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METAL CASTING APPARATUS
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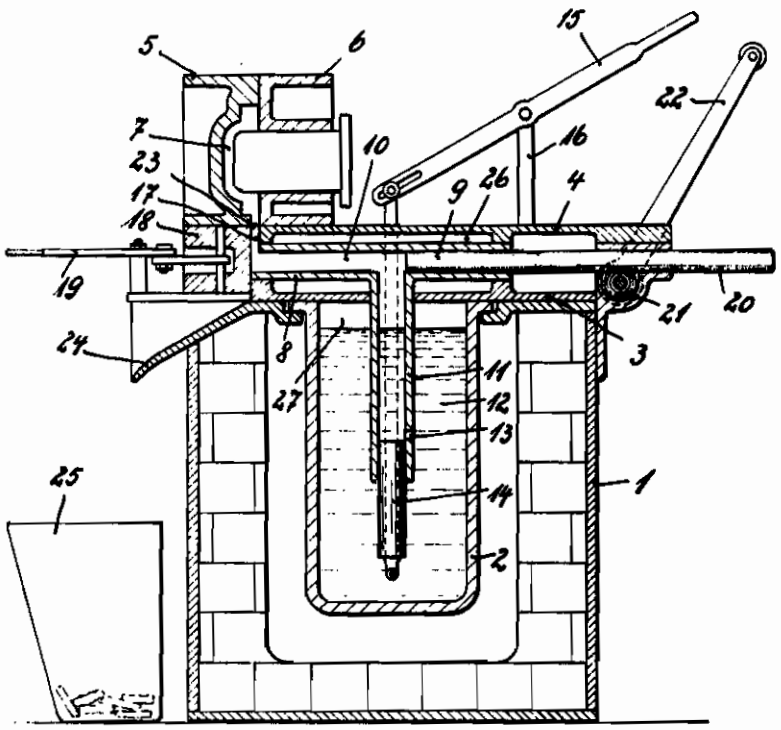

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ALIEN PROPERTY CUSTODIAN

METAL CASTING APPARATUS

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My invention relates to the art of metal casting and more especially to means for casting metal in permanent metal molds which are movably mounted on a mold frame arranged in close vicinity of the smelting oven.

It is an object of my invention to provide a device adapted for use in this art, which renders the casting of metal in permanent molds more economical and efficient than was hitherto the case.

Hitherto, when casting fluid metal in metal molds, the workman withdraws the metal from the oven by means of a ladle and pours it into the mold, which is opened and closed by hand. Similarly the finished casting is removed from the mold by hand. In this mode of operation the temperature, at which the metal is cast, must be comparatively very high, since the metal must be thinly fluid. Since the metal is supplied to the mold under its static pressure, large risers and runners must be provided, in consequence of which the relation of the weight of the casting to the weight of the riser and runner becomes very unfavorable, being frequently 1:1 and in a great number of cases still more unfavorable. In consequence thereof the circulation of metal in the factory becomes altogether uneconomical. Furthermore the danger of spilling casting metal when transporting the open ladles from the smelting oven to the mold is greatly increased. The same is true of the danger of metal poured into the mold flowing over, with consequent loss of metal. In respect to readily oxidizable metals such as for instance magnesium and its alloys this mode of casting is altogether disadvantageous in view of the great deterioration of the metal.

The casting apparatus according to the present invention allows these drawbacks to be avoided by the provision that the casting metal is taken up from the melting pot by a mechanical filling device and is fed directly to the mold also by mechanical pressure through a pressure chamber under seclusion from air. The mold frame is arranged right above the smelting oven, and with the airtightly mounted covering plate of this oven the mold frame is combined into an intermediate piece forming a casing in which is arranged in an airtight manner the pressure chamber serving for feeding the metal to the mold. The metal flows under a pressure corresponding to the usual static pressure generated by a casting piston, which is preferably actuated by hand, from below directly into the mold. A riser or dead head is not required at all for the operation of this device, and the runner may be kept extraordinarily small. After removal of a slide closing the casting channel near the gate the runner may be removed directly by the casting piston before the casting is withdrawn from the mold.

The new casting device involves further the advantage of altogether secluding the metal from the air on its way from the melting pot to the mold, whereby the casting of readily oxidizable metals is rendered possible. It involves the further advantage of resulting in the production of dense, accurately shaped castings and a considerable reduction of time as compared with the casting by means of ladles.

The mold may either be movably arranged on the mold frame as in the process hitherto practised, or a special holding and mounting device may be provided on the mold frame, in which the mold is mounted.

In the drawings affixed to this specification and forming part thereof a metal casting device embodying this invention is illustrated diagrammatically by way of example in axial section.

Referring to the drawing, 1 is the smelting oven, 2 is the melting pot, and 3 is a covering plate hermetically closing the oven. 4 is the mold frame mounted on the covering plate and forming together with it an intermediate piece resembling a hermetically closed casing and being hermetically closed. 5 is the stationary part, and 6 is the part movable in the direction of the axis of the pressure chamber, of the mold mounted on the mold frame, this mold being formed with a cavity as required for the formation of the casting 7. 8 is the pressure chamber formed in the casing, and 9 is the casting piston arranged in this chamber for longitudinal displacement. The pressure space of the chamber communicates directly with the interior of the filling chamber 11, which extends into the body of molten metal 12 in the melting pot and is formed with a lateral opening 13. 14 is the filling piston arranged for reciprocation in the filling chamber 11, 15 being a lever pivotally mounted on a rod 16 and serving to actuate the piston 14 for the feeding of fluid metal into the pressure chamber 10. The return movement of the piston 14 to its position of rest may be furthered by a spring.

The pressure chamber 10 communicates directly through the short gate 17 with the interior of the mold. On the side facing the casting piston 9 the pressure chamber 10 is closed during the casting procedure by a movable slide 18, which at

the same time delimits the gate and can be shifted laterally by means of a lever 19.

The casting piston 9 is connected by a rack 20 with a pinion 21 which can be rotated by means of a lever 22 to reciprocate the casting piston in the pressure chamber. The movement of the piston in this chamber causes the fluid metal present therein to be forced into the mold and to be kept therein under pressure during solidification. After the casting procedure has come to an end, the slide 18 is removed and the casting piston 9 advanced farther to sever the runner at the edge 23, the runner then dropping through the chute 24 into a basket 25.

The smelting oven 1 is provided with an opening (not shown), which can be closed and through which fresh metal can be supplied to the oven. If it should be desirable, with respect to the metal to be cast or to the casting procedure as such, to maintain a uniform temperature in the pressure chamber 10 a suitable liquid or gaseous heating or cooling agent may be passed through the cavity 26 surrounding the pressure chamber 8. Whenever the nature of the casting metal should require it, the cavity 28 and the free space above the metal level in the melting pot may be evacuated or may be filled with inert non-oxidizable gases in order to prevent the casting metal to be deteriorated in contact with the air.

Obviously the field of application of the new casting device is not confined to readily oxidizable metals, and the device may advantageously be used also when casting any other kind of metals and alloys. The filling and mounting devices may also be made of materials which are not attacked by the casting metal, for instance aluminum and its alloys.

I wish it to be understood that I do not desire to be limited to the exact details of construction shown and described for obvious modifications will occur to a person skilled in the art.

KARL FRIEDRICH WAGNER.