

June 26, 1956

A. HODES

2,751,872

DRAWING AND INDENTING DIE

Filed Oct. 12, 1951

3 Sheets-Sheet 1

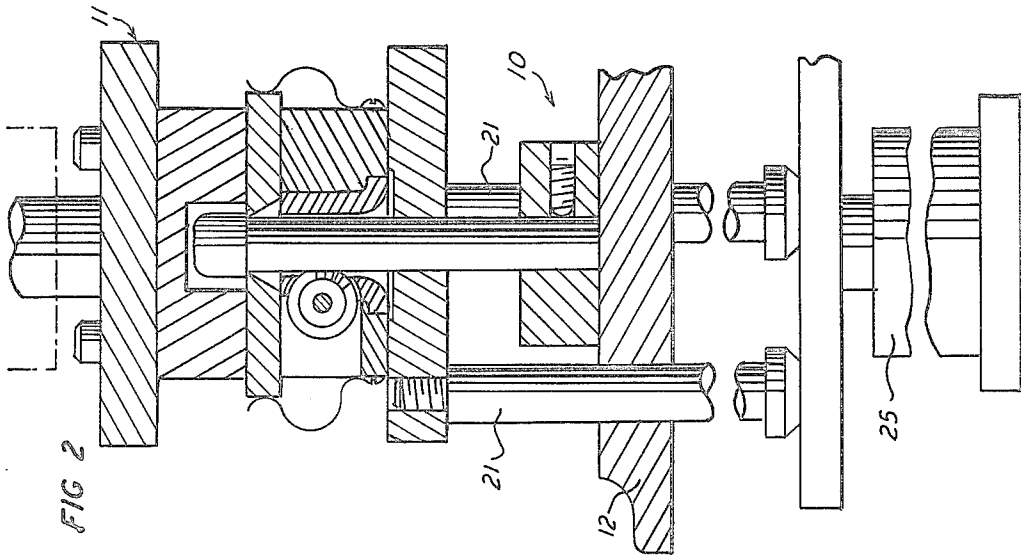


FIG 2

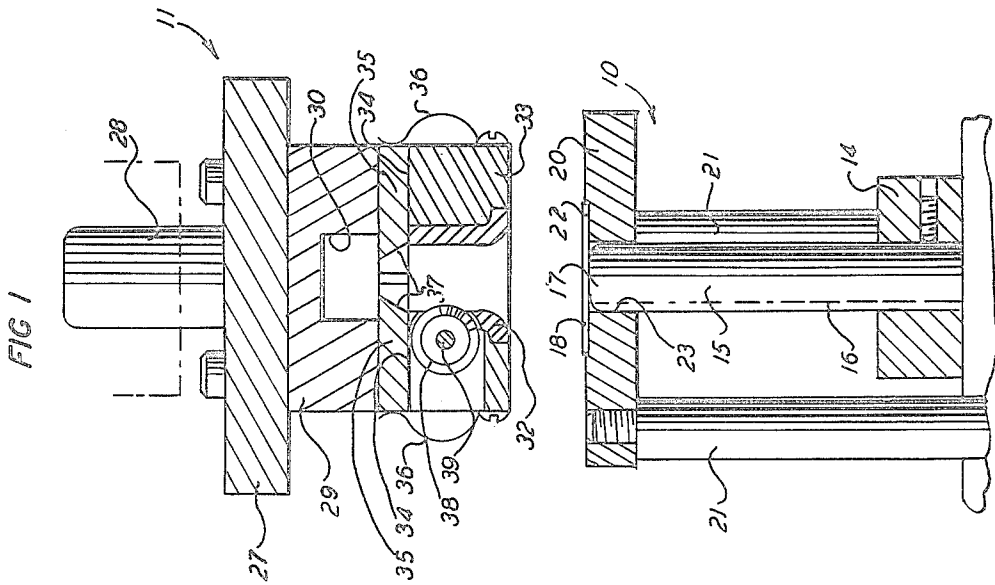


FIG 1

INVENTOR  
ALBERT HODES

BY  
*W. Parnell*  
ATTORNEY

June 26, 1956

A. HODES

2,751,872

DRAWING AND INDENTING DIE

Filed Oct. 12, 1951

3 Sheets-Sheet 2

FIG. 3

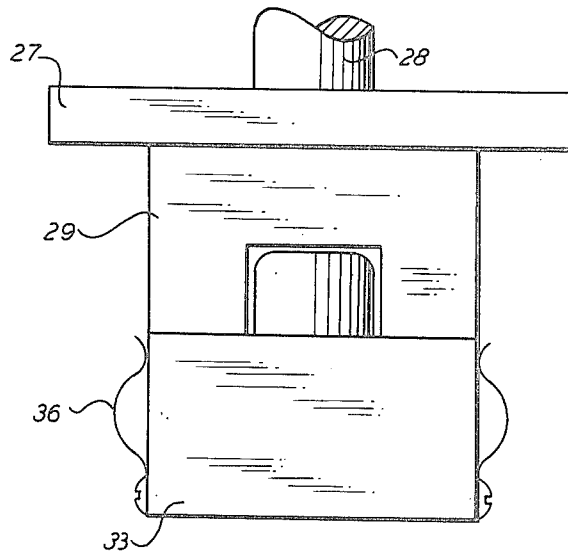
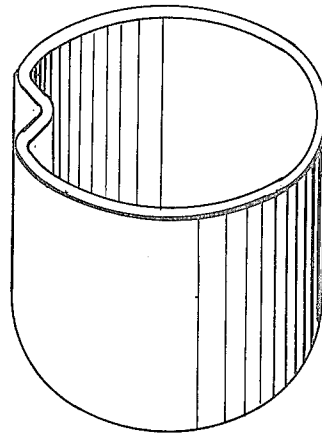


FIG. 6



INVENTOR

ALBERT HODES

BY

*W. Parnell*  
ATTORNEY

June 26, 1956

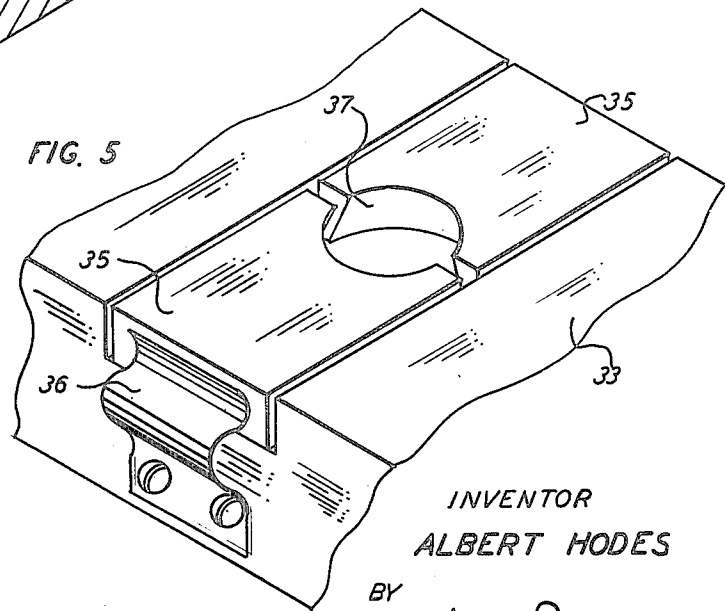
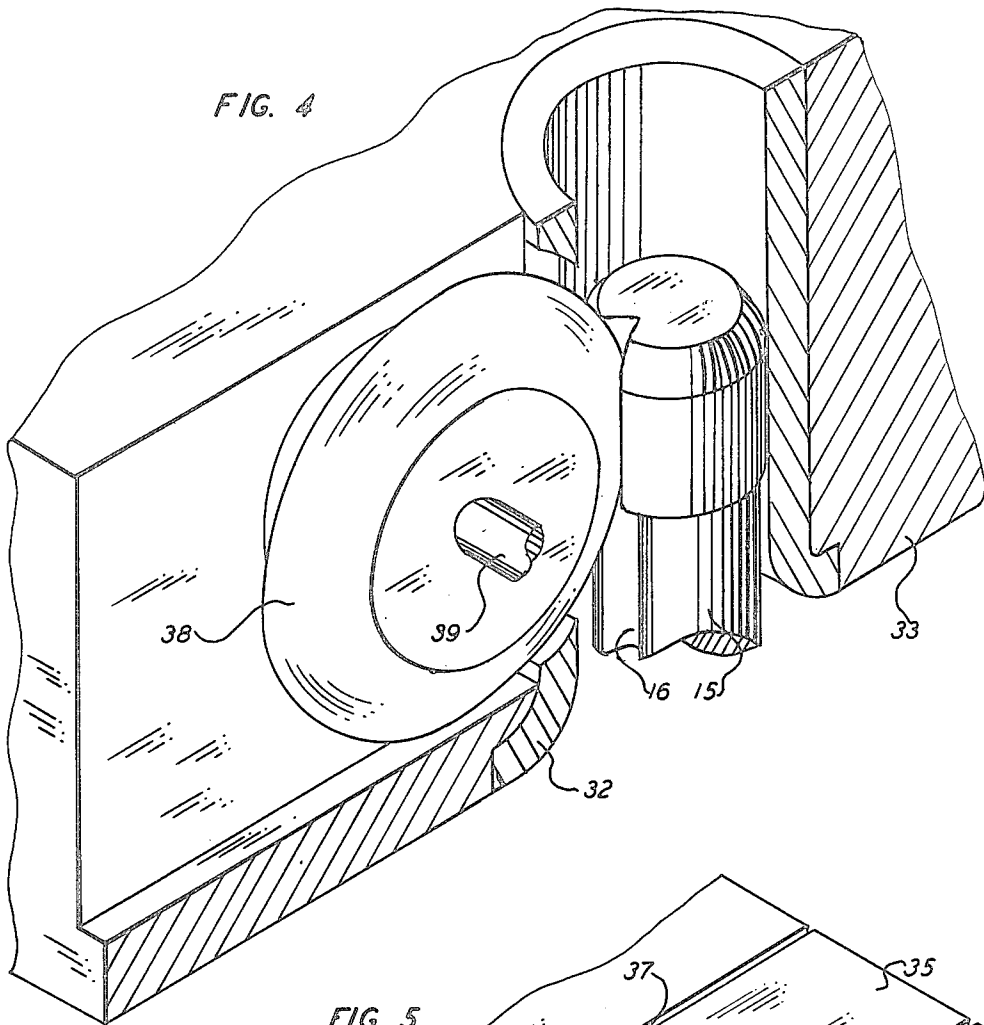
A. HODES

2,751,872

DRAWING AND INDENTING DIE

Filed Oct. 12, 1951

3 Sheets-Sheet 3



INVENTOR  
ALBERT HODES

BY

*W. Parnell*  
ATTORNEY

1

2,751,872

## DRAWING AND INDENTING DIE

Albert Hodes, Burbank, Calif., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application October 12, 1951, Serial No. 251,065

1 Claim. (Cl. 113—46)

This invention relates to apparatus for drawing and grooving articles from blanks and more particularly to apparatus for drawing cup-shaped articles and indenting portions thereof.

The two common methods of forming grooves or indentations in cup-shaped articles, both involve certain disadvantages which frequently render the articles undesirable. One of the well known methods includes the use of a stationary projection in the wall of the drawing die which thins the material and frequently causes cracks and tears in the article. The other method includes a cam operated indenting tool pressed into the side of a previously drawn cup-shaped article but it produces an undesirable hump at the bottom of the cup due to the flow of excess metal at this portion.

An object of the present invention is to provide an apparatus which is simple in structure, yet highly efficient in simultaneously drawing and grooving articles from blank material.

With this and other objects in view, the invention comprises an apparatus for drawing and grooving an article from a blank of material including a drawing punch element and a drawing die element movable relative to each other to draw a blank of material into a hollow article. The salient features of this invention include the provision of a groove in one of the elements and a wheel carried by the other element to roll the material into the groove while the article is being drawn.

In the present embodiment of the invention, the drawing punch is supported at a fixed position and provided with a longitudinal groove so that a roller carried by the drawing die may readily move the material into the groove of the drawing punch during drawing of the material over the punch maintaining uniform thickness of the material in the article and eliminating defects in the material or undesired accumulations of portions of the material during the drawing of the article.

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 shown in its open position;

Fig. 2 is a vertical sectional view of the apparatus shown in its operated position;

Fig. 3 is a front elevational view of the drawing die;

Fig. 4 is an enlarged fragmentary isometric view illustrating the elements grooving of the article;

Fig. 5 is a fragmentary isometric view of the ejecting elements of the drawing die; and

Fig. 6 is an isometric view of the completed article.

Referring now to the drawings, the apparatus shown therein is to be mounted in a conventional press wherein the drawing punch unit 10 is mounted on the bed of the press and the drawing die unit 11 is secured to the reciprocating ram of the press. The drawing punch unit 10 includes a base 12 with a mounting block 14 secured thereto, to support a drawing punch element 15 at a given position. A longitudinally extending groove 16 is formed in

2

the die element 15 extending the full length thereof, while the upper end 17 has rounded edges of contours desirable for the formation of an article from a blank 18 of material. A pressure pad 20 supported by vertical rods 21 is recessed at 22 to receive the material 18 and support it adjacent the upper end of the drawing punch 15. The pressure pad is apertured at 23 for the drawing punch and is normally urged into the position shown in Fig. 1 by suitable means such as an air cylinder 25 engaging the lower ends of the rods 21.

The drawing die unit 11 includes a head 27 with the conventional portion 28 for connection with the ram of the press. A member 29 secured to the head 27 is substantially U-shaped in general contour providing a passage-way 30 to receive the completed article from which the article may be ejected by suitable means such as air under pressure from an air nozzle, suitably positioned with respect to the drawing die when in its open position. A drawing die element 32 of the contour shown, has an inner diameter of a suitable size comparable to the outer diameter of the drawing punch 15 depending upon the gage or thickness of the material to be drawn, so as to draw the material into the form of a cup without stretching or otherwise varying its thickness. The drawing die 32 is carried by a support 33 which is secured to the member 29 and has aligned grooves 34 to receive ejecting elements 35. The ejecting elements 35 are normally urged toward each other by springs 36 and have their inner edges tapered as illustrated at 37 so that they may be moved outwardly as they ride over the material of the article being formed and at the completion of the drawing and grooving operation, the ejecting elements will be forced inwardly toward each other beneath the lower ends of the completed article to eject the article from the drawing punch when the drawing die unit is moved upwardly. The drawing die 32 and its support 33 are suitably grooved to receive a roller 38 mounted on a spindle 39 and having its periphery of any desired contour such as that illustrated more clearly in Fig. 4, to cooperate with the groove 16 in forming a groove in the article formed from the material 18.

Considering now the operation of the apparatus, attention is directed to Fig. 1 which illustrates the apparatus in its open position ready to receive a blank 18 of material in the recess 22 of the pressure pad 20 of the drawing punch unit 10. The press may then be operated through one cycle, causing the drawing die unit 11 to move downwardly engaging the material and pressure pad to draw the material through the function of the drawing die 32 about the drawing punch 15. The drawing and grooving operations are performed during a single operating cycle of the apparatus, however, the grooving operation follows that of the drawing operation which is evidenced by the positioning of the roller 38 back of the mouth of the drawing die 32. The function of the roller 38 and the groove 16 is to roll the material into the groove causing an even flow of the material without damaging the material in any way. When the drawing die 11 has reached the end of its operating stroke illustrated in Fig. 2, the article has been completed, drawn into the form of a cup from the material 18 and longitudinally grooved. The ejecting elements 35 have traveled, at this time, beyond the end of the article and moved inwardly toward the drawing punch 15 beneath the lower edge of the article so that upon return movement of the drawing die to the position shown in Fig. 1, the completed article will be removed from the drawing punch and positioned in the passage-way 30 from which it will be ejected. This operating cycle of the apparatus may be repeated as rapidly as desired, positioning new blanks 18 of material in the recess of the pressure pad 20, during the rest interval of the press.

It is to be understood that the above described arrangements are simply illustrative of the application of the principles of the invention. Numerous other arrangements may be readily devised by those skilled in the art which will embody the principles of the invention and fall within the spirit and scope thereof.

What is claimed is:

An apparatus for drawing and grooving an article from a blank of material comprising a drawing punch element having a free end portion of a contour to which the interior of the article is to be formed and a groove extending longitudinally through the free end portion, a support for the punch element, a pressure pad to support a blank of material normally adjacent the free end of the drawing punch element, a drawing die element having an entrance end and an opening in a side of the die element beyond the entrance end adjacent to the groove in the punch element when the elements are in closed positions, a support for the drawing die element, means to cause relative movement of the supports through operating cycles to cause interengagement of the punch element with the die element

to draw the blank into a cup-shaped article, and a roller rotatably carried by the support for the die element and having its periphery extending through the opening in the die element to roll a portion of the material into the groove following the elements forming the material to complete the cup-shaped article with a groove extending the full depth of the cup-shaped article including the bottom thereof.

#### References Cited in the file of this patent

##### UNITED STATES PATENTS

353,426	Paull	Nov. 30, 1886
613,936	Painter	Nov. 8, 1898
1,152,984	Sherbondy	Sept. 7, 1915
2,003,981	Stanitz et al.	June 4, 1935
2,261,060	Giesler	Oct. 28, 1941
2,331,490	Menkin	Oct. 12, 1943
2,369,064	Maloney	Feb. 6, 1945
2,396,218	Watters	Mar. 5, 1946
2,568,730	Guthmann	Sept. 25, 1951