

July 14, 1964

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3,141,053

METHOD OF REPRODUCING COMPOUND CONTOURS

Filed April 13, 1960

3 Sheets-Sheet 1

FIG. 1

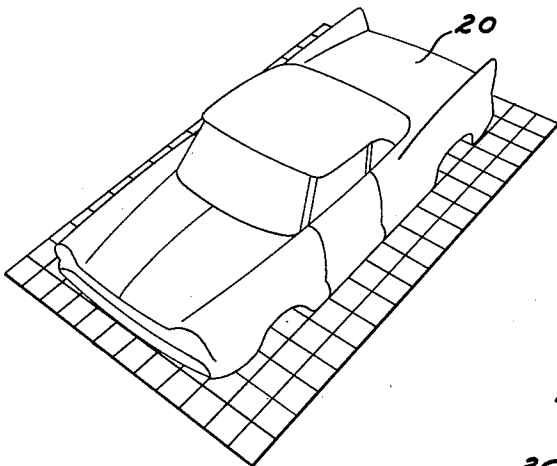


FIG. 2

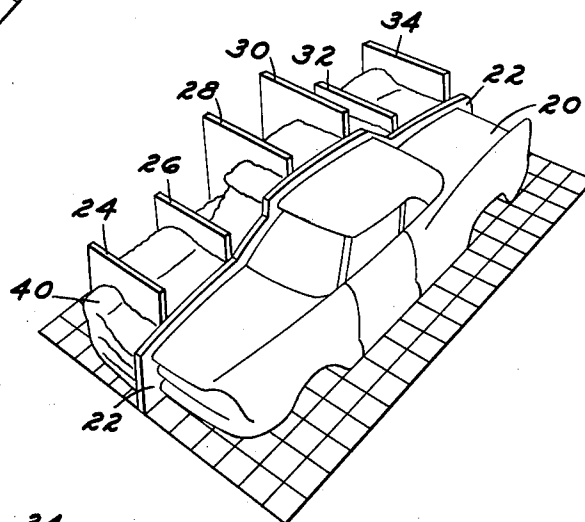
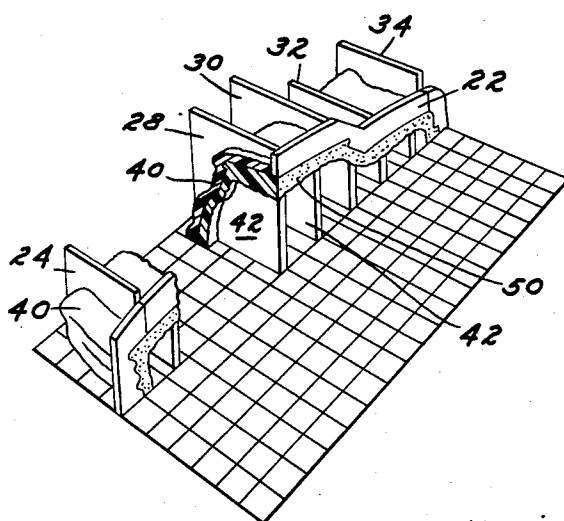


FIG. 3



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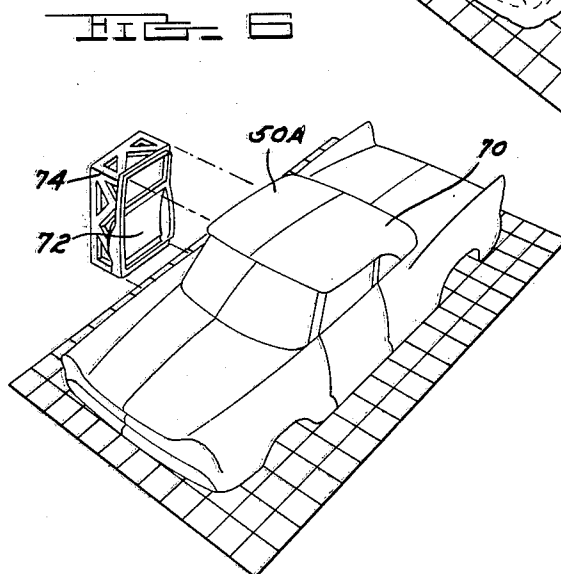
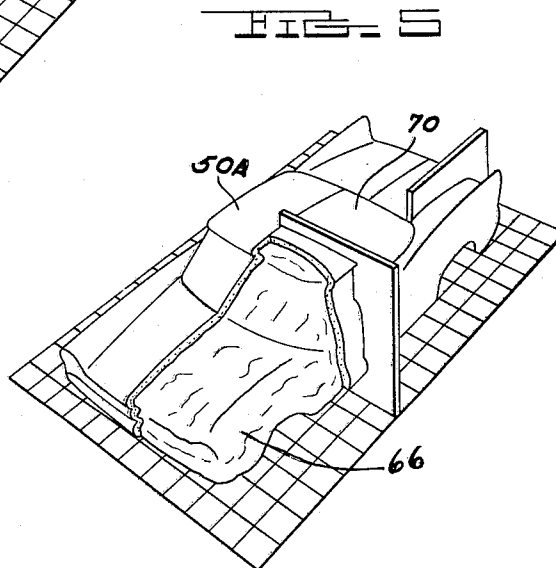
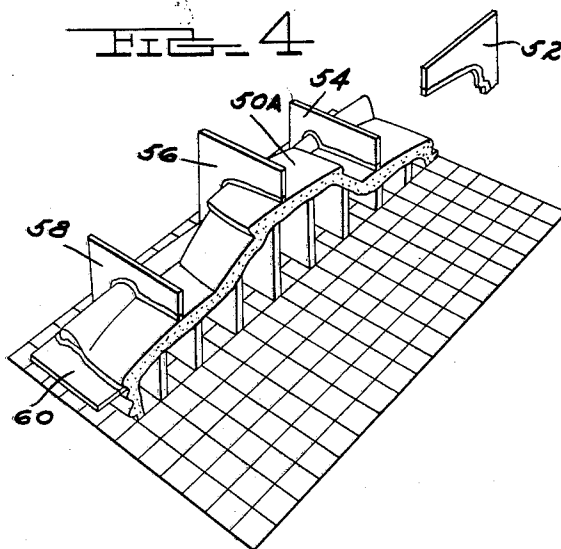
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METHOD OF REPRODUCING COMPOUND CONTOURS

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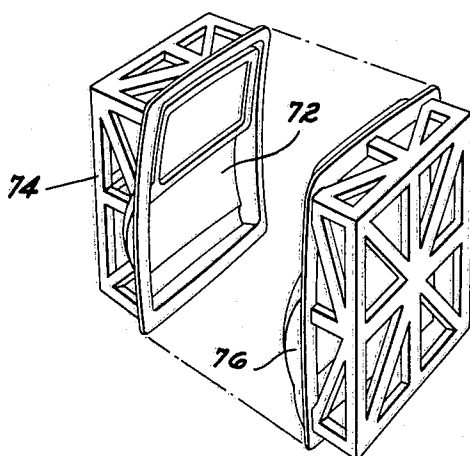


FIG. 7

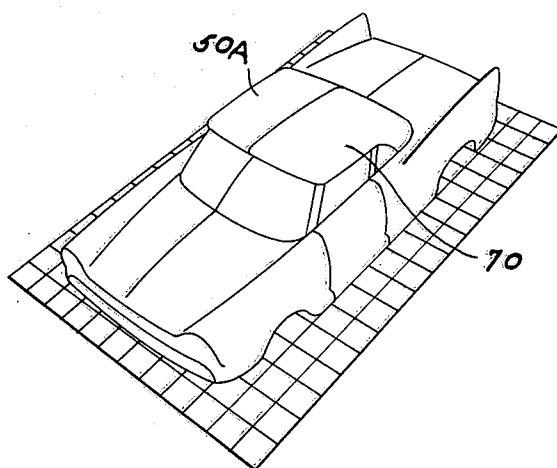


FIG. 8

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METHOD OF REPRODUCING COMPOUND CONTOURS

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Filed Apr. 13, 1960, Ser. No. 22,033
6 Claims. (Cl. 264-220)

This invention relates in general to the art of model making and more particularly to an improved method for making models for expediting the manufacture of contoured parts which have been originally embodied in a clay model.

In many industries, such as the automotive industry, models of contoured parts, such as body contours, are first made up in clay so that they may be approved by the design engineers and adopted for production. Once the designs have been approved for production, it is necessary to create dies to manufacture the metal parts. In the past, this has required at least six steps as follows:

- (1) The making of the clay model;
- (2) The making of templets from the clay model;
- (3) Drafting up the parts on paper or on metal sheets in order that the lines can be trued up;
- (4) Making accurate templets from the trued up engineering working;
- (5) Gluing up wood model from the accurate templets; and
- (6) Taking off master models for die duplication from the wood model.

In the Kish Patent No. 2,652,595, dated September 22, 1953, is found a disclosure for taking impressions from a styling model and working to a final casting model through a series of ten different steps, avoiding the necessity for a wood model but these steps including, however, the necessity for conventional templets prepared from body drafts.

It is the purpose of the present invention to provide a method of accomplishing the ultimate result in a much shorter time and with much less expense.

Briefly, the method consists of taking a one-half impression from the original styling model, casting this one-half impression to recreate one-half of the styling model and truing up this one-half to final lines before taking templets therefrom. The second half of the engineering model can then be started while the templets are being formed in aluminum and subsequently the aluminum templet can be used to true up the second half of the primary model so that sections of the model on both sides can be taken off in a casting operation for die duplication. Weeks of time can thus be saved by this method and vast amounts of engineering expense and model expense can be eliminated.

In the description of the method, drawings have been provided to facilitate the explanation and the various views thereof may be briefly described as:

FIGURE 1, a view of the original clay model.

FIGURE 2, an illustration showing the taking of an impression of one-half of the clay model.

FIGURE 3, a sectional view showing the recreation of a half styling model.

FIGURE 4, a view of the casting of the primary one-half casting showing the manner in which templets are taken from it.

FIGURE 5, a view showing the manner in which the second half of the final model is reproduced.

FIGURE 6, a view showing how a panel portion of a model is reproduced.

FIGURE 7, a view illustrating the manner in which a male die is produced from the female portion taken from the model.

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FIGURE 8, a final view of the plastic model sectional for further take-off molds.

Referring to the drawings:

In FIGURE 1, the body 20 is shown as it would be viewed in the customers' design room after it has been created in clay and examined by the necessary officials who have approved the design for production. A basic armature is then prepared for one-half of the clay model, this armature consisting of a frame member which will receive and support a cast shell over the model.

As shown in FIGURE 2, the armature has a front-to-back plate 22 prepared in advance from general information obtained, and fastened to the plate are side elements 24, 26, 28, 30, 32 and 34, each shaped roughly to the contour of the body to be duplicated. This basis armature is placed over the clay model 20 and a plastic material 40 is cast around the one-half portion of the model 20 into and around the armature members. This creates a one-half female mold for the body.

When this basic armature and in situ casting 40 are removed from the original clay model, it can be taken back to the plant of the engineering company or to the engineering division of the manufacturing corporation and the half model 50 can be cast into the female mold created by the in situ casting 40. The primary half of the reproduced styling model is then worked and splined to approved condition. In this operation the irregularities are removed by filling and cutting and smoothing the plastic until all lines of the body flow into each other properly for standard manufacturing procedures and for final appearance approval.

As shown in FIGURE 3, this basic one-half mold is used to cast the new half body 50 over a suitable armature formed of transverse plates 42. The armature 22 is shown in place with the transverse plates 24 to 34. Cast in and around the armature plates 24 to 34 is the material 40 which has assumed the contours of the original clay model 20. The material used is a workable plastic which can be removed and added conveniently and which is stable in dimension.

Templets are then taken from the one-half model 50A, FIGURE 4, such as templets 52, 54, 56, 58 and 60, after the surface of the model 50 has been suitably worked to an approved condition. The templets 52, 54, 56, 58 and 60 (cast-edge templets) are preferably formed by roughing them out in an approximate contour, a process which is sometimes called "eyeballing," the rough templets being provided with slotted edges. The space between the templets and the finished body half 50A are then filled in with plastic to exact contour of the primary half of the model 50A.

These templets from the approved surface are then reproduced in aluminum and delivered to engineering for styling and design confirmation; that is, the engineering of the structural portions of the body is started, working from the shape of the outer skin. Meanwhile, the other half of the portion 50 of the body is being armatured, that is, a rough form 66 is being built up; and, when the aluminum templets have been returned from engineering as approved, they are placed and located along the second half of the portion of the armature 66 at the same transverse locations which they occupied on the side 50A. They can thus be used to guide and gauge the operators in filling out the armature with plastic material to provide a finish contour 70 for the completion of the whole model which now, as shown in FIGURE 6, has a second half 70. Various portions of the body are then marked off as required by the Engineering Department and female molds 72 on a suitable armature 74 are pulled from various portions of the vehicle body. Subsequently, the female molds, such as 72, are used to form male molds 76 which form the basis of a die to manufacture the

finished part. In addition, the resulting model composed of the portions 50A and 70 is available for front and rear end variations required for other models of the vehicle, such as two-door, four-door, station wagon, and convertible models, etc.

Reviewing the steps of the method then, first, is the taking of a female mold on a basic armature from the approved model; second, molding within this female mold a male half of a working model; third, taking female, cast-edge templets from the basic half which has been worked to final contours; fourth, recreating the other half of the basic model using the templets from the first half and then pulling the necessary female plastic molds for the component parts of the body.

It will be seen that it is unnecessary to create a solid wood model for the making of templets, and it is unnecessary to recreate all the lines of the body on paper or metal before reproducing it for the purpose of pulling tooling molds.

Another time-consuming and expensive operation which is avoided is the reproduction of body lines from metal plates or drawings in order to permit templets to be made therefrom. This is an expensive reproducing process which has been completely avoided in the present method. Thus the process results in a great savings of time in the moving of a finally approved model to production and it avoids the need of a great deal of space in a reproducing plant for engineering work as well as the wood model work which requires skilled craftsmen.

I claim:

1. The method of making a master model from a styling dummy formed of clay or other similar material which consists of taking a cast of one-half of the styling dummy and reproducing said one-half in a formed material over a basic armature, taking templets from said recreated one-half and utilizing said templets to recreate the other half of said model over a basic armature independent of said styling dummy, working said recreated model into a proper styling lines and taking molds directly from said model for the formation of sectional die members for manufacture.

2. The method of making dies for a manufacturing operation from a styling dummy formed of clay or other similar material which consists of taking a cast of one-half of the styling dummy, reproducing said one-half of a master model in a workable material utilizing said cast and a basic armature, working said reproduced portion into final lines, taking cast-edge templets from the reproduced portion, reproducing said templets in a permanent material, creating the second half of said model independently of said styling dummy using said permanent templets to mark the surface of the second half, and taking casts from delineated portions of said full model for direct use in the making of dies.

3. A method of making dies for a manufacturing operation from a styling dummy formed of clay or other similar material which consists of taking a cast of one-half of the styling dummy, reproducing one-half of a master model in a workable material utilizing said cast and a basic armature, working said reproduced portions into final lines, placing rough edge templets over said reproduced portion and casting the edge thereof to reflect the surfaces of the one-half master model, reproducing said templets in a permanent material, creating the second half

of said model independent of said styling dummy using a basic armature and an overlying workable material on said armature to match the permanent templets, taking incremental casts from delineated portions of said full model, and forming male molds from said incremental casts for direct use in the making of forming dies.

4. The method of making dies for a manufacturing operation from a two-sided symmetrical styling dummy formed of clay or other similar material which consists of setting up a similar armature of one-half of said styling dummy and casting a material over one-half of said dummy to interengage said armature to form a similar mold, utilizing said mold to reproduce a one-half master model of said styling dummy, working said one-half master model to final production lines, overlying said one-half model with rough-edge templets and casting to the surface of said model from said templets to reproduce the delineated portions of said surface, creating the second half of said master model independent of said styling dummy using said templets to work the surface thereof, and taking casts from delineated portions of said full model for direct use in the making of dies.

5. A method as defined in claim 4 in which the templets are reproduced in a permanent material while the basic armature is being prepared for the second half of said master model and utilizing said permanent templets for finishing the second half of said master model from said basic armature.

6. The method of making dies for a manufacturing operation from a two-sided symmetrical styling dummy formed of clay or other similar material which consists of the steps of:

first, setting up a similar armature of one-half of said styling dummy,

second, casting the material over one-half of said dummy to interengage said armature to form a similar mold,

third, utilizing said mold to reproduce a one-half master model of said styling dummy with a workable plastic material,

fourth, working the surface of said one-half master model to final production lines,

fifth, creating templets accurate to the worked surface of the finished one-half master model,

sixth, simultaneously during the fourth and fifth steps creating a second half armature adjacent the first half model independent of the styling dummy and

covering said armature with a workable material roughly comparable to the said first half model,

seventh, utilizing the templets from the first half model to rework the second half of the said master model to create a completed model, and

finally, taking casts from delineated portions of said full model for direct use in the making of dies.

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