March 14, 1939. A. R. MacLAGAN 2,150,384

METHOD OF FORMING SHEET METAL COIN COLLECTOR HOUSINGS.

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FIG. 1

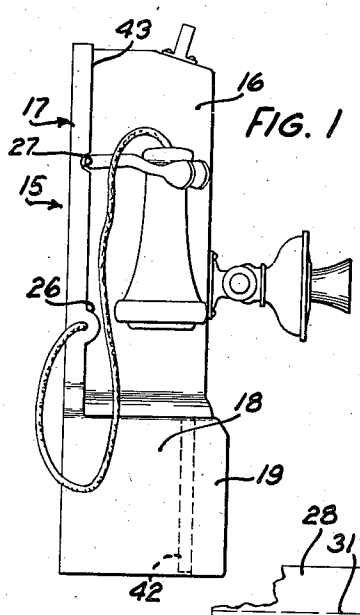
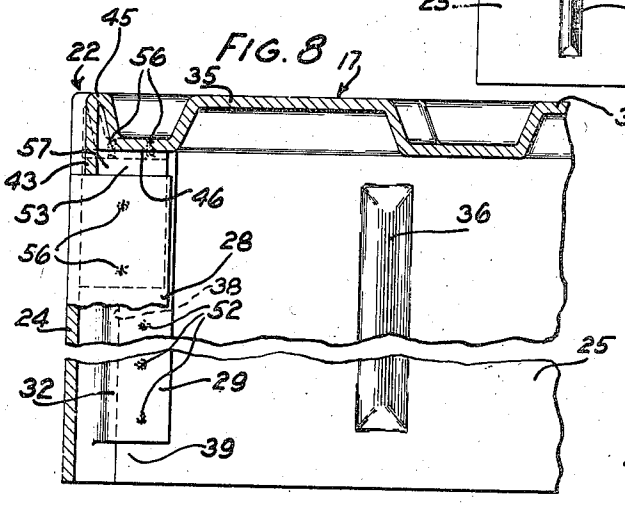


FIG. 2

FIG. 8



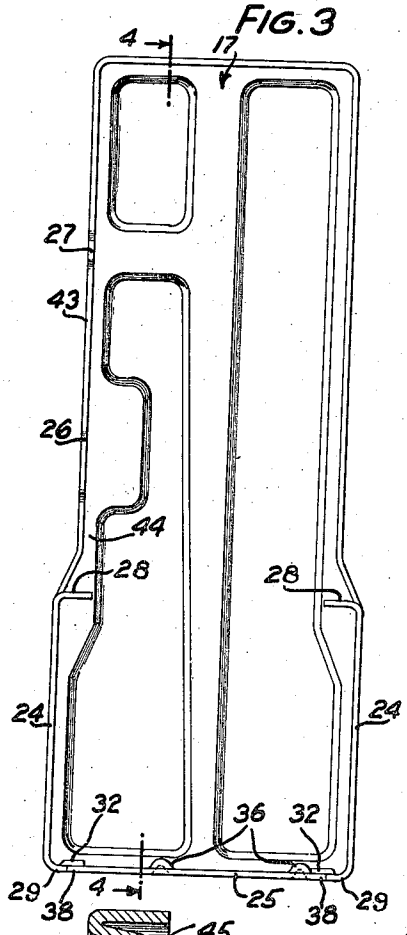
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FIG. 3



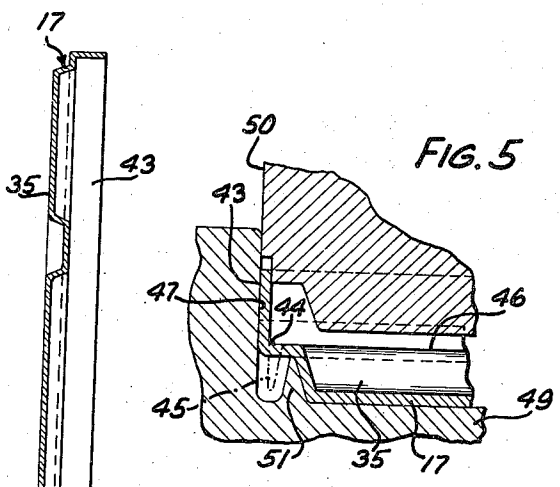


FIG. 4

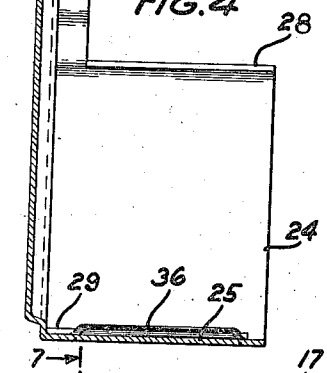


FIG. 5

FIG. 6

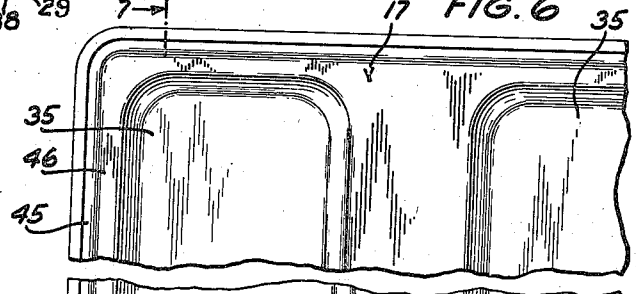
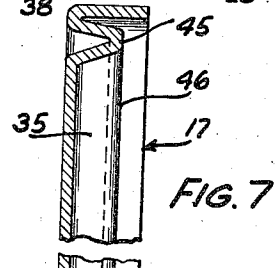
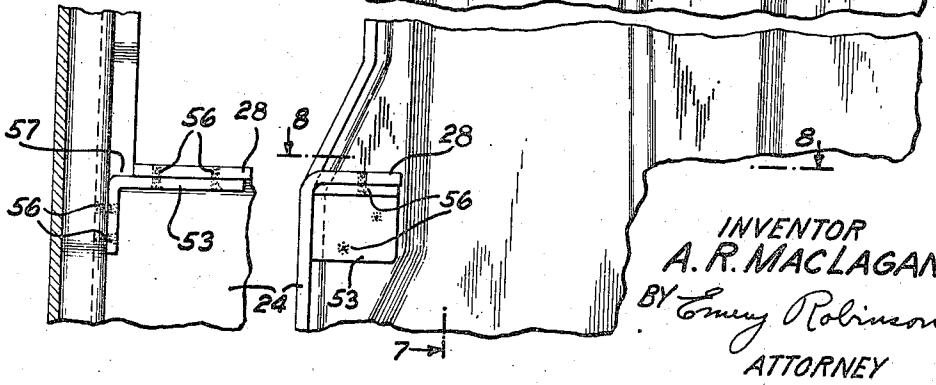


FIG. 7





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METHOD OF FORMING SHEET METAL COIN COLLECTOR HOUSINGS

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Application May 15, 1937, Serial No. 142,813

7 Claims. (Cl. 29—148.2)

This invention relates to a method of forming sheet metal housings, and more particularly to a method of producing as an integral unit the mounting or base plate and rear portion of the lower housing for telephone coin collectors.

Objects of this invention are the provision of a practical and economical method of producing an integral base plate and rear lower housing for telephone coin collectors and to increase the structural strength and durability of telephone coin collectors in service.

In accordance with the aforementioned object, the invention as applied to producing an integral unit comprising the base plate and rear lower housing portion of a telephone coin collector contemplates a method which comprises forming a blank from a sheet of metal by punching and shearing operations, the blank comprising a base plate portion with three wing-like portions at its lower end serving finally as the two side walls and bottom wall of the rear lower housing portion. Each of the side walls at their opposite upper and lower ends are provided with extensions, the lower extensions being offset substantially the thickness of the blank during the blanking operation. During the operation of punching the blank the base plate and bottom wall are embossed to provide a plurality of reinforcing ribs. The blank is then subjected to a series of folding and drawing operations in a predetermined sequence, whereby the two sides and bottom walls and the remaining peripheral portion of the base plate are turned at right angles to the plane thereof, and the extensions on the side walls are turned at right angles to the walls, the offset portions of the lower side wall extensions meeting and nesting in the opposite edge portions of the bottom wall. Subsequently the folded blank is subjected to pressing, drawing and folding operations to form a reinforcing flange comprising a double thickness of metal extending around the entire periphery of the base plate. In further steps of the method the offset portions of the side wall extensions are welded to the edge portions of the bottom wall and an angle plate is welded to the upper side wall extensions and the base plate to position and rigidly secure at this point the upper ends of the side walls and to close an opening which otherwise would occur at this point.

Other objects and advantages of this invention will more fully appear from the accompanying detailed description taken in connection with the accompanying drawings, wherein

Fig. 1 is a side view of a telephone coin collector having the base plate and rear lower housing portion produced in accordance with the method of this invention;

Fig. 2 is a plan view of a sheet metal blank formed by punching, shearing and embossing operations from which blank the integral base plate and rear lower housing portion is subsequently formed;

Fig. 3 is a front view of the base plate and rear lower housing portion after the blank of Fig. 1 has been subjected to folding and drawing operations to position the side and bottom walls at right angles to the base plate portion, and the side wall extensions at right angles to the side walls;

Fig. 4 is a vertical section taken on the line 4—4 of Fig. 3;

Fig. 5 is a diagrammatic fragmentary sectional view of a reforming punch and dial mechanism illustrating the operation of forming a reinforcing flange comprising a double thickness of metal extending around the entire periphery of the base plate;

Fig. 6 is an enlarged fragmentary front view of Fig. 3 upon completion of drawing and folding operations to form the reinforcing flange around the base plate, the angle plate being shown welded to the upper end of one of the side walls and the base plate;

Fig. 7 is a vertical section taken on the line 7—7 of Fig. 6, and

Fig. 8 is a fragmentary plan section taken on the line 8—8 of Fig. 6.

Referring now to the drawings, Fig. 1 discloses a side view of a telephone coin collector having an integral base plate and rear portion of the lower housing, indicated in general by the numeral 15, produced in accordance with this invention. An upper housing 16 is secured to a base plate portion 17 and rests upon a rear portion 18 of the lower housing. A drop forged lower front housing portion 19 produced in accordance with the method disclosed in the application of A. R. MacLagen and F. F. Schuster, Serial No. 136,760, filed April 14, 1937, completes the coin collector housing. For details of construction and operation of a typical telephone coin collector with which this invention is particularly adapted to be used, reference may be made to O. F. Forsberg U. S. Patent 1,043,219, issued November 5, 1912.

In the practice of the method referring to Fig. 2 a blank 22, which is substantially flat except as hereinafter described, is first formed from sheet metal, the blank having a predetermined

configuration and of such dimensions throughout that sufficient metal is included whereby at the termination of subsequent folding and drawing operations the resultant integral base plate and lower rear housing will be of the desired dimensions. The blank 22 comprises the rectangular shaped base plate portion 17 with two opposite similar wing-like portions 24 serving finally as side walls of the lower rear housing 18 and a portion 25 which will provide the bottom wall of the housing. A rounded projection or ear 26 (Figs. 1 and 3) is formed on the periphery of the base plate portion 17, the ear finally being perforated for the passage of a receiver cord which also extends through a notch (not shown) formed in the back edge of the upper housing 16. Formed in the periphery of the portion 17 is a notch 27 for a receiver hook. Each of the side wall portions 24 is formed with upper and lower extensions 28 and 29, respectively, the upper extensions 28 being sheared at 30 (Fig. 2) from their upper edges to a folding line indicated by a broken line 31. The lower extensions 29 at their lower edge portions are raised or offset as shown at 32 (Figs. 2, 3 and 8) the thickness of the sheet metal from the plane of the side wall portions 24, as viewed in Fig. 2. Thus, upon folding the lower side wall extensions 29 at right angles to the plane of the blank 22 along folding lines indicated by broken lines 33, the bottom wall portion 25 being similarly folded, and a folding of the side wall portions 24 forward, as viewed in Fig. 2, to position them at right angles to the plane of the blank, which latter folding operations will be referred to hereinafter, the upper surfaces of the opposite edge portions of the bottom wall portion 25 will meet and nest in the offset portions 32 of the side wall portions as clearly shown in Fig. 3.

Simultaneously with the punching and shearing of the blank 22 (Fig. 2) the base plate portion 17 and the bottom wall portion 25 thereof are subjected to an embossing operation which provides, in the case of the portion 17 three embossments 35, and in that of the bottom wall portion 25 two embossments 36. The embossments 35 and 36 as viewed in Fig. 2 appear as depressions and serve as reinforcing ribs to add rigidity to the integral base plate and lower rear housing.

After the forming of the substantially flat blank 22 (Fig. 2) it is subjected to a series of folding and drawing operations in a predetermined sequence as a result of which the two side wall portions and the bottom wall portion 24 and 25, respectively, and the remaining peripheral portion of the base plate portion 17 are turned or folded forwardly, as viewed in Fig. 2, along an endless folding and drawing line, indicated by a broken line 37, until they are finally disposed at right angles to the plane of the base plate 17, as shown in Figs. 3 and 4. The extensions 28 and 29 on the upper and lower ends of the side wall portions 24 are turned inwardly on the folding lines 31 and 33, respectively, at right angles to the plane of the side wall portions. Thus the offset portions 32 of the lower extensions 29 are in position whereby opposite edge portions 38 of the bottom wall portion 25 will meet and nest therein when the latter portion is finally positioned, as shown in Figs. 3 and 4. In forming the lower extensions 29 on the side walls 24 the outer ends of the extensions are notched as indicated at 39 (Figs. 2 and 8) so that when the side walls and extensions thereof, and the bottom wall 25 have been turned to their normal position (Fig. 8) only one thickness of metal will occur at the open end of the lower rear housing 18 for a suitable distance back of the edge formed by the side and bottom walls. This provides a suitable clearance back of the edge for a shouldered portion 42 (Fig. 1) of the lower front housing portion 19, which extends into the lower rear housing.

As a result of the drawing of the peripheral portion of the base plate portion 17 along the endless folding and drawing line 37 the upper portion thereof is now provided with a comparatively narrow peripheral flange 43 (Figs. 3, 4 and 5) which is coextensive with the side walls 24, the ear 26 and notch 27 being moved to their normal position parallel to the side wall of the upper housing 16.

In a subsequent reforming operation the integral base plate and rear lower housing formed, as above described and shown in Figs. 3 and 4, is subjected to a combined pressing, drawing and folding operation along the edges of the flange 43, the edges of the side and bottom walls 24 and 25 and a continuous portion 44 (Figs. 3 and 5) adjacent thereto of the base plate to form a reinforcing flange 45 comprising a double thickness of metal extending around the entire periphery of the base plate portion 17, the flange projecting from opposite sides of a surface 46 (Figs. 6, 7, and 8) against which the housing portion 16 abuts.

The integral plate and housing unit, as shown in Figs. 3 and 4, is placed in a reforming punch and die mechanism (Fig. 5), the unit resting in a die aperture 47 of a stationary die 49 for operation upon by a reciprocating shouldered punch 50. The die aperture 47 and punch 50 have such a configuration and are otherwise suitably shaped at all points to operate upon the edges of the flange 43, the edges of the side and bottom walls 24 and 25 and the continuous portion 44 adjacent thereto of the plate portion 17 without deleterious injury to other portions of the unit. It is to be understood that the punch 50 is suitably shaped and equipped where the narrow extensions 29 of the side walls 24 extend across the continuous portion 44 of the plate (Fig. 3) that no interference in the operation of reforming the unit occurs. As the punch 50 descends, it engages the peripheral edges of the flange 43 and side and bottom walls 24 and 25 and in its continued descent forces or presses the flange downwardly, thereby folding and drawing the continuous portion 44 of the plate over a raised formation 51 of the die 49. The punch 50 at the end of its stroke, terminating when its lowermost surface abuts the inner surface of the plate 17, has completely drawn and folded the flange 43 and the adjacent portion of the plate to the formation indicated in broken outline at 45 (Fig. 8), the lower surface of the reinforcing flange being in line with the bottom surface of the rest of the plate 17, as shown.

After this described reforming operation a welding step takes place wherein the offset edge portions 32 of the lower side walls extensions 29 are spot welded to the opposite edge portions 38 of the bottom wall 25, as indicated at 52 (Fig. 8). Thereafter as shown in Figs. 6, 7 and 8 an angle plate 53 is spot welded as indicated at 56, to the lower surface of each of the upper side wall extensions 28 and the surface 46 of the base plate 17, thereby positioning and rigidly securing the upper ends of the side walls 24.

The angle plates 53 also serve an important purpose in forming closures for points 58 (Figs.

7 and 8) where the rear sheared edges of the side wall extensions **28** are spaced from the base plate surface **46** against which the upper housing **16** abuts. The angle plates **53** extend across these spaces and back to the surface **46** and thus effectively serve to prevent unauthorized entry from the exterior of the coin collector of wires, or the like, which otherwise could be inserted through a normal space occurring between the outer surface of the upper housing and the inner peripheral surface of the base plate flange **43** at the lower corners of the upper housing, where it rests upon the upper side wall extensions **28**, and thence through the space occurring at the point **57** into the interior of the coin collector.

It will be apparent that the integral base plate and rear lower housing for telephone coin collectors produced by practicing the method of this invention will be a strong and durable structure which is an important factor in maintaining uninterrupted telephone service. Furthermore, the method provides for a practical and economical production of such base plate and rear lower housing.

Although the invention as herein described and illustrated is particularly well adapted for producing as an integral unit the base plate and rear lower housing for telephone coin collectors, it is not to be limited thereto except as defined by the appended claims.

What is claimed is:

1. A method of making an integral base plate and rear lower housing for telephone coin collectors comprising punching and shearing from sheet metal a blank of predetermined configuration having a base plate portion with opposite side wall portions and a bottom wall portion projecting therefrom at its lower end, notching the side wall portions for a predetermined distance from their lower edges and the adjacent portion of the bottom wall portion, folding the lower edge portion of each side wall at substantially right angles to the plane of the wall, folding and drawing the side and bottom walls and the upper peripheral portion of the plate at substantially right angles to the plane of the plate, to cause opposite portions of the bottom wall to meet the folded edge portions of the side walls and the upper peripheral portion of the plate to have a flange coextensive with the side walls, and then welding the meeting edges of the side and bottom walls.

2. A method of making an integral base plate and rear lower housing for telephone coin collectors comprising punching and shearing from sheet metal a blank of predetermined configuration having a base plate portion with opposite side wall portions and a bottom wall portion projecting therefrom at its lower end, notching the side wall portions for a predetermined distance from their lower edges and the adjacent portion of the bottom wall portion, relatively offsetting the lower edge portions of the side wall portions and the adjacent right angularly disposed edge portions of the bottom wall portion from the plane of the blank the thickness of the metal, folding the lower edge portion of each side wall at substantially right angles to the plane of the wall, and then folding and drawing the side and bottom walls and the upper peripheral portion of the plate at substantially right angles to the plane of the plate, to cause the relatively offset edge portions of the side and bottom walls to abut and nest one within the other and the upper peripheral portion of the plate to have a flange coextensive with the side walls.

3. A method of making an integral base plate and rear lower housing for telephone coin collectors comprising punching and shearing from sheet metal a blank of predetermined configuration having a base plate portion with opposite side wall portions and a bottom wall portion projecting therefrom at its lower end, notching the side wall portions for a predetermined distance from their lower edges and the adjacent portion of the bottom wall portion, offsetting the lower edge portions of the side wall portions from the plane of the blank the thickness of the metal, folding the lower edge portion of each side wall at substantially right angles to the plane of the wall, and then folding and drawing the side and bottom walls and the upper peripheral portion of the plate at substantially right angles to the plane of the plate, to cause opposite edge portions of the bottom wall to abut and nest in the adjacent offset portions of the side walls and the upper peripheral portion of the plate to have a flange coextensive with the side walls.

4. A method of making an integral base plate and rear lower housing for telephone coin collectors comprising punching and shearing from sheet metal a blank of predetermined configuration having a base plate portion with opposite side wall portions and a bottom wall portion projecting therefrom at its lower end, shearing the side wall portions inwardly a predetermined distance from their upper edges, notching the side wall portions for a predetermined distance from their lower edges and the adjacent portion of the bottom wall portion, offsetting the lower edge portions of the side wall portions from the plane of the blank the thickness of the metal, folding the upper and lower edge portions of each side wall at substantially right angles to the plane of the wall, folding and drawing the side and bottom walls and the upper peripheral portion of the plate at substantially right angles to the plane of the plate, to cause opposite edge portions of the bottom wall to abut and nest in the adjacent offset edge portions of the side walls and the upper peripheral portion of the plate to have a flange coextensive with the side walls, and then pressing, drawing and folding the edges of the plate flange, the side and bottom walls, and a continuous portion of the plate adjacent the edges to form an endless reinforcing flange of a double thickness of metal.

5. A method of making an integral base plate and rear lower housing for telephone coin collectors comprising punching and shearing from sheet metal a blank of predetermined configuration having a base plate portion with opposite side wall portions and a bottom wall portion projecting therefrom at its lower end, shearing the side wall portions inwardly a predetermined distance from their upper and lower edges parallel to and adjacent the bottom wall portion, offsetting the lower edge portions of the side wall portions from the plane of the blank the thickness of the metal, folding the upper and lower edge portions of each side wall at substantially right angles to the plane of the wall, folding and drawing the side and bottom walls and the upper peripheral portion of the plate at substantially right angles to the plane of the plate, to cause opposite edge portions of the bottom wall to abut and nest in the adjacent offset edge portions of the side walls and the upper peripheral portion of the plate to have a flange coextensive with the

side walls, then pressing, drawing and folding the edges of the plate flange, the side and bottom walls, and a continuous portion of the plate adjacent the edges to form an endless reinforcing flange of a double thickness of metal, and then welding the offset side wall edge portions to the adjacent edge portions of the bottom wall.

6. A method of making an integral base plate and rear lower housing for telephone coin collectors comprising forming by punching, shearing and embossing from sheet metal a blank of predetermined configuration having a base plate portion with opposite side wall portions and a bottom wall portion projecting therefrom at its lower end, shearing the side wall portions inwardly a predetermined distance from their upper and lower edges, offsetting the lower edge portions of the side wall portions from the plane of the blank the thickness of the metal, embossing the plate portion and bottom wall to provide reinforcing ribs, folding the upper and lower edge portions of each side wall at substantially right angles to the plane of the wall, folding and drawing the side and bottom walls and the upper peripheral portion of the plate at substantially right angles to the plane of the plate, to cause opposite edge portions of the bottom wall to abut and nest in the adjacent offset edge portions of the side walls and the upper peripheral portion of the plate to have a flange coextensive with the side walls, and then pressing, drawing and folding the edges of the plate flange, the side and bottom walls, and a continuous portion of the plate adjacent the edges to form an endless reinforcing flange of a double thickness of metal.

7. A method of making an integral base plate and rear lower housing for telephone coin collectors comprising punching and shearing from sheet metal a blank of predetermined configuration having a base plate portion with opposite side wall portions and a bottom wall portion projecting therefrom at its lower end, notching the side wall portions for a predetermined distance at their outer lower corners and also at their lower edges adjacent the bottom wall portion, offsetting the lower edge portions of the side wall portions from the plane of the blank the thickness of the metal, folding the lower edge portion of each side wall at substantially right angles to the plane of the wall, and then folding and drawing the side and bottom walls and the upper peripheral portion of the plate at substantially right angles to the plane of the plate, to cause opposite edge portions of the bottom wall to abut and nest in the adjacent offset portions of the side walls, the notched outer corners of the side walls having one thickness of metal at the outer edge of the housing, and the upper peripheral portion of the plate having a flanged coextensive with the side walls.

ALLAN R. MACLAGAN.