March 9, 1937. M. G. DUMAS 2,073,200

CENTRIFUGAL CASTING

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Fig. 1.

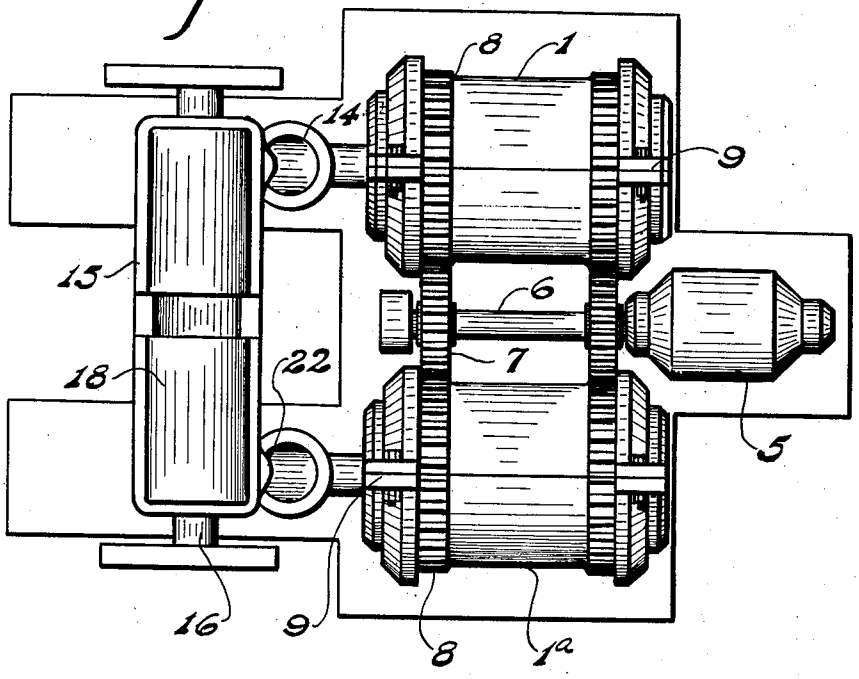
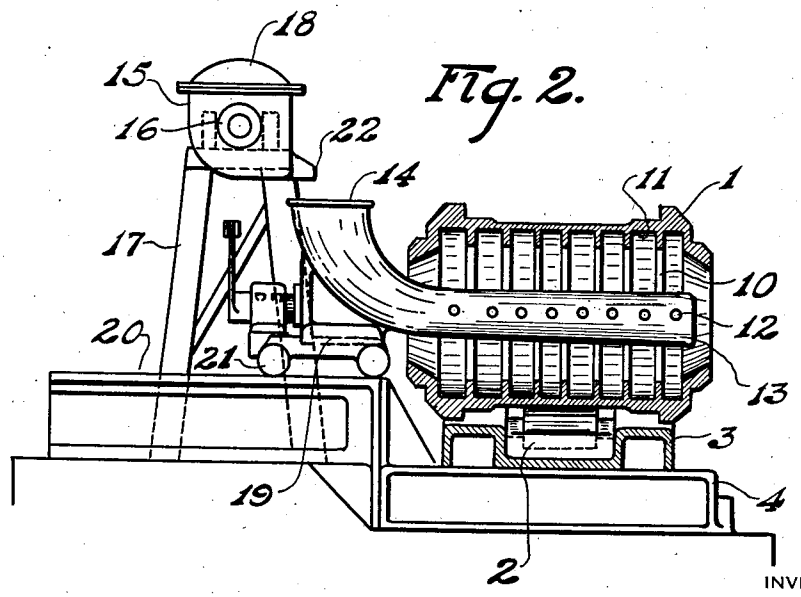


Fig. 2.



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Fig. 3.

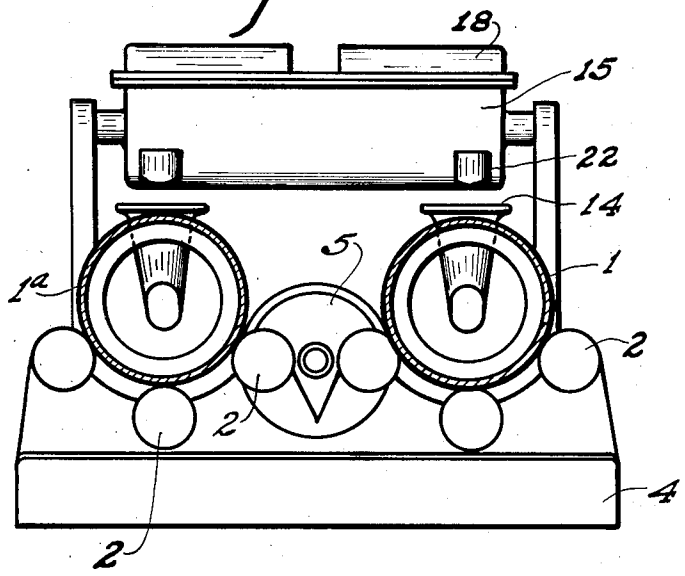
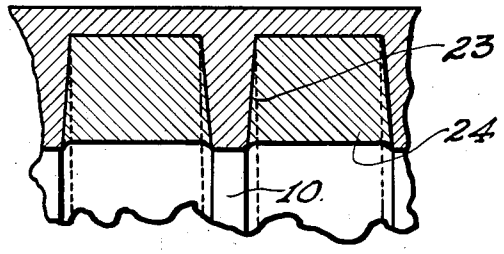


Fig. 4.



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Fig. 5.

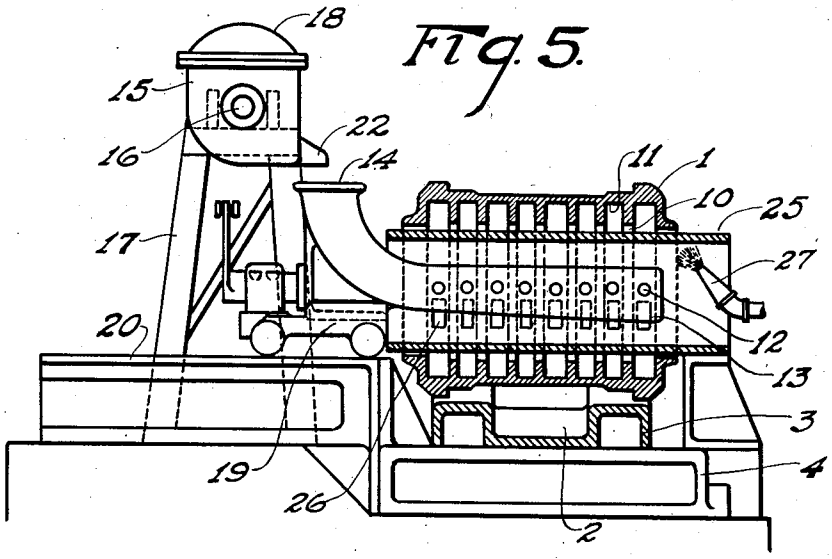
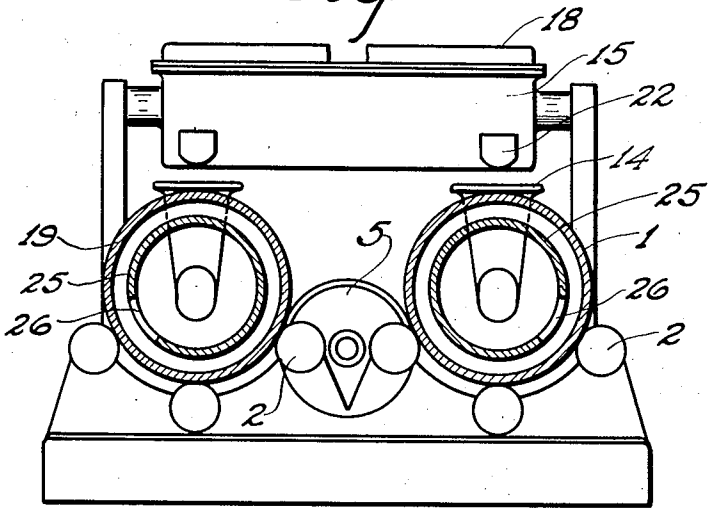


Fig. 6.



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CENTRIFUGAL CASTING

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Application December 19, 1933, Serial No. 703,087

4 Claims. (Cl. 22—65)

This invention relates to centrifugal casting, more particularly to apparatus for and method of casting a multiple of ingots, bars or slabs simultaneously by centrifugal process, and it is among the objects thereof to provide means whereby a plurality of bars or slabs of uniform size and quality may be cast simultaneously.

The centrifugal casting of ingots, bars or slabs, as heretofore practiced, has been expensive and tedious due to the fact that no provision was made for casting a plurality of such articles simultaneously, and where this has been attempted, the articles were not sufficiently dense or free from so-called piping because the metal would not distribute itself uniformly to fill out the matrix portion of the mold.

In accordance with the present invention I am able to greatly increase the production of a single mold and further utilize a plurality of molds to be fed and operated by one pouring receptacle and a common actuator.

The objects of the invention will become more apparent from a description of the accompanying drawings constituting a part hereof, in which like reference characters designate like parts and in which Figure 1 is a top plan view of a multiple pouring apparatus embodying the principles of this invention; Figure 2 a side elevational view thereof showing one of the molds in cross-section; Figure 3 a front elevation partially in section of the apparatus shown in Figure 1; Figure 4 an enlarged detail showing the formed ingots or bars in a plural cavity of the casting mold;

Figure 5 is a side elevational view partially in section of a modified form of centrifugal casting device; and Figure 6 is a front elevational view thereof partially in section.

With reference to the structure shown in Figures 1 to 4 inclusive of the drawings, 1 and 1*a* designate a pair of rotary molds mounted on rollers 2 which are retained between the brackets 3 on a bed or casting 4, the molds being thus anti-frictionally mounted and adapted for rotation by a motor 5 which is connected to the molds by a shaft 6 having gear wheels 7 interacting with the teeth 8 of the molds 1 and 1*a*.

The mold structures are split elements constituted of half sections which are bolted at their flanges 9, the interior of the mold being provided with radially projecting ribs 10 dividing the mold into annular compartments 11 which are of the dimensions of the desired ingot bar or slab, the cross-section of the compartments 11 determining the size of the article which is formed to annular shape and subsequently split and straightened to form the ingots or bars.

As will be apparent from Figure 2 of the drawings, there are a plurality of annular compartments 11 in axially spaced relation, each of which is fed through an opening 12 of a flow spout 13, the openings 12 being spaced to correspond to the spacing of the annular compartment 11. Instead of the multiple opening spout 13, a similar spout having but one opening 12 may be employed and the spout moved bodily to bring the single opening in register with the different compartments.

One end of the spout 13 is closed and the other is enlarged as at 14 to receive the metal poured from a pouring receptacle generally designated by the reference numeral 15, the receptacle being journalled at 16 to be tiltable on a support 17. The receptacle is lined with refractory brick and is preferably provided with an insulated cover 18 to retain the metal in the receptacle at suitable pouring temperatures.

The spout 13 is mounted on a carriage 19 operating on track 20, the carriage being provided with wheels 21 to render it movable whereby the spout may be withdrawn from the molds 1 and 1*a*.

The method of casting employed in connection with the above described apparatus is briefly as follows: The molds 1 and 1*a* are assembled and mounted on their rollers 2 in the manner shown in Figures 2 and 3, and the pouring receptacle 15 is filled with molten metal and the cover 18 placed thereon.

The motor 5 is then energized causing the molds to rotate very rapidly and the spout 13 is rolled in position by advancing the carriage 19 on track 20 to bring the pouring openings 12 in alinement with the respective annular cavities 11 of the mold.

The pouring receptacle is then tilted to bring the lips 22 in the position where metal will pour from them into the enlarged portion 14 of the spout and as the spout 13 begins to fill with the metal, it will flow from openings 12 radially into the compartments 11. It will be noted that the spout is sloped at its closed end to provide flow by gravity to bring the metal to the same level at all openings 12 to start the metal flowing simultaneously from all of the openings 12, and in as much as the annular chambers 11 which constitute the matrices of the mold are individually fed with the metal, they will fill simultaneously and none of the metal will be subjected to axial displacement on account of the rib or projection 10.

When the annular compartments 11 have filled, the pouring receptacle 15 is tilted back to cut off the flow of metal to the flow spout 13 and when the metal has completely set in the mold, they are split and the rings or castings as shown at 23 in Figure 4 of the drawings, are removed.

It is to be noted in connection with Figure 4 of the drawings that the walls or ribs 10 are slightly chamfered at 23 to provide for the ready removal of the cast rings 24 therefrom.

After the castings are formed and removed from the mold, they are split and straightened in any suitable manner to form the ingots or bars.

In the modification shown in Figure 5, a cylindrical liner 25 is disposed centrally of the mold between the mold cavities 11 and the spout 13, the cylinder 25 being held stationary while the mold 1 is subjected to rotation.

Slots 26 are provided in the cylinder 25 in longitudinal spaced relation corresponding to the spacing of the openings 12 in the flow spouts 13, the slots 26 being in register with the openings 12 so that the metal poured from the spout flows through the slots into the corresponding grooves 11 of the mold.

The cylinder 25 is preferably made of metal to produce a chilling effect on the cast bars, that is, the inner surface thereof, and a nozzle 27 may be provided for conducting a cooling medium against the cylinder 25 to hasten the chilling action or to prevent excessive heating of the cylinder from the metal in the mold grooves. It is to be noted also that cylinder 25 does not contact the ribs 10 of the mold but is in spaced relation therewith so that the only effect of the cylinder is cooling of the inner surface of the cast bars to get a uniform shrinkage on all four sides of the bar as, obviously, the contact of the cast metal with the mold on the three sides of the groove produces a chilling effect on the bars which will rupture the inner surface of the bars unless an equal cooling means or medium is provided to offset this shrinking away of the metal from the inner face of the bars.

It is evident from the foregoing description of this invention that the regulation of flow of metal to the mold cavity is controllable to produce dense castings free of piping and that a maximum production is attainable with a minimum amount of labor and equipment in as much as the pouring receptacle is common to two molds each of which contains a plurality of cavities and both of which are operated by a common actuator.

I claim:

1. Apparatus for centrifugally casting bars or slabs comprising a mold mounted for rotary movement having annular cavities in axially spaced relation, a cylinder disposed centrally of said mold with its outer surface in spaced relation with the ribs of the mold forming the annular cavities, said cylinder having slotted openings corresponding to the spacing of the annular cavities, and a flow spout extending into said cylinder having openings in alinement with the slotted openings of said cylinder, and means for feeding molten metal into said spout to cause the metal to flow from the spout openings to the slotted openings of the cylinder into the annular mold cavities.

2. Apparatus for centrifugally casting bars or slabs comprising a mold mounted for rotary movement having annular cavities in axially spaced relation, a metallic liner disposed centrally of the mold with its outer wall proximate to but not in contact with the mouths of the annular mold cavities, means for pouring metal into said mold cavities between the cavities and said liner, and means for regulating the flow of the metal to said cavities.

3. Apparatus for centrifugally casting bars or slabs comprising a mold mounted for rotary movement having annular cavities in axially spaced relation, the axis of the mold being in a horizontal plane, a metallic liner disposed centrally of the mold and in spaced relation with the mouths of the mold cavities, means for pouring metal into the annular cavities of the mold and means for applying a cooling medium to said liner.

4. Apparatus for centrifugally casting metal comprising a rotatable mold having a mold cavity for receiving metal on the inner wall thereof, a metal liner placed in alinement with and co-extensive to the mold cavity but out of contact with the edges thereof, and means for pouring molten metal between the liner and the walls of the mold cavity, while the mold is subjected to rotary motion.

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