C. REHBEIN.

EMBOSSING PRESS.

APPLICATION FILED APR. 6, 1914.

1,267,591. Patented May 28, 1918.

Fig 1

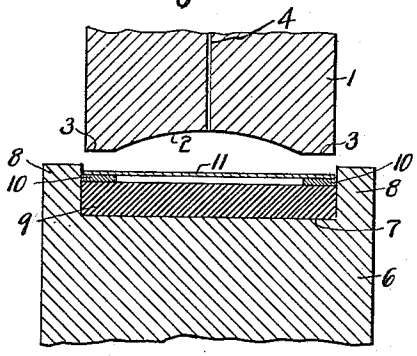


Fig. 2.

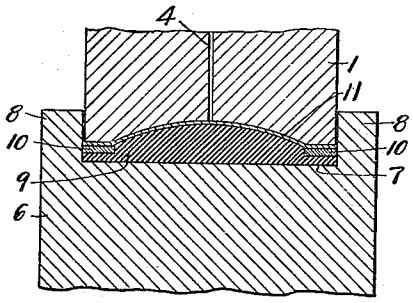


Fig. 3.

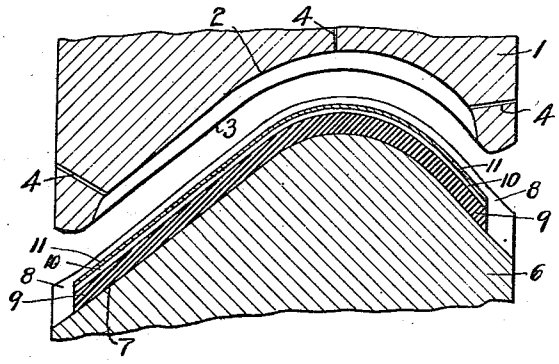
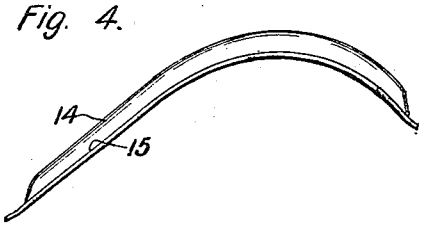


Fig. 4.



WITNESSES:

M. E. Broccamble

H. J. Ferrell

INVENTOR

Conrad Rehbein.

BY

Louis M. Spencer.

ATTORNEY

UNITED STATES PATENT OFFICE.

CONRAD REHBEIN, OF DETROIT, MICHIGAN, ASSIGNOR TO HAYES MANUFACTURING COMPANY, OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

EMBOSSING-PRESS.

1,267,591. Specification of Letters Patent. Patented May 28, 1918.

Application filed April 6, 1914. Serial No. 829,747.

To all whom it may concern:

Be it known that I, CONRAD REHBEIN, a citizen of the United States, and a resident of Detroit, in the county of Wayne and State of Michigan, have invented a new and Improved Embossing-Press, of which the following is a specification.

This invention relates to presses for forming and embossing sheet metal members, particularly members such as mud-guards for motor vehicles, having portions curved in longitudinal cross-section and also having laterally extending flanges. In the presses ordinarily used, there is great tendency for the flanges to become wrinkled as the metal is stretched to produce the necessary longitudinal curve, which results in many defective or worthless shapes. It is the object of the present invention to prevent this wrinkling, and at the same time improve the finish of the article generally.

This invention consists in a female die having an opening therein conforming to the surface which is to be embossed on a piece of metal stock, a male die adapted to coöperate with the female die, a sheet of resilient material between the dies, and means for preventing longitudinal movement of the flanges of the metal stock as the dies approach each other.

This invention further consists in the novel details of construction shown, described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a fragmentary transverse section of the press, showing the dies separated a short distance and a sheet of metal stock in position to be embossed. Fig. 2 is a similar section showing the dies in engagement. Fig. 3 is a fragmentary longitudinal section of a press for forming mud-guards for motor vehicles in which my invention is embodied. Fig. 4 is a side view of a mud-guard embossed by the press.

Similar reference characters refer to like parts throughout the several views.

In the embodiment shown, the working surface of the upper or female die 1 is curved longitudinally to correspond to the longitudinal curvature of the proposed mud-guard indicated in Fig. 4. This working surface, throughout the greater part of its length, comprises a central portion 2, curved transversely to form a shallow groove in the manner of the embossing on the proposed mud-guard; and at each side of the central portion is a portion 3 of a width and shape corresponding to that of the respective flange to be formed thereon. In order to allow the escape of air from above the pad as the dies come into engagement with each other, I prefer to provide the female die with the small vent passages 4.

The lower or male die 6 (in this case the fixed die) is provided with a working surface 7 curved longitudinally to correspond to the curvature of the portions 3 of the female die. As shown, transverse elements of this surface are straight lines, each of a length substantially equal to the distance between the outer edges of the portions 3, that is, equal to the width of the female die. On each side of the surface 7, the lower die is provided with the up-standing ribs 8 that are adapted to embrace the sides of the female die when the dies are brought into engagement with each other.

Supported upon the working surface 7 is a thick rubber pad 9 of a width substantially equal to the distance between the ribs 8, and resting upon each longitudinal edge of the pad is a leather strip 10 upon which the sheet of metal 11, that is to be embossed, is laid.

The relation of the parts as the movable die approaches the fixed die is shown in Figs. 1 and 3; and when the dies are fully engaged with each other the parts assume the positions indicated in Fig. 2, the rubber being compressed and forced inwardly from its edges, whereby the sheet metal is distended to correspond to the working surface of the female member. At the same time, the tough, flexible leather strips 10 prevent any local longitudinal movements of the edges of the sheet metal, thereby avoiding the formations of the wrinkles along the longitudinal edges of the shape that are incident to the use of presses of ordinary construction, and producing a smooth finished article having an embossed central portion 14 and the longitudinal flanges 15 on each side thereof. Local longitudinal movement of the sheet metal relative to the female die and the distortable element is prevented by reason of the fact that these strips laid along the top at the sides of the pad cause the gripping of the edges of the sheet metal before the rubber is caused to flow toward the

center and raise the sheet metal into the groove of the female die. The use of strips laid upon the pad to cause the gripping of the metal before the sheet is distorted by the bulging of the pad at the center is not the only means by which this can be accomplished. The essential feature of securing this early gripping action and avoiding the local wrinkling is the use of a chamber between the upper level of the distortable means and the face of the male die upon which the distortable means rests. This allows the rubber to flow some before the sheet metal begins to raise and hence allows the female die to get a firm grip upon the metal in connection with the distortable means before the drawing starts.

While I prefer to use leather strips as a facing for the rubber pad, strips of other material may be employed in certain cases. And, while I have shown my invention as applied to a press for forming mud-guards for motor vehicles, it is obviously of application generally to the formation of sheet metal members curved both longitudinally and transversely.

I do not, therefore, desire to be limited otherwise than as indicated by the subjoined claims.

I claim:—

1. A press comprising a female die having an opening therein, portions of which are curved in longitudinal cross-section and parts of the longitudinally curved portions being curved transversely to correspond to the shape of a surface that it is desired to impart to a sheet-metal member, a male die having a working surface in alinement with the opening in the female die and curved longitudinally to correspond to the longitudinal curvature of the said opening, one of the dies being movable in respect to the other, a resilient pad between the dies, and tough flexible longitudinal strips carried by the edges of the pad, whereby an intermediate portion of a sheet of metal may be embossed and wrinkling of its longitudinal edges may be avoided.

2. A press comprising a female die having a working surface, portions of which are curved longitudinally, and parts of the longitudinally curved portions being curved transversely to correspond to a surface that it is desired to impart to a sheet-metal member, a male die having a working surface curved longitudinally to correspond to the longitudinal curvature of the working surface of the female die, one of the dies being movable in respect to the other, a resilient pad resting on the working surface of the male die, and tough flexible longitudinal strips resting on the edges of the pad, whereby a sheet of metal may be embossed and wrinkling of its longitudinal edges may be avoided.

3. A press comprising a female die having a lower working surface, portions of which are curved longitudinally and parts of the longitudinally curved portions being curved transversely to correspond to the shape of a surface to be imparted to a sheet-metal member, a male die having an upper working surface curved longitudinally to correspond to the longitudinal curvature of the working surface of the female die, one of the dies being movable in respect to the other, a rubber pad resting on the working surface of the male die, and leather strips resting on the edges of the pad, whereby a sheet of metal may be embossed and wrinkling of its longitudinal edges may be avoided.

4. A press comprising a female die having a working surface, portions of which are curved longitudinally and parts of the longitudinally curved portions being curved transversely to correspond to the shape of an embossed surface which is to be formed on a sheet-metal member, other portions of the surface being curved longitudinally to correspond to the shape of flanges that are to be formed on the sheet-metal member, a male die, one of the dies being movable in respect to the other, said male die having a working surface, portions of which are curved longitudinally to correspond to the longitudinal curvature of the flange-forming surfaces on the female die, a resilient pad carried by the male die and covering the working surface thereon, and strips of tough flexible material carried by the edges of the resilient pad, whereby a sheet of metal may be embossed and wrinkling of its longitudinal edges may be avoided.

5. A press comprising a female die having a working surface, portions of which are curved longitudinally and parts of the longitudinally curved portions being curved transversely to correspond to the shape of an embossed surface which is to be formed on a sheet metal member, other portions of the surface being curved longitudinally to correspond to the shape of flanges that are to be formed on the sheet metal member, a male die having a working surface curved longitudinally to correspond to the longitudinal curvature of the working surface of the female die, longitudinal ribs on one of the dies adapted to embrace the sides of the other die, one of the dies being movable toward and from the other, a resilient pad carried by the male die and covering the working surface thereon, and strips of tough flexible material carried by the edges of the resilient pad, whereby a sheet of metal may be embossed and wrinkling of its longitudinal edges may be avoided, said longitudinal ribs serving to prevent the material of the pad from being forced out laterally by the pressure between the dies.

6. A press comprising a female die having a lower working surface, portions of which are curved longitudinally and parts of the longitudinally curved portions being curved transversely to correspond to the shape of an embossed surface which is to be formed on a sheet metal member, other portions of the surface being curved longitudinally to correspond to the shape of flanges that are to be formed on the sheet metal member, a male die, one of the dies being movable in respect to the other, said male die having an upper working surface, portions of which are curved longitudinally to correspond to the longitudinal curvature of the flange-forming surfaces on the female die, longitudinal ribs on one of the dies adapted to embrace portions of the other die as the movable die approaches the fixed die, a rubber pad carried by the male die and covering the working surface thereon, and strips of tough flexible material carried by the edges of the rubber pad, whereby a sheet of metal may be embossed and wrinkling of its longitudinal edges may be avoided, the longitudinal ribs serving to prevent the material of the pad from being forced out laterally by the pressure between the dies.

7. A press comprising a female die having an opening therein, portions of which are curved in longitudinal cross-section and parts of the longitudinally curved portions being curved transversely to correspond to the shape of a surface that it is desired to impart to a sheet-metal member, a male die having a working surface in alinement with the opening in the female die and curved longitudinally to correspond to the longitudinal curvature of the said opening, one of the dies being movable in respect to the other, a resilient pad between the dies, and a tough flexible strip carried by one portion of the pad, the whole arrangement being such that one portion of a sheet of metal may be embossed and wrinkling of another portion may be avoided.

8. A press comprising a female die having an opening therein, a male die having a working surface in alinement with the opening in the female die, one of the dies being movable in respect to the other, a resilient pad carried by the male die and adapted to enter the opening of the female die, and a strip of tough flexible material carried by the edge of the resilient pad, whereby an intermediate portion of a sheet of metal may be embossed and wrinkling of one of its edges may be avoided.

9. A press comprising a female die having an opening therein, portions of which are curved in longitudinal cross-section and parts of the longitudinally curved portions being curved transversely to correspond to the shape of a surface that it is desired to impart to a sheet-metal member, a male die having a working surface in alinement with the opening in the female die and curved longitudinally to correspond to the longitudinal curvature of the said opening, one of the dies being movable in respect to the other, a resilient pad between the dies, and a tough flexible strip carried by one portion of the pad, means for venting the female die, the whole arrangement being such that one portion of a sheet of metal may be embossed and wrinkling of another portion may be avoided.

10. A press comprising a female die having an opening therein, a male die having a working surface in alinement with the opening in the female die, one of the dies being movable in respect to the other, a resilient pad carried by the male die and adapted to enter the opening in the female die, means for venting the opening in the female die, and a strip of tough flexible material carried by the edge of the resilient pad, whereby an intermediate portion of a sheet of metal may be embossed and wrinkling of one of its edges may be avoided.

11. A press comprising a female die having an opening therein, a male die having a working surface in alinement with the opening in the female die, one of the dies being movable in respect to the other, a resilient pad carried by the male die and adapted to enter the opening in the female die, and a strip of tough flexible material in position to engage with one portion of the resilient pad, the whole arrangement being such that one portion of a sheet of metal may be embossed and wrinkling of another portion may be avoided.

12. A press comprising a female die having an opening therein, portions of which are curved in longitudinal cross-section and parts of the longitudinally curved portions being curved transversely to correspond to the shape of a surface that it is desired to impart to a sheet-metal member, a male die having a working surface in alinement with the opening in the female die and curved longitudinally to correspond to the longitudinal curvature of the said opening, one of the dies being movable in respect to the other, a resilient pad between the dies, and a tough flexible strip in position to engage with one portion of the pad, the whole arrangement being such that one portion of a sheet of metal may be embossed and wrinkling of another portion may be avoided.

13. In a press for embossing sheets of metal, the combination of a pair of dies whose adjacent operative surfaces are adapted to fit each other, one of the dies having an extended shallow groove in its operative surface, a sheet of rubber mounted on the operative surface of the other die and adapted to be pressed into said groove, and a strip

of leather mounted along each edge of said rubber and adapted to be engaged by the other die at each side of said groove when the dies come together without a sheet between them, and to grip the edges of the sheets when the press is operating.

14. In a press for embossing sheets of metal, the combination of a movable upper female die and a stationary lower male die, the upper surface of the male die fitting the lower surface of the female die when the dies contact, the lower surface of the female die having a shallow groove, a pad of rubber on the male die, and a strip of leather on each edge of the rubber between which and the female die the edges of the sheets are gripped while their intermediate portions are forced up into the groove by the rubber pad.

15. A press, comprising a female die having an opening therein, portions of which are curved in longitudinal cross-section and parts of the longitudinally curved portions being curved transversely to correspond to the shape of the surface that it is desired to impart to a sheet metal member, a male die having a working surface in alinement with the opening in the female die and curved longitudinally to correspond to the longitudinal curvature of the said opening, one of the dies being movable in respect to the other, distortable means including a rubber pad between the dies, said distortable means extending transversely across the central portion of the working surface of the dies, the arrangement of the parts being such that a central chamber is formed in the space between the uppermost level of the distortable means and the working surface of the male die into which a portion of the rubber pad is forced as the movable die approaches the other die, whereby the edge portions of the pad are first caused to grip the edges of the sheet metal to prevent longitudinal movement thereof, and the central portion of the pad is afterward caused to force the central portion of the sheet metal into the groove in the female die to form the desired embossed surface.

16. A press comprising a female die having an opening therein, portions of which are curved in longitudinal cross-section and parts of the longitudinally curved portions being curved transversely to correspond to the shape of the surface that it is desired to impart to a sheet metal member, a male die having a working surface in alinement with the opening in the female die and curved longitudinally to correspond to the longitudinal curvature of the said opening, one of the dies being movable in respect to the other, distortable means including a rubber pad between the dies, said distortable means extending transversely across the central portion of the working surface of the dies, one of the dies having ribs formed thereon that inclose the sides of the other die when the dies are in working engagement whereby the pad is prevented from flowing outwardly, the arrangement of the parts being such that a central chamber is formed in the space between the uppermost level of the distortable means and the working surface of the male die, into which a portion of the resilient pad is forced as the movable die approaches the other die, whereby the edge portions of the pad are first caused to grip the edges of the sheet metal to prevent longitudinal movement thereof, and the central portion of the pad is afterward caused to force the central portion of the sheet metal into the groove in the female die to form the desired embossed surface.

17. An embossing press comprising an upper and lower die in alinement with each other, one of the dies being movable in respect to the other, a female die having a long and narrow working surface curved longitudinally and provided with a long and narrow depression in its working surface corresponding to a crown that is to be formed on a sheet of metal, distortable means including a thick pad of rubber carried by the male die, said distortable means extending transversely from side to side across the working surface of the dies, said male die and said distortable means constituting two members, one of which being so shaped below the upper surface of the distortable means that when the sheet of metal is placed upon the distortable means and the movable die approaches the other die, the edges of the metal sheet are first gripped between the edges of the upper die and the distortable means, and the central portion of the rubber pad is afterward caused to force the central portion of the sheet metal into the depression in the upper die to form the desired surface by reason of the rubber flowing into the center of the pad from the edges.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CONRAD REHBEIN.

Witnesses:
HUGO W. KREINBRING,
L. M. SPENCER.