Aug. 4, 1936. J. A. EDEN, JR 2,050,045

PUNCH PRESSING OPERATION

Original Filed June 10, 1931

Fig. 1.

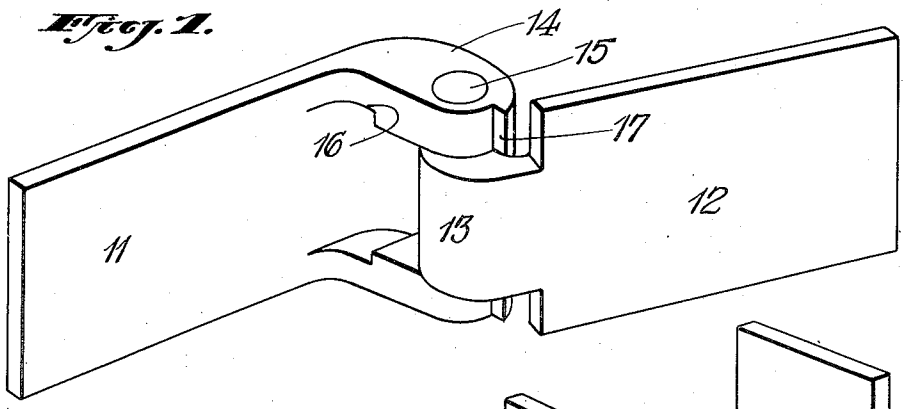


Fig. 2.

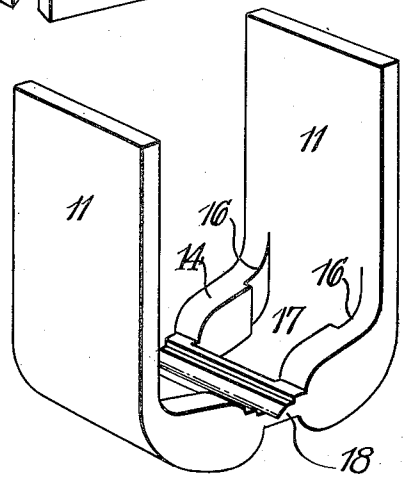


Fig. 3.

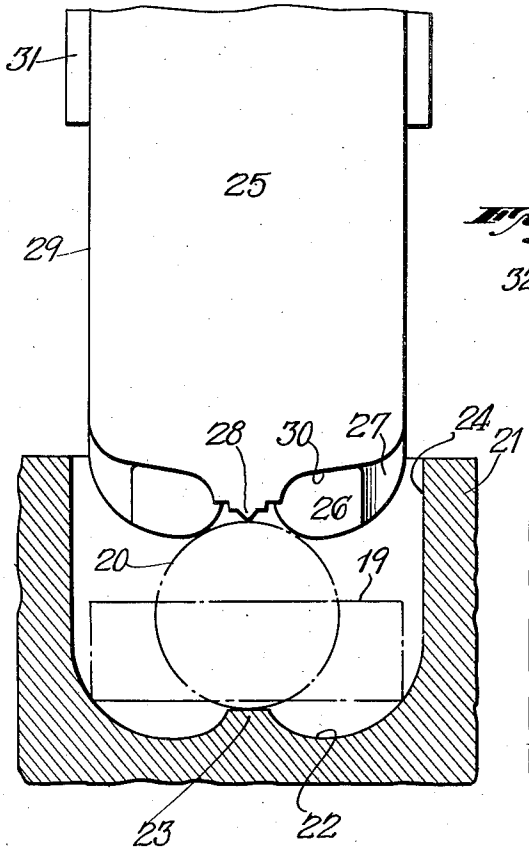
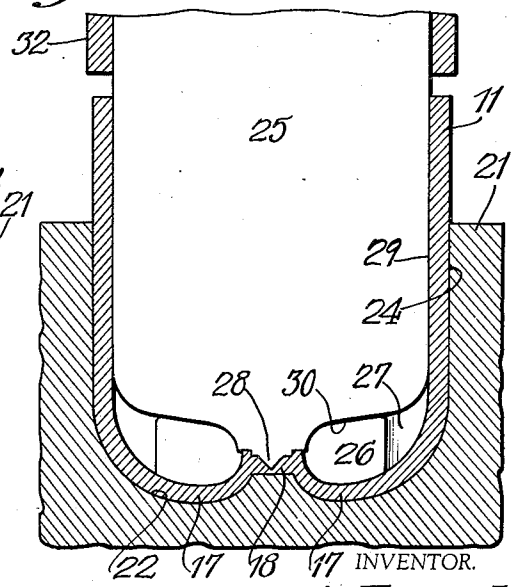


Fig. 4.



INVENTOR.

BY JAMES A. EDEN JR.

Ulman Rauber, ATTORNEYS

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UNITED STATES PATENT OFFICE

2,050,045

PUNCH PRESSING OPERATION

James A. Eden, Jr., Springfield, Mass., assignor to Moore Drop Forging Company, Springfield, Mass., a corporation of Massachusetts

Division of application September 13, 1932, Serial No. 632,882. Continuation of application June 10, 1931, Serial No. 543,319. Divided and this application July 23, 1935, Serial No. 32,693

2 Claims. (Cl. 78—12)

The invention provides an improved method of forming certain metal products and a punch and die adapted to be used in carrying out the method. The invention is designed for, and is illustrated specifically in connection with, the making of certain hinge leaves and is applicable also in the making of other metal articles. This is a division of a previous application No. 632,882, filed September 13, 1932 (which was a continuation of application No. 543,319, filed June 10, 1931).

Fig. 1 is a perspective view of a complete hinge. Fig. 2 is a perspective of the double hinge leaf produced by the present process. Figs. 3 and 4 illustrate in vertical section successive stages in the operation.

Fig. 1 shows a complete hinge comprising two members 11 and 12; the latter having a lug 13 fitting between ears 14 and turning about a pin 15. A shallow clearance groove 16 is provided between the body 11 and the inner faces of the ears. The ears 14 are thicker than the body and are substantially parallel to each other, and the body is continued around the ears and around the lug 13 of the other leaf to form a hood 17.

The product of the present process is an article like that of Fig. 2, being a pair of leaves with a connecting web 18 which needs only to be sheared off afterwards. The pair of opposite bodies or plates 11 are straight and parallel to each other, of uniform width and thickness. Similarly, the pairs of opposite ears 14 are parallel, straight and uniformly thick, somewhat thicker than the bodies 11.

In certain previous methods of manufacture the leaves have first been partially formed and later bent around to final shape. In other methods the ears 14 have been bent to position in a second operation after first forming them. Such articles with a central recess within shaped sides have also been drop forged with fins, requiring subsequent operations to trim off the fins and perfect the shape and dimensions.

By the present invention the desired product is brought to size, shape and configuration from a slug in one operation in a punch press with all parts and faces in finished directions and all edges finished. The contours of the punch and of the die recess are indicated, and the usual mechanism will be understood for actuating the parts.

A slug of the prismatic shape 19 or the cylindrical shape 20 lies entirely within the open ended die 21. The slug is unformed, that is it is not preformed partially to the shape of the die or punch as has sometimes been the practice. It may, for example, be cut from rolled rods into pieces small enough to lie within the die, below the open end thereof. It may for example be of ordinary machinery steel heated to suitable forming temperature. The die has curved bottom recesses 22 divided by a ridge 23 to form the hoods and their connecting web, and opposite side faces 24 for the plates 11. The punch 25 has end portions 26 corresponding to the inner faces of the hollow hoods with thicker parts 27 to form the relief grooves 16 and with a central projection 28 for the web 18.

The advancing punch first presses the slug into the shape of the die at the bottom. As the advance continues, the metal of the slug flows backward through the space between the faces 24 of the die and the cooperating faces 29 of the punch and is extruded through the open ends of these spaces as shown in Fig. 4. Each punch face 29 is parallel to the corresponding die face 24 and to the direction of movement of the punch. These faces of the punch continue in a straight line over the portion within the die and the portion which remains projecting beyond the die, so that the metal extruded beyond the die follows these faces of the punch and remains accurate in width and thickness, needing only to have its outer end trimmed for length.

The other two sides of the product, the ears 14, are formed to the true thickness and direction desired, and in addition are finished on their upper edges by the shoulders 30 of the punch.

The work may be removed when the punch is lifted, by means of ejectors of the ordinary type indicated at 31 and adapted to be reciprocated along the punch at the proper instant.

The movement of the punch parallel to the face of the part 11 of the hinge, permits of bringing up the free edge of the hood to a plane at right angles to the body and passing through the center of the hinge pin so as to give the fullest protection from dust. See Fig. 1. The die may be moved up to the punch or both die and punch may be moved, the die may be inverted above the punch or the parts may be arranged for horizontal movement toward each other. Knockouts may be provided in the die, and operating devices of any usual or suitable style may be used. The slug may be of various other shapes than those illustrated in Fig. 3.

Although the single punch press operation brings the product to required dimensions with finished faces and edges, such product may be subjected to other operations to achieve further refinements in finish or in detail.

Various modifications in the details of the mechanism, the shape of the slugs and the steps of the process may be made by those skilled in the art without departing from the invention as defined in the following claims.

What I claim is:

1. The method of forming hinge pieces having each a long flat body with ears at one end and a hood extending around the space between the ears by means of a suitably shaped punch and open-ended die, which method comprises placing a solid substantially uniformed slug entirely within the die and in a single operation pressing it into the shape of two hoods with a connecting web at the bottom and with two pairs of ears at the sides of said hoods and extruding two opposite hinged bodies backwardly through passages whose faces are parallel to each other and parallel to the direction of relative movement of the punch and die and thence out of the die in the same direction and of uniform thickness.

2. The method of claim 1, forming the edges of such ears and forming said bodies and ears in final angular relation in the same pressure operation.

JAMES A. EDEN, JR.

CERTIFICATE OF CORRECTION.

Patent No. 2,050,045. August 4, 1936.

JAMES A. EDEN, JR.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, first column, line 12, claim 1, for "uniformed" read unformed; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of October, A. D. 1936.

Leslie Frazer

(Seal) Acting Commissioner of Patents.