means for cooling the load of a coil annealing furnace or the like

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MEANS FOR COOLING THE LOAD OF A COIL ANNEALING FURNACE OR THE LIKE

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1 Claim. (Cl. 266—2)

This invention relates to an improved means for cooling the load of a coil annealing furnace after the heating cycle and has for its object to reduce the time taken in cooling thereby increasing the output of the furnace.

In coil annealing furnaces as at present in use, the load to be treated is contained within an inner casing within which a purging gas is circulated by means of a fan located at the bottom of the load and is sealed from the products of combustion. The outer casing of the furnace fits over the load casing and during the heating phase heat is transferred to the load through the load casing by radiation and convection. In present practice after the heating and soaking phase is completed the outer casing of the furnace is removed and the circulation of the purging gas within the load casing is maintained, whilst the heat that is transferred from the load to the load casing by means of radiation and convection is dissipated to atmosphere by the natural cooling of the load casing. Thus the speed of cooling of the load is dependent upon the rate at which the load casing can transfer to still atmosphere the heat it receives from the load.

According to the present invention means for cooling the load of a coil annealing furnace is provided comprising a cover adapted to be fitted over and around the load casing of the furnace after the heating casing of the furnace has been removed said cover defining with the load casing a space surrounding the load casing through which air is drawn upwardly by a fan situated within an aperture in the upper portion of the cover.

A convenient embodiment of the present invention will now be described as applied to a coil annealing furnace of the kind incorporating a plurality of load casings each enclosing a load and in the following description reference will be made to the accompanying drawings in which:

Fig. 1 is a part sectional side elevation showing the base of a coil annealing furnace having four load casings mounted thereon with the heating casing removed and replaced by a cover in accordance with the present invention.

In this drawing the left hand load casing is shown in section, the adjacent load casing is shown in side elevation and the pair of load casings on the right hand side of the drawing are hidden by the cover which is shown in elevation.

Fig. 2 is a section on the line A—A of Fig. 1 looking in the direction of the arrows, and

Fig. 3 is a sectional plan of Fig. 1, the section line being taken on the line B—B for the two left hand load casings, and on the line C—C for the two right hand load casings.

In the drawings 4 represents the normal base of the coil annealing furnace which incorporates the usual form of sand seal 5 for the outer heating casing of the furnace when in position. Also mounted on this base is a plurality of, in the present instance four, cylindrical load casings 6 in which the coil loads 7 are disposed. Fans 8 are provided on the base for circulating a purging gas through the load 7 in each load casing 6 in normal manner.

According to the present invention, after the outer heating casing has been removed at the completion of the heating and soaking phase there is fitted in its place over the load cylindrical casings 6 of the furnace, the cover 9 which is open at its lower end and is provided with a surrounding seal 10 which engages with the sand seal 5 on the base 4 in a similar manner to the outer casing of the furnace when the latter is in position.

The cover 9 is of such a shape that it is spaced from the load casings 6 so as to leave a surrounding passage way 11 which is maintained by the fans 13 of said walls, a thin metal cover adapted to be lowered
over such load casings, said cover having curved vertical wall sections which when said cover is so lowered are substantially uniformly radially spaced from the cylindrical vertical walls of such load casings, said cover being formed with converging-diverging ducts which when said cover is so lowered are located axially above the respective load casings, an axial flow type fan mounted within each of said converging-diverging ducts to evacuate air from within said cover by drawing such air upwardly along the vertical wall sections of said cover and along the outer surfaces of the cylindrical vertical walls and over the tops of said load casings, thereby abstracting heat from said load casings, transferring heat to said cover and carrying heat away through said ducts, a conical shield positioned below each said fan with its apex pointing upwardly, each of said curved vertical wall sections being provided with a plurality of main inlet ports adjacent its lower end to admit air to the space surrounding the load casings, each of said curved wall sections being provided also with an auxiliary inlet port located above said main inlet port and damper doors for regulating the inflow of air through said auxiliary inlet ports.

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