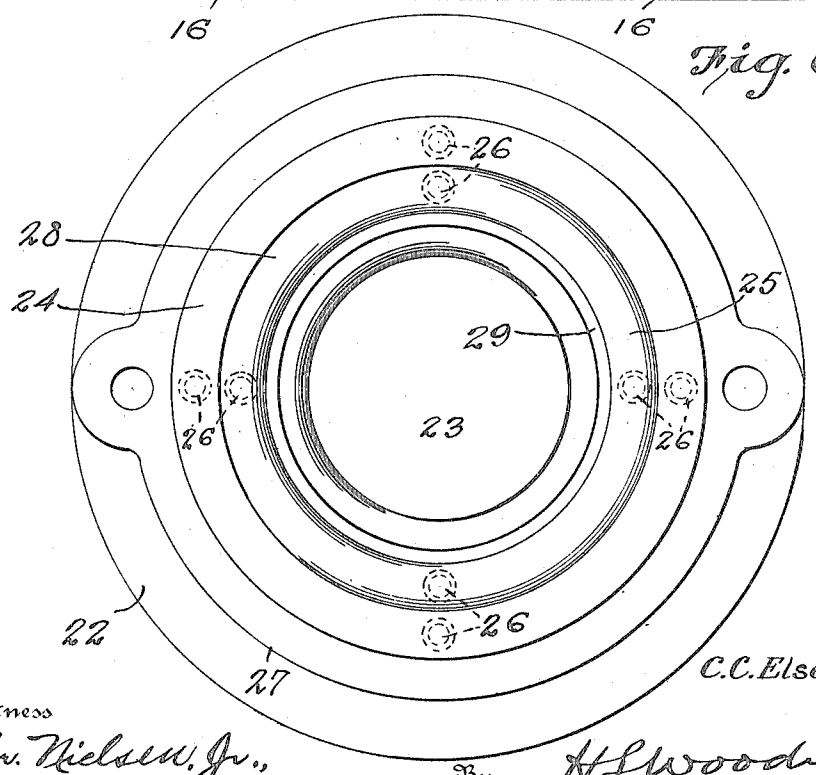


Fig. 6.



Witness

Chas. Nielsen, Jr.,

Inventor

C. C. Elsener,

By H. L. Woodworth

Attorney

C. C. ELSENER.

COMBINATION BLANKING AND FORMING DIE.

APPLICATION FILED MAR. 20, 1917.

1,270,933.

Patented July 2, 1918.

3 SHEETS—SHEET 3.



Fig. 4.

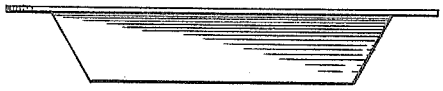


Fig. 5.

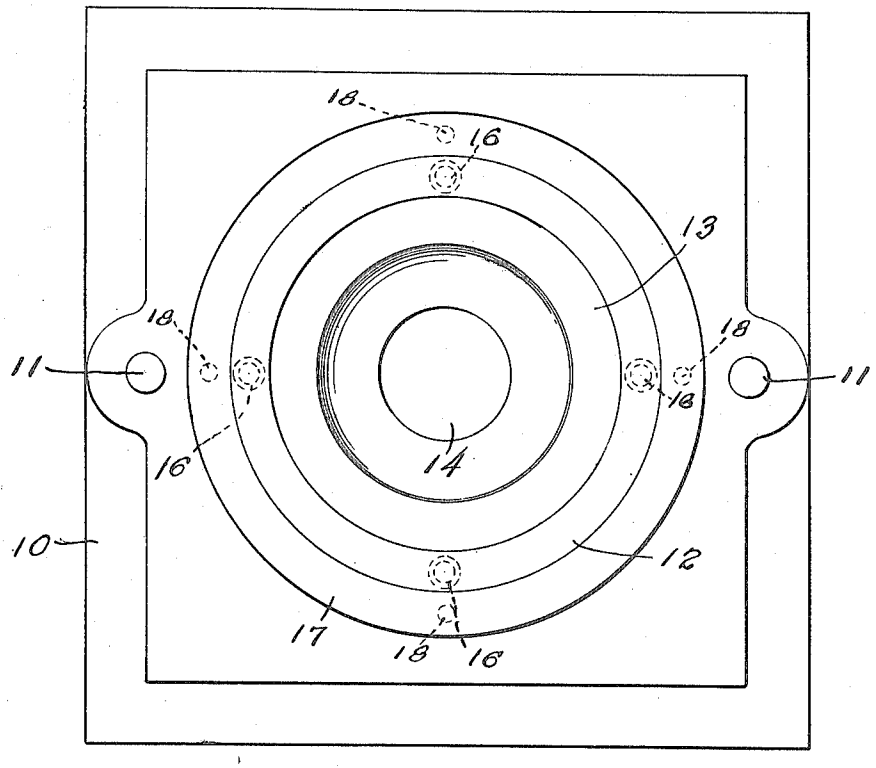


Fig. 7.

Witness
Chr. Nielsen, Jr.

Inventor
C. C. Elsener,

By H. S. Woodward

Attorney

UNITED STATES PATENT OFFICE.

CHARLES C. ELSENER, OF WATERLOO, IOWA.

COMBINATION BLANKING AND FORMING DIE.

1,270,933. Specification of Letters Patent. Patented July 2, 1918.

Application filed March 20, 1917. Serial No. 156,043.

To all whom it may concern:

Be it known that I, CHARLES C. ELSENER, a citizen of the United States, residing at Waterloo, in the county of Blackhawk and State of Iowa, have invented certain new and useful Improvements in Combination Blanking and Forming Dies, of which the following is a specification.

The invention has for an object to give a die construction especially useful in the stamping of dishes from sheet metal, and has for an object to enable the cutting of the blank and the forming of the dished portion in the blank in one operation. A special object of the invention is to enable the formation of such dishes economically, requiring less metal than by the ordinary process. A further object is to obviate the liability of wrinkling of the metal at the sides of the dished portion as frequently occurs under present methods. Another object is to enable the formation of a dish having a very thick edge portion adapted to give the dish ample rigidity, while enabling the formation of the intermediate parts of the plate of thinner material, in places where it is of such form that the thinner material thus exposed to withstand stresses incident to use.

It is a further object to enable the formation of a plate with heavy edge portions, adapted to give it sufficient rigidity, without requiring crimping of the edges.

It is well understood that the surfaces where the principal wear occurs in pie plates and other dishes, is on the bottom, and their upper rim and edge portions. By the action of my dies, it is possible to use a metal of ample thickness to sustain the wear ordinarily occurring in the parts mentioned, and to form a dish the bottom and upper rim portions of which will be of a full thickness, while the sides or sloping portions intermediately thereof will be of greatly attenuated material, which owing to conical or other forms customarily found in the sloping parts of dishes will be amply strong to resist the stresses to which it will be subjected, and being subject to much less abrasion than the other parts, will wear and last equally long.

Objects and advantages, and features of invention in addition to those mentioned will appear from the construction, arrangement, and combination of parts hereinafter described and shown in the drawings, wherein,

Figure 1 is a sectional view of an appliance constructed in accordance with my invention, in position to receive stock.

Fig. 2 is a similar view showing the device in position immediately after the cutting of a blank and its initial forming operation,

Fig. 3 is a similar view in the final forming position,

Fig. 4 is an illustration of the work in the form produced in Fig. 2,

Fig. 5 is a similar view of the work resulting by the operation illustrated in Fig. 3,

Fig. 6 is a top view of the upper die,

Fig. 7 is a similar view of the lower die.

There is illustrated a metal cutting and forming appliance adapted for the cutting of a blank and the forming thereof in one operation, adapted to be used with some of the familiar forms of presses, either of the toggle, cam, or hydraulic type well known in the art. As the manner of using the appliance with such presses will be readily understood without detailed disclosures, the press construction is omitted.

In the present instance, a device adapted to use in forming pie plates is illustrated, by similar construction with slight modifications of form it may be utilized in producing pans of various kinds. The device includes a lower die comprising a base piece 10 of suitable steel, in which pilot pins 11 are mounted for guiding the upper die to be subsequently described, and upon which a forming and blanking ring 12 is mounted, the latter being formed of suitable hard steel. The base piece 10 is formed with a central recess 13, the sides of which are shaped to conform to the shape of the article to be formed, and forming a continuation of the inner face of the ring 12, the sides of the recess 13 and the inner side of the ring 12 being in the present instance in the form of an inverted truncated cone. The base has a large central opening 14 there-

through, communicating with the recess 13. Around the recess 13 a slight boss 15 is formed, and the forming ring 12 is formed with a suitable angular concentric recess on the under side to fit over the boss 15, as illustrated. The ring 12 is secured in place by filester cap screws 16, suitably engaged in the base 10. A stripper plate 17 is provided, adapted to fit closely around the ring 12, and supported by sliding bolts 18, mounted vertically in the base 10, which has suitable recesses formed therein to receive the bolts snugly, springs 19 being confined in the recesses beneath the bolts as shown. The bolts 18 have each a longitudinally extended recess portion 20, extending for a suitable distance on the bolt, and proper set screws 21 are engaged through the sides of the base 10 to project into the recesses 20, serving to limit outward movement of the bolts 18. The upper elements of the device include an annular blank holder 22, vertically movable, and receiving the pins 11 slidably therethrough, as shown, being suitably formed for the purpose. Centrally through this holder there is vertically reciprocable a punch element 23, having its lower portion tapered for a distance to correspond to the slope of the sides of the recess 13 its lower end portion stopping short of the base of the recess 13 when fully projected into the base piece 10, and its larger part having a diameter slightly less than the minimum inside diameter of the ring 12. Upon the blank holder 22 there is carried a blanking ring 24, adapted to coöperate with the ring 12 in cutting the blank for an article to be formed. Immediately inward of and tightly fitted within the ring 24, there is an upper forming ring 25, these two rings being suitably secured to the blank holder 22 by means of screws 26. The member 22 is formed with a suitable flange 27 closely circumscribing the ring 24, whereby the upper blanking ring is suitably trussed and reinforced. The ring 25 is formed with an opening just large enough to permit the passage of the punch 23, and has an outer horizontal face 28, disposed to engage snugly upon the upper side of the ring 12, which has a corresponding opposed surface. The ring 25 is formed with an inner downward extension or forming flange 29, having the same inclination at the outer sides as the inner surface of the ring 12, as shown. The maximum outer diameter of the flange 29 should be slightly less than the maximum inner diameter of the ring 12, as will be readily understood, the difference corresponding to the thickness of metal to be formed.

The punch 23 and blank holder 22 are connected with the press elements so that the blank holder may move into snug coöperative relation to the lower die before the punch operates, and in withdrawal the punch is to be lifted above the level of the lower side of the blanking ring 24.

It is notable that the blanking ring 24 is of a vertical measurement slightly greater than the distance between the top of the ring 25 and the lower part of the forming flange 29, so that the cutting of the blank occurs before the initial forming operation begins. The set screws 21 are so positioned as to check upward movement of the stripper plate as soon as it reaches or passes slightly above the level of the upper side of the ring 12. The mounting of the blank holder 22 is such that it will move downwardly a sufficient distance to firmly compress and hold the outer edge portion of a blank against the upper face of the ring 12.

In operation, a straight sheet cut the proper width may be entered between the dies, while the punch 23 and the blank holder 22 are at the upper limit of their movement, and as the blank holder 22 descends the rings 24 and 12 first cut the blank to the necessary size, and immediately thereafter the flange 29 depresses the body of the blank at its intermediate part closely adjacent the line at which the sides of the vessel being formed join the rim portion, the edge portion of the blank being slightly drawn inwardly thereby and bent over the ring 12; and as the surface 28 engages upon the blank to hold it flat, a slight distention of the metal adjacent the lower part of the flange 29 occurs, so that at the inner edge of the rim a maximum thickness of metal is provided. The edge portion of the blank and inclined portion between the flange 29 and ring 12 are finally clamped firmly between the upper and lower forming rings and the punch 23 then descends, bearing downwardly the central part of the blank and distending the metal between the bottom of the punch and the lower edge of the flange 29, the tendency of the metal to wrinkle being offset by its longitudinal strain, so that a perfectly smooth side portion is formed, at the same time that it is distended. The maximum thickness of the blank is thus retained upon the bottom where most required to resist abrasion in use of the article. The extreme edge portion of the plate may be crimped if desired, in any customary manner, although not essential.

What is claimed:

In a device of the character described a die element having an outer cutting edge therearound, an intermediate holding face and an inner forming face, a support therefor; a second die element comprising a blanking ring conforming to the cutting edge of the first die, a forming and holding element within and in fixed relation to the blanking ring, having a face adapted to coengage snugly upon a blank with the upper side of the first die element to hold the blank

against inward slip, an inner downward extension on said forming and holding element adapted to coöperate with the forming face of the first named member, and having an opening therethrough, and a punch element having forming surfaces thereon certain of which form a continuation of the forming surface of said extension on the forming and holding element when projected therethrough as described.

In testimony whereof I have affixed my signature in presence of two witnesses.

CHARLES C. ELSENER.

Witnesses:
O. J. VALENTIN,
A. L. SAMPSON.