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L. SAIVES

3,038,220

PRESSURE DIECASTING MACHINE

Filed Jan. 29, 1957

Fig. 1

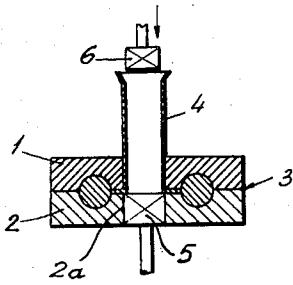


Fig. 2

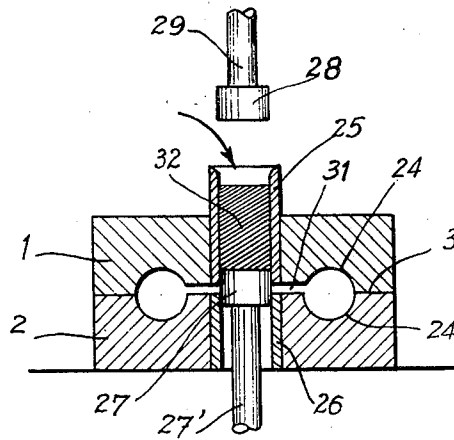


Fig. 3

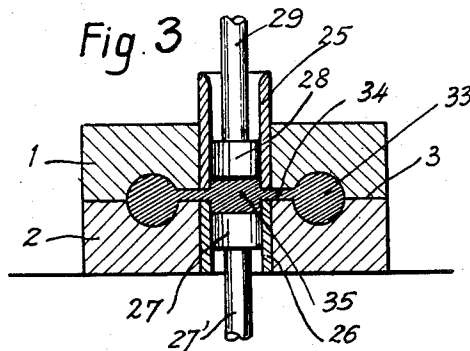
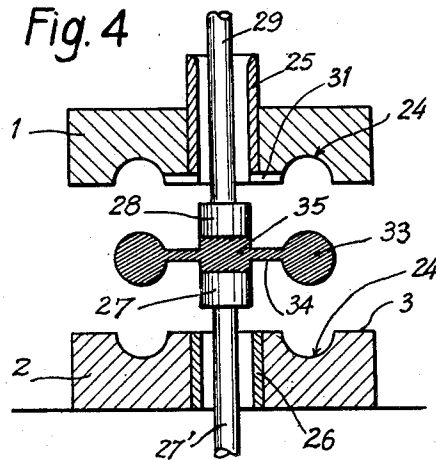


Fig. 4



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PRESSURE DIECASTING MACHINE

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4 Claims. (Cl. 22—68)

This application is a continuation-in-part of my co-pending application Ser. No. 370,837 dated July 28, 1953, now Patent No. 2,795,827, granted June 18, 1957.

This invention relates to pressure diecasting machines intended more particularly for casting ferrous metals.

This invention is concerned notably with improvements in pressure diecasting machines whereby the travel of the molten metal from the casting point to the mold is reduced to a substantial extent whereas the discharge of impurities is greatly facilitated.

It is the primary object of this invention to provide a pressure diecasting machine comprising a vertical injection cylinder fed directly with molten metal, a split mold having a horizontal joint, said cylinder extending through the upper part of said mold, an injection piston movable within said injection cylinder and an obturator piston slidably fitted in a bore formed to this end through the lower part of the mold in axial alignment with said injection cylinder.

According to a preferred embodiment of this invention, the vertical injection cylinder is open at both ends and consists of a pair of elementary cylinders, i.e. an upper cylinder fixed in the upper half of the mold and a lower cylinder fixed in the lower half of the mold, both elementary cylinders being disposed in axial alignment and of the same inner diameter, and communicating with the different impressions or shaping cavities of the mold through feed passages extending radially at the level of the horizontal joint between the two mold parts, the upper cylinder receiving the injection piston and the lower cylinder and obturator piston, both pistons being displaceable within the injection cylinder and adapted to move beyond the plane of the joint separating the two mold parts and to travel upwards beyond the upper end of said upper elementary cylinder and the lower end of said lower elementary cylinder. Besides, these pistons may be fitted on or removed from their respective rods by means of a snap-locking device.

In order to afford a better understanding of this invention and of the manner in which the same may be carried out in the practice, reference will now be made to the attached drawing forming part of this specification and illustrating diagrammatically by way of example two typical embodiments of a pressure diecasting machine constructed in accordance with the teachings of this invention. In the drawing:

FIGURE 1 is a diagrammatic vertical axial section showing the mold and injection-cylinder assembly with its pistons;

FIGURE 2 is another vertical axial section of a modified embodiment, wherein the parts are shown in their positions after the actual casting step but before the injection step, the molten metal being retained in the upper cylinder;

FIGURE 3 is another section corresponding to FIG. 2 but showing the parts after the injection of molten metal in the mold impressions, and

FIGURE 4 is a view similar to FIGS. 2 and 3, showing the machine just before the set casting is extracted from the machine.

In the embodiment illustrated in FIG. 1 of the drawing, the mold consists of two halves or parts 1, 2, separated

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by a substantially horizontal joint 3; the injection cylinder 4 also acts somewhat as a ladle cylinder and has slidably fitted therein an injection piston 6 and an obturator piston 5. The injection cylinder 4 projects vertically above the mold. With this arrangement, the travel of the molten metal is reduced considerably. On the other hand, any slag tending to rise will remain within the casting.

Referring now to the modified embodiment shown in FIGS. 2, 3 and 4, it will be seen that the mold also consists of two halves or parts 1, 2 separated by a horizontal joint 3 which may be flat or not.

The mold halves 1, 2 have formed therein impressions or shaping cavities such as 24, which are spaced around the vertical centre line of the mold and illustrated in vertical axial section in the figures.

The upper mold half 1 has fitted therein an injection cylinder 25 having its axis at right-angles to, and its lower edge flush with, the joint plane 3, this cylinder 25 extending above the upper face of the mold half 1; on the other hand, the lower mold half 2 has fitted therein another cylinder 26 having its upper edge flush with the joint plane 3 and extending downwards to the level of or beyond the lower face of the mold half 2. Both cylinders 25, 26 are of same diameter and in axial alignment with each other. An obturator piston 27 carried by a rod 27' is normally fitted in the lower cylinder 26, but movable as well in the upper cylinder 25; besides, an injection piston 28 carried by a rod 29 is normally fitted in the upper cylinder 25 but movable as well in the lower cylinder 26. Preferably, these pistons are mounted on the rods by means of snap-locking devices of any known and suitable construction (not shown).

The impressions or shaping cavities 24 of the mold are connected to the injection cylinder 25 through casting or feed passages 31 disposed radially around the cylinder 25 and formed in the joint 3 so that when the set metal constituting the castings 33 in the impressions 24 is removed from the mold they will form an integral part of the metal having set in the passages 31 and constitute as many arms 34 radiating from a central riser 35, the complete casting unit forming a kind of cluster or bunch. In the position shown in FIG. 2, the molten metal is cast as shown by the arrow, as the piston 27 is positioned slightly above the plane of the joint 3. The piston 28 carried by the relevant rod 29 is extracted from the cylinder 25 and frees completely the upper cylinder aperture; the piston 27 obturates the ingress of the feed passage 31; the molten metal 32 is cast into the upper cylinder 25 alone.

In the position of FIG. 3, showing the pressure casting step, the obturator piston 27 is moved downwards somewhat below the plane of the joint 3, the piston 28 is driven downwards in the cylinder 25 and forces the molten metal through the feed passages 31 into the mold cavities 24 to form the castings 33.

Finally, in the position illustrated in FIG. 4 showing the extraction step, the cluster or bunch of castings has set so that the two mold halves 1 and 2 may be moved away from each other. The lower piston 27 is moved upwards to its uppermost position beyond the upper face of the lower mold half 1, thereby ejecting the cluster-forming castings 33, arms 34 and riser 35 from the lower half 2. The piston 28 is also moved downwards beyond the joint 3 of the upper mold half 1 to its lowermost position, thereby loosening and ejecting the riser and castings from the upper mold half 1.

FIGURE 4 illustrates the mold at this stage of the operation.

As the assembly continues the opening movement, the two pistons move away from each other and release com-

pletely the cluster of castings 33 hitherto clamped between the pistons 27, 28, engaging the central riser 35.

The movement of piston 28 to its initial position shown in FIG. 2 is facilitated by the provision of the aforesaid snap-locking device whereby the piston 28 may be quickly fitted on or removed from the respective rod 29. In this manner the piston can return to its initial position without passing through cylinder 25. It is possible to proceed in the same manner with piston 27.

Although the above description and the attached drawing refer to typical and preferred embodiments of this invention, it will be readily understood by anybody conversant with the art that many modifications and alterations may be brought thereto without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. A pressure die casting machine for the manufacture of ferrous metal castings which comprises, in combination, means defining an injection cylinder having a vertical axis and having an upper end provided with an opening adapted to be fed directly with the molten metal to be cast and having an opposite open lower end, a mold having an upper half connected to said cylinder and into which said cylinder extends and a cooperating lower half, with the two halves separated by a substantially horizontal joint lying in a plane below the lower end of said injection cylinder, said injection cylinder extending through said upper mold half and substantially beyond the upper face thereof, means defining a cylindrical bore in said lower mold half coaxial with and of the same diameter as the bore defined by said injection cylinder, an injection piston slidably movable in said injection cylinder and an obturator piston slidably disposed in said bore for slidable movement in said bore and in said injection cylinder, said pistons being reciprocable through said bores and both of said pistons being movable to positions beyond the co-operating ends of said bores, said mold halves defining a mold cavity between them and channel means of lesser depth formed in at least one of said mold halves connecting said cavity with said injection cylinder.

2. A pressure die casting machine for the manufacture of ferrous metal castings which comprises, in combination, means defining an injection cylinder having a vertical axis and having an upper end provided with an opening adapted to be fed directly with the molten metal to be cast and having an opposite open lower end, a mold having an upper half connected to said cylinder and into which said cylinder extends and a cooperating lower half with the two halves separated by a substantially horizontal joint lying in a plane below the lower end of said injection cylinder, said injection cylinder extending through said upper mold half and substantially beyond the upper face thereof, an obturator cylinder defining a cylindrical bore in said lower mold half coaxial with and of the same diameter as the bore defined by said injection cylinder, said cylinders extending substantially at right angles to said plane, an injection piston slidably movable in said injection cylinder and an obturator piston slidably disposed in said bore for slidable movement in said bore and in said injection cylinder, said pistons being reciprocable through said bores, and both of said pistons being movable to positions beyond the cooperating ends of said bores, said mold halves defining a mold cavity between them and channel means of lesser depth formed in at least one of said mold halves connecting said cavity with said injection cylinder.

3. A pressure die casting machine for the manufacture of ferrous metal castings which comprises, in combination, means defining an injection cylinder having a vertical axis and having an upper end provided with an opening adapted to be fed directly with the molten metal to be cast and having an opposite open lower end, a mold having an upper half connected to said cylinder and into which said cylinder extends and a cooperating lower half with the two halves separated by a substantially horizontal joint lying in a plane below the lower end of said injection cylinder, said injection cylinder extending through said upper mold half and substantially beyond the upper face thereof, an obturator cylinder defining a cylindrical bore in said lower mold half coaxial with and of the same diameter as the bore defined by said injection cylinder, said cylinders extending substantially at right angles to said plane, an injection piston slidably movable in said injection cylinder and an obturator piston slidably disposed in said bore for slidable movement in said bore and in said injection cylinder, said pistons being reciprocable through said bores, and both of said pistons being movable to positions beyond the cooperating ends of said bores, said mold halves defining a mold cavity between them and the upper mold half being formed with a plurality of radial channels of lesser depth connecting said cavity with said injection cylinder.

4. A pressure die casting machine for the manufacture of ferrous metal castings which comprises, in combination, means defining an injection cylinder having a vertical axis and having an upper end provided with an opening adapted to be fed directly with the molten metal to be cast and having an opposite open lower end, a mold having an upper half connected to said cylinder and into which said cylinder extends and a cooperating lower half with the two halves separated by a substantially horizontal joint lying in a plane below the lower end of said injection cylinder, said injection cylinder extending through said upper mold half and substantially beyond the upper face thereof, an obturator cylinder defining a cylindrical bore in said lower mold half coaxial with and of the same diameter as the bore defined by said injection cylinder, said cylinders extending substantially at right angles to said plane, an injection piston slidably movable in said injection cylinder and an obturator piston slidably disposed in said bore for slidable movement in said bore and in said injection cylinder, said pistons being reciprocable through said bores, and both of said pistons being movable to positions beyond the cooperating ends of said bores, said mold halves defining a mold cavity between them and the upper mold half being formed with a plurality of radial channels of lesser depth connecting said cavity with said injection cylinder, said pistons being adapted to move independently of each other and of said cylinders so that said pistons may be positioned as required for successively casting molten metal into said injection cylinder, forming the castings in said mold cavity, extracting the set castings and removing the cluster of finished castings.

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