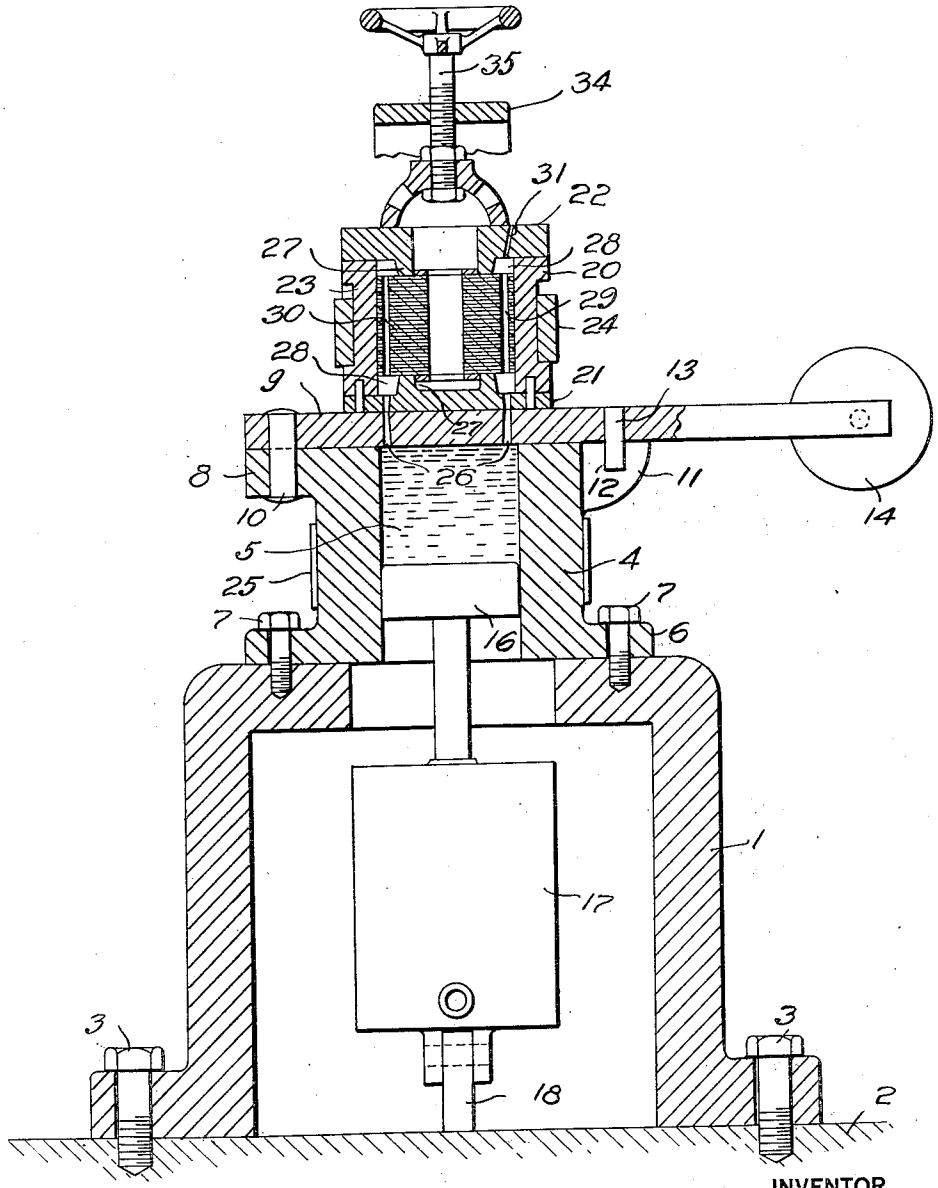
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1,555,284

S. C. HOEY

DIE CASTING MACHINE

Filed July 13, 1923



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Patented Sept. 29, 1925. 1,555,284

UNITED STATES PATENT OFFICE.

SAMUEL C. HOEY, OF WILKINSBURG, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA.

DIE-CASTING MACHINE.

Application filed July 13, 1923. Serial No. 651,220.

To all whom it may concern:

Be it known that I, SAMUEL C. HOEY, a citizen of the United States, and a resident of Wilkinsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Die-Casting Machines, of which the following is a specification.

My invention relates to a process of and apparatus for casting metal bodies under pressure, and more especially to a device for casting squirrel cage rotors for dynamo-electric machines.

It is among the objects of my invention to provide a device for casting metal bodies under pressure which shall be of simple and durable mechanical construction and which shall be efficient in casting such bodies in large quantities and of uniform quality.

In the casting of metal bodies of irregular cross-section, such as a rotor comprising superposed laminations of steel having the conductor members, constituting end rings and conductor bars, cast integrally therewith, the metal should be forced into the mold under pressure in such manner as to avoid the forming of blow holes and shrunken surfaces. I accomplish this result by utilizing a mold having a reservoir for casting a molten metal, such as aluminum, copper or their alloys located underneath the mold and co-operatively associated therewith by a plurality of communicating ports. A plurality of vent holes are provided in the top of the mold to permit any trapped gases and air to escape when the metal is forced into the charging end at the bottom of the mold. I also provide means for breaking off the sprues formed in the port holes before the rotor is removed from the casting device.

In the accompanying drawing constituting a part hereof and in which like reference characters designate like parts, the single figure is a view partially in vertical section and partially in elevation, of a pressure casting device embodying the principles of my invention.

The apparatus comprises a base 1 adapted to be secured to a foundation 2 by a plurality of bolts 3. A pot 4 comprising a reservoir 5 for storing molten metal is provided with an annular flange 6 which is secured by bolts 7 to the base 1. The pot 4 is further provided with an extending portion 8 to which a plate 9 is pivotally mounted by a rivet or bolt 10. Opposite to the extension 8 is a supporting lug 11 provided with a guide slot 12 adapted to receive a pin 13 secured in the plate 9 to permit annular movement of the latter, which movement is limited by the pin 13 and the slot 12. The plate 9 is provided with an actuating member, such as a fluid pressure operated piston 14, by which it is actuated about its pivot 10.

A piston 16 is disposed in the reservoir 5 and provided with a weight member 17 by which it is pivotally connected to a suitable actuating means, such as a lever 18 constituting a part of a liquid pressure actuating device (not shown). A mold comprising a matrix 20, a base plate 21 and a pressure plate 22 is secured to the pot 4 and is provided with an annular recess 23 adapted to receive a heating element 24. The mold may be moved horizontally along the plate 9 to give access to the reservoir 5 and piston 16 for the purpose of removing solidified metal after the casting operation. The pot member 4 may also be provided with a heating element 25 to maintain the molten metal in the reservoir at a certain temperature. The vertical port holes 26 extend through the plate 9 and the base plate 21 to establish communication between the reservoir 5 and the matrix 20 of the mold.

The base plate 21 and clamping plate 22 are provided with extending central portions 27 to form annular recesses 28 which receives the metal to constitute the end rings of the body to be cast. The so provided spaces are in communication with vertical slots 29 in the laminated structure 30 of the rotor which is clamped between the plates 21 and 22 respectively. The clamping plate 22 is provided with a plurality of vent holes 31 to permit any trapped gases or air in the mold to escape. A bar 34 is secured to the base 1 to provide a yoke having a manually operated screw 35 associated therewith to exert pressure on the clamping plate 22.

The operation of the device is briefly as follows:

The laminated portion 30 of a rotor to be cast is secured between the base plate 21 and clamping plate 22 within the mold, as illustrated. The molten metal in the reservoir 5, at a suitable temperature which is maintained by the heating element 25, is forced through the ports 26 by means of the piston

16, causing the metal to rise into the bottom space 28 through the vertical slots 29 and into the upper space 28 after which it is permitted to solidify. The plate 9 is then actuated by operating the piston 14 which effects an oscillatory movement thereof about its pivot point 10 to break or shear all the sprues of metal formed in the port holes 26. The clamping plate 22 is then removed, the cast rotor is withdrawn and a new laminated structure is inserted therein. The apparatus is then in readiness for another casting operation.

The end rings constituting the metal formed in the spaces 28 and the conductor bars of the spaces 29 are formed integrally with the laminated body 30 and constitute a unitary structure, such as a rotor of the squirrel cage type. Rotors so formed have been found very statisfactory in performance and are adapted for use with but a minimum number of machining operations which greatly reduces the cost of manufacture as compared with the methods heretofore employed. My process further expedites the manufacture of such rotors and permits of quantity production with uniform results.

Although I have described a specific embodiment of my invention, it will be obvious to those skilled in the art that various changes may be made in the mechanical details, proportions and in the assembly of parts to adapt the apparatus for various sized rotors or for differently shaped bodies without departing from the spirit thereof.

I claim as my invention:—

1. A device for casting metal bodies under pressure comprising a mold, a reservoir for molten metal associated therewith, a plurality of communicating ports for said mold and reservoir and means for breaking the sprues of the casting after the same is formed.

2. A device for casting metal bodies under pressure comprising a mold, a reservoir for molten metal associated therewith, a plurality of communicating ports for said mold and reservoir, pressure actuating means for discharging the metal from said reservoir into said mold and pressure actuated means for breaking the sprues so formed simultaneously.

3. A device for casting metal bodies under pressure comprising a mold, a reservoir for molten metal associated therewith, a plurality of vertical communicating ports for said mold and reservoir, a piston operatively mounted in the said reservoir, pressure actuated means for effecting vertical movement of said piston in the direction of said ports and pressure actuated means for breaking the metal formed in the said ports simultaneously.

4. A device for casting metal bodies under pressure comprising a mold, a reservoir having a pressure-actuated piston therein, a plate hinged at one end interposed between said mold and reservoir, a plurality of port holes extending from said reservoir through said plate and into said mold and means for oscillating said plate about its hinge.

5. A device for casting metal comprising a base, a reservoir mounted thereon, a pressure-actuated piston for said reservoir, a plate pivoted to said reservoir, a mold mounted on said plate and clamping means for said mold, a plurality of communicating ports for said mold and reservoir extending through said pivoted plate, means for actuating said piston to effect a discharge of molten metal from said reservoir to said mold and liquid pressure actuating means for said plate to oscillate the same horizontally about its pivot connection to break the sprues formed in said ports.

6. A device for casting metal comprising a base, a reservoir, a pressure actuated piston for the latter, a shear plate pivoted to said reservoir, a mold mounted on said plate and reservoir, communicating ports for said mold and reservoir vent holes for said mold and means for removing said mold to give access to said reservoir.

7. A device for casting metal comprising a base, a reservoir, a pressure actuated piston for the latter, a shear plate pivoted to said reservoir, a mold movably mounted on said plate and reservoir mounted on said plate and reservoir, communicating ports for said mold and reservoir vent holes for said mold and means for removing said mold to give access to said reservoir.

In testimony whereof, I have hereunto subscribed my name this 2nd day of July 1923.

SAMUEL C. HOEY.