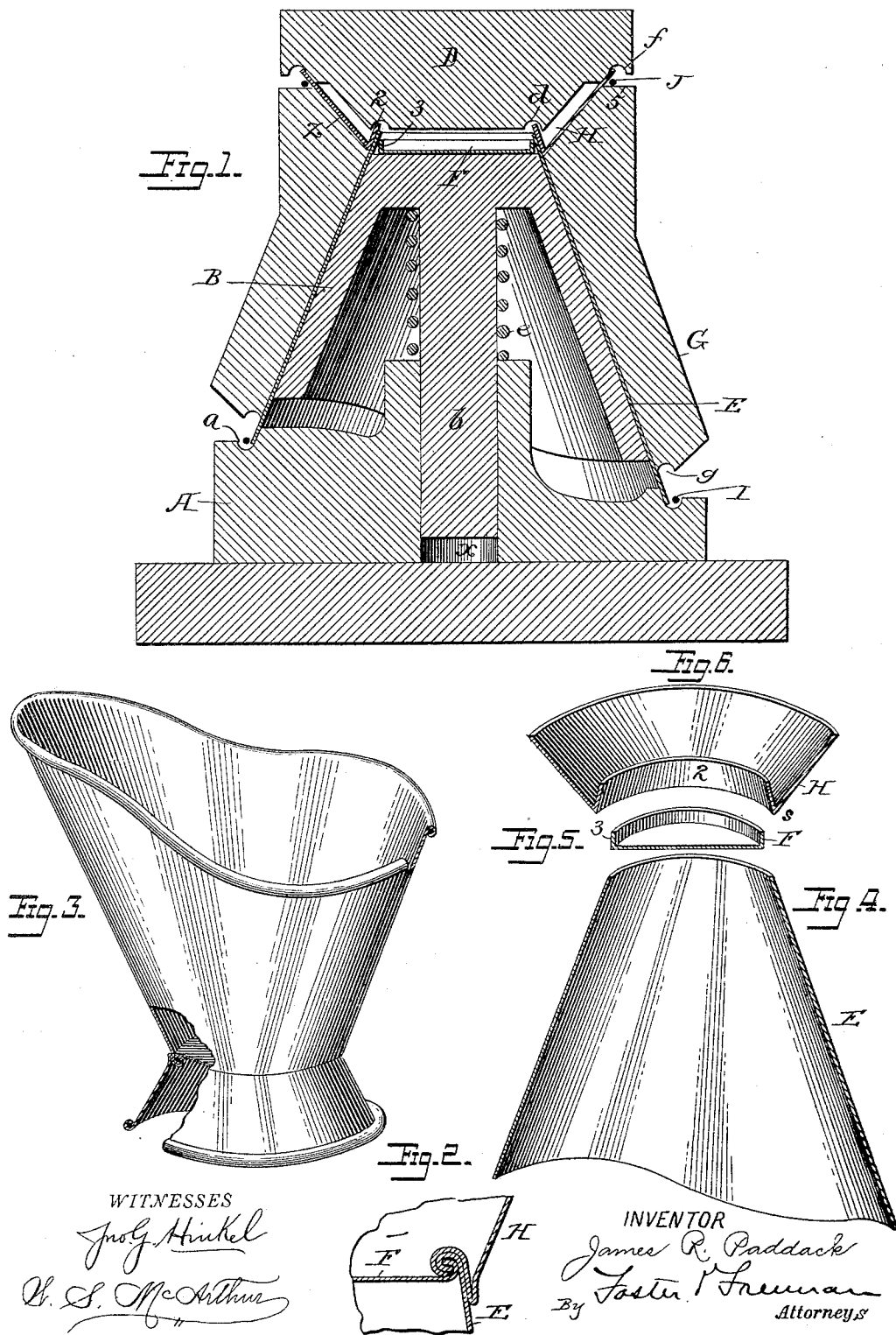


(No Model.)

J. R. PADDACK.
DIE FOR MAKING SHEET METAL ARTICLES.

No. 461,042.

Patented Oct. 13, 1891.



UNITED STATES PATENT OFFICE.

JAMES R. PADDACK, OF CINCINNATI, OHIO.

DIE FOR MAKING SHEET-METAL ARTICLES.

SPECIFICATION forming part of Letters Patent No. 461,042, dated October 13, 1891.

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To all whom it may concern:

Be it known that I, JAMES R. PADDACK, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in the Manufacture of Sheet-Metal Articles, of which the following is a specification.

My invention relates to the manufacture of sheet-metal articles; and it consists in the method and means, as fully set forth hereinafter, for curling the edges of the articles in wiring or forming an edge-finish and for connecting the parts together when the articles consist of different sections.

In the accompanying drawings, Figure 1 is a sectional elevation of my improved die. Fig. 2 is a view of the joined parts of the hod in section. Fig. 3 is a perspective view of the hod, a portion broken away. Figs. 4, 5, and 6 are views illustrating the construction of the different parts of the hod detached.

The base A is constructed in any suitable manner to support the other portions, preferably with a central socket *a*, receiving the stem *b*, projecting from and connected with the central supporting-block B, the socket being sufficient in depth to constitute the necessary guide for the movements of the block, and a spring *c*, encircling the stem, serves to hold the block in its place and permit a downward movement when necessary.

G is the outer casing or die, in two vertically-separable sections connected together, which inclose the block B, and the external form of the latter corresponds with the interior form of the article to be operated upon, while the interior form of the casing G corresponds to the exterior form of the article to be operated upon—as, for instance, the body E of a coal-hod, which, when in the machine, occupies an inverted position, as shown.

In the base A is a groove, coinciding in its outline with the outline of the edge of the hod or other articles, and therefore in this case irregular in outline—that is, the different parts being in different planes—and in a shoulder of the casing G is a coinciding groove *g*, the lower groove constituting the curling-groove and the upper groove the

swaging-groove. Thus when the body of the article is placed upon the block B, as shown, the lower edge will lie in groove *a*, and when the said edge is to be “wired” a wire of proper configuration is laid in the groove *a*, and a downward pressure is imparted by forcing down the casing G, and with it the block B and intervening body E, when the edge of the body will be gradually curled outward by the face of the groove *a* and curled around the wire I, and as the casing G completes its descent the face of the swaging-groove *g* will be brought against the curled portion of the body with great pressure and will bring every portion closely against the wire, forming a finished edge to the body.

In many instances it is desirable to connect the bottom and frequently also the foot of the article to the body at the same time that the other edge is wired, and to effect this I make use of a flanged disk F, constituting a bottom, as shown in Fig. 5, and a flanged ring H, constituting the foot-piece, as shown in Fig. 6, and I form a joint connecting the body, bottom, and foot-piece, as I will now describe. The casing G has at its upper end a die-face *z*, or there is otherwise constructed a suitable support for holding the foot-piece in position with its inner flange 2 against the outer face of the body E and projecting slightly above the latter, as shown in Fig. 1. The bottom F rests upon the top of the block B, with its flange 3 inside but below the edge of the body E. As thus shown it will be seen that the flange of the bottom, the end of the body, and the flange of the foot-piece are of different heights, the outer flange overtopping the next and the latter projecting above the inner flange. In order to curl these flanges and form a joint, I make use of a swaging-die D, having a curling-groove *d*, adapted to receive the edge of the flange 2, and a downward movement is imparted to the swaging-die D, preferably, so as to impart a like movement to the parts below it, by which movement the flange 2 is first curled over the edge of the body, and the latter and the flange 2 are then curled over the flange 3, and the latter is then curled inward, forming a joint of the character illustrated in Figs. 2 and 3, in which all the parts are so

closely interlocked that pressure or draft upon any one part will have no effect to separate them unless such pressure is sufficient to fracture. The folds of this joint being located upon the inside of the vessel are thus protected from wear, while the exterior presents a finished surface scarcely broken by the joint.

In cases where two parts, as E and H, only have to be united, without a cross portion F, the arrangement and operation will be the same, and the effect in uniting these two parts will be to curl first the flange 2 over the edge of the part E and then to curl the latter with the flange inward, forming a joint locking the two parts inseparably together.

In many instances it is desirable to wire the edge of the foot-piece or part H practically simultaneously with the wiring of the lower edge of the part E. To this end the die D is provided with a second curling face or groove *f*, arranged in position to receive the edge of the part H, and the wire J is placed upon an annular swaging face or support or base 5 of the casing G below the groove *f*. When the die D is pressed downward, the edge of the part H will be curled first outward and then inward, picking up the wire, inclosing it, and the further thrust of the die will swage and shape the inturned edge or curl against the flat face 5. In some cases the wire may be dispensed with, the edge of the part H being merely curled inward against the body. After the joining of the different parts of the article or the curling of the edges, as described, pressure upon the die D will be removed, when the spring *e* will lift the parts above the same. The die D is then raised and the casing G separated, after which the article is taken from its place and the parts are put in position to operate upon other blanks as before.

It will be seen that the groove *g* is formed in the lowest portion of the casing G, so that as the casing is brought toward its lowest position there is nothing to obstruct the view at the point where the edge of the article is curled, so that should any particles of metal be in position to be caught in the curling operation they may be seen and detached.

It will be evident that in the formation of some classes of articles only a portion of the features described need be used or assembled. For instance, in the manufacture of a double-flaring article where there is no cross portion or bottom F, or where in other articles no wiring is required, the edge may merely be curled against the body, or the joint may be formed between the three parts without wiring or curling the outer edges.

Where the curling is upon a flat plane, the action of the curling-groove is sufficient, and no swaging is ever required. Where the edge to be curled is upon an irregular plane, however, parts of the curl are imperfect and can only be completed by a swaging action.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. A die for curling the edges of sheet-metal articles, which consists in the combination of a base-piece having a curling-groove *a* on an irregular plane, a hollow die-casing having a die or swaging-surface at its lower edge opposite the groove *a*, parallel to the line of the latter, and means for clamping the article against the hollow die-casing adjacent to the edge to be curled and for supporting the casing, so as to be vertically movable to and from the base to bring the swaging-face against the curl, all arranged to curl and swage one edge of the article at one operation, substantially as set forth.

2. A die for curling the edges of sheet-metal articles, which consists in the combination of a base-piece having a curling-groove *a*, a hollow casing for receiving the body of the article, provided with upper and lower swaging-faces *b* and *g*, and a follower having a curling-groove *f* opposite the upper swaging-face, the follower and the casing being supported to move vertically, and all constructed to curl and swage the opposite edges of the article at one operation, substantially as set forth.

3. A die for curling and joining the edges of sheet-metal articles, which consists in the combination of supports for the body, bottom, and base-piece of the article, and a follower having a groove arranged opposite the point of junction of said parts to curl and swage into a single joint all of said parts at a single operation when moved toward the supports, substantially as described.

4. The combination, in a die for joining the sections of a sheet-metal article, of a base, a casing, supports for two portions E H of said article, and a swaging-die or follower D, provided with a curling-groove for receiving and curling together parts of the portions to be joined, substantially as described.

5. A die for curling and joining the edges of sheet-metal articles, which consists in the combination of a base-piece, supports for the body, bottom, and foot-piece of the article, and a follower having curling-grooves arranged to curl the outer edge of the foot-piece and to curl and swage together the joining edges of the several parts, substantially as described.

6. A die for connecting the parts and simultaneously curling the edges of sheet-metal articles, consisting in the combination, with a base-piece having a curling-groove, of a hollow die-casing supported to move vertically and constructed to receive the body portion of the article, a support for the other portion of the article, and a die or follower provided with curling-grooves for curling the flanges of the meeting portions of the article and for curling the outer edge of the upper portion, all substantially as set forth.

7. The combination, in a metal article, of a

bottom piece, a body-piece, and a foot-piece having lapping parts all curled together to form a joint, a flange of the foot-piece fitting closely the outside of the body, and the flange
5 of the bottom fitting closely the side of the body, all substantially as set forth.

8. The combination, in a sheet-metal article, of three sections having edges meeting and coiled into a common joint, one of said
10 sections having a sharp return-angle s and

having its return portion or flange 2 coiled about the edges of the other sections, substantially as shown and described.

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

J. R. PADDACK.

Witnesses:

C. S. DRURY,
CHARLES E. FOSTER.