

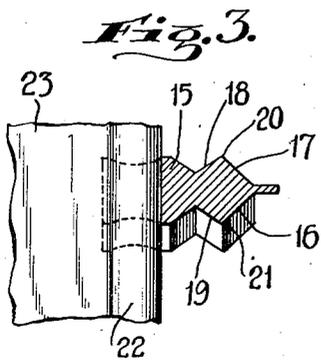
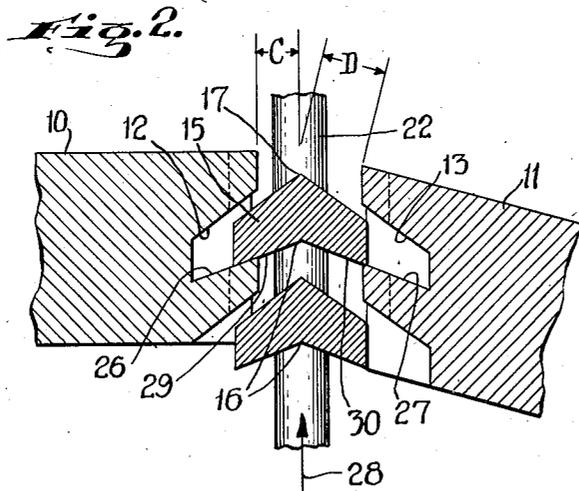
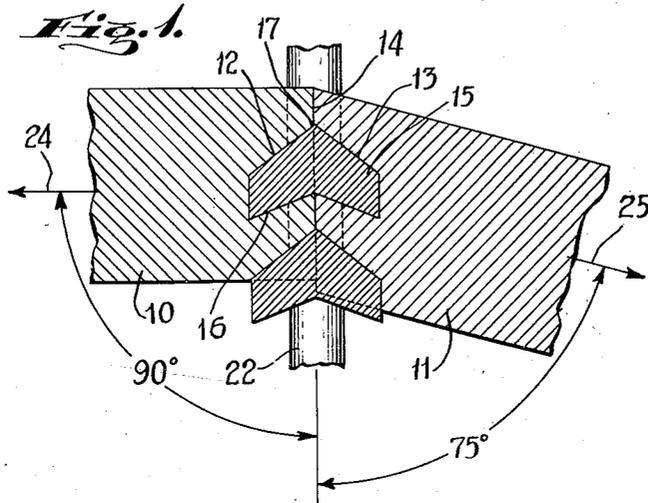
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METHOD OF AUTOMATICALLY EJECTING CASTINGS

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METHOD OF AUTOMATICALLY EJECTING CASTINGS

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This invention relates to the formation of die castings. More particularly, the invention deals with the method of automatically ejecting castings from the cavities or impressions of relatively movable dies by moving the dies at different angles to the parting line defined by adjacent abutting surfaces of the dies and in automatically moving the casting relatively to the dies and longitudinally of the parting line. Still further, the method includes the movement of one die at a speed greater than the other die in compensating for the different angular movement of said dies and in maintaining constant feed of the casing relatively to the dies in ejecting or freeing the casing from the die cavities or impressions. The novel features of the invention will be best understood from the following descriptions 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 sectional view through a pair of dies, showing a casting formed in the cavities thereof with the dies in closed position.

Fig. 2 is a view similar to Fig. 1, showing the dies in a partially open position; and

Fig. 3 is a longitudinal sectional view through a part of a casting arranged upon a mounting member and formed from the dies, as disclosed in Figs. 1 and 2.

The invention deals with the formation of die castings having undercut surfaces therein and formed by the use of what I term coreless dies, the die cavities being shaped to form the undercut recesses in the resulting castings. In some instances, dies of this type and kind have both been moved at acute angles with respect to the parting line defined by abutting surfaces of the dies. In other instances, the dies have been moved toward and from each other in a common plane.

The present invention deals with a method of operating dies to eject or free the castings from the cavities or impressions thereof by moving one die at ninety degrees to the parting line of the dies, and the other companion die at a lesser angle, say for example, an angle of seventy-five degrees with respect to the parting line. The last die, in the construction as herein disclosed, maintains supporting contact with the undercut recess formed in the resulting casting, primarily to maintain proper position of the casting. In this method, the dies are separated from

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each other at different speeds. The die operating at the seventy-five degree angle moves at a greater speed or travels a greater distance than the companion die in order to maintain common ejector movement and feed of the cast product. The companion die moves slower and in the construction as shown, may be said to move perpendicularly to the parting line 7 of the dies. In this connection, it will be understood that the particular angular relationship of the dies with respect to each other and with respect to the parting line may be varied in different types and kinds of castings as long as the angular relationship with respect to the parting line is different. For example, with some types of castings, the one die may move at an angle of seventy-five degrees to the parting line and the other die at an angle of sixty degrees. In fact, a closer relationship of angularities may be provided, in which instances, the ratio of different movement is in proportion to the difference in angularity.

In the present illustration, the dies have been shown having cavities for the production of scoops of a separable fastener stringer in order to illustrate one adaptation and use of the invention. In such uses, and where the casting is formed upon a mounting, such as the stringer tape, means will be provided to grip the tape as the castings are freed from the die cavities to support the castings and also to feed the tape in order to bring successive sections of the tape in position to receive successive castings. However, as these structures are well known in the art, they are not here indicated. In other instances, the castings may simply be dropped into a receiver or may be picked-up by suitable grippers for conveyance to a predetermined position.

In Figs. 1 and 2 of the drawing I have diagrammatically illustrated a pair of dies 10 and 11. For purposes of description, the die 10 will be referred to as the left die and the die 11 as the right die. The dies have registering cavities 12 and 13 opening through adjacent abutting surfaces of the dies, which surfaces define the parting line 14 of the dies. In the construction shown, the cavities 12 and 13 are undercut so as to form a scoop body 15 having a longitudinal recess or channeled lower surface 16 and an upper longitudinal ridged surface 17. The side portions of the scoop are angularly disposed to each other throughout the length thereof and these surfaces have the irregular longitudinal section indicated in Fig. 3 to form upper and lower re-

cesses 18 and 19, outwardly of which are corresponding upper and lower projections 20 and 21 which form the female and male couplings for retaining coupled scoops against transverse separation.

The scoop bodies 15 are die cast directly upon the beaded edge 22 of a stringer tape, part of which is indicated at 23 in Fig. 3 of the drawing.

The left die 10 is mounted to move in the direction of the arrow 24, Fig. 1, in other words, at ninety degrees to the parting line 14 of the dies, whereas the right die 11 is adapted to move in the direction of the arrow 25 which in the present instance is substantially seventy-five degrees to the parting line 14.

After a casting has been formed in the cavities or impressions 12-13, the dies 10 and 11 are separated in order to automatically eject and free the cast scoop 15 from the dies. In this operation, the die 10 moves slower than the die 11 so that when the die 10 has traveled a distance equal to the distance O indicated in Fig. 2, the die 11 will have traveled a distance equal to the distance D, also indicated in said figure.

In the separation of the dies 10 and 11, the surface 26 of the die 10 and the surface 27 of the die 11 slide outwardly over the recessed surface 16 of the casting 15, as clearly indicated in Fig. 2, and this operation feeds the casting upwardly in the direction of the arrow 28 of Fig. 2 of the drawing. By moving the die 11 faster and a greater distance, the upward ejection of the casting is maintained without any objectionable tilting which might cause injury to the resulting casting. At least this is obviated until such time as the casting has become substantially free of both cavities.

In the present construction, the surfaces 29 and 30 of the casting 15, which define the recessed or undercut side of the casting, extend angularly from the parting line at substantially the same angles. However, in some cases, the angularity of these surfaces may materially vary, and at such times, the degree of relative movement between the dies will be proportionately varied to compensate for the conditions which prevail. There are times when the particular angle of movement of the dies is of no important consequence except in clearing parts of other surfaces of the casing being formed. In other words, in the present construction, difference in angularity of movement of the dies is the controlling factor for differential speed of travel in the dies. It will also appear that the differential in speed of travel of dies may be varied simply to provide free automatic ejection of the casting or to clear the casting from both die cavities. There are cases where the one die will have to be moved many times faster than the other die in order to get out of the way of, or clear the casting as it is being ejected from one die.

As previously indicated, both dies may be disposed at unequal angles other than ninety degrees to the parting line, and it is here also to be kept in mind that the particular angular relationship

is also immaterial. It is only important to keep in mind that with the pairs of dies employed, the one die moves a greater speed and a greater distance than its companion die. These angular movements of dies are not only desirable from a standpoint of clearing castings of irregular contour, but also from a standpoint of practical operation of dies toward and from each other.

It is also possible that the differential movement between dies may be utilized to actually control and regulate the position assumed by a casting on the point of discharge from the die cavities. By this I mean that the casting may be given a predetermined tilted or other position at the moment of discharge for the purpose of alinement with predetermined grippers or for delivery in a predetermined position upon a receiver. Consider in this respect Fig. 2 of the drawing, from which it will appear that the die 11 will free itself from the casting in advance of the die 10, now if the casting was not arranged on a mounting, such as the beaded edge 22 of the tape 23, the side of the casting would have a tendency to swing downwardly as it would free itself from the cavity 12 of the die 10. In conditions of this type and kind, the faster movement of one die may be solely for the purpose of quickly freeing one side of the resulting casting.

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

1. The method of automatically ejecting castings from two separable dies having cavities shaped to form undercuts in said castings, which comprises moving one of said dies during separation in a direction at an angle to the parting line of said dies different from the movement of the other die and at a speed faster than said other die to move said casting relatively to said dies along the parting line.

2. The method of automatically ejecting castings from two separable dies having cavities shaped to form undercuts in said castings, which comprises moving one of said dies during separation in a direction at an angle to the parting line of said dies different from the movement of the other die and at a speed faster than said other die to move said casting relatively to said dies along the parting line, moving the first named die at an angle less than ninety degrees to said parting line.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
2,137,539	McIntosh	Nov. 22, 1938
2,198,634	Richter	Apr. 30, 1940
2,263,037	Gits	Nov. 18, 1941
2,327,665	Peat	Aug. 24, 1943
2,322,908	Poux	June 29, 1943