May 14, 1940. L. H. MORIN ET AL 2,200,633

METHOD OF DIE CASTING SEPARABLE FASTENERS

Filed March 17, 1938

Fig. 1.

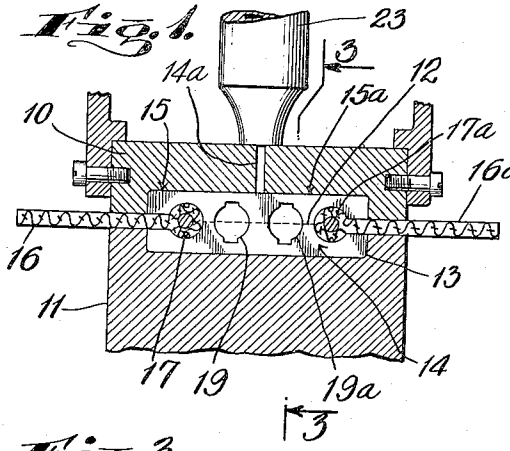


Fig. 2.

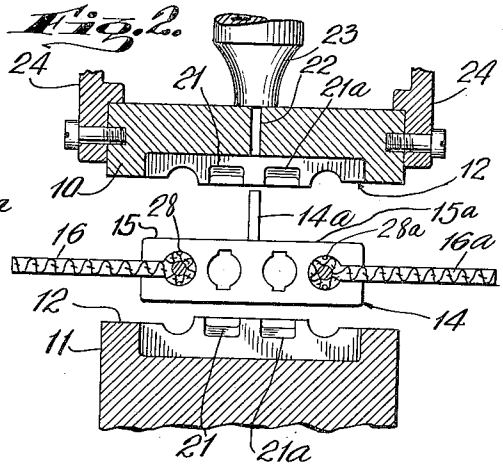


Fig. 3.

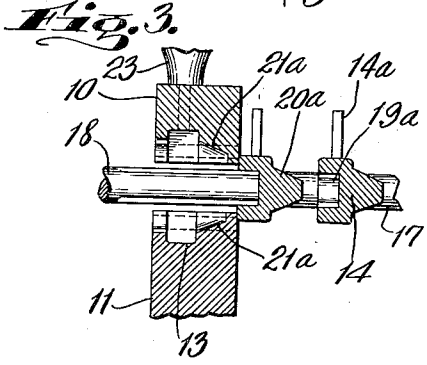


Fig. 4.

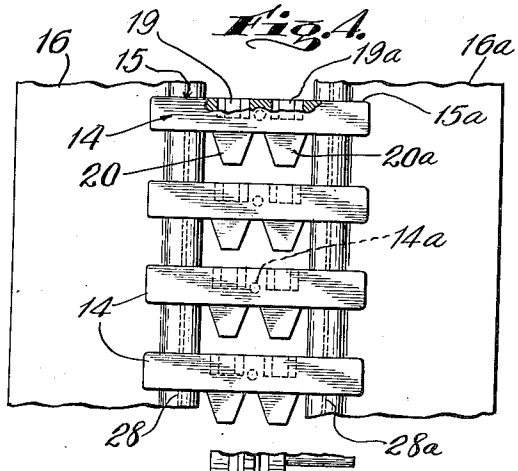


Fig. 6.

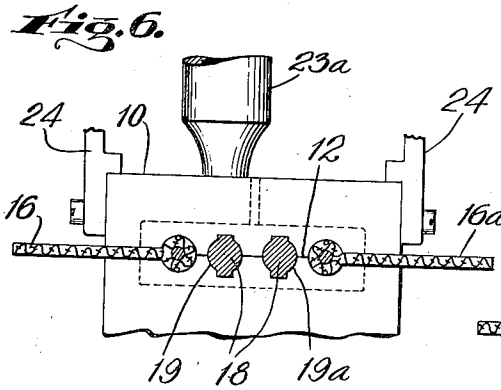
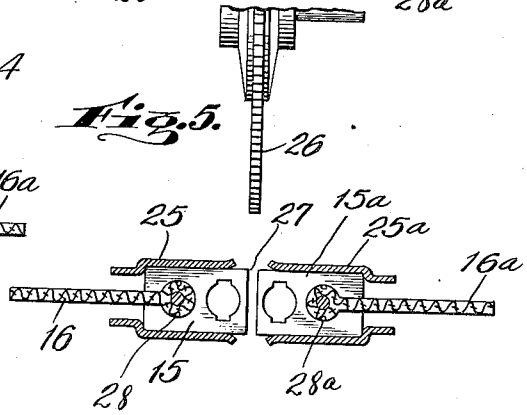


Fig. 5.



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METHOD OF DIE CASTING SEPARABLE FASTENERS

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Application March 17, 1938, Serial No. 196,353

4 Claims. (Cl. 18—59)

This invention relates to the die casting of the links of separable fastener stringers, either by the use of metal alloys or thermoplastic materials. More particularly, the invention relates to a method which consists in casting two or dual links in a single casting operation upon two stringer tapes arranged in close proximity to each other so as to produce in a single successive series of casting operations two stringers of a separable fastener, and then in severing the two or dual links to form the two stringers of a separable fastener. The novel features of the invention will be best understood from the following description and annexed drawing in which the several parts are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a diagrammatic sectional view through a die illustrating a method of forming two united die cast links upon two tapes arranged in close proximity to each other.

Fig. 2 is a view similar to Fig. 1 showing the die parts in spaced relation to each other in separating the formed casting therefrom.

Fig. 3 is a sectional view at right angles to that shown in Fig. 2 illustrating the dies partially closed and demonstrating the operation of stripping the core pins from the castings, the section being substantially on the line 3—3 of Fig. 1.

Fig. 4 is a face view of a portion of two stringer strips with the dual links arranged on adjacent edges thereof.

Fig. 5 is a sectional view diagrammatically illustrating the method of severing the unit as seen in Fig. 4 in forming the separate stringers, each having a series of links or scoops thereon, and

Fig. 6 is a sectional plan view similar to Fig. 1 showing the dies in full line and illustrating the nozzle in a different position.

In Figs. 1 to 5 inclusive we have shown one method of carrying our invention into effect. In Figs. 1 to 3 inclusive, we have shown two relatively movable die parts 10 and 11 having a parting line as at 12. At 13 is shown an impression formed between adjacent surfaces of the die parts 10 and 11 at the parting line 12 thereof. This impression is of such contour and size as to form a single die cast body 14, each side portion of which will form, when this body is cut or severed centrally thereof, two links or scoops 15, 15a which will be arranged upon separate stringer tapes 16, 16a which are supported between the dies 10 and 11. The beaded or enlarged edges 17, 17a of the stringer tapes 16, 16a are disposed within the impression 13 so that the body 14 is cast thereon as will be apparent.

Arranged on the parting line 12 of the dies and movable at right angles to the movement of said dies toward and from each other are two similar core pins one of which is shown at 18 in Fig. 3 of the drawing. The inner ends of these core pins form recesses 19, 19a on one surface of the body 14 adjacent the central portion thereof, so that when the body is severed, the recess 19 will be on the link 15 and the recess 19a on the link 15a. The opposite surface of the body 14 has formed thereon projections 20, 20a in alinement with the recesses 19, 19a so as to register with the recesses of an opposed stringer in coupling two stringer tapes together, as in other fastener devices of this kind. The projections 20, 20a are formed by crevices or recesses 21, 21a formed in the die parts 10 and 11, as will be apparent from a consideration of Figs. 2 and 3 of the drawing.

In the construction shown the die 10 is provided with an admission opening or gate passage 22 with which an injection nozzle 23 registers in pressure feeding or injecting suitable casting material into the impression or mold cavity 13 of the dies in forming the casting. It will be understood that suitable metals or metal alloys may be used in making the castings. On the other hand, suitable thermoplastic materials may be employed. In connection with the latter we may use the teachings set forth in our prior applications Serial Nos. 131,606, 131,607 and 131,608, all filed March 18, 1937, especially from the standpoint of using dual or independent cylinders which may be brought into registering position with the passage 22 as well as in the control of the heating and discharge of the casting material from one or more cylinders. That is to say, in charging a cylinder with two or more successive charges intermediate each injection stroke for injecting the casting material from a cylinder or nozzle into the mold cavity of a die.

In forming the cast body 14 it will be apparent that a gate 14a will be formed thereon by virtue of the passage 22. This gate is arranged centrally of the body 14 and is removed in the operation of cutting or severing the body 14 into the separate link parts 15, 15a, the result of which is shown in Fig. 5 of the drawing.

In the steps of the method for producing dual stringer and link units of the character described, it will be understood that the two tapes 16, 16a

are arranged and guided between the relatively movable dies 10 and 11. The dies 10 and 11 will be moved into firm engagement with the tapes, the core pins 18 will be arranged between the die parts with the ends protruding into the impression 13, and the nozzle 23 will be then brought into registering position with the passage 22. Then the heated casting material will be injected into the impression 13 of the dies to form the resulting cast body 14. In this connection it will be understood that the dies will be cooled in the usual or any desired manner.

The dies 10 and 11 may be separated and operated in any desired manner and it is preferred that the die 10 be arranged in a yoke-shaped or other frame, parts of which are shown at 24, so as to provide clearance for the gooseneck or discharge nozzle 23. It will also be understood that the discharge nozzle or gooseneck may be moved transversely with respect to the die 10 as seen at 23a in Fig. 6 of the drawing to maintain the discharge of the nozzle sealed against the surface of the die which is especially desirable in casting thermoplastics. In other words, with this construction, the nozzle will always be maintained in juxtaposition to the die and will be movable with it and relatively to it in opening and closing the dies and intermittent the injection charges of casting material into the mold cavity of the dies. It will of course be understood that our invention is not limited to any particular size or contour of the dual links formed, nor to any particular shape or contour of the projections 20, 20a and recesses 19, 19a on opposed surfaces of the pair of links produced in the single casting operation as above described.

In completing the formation of the two stringers, the dual unit as seen in Fig. 4 is fed between two jaws or guides 25, 25a arranged adjacent a disk saw or cutter 26. This cutter may be moved toward and from the jaws 25, 25a or the latter moved toward and from the cutter 26 whichever may be desired, so as to sever the links 15, 15a one from the other as indicated at 27 in Fig. 5 of the drawing; thus forming the separate fastener stringers which may be then coupled one with the other as in other devices of this kind. In the severing or splitting operation illustrated diagrammatically in Fig. 5, it will be understood that this may be accomplished by a single cutter or by a series of cutters. It will also appear that the stringer tapes may be moved longitudinally of the guide and supporting jaws 25, 25a or these jaws may constitute part of the conveyor for conveying the dual links to be severed across or beneath one or more of the cutters or saws 26, as will be apparent.

In the use of some materials in forming the dual casting it may be necessary and desirable to trim the outer edges of the resulting links to finish the same. This may be done in accordance with conventional methods of trimming or buffing articles of the character described. It will also be understood that the gates 14a of the resulting castings may be trimmed off prior to the severing operation such as illustrated in Fig. 5 of the drawing, or these gates may be removed in the latter operation.

In Fig. 4 of the drawing we have indicated at 28, 28a two strands which are arranged longitudinally of the tapes 16, 16a or the enlarged beaded edges 17, 17a thereof. These strands may either constitute rayon threads stitched or otherwise applied to the beaded edges, or the strands may be in the form of wire strands correspondingly arranged so as to contact each of the links on the separate stringers. Rayon is used when thermoplastic castings are employed, and metallic strands when the metal castings are employed. The rayon threads facilitate a more secure anchorage of the links to the tapes especially in treating the tapes with an acetone or other solution which acts as a solvent both for the links and the rayon thread and provides a secure mounting of the links to the stringer tapes. On the other hand, the metallic strands which are employed in conjunction with the metal castings facilitate electroplating of the resulting castings, which operation will be performed after the links have been severed as taught in Fig. 5 of the drawing.

It will be understood that in casting different forms and types of links of the character described and especially in forming smaller links, weakened lines of parting may be provided between the adjacent pair of links to permit easy severing thereof. This will also be true in casting pairs of other types and kinds of devices in accordance with the teachings herein shown and described, regardless of the type and kind of mounting member employed, or in fact, regardless of the use of any such mounting member. It is understood in this connection that four core pins could be used instead of the two shown, the latter core pins being of the cross sectional contour of the tapes employed. The result of this method of procedure would be the formation of a pair of links having the channeled ends adapting them for mounting on stringer tapes.

From the foregoing it will appear that one of the distinctive features of the invention resides in the use of a single impression die so constructed as to form simultaneously a pair of two similar die cast devices which are joined in the unitary casting and then later severed to form two similar or substantially similar parts.

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

1. The herein described method of forming a pair of complete stringers of separable fasteners of the character described, which consists in providing a pair of dies movable toward and from each other, providing a single cavity between adjacent surfaces of the dies of a contour defining the peripheral contour of a pair of links arranged in endwise relationship, arranging two separate stringer tapes between adjacent surfaces of the dies, each extending into the cavity of the dies from opposite sides thereof and terminating in spaced relationship to each other within the cavity, arranging a pair of core elements between the dies with part thereof extending into said cavity to form a recess in each of the resulting pair of links, injecting casting material under pressure into the cavity of the dies and around said tapes and core elements to form a unitary die cast body joining both of said stringers, then removing said body from the dies and core elements and severing said body centrally to form independent links arranged upon independent stringer tapes.

2. The herein described method of forming a pair of complete stringers of separable fasteners of the character described, which consists in providing a pair of dies movable toward and from each other, providing a single cavity between adjacent surfaces of the dies of a contour defining the peripheral contour of a pair of links arranged in endwise relationship, arranging two separate

stringer tapes between adjacent surfaces of the dies, each extending into the cavity of the dies from opposite sides thereof and terminating in spaced relationship to each other within the cavity, arranging a pair of core elements between the dies with part thereof extending into said cavity to form a recess in each of the resulting pair of links, injecting casting material under pressure into the cavity of the dies and around said tapes and core elements to form a unitary die cast body joining both of said stringers, then removing said body from the dies and core elements and severing said body centrally to form independent links arranged upon independent stringer tapes, and treating the stringer tapes to aid in securing each of the links thereon.

3. The herein described method of forming a pair of complete stringers of separable fasteners of the character described, which consists in providing a pair of dies movable toward and from each other, providing a single cavity between adjacent surfaces of the dies of a contour defining the peripheral contour of a pair of links arranged in endwise relationship, arranging two separate stringed tapes betwen adjacent surfaces of the dies, each extending into the cavity of the dies from opposite sides thereof and terminating in spaced relationship to each other within the cavity and each tape having a rayon thread in the portion thereof disposed within the cavity and extending longitudinally of the tape, arranging a pair of core elements between the dies with part thereof extending into said cavity to form a recess in each of the resulting pair of links, injecting casting material under pressure into the cavity of the dies and around said tapes and core elements to form a unitary die cast body joining both of said stringers, then removing said body from the dies and core elements and severing said body centrally to form independent links arranged upon independent stringer tapes.

4. The herein described method of forming die castings of the character described, which consists in arranging portions of two spaced mounting strands between adjacent surfaces of relatively movable dies having a single cavity therein with said portions of the strands arranged in said cavity in spaced relation to each other, pressure feeding casting material into said cavity of the dies while holding said dies in firm engagement with each other to form a unitary cast body in said cavity and upon that part of the strands arranged in the cavities and intermediate said strands, then removing the casting from the dies, and then severing the unitary cast body intermediate said strands to form independent castings one arranged upon each of said strands.

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