

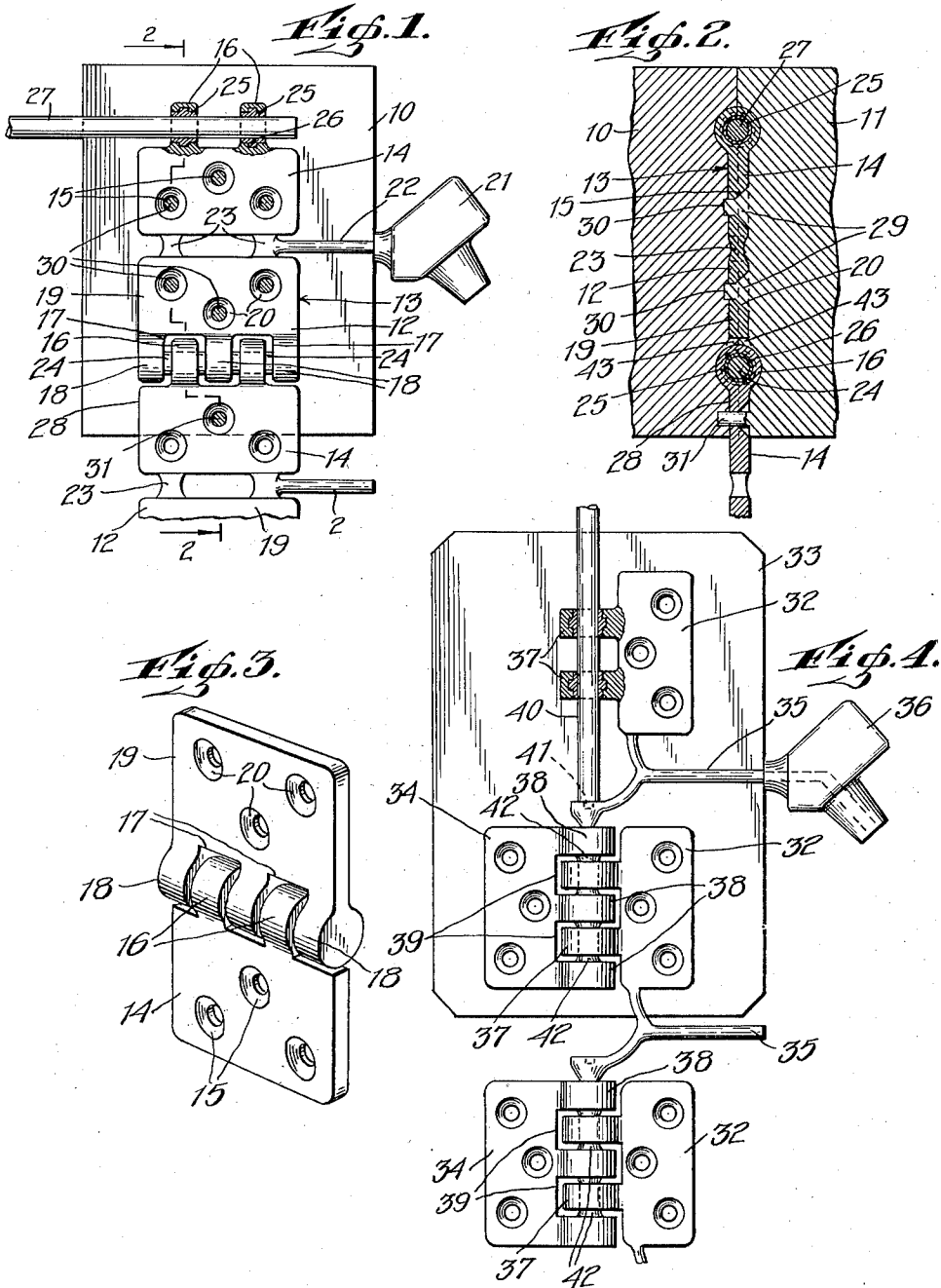
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HINGE

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HINGE

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This invention relates to hinges employing butts coupled by a pintle in providing relative swinging movement of the butts. More particularly, the invention relates to hinge devices wherein the butts are formed from die castings, and the pintle comprises an integral part of one of the butts and cast within the apertures of bearings of the other butt. Still more particularly, the invention relates to hinges wherein the two butt parts are simultaneously cast in one casting operation, and one of these parts is cast within the other part, when the latter, as a pre-formed casting is supported in the die and exposed to the cavity forming the second part.

The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing, in which certain embodiments of the invention are disclosed, and in which the separate parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a diagrammatic face view of one of the dies employed in forming a pair of hinge butts showing one method of forming and intercasting said butts.

Fig. 2 is a section on the broken line 2—2 of Fig. 1.

Fig. 3 is a perspective view of a hinge detached by a trimming operation; and

Fig. 4 is a view similar to Fig. 1, showing another adaptation of the invention.

In the construction of hinges of various kinds and classes, or any other two members which might generally be classified as hinges, it is customary to form in the pintle bearings of articles of this kind, apertures for the reception of a pintle pin. It is the purpose of my invention to materially simplify and economize on the production of articles of manufacture of this kind by forming the pintle or pivot portion as an integral part of one butt to enter sockets or apertures in the bearings of the companion butt in hingedly or pivotally coupling the butt parts and in permanently uniting said parts. In addition to simplifying the butt structure, the hinge is improved from the standpoint of eliminating the exposure of the pintle through the end bearings of the butt, which is objectionable in the conventional type of hinges. In illustrating simple adaptations of the invention, the same has been shown as applied to making more or less conventional hinge butts. Figs. 1 and 2 illustrate one method of procedure, and Fig. 4 another method of procedure.

In Figs. 1 and 2 are shown at 10 and 11, the two die parts employed for producing the dual die

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cast body 12 in the impression chamber or cavity 13 formed on the parting line of the die parts, as will clearly appear from a consideration of Fig. 2. The upper part of the cavity 13, as seen in the drawing is adapted to form one butt part 14, which comprises a rectangular plate having spaced countersunk screw apertures 15 therein. At one edge of the plate are spaced pintle bearings 16 disposed inwardly of side edges of the butt 14. On the completed hinge, the bearings 16 are adapted to be arranged in the spaced recesses 17 formed between the pintle bearings 18 of the butt 19.

The butt 19 is also in the form of a rectangular plate having the pintle bearings 18 at one edge thereof. Countersunk apertures 20 are also formed in the butt 19 to receive the screws or other fasteners. In forming the butts 14, 19, these butts are simultaneously cast in the cavity 13 by injection of heated casting material from a discharge nozzle 21 through a gate passage 22 into the cavity. In the casting operation the plate portions of the butts 14, 19 are joined by connecting webs 23 which are severed in the trimming operation. This separates the two butt parts which are cast as a unit, but at the same time, forms pairs of butts 14, 19 that are permanently united and pivotally coupled by reason of the integral pintle pin portions 24 on the butt 19, being cast in the apertures 25 of the bearings 16, or in the bushings 26 arranged in said apertures.

The unit casting 12 is formed on a core pin 27 supported in the upper portion of the dies and upon which the bushings 26, as inserts, are arranged. Thus after the cast unit 12 is formed, the dies are separated, and the cast unit is left suspended on the core 27. This core is then moved downwardly to position the butt part 14 of the first cast unit in an impression 28 at the lower portion of the dies, after which the dies are partially closed, the core pin 27 stripped from the first casting, then returned to its original position, and other inserts 26 arranged on the core pin, and a second cast unit formed. In this last operation, the pintle pin portions 24 are cast within the bearings 16.

It will appear from a consideration of Fig. 2 of the drawing that the die 11 has pin portions 29, which extend across the cavities and enter recesses 30 in the die in forming the countersunk apertures 15, 20. The die 11 will also have at least one pin 31 in the cavity 28 to engage at least one of the pre-formed countersunk apertures of the butt 14 to retain said butt against displacement when the dies are in the partially closed

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position and in the operation of stripping the core pin, as above described.

In Fig. 4 of the drawing I have shown another method of forming hinges of the kind under consideration, which consists in forming one butt 32 at one side of a pair of dies 33, and the other butt 34 at the other side thereof, the butts being in spaced relationship to each other, and joined through a gate 35; so that these butts are simultaneously cast in the injection of heated casting material from a nozzle 36.

The butt 32 has at one side edge thereof pintle bearings 37, similar in all respects to the bearings 16, whereas the butt 34 has at one side thereof spaced bearings 38 similar to the bearings 18. Between the bearings 38 are recesses 39 for receiving the bearings 37, and are thus similar in this respect to the recesses 17. In other words, while the brief description of Figs. 1 and 2 has been applied to Fig. 3, it will be understood that the resulting hinge formed by the method shown in Fig. 4, will be the same as the hinge shown in Fig. 3. From this standpoint, further details of construction of the butts 32—34 will be omitted.

In Fig. 4 a vertical core pin 40 is employed, and this core pin in addition to extending through the bearings 37 also extends to and supports part of the gate 35, as indicated at 41. The purpose of this is to avoid any tendency of severing the two butts 32; 34 in shifting them, by the core pin 40, from the cast position to the lowered position where the butt 32 enters the impression forming the butt 34.

After stripping the core pin 40 from the cast unit, comprising the two butts 32, 34, with the dies in a partially closed position, the core is returned to its normal position and the next successive cast unit is formed, and in this operation the pintle portions 42 which join the bearings 38 will be formed within the bearings 37, thus pivotally and hingedly uniting the pre-cast butt 32 with the cast butt 34, the same as in uniting the butt 14 with the butt 19. It will also be noted that the pintle portions 42, on each side of each apertured bearing 37, is enlarged to an extent greater than the size of the aperture. This construction serves to restrain movement of the butts relatively to each other in a direction axially of the pintle portions.

From the foregoing, it will be understood that in both methods of procedure, a pair of hinge butts are formed in each casting operation, and one butt is united with its pre-cast companion butt. In both cases, in the initial casting operation or when the first of a series of butt units are formed, a suitable plug, preferably patterned along the lines of the butts 14—32 will be arranged between the dies and by making these of separate parts split along the line of the pintle, they may be removed and thereafter the operation will be continuous. The assembled hinges may be cast in units of predetermined length or they may be trimmed shortly after the cast assemblage, to form the independent unit hinges comprising the butts 14, 19 or the butts 32, 34.

In both forms of construction, it will be apparent that the dies will have suitable portions, as at 43, fitting in the recesses 17—39 and around the bearings 16—37.

In referring to the use of heated casting materials, it will be understood that the hinge butt parts may be formed from suitable metals or metal alloys, or from different plastic materials. When metals are used, and when it is desired to

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employ the bushings, these bushings may be composed of hard fibrous material, or suitable bearing metals and plastics. Either harder plastics, or metals, or fibrous materials can be employed.

It will, of course, be apparent that the shape or contour of the attaching plates of the butts may be characterized in any desired manner. Further, the combination of interengaging bearings may be modified, and in fact, the general structure of the pintle or pivot portion of the butts may be made to suit the type of hinge employed in the hinge coupling desired between two members.

In all instances, however, the last cast portion in producing the assembled unit will be the internal bearing portion of the coupling in order to benefit by the shrinkage of this cast portion in producing the resulting free and yet firm bearing action between the relatively movable members. In the present illustrations, the inner or last cast portion is the pintles 24—42. It will be understood that any means may be provided for supporting the bushings in proper position as inserts on the core pins. Slight frictional engagement with the pins would be sufficient.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A hinge of the class described comprising two die cast butts having interengaging knuckles at adjacent edges of said butts, the knuckles of one butt having apertures therein while the knuckles of the second butt are solid, said knuckles of the second butt being joined by integral pintle portions arranged therebetween and rotatably disposed within the apertures of the knuckles of the first butt, and each knuckle of each butt being substantially spaced from each adjacent knuckle of the other butt, said pintle portions on each side of each aperture of an apertured knuckle being enlarged to restrain movement of said first butt axially of said pintle portions.

2. A hinge of the class described comprising two die cast butts having interengaging knuckles at adjacent edges of said butts, the knuckles of one butt having apertures therein while the knuckles of the second butt are joined by pintle portions arranged therebetween and rotatably disposed within the apertures of the knuckles of the first butt, and each knuckle of each butt being spaced from each adjacent knuckle of the other butt, said pintle portions on each side of each aperture of an apertured knuckle being enlarged to an extent greater than the size of the aperture to restrain movement of said first butt axially of said pintle portions.

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