Aug. 14, 1951 E. M. TALLBERG 2,564,615

CASTING MACHINE

Filed March 30, 1948 2 Sheets-Sheet 1

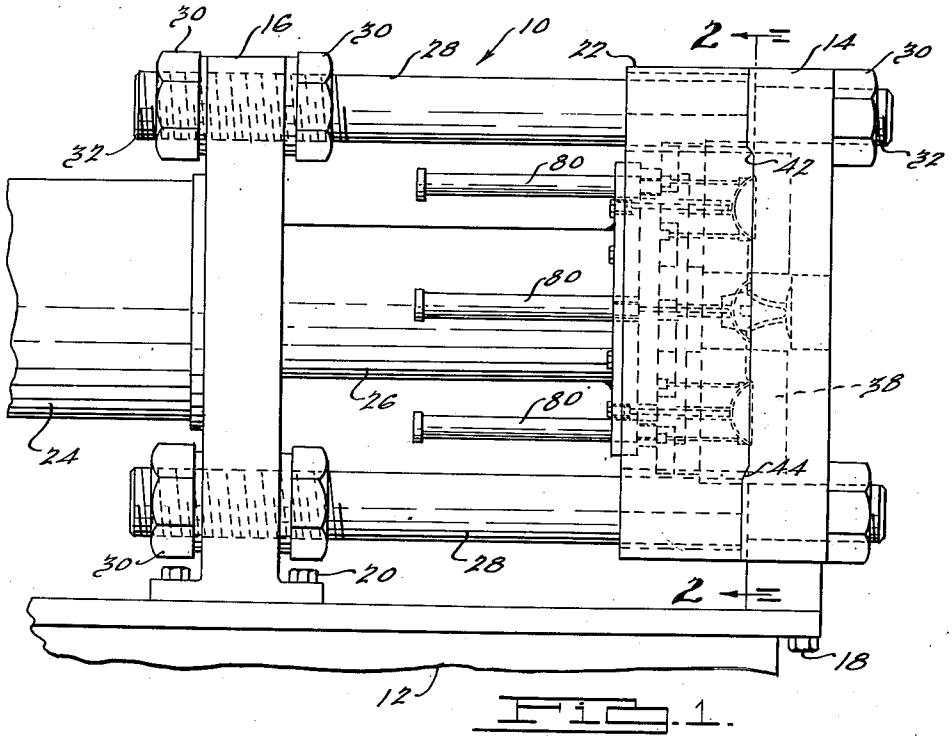


Fig. 1.

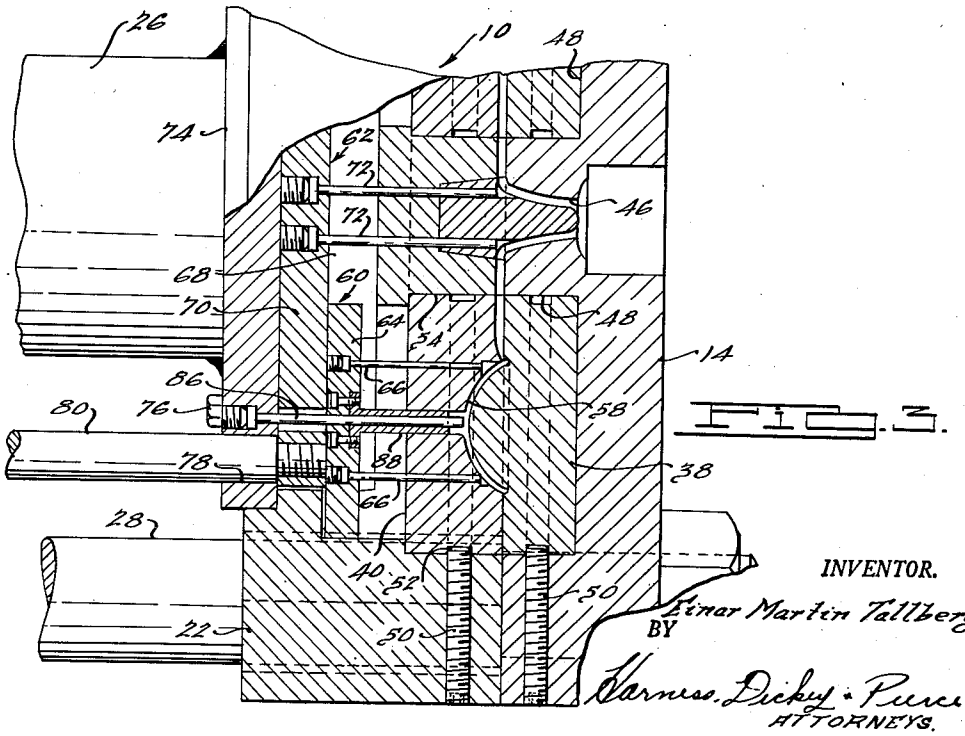


Fig. 2.

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Fig. 2.

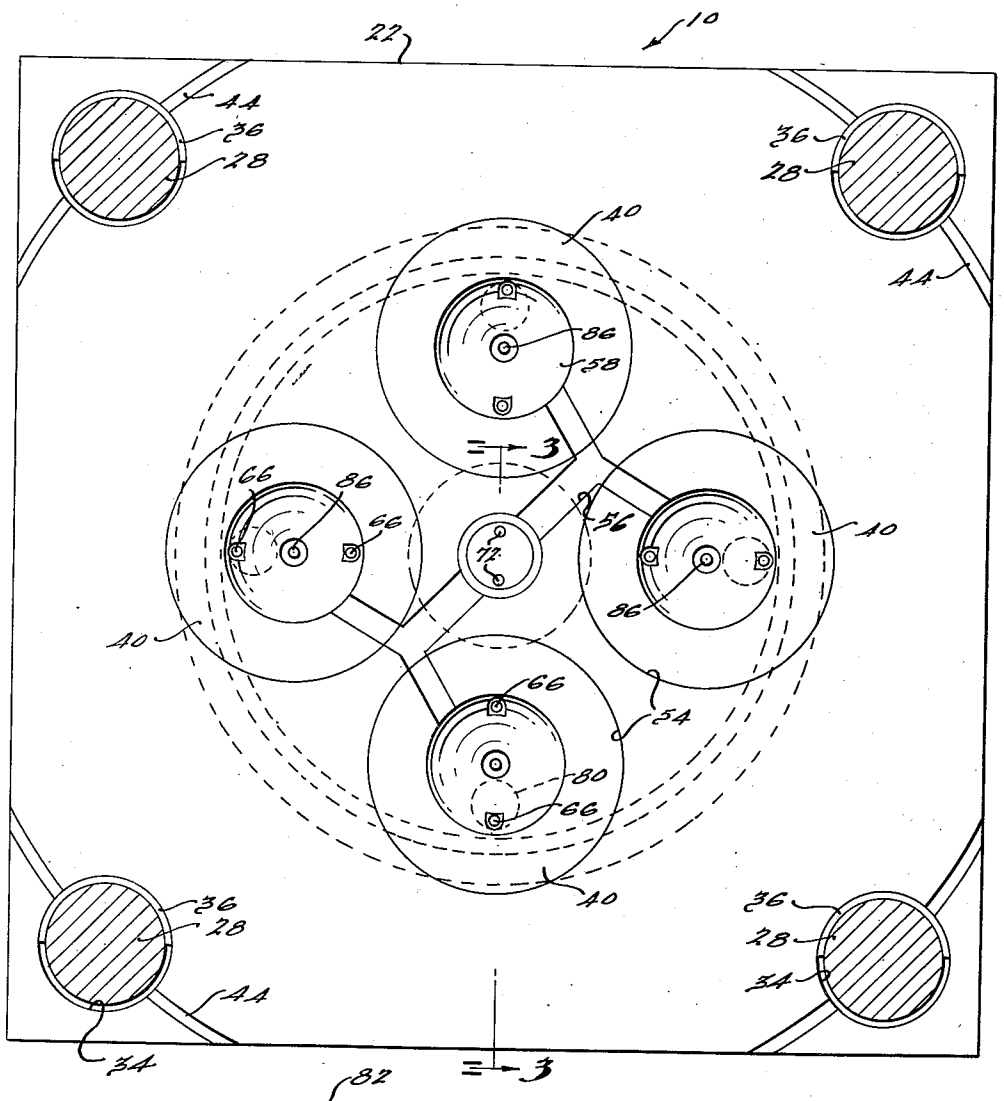


Fig. 4.

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CASTING MACHINE

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2 Claims. (Cl. 18—30)

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The present invention relates to an improved casting machine construction adapted for use in material forming apparatus including die casting machines, injection molding machines, and the like.

The principal objects of the present invention include the provision of an improved casting machine which is simple in construction, economical of manufacture, and reliable and efficient in operation; to provide an improved casting machine having a fixed machine plate and a travelling machine plate movable into and out of abutting engagement with the fixed machine plate, both of which plates are adapted to directly receive die insert elements in their abutting faces; to provide an improved casting machine adapted for simultaneously producing a plurality of cast pieces and having a fixed machine plate and a travelling machine plate movable into and out of abutting engagement with the fixed machine plate, both of which plates are built into the machine as permanent parts thereof and are adapted to perform the functions of die plates and thereby eliminate the need for the unit die mounted between the machine plates in conventional casting machine constructions; to provide an improved casting machine having cooperating machine plates recessed to receive complementary die insert elements and adapted for movement into abutting relation to provide a seal around said elements to prevent escape of the material being cast, during a casting operation; to provide an improved casting machine having an improved ejector mechanism; to provide an improved casting machine having an improved master ejector mechanism permanently mounted in the travelling machine plate thereof; to provide, for a casting machine, an improved travelling plate adapted to be permanently built into the machine as a machine plate thereof and recessed to support a die insert element in flush relation with the recessed face thereof; to provide for a casting machine an improved travelling plate adapted to be permanently built into the machine as a machine plate thereof and having a central chamber, a recess in one face thereof adapted to receive a die insert element and an associated ejector mechanism projecting into the central chamber, and master ejector means mounted in the central chamber for operating the ejector means associated with the die insert element and means extending through the opposite face of the travelling plate for engaging a portion of the machine to actuate the ejector mechanism; and to otherwise improve the construction and operation of casting machines.

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Other and more detailed objects of the invention will become apparent from a consideration of the following specification, the appended claims and the accompanying drawings wherein:

Figure 1 is a broken view in elevation of a casting machine embodying the invention;

Fig. 2 is an enlarged view in transverse section of the construction illustrated in Fig. 1 taken substantially along the line 2—2 thereof;

Fig. 3 is a broken view in section of the construction illustrated in Fig. 2 taken substantially along the line 3—3 thereof; and

Fig. 4 is an enlarged view in section of the article formed by the die elements illustrated in the foregoing figures.

It will be appreciated from a complete understanding of the present invention that the improvements thereof may be readily embodied in material forming apparatus of various types and constructions. The term "casting machine" is used herein in a broad sense to include all such material forming apparatus, including but not limited to die casting machines and injection molding machines. In an illustrative, but not in a limiting sense, the improvements of the present invention are illustrated and described herein in relation to a die casting machine.

Referring to the drawings, the casting machine 10 there illustrated generally comprises a base 12, front and back machine plates 14 and 16 respectively, secured to the base 12 in fixed spaced relation by screws 18 and 20 respectively, and a travelling machine plate 22 mounted intermediate the plates 14 and 16 for movement into and out of abutting engagement with the front machine plate 14. This movement of the travelling plate 22 is effected by means of a hydraulic cylinder 24 having a ram 26 the outer end of which is secured to the travelling plate 22 as hereinafter described.

The machine plates 14 and 16 are mounted in parallel relation and are interconnected at their four corners by four parallel machine bars 28. The machine plates 14 and 16 are rigidly secured to the bars 28 and accurately positioned relative to each other by means of nuts 30 received on threaded portions 32 at the opposite ends of the bars 28. The travelling machine plate 22 is slidably supported on the bars 28 which extend through apertures 34 formed in the four corners of the travelling plate 22 and in which are mounted semi-cylindrical bearing bushings 36 which engage and slide along the bars 28.

The means for supplying the liquid or molten material forms no part of the present invention

and accordingly is not illustrated or described herein.

The front plate 14, the travelling plate 22 and the back plate 16 are commonly referred to as machine plates because they are built into the machine as permanent parts thereof. Casting machines of this general arrangement, including spaced front and back machine plates and a travelling machine plate mounted intermediate the front and back plates, are, of course, well known in the art. The casting machine of the present invention differs from such conventional machines in that its travelling machine plate 22 is adapted for movement into and out of abutting engagement with its front machine plate 14 and the abutting faces of these plates are recessed to directly receive complementary die insert elements 38 and 40. This construction permits the use of the improved automatic ejector mechanism hereinafter described.

Considering the construction of these plates in greater detail, accurate alignment of the front machine plate 14 and the travelling machine plate 22, when the latter is moved to the closed position illustrated in Figures 1 and 3 of the drawings in which the adjacent faces of the plates are in abutting engagement, is insured by cooperating conical surfaces 42 and 44, formed on the plates 14 and 22 respectively. These conical surfaces 42 and 44 are generated about an axis parallel to the bars 28 and extending through the center of the plates 14 and 22. These conical surfaces 42 and 44 are preferably disposed at a maximum practical distance from the centers of the plates. In the construction illustrated, they are discontinuous and are at substantially the same distance from the centers of the plates as are the machine bars 28.

The front plate 14, in the preferred construction illustrated in the drawings, has a centrally disposed sprue 46 and four equally angularly spaced cylindrical recesses 48 formed in its rear or left-hand face as viewed in Figures 1 and 3 of the drawings. Each of the recesses 48 is adapted to receive a cylindrical die insert element 38 which is secured in place by means of a set screw 50 mounted in the front plate 14 and projecting laterally into the recess 48 through the cylindrical wall thereof. The inner end of the screw 50 is received in an annular groove 52 formed in the cylindrical wall of the die insert element 38 and disposed to register with the set screw 50 when the die insert element 38 is in assembled position.

The travelling machine plate 22, in its front face or face adjacent the front plate 14, has four cylindrical recesses 54 disposed to register with the recesses 48 in the front plate 14 and adapted to receive the cylindrical die insert elements 40. The front face of the travelling plate 22 is also recessed to define a gate 56 adapted to receive from the sprue the liquid or molten material to be cast and distribute the same to the die cavities 58 defined by the complementary die insert elements 38 and 40.

The travelling machine plate 22 of the present invention also carries means for automatically ejecting the cast pieces and the sprue, during the operation of the machine. For this purpose, an individual ejector means, generally indicated at 60, and individual to each die insert element 40 is provided, and a master ejector means, generally indicated at 62, is provided for actuating the individual ejector means 60. Each individual ejector means 60 includes an individual ejector plate 64 and ejector pins 66 rigidly mounted on the plate 64 and adapted to project through the die insert element 40 and into the die cavity 58 formed therein. It will be appreciated that the ejector means 60 must be designed for use with a particular die insert element 40 since the number, disposition and length of the ejector pins 66 must necessarily vary, depending upon the contour of the die cavity 58. The individual ejector means 60 is assembled into the travelling machine plate 22 with the die insert element 40, the ejector pins 66 extending rearwardly from the die insert element 40 or to the left as viewed in Figures 1 and 3, and the individual ejector plate 64 projecting into a large centrally disposed recess 68 formed at the rear of the travelling plate 22.

The master ejector means 62 is disposed within the recess 68 and forms a permanent part of the machine. The master ejector means 62 comprises a master ejector plate 70 received in the recess 68 and adapted to engage the individual ejector plates 64 and carrying forwardly projecting ejector pins 72 for engaging and ejecting the sprue. The recess 68 is closed by a large central cover plate 74 secured to the plate 22 by a plurality of screws 76. The cover plate 74 is welded or otherwise suitably secured at its center to the outer end of the ram 26. Adjacent its periphery, this cover 74 has a plurality of apertures 78 which slidably receive ejector rods 80. The inner or forward ends of these rods 80 are threaded or otherwise suitably secured to the master ejector plate 70. The rods 80 extend parallel to the bars 28 and are of a length such that their rear ends simultaneously engage the back machine plate 16 as the travelling plate 22 approaches the limit of its movement in an opening direction. Upon such engagement of the rods 80 with the back plate 16, it will be appreciated that continued movement of the travelling plate 22 in a rearwardly direction, or to the left as viewed in Figures 1 and 3, causes the ejector plates 70 and 64, and the ejector pins 72 and 66 carried thereby, to move relative to the travelling plate 22 and the die insert elements 40 carried thereby in a manner to eject the cast pieces and the sprue therefrom.

The above-described construction permits the recess 82 in the cast piece 84 to be readily formed by a core pin 86 mounted in the plate 74 and projecting forwardly through the master ejector plate 70, the individual ejector plate 64, the die insert element 40 and into the die cavity 58. To eject the cast piece 84 from the pin 86, a tubular ejector pin 88 is mounted on the individual ejector plate 64 and surrounds the pin 86. It will be appreciated that upon actuation of the ejector means 62 and 60 the tubular pin 88 strips the core pin 86 to free the cast piece from the core pin and aid in the ejecting of the former from the die cavity.

The die insert elements 38 and 40 are of a thickness equal to the depth of the recesses 48 and 54, respectively, in which they are received, whereby the outer faces of the die elements 38 and 40 are disposed flush with the recessed faces of the front plate 14 and the travelling plate 22. It will thus be appreciated that the abutting faces of the front plate 14 and the travelling plate 22 have a sealing effect surrounding each of the complementary pairs of die insert elements 38 and 40, thereby eliminating the necessity of any specific extent of sealing area between the complementary die elements.

It will now be appreciated the present invention provides a casting machine which is simple and economical of construction and which has an improved operation and eliminates substantial items of expense in conventional constructions.

While only one specific embodiment of the invention has been illustrated and described in detail, it will be readily appreciated by those skilled in the art that numerous modifications and changes may be made therein without departing from the spirit of the invention or from the scope of the appended claims.

What is claimed is:

1. A casting machine comprising a fixed machine plate, a traveling machine plate mounted for movement into and out of abutting engagement with said fixed machine plate, and means for effecting said movement of said traveling machine plate, said plates having cooperating faces adapted to move into abutting engagement and recessed; to mount complementary die insert elements in said abutting faces, and said plates having cooperating conical guide surfaces on said faces adapted to interengage as said plates are moved into said abutting engagement to insure proper alignment of said plates.

2. A casting machine comprising a fixed machine plate, a traveling machine plate mounted for movement into and out of abutting engagement with said fixed machine plate, and means for effecting said movement of said traveling machine plate, said plates having cooperating faces adapted to move into abutting engagement and recessed; to mount complementary die insert elements in said abutting faces, and said plates having cooperating conical guide sufaces on said faces disposed outwardly of said complementary die insert elements adapted to interengage as said plates are moved into said abutting engagement to insure proper alignment of said plates.

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REFERENCES CITED

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

UNITED STATES PATENTS

Number	Name	Date
1,909,253	Claus	May 16, 1933
2,111,857	Jeffery	Mar. 22, 1938
2,191,882	Ernst et al.	Feb. 27, 1940
2,204,151	Rodefer et al.	June 11, 1940
2,298,044	Dinzl	Oct. 6, 1942
2,332,856	Kalajian	Oct. 26, 1943