

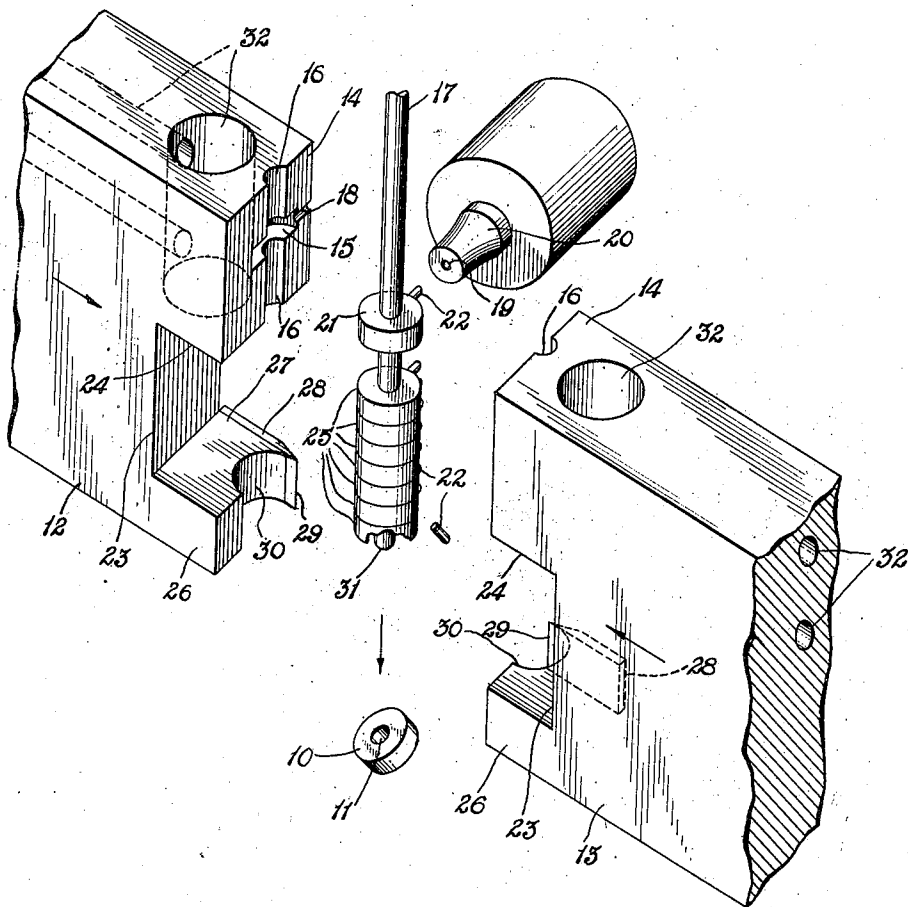
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METHOD OF CASTING AND TRIMMING PLASTIC CASTINGS

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METHOD OF CASTING AND TRIMMING
PLASTIC CASTINGSLouis H. Morin, Bronx, N. Y., assignor of one-
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This invention relates to the formation of plastic castings where the casting material employed is of a type which does not harden or set instantly in the formation thereof in water cooled dies in accordance with conventional die casting practices. More, particularly, the invention deals with a novel method of forming and handling castings of the kind under consideration, so as to delay the discharge of the castings from the machine, and thereby also providing sufficient time for the castings to become fully set or hardened to facilitate the performance of trimming operations thereon without danger of distorting the casting. The novel features of the invention will be best understood from the following description when taken together with the accompanying drawing, in which drawing is shown a perspective view diagrammatically illustrating parts of a casting machine for carrying out my improved method.

In the art of forming plastic die castings, many types and kinds of plastic materials are employed. Some of these materials do not harden or set even though formed in water cooled or otherwise chilled dies, particularly when the casting machine is operating at high speed, producing many castings a minute. From this standpoint, it has been difficult to discharge and otherwise handle castings so formed without distorting the castings, and further, it has been required to perform trimming operations as separate operations on separate machines.

To obviate these difficulties, I have devised a method which consists in maintaining the castings on an extended core for a long period of time, equal to many operations of the machine, and then after the castings have become fully set and hardened, to trim the castings and then discharge them from the machine by stripping the same from said core.

In illustrating one adaptation of my invention, I have shown in the accompanying drawing the formation of ring like castings 10 in the form of plastic insulators adapted for use as spacing washers in what is known as coaxial cable. In other words, the insulators 10 include central apertures 11 for the reception of the wire or cable.

In forming the insulators or washers 10, I employ a pair of relatively movable dies 12 and 13 having on adjacent surfaces of the upper portions 14 thereof cavities or impressions, one of which is shown at 15, in perspective, in the die 12 of the drawing. Opening into the cavity 15 of each die is a core cavity or impression 16 which extends entirely through the upper portion of the die to

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receive an elongated core pin or carrier member 17. Also opening into the cavity 15 of each die is a gate passage 18 which, when the dies are closed, is adapted to register with the discharge 19 of a suitable nozzle 20. Heated plastic material is adapted to be pressure discharged from the nozzle 20 into the cavity 15 of the dies in forming a casting on the core pin 17, such for example, as the casting 21 arranged uppermost on the core pin 17. After the dies are separated, the casting 21 will have thereon a projecting gate 22 which is required to be trimmed.

The dies 12 and 13 have on their adjacent surfaces large recesses 23 which form, on each die, lower surfaces or shoulders 24, which are adapted to engage the upper surface of the last casting formed, for example, the casting 21 when the core 17 is moved downwardly and the dies closed preparatory to moving the core 17 upwardly, thus moving the last casting into a stack, which for illustrative purposes will be identified by the several castings 25. The recesses of the dies 12 and 13 also form at the lower portion of the dies inwardly extending plates 26, the side wall 27 of which terminates at the periphery of the casting 21 so that a trimming knife 28, or the edge 29 thereof, will trim the gate 22 at the periphery of the casting, as will appear from the trimmed casting shown displaced from the core 30 at the lower portion of the drawing. Adjacent surfaces of the plates 26 have arc shaped recesses 30 sufficiently large to receive the groups of castings 25 on the core 17 when the dies are brought together. It will be understood that about five of the castings will be disposed above the plates 26 when the dies are brought together for the stripping and trimming operations, and the gate of the first casting will be trimmed in this operation. At the same time, one of the end castings will be stripped off and discharged from the lower end 31 of the core and may drop into a receptacle or may be fed onto a reduced wire or carrier, not shown.

The upper cavity portions of the dies 12 and 13 will have cooling passages, as diagrammatically illustrated at 32 in order to keep the dies cool in the high speed formation of the individual castings, as at 21.

While the diagrammatic illustration in the accompanying drawing shows the formation of single castings on a core, it will be apparent that this is only for illustrative purposes as any number of castings may be formed, and the same operations of stripping and trimming castings will take place. The knives or trimming tools 28 will

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have suitable edges 29 to trim at each operation the groups of castings that may be formed.

From the foregoing, it will be understood that the distinctive feature of the invention resides in what may be termed a delayed action for performing trimming operations upon die castings, particularly when formed from materials which do not set and harden sufficiently to perform the trimming operation on the casting without distortion of the material in the casting, and more particularly in what are known as high speed die casting machines.

In the present illustration, it will appear that the trimming operation is performed after five castings have been formed in the machine. In other words, in the initial starting of operation of the machine the machine would operate five times before a casting would be trimmed. Thereafter, one casting will be trimmed in the operation of closing the dies preparatory to performing the stripping operation. In the present construction, the trimming tool is shown as part of the die structure, but this is not essential.

After the machine has produced five castings, the steps of operation of the machine will be substantially as follows:

After the casting is formed on the core pin 17, as at 21, the dies are separated sufficiently to have their adjacent surfaces clear the casting 21, after which the core pin 17 moves downwardly so that the upper surface of the last casting 21 is arranged below the shoulders 24. When in this position, the dies are again closed, in which operation, a gate 22 is trimmed from one of the castings in the stack 25 by the trimming knives or tools 28. Immediately thereafter, the dies are separated a slight degree to free the core 17 from the dies and this core is then moved upwardly, in which operation, the last casting 21 is moved along the core to constitute the uppermost casting of the stack 25. In this operation, one of the trimmed castings is removed from the lower end of the core. At the completion of this upward movement of the core, the dies are again closed and another casting, similar to the casting 21 is formed. This cycle of operation is repeated in the formation of the successive castings.

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

1. The method of forming and trimming plastic castings, which comprises forming a casting on a carrier member arranged between relatively movable dies, moving the carrier member relatively to the dies when opened to position the formed casting on said carrier member adjacent a stripper surface on the die, then returning the carrier member to the original position preparatory for the reception of another casting, feeding the first casting along the carrier member in this operation, repeating this operation a number of times to form on the carrier member a group of said individual castings, and subsequently trimming only the first formed of the castings in the group in the operation of closing said dies, thereby delaying the trimming of each casting by the length of time required to form as many castings as there are in the said group.

2. The method of forming and trimming plastic castings, which comprises forming a casting on a carrier member arranged between relatively movable dies, moving the carrier member relatively to the dies when opened to position the formed casting on said carrier member adjacent a stripper surface on the die, then returning the

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carrier member to the original position preparatory for the reception of another casting, feeding the first casting along the carrier member in this operation, repeating this operation a number of times to form on the carrier member a group of said individual castings, subsequently trimming only the first formed of the castings in the group in the operation of closing said dies, thereby delaying the trimming of each casting by the length of time required to form as many castings as there are in the said group and stripping such first formed casting of said group from the carrier member in the operation of adding the last formed casting to the group on said carrier member.

3. The herein described method of delaying operations performed on a die cast member prior to discharge of the member from the casting machine, which comprises successively forming die castings in successive operations of a casting machine, collecting the formed castings in a group with adjacent castings in the group abutting, allowing the castings to set and harden while arranged in the group, and then trimming each set and hardened casting preparatory to the discharge of each casting from the machine.

4. The herein described method of forming and trimming die castings, which comprises first forming successive die castings on a mounting member arranged between relatively movable dies, feeding the mounting member with the castings thereon in spaced relation to cavity surfaces of the dies in forming successive castings, allowing the castings on said member to set and harden by grouping said castings in spaced relation to the die cavities with adjacent castings in the group abutting, and then trimming each set and hardened end casting of said group in advance of discharging said end casting from the mounting member.

5. The method of forming and trimming plastic die castings, which comprises supporting a core between a pair of relatively movable dies having a casting station and a spaced trimming station, arranging the core in the cavities of the casting station when the dies are closed preparatory to forming a casting on said core, forming a casting on said core, separating the dies, then feeding the core with the casting thereon relatively to the dies, then moving the dies toward each other and around the core, then moving the core in the opposite direction to return the same to its original casting position, moving the casting longitudinally of the core in this operation, repeating the casting operation and grouping a number of castings on the core between the casting and trimming stations to allow the successively formed castings to become set and hardened while accumulating in said group, and, subsequent to the completion of the group successively trimming the castings in the order of their formation and coincidentally with the successive closures of the dies, thereby delaying the trimming of each casting by the length of time required to form as many castings as there are in the said group.

6. The method of forming and trimming plastic die castings, which comprises supporting a core between a pair of relatively movable dies having a casting station and a spaced trimming station, arranging the core in the cavities of the casting station when the dies are closed preparatory to forming a casting on said core, forming a casting on said core, separating the dies, then feeding the core with the casting thereon relatively to the dies, then moving the dies toward

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each other and around the core, then moving the core in the opposite direction to return the same to its original casting position, moving the casting longitudinally of the core in this operation, repeating the casting operation and grouping a number of castings on the core between the casting and trimming stations to allow the successively formed castings to become set and hardened while accumulating in said group, subsequent to the completion of the group successively trimming the castings in the order of their formation and coincidentally with the successive closures of the dies, thereby delaying the trimming of each casting by the length of time required to form as many castings as there are in the said group, and stripping an end trimmed casting from said group in the aforesaid operation of adding a newly formed casting to the group.

7. In die casting machines for forming and trimming die castings, a pair of dies movable toward and from each other, said dies having a cavity at the upper end portion thereof, a core arranged between adjacent abutting surfaces of the dies and extending transversely through said cavity and, upon which, castings are adapted to be formed, said core being movable relatively to the dies when separated, means on the dies adapted to engage a casting on the core to feed the casting along the core to form part of a stack in movement of the core relatively to said dies when the latter are substantially in closed position, said dies being recessed to receive the stack of castings on said core when the dies are closed, and means on the lower portion of the dies for trimming lower castings of the stack on said core in the operation of closing said dies.

8. In die casting machines for forming and trimming die castings, a pair of dies movable toward and from each other, said dies having a cavity at the upper end portion thereof, a core arranged between adjacent abutting surfaces of the dies and extending transversely through said cavity and, upon which, castings are adapted to be formed, said core being movable relatively to the dies when separated, means on the dies adapted to engage a casting on the core to feed the casting along the core to form part of a stack in movement of the core relatively to said dies when the latter are substantially in closed position, said dies being recessed to receive the stack of castings on said core when the dies are closed, means on the lower portion of the dies for trimming lower castings of the stack on said core in the operation of closing said dies, and the length of said core being such as to eject a trimmed casting from the lower portion of the stack in the operation of adding an untrimmed casting to the upper portion of the stack on said core.

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9. In die casting machines of the class described, the combination with a core on which castings are formed and stacked of a pair of dies having spaced casting and trimming portions on adjacent surfaces thereof, said dies having recesses between said portions to receive a stack of castings arranged on said core, said core being movable relatively to the dies between said portions, and means on the dies engaging successive castings on the core for feeding formed castings into the stack on the core in movement of the core relatively to said dies.

10. The herein described method of forming and trimming die castings, which comprises first forming successive die castings on an elongated mounting member arranged between the die cavities of relatively movable dies with end portions of said member extending beyond the limits of the dies, feeding successively formed castings longitudinally of the member to group said castings on one end portion of the member beyond the limits of said die cavities with adjacent castings of the group abutting, allowing the castings in the group to set and harden, and then trimming the set and hardened end casting before removal of the casting from said member.

11. The herein described method of forming and trimming die castings, which comprises first forming successive die castings on a mounting member arranged between relatively movable dies, feeding the mounting member with the castings thereon in spaced relation to cavity surfaces of the dies in forming successive castings, allowing the castings on said member to set and harden by grouping said castings in spaced relation to the die cavities with adjacent castings in the group abutting, then trimming each set and hardened end casting of said group in advance of discharging said end casting from the mounting member, and removing the trimmed end casting from the mounting member in the operation of adding a formed casting to said group of castings.

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