J. J. HOFFMAN.

PROCESS OF MANUFACTURING SHEET METAL CAR ROOF PARTS.

APPLICATION FILED OCT. 15, 1912.

1,092,486.

Patented Apr. 7, 1914

3 SHEETS—SHEET 1.

Fig. 1.



Fig. 2.

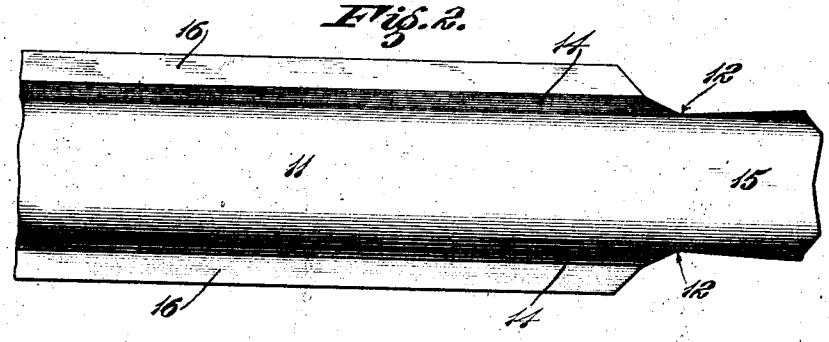


Fig. 3.

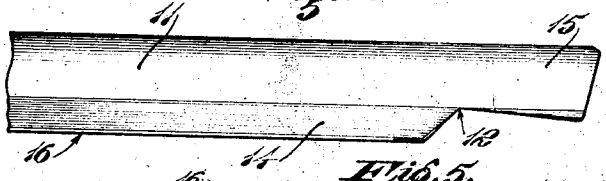


Fig. 4.

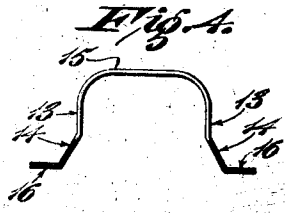


Fig. 5.

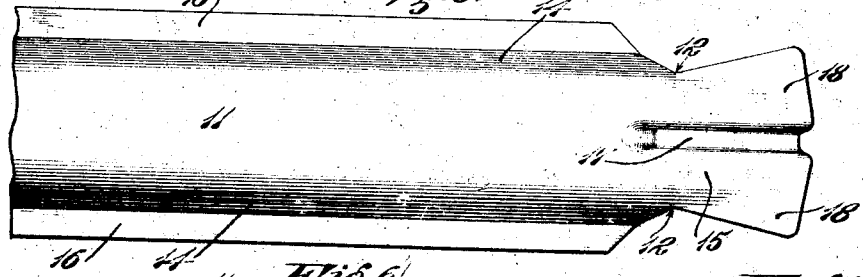


Fig. 6.

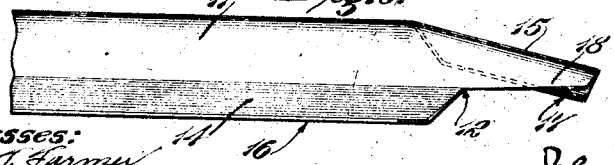
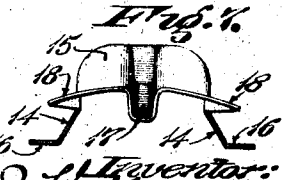


Fig. 7.



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Inventor:
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3 SHEETS—SHEET 2.

Fig. 8.

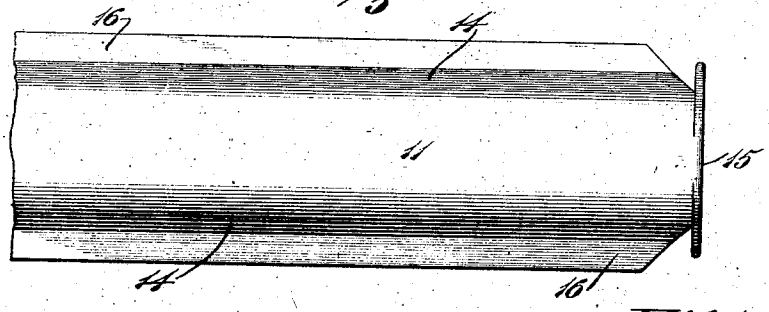


Fig. 9.

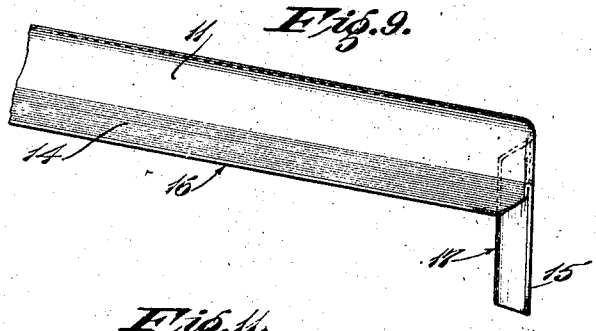


Fig. 10.

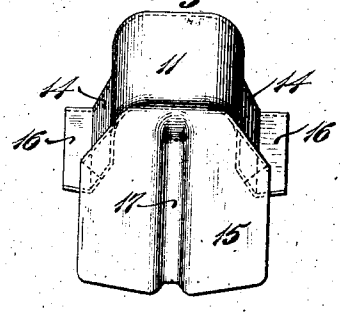


Fig. 11.

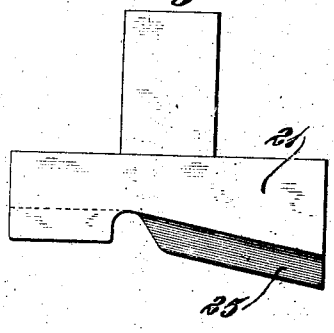


Fig. 12.

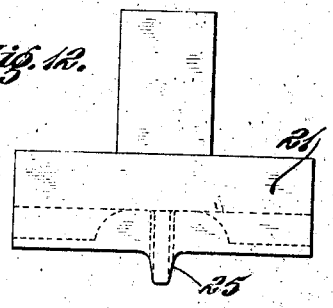


Fig. 13.

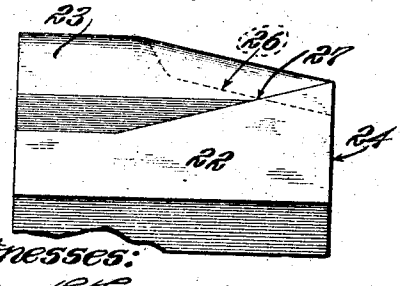
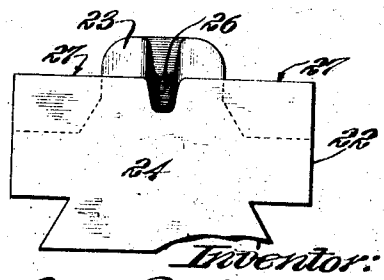


Fig. 14.



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3 SHEETS—SHEET 3.

Fig. 15.

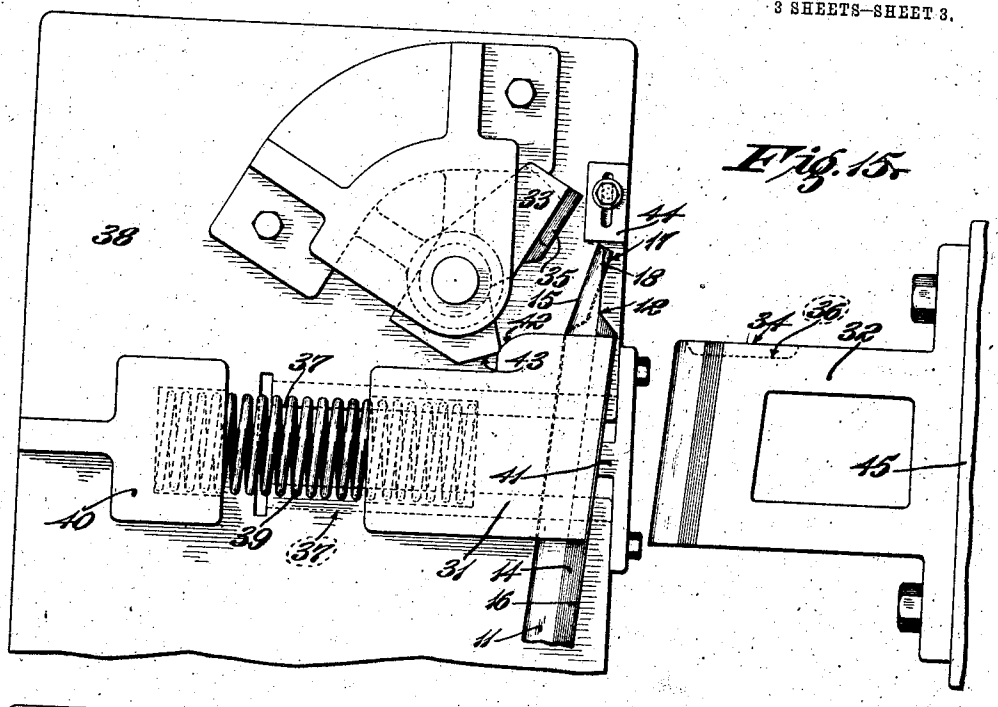
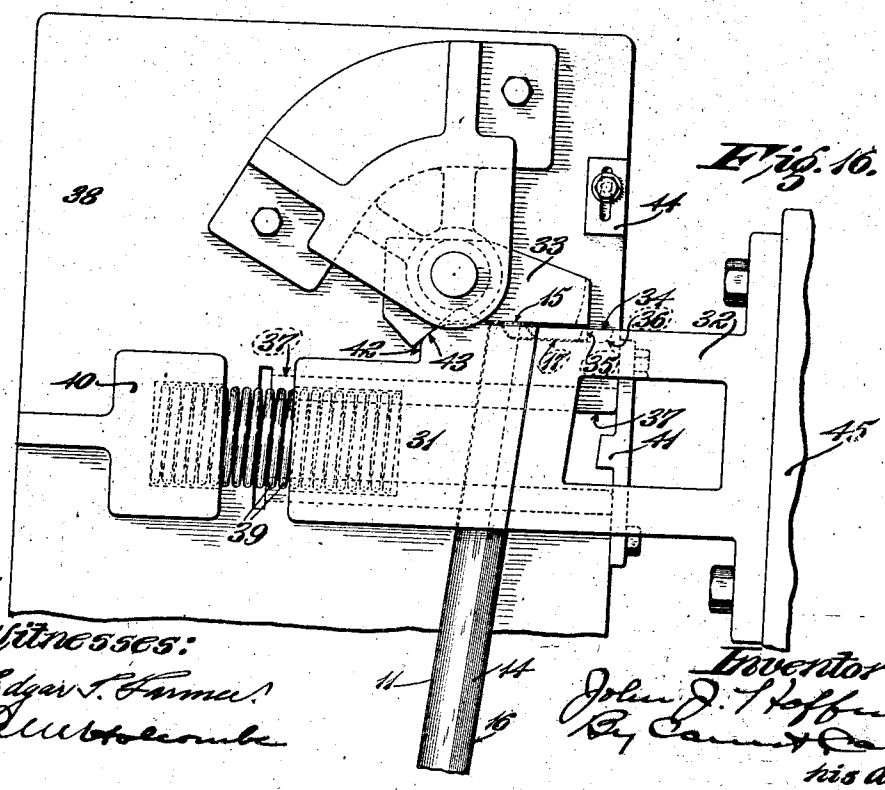


Fig. 16.



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UNITED STATES PATENT OFFICE.

JOHN J. HOFFMAN, OF NEW KENSINGTON, PENNSYLVANIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO P. H. MURPHY COMPANY, OF PARNASSUS, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

PROCESS OF MANUFACTURING SHEET-METAL CAR-ROOF PARTS.

1,092,486. Specification of Letters Patent. Patented Apr. 7, 1914.

Application filed October 15, 1912. Serial No. 725,841.

To all whom it may concern:

Be it known that I, JOHN J. HOFFMAN, a citizen of the United States, and a resident of the city of New Kensington, county of Westmoreland, and State of Pennsylvania, have invented a new and useful Improvement in Processes of Manufacturing Sheet-Metal Car-Roof Parts, of which the following is a specification.

This invention relates particularly to the manufacture of sheet-metal seam covers for the joints of outside metal car roofs, such as are shown in my co-pending application, Serial No. 697,405, filed May 15, 1912, and has for its principal object the expiditious and accurate forming up of the end portion of such seam covers.

Further objects of the invention will appear in connection with the description of the methods and apparatus hereinafter described.

In the accompanying drawings, in which like symbols are used to designate like parts wherever they appear,—Figure 1 represents in plan view the end of the sheet-metal blank from which the seam cover is to be formed, showing the shape to which the blank is cut in the notching operation; Figs. 2, 3 and 4 are top plan view, side elevation and end view, respectively, of the blank after it is formed up into trough shape; Figs. 5, 6 and 7 are top plan view, side elevation and end view, respectively, of the blank after the crimping and flattening operation; Figs. 8, 9 and 10 are top plan view, side elevation and end elevation of the finished seam cover; Figs. 11 and 12 are side and rear elevation, respectively, of the upper crimping and flattening die; Figs. 13 and 14 are side and rear elevation, respectively, of the lower crimping and flattening die; Fig. 15 is a top plan view of the die bed of the bending machine, showing the gripping and bending dies in position to start the bending operation; and Fig. 16 is a similar view showing the dies in their respective positions at the end of the bending operation.

In manufacturing seam covers according to this invention, the sheet metal is sheared into strips somewhat longer that the finished article, and of uniform width sufficient to form up into the desired trough shape, wherein the side walls are straight and parallel for part of their depth and are flared or inclined outward toward their extremities. The ends 11 of these strips are notched out at the corners, as shown in Fig. 1, by means of suitably shaped shearing dies in a press. The notches are deeper at their inner angles or corners 12 than at the ends of the strip, and the inner angles 12 of the notches are positioned on the lines where the straight portions 13 and inclined portions 14 of the sides of the trough meet, and at about the point where the bend between the top and sides of the seam cover and downturned end portion 15 is to be. The seam cover is then formed into trough shape, as shown in Figs. 2, 3 and 4, in suitable dies in a press, the flanges 16 along the lower edges of the inclined portions 14 of the sides being formed at the same operation. The next step is the crimping and flattening of the ends of the seam cover into a shape suitable for bending down. It is found to be difficult, if not impossible to bend down the end of a sheet metal trough without rupturing the metal in the angle and buckling the sides of the trough, unless very thin or very ductile metal is used. Heavy sheets of ordinary galvanized iron formed into trough shape cannot be bent down at the ends like tin gutters, but by first forming longitudinal folds or crimps 17 extending from the ends 15 of the seam covers past the angles 12 of the notches, at the same time flattening out the edges 18 of the ends 15, the ends thus shaped can be bent down without difficulty.

Dies 21, 22, suitable for crimping and flattening the seam cover ends, are shown in Figs 11 to 14. The lower die 22, is placed on the fixed platen of a vertical press, and the upper die 21 secured to the under side of the movable platen. The end of the seam cover is placed on the lower die, straddling the central portion 23, and with its end approximately flush with the rear end face 24 of the die. The projection 25, on the upper die, will force the central portion of the end of the seam cover down into the groove 26 in the lower die, and the flat portion 27 of the lower die will at the same time spread and flatten out the edges 18.

The last operation, bending down the ends of the seam cover, may be performed with a mallet over a suitably shaped anvil block, as when the ends have been notched and

crimped as already described there is no difficulty in bending them. However, the means preferably employed for bending the ends comprises mating gripping dies 31, 32, arranged to grip the seam cover just short of the point where the bend is to be made, and a pivotally mounted finger 33 adapted to press the projecting end 15 of the seam cover around until it brings up against the edge 34 of the gripper die 32. The finger 33 has a projection 35 and the gripper die 32 has a recess 36 in its edge 34 corresponding to the crimp 17 in the end of the seam cover. The gripper die 31 is slidably mounted in a dovetail groove 37 in the bed plate 38, and a compression spring 39 arranged between the rear face of the gripper die and a fixed bracket 40 on the bed plate tends to hold the gripper die against the stop 41 at the outer end of the dovetail slot. A cam shoulder 42 on the gripper die 31 engages with a cam projection 43 on the pivoted finger 33, and causes the latter to rotate toward the gripper dies when the die 31 is moved away from the stop 41 against the pressure of the spring 39. The bed plate 38 is mounted on the frame of a bulldozer, or horizontal press, to the ram or moving platen 45 of which the gripper die 32 is secured.

The operation of the apparatus is as follows: The dies being in the position shown in Fig. 15, the end of the seam cover is run through the gripper die 31 until it strikes the adjustable stop 44, which will position the point at which the bend is to be made at the back edge of the die. The machine is set in operation and the die 32 is advanced against the die 31 and grips the seam cover. Further movement of the die 32 carries the seam cover and die 31 back toward the bracket 40, and at the same time the shoulder 42 on the die 31 causes the finger to swing against the end of the seam cover and bend it around against the edge of the die 32, as shown in Fig. 16. This completes the bending operation, and the die 32 is retracted, allowing the die 31 and finger 33 to return to their normal positions, whereupon the finished seam cover can be withdrawn from the machine.

Although I have shown and particularly described certain forms of apparatus for carrying out my invention, my invention is not limited to the apparatus, but relates to the methods used, and to the operations performed, in carrying out my invention, as set forth in the claims.

I claim the following:

1. In the manufacture of sheet-metal car roofing parts, notching the corners of a suitable blank, bending the side margins of said blank to form it to trough shape, flattening and longitudinally crimping the ends of said trough-shaped blank, and bending over said crimped portions at the inner corners of said notches to close the ends of the trough.

2. In the manufacture of sheet-metal car roofing parts, notching the corners of a suitable blank, said notches being deeper at their inner corners than at their outer ends, bending the side margins of said blank to form it to trough shape, flattening and longitudinally crimping the ends of said trough-shaped blank, and bending over said crimped portions at the inner corners of said notches to close the ends of the trough.

3. The process of manufacturing sheet-metal car roof parts comprising the following operations, first notching the corners of a strip of sheet metal, second, bending the margins of said strip to form the latter to the shape of a trough, the depth of the sides of said trough being greater than the depth of said notches, third, flattening out the side walls of said trough at their ends and crimping its narrow end portions longitudinally, and fourth, bending over said crimped end into planes transverse to said side walls.

4. The process of manufacturing sheet-metal car roof parts comprising the following operations, first, notching the corners of a strip of sheet metal, said notches being deeper at their inner corners than at their outer ends, second, bending the margins of said strip to form the latter to the shape of a trough, third, flattening out the side walls of said trough at their ends and crimping its narrow end portions longitudinally, and fourth, bending over said crimped ends at the inner corners of said notches into planes transverse to said side walls.

5. The process of manufacturing sheet-metal car roof parts comprising the following operations, first notching the corners of a strip of sheet metal, said notches being deeper at their inner corners than at their outer ends, second, bending the margins of said strip to form the latter to the shape of a trough, the depth of the sides of said trough being greater than the depth of said notches, third, flattening out the side walls of said trough at their ends and crimping its narrow end portions longitudinally, and fourth, bending over said crimped ends at the inner corners of said notches into planes transverse to said side walls.

Signed at New Kensington, Pennsylvania, this 10″ day of Oct., 1912.

JOHN J. HOFFMAN.

Witnesses:
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A. A. POTTS.