EXTERNAL CHILL MEANS FOR METAL CASTINGS

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1 Claim. (Cl. 22—174)

This invention relates to the making of metal castings, and particularly to means for chilling castings, especially those of steel, at points or along areas where the metal is of greater mass and the cooling therefore retarded relative to adjacent portions of less mass.

It is well known in the metal casting art, that in the making of angular metal castings, external chilling members must be provided in contact with the cast metal in reentrant angles and also in opposition to such angles to prevent unequal cooling and the strains and stresses in the castings resulting therefrom. These chilling members have customarily consisted of more or less round bar-like members within the angles and flat straight edged members against opposing surfaces. It is found, however, in practice that with the use of these straight edged members cracks usually occur in the casting along the line or lines where the straight edges of the chill members have contact therewith.

The object of the invention is the provision of chilling means of the class described which is of a character and construction to prevent or reduce to a minimum the stress forming tendencies in castings, as above-noted.

A further object of the invention is the provision of a chill member for use in connection with metal castings, which member will have its metal contacting edges of serrated form to provide a plurality of narrowly spaced fingers at such edges with the fingers of gradually increasing thickness from their free ends inwardly, whereby a straight line chilling effect is avoided and a more efficient distribution of the stresses set up during cooling obtained.

The invention is fully described in the following specification, and a preferred embodiment thereof illustrated in the accompanying drawing, in which—

Figure 1 is a vertical cross-sectional view of a mold having a formed casting therein and equipped with chill members embodying the invention; Fig. 2 is a perspective view of a casting removed from a mold and with the chill members still in attachment thereto, and Fig. 3 is a perspective view of one of the chill members used in connection with a reentrant angle of the casting.

Referring to the drawing, I designates a cast article disposed in the cavity of a mold 2 in which it was formed. The chill members embodying the invention are designated 3 and 4 and are embedded in the sand walls of the mold in cooling engagement, at their exposed or mold cavity sides, with the casting. The metal casting is of angular form in cross-section and of a nature requiring external chilling at portions thereof to facilitate uniform cooling to obviate internal strains or stresses, as well understood in the art. In the present instance, the casting is of T-form in cross-section so that a greater mass of metal is present at the meeting point of the arms than in the arms themselves, thus necessitating the use of external chilling means within the mold in engagement with the central greater mass portion of the casting to effect uniform cooling.

The chilling members 3 and 4 are of elongated bar-form and of a cross-sectional shape to fit against the surface of the casting to which applied. In the present instance, the member 3 is suitable to fit against the substantially flat top side of the casting over the heavy portion thereof, while the members 4 are suitable to fit in the reentrant angles in opposition to the member 3.

Each chill member 3, 4, includes a lengthwise extending body part 5 of sufficient volume to have the desired chilling effect on the portion of the casting metal against which disposed, and each side edge of such body part throughout its length is provided with a series of narrowly spaced integral fingers 6 for full engagement throughout their exposed sides with the casting. These fingers are tapered substantially throughout their lengths to gradually increase their thicknesses inwardly from their outer ends and with the outer sides of each relative to the casting inclined or receding therefrom. It is found in practice that the best results are obtained by having the width of the fingers 6 and of the spaces 7 therebetween of substantially the same width with their walls parallel or substantially so. Each chill member is provided with the usual spuds 8 to hold it in the sand wall of the mold.

The use of chill members of bar-form the same as those illustrated, except that the side edges are straight or not serrated as shown, is old. It is found, however, that with the use of such straight edge chill members cracks occur and weakness develops or is present in the casting along or adjacent to the straight lines which register with the side edges of the chill members. It has also been found that by breaking up the straight edge lines of the chill members so that they are serrated to provide a plurality of fingers, which are preferably tapered, the objectionable straight line chilling effect is avoided and the stresses set up in the casting during cooling are distributed in a manner to
prevent cracks and weakened lines in the casting.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claim.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

A chill member for use in engagement with metal castings when being formed to expedite the chilling of the contacting portion thereof, which member consists of an elongated chilling body of metal for engagement throughout one side thereof with a casting and having at each side edge thereof a plurality of integral fingers narrowly spaced lengthwise of the body and adapted to have contact with a casting at one side, said fingers increasing in thickness from their outer ends inwardly to provide a heat gradient characteristic and the spaces therebetween being approximately equal in width to the width of the fingers with the side walls thereof substantially parallel.

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