Feb. 10, 1942. H. G. COORDES 2,272,547

APPARATUS FOR MAKING LAVATORIES OR THE LIKE

Original Filed Sept. 3, 1938 2 Sheets-Sheet 1

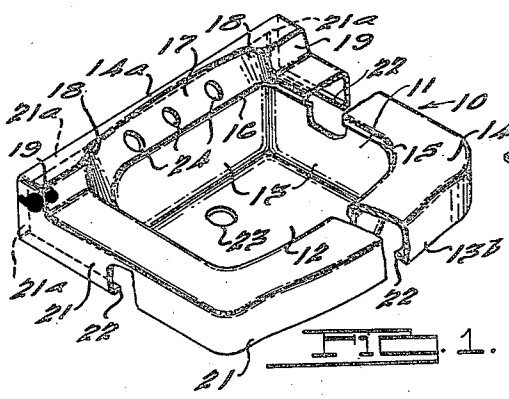


FIG. 1.

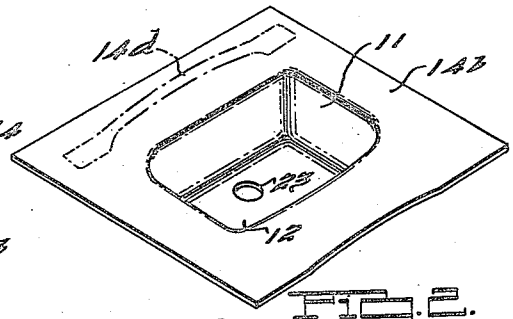


FIG. 2.

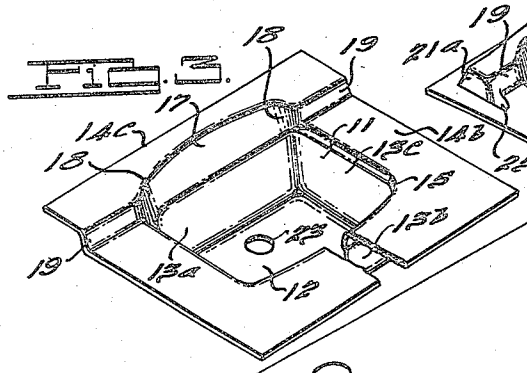


FIG. 3.

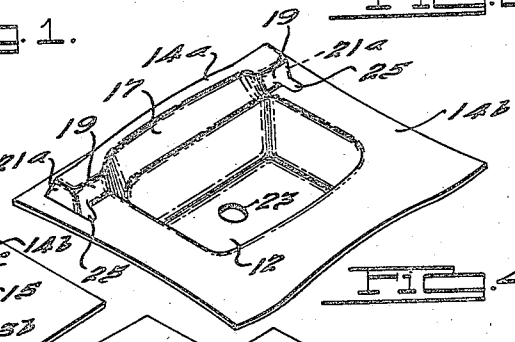


FIG. 4.

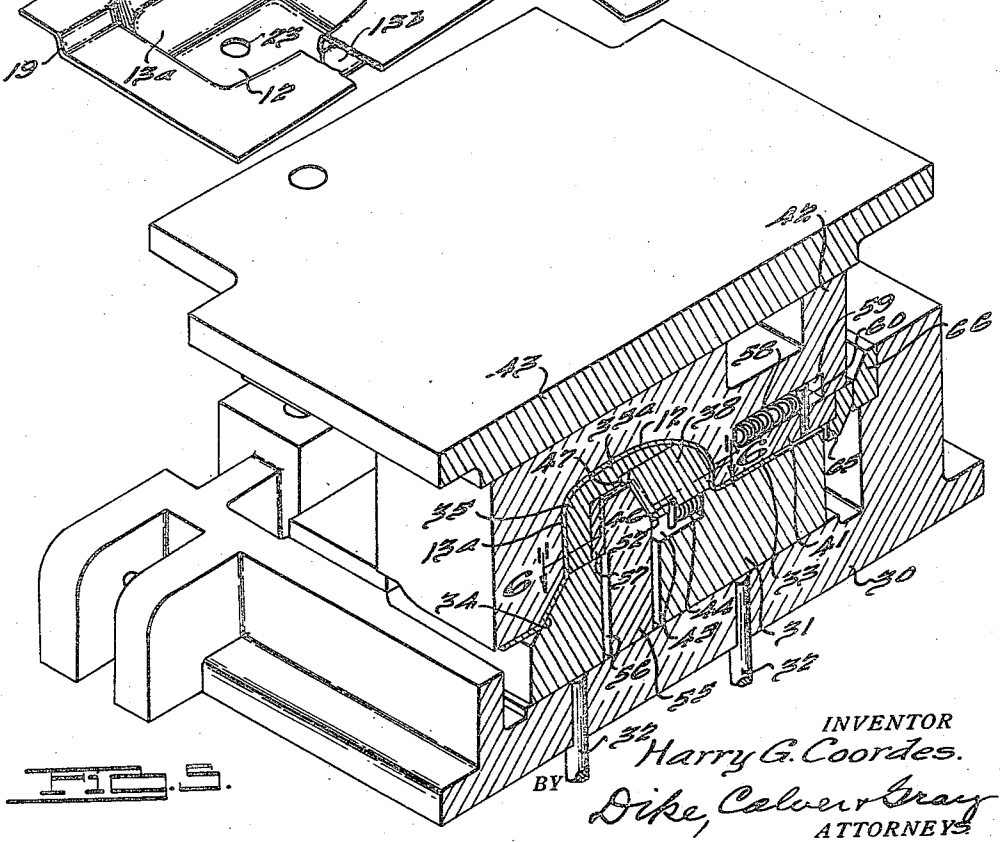


FIG. 5.

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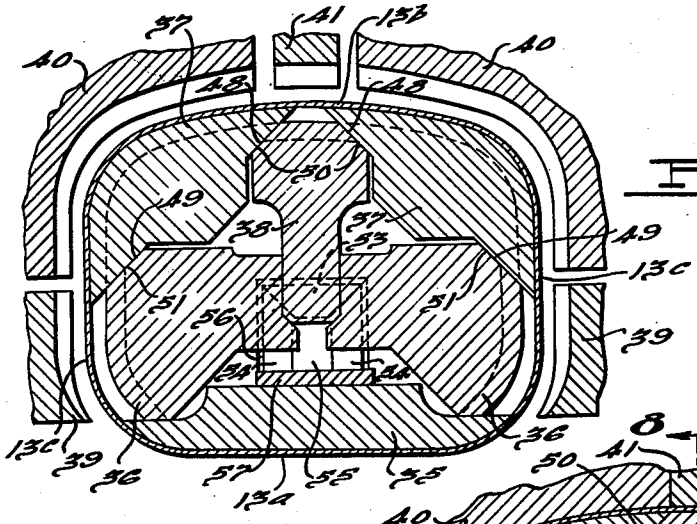


FIG. 6.

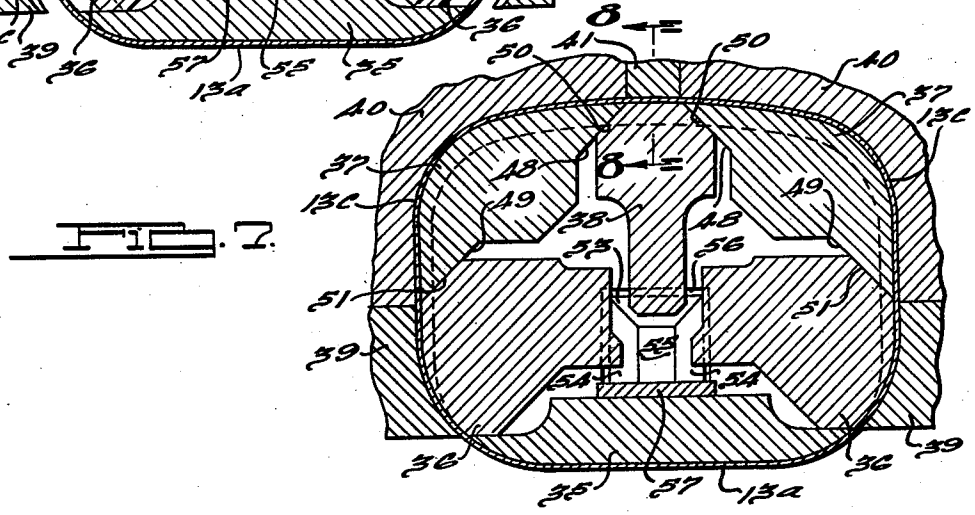


FIG. 7.

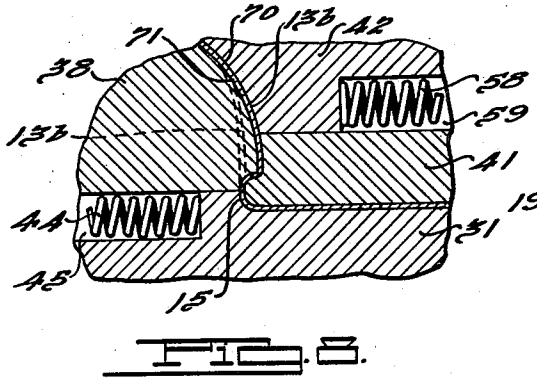


FIG. 8.

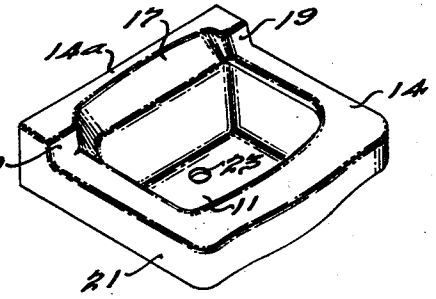


FIG. 9.

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APPARATUS FOR MAKING LAVATORIES OR THE LIKE

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Original application September 3, 1938, Serial No. 228,317. Divided and this application December 26, 1939, Serial No. 310,897

6 Claims. (Cl. 113—48)

This invention relates to the art of fabricating articles by pressing from a single blank of sheet metal, and more particularly to an apparatus for manufacturing one-piece wash basins such as lavatories and the like. This application is a division of my co-pending application Serial No. 228,317, filed September 3, 1938.

One of the objects of the present invention is to provide an improved apparatus for forming from a single blank of sheet metal a lavatory having a horizontal portion and a basin or sump formed therein, said basin partly extending under said horizontal portion and thus having greater capacity and decreasing splashing of water due to the overhang of the edges of said horizontal portion inwardly of the basin and forming in effect an overhanging bead projecting inwardly of the basin.

Another object of the present invention is to provide an improved die apparatus for forming from a single metal sheet a lavatory having a basin with an inwardly projecting bead provided around upper edges of said basin, said die apparatus having means whereby said bead is formed by stretching the metal in expanding the basin rather than by pressing said bead inwardly and thereby compressing and crowding the metal into decreased area which may result in the formation of folds and wrinkles in the metal.

A further object of the invention is to provide an improved die apparatus for forming from a single metal sheet a lavatory having a basin and particularly for expanding the basin in a direction transverse to the direction of travel of the die punch.

A still further object of the invention is to provide an improved die apparatus of the character specified in the preceding paragraph, in which the basin expanding means are formed by a plurality of expandible and contractible die sections which are so arranged that in their final forming positions they form a continuous smooth surface whereby "necking" of the metal at the places of juncture of said sections is eliminated.

It is an added object of the present invention to provide an improved die apparatus of the foregoing character, which is simple in construction, dependable in operation and is relatively inexpensive to make.

The above and other objects and advantages of the present invention will appear from the following description and appended claims when considered in connection with the accompanying drawings forming a part of this specification, wherein like reference characters designate corresponding parts in the several views.

In said drawings:

Fig. 1 is a perspective view, partly in section, of a wash basin which is made according to the present invention.

Fig. 2 is a perspective view at a reduced scale of a blank of sheet metal after the first of a series of operations in the making of the wash basin has been performed thereon.

Fig. 3 shows the blank in perspective after the conclusion of another in said series of operations.

Fig. 4 is a perspective view of the blank obtained by a modified step in said series of operations.

Fig. 5 is a perspective section through die mechanism for forming the inward bead at the top of the wash basin.

Fig. 6 is a fragmentary section through the same die mechanism, taken substantially on the line 6—6 of Fig. 5.

Fig. 7 is a section similar to that of Fig. 6, showing the elements of the mechanism in different positions of operation, however.

Fig. 8 is a greatly enlarged fragmentary section taken on the line 8—8 of Fig. 7.

Fig. 9 is a perspective view of the basin after most of the operations have been performed.

Before explaining in detail the present invention it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation, and it is not intended to limit the invention claimed herein beyond the requirements of the prior art.

Referring to the drawings, Fig. 1 shows one type of pressed metal wash basin made according to the present invention. This wash basin 10 generally comprises a sump 11 having a bottom 12 and upright walls 13 which are surrounded at the top by a continuous ledge or border flange 14. Along the line of merger of certain upright walls 13 and the ledge 14 there is formed a bead 15 which projects into or overhangs the sump 11 and serves not only to reenforce or stiffen the one-piece basin but also to reduce splashing of water from the sump over the ledge 14 thereof to a minimum. In the preferred type of wash basin shown in Fig. 1, the inwardly projecting

bead 15 extends uninterruptedly around the front and sides of the sump. It is to be distinctly understood, however, that the present invention is not intended to be limited to the disclosed extent of the bead 15 in Fig. 1, as the present invention contemplates the formation of the bead along any one or more, or all, sides of the sump. Extending from the top 16 of rear wall 13 of the sump is an inclined splashboard 17 which merges smoothly and gradually as at 18 into steeper end shoulders 19. Extending rearwardly from the top of the splashboard 17 and the shoulders 19 is a raised portion 14*a* of the ledge 14. A depending flange or apron 21 extends uninterruptedly around the front and sides of the ledge 14 and also flanks the shoulders 19 and the ends of the raised ledge portion 14*a*. The rear edges of the apron 21 and the ledge portion 14*a*, which form an inverted U, are bent inwardly to form an uninterrupted flange 21*a* which lies in one plane and serves for mounting purposes. The lower edge of the apron 21 is also bent inwardly to form an uninterrupted flange 22 which is continuous with the rear flange 21*a* but extends in a plane which is substantially perpendicular to that in which said rear flange lies. A drain hole 23 is provided in the bottom 12 of the sump 11, while a plurality of holes 24 in the splashboard 17 are adapted to receive faucets.

In making the wash basin 10 (Fig. 1), the hereafter described steps in the deformation of a single blank of sheet metal are preferred. The blank is first subjected in any conventional die mechanism (not shown) to a drawing operation, resulting in the formation of the sump 11 with a continuous plane outward flange 14*b* at the top. This same die mechanism may also be provided with a piercing punch to provide the drain hole 23 in the bottom of the sump. Depending on the depth of draw of the sump 11 during this first operation, the blank in Fig. 2 may at this stage need to be annealed so as to become sufficiently ductile again to withstand the further steps in the deformation of the blank.

Next, the blank is subjected in any suitable die mechanism (not shown) to a second drawing operation, with the result that the flange or ledge portion 14*c* is raised above the rest of the flange 14*b* (Fig. 3) and the splashboard 17 with its end shoulders 19 is formed.

This second drawing operation may also be performed in a modified manner by suitable die mechanism (not shown) so that an intermediate strip 14*d* of the flange 14*b*, indicated in dotted lines in Fig. 2, is raised above said flange to 14*a* in the manner shown in Fig. 4 for the formation of the splashboard 17 with its end shoulders 19, the corresponding side portions 21*a* of the apron 21 and the hidden flange along the rear edge of the raised ledge portion 14*a*. Moreover, substantially parallel beads 25, which join the ends of the shoulders 19 with the flange 14*b*, may be formed in this modified drawing operation. These beads 25 not only help to prevent the formation of wrinkles in the blank, but also constitute a continuation of the splashboard into the ledge 14.

Next, the blank is subjected to a beading operation in the mechanism shown in section in Figs. 5 to 7, inclusive. The lower die plate 30 is suitably mounted on the bolster plate of any suitable press (not shown), and is provided with a die pad 31 which is suitably guided for vertical movement and normally yieldingly urged into an uppermost position by pressure pins 32. The pad 31 has surfaces 33 and 34 which are so shaped as to accommodate the ledge portion 14*b* (Fig. 3) and the splashboard 17, including the shoulders 19, of the blank when the same is placed thereon. An auxiliary pad 35 (see also Figs. 6 and 7), which is preferably a separate part, is mounted on the pad 31 and is of such shape as to coincide with the rear wall 13*a* and the bottom 12 of the sump 11 when the blank is in place. Slidable between the pad 31 and the overhanging portion 35*a* of the auxiliary pad 35 are a plurality of beading dies 36, 37 and 38 which are adapted to cooperate with counter dies 39, 40 and 41, respectively, on a blank holder 42, mounted on a plate 43 which adapts said blank holder to the ram (not shown) of the press. The dies 36 to 41, inclusive, are shown in contracted or inoperative position in Fig. 6 in which the non-beaded blank is securely located on the pad 31, the auxiliary pad 35 and the dies 37, as will be readily understood. Each of the inner dies 36, 37 and 38 is urged into the retracted position shown in Fig. 6 by a compression spring or springs which are similarly arranged as the spring 44 (Fig. 5) for the die 38. This spring 44, which is received in a groove 45 in the pad 31 and bears against a projecting pin 46 of the die 38, normally urges said die into retracted position in which it rests against a shoulder 47 of the auxiliary pad 35. The identical dies 36 are in turn urged by their springs (not shown) into the retracted position shown in Fig. 6 in which they engage the die 38. The remaining identical dies 37 are urged by their springs (not shown) into the retracted position shown in Fig. 6 in which their cam surfaces 48 and 49 engage corresponding surfaces 50 and 51, respectively, of the die 38 and the dies 36, respectively. The dies 36 and 38 are provided with inclined surfaces of which the surface 52 of the die 38 is shown in Fig. 5. These inclined surfaces are adapted to cooperate with the correspondingly inclined cam surfaces 53 and 54 of a block 55 which is mounted on the lower die plate 30 and extends through an opening 56 in the pad 31 in the manner shown in Figs. 5 and 6. The cam block 55 preferably bears against a thrust pad 57 which is mounted on the auxiliary pad 35.

Adapted to cooperate with the inner dies 36, 37 and 38 are the outer dies 39, 40 and 41, respectively, which are retained on the blank holder 42 and guided thereon for movement in the proper directions toward and away from their respective inner dies by any suitable means (not shown). Each of the outer dies 39, 40 and 41 is normally urged into the retracted position shown in Fig. 6 by a compression spring or springs which are similarly arranged as the compression spring 58 (Fig. 5) for the die 41. This compression spring 58 is received in a groove 59 in the blank holder 42 and bears against a pin 60 which projects from the die 41.

In home or rest position, the pad 31 with its auxiliary pad 35 and inner dies 36, 37 and 38 is held in uppermost position by the pressure pins 32, and the ram of the press and the blank holder 42 are also in their uppermost position. However, there is sufficient clearance between the blank holder 42 and the pad 31 in their uppermost positions to place a blank on the latter for a beading operation. On manually starting an operation of the press by any suitable means such as a clutch or similar control, the ram and the blank holder 42 will descend and clamp the blank to the pads 31 and 35 which are thereupon

forced to descend with said blank holder. During such descent of the pads 31, 35 and the blank holder 42 with the blank therebetween, the outer dies 39, 40 and 41 are forced inwardly into the position shown in Fig. 7, against the compression of their retracting springs such as 58, by cooperating cams 65 and 66. The cams 65 are movable with their respective outer dies 39, 40 and 41, while the cams 66 are mounted in the lower die plates 30. After the outer dies 39, 40 and 41 have been cammed inwardly into the position shown in Fig. 7 and while the pads 31, 35 and the blank holder 42 continue their descent into the lowermost position shown in Fig. 5, the inclined surfaces, such as 52 (Fig. 5), of the inner dies come to cooperate with the cam surfaces 53 and 54 of the block 55. This results in outward movement of the inner dies into the position shown in Fig. 7, i. e., into cooperative relation with their corresponding outer dies 39, 40 and 41, thereby forming the uninterrupted bead 15 which projects into the sump 11 of the wash basin. While the cam block 55 forces only the dies 36 and 38 outwardly, it will be understood that their cam surfaces 51 and 50, respectively, cooperate with the respective surfaces 49 and 48 of the dies 37 and force the latter outwardly simultaneously with the dies 36 and 38. Hence, when the blank emerges from the present mechanism, it will have the form shown in Fig. 3.

Referring again to Fig. 7, it should be particularly noted that in their fully expanded positions the die sections, operating to expand the basin, due to their wedging action, form a continuous and smooth surface, thereby preventing "necking," i. e. sagging of the metal at the places of juncture of said sections.

Referring to Fig. 8, it will be seen that the front wall 13b of the sump 11 is only of the preliminary shape or profile shown in dotted lines when the blank emerges from the described first drawing operation in which the sump is formed. More particularly, this front wall of preliminary shape extends upwardly at little or no curvature and merges into the smoothly rounded corner 70, that leads into the bottom 12 of the sump 11, at an abrupt bend 71. The inner dies 37, 38 and their respective outer dies 40 and 41 cooperate to press said front wall 13b into the final shape shown in full lines in Fig. 8. In other words, the dies 37, 38, 40 and 41 cooperate to form the front wall 13b of the sump into the desired shape or curvature of which the previously rounded corner 70 is a part. The opposite side walls 13c of the sump are likewise formed into a preliminary shape only during the first drawing operation, to be finish-shaped by the cooperating dies 35, 39 and 37, 40 in substantially the same manner as the front wall 13b. Inasmuch as the die pad 31 and the inner dies 36, 37 and 38 together define the desired inner contour of the bead 15, and the outer dies 39, 40 and 41 define the outer contour of said bead, the latter will be of a desired smooth curvature which may be uniform throughout its length or varied at will by correspondingly shaping the dies.

On a completed work stroke of the ram, the blank holder rises to its uppermost position, permitting the die pad 31 with its auxiliary pad 35 and inner dies 36, 37 and 38 to return to normal uppermost position. During the upward movement of the die pad 31, the inner dies move out of cooperation with the cam block 55 and are spring-retracted into the position shown in Fig. 6 in which the beaded blank may be readily removed and a new blank placed for the next beading operation.

Next, the edges of the blank are preferably trimmed by any suitable mechanism (not shown), whereupon the outer margins of the flange portions 14b, 14c and of the shoulders 19 (Fig. 3) are formed in any suitable die mechanism (not shown) into the depending apron 21.

The wash basin is thereafter subjected to a flanging operation in any suitable die mechanism (not shown) which forms the uninterrupted inward flange 22 along the front and sides of the apron 21, as well as the U-flange 21a at the rear edges of the apron 21 and the raised ledge portion 14a. The faucet holes 24 may then be punched into the splashboard 17 by any suitable mechanism (not shown).

To protect the wash basin against rusting and to enhance its pleasing appearance, a coat of enamel or similar substance is applied to the wash basin.

While the drawings disclose the formation of an inward or overhanging bead in a wash basin of the lavatory type, it is to be distinctly understood that the present manner of providing the bead and the disclosed apparatus for making the same are not limited to this type of wash basin but can be used for beading other types of basins.

I claim:

1. An apparatus for making wash basins or the like from a single metal sheet formed with a sump having an outward flange projecting from an upright portion of a side wall of said sump which has another portion merging at a curvature into the sump bottom, comprising expanding die members cooperating to outwardly press said upright portion into a desired curved profile of which the curvature of said other portion is a part, and means movable into position to operate simultaneously with said die members for holding said flange substantially unmovable thereby obtaining between said side wall and flange a bead which projects into said sump.

2. An apparatus for making wash basins or the like from a single metal sheet formed with a sump having an outward flange projecting from an upright portion of a side wall of said sump which has another portion merging at a curvature into the sump bottom, comprising expanding die members cooperating to outwardly press said upright portion into a desired curved profile of which the curvature of said other portion is a part, and means movable into position to operate simultaneously with said die members for holding said flange against any substantial outward movement thereby obtaining between said side wall and flange a bead projecting into said sump.

3. An apparatus for making wash basins or the like from a single metal sheet formed with a sump having an outward flange projecting from an upright portion of a side wall of said sump which has another portion merging at a curvature into the sump bottom, comprising a die having means projecting within the sump to support the sump bottom against collapsing, a movable ram, a plurality of blank holding sections adapted when the ram reaches a predetermined position during its operative stroke to contract inwardly outside of said sump and to cooperate with said die to hold said flange against any substantial outward movement, and a plurality of expanding

die sections associated with said die and disposed within said sump and adapted to press said upright portion of the sump outwardly into a desired curved profile of which the curvature of said other portion of the sump is a part, thereby obtaining between said side wall and flange a bead which projects into said sump.

4. An apparatus for making wash basins or the like from a single metal sheet formed with a sump having an outward flange projecting from an upright portion of a side wall of said sump which has another portion merging at a curvature into the sump bottom, comprising a die having means projecting within the sump to support the sump bottom against collapsing, a movable ram, a plurality of blank holding sections adapted when the ram reaches a predetermined position during its operative stroke to contract inwardly outside of said sump and to cooperate with said die to hold said flange against any substantial outward movement, and a plurality of expanding die sections associated with said die and disposed within said sump and adapted to press said upright portion of the sump outwardly into a desired curved profile of which the curvature of said other portion of the sump is a part, thereby obtaining between said side wall and flange a bead which projects into said sump, said expanding die sections presenting in their fully expanded positions a continuous forming surface.

5. An apparatus for making wash basins or the like from a single metal sheet formed with a sump having an outward flange projecting from an upright portion of a side wall of said sump which has another portion merging at a curvature into the sump bottom, comprising expanding die members cooperating to outwardly press said upright portion into a desired curved profile of which the curvature of said other portion is a part, and means movable into position to operate simultaneously with said die members for holding said flange against any substantial outward movement thereby obtaining between said side wall and flange a bead projecting into said sump, said expanding die members presenting in their fully expanded positions a continuous forming surface.

6. An apparatus for making wash basins or the like from a single metal sheet formed with a sump having an outward flange projecting from an upright portion of a side wall of said sump which has another portion merging at a curvature into the sump bottom, comprising a die having means projecting within the sump to support the sump bottom against collapsing, a movable ram, a plurality of blank holding sections adapted when the ram reaches a predetermined position during its operative stroke to contract inwardly outside of said sump and to cooperate with said die to hold said flange against any substantial outward movement, and a plurality of expanding die sections associated with said die and disposed within said sump and adapted, after said blank holding sections have contracted, to press said upright portion of the sump outwardly into a desired curved profile of which the curvature of said other portion of the sump is a part, thereby obtaining between said side wall and flange a bead which projects into said sump.

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