

[54] **METHOD FOR FORMING A CAST HINGE**

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[22] Filed: **May 30, 1973**

[21] Appl. No.: **365,119**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 187,427, Oct. 7, 1971, Pat. No. 3,742,555.

[52] U.S. Cl. **29/11, 29/527.1, 29/527.5, 164/90, 264/242**

[51] Int. Cl. **B21d 53/40, B21k 13/02**

[58] Field of Search **16/128, 171; 29/527.1, 29/527.5, 11; 164/90; 264/242**

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Primary Examiner—Charles W. Lanham

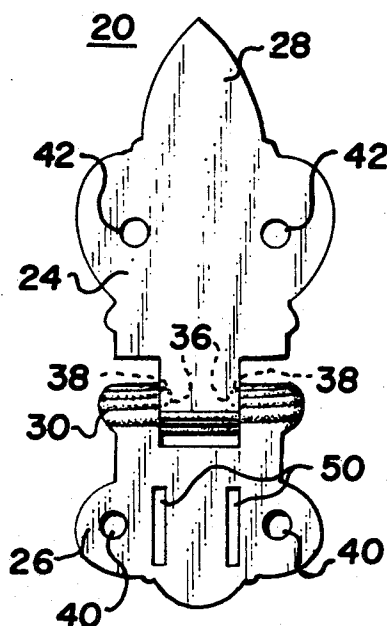
Assistant Examiner—D. C. Reiley, III

[57]

ABSTRACT

A cast hinged article and the method and apparatus for simultaneously casting both parts of the article. A first part of the article is formed with inner projections, and a second part of the article is formed there-over to enclose the projections to provide a hinged pivot. A staking unit which includes a punch then distorts the material in the first part adjacent to the projections so that the pivot will be freely movable.

11 Claims, 18 Drawing Figures



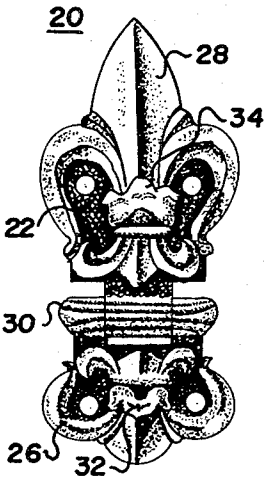


Fig. 1

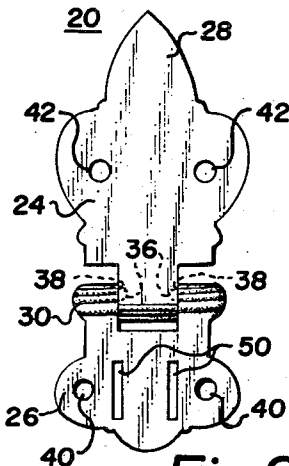


Fig. 2

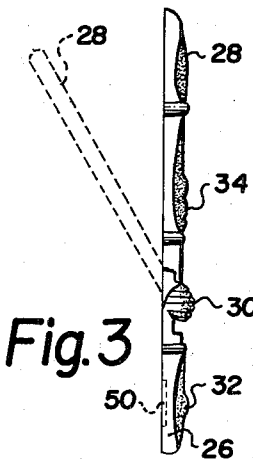


Fig. 3

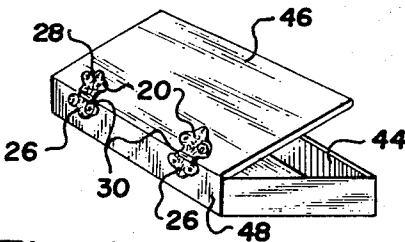


Fig. 4

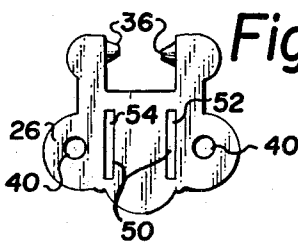


Fig. 5

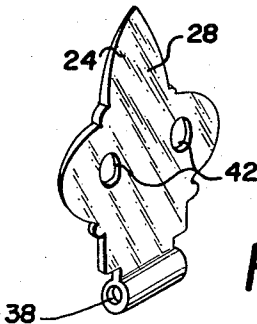


Fig. 6

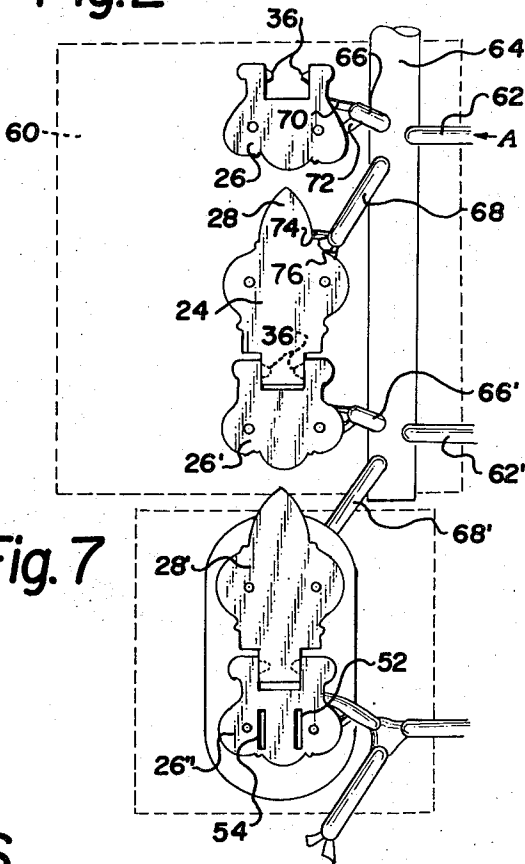
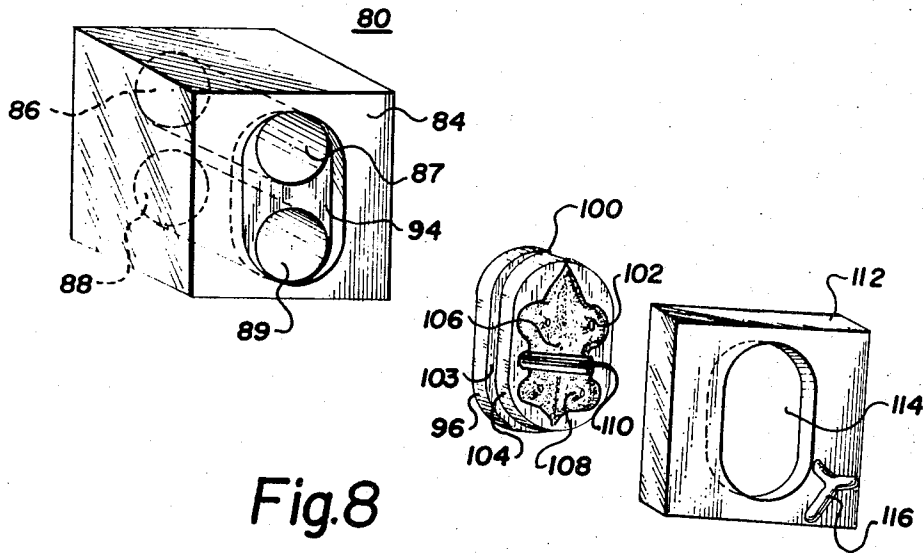
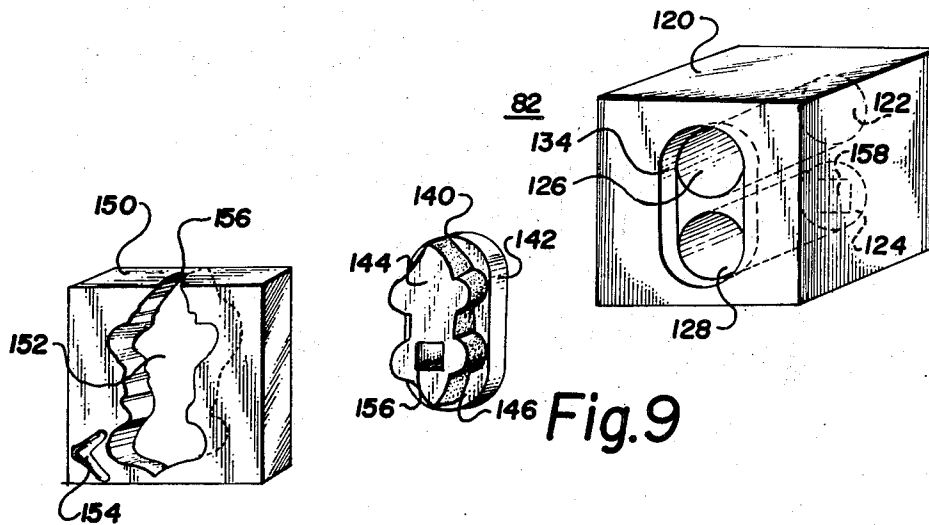


Fig. 7



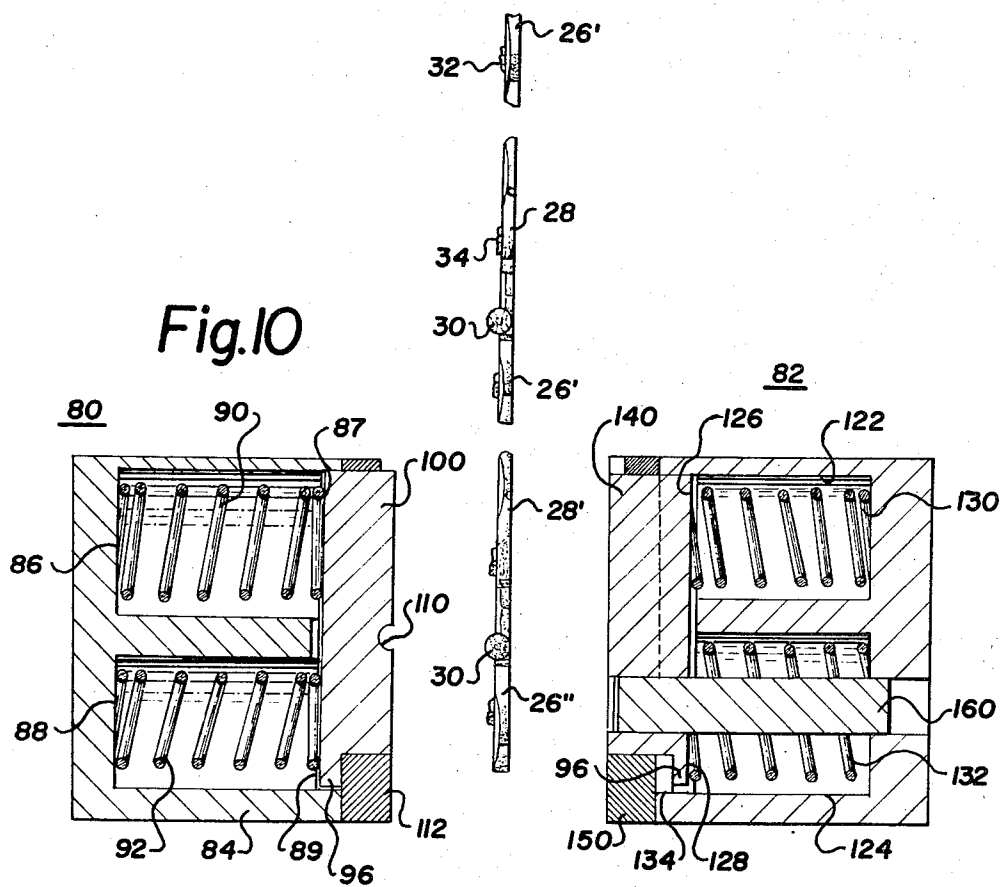
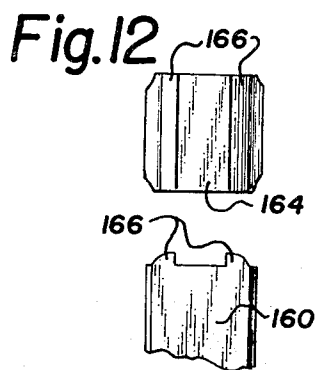
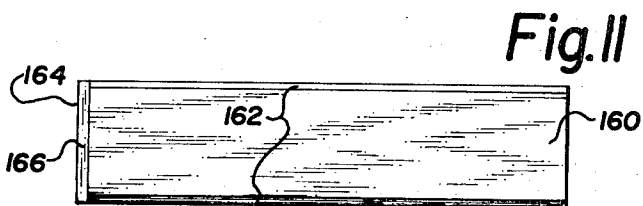
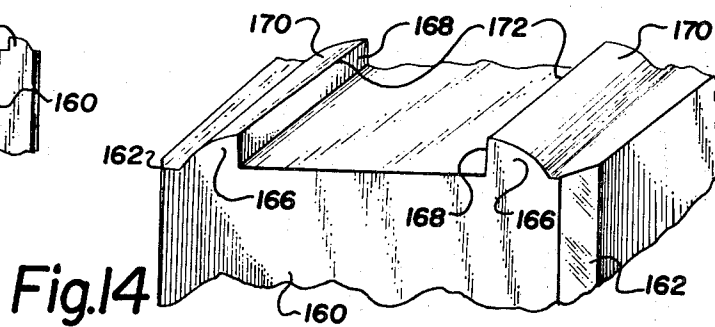


Fig.13



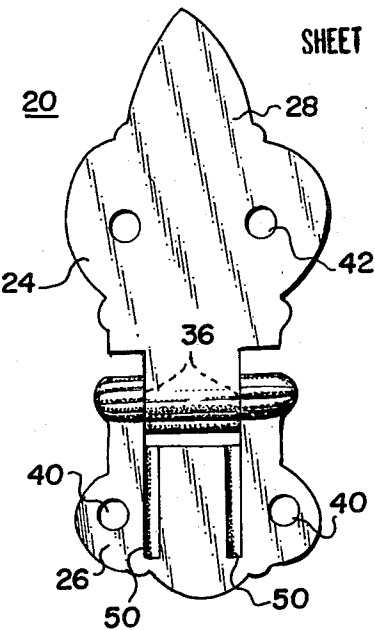


FIG. 15

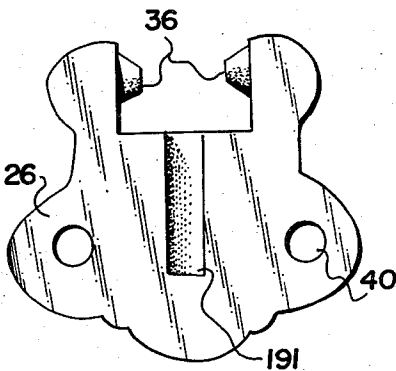


FIG. 16

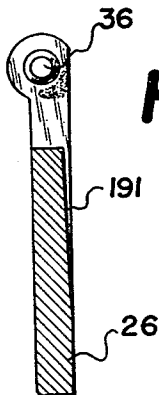


FIG. 18

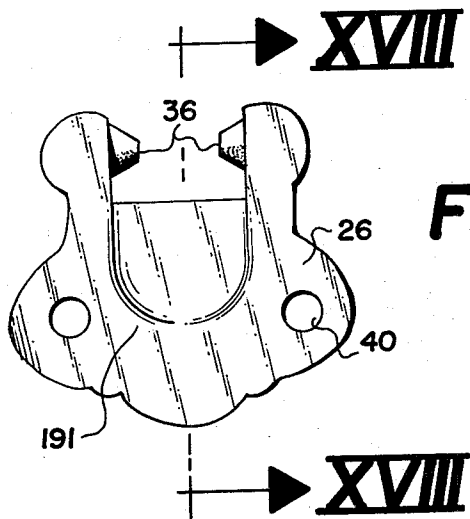


FIG. 17

METHOD FOR FORMING A CAST HINGE

This application is a continuation-in-part of my co-pending application Ser. No. 187,427 filed Oct. 7, 1971, now U.S. Pat. No. 3,742,555.

BROAD STATEMENT OF INVENTION

The present invention relates to a method for casting the parts of a hinged article simultaneously to be pivotal on each other with the hinged pivot being treated to be freely movable.

DESCRIPTION OF THE PRIOR ART

It is known in the prior art to cast pivotal or hinged elements to form an integral unit. An example of such casting is shown in U.S. Pat. No. 2,819,494 issued on Jan. 14, 1958 to Louis H. Morin. In such prior art casting a pivot was provided that would allow one element to be rotated with respect to the other. However, in this type of casting where a second element is formed over a prior formed element, a degree of binding is present so that the relative movement of the two elements is not freely rotatable. In the aforementioned patent this is not necessarily a disadvantage since a belt buckle is the product involved. However, for other elements, such as a hinge, where this type of casting process is utilized, movement of the pivot free of binding is desired.

DESCRIPTION OF THE INVENTION

The present invention is directed to a method of forming a product having hinged elements wherein one element is treated to be freely movable with respect to the other element.

The present invention further provides a method of casting a first element followed by further casting of a second element thereover in an articulated manner to form a pivot followed by deforming the first element so that the pivot is freely movable.

A further provision of the subject invention is a method of casting between movable dies a first element forming projections thereon followed by casting a second element thereover to enclose the projections in pivotal arrangement followed by positioning the connected elements between sliding means for deforming the first element to make a pivot freely movable.

There is further provided in the present invention a method of casting between movable dies a first element formed with projections and casting a second element thereover to enclose the projections in pivotal arrangement, positioning the connected elements within a staking unit and forcing a punch into the first element to spread the material of the projections to make the pivot freely movable.

A still further provision of the present invention is to form articulated elements between movable dies wherein one element is cast over another element to form a hinged area, and the connected elements are positioned between staking means that include opposed relatively movable parts that press against the elements so that a punch positioned in the opposing parts can be forced into the other element to spread the material and free the hinged area.

In a preferred embodiment of the invention an article is formed comprising articulated elements of which the first element is formed with projections around which the second element has been formed to provide a piv-

otal joint. The first element includes depression means formed therein which distort and spread the material in the area of the projections. In the embodiment illustrated a pair of spaced parallel depressions are formed in the first element to provide for the movement of the projections which releases any binding between the first and second elements. The article can be made in the form of a decorative hinge, and the inclusion of the depression means provides a freely movable pivot area.

The present invention further includes a method of casting an article between relatively movable dies wherein heated material is flowed into the molds in the dies to form a first element which is then moved to the next cavity and additional heated material is flowed in to form a second element thereabout in an articulated and pivotal arrangement. The articulated element then moves to a staking position between opposing units that contact the articulated elements on either side and a punch then depresses the material around the pivot area for deformation to provide free movement of the pivot. The method includes the formation of projections on the first element and enclosures on the second element around the projections so that the distortion by the spreading of the material allows the projections to be freely movable. In the staking position the opposed units are moved toward each other, and the punch is slid through one of the opposed units to contact a surface of the one element adjacent the projections.

The nature of the present invention will become more clearly apparent and better understood from the following description and accompanying drawings, in which:

FIG. 1 is an elevational view of one side of the hinged article of the present invention showing the decorative formation thereon;

FIG. 2 is an elevational view of the other side of the hinged product showing the flat-sided formation and depressions formed therein;

FIG. 3 is a side view of the hinged product shown in FIGS. 1 and 2;

FIG. 4 illustrates the installation of the article shown in FIGS. 1-3;

FIG. 5 is a view similar to FIG. 2 showing a lower element of the formed article in enlarged form;

FIG. 6 is a perspective view of an upper element of the formed article;

FIG. 7 is a diagrammatic view illustrating the apparatus and method for forming the article shown in FIGS. 1-3;

FIG. 8 is an exploded perspective view of one opposed means that provides the distortion of the element shown in FIG. 5;

FIG. 9 is an exploded perspective view of another opposed means that provides the distortion of the lower element shown in FIG. 5;

FIG. 10 is a view of the opposed means shown in FIGS. 8 and 9 in assembled condition prior to contacting the formed article for a distortion step;

FIG. 11 is an elevational view of punch means located in the opposed means;

FIG. 12 is an end view of the punch means shown in FIG. 11;

FIG. 13 is a plan view of part of the punch means shown in FIG. 11;

FIG. 14 is a perspective view of part of the end of the punch means showing raised areas thereon;

FIG. 15 is an elevational view of a modification of the embodiment of FIG. 2;

FIG. 16 is an elevational view of a modification of the embodiment of FIG. 5;

FIG. 17 is an elevational view of a further modification of the embodiment of FIG. 5; and

FIG. 18 is a cross sectional view of the embodiment of FIG. 17 taken along the lines XVIII — XVIII.

It will be understood that the accompanying drawings are merely diagrammatic illustrations, and reference should be made to the following description for a more detailed explanation of the structure involved.

FIG. 1-3 illustrate the articulated article of the present invention. The article 20 has a front decorative side 22 as shown in FIG. 1 and a rear flat side 24 as shown in FIG. 2. The article illustrated is a decorative hinge although it is to be understood that the invention is not to be so limited since the invention is considered to encompass any articulated element to be provided with a freely movable pivot. Front surface 22 of the hinge includes a decorative surface such as the illustrated embodiment of a fleur de lis pattern which includes part of the pattern formed as raised surfaces to provide the decorative effect which can be enhanced by polishing and finishing. Article 20 includes a first element or lower section 26 and a second element or upper section 28. Element 26 is connected with element 28 by a pivot or hinge means 30. As mentioned above, front surface 22 includes raised areas with central area 32 in lower element 26 and central area 34 in upper element 28 being the highest raised surfaces on the article.

Hinge means 30 is provided by a pair of projections 36 formed on an inside surface of lower element 26 as shown in FIG. 5 and extending inwardly toward each other in opposed relation. Each projection 36 is tapered so that its cross-section is smallest at its remote end. Upper element 24 is formed with a pair of enclosure areas 38 as shown in FIG. 6 formed to fit respectively around the projections 36 to complete the hinge. FIG. 3 shows upper element 28 in solid lines where it is aligned with lower element 26 so that the entire hinged article 20 is flat while the dotted line position of element 28 in FIG. 3 illustrates a pivoted position around hinge means 30.

A pair of spaced holes 40 are formed in lower element 26. The particular spacing, number and location of holes 40 is not a critical feature of the invention as long as these holes are sufficiently spaced apart to receive screws, nails or other fastening means for holding the article in place when installed. Similarly, a pair of spaced holes 42 are provided in the upper element 28 for the same purpose of receiving similar fastening means for installation. Although four holes are illustrated, it is to be understood that more or less than four holes could be utilized for fastening an article such as the decorative hinge illustrated to the structure where it is utilized.

FIG. 4 illustrates a typical installation of article 20 as a hinge for a container such as a jewelry box 44. A typical decorative hinge for this purpose would be approximately 1-2 inches in length and the upper or larger element 28 would be attached to the top lid 46 of the box 44 while the lower or smaller element 26 would be attached to the back side 48 of the box 44. It is important that the pivot 30 provide a freely movable relationship between the elements so that top lid 46 does not bind and is easily rotated for opening and closing. The novel

decorative hinge of the invention could also be used on louvered doors or cabinets or similar structures, and it is understood that the size and thickness of the hinge could be varied depending upon the strength required and the size of the structure involved. Similarly, the decoration could be changed and other designs utilized as long as the freely movable pivot feature is present.

The freely movable feature of the pivot is provided by depression means 50 formed in the first element 26. As most clearly seen in FIG. 5, depression means 50 comprises a pair of spaced, parallel, elongated depressions 52 and 54 that extend longitudinally in element 26 with each depression respectively aligned generally with a projection 36 and preferably normal to the pivotal axis, as illustrated. Depressions 52 and 54 are formed by a punch or similar device being forced into element 26 to thereby spread the material in the area around each projection 36. Accordingly, it will be appreciated from a consideration of FIG. 5 that depressions 52 and 54 provide a distortion of the material around each of projections 36 so that they will pivot freely within enclosures 38 of pivot hinge 30.

While the hinge member 26 is illustrated in FIGS. 2 and 5 is shown as being provided with two parallel depressions means 50, it will be apparent that the number, type and size of such depression means can be varied depending, for example, on the form of the hinge itself and the material of which the hinge is made. Thus, in a small hinge, it has been found to be more satisfactory to provide only a single depression 190 centrally disposed in the hinge member 26 as shown in FIG. 16, the depression being normal to the pivotal axis of the hinge. A single such depression is thus preferable when the dimensions of the article are such that it would be more difficult to provide two such depressions aligned as shown in FIGS. 2 and 5. Furthermore, it is apparent that more than two parallel depression means may be provided if desired, for example, with larger size hinges, and also when the metallurgical characteristics or shape of the hinge structure limit the spreading that can be effected in a practical manner by only two such depressions.

In addition, while the depressions 50 illustrated in FIGS. 2 and 5 are shown as being spaced from the perimeter of the hinge member 26, this depiction of the depression means is not intended to be limiting, since if desired the depression means may extend to the perimeter of the hinge member 26, as shown in FIG. 15, especially that perimeter toward the projections 36.

In addition, it is to be pointed out that the deformation of the hinge member 26 to effect the spreading of the projections 36 may be effected by punching or compressing the central or bridge portion of the hinge member over a larger area 191, as shown in FIGS. 17 and 18 in which case discreet depression lines such as the depression means 50 may not appear. In the illustration of FIGS. 17 and 18 the depression 191 is shown in exaggerated form, and thus in an actual structure the depression may be only barely visible. For example, a large punch may be employed to effect the general spreading of the material in the central portion of the hinge member coextensive with the region aligned with the projections 36 and the region therebetween. A die member for effecting such spreading may, if desired, be smoothly rounded whereby a general concavity is produced in the hinge member 26 instead of the discrete

linear depression means as illustrated in FIGS. 2 and 5.

The casting apparatus of the invention is shown schematically in FIG. 7 where the dotted outline 60 represents one side of a pair of movable dies within which elements 26 and 28 are formed. The general procedure of forming a first element, then moving such element to the next cavity and forming another element in articulated relation therewith is shown in the aforementioned U.S. Pat. No. 2,819,494. This is provided by having die 60 and a mating die relatively movable toward and away from each other to allow the vertical movement of the elements being formed in sequential steps. During the formation heated material from an injection nozzle (not shown) flows into a gate 62 in the direction shown by arrow A. The heated material flows around a transfer core pin 64 to form a ring-like upper gate portion 66 and a lower gate portion 68. It is to be appreciated that this is a known feature to flow the heated metal into molds formed in mating dies to simultaneously form upper and lower elements in articulated form. In the upper part of the die 60 the gate 66 is seen to include paths 70 and 72 arranged to direct separate flows obliquely with respect to each other to completely form one lower element 26. Simultaneously with the flow into gate 66, there is also a flow into lower gate 68 to form the upper or second element 28 in articulated condition with a previously formed lower element that has been transposed downwardly. This is provided by flow paths 74 and 76 located obliquely with respect to each other to disperse the heated material throughout the mold in forming element 28. The articulated formation is correlated with opening and closing of the dies so that just prior to this material flowing step, the movable dies had been separated and the transfer core pin 64 had moved the previously formed element 26 down to the lower position where it is shown in FIG. 7 as element 26'. Accordingly, it is to be understood that each time the heated material flows into gate 62 and through portions 66 and 68 into the molds, a first or lower element 26 is formed in the upper position and a completed hinge article is formed in the lower position by element 28 being cast with its lower enclosure portions 38 molded around solidified projections 36.

It will also be seen in FIG. 7 that when first element 26 representing the lower half of the hinged article has moved downward to where it appears as a solidified element 26', then gate elements 62, 66 and 68 appear as solidified gate elements 62', 66' and 68'.

It will further be appreciated from an examination of FIG. 7 that when element 26 moves to its first lower position where it appears as solidified element 26' that an element 28 that had been previously formed then moves to a further lower or stacking position where it appears as solidified element 28' where it is seen to be in articulated connection with a solidified first element 26' that had been previously formed and moved downwardly to the staking position.

The staking step is an important feature of the present invention, and the staking location is located directly below movable die 60 so that the articulated elements 26, 28 in solid form that form a completed hinged article are moved downwardly thereto by the intermittent vertical movement of the transfer core pin 64. The staking step is for the purpose of treating the first or lower element now indicated as element 26'' so

that its projections 36 will be freed from binding within the enclosures 38 located in element 28'. It is in this stacking location that element 26'' is subjected to a staking or punching deformation of the material in the central area of the element to form the depression means 50. The type of material that is supplied in the heated form to be solidified is a zinc alloy which is known as Zamak No. 3. However, the invention is not to be considered to be limited to a zinc alloy, as any material of similar nature can be used which is capable of being melted and injected in the flowable form to be solidified in the mating molds.

The staking or punch operation will now be described, and it is to be noted that the staking location is just below and closely adjacent to the forming molds so that the solidified elements 26'' and 28' are still in a heated condition allowing the depressions and spreading of the metal to be easily performed.

FIGS. 8 and 9 illustrate the elements that form the staking unit which are positioned in opposed relation as shown in FIG. 10. The hinged article shown as elements 26'' and 28' that is to be staked or punched is moved into the lower position as shown in FIG. 10 between opposed units 80 and 82 that are movable toward each other to respectively contact either side of the solidified hinged article. Element 80 is shown on the left side of FIG. 10 and would be movable toward the right by means not shown to be placed in contact throughout front surface 22 of hinged elements 26'', 28' which includes the decorative ornamentation. For this purpose opposed unit 80 includes an outer cover or housing 84 which includes horizontally spaced parallel bores 86 and 88 for including therein stiff compression springs 90 and 92, respectively. The right-hand surface of housing 80 that includes the bore openings 86 and 88 is formed with a notched or depressed area 94 that is oblong in shape as shown in FIG. 7 to include the openings of bores 86 and 88 and be substantially of the same size as the hinged article 20. Within the notched area 94 is fitted one end 96 of a trim punch 100 which includes a raised portion 102 on its other end that is substantially of the same size and shape as the front surface of hinged element 20. From a consideration of FIG. 8 it will be seen that trim punch 100 includes the oblong shaped end portion 96 that fits within slot 94, a section 104 that extends from end 96 and has a similar but slightly smaller oblong shape with its top surface aligned with the top surface of end portion 96, the raised portion 102 which includes upper and lower parts 106 and 108 of generally the same configuration as the entire front surface 22, and a recessed groove 110 for receiving the projecting hinged area 30 of the hinged product 26'', 28'.

An end cover 112 fits around portion 104 to enclose trim punch 100 in place on housing 84. Cover 112 includes an oblong opening 114 that is approximately the same size as the oblong portion 104 so that it fits therearound so that part of a back surface of cover 112 is pressed against a flat surface 103 which is the front surface of the end 96 that contacts extended portion 104. Cover 112 and housing 84 have a generally rectangular shape although this is not an essential feature of the invention. Cover 112 further includes a depressed area 116 in the form of three connected legs shaped to receive the solidified gates 62', 66' and 68' when they have been moved into the staking location. Accordingly, depression 116 has generally the same shape as

the gate portions shown in FIG. 7 and the trimming of the gate portions from the hinged product 26'', 28' is provided at this position.

Opposed means 82 includes a housing 120 which is shaped similarly to housing 84 and includes horizontally spaced parallel bores 122 and 124 terminating in openings 126 and 128 within which stiff compression springs 130 and 132 are respectively located. On the surface of housing 120 facing hinged product 26'', 28' a recessed area 134 is formed which is oblong in shape and substantially of the same size as the hinged product 26'', 28' and further includes the openings 126 and 128 as shown in FIG. 9.

A second contacting part of trim pad 140 is provided which includes an end 142 of such oblong size that fits within recessed area 134. Trim pad 140 is seen in FIG. 9 to include the oblong end section 142, and a raised portion 144 is formed thereon in a shape of generally the same size and corresponding to the shape of the hinged product. The surface of portion 144 is positioned to contact the back surface of the hinged product and is generally flat to correspond with surface 24 shown in FIG. 2. It will be noticed in FIG. 9 that the top surface of raised area 144 is generally in line with the top surface of end 142, but end 142 extends further downwardly than area 144 in order to receive a cover on a flat surface 146 that is formed on a front side of end 142.

A cover 150 fits around trim pad 140 and against the inner surface of housing 120. Cover 150 includes a centrally located cut-out portion 152 which is generally of the same shape as raised portion 144 so as to fit thereabout with the rear surface of cover 150 abutting flat surface 146 as well as the inner surface 129 of housing 120. It will be seen in FIG. 9 that cover 150 includes a cut-out portion 152 that extends into the upper surface of cover 150 to form a notched opening 156 to accommodate the upper tip of hinged product 26'', 28' in the position shown in FIG. 9. Cover 150 also includes a depression 154 that is in the general shape of the gate portions 62', 66' and 68'. It is to be understood that depression 154 corresponds in opposing location and shape with depression 116 to enclose the gate portions to provide for trimming and removal thereof from the cast product.

It will be noted in FIGS. 9 and 10 that an opening 156 is provided in the lower part of trim pad 140. A corresponding opening 158 is formed in the rear of housing 120 so that a punch 160 can be slidably positioned therein as shown in FIG. 10. It will be noted that punch 160 as well as housing 120 and cover 150 have a generally rectangular shape, but this is not a critical feature of the invention.

The function of punch 160 is to provide the staking operation wherein the punch is acted upon at one end by means not shown which would pass opening 158. The other end of punch 160 is thereby driven into the back of element 26'' to form depressions 50 as described hereinbefore to spread the material and free the pivot.

As seen in FIGS. 11-14 punch 160 is an elongated member with a generally square shape in cross section and includes chamfered edges 162 along its elongated edges. Punch 160 has an end 164 that is forced into the lower element of product 20. End 164 includes a pair of parallel raised areas 166, and the punch and raised areas are formed of a material sufficiently hard, such as

hardened tool steel, to press into the lower element 26'' without deformation of the punch or raised areas. As mentioned previously, the forcing of raised areas 166 into the lower element is facilitated since the product is still in the heated condition from the molding operation.

Each raised area 166 has a particular configuration to facilitate entry and spreading of the material in order to free projections 36 from enclosures 38. As most clearly seen in FIG. 14, each raised area 166 includes an inner surface 168 projecting perpendicularly from the end 164 of punch 160. Surface 168 extends on the order of 0.02 inches and then is curved outwardly to form a curved surface 170 terminating adjacent the respective chamfered edges and outer side of the punch. The radius of the curved surface 170 is approximately 0.05 inches measured from the outer edge of surface 168. It is an important feature of the invention to have curved surfaces 170 so that the penetration by raised areas 166 is first achieved along the outer edges 172, and the continued penetrating movement of the punch causes the material to spread outwardly because of the curved surface 170. The spacing of each raised area 166 from each other is not a critical feature of the invention as long as such spacing is in general alignment with the particular location of the projections 36 so that the spreading of the alloy material is effective to move the projections into freely pivotal movement with respect to enclosures 38. The actual spread or deformation of the material is about 7-10 mils.

When the contact is made by opposed units 80 and 82 being pressed against the opposite side of hinged product 26'', 28', punch 160 is driven by the means not shown so that the raised areas 166 are forced into the back of lower element 26'' to spread the material and provide the free pivotal motion. With this driving or staking step the springs 90, 92 and 130, 132 provide a resilient support for the contacting parts 100 and 140 so that a small amount of movement of "give" is permitted with respect to parts 100 and 140.

While the punch 160 is illustrated in FIGS. 11-14 is provided with two raised areas 166 for spreading of the material in the hinge member, it will be apparent that the punch may be provided with any number of projections depending upon the design of the hinge as above discussed. For example, when a single depression means is to be provided in the hinge member 26 as shown in FIG. 16, the punch will of course then be provided with a single projection, the sides of the projection being shaped to effect the spreading of the material in opposite directions, for example with curved surfaces as illustrated in the outward sides of the projections 166 in FIGS. 13 and 14. Similarly, when the spreading of the projections 36 is to be effected by a larger area punch, to provide the modification of FIGS. 17 and 18, the punch may have a generally convex cross section to effect the general movement of the material from the center of the hinge member without the forming of a discreet depression mark. The invention thus contemplates the compression or punching of the central portion of the hinge member whereby material in the central portion or bridge area of the hinge member 26 is outwardly forced to effect the spreading of the projections 36. It will further be apparent that the invention also encompasses spreading of the hinge member in the event that the hinge is formed with the projections and enclosure areas in opposite relative posi-

tions as compared with the hinge shown in FIGS. 2, 5 and 6, i.e., with outwardly extending projections on the hinge member 28 replacing the enclosure areas 28 and adapted to mate with enclosure areas on the hinge member 26 replacing the projections 36.

From the above description it is clear that the present invention discloses a novel articulated or hinged element wherein one element has depressions formed therein to spread the projections forming the hinge for free movement.

Another feature of the present invention is the provision of the casting apparatus for the articulated elements which includes staking or punch means that provides opposed units for contacting the articulated elements so that the punch can cause the distortion or spreading of the material for the freeing of the pivot.

A further feature of the present invention is the method of casting the article whereby the articulated elements are moved into the staking position, and the punch means are driven into one of the elements to spread the material for the loosening and free movement of the pivot.

It will be understood that various changes and modifications may be made by those skilled in the art in the particular features of the article, apparatus and method which has been described above for illustrative purposes without departing from the scope of the invention as defined by the following claims.

What is claimed is:

1. A method of casting an article between relatively movable dies comprising
 - passing material in heated fluid condition through passages around a transfer core pin to be solidified in separate molds to simultaneously form an upper first element and a longitudinally aligned lower second element;
 - said second element being formed in an articulated manner around part of said first element that has been moved downwardly by said transfer core pin from its prior upper position where it was formed, said first and second elements being pivoted together in the articulated condition;
 - moving said articulated first and second elements downwardly to a staking position to position said articulated elements between opposed moving means;
 - moving said opposed means together to contact said articulated elements on either side thereof; and
 - forcing punch means into one side of said first element to form depression means therein to distort the material thereabout to loosen the pivot.
2. A method of casting according to claim 1 including forming inner tapered projections on said first element, forming enclosure areas on said second element that

correspond to and enclose said projections, and effecting the distortion by spreading the material to free said projections from said enclosure areas.

3. A method of casting according to claim 1 wherein said first and second articulated elements form a hinge with substantially flat front and back surfaces, and said opposed means are moved toward each other to make individual contact throughout said front and back surfaces.

4. A method of casting according to claim 3 including sliding said punch means through one of said opposed means to contact said back surface to form the depression means.

5. A method of casting according to claim 4 including forming the depression means by spreading the material in two parallel-spaced areas aligned respectively with said projections.

6. A method of casting according to claim 3 wherein said front and back surfaces are contacted by elements located within said opposed means, said elements each being movable during the staking step within respective opposed means against a biasing force.

7. A method for forming an article having a first element with first and second aligned pivot means facing each other and joined by a bridge area, and a second element with third and fourth pivot means cooperatively engaging said first and second pivot means respectively whereby the first and second elements are pivoted together in an articulated condition; said method comprising casting one of said elements, then casting the other of said elements with the pivot means of the one element forming a casting surface for the pivot means of the other element, and then deforming said bridge area to effect the opposite relative displacement of the first and second pivot means to loosen the pivotal connection between said first and second elements.

8. The method of claim 7 wherein said step of deforming comprises compressing a portion of said bridge area.

9. The method of claim 7 wherein said step of deforming comprises forcing punch means into one side of said bridge area.

10. The method of claim 7 wherein said step of deforming comprises forcing a die into said bridge area to effect the relative opposite displacement of said first and second pivot means.

11. The method of claim 7 wherein said step of deforming comprises forcing a pair of parallel linear die projections into said bridge area, said die projections being oriented normal to the pivotal axis of said article, to form parallel depressions in said bridge area.

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