

Feb. 22, 1938.

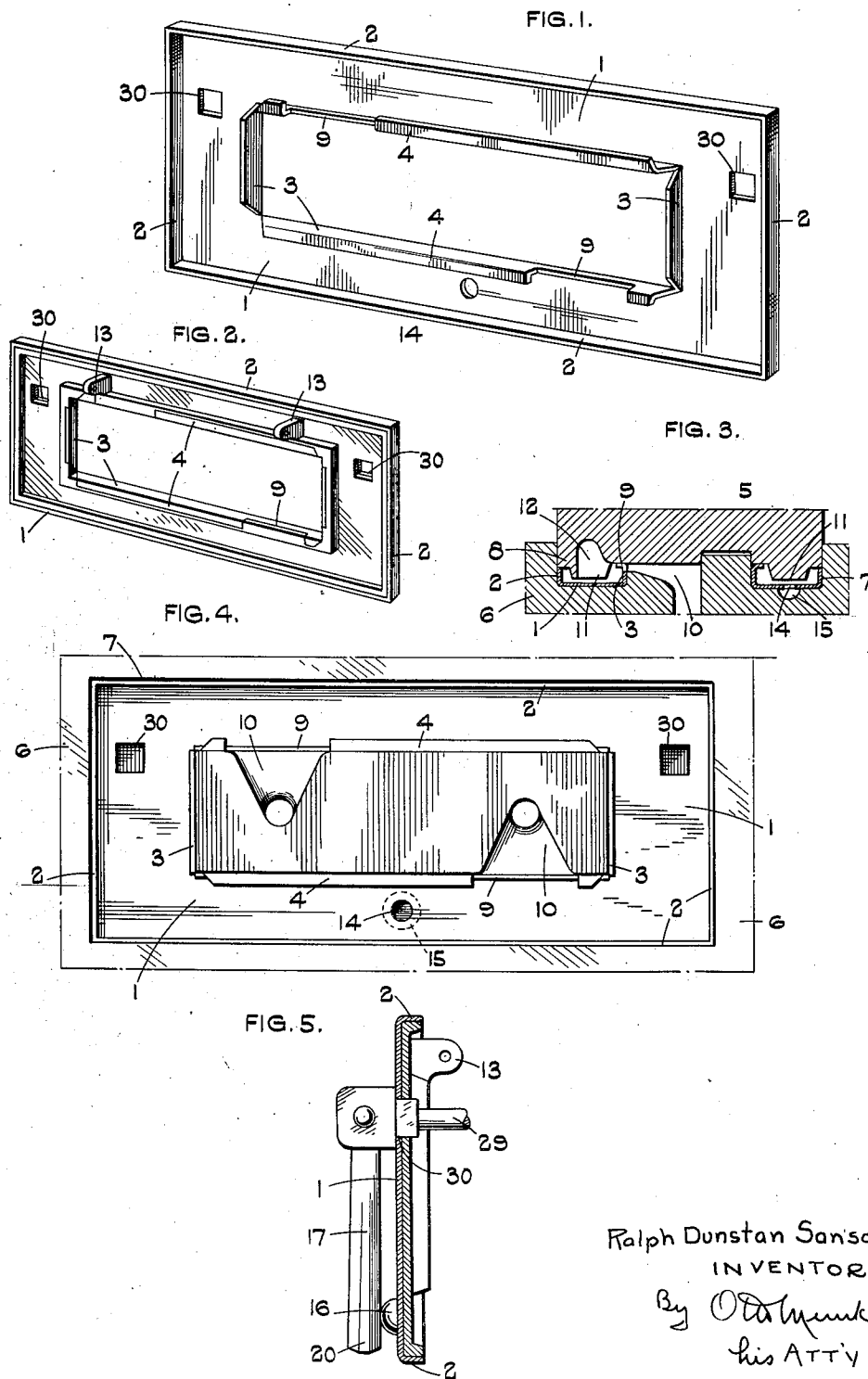
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2,108,996

MEANS FOR PRODUCING A CAST ARTICLE WITH A FACING OF SHEET METAL

Filed June 23, 1936

4 Sheets-Sheet 1



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MEANS FOR PRODUCING A CAST ARTICLE WITH A FACING OF SHEET METAL

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4 Sheets-Sheet 2

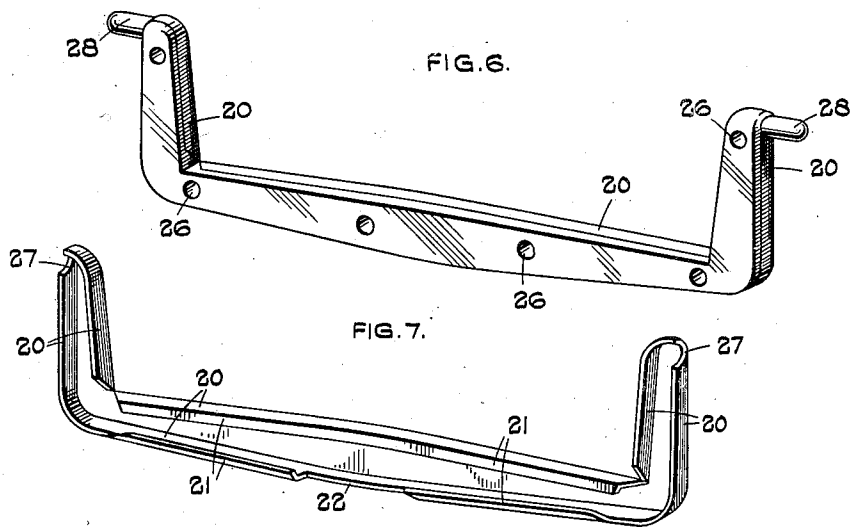


FIG. 8

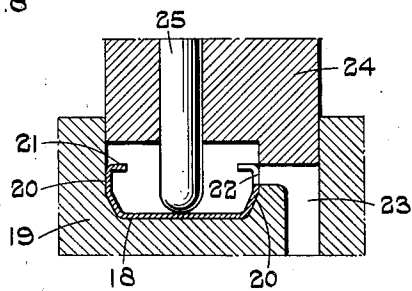
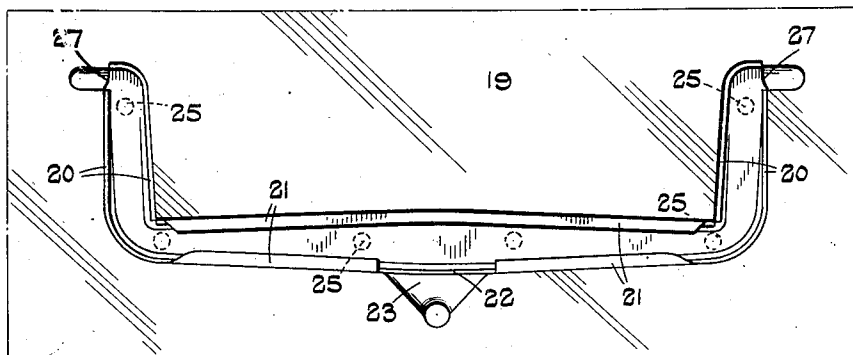


FIG. 9.



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MEANS FOR PRODUCING A CAST ARTICLE WITH A FACING OF SHEET METAL

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FIG. 10.

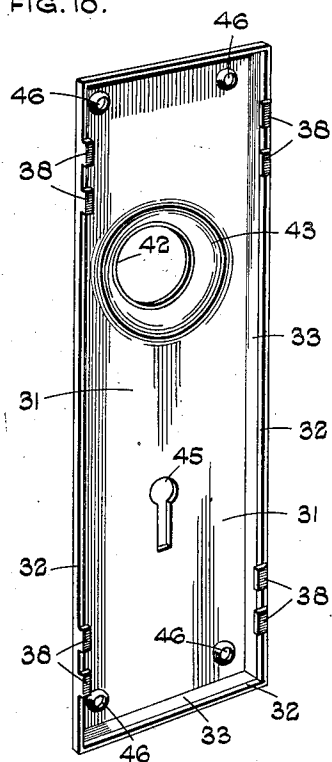


FIG. 11.

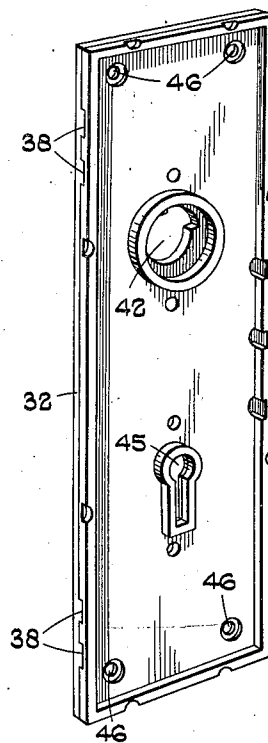
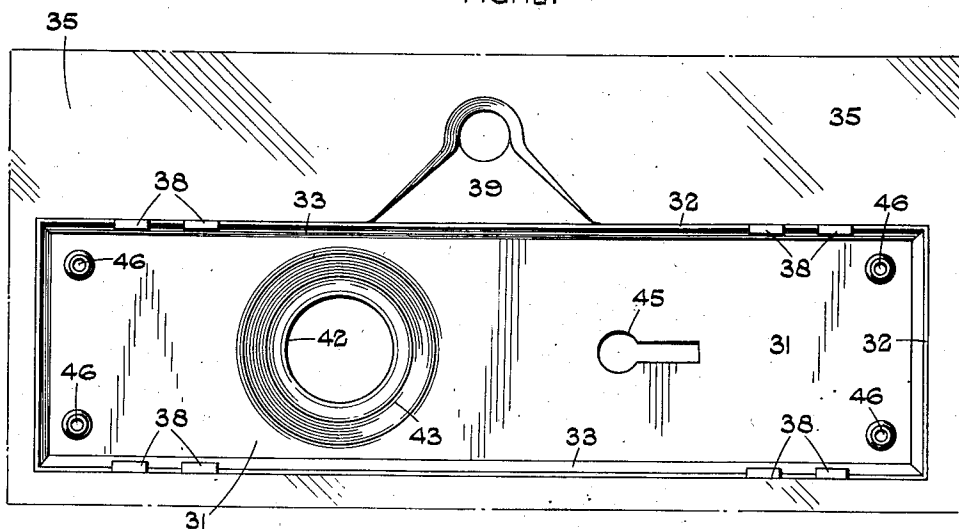


FIG. 12.



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UNITED STATES PATENT OFFICE

2,108,996

MEANS FOR PRODUCING A CAST ARTICLE
WITH A FACING OF SHEET METALRalph Dunstan Sansome, Birmingham, England,
assignor of one-half to William Pilkington,
Wylde Green, EnglandApplication June 23, 1936, Serial No. 86,885
In Great Britain December 19, 1932

4 Claims. (Cl. 22—58)

This invention relates to an improved means for producing a cast article with a facing of sheet metal, and is primarily intended for application to articles of the class comprising letter box plates, knockers, locks, hinges, and other fittings used by builders or in the furniture trade.

This application is a continuation in part of my copending application, Serial No. 703,146, filed Dec. 19, 1933.

When casting the body of an article on to a sheet metal facing member, it is common practice to provide the latter with some form of anchorage means which becomes engaged by the cast metal and serves to key the two parts of the article together.

In the case of relatively small articles, such as those with which the present invention is concerned, it has been found essential to effect the casting under pressure in a die-casting machine in order to obtain a sufficiently intimate connection between the cast metal and the facing member and an absolutely secure engagement of the anchorage means on the latter. Pressure die-casting further ensures the accuracy of register between casting and facing member which is necessary when the composite article is to be fitted into a recess in another part.

The use of pressure, however, introduces its own difficulties in that the molten metal has a tendency to enter between the coacting surfaces of the facing member and the die, and thus spoil the appearance of the finished article. This is particularly the case where, in the interests of cheapness, the facing member employed is a pressing or stamping of light gauge, such as will often acquire a certain amount of twist during manufacture.

The present invention has for its chief object to obviate the aforesaid drawback and to enable facing members of very thin material to be used in conjunction with pressure die-casting in a perfectly satisfactory manner.

Referring to the drawings:—

Figure 1 is a perspective view of the reverse side of a sheet metal facing member for a letter-box plate,

Figure 2 is a similar view, showing the finished article,

Figure 3 is a fragmentary transverse section of a pair of die-casting dies arranged, in accordance with the present invention, for the production of the letter-box plate aforesaid, the facing member being shown in position,

Figure 4 is a plan view of the lower die with the facing member therein,

Figure 5 is an end view showing the letter-box plate in association with a knocker, the plate being in transverse section,

Figure 6 is a perspective view of the reverse side of a knocker, and

Figure 7 is a similar view of the facing member therefor, whilst

Figures 8 and 9 illustrate the dies used in the production of the knocker and correspond to Figures 3 and 4,

Figure 10 is a rear perspective view of the facing member of a lock plate for association with a lever handle,

Figure 11 is a similar view showing the finished article, and

Figure 12 is a plan view of the lower die used in its production, with the facing member in position,

Figure 14 is an inverted plan view of the upper die, and

Figures 13 and 15 are longitudinal and transverse sections, respectively, of the two dies ready for the casting operation.

Each of the articles hereinafter described comprises a facing member constructed as a pressing or stamping from sheet-metal and having a rearwardly directed peripheral flange thereon, and a metal body which is cast on to the back of said facing member and engages the interior of said flange.

Preferably the body of the article is formed in a relatively soft metal, such as ordinary die-casting metal, whilst the facing member is produced from stainless steel sheet of very light gauge.

The above mode of construction, which forms no part of the present invention, results in a strong and decorative article capable of rapid and inexpensive production. The soft metal body can be easily machined where necessary, whilst the facing member, being of hard and non-corrosive material, protects from wear and atmospheric action those surfaces of the article which are exposed when the article is in position or in use, besides strengthening the article as a whole. Articles so produced are thus particularly suitable for use as door furniture and like fittings which, when in position, are continually subjected to atmospheric influences, as well as having to withstand a certain amount of wear.

The present invention is concerned with an improved method of, and means for, producing such articles. Figures 1 to 5 illustrate the manner in which the invention is applied to the manufacture of a letter-box plate, of the kind

which is usually formed as a brass or other casting and provided with projecting lugs for the attachment thereto of a knocker and, on the reverse side of the plate, with a flap which hangs down to cover a central slot or other aperture in the plate.

The letter-box plate is cast on to a flat facing member 1, which is of rectangular form and has the usual longitudinal slot. The member 1 is provided at its outer edge with an upstanding flange 2, a similar flange being provided around the central aperture. This inner flange may comprise a plurality of pressed-up ears 3 and the marginal portions of such ears may be bent into a plane parallel to that of the member 1, as shown at 4.

The uniting of the letter-box plate with its facing member 1 is effected by die-casting it thereon between upper and lower dies 5, 6 in the manner illustrated in Figure 3, the lower die 6 (see Figure 4) having a recess 7 therein which the facing member 1 exactly fits. As will be seen, the facing member 1 is placed face downwards in the recess 7, which is deeper than the peripheral flanges 2, 3 aforesaid.

The upper die 5 is formed with an integral downwardly extending portion 8 which is so shaped as to enter and closely fit the mouth of the recess 7 when the two dies are brought together.

After the mould has been closed as aforesaid, the continued downward movement of the upper die 5 causes the portion 8 thereof to engage and press exclusively upon the facing member 1, so that the latter is forced tightly against the base of the recess 7 in which, as already mentioned, it is an exact fit.

Molten metal is then admitted to the moulding cavity defined by the facing member 1 and the underside of the die portion 8, the direct pressure of the latter upon the facing member effectively preventing the molten metal from penetrating between the facing member and the lower die 6, even when such metal is forced into the mould under pressure applied externally, as by compressed air or by a force-pump.

In the arrangement shown in Figure 3, the underside of the die portion 8 engages the edges of the peripheral flanges 2, 3 on the facing member, the latter flange being cut away as at 9 to allow molten metal to enter the mould from lateral gates 10 when the die 5 is fully lowered. These gates are formed in the lower die 6 and are bounded at the top by the underside of the die 5.

The upper die 5 is provided with a depending integral rib or ribs 11 which enter between the upstanding flanges 2, 3 of the facing member 1 and serve to force the cast metal into close association with the latter. The intumed marginal portions 4, 4 of the inner flange 3 constitute anchorage means for the molten metal, the parts of the letter-box plate being securely keyed together thereby.

Recesses 12 are also formed in the upper die 5 for the production of a pair of lugs 13 on the reverse side of the finished article, between which lugs a suitable flap is hingedly mounted. This flap may be, and preferably is, formed in a similar manner to the letter-box plate itself.

The letter-box plate is provided with the usual projection against which the lower part of a knocker may be struck, and in the convenient arrangement shown, the facing member is provided with an aperture 14 through which the die-

cast metal can flow, during the casting operation, into a hemispherical recess 15 in the lower die 6 so as to form a rounded projection 16 on the outer surface of the finished letter-box plate (see Figure 5).

In applying the invention to the manufacture of a knocker for use in conjunction with the letter-box plate aforesaid, a similar arrangement of dies is employed, as illustrated in Figures 8 and 9.

The facing member 17, which may be U shaped, is placed in a suitable recess 18 in the lower die 19, and the body of the knocker is die-cast on to it in the manner already described. The facing member 17 is formed with peripheral flanges 20 at both sides and the marginal portions of these flanges may be bent inwardly as at 21, so as to become embedded in the metal of the knocker body when the latter is cast on to them. The peripheral flange 20 is cut away at 22 on one side of the facing member 17 to allow the molten metal access to the moulding cavity from a lateral gate 23 in the lower die 19.

The upper die 24 is shaped so as to enter and closely fit the mouth of the recess 18 when lowered, but, in order to provide a relatively heavy knocker, the underside of the die may not actually be brought into contact with the facing member as in the production of the letter-box plate, so that the moulding cavity extends somewhat above the flanges 20, as shown in Figure 8. In such a case, the facing member 17 may be held firmly in the recess 18 by means of a number of downwardly projecting pegs 25 carried by the upper die 24 and adapted, when the latter is fully lowered, to engage the inner surface of the facing member 17. The use of such holding-down pegs 25 produces, of course, recesses 26 of corresponding form in the body of the finished article.

At the ends of the facing member 17, the peripheral flange is notched or cut away, as shown at 27, the object being to enable hinge pins 28 to be cast integrally with the body of the knocker. These pins may have a bearing in the enlarged heads of bolts 29, the latter being passed through apertures 30 in the letter-box plate (see Figures 2 and 5) to secure the latter to a door or the like.

Figures 10 to 15 illustrate the manner in which the invention is applied to the production of a lock plate intended for association with a lever handle.

The facing member 31 in this case is of rectangular shape and is formed with a peripheral flange 32 which is perpendicular to the face of the member and a radiused or bevelled portion 33 where the face joins said flange.

The recess 34 in the lower die 35 is exactly fitted by the facing member 31 when the latter is placed face downwards therein and has a somewhat greater depth than the peripheral flange aforesaid.

The upper die 36 has a downwardly extending portion 37 which corresponds to the rib 11 in Figure 3 and acts, on closing of the dies, to force the cast metal into close association with intumed anchorage tongues 38 on the edge of the flange 32.

As in the previous construction, the moulding cavity extends above the level of these anchorage means, which thus become embedded in the cast body of the article. Molten metal is injected from a lateral gate 39 and passes into the moulding cavity over the edge of the flange 32 on the facing member 31.

During this operation, the facing member 31 is pressed firmly into the recess 34 by pegs carried by the upper die 36 and disposed at all points where there is a tendency for the molten metal to enter between the facing member 31 and the surface of the recess 34.

In the particular construction shown, a plurality of pegs 40 are arranged so as to bear on the edge of the flange 32, the end of each peg being stepped so that one part of it lies flush with the underside of the upper die 36.

Other pegs 41 are arranged to engage the back of the facing member 31 at opposite sides of an aperture 42 through which the spindle of the handle is to pass. The part of the facing member surrounding the aperture 42 is pressed outwardly to form a boss 43, and the ends of the pegs are chamfered to bear on the sloping interior of the boss.

Similarly, flat-headed pegs 44 are provided which engage the facing member 31 at opposite sides of a keyhole 45 therein, and, where holes 46 for screws are provided in the member 31, further flat-headed pegs 47 contact with the edges of such holes when the dies are closed.

It has been found that leakage of molten metal beneath the facing members is particularly liable to occur at the point where such metal is injected into the moulding cavity, and for this reason one or more pegs 48 are arranged to bear on the facing member immediately adjacent to that part of the peripheral flange 32 across which the molten metal passes on entering the moulding cavity. In the arrangement shown, three of these pegs 48 are provided, the end of each peg being stepped so that one part of it lies flush with the underside of the die 36, whilst the other part is chamfered at 49 and engages the radiused or bevelled portion 33 of the facing member 31. Thus the pegs 48 not only force that part of the member 31 which lies adjacent to the gate 38 firmly into the recess 34, but also exert an outward pressure on the flange 32 at this point.

As already mentioned, the facing members 1, 17 and 31 are preferably pressed or stamped from stainless steel sheet of very light gauge, and consequently have a tendency to acquire a certain amount of twist during their production. It is an additional advantage of the method and means above described that such distortion is automatically rectified by the direct pressure of the upper die or the pegs carried thereby. This enables sheet metal of less than $\frac{1}{16}$ " thickness to be employed, and eminently satisfactory results have in fact been obtained using sheet which is only $\frac{1}{100}$ " thick.

The above constructions are hereby described as illustrating the manner in which the present invention is applied to representative articles of the class in question. Amongst the many articles which may be produced by similar methods and means are the cylinders and barrels of pin tumbler locks, door handles and knobs, key hole and escutcheon plates, and roses and face plates of various types. It will be obvious that the form of the dies used may be varied somewhat to suit a given article, and furthermore the anchorage means on the facing members, instead of being formed as inturned parts of the peripheral flanges, may comprise dovetailed tongues or perforations in such flanges, or the flanges may be slotted, serrated, bent into undulating form, or otherwise treated to ensure the firm attachment of the cast metal to the facing member.

What I claim then is:—

1. In apparatus for the production of an article comprising a facing member pressed from thin sheet metal, said facing member having a rearwardly directed peripheral flange thereon, and a metal body cast on to the back of said facing member and engaging the interior of said flange, the combination of a die having a recess adapted to receive said facing member with its front face towards the base of said recess, said recess being closely fitted by said facing member and deeper than the peripheral flange thereon, a second die shaped to fit into said recess, said second die being adapted on relative movement of said dies to enter and close the mouth of said recess, a projecting peg carried by said second die and adapted to engage and exert a positive pressure upon the back of said facing member so that the latter is forced tightly against the base of said recess, and means for injecting molten metal into said recess to form the body of the article.

2. In apparatus for the production of an article comprising a facing member pressed from thin sheet metal, said facing member having a rearwardly directed peripheral flange with a radiused or bevelled portion where the back of the member joins said flange, and a metal body cast on to the back of said facing member and engaging the interior of said flange, the combination of a die having a recess adapted to receive said facing member with its front face towards the base of said recess, said recess being closely fitted by said facing member and deeper than the peripheral flange thereon, a second die adapted on relative movement of said dies to close the mouth of said recess, a projection on said second die adapted to engage and exert a positive pressure upon the radiused or bevelled portion of said facing member so that the latter is forced tightly against the base of said recess, said projection being so shaped that a component of said pressure acts outwardly on said flange, and means for injecting molten metal laterally into said recess at a position adjacent to the projection on said second die.

3. In apparatus for the production of an article comprising a facing member pressed from thin sheet metal, said facing member having a rearwardly directed peripheral flange thereon, and a metal body cast on to the back of said facing member and engaging the interior of said flange, the combination of a die having a recess adapted to receive said facing member with its front face towards the base of said recess, said recess being deeper than the peripheral flange on said facing member and being closely fitted by said facing member so that the latter defines the front face of the finished article, a second die shaped to fit into said recess, said second die being adapted on relative movement of said dies to enter and close the mouth of said recess so as to define the rear face of the finished article, said second die being adapted finally to exert a positive pressure upon said facing member so that the latter is forced tightly against the base of said recess, and means for injecting molten metal into said recess to form the body of the article.

4. In apparatus for the production of an article comprising a facing member pressed from thin sheet metal, said facing member having a rearwardly directed peripheral flange thereon, and a metal body cast on to the back of said facing member and engaging the interior of said

flange, the combination of a die having a recess adapted to receive said facing member with its front face towards the base of said recess, said recess being closely fitted by said facing member
5 and deeper than the peripheral flange thereon, opposite sides of said recess being parallel, a second die shaped to fit into said recess, said second die being adapted to enter and close the mouth of said recess and to be guided by the
10 sides of said recess on relative movement of said

dies in a direction parallel to said sides, and means for injecting molten metal into said recess to form the body of the article, said second die being adapted before entry of said molten metal to exert positive pressure upon said facing member so that the latter is forced tightly
5 against the base of said recess and entry of molten metal between the latter and said facing member is prevented.

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