May 9, 1950 L. H. MORIN ET AL 2,506,966

APPARATUS FOR CASTING ENLARGED BODIES ON PINS OR RODS

Filed Oct. 11, 1945 2 Sheets-Sheet 1

Fig. 4.

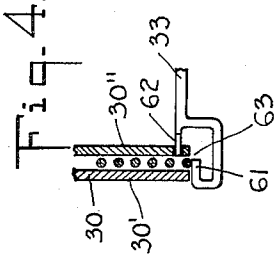


Fig. 1.

INVENTORS
LOUIS H. MORIN
OTTO GRIES
BY
Howard P. Thompson
ATTORNEY

May 9, 1950 L. H. MORIN ET AL 2,506,966

APPARATUS FOR CASTING ENLARGED BODIES ON PINS OR RODS

Filed Oct. 11, 1945 2 Sheets-Sheet 2

Fig. 2.

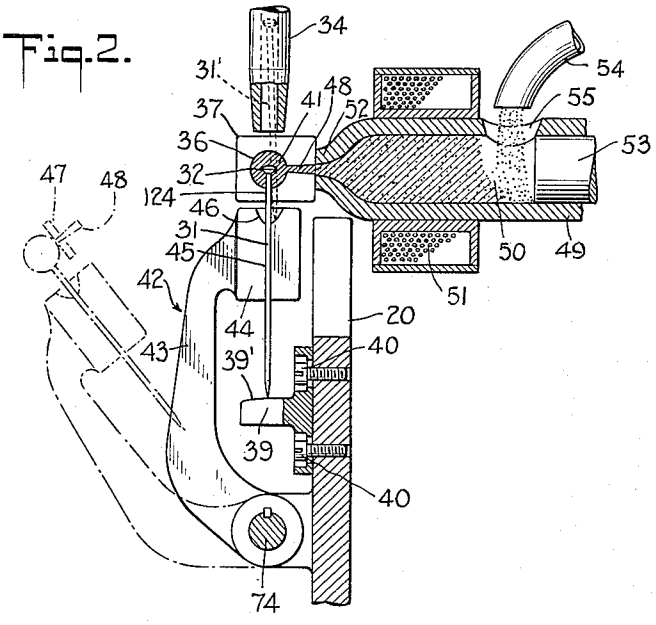


Fig. 3.

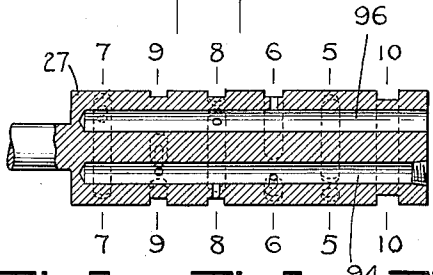


Fig. 5.

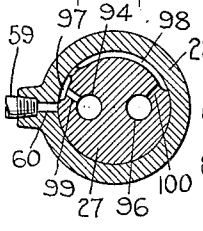


Fig. 6.

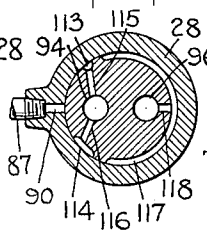


Fig. 7.

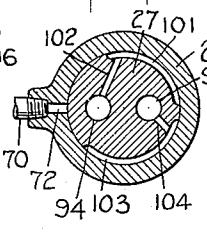


Fig. 8.

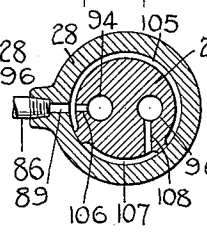


Fig. 9.

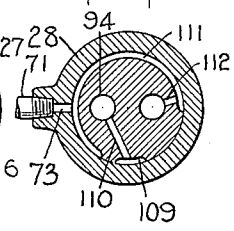
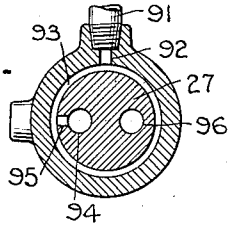


Fig. 10.



INVENTORS
LOUIS H. MORIN
OTTO GRIES
BY
Howard E. Thompson
ATTORNEY

Patented May 9, 1950

2,506,966

UNITED STATES PATENT OFFICE

2,506,966

APPARATUS FOR CASTING ENLARGED BODIES ON PINS OR RODS

Louis H. Morin, Bronx, and Otto Gries, New Rochelle, N. Y.; said Gries assignor to Crown Fastener Corporation, a corporation of Delaware

Application October 11, 1945, Serial No. 621,734

12 Claims. (Cl. 18—30)

1

This invention relates to an apparatus for forming enlarged die cast bodies or heads upon pins or rods and in trimming the casting before discharge of the cast product from the machine. More particularly, the invention deals with an apparatus for automatically feeding pins, rods or similar mounting members into position between a pair of grippers and a pair of relatively movable dies; holding a mounting member in position between the dies by said grippers; then forming a die cast body upon the mounting member with the dies in closed position therearound and, thereafter, moving the casting by said grippers into position at a trimming station to automatically trim the casting; and, finally, discharging the casting from the machine in separation of said grippers. Still more particularly, the invention comprises the method of forming die cast bodies on mounting members as more fully hereinafter described and claimed.

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 perspective view somewhat diagrammatically illustrating parts of an apparatus employed for producing castings in accordance with our improved method with duplicate parts of the apparatus omitted for sake of clarity.

Fig. 2 is a transverse sectional view through the apparatus of Fig. 1 taken along the parting line of the dies, showing only a part of the construction and with parts of the construction shown in different positions in dot and dash lines.

Fig. 3 is a sectional view through a control valve which we employ and shown at the extreme right of Fig. 1, the valve casing being omitted.

Fig. 4 is a sectional detail view of a pin release and feed mechanism which we employ; and

Figs. 5–10 inclusive are cross-sectional views taken through the valve of Fig. 3 on the several section lines indicated in Fig. 3 and showing the casing environment of the valve.

In Fig. 1 of the drawing, 20 shows part of a machine frame, in side members 21, 22 of which is supported a driveshaft 23 driven from one end by a pulley 24 or other drive medium. At 25 is shown a suitable clutch mechanism actuated through a hand lever 26 to couple the shaft 23 with the drive 24. At the other end of the shaft 23 is a valve 27 which operates in a casing 28.

Suitably supported through the medium of a bracket 29 is a pin feed or feed and release mechanism 30 to which pins 31, having heads 32, are adapted to be fed from a suitable hopper, not shown. The feed 30 comprises a pair of spaced plates 30', 30'', between which the shanks of the pins 31 are arranged with the heads of the pins supported on upper edges of said plates.

At 33 is shown an escapement slide which automatically controls the feed of pins 31, one at a time, into a guide cylinder 34 arranged in a suitable support, as at 35 directly above and in proper alinement with the impression cavity 36 of a pair of dies 37 and 38.

Arranged below the dies and in wide spaced relationship thereto is a pin stop table or shelf 39, which limits downward movement of the pin 31 and maintains the head 32 of the pin substantially centrally of the impression or cavity 36. The stop 39 is adjustably supported in the frame 20, as seen at 40, so as to gauge the location of the head 32 in the resulting cast body or head 41.

At this time, it will be apparent that, by using different stops and adjustably supporting the same, pins or other rod members of different sizes can be fed into a single machine.

At 42 is shown a workpiece gripper unit comprising a pair of arms 43, 43', each supporting a gripper block 44, 44'. The blocks 44, 44', when brought together, form a passage 45 for the reception and engagement of the pin 31 to support the pin firmly in position, when held between the dies, as well as in movement of the pin with the casting thereon to the trimming station, later described. The passage 45 has a conical upper end 46 to guide the pin 31 in its downward movement to the stop position, as shown in Fig. 2 of the drawing.

The trimming station, above referred to, comprises a pair of oppositely disposed and angularly arranged trimming tools 47, 47' which are moved toward each other at the proper time to trim the cast head 41 to remove a gate 48 therefrom, the gate being formed by the conventional gate passage on the parting line of the dies.

Before proceeding to describe the means for actuating the several parts, units or mechanisms referred to, attention is directed to Fig. 2 of the drawing, in which is shown in part the cylinder 49, into which the plastic material, as at 50, is adapted to be fed and heated by a suitable electric heating element 51 to be discharged through the nozzle end 52 of the cylinder by actuation of a plunger 53.

At 54 is shown means for feeding, preferably

at intermittent intervals, plastic material into the cylinder in the front of the plunger 53 through an opening 55.

It will be apparent that, when the dies are brought into closed position around the pin 31, the plunger 53 will be actuated to inject plastic material into the impression or cavity 36 to form the cast head or body 41. At this time, it will also be apparent that dual injector cylinders, such as the cylinder 49, can be employed, as is known in the art, to intermittently inject the casting material from the pair of cylinders; first, to speed up production and, secondly, from the standpoint of forming castings of different colors, it being apparent that each cylinder may have a plastic of a different distinct color, or where combined colors are used, each cylinder would have different combinations of colors.

Coupled with one end of the slide 33 is a forked-end 56 of a plunger 57 operating in an air-cylinder 58. To one end of the cylinder 58 is coupled an air supply pipe 59, which communicates with the port 60 of the valve casing 28, note Fig. 5. The other end of the slide 33 has a reversely extending stop wall 61 formed by a hook-shaped portion on the end of the slide and, extending from the plane of the slide 33 in the direction of the stop wall 61 but spaced therefrom, is a stop-finger 62 which passes through the wall or plate 30'' to engage one of the pins while the lowermost pin of the feed is released through the opening 63, note Fig. 4. In other words, the slide 33 is shown in the stop position in Figs. 1 and 4, supporting the lowermost pin by the wall 61. As the slide moves inwardly or toward the left, the finger 62 is disposed beneath the second pin, holding it against movement while the wall 61 frees the lowermost pin and allows it to drop into the feed and guide tube 34. It will be understood that the actuation of the slide 33 is timely controlled by introduction of air under pressure from the control valve through the pipe 59 into the cylinder 58.

The dies 37, 38 are arranged in similar guides 64, 64' on the frame 20, which guides include portions 65, 65' for guiding the trimming tools 47, 47'. As both of the die structures and trimming tools are the same, and the mechanism for actuation thereof are the same, only one mechanism is shown in each instance in order to simplify the present illustration and the mechanism at the right of the machine only will be described.

At the right end of the frame 20 are shown two cylinders 66 and 67, in which are arranged pistons or plungers coupled with rods 68 and 69, the latter being coupled in any suitable manner with the dies and trimming tools, for example, with the die 38 and tool 47' in the manner diagrammatically illustrated. Extending from the control valve casing 28 is a pipe 70 which leads to one end of the cylinder 66, as well as the companion cylinder not shown. A similar pipe 71 extends from the control valve casing to the two cylinders similar to the cylinder 67. The pipe 70 communicates with a port 72 in the casing 28, whereas the pipe 71 communicates with a port 73 in said casing, as seen in Figs. 7 and 9 of the drawing.

The arms 43, 43' are keyed to and slidably mounted on a rocker-shaft 74 supported in suitable bearings 75, 75' on the frame 20, each arm having a grooved collar 76, 76' engaged by forked-end portions 77, 77' of levers 78, 78' pivoted to the frame 10, as seen at 79, 79', the other ends of said levers being pivoted to pistons or plunger rods 80, 80' operating in cylinders 81, 81'.

To one end of the shaft 74 is secured an arm 82, to which is coupled the piston or plunger rod 83 of a cylinder 84, the latter having a pivotal mounting on the frame, as at 85. At 86 is shown a pipe extending from the casing 28 and, coupled with one end of the cylinder 84, another pipe 87 extends from the casing 28 and couples with one end of each of the cylinders 81, 81'. These latter cylinders have pivotal mountings in the frame 20, as at 88, 88'. The casing 28 has a port 89, with which the pipe 86 communicates and a similar port 90 communicates with the pipe 87. On the casing 28 is a main high pressure air inlet 91, which communicates with a passage 92.

Considering Fig. 10 of the drawing, it will appear that the valve 27 has a circumferentially continuous passage 93 communicating with the port 92 to provide a constant supply of air to a distributor passage 94 through a radial port 95. The passage 94 is shown in its longitudinal extension in Fig. 3 of the drawing and in cross-section in Figs. 5–10 inclusive. At 96 is shown an exhaust passage extending longitudinally of the valve 27 and opening through the end thereof to atmosphere.

Before proceeding to describe the actuation of the valve for operating the several mechanisms, it will be apparent that, in each of the cylinders 58, 66, 67, 81, 81' and 84, as well as the duplicates of cylinders 66, 67, there will be arranged springs for moving the parts in the direction opposite to the direction in which the parts are moved by air, so that in operating the several positions or plungers by air, they are operated against such spring action.

Considering now the several cross-sections, Figs. 5–10 inclusive, it will appear that various sections of the valve 27 have circumferentially extending short or long passages for controlling the operation of various mechanisms.

In Fig. 5, a passage 97 and a longer passage 98 are employed, the passage 97 controlling actuation of the slide 33 to release one of the pins 31. Immediately upon this release, the passage 98 is brought into registering position with the port 60 and air is exhausted allowing the slide 33 to return to normal position.

It will be apparent that the passage 94 communicates with the passage 97 through a port 99; whereas, the passage 96 communicates with the passage 98 through a port 100.

Noting Fig. 7, it will appear that the valve 27 has a passage 101 communicating with passage 94 through a port 102 and an exhaust passage 103 communicating with the exhaust 96 through a port 104. After the pin 31 has been moved into position, registration of the passage 101 with the port 72 will cause the dies to be moved into closed position on the pin and held in such position during injection of casting material into the cavity 36 through the nozzle 52 and, immediately thereafter, the passage 103 registers with the port 72 to exhaust the air allowing the dies to be moved into open position.

Considering now Fig. 8 of the drawing, it will appear that a long passage 105 on the valve 27 communicates with the passage 94 through a port 106 and the passage 105 registers with the port 89 to provide for a long period of maintaining the grippers 44, 44' and the arms 43, 43' thereof in the full line position shown in Fig. 2 of the drawing; whereas when the exhaust passage 107 regis-

ters with the port 89, the arms 43, 43' are permitted to swing to the full line position of Fig. 1 or the dotted line position of Fig. 2. The passage 107 is in communication with the exhaust 96 through a port 108.

Considering Fig. 9, it will appear that the valve 27 has a short passage 109 in communication with the passage 94 through a port 110 and a long passage 111 placed in communication with the exhaust 96 through a port 112. The short passage 109, when registering with the port 73, serves to actuate the trimming tools 47, 47' to remove the gate 48, this operation taking place with the grippers 44, 44' in the full line position of Fig. 1 and the dotted line position of Fig. 2.

Considering now Fig. 6 of the drawing, it will appear that the valve 27 has a very short passage 113 and a somewhat longer passage 114, both in communication with the intake passage 94 through ports 115 and 116 respectively. A long exhaust passage 117 communicates with the exhaust 96 through a port 118. This construction provides for the slight opening or separation of the grippers 44, 44' when the passage 113 registers with the port 90. Then a long holding of the grippers in closed position when the passage 117 registers with the port 90 and, then, a wide and relatively long separation of the grippers when the passage 114 registers with the port 90 in the discharge of the cast and trimmed product from the machine.

The above description has been applied to the several showings in the cross-sectional views of Figs. 5–10 inclusive, However, in the cycle of operation of the machine, it will be apparent that, when the grippers 44, 44' are in the position shown in full lines in Fig. 2 and closed, a pin is dropped between the open dies and first enters the cavity or recess 46 at the upper end of the closed grippers. Thereafter, the grippers are slightly opened allowing the pin to drop freely through the passage 45 onto the shelf 39. After which, the grippers are closed and the dies moved into closed position. The casting is now formed upon the head 32 of the pin 31, after which the dies are opened, the arms 43, 43' swung into the full line position at Fig. 1, or the dotted line position at Fig. 2, the casting trimmed while held by the grippers at this station, after which the grippers are separated and the casting automatically discharged. Thereafter, the grippers return to the full line position of Fig. 2 and the above cycle of operation is repeated.

It will be apparent that the entire apparatus, carrying out our improved method and as diagrammatically illustrated, is air actuated, at least in one direction. This materially simplifies the construction of the machine and provides, through the medium of the valve unit, a positive control and synchronism of operation of the several parts.

With our improved method, metallic, as well as plastic, castings can be formed by utilizing the different types of injector mechanisms for injecting casting material into the dies. It will also be apparent that pin or rod-like mounting members of any type and kind can be employed, various parts dealing with the workpiece blank or member being modified to suit the structure thereof.

Considering Fig. 2 of the drawing, it will be apparent that the upper surface 39' of the stop or workpiece supporting table 39 is curved downwardly and outwardly in a curvature at least within a radius of the shaft axis 74, so that the

lower end of the pin or other member will swing freely as the arms 43, 43' are moved from the full line to the dotted line position of Fig. 2. In this position, it is understood that the pin or other member 31 is firmly supported by the grippers in proper positioning of the cast head 41 in position at the trimming station. Here, it will be understood that other trimming tools may be employed to otherwise trim a casting as and when such trimming operations are desired.

Considering Fig. 2 of the drawing, it will appear that, at 31', is shown in dotted lines a pin in the process of descending through the tube 34. The bore of the tube has surface clearance to allow free passage of the pin therethrough and the flare 46 is sufficiently large to receive the end of the pin when dropped onto the grippers. In partially opening the grippers 44, 44', the pin is then free to pass downwardly to the stop position. However, there will be some slight frictional engagement of the pin passing downwardly through the openings 45 to check, to some degree, downward movement of the pin to minimize the blow of the end of the pin engaging the stop table 39. However, this table may be made of a relatively soft material which will not tend to injure the pin end.

The speed of operation of a machine of the kind under consideration is largely dependent upon the type and kind of material employed. Metal heads or enlarged bodies may be cast at a relatively high speed. However, in utilizing two or more injection cylinders of plastic material, the production speed may be materially increased as compared with the use of a single injection cylinder. By reason of the simple die construction and mounting and the use of the T-slot couplings, at at 119, Fig. 1 of the drawing, engaging the heads 120 of the rods 68, a quicker coupling and uncoupling of the dies is provided. This particular head construction also dispenses with the need of accurate alinement between the guides 64, 64' and the cylinder 66 as the dies may be alined solely by the positive guides 64, 64'.

It is also prefered that the bearing or shaft support 75' includes adjustable stop pins 121 and 122 adapted to be engaged by an offset finger 132 on the rocker arm 82. The stop pin 121 is adapted to check opening swinging movement of the arms 43, 43' and the pin 122 to check movement of said arms to the full line position of Fig. 2 in proper alining the grippers 44, 44' beneath the die cavity or impression 36, so as to keep the bore or passage 45 in alinement with the passage 124 on the abutting surfaces of the dies for receiving the pin shank.

The method herein described has a distinctive step of procedure, the gravity delivery of the members, which may be regarded as insert members, to a stop position between adjacent surfaces of the dies when the latter are open and, in this delivery, gripper means are employed to grip and support the member in predetermined alinement to position part of the member within the die cavity when the dies are in closed position, so that the cast body is formed on that part of the member disposed in the cavity. Further, these same gripper means support the casting and member in the separation of the dies and are utilized to feed the casting and member out of alinement with the dies and to the trimming station. This procedure dispenses with the need of coupling or otherwise uniting the members for delivery to position between the dies and materially simplifies the entire method of procedure, as the mem-

bers are simply grouped in the guide rack and released one at a time in each cycle of the machine operation.

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

1. In machines for forming die cast bodies on a pre-formed insert member, a pair of dies movable toward and from each other, a pair of grippers adapted to engage said member, upon which a cast body is adapted to be formed, means supporting the grippers adjacent and in alinement with cavities of the dies, a feed for delivering said member to predetermined position between said grippers with the dies in open position, means urging said grippers into firm engagement with said insert member during the forming of a cast body on said member by injection of casting material into the cavities of the dies when in closed position, a trimming station, and means for moving the grippers and member supported thereby to said trimming station when the dies are in open position.

2. In machines for forming die cast bodies on a pre-formed insert member, a pair of dies movable toward and from each other, a pair of grippers adapted to engage said member, upon which a cast body is adapted to be formed, means supporting the grippers adjacent and in alinement with cavities of the dies, a feed for delivering said member to predetermined position between said grippers with the dies in open position, means urging said grippers into firm engagement with said insert member during the forming of a cast body on said member by injection of casting material into the cavities of the dies when in closed position, a trimming station, means for moving the grippers and members supported thereby to a trimming station when the dies are in open position, trimming tools located at said trimming station, and means for actuating said trimming tools to trim the cast body on the member supported at said station.

3. In machines for forming die cast bodies on a pre-formed insert member, a pair of dies movable toward and from each other, a pair of grippers adapted to engage said member, upon which a cast body is adapted to be formed, means supporting the grippers adjacent and in alinement with cavities of the dies, a feed for delivering said member to predetermined position between said grippers with the dies in open position, means urging said grippers into firm engagement with said insert member during the forming of a cast body on said member by injection of casting material into the cavities of the dies when in closed position, a trimming station, means for moving the grippers and member supported thereby to said trimming station when the dies are in open position, trimming tools located at said trimming station, means for actuating said trimming tools to trim the cast body on the member supported at said station, and said member, delivery means, dies, trimming tools and grippers being pneumatically actuated in at least one direction.

4. In machines for forming die cast bodies on a pre-formed insert member, a pair of dies movable toward and from each other, a pair of grippers adapted to engage said member, upon which a cast body is adapted to be formed, means supporting the grippers adjacent and in alinement with the cavities of the dies, a feed for delivering said member to predetermined position between said grippers with the dies in open position, means urging said grippers into firm engagement with said insert member during the forming of a cast body on said member by injection of casting material into the cavities of the dies when in closed position, a trimming station, means for moving the grippers and member supported thereby to said trimming station when the dies are in open position, trimming tools located at said trimming station, means for actuating said trimming tools to trim the cast body on the member supported at said station, said member, delivery means, die, trimming tools and grippers being pneumatically actuated in at least one direction, and an automatically actuated valve controlling supply of air to the several mechanisms of the machine in each cycle of operation thereof.

5. In a die casting machine for casting attachments to pre-formed pin-like members, the combination of separable gripper members having initially mating faces interrupted by complementary, substantially vertical jaw cavities dimensioned to exclude the entry therein of a pin member when the said faces are in engagement, each of said cavities having an enlargement at its upper end, said enlargements together forming a top cavity section dimensioned to receive the end of a pin member, means for dropping a pin member endwise into said enlarged cavity section, means for separating the gripper members to permit the pin member to fall into the said jaw cavities, means for interrupting the fall of the pin member prior to the entry into said top cavity section of that portion of the pin member which is to receive the attachment, and means for closing the gripper members on the pin member as located by said interrupting means.

6. In casting machines, the combination with a pair of dies movable toward and from each other and having a cavity on adjacent abutting surfaces thereof, of a pair of workpiece grippers, means supporting the grippers adjacent the dies and in alinement with the cavity thereof, means for delivering a workpiece into position between the grippers with part of the workpiece in alinement with the die cavity when the dies are in open position, means positioning one end of the workpiece with respect to the die cavity, means for injecting casting material into the die cavity when the dies are closed upon said workpiece to form a casting on the end of the workpiece within the cavity, a trimming station, and means for moving the grippers with the workpiece and casting supported thereby in position for trimming at said trimming station.

7. In casting machines, the combination with a pair of dies movable toward and from each other and having a cavity on adjacent abutting surfaces thereof, of a pair of workpiece grippers, means supporting the grippers adjacent the dies and in alinement with the cavity thereof, means for delivering a workpiece into position between the grippers with part of the workpiece in alinement with the die cavity when the dies are in open position, means positioning one end of the workpiece with respect to the die cavity, means for injecting casting material into the die cavity when the dies are closed upon said workpiece to form a casting on the end of the workpiece within the cavities, a trimming station, means for moving the grippers with the workpiece and casting supported thereby in position for trimming at said trimming station, said trimming station comprising a pair of trimming tools,

and means to actuate said tools to trim the casting at said station.

8. In casting machines, the combination with a pair of dies movable toward and from each other and having a cavity on adjacent abutting surfaces thereof, of a pair of workpiece grippers, means supporting the grippers adjacent the dies and in alinement with the cavity thereof, means for delivering a workpiece into position between the grippers with part of the workpiece in alinement with the die cavity when the dies are in open position, means positioning one end of the workpiece with respect to the die cavity, means for injecting casting material into the die cavity when the dies are closed upon said workpiece to form a casting on the end of the workpiece within the cavities, a trimming station, means for moving the grippers with the workpiece and casting supported thereby in position for trimming at said trimming station, said trimming station comprising a pair of trimming tools, means to actuate said tools to trim the casting at said station, and means for moving the grippers toward and from each other in engaging a workpiece and in delivering a workpiece with a trimmed casting thereon from the machine.

9. In casting machines, the combination with a pair of dies movable toward and from each other and having a cavity on adjacent abutting surfaces thereof, of a pair of workpiece grippers, means supporting the grippers adjacent the dies and in alinement with the cavity thereof, means for delivering a workpiece into position between the grippers with part of the workpiece in alinement with the die cavity when the dies are in open position, means positioning one end of the workpiece with respect to the die cavity, means for injecting casting material into the die cavity when the dies are closed upon said workpiece to form a casting on the end of the workpiece within the cavities, a trimming station, means for moving the grippers with the workpiece and casting supported thereby in position for trimming at said trimming station, said trimming station comprising a pair of trimming tools, means to actuate said tools to trim the casting at said station, means for moving the grippers toward and from each other in engaging a workpiece and in delivering a workpiece with a trimmed casting thereon from the machine, and said workpiece delivery means, dies, trimming tools and grippers being actuated in one direction by pneumatically actuated means.

10. In casting machines, the combination with a pair of dies movable toward and from each other and having a cavity on adjacent abutting surfaces thereof, of a pair of workpiece grippers, means supporting the grippers adjacent the dies and in alinement with the cavity thereof, means for delivering a workpiece into position between the grippers with part of the workpiece in alinement with the die cavity when the dies are in open position, means positioning one end of the workpiece with respect to the die cavity, means for injecting casting material into the die cavity when the dies are closed upon said workpiece to form a casting on the end of the workpiece with the cavities, a trimming station, means for moving the grippers with the workpiece and casting supported thereby in position for trimming at said trimming station, said trimming station comprising a pair of trimming tools, means to actuate said tools to trim the casting at said station, means for moving the grippers toward and from each other in engaging a workpiece and in delivering a workpiece with a trimmed casting thereon from the machine, said workpiece delivery means, dies, trimming tools and grippers being actuated in one direction by pneumatically actuated means, and a control valve controlling all of the pneumatically actuated means of the machine in each cycle of operation of the machine.

11. In a die casting machine for casting attachments on a pre-formed pin-like member, the combination of separable gripper members having initially mated faces interrupted by complementary, substantially vertical jaw cavities dimensioned to exclude the entry of said pin member when said faces are in engagement, each of said cavities having an enlargement at its upper end forming a top cavity section to receive and end of said pin member, a feed for delivering said pin member endwise to the enlarged cavity section of said grippers, means for separating said jaws for permitting continued movement of the pin member into said jaw cavities, a stop for positioning the pin member at a predetermined position and means for closing the gripper members on the pin member when located at said predetermined position.

12. A die casting machine for casting attachments on pre-formed pin-like members characterized by separable gripper members for holding said pin-like members during casting and trimming operations, said gripper members having mating faces dimensioned to prevent entry therein of said pin-like members when said faces are in engagement, each of said faces having an enlargement at its upper end forming a top cavity section to receive an end of one of said pin-like members, a gravity feed for delivering said pin-like members one by one in timed sequence and endwise to said top cavity section of said gripper members, means for separating said gripper members for permitting continued movement of the pin-like members as guided by said gripper members, a stop for positioning said pin-like members at a predetermined position and means for closing the gripper members on the pin-like members when it is located at said predetermined position.

LOUIS H. MORIN.
OTTO GRIES.

REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,720,611	Smith	July 9, 1929
1,975,966	Morin et al.	Oct. 9, 1934
2,244,425	Marinsky et al.	June 3, 1941
2,266,432	Morin et al.	Dec. 16, 1941
2,367,303	Morin	Jan. 16, 1945