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J. R. SALAZAR

2,394,876

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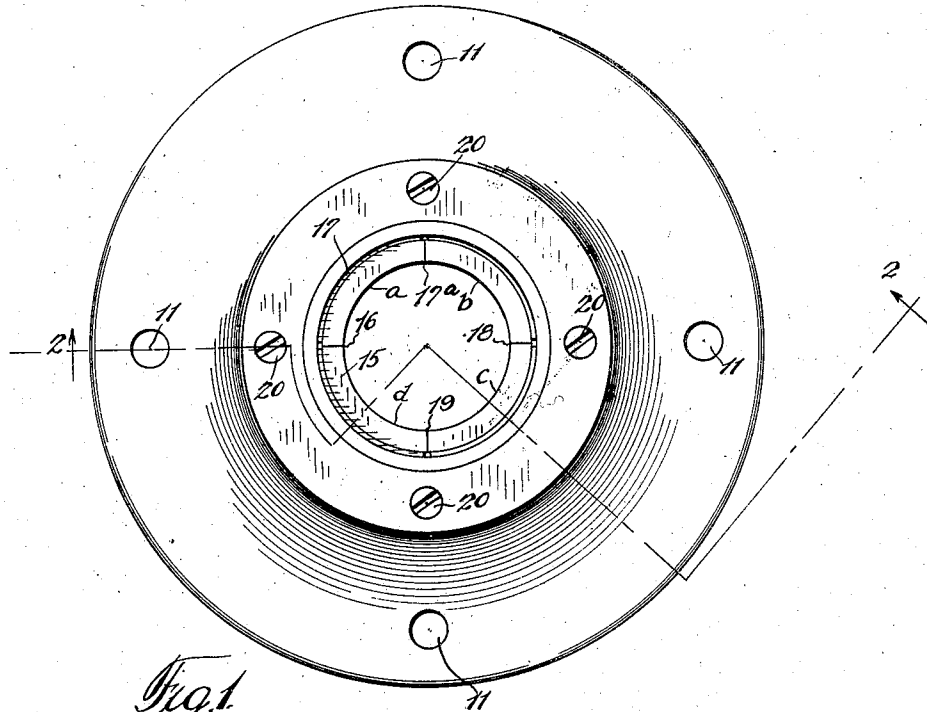


Fig. 1.

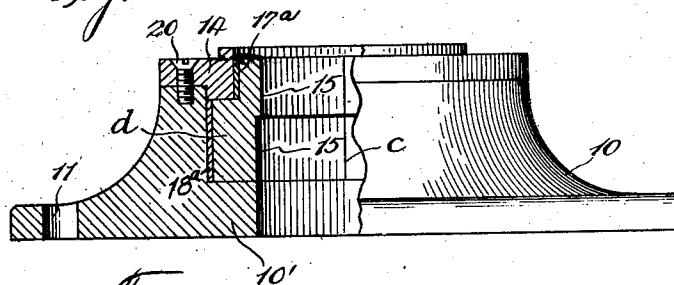


Fig. 2.

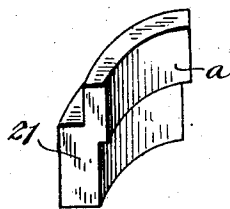


Fig. 3.

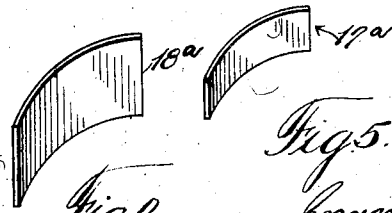


Fig. 5.

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1 Claim. (Cl. 113—42)

The present invention relates to improvements in dies or draw-rings such as are used in can top forming machines for manufacturing round tops or carton tops for cans or canisters, as for example tops that are made either of metal, cardboard, paper board, and the like.

In the manufacture of round tops with dependent peripheral skirts of the character indicated, the method of operation in the past has been to punch out a circular piece of material, be it metal or cardboard, and then, if desired, in the same operation and by means of a suitable male plunger, to form the dependent skirt by forcing, through the use of a male die, the central portion of said cut piece into a die or draw-ring for a sufficient depth so as to form the skirt. It is therefore necessary to allow for a certain amount of clearance between the inner periphery of the draw-ring and the outer periphery of the male die in order to prevent the skirt from being completely shorn away during the operation. As either metal, or even cardboard, despite the fact that the latter is softer than the metal of which the male and female dies of the apparatus are made, will nevertheless eventually wear down the interior perimeter of the draw-ring to a degree where there exists too much clearance between the draw-ring and the male die, it became necessary to replace the draw-ring entirely. In accordance with the present invention, however, the worn draw-ring can be salvaged and continued in use for a considerable period.

Therefore one of the objects of the present invention relates to a method of restoring a worn die or draw-ring to substantially its original condition by the expedient of cutting the worn draw-ring into a number of segmental parts, milling or grinding off a sufficient quantity of the surfaces along the cuts thus made, so that, when reassembled in connection with suitable packings or shims, the interior diameter and interior perimeter of the draw-ring or die will be substantially the same as it was when the draw-ring or die was new.

A further object of the invention is to provide a draw-ring or die made of a number of segments which can be utilized in combination with suitable shims or packings in the manner already indicated.

For a better understanding of the present invention, reference may be had to the following description and the concurrently herewith filed drawing, in which

Fig. 1 is a horizontal plan view of a draw-ring,

embodying one form of my invention, and its supporting structure;

Fig. 2 is an elevational view partially in section of the device illustrated in Fig. 1, said section being taken along the lines 2—2 of Fig. 1;

Fig. 3 is a perspective view of one of the segments of the draw-ring; and

Figs. 4 and 5 are respectively perspective views of suitable packings or shims which are placed behind the various segments of the draw-ring in order to reconstitute the worn ring with an internal diameter and perimeter equal to that which it had when first placed in use.

In the said drawing it will be seen that there is provided a die-holding member 10 which may be attached to a suitable base (not shown) by placing lag screws or bolts through the suitably provided holes 11. This base may be the bed plate of the punching machine. Within the said member 10 there is located the segmentally cut draw-ring 15 which, for purposes of illustration, is shown in the drawing as having been cut into four equal segments, *a*, *b*, *c* and *d*. The lower part of each segment of the draw-ring 15 is supported at its bottom portion by the shoulder 10' of the die-holding member 10. The male die member, not shown, may be provided with a cutting edge which cooperates with an outer cutter ring 14 which latter is secured to the member 10 by means of the screws 20.

It will be understood that there may be a suitable male die having the cutting edge mentioned above, which passes through the cutter ring 14 which first cuts to proper size the disk of metal or cardboard. The diameter of the disk thus cut is the diameter of the inner peripheral edge of the cutter ring 14. After the disk is cut, the male die then passes down into the draw-ring 15 so as to form the peripheral skirt on the disk, thus making the carton top. The length of the skirt is determined by the distance between the inner periphery of the draw-ring 15 and the inner periphery of the cutter ring 14 that serves to cut the disk.

When the draw-ring 15 becomes worn, the same is cut along the radial lines 16, 17, 18 and 19, thus forming the four segments *a*, *b*, *c* and *d*. These segments have their cut surfaces 21 finished so that when the segments are reassembled, the draw-ring 15 has its original internal diameter and a smaller external diameter. Thereafter there is placed behind the upper and lower portions, respectively, of the thus segmented portions of the draw-ring the packings or shims 17^a

and 18^a, these being of a suitable thickness so as to make up and compensate for the wear upon the draw-ring 15.

To accomplish this, the screws 20 are removed and the cutter ring 14 is lifted off, which thus enables the removal of the draw-ring 15. The same is then cut along the lines 16, 17, 18 and 19, usually at the first replacement operation, this cutting operation usually sufficing to take enough metal away from the faces 21 of the segments so that when these segments are reassembled the internal diameter and internal perimeter of the draw-ring will be restored to substantially the same as it was before the draw-ring became worn. Self-evidently, however, the outer perimeter will be smaller than it was before. Suitably sized shims 17^a and 18^a are then selected and placed where shown in Figs. 1 and 2, whereafter the cutter ring 14 is replaced and screwed down upon the base 10 by means of the screws 20.

After further wear has been encountered, the operation is repeated, except that it is no longer necessary to cut the draw-ring 15 into segments. However, sufficient additional metal is milled or ground from the faces 21 so that when reassembled the draw-ring will again have substantially its original internal diameter. Additional shims, or if desired, larger shims, are then placed in position and the die reassembled.

It has been found that the draw-ring 15 can be thus reconditioned for about four or five times or until its upper portion becomes too thin to warrant further reconditioning. When this occurs, the shims are all removed and an entirely new draw-ring is substituted. During the first portion of its operation it will, of course, operate as the draw-rings of the prior art and it is not until the draw-ring has become worn that the present invention again comes into play.

While four segments of the draw-ring 15 have been shown, it is obvious that a lesser number or a greater number may be employed, either three, five, six, or even more. However, it has been

found that four segments are adequate for the practice of the present invention. The material of which the draw-ring 15 is made is, of course, entirely within the choice of the operators, but in general it is made of steel.

What is claimed as new is:

In a can top forming machine, the combination of a holder having a substantially cylindrical opening therein, a reconditionable and multi-segmental draw-ring disposed in said opening and projecting above the upper surface of said holder, said draw-ring having its outer surface formed to provide an inwardly extending peripheral shoulder adjacent the upper surface of said holder whereby the projecting portion of said draw-ring is of reduced diameter relative to the diameter of said opening, a plurality of segmental compensating shims interposed in end to end relation between the inner surface of said opening and the outer periphery of the portion of said draw ring disposed in said opening, a cutter-ring secured to the upper surface of said holder and projecting inwardly of said opening to engage said shoulder and hold said draw-ring in said opening, said cutter-ring having an opening for receiving said reduced diameter portion of said draw-ring, and a plurality of segmental compensating shims interposed between the inner surface of said cutter-ring opening and the outer periphery of said reduced diameter portion, said segmental draw-ring comprising a plurality of similar arcuate segments having radially extending sides from which material may be removed upon excessive wear of the internal working surface of said draw-ring whereby said segments after removal of said material may be reassembled within the said openings in said holder and said cutter-ring to provide, with compensating shims of suitable thickness, an internal diameter for the draw-ring that is substantially the same diameter as that of the original draw-ring.

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