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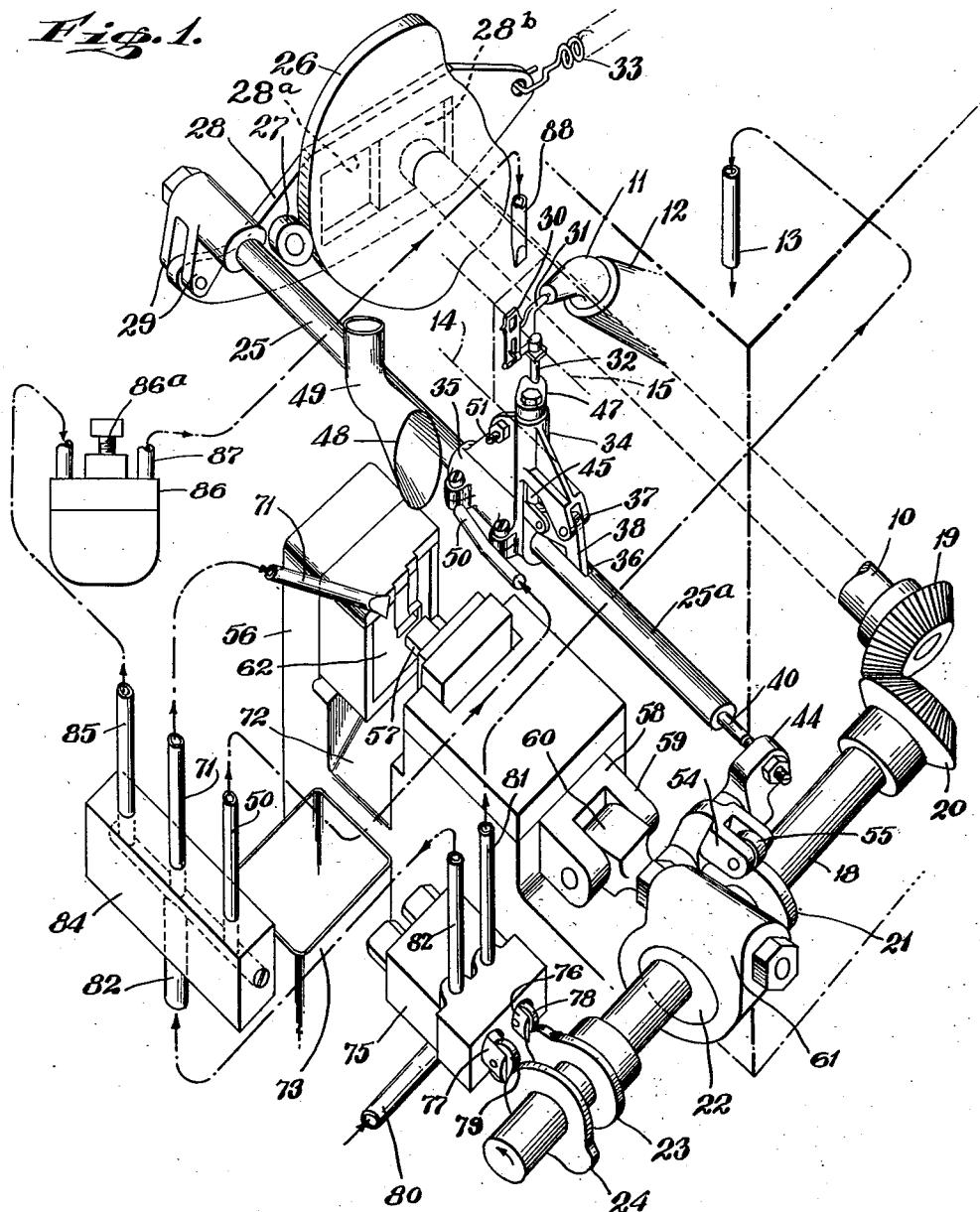
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**2,266,787**

## APPARATUS FOR FORMING AND TRIMMING DIE CASTINGS

Filed Nov. 3, 1939

3 Sheets-Sheet 1



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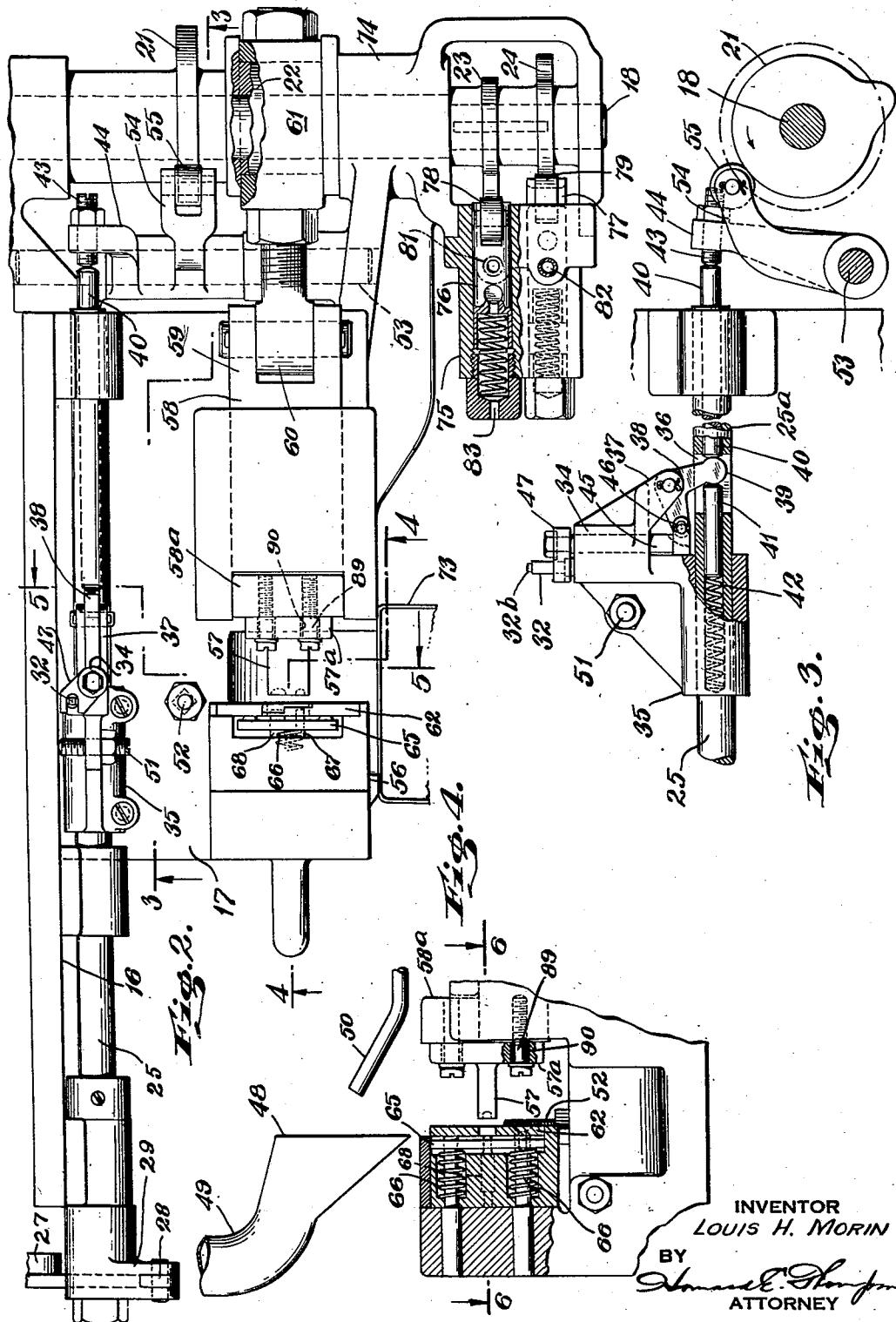
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## APPARATUS FOR FORMING AND TRIMMING DIE CASTINGS

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3 Sheets-Sheet 2



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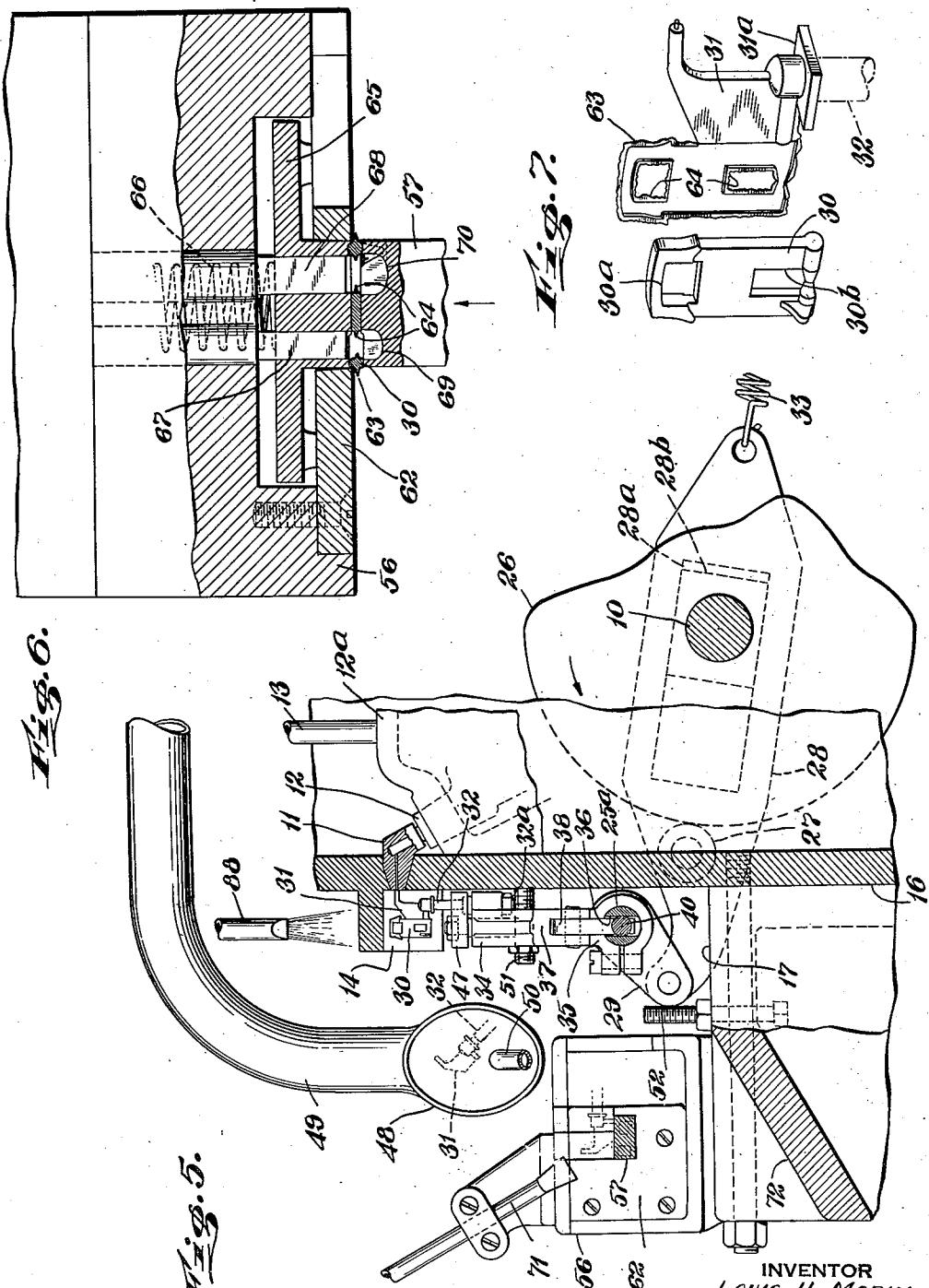
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APPARATUS FOR FORMING AND TRIMMING DIE CASTINGS

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3 Sheets-Sheet 3



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## UNITED STATES PATENT OFFICE

2,266,787

APPARATUS FOR FORMING AND TRIMMING  
DIE CASTINGSLouis H. Morin, Bronx, N. Y., assignor to White-  
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Application November 3, 1939, Serial No. 302,666

19 Claims. (Cl. 29—33)

This invention relates to the art of forming successive series of die castings and to simultaneously trim the castings thus formed to produce finished articles of manufacture. More particularly, the invention consists in an attachment to casting machines providing for automatic trimming of die castings in the forming of successive castings in the machine and in the method of casting and trimming as set forth. The novel features of the invention will be best understood from the following description when taken together with the accompanying drawings, in which certain embodiments of the invention are disclosed, and in which the separate parts are designed by suitable reference characters in each of the views, and in which:

Fig. 1 is a diagrammatic perspective view illustrating the attachment and parts of a casting machine to illustrate the invention.

Fig. 2 is a plan view of a part of the construction as seen in Fig. 1 with parts of the structure broken away and in section.

Fig. 3 is a detail view substantially on the line 3—3 of Fig. 2, showing parts of the structure broken away and in section.

Fig. 4 is a sectional detail view on the line 4—4 of Fig. 2.

Fig. 5 is a sectional view on the broken line 5—5 of Fig. 2.

Fig. 6 is a sectional view on the line 6—6 of Fig. 4 illustrating a workpiece in position to be trimmed; and

Fig. 7 is an exploded view diagrammatically illustrating the trimmed workpiece and the trimmings thereof.

In the formation of die castings by the pressure injection of heated casting material into the impression or mold cavity of relatively movable dies, it is customary to form a gate on the casting. In producing successive series of relatively small castings at what might be termed a high speed die casting operation, it has also been customary to, in some way, remove the gate from the casting. However, in such operations, it has still been necessary to perform an additional operation on the casting, namely to finally trim the same to remove the flare or flash of metal which might prevail along the parting line edges of the resulting casting. It is the purpose of my invention to provide a die casting machine, or an attachment, which will form in the successive cycles of operation of the machine, a series of finished trimmed articles of manufacture. This eliminates the necessity of rehandling the articles in performing the trimming operation

and therefore materially decreases the cost of the production of the article in question. Furthermore, a greater saving in the cost of manufacture is effected by reason of the increased speed of production of the articles by eliminating the unnecessary handling occasioned by the conventional trimming operation.

In accordance with my present method a complete casting including the gate is formed upon a pin, rod, or member, which is utilized first in ejecting the casting from the dies in the separation of the dies, and then to move the complete casting to position the same between stripping or trimming dies which completely trims the casting to form a finished article. It is further utilized to move the trimmed-off gate into a tube, preferably by a blast of air, to direct the same to a storage receptacle or to deliver the same to the molten metal pot of the casting machine for re-melting. A further blast of air is utilized to direct the trimmed casting downwardly for delivery into a suitable receptacle as well as to remove the trimmings from the trimming dies.

The diagrammatic illustration of the attachment as seen in Fig. 1 is applicable to a die casting machine substantially of the type and kind disclosed in Patent #1,975,966 of October 9, 1934, when such machines are converted to the manufacture of individual die castings.

In Fig. 1 of the accompanying drawings, 10 represents the drive shaft of the casting machine, 11 the discharge nozzle from the gooseneck 12 which is an extension of the conventional melting pot employed. It will be understood, however, at this time, that the invention is also applicable to thermoplastic die casting machines, such for example as disclosed in application, Serial No. 152,942, filed July 10, 1937, in which event the feed hopper would be equivalent to the melting pot from a receptacle standpoint, and the gooseneck 12 would be equivalent to the cylinder as commonly employed in machines referred to in said application.

At 13 is diagrammatically illustrated the plunger used to pressure inject the heated casting material into the impression or mold cavity of relatively movable dies indicated at 14 and 15 in dot and dash lines in Fig. 1 of the drawings. One surface of the die 14 is indicated in full lines in Fig. 5 of the drawings, in which figure is also shown the nozzle 11, gooseneck 12 and plunger 13 as applied to a metal die casting machine, part of the melting pot of which is indicated at 12a in said figure.

In Fig. 5 of the drawings, 16 represents a part

of the front plate of the casting machine, having at one end thereof an extension 17. The various parts of the attachment are coupled and supported in connection with the frame in any desired manner, the general arrangement of the parts being illustrated in Fig. 5 and Fig. 2 of the drawings. The illustration in Fig. 1 of the drawings is diagrammatic insofar as the general relationship of the parts is concerned.

At 18 is shown a cam shaft which is geared directly to the drive shaft through beveled gears 19 and 20. On the shaft 18 is a cam 21 for actuating a stripper plate, later described, an eccentric 22 for actuating the trimming punch or die, and two cams 23 and 24 for actuating valves controlling the air supply to the several parts or mechanisms of the machine.

At 25 is shown an elongated rod which is given rotary oscillatory movement through a cam 26 on the shaft 10 operating upon a roller 27 on a sliding plate 28. The plate 28 has an elongated aperture 28a through which a square block 28b on the shaft is free to pass. To the free end of the plate 28 is pivotally coupled a rocker arm 29 which is yoke-shaped in form to receive the plate 28 and is secured to the rod 25, so that in the forward and backward movement of the plate 28 by the cam 26, rotary oscillatory movement is contributed to the rod 25. This movement of the rod 25 moves a casting at 30, including the gate portion 31 thereof, as well as a casting supporting pin or member 32 from a position between the dies 14, 15 into a position between the stripping and trimming dies or tools later described, and then moves the gate 31 and member 32 into a position intermediate said dies where it hesitates for a moment for the removal of the gate 31, and then returns the supporting pin or member 32 back into a position between the dies 14 and 15. The roller 27 of the plate 21 is held constantly upon the cam 26 by a coil spring 33 partially illustrated in Fig. 1.

The pin or member 32 is supported in a tubular bearing 34 of an enlarged body part 35 secured centrally of the rod 25 adjacent a radial opening 36 formed in the tubular end portion 25a of the rod. The part 35 has a yoke-shaped bearing 37 in which is pivoted a bell crank 38. One end 39 of the bell crank 38 extends through the aperture 36 to seat between two pins 40 and 41 disposed in the tubular portion of the rod. A spring 42 serves to support the bell crank end 39 in engagement with the pin 40 and also to maintain the outer end of the pin 40 in engagement with an adjustable screw 43 on an operating lever 44, later described.

Arranged in the tubular portion 34 of the part 35 is a sliding rod 45 to the lower or inner end of which is coupled the other end of the bell crank 38 as seen at 46. To the upper or outer end of the rod 45 is secured a stripper plate 47 which is slidable upon the pin 32 to strip the gate 31 from the pin when the parts are in the intermediate stage previously referred to and as is diagrammatically illustrated in Fig. 5 of the drawings. This stage is adjacent the wide open throat 48 of a discharge tube 49 and an air blasting tube 50 disposed adjacent the throat of said discharge tube, so that the instant the gate 31 is stripped from the pin 32, the blast of air from the tube 50 will forcibly discharge the gate 31 through the tube 49 to a suitable receiving receptacle or back into the melting pot or hopper, as previously described, for re-use in the machine.

On the part 35 is an adjustable stop screw 51

which is adapted to strike the front plate 16, note Fig. 2, to limit the upward movement of the member 32 and to positively locate this member with respect to the dies 14 and 15. Another stop screw 52 is adjustably supported on the table or extension 17 and limits the downward swinging movement of the member 35 to properly align the casting between the shearing or trimming tools or dies.

10 The lever 44 is mounted upon a suitably supported shaft 53, note Figs. 2 and 3 of the drawings. Integral with the lever is a yoke-shaped arm 54 supporting a roller 55 which operates upon the cam 21 so that in the proper cycle of operation of the machine, the lever 44 will advance the pin 40 in the direction of the end 39 of the bell crank 38 and actuate said crank to raise the pin 45 and stripper plate 47 to strip the gate 31, as will be apparent.

20 25 On the table or extension 17 of the machine, is a yoke-shaped block 56 within which is supported the trimming dies or tools, one consisting of a punch 57 which is coupled with a slide bar 58, and the yoke-shaped end 59 of which is coupled with the crank end 60 of a block 61 actuated by the eccentric 22 so as to move the tool 57 in engagement with the casting 30 in forcing the casting into a stripper or trimming plate 62 having a contour corresponding to the contour of all peripheral edges of the resultant trimmed casting 30 including the apertures 30a and 30b therein. In other words, this operation is to trim any flared metal that may prevail on the outer edges of the casting as seen at 63, Fig. 7, and the flared metal which may prevail around the apertures 30a, 30b as seen at 64, Fig. 7, while at the same time trimming the gate 31 from the casting. Fig. 6 also indicates the fins or flared metal that are about to be trimmed off.

30 35 40 45 50 55 Supported within the plate 62 is a yieldable backing plate 65 normally held by springs 66 in the outward or extended position. This plate moves inwardly and yields to the advance of the punch 57 to provide for the shearing of the flared metal 63 and 64. Supported within the plate 65 are fixed trimming tools 67 and 68 which trim the flared metal 64 bordering the apertures 30a, 30b as will be apparent. The face of the punch 57 is recessed as seen at 69 and 70 to receive the trimmed metal and to allow the punches 67 and 68 to extend completely through the casting 30 as will be apparent. Upon movement of the punch 57 away from the plate 62, the spring 66 will force the plate 65 and the casting 30 outwardly, thus ejecting the casting from the plate 62 and the punches 67 and 68. At this instant a blast of air from a tube 71 will blow the casting downwardly onto an inclined surface 72 on the table 17 or in the block 56 thereof to discharge the removed castings 30 into a receptacle or pan 73, as well as to remove the trimmed flared metal from the trimming tools. In trimming the casting 30, it will be understood that the gate 31 remains upon the pin 32 and this gate is then moved into the stripping and ejecting position previously described.

50 60 65 70 75 It will be understood that the cam shaft 18 is suitably supported in brackets or housings, for example as indicated at 74 in Fig. 2 of the drawings which are omitted in the diagrammatic illustration in Fig. 1 for sake of clarity. To one side of the housing 74 is supported, adjacent the cams 23, 24 a valve casing 75 in which are disposed valves 76 and 77. Each valve has an anti-frictional roller 78 and 79 operating upon the

cams 23 and 24 respectively, springs being employed to maintain the valves in constant engagement with the cams.

The casing 75 is provided with one admission pipe 80 for the supply of compressed air from a suitable source, and the valves are so ported as to provide, in the movement thereof, a discharge of air through a pipe 81 from the valve 76 and through a pipe 82 from the valve 77. The air discharged from the pipe 81 is directed to the plunger 13 controlling the pressure discharge of casting material into the dies. This valve is so constructed as to provide for an exhaust of the air through an outlet 83, note Fig. 2 of the drawings, upon the completion of the actuation of the plunger 31. No such exhaust is necessary with respect to the discharge 82 as this discharge passes to a distributor box 84 suitably supported on the machine. Compressed air is discharged from this box through the tube 50, the tube 71 and also through a tube 85. The latter enters a suitably supported container 86 for a lubricant, the lubricant being discharged from a pipe or tube 87. The nozzle end 88 of the tube 87 is disposed adjacent the parting line of the dies 14, 15 so that a fine spray of oil may be discharged upon the impression or cavity surfaces of the dies to maintain the same in a clean state or condition at all times. The amount of lubricant sprayed upon the dies in this manner is controlled by an adjustable needle valve 86a on the oil receptacle 86.

Insofar as the valve operation is concerned, it will be apparent that it is simply a matter of bringing ports of the valves in registering position with the discharge tubes 81 and 82. The full blast of air is utilized in the tubes 50, 71 and 85 under the prevailing pressure without any by-pass exhaust through the valve 77, whereas the pressure must be held on the cylinder 13 and this pressure relieved through the by-pass 83 when the plunger 13 has performed its function. The timing of the blast of air through the discharge tubes 50, 71 and 85 will be regulated to take effect when the gate 31 is stripped from the member 32. At this instant, the tools 57, 62 will be separated as will also the dies 14 and 15. It will of course be understood that the removed casting 30 will drop by gravity upon the discharge chutes 72 and the trimmed particles removed by the air blast 71, although this blast of air may also be utilized to assist in delivering the castings to the receptacle 73 should they remain upon the chute surface 72.

The tool or punch 57 is detachably and adjustably coupled with the slide bar 58 by screws 89 secured to an extension 58a on the plate 58 in passing through enlarged openings 90 formed in the flange portion 57a of the tool 57 as indicated in Fig. 4 of the drawings. This construction provides proper alinement of the tool 57 with the workpiece and aperture in the plate 62, it being understood that the plate 62 and associated parts is properly positioned to register with the workpiece when moved into the stripping or trimming position. The pin 32 is also adjustable in the part 34 and retained in different positions of adjustment by the nut 32a, note Fig. 5, to properly locate the upper reduced and preferably squared end 32b of the pin, note Fig. 3, in the impression of mold cavity of the die. This squared or angular end of the member 32 in addition to retaining the complete casting against displacement from said member also maintains the casting in proper alinement in the movement

thereof into position between the trimming tools or dies.

It will also be apparent that the gate 31 is so formed as to provide a wide flange 31a which protrudes beyond the circumference of the pin 32 so as to facilitate engagement of the stripper plate 47 therewith and insure positive ejection of the casting and to accomplish this result without the necessity of frictional engagement of the stripper plate with the pin 32.

It will be understood that my invention is by no means limited to the formation of a casting of any particular form or contour, and in fact two castings may be simultaneously formed in the impressions or mold cavities of the dies and trimmed by suitable tools. For example, one means and method of forming the dual castings simultaneously is disclosed in prior applications, Serial No. 175,038 filed Nov. 17, 1937, and Serial No. 175,039, filed Nov. 17, 1937.

The method of procedure in forming the successive series of die castings and in simultaneously trimming the castings to deliver finished articles of manufacture or finished die cast parts, aside from any question of plating the same, consists in arranging a pin member, which may be termed a feed or carrier member, between adjacent surfaces of relatively movable dies to extend into impressions or cavities formed between the dies when in closed position, said member 32 extending to that part of the impression which forms the gate of the resulting castings. The gate, which is represented at 31, is made sufficiently large to provide for a free flow and wide distribution of the casting material to that part of the impression or mold cavity which forms the resulting die casting, while at the same time, providing the wide flange portion 31a for the purposes heretofore stated.

When the dies are in closed position and firmly held in such position, casting material is injected into the mold cavity to form the casting 30 and the gate 31. The material is forced into the dies by the air actuation of a plunger 13 controlled by the valve 76, the opening and closed of the valve being controlled by the cam 23. Immediately upon the formation of the casting, the dies 14 and 15 are opened and the member 32 is moved forwardly and downwardly to bring the casting 30 and gate 31 into registering position with the trimming tools 57, 62, 67 and 68. This operation is performed by the cam 26 and slide plate 28 which imparts the rotary oscillatory movement to the rod 25 upon which the member 32 is secured by the block or part 35.

The casting 30 and gate 31 are retained in the lowermost position seen in dotted lines in Fig. 5 of the drawings, while the punch 57 moves in the direction of the plate 62 to trim the casting 30. The gate remains on the pin 32, but the cast article 30 is cut loose therefrom by the trimming operation, and will drop to the surface 72 and thence to the receptacle 73 as before stated. Immediately after this trimming operation, the member 32 is raised to the intermediate stage or position, also indicated in dotted lines in Fig. 5 of the drawings, in registration with the wide mouth 48 of the pipe 49 and adjacent the air blast tube 50. When momentarily held in the last mentioned position by the cam 26, the stripper plate 47 strips the gate 31 from the member 32, and at the same instant, air is discharged from the tube 50, the control of this discharge being governed by the valve 77 operated through the cam 24. At this same instant, air is also dis-

charged from the tube 71 and lubricant is sprayed from the nozzle 88 at the end of the pipe 87, since all of these actions are controlled by the one valve 77 actuated by the cam 24. The latter spray of lubricant will clean the adjacent surfaces of the dies 14, 15 which are then in open position. The blast of air from the tube 71 will remove the trimmed particles of the casting from the trimming tools and also assist in delivering the trimmed casting into the receptacle 73. Immediately after the gate 31 has been stripped from the member 32, the same returns to the full line position shown in Fig. 5 of the drawings and the dies are again closed and the cycle of operation is repeated.

From the foregoing, it will be apparent that in each cycle of operation of the machine a complete casting is die cast and completely trimmed and delivered. The gate removed from the member 32 is delivered to a receptacle or through the pipe 49 and returned to the source of supply, for example, the melting pot 12a.

This method of procedure in addition to producing accurate die castings, also produces and delivers from the machine what may be termed a finished article of manufacture, or at least a finished die cast part requiring no further handling and operations insofar as trimming the product or casting is concerned. It will of course be apparent that the trimming and other operations apart from the actual casting operation, are performed within the cycle of operation of the machine and without in any way retarding the progress of forming a successive series of castings. It will also be apparent that in the production of larger castings and where larger gates are employed, other means of delivering or conveying the stripped gate from the machine may be employed. However, where relatively small castings are being produced, the method and means herein disclosed has been used with great success.

In referring to adaptations of the attachment to certain types of machines, this is done purely as examples and not by way of limitations.

It will be understood that my invention is adaptable for use in the construction of various types and kinds of die casting machines regardless of the particular manner of injecting casting material into the dies. In the present illustration the casting material is introduced into the die impression on the parting line of the dies. It will further be apparent that the particular movement of the casting carrier member may be varied to suit different types and kinds of machines and also to care for the trimming of castings of different shapes and contours.

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

1. In a die casting machine employing relatively movable dies with a mold cavity formed between abutting surfaces of the dies with means for pressure injecting heated casting material into the mold cavity on the parting line of the dies, a member extending into the mold cavity of the dies and arranged on the parting line thereof upon which the casting is formed, relatively movable trimming tools disposed in spaced relation to the dies, means for actuating said member to move the same together with the casting formed thereon from the dies when separated and into position between said trimming tools, means for actuating the trimming tools to completely trim the die cast product formed by said

casting and to remove the same from a gate portion of the casting remaining on said member, means for removing the gate portion of the casting from said member, and means returning the member to position between the dies prior to the completion of the next cycle of operation of the machine.

2. In a die casting machine employing relatively movable dies with a mold cavity formed between abutting surfaces of the dies with means for pressure injecting heated casting material into the mold cavity on the parting line of the dies, a member extending into the mold cavity of the dies and arranged on the parting line thereof upon which the casting is formed, relatively movable trimming tools disposed in spaced relation to the dies, means for actuating said member to move the same together with the casting formed thereon from the dies when separated and into position between said trimming tools, means for actuating the trimming tools to completely trim the die cast product formed by said casting and to remove the same from a gate portion of the casting remaining on said member, means for removing the gate portion of the casting from said member, means returning the member to position between the dies prior to the completion of the next cycle of operation of the machine, and means for conveying and delivering the gate when removed from said member to a predetermined receptacle.

3. In a die casting machine employing relatively movable dies with a mold cavity formed between abutting surfaces of the dies with means for pressure injecting heated casting material into the mold cavity on the parting line of the dies, a member extending into the mold cavity of the dies and arranged on the parting line thereof upon which the casting is formed, relatively movable trimming tools disposed in spaced relation to the dies, means for actuating said member to move the same together with the casting formed thereon from the dies when separated and into position between said trimming tools, means for actuating the trimming tools to completely trim the die cast product formed by said casting and to remove the same from a gate portion of the casting remaining on said member, means for removing the gate portion of the casting from said member, means returning the member to position between the dies prior to the completion of the next cycle of operation of the machine, means for conveying and delivering the gate when removed from said member to a predetermined receptacle, and said last named means comprising an automatically actuated air valve delivering a blast of air to a position assumed by the gate when removed from said member.

4. In a die casting machine employing relatively movable dies with a mold cavity formed between abutting surfaces of the dies with means for pressure injecting heated casting material into the mold cavity on the parting line of the dies, a member extending into the mold cavity of the dies and arranged on the parting line thereof upon which the casting is formed, relatively movable trimming tools disposed in spaced relation to the dies, means for actuating said member to move the same together with the casting formed thereon from the dies when separated and into position between the said trimming tools, means for actuating the trimming tools to completely trim the die cast product formed by said casting and to remove the same

from a gate portion of the casting remaining on said member, means for removing the gate portion of the casting from said member, means returning the member to position between the dies prior to the completion of the next cycle of operation of the machine, means for conveying and delivering the gate when removed from said member to a predetermined receptacle, said last named means comprising an automatically actuated air valve delivering a blast of air to a position assumed by the gate when removed from said member, said position being intermediate the casting and trimming positions assumed by said member, and means momentarily supporting the member stationary in said position.

5. In a die casting machine employing relatively movable dies with a mold cavity formed between abutting surfaces of the dies with means for pressure injecting heated casting material into the mold cavity on the parting line of the dies, a member extending into the mold cavity of the dies and arranged on the parting line thereof upon which the casting is formed, relatively movable trimming tools disposed in spaced relation to the dies, means for actuating said member to move the same together with the casting formed thereon from the dies when separated and into position between said trimming tools, means for actuating the trimming tools to completely trim the die cast product formed by said casting and to remove the same from a gate portion of the casting remaining on said member, means for removing the gate portion of the casting from said member, means returning the member to position between the dies prior to the completion of the next cycle of operation of the machine, means for conveying and delivering the gate when removed from said member to a predetermined receptacle, said last named means comprising an automatically actuated air valve delivering a blast of air to a position assumed by the gate when removed from said member, said position being intermediate the casting and trimming positions assumed by said member, means momentarily supporting the member stationary in said position, and other means controlled by said air valve for spraying a lubricant upon the mold surfaces of the dies and for applying a blast of air to the trimming tools of the machine.

6. A trimming attachment for die casting machines employing relatively movable dies, with a said attachment comprising trimming tools arranged in spaced relation to the dies of the machine, a member upon which the casting is formed, means for actuating said member to deliver a casting formed between the dies into position between the trimming tools, supporting the casting stationary in the operation of said tools to trim the casting, moving the member into another stationary position, then returning the member to a position between the dies for the reception of the next successively formed casting, means actuating the trimming tools to trim a die cast product from the casting, leaving the gate portion of the casting on said member, means for stripping the casting from said member while held in the second mentioned stationary position, and means for conveying the gate from the machine.

7. In a die casting and casting trimming machine, means for forming a casting, means for trimming a casting formed by the first named means, a member associated with the first named means and upon which the casting is formed,

5 said member being utilized to remove the casting from the first named means, means for actuating said member to feed the casting in position between said trimming means and to support the casting at rest in the operation of the trimming means, and means for actuating said trimming means to completely trim a die cast product and to deliver the product from the machine.

8. In a die casting and casting trimming machine, means for forming a casting, means for trimming a casting formed by the first named means, a member associated with the first named means and upon which the casting is formed, said member being utilized to remove the casting from the first named means, means for actuating said member to feed the casting in position between said trimming means and to support the casting at rest in the operation of the trimming means, means for actuating said trimming means to completely trim a die cast product and to deliver the product from the machine, the cast product comprising an apertured body, and said trimming means employing tools for trimming peripheral edges of the body and the apertured portion thereof.

9. In a die casting and casting trimming machine, means for forming a casting, means for trimming a casting formed by the first named means, a member associated with the first named means and upon which the casting is formed, said member being utilized to remove the casting from the first named means, means for actuating said member to feed the casting in position between said trimming means and to support the casting at rest in the operation of the trimming means, means for actuating said trimming means to completely trim a die cast product and to deliver the product from the machine, the remainder of the casting comprising a gate portion being retained on said member after the actuation of said trimming means, and means for removing the gate from said member.

10. In a die casting and casting trimming machine, means for forming a casting, means for trimming a casting formed by the first named means, a member associated with the first named means and upon which the casting is formed, said member being utilized to remove the casting from the first named means, means for actuating said member to feed the casting in position between said trimming means and to support the casting at rest in the operation of the trimming means, means for actuating said trimming means to completely trim a die cast product and to deliver the product from the machine, the remainder of the casting comprising a gate portion being retained on said member after the actuation of said trimming means, means for removing the gate from said member, a nozzle tube disposed adjacent each of the first, second and last named means, and an automatically actuated air valve controlling the supply of air to each of said tubes.

11. In a die casting and casting trimming machine, means for forming a casting, means for trimming a casting formed by the first named means, a member associated with the first named means and upon which the casting is formed, said member being utilized to remove the casting from the first named means, means for actuating said member to feed the casting in position between said trimming means and to support the casting at rest in the operation of the trimming means, means for actuating said trimming means to completely trim a die cast product and to deliver the product from the machine, the remainder of

the casting comprising a gate portion being retained on said member after the actuation of said trimming means, means for removing the gate from said member, a nozzle tube disposed adjacent each of the first, second and last named means, an automatically actuated air valve controlling the supply of air to each of said tubes, and the air supply to the nozzle tubes disposed adjacent the first named means passing through a lubricant storage receptacle to spray a lubricant on the first named means.

12. In a die casting and casting trimming machine, means for forming a casting, means for trimming a casting formed by the first named means, a member associated with the first named means and upon which the casting is formed, said member being utilized to remove the casting from the first named means, means for actuating said member to feed the casting in position between said trimming means and to support the casting at rest in the operation of the trimming means, means for actuating said trimming means to completely trim a die cast product and to deliver the product from the machine, the remainder of the casting comprising a gate portion being retained on said member after the actuation of said trimming means, means for removing the gate from said member, and means for delivering the gate to a predetermined receptacle.

13. In a die casting machine, a casting receiving and delivery member, means for moving said member in one cycle of operation of the machine from a casting receiving position to a trimming position, then to a gate removing position and back to the first named position and for holding said member momentarily in each of said positions, means forming a die casting on said member to be completely supported by said member when removed from said means, trimming tools for trimming the casting supported on said member when in said trimming position, said tools leaving the gate portion of the casting on said member, and means removing the gate from said member when said member is momentarily held in the stationary gate removing position.

14. An automatic trimming attachment for die casting machines of the class described, said attachment comprising relatively movable tools, one consisting of a punch, another an apertured plate for trimming peripheral edges of a die casting in the movement of the casting through said plate by said punch, the punch conforming substantially to the peripheral contour of the casting formed, a resiliently supported supplemental plate disposed within the aperture of the first named plate to yield to the pressure of said punch in forcing the casting to be trimmed through the aperture of said first named plate, and said supplemental plate serving to eject the casting from the aperture of the first named plate automatically in the retraction of said punch.

15. An automatic trimming attachment for die casting machines of the class described, said attachment comprising relatively movable tools, one consisting of a punch, another an apertured plate for trimming peripheral edges of a die casting in the movement of the casting through said plate by said punch, the punch conforming substantially to the peripheral contour of the casting formed, a resiliently supported supplemental plate disposed within the aperture of the first named plate to yield to the pressure of said punch in forcing the casting to be trimmed through the

aperture of said first named plate, said supplemental plate serving to eject the casting from the aperture of the first named plate automatically in the retraction of said punch, and a stationary trimming tool arranged within the supplemental plate to trim apertured portions of the casting when forced into the aperture of the first named plate by said punch.

16. An automatic trimming attachment for die casting machines of the class described, said attachment comprising relatively movable tools, one consisting of a punch, another an apertured plate for trimming peripheral edges of a die casting in the movement of the casting through said plate by said punch, the punch conforming substantially to the peripheral contour of the casting formed, a resiliently supported supplemental plate disposed within the aperture of the first named plate to yield to the pressure of said punch in forcing the casting to be trimmed through the aperture of said first named plate, said supplemental plate serving to eject the casting from the aperture of the first named plate automatically in the retraction of said punch, a stationary trimming tool arranged within the supplemental plate to trim apertured portions of the casting when forced into the aperture of the first named plate by said punch, a casting carrier member for feeding a casting in position between said trimming tools and for moving a part of the casting trimmed from the cast article to a point of delivery, and means for stripping said part of the casting from said member at said delivery point.

17. In a die casting and casting trimming machine, means for forming a casting, said casting comprising a gate part and a product part, means for trimming the casting formed by the first named means to separate said parts, a member upon which the complete casting is formed, said member being movable between the casting means and said trimming means, means whereby the operation of said trimming means will remove a trimmed product part from the gate part of said casting leaving one of said parts disposed on said member, and means for stripping the last mentioned part from said member.

18. In a die casting and casting trimming machine, means for forming a casting including portions to be trimmed therefrom, a trimming station in spaced relation to the first named means and comprising relatively movable trimming tools for trimming the casting, means moving the casting from the first named means to the trimming station and for supporting the casting in aligned position with the tools of said station, means whereby the operation of said trimming tools will produce a trimmed product of said casting leaving part of the trimmed portion on said second named means, and means for removing the trimmed portion from said second named means.

19. In a die casting and casting trimming machine, means for forming a casting including portions to be trimmed therefrom, a trimming station in spaced relation to the first named means and comprising relatively movable trimming tools for trimming the casting, means moving the casting from the first named means to the trimming station and for supporting the casting in aligned position with the tools of said station, and means operating said trimming tools upon a casting supported at the trimming station to produce a trimmed product.

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