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(54) Title of the Invention: **Directional solidification of polycrystalline diamond compact (PDC) drill bits**
Abstract Title: **Directional solidification of polycrystalline diamond compact (PDC) drill bits**

(57) A method of manufacturing a rotary drill bit includes forming a mold having an inner surface and an outer surface, locating a metal mandrel within the mold, packing the mold around at least part of the mandrel with particulate matrix-forming material and installing an insulating material around at least an upper portion of the outer surface. The material is infiltrated in a furnace with a molten binding alloy and the mold including the insulating material is removed from the furnace, directionally solidifying the material and binding alloy in portion of said bit, wherein said directional solidification proceeds from the lower portion of the outer surface in an upward and outward direction to form a solid infiltrated matrix bonded to the mandrel by cooling of the mold with the insulating material disposed around at least the upper portion of the outer surface of the mold.

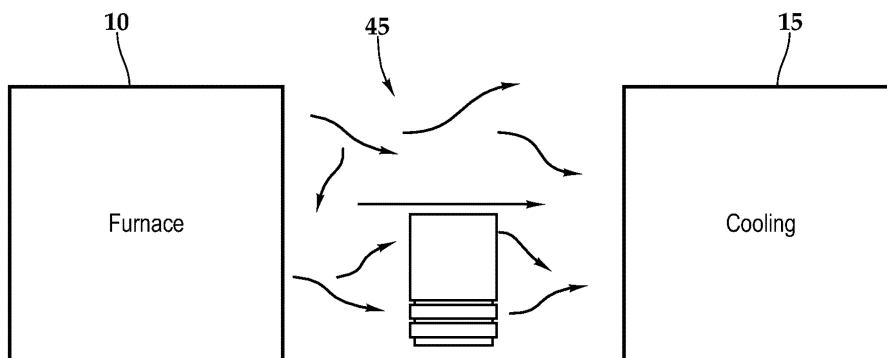


Fig.1