ELECTROMAGNETIC STIRRING OF METALS IN SPATIALLY ORTHOGONAL MAGNETIC FIELDS

Authors

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Abstract

A mathematical model and a method for calculating the parameters of an electromagnetic system with spatially orthogonal magnetic fields, which are created by the currents of two windings, one of which is made in the form of a cylindrical inductor, and the second in the form of a saddle-shaped coil with linear sections directed along the generatrix of the inductor, are developed. The average volume densities of electromagnetic forces causing the melt motion

during induction heating in crucible furnaces or continuous casting machines of steel billets are determined. It was established that at the level of large radial velocities insignificant velocity inhomogeneities take place, which together with the azimuthal velocity leads to the appearance of velocity vortices and contributes to additional mixing of the metal. The windings supply voltage of the considered electromagnetic device is determined, which ensures the stirring of liquid metal at the final stage of the continuously cast ingot production. References 9, figures 3.

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