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E. R. STODDARD.  
DIES FOR DRAWING SHEET METAL VESSELS.  
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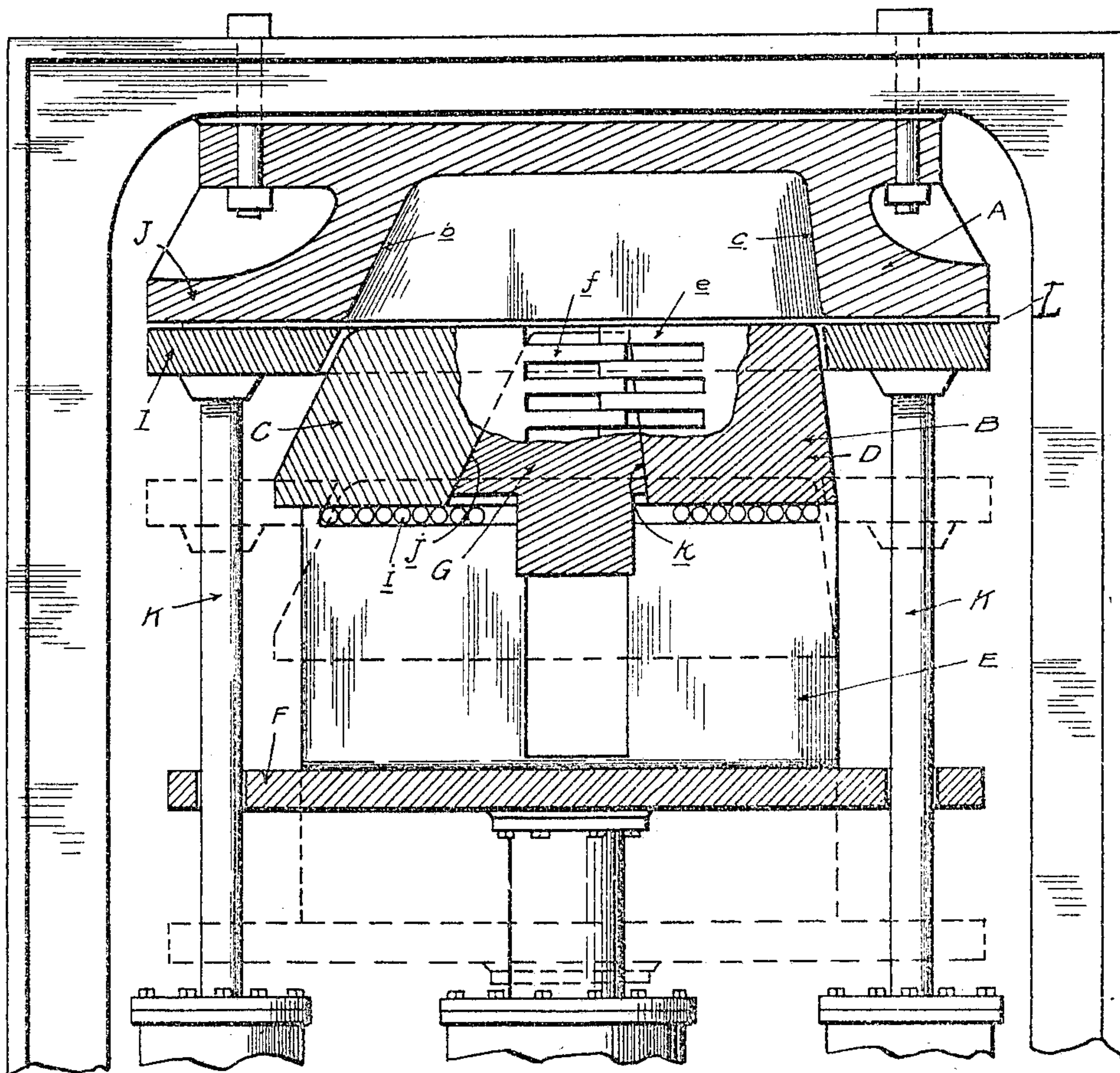


FIG. 1.

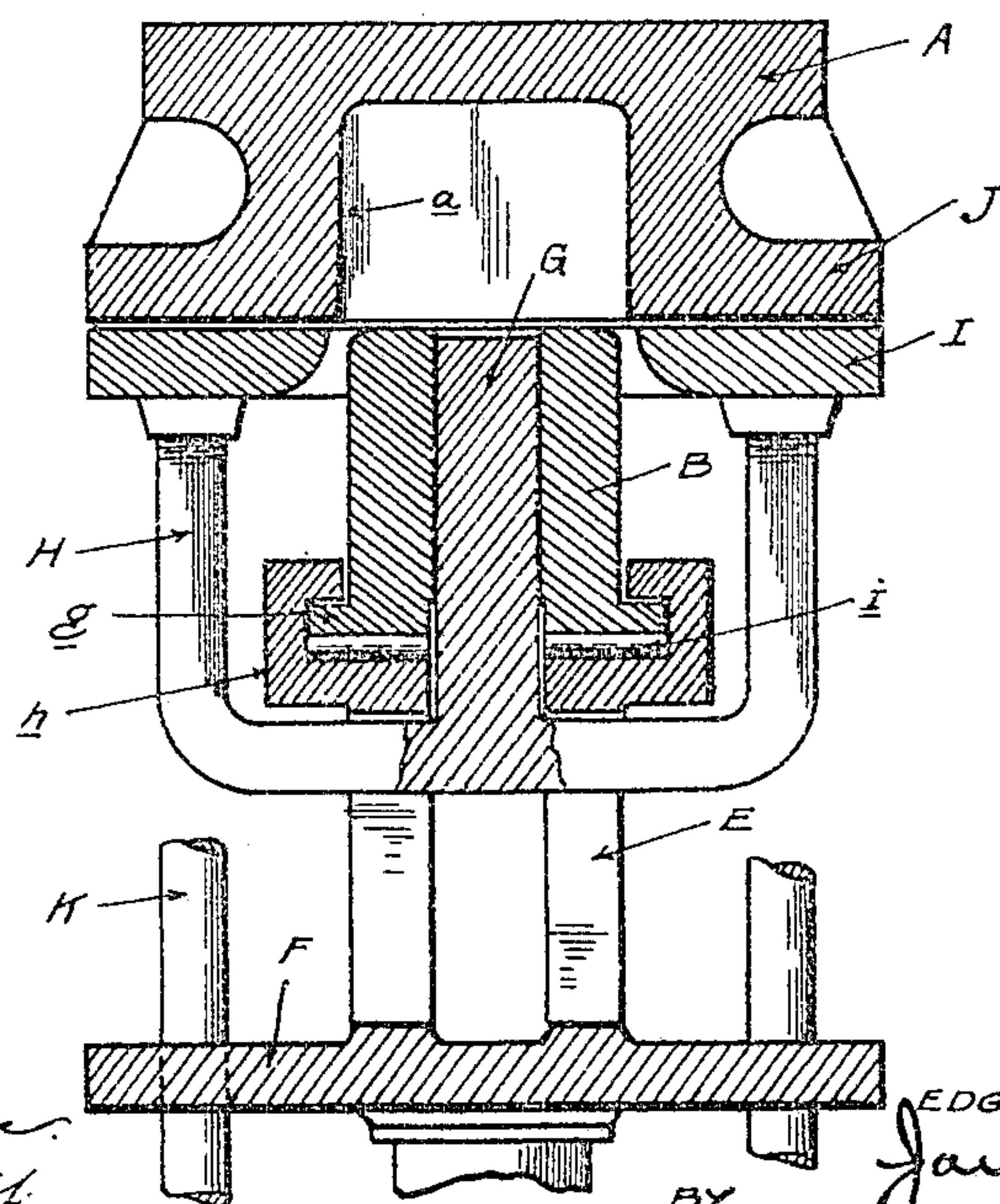


FIG. 2.

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## DIES FOR DRAWING SHEET-METAL VESSELS.

SPECIFICATION forming part of Letters Patent No. 787,059, dated April 11, 1905.

Application filed March 15, 1904. Serial No. 198,312.

*To all whom it may concern:*

Be it known that I, EDGAR R. STODDARD, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Dies for Drawing Sheet-Metal Vessels, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention relates to dies for drawing sheet metal, being particularly designed for the formation of sheet-metal vessels, such as bath-tubs.

In the present state of the art sheet metal is drawn into various shapes by dies. Where the walls of the drawn shell are parallel, as in cylindrical vessels, they may be formed in their final shape without difficulty; but where said walls are tapering or in inclined relation to each other body wrinkles or corrugations are formed in said walls during the drawing of the blank which cannot be completely straightened out between the dies. The reason of this is that with the parallel walls the space between the male and female dies is only sufficient to receive the thickness of the metal blank and will not permit of the formation of body-wrinkles; but with the tapering form the walls of the dies in the initial operation are separated from each other a considerable distance, which permits that portion of the metal which has passed it to form into kinks or corrugations.

It is the object of the present invention to avoid the formation of said body wrinkles or corrugations by constructing a die in which the walls of the male and female die are maintained in all parts of the operation in such proximity to each other as to permit only the thickness of the metal blank therebetween.

With this object in view the invention consists in the construction as hereinafter set forth.

In the drawings, Figure 1 is a longitudinal section through the dies. Fig. 2 is a cross-section thereof.

A is the female die, which, as shown, is of a shape to form a bath-tub, the side walls *a*

of which are substantially parallel, but the end walls *b* and *c* are inclined.

B is the male die, which is adapted when in engagement with the die A to conform to the shape thereof. This die B is formed in two sections C and D, which are centrally joined to each other by interlacing fingers *e* and *f*, the arrangement being such that the sections C and D are capable of being separated longitudinally without disengaging said fingers. The die B is supported upon and actuated by a vertically-movable standard E, which in turn is supported upon the table F of a press acting hydraulically or by any other suitable means. The standard E engages with the sections C and D, preferably by providing said sections with the side flanges *g*, which longitudinally slidingly engage with grooves *h* in the standard E. To permit of the sliding of said flanges during operation, antifriction-rollers *i* are preferably arranged between the sections and standard.

G is a wedge arranged centrally within a recess formed between the sections C and D. The inclined walls *j* and *k* of this wedge are respectively arranged to be substantially parallel with the walls *b* and *c* of the female die. The wedge G is attached to a suitable support, which, as shown, consists of the yoke H, passing through apertures in the standard E and engaging with the blank-holding plate I, which is arranged parallel to the blank-holding flange J on the female die. The flange I is held to press the blank against the flange J by any suitable device, such as hydraulic presses K.

The parts being constructed as described, in operation the sheet-metal blank, such as L, is first placed between the blank-holding plate I and the flange J, the male die being withdrawn. The plate I being then secured in position by pressure of the hydraulic presses K, pressure is applied to the male die through the medium of the table F and standard E. In the initial position of parts the sections C and D of the male die are separated from each other a sufficient distance so that the inner portion of said die will just permit the thickness of the sheet-metal blank between it and the walls *b* and *c* of the female die.



These sections C and D are, however, held in this position merely by the inclined walls *j* and *k* of the wedge G, and as this wedge is stationary during the upward movement of the male die it is evident that the sections C and D will be permitted to collapse or move toward each other as they are lifted and forced into the female die. The arrangement is such that in each position of the sections C and D during their upward movement the end walls thereof will be separated from the walls *b* and *c* merely a sufficient distance to receive the sheet metal, but not enough to permit of any wrinkling. As a result the metal will be formed to exactly the shape of the dies in a single operation of the press.

I claim—

1. The combination with the female die, having a tapering wall, of a male die adapted to conform to the shape of said female die when in engagement therewith, and means for maintaining the inclined walls of said male and female dies in substantially uniform proximity throughout the inward movement of the die.

2. The combination with the female die having an inclined wall, of the male die of corresponding shape, when in engagement therewith said die being formed of separable sections, and means for moving said sections in relation to each other during the inward movement of said male die, whereby the inclined walls of said male and female dies throughout are maintained in substantially uniform proximity during the movement.

3. The combination with the female die having an inclined wall of a male die having a correspondingly-inclined wall and formed in separable sections, a wedge correspondingly inclined adapted to separate said sections when said male die is withdrawn and

permit the inward movement of said sections as said male die is moved inward, whereby said inclined walls are maintained in substantially uniform proximity during the operation.

4. The combination with the female die having substantially parallel side walls and an inclined end wall of a male die correspondingly shaped, formed in longitudinal, separable sections, a vertical movable standard for actuating said male die, and a stationary wedge correspondingly inclined engaging sections of said male die adapted to separate the same in the initial inward movement and to permit the gradual collapse, or moving together, of said sections during the inward movement, whereby the walls of said dies are maintained in substantially uniform proximity during the operation.

5. The combination with a female die having an inclined wall, of a male die having a correspondingly-inclined wall, said male die being formed in two sections having interlocked inner edges, a wedge adapted to separate said sections when said male die is withdrawn and permit the inward movement of said sections as said male die is moved inward.

6. In a device for drawing sheet metal, a male die, and means whereby the drawing edge of said die is contracted in length during the drawing operation.

7. In a device for drawing sheet metal, a male die comprising separable sections permitting the drawing edge of said die to contract in length during the drawing operation.

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

EDGAR R. STODDARD.

Witnesses:

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