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M. SCHEIBLE

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DIE CASTING MACHINE

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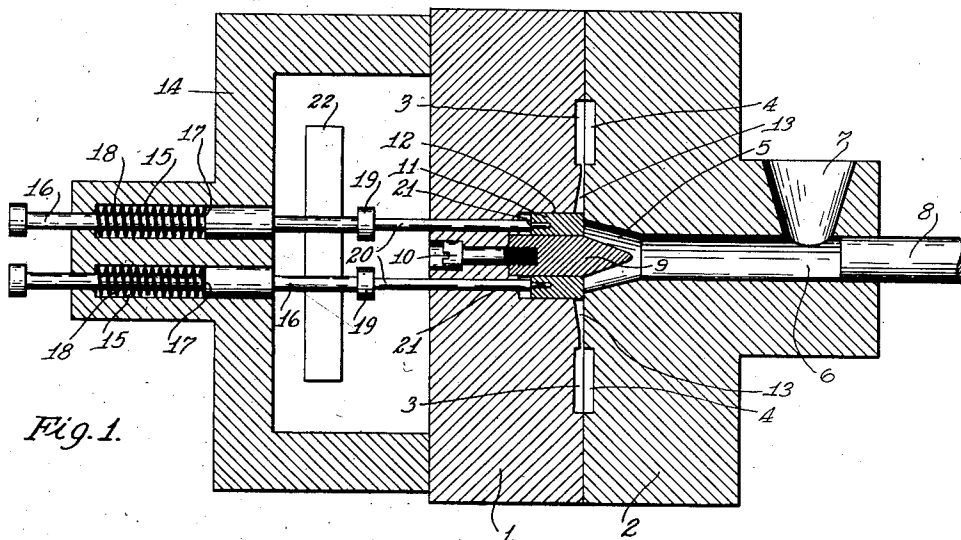


Fig. 1.

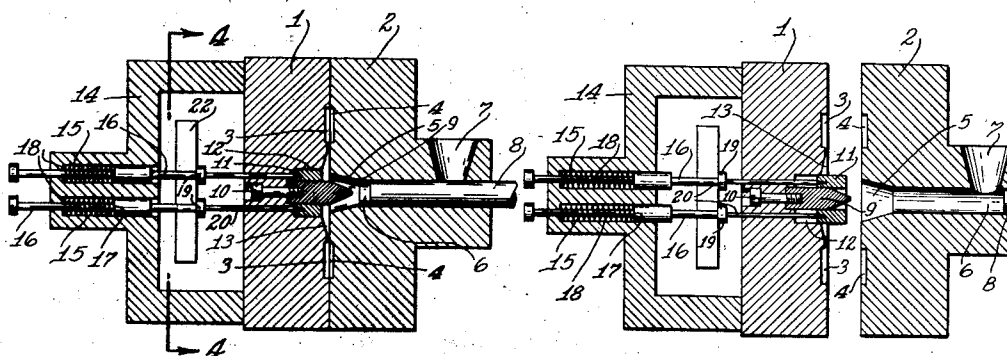


Fig. 2.

Fig. 3.

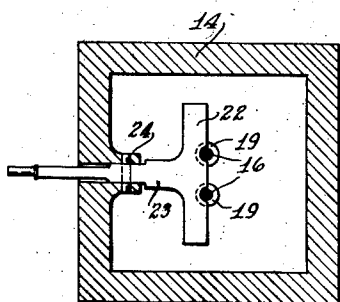


Fig. 4.

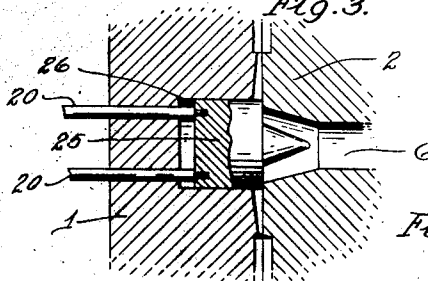


Fig. 5.

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DIE CASTING MACHINE

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4 Claims. (Cl. 22—68)

The present invention relates to die casting machines and more particularly to means for controlling the movement of the molten metal into the moulds and for stripping the castings from the moulds when the metal has become hardened.

The primary object of the present invention is to provide a device for suspending movement of molten metal in the sprue of a die casting machine until sufficient pressure is built up on the same by a reciprocable plunger to rapidly force the metal through the gates into the die cavities. In this manner air pockets which result from slow moving molten metal which becomes hardened before it reaches the outermost extremities of the die cavity are avoided.

Another object of the present invention is to provide means for controlling the movement of the molten metal in a manner whereby it may be rapidly forced from the sprue through the gates into the die cavity, said means having an additional function in that it serves to force the castings from the die cavities when the movable die blocks are moved apart. The controlling and stripping means comprises a resiliently supported sleeve that shuts off communication between the sprue and the gates until such time as sufficient pressure is built up on the molten metal to force the sleeve backwardly on its resilient supports and uncover the gates so that the metal rushes there-through to fill the cavities. When the metal in the die cavities and gates has become hardened outward movement of the sleeve, resulting from its resilient support and assisted by a manually operable bar causes said sleeve to engage the metal in the gates in a manner to strip the castings from the cavities.

With the above and other ends in view the invention consists in matters hereinafter set forth and more particularly pointed out in the appended claims, reference being had to the accompanying drawing, in which

Figure 1 is a vertical cross section of a movable and stationary die block with the present invention applied thereto and in the normal inoperative position;

Fig. 2 is a vertical cross section illustrating the parts in the position assumed while the molten metal is being forced into the die cavities;

Fig. 3 is a vertical cross section illustrating the parts in the position assumed during the casting stripping operation;

Fig. 4 is a transverse cross section taken on the line 4—4 of Fig. 2, and

Fig. 5 is a fragmentary section of a modified form of sprue spreader.

Like characters of reference are employed throughout to designate corresponding parts.

The numeral 1 indicates a movable die block and 2 a stationary die block, the two blocks being supported in any suitable manner known to the trade. The mechanism for moving the movable block and the structure that supports the stationary block form no part of the present invention and inasmuch as the same are well known they are omitted entirely from the present application for the sake of clarity.

In the two blocks are formed impressions or cavities that are shaped to give the required finishing castings, the cavities in the movable block being indicated at 3 and the cavities in the stationary block being shown at 4, the cavities 3 and 4 in each case being adapted to combine to form a mould when the two blocks are brought together as illustrated in Figs. 1 and 2.

In the stationary block is formed a sprue 5 that communicates with a cylindrical bore 6 having a filling opening 7 through which molten metal may be poured to enter the cylinder and the sprue. A plunger 8 is slidably received in the cylinder 6 and is adapted to be reciprocated therein to exert pressure on the molten metal that is poured into the cylinder. Any suitable mechanism may be employed for reciprocating the plunger 8 and inasmuch as said mechanism forms no part of the present invention it has been omitted from the drawing for the sake of clarity.

Mounted in a bore in the face of the movable die block 1 is a spreader 9 that has a conical end which projects into the sprue 5, the spreader being held in place by a bolt 10 which passes through from the opposite side of the block. Slidably received on the spreader 9 is a sleeve 11 which is received in the bore 12 in the face of the movable die block 1. Gates 13 are formed in face of the movable die block 1 and connect the bore 12 with the die cavities 3.

Secured in any suitable member on the rear of the die block 1 is a supporting frame 14 having bores 15 in which are slidably received the rods 16 that have shoulders 17 against which coiled springs 18 exert pressure tending to force the rods toward the movable die block. The rods 16 are provided with collars 19 and with slightly reduced portions 20 that extend through bores in the movable die block to en-

gage the sleeve 11. The sleeve is provided with suitable bores into which the ends of the rods are slipped until the shoulder 21 on the rods engage the sleeve. In this manner movement of the rods as a result of the pressure of the springs can only be when accomplished by movement of the sleeve.

A bar 22 is supported by a lever 23 so that it engages the collars 19 on the rods 16 and the lever is pivotally mounted as at 24 to extend outwardly whereby it may be pivotally moved manually.

In operating the present device the movable die block 1 is moved into engagement with the stationary die block in which position the sleeve 11 is held in contact with the face of the stationary die block 2 immediately surrounding the sprue 5. Molten metal is then poured into the chamber 6 until the same is filled, it being noted that the sleeve 11 prevents the molten metal from entering the gates and the die cavities. The plunger 8 is then moved forwardly to force the molten metal against the sleeve 11 and when sufficient pressure is exerted to overcome the pressure exerted by the springs 15 the sleeve is moved backwardly to uncover the gates 13 and the molten metal may be forced rapidly into the die cavities. In this manner the sleeve facilitates the building of a pressure on the molten metal that results in a rapid injection into the cavities when the gates are opened.

After the metal in die cavities has become hardened the movable die block 1 is moved away from the stationary die block 2 and the springs 15 exert pressure on the sleeve tending to force the same outwardly. The sleeve 11 engages the metal which became hardened in the gates and the sprue and the outward movement of the sleeve causes the castings to be stripped from the cavities. In cases where the castings tend to adhere to the mould cavity so that the pressure of the springs 15 is not sufficient to strip the same from the cavity the lever 23 may be moved manually until the cross bar 22 engages the collars 19 to assist in the outward movement of the rods 16 and sleeve 11. In this manner the same mechanism that serves to control the movement of the molten metal also serves to strip castings from the die cavities.

As illustrated in Fig. 5 the sprue spreader and the slidable sleeve may be formed as a single unit 25 and slidably supported in a bore 26 in the same manner as described above in relation to the sleeve 11.

Although specific embodiments of the present invention have been illustrated and described it is to be understood that various changes may be made in the details of construction without departing from the spirit of the invention as set forth in the appended claims, and such changes are contemplated.

What I claim is:—

1. A device of the character described comprising a movable die block having cavities formed in the face thereof, having a central bore with its axis at right angles to said face and having gate grooves in said face providing communication between each of said cavities and said bore; a stationary die block having cavities in the face thereof registering with said cavities in said movable block, and having a cylindrical bore co-axial with said central bore; means for forcing molten metal from said cylindrical bore through said central bore to said grooves and cavities, means carried by said mov-

able block for preventing flow of molten metal through said central bore until a predetermined pressure is applied thereon, and manual means for moving said last named means when said die blocks are apart to strip castings from said cavities.

2. A device of the character described comprising a movable die block having cavities formed in the face thereof, having a central bore with its axis at right angles to said face and having gate grooves in said face providing communication between each of said cavities and said bore; a stationary die block having cavities in the face thereof registering with said cavities in said movable block, and having a cylindrical bore co-axial with said central bore; a cylindrical member slidably mounted in said central bore, resilient means normally holding said cylindrical member in contact with the face of said stationary block when said blocks are in contact with each other and thereby preventing communication between said cylindrical bore and said grooves, manually operated means for forcing said cylindrical member outwardly in relation to said movable block, and means for exerting pressure on molten metal in said cylindrical bore to cause said molten metal to force said cylindrical member away from said stationary block.

3. A device of the character described comprising a movable die block having cavities formed in the face thereof, having a central bore with its axis at right angles to said face and having gate grooves in said face providing communication between each of said cavities and said bore; a stationary die block having cavities in the face thereof registering with said cavities in said movable block, and having a cylindrical bore co-axial with said central bore; a conical spreader mounted in said central bore and extending into said cylindrical bore, a sleeve slidably mounted on said conical spreader, resilient means for urging said sleeve outwardly in relation to said slidable block so that said means is in compressed condition when said blocks are together, and means for exerting pressure on molten metal in said cylindrical bore so that said metal moves said sleeve to enter said grooves and further compresses said resilient means.

4. A device of the character described comprising a movable die block having cavities formed in the face thereof, having a central bore with its axis at right angles to said face and having gate grooves in said face providing communication between each of said cavities and said bore; a stationary die block having cavities in the face thereof registering with said cavities in said movable block, and having a cylindrical bore co-axial with said central bore; a conical spreader mounted in said central bore and extending into said cylindrical bore, a sleeve slidably mounted on said conical spreader, resilient means for urging said sleeve outwardly in relation to said slidable block so that said means is in compressed condition when said blocks are together, manual means for forcing said sleeve outwardly, and means for exerting pressure on molten metal in said cylindrical bore so that said metal moves said sleeve to enter said grooves and further compresses said resilient means.

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